INFRASTRUCTURE DESIGN STANDARDS

THE CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION

STANDARD HIGHWAY SPECIFICATIONS

September 1, 2026

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NYC DDC Department of Design and Construction

NEW YORK CITY DOT

INTRODUCTION

This publication has been prepared by the New York City Department of Design and Construction (“NYCDDC” or “the Department”) to provide a compilation of standard requirements, called specifications, used by the New York City Department of Transportation (“NYCDOT”) for street construction contracts. These specifications define the Contractor’s responsibility in meeting the contract requirements, enumerate the Department’s expectations, define how the Department will measure and pay for the work, and explain what the Contractor is expected to provide. When this publication, entitled Standard Highway Specifications and dated September 01, 2026 is incorporated by reference into the Department’s construction contracts, it is made a part of that document.

TABLE OF CONTENTS

DIVISION I – CONTRACT REQUIREMENTS 1

SECTIONS 1.01 THRU 1.05 (NO TEXT) 3
SECTION 1.06 - General Conditions 3
1.06.1. Work Described. 3
1.06.2. Understanding of the Plans and Specifications. 3
1.06.3. Conflicting Plans and Specifications. 3
1.06.4. Deviations from Plans and Specifications. 3
1.06.5. Measurement of Work and Materials. 3
1.06.6. Workmanship, Contract and Standard Drawings. 4
1.06.7. All Work and Materials Necessary to be Furnished. 4
1.06.8. Definitions of Terms. 4
1.06.9. Plans and Specifications Furnished to the Contractor. 5
1.06.10. Supplementary Contract Drawings and Specifications. 5
1.06.11. Contractor to Verify Dimensions. 5
1.06.12. Copies to Subcontractors. 5
1.06.13. Shop and Working Drawings. 5
1.06.14. As-Built Drawings. 7
1.06.15. Bulletins. 7
1.06.16. Reference Drawings. 7
1.06.17. Records of Borings. 8
1.06.18. Records of Subsurface Structures, Etc. 8
1.06.19. Duties of the Contractor. 9
1.06.20. Contractor Assumes Risk of Loss or Damage. 12
1.06.21. Contractor's Representative and Temporary Structures. 12
1.06.22. Contractor's Plant. 13
1.06.23. Rules, Laws, and Requirements. 13
1.06.24. Conflicts of Interest. 20
1.06.25. Schedule of Operations. 20
1.06.26. Job Meetings. 24
1.06.27. Controls, Surveys and Layout. 24
1.06.28. Protection of the Work, Persons and Property. 26
1.06.29. Street Surface Railroads. 28
1.06.30. Contractor Not to Discommode Private Companies. 28
1.06.31. Approval of Materials. 29
1.06.32. Costs of Tests Borne and Inspection. 32
1.06.33. Delivery of Materials. 32
1.06.34. Transportation and Storing of Materials. 33
1.06.35. Partial Payments for Materials in Advance of Their Incorporation in the Work. 33
1.06.36. Department of Design and Construction to be in Complete Control of Entire Contract. 35
1.06.37. Maintenance Work by the City. 35
1.06.38. Inspection of Existing Construction. 35
1.06.39. Inspection During Progress of the Work. 36
1.06.40. Assistance to be Furnished. 36
1.06.41. Rejected Work. 36
1.06.42. Final Inspection. 36
1.06.43. Restoration. 36
1.06.44. Maintenance and Protection of Traffic. 37
1.06.46. Project Sign 38
1.06.46A. Temporary Notification Signs. 40
1.06.47. Site to be Maintained in Neat and Orderly Condition. 40
1.06.48. Additional Provisions Pertaining to Street Paving and Installation of Sidewalks. 41
1.06.49. Additional Provisions for Street Lighting and Traffic Signal Work. 46
1.06.50. Additional Provisions Should Any Railroad Facilities Pass Over, Under, or Adjacent to the Project Work. 47
1.06.51. Additional Provisions Pertaining Only to FHWA Funded Projects. 54

1.06.52. Contractor Performance Evaluation. 54
1.06.53. Audit by the Department and City. 54
1.06.54. Schedule A. 55
1.06.55. Payments to M/WBE Subcontractors 55
1.06.56. Prices to Cover. 55

DIVISION II - BASIC MATERIALS OF CONSTRUCTION 57

SECTION 2.01 - Definitions 59
SECTION 2.02 – Aggregate – Coarse (Broken Stone and Gravel) 62
SECTION 2.03 – Asphalt, Liquid 65
SECTION 2.04 – Asphalt, Emulsified 66
SECTION 2.05 – Asphaltic Cement 67
SECTION 2.06 – Block, Granite 68
SECTION 2.07 (NO TEXT) 70
SECTION 2.08 – Calcium Chloride 70
SECTION 2.09 – Admixtures 71
SECTION 2.10 – Cement, Portland 72
SECTION 2.11 – Pozzolans 73
SECTION 2.12 – Curbs, Headers and Slabs, Granite and Bluestone 74
SECTION 2.13 – Curb–Steel Facing 78
SECTION 2.14 – Curing Materials 79
SECTION 2.15 – Filler, Expansion Joint, Preformed 80
SECTION 2.16 – Filler, Joint; Asphaltic, Blown 81
SECTION 2.17 – Iron Castings, Gray and Malleable 82
SECTION 2.18 – Mineral Dust 83
SECTION 2.19 – Pigmented Admixture for Portland Cement 84
SECTION 2.20 (NO TEXT) 86
SECTION 2.21 – Fine Aggregate – Sand (for Asphalt, Concrete, Mortar and Plaster) 86
SECTION 2.22 – Sealer, Concrete Expansion Joint, Elastic Type 87
SECTION 2.23 – Steel Bars for Concrete Reinforcement 88
SECTION 2.24 (NO TEXT) 89
SECTION 2.25 – Welded Steel Wire Fabric for Concrete Reinforcement 89
SECTION 2.26 – Topsoil 90
SECTION 2.27 – Riprap, Stone Ballast, Broken Stone and Slope Pavement 92
SECTION 2.28 – Rejuvenating Agent 93
SECTION 2.29 (NO TEXT) 94
SECTION 2.30 – Recycled Asphalt Pavement 94
SECTION 2.31 – Bluestone Flags 95
SECTIONS 2.32 AND 2.33 (NO TEXT) 96
SECTION 2.34 – Galvanizing 96
SECTION 2.35 – Structural Steel 97
SECTION 2.36 – Wrought Iron 98
SECTION 2.37 (NO TEXT) 99
SECTION 2.38 – Wood and Timber Posts and Timber Blockouts 99
SECTION 2.39 – Stress Graded Timber and Lumber 100
SECTION 2.40 – Timber and Lumber 101

DIVISION III - COMBINED MATERIALS OF CONSTRUCTION 103

SECTION 3.01 – Asphalt Paving Mixtures (BINDER, ASPHALTIC CONCRETE) 105
SECTION 3.02 – Bed, Bitumen-sand 113
SECTION 3.03 – Bed, Mortar 114
SECTION 3.04 – Block, Asphalt 115
SECTION 3.05 – Concrete 118
SECTION 3.06 – Filler; Joint, Air-entrained Cement-grout 133
SECTION 3.07 – Mortar, Air-entrained Portland Cement 135
SECTION 3.08 – Separating Agent, Calcium Chloride 136
SECTION 3.09 (NO TEXT) 137
SECTION 3.10 – TEMPORARY ASPHALT PAVING MIXTURES 137

DIVISION IV - CONSTRUCTION METHODS.....139

SECTION 4.01 – Asphalt Macadam Pavement.....141
SECTION 4.02 – Asphaltic Concrete Wearing Course.....145
SECTION 4.03 – Temporary Surfacing For Roadways.....158
SECTION 4.04 - Concrete Base for Pavement.....160
SECTION 4.05 – Concrete Pavement.....164
SECTION 4.06 – Concrete in Structures.....179
SECTION 4.07 – Curb, Bluestone and Granite.....184
SECTION 4.08 - Curb, Concrete.....187
SECTION 4.09 - Curb, Concrete, Steel Faced.....190
SECTION 4.10 – Plant Establishment (Post Planting Care).....194
SECTION 4.11 – Excavation and Filling.....199
SECTION 4.12 – Header, Bluestone and Granite.....212
SECTION 4.13 – Sidewalk, Concrete.....214
SECTION 4.13 DWS – Detectable Warning Surface.....223
SECTION 4.14 – Steel Reinforcement in Concrete.....226
SECTION 4.15 – Topsoil.....228
SECTION 4.15 SS – Structural Soil Foundation Material.....229
SECTION 4.16 – Trees (Removal, Transplanting, Planting).....233
SECTION 4.17 – Shrubs and Groundcover.....245
SECTION 4.18 – Tree Pruning.....251
SECTION 4.18 DC – Decompact Trees.....254
SECTION 4.19 – Sodding.....258
SECTION 4.20 – Seeding.....261
SECTION 4.21 – Tree Consultant.....264
SECTION 4.22 – Protective Tree Barrier.....266

DIVISION V – INSPECTION AND TESTING OF MATERIALS, ADJUSTMENTS FOR DEFICIENCIES, AND MAINTENANCE.....269

SECTION 5.01- Inspection of Materials.....271
SECTION 5.02 – Sampling.....277
SECTION 5.03 – Methods of Sampling and Testing.....279
SECTION 5.04 – Deficiencies in Bituminous Pavements and Concrete.....285
SECTION 5.05 – Maintenance.....293
SECTION 5.06 – Procedure For Estimating Concrete Strength By The Maturity Method.....296
SECTION 5.07 – QUALITY ASSURANCE TESTING FOR MATERIAL ACCEPTANCE.....298
SECTIONS 5.08 THRU 5.36 (NO TEXT).....299
SECTION 5.37 – Construction Report.....299

DIVISION VI - SUPPLEMENTAL CONSTRUCTION METHODS.....303

SECTION 6.01 – Clearing and Grubbing.....305
SECTION 6.02 - Unclassified Excavation.....307
SECTION 6.02 PA – Pneumatic Excavation Around Trees.....310
SECTION 6.02 PB – Backfilling Around Trees.....313
SECTION 6.02 XHEC – Incremental Cost for Modifying Work Methods Near (Within 3 Feet of) Transit Facilities and Building Vaults.....315
SECTION 6.02 XSCW - Incremental Cost for Using Special Care Work Methods Near (from 3 Feet to 50 Feet) Transit Facilities.....317
SECTION 6.03 – Stripping of Pavement Surfaces.....319
SECTION 6.04 – Granite Block and Slab Wearing Course.....321
SECTION 6.05 (NO TEXT).....327
SECTION 6.06 – Granite Block and Concrete Paver Sidewalk.....327
SECTION 6.07 – Bluestone Flags.....330
SECTION 6.08 - Concrete Curb, Re-used Steel Facing.....334
SECTION 6.09 - Concrete Headers.....335
SECTIONS 6.10 THRU 6.17 (NO TEXT).....337
SECTION 6.18 – Picket Fence.....337
SECTION 6.19 (NO TEXT).....339

SECTION 6.20 – Broken Stone Ballast *339*
SECTION 6.21 (NO TEXT) *340*
SECTION 6.22 – Additional Hardware *340*
SECTION 6.23 – Fire Department Facilities *341*
SECTION 6.24 – Asphaltic Concrete Sidewalk *358*
SECTION 6.25 – Temporary Signs *360*
SECTION 6.26 – Timber Curb *362*
SECTION 6.27 – Demolition of Structures *364*
SECTION 6.28 A – Timber Barricades *368*
SECTION 6.28 B – Type III Breakaway Barricades (Alternate A or Alternate B) *370*
SECTION 6.29 – Tubular Markers *372*
SECTION 6.30 – Beam Type Guide Rail and Mall Barrier *374*
SECTION 6.31 – Precast Concrete Wheel Stops *378*
SECTION 6.32 (NO TEXT) *380*
SECTION 6.33 – Steel Faced Mall Nosings *380*
SECTION 6.34 – Chain Link Fence *381*
SECTION 6.34 A – Temporary Chain Link Fence *383*
SECTION 6.35 (NO TEXT) *385*
SECTION 6.36 – Structural Repair and Adjustment of (City Owned) Utility Structures *385*
SECTIONS 6.37 THRU 6.38 (NO TEXT) *387*
SECTION 6.39 – Mobilization *387*
SECTION 6.40 – Engineer's Field Office *389*
SECTION 6.41 – Line-and-Grade Surveys *396*
SECTION 6.42 – Beam Barriers for Dead-End Streets *398*
SECTION 6.43 – Photographs *400*
SECTION 6.44 – White and Yellow Thermoplastic Reflectorized Pavement Markings *403*
SECTION 6.44 CST – COLOR SURFACE TREATMENT FOR PAVEMENTS (CST) *410*
SECTION 6.45 (NO TEXT) *414*
SECTION 6.46 – Dense-Graded Stone Base *414*
SECTION 6.47 – Interlocking Concrete Pavers *416*
SECTION 6.48 (NO TEXT) *419*
SECTION 6.49 – Temporary Pavement Markings *419*
SECTION 6.50 – Cleaning of Drainage Structures *423*
SECTION 6.51 (NO TEXT) *424*
SECTION 6.52 – Flaggers, Crossing Guards, and Pedestrian Managers *424*
SECTION 6.53 – Remove Existing Lane Markings *427*
SECTION 6.54 (NO TEXT) *428*
SECTION 6.55 – Sawcutting Existing Pavement *428*
SECTIONS 6.56 AND 6.57 (NO TEXT) *431*
SECTION 6.58 – Tack Coat *431*
SECTION 6.59 – Concrete Barrier *434*
SECTION 6.59 P – Temporary Concrete Barrier *436*
SECTION 6.60 – Asphalt Block Pavers *438*
SECTIONS 6.61 THRU 6.65 (NO TEXT) *443*
SECTION 6.66 – Brick Pavers *443*
SECTION 6.67 – Subbase Course, Select Granular Material *447*
SECTION 6.67MAC – Subbase Course, Milled Asphaltic Concrete Aggregate *452*
SECTION 6.68 – Plastic Filter Fabric *454*
SECTION 6.69 (NO TEXT) *456*
SECTION 6.70 – Maintenance and Protection of Traffic *456*
SECTIONS 6.71 AND 6.72 (NO TEXT) *473*
SECTION 6.73 – Removing, Furnishing and Installing Parking Meter Posts *473*
SECTION 6.74 – Steel Plate at Tree Wells *475*
SECTION 6.75– - Grinding Existing Asphaltic Concrete Wearing Course *477*
SECTION 6.77 – Public Space Receptacle Bins *481*
SECTIONS 6.78 THRU 6.81 (NO TEXT) *487*
SECTION 6.82 – Removing Existing Traffic and Street Name Signs and Sign Posts *487*
SECTION 6.83 – Furnishing and Installing Traffic Signs and Posts *488*
SECTION 6.84 –Bus Signs *495*

SECTION 6.85 – Traffic Enforcement Agents *496*
SECTION 6.86 – Furnishing and Installing Street Name Signs and Posts *498*
SECTION 6.87 – Plastic Barrels *503*
SECTIONS 6.88 THROUGH 6.90 (NO TEXT) *504*
SECTION 6.91 – Reflective Cracking Membrane (18" Wide) *504*
SECTIONS 6.92 THRU 6.93 (NO TEXT) *505*
SECTION 6.94 – Cast Iron Under-Sidewalk *505*
SECTION 6.95 – Stabilization of Subgrade *506*
SECTION 6.96 (NO TEXT) *508*
SECTION 6.97 – Extra High-Early Strength Concrete *508*
SECTION 6.98 (NO TEXT) *510*
SECTION 6.99 – Audio and Video Documentation Survey *510*
SECTION 7.00 (NO TEXT) *512*
SECTION 7.01 – Subway Sidewalk Frames and Gratings *512*
SECTION 7.02 – Epoxy Mortar Repairs *514*
SECTION 7.03 (NO TEXT) *515*
SECTION 7.04 – Painting Handrailing *515*
SECTIONS 7.05 THRU 7.06 (NO TEXT) *516*
SECTION 7.07 – Martello Bollard *516*
SECTION 7.08 – Pipe Bollard, Cover Protected *518*
SECTIONS 7.09 THRU 7.11 (NO TEXT) *522*
SECTION 7.12 – Soil Density Testing *522*
SECTION 7.13 – Maintenance of Site *525*
SECTION 7.14 (NO TEXT) *532*
SECTION 7.15 - Temporary Wooden Steps *532*
SECTION 7.16 - Test Pits *534*
SECTION 7.17 (NO TEXT) *536*
SECTION 7.18 - Controlled Low Strength Material (CLSM) *536*
SECTION 7.19 - Load Transfer Joint *539*
SECTION 7.20 - Reset Basement Access *540*
SECTION 7.21 (NO TEXT) *542*
SECTION 7.22 - Slope Protection *542*
SECTIONS 7.23 THRU 7.28 (NO TEXT) *544*
SECTION 7.29 – Security Guards *544*
SECTION 7.30 - Removal of Tracks *545*
SECTION 7.31 - Demolition of Roadway Vaults and Truss Blocks *546*
SECTIONS 7.32 THRU 7.33 (NO TEXT) *548*
SECTION 7.34 - Tow Truck Service *548*
SECTION 7.35 (NO TEXT) *549*
SECTION 7.36 - Pedestrian Steel Barricades *549*
SECTIONS 7.37 THRU 7.49 (NO TEXT) *551*
SECTION 7.50 – City Bench *551*
SECTION 7.50 FCR - ALLOWANCE FOR FURNISHING CITYRACK *553*
SECTION 7.50 FLB - Allowance for Furnishing DOT Leaning Bar *554*
SECTION 7.50 ICR - CITYRACK INSTALLATION *556*
SECTION 7.50 ILB - Installation of the DOT Leaning Bar *557*
SECTIONS 7.51 THRU 7.87 (NO TEXT) *558*
SECTION 7.88 - Rodent and Waterbug Pest Control *558*
SECTIONS 7.89 THRU 7.95 (NO TEXT) *564*
SECTION 7.96 - Anti-Graffiti Coating *564*
SECTIONS 7.97 THRU 7.99 (NO TEXT) *567*
SECTION 8.00 MT – Microtrenching *567*
SECTION 8.01 Handling, Transporting, and Disposal of Potential and Identified Contaminated and Hazardous Materials *570*
SECTION 8.01 C1 Handling, Transportation, And Disposal Non-Hazardous Contaminated Soil *574*
SECTION 8.01 C2 – Sampling And Testing Of Non-Hazardous Contaminated/Potentially Hazardous Soil For Disposal Purposes *580*
SECTION 8.01 H – Handling, Transporting, And Disposal Of Hazardous Soil *583*
SECTION 8.01 S Health And Safety *588*

SECTION 8.01 W1 – Removal, Treatment, And Disposal / Discharge Of Contaminated Water 592
SECTION 8.01 W2 –Sampling and Testing of Contaminated Water 597
SECTION 8.02 – Special Modification of Work for Installation of New Curb and Sidewalks 599
SECTIONS 8.03 THRU 8.06 (NO TEXT) 602
SECTION 8.07 – Temporary Aluminum Pedestrian Bridge 602
SECTION 8.08 – Variable Message Boards 603
SECTION 8.09 (NO TEXT) 604
SECTION 8.10 – Survey Monuments 604
SECTION 8.10M - Survey Monuments 609
SECTION 8.11 (NO TEXT) 613
SECTION 8.12 - Temporary Retaining Wall 613
SECTIONS 8.13 THRU 8.21 (NO TEXT) 617
SECTION 8.22 Three Ply Membrane Waterproofing 617
SECTIONS 8.23 THRU 8.31 (NO TEXT) 622
SECTION 8.32 – BARK CHIP MULCH 622
SECTIONS 8.33 THRU 8.51 (NO TEXT) 623
SECTION 8.52 – Allowance for Wayfinding Totems 623
SECTION 8.52 FP – Steel Foundation Plate 624
SECTION 8.52 PT – Paving Tray 625
SECTION 8.52 WSF – Wayfinding Sign Footing 626
SECTIONS 8.53 THRU 8.99 (NO TEXT) 628
SECTION 9.00 - Exploratory Test Pits 628
SECTIONS 9.01 THRU 9.03 (NO TEXT) 629
SECTION 9.04 - Allowance for Anti-freeze Additive in Concrete 629
SECTION 9.05 – Allowance for New Electrical and Gas Service Connections 630
SECTION 9.06 – Allowance for Decorative Mesh Fabric 631
SECTION 9.07 – Non-Woven Geotextile 632
SECTIONS 9.08 THRU 9.22 (NO TEXT) 634
SECTION 9.23 – Asphalt, Fuel, and Steel Price Adjustment Allowance 634
SECTIONS 9.24 THRU 9.27 (NO TEXT) 639
SECTION 9.28 – Expanded Work Allowance 639
SECTION 9.29 - Allowance For Railroad Facility Permitting (All Types) 641
SECTION 9.30 - Stormwater Pollution Prevention 642
SECTIONS 9.31 (NO TEXT) 646
SECTION 9.32 – Reinforced Silt Fence 646
SECTIONS 9.33 THRU 9.94 (NO TEXT) 648
SECTION 9.95 - Dimensioned Granite Masonry 648
SECTIONS 9.96 THRU 9.98 (NO TEXT) 650
SECTION 9.99 - Flashing Arrow Boards 650
APPENDIX A – STAKED STRAW BALES 652
APPENDIX B – REINFORCED SILT FENCE 654
APPENDIX C – TEMPORARY SEDIMENT TRAP WITH FILTER 655
APPENDIX D – TEMPORARY SEDIMENT FILTER 657
APPENDIX E – PORTABLE SEDIMENT TANK 660
APPENDIX F – STORM DRAIN INLET PROTECTION MEASURES 662
APPENDIX G – TEMPORARY SEEDING FOR DISTURBED AREAS 667

DIVISION I – CONTRACT REQUIREMENTS

(NO TEXT ON THIS PAGE)

DIVISION I

CONTRACT REQUIREMENTS

SECTIONS 1.01 THRU 1.05 (NO TEXT)

SECTION 1.06 - General Conditions

1.06.1. Work Described.

The Contractor, at the Contractor's own cost and expense, must furnish all the labor, materials and equipment, etc., necessary or proper for the purpose, and in a good, substantial and workmanlike manner, in strict accordance with the plans, the specifications and the directions of the Engineer, and contract herein contained or hereto annexed; must regulate, grade, pave or repave with the specified pavement on the designated foundation, and set or reset or construct such curbs, and lay or relay or construct such sidewalks, and set or reset header stones, manholes, etc., as may be required; all as herein provided; and maintain said work as stipulated in this contract. Any work or materials that may have been accidentally omitted in the description of the work, but which is clearly implied, must be furnished by the Contractor the same as if it had been specifically stated, without any additional charge to The City.

1.06.2. Understanding of the Plans and Specifications.

The Contractor hereby distinctly and expressly declares and acknowledges that, before the signing of this contract, the Contractor has carefully read the same, and the whole thereof, together with and in connection with the plans and specifications, and that the Contractor has made such examination of this contract and of said plans and specifications, and material required to be furnished and the location where said work is to be done, and such investigation of the work required to be done as to enable the Contractor to thoroughly understand the intention of the same, and the requirements, covenants, agreements, stipulations and restrictions contained in this contract and in said plans and specifications; and distinctly agrees that the Contractor will not hereafter make any claim or demand upon the City based upon or arising out of any alleged misunderstanding or misconception on the Contractor's part of the said requirements, covenants, stipulations and restrictions; and that any information given to the Contractor by the Engineer or others as to the quantities in the work, prior to or during the progress of the work, will have no bearing or effect whatsoever upon the total amount of work to be paid for in the final settlement.

1.06.3. Conflicting Plans and Specifications.

Anything shown on the plans and not mentioned in the specifications, or mentioned in the specifications and not shown on the plans, will have the same effect as if shown or mentioned, respectively, in both.

Should any conflict occur in or between the plans and specifications, see Article 1.2 of the Standard Construction Contract.

Any doubt as to the meaning of this contract or the specifications thereof, or any obscurity as to the wording of them, or any discrepancy between them, or any discrepancy between figures and drawings will be explained by the Engineer.

1.06.4. Deviations from Plans and Specifications.

No deviation from the plans and specifications will be allowed, unless the same has been previously authorized by and written permission therefor obtained from the Commissioner.

1.06.5. Measurement of Work and Materials.

All quantities of work and materials to be paid for will be measured and determined according to the plans or working drawings to be issued from time to time and specifications, when the work conforms thereto. No

allowance will be made on any part of the work for any excess above the quantities required by such plans, lines and specifications. Should the dimensions of any part of the work, or of the materials, be less than those required by the plans, the actual quantities only will be allowed in measurement.

1.06.6. Workmanship, Contract and Standard Drawings.

All workmanship must be first class in every particular, and all materials and construction must be as hereinafter more particularly described and in accordance with the Contract Plans and the Standard Drawings on file in the office of the Commissioner, all of which will also form part of these specifications.

Wherever any feature of the work is not fully set forth in these specifications, it must be understood that the same be governed by the rules of the best modern practice, as determined by the Engineer.

1.06.7. All Work and Materials Necessary to be Furnished.

It is especially understood and agreed by the Contractor that anything, whether materials or labor, which may not be shown, indicated or described on either the plans or in the specifications, but which is necessary for the proper operation and perfect completion of the entire work under this contract according to the true intent and meaning of the plans and specifications, must be furnished by him as part of this contract without any extra cost to the City as though it were herein particularly set forth or shown on the plans.

1.06.8. Definitions of Terms.

Whenever in the specifications and contract the following terms, words, expressions or pronouns in place of them are used, the meaning and intent must be interpreted as follows:

Whenever it is provided that anything is "to be" or "to be done," "if" or "as" or "when" or "where approved," "required," "directed," "prescribed," "permitted," "ordered," "designated," "deemed necessary," or "satisfactory," or words of like import, it must be taken to mean and intend, approved, required, directed, prescribed, permitted, ordered, deemed necessary or satisfactory, as the case may be, by the Engineer.

Whenever "specified" is used herein it will mean "specified in the contract."

Whenever the words "desirable," "suitable," "sufficient," "satisfactory," or others of a similar purport are used, it is hereby agreed that the desirability, suitability, sufficiency, satisfactoriness, or other denominated condition must be as determined by the Engineer.

Whenever the term "railroad area" is used, it refers to and means that portion of the street included between the tracks, the rails of the tracks and two feet in width outside, and any other portion of the street which the railway company is required by its franchise to maintain. Whenever the word "approach" is used, it refers to and means the abutting pavement that has to be adjusted to fit the new work.

Whenever reference is made herein to any other specifications, plan or section of these specifications, it will mean the latest revision thereof in effect at the time of invitation to bid, unless otherwise specifically provided.

When a revision of a specification is in effect which is later than the latest standard specification, the revision will govern.

Whenever the word “shall” is used herein, the term is intended to convey a contractual mandate, such as the terms “must”, “will”, or “be obliged to” (and not “may”).

Wherever the term “Department” is used, it refers to the New York City Department of Design and Construction (“NYCDDC” or “DDC”).

Wherever the term “Commissioner” is used, it refers to the Commissioner of the NYCDDC.

Wherever the term “City” is used, it refers to the City of New York.

1.06.9. Plans and Specifications Furnished to the Contractor.

After the award of the contract, the Contractor will be furnished with four (4) sets of prints of the plans and with four (4) sets of the specifications. Additional copies of the plans and specifications, if available, will be furnished to the Contractor, when requested.

1.06.10. Supplementary Contract Drawings and Specifications.

When, in the opinion of the Commissioner, it becomes necessary to more fully explain the work to be done or to illustrate the work further or to show any changes which may be required, supplementary drawings and specifications will be provided by the Commissioner. Four (4) prints of each of these drawings and four (4) sets of these specifications will be furnished to the Contractor. These supplementary drawings and specifications will be binding upon the Contractor with the same force as the Contract Plans and Specifications.

No work affected by the supplementary drawings and specifications will be done if the revisions occasioned thereby require an adjustment in the prices bid, until a written agreement has been reached and the Contractor has received written authorization from the Commissioner to proceed with the work.

1.06.11. Contractor to Verify Dimensions.

Existing underground and overhead utilities shown on the contract drawings have been determined by standard surveying methods and available records. Neither the exact location nor the information of these existing utilities is guaranteed to be complete or correct.

The Contractor is advised that block interior angles, block lengths and legal grades were obtained from the final maps of the Borough.

The Contractor must verify all dimensions and details on the drawings and other data received from the Commissioner and must notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors must be given before the Contractor proceeds with the work. Figures must be used in preference to small scale drawings.

1.06.12. Copies to Subcontractors.

The Contractor must furnish all subcontractors and materialmen copies of such portions of the plans, supplementary drawings, and specifications as may be required for their work.

1.06.13. Shop and Working Drawings.

(A) GENERAL

The Contractor must promptly prepare and submit accurate and complete shop and working drawings for all parts of the work (including drawings showing the locations and details of steel reinforcement) as may be required for the proper performance of the work, and such other detail drawings, diagrams, photographs or bulletins as may be demanded by the Commissioner, in accordance with the plans and specifications. The Contractor must submit these shop and working drawings as directed herein, and have them approved by the appropriate agency as specified, before any work covered by these drawings must be undertaken. In addition, any electrical drawing which requires the approval of the Division of Traffic Operations must have its stamp of approval affixed thereon before work covered by said drawings may be undertaken.

All shop drawings submitted for review and approval are to be sealed and signed by a licensed New York State Professional Engineer.

(B) SCOPE

Shop and working drawings must accurately and distinctly represent the following:

1. All working and erection dimensions.
2. Arrangements and sectional views.
3. Necessary details, including complete information for making necessary connections with other work.

4. Kinds of materials and finishes.
5. All other information requested by the Commissioner, and as required under other headings of the Specifications.

(C) STRUCTURAL STEEL SHOP DRAWINGS

Structural steel shop drawings must show all dimensions and details. They must include erection, camber and match marking diagrams; lists of field rivets, bolts, nuts and other parts for structural steel, castings and metal parts. Shop drawings for castings must be so complete that the parts may be duplicated without reference to patterns, other drawings, or individual shop practice. Shipping statements for castings must contain the actual weight of each member or piece.

(D) STEEL REINFORCEMENT SHOP DRAWINGS

Steel reinforcement shop drawings must be made to a sufficiently large scale to show clearly the arrangement, splicing and spacing of the reinforcement rods. The drawings must show the location of construction joints and must give all pertinent dimensions of the concrete construction, to the end that the details and lengths of rods may be readily checked. They must show the rods in their true position, tying in the reinforcement steel with the concrete and structural steel construction.

(E) ELECTRICAL SHOP AND WORKING DRAWINGS

Electrical shop and working drawings must show complete wiring and installation details, and must include the following:

1. Equipment details and ratings.
2. Conduit, cable and wiring runs and layouts.
3. Conduit, cable, cabinet and box support details.
4. Cabinet and box connection diagrams.
5. Complete wiring diagrams.
6. Any other items and details which the Engineer may require.

(F) SIZES OF SHOP AND WORKING DRAWINGS

All shop and working drawings must be submitted on ANSI, F size, sheets 28" x 40", which includes a border of 2" on the left and a border of 1/2" on the other three sides. Sketches may be 8-1/2" x 11", including 1/4" border. Each drawing must be dated, numbered and must have an identifying title.

(G) SUBMISSION OF SHOP AND WORKING DRAWINGS

1. The Contractor must submit the following number of prints:
2. Three (3) for each structural shop or working drawing, and for each mechanical drawing not having electrical work.
3. Five (5) for each electrical drawing and for each mechanical drawing having electrical work.

A satisfactory drawing will be stamped "Approved", be dated, and one copy thereof will be returned to the Contractor. Should the drawing be not approved, one copy of the drawing with the corrections and changes indicated thereon will be returned to the Contractor, and the Contractor must independently check and make such corrections and changes, and again submit prints of the drawing for approval in the number specified above. Each submission of drawings must be accompanied by a letter of transmittal in triplicate. If the drawings show variations from the contract requirements because of standard shop practice or other reasons, the Contractor must make specific mention of such variations in the letter of submittal and must clearly indicate them on the shop drawings.

(H) UNCHECKED SUBMISSIONS TO BE RETURNED UNEXAMINED

Any submission not containing the signature of the checker as an indication that the drawing has been completely checked, will be deemed to be substantially incomplete, and will be returned marked "UNEXAMINED" by the Engineer.

(I) PRINTS OF APPROVED SHOP AND WORKING DRAWINGS

Upon approval of the drawings by the Engineer, the Contractor must insert the date of final approval on the original tracing and must promptly furnish prints of the approved drawings in accordance with the following schedule:

1. Five (5) for each structural shop or working drawing, and for each mechanical drawing not having electrical work.
2. Seven (7) for each electrical drawing and for each mechanical drawing having electrical work.

(J) CONTRACTOR'S RESPONSIBILITY

The approval of shop and working drawings will be as to general design only and such approval will not relieve the Contractor of responsibility for the accuracy of such drawings nor the proper fitting of the work, and any incorrect work resulting therefrom must be corrected by the Contractor without additional cost to the City.

(K) TRACINGS OF APPROVED SHOP AND WORKING DRAWINGS

Upon completion of the work, the Contractor must check all approved tracings and make them conform to the work as executed, and must furnish, for the records of the Department, a complete set of legible, corrected and approved shop and working drawings for the records of the Department. The following must be provided for all drawings:

1. Set of 4 mil Mylar prints
2. Set of bond paper prints
3. CAD files for all prints on CD
4. PDF or TIFF files for all prints on CD

1.06.14. As-Built Drawings.

As-built drawings will be made by the Engineer, except for as-built drawing for Trunk Water Mains twenty-four (24”) inches and above which must be done by the Contractor as per the *Specification for Trunk Main Work*. The Contractor must fully cooperate with the Engineer in the making of the as-built drawings to insure their accuracy. They must contain data, measurements and information necessary to accurately show the work "as installed", special attention being given to data on concealed construction and on construction that differs from the plans in their present form.

The sizes and type of material for as-built drawing sheets will be as specified for tracings of approved shop and working drawings.

The Engineer will provide one (1) additional set of all as-built tracings pertaining to sewers, water mains and their appurtenances installed in the work.

1.06.15. Bulletins.

Where the Contractor has submitted prints in the form of technical bulletins or other printed matter as a shop drawing, having diagrams or drawings thereon of material or equipment installed in the work, The Contractor must furnish six (6) sets thereof so that the City may have all the necessary information for the proper operation, maintenance and repair of the material and equipment and for ordering of future replacements.

1.06.16. Reference Drawings.

Original shop, working and other reference drawings pertaining to existing construction, if they exist, are on file in the office of the Department of Design and Construction (NYCDDC), Infrastructure Division, 30-30 Thomson Avenue, Long Island City, New York 11101, and are available for the Contractor's inspection.

The Contractor may obtain reproductions of these drawings provided that expenses incurred thereby are paid by the Contractor. At no time, however, will the original drawings be permitted to go out of the possession or control of the City. The City will make all arrangements to procure the reproductions for the Contractor as requested.

It is distinctly understood that these drawings, if they exist, are made available to the Contractor only as information in the possession of the City, without any warranty, expressed or implied, as to their present accuracy or sufficiency. The information therein contained may not be complete nor disclose the true conditions that may be met during the course of the work under this contract. The Contractor must make measurements at the site and field check all information obtained from these drawings before putting them to use.

1.06.17. Records of Borings.

When borings have been taken for a project, the records of the borings and the cores and samples therefrom, and records of other borings in the vicinity may be examined in the offices of the Department. It should be distinctly understood, however, that the information therein contained may not disclose the true conditions that may be met during the course of the construction work under the contract. Said information is not part of the contract and the Contractor is warned not to rely upon it in forming conclusions as to the nature of the conditions to be encountered. The Contractor hereby specifically agrees that the Contractor will not hold the City liable because of any condition that may be encountered and which may be different from that assumed by him.

1.06.18. Records of Subsurface Structures, Etc.

The Contractor stipulates that it has the obligation to examine and review any and all available documents and other sources of information concerning the condition of the sub soil materials, subsurface conditions and existing subsurface structures of bridges, pipes, tunnels, conduits, sewers, foundations, bulkhead walls and other subsurface structures and stipulates that it has made such investigation and research as it deems necessary. To the extent the Contractor incurs delays or damages based on sub soil materials, subsurface conditions and existing subsurface structures that were known or reasonably could have been known to the Contractor through such available documents or other sources of information, the Contractor will make no claim for such delays or damages.

The Contractor is hereby advised that under-sidewalk vaults may be present in both sidewalk and roadway areas within the project limits. Where the Contractor claims any locations can not be completed because of vaults, the method used to determine vault interference must be provided to the Engineer.

Prior to any sidewalk excavation, the Contractor will be responsible to verify the existence of under-sidewalk vaults. The Contractor must perform visual sidewalk reconnaissance; search for and examine record drawings; gain access to cellars and obtain measurements within vaults; and perform sub-surface radar examination or use other non-destructive methods to locate possible vault structures. Where these above methods of verification are not available to the Contractor, it will then be required to locate the vault envelopes and their roof depth below finished sidewalk grade by drilling holes (at no direct payment), or by Test Pits, under Item No. 9.00 C, as directed by the Engineer.

The Contractor will be liable for any damage to the under-sidewalk building vaults and/or its contents and/or occupants due to the Contractor’s failure to verify the pre-existing vault condition.

Vault records may be available from the following (or other) sources:

A- NEW YORK CITY DEPARTMENT OF BUILDINGS

B- FOIL / RECORD ACCESS

OFFICE OF LITIGATION SERVICES AND RECORDS MANAGEMENT

NEW YORK CITY DEPARTMENT OF TRANPORTATION

C- NEW YORK CITY DEPARTMENT OF FINANCE

Where vault roofs are determined to interfere with construction of standard pedestrian ramps, the Engineer may approve for construction of, or installation of, non-standard pedestrian ramps, which may include relocation of ramps and/or partial roadway ramps.

An overall field sketch of each corner suspected of having a vault, along with at least one photograph (3" x 3" minimum) of each location, and the results of the Contractor’s investigation must be furnished by the Contractor to the Engineer for review at least ten (10) working days prior to start of work at that respective

corner. Said photographs will be in addition to those required under Item No. 6.43. Each field sketch must show measurements of affected areas of vaults, the building line as a reference guide which can be employed to indicate the vault envelope in the sidewalk, the boundaries of the underground structures, curb reveals, and location of proposed pedestrian ramps. No additional payment is to be made for this overall sketch.

Any vault structures punctured by the Contractor's operations must be repaired by the Contractor to match the existing structure. Said hole in vault structures must be temporarily repaired with an approved epoxy mortar, or securely steel plated if permanent repairs are not completed prior to the end of that same working day. No holes in vault roofs must be left unattended at any time.

The Contractor will also be responsible to replace damaged water proofing directly over vault roofs at the Contractor's expense.

1.06.19. Duties of the Contractor.

The Contractor must personally see that the requirements of the contract, of the plans, and of the specifications are fully and faithfully complied with by all subcontractors, materialmen and workmen at all times, that all of this work is prosecuted with the utmost diligence, and that all materials are provided promptly in sufficient quantities in order not to delay the work. The Contractor must exercise the closest inspection of all materials delivered, promptly returning defective materials without waiting for their rejection by the Engineer. The Contractor must also become thoroughly familiar with the plans and specifications and must promptly report to the Engineer all errors, discrepancies or omissions, which may be discovered in them. The Contractor must abide by the decisions and explanations of the Engineer made in regard to such matters.

If during construction the Contractor encounters a condition that it believes may require a change order to be issued, the Contractor must immediately notify the Associate Commissioner for Construction in writing, identifying the condition and any potential extra work. The Contractor must at the same time list any information or documents that it requests from NYCDDC in order to prepare its detailed cost proposal, in accordance with **Articles 25 and 26** of the Standard Construction Contract.

If no further information or documents are requested from NYCDDC, the Contractor's detailed cost proposal must be submitted within 10 days of its initial letter to the Associate Commissioner. If such documents or information are requested, the Contractor must submit its detailed cost proposal within 10 days of NYCDDC's response.

In addition, the Contractor will be expected to sign a copy of 'THE NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION CONTRACTOR CODE OF CONDUCT' policy, as contained on the following two (2) pages, at the pre-construction meeting. The Contractor is strongly advised that failure to comply with this policy could negatively impact upon their performance evaluations.

THE NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

CONTRACTOR CODE OF CONDUCT

Although the New York City Department of Design and Construction (NYCDDC) carefully stages construction activities to minimize disruption to people and businesses, the nature of sewer, highway, sidewalk, and water main work is such that some disruptions, noise and dirt will occur. To minimize the impact that capital construction has on residents and businesses, NYCDDC has developed a Contractor Code of Conduct. The Code of Conduct describes what the Contractor will do to minimize inconveniences and how the Contractor's workers will conduct themselves. In signing this Code of Conduct, NYCDDC's Contractor acknowledges the obligation to be a "good neighbor" during the construction period. However, in the event of a conflict between the policy and the contract, the contract will control.

Noise will be minimized

- Construction will not begin before 7 am or as specified in the NYCDOT traffic stipulations.
- Workers arriving at the project site will respect the community's need for quiet before construction begins; shouting will be avoided and materials will not be handled carelessly or dropped.
- Equipment will not be left idling unnecessarily.
- Road plates will be secured.
- Multi-frequency ("white noise") type backup alarms must be used, as described in **Section 1.06.22.(B)**.
- Dump trucks must avoid slamming the tailgate against the body of the truck when trying to loosen the residual materials.

The site will be clean and well maintained

- Garbage and debris on the site and adjacent to the project will be removed immediately; workers will discard lunch debris in trash containers and not on the ground around the worksite or on private property.
- Small tools and equipment will be kept off private property.
- Dust will be controlled; the project site and roadways will be swept and washed at the end of the day.
- Workers will use porta-sans.
- Materials will be neatly and securely stored and fenced.
- Materials will not spill or blow from trucks traveling to and from the worksite; if material is spilled, it will be promptly cleaned up.
- Once work is completed at a location all equipment and materials will be removed as soon as possible.
- Existing catch basins will be maintained.
- Whenever possible, water shut-off notices will be distributed at least 24 hours before the water is scheduled to be shut-off.
- The site will be protected against unauthorized dumping.
- Sanitation pickups will be maintained.

Relationships with the community will be polite and helpful

- Inappropriate or foul language will not be tolerated.
- Personal and commercial deliveries will be accommodated.

- Access will always be maintained for mail delivery and the community.
- Construction personnel will be courteous to the public and will refer all questions to the Resident Engineer or Community Construction Liaison.

The community will be kept informed about the project

- An overall project schedule along with detailed information about immediate project activities will be maintained and kept up-to-date, for use by City representatives to keep the community informed of Contractor's operations.
- All 24 Hour Notifications signs prepared by the project staff in order to inform the public of impending work (i.e. water shutdowns, parking interruptions, traffic pattern changes, access restrictions, etc.) must be posted by the Contractor in the affected geographical area as directed by the Engineer, at least 24 hours before the start of such work.

Construction will proceed in a safe manner

- Temporary walkways will be clearly marked, smooth, drained, and clear of obstacles.
- Access to active fire hydrants will be maintained.
- Equipment and vehicles will be operated at acceptable speeds and in a safe manner.
- Fencing will be maintained in an acceptable condition.
- There will be sufficient traffic control devices and they will be maintained.
- Trucks will not stand idling.
- Steel road plates will be skid-resistant.
- Flaggers will ALWAYS be used when equipment is moved into and out of congested or high-volume traffic areas.
- Temporary asphalt ramps and roadway restorations will be well maintained.
- There is a zero tolerance policy with respect to the consumption of alcohol or use of drugs during the work shift, as specified below:
    - Use, or working under the influence of alcohol or controlled substances (other than prescribed or over-the-counter medication that does not impair one's muscular or mental capabilities or cause drowsiness) is strictly prohibited at all times during the work shift.
    - Use of alcohol or controlled substances at any time during the work shift will result in immediate removal from the site and permanent loss of access.
    - Site workers may be subject to substance use testing at any time "for cause" or following a safety or property damage incident.

Signature of Principal of Construction Company Date

Name of Construction Company (Print)

1.06.20. Contractor Assumes Risk of Loss or Damage.

The Contractor agrees to assume and to make no claim on account of any and all loss or damage arising out of the nature of the work to be done under this contract, or for any unforeseen obstructions or difficulties which may be encountered in the prosecution of the same, or from the action of the elements, or from encumbrances on or near the line of the work.

1.06.21. Contractor's Representative and Temporary Structures.

(A) CONTRACTOR'S REPRESENTATIVE

The Contractor or the Contractor's authorized representative must be present on the work site at all times while work is being progressed, to receive and promptly execute all orders or directions of the Engineer. The foregoing provision must be complied with irrespective of whether work is being progressed by the Contractor or any subcontractor forces. Furthermore, the Contractor, prior to commencement of work and for the duration of the contract, must make available to the Engineer a telephone number through which the Contractor or the Contractor's authorized representative can be contacted to respond to any and all emergency situations, 24 hours a day, 7 days a week. Failure by the Contractor to respond to any emergency condition will be reason for a poor performance rating, and will therefore authorize the City to correct such condition, as required, and deduct the cost of the corrective work from any monies due to the Contractor.

(B) CONTRACTOR'S FIELD OFFICE

The Contractor must, during the period of construction, erect or provide a temporary field office for use by the Contractor, in which readily accessible copies of all Contract Documents and approved shop and working drawings will be kept. The field office must be located at the site, where directed by the Engineer, and must be provided with a telephone.

(C) MATERIAL SHEDS

Material sheds used by the Contractor for the storage of tools, materials and equipment, must be kept at locations which will not interfere at any time with the progress of the work.

(D) SUBSTANTIAL CONSTRUCTION

All the Contractor's temporary structures must be of substantial construction and neat appearance and must be painted a uniform gray, unless another color is ordered by the Engineer.

(E) CONTRACTOR'S SIGN

The Contractor must post and keep posted a legible sign giving the full name and address of the Contractor, and the telephone numbers of responsible representatives of the Contractor who can be reached in the event of an emergency at any time when there is no representative at the site. The sign must be posted on the outside of the Contractor's field office or an exterior fence / wall.

(F) CONTRACTS OF LIMITED SCOPE

When, in the opinion of the Engineer, the scope of the work to be done under the contract does not require a field office or material sheds, the Engineer may exempt the Contractor from providing any or all of the above services.

(G) TELEPHONE TIE LINE

Contractors whose offices are located outside the City must make available to the City a local tie line (such as 212, 332, 347, 646, 718, 917, or 929) to their telephone service. Failure to provide such tie line will be considered a substantial breach of the Contract.

1.06.22. Contractor's Plant.

(A) PLANT

The Contractor’s construction plant may occupy any unused location within the area controlled by the NYCDDC, subject to the approval of the Engineer. If the Contractor desires to use additional area outside of that controlled by the NYCDDC, the Contractor must arrange for such area at the Contractor’s own expense. The location of the Contractor's stationary and mobile equipment will be subject to the Engineer's approval.

Sufficient construction plant must be provided and maintained at all points where work is in progress to meet adequately all the demands of the work, with ample margin for emergencies or overload. The plant must be of such capacity as will permit a rate of progress to insure completion of the work within the time stipulated in the contract.

The Engineer will have the right to reject or condemn any plant, apparatus, staging or other appliance which, in the opinion of the Engineer, is unsafe, improper or inadequate. Whether or not the Engineer exercises this right, the Contractor will not be relieved from the sole responsibility for the safe, proper and lawful construction, maintenance and use of such plant, apparatus, staging or other appliance or for the adequacy of such plant.

All materials must be properly stacked in convenient places adjacent to the site, or where directed, and protected in a satisfactory manner. All stacking of materials on streets must be done in compliance with local laws and ordinances. If it should become necessary to remove and restack materials to avoid impeding the progress of any part of the work, or for any other reason deemed sufficient by the Engineer, the Contractor must remove and restack such materials, as directed, at the Contractor’s own expense.

(B) BACK UP ALARMS

Starting January 1st 2023, all back up alarms on NYCDDC construction sites must be of the multi-frequency (“white noise”) type. Alarms with self-adjusting volume are preferred. For an abundance of clarity, this requirement applies to all on road and off road equipment, and to all rental equipment. Examples of acceptable back up alarms include:

1. Brigade Electronics SA-BBS-107
2. ECCO EA5050
3. Grote 73310
4. Or approved equal.

1.06.23. Rules, Laws, and Requirements.

(A) PERMITS

The Contractor must, at the Contractor’s own cost and expense unless otherwise stated, obtain all necessary permits, give all necessary notices, pay all legal fees, and comply with all Federal, State and City Building and Sanitary Laws, ordinances and regulations applicable to this contract and to the work to be done hereunder. Such permits may include, but are not limited to:

(a) Permits from the New York City Department of Transportation (NYCDOT) Office of Construction Mitigation and Coordination (OCMC) to make necessary excavations in the street (street opening permits), to store materials offsite in street and/or roadway areas, and for street closures (street closure permit);

(b) Any planned work requiring a NYCDOT Construction Permit that may potentially be within 100 feet of a bridge structure will be placed on a Bridge Hold. If any proposed work is within 100 feet of a bridge structure, permittees must submit a scaled drawing showing the work and exact location, along with the following:

- Plan layout of the project area.
- The scope of work.
- The contractor's means and methods.

- Indicate if work will be done on the bridge itself or its abutments, and the type of work.

If the work is more than 100 feet away from the bridge structure, permittees may send a certification by e-mail stating so. Either response must be sent to the Division of Bridges at bridgeshold@dot.nyc.gov for review and release prior to commencing work. Emergency work will not be placed on hold and will proceed in accordance with the New York City Highway Rules, section 2-11 (g);

(c) Permits from the Department of Sanitation for use of City landfills; and,

(d) All necessary permits from the Department of Environmental Protection (NYCDEP) which may include, but are not limited to, permits for use of City water.

No fee permits will be issued by the NYCDOT for their projects (such as installation of sidewalks, installation of pedestrian ramps, pavement milling, resurfacing, rehabilitation of retaining walls, and bridge and roadway reconstruction type projects).

No fee permits for use of City water will be issued by the Department of Environmental Protection (NYCDEP) for completion of their sewer and/or water main projects and for completion of any NYCDOT project being done in conjunction with the NYCDEP sewer and/or water main project. However, for all other type projects (such as installation of sidewalks, installation of pedestrian ramps, pavement milling, resurfacing, rehabilitation of retaining walls, and bridge and/or roadway reconstruction type projects that are not being done in conjunction with a NYCDEP sewer and/or water main project) the Contractor will be required to obtain the water use permit at its own cost.

Photostatic copies of all required permits must be filed with the Commissioner.

A copy of each permit must also be posted in a conspicuous place on or near the material or equipment being stored or kept on the site or in the designated field headquarters of the work with respect to which the permit was issued so as to be readily accessible for inspection.

(B) DISPOSAL OF CONSTRUCTION WASTE

The Contractor must dispose of all waste materials in a legal and proper manner. Should the facilities of the New York City Department of Sanitation be used, waste material must be disposed of in accordance with the rules and regulations of the Department of Sanitation. The Contractor must submit an affidavit to the Commissioner indicating that the Contractor has complied with said rules and regulations, the site used, and proof of purchase of dump tickets. Should the Contractor use a site other than the Department of Sanitation, the Contractor must submit an affidavit to the Commissioner indicating that the Contractor has complied with all laws for removal of waste material, the site used, and a paid receipt. In addition, should the facilities used be located in the State of New York, it must be a Solid Waste Management Facility registered with the New York State Department of Environmental Conservation, Division of Materials Management. Failure to comply with this provision will be deemed a material breach of this contract.

(C) CONFORMANCE WITH FEDERAL, STATE AND CITY AGENCIES

The Contractor must, in performance of this contract in its different works, conform to the rules and regulations of the various agencies which have any jurisdiction or authority affecting either the execution of the work, its sanitary or other conditions, the use or occupancy of the public grounds, roadways, streets, or which govern protection to the public.

The Contractor is notified that the Department of Design and Construction has adopted a zero tolerance policy with respect to the consumption of alcohol or use of drugs during the work shift, as specified below:

- Use, or working under the influence of alcohol or controlled substances (other than prescribed or over-the-counter medication that does not impair one's muscular or mental capabilities or cause drowsiness) is strictly prohibited at all times during the work shift.
- Use of alcohol or controlled substances at any time during the work shift will result in immediate removal from the site and permanent loss of access./
- Site workers may be subject to substance use testing at any time "for cause" or following a safety or property damage incident.

The Contractor is alerted to the Rules and Regulations of 16 NYCRR Part 753 (also cited as Industrial Code 53 or Code Rule 53) and is directed to comply. The City will not be liable for any costs incurred by the Contractor as a result of the compliance, non-compliance, or improper compliance by the franchised operators of underground facilities, with sub-part 753-3 of 16 NYCRR Part 753. For additional requirements concerning underground facilities see **Subsection 1.06.28.(H)**.

The Contractor is notified that all vehicles that are owned, leased or operated by the Contractor or its subcontractors and used in connection with the Project must comply with the following requirement:

> Every truck, tractor, and tractor-trailer or semitrailer combination, having a gross vehicle weight rating of twenty-six thousand pounds or more, and a conventional cab configuration in which more than half of the engine length is forward of the foremost point of the windshield base, and the steering wheel hub is in the forward quarter of the vehicle length must be equipped with a convex mirror on the front of such vehicle or combination of vehicles. Such convex mirror must be adjusted so as to enable the operator of such vehicle or combination of vehicles to see all points on an imaginary horizontal line which is three feet above the road, is one foot directly forward from the midpoint of the front of such vehicle or combination of vehicles, and extends the full width of the front of such vehicle or combination of vehicles.
>
> Any vehicle that does not comply with this provision may be prohibited from entering the Project site and/or supplying equipment or materials to the Project. The Contractor will not be entitled to any damages as a result of such prohibition.

The Contractor is notified that all persons constructing or operating a large article, machine, device, equipment, such as a rock crusher, or other contrivance or facility capable of causing or permitting emission of dust into the atmosphere at a construction site must keep on site a document[1] detailing such equipment. Information provided on this document must include the ownership, location, design, make and model, operation, i.e. how does it operate, as well as any other pertinent information requested by the Department. **In addition, the measures utilized to reduce dust emissions resulting from the use of these items as set forth in 15 RCNY 13-01 et seq. must be clearly outlined. This document must be attached as an addendum sheet to the Noise Mitigation Plan prepared pursuant to Section 24-220 of the Noise Code.**

(D) NOTICES

The Contractor must give notice, in writing, to all Federal, State and City agencies, having jurisdiction, whose facilities or functions will be affected by the work, at least forty-eight (48) hours before commencing construction.

The Contractor must notify the Engineer at least forty-eight (48) hours in advance of the start of paving work.

The Contractor must notify the Fire Department's Bureau of Facilities Management, Plant Operations Engineering Unit, telephone (718) 281-3846 or (718) 281-3933, at least **one (1) month** in advance of starting construction and to make an appointment to pick up FDNY base maps at 316 Sgt. Beers Avenue, Fort Totten, Bayside, Queens 11359. However, said drawings are made available to the contractor, architect, engineer, agency, etc., only as information in the possession of the City, without any warranty, expressed or implied, as to their present accuracy or sufficiency. The Contractor must make field checks of all information obtained from these drawings before putting it to use.

To request street markouts of Fire Communications underground facilities, the Contractor must contact Plant Operations Engineering at (718) 281-3846 or (718) 281-3933 at least **one (1) month** prior to commencement of work.

The Contractor must contact Empire City Subway or Verizon for any Point of Entries (P.O.E.'s) into their manholes and obtain wall markouts by them. The Contractor will be responsible for all P.O.E. and ECS/Verizon inspections.

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[1] Use latest version which can be found on the NYCDEP website at:
https://www1.nyc.gov/assets/dep/downloads/pdf/air/construction-dust-mitigation-form.pdf

The Engineer must notify the Department of Transportation, Division of Traffic Operations, Signs and Markings to verify all thermoplastic pavement markings detail drawings seven (7) calendar days prior to the start of work on pavement markings.

The Contractor must notify the Department of Transportation, Division of Traffic Operations, Signals, Street Lighting, Systems Engineering at least seventy-two (72) hours prior to the start of work.

The Contractor must notify the Department of Transportation, Division of Traffic Operations, Parking Operations, forty-eight (48) hours prior to the start of work to have parking meters removed. The following information must be given: (1) Parking Meter Numbers, (2) Location of Meters, and (3) Date when meters can be re-installed.

The Contractor must notify the Department of Parks and Recreation, not less than seventy two (72) hours in advance, when the job is started, to permit a survey and examination of the site by their Inspection Unit.

(E) CLOSING OF STREETS - FORMAL REQUEST FOR APPROVAL

No street will be closed for contract construction until Form MP 125 (REQUEST TO CLOSE STREET) has been submitted to and approved by the Commissioner. This form must be filed notwithstanding that a provision in the contract may provide for the closing of streets.

(F) REQUIREMENTS FOR SIDEWALK CONSTRUCTION CONTRACTS

The Contractor will not proceed with any sidewalk construction unless ordered to do so by the Commissioner or the Comissioner’s authorized representative. Sidewalks must be constructed only in those specific areas as designated in the Commissioner's order.

(G) RULES GOVERNING NAVIGATION

The Contractor must observe all laws, rules and regulations prescribed by the Supervisor of the Harbor, the United States Coast Guard, and the United States Army Corps of Engineers.

Proper and sufficient temporary warning signs and lights for the prevention of accidents to boats must be furnished and maintained by the Contractor, as required by Federal regulations.

During the entire period of construction, no interruption to waterway traffic will be permitted for any length of time. Any protective measures specified hereinbelow must be such that the channel depth and headroom between the water level and underside of the bridge or traveling platform must be maintained. Should it be suspected that the channel depth may have been impaired or that an obstruction may exist from the work, the Contractor must, upon request by the Coast Guard or Corps of Engineers, provide the necessary equipment and personnel to undertake a survey to determine the presence of any obstruction, or objects, or silting that may have occurred during construction. The cost for this work will be borne by the Contractor.

The Contractor must provide a safety net directly below the underside of the bridge to cover the entire work area. The net must be strong enough to catch any materials, debris or persons from falling into the water. The safety net will be subject to the approval of the Engineer. The Contractor must also provide a fire-retarding tarpaulin above the safety net and a fire-retarding tarpaulin directly beneath the area where flame cutting, welding or any burning operations are being done. The material for and method of providing the fire-retarding tarpaulin will be subject to the approval of the Engineer.

(H) CONTRACTOR TO EXAMINE SITE

The Contractor is assumed to have visited the site of the work, become familiar with the present conditions, and judged the extent and nature of the work to be done under this contract. No extra compensation will be allowed due to the Contractor’s failure to include the costs of all required labor and materials in the bid.

(I) PROTECT EXISTING CONSTRUCTION

The Contractor must protect from injury all parts of the work, and any damage caused by the Contractor or the Contractor’s agents to any part of existing construction must be repaired by the Contractor at the Contractor’s expense to the full satisfaction of the Engineer.

(J) SCAFFOLDING AND LADDERS

The Contractor must furnish and securely set scaffolding, platforms and ladders required for the erection and inspection of all work. All such facilities must be of good, sound materials, adequately dimensioned, substantially braced and tied, and must be approved by the Engineer.

(K) NO ADVERTISING SIGNS

The Contractor must not display any advertising signs on or about the site of the work, other than the Contractor's name and address, without the written permission of the Commissioner.

(L) SANITARY SERVICES

The Contractor must provide toilet and other sanitary facilities for the use of the Contractor's employees on the project, in accordance with the requirements of the New York State Labor Law and in accordance with the regulations of the City of New York. The Contractor must furnish all labor, energy, water, heating and all other services necessary to maintain these facilities in a clean and sanitary condition. Toilets and other sanitary facilities must be connected to sewers. After completion of the work and when directed, the temporary toilet facilities must be completely removed.

(M) SANITARY NUISANCES

The Contractor must not permit any sanitary nuisances to be committed by the Contractor's employees in or about the work and must enforce all sanitary regulations of the City and State Health Authorities.

(N) MEDICAL SERVICE

The Contractor must provide such equipment and facilities as are necessary or required in case of accident for First Aid Service to anyone injured in the progress of the work and shall have standing arrangements for the removal and hospital treatment of any employee who is injured or becomes ill.

(O) WATER IN EXCAVATIONS

Whenever water is encountered or collects in the excavations or trenches, the Contractor must remove the same in a satisfactory manner.

(P) HOURS OF WORK

Working hours must be as stipulated by the Department of Transportation's Office of Construction Mitigation and Coordination (OCMC). Generally, no work will be done on the job before 7:00 A.M. nor after 6:00 P.M., excepting that water mains must not be shut down before 8:30 A.M. nor after 4:30 P.M., nor will any work be done on Saturdays, Sundays, or the following holidays, as celebrated in New York City, unless the Contractor will have given the Engineer at least 7 calendar days advance notice in writing, and the Engineer will, in turn, have given written permission for such work:

1. New Year's Day
2. Memorial Day
3. Independence Day
4. Labor Day
5. Thanksgiving Day
6. Christmas Day

The above hours of work will apply except when, because of failure to shut down any water main due to any difficulty encountered, or because of any act or omission by the City, the work of connecting to existing water mains is delayed, and such delay mandates that work be performed beyond 4:30 P.M. in order to restore water service.

If the day preceding any of these holidays falls on a normal work day, then no water shutoffs will be allowed on that day preceding the holiday and the Contractor must cease construction operations and must restore the streets to public use by midday of that day. The Contractor may be granted permission to continue working beyond midday on the day preceding a holiday if the Contractor requests written permission at least seven (7) calendar days in advance from the Engineer and receives written approval from the Engineer prior to the holiday.

Pursuant to the provisions of §24-222 of the Noise Control Code: the permissible hours of work must be on weekdays from 7:00 A.M. to 6:00 P.M., unless a variance therefrom is provided in the contract.

(Q) CONTRACTOR AGREES TO PROTECT CITY STRUCTURES WITHIN THE LIMITS OF, ALONG, AND OUTSIDE THE LIMITS OF ORDERED EXCAVATION

The Contractor agrees to support and to properly protect from injury the City fire alarm system, all water mains and service water pipes, sewers and appurtenances and conduits or duct lines owned, controlled or operated by the City which may be affected in any manner by the Work done under this Contract, except as hereinbefore provided, and to protect all such water and service pipes from freezing. If the Contractor fails to do so, the Commissioner is hereby authorized to relay and recaulk and repair the same immediately, in each block, as the Work progresses, and the cost thereof will be charged to the Contractor, and the City hereby is authorized to retain and deduct said cost out of the monies which may be due or become due to the Contractor.

All existing Fire Department Communication facilities shall be protected and provisions made for their continuous operation during construction. All alarm boxes and posts must remain accessible. The cost of all labor, materials, plant, equipment, and incidentals required and necessary to support, protect, and maintain portions of the existing Fire Communication System, including, but not limited to, manholes, in order to complete the work of this Contract shall be deemed included in the contract prices bid for all items of work.

If, due to the Contractor's operation, Fire Alarm Service is inadvertently interrupted or Fire Communication System equipment or facilities are damaged, the Contractor will be held responsible and shall replace them at the Contractor's sole expense and in accordance with Fire Department requirements and **Section 6.23** herein these Standard Highway Specifications.

In general, existing traffic signal and street lighting conduits are not shown on the contract drawings. It is the Contractor's responsibility to determine the location of the traffic and street lighting underground distribution system. The Contractor shall make field observations and research the City's records to determine the location of such facilities.

Should it prove necessary to disturb existing traffic signals or street lighting equipment which is the property of the City of New York, the Contractor shall provide, at no separate payment, temporary traffic signal and street lighting as directed, in accordance with the following NYC Department of Transportation items:

Traffic Signal Items

2.16	FURNISH, INSTALL, MAINTAIN AND REMOVE TEMPORARY POST OR PYLON WITH SIGNALS
2.18	FURNISH, INSTALL, MAINTAIN AND REMOVE TEMPORARY POST OR PYLON WITH CONTROLLER AND SIGNALS

Street Lighting Items

21.02.02	FURNISH AND INSTALL A STANDARD WOOD POLE
21.09.03	REMOVE A WOOD POLE WITH ALL ATTACHMENTS, IF ANY
29.01.01	FURNISH, INSTALL, MAINTAIN AND REMOVE EQUIPMENT FOR TEMPORARY LIGHTING (PYLON), AS PER DWGS F-3390, F-5005 AND F-5005A
29.01.02	REMOVE TEMPORARY LIGHTING UNIT
29.01.03	FURNISH, INSTALL, MAINTAIN AND REMOVE EQUIPMENT FOR TEMPORARY LIGHTING, AS PER DWG J-5226
33.02.02	FURNISH AND INSTALL NO. 6 AWG XLP COPPER CABLE OR EQUAL FOR OVERHEAD INSTALLATION

and the costs for such work shall be deemed included in the prices bid for all scheduled Contract items.

Upon completion of the work, traffic signals, luminaires, lampposts, and accessory equipment shall be restored and temporary facilities shall be removed. Such work shall be accomplished in coordination with the Department of Transportation, Division of Traffic Operations and the appropriate utility companies. All

costs for connections, disconnections, supply, erection, dismantlement, storage, and restoration of existing facilities shall be included in the prices bid for all Contract items.

Should the Contractor disturb, damage, remove or relocate any conduits, junction boxes, traffic post and/or lampposts, luminaires or traffic signals in the streets affected by this work, such damage, removal or relocation shall be immediately repaired with the knowledge of and to the satisfaction of the City. The cost of such work shall be at the sole expense of the Contractor.

(R) PLANT PEST CONTROL REQUIREMENTS

The Contractor and/or subcontractors shall be certified by the New York State Department of Agriculture & Markets to perform work within the Asian Longhorned Beetle Quarantine Zone. The Contractor must review and abide by the description of the quarantine and compliance agreements as presented in the publication entitled Part 139 of the New York State, Department of Agriculture & Markets (NYSDAM) law. Full information can be obtained from Federal and State Pest Control personnel.

Due to current Federal and New York State laws and regulations concerning Asian Longhorned Beetle management, the following host species may not be planted in the quarantine zone. Host species are as follows: Acer-Maple, Aesculus-Horsechestnut/Buckeye, Salix-Willow, Betula-Birch, Populus-Poplar, Ulmus-Elm, Albiza-Mimosa/Silk Tree, Celtis-Hackberry, Fraxinus-Ash, Platanus-London Planetree, Sycamore, Sorbus-Montain Ash.

The Contractor must comply with all Federal, State, and City laws pursuant to the handling and disposal of woody organic material that is host material for the Asian Longhorned Beetle. All wood that is host material for the Asian Longhorned Beetle must be chipped, ground, or shredded inside the quarantine zone to a size of less than one (1”) inch in at least two dimensions before it is permitted to leave the quarantine zone. Please refer to Part 139 of the New York State Department of Agriculture and Markets law and contact State personnel for further details.

In addition, Nurseries located within the quarantine zone shall comply with State and Federal Law and all Contractors and/or Subcontractors shall be certified by the New York State Department of Agriculture and Markets to perform work within the Quarantine Zone.

Any host material that is infected with the Asian Longhorned Beetle must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.

Prior to commencement of tree work, the Contractor shall submit to the Commissioner a copy of a valid Asian Longhorned Beetle compliance agreement entered into with NYSDAM and the Contractor or its subcontractor performing tree work. If any host material is transported from the quarantine area the Contractor shall immediately provide the Commissioner with a copy of the New York State “Statement of Origin and Disposition” and a copy of the receipt issued by the NYSDAM approved facility to which the host materials are transported.

Quarantine areas, for the purpose of this contract shall be defined as all five Boroughs of the New York City. In addition, prior to the start of any tree work, the Contractor shall contact the NYC Department of Parks & Recreation’s Director of Landscape Management at (718) 699-6724, to determine the limits of any additional quarantine areas that may be in effect at the time when tree work is to be performed. The quarantine area may be expanded by Federal and State authorities at any time and the Contractor is required to abide by any revisions to the quarantine legislation while working on this contract. For further information please contact: NYSDAM (631) 288-1751.

No separate payment shall be made for Plant Pest Control. The cost for Plant Pest Control shall be deemed included in the unit prices bid for the various tree removal and tree pruning items in the contract.

(S) PAYMENT REQUISITIONS

Each payment requisition following the initial mobilization payment requisition must be consistent with the previous requisitions and payments, as certified by the Engineer. Each partial payment requisition must comply with the requirements of Article 42 of the Standard Construction Contract.

The Contractor must submit the payment requisition to the Engineer by the end of the month following the payment period ("Due Date"). The period covered by each payment requisition is one month, ending on the

last day of the month, unless a longer payment period is approved by the Engineer. The Contractor must submit a draft copy of the payment requisition seven days prior to the Due Date for review by the Engineer.

1.06.24. Conflicts of Interest.

See Article 72. in the Standard Construction Contract for Conflicts of Interest provisions.

1.06.25. Schedule of Operations.

(A) METHODS.

The Contractor is required to provide the following submittals, in the format, and within the time, described in this Specification:

- Progress Schedule;
- Weekly lookahead schedule; and
- Submittal schedule log and shop drawing submittal log in Excel format (tied to construction schedule), including a description of, and the scheduled submission dates for, all required submittals, approval requests, design mixes, reports, samples, as required by the Specifications and terms of the Contract ("Submittal Schedule Log and Shop Drawing Submittal Log").

The Contractor must submit a Progress Schedule in compliance with Article 9 of the Standard Construction Contract. The Contractor's Progress Schedule must be prepared using Department's selected scheduling software, Oracle's Primavera P6 Professional Project Management ("P6") using Critical Path Method ("CPM") techniques aided with the precedence diagramming method. The version of P6 to be used must be approved by the Engineer. The Contractor will be required to use the Contractor's own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Engineer. If directed by the Engineer prior to the Notice to Proceed ("NTP"), the Contractor must use the Department's P6 Enterprise license and develop the Progress Schedule within the Department's Enterprise environment.

The Contractor must employ or retain the services of a construction scheduler with construction scheduling experience involving the use of P6, subject to review and approval by the Engineer, in consultation with the DDC Infrastructure Program Management scheduling unit. Upon request, the Contractor shall provide the Commissioner with identification, qualifications and experience of the proposed scheduler(s).

As used in this Specification Section, "days" means consecutive calendar days (CCD) unless otherwise specifically noted to mean working days.

(B) SUBMITTALS PREPARATION TIMELINE

Within fifteen (15) days after the issuance of the NTP, the Contractor must submit for approval to the Engineer the following:

- Progress Schedule; and
- Submittal Schedule Log and Shop Drawing Submittal Log

The Contractor must incorporate any corrections/revisions from the Engineer on the Progress Schedule, and is required to provide an updated version of the Progress Schedule for review within fifteen (15) days after the Engineer provides review comments on the Progress Schedule.

Updates to the Progress Schedule, Submittal Schedule Log and Shop Drawing Submittal Log must be submitted monthly until Substantial Completion is reached or as otherwise directed by the Engineer. The Progress Schedule "data date" shall be set to the last working day of the month (schedule period) unless otherwise directed by the Engineer. Updates must be provided to the Engineer no later than fourteen (14) days after the schedule "data date". Updates shall reflect actual or reasonably anticipated progress as of the last working day of the period.

The Engineer may request meetings with the Contractor to review the Progress Schedule to jointly verify actual activity start dates, actual activity completion dates, percentage of work reported in place (if required), and activity percent completion.

In addition, the Engineer may request meetings with the Contractor's construction scheduler(s) to resolve out-of-sequence logic, assess the impact, if any of any pending change orders, incorporate accepted time extensions, review revised logic (as-built and projected) and changes in activity duration, cost, and labor hours assigned.

Furthermore, the Contractor must submit weekly lookahead schedules showing the Contractor's anticipated work schedule for the upcoming week, or as otherwise directed by the Engineer. The weekly lookahead schedules must be submitted beginning on the start date indicated on the NTP through Final Acceptance. Timely submission of these weekly lookahead schedules is critical for preparation of the Weekly Construction Bulletin, which is prepared by the Construction Community Liaison or project staff. If the Contractor fails to timely submit the required weekly lookahead schedule, the Resident Engineer will issue a Field Order.

(C) PROGRESS SCHEDULE FORMAT

The Progress Schedule should utilize the entire Contract duration as specified in the NTP. The Progress Schedule shall be the Contractor's working schedule used to plan, organize, execute, and track the work. The Progress Schedule update is the primary vehicle that must be used to report actual performance, progress, and must clearly convey the Contractor's execution plan, in order to complete all the remaining Work.

The Progress Schedule must show the sequence, in which the Contractor proposes to perform the work, and account for all major and intermediate milestone activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

The Contractor shall ensure and represent that all subcontractors performing any portion of the Work have knowledge and acceptance of the accepted Progress Schedule and the monthly updates.

The amount of detail in the Progress Schedule must be to the satisfaction of the Engineer and must, at a minimum, include:

1. Contract major milestones as set forth in Subsection E below;
2. For all major materials and equipment:
    a. Separate submittal preparation and approval activities;
    b. Manufacturing and procurement activities
3. Preparation, submittal, and approval of drawings, samples, and health and safety plans;
4. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties;
5. Performance of tests, submission of test reports, and approval of test results;
6. Completion dates of all items required for phased completion (if applicable);
7. Completion dates of all items required for Substantial Completion;
8. Completion dates for close-out of regulatory and punch list items prior to final payment and transfer of the project.

Activities identified in the Progress Schedule shall have the duration in units of whole working days. Construction activity durations shall not exceed twenty (20) working days unless specifically approved by the Engineer. Durations for non-construction activities such as procurement of materials or delivery of equipment may not exceed twenty (20) working days without prior approval. Activity duration shall be based on the available resources required for performing each activity and shall be the result of definitive labor hours and resource planning by the Contractor to perform the Work and with consideration of on-site work conditions.

Activity descriptions must clearly and uniquely define each activity with a description of the work that is readily identifiable. Each activity must have a narrative description that includes a verb or work function (i.e. submit, test, install etc.) an object (12-inch water main, road base, etc.), and, for any construction activities, a specific location. The work related to each activity shall be limited to one subcontractor's responsibility and one trade.

Activity Relationships must be assigned to clearly establish predecessor and successor relationships to each activity. Open ended activities are not permitted with the exception of the first and last activities in the

network, the first activity being the issuance of the NTP, and the last being Final Completion. The use of relationship lag times is discouraged and only permitted with approval by the Engineer; use of negative lag is never permitted.

Activity Constraint Dates are only to be used to reflect contractual or DDC-designated constraints, unless specifically authorized by the Engineer.

Float or slack, in the Progress Schedule, must not be for the exclusive use or benefit of either the City or the Contractor, but is to be available for use by both the City and the Contractor.

The Progress Schedule shall be cost-loaded. Cost loading shall be accomplished by adding a single summary level cost loaded activity in the Progress Schedule. This activity will allow initial generation and monthly update of the planned value that is time-phased into monthly periods. The intent of the cost loading is to facilitate cost forecasting, tracking, and reporting of monthly cost projection. Every month, the cost loaded summary activity shall be updated with monthly forecast for future periods. If there is significant variance between cumulative monthly invoice and the cumulative planned value as of any reporting month, Contractor shall provide the Commissioner with the reason for variance.

(D) PROGRESS SCHEDULE ACTIVITY AND CALENDAR CODING STRUCTURE

1) ACTIVITY NAMING AND CODING

All activities shall be coded inside the P6 PROJECT Environment/PROJECT LEVEL (NOT the GLOBAL Environment/ENTERPRISE LEVEL) to facilitate selection, sorting and preparation of reports. The Contractor will use the Lead FMS ID (included in the NTP) as the Project ID prefix.

Activity Coding shall consist of the Project ID followed by a dash, followed by activity coding (i.e. PROJECT ID-ACTIVITY CODE). Activity Codes must be created at the project level and shall utilize the coding scheme outlined below:

RESP Responsibility – Identify Contractor, Utility, Subcontractor, etc. responsible for the Work.

PHAS Phase – Breakdown of activities in Milestones, Construction, and Closeout Activities.

LOCN Location – Breakdown by Street or intersection.

AREA Area – Breakdown by corner or block. May be used as a subdivision of PHASE to include milestones, permits, subcontractor approvals, submittals fabrication, and delivery. Subdivision of the site into logical modules such as blocks.

TRAD Trade - Breakdown by work type. Examples include:

- SEWER: Sewer main work, including roadway restoration.
- DWM: Distribution water main work, including roadway restoration.
- TWM: Trunk water main work, including roadway restoration.
- ROAD: Roadway construction work.
- SWK: Sidewalk work.
- RAMP: Pedestrian ramp work.
- PLAZA: Plaza work.
- BMP: BMP work.
- GI: Green infrastructure work.

For trades not listed above, the Contractor must submit the proposed trades and their codes to the Engineer for approval.

2) CALENDAR NAMING AND CODING

All calendars created and assigned to activities shall be Project-level calendars. The Contractor shall use the same Lead FMS ID (included in the NTP) that is used as the Project ID prefix for Activity Coding.

The Calendar Name shall consist of the Project ID followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME)

3) WORK BREAKDOWN STRUCTURE NAMING AND CODING

A multi-level hierarchal work breakdown structure (WBS) shall be incorporated in all P6 Progress Schedules. The levels (nodes) shall include, but not be limited to:

LEVEL 01 – is the Contract or Project Level

LEVEL 02 – shall have a minimum of four nodes; Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout, however, the Contract must only use the Construction and Closeout nodes.

LEVEL 03 – Specification Section

(E) MAJOR MILESTONES

The following is a list of Standard Major Milestones that constitute the minimum for Progress Schedule preparation. The content of the Progress Schedule shall not be limited to the list. The Contractor is obligated to include and maintain in the Progress Schedule all applicable milestones that appear after NTP. The Engineer may change, add or modify these milestones as required.

- Issuance of the NTP
- Notice to Utility Co.
- Notice to railroad
- Submit Support of Excavation (SOE)
- Issuance of permit (separate milestones for each permit)
- Approve soil sampling and disposal facility
- Execution of major subcontracts
- Fabrication and delivery of major materials and equipment
- Complete Engineer's Field office
- Mobilization
- Install maintenance and protection of traffic
- Start temporary protection (protective barriers, barricades, walkways)
- Deliveries of all New York City furnished equipment and/or materials.
- Complete demolition of existing structures
- Complete clearing & grubbing
- Complete cleaning pipe and/or drainage structures
- Complete saw cutting
- Start excavation
- Complete sheeting and/or bracing
- Complete pile installation
- Complete leakage testing
- Temporary road or sidewalk restoration
- Complete removal, relocation and resetting of existing FDNY facilities
- Disconnection of utilities and public services
- Start Installation of pipe & fillings
- Complete installation of manholes, chambers and/or catch basins
- Start Installation of distribution valves, hydrants, and iron castings
- Start installation of trunk water main valves, both butterfly and pressure reducing
- Start Installation of site furnishings and/or specialties
- Start final testing
- Complete inspection & testing
- Start installation of reinforcing and misc. steel
- Start concrete placement
- Complete asphalt paving
- Installation/relocation of traffic signal devices
- Complete backfill
- Complete paving
- Complete pavement markings
- Complete landscaping
- Demobilization

- Clean-up
- Substantial Completion
- Final Completion

(F) SUBMITTALS

Every Progress Schedule must be provided with a narrative report. The narrative report must include the following: :

1. A discussion of progress through the update period and status of the project with respect to completion of the project schedule.
2. A discussion of changes, delays or other circumstances affecting progress of the project.
3. A listing and brief explanation of modifications to the previously submitted network including logic changes and activity additions, deletions or modifications.

All Progress Schedules and corresponding narrative shall be submitted in hard copy as well as in electronic format on a USB stick or other media accepted by the Engineer. When opened, the electronic format must provide flawless restoration to the native files (P6(.xer) for Primavera schedule files and MS Word and/or Adobe Acrobat for the narrative report and supporting document submittals). Each electronic submission of the Progress Schedule shall be assigned a unique file name consisting of the Project ID (as noted on the Notice to Proceed) followed by a dash followed by a unique file name clearly marked (i.e. ProjID- 000 = rev0, ProjID-001 = rev01 etc.) to indicate the specific submission.

For each submittal of the Progress Schedule, the following layouts, reports, graphics are required and must be included.

An All Activity Detailed Barchart Layout grouped by Activity Code and then sorted by Early Start, Early Finish, and then Total Float. Each activity line shall display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start (ES), Finish (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF). The top line of the barchart area shall contain the early and float bars; the second line of the barchart shall depict the accepted baseline dates showing baseline total float bars.

G) CHANGES, DELAYS, CLAIMS, AND TIME EXTENSIONS

In addition to the requirements outlined in with Article 11 “Notice of Conditions Causing Delay and Documentation of Damages Caused by Delay” of the Standard Construction Contract, the contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.

The Time Impact Analysis must include a written narrative and supporting impact schedule fragnet detailing the project delays resulting from the alleged delay. The impact schedule, separate and distinct from the Progress Schedule update, shall demonstrate that the changes or anticipated delays affect activities of the current accepted Progress Schedule. The impact schedule shall be incorporated into the Progress Schedule only after it is accepted, and a time extension is approved. The fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these change or delays on the Substantial Completion date.

1.06.26. Job Meetings.

The Contractor agrees to attend in person or by a representative duly recognized and approved by the Engineer, and to procure the like attendance of all subcontractors required by the Engineer to be present, at any and all conferences called by the Engineer upon twenty-four (24) hours’ notice thereof, either at the Site of the Work or at the Office of the Department of Design and Construction, 30-30 Thomson Avenue, Long Island City, New York 11101, as directed in said notice.

1.06.27. Controls, Surveys and Layout.

Bench marks and control lines for the alignment and grades necessary for the prosecution of the work, where required, shall be established by a licensed Professional Land Surveyor retained by the Contractor. When necessary, the Land Surveyor shall obtain the required data from the Topographical Bureau of the Borough President’s Office, in the respective borough in which the work is to be performed.

The Contractor shall furnish all stakes, range poles, range sights, scaffolding, platforms and staging required, and shall maintain the said controls.

The Contractor shall take cognizance of datum planes used in the work.

Unless otherwise noted, the elevations indicated on the plans refer to the respective Borough Datum specified below in feet above mean sea level as established by the U.S.C.&G. Survey at Sandy Hook, New Jersey is:

The Bronx: 2.608 Manhattan: 2.750 Brooklyn: 2.560 Queens: 2.725 Staten Island: 3.192

The Contractor shall provide the required survey parties and all necessary surveying equipment. The Contractor shall make all necessary computations and determine the alignment, elevation and position for all construction work from the controls furnished by the Engineer. The Contractor shall be responsible for the accuracy of all lines and grades established by him. The Engineer may check any or all of the survey work done by the Contractor, but such check shall not relieve the Contractor of responsibility for the accuracy of all work.

The Contractor's survey parties shall take all preliminary measurements, prepare all sketches and obtain other field data, as required, when so ordered by the Engineer. Copies of survey notes and sketches shall be delivered to the Engineer, when required, and such copies shall be signed by, and bear the seal of a Professional Engineer or Land Surveyor licensed in the State of New York.

The Contractor must furnish the necessary forms, templates, lines, levels, stakes and other tools, implements and materials and employ competent and skillful men to correctly set out from the grade marks or stakes all details of the work, in full accordance with the plans, specifications, and directions of the Engineer.

Prior to commencement of work, preliminary transverse cross-sections extending from building line to building line shall be taken by the Contractor at longitudinal intervals not exceeding fifty (50') feet, at all grade breaks and at ends of streets midway into the intersecting street. Transverse cross-sections shall be plotted on approved cross-section paper to a scale of 1" = 1'- 0", vertical, and 1" = 10'- 0", horizontal. The Contractor shall plot to the same scale, a longitudinal profile for each curb line, showing the proposed curb line grades and existing elevations at not more than twenty-five (25') feet intervals and at intermediate points where unusual sidewalk conditions occur. The Contractor shall also prepare two (2) copies of curb and gutter grade sheets, one (1) for the Contractor's use and one (1) for the Engineer's use.

All plotted material, curb and gutter grade sheets and supporting data shall be submitted to the Engineer, for approval, at least one week before work, which is dependent upon approval of the submitted material, is started.

The Contractor shall submit to the Engineer a certification from a Professional Engineer or Land Surveyor, licensed in the State of New York, that the lines and grades used in the completed work comply with the contract requirements or such revisions thereof which the Engineer shall direct or order.

(A) PRESERVATION OF MONUMENTS, POINTS, STAKES, ETC.

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks, made or established on or near the line of the work, and the Contractor agrees to accept the responsibility for and to remedy at the Contractor's cost any mistakes that may be caused by the unauthorized disturbance or removal of such points, stakes, grade marks, monuments and bench marks.

The Contractor shall not disturb or excavate within five (5') feet of any City monument which may be within the limits of or be disturbed by the work herein contemplated, or in any manner disturb the same, but shall cease work at such places until the said monument has been referenced and reset or otherwise disposed of, except upon special permit from the Commissioner in accordance with the City ordinance therefor. After permission is given to remove any monument, the Contractor shall take up and preserve such monument, and, if required, remove same to the nearest Bureau yard.

Any expense incurred in replacing any points, stakes or bench marks, which the Contractor, or any person working under him, may have failed to preserve, shall be charged to the Contractor and deducted from the amount to be paid him for doing the work under this contract.

A New York State licensed Professional Land Surveyor shall perform all work regarding the re-establishment of monuments.

(B) LICENSED SURVEYOR

All bench marks and control lines for the alignment and elevations necessary for the prosecution of the work shall be established by a Professional Land Surveyor, licensed in the State of New York, retained by the Contractor.

1.06.28. Protection of the Work, Persons and Property.

The Contractor shall protect the work, persons and property in accordance with the Provisions of Article 7 of the Standard Construction Contract, and furthermore as follows:

(A) MAINTENANCE OF EXISTING DRAINS, ETC.

Where the work herein contemplated intercepts or affects in any way any stream, ditch, drain or culvert, the Contractor shall, where required, arrange for keeping the same permanently open by building drains, culverts, or other structures or by rebuilding, repairing, or extending those existing with materials of the quality specified herein, of the size required, and as directed for each case.

(B) DRAINS TO BE KEPT CLEAN

During the progress of the work and until the completion and acceptance thereof, all catch basins and inlets, and connections, whether built under this contract or existing to remain, mustbe kept thoroughly serviceable throughout, and shall be left serviceable upon the completion of the project. The Contractor is required to actively provide temporary protection shielding to prevent construction debris from entering catch basins and inlets.

1) The temporary protection shielding must be a manufactured product made from permeable geotextile and designed to be supported beneath the catch basin grate.
2) Where the inlet has a curb piece, the shielding must have an integral barrier to prevent free flowing water through the curb piece bypassing the shielding.
3) The shielding must have overflow ports for high volume storm events.
4) The shielding must have integral lifting straps or apparatus to allow the shielding to be removed, emptied, and reused when the shielding is full of sediment.

The Contractor is required to maintain the temporary protection shielding per the manufacturer's instructions and as directed by the Engineer. Installation, maintenance, and removal of the temporary protection shielding is deemed included in the unit prices bid for all scheduled items.

All basins and connections within the limits of this contract and contiguous thereto are to be cleaned and flushed to the satisfaction of the Engineer. Unless a scheduled item is provided for this work, the cost of cleaning these existing basins and connections is deemed included in the unit prices bid for all scheduled items.

(C) PROTECTION OF WATER PIPES, ETC.

The Contractor shall maintain, without injury, all City main and service water pipes, sewer connections, and the City fire alarm system which may be affected in any manner by the work under this contract, including any such protective measures as may be required in cold weather to prevent them from freezing; or, failing to do so, the Commissioner is hereby authorized to relay and recaulk and repair the same immediately, in each block, as the work progresses, and the cost thereof shall be charged to the Contractor, and The City hereby is authorized to retain and deduct said cost out of the moneys which may be due or become due to the Contractor.

(D) MATERIALS ON PUBLIC PROPERTY

No excavated or other materials necessary to be disposed of, excepting as herein otherwise specified, shall be dumped or placed within the limits of any existing or projected public street or road, nor shall any materials be excavated and removed from such locations, without the written permission of the Commissioner.

(E) MATERIALS ON PRIVATE PROPERTY

The Contractor hereby agrees that no excavated material or materials of construction will be placed by or for the Contractor upon private property unless a written affidavit granting such permission has been obtained from the owners or lessees of said private property and filed with the Commissioner. In the event that materials are placed on private property without permission, and such materials are not removed and such damages not remedied by the Contractor within forty-eight (48) hours after the Contractor has received a written notice from the Commissioner to do so, the Contractor agrees that the Commissioner shall be and is hereby authorized to dispose of such materials, and to remedy such damages, and to deduct the expense thereof from the money due or to become due under this contract. Copies of all written affidavits shall be given to the Engineer prior to the placement of any material on private property.

(F) REPAIR OF DAMAGED PROPERTY

In case any damage or injury shall or may result to pipes, lampposts and other works of any utility, railroad or other company, or to any private property or to any sidewalk along the line of the work, in consequence of any act or omission on the part of the Contractor or the Contractor's employees, agents or subcontractors in carrying out any of the provisions or requirements of this contract, the Contractor shall make such repairs as are necessary in consequence thereof, at the Contractor's own expense and to the satisfaction of the Commissioner, or in case of damages to property of utility companies, pay such amount as shall or may be sufficient to cover the cost of repairing such damages.

Grass or lawn areas that are injured or defaced as a result of the Contractor's construction operations shall be replaced with sod, unless otherwise directed by the Engineer, in accordance with the requirements of the **Section 4.19**. Payment for the replacing of injured or defaced grass or lawn areas due to the Contractor's construction operations shall be deemed included in the prices bid for all items of work.

All water service pipes damaged in performance of the work under this contract shall be repaired by a licensed plumber at the expense of the Contractor and under the rules and regulations of the Bureau of Water and Sewer Operations.

In case of failure on the part of the Contractor to promptly make such repairs, the Commissioner may have such repairs made and deduct the cost thereof out of the moneys due or to become due under this contract, or The City may retain from the moneys due or to become due under this contract a sum, estimated by the Commissioner as sufficient to pay the cost of making such repairs by third parties.

(G) WALKS REPLACED

New flagging or concrete sidewalk furnished to replace any breakage shall be of the same thickness and quality as that broken or displaced and will not be included in the final measurements.

(H) UNDERGROUND FACILITIES

Intent. Contractors must comply with the provisions of 16 NYCRR Part 753 (also cited as Industrial Code 53 or Code Rule 53), including, but not limited to, the provisions of Subparts 753-3.1(a) and (b), which states that excavators shall notify the New York City One Call Center at 1-800-272-4480 at least two but not more than ten working days, not including the date of the call, before the commencement of excavation. Care and caution shall be exercised by the Contractor while performing the work, to ensure that continuing service to all underground facilities will be maintained. The cost of any and all work necessary to ensure continuing service to private underground facilities is to be borne by the private utility company and not by the City. In addition, care shall be taken so as not to damage anything that will remain a part of the finished product.

In particular, until hand-dug test holes have been made to verify the locations of underground facilities, powered or mechanical equipment may be used for the removal of pavement, but only to the depth of such pavement. Maximum bit diameter shall be 4-1/2", Maximum length 2'-0", Maximum penetration 12".

Use of powered or mechanical equipment will be permitted, as follows:

1. Resurfacing Projects - Use not permitted. All pavement breaking shall be accomplished by using hand-held pneumatic or hydraulic tools.

2. Sewer and/or Water Main Installations - Hoe-Rams will be permitted as long as the above Intent is followed. Longitudinal cuts shall be made with concrete saw or vermeer-type cutting wheel. Hoe-Ram will be permitted to crack the pavement between longitudinal cuts just prior (same day) to the excavation (where surrounding pavement is to remain).

3. Street and Highway Reconstruction - Hoe-Rams will be permitted as long as the above Intent is followed. Use must be the same day as excavation (no holes are to be left overnight). Use permitted for water main and sewer work in conjunction with roadway reconstruction as long as same day as excavation (no holes are to be left overnight).

4. Bridge and Structural Reconstruction - Hoe-Rams will be permitted as long as the above Intent is followed, except where there is a partial demolition of deck (e.g. the existing structural steel frame is to be reused).

THE CONTRACTOR IS ADVISED THAT THE PROVISIONS OF 16 NYCRR PART 753 DO NOT APPLY TO CITY OWNED UTILITIES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF THE CITY OWNED UNDERGROUND DISTRIBUTION SYSTEMS. THE CONTRACTOR SHALL MAKE FIELD OBSERVATIONS AND RESEARCH THE CITY'S RECORDS TO DETERMINE THE LOCATION OF SUCH FACILITIES BEFORE THE COMMENCEMENT OF EXCAVATION.

1.06.29. Street Surface Railroads.

If, within the limits of the contract, a street surface railroad company shall fail to make the repairs or lay pavements ordered by the Commissioner, then, upon written notice from the Commissioner, the Contractor shall perform the work within the railroad franchise area, or such portion thereof as may be directed by the Commissioner, in accordance with the terms of this contract. And the Contractor hereby agrees to make a contract with the railroad company to perform the aforesaid work in accordance with the terms of this contract and at the prices fixed herein, unless other terms are mutually agreed upon. Provided, however, that if the railroad company performs the aforesaid work or any portion thereof, then the Contractor shall not perform the within specified work within the railroad franchise area, and in that event the Contractor shall not demand or receive any compensation therefor or any sum of money whatever as damages of any kind, nature or description or for prospective profits lost because of the failure of The City to allow the Contractor to perform said work within the railroad franchise area, other than that provided for in this contract for work actually performed.

1.06.30. Contractor Not to Discommode Private Companies.

During the progress of the work, the Contractor shall afford the necessary facilities to any and all companies owning railroad tracks, pipes, subways, ducts, or other surface or sub-surface structures on the line of the work, for their preservation from injury.

In case it be necessary to remove, repair, protect, support, or temporarily remove and replace these structures or any portions of them that may be on the line of the work, the Contractor shall give notice, in writing, to the company or companies owning such structures, so that said companies may remove, repair, protect, support, or temporarily remove and replace their structures at their expense, and the Contractor shall not cause any hindrance to or interference with said companies in performing such work on their structures. If said companies, within five (5) days after receipt of such notice, shall fail to commence performance of such work, the Contractor shall, upon the approval of the Commissioner, perform the same, it being expressly understood that the cost thereof shall not be a charge against the City, but shall be a matter for adjustment between the Contractor and the company or companies concerned.

Pursuant to the above, the Contractor agrees to confer with and to make or entertain an offer from such company or companies owning the said structures, and the Contractor further agrees to enter into an agreement with said company or companies by what terms and at what prices the removal, repair, protection, support, or temporary removal and replacement of the said structures will be undertaken and accomplished, and in the event of the failure to make such agreement with said company or companies, the Contractor will not complain nor make any demand for additional compensation for the removal, repair, protection, support, or temporary removal and replacement of the said structures, it being expressly

understood that the cost thereof shall not be a charge against the City, but shall be a matter for adjustment between the Contractor and the company or companies concerned.

The provisions of this section shall be understood to include all work performed to remove, repair, protect, support or temporarily remove and replace privately owned utility property, including all work which may be authorized by the Engineer to avoid interference with privately owned utility property. The provisions of this section shall govern in all cases where private utility property interferes with or is about to be disturbed by the City work, notwithstanding any other provisions of the contract.

The Contractor shall give notice in writing, at least seventy-two (72) hours before breaking ground, for the purpose of constructing the work hereunder, to any bus company operating in the streets affected by the work and to any and all private utility companies whose structures may be affected by such work.

1.06.31. Approval of Materials.

(A) LOCAL LAWS

All materials, appliances and types or methods of construction shall be in accordance with the Contract Documents and shall, in no event, be less than that necessary to conform to the requirements of the Administrative Code and the Charter of the City of New York.

(B) APPROVAL OF MANUFACTURERS

The names of proposed manufacturers, materialmen and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Commissioner for approval, as early as possible to afford proper investigation and checking.

(C) REPUTE OF MANUFACTURER

No manufacturer will be approved for any materials to be furnished under the contract unless the manufacturer shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products.

(D) DOCUMENTARY EVIDENCE OF TESTS

For any materials which may not be inspected by the City or its designated representatives, satisfactory documentary evidence that the materials have passed the required inspection and testing must be furnished to the Commissioner prior to their incorporation in the work.

(E) MATERIALS AND WORKMANSHIP

All materials furnished under the contract, unless otherwise specifically called for herein, shall be new and unused, of standard first grade quality and of the best workmanship and design. No inferior or low grade articles will be either approved or accepted, and all work of assembling and construction must be done in a neat, first-class and workmanlike manner.

(F) INFORMATION TO SUPPLIERS

In asking for prices on materials under any item of the contract, the Contractor shall supply the manufacturer or the dealer with such complete information from the specifications and the plans, as may in any case be necessary, and in every case the Contractor shall inform the manufacturer or dealer of all the general conditions and requirements herein contained.

(G) STANDARDS

Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code or specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard.

When no reference is made to a code, standard or specification, the appropriate Standard Specification from ASTM International shall govern.

(H) COMMISSIONER TO SELECT INSPECTORS

Except as specifically provided in the Contract Documents, the Commissioner will select and designate all persons, firms, or corporations to make or witness each and every inspection, test or analysis, with or without reports.

(I) ACCESS TO MANUFACTURING PLANTS

The Commissioner or the Commissioner's designated representative shall have free access at all times to the works, laboratories and refineries where the materials are prepared, and shall be permitted to take such samples therefrom as they may deem necessary.

(J) SAMPLES OF MATERIALS

The Contractor shall submit to the Commissioner for approval, as and when required, samples of materials proposed to be used, as follows:

1. Samples shall be in triplicate, of sufficient size or number to show the quality, type, range of color, finish and texture or material.
2. Each of the samples shall be labeled, bearing the name and quality of material, Contractor's name, date, and contract number.
3. A letter of transmittal, in triplicate, from the Contractor requesting approval, must accompany all such samples.
4. Transportation charges to the Commissioner's Office must be prepaid on all samples forwarded.
5. Samples for testing purposes shall be in accordance with the requirements of the Contract Documents.

(K) (NO TEXT)

(L) TIMELY SUBMISSION

Samples shall be submitted in due time so as to permit proper consideration without delaying any operation under the project. Materials should not be ordered until approval is received in writing from the Commissioner. All materials shall be furnished equal in every respect to the approved samples.

(M) APPROVAL OF SAMPLES

The approval of any samples will be given as promptly as possible, and shall be only for the characteristic color, texture, strength, or other feature of the material named in such approval, and no other.

When this approval is issued by the Commissioner, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Contract Documents, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equivalent to the approved sample and complies in every respect with the Contract Documents. The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.

(N) VALUABLE SAMPLES

Valuable samples such as hardware, electrical fixtures, etc., not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the work after all questions of acceptability have been settled, providing suitable permanent records are made as to location of the samples and their properties.

(O) EQUIVALENT QUALITY OF MATERIALS - "APPROVED EQUIVALENT" OR "APPROVED EQUAL"

All materials and equipment which are designated in the Contract Documents by a number in a catalog of any manufacturer or by a manufacturer's grade or trade name are designated for the purpose of describing the article and fixing the standard of the quality and finish. Materials and equipment which are, in the opinion of the Commissioner, the equivalent to that specified, will be accepted.

The submission of any material, or article, as the "approved equivalent" or “approved equal” of the materials or articles set forth in the Contract Documents as a standard shall be accompanied by illustrations, drawings, descriptions, catalogs, records of tests, samples and any and all other information essential for judging the equality to the materials, finish and durability of that specified as standard, as well as information indicating satisfactory use under similar operating conditions.

Where the Contract Documents provide that the manufacturer's directions are to be followed, such printed directions shall be submitted to the Commissioner.

Samples taken from various deliveries during the progress of the work and during the maintenance period, when tested and analyzed, shall exhibit qualities equal or superior to those of the sample submitted with or described in the bid, and no change of materials shall be made without written permission of the Commissioner.

(P) NOTICE PRIOR TO MANUFACTURE

The Contractor shall give notice, in writing, to the Commissioner, sufficiently in advance of commencing the manufacture or preparing materials especially manufactured or prepared for use in or as a part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or the Commissioner will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or the Commissioner will notify the Contractor that inspection will be waived.

(Q) NO SHIPPING BEFORE INSPECTION

The Contractor shall comply with the foregoing before shipping any material.

(R) CERTIFICATE OF MANUFACTURE

When the Commissioner so requires, the Contractor shall furnish to him authoritative evidence in the form of certificates of manufacturer that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product, or on similar products being fabricated by the manufacturer.

When materials or manufactured products comprise such small quantities that it will not be practical to make physical tests or chemical analyses directly on the products furnished, a certificate stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for acceptance of such materials or manufactured products.

(S) TESTING COMPLIANCE

The testing Personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents, indicating thereon all analyses and/or test data and interpreted results thereof.

(T) REPORTS

Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Commissioner as a pre-requisite for the acceptance of any material or equipment.

(U) REJECTION

If, in making any test, it is ascertained by the Commissioner, that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the site or from the work, and replace it with acceptable material without cost to the City.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract Documents, the Contractor shall immediately proceed to furnish the designated material or equipment.

(V) TESTING APPARATUS AND LABORATORY

The Contractor shall provide and maintain at the plants suitable registering thermometric instruments, weighing devices and other apparatus necessary for the determination of the temperatures, the penetrations, the qualities of materials used, the grading of the mineral aggregates, and for all other tests required by the Contract Documents throughout the process of manufacture.

These instruments, etc., shall be of standard type and approved by the Commissioner. The Contractor shall also provide at the plant a suitable space in which a representative, designated by the Engineer, can carry out these tests under proper conditions.

1.06.32. Costs of Tests Borne and Inspection.

The City will bear the costs of inspections and the making of tests deemed necessary to determine compliance with the Contract Documents of materials and equipment furnished hereunder, with the following exceptions:

1. Any material or equipment to be furnished hereunder as the equal to those designated in the Contract Documents which is tested by the City and found unacceptable because it does not meet the contract requirements, will be rejected. When any such material is rejected, the Contractor hereby agrees to pay the City for all costs incurred in conducting such tests. The Contractor further agrees that upon rejection, the Contractor will immediately proceed to furnish the designated material or equipment and replace any rejected materials at no cost to the City.
2. The Contractor must bear the cost of testing material and equipment specifically called for by the Contract Documents to be tested by the Contractor, and the cost of these tests must be deemed to be included in the prices bid for the related items.

1.06.33. Delivery of Materials.

(A) GENERAL

The Contractor shall furnish to the Engineer a copy of each material order, indicating date of order and quality of material, and shall also notify the Engineer when materials have been delivered to the site and in what quantities.

(B) AMPLE QUANTITIES

The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the contract time.

(C) SEALS AND LABELS

Manufacturer's containers shall be delivered with unbroken seals and shall bear proper labels.

(D) COORDINATION OF DELIVERIES

The Contractor shall coordinate deliveries in order to avoid delay in or impeding the progress of the work.

(E) DELIVERY AND INSPECTION OF MATERIALS FOR STREET CONSTRUCTION

The materials for street construction shall not be brought to or deposited on the street in quantities greater than is necessary for convenient working, and shall be so deposited as to cause the least possible obstruction to streets and sidewalks, as may be determined by the Engineer. All new material of every description shall be carefully inspected after it is brought on the street, and all such not conforming in quality and dimensions to the Contract Documents will be rejected and must be immediately removed from the site of the work. Not until this has been done and the rejected materials removed entirely from the site of the work, each of which conditions must be faithfully fulfilled, will the Contractor be permitted to proceed with the work.

1.06.34. Transportation and Storing of Materials.

It shall be the duty of the Contractor to determine the availability of transportation facilities and dockage for the use of the Contractor's employees, equipment and materials, and the conditions under which such use will be permitted.

If transportation facilities and dockage are available and are permitted to be used by the agency having jurisdiction, the Contractor shall pay all necessary costs and abide by the agency having jurisdiction and all regulations promulgated in connection therewith.

It is understood that the Commissioner makes no warranty or representations as to the availability or adequacy of such facilities.

For storage of materials and equipment on streets, the Contractor shall comply with the New York City Administrative Code, Title 19 TRANSPORTATION, Subchapter 1, §19-121 "Construction and excavation sites; storage of materials and equipment on street".

1.06.35. Partial Payments for Materials in Advance of Their Incorporation in the Work.

The following provisions will be applicable except when it is expressly specified in the "Special Provisions" of the contract that no partial payments will be made for materials in advance of their incorporation in the work:

In order to better insure the availability of materials, fixtures, and equipment when needed for the work, the Commissioner may authorize partial payment for certain materials, fixtures or equipment, prior to their incorporation in the work, but only in strict accordance with and subject to all the terms and conditions set forth in the following subdivisions designated (A) to (P) inclusive, unless another method of payment is elsewhere provided in the contract for specified materials, fixtures or equipment.

(A) The Contractor shall submit to the Commissioner a written request, in quadruplicate, for payment for materials purchased or to be purchased for which the Contractor desires to be paid prior to their actual incorporation in the work. The request shall be accompanied by a schedule of the types and quantities of materials and shall state whether such materials are to be stored on or off the site.

(B) Where the materials are to be stored off the site, they must be stored at a place within the continental United States other than the Contractor's premises (except with the written consent of the Commissioner) and under the conditions prescribed or approved by the Commissioner. The Contractor must set apart and separately store at the place or places of storage all materials and must clearly mark same "PROPERTY OF THE CITY OF NEW YORK," and, further, must not at any time move any of said materials to another off-site place of storage without prior written consent of the Commissioner. Materials may be removed from their place of storage, off the site, for incorporation in the work, upon approval of the Engineer.

(C) Where materials are to be stored at the site, they shall be stored at such locations as shall be designated by the Engineer and only in such quantities as, in the opinion of the Engineer, will not interfere with the proper performance of the work by the Contractor or by other contractors then engaged in performing work on the site. Such materials shall not be removed from their place of storage on the site except for incorporation in the work, without the approval of the Engineer.

(D) INSURANCE

1. <u>Storage off Site</u>

Where the materials are stored off the site and until such time as they are incorporated in the work, the Contractor shall fully insure such materials against any and all risks of destruction, damage or loss, including but not limited to, fire, theft and any other casualty or happening. The policy of insurance shall be payable to The City of New York. It shall be in such terms and amounts as shall be approved by the Commissioner and shall be placed with a company duly licensed to do business in the State of New York. The Contractor shall deliver the original and one copy of such policy or policies marked "Fully Paid" to the Commissioner.

2. Storage on the Site

Where the materials are stored at the site, the Contractor shall furnish satisfactory evidence to the Commissioner that they are properly insured against loss, by endorsements or otherwise, under the policy or policies of insurance obtained by the Contractor to cover losses to materials owned or installed by him. The policy of insurance shall cover fire and extended coverage against windstorm, hail, explosion and riot attending a strike, civil commotion, aircraft, vehicles and smoke.

(E) All costs, charges and expenses arising out of the storage of such materials shall be paid by the Contractor, and the City hereby reserves the right to retain out of any partial or final payment made under the contract an amount sufficient to cover such costs, charges and expenses with the understanding that the City shall have and may exercise any and all other remedies at law for the recovery of such costs, charges and expenses. There shall be no increase in the Contract Price for such costs, charges and expenses and the Contractor shall not make any claim or demand for compensation therefor.

(F) The Contractor shall pay any and all costs of handling and delivery of materials to the place of storage and from the place of storage to the site of the work; and the City shall have the right to retain from any partial or final payment an amount sufficient to cover the cost of such handling and delivery.

(G) In the event that the whole or any part of these materials is lost, damaged or destroyed in advance of their satisfactory incorporation in the work, the Contractor shall replace such lost, damaged or destroyed materials with materials of the same character and quality at the Contractor's own expense. The City will reimburse the Contractor for the cost of the replaced materials to the extent, and only to the extent, of the monies actually received by the City under the policies of insurance hereinbefore referred to. Until such time as the materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid to the Contractor for such lost, damaged or destroyed materials.

(H) Should any of the materials paid for by the City hereunder be subsequently rejected or incorporated in the work in a manner or by a method not in accordance with the Contract Documents, the Contractor shall remove and replace such defective or improperly incorporated material with materials complying with the Contract Documents. Until such materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.

(I) Payment for the cost of materials made hereunder shall not be deemed to be an acceptance of such materials as being in accordance with the Contract Documents and the Contractor always retains and must comply with the duty to deliver to the site and properly incorporate in the work only materials which comply with the Contract Documents.

(J) The Contractor shall retain any and all risks in connection with the damage, destruction or loss of the materials paid for hereunder to time of delivery of the same to the site of the work and their proper incorporation in the work in accordance with the Contract Documents.

(K) The Contractor shall comply with all laws and regulations of any Governmental body or agency pertaining to the priority purchase, allocation and use of the materials.

(L) When requesting payment for such materials, the Contractor shall submit with the partial estimate duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The executed bills of sale shall transfer title to the materials from the Contractor to the City (in the event that the invoices state that the material has been purchased by a subcontractor, bills of sale in quadruplicate will also be required transferring title to the materials from subcontractor to the Contractor).

(M) Where the Contractor, with Commissioner's approval, purchased unusually large quantities of materials in order to assure their availability for the work, the Commissioner, at the Commissioner's option, may waive the requirements of Par. (L) provided the Contractor furnishes evidence in the form of an affidavit of the Contractor in quadruplicate, and such other proofs as the Commissioner may require, that the Contractor is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor shall pay for such materials and submit proof thereof, in the same manner as provided in Par. (L) hereof, within seven (7) days after receipt of payment

therefor from the City. Failure on the part of the Contractor to submit satisfactory evidence that the Contractor has paid in full for all such materials shall preclude him from payments under the Contract.

(N) The Contractor shall include in each succeeding partial estimate requisition a summary of materials stored which shall set forth the quantity and value of materials in storage, on or off the site, at the end of each preceding estimate period; the amount removed for incorporation in the work; the quantity and value of materials delivered during the current period and the total value of materials on hand for which payment thereof will be included in the current payment estimate.

(O) Upon proof to the satisfaction of the Commissioner of the actual cost of such materials and upon submission of proper proof of title as required under Par. (L) or (M) hereof, payment will be made therefor to the extent of 85% provided however, that the cost so verified, established and approved shall not exceed the estimated cost of such materials included in the approved detailed breakdown estimate submitted in accordance with Article 41 of the Standard Construction Contract; if it does, the City will pay only 85% approved estimated cost.

(P) Upon the incorporation in the work of any such materials which have been paid for in advance of such incorporation in accordance with the foregoing provisions, payment will be made for such materials incorporated in the work pursuant to Article 42 or Article 45 of the Standard Construction Contract, less any sums paid pursuant to Par. (O) herein.

1.06.36. Department of Design and Construction to be in Complete Control of Entire Contract.

Whenever reference is made in the Contract Documents to an approval to be obtained from any agency other than the Department of Design and Construction, or when the Contract Documents state that the Contractor will be subject to the directions or orders of such agency in the performance of certain parts of the work, the intention is that the approvals, directions and orders will originate in the agencies but will be transmitted to the Contractor through and with the approval of the Commissioner.

The Contractor shall not act upon any communication directly sent to the Contractor by another agency relative to the prosecution of the work until the Contractor has furnished the Engineer with a copy thereof and received the approval of the Commissioner to proceed.

All communications and coordination meetings relative to the project between the Contractor and any agency, utility company or organization will be conducted and/or approved by the Engineer.

1.06.37. Maintenance Work by the City.

The Contractor agrees that, should it be necessary for City employees to do maintenance or emergency work on or near the site of the work, or to do any other work not part of the contract requirements but deemed expedient by the Engineer, the Contractor will not cause any interference thereto, and further agrees not to claim any damages or extra compensation if such maintenance or emergency work should delay the Contractor's work or cause the Contractor to move any plant or other materials.

If any such work by the City should delay the Contractor and cause him to move plant or materials, the right to an extension of time for performing the whole work under this contract, as provided in Article 13 of the Standard Construction Contract, shall be considered as sufficient compensation thereof.

1.06.38. Inspection of Existing Construction.

As the work progresses, the Contractor shall bring to the Engineer's attention any defective condition of existing construction which is not specifically subject to correction under the Contract Documents in their present form.

The Contractor shall afford the Engineer all cooperation and facilities to inspect existing construction during the course of field operations.

1.06.39. Inspection During Progress of the Work.

The Engineer will inspect the materials furnished and the work done to ensure that they comply with the Contract Documents, and shall have free access at all times to the works, laboratories and refineries where the materials are prepared, and shall be permitted to take such samples therefrom as the Engineer may deem necessary. Materials will be tested in the laboratory of the Commissioner or in any other laboratory of the City designated by him. When deemed necessary, materials may be tested in any other recognized and approved laboratory designated by the Commissioner. The Engineer is hereby authorized and empowered to reject and refuse all labor and materials or methods of installation or application, or any part thereof, offered under or in fulfillment of this contract, that do not comply in kind, quality or quantity with the terms thereof. Any materials delivered or offered to be delivered under this contract, which are rejected by the Engineer as not conforming to the terms thereof, shall be forthwith removed by the Contractor, and materials which do so conform shall be forthwith furnished and delivered by him in place thereof.

The Contractor hereby agrees not to use any materials which have not been inspected and accepted, nor to perform any work except under inspection, to which end the Contractor further agrees to notify the Engineer when lines, grades or inspection are required, so that the Engineer may have time to provide the same. It is hereby agreed that the right of inspection herein provided for is intended solely for the benefit of the City, and the City shall not in any manner be bound by such inspection or by failure to inspect, or by the failure to discover any defective work or materials used in the work or non-compliance with any provisions of the Contract Documents, to accept work which does not in fact comply with the Contract Documents, or relieve the Contractor of the obligation to comply with each of the provisions of this contract. No inspection, approval or acceptance of any part of the work herein contracted for, or of the materials used herein, or any payment on account thereof, shall prevent the Commissioner from refusing to accept the work or materials at any time thereafter during the existence of this contract, because the same do not comply with the requirements of the contract.

The Commissioner reserves the right at all times to undertake and perform such work as may be necessary in opening or removing portions of the work for the purpose of examination. The Contractor shall satisfactorily restore the work so disturbed. Should the work be found faulty in any respect, the portions disturbed shall be restored without cost to the City.

1.06.40. Assistance to be Furnished.

The Contractor shall furnish such laborers as may be necessary to aid the Engineer with inspections, and if the Contractor shall neglect or refuse to do so, such laborers as may be necessary will be employed by the Commissioner, and the expense thereof will be deducted from and paid out of any money then due or which may thereafter become due to the Contractor for work performed under this contract.

1.06.41. Rejected Work.

If, after inspection any work is rejected by the Engineer as defective or improperly done, such defective or improper work shall be taken down and rebuilt or the defects otherwise remedied as the Engineer may direct. And if the Contractor refuses or neglects to remove such rejected work, or otherwise correct the defects, as the Engineer may direct, then the Commissioner may obtain, use and employ materials, men and equipment to do the same, and the expense thereof will be deducted from any money which may then be due or thereafter become due to the Contractor for work performed under this contract.

1.06.42. Final Inspection.

When, in the opinion of the Contractor, the work is complete and ready for final inspection, the Contractor shall so notify the Commissioner in writing. The Commissioner will arrange to give the entire work a thorough inspection, either in person or by a designated representative. Before final payment will be made, any defects or omissions noted on this inspection must be corrected by the Contractor without additional compensation.

1.06.43. Restoration.

Any existing construction on or off the site of the work not required by the Contract Documents to be permanently altered or removed but which has been damaged, disturbed or removed by the Contractor

during the course of the work, shall be repaired, restored or replaced to its original condition as of the start of the work, in accordance with standard practice of the owning Agency, at the Contractor's expense.

1.06.44. Maintenance and Protection of Traffic.

In addition to the following provisions, the Contractor shall be required to maintain and protect traffic in accordance with the requirements of **Section 6.70**.

(A) COMPLIANCE WITH LAW AND ORDINANCES

The Contractor shall observe the law and all ordinances of the City in relation to obstruction of the streets, keeping open passageways and protecting the same where they are exposed and potentially dangerous to the public travel, such passageways shall, as may be required, be planked or bridged by the Contractor and the cost thereof, except as otherwise provided, shall be deemed to be included in all items for which there are contract prices.

(B) MEETING WITH OFFICE OF CONSTRUCTION MITIGATION AND COORDINATION (O.C.M.C.)

To permit finalization of traffic control measures, the Contractor, twenty (20) days before beginning operations, shall arrange for an on-site field meeting with the N.Y.C. Department of Transportation's Office of Construction Mitigation and Coordinating (O.C.M.C.).

The Contractor shall submit a schedule of operations to the O.C.M.C., 55 Water Street, 7th Floor, New York, N.Y. 10041, prior to the start of work.

(C) MAINTAIN TRAFFIC

Where streets now in use are included within or connect with the work under this contract, the Contractor shall keep the passageways of such streets open and provide safe and convenient means of access to buildings fronting thereon. Only so much of such streets, as may be directed, shall be disturbed at one time.

(D) MAINTENANCE OF WAY

Where streets or portions of streets now in use are included for paving or repaving work under this contract, the Contractor shall be responsible for the maintenance of such streets or portions of streets prior to the performance of said paving or repaving work. The maintenance of such streets shall include any repairs, as directed, including the filling of potholes, that may be necessary due to usage of the streets by traffic, and shall start from the date of written notice to commence work or actual start of work, whichever is earlier.

(E) BARRICADES, SIGNS AND OTHER PROTECTIVE DEVICES

The Contractor shall furnish, erect and maintain at closures, intersections and at all other locations, where required, all necessary standard or approved barricades, suitable and sufficient lights, approved reflectors, danger signals, warning and closure signs, directional detour signs and whatever additional measures the Engineer may deem necessary for proper control of traffic and for the safety of all concerned, all in accordance with the rules and regulations of the NYC Department of Transportation and the National Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), supplemented by 17 NYCRR Chapter V (New York Supplement), latest edition. The Contractor shall indicate by day and by night the impassable and dangerous conditions existing on or adjacent to the site of the work. The Contractor shall take all necessary and legal precautions for the protection of the work and for the safety of the public, as required by the contract. All barricades, danger signals, warning signs and obstructions shall be illuminated at night and all lights shall be kept burning from sunset until sunrise.

Barricades shall be placed parallel to, adjacent to and on both sides of excavations for curbs and sidewalks in accordance with the stipulations under **Subsection 6.70.11.(C)** FOR CURB AND/OR SIDEWALK WORK. Each barricade within the roadway shall have at least one (1) battery-operated, flash-type warning device of approved manufacture affixed thereon, as directed by the Engineer.

“Regulatory” and/or “No Parking-Construction” signs used during the construction period are to be furnished by the Contractor, as required. The Contractor shall install these signs where directed by the Engineer and, when no longer required, shall carefully remove these signs and deliver them to the Bureau of Traffic.

These signs will be measured for payment under Item 6.25 RS. The cost of said removing and delivering shall be deemed included in the price bid for Item 6.25 RS. A credit of fifty ($50) dollars will be taken for each sign not so delivered. Relocation of signs shall not entitle the Contractor to additional payment.

Excavations for basins, inlets, manholes, seepage basins, pipe connections, sewers and other miscellaneous structures shall be protected by installing a five (5') feet high, two (2") inch x four (4") inch mesh, #14 gauge, welded-wire fabric fence around the periphery. Stay wires shall be two (2") inches apart; line wires four (4") inches apart. Wire fabric shall be securely attached to approved posts which are driven into the ground. Maximum post spacing shall be eight (8') feet. The said excavation shall be further protected by the use of barricades, as specified for curb and sidewalk excavation, above.

Steel plates shall be provided over all excavations in front of driveways and excavations over which pedestrian or vehicular traffic is to be maintained. Plates shall be of a thickness sufficient for the loads to be carried and shall have not less than two (2') feet of bearing on either side of an excavation. Width of plates for vehicular traffic shall not be less than ten (10') feet, and for pedestrian traffic not less than four (4') feet. Plates for pedestrian traffic shall be equipped with approved, dismountable hand rails on both sides, for the full lengths of plates. The Contractor shall be responsible for the adequacy of all plates.

Where roadway pavement excavations have not been backfilled to grade within seven (7) calendar days of excavation and the roadway is required to be opened to traffic by covering the excavation with steel plates, the Contractor must recess the steel plates into the pavement surface by either stripping or grinding the asphalt pavement around the perimeter of excavations, as required, to embed the plates flush with the adjacent pavement surface at no additional cost to the City.

(F) TEMPORARY WALKS AND BRIDGES

Where required, the Contractor shall construct and maintain as directed, suitable temporary walks and bridges for pedestrians and vehicles.

(G) USE OF ROADWAYS BEFORE FINAL ACCEPTANCE OF THE WORK

The City shall have the right before the final acceptance of all work under this contract, to open to vehicular traffic those areas adjacent to the structures upon which work has been completed, and the Contractor shall carry on the work so as not to interfere with or endanger such vehicular traffic and shall make no claim for damages on account thereof.

1.06.45. NO TEXT.

1.06.46. Project Sign

The Contractor is notified that the Contractor shall be required to furnish, install, maintain, and remove, when directed, Construction Project Information Signs (CPIS) as per Sec. 2-02(c)(3) of the NYCDOT Highway Rule and the cost shall be deemed included under all scheduled items of the contract. In addition, unless otherwise specified in the Special Provisions of the contract, the following Project Sign shall also apply:

(A) PROJECT SIGN

1. Responsibility: The Contractor shall produce and install one (1) project sign which shall be posted and maintained upon the site of the project at a point and in a position where directed by the Commissioner. The Contractor shall protect the sign from damage during the continuance of work under the Contract and shall do all patching of lettering, painting and bracing thereof necessary to maintain same in first class condition and in proper position. Prior to fabrication, the Contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of completed sign for approval by the Commissioner. Sign shall remain on display where posted until the completion of the work except that, when so ordered by the Engineer, the Contractor shall remove, relocate or repost sign as directed.

2. Sign Quality: The Contractor shall provide all materials required for the production of the sign as specified herein. Workmanship shall be of the best quality, free from defects and shall be produced in a timely manner.

3. Schedule: Upon project mobilization, the Contractor shall commence production and installation of the sign.

4. Removal: At the completion of all work under the Contract, the sign shall be removed and disposed of away from the site.

5. a. Sign Construction with Image: shall be a one piece 4' x 8' x 1/8" (3mm) (minimum thickness) industrial standard type sign panel composed of double sided painted aluminum bonded to a solid polyethylene core. Paint shall be a factory applied surface that is flat white, smooth, and ready for the application of the vinyl sign graphics. Samples must be submitted for approval.

   b. Sign Construction without Image shall be a one piece 4' x 4' x 1/8" (3mm) (minimum thickness) industrial standard type sign panel composed of double sided painted aluminum bonded to a solid polyethylene core. Paint shall be a factory applied surface that is flat white, smooth, and ready for the application of the vinyl sign graphics. Samples must be submitted for approval.

6. Sign Graphics:

   a. All visual components of the sign are in an Adobe *.pdf file, which is provided by the Commissioner's representative. The file is not to be altered for composition, type font or image from the version provided by NYCDDC. The Commissioner's representative shall provide a complete file with data and image. The digital file shall be provided by NYCDDC to the Contractor (on a CD or via E-mail) for printing.

   b. The NYCDDC *.pdf file with names provided by the Commissioner shall be reproduced digitally at the Sign Panel size of 4' x 8', or 4' x 4' without Image, on outdoor non-fading vinyl with matte uv laminate with 6-year lifespan made by 3M, Avery, Orical, or an approved equivalent. Vinyl shall be guaranteed for six years. Guarantee must cover fading, peeling, chipping or cracking.

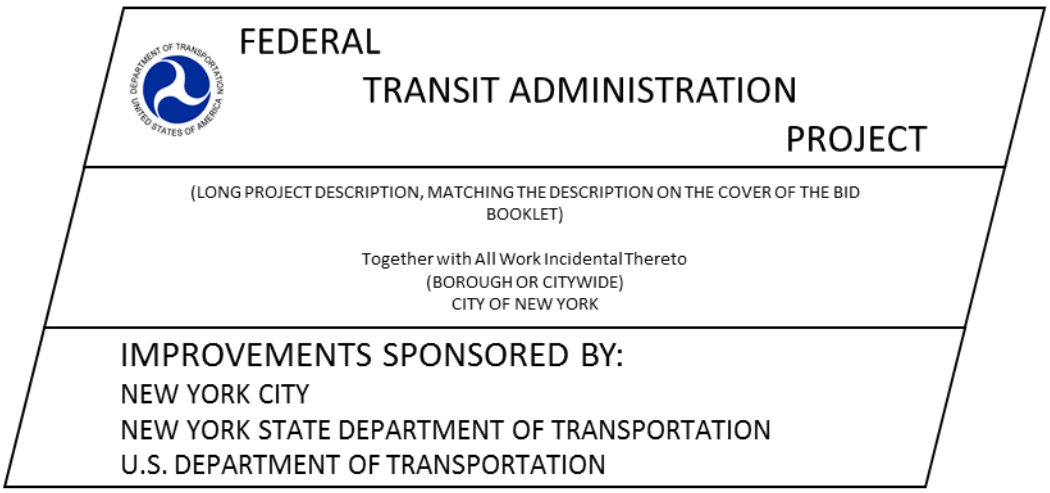
(B) FEDERAL HIGHWAY ADMINISTRATION (FHWA) PROJECTS

For contracts with FHWA funding, no Project Signs will be required on this project.

(C) FEDERAL TRANSIT ADMINISTRATION (FTA) PROJECTS

In addition to the Project Sign specified above, the Contractor shall also be required to furnish and install an FTA Project Sign as shown below. The FTA Project Sign shall be posted and maintained upon the site at a point and in a prominent position where directed by the Commissioner. The Contractor shall protect and repair the sign from damage during the continuance of work under the Contract. In addition, the requirements for Sign Quality, Schedule, and Removal as specified above will also apply to the FTA Project Sign and the sign panel material shall be the same as that used for the Project Sign required above, but with the dimensions and details as follows:

- Overall sign height: 30", with three equal bands, each 10" high
- Overall sign width: 67.5" (60" horizontal bottom + 7.5" skew of parallelogram)
- Three bands of equal size, with the following formatting:
  - Topmost band: White lettering on a red background
  - Middle band: Blue lettering on a white background
  - Bottom band: White lettering on a blue background



1.06.46A. Temporary Notification Signs.

The Contractor is notified that the Contractor shall be required to furnish, display, maintain, remove, relocate and dispose of temporary notification signs in accordance with the following provisions:

(A) Temporary Notification Signs shall be conspicuously displayed at the site of each street opening or at a minimum on one (1) sign per block along a series of excavations or continuous cuts. All sign locations shall be as directed by the Engineer.

(B) Temporary Notification Signs shall be of sufficient size to contain the required and appropriate text, and shall be reusable along the work site and for various stages of work.

(C) Temporary Notification Signs shall be clean, readable and in letters at least one and one-half (1-1/2") inches in height, and shall conform to the N.Y.C. Department of Transportation's specifications. A sample of the proposed notification signs must be submitted to the Resident Engineer for approval, prior to any signs being posted.

(D) The following information shall be indicated upon the Temporary Notification Signs:

(a) Name of the Contractor doing the work.
(b) Name of the agency (Department of Design and Construction) for whom the work is being done.
(c) Names of subcontractors, when employed.
(d) Permit number.
(e) Purpose of the street opening (e.g. Construction of Sanitary/Storm Sewers).
(f) Start and scheduled completion dates of the work.
(g) The Resident Engineer's Field Office telephone number for complaints.

(E) The cost of all labor, materials, plant, equipment and samples required to furnish, display, maintain, remove, relocate and dispose of the Temporary Notification Signs all in accordance with the specifications and direction of the Engineer shall be deemed included in the price bid for all contract items of work. No separate or additional payment will be made for this work.

1.06.47. Site to be Maintained in Neat and Orderly Condition.

The Contractor shall maintain the site in accordance with the requirements of **Section 7.13**. Where no separate item is provided for this work, the cost thereof shall be deemed to be included under all scheduled contract items.

1.06.48. Additional Provisions Pertaining to Street Paving and Installation of Sidewalks.

(A) GENERAL

The Contractor shall furnish lines and grades in accordance with **Section 1.06.27**, except that survey controls established for the project may no longer exist and the Contractor shall be required to re-establish the survey control information using official Borough Survey Control Monuments and Bench Marks, where they exist. The Contractor shall check with Topographical Bureau of the Borough President's Office as to the reliability and accuracy of the data to be used for lines and grades.

All hydrants, light poles, trees or other fixed objects that are to be constructed, planted, reset, or relocated as a result of the project shall be constructed or planted so as to provide at least a one and one-half (1-1/2') feet clear distance from the face of the curb to the face of the object.

As a result of curb relocation within the contract limits, existing street appurtenances projecting above paved surfaces, such as hydrants, lampposts and traffic signal poles, bus shelters, etc., will have to be relocated. Not withstanding any construction sequence as defined by the Contract Documents, the Contractor shall plan all construction operations to ensure that these appurtenances are constructed or relocated in conjunction with the installation of the new curb.

In particular, in the event the sidewalk is widened, the street appurtenances shall be maintained at their existing location behind the existing curb until the new sidewalk is constructed. If the sidewalk is narrowed, the street appurtenances must be moved to their new locations behind the proposed new curb prior to removal of the existing curb.

Services must be maintained by installing and energizing new appurtenances or by using temporary appurtenances, as directed by the Engineer. Unless otherwise provided for, all temporary appurtenances shall be provided at no additional cost to the City.

(B) STAGING OF CONSTRUCTION

During its progress and at its completion, the work to be done shall conform to the lines and grades given by the Engineer and shall be constructed in accordance with the plans, additional working drawings, the specifications, and the directions given by the Engineer.

The Contractor's attention is specifically directed to the following requirements regarding the staging of the construction:

Contractor shall plan and/or stage the work schedule using all hours/days available. Contractor is advised that all applicable unit prices shall include, for the purpose of this contract, all overtime costs, premium time costs, shift differentials required to complete construction within the specified "Time(s) of Completion" stipulated in this contract.

Contractor shall be permitted to accelerate the project, to combine stages and/or work sequences. Any such changes shall be shown in the construction schedule, to be furnished in accordance with the Progress Schedule required by Article 9 of the Standard Construction Contract and the above **Section 1.06.25.**, "Schedule of Operations", and shall be submitted for approval of the Engineer.

The Contractor shall complete all curb construction before commencing any roadway grading operations, stripping, removing or placing any pavement, unless otherwise permitted by the Engineer, in writing. Curbs and depressed curbs in driveways are to be constructed where shown on the plans or as directed by the Engineer.

When constructing curbs, the Contractor will be permitted to encroach upon the area immediately adjacent to the curb only to the extent essential for this operation. Excavation adjacent to curb shall be safeguarded and protected as specified in Paragraph 1.06.44(E), BARRICADES, SIGNS AND OTHER PROTECTIVE DEVICES.

All excavations shall be adequately sheeted and braced in accordance with the requirements of Rule 23, Industrial Code, Department of Labor, State of New York, to the satisfaction of the Engineer and as supplemented herein. The adequacy of all sheeting and bracing shall be, solely, the responsibility of the Contractor.

All sheeting and bracing placed by the Contractor, no matter under which items, shall be removed at the completion of the work, unless it is designated on the plans to be permanently installed, and the cost shall be deemed included in the prices bid for all scheduled items.

When sheeting and bracing is removed, the rate of removal shall coincide with the rate of placement and compaction of backfill. The surface of compacted backfill shall be kept above the bottom of the sheeting until the said surface is within twelve (12”) inches below the proposed final surface.

Where permanent sheeting is designated to be installed it shall be cut off two (2’) feet below the adjacent ground surface after backfilling has been placed and compacted to within four (4’) feet of the proposed final surface, and all voids behind such sheeting shall be filled with acceptable, compacted materials.

All excavations shall be safeguarded and protected as specified in Paragraph 1.06.44(E).

When contract work is to be progressed in other than daylight hours, the Contractor shall provide auxiliary lighting equipment to illuminate the work area. Such equipment shall be self-contained, portable and of the floodlight type. Power units and floodlights shall be adequate in capacity and number to provide a minimum intensity of two and one-half (2-1/2) foot-candles over the entire work area. The Contractor shall provide an approved type of foot-candle meter which shall be available for the Engineer's use at all times. Light intensity shall be measured at the surface of the pavement.

(C) ACCESS RAMPS

Where the City has obtained slope easements or the equivalent thereof from owners whose properties abut the contract work and where it is necessary to cut or fill said abutting property in accordance with the contract requirements to effect entrance or exit to or from the property, the Contractor, when ordered by the Engineer, shall provide temporary access by ramping as indicated below or by other approved means.

Said access ramps shall have a maximum grade of one (1) vertical on twelve (12) horizontal for pedestrian ramp and one (1) vertical on six (6) horizontal for driveway ramp and shall be hard surfaced with a minimum of two (2”) inches of asphaltic material or equivalent. The cost of installation (over and above the cost of normal sloping of cut or fill) of these access ramps will be included in the appropriate scheduled contract items.

(D) REMOVE EXISTING CURB, GUTTER, PAVING AND FLAGSTONES

Before commencing the work in any block, the Contractor shall:

1. allow any property owner, having a proper permit from the Commissioner, to remove and retain the old curb and flagstone which may be in front of the property owner’s premises;
2. take up, where required, all existing curb, bridgestones, gutter, paving and flagstones not in conformity with the Contract Documents;
3. mark for identification curb and flagstones not claimed by property owners, and remove, store and utilize, as directed, such existing materials of construction as may be required; and
4. remove to a location designated by the Engineer, such of the existing curb, bridgestones, gutter, paving and flagstones, when and as may be directed, which are not claimed by property owners or utilized in the work as provided.

Where materials are designated to be hauled to and deposited in a specific location, alternate locations may be designated by the Engineer provided the hauling distance remains approximately the same.

(E) REMOVE SIGN POSTS

Unless otherwise provided in the contract, the Contractor shall remove, as required, all sign posts not in conformity with the work, and transport them to a location designated by the Engineer or relocate and reset them as directed; and shall backfill holes caused by such removal.

(F) REMOVE OTHER ENCUMBRANCES

Buildings, pipes, lumber and all other encumbrances or obstructions, above the ground surface, which may be upon the line of the work when it is begun, or may thereafter be placed there, shall, if and to the extent directed, be removed by the Contractor.

(G) REMOVE SURPLUS MATERIALS, RUBBISH, ETC.

All surplus materials, earth, sand, rubbish and stones shall be removed from the site of the work, block by block, as rapidly as the work progresses. The Contractor shall remove all stains or deposits of cement or bitumen from the curbs, walks and adjoining pavements. All material covering the pavement and sidewalks shall be swept into heaps and immediately removed from the line of the work. Unless this is done by the Contractor to the satisfaction of the Commissioner, within forty-eight (48) hours after being notified to do so by a written notice to be served upon the Contractor, either personally or by leaving it at the Contractor's residence or with any of the Contractor's agents on the work, or in the manner provided herein, the same will be removed by the Commissioner and the amount of the expense thereof will be deducted out of any moneys due or to become due to the Contractor under this contract. The work will not be accepted until the said materials are removed.

(H) RELOCATE CITY STRUCTURES

City water mains, hydrants and connections to be relocated, will be removed and reconstructed or relaid by the Bureau of Water and Sewer Operations, except as otherwise provided.

Traffic signal posts, fire alarm posts, street lighting posts and other City structures required to be relocated, shall be removed and relocated on new foundations and provided with new service connections or reconstructed by the City Agencies having jurisdiction thereover, except as otherwise provided.

All signs, meters and other equipment, belonging to the Bureau of Traffic and which have been taken down by the Contractor during the progress of the work, shall be carefully loaded by the Contractor and delivered by him to a City yard to be designated by the Bureau of Traffic or stored on the site, re-used in the work and reset in locations designated by the Bureau of Traffic as directed by the Engineer.

(I) TREE PRESERVATION, REMOVAL, RELOCATION AND PLANTING

The Contractor must submit a no fee PA-Forestry application to the respective borough office of the proposed project. Applications MUST contain the project name, proposed site plan/drawings, scope of work, and any other supplemental information the Contractor feels would help facilitate the goals of the project. An application can be found at the following link:

https://www.nycgovparks.org/services/forestry/tree-work-permit

No trees are to be removed unless approved by the Department of Parks and Recreation (NYCDPR). No branches or roots are to be cut up unless approved by the Department of Parks and Recreation. Every conscionable effort is to be made to save trees by the use of: the curb detail at existing trees, by slight modification in curb alignment, or by other methods so ordered by the Engineer, in accordance with acceptable Engineering practices. All proposed work must be clearly stated and explained on the PA-Forestry application and/or with the addition of supplemental information.

All work consisting of removing and replanting existing trees, planting new trees, constructing walls, installing iron tree guards, and all work in connection therewith shall be done by the Contractor to the satisfaction of the Department of Parks and Recreation of The City of New York. A Certificate of Acceptance shall be obtained by the Contractor from the Department of Parks and Recreation and filed with the Engineer before the final voucher is approved for payment.

Trees along the line of work shall be protected against injury or defacement by the Contractor. The Contractor shall be required to furnish, install, maintain, and subsequently remove temporary protective tree barriers along the line of work to protect the trunks of said trees which are designated to remain and said tree branches which obstruct the proper use of Contractor's equipment shall be properly restrained. Such tree protection shall be erected prior to commencement of work in any particular street as specified herein. Any trees injured or defaced which do not require replacement shall be treated by the Contractor to insure its continued growth in accordance with the recommendations of the Project's Tree Consultant and/or Department of Parks and Recreation, and at the expense of the Contractor.

Protective tree barriers shall be Type B, unless otherwise directed by the Engineer, and shall be constructed and installed as per the requirements of **Section 4.22**, and as directed by the Engineer.

Trees injured or defaced beyond treatment shall be replaced in accordance with the requirements for new trees, and at the expense of the Contractor.

No work adjacent to street trees may be performed until the Contractor has obtained the required no fee permit from the Department of Parks and Recreation and filed it with the borough office that falls within the project limits. An application can be found at the following link:

https://www.nycgovparks.org/services/forestry/tree-work-permit

All new trees are to be planted in accordance with the requirements of **Section 4.16** and as shown on the Contract Drawings or as directed by the Engineer. Type of trees to be planted shall be as directed by the Engineer, in consultation with the Department of Parks and Recreation, unless otherwise specified.

If existing tree roots are exposed as a result of the project construction activity, they must be kept wet by covering with burlap saturated with NYC municipal water, until back filled and or covered with soil.

Any tree root damage, caused by the Contractor's operations, shall be evaluated thoroughly by the Contractor's Tree Consultant prior to any action being taken, and any corrective measures required shall be performed at no cost to the City.

In areas where heavy equipment or vehicles must operate within the critical root zone of a tree (under the drip line), a 12" layer of wood chips must be applied by hand and spread to a uniform depth over the entire area to create a smooth level cover to prevent soil compaction and root loss. Plywood or ground surface protection mats should also be added if requested by the Contractor's Tree Consultant and approved by the Engineer, to further abate soil compaction.

Wood chips shall be clean chips free of any deleterious material such as ash or insecticide. Chips may be of any wood except wood waste generated from an Asian Longhorned beetle infestation or an Emerald Ash borer infestation. Wood chips produced on the site through authorized pruning and tree removal may also be used for this work. Chips shall be derived from tree material, not from wood waste or by-products like sawdust, shredded pallets, or other debris.

Plywood shall be new or gently used 4' by 8' feet sheets with a minimum thickness of 1/2". CCA treated lumber is not acceptable for this work. Hardware to fasten plywood sheets shall be corrosion resistant steel.

Ground surface protection mats shall be manufactured from high-density polyethylene (HPDE), 1/2" thick minimum, measured approximately 4' by 8', be equipped with a lip on two sides that creates an overlapping joint with an adjoining mat to allow for effective load distribution between points uniformly spaced along the full length of the overlapping lips of adjacent mats with fixed locking pins, and a potential load bearing capacity of at least 60 tons dependent upon sub-surface properties. Mats shall be similar to "Dura Deck®" as manufactured by Signature Fencing & Flooring, NY, NY; "AlturnaMATS®" as manufactured by Alturnamats, Inc., Titusville, PA; or, an approved equivalent.

Plywood/Ground surface protection mats shall remain in place and not be moved or removed without written permission granted by Contractor's Tree Consultant and the Engineer, until all work which might cause compaction or root damage has been completed.

Wood chips shall be removed by hand at the completion of all work which might cause soil compaction or root damage has been completed, unless otherwise directed by the Engineer.

The Contractor shall not be permitted to operate auxiliary equipment which generates exhaust or other heat upward (e.g., generators and compressors), under the branches of trees where the branches are less than 25' above the ground, unless approved by the Engineer in consultation with the Tree Consultant.

(J) SIDEWALK OPENINGS FOR TREES

When new sidewalks are constructed and/or old sidewalks relaid, an opening of at least forty (40) square feet shall be left around existing trees or as otherwise approved by NYCDPR, or the walk shall be constructed as directed by the Engineer.

(K) ADJUSTING MANHOLE HEADS, ETC.

All existing manhole heads and other appurtenances of subsurface structures which:

1. belong to The City shall, where required, be adjusted to the new work; be brought to the finished street surface with masonry of the same thickness as that of the existing structures; have broken iron heads or gratings replaced with heads or gratings which will be furnished by the Contractor under Item 6.22 F;
2. belong to public utility or other corporations will be adjusted to the new work by the corporations owning such appurtenances, under the supervision of the Contractor who shall be held responsible for the accuracy of such adjustments and who shall make such corrections, during the progress of the work or the maintenance thereof, as may be required.

(L) ADJUSTING EXISTING PAVEMENTS, SIDEWALKS, ETC.

Existing pavements, sidewalks, curb, gutter, flagging, and crosswalks shall be properly adjusted to the work done under this contract, as may be directed.

(M) RESETTING EXISTING CONCRETE CURB

Existing concrete curb which, in the opinion of the Engineer, is of suitable quality and dimensions shall be reset as directed to the proper line and grade.

(N) OLD MATERIALS TO BE REMOVED

Designated old useful materials, necessary to be removed in the preparation for the work (excepting earth and rock excavation, all salvageable sewer and water main materials, and materials designated by the Engineer as useless), which cannot be utilized in accordance with the terms of this contract, shall remain the property of The City and shall be delivered by the Contractor to a designated City-owned yard. All salvageable sewer and water main materials which cannot be utilized in accordance with the terms of this contract shall become the property of the Contractor for removal and disposal, by him, away from the site.

All old steel curb, basin and inlet castings designated to be scrapped, all other metallic scrap belonging to the City, and all useless materials shall become the property of the Contractor and shall be removed and disposed of, by him, away from the site.

Materials to be re-used in the work shall be marked in such a manner as may be required for future identification.

(O) REUSE OF MATERIAL

Materials which are specially suitable for use in the work shall be collected, piled and utilized as directed by the Engineer. All the work of removing old material as specified above shall be done at the expense of the Contractor.

(P) REQUIREMENTS BEFORE ACCEPTANCE

Before the work is accepted, the Contractor shall remove all surplus material and shall:

1. crown the roadway to the uniform space specified and, if directed, thoroughly compact the roadway with an approved roller;
2. grade sidewalk areas to slopes specified;
3. cut the side slopes in earth excavation to a slope of one and one-half (1-1/2) horizontal to one (1) vertical or such other approved slope as may be rendered necessary by local conditions, and no measurement beyond such approved limits of slope will be made or allowed; and
4. drop the curb, where authorized, at private driveways, so that the top of the curb is one and one-half (1/2”) inches above the gutter line for a width of not less than eight (8’) feet, or as directed by the Engineer.

(Q) OPENING OF STREET NOT TO BE CONSTRUED AS ACCEPTANCE

Streets or parts thereof, or completed portions of pavement, within the limits of this contract, shall be open to travel as directed by the Engineer, but such openings shall not be construed as an acceptance by the

City of the work done. Where thus open to public travel by direction of the Engineer, the Contractor shall repair such damage to the work caused by such travel or public use, pending the final completion as certified by the Engineer. Payment therefor will be made under the appropriate scheduled contract items.

(R) NO TEXT.

(S) NEW CURBING EXTENDED INTO CROSS STREETS

When new curbing is to be extended into cross streets, it shall be concrete curb, unless otherwise shown on the plans or directed by the Engineer. Where curb beyond the corner is not steel faced concrete curb, steel curb is to be extended to clear pedestrian ramps and/or to the new catch basins as constructed, clear of the pedestrian crosswalk. The cost of the additional tangent length of steel faced concrete curb will be paid for under the appropriate straight steel faced concrete curb item, except when there is no scheduled item for straight steel faced concrete curb. Where there is no scheduled item for straight steel faced concrete curb, then the additional tangent lengths of straight steel faced concrete curb required to clear pedestrian ramps and other street hardware shall be paid for as Corner Steel Faced Concrete Curb.

(T) NEW CURBING ADJACENT TO EXISTING CONCRETE SIDEWALK

Where new curbing is required adjacent to existing concrete sidewalk which is not to be replaced, a concrete saw-cut shall be made along a line parallel to and two (2') feet back from the new curb. The cost of the saw-cut shall be deemed to be included in the price bid for the curb item.

(U) WHERE PROPOSED TOP OF CURB LINE PROFILE VARIES FROM THE EXISTING PROFILE ALONG THE TOP OF SUBWAY/SIDEWALK VENTILATORS BY MORE THAN ONE (1") INCH

Where the proposed top of curb line profile varies from the existing profile along the top of subway/sidewalk ventilators by more than one (1") inch, the Engineer will direct the Contractor to adjust the top of the new curb, during construction, to conform with the profile of each ventilator and with the proposed grades at the points of tangency and curvature in each block. The gutter line profile shall be seven (7") inches below the proposed top of curb profile.

(V) TOP OF CURB ELEVATIONS AT CORNER PEDESTRIAN RAMPS

The top of curb elevations at corner pedestrian ramps shall be established in conjunction with roadway pavement construction so as to provide positive surface drainage from the apex to a catch basin, as directed.

(W) SIDEWALK WORK

The location and the extent of new sidewalk to be constructed shall be as shown on the Contract Drawings or as directed by the Engineer.

When new sidewalk is designated to be constructed in corner quadrants and in tee intersections, the Contractor shall be required to install pedestrian ramps with detectable warning surfaces at each location, unless otherwise directed. The cost for such is to be deemed included in the various sidewalk, embedded preformed detectable warning units, and steel faced corner or granite corner curb items used.

The Contractor shall also be required to reset/adjust anchorage for security gates within sidewalk areas, as necessary or as directed by the Engineer. Cost of this work shall be deemed included in prices bid for sidewalk work.

At all proposed bus pads new continuous sidewalk shall be constructed for the entire length of the bus pad, from the curbline to the property line/fence line or as directed by the Engineer.

1.06.49. Additional Provisions for Street Lighting and Traffic Signal Work.

The Contractor shall furnish, install and remove all necessary street lighting and traffic signal equipment prior to new paving.

All material to be furnished and all work to be performed shall conform to the latest specifications and drawings on file with the New York City Department of Transportation, Division of Traffic Operations, Signal Engineering and Street Lighting office, be subject to the approval of the Division's Engineer, and conform

to the latest NEMA Standards and be UL approved. Said specifications and standard drawings are hereby made a part of this contract and the Contractor shall be responsible for strict adherence thereto. All questions as to whether materials conform to NEMA Standards or code requirements shall be resolved as determined by the Engineer.

It shall be the Contractor's responsibility to familiarize himself with the contents of the above mentioned specifications, copies of which are on file in the above office of Signal Engineering and Street Lighting. New installations shall be energized before removal of the existing poles.

All electrical work related to street lighting and traffic signals shall be performed only by a licensed electrician registered with the Department of Buildings. The Contractor shall furnish to the Engineer the name and license number of the licensee prior to the performance of any street lighting or traffic signal work.

All materials required for Street Lighting Facilities and Traffic Facilities work, including but not limited to all internal pole wiring, shall be furnished by the Contractor, unless otherwise specified.

Existing street lights shall not be removed until new street lights are energized and operational. In the event that a lamppost is removed for the Contractor's convenience before a corresponding new lamppost is energized, temporary lighting must be provided at no additional cost to the City.

All existing street lighting and traffic signal equipment designated to be removed but deemed salvageable by the Borough Engineer of the Department of Transportation, must be carefully disassembled and returned to a location or locations within the five boroughs of New York City as directed by the Borough Engineer of the Department of Transportation.

Any damage to the existing street lighting and traffic control equipment, as a result of the Contractor's work and/or work force, shall be replaced or repaired by the Contractor at no cost to the City.

All pedestrian drop curbs shall clear existing lampposts and traffic signal posts.

1.06.50. Additional Provisions Should Any Railroad Facilities Pass Over, Under, or Adjacent to the Project Work.

The Contractor is cautioned that underground Transit facilities may exist within or adjacent to the project limits and these Transit structures may extend to, or near to, the street surface. These facilities may include ventilation structures, entrances, emergency exits, vaults, conduits, ducts, column foundations, etc., during the construction. These facilities must be supported and protected by the Contractor as directed by the Transit Engineer.

No direct payment will be made for costs incurred in complying with the following provisions, unless otherwise provided. Said cost will be deemed to have been included in the prices bid for all the scheduled contract items.

The following appropriate notes will apply, as necessary, should any railroad facilities pass over, under, or adjacent to the project work:

(1) The N.Y.C. Transit (NYCT) reserves the right to place inspectors, flagperson or other personnel in the subway structures during construction of the project linked by a telephone system, if deemed necessary, to observe the effects of the construction on the transit facilities. It is expected that such personnel will be necessary when the construction comes within twenty-five (25') feet of the subway structure. However, NYCT further reserves the right to place such personnel whenever, in its opinion, the project conditions warrant such placement, regardless of distance. The cost of such personnel, telephone installation and any re-routes, diversions of service, work trains, etc., made necessary by the project, will be paid direct to the NYCT by the City, at no cost to the Contractor. It is agreed that the furnishing of any Transit personnel will not relieve the Contractor from any liability of payment for damage caused by the Contractor's operations.

(2) All rock excavation adjacent to the Transit structure is to be channel drilled two (2') feet below subgrade.

(3) If top of rock is found below subway structure, the subway structure must be underpinned in accordance with drawings to be submitted to NYCT for approval.

(4) If rock is soft or seamy, lateral supports must be provided below the subway structure in accordance with drawings to be submitted to NYCT for approval.

(5) Blasting will be permitted only with light charges subject to the approval of NYCT's Engineer and in accordance with the regulations of the Fire Department. The Contractor must provide a detailed monitoring plan, providing for measurements of both particle velocity and displacements at critical locations of the NYCT structure. The monitoring plan must include threshold and upset levels of both particle velocity and settlement together with an action plan for their implementation. The Contractor must secure an approved Seismologist to install and operate suitable velocity gauges to continuously monitor particle velocity and an independent licensed Surveyor to monitor displacements. The threshold maximum particle velocity above ambient caused by the blasting will be 0.5 inch per second. Values exceeding this level will be reviewed and evaluated by NYCT's Engineer. In no case will particle velocities exceed the upset level of two (2.0") inches per second.

(6) Before placing concrete, the subgrade of the foundations in the vicinity of the subway structure is to be inspected and approved by the NYCT's Engineer.

(7) If any portion of the subway structure or finish is damaged as a result of the Contractor's operations, it must be repaired or replaced with the same materials in place, subject to the approval of the NYCT's Engineer and at the Contractor's own expense.

(8) Excavation embankments are to be shored and braced. Drawings indicating a suggested method of construction are to be submitted to NYCT for approval in conjunction with the Project's Contract Drawings. In case of excavation undermining the subway structure, underpinning may be required. Drawings for underpinning are to be submitted to NYCT for approval.

(9) Temporary shoring may be placed in direct contact with NYCT structures only if the NYCT structure is shown to be able to support all anticipated loads that can be transferred through the temporary structures without damaging the existing structure. At the completion of the project, these temporary shoring and bracing systems are to be removed as approved by NYCT.

(10) When piles are to be driven adjacent to the subway structure, boring data, pile layouts, specifications and installation procedures are to be submitted to NYCT for approval. Velocity meters are to be installed in the subway tunnel at critical locations to monitor induced vibrations. Induced displacements along the tunnel structure and track invert are to be monitored during driving. The threshold maximum particle velocity above ambient caused by the driving will be 0.5 inch per second. Values exceeding this level will be reviewed and evaluated by NYCT's Engineer. In no case will particle velocities exceed the upset level of 2.0 inches per second.

(11) No piles are permitted to be installed by any method within three (3') feet of subway structure, measured from the edge of the pile or casing to the wall. Closed end piles will not be permitted to be driven within ten (10') feet of the subway structure.

(12) All piles are to be placed within a preaugered cased hole to the influence line. The casing must be cleaned without disturbing the soil outside the casing and the pile to be placed within the casing for installation. The piles may then be driven beyond the influence line within the casing.

(13) The influence line shall will at the bottom of the subway structure and extend at a 1:1 slope. For piles installed within ten (10') feet of the subway structure, the casing must be extended up to the bottom of the subway structure.

(14) At the completion of pile installation, the space between the pile and the casing is to be filled with either clean sans or grout. If the casing is to be removed, the filling must be completed prior to removal of the casing.

(15) All piles are to be driven a minimum of ten (10') feet below the intersection of the pile center line and the influence line of the subway structure.

(16) The use of “down-the-hole-hammers” for installation of piles through overburden and fill will be permitted only to remove boulders. It will not be permitted as a matter of course to advance the hole. Their use to construct rock sockets will not be allowed within five (5’) feet of the NYCT structure.

(17) Vibratory hammers will not be permitted within 75 feet of subway structures. Hoerams will not be permitted within 25 feet of subway structures.

(18) Dynamic compaction methods using dropped heavyweights cannot be conducted within 1,000 feet of any NYCT structure unless it is shown that induced settlements and vibrations will not damage these structures. A suitable monitoring plan including settlement and vibration measurements must be approved by NYC’s Engineer for all such operations within these distances.

(19) No machine excavation will be allowed within three (3’) feet of NYCT structures, power duct lines, or any other facilities until the facilities have been carefully exposed by hand excavation.

(20) All dewatering operations conducted within 500 feet of the NYCT structure must be performed in accordance with drawings and procedures submitted to NYCT for approval. The distance from the structure to the dewatering operation can be reduced provided that soil conditions at the site indicate that the radius of influence of the dewatering is less than 500 feet. For dewatering within the radius of influence, the dewatering program must be shown to have negligible influence on settlements of the NYCT structure.

(21) Subway entrances (ventilators, etc.) are to be underpinned or shored and braced if directed by NYC’s Engineer.

(22) NYCT, at its discretion, reserves the right to require the project to close or maintain and protect existing subway entrances, ventilators, etc., adjacent to the project during construction. Such construction may include underpinning, shoring, bracing and erection of suitable barricades and/or canopies and shields. Such protection must be in accordance with drawings submitted to NYCT for approval.

(23) If shields are to be installed to protect NYCT facilities and/or the public, plans showing the location, type and method of attachment to the Transit structure must be submitted to NYCT for approval.

(24) All lumber and plywood used for protection of transit facilities must be fire retardant.

(25) Subway emergency exists must be kept clear at all times.

(26) In excavating over or near the subway roof, special care must be exercised so that the thin concrete protection of the subway waterproofing is not damaged.

(27) Burning of, welding to or drilling through existing steel structures will not be permitted except as shown on drawings approved by NYCT.

(28) Horizontal and vertical control survey data of the existing NYCT structure is to be taken by a licensed Land Surveyor to monitor any movements that occur during construction and to show that the induced movements are within allowables provided and approved by NYCT’s Engineer. If any movements exceed allowables, remediation as approved by NYCT must be performed.

(29) Bus routes affected by the project will or may require bus diversions. These arrangements must be made through:

General Superintendent, Special Operations
New York City Transit
2 Broadway, 17th Floor
New York, NY 10004
Telephone Number (646) 252-5526

When impacting any bus stop, Special Operations must be notified two weeks in advance.

(30) Duct lines must be maintained and protected during construction. Any interference with duct lines should be reported to NYCT inspector. When a duct line containing cables is to be removed, or when masonry adjacent thereof is to be removed, penetrated, or drilled, the work must be done with hand labor entirely, using hammer and chisel. Jackhammers, bull points or other power equipment may not be used.

(31) Where manholes are encountered:

a) They must be protected and raised or lowered as required, to match the new street grade.
b) If manhole covers are raised or lowered, cables in the manhole must be protected by wood sheeting of 2” nominal thickness.
c) Prior to the start of construction operations affecting manholes and duct lines, seven days’ notice must be given to Manager, Department of Maintenance of Way, at (718) 694-1358.

(32) Construction work done near vent gratings and hatches must be as follows:

a) Unless approved by the NYCT’s Engineer, all vent gratings and hatches should remain outside the construction site, separated by a construction fence. Protective shields must be provided over vent gratings as required by NYCT’s Engineer.
b) No building material, vehicles or construction equipment is to be stored or run over vent, gratings, hatches or emergency exits.
c) Details of sidewalk reconstruction around vent grating, hatches and emergency exits are to be submitted to NYCT for approval.

(33) Tractors, cranes, excavators, etc. used in the vicinity of the elevated structures must be isolated from the ground. Since the elevated structure is used as a negative return path with a consequent potential between it and the ground, any contact between the structure and grounded equipment could result in burning of the steel.

(34) Temporary construction sheds, barricades or plywood partitions must be a minimum of 5’-0” from edge of finished platform.

(35) Station areas or stairway/closings: The general requirements for station areas or stairway/closings are as follows:

a) Only one stairway at each station will be permitted to be closed at the same time. Approvals for closing any stairway must be obtained from the Division of Stations at least three (3) weeks in advance.
b) Director, Office of Station Programs; Telephone (718) 694-4891 or (718) 694-1695 of the Division of Stations must be notified one (1) week prior to the actual closing and reopening of the entrance.
c) Ample signage must be supplied and posted at least one (1) week in advance, advising the public of the proposed subway stair closing.
d) The street entrance stairway should not be closed unless manpower and materials are available to commence work on dates permitted.
e) Once the closing is effected, construction signs must be placed at appropriate locations on the barricades at the street and mezzanine levels, stating the Contractor’s name, 24 hour emergency telephone number, contract number, the duration of the closing, direction to an alternate entrance/exit, and an apology for the inconvenience to out customers.
f) Existing station signage must be adjusted to reflect any changes in access/egress.
g) Barricades are to be painted and kept graffiti free at all times. The Contractor must maintain the barricaded area clean of all debris.
h) All materials are to be properly stored and secured away from passenger traffic.
i) The Contractor must remove all waste material and barricades from all station areas when construction is completed.
j) Inspection of the area under construction by authorized Station Department employees will not be inhibited.
k) If street lights on the sidewalks are affected, temporary lights must be provided.

(36) If new concrete construction is joined to existing concrete, dowels and keyways are to be used in accordance with NYCT Standards.

(37) If the project involves construction or alteration of a subway facility on private property, the property owners will be required to enter into an agreement with NYCT pertaining to all work affecting the Transit facilities and clearly defining limits and responsibility for maintenance and liability.

(38) Wherever a new sidewalk is being placed adjacent to NYCT structures the following will be required:

a) The top of the new sidewalk must be flush with the subway vent gratings, hatches and emergency exits.
b) The slope of the new sidewalk must be such that the drainage will be away from these structures.
c) A one-half (1/2") inch preformed filler must be installed between the new sidewalk and NYCT structure.
d) Where sidewalk elevations are being changed details of proposed work around NYCT structures are to be submitted for approval.

(39) Before the start of any work, the Contractor shall make an examination, in the presence of NYCT's Engineer, of the interior and exterior of the NYCT subway or other structure adjacent to the proposed work. The person or persons authorized by the Contractor to make these examinations must be approved by the Engineer. The Contractor must take all photographs as may be necessary or ordered to indicate the existing condition of NYCT structure. One copy of each photograph, eight inches by ten inches in size, and the negative is to be submitted to Manager, Department of Maintenance-of-Way, 130 Livingston St., Room 8044D, Brooklyn, New York 11201, telephone (718) 694-1358 before the start of construction.

(40) All architectural details (token booths, railings, doors, etc.) are to conform to the latest NYCT Standards. These Standards are available at NYCT.

(41) The Contractor (Permittee) must indemnify and save harmless the City of New York and the New York City Transit (Permittor) in accordance with the following "Insurance Requirements" and proof that the necessary insurance is in effect will be required before work can commence, when required in Schedule A:

NYCT "OUTSIDE CONTRACT" INSURANCE REQUIREMENTS

1. The Permittee at its sole cost and expense must carry and maintain policies of insurance at all times during the period of performance under this Agreement as herein set forth below:

   (A) Workers' Compensation Insurance: (including Employer's Liability Insurance) with limits as specified in Schedule 'A', which limit may be met in combination of primary and excess insurance meeting the statutory limits of New York State. The policy must be endorsed to include Longshoreman's and Harbor Workers' Compensation Act / Maritime Coverage Endorsement and/or Jones Act Endorsement when applicable.

   (B) Commercial General Liability Insurance: (ISO 2001 Form or equivalent) approved by Permittor in the Permittee's name with limits as specified in Schedule 'A' for each occurrence on a combined single limit basis for injuries to persons (including death) and damages to property. The limits may be provided in the form of a primary policy or combination of primary and umbrella/excess policy. When the minimum contract amounts can only be met when applying the umbrella/excess policy, the Umbrella/Excess Policy must follow form of the underlying policy and be extended to "drop down" to become primary in the event primary limits are reduced or aggregate limits are exhausted. Such insurance must be primary and non-contributory to any other valid and collectible insurance and must be exhausted before implicating any Permittor/MTA policy available.

   Such policy should be written on an occurrence form, and must include the following coverages:

   - Additional Insured Endorsement (I.S.O. Form CG 20 26 07/04) version or equivalent approved by the Permittor, must name the indemnitees as referenced under Section B of this agreement as Additional Insureds.
   - Contractual Liability assumed by the Permittee under this agreement;
   - Personal and Advertising Injury;
   - Products-Completed Operations;
   - Independent Contractors;
   - "XCU" (Explosion, Collapse, and Underground Hazards) where necessary;
   - Contractual Liability Exclusion, applicable to construction or demolition operations to be performed within 50 feet of railroad tracks, must be removed, where necessary; and

- Additional Insured Endorsement (I.S.O. Form CG 20 26 07/04 version or equivalent) approved the Permittor naming: New York City Transit Authority (NYCTA), the Manhattan and Bronx Surface Transit Operating Authority (MaBSTOA), the Staten Island Rapid Transit Operating Authority (SIRTOA), MTA Capital Construction Co., the Metropolitan Transportation Authority (MTA) including its subsidiaries and affiliates, and the City of New York (as Owner).

(C) Business Automobile Liability: (ISO Form CA 00 01 10 01 or equivalent) approved by the Permittor is required if Permittee's vehicle enters Permittor's property. The insurance must be in the name of the Permittee or its contractor entering the Permittor property with limits of liability in the amount of not less than $2,000,000 each accident for claims for bodily injuries (including death) to persons and for damage to property arising out of the ownership, maintenance or use of any owned, hired or non-owned motor vehicle.

(D) Railroad Protective Liability Insurance policy must be required as specified in Schedule 'A'

(E) Environmental Insurance: In the event environmental or pollution exposures exist, the Permittee must require the environmental contractor or sub-contractor to provide the applicable insurance covering such exposure. The limits and types of insurance provided must be satisfactory to the Permittor and approved prior to the start of the work.

(F) General Insurance Requirements Applicable To Insurance Policies:

(a) All of the insurance required by this Article must be with Companies licensed or authorized to do business in the State of New York with an A.M. Best Company rating of not less than A-/VII or better and reasonably approved by the Permittor/MTA and must deliver evidence of such policies.

(b) Except for Workers Compensation, all references to forms and coverages referred to above must be the most recent used by the Insurance Services Office, Inc. (ISO) or equivalent forms approved by the Insurance Department of the State of New York, provided, however, that excess coverages may be written on forms reasonable acceptable to Permittor containing provisions other than those contained in ISO forms but otherwise conforming in substance to the requirements of this Article.

(c) The Permittee or its Contractor performing the work must furnish evidence of all policies before any work is started to the Permittor using the following link:

https://us.marketplace.asite.com/marketplace/main/detail/28/1/1/5512158/forms

These policies must: (i) be written in accordance with the requirements of the paragraphs above, as applicable; (ii) be endorsed in form acceptable to include a provision that the policy will not be canceled, materially changed, or not renewed, unless otherwise indicated within at least thirty (30) days prior written notice to the Permittor c/o MTA Risk and Insurance Management (MTA RIM) Department – Standards, Enforcement & Claims Unit, 2 Broadway – 21st Floor, New York, NY 10004; and (iii) state or be endorsed to provide that the coverage afforded under the contractor's policies must apply on a primary and not on an excess or contributing basis with any policies which may be available to the Permittor/MTA, and also that the contractor's policies, primary and excess, must be exhausted before implicating any Permittor/MTA policy available. (iv) In addition, the contractor's policies must state or be endorsed to provide that, if a subcontractor's policy contains any provision that may adversely affect whether contractor's policies are primary and must be exhausted before implicating any Permittor/MTA policy available, contractor's and subcontractor's policies must nevertheless be primary and must be exhausted before implicating any Permittor/MTA policy available. Except for Professional Liability, policies written on claims made basis are not acceptable. At least two (2) weeks prior to the expiration of the policies, contractor must endeavor to provide evidence of renewal or replacement policies of insurance, with terms and limits no less favorable than the expiring policies. Except as otherwise indicated in the detailed coverage paragraphs below, self insured retentions and policy deductibles must not exceed $100,00, unless such increase deductible or retention is approved by Permittor/MTA. The Permittee must be responsible for all claim expense and loss payments within the deductible or self insured retention. The insurance monetary limits required herein may be met through the combined use of the insured's primary and umbrella/excess policies.

(d) Certificates of Insurance may be supplied as evidence of policies of the above policies, except for Policy (D) Railroad Protective Liability. However, if requested by the Permittor, the Permittee must deliver to the Authority within forty-five (45) days of be request, a copy of such policies, certified by the insurance carrier as being true and complete. The Railroad Protective Liability Insurance Policy must be provided, ACORD or Manuscript form, pending issuance of Original Policy. The Original Policy must be submitted to MTA RIM within thirty (30) days of the Binder Approval.

(e) If a Certificate of Insurance is submitted, it must: (1) be provided on the Permittor Certificate of Insurance Form of MTA Certificate of Insurance From for Joint Agency Agreements; (2) be signed by an authorized representative of the insurance carrier or producer and notarized; (3) disclose any deductible, self-insured retention, sub-limit, aggregate limit or any exclusions to the policy that materially change the coverage; (4) indicate the Additional Insureds and Named Insureds as required herein, along with a physical copy of the Additional Insured Endorsement (ISO) Form CG 20 26 07/04 version or equivalent) as applicable and the endorsement(s) must include policy information; (5) reference the Contract number on the face of the certificate; and (6) expressly reference the inclusion of all required endorsements.

(f) The minimum amounts of insurance required in the detail description of policies (A), (B), (C), and (D) above will not be construed to limit the extent of the Permittee's liability under this Agreement.

(g) If, at any time during the period of this Agreement, insurance as required is not in effect, or proof thereof is not provided to the Permittor, the Permittor will have the options to: (i) direct the Permittee to suspend work or operation with no additional cost or extension of time due on account thereof; or (ii) treat such failure as an Event of Default.

(42) At the close of any project involving construction or alterations to Transit facilities, one set of vellums or mylars, five sets of 35mm microfilm, and electronic copies complying to microstation.dgn format of "APPROVED AS-BUILTS" must be provided to NYCT for its records. For details of specific requirements contact NYCT Outside Projects.

(43) At least fourteen (14) working days prior to the start of construction operations, notification must be given to:

Manager, Department of Maintenance-of-Way
(718) 694-1358

Project Engineer – Outside Projects
Mr. Mohamed Adam, PE
New York City Transit
2 Broadway, 7th Floor
New York, NY 10004
Attn: Ms. Alina Avadanel
(646) 252-3641

Director of Short Range, Bus Service Planning (SRB)
Ms. Sarah Wyss
New York City Transit
2 Broadway, 17th Floor
New York, NY 10004
(646) 252-5517
sarah.wyss@nyct.com

(44) The Contractor must provide temporary quarters near the job site for NYCT inspectors, containing a desk and telephone. Said quarters may be added to the Engineer's Field Office at no additional cost to the City.

1.06.51. Additional Provisions Pertaining Only to FHWA Funded Projects.

The requirements of this section will apply to all contracts with Federal Highway Administration (FHWA) funding. Other requirements for FHWA contracts are found throughout the specifications, including but not limited to:

- Section 1.06.46 – Project Sign
- Section 4.02 – Asphaltic Concrete Wearing Course, Subsection 4.02.4;
- Section 5.02 – Sampling, Subsection 5.02.2;
- Section 6.70 – Maintenance and Protection of Traffic, Subsections 6.70.5 and 6.70.11;
- Section 6.77 – Public Space Receptacle Bins, Subsection 6.77.2.

(A) MAINTENANCE.

All work done under this contract when completed will be maintained by the City of New York in accordance with the New York State Department of Transportation agreement with the City of New York for maintenance of improvements of the State Arterial Highways System funded under the New York FAUS, Topics, Title II Programs dated February 3, 1977, or any other Federal Aid made available by Title 23, U.S.C.

All existing sanitary and other sewers not deemed to be part of the project by the New York State Department of Transportation Commissioner, Water Mains, Hydrants, and other Municipally or privately owned facilities within the limits of the Right-of-way which remain in service unchanged, and all such facilities relocated or protected as part of the work performed under the project, whether crossing, located within or adjacent to the R.O.W. will be maintained, as the case may be, by the Municipality, or by the Agency or unit having control or jurisdiction thereof, at no cost or expense to the State.

APPROVED PURSUANT TO THE ABOVE REFERENCE AGREEMENT AND WITH THE UNDERSTANDING THAT THE STATE WILL NOT FURNISH MAINTENANCE PAYMENTS.

(B) MATERIALS TESTING

Additional acceptance testing by the Engineer shall not relieve the Contractor of any testing requirements of these specifications.

The Engineer shall maintain custody of cylinders, cores, aggregate and soil samples at all times. In order to comply with this requirement, the Contractor shall:

- Provide secure storage for cylinder curing boxes on site, near the concrete placement area. If requested by the Engineer, the storage shall be lockable using a lock provided by the Engineer.
- Strip the cylinders under the supervision of the Engineer, and allow the Engineer to transfer cylinder marks to stripped cylinders.
- Provide transportation for delivery of the samples to the designated area near 30-30 Thomson Ave, if requested by the Engineer. The Engineer shall travel with the samples and maintain custody.

1.06.52. Contractor Performance Evaluation.

The Contractor's performance will be evaluated by the City during the duration of the Contract. The Contractor will be evaluated on the following specific criteria: costs, schedules, quality of work, cooperativeness, record-keeping, contract changes, contract enforcement, and performance.

1.06.53. Audit by the Department and City.

All vouchers or invoices presented for payment to be made hereunder, and the books, records and accounts upon which said vouchers or invoices are based are subject to audit by the Department and by the Comptroller of the City of New York pursuant to the powers and responsibilities as conferred upon said Department and said Comptroller by the New York City Charter and Administrative Code of the City of New York, as well as all orders and regulations promulgated pursuant thereto.

The Contractor shall submit any and all documentation and justification in support of expenditures or fees under this Contract as may be required by said Department and said Comptroller so that they may evaluate

the reasonableness of the charges and shall make its records available to the Department and to the Comptroller as they consider necessary.

All books, vouchers, records, reports, canceled checks and any and all similar material may be subject to periodic inspection, review and audit by the State of New York, Federal Government, and other persons duly authorized by the City.

The Contractor shall not be entitled to final payment under the Standard Construction Contract until all requirements have been satisfactorily met.

1.06.54. Schedule A.

Pursuant to the several sections of the Contract, the Contractor shall observe and comply with the requirements indicated in Schedule A.

1.06.55. Payments to M/WBE Subcontractors

The Department of Design and Construction ("NYCDDC") is committed to supporting the growth and success of Minority and Women-owned Business Enterprises ("M/WBE"). In furtherance of this goal, NYCDDC complies with Local Law 1 / NYC Administrative Code section 6-129, as amended. In order to support the growth and success of M/WBEs on all NYCDDC projects, it is important that M/WBE vendors that are sub-contractors (any tiers) are treated fairly at all times and that their payment requisitions / invoices are handled in accordance with the City's Standard Construction Contract. Pursuant to the Standard Construction Contract, prime contractors are required to pay subcontractors within thirty (30) days of receipt of such funds from NYCDDC. Failure to comply with the Standard Construction Contract and the goals established by NYCDDC as it applies to M/WBEs, may result in financial sanctions and negative performance evaluations, which will be taken into consideration on future procurements.

1.06.56. Prices to Cover.

No direct payment will be made for costs incurred in complying with the foregoing General Conditions, except as otherwise provided. Said costs will be deemed to have been included in the prices bid for all the scheduled items of the contract.

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DIVISION II - BASIC MATERIALS OF CONSTRUCTION

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DIVISION II

BASIC MATERIALS OF CONSTRUCTION

SECTION 2.01 - Definitions

All definitions of materials shall be in accordance with the latest revisions of the Specifications on Nomenclature of ASTM International, unless otherwise specified herein.

AASHTO – American Association of State Highway and Transportation Officials.

AASHTO re:source — Laboratory that provides accreditation for testing of construction materials. Includes references to the Cement and Concrete Reference Laboratory (CCRL). Formerly known as the AASHTO Materials Reference Laboratory (AMRL).

Aggregate – Mineral materials: sand, gravel and broken stone. Fine Aggregate – aggregate passing the #8 sieve. Coarse Aggregate – aggregate retained on the #8 sieve.

Asphalt – A dark brown to black cementitious material in which the predominating constituents are bitumens, which occur in nature or are obtained in petroleum processing.

Asphalt--Emulsified – An emulsion of asphalt binder and water that contains a small amount of an emulsifying agent.

Asphaltic Cement – Asphalt cement that is classified according to the Standard Specification for Performance Graded Asphalt Binder, AASHTO Designation MP1. Also referred to as asphalt binder, liquid asphalt, or asphaltic binder.

ASTM – ASTM International.

Bag, Cement – A quantity of Portland Cement, 94 pounds.

Binder Course – The hot mix asphalt course immediately below the surface course.

Bitumen – A class of black or dark colored cementitious substances, composed principally of high molecular weight hydrocarbons, of which asphalts, tars, pitches and asphaltites are typical.

Cement, Portland – The product obtained by pulverizing clinker consisting essentially of hydraulic calcium silicates and usually containing one or more forms of calcium sulfate interground with the clinker.

Clay – An earthy or stony mineral aggregate consisting essentially of hydrous silicates of alumina, plastic when sufficiently pulverized and wetted, rigid when dry, and vitreous when fired at a sufficiently high temperature.

Concrete – A homogeneous mixture consisting essentially of cement, fine aggregate, coarse aggregate and water, with or without admixtures.

Concrete, Air-entrained – Concrete in which air has been incorporated by the use of air-entraining agents.

Consistency – The degree to which a freshly mixed concrete, mortar, grout, or cement paste resists deformation. Consistency of concrete is measured by slump or spread.

Field Mix – A concrete mixture whose proportions are expressed in terms of a sack of Portland cement (1 cu. ft.) and of separated volumes of damp-loose aggregates measured on the job. Damp-loose aggregates are considered to be materials as delivered on the job.

Fire Clay – Sedimentary clay of low flux content.

Flag – A single rectangle of sidewalk. Where stone sidewalk flags are used, a flag refers to a single piece of stone. Where concrete sidewalk flags are used, a flag refers to a rectangle of concrete bounded by joints (tooled, saw cut, or expansion), independent of size.

Fly Ash – The finely divided residue that results from the combustion of ground or powdered coal and that is transported by flue gasses from the combustion zone to the particle removal system.

Gravel – A coarse aggregate resulting from the natural erosion of rock.

Ground Granulated Blast Furnace Slag (GGBFS) - The glassy, granular material formed when molten blast-furnace slag is rapidly chilled, as by immersion in water.

Hot Mix Asphalt – High quality, thoroughly controlled hot mixture of asphalt binder (cement) and well-graded, high quality aggregate, which can be compacted into a uniform dense mass. Includes asphalt mixtures manufactured at a lower temperature using Warm Mix Technologies.

MC – Medium Curing Asphalt; Cutback asphalt composed of asphalt cement and a diluent of medium volatility**.**

Microsilica -- Very fine pozzolanic material, composed mostly of amorphous silica produced by electric arc furnaces as a by-product of the production of elemental silicon or ferro-silicon alloys. Also known as silica fume or condensed silica fume.

Mineral Aggregate in Bituminous Mixture – The entire inorganic part or percentage of the bituminous mixture which remains after binder extraction via chemical or ignition methods.

NYCDDC QA – The Department's Quality Assurance Unit, headed by the NYCDDC QA Director.

NYSDOT – New York State Department of Transportation.

Pavement – Shall consist of all the courses above the subgrade. This shall consist of monolithic concrete or a base course consisting of concrete or broken stone and a wearing course of a thickness as specified. In addition, a pavement may contain a stabilizing sub-base and/or a binder leveling course.

Proportion Strength Concrete – Concrete whose constituent materials are proportioned in accordance with specification requirements to produce a required strength.

QA – Quality Assurance: The Department's system for ensuring that the Contractor's Quality Control process is adequate.

QC – Quality Control: The Contractor's system for ensuring that the Work is constructed to the required quality.

RC – Rapid Curing Asphalt: Cutback asphalt composed of asphalt cement and a naphtha or gasoline-type diluent of high volatility.

Sand – The fine granular material (usually less than one quarter (1/4") inch in diameter) resulting from the natural disintegration of rock or from the crushing of rock.

Shale – A thinly stratified, consolidated sedimentary clay with well marked cleavage parallel to the bedding.

Sieve – A metallic plate or sheet, woven-wire cloth, or other similar device with regularly spaced apertures of uniform size mounted in a suitable frame or holder for use in separating granular material according to size.

Sieve Analysis – The process of determining particle-size distribution of an aggregate, in accordance with ASTM C136 for virgin aggregates, and ASTM D5444 for aggregates recovered from asphalt mixtures. Also known as grading.

Slump – A measure of consistency of freshly mixed concrete equal to the subsidence measured to the nearest 1/4 in. (5 mm) of the molded specimen immediately after removal of the slump cone .

Spread – The distance of lateral flow of concrete during the slump-flow test in accordance with ASTM C1611.

Surface Clay – An unconsolidated, unstratified clay, occurring on the surface.

Surface Moisture – Free water retained on surfaces of aggregate particles, as distinguished from absorbed moisture. In cementitious mixtures, surface moisture is considered to be part of the mixing water. Also known as free water or free moisture.

Top Course – The hot mix asphalt course at the top of the pavement. Also known as surface course or riding course.

Total Cementitious Materials (TCM) – The sum of Portland cement and all pozzolans by weight in a given measure of concrete.

Viscosity – The measure of the resistance to flow of bituminous material expressed as the number of seconds required for a given volume of the material to flow through a given orifice at a given temperature.

Water Cement Ratio – The ratio of the mass of water, excluding water absorbed by the aggregates, to the mass of cementitious materials (Portland cement and all pozzolans) in a cementitious mixture; preferably stated as a decimal. Also known as Water Cementitious Ratio.

Standard Drawings and/or Standard Specifications – Whenever any reference is made to a standard drawing and/or standard specification of any agency or authority, it shall mean the latest edition or revision in effect at the time of invitation to bid.

SECTION 2.02 – Aggregate – Coarse (Broken Stone and Gravel)

2.02.1. This section describes Coarse Aggregate.

2.02.2. (A) Coarse aggregate shall consist of crushed stone, crushed gravel, screened gravel, or crushed air-cooled blast furnace slag, conforming to the requirements of these specifications. Coarse aggregate shall be of the following types:

Type 1–Broken Stone

Type 2–Gravel

(B) Type 1 shall be of the following grades:

Grade A–Highly Resistant to Abrasion

Grade B–Moderately Resistant to Abrasion

Type 2 shall be of Grade B–Moderately resistant to abrasion.

(C) Coarse aggregate shall be of the size numbers and nominal sizes shown in Tables 2.02-I and 2.02-II.

(D) Type, grade, size number and corresponding nominal size shall be as specified.

2.02.3. (A) GENERAL REQUIREMENTS

Type 1 broken stone aggregate shall be broken, clean, hard, unweathered stone of uniform quality. It shall consist of fragments roughly cubical or pyramidal in shape and shall be crushed from ledge rock.

Type 2 gravel aggregate shall be crushed, clean, washed, sound, hard gravel of uniform quality. It shall be free from injurious amounts of soft, thin, elongated, weathered or decomposed pieces, loam, clay lumps, organic or other foreign matter.

All coarse aggregates must be from a source on NYSDOT Approved List 703-02. The aggregates must meet the physical requirements from table 703-2 in the NYSDOT Standard Specifications and the deleterious materials requirements from table 703-3 in the NYSDOT Standard Specifications.

(B) SIEVE ANALYSIS

Coarse aggregate of each size number shall comply with the requirements of Tables 2.02-I and 2.02-II.

(C) FRICTION

Where friction aggregates are required, only Type 1 – Broken Stone coarse aggregate must be used. The aggregate must meet the following additional requirements:

1. Concrete: the aggregate must meet one of the following requirements:
    a. Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonated materials.
    b. For concrete containing #7 size aggregate: a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 1 inch, plus 1/4 inch primary size fraction.
    c. For concrete containing #57 size aggregate: a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 1 1/2 inch, plus 1/2 inch and the minus 1/2 inch, plus 1/4 inch primary size fractions.

TABLE 2.02-I – COARSE AGGREGATE – SIEVE ANALYSIS

Percent By Weight Passing Sieves (Square Sieve Openings)

Size No. (ASTM) (C33)	Nominal Size (inches) (except) (as) (noted)	4 inch	3-1/2 inch	3 inch	2-1/2 inch	2 inch	1-1/2 inch	1 inch	3/4 inch	1/2 inch	3/8 inch	#4	#8	#16
1	3-1/2 to 1-1/2	100	90-100	-	25-60	-	0-15	-	0-5	-	-	-	-	-
2	2-1/2 to 1-1/2	-	-	100	90-100	35-70	0-15	-	0-5	-	-	-	-	-
3	2 to 1	-	-	-	100	90-100	35-70	0-15	-	0-5	-	-	-	-
357	2 to #4	-	-	-	100	95-100	-	35-70	-	10-30	-	0-5	-	-
4	1-1/2 to 3/4	-	-	-	-	100	90-100	20-55	0-15	-	0-5	-	-	-
467	1-1/2 to #4	-	-	-	-	100	95-100	-	35-70	-	10-30	0-5	-	-
5	1 to 1/2	-	-	-	-	-	100	90-100	20-55	0-10	0-5	-	-	-
56	1 to 3/8	-	-	-	-	-	100	90-100	40-85	10-40	0-15	0-5	-	-
57	1 to #4	-	-	-	-	-	100	95-100	-	25-60	-	0-10	0-5	-
6	3/4 to 3/8	-	-	-	-	-	-	100	90-100	20-55	0-15	0-5	-	-
67	3/4 to #4	-	-	-	-	-	-	100	90-100	-	20-55	0-10	0-5	-
7	1/2 to #4	-	-	-	-	-	-	-	100	90-100	40-70	0-15	0-5	-
8	3/8 to #8	-	-	-	-	-	-	-	-	100	85-100	10-30	0-10	0-5
*EF	#4 to #8	-	-	-	-	-	-	-	-	-	100	50-80	5-20	0-5

** NOTE: Size No. EF used in mixes for bituminous park sidewalks, tennis courts, playgrounds, etc.*

TABLE 2.02-II – SCREENINGS AND STONE BASE MIXES

Percent By Weight Passing Sieves (Square Sieve Openings)

Type of Mix	Nominal Size	2 inch	1 inch	1/2 inch	3/8 inch	#4	#8	#100	#200
Screenings	#4 to #200	-	-	100	50-100	-	40-70	8-15	-
Dense Graded Stone Base	1” to #200	100	80-100	-	-	25-60	-	-	0-10
Dense Graded Gravel Base*	1” to #200	100	80-100	-	-	25-60	-	-	4-12

**NOTE: Gravel base mix to have Plasticity Index of 0-5, as determined in accordance with ASTM Designation D4318.*

SECTION 2.03 – Asphalt, Liquid

2.03.1. This section describes Liquid Asphalt.

2.03.2. (A) Rapid curing liquid asphalt shall be of the following grades:

Grade	Recommended Uses (See ASTM Designation D2028)
RC-70	Surface Treatment, Seal, Carpet Coat and Cold Mix
RC-250	Bitumen-sand Bed, Cold Laid Plant Mix
RC-800	Road Mix

(B) Medium curing liquid asphalt shall be of the following grades:

Grade	Recommended Uses (See ASTM Designation D2027)
MC-30	Priming Material, Temporary Surfacing
MC-70	Surface Treatment Binder
MC-250	Surface Treatment Binder, Cold Laid Plant Mix
MC-800	Cold Laid Plant Mix, Open or Dense Aggregate

(C) Grade shall be as specified.

2.03.3. (A) Liquid asphalt shall be a product of fluxing an asphaltic residuum with a distillate.

(B) Liquid asphalt made from an asphalt whose value for paving purposes has not been demonstrated by practical experience in the United States will not be accepted.

2.03.4. Liquid asphalt shall be homogeneous, free from water and shall comply with the requirements for the corresponding grade of ASTM Designation D2028, Rapid Curing, and Designation D2027, Medium Curing.

SECTION 2.04 – Asphalt, Emulsified

2.04.1. This section describes Emulsified Asphalt.

2.04.2. (A) Emulsified asphalt shall be of the following types:

RS-1 Quick-setting, low consistency, for penetration and surface treatment.

RS-2 Quick-setting, high consistency, for surface treatment only, particularly for high crowned or steep graded surfaces.

MS-1 Medium-setting, low consistency, for retread mixes with coarse aggregate.

MS-2 Medium-setting, medium consistency, for plant mixes with coarse aggregate.

MS-3 Medium-setting, high consistency, for heavy pre-mix with coarse aggregate.

(B) Type shall be as specified.

2.04.3. (A) Emulsified asphalt shall be a liquid mixture in which minute globules of bitumen are held in suspension in water or in a watery solution.

(B) Emulsified asphalt shall show no separation of asphalt after thorough mixing, within thirty (30) days after delivery, provided separation has not been caused by freezing. Asphalt separation caused by freezing is unacceptable at any time.

(C) Emulsified asphalt made from an asphalt whose value for paving purposes has not been demonstrated by practical experience in the United States will not be accepted.

2.04.4. Emulsified asphalt shall comply with the requirements of ASTM Designation D977.

SECTION 2.05 – Asphaltic Cement

2.05.1. This section describes Asphaltic Cement for use in the construction of pavements.

2.05.2. GENERAL REQUIREMENTS

Asphaltic cement shall be Performance Graded (PG) and meet the requirements of AASHTO M 322 and the NYSDOT Standard Specifications, latest version, Section 702. Asphaltic cement shall be from a primary source on the NYSDOT Approved List for "PERFORMANCE-GRADED (PG) BINDERS FOR HOT MIX ASPHALT (HMA) PAVING."

Asphalt cement shall have all test data and shipping documents as required by NYSDOT Materials Specification 702-1. These records shall be maintained at the plant.

Heating and storage of PG binder must meet the requirements of NYSDOT Materials Procedure 401.

The temperature of PG binder delivered to the plant must not exceed 350F, unless the PG binder supplier recommends it.

Any PG Binder previously approved that has been stored at the plant over the winter must be re-sampled and approved by the Engineer before it can be used. If the plant re-samples and receives NYSDOT approval for the binder stored over the winter, the plant may submit that approval to the Engineer in leiu of additional sampling.

2.05.3. GRADES

PG asphalt cement shall be of the grades shown in NYSDOT Table 702-1.

The default grade is PG 64E-22.

SECTION 2.06 – Block, Granite

2.06.1. This section describes Granite Block.

2.06.2. (A) Granite blocks shall be of the following grades:

Grade 1–Standard five (5”) inch

Grade 2–Redressed

(B) Grade shall be specified.

2.06.3. (A) GENERAL REQUIREMENTS

Blocks shall be of fine or medium grained granite showing an even distribution of constituent minerals. They shall be of uniform quality and texture throughout, and free from seams or disintegrated materials.

Color shall be gray, unless otherwise specified or required to match existing savaged block.

(B) MECHANICAL PROPERTIES

For existing blocks being reused: No mechanical testing will be required. The Contractor must visibly assess the granite blocks for suitability, to be confirmed by the Engineer in the field.

For new granite blocks: blocks subject to vehicular traffic (in roadways or crosswalks) must meet the requirements of ASTM C615, including abrasion resistance. (C) SIZE

Blocks shall be of the following sizes:

	Grade 1 – Standard Five (5”) inch			Grade 2 – Redressed		
	Dimensions, Inches	Tolerance, Plus or Minus, Inches		Dimensions, Inches	Tolerance, Plus or Minus, Inches	
Length	9 to 10-1/2	1/2”	1”	8-1/2	2-1/2”	2-1/2”
Width	4 to 4-1/2	1/2”	0”	4	1/2”	3/4”
Depth	4 to 5	1/2”	0”	4-1/2	1”	3/4”

Each delivery of Grade 1 Blocks shall average not less than ten (10”) inches in length.

When blocks of special size are required, the dimensions and permissible tolerances shall be as specified.

(D) DRESSING

Blocks shall be so dressed that each face is approximately a rectangle and adjacent faces are approximately at right angles to each other.

Blocks shall have no depressions greater than three-eighths (3/8”) inch on the top and for one (1”) inch down from the top on the ends and sides, as measured from the edge of a square laid in any direction.

The top one (1”) inch of the blocks shall be of the length and width specified and below the top one (1”) inch the dimensions of any block shall not exceed the dimensions of the top one (1”) inch. No side or end shall be more than one-half (1/2”) inch off the rectangle.

Upon examination of one (1) percent of a delivery, not less than eighty-five (85) percent of all blocks so examined shall comply with the above requirements for dressing.

No drill holes shall be permitted in the wearing surfaces of the blocks and not more than ten (10) percent of the blocks shall show drill holes or bull wedge marks along the top edges.

Blocks shall be inspected either (a) at the quarry or plant, or (b) at the dock or siding as unloaded, before delivery on the street, or (c) at both locations.

If the sample taken does not comply with the requirements for size and dressing, the Engineer may, at the Engineer's discretion, permit an inspection of a second sample lot equal in number to the first, and, if this lot is satisfactory, may accept the shipment. All deliveries will be subjected to further inspection at the place of use, and blocks which do not comply with the specification requirements will be rejected.

SECTION 2.07 (NO TEXT)

SECTION 2.08 – Calcium Chloride

2.08.1. This Section Describes Calcium Chloride.

2.08.2. Calcium Chloride shall comply with the requirements of ASTM Designation D98.

SECTION 2.09 – Admixtures

2.09.1. This section describes material requirements for air-entraining, water-reducing and retarding, and water-reducing admixtures used in the manufacture of Portland Cement concrete.

2.09.2. All admixtures shall be in liquid form having a consistency that flows readily. The admixtures shall not contain chemicals which, when mixed with concrete, produce a condition that is injurious to the quality and durability of the concrete or reinforcing steel. This applies specifically to compounds which, when used in manufacturing process, produce a significant amount of chloride ions in the final product. Admixtures must be stored and handled per the manufacturer's instructions. Admixtures must not be allowed to freeze or come in contact with each other.

Approval of any manufactured product or brand of concrete admixture shall be obtained from the Engineer prior to use. The concrete admixture shall be added to the concrete mix in accordance with the manufacturer's recommendations. The air content in the concrete mix shall comply with the requirements of **Section 3.05, Concrete**.

2.09.3. Admixtures must be from NYSDOT Approved Lists as follows:

Admixture Type	NYSDOT Approved List
Air Entraining	711-0801
Water Reducing and Retarding Admixtures	711-0802
Water Reducing, Normal	711-0803
Water Reducing, High Range	711-0804
Foaming Agents for Lightweight Concrete Fill	711-0805
Non-Chloride Accelerator Admixtures	711-0807
Calcium Nitride Based Corrosion Inhibitors	711-13

Where an "anti-freeze" admixture or additive is specified, a Non-Chloride Accelerator as described above must be used.

2.09.4. The cost of all labor, materials and equipment required to incorporate concrete admixtures in the work shall be included in the contract prices for the respective items under which the concrete admixture is used.

SECTION 2.10 – Cement, Portland

2.10.1. This section describes Portland Cement.

2.10.2. (A) Portland Cement shall comply with the requirements of ASTM Designation C150 and shall be of the following types:

Type I	Normal
Type IA	Air-entraining Normal
Type II	Moderate Sulphate Resistant
Type IIA	Air-entraining Moderate Sulphate Resistant
Type III	High Early Strength
Type IIIA	Air-entraining High Early Strength
Type V	High Sulphate Resistant

(B) Type shall be as specified.

2.10.3. (A) Portland Cement shall be uniform in color. The brand shall have an established reputation of uniformity of character and have been successfully used in the United States for at least two (2) years unless otherwise approved by the Engineer.

Cement must be from a supplier and type on the current NYSDOT Approved List for Cement (701-01).

NYSDOT lot certifications must be kept at the plant for inspection by the Engineer.

(B) Portland Cement shall be stored in such a manner as to permit easy inspection and to protect the Portland cement from dampness and minimize warehouse set.

2.10.4 Blended Cements

(A) Blended cements may be used, provided that the following requirements are met:

1. The blended cement may be selected as part of the Contractor's means and methods, but must not change the material requirements – a blended cement may be used as a substitution to separate approved constituents.
2. Blended cements must be from NYSDOT Approved List 701-03.
3. For blended cements containing pozzolans or slag (Types IP/IS/IT): for the purposes of calculating Portland cement content in a concrete mixture, the portion of the blended cement that is Portland cement must be used, not the total amount of blended cement including the pozzolans or slag.
4. For Portland-Limestone cement (Type IL); the total amount of Type IL cement must be used for calculating Portland cement content in a concrete mixture.
5. Blended cements must be shown on the approved mix design. They may not be substituted in after approval.

(B) Unless explicitly noted otherwise or if directed by the Engineer, Type IL Portland-Limestone cement with the appropriate special property designations outlined in Table 3 of ASTM C595 may be substituted for all Portland cement specified in the NYCDOT Standard Highway Specifications.

SECTION 2.11 – Pozzolans

2.11.1. This section describes pozzolans.

2.11.2. (A) Pozzolans must be of the following types:

- Fly Ash
- Ground Granulated Blast Furnace Slag (GGBFS)
- Microsilica (Silica Fume)
- Ground Glass Pozzolan

(B) Type will be as specified.

2.11.3. (A) General

Any pozzolan hardened by moisture will be rejected. If pozzolans stored over the winter at the concrete plant, the Engineer may require that the pozzolan be retested for compliance by the Contractor, at the Contractor's own expense.

NYSDOT lot certifications must be kept at the plant for inspection by the Engineer.

(B) Fly Ash

Fly ash must conform to the chemical and physical requirements for Mineral Admixture, Class F listed in AASHTO M 295, except that Loss of Ignition must not exceed 4%, and no alternate classes of fly ash will be acceptable.

Fly ash must not include the residue resulting from:

(1) fluidized bed combustion ash,
(2) the burning of municipal solid waste or any other refuse with coal, or
(3) the burning of industrial or municipal solid waste in incinerators commonly known as "incinerator ash."

Fly Ash must be from a supplier and type on the current NYSDOT Approved List for Fly Ash (711-10).

(C) Ground Granulated Blast Furnace Slag (GGBFS)

Ground granulated blast-furnace slag (GGBFS) must conform to the chemical and physical requirements for Grade 100 or 120 slag, as classified in AASHTO M 302.

GGBFS must be from a supplier on the current NYSDOT Approved List for Ground Granulated Blast – Furnace Slag (711-12).

(D) Microsilica

Microsilica (Silica fume) must conform to the standard and optional physical and chemical requirements of AASHTO M 307, and the following:

- Uniformity of Silicon Dioxide Content: Maximum of ±7.0% variation between any two samples
- Chloride Content: 0.20% maximum, per AASHTO T 260, Procedure B
- Fineness: (on undensified powder) 10% maximum retained on No. 325 sieve.

Microsilica must be from a supplier on the current NYSDOT Approved List for Microsilica (711-11).

(E) Ground Glass Pozzolan

Ground glass pozzolan must be manufactured from recycled glass that has been ground and processed to an amorphous silica pozzolan and must meet all the requirements of NYSDOT Standard Specifications Table 715-15-1.

Ground Glass Pozzolan must be from a supplier on the current NYSDOT Approved list for Miscellaneous Supplementary Cementous Materials (711-15).

SECTION 2.12 – Curbs, Headers and Slabs, Granite and Bluestone

2.12.1. This section describes Granite and Bluestone Curbs, Headers, and Slabs for streets and highways.

2.12.2. (A) Curbs and headers shall be of the types and corresponding classes shown in the following Table:

TYPES, CLASSES, AND DIMENSIONS OF CURBS AND HEADERS

Type	Description	Class	Length in Feet* Straight	Curved	Matched Top Width Inches	Bottom Width Minimum Inches	Depth** Inches	Depth Tolerance Inches
1	Granite Curb	Class A	4-12	3-8	6	4	16	±1
2	Granite Curb	Class A	4-12	3-8	5	3	16	±1
3	Granite Curb	Class B	4-12	3-8	5 ±1/4	3	16	±1
4	Granite Curb	Class B	4-12	3-8	6 ±1/4	4	16	±1
5	Bluestone Curb	Class A	3-8	3-8	5	3	16	±1
6	Bluestone Curb	Class B	3-8	3-8	5 ±1/4	3	16	±1
7	Granite Header	-------	3-5	---	4	3	12 min.	---
8	Granite Header	-------	3-5	---	6	3	12 min.	---
9	Bluestone Header	-------	3-5	---	4	3	12 min	---

* *At least eighty (80%) percent of straight curb shall be furnished in the longest length specified. At least eighty (80%) percent of corner curb shall be furnished in lengths of four (4') feet or greater. At least eighty (80%) percent of transition curb (straight or curved) at corners shall be furnished in lengths of five (5') feet or greater.*

***Depth shall be the distance between parallel lines at the top and bottom extremities, normal to the face of the curb or header.*

Dimensions of slabs must be as shown in the contract drawings.

(B) Type shall be as specified.

2.12.3. (A) GENERAL REQUIREMENTS

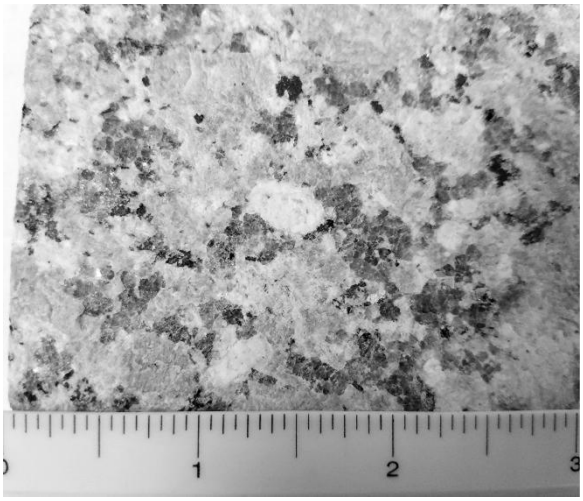
Granite curbs, headers, and slabs must be of medium or coarse grained granite showing an even distribution of constituent minerals. They shall be of uniform quality, color and texture throughout, and free from seams or disintegrated materials. Unless otherwise specified, granite must be medium gray, beige or pink in color. Green granite is not acceptable.

Granite must be from the sources listed in the table below. Alternate similar sources may be submitted to the Engineer for approval.

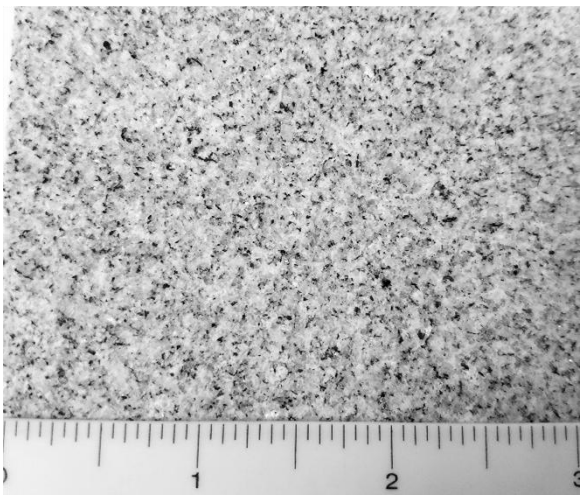
Granite used must be of same color and visually similar to any existing granite curbs, headers, and slabs in the area. Granite used must be from a single supplier for the same job location.

Type	Quarry Location	Supplier
Deer Isle	Crotch Isle, ME	Granites of America 15 Branch Pike, Smithfield, RI 02917 www.granitesofamerica.com Structural Stone, LLC 285 Smith Street, Kingstown, RI 02852 https://structuralstonellc.com/
Greene County Granite/Oconee	Greene County, GA	North Carolina Granite Corp. PO Box 151, Mount Airy NC 27030 www.ncgranite.com Structural Stone, LLC 285 Smith Street, Kingstown, RI 02852 https://structuralstonellc.com/
Pink Kershaw	Kershaw, SC	
Caledonia	San Sebastian, QC, Canada	North Carolina Granite Corp. PO Box 151, Mount Airy NC 27030 www.ncgranite.com
Fawn Island	Shang Dao Province, China	Architectural Craft Stone Source 150-28 Union Tpke, Suite 105 Flushing, NY 11367 https://acs-us.squarespace.com
Rockville White	Rockville, MN	Cold Spring USA 17482 Granite West Rd, Cold Spring MN 56320 www.coldspringusa.com
Iridian	Isle, MN	
Shadow Blush	Danburg, GA	Williams Stone Co. 1158 Lee Westfield Rd, East Otis, MA 01029 www.williamsstone.com

See pictures below for examples of acceptable and unacceptable grain:



Acceptable medium granite grain



Unacceptable fine granite grain

Bluestone curbs and headers shall be of tough, sound, durable, fine-grained sandstone or quartzite. They shall be uniform in color, and free from injurious seams and other imperfections.

(B) MECHANICAL PROPERTIES

Mechanical testing will not be required for curbs, headers, and sidewalk slabs.

Slabs subject to vehicular traffic (in roadways or crosswalks) must meet the requirements of ASTM C615, including abrasion resistance.

(C) CUTTING AND DRESSING

Curbs of all types shall not be less than the full box width for at least four (4”) inches down from the top. They shall have the top and the front face out of wind. Unless otherwise specified, top of curbs shall be cut to a bevel of one (1) in twelve (12), bottom shall be roughly parallel to the top. Curbs shall be cut to true radii for corners and curves; top ends adjacent to driveways shall be rounded or splayed, as specified; curbs adjacent to receiving basins or other structures shall be cut to special shapes, as specified.

Curbs of all types shall have the top sawed and dressed with a bush hammered or thermal finish, as specified, with no drill holes, and with no projections or depressions greater than one-eighth (1/8”) inch as measured from a straight edge along the length of the stone.

Back shall be dressed squared to the top for a depth of not less than one (1”) inch. Below that point the back face may have the natural quarry face, with no projections greater than one-half (1/2”) inch and no depressions greater than one (1”) inch down to a point four (4”) inches below the top, and with depressions or projections not greater than one and one-half (1-1/2”) inches for the remaining depth.

Ends shall be dressed radially for curved curbs, and dressed squared to the top and face for straight curbs.

Granite and bluestone curb of Class A shall have the front face sawed and dressed like the top for a depth of ten (10”) inches below the top. The remaining depth shall have no projections or depressions greater than one and one-half (1-1/2”) inches.

Ends of Class A granite and bluestone curb shall be cut square down for their full width to a line at least four (4”) inches below the top and for six (6”) inches below this line, one (1”) inch in from the front face of the stone, to give a joint not greater than one-quarter (1/4”) inch. The remaining end area shall have no slackness greater than one (1”) inch and no projections.

Granite curb of Class A shall have the top front edge dressed to a one (1”) inch radius or to a well-defined arris, as specified, and the top back edge dressed to a well-defined arris. Bluestone curb of Class A shall have top front and top back edges pitched true to well-defined arrises.

NY Historical granite curb and bluestone curb of Class B shall have the front face quarry split. For a distance of ten (10”) inches below the top, the front face shall have no drill holes and shall have all projections greater than one-half (1/2”) inch pointed off.

Ends of NY Historical granite curb and bluestone curb shall be cut square down for their full width to a line at least ten (10”) inches below the top. The remaining end area may break back not over eight (8“) inches and have no projections greater than the length of curb, to give a joint not greater than one-quarter (1/4”) inch.

NY Historical granite curb of Class B shall have the top front edge dressed to a one (1”) inch radius or to a well-defined arris, as specified, and the top back edge dressed to a well-defined arris. Bluestone curb of Class B shall have top front and top back edges pitched true to well-defined arrises.

Granite headers shall be dressed or sawn on top to a surface free from irregularities greater than one-quarter (1/4”) inch and free from drill holes.

Bluestone headers shall be dressed on top to a surface free from irregularities greater than three-eighths (3/8”) inch and free from drill holes.

Granite and bluestone headers shall have the sides quarry split or sawn. For a distance of six (6”) inches below the top they shall be not less than the full box width, with no projections on the sides greater than three-quarters (3/4”) inch. Sides of bluestone headers shall be free from bunches.

Granite and bluestone headers shall have the ends cut square down to give a joint not greater than one-quarter (1/4”) inch for their full width for a depth of at least four (4”) inches below the top. The remaining

end area shall be pitched off to have no slackness greater than one (1”) inch. Both top edges shall be pitched true to well-defined arrises.

Slabs must be cut and dressed as shown on the contract drawings, or as described above for headers.

SECTION 2.13 – Curb–Steel Facing

2.13.1. This section describes Steel Facing for Concrete Curbs.

2.13.2. Steel facing shall be Type D – Bent Plate.

2.13.3. (A) Type D – Bent plate facing shall be of the thickness and bent to the dimensions shown on the Standard Steel Curb detail.

(B) Each length of straight steel facing shall be twenty (20') feet, unless otherwise specified or provided.

If straight steel facing cannot be fabricated in single twenty (20') feet lengths, two (2) lengths ten (10') feet long shall be butt-welded to provide a center-welded twenty (20') feet length. Center-welded lengths shall be straight and true in all planes, unless otherwise required and directed by the Engineer. Welds which will be exposed after installation shall be ground flush with adjacent metal.

(C) Curved steel facings shall be bent to a twelve (12') feet radius, unless otherwise shown on the plans or directed by the Engineer, and provided with straight tangents at the ends three (3') feet in length, unless otherwise specified or provided. All curved steel facing shall be shop fabricated.

(D) Special steel facing for drop curbs, splays, etc., shall be fabricated as shown on the plans. If the length exceeds twenty (20') feet, the steel facing shall be spliced by welding at the point indicated on the plans.

(E) Anchors provided for securing the steel faced curb in position shall be of such shape and size and attached in such manner and at such points as designated on the plans.

(F) Unless otherwise specified, steel shall comply with the requirements of ASTM Designation A36.

The Contractor may be required to furnish mill certificates which shall certify that the materials furnished comply with the requirements of the reference specifications.

2.13.4. All surfaces of steel facing, including anchors, fastenings, etc., shall be thoroughly cleaned of all rust, oil, grease, scale, or foreign matter and painted with one (1) shop coat of Primer. All steel facing which will be exposed to view after installation shall be given one (1) shop coat of Intermediate and one (1) shop coat (rolled field coat permitted) of Finish topcoat. The color of the Finish paint shall be gray, as approved by the Engineer. All paints shall be applied in compliance with the paint manufacture's data sheets. All components of paint shall be compatible and supplied by a single manufacturer. Prior to field painting, the surfaces to be painted shall be clean, dry, and lightly sand papered.

Approved paint types and their manufacturers shall be as listed in the NYS Department of Transportation's, Materials and Equipment Approved List for "A. STRUCTURAL STEEL PAINTS CLASS 1 (708-01)".

SECTION 2.14 – Curing Materials

2.14.1. This section describes membrane curing materials.

2.14.2. (A) Membrane curing must be one of the following types:

Type 1-D, Clear or translucent with fugitive dye that does not cause stain, or any discoloration to the finished concrete shall be used at the rate of one hundred fifty (150) square feet per gallon or as recommended by the manufacturer, whichever is higher. It shall be sprayed on sidewalks, curbing, walks and other exposed concrete surfaces.

Type 2, White Pigmented. Shall be sprayed at the rate of two hundred (200) square feet per gallon or as recommended by the manufacturer, whichever is higher. It shall be used on Portland cement concrete pavements.

Type 4, Bituminous. Shall be sprayed at the rate of one hundred (100) square feet per gallon or as recommended by the manufacturer, whichever is higher. It shall be used on all concrete roadway base.

(B) Type shall be as specified. All curing compounds shall be ready for immediate use without any alteration and be sprayed prior to the hardening of the concrete and within five minutes of texturing the concrete.

2.14.3. (A) Membrane curing materials Type 1-D shall comply with ASTM Designation C309 and C1315; Type 2 shall comply with ASTM C309. Type 1-D must consist of acrylic copolymer and penetrating silane sealer, and must meet the Test Data in Table 1.

Table 1 - Test Data

Test Type	Test Criteria
Depth of Penetration	Minimum 0.15” to 0.23”
ASTM C642-Water Absorption Reduction in Hardened Concrete	Minimum 80% to 90%

(B) Type 4, Bituminous Curing Material, shall comply with the requirements of **Section 2.03**, Grade RC-70, Liquid Asphalt, or **Section 2.04**, Type RS-1, Emulsified Asphalt. RS-1 shall be used when the ambient temperature is 40° Fahrenheit and over. RC-70, Liquid Asphalt, shall be used when ambient temperature is below 40° Fahrenheit.

2.14.4. The concrete shall be cured in such a manner as to give a non-glaring surface by an application of curing material.

Curing material shall be applied by means of approved spraying equipment as a fine mist or spray in such manner as not to mar the surface and to form a continuous, uniform water-impermeable film. The membrane shall remain intact for a minimum of seven (7) days.

For pavement applications use atomizing mechanical sprayers capable of exerting consistent pressure without hand pumping that are equipped with tank agitators to continuously mix the curing compound. Nozzles with spray shields must be used to prevent drift. Nozzles must be flushed daily before use.

One coat of curing compound using approved equipment is permitted, if the coverage secured is even and satisfactory to the Engineer. On any work where the coverage is uneven or is, for any reason, unsatisfactory to the Engineer, application of additional coating material is required in satisfaction to the Engineer.

SECTION 2.15 – Filler, Expansion Joint, Preformed

2.15.1. This section describes Preformed Expansion Joint Filler.

2.15.2. (A) Preformed expansion joint filler must be nonextruding, and must be of the following types:

Type I -- Sponge rubber, conforming to ASTM Designation D1752, Type I

Type II -- Cork, conforming to ASTM Designation D1752, Type II

Type III -- Self expanding cork, conforming to ASTM Designation D1752, Type III

Type IV -- Bituminous fiber, conforming to ASTM Designation D1751, or a product on the NYSDOT 705-07 Approved List.

(B) Type must be as specified.

(C) Type I, II or III must be used in concrete pavements.

Type I must be used in structures.

Type IV must be used in sidewalk and curbing.

SECTION 2.16 – Filler, Joint; Asphaltic, Blown

2.16.1. This section describes Asphaltic Joint Filler.

2.16.2. Asphaltic Joint Filler shall be of the blown type.

2.16.3. (A) Joint filler shall consist of asphaltic cement derived from the distillation of asphaltic petroleum and blown to obtain the desired characteristics.

(B) Joint filler made from an asphalt whose value for paving purposes has not been demonstrated by practical experience in the United States will not be accepted.

2.16.4. Asphaltic Joint Filler shall be homogeneous and free from water. It shall not foam when heated to 350° Fahrenheit, and shall comply with the following requirements:

Flash Point ^{o}F., Minimum	469
Softening Point ^{o}F. (Ring-and-Ball Method)	167 to 185
Penetration:	
32°F., 200 g., 60 sec., Minimum	15
77°F., 100 g., 5 sec	30 to 40
115°F., 50 g., 5 sec., Maximum	80
Loss on Heating at 325°F., 5 hrs.–percent, Maximum	1.0
Total Bitumen – Soluble in Carbon Disulfide or Chloroform, percent, Minimum	99
Proportion of Bitumen – Soluble in Carbon Tetrachloride, percent, Minimum	99
Ductility at 77°F. – cms., Minimum	3

SECTION 2.17 – Iron Castings, Gray and Malleable

2.17.1. This section describes Gray Iron and Malleable Iron Castings.

Gray Iron and malleable iron are not to be used for valves, cast iron pipe or castings subject to high temperatures.

2.17.2. KIND.

(A) Iron castings shall be of the following types:

Type 1 – Gray Iron Castings

Type 2 – Malleable Iron Castings

(B) Gray iron castings shall be at least Class No. 30B, ASTM A48, with a minimum tensile strength of thirty thousand (30,000) pounds per square inch. The flexural test described in ASTM A377 shall be the primary test used in testing the iron. The Engineer, however, may require that the tensile test be made.

(C) Malleable iron shall be Grade 32510, ASTM A47.

(D) The iron shall be such as will make castings which are of close and even grain and easily machined.

2.17.3. SIZE, WEIGHT AND LOT NUMBER.

(A) Castings shall conform to either the drawings or patterns or both as specified.

(B) The weight of each casting shall be conspicuously painted thereon in white oil paint.

(C) Each casting shall have the initials of the manufacturer's name, the date of manufacture and the initials of the plant of manufacture integrally cast on it at time of manufacture.

2.17.4. WORKMANSHIP AND FINISH.

(A) Casting shall be true to pattern, free from cracks, gas holes, flaws and excessive shrinkage. Surfaces of castings shall be free from burnt on sand and shall be reasonably smooth after cleaning. Runners, risers, fins and other cast on pieces shall be removed. Plugging and filling will not be allowed.

(B) When "machining" is specified or shown on the drawings, it shall mean the use of a machine or machines having cutting tool or tools to produce such surfaces and dimensions to a true and even surface.

(C) The underside of the seating rim of manhole covers shall be machined. The upper side of the cover seating rims of manhole heads shall also be machined.

2.17.5. CHEMICAL AND PHYSICAL REQUIREMENTS.

(A) Gray iron castings shall comply with the requirements of ASTM Designation A48.

(B) Malleable iron castings shall comply with the requirements of ASTM Designation A47.

(C) When a particular chemical composition is required in gray iron castings, it shall be as specified.

SECTION 2.18 – Mineral Dust

2.18.1. This section describes Mineral Dust.

2.18.2. Mineral Dust shall be of one grade.

2.18.3. (A) Mineral Dust shall be limestone or other approved dust. It shall be thoroughly dry when delivered and must not contain more than 50% free silicon dioxide and conform to the following requirements:

Dust shall have a record of satisfactory performance in pavements for not less than three (3) years.

It shall be uniform in quality, satisfactorily reduce voids, produce density, stability and durability in the pavement according to tests as described in Asphalt Institute Research Bulletin No. 1, and any other tests approved by the Engineer.

The use of dusts of a siliceous nature shall conform to the requirements of Industrial Bulletin No. 33 of the New York State Department of Labor, Board of Standards and Appeals and the health standards of OSHA of the U.S. Department of Labor.

(B) Mineral Dust shall comply with the following sieve analysis:

Passing No. 30 Sieve	100%
Passing No. 200 Sieve	70% - 100%

SECTION 2.19 – Pigmented Admixture for Portland Cement

2.19.1. This section describes pigmented admixture for coloring Portland cement mixtures.

2.19.2. Pigmented admixture must be certified by the manufacturer to consist of pure synthetic mineral oxide only, and to comply with the requirements of ASTM C979 and ACI 316.

The pigmented admixture must produce a color equivalent to that required below and the standards on file at the office of the New York City Department of Design and Construction, Division of Infrastructure, 30-30 Thomson Avenue, Long Island City, New York 11101 and the Office of New York City Landmarks Preservation Commission, unless otherwise specified.

Pigmented admixtures known to produce equivalent colors:

Color	Pigmented Concrete: Dark (Commercial Grey)[1]	Bluestone	Granite
Davis Colors	884 – 3%	884 – 3%	884 – 1%
EA Pigments Corp. (Previously Bayferrox or Lanxess)	"Landmarks Grey" at 3.5lbs per sack [2]	"Limestone 330" at 2lbs per sack [2]	"Silver 330" at 1lbs per sack [2]
DCL Corp (previously Lansco Colors)	8330 – 5lbs per sack [2] and 3 parts sand	8330 – 5lbs per sack [2] and 3 parts sand	8330 – 2.5lbs per sack [2] and 3 parts sand
Sika (previously LM Scofield)	"Landmarks Grey" C-284	"Cool Black #4"	"Cool Black #1"

Notes:

1. As required by the NYCDOT Highway Rules, Commercial Grey must be used in commercial districts C4-4 through C4-7, C5, and C6.
2. A sack, as used above, is 94 pounds of light grey Portland Cement.

2.19.3. (A) If the pigmented admixture is not included in the mix design, the pigmented admixture manufacturer must certify that when used at the recommended dosage, the pigmented admixture will have no deleterious effect on any mix design approval parameter (such as compressive strength, yield, and slump) and will not increase the compressive strength more than 10% when compared to the approved mix design .

(B) Calcium Chloride must not be used in the composition of the admixture nor in the composition of the concrete.

(C) The pigmented admixture must be packaged by the manufacturer in incremental amounts by weight for a single cubic yard of concrete, with the designated dosage clearly marked on each package.

2.19.4. (A) An air entraining agent complying with the requirements of **Section 2.09** must be used in combination with the pigmented admixture.

Water reducing admixtures complying with the requirements of **Section 2.09** may also be used in combination with the pigment admixture as per the Pigment manufacturer's instructions.

(B) No other agents or admixtures can be used with the pigmented admixture in the concrete, unless stated in writing by the manufacturer of the pigmented admixture to be of no consequence to the colorfastness of the concrete mixture.

(C) The concrete containing the pigmented admixtures must be mixed and delivered in accordance with **Section 3.05**. The quantity of concrete being mixed in a mixer must be no less than 40% of the capacity of the mixing drum (a minimum of 4 yards in a 10-yard truck). Before placing the pigmented admixture in a mixer drum, the drum must be thoroughly cleaned and wetted with approximately 35 gallons of mix water and a portion of the aggregate added. This mixture must mix for 3-4 minutes while the truck hopper and fins are washed with 5 gallons of water. After adding the remainder of the concrete to the truck, the load must mix at mixing speed for a minimum of 80 revolutions or 10 minutes.

At the Contractor's option, pigmented admixtures may be added at the site, in which case:

1. The truck must be charged and mixed at the plant, as previously specified, with the required cement, aggregate and admixtures (excluding pigmented admixtures), but only eighty (80%) percent to ninety (90%) percent of the required water must be added. The truck must leave the plant with 0 revolutions on its counter.

2. Once the truck arrives on Site, the remaining water and the pigmented admixture must be added and the load mixed a minimum of 90 revolutions.

Whether the pigment is batched at the plant or the site:

1. Once mixed as required above, the concrete must be sampled and tested in accordance with **Section 3.05.10**. If the consistency of the mix is not acceptable, additional water may be added not more than twice and mixing resumed for 30 revolutions each time. Water added must not exceed the limits shown on the approved mix design. Once the mix is acceptable, it must be discharged directly into the forms.

2. The total number of revolutions allowable after the truck has left the plant must not exceed 150 and the mix must be discharged within 90 minutes from when the truck has left the plant to achieve the correct workability.

(D) The same type and brand of cement, source of sand and water/cement ratio must be maintained for each load of concrete used in the entire Project.

(E) The slump of the concrete must remain consistent as required in the approved mix design.

(F) Before providing the following sample panel(s), the Contractor must prepare pairs of 6 inch x 6 inch x 4 inch samples of pigmented concrete, one with and one without the color matched curing membrane required below in **Subsection 2.19.5.(B)**. As many samples as necessary must be produced until the color is satisfactory to the Engineer. The Contractor must then furnish for approval and on Site a concrete sample for each color specified using the pigmented admixture. The sample must be at least 4' x 4' x 4" and must be given the specified surface texture and cured with the methods specified for the concrete installation. The Contractor must not order the admixture until the samples are approved by the Engineer. Once approved, the samples will be used for assessing color conformance of pigmented concrete installed.

2.19.5. (A) Water must not be sprinkled or otherwise added to the surface of the slab during finishing. Evaporation retardants may be fog-sprayed provided they are not detrimental to the finished color of the concrete.

(B) Curing Membrane. If the concrete is pigmented as per this **Section 2.19**, the curing membrane must be of the liquid-membrane forming type and must be color-matched to the pigmented concrete. Additionally, the curing membrane must be of a type recommended by the pigmented admixture manufacturer and must conform to both ASTM C309 and all local, State, and Federal regulations concerning volatile organic compounds (VOC). Plastic sheeting, burlap, paper, or other unspecified material must not be used as a curing membrane.

2.19.6. Prior to making any field samples and the placing of any colored concrete, the Contractor, concrete supplier, and the Engineer must meet and discuss methods of handling the colored concrete.

SECTION 2.20 (NO TEXT)

SECTION 2.21 – Fine Aggregate – Sand (for Asphalt, Concrete, Mortar and Plaster)

2.21.1. This section describes Sand.

2.21.2. (A) Sand shall be of the following types:

Type 1A -- Concrete Sand, Natural Sand

Type 2A -- Asphalt, Mortar and Plaster Sand; Natural Sand

Type 2B -- Asphalt Sand, Crushed Stone Sand

(B) Type shall be as specified. If type of Asphalt Sand is not specified, either Type 2A or Type 2B may be used.

2.21.3. (A) GENERAL REQUIREMENTS

Sand shall consist of clean, hard, durable, angular, rough-surfaced mineral particles, and be from a source currently on NYSDOT Approved List 703-01.

(B) SIEVE ANALYSIS

Sand shall comply with the following requirements:

	Total Passing -- Percent by Weight	
Sieve Number	Concrete Sand Type 1A	Asphalt, Mortar and Plaster Sand Type 2A or Type 2B
3/8 inch	100	----
No. 4	95-100	100
No. 8	80-100	85-100
No. 16	50-85	45-85
No. 30	25-60	---
No. 50	5-30	10-30
No. 100	0-10	0-10
No. 200	0-3	---

(C) Fineness Modulus of all sands shall not vary more than plus or minus 0.20 from the first approved test sample.

(D) DELETERIOUS SUBSTANCES

Sand shall not contain any deleterious substances in excess of that shown in Table 1 of ASTM Designation C33. The calculated quantity of sodium chloride in Type 1A sand shall not exceed three-tenths (0.3) of one percent, by weight.

SECTION 2.22 – Sealer, Concrete Expansion Joint, Elastic Type

2.22.1. This section describes Elastic Type Concrete Expansion Joint Sealer for sealing expansion and contraction joints in concrete pavements and structures. (For asphaltic joint filler see **Section 2.16**.)

2.22.2. Expansion sealer shall be of the following types:

Type 1 – Hot poured sealer

Type 2 – Cold application sealer

2.22.3. (A) Expansion joint sealer shall be a resilient and adhesive material which, when applied to the joints of concrete pavements and structures, will form an effective and continuous seal against infiltration of water through the joints during expansion and contraction.

(B) Type 1 Expansion Joint Sealer shall be suitable for melting in an oil jacketed kettle. When uniformly heated to a safe temperature, it shall melt to such a consistency that it can be readily poured into a horizontal joint one-half (1/2") inch in width. Upon cooling to atmospheric temperature, it shall adhere to the sides of the joint and shall not crack or break or separate from the sides of the joint when exposed to freezing temperatures and extended.

Type 2 Expansion Joint Sealer shall be capable of pouring or extruding at 70° Fahrenheit into joints one-quarter (1/4") inch in width. It shall be resilient and adhesive to concrete. It shall not flow from the joint or be picked up by vehicle tires at summer temperatures.

(C) Expansion joint sealer shall have at least one (1) year of field service satisfactory to the Engineer.

2.22.4. Type 1 – Hot Poured Sealer shall comply with the requirement of ASTM Designation D6690, Type III.

Type 2 – Cold Application Sealer shall be a one-component, cold-applied, silicone material that cures with atmospheric moisture to form a flexible, low-modulus 100% silicone rubber joint seal which meets or exceeds both Federal Specifications TT-S-001543A Class A (one-part silicone sealants) and TT-S-00230C Class A (one-part silicone sealants), and listed in the NYS Department of Transportation's Materials and Equipment Approved List for "SILICONE JOINT SEALANTS FOR PAVEMENTS (705-05)".

SECTION 2.23 – Steel Bars for Concrete Reinforcement

2.23.1. This section describes Steel Bars for Concrete Reinforcement.

2.23.2. (A) Steel bars shall be of the following types:

Type I – Deformed Billet Steel Bars complying with the requirements of ASTM Designation A615, Grade 40 [280] or 60 [420].

(B) Steel bars shall be Grade 60 [420], unless otherwise specified.

2.23.3. (A) Size of bars shall be as specified.

(B) Unless exact lengths are specified, bars shall be furnished in stock lengths in multiples from 20 feet up.

2.23.4. If epoxy coating is specified, the steel bars shall conform to the requirements of NYSDOT Standard Specification 709.04.

SECTION 2.24 (NO TEXT)

SECTION 2.25 – Welded Steel Wire Fabric for Concrete Reinforcement

2.25.1. This section describes Welded Steel Wire Fabric for Concrete Reinforcement.

2.25.2. Welded steel wire fabric shall be of one kind.

2.25.3. Welded steel wire fabric shall be of the weight per one hundred (100) square feet specified.

2.25.4. Welded steel wire fabric shall comply with the requirements of ASTM Designation A1064

SECTION 2.26 – Topsoil

2.26.1. This section describes Topsoil.

2.26.2. GENERAL REQUIREMENTS

Topsoil may be from natural sources or may be manufactured. Natural topsoil and manufactured topsoil must meet the same requirements, except as noted below.

Topsoil must meet the following requirements:

1) Must be of uniform quality;
2) Must be from a verifiable source;
3) Must be a loam topsoil with the addition of humus only and no added sand or clay;
4) Must be free of undesirable materials and materials toxic or otherwise deleterious to plant growth, including:
    a. Natural materials: hard clods, stiff clay, clay lumps, hardpan, sods, stones, and partially disintegrated stone;
    b. Foreign materials: lime, Portland cement, concrete, ashes, slag, tar residues, asphalt, trash, refuse, and wood;
    c. Plant materials: plant growth, seeds, viable propagules of invasive plants, woody vegetation, stumps, roots, brush;
5) Must not be delivered in a frozen or muddy condition;
6) Natural topsoil shall be obtained from an area that has never been stripped, and shall be removed to the lesser of 1 foot or until subsoil is encountered.

2.26.3 ANALYTICAL REQUIREMENTS

Topsoil shall be tested for:

- Sieve analysis (particle size)
- pH
- Organic matter
- Salinity
- Nutrient Content

(A) SIEVE ANALYSIS (PARTICLE SIZE)

Sieve analysis and classification must be performed per ASTM D2487, and meet the following requirements:

Component	Description	Percent of total, by weight
Coarse	2” or larger	0.0%
Gravel	≥ 2.0mm	20% maximum
Sand	0.05mm to 2mm	68% maximum
Silt	0.002mm to 0.05mm	55% maximum
Clay	< 0.002mm	25% maximum

(B) pH

pH must be between 5.5 to 7.2, inclusive, per ASTM D4972.

(C) ORGANIC MATTER

Organic matter is to be tested per ASTM D2974, using the ignition item method on dried moisture-free samples. The organic matter must meet the following requirements:

- Where the planting bed is open to the subgrade (i.e., street trees):5% to 10%
- Where the topsoil is for seeding or sodding: 3% to 8%
- Where the planting bed has a footing, closed bottom, or base between the subgrade and the planting (i.e., planters or raised median beds): 5% to 8%

(D) SALINITY

Soil salinity shall not exceed 0.75 millimohs per centimeter at 25C, per USDA circular No. 892, using the electrical conductivity method.

(E) NUTRIENT CONTENT

Nutrient contents, measured in parts per million (PPM), must meet the requirements below:

Nutrient	Requirement
Nitrogen (N)	25 PPM minimum
Phosphorus (P)	5 PPM minimum
Potassium (K)	20 PPM minimum

Topsoil test results must show recommendations for soil additives or fertilizers to correct nutrient deficiencies, as necessary.

2.26.4 SAMPLING AND TESTING

The Contractor must submit the following to the Engineer for approval:

1) Intended source of topsoil
2) Test reports, from an accredited 3rd party laboratory. The test reports shall include the results of all tests in **Section 2.26.3**, and verify conformance. Acceptable 3rd party laboratories include state Cooperative Extension Laboratories, such as those operated by Cornell and Rutgers.
3) If requested by the Engineer, a representative sample of topsoil. The sample size must be at least 2 gallons, or as directed by the Engineer.

The above required submittals shall be provided no fewer than 21 days prior to the scheduled delivery of topsoil. No delivery of topsoil will be allowed until the submittals are approved by the Engineer.

The initial sampling and testing for approval listed above is in addition to the sampling and testing of installed materials per **Section 5.03** (1 sample per 50 CY of topsoil installed). If the testing shows deficiencies in the installed material, the contractor may propose correcting the installed material (i.e., using additives to adjust pH) instead of replacement, if approved by the Engineer.

2.26.5 INSTALLATION

Topsoil in an unworkable condition due to excessive moisture, frost, or other conditions shall not be placed until it is suitable for spreading.

If geotechnical fabrics and/or drainage layers have been specified or are present, the condition of these items shall be intact and free of holes, tears, or defects.

Before placing topsoil, the subgrade shall be trimmed to a smooth uniform surface at the required distance below the finished grade. All hollows, depressions and gullies shall be filled with acceptable material free from stones over two (2”) inches in diameter, rubbish and other material which is unsuitable in the opinion of the Engineer.

After topsoil is spread, all large stiff clods, rocks, roots, or other foreign matter shall be cleared and disposed of by the Contractor as approved so that the finished surface will be acceptable for mulching, jute mesh, or planting.

Topsoil shall be satisfactorily compacted, as directed by the Engineer.

The Contractor shall be responsible for repairing any damage caused during the removal and replacement of topsoil, which includes, but is not limited to, plant material, irrigation systems, water proofing membrane, adjacent sidewalk, curb and gutter, pavements, planters, etc.

SECTION 2.27 – Riprap, Stone Ballast, Broken Stone and Slope Pavement

2.27.1. This section describes riprap, stone ballast, broken stone and slope pavement.

2.27.2. (A) RIPRAP – Riprap shall consist of stones of acceptable size and quality, placed in embankments or to form foundations. All riprap shall be granite, dolomite, gneiss, traprock or other approved hard and durable stone. No riprap stone shall be smaller than the commercial two and one half (2-1/2") inch stone. In general, riprap stone shall be graded from two and one half (2-1/2") inches to eighteen (18") inches so that voids between the larger stones shall be filled by the smaller stones. When available and suitable for the purpose larger stones will be permitted. Larger stones will be required for slope facing.

(B) STONE BALLAST – Stone ballast shall be broken stone, sound, hard and roughly cubical in shape, or gravel of sizes known as commercial two and one half (2-1/2") inch.

(C) BROKEN STONE – Broken stone shall be broken stone, sound, hard and roughly cubical in shape, or gravel of sizes known as commercial one and one half (1-1/2") inch.

(D) SLOPE PAVEMENT – Slope pavement shall be not less than eighteen (18") inches in depth, normal to the slope and shall be composed of sound quarried or split stones. Except when used for pinning or wedging, the stones shall be not less than six (6") inches thick and from twelve (12") to eighteen (18") inches long.

SECTION 2.28 – Rejuvenating Agent

2.28.1. This section describes rejuvenating agent for use in the construction of Performance Based Asphalt Paving Mixtures with high recycled asphalt pavement (RAP) content.

2.28.2. GENERAL REQUIREMENTS

Rejuvenating agents shall meet the requirements of ASTM D4552. Rejuvenating agents shall be manufactured products of a type specifically manufactured as a rejuvenating agent. Unrefined used oil shall not be used.

2.28.3. TEST REPORTS

Each manufacturer providing rejuvenating agent must sample, test, and certify a fixed quantity (lot) of rejuvenating agent and determine that it conforms to Department specifications. Certifications by suppliers are not acceptable.

The manufacturer shall provide test reports for every lot of rejuvenating agent offered for Department work. Tests shall be performed on materials sampled from the lot. The test reports shall include the following:

i. Manufacturer's name and product ID;
ii. Quantity of rejuvenating agent covered by report;
iii. Dates of production;
iv. Lot number;
v. Grade of rejuvenating agent per ASTM D4552;
vi. Results of all tests listed in ASTM D4552 Table 1 and the acceptance criteria;
vii. Name of laboratory performing tests;
viii. A statement of compliance to ASTM D4552;
ix. Signed and notarized.

Copies of test reports shall be maintained at the plant.

The laboratory performing the tests shall maintain AASHTO re:source (AMRL) accreditation for all tests performed.

SECTION 2.29 (NO TEXT)

SECTION 2.30 – Recycled Asphalt Pavement

2.30.1. This section describes recycled asphalt pavement (RAP) for use in the construction of Asphalt Paving Mixtures.

2.30.2. GENERAL REQUIREMENTS

RAP shall consist of asphalt millings that pass a 2" sieve. Chunks or slabs of millings that do not pass a 2" sieve will require additional mechanical processing before added to a stockpile.

A flat or elongated particle is defined herein as one which has its greatest dimension more than three (3) times its least dimension. Provide material consisting of particles where not more than 30%, by weight, of the particles retained on a ½ in. sieve are flat or elongated. Acceptance for this requirement will be by visual inspection.

RAP shall be bituminous material that is well-graded from coarse to fine and free from organic or other deleterious material, including tar. This material is at least 95%, by weight, reclaimed bituminous material. No soundness or Plasticity Index testing will be required.

If RAP exceeds 50% of total aggregate, fractionation will be required. Fractionation is the mechanical separation (sieving) of RAP into sand RAP and stone RAP fractions. Fractionated RAP stockpiles shall be tested for gradation and asphalt content separately, and shall be listed as separate lines on mix designs. The fractionation limit shall be shown on the mix design.

RAP shall be from pavements from: New York City streets, NYSDOT Highways, NJDOT Highways, and/or Port Authority of NY & NJ; no residential or commercial pavement shall be used. If RAP materials from other sources are stored at producer's yard, the materials from other sources must be in clearly marked and separate stockpiles.

RAP shall not contain asphalt plant waste material or rejected asphalt mix.

Recycled asphalt shingles (RAS) shall not be used. This prohibition covers both manufacturer's waste and post-consumer tear-offs.

2.30.3. RECORDS

Suppliers of RAP shall provide a signed certification to the plant, which shall contain the following:

i. Project identifier (city / state project number);
ii. Tonnage delivered;
iii. Certification that the RAP is from municipal sources.

Certifications shall be provided by the RAP supplier to the plant at least monthly.

2.30.4. TESTING

When RAP stockpiles are sampled for asphalt content and aggregate gradation, the following procedures shall be followed:

i. Two samples shall be obtained from the stockpile at different locations per ASTM D75. The two samples shall be tested separately.
ii. Asphalt content shall be determined using ignition oven per ASTM D6307;
iii. Aggregate gradation of the extracted aggregate shall be determined per ASTM D5444;
iv. If the two samples differ by more than 5% on any sieve or 0.1% in asphalt content, the stockpile shall be thoroughly mixed and retested with four samples, which shall meet the same criteria.

SECTION 2.31 – Bluestone Flags

2.31.1. INTENT. This section describes Bluestone Flags for sidewalks.

2.31.2. MATERIAL REQUIREMENTS. Bluestone flags shall consist of either new or existing salvaged flags.

(A) Existing bluestone flags to be cleaned, dressed and reset, shall have a minimum thickness of two (2") inches. Existing flags to be dressed and reset are to be removed and handled with the utmost care.

Existing flags to be relaid shall be rectangular in shape, not be less than two (2') feet wide and not less than five (5) square feet in area.

(B) New bluestone flags to be furnished as replacement flags, or as required to complete the work, shall be bluestone which match the existing bluestone in color and original rectangular size of flags. New bluestone shall be not less than three (3") inches nor more than four (4") inches in thickness, unless otherwise directed by the Engineer.

New flags shall be rectangular in shape, not less than four (4') feet wide and not less than ten (10) square feet in area, unless otherwise required to match the existing stone pattern.

New bluestone shall be "North River bluestone" or "Hudson River bluestone" quarried in either Ulster, Albany, and Greene Counties of New York State along the Hudson (North) River, or an approved equivalent, meeting the requirements of **Subsection 2.31.3**, below.

2.31.3. All bluestone, whether existing or new, shall be solid, sound, durable, reed-free stone, free from tool marks, hollows, ridges, spalls, weaves, or any other defects which impair strength, durability, or appearance.

All exposed surfaces to be naturally cleft, with a variation in smoothness not exceeding 1/8 inch. Edges can be sawn, rubbed, or thermal.

2.31.4. BASIS OF ACCEPTANCE. Before proceeding with any bluestone work under this contract, the Contractor must submit for approval two or more sets of samples of proposed new stone, which are typical of the extremes of color, texture, and quality of stock and finish. Samples are to be at least 4" by 6" by 2" thick. Each sample must be labeled with the type of stone, finish, source, and supplier. Bluestone delivered must be equal in all respects to the approved samples. The color range is to approximate as closely as possible the existing bluestone sidewalk. Bluestone must be carefully shipped, handled, stored, and set to prevent breakage, staining, or other damage.

SECTIONS 2.32 AND 2.33 (NO TEXT)

SECTION 2.34 – Galvanizing

2.34.1. This section describes Galvanizing.

2.34.2. All galvanizing shall be done by the hot-dip process, or, the electrolytic process.

2.34.3. WORKMANSHIP.

(A) Zinc coating shall be adherent, smooth, continuous and thorough. It shall be free from such imperfections as lumps, blisters, gritty areas, uncoated spots, acid and black spots, dross and flux.

(B) Metal to be galvanized shall be thoroughly cleaned and pickled.

(C) Threading shall be done before galvanizing. The coating shall not interfere with the intended use of the material.

2.34.4. CHEMICAL AND PHYSICAL REQUIREMENTS.

(A) GENERAL REQUIREMENTS – Galvanizing shall comply with the requirements of ASTM Designation A123.

(B) WEIGHT OF COATING - The weight of zinc coati–g per square foot of actual surface shall average not less than two (2.0) ounces and no individual specimen shall show less than one and eight tenth (1.8) ounces as determined in accordance with ASTM Designation A90.

(C) UNIFORMITY OF COATING – Coating shall be uniform as determined by visual inspection. If, in the opinion of the Engineer, visual examination is not conclusive, uniformity of coating shall be determined in accordance with ASTM Designation A239. Galvanized articles, so tested, shall withstand seven (7) one (1) minute dips without exposing base metal or showing adherent copper deposit.

(D) ADHERENCE – The coating shall be so adherent as not to be removable by any reasonable handling and erection. Light blows with a one half (1/2) pound hammer shall not cause peeling of the coating adjacent to the area deformed by the hammer blows.

SECTION 2.35 – Structural Steel

2.35.1. This section describes Structural Steel.

2.35.2. Structural steel shall be of one kind, and unless otherwise specified, shall have a minimum yield strength (Fy) of thirty six thousand (36,000) pounds per square inch.

Structural steel shall comply with the requirements of ASTM Designation A36. Steel for structural rivets shall comply with the requirements of ASTM Designation A502.

2.35.3. Structural steel sizes and shapes shall be as shown on the Contract Drawings, specified or required by the Engineer.

2.35.4. Test specimens and every finished piece of steel shall be stamped with melt or blow number, except that small pieces may be shipped in bundles securely wired together, with melt or blow number on a metal tag attached.

2.35.5. The steel shall be finished straight and smooth and shall be free from all seams, flaws, cracks, defective edges or other defects. Sufficient discard shall be made by cropping ingots to insure sound material, free from piping or excessive segregation.

2.35.6 All exposed surfaces of structural steel shall be thoroughly cleaned of all rust, oil, grease, scale or foreign matter and painted in accordance with the requirements of **Subsection 2.13.4**.

SECTION 2.36 – Wrought Iron

2.36.1. This section describes Wrought Iron.

2.36.2. Wrought iron shall be of one kind.

2.36.3. Wrought iron shall be tough, fibrous, uniform in quality, ductile and malleable, thoroughly welded in rolling and free from surface defects.

2.36.4. Wrought iron shall comply with the requirements of ASTM Designation E350.

SECTION 2.37 (NO TEXT)

SECTION 2.38 – Wood and Timber Posts and Timber Blockouts

2.38.1. INTENT. This section covers wood posts used as witness posts, timber posts, and blockouts used in guiderail construction.

2.38.2. MATERIALS REQUIREMENTS. Wood posts, timber posts, and timber blockouts shall comply with the requirements of **Section 2.39, Stress Graded Timber and Lumber**. Using the clean wood properties of ASTM D2555, the bending stress (Modulus of Rupture) shall not be less than 4,000 pounds per square inch. They shall be surfaced on four sides and the dimensions shall be actual or nominal as indicated on the plans. If the dimensions are indicated to be nominal, the actual dimensions provided shall be in accordance with current trade practice. Surface dried redwood, red cedar, cypress or black locust may be used untreated. Other lumber including douglas fir, pine, oak, birch, apple, and beech may also be used but shall be pressure treated as specified in **Subsection 2.38.3**, below, after all the holes have been drilled and all other woodwork operations have been performed. Bituminous preservative treatments will not be permitted. Before using, the Contractor shall submit to the Engineer, for approval, information as to the species of timber to be used and method of preservative treatment to be employed.

2.38.3. PERSERVATIVE TREATMENT. All wood components shall be pressure preservation treated in strict accordance with the provisions of the American Wood-Preserves' Association (AWPA) Standards. Wood shall be seasoned, either by air-drying or kiln drying, and the moisture content prior to treatment shall be not more than 25%. Wood shall be treated to a net retention of 0.40 pounds per cubic foot with ACQ (ammoniacal copper quaternary), Coper Azole preservation, or an approve equivalent. The preservative shall penetrate 2.5 inches quateary), Coper Azole preservation, or an approved equivalent. The preservative shall penetrate 2.5 inches or 85% of the sapwood. All details of treatment methods, quality, control and production testing shall be in accordance with the appropriate AWPA standards. In accordance with New York State law, Bills A102 and §7167, CCA (chromate copper arsenate) treatment is prohibited as a wood treatment material.

If any other preservative treatment is proposed, the Contractor shall submit documentation that such treatment conforms to the AWPA Standards for treatment of the wood for the intended use.

Posts shall be dried at least thirty (30) days after treatment and prior to installation. All fabrication shall be performed prior to treatment. Where field cuts have to be made, the cut ends shall have two coats of concentrated preservative brushed on.

2.38.4. BASIS OF ACCEPTANCE. Acceptance will be based on the manufacturer's certificate with supplementary sampling and testing at the discretion of NYCDDC QA.

SECTION 2.39 – Stress Graded Timber and Lumber

2.39.1. INTENT. Stress graded timber and lumber shall be graded for the stress grade selected, in accordance with grading rules for the indicated stress grade, developed from ASTM D245.

Commercial stress grades of timber and lumber, with grade descriptions providing material which will meet the indicated stress requirements under rules conforming to ASTM D245, will be acceptable.

2.39.2. MATERIAL REQUIREMENTS. Stress graded timber and lumber will be subject to inspection by representatives of the Department whom the manufacturer shall furnish copies of the manufacturer's certification of inspection and piece tally in triplicate. Each piece must be clearly branded with the stress grade mark of the manufacturer's inspector.

The Contractor shall furnish all facilities for the inspection of this material by the Department's representatives and shall allow them free access to all premises where inspections can be made.

2.39.3. BASIS OF ACCEPTANCE. The manufacturer shall certify that the timber and lumber has been inspected under grading rules which conform to the requirements of ASTM D245 and shall show on the certificate the identifying mark used by manufacturer's inspector.

SECTION 2.40 – Timber and Lumber

2.40.1. This section describes timber and lumber.

2.40.2. All timber and lumber shall be yellow pine or Douglas fir.

2.40.3 Timber and lumber shall be of the sizes shown, specified or required. Sizes given are nominal sizes.

2.40.4. Each piece of wood shall be stamped with standard grade marks.

2.40.5. MATERIAL, WORKMANSHIP AND FINISH.

(A) YELLOW PINE – Yellow pine timber and lumber shall be either Structural Square Edge and Sound Longleaf or Dense Structural Square Edge and Sound Shortleaf grade.

(B) DOUGLAS FIR – Douglas fir timber and lumber shall be Select Structural grade.

2.40.6 CHEMICAL AND PHYSICAL REQUIREMENTS.

(A) YELLOW PINE – Yellow pine timber and lumber shall conform to the requirements of the Southern Pine Association Standard Specifications.

(B) DOUGLAS FIR – Douglas fir timber and lumber shall conform to the requirements of the West Coast Lumberman's Association Standard Grading and Dressing Rules.

(NO TEXT ON THIS PAGE)

DIVISION III - COMBINED MATERIALS OF CONSTRUCTION

(NO TEXT ON THIS PAGE)

DIVISION III

COMBINED MATERIALS OF CONSTRUCTION

SECTION 3.01 – Asphalt Paving Mixtures (BINDER, ASPHALTIC CONCRETE)

3.01.1. This section describes Asphalt Paving Mixtures which are to be laid hot.

3.01.2. (A) Asphalt paving mixtures shall be of the following kinds:

Rut Avoidance Binder Mixture, Type 3 RA;

Rut Avoidance Asphaltic Concrete Mixture, Type 6F RA;

Extra Fine Asphaltic Concrete Mixture

(B) Kind of mixture shall be as specified.

3.01.3. Asphalt paving mixtures shall consist of mineral aggregate thoroughly coated with asphaltic cement.

(A) GENERAL. The Contractor shall obtain Department approval of materials before any material is mixed at any bituminous mixing plants. Approval of sources of supply of the coarse and fine mineral aggregates shall be obtained from DDC QA.

All laboratories, asphalt mix designs, all vendors including bituminous (asphalt) plants proposed by the Contractor shall be subject to approval by NYCDDC QA and in accordance with their "MIX DESIGN, LABORATORY AND PLANT APPROVAL PROTOCOL". Copies of this protocol may be obtained at the pre-construction meeting or from the Engineer. The minimum requirement for approval of the proposed plant is that it must be on the New York State Department of Transportation (NYSDOT) approved list for the current construction season.

(B) COMPOSITION OF MIXTURES. The bituminous plant mix shall generally be composed of a mixture of aggregate, filler if required, and bituminous material in accordance with Table 3.01—III – Ingredient Materials.

For any bituminous mixture required by the plans or itemized proposal, the Contractor shall formulate and submit, in writing, to the Engineer, a job mix formula (JMF) that satisfies the design general limits listed in Table 3.01-I – Composition of Bituminous Plant Mixtures. The production tolerances in Table 3.01-I will be permitted to exceed the design general limits. In addition, the formula shall state the mineral aggregate sources, and the grade of bituminous material used in the mixture.

The optimum asphalt cement content for the proposed gradation of Type 3RA binder course and Type 6F RA top course mixtures shall be determined by the Contractor using the Marshall Mix Design Method specified in **Subsection 3.01.3.(E)**. The resultant mixture for each type course shall meet the Marshall Properties shown in Table 3.01-II, herein.

Marshall specimens shall be prepared, mix properties determined, and completed mix design submitted to the Engineer for approval a minimum of four (4) weeks prior to the scheduled start of paving work.

The approved formula or raw material sources shall not be changed without the written permission of the NYCDDC QA Director.

	Binder		Top		
	Type 3 RA		Type 6F RA		Extra Fine*
Screen Size	Design General Limits % Passing	Production Tol. %	Design General Limits % Passing	Production Tol. %	Design General Limits % Passing
1 1/2”	100	--			
1”	95-100	--	--		
3/4”	74-93	±5	100	--	
1/2”	58-73	±5	95-100	--	100
3/8”					98-100
1/4”	38-53	±5	58-72	±5	
1/8”	26-40	±4	36-54	±4	
4					70-90
8					38-65
20	9-23	±4	15-32	±4	
40	4-18	±4	8-25	±4	
50					6-25
80	3-13	±3	4-16	±3	
200	2-6	±2	2-6	±2	2-8
% Asphalt	4.0-6.0	±0.7 of JMF A.C. %	5.0-6.2	±0.7 of JMF A.C. %	5.0-8.0

TABLE 3.01-I

COMPOSITION OF BITUMINOUS PLANT MIXTURES

NOTES:

1. All aggregate percentages are based on the total weight of the aggregate. The asphalt content is based on the total weight of the mix.
2. The “F” designation in the mix type indicates that high friction coarse aggregates are required.
3. When determining the mixture % asphalt, 100% of the asphalt from RAP will be used.
4. The asphalt cement shall be introduced into the pugmill at a temperature compatible with that of the aggregate as determined by the Engineer, between the limits of 225° and 350° Fahrenheit.

* *Used for park walks, playgrounds, tennis courts, etc.*

Once approved, the mix shall be produced within the job mix formula tolerances set forth in Table 3.01-I. The aggregate tolerances shall be based on the total weight of the aggregate and the bituminous material tolerances shall be based on the total weight of the mix.

If for any reason, a change in gradation or materials occurs or is contemplated, a separate job mix formula and Marshall Design, when appropriate, shall be prepared to fit each change in materials or gradation. The Engineer may order increases or decreases in the bituminous material quantity without changing the job

mix formula providing that any change stays within the approved job mix formula range for the bituminous material. Changes in asphalt content for mixtures requiring Marshall Design, can be made by the Engineer providing the resultant mixture has properties within the specified Marshall criteria and the asphalt content is within the general limits listed in Table 3.01-I.

Two sets of Marshall plugs shall be prepared per ASTM D6926 and asphalt samples taken per ASTM D979 for every 800 tons, or portion thereof, of material placed each day. The testing sample points within the 800 ton lot must be determined by ASTM D3665. One set of Marshall plugs shall be delivered to the NYCDDC QA laboratory under supervision of the Engineer. The other set of Marshall plugs shall be prepared and tested by the asphalt plant's Quality Control (QC) staff for Marshall stability and flow per ASTM D6927 and bulk specific gravity per ASTM D2726. The asphalt sample must be tested by the asphalt plant's QC staff for asphalt content per ASTM D6307, gradation per ASTM D5444, theoretical maximum density per ASTM D2041, and air voids per ASTM D3203. These tests are required to be performed for use in the Contractor's quality control program and therefor shall be completed so that the results are available at the job site as far in advance of the end of shift as possible. In addition, test results from the asphalt plant's QC staff or the Contractor's laboratory will not be used for payment and acceptance.

The aggregates shall be those approved for use by the approved job mix formulas and will be accepted at the plant site. The bituminous material will be conditionally accepted at the supplier's source and at the plant on the basis of certification. Samples taken at the plant will be tested by the City or its representative to determine specification compliance. The gradation of the plant mixed material will be tested to determine compliance with the job mix formula during the production of the material. The plant mixed material will be judged for acceptance after blending and mixing at the plant. The pavement courses will be judged for acceptance after all paving operations are completed.

(C) AGGREGATES. Fine aggregate shall consist of materials conforming to the requirements of **Section 2.21, Sand**.

Coarse aggregate shall consist of crushed stone, crushed gravel, or crushed slag conforming to the requirements of **Section 2.02, Coarse Aggregate**, except for gradation.

When aggregates from approved natural fine sand sources are combined with coarse aggregates in the mixture, aggregate particles shall meet additional requirements as follows:

Particles retained on the No. 1 Sieve shall meet the quality requirements of **Section 2.02** and shall have a minimum of 85 percent, by weight, of the particles with at least two fractured faces.

In addition to the above requirements, coarse aggregate shall meet the following high friction requirements:

1. COARSE AGGREGATES. Top Course Type 6F RA asphalt concrete mixtures shall meet one of the following high friction requirements:

(a) Coarse aggregates shall be crushed limestone having an acid insoluble residue content of not less than 20% (excluding particles of chert and similar siliceous rocks), or crushed dolomite (excluding Wappinger Dolomite as defined by the Department).

(b) Coarse aggregates shall be crushed sandstone, granite, chert, traprock, ore tailings, slag or other similar materials.

(c) Coarse aggregates shall be crushed gravel or blends of two or more of the following types of materials: crushed gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, slag, reclaimed asphalt pavement, or other similar materials. These aggregates shall meet the following requirements:

Type 6FRA Mixes – Not less than 20% (by weight with adjustments to equivalent volumes for materials of different specific gravities) of the total coarse aggregate particles (plus 1/8" material) shall be non-carbonate. In addition, not less than 20% of the plus 1/4" particles shall be non-carbonate.

Non-carbonate particles are defined as those having an acid insoluble content not less than 80%.

The proportion of reclaimed asphalt pavement permitted within each mix shall be not less than 30 percent for the top and not less than 30 percent for the bottom courses as per Local Law #71 of 2011.

2. Source of Aggregate and Sampling.

(a) Virgin Aggregate.

i. Sources of virgin aggregates shall be selected well in advance of the time the materials are required for the construction. When the aggregates are obtained from a previously approved source, random hot bin samples shall be submitted, if requested by the Engineer, 14 days prior to the start of production and if from a source not previously approved, random hot bin samples shall be submitted 45 days prior to the start of production. Sampling of the hot bin materials for job mix formulation will be observed by the Engineer and identical samples shall be obtained for verification of the job mix formulation by DDC QA. The Engineer may require the proposed mix formulation to be batched at the asphalt plant and tested in the presence of the Engineer.

ii Where previously used or concurrent job mix formulations are to be used, the taking of hot bin samples may be waived by the Engineer.

(b) Reclaimed Asphalt Pavement.

Recycled asphalt pavement (RAP) shall meet the requirements of **Section 2.30**. The fine aggregate contained in the RAP shall have a plasticity index not greater than 4 when tested in accordance with ASTM D4318.

The stockpiles of RAP shall be maintained in a manner to prevent contamination with other aggregates, and shall be clearly labeled.

(c) The Contractor shall submit certified test data, location of each type aggregate to be used and quantities to be obtained from each location and make arrangements for the Engineer to obtain samples from each such location for checking against the samples submitted. Take all samples in accordance with requirements of ASTM D75 and ASTM D242.

If requested, submit to the Engineer samples of each type aggregate to be used and from each source with proper identification as to source, type of aggregate and Contract number. Submit in clean, sturdy bags and in the following amounts for each sample when requested:

RAP – 50 lbs.
Coarse Aggregate – 25 lbs.
Fine Aggregate – 25 lbs.
Mineral Filler – 5 lbs.

If requested the Contractor shall submit to the Engineer for approval four one-quart samples of the asphalts proposed for use together with the following data:

i. The name of the supplier(s).

ii. An analysis of such asphalts by the supplier, certifying that the results of tests comply with the requirements of AASHTO MP1 and this Section.

(d) Stockpiles of RAP and virgin aggregate must be located so as to prevent intermingling (cross-contamination), either by physical walls or barriers or with sufficient separation between the stockpiles.

(e) When more than one asphalt plant is to be used to supply asphalt concrete to the construction site, each asphalt plant shall use the same materials and a similar job mix formula.

(f) Locations and timing of random sampling shall be as determined by the Engineer.

3. BLENDING. Where coarse aggregates for these mixes are from more than one source or of more than one type of material, they shall be proportioned and blended to provide a uniform mixture.

(D) MIX PROPERTIES. The mixtures shall meet the Marshall property criteria appearing in Table 3.01-II – Marshall Mix Property Criteria.

	Mix Criteria	
Mix Property	Type 3RA	Type 6FRA
Stability, lb. min.	1500	1500
Flow, 0.01 in.	8 – 12	8 – 12
Marshall Quotient lb./0.01 in., min.	150	150
Air Voids, percent	3.0 -5.0	3.0 -5.0
Voids in Mineral Agg. (VMA), percent min.	13.5	15.5
Voids Filled with Asphalt (VFA), percent	65-75	65-75

Table 3.01-II – Marshall Mix Property Criteria

(E) MIX PREPARATION. The Marshall specimens shall be prepared, mix properties determined, and completed mix design submitted in accordance with the procedures outlined by Department's written instructions with the following modifications:

(1) Compactive effort shall be 75 blows per side.

(2) Five point asphalt cement content Marshall design is required prior to production. One point designs are not acceptable.

(3) The minimum specified VMA shall be met at each of the five mix design asphalt cement contents.

(4) The Marshall quotient is calculated as the corresponding ratio of corrected stability (lbs.) to flow (0.01 in.).

(5) The optimum asphalt cement content shall be determined by the "Range" method. Graphs shall be constructed for each of the specified mix design properties (stability, Marshall quotient, air voids, VMA and VFA) using each property as the vertical axis and percent asphalt cement content as the horizontal axis. The plotted values in each graph shall be fitted with a smooth curve that obtains the "best fit" for all values. A vertical line is drawn at the point where the asphalt cement content provides the acceptable lower and upper limits for the properties of stability, flow, Marshall quotient, and air voids. The mid-point of the common overlap is the optimum asphalt cement content provided it does not fall on the positive slope of the VMA curve. When this occurs the low point of the VMA curve shall be the optimum asphalt cement provided it falls within the common overlap of the specified stability, flow, Marshall quotient, and air voids ranges.

If, for any reason, a change in gradation or materials occurs or is contemplated or when field conditions dictate, a separate job mix formula and Marshall Design shall be prepared to fit each change in materials or gradation.

(F) RECYCLED ASPHALT PAVEMENT.

(1) Contractor shall take a sample of RAP and determine the moisture content at least twice daily in accordance with AASHTO T329. The moisture content of the freshly mixed bituminous concrete shall not exceed 0.8 percent.

(2) The Contractor shall take a sample of RAP from the stockpile at least once daily and test in accordance with ASTM D6307 to determine asphalt content and gradation in accordance with ASTM D5444. The resulting asphalt content and aggregate gradation shall be similar to the average test results of the RAP submitted with Design Job Mix Formula. If there is a variation of plus or minus 1.0 percent in the asphalt content or, plus or minus 10 percent in aggregate graduation on any sieve, a second sample shall be taken and tested in the same manner as the

first sample, appropriate measures shall be taken to adjust the mixture to compensate for the variation in the RAP.

(G) MOISTURE CONTENT OF AGGREGATE. The moisture content of aggregate used for production in drum plants shall be determined a minimum of once per lot in accordance with ASTM C566.

(H) MOISTURE CONTENT OF MIXTURE. The moisture content of the mixture shall be determined once per lot in accordance with AASHTO T329.

(I) PERFORM ADDITIONAL TESTING AS REQUIRED to ensure that mixtures produced meet the requirements of this Section.

(J) MIXING PLANT REQUIREMENTS FOR RECYCLED ASPHALT CONCRETE.

1. Batch Plants shall have an appropriately located metering device for adding the RAP to the heated new aggregate and shall provide an accurate method for proportioning the RAP into the mixture.

2. The batch plant's dryer may have to be operated at temperatures higher than with all new materials. Modifications to the dryer and the dust collection system may be necessary to prevent damage.

3. Drum-mix plants shall have an appropriately located metering device for adding the RAP to the dryer-mixer in a manner that does not damage the asphalt in the RAP. An accurate method for proportioning the RAP into the mixture shall be provided. The Contractor shall make provisions for compensating for the moisture in the RAP.

4. The mixing time for a drum-mix plant shall be such as to achieve an intimate blending of the new and recycled materials and a complete coating of all aggregate particles.

5. The batch or drum-mix plant may be equipped with a surge-storage bin at the mixture discharge point.

(K) MINERAL FILLER. Mineral filler, if required in the mix to meet gradation requirements, shall conform to the requirements of **Section 2.18**.

(L) BITUMINOUS MATERIALS. The type and grade of bituminous material shall be as specified in the Table 3.01-I, Composition of Bituminous Plant Mixtures, unless otherwise indicated on the plans or in the itemized proposal.

The bituminous material shall meet the applicable requirements of **Section 2.05, Asphalt Cement**.

3.01.4. Asphalt paving mixtures shall comply with the requirements of Tables 3.01-I, 3.01-II, and 3.01-III and shall produce satisfactory surfaces.

TABLE 3.01-III – INGREDIENT MATERIALS

Kind of Mixture	Applicable Sections			
	Asphaltic Cement	Sand	Broken Stone	Mineral Dust
Rut Avoidance Binder, Type 3 RA	Section 2.05*	**Section 2.21** Type 2A or Type 2B	**Section 2.02** Type 1 Grade B Size as per Section 3.01, Table 3.01-I	--
Rut Avoidance Asphaltic Concrete Type 6F RA	**Section 2.05***	**Section 2.21** Type 2A or Type 2B	**Section 2.02** Type 1 Grade A Size as per **Section 3.01**, Table 3.01-I	**Section 2.18**
Extra Fine Mix Asphaltic Concrete	**Section 2.05***	**Section 2.21** Type 2A or Type 2B	**Section 2.02** Type 1 Grade A Size EF	**Section 2.18**

* *The penetration of the asphaltic cement in stone mixes shall be 85 to 100.*

3.01.5. (A) HEATING AND STORING INGREDIENTS.

The asphaltic cement shall be heated in approved receptacles to a temperature between 275° and 325° Fahrenheit. It shall be kept uniform in composition and consistency by thorough mixing and agitation, and, if required by the Engineer, it shall be agitated both before and during use. Approved methods of agitation, which will not injure the cement, shall be used.

The broken stone and sand shall be heated in approved revolving driers and delivered to separate storage bins. If the broken stone and sand are heated together in the same drum they shall be screened and delivered to separate storage bins. The broken stone shall be delivered to the proportioning box at a temperature not exceeding 350° Fahrenheit. The sand shall be delivered to the proportioning box at a temperature not exceeding 400° Fahrenheit.

The mineral dust, as used, shall be thoroughly dry. It may be heated in an approved manner to a temperature not exceeding 325° Fahrenheit.

(B) PROPORTIONING INGREDIENTS

The materials comprising the charge for each batch shall be proportioned accurately by weight or by volume. The proportioning apparatus shall be of approved design, kept in good working order and accurate to 0.5 percent.

Fluid materials may be measured by approved fluidometers.

(C) MIXING INGREDIENTS

After proportioning, the ingredients shall be incorporated in an approved mixer. When mixed in a batch mixer prior to the addition of the asphaltic cement, the aggregate shall be deposited in the mixer and

thoroughly mixed for a period of not less than ten (10) seconds for binder mixture and fifteen (15) seconds for sheet asphalt and asphaltic concrete mixtures. The asphaltic cement shall then be added and the mixing continued for a period of not less than thirty (30) seconds. When mixed in a batch or continuous mixer, the mixing shall be continued until a homogeneous mixture is produced in which all particles of the mineral aggregate are completely coated with asphaltic cement.

The size of batch shall not exceed the rated capacity of the mixer.

(D) TEMPERATURE OF MIXTURE

The temperature of the mixture and rolling time available for placement of bituminous paving mixtures shall be regulated according to the temperature of the surface on which the mat is placed (called base temperature) and the mat thickness to be placed. The maximum temperature of any batch immediately after mixing shall in no case exceed 350° Fahrenheit at the plant, and unless otherwise specified, the minimum laydown temperature and rolling time available for placement of bituminous paving mixtures shall be as given in the following table:

	Minimum Laydown Temperature (^{o}F)					
Base Temp.(^{o}F)	1/2”	3/4”	1”	1-1/2”	2”	3” and Greater
+32-40	-	-	-	305	295	280
+40-50	-	-	310	300	285	275
+50-70	310	300	290	285	275	265
+70-80	300	290	285	280	270	265
+80-90	290	280	275	270	265	260
+90	280	275	270	265	260	255
Rolling Time Available (Minutes)	4	6	8	12	15	15

All temperatures shall be measured on the surface where the paving is to be placed and the controlling temperature shall be the average of three temperature readings taken at locations 25± feet apart in accordance with the Engineer’s instructions.

The above temperature limits are based on the use of residual petroleum asphalt. If the Contractor uses asphalt derived from other sources, the Engineer shall fix appropriate temperature limits within which the mixture must be confined.

SECTION 3.02 – Bed, Bitumen-sand

3.02.1. This section describes Bitumen-sand Bed.

3.02.2. Bitumen-sand bed shall be of one kind.

3.02.3. (A) Bitumen-sand bed shall consist of sand coated with liquid asphalt combined in definite proportions by weight to produce a mixture containing 94 to 96 percent by weight of mineral aggregate and 4 to 6 percent by weight of liquid asphalt.

(B) Liquid asphalt shall comply with the requirements of **Section 2.03**, Grade RC-250.

(C) Sand shall comply with the requirements of **Section 2.21**, Type 2A.

3.02.4. (A) HEATING INGREDIENTS.

Liquid asphalt shall be used at atmospheric temperature or it may be heated in an approved manner to a temperature not exceeding 150° Fahrenheit.

Sand shall be heated and dried in approved revolving driers and delivered to the weight box at a temperature not exceeding 200° Fahrenheit.

(B) PROPORTIONING INGREDIENTS.

The materials comprising the charge for each batch shall be measured accurately by weight and shall be weighed separately by dial scales attached to the receptacle or bucket used for such proportioning. The weighing apparatus shall be of approved design, kept in good working order and accurate to 0.5 percent.

(C) MIXING INGREDIENTS.

After weighing, the ingredients of each mixture shall be incorporated in an approved mixer. Mixing shall be continued until a homogeneous mixture is produced.

(D) TEMPERATURE OF MIXTURE.

The temperature of the mixture shall be regulated according to the temperature of the atmosphere and the character of the materials employed. The temperature of any batch after mixing and when delivered on the street shall be between 110° and 175° Fahrenheit.

SECTION 3.03 – Bed, Mortar

3.03.1. This section describes Mortar Bed.

3.03.2. (A) Mortar bed shall be of the following types:

Type 1–Normal Portland Cement Mortar Bed

Type 2–Extra Strength Portland Cement Mortar Bed

(B) Type shall be as specified.

Type 1 shall be used unless Type 2 is specified.

3.03.3. Mortar bed of each type shall comply with the requirements of **Section 3.07** for the corresponding type of mortar.

SECTION 3.04 – Block, Asphalt

3.04.1. This section describes Asphalt Blocks.

3.04.2. (A) Asphalt blocks shall be of the following types and sizes:

Type		Size	Dimensions – Inches		
Number	Name		Depth	Width	Length
1	Rectangular Block	A B	2-1/2 3	5 5	12 12
2	Rectangular Tile	-	1-1/2	8	16
3	Hexagonal Tile	-	2	8 inches between parallel sides	

(B) Type and size of block and penetration of asphalt cement shall be as specified.

(C) When blocks of special size are required, the dimensions shall be as specified.

3.04.3. Asphalt blocks shall consist of a homogeneous mixture of broken stone, mineral dust and asphaltic cement.

3.04.4. If required by the Engineer, the Contractor shall submit the proposed formula to the Engineer for approval before manufacturing the asphalt blocks. The Contractor shall submit for this purpose a statement, in writing, of the sources of all ingredient materials, the penetration of the asphaltic cement, the percentages by weight and the number of pounds of each of the materials making up one batch.

The approved formula, including material sources, shall not be changed without the written permission of the Engineer.

3.04.5. (A) ASPHALTIC CEMENT. Asphaltic cement shall be a high melting point oxidized asphalt conforming to ASTM Designation D 312 for Type 3 asphalt.

(B) BROKEN STONE

Broken stone shall be clean, hard, unweathered stone of uniform quality. It shall consist of fragments roughly cubical or pyramidal in shape and shall be crushed from ledge rock. The stone shall conform to the sieve analysis for Size No. 8 under ASTM Designation C33.

(C) MINERAL DUST

Mineral dust shall comply with **Section 2.18**.

3.04.6. (A) COMPOSITION. Asphalt blocks shall comply with the following composition requirements:

		(Percent by Weight)
Bitumen Soluble in Chloroform		6.0 to 9.0
Mineral Aggregate		91.0 to 94.0
Sieve Analysis of Mineral Aggregate:		
Total Passing Sieve	3/8”	100
	No. 4	95 to 100
	No. 10	60 to 80
	No. 40	40 to 60
	No. 80	25 to 40
	No. 200	15 to 25

Provided the final composition remains within the limits prescribed above, the following maximum plus or minus deviations from composition percentages as determined by the formula approved by the Engineer shall be allowed:

Passing No. 200 Sieve	2.0%
Bitumen	0.5%

(B) SPECIFIC GRAVITY

The specific gravity of the blocks at a temperature between 65° and 80° Fahrenheit shall be not less than 2.40.

(C) ABSORPTION OF WATER

The average absorption of a set of four (4) blocks shall be not more than one-fourth of one percent (0.25%).

(D) TOLERANCE IN DIMENSIONS

Depth and Width – plus or minus 1/8 inch.
Length – plus or minus 1/4 inch.
Distance Between Parallel Sides of Hexagonal Block – plus or minus 1/8 inch.

3.04.7. (A) PLANT

Asphalt blocks shall be manufactured in an approved, modern, well equipped and scientifically operated plant.

(B) HEATING INGREDIENTS

The asphaltic cement and broken stone shall be heated separately to a temperature not exceeding 350° Fahrenheit for asphaltic cement and 400° Fahrenheit for broken stone. The mineral dust may be heated to a temperature not exceeding 350° Fahrenheit.

The temperature of the ingredients shall be so regulated that the temperature of the mixture as delivered to the press molds shall be not less than 225° Fahrenheit and not more than 325° Fahrenheit.

(C) PROPORTIONING INGREDIENTS

Asphaltic cement and mineral dust for each mixer charge shall be measured separately by weight.

Broken stone for each mixer charge may be measured by weight or by struck volume, provided that suitable means are readily available at all times for segregating and check-weighing volumetrically measured batches of broken stone.

Measuring devices shall be of approved design and always kept in good working order.

(D) MIXING INGREDIENTS

After proportioning, the broken stone and mineral dust shall be deposited in an approved mixer and thoroughly mixed for not less than fifteen (15) seconds for each ton or part of a ton. The asphaltic cement shall then be added and the mixing continued for not less than sixty (60) seconds or longer, if required, until a homogeneous mixture is produced in which all the mineral particles are completely coated with asphaltic cement.

(E) PRESSURE ON BLOCKS

The mixture shall be conveyed into molds of the shape and size of the blocks specified in approved presses, where the mixture shall be subjected to a hydraulic pressure upon the wearing surface of the block of not less than two (2) tons per square inch.

(F) COOLING

After leaving the press, the blocks shall be cooled by automatically conveying them through clean cold water or by other approved methods.

SECTION 3.05 – Concrete

3.05.1. INTENT.

This section describes Concrete.

3.05.2. CLASSES AND TYPES.

(A) Concrete shall be of the classes and types shown in Table 3.05-I.

Note: Based on dry-rodded volumetric measurement of ingredient materials:
High Early Strength Concrete is approximately equal to a 1 : 1-1/4 : 2-1/4 mix.
Class A-40 Concrete is approximately equal to a 1 : 1-3/4 : 2-3/4 mix.
Class B-32 Concrete is approximately equal to a 1 : 2 : 3-1/4 mix.

TABLE 3.05-I

Class Designation	Nominal Mix	Cement Type	Type of Portland Cement
High-Early Strength	7-1/2 Bag Mix	Type IIIA	Moderate Sulphate Resistant Air-entrained
Class A-40	7-Bag Mix	Type IA Type IIA	Normal Air-entrained Moderate Sulphate Resistant Air-entrained
Class B-32	6-Bag Mix	Type IA Type IIA	Normal Air-entrained Moderate Sulphate Resistant Air-entrained

Note: The above proportions shown for non-High-Early mixes shall be modified by pozzolan substitutes as per **Subsection 3.05.4**.

(B) Class, type and method of mixing concrete shall be as specified.

Type, grade, size number and corresponding nominal size of coarse aggregate shall be as specified.

Concrete shall be pigmented when specified.

3.05.3. MATERIAL. Concrete shall be a homogeneous mixture consisting essentially of Portland cement, fine aggregate, coarse aggregate, water, and admixtures and pozzolan. It shall be proportion-strength concrete whose constituent materials are proportioned in accordance with specification requirements to produce a required strength. Air-entrained concrete shall be concrete which in addition to the above shall have a specified air content resulting from the use of an admixture in the concrete.

(A) CEMENT

Cement shall be dry, free from lumps and have a temperature less than 170° Fahrenheit when used.

For concrete exposed to view, the Contractor shall not use more than one (1) brand, unless otherwise permitted.

Cement shall be measured by weight or in full bags of 94 pounds each for Portland cement.

When Portland cement is measured by weight, it shall be weighed on a scale separate from those used for the other materials. After weighing, the entire contents of the hopper shall be completely discharged.

When the Portland cement is measured in bags, no fractions of bags shall be used unless weighed. Bags of Portland cement shall be taken from the place of storage and placed adjacent to the mixer, in separate piles containing the exact number of bags for each mixer charge. Each pile shall be emptied into the mixer for each charge.

(B) AGGREGATES

Aggregates shall be measured by weight. Batch weights shall be based on saturated surface-dry materials and shall be corrected to take into account the weight of surface moisture contained in the aggregate.

When volumetric measurements are permitted, the Engineer shall require such increase in the volumes of fine and coarse aggregates as will compensate for the bulking. Only approved measuring devices shall be used.

NOTE: When aggregates are measured in the damp-loose condition (for use in Mixing Method D), they will occupy greater volume than when dry-rodded and the percentage bulking shall be determined by test. Approximate average bulking value for sand is twenty-five (25) percent and for coarse aggregate six (6) percent. Volumes may also be determined from the Contractor's approved weight formula by dividing by the damp-loose weight of aggregates per cubic foot. Average weight of damp-loose sand is 85 pounds per cubic foot and average weight of damp-loose coarse aggregate is 95 pounds per cubic foot.

(C) WATER

Water shall be measured by volume or by weight. The device for the measurement of the water shall be readily adjustable and, under all operating conditions, shall be accurate within one (1.0%) percent of its maximum capacity.

Water shall be potable and drawn from municipal water mains.

(D) PIGMENTED ADMIXTURE

When pigmented concrete is specified, the concrete shall be colored with an approved pigment conforming to the requirements of **Section 2.19**. The final color of the concrete shall be as approved by the Engineer. Pigments used shall not vary the air content of the concrete by more than ±0.5%. The concrete mix shall be adjusted to provide that the air content of the concrete remains within the specified tolerances.

Pigmented admixture shall be measured by weight. Water present in pigment shall be taken into account in measuring the quantity of water required for each batch.

(E) POZZOLANS

Pozzolans must meet the requirements of **Section 2.11**.

(F) ADMIXTURES

Admixtures shall comply with the requirements of **Section 2.09, Admixtures**.

3.05.4. CONTRACTOR'S FORMULA. All concrete mix designs shall be subject to approval by DDC QA and in accordance with their "MIX DESIGN, LABORATORY AND PLANT APPROVAL PROTOCOL". Copies of this protocol may be obtained at the pre-construction meeting or from the Engineer. Before the Contractor begins to manufacture concrete, a mix design shall be submitted to the Engineer for approval by DDC QA. The Contractor shall submit for this purpose a statement, in writing, of the sources of all ingredient materials, the type and brand of the Portland cement, pozzolans and the number of pounds of each of the materials in a saturated surface-dry condition making up one (1) cubic yard of concrete. The calculated yield of the mix shall be within ± 2% of the Theoretical one (1) cubic yard. The range of water-cement (W/C) ratios within which the concrete will be manufactured and the method of mixing to be employed shall also be stated. The mix design submittal shall include gradation of aggregates, specific gravities of ingredients, unit weight, mix proportion for each batch (a minimum of 4 batches except in case of precast plants where one specific mix may be proposed), compressive strength test results for each mix at 7 days, 28 days (high early strength mixes may require 6 hrs, 24 hrs, 3 days and shrinkage test as per the requirements), and graphical representation of strength vs. W/C projected in hours/days.

For A-40 and B-32 concrete, the Contractor must substitute Portland cement with pozzolans such that the maximum amount of Portland cement per cubic yard of concrete does not exceed 400 pounds, and with the use of an approved non-corrosive, non-chloride admixture as required to obtain a minimum compressive strength of 3,000 psi in seven (7) days. For high-early strength concrete the Contractor may substitute Portland cement with pozzolans, pound for pound, up to 40% of the weight of Portland cement specified

for any concrete mixture provided the Contractor can obtain a minimum compressive strength of 3,000 p.s.i. in three (3) days.

Also, for high-early strength concrete, at no additional cost, the Contractor may be allowed to use a water reducing admixture to achieve an additional one (1") inch slump, for a maximum slump of four (4") inches, to enhance workability and to help in surface finishing of the concrete. The admixture shall conform to the requirements of **Section 2.09, Admixtures**. If such an admixture is used the concrete shall have a minimum compressive strength of 3,200 psi at three (3) days as determined by the average compressive strength of one set of three (3) concrete cylinders for each day's work. The Contractor shall submit the mix design for approval by the Engineer; however, such approval by the Engineer shall not relieve the Contractor of the responsibility for meeting the minimum three (3) day strength requirements specified herein, when admixtures for slump and enhanced workability have been used.

The approved mix design shall not be changed, including changing material sources, without the written permission of the Engineer and approval of a revised mix design.

The approval of materials shall not preclude subsequent withdrawal of such approval in case of development of qualities objectionable to the Engineer.

The relative amounts of fine and coarse aggregates in any class of concrete may be changed within the limits given in Table 3.05-II by the Engineer at any time in order to secure maximum density and to promote workability, provided the sum of the absolute volumes of the aggregates is unchanged. Such changes shall be made when required without extra compensation, regardless of the quantity of concrete affected thereby.

If the concrete is to be used with an accelerant per **Section 9.04**:

1. The accelerant must be shown on the mix design, and marked "For use when directed per Section 9.04";
2. The maximum dosage must be listed;
3. The accelerant should not be included in the trial batches.

3.05.5. MIX DESIGN.

(A) Unless otherwise specified elsewhere herein, concrete shall comply with the applicable requirements of Tables 3.05-II, 3.05-III, 3.05-IV, 3.05-V, and 3.05-VI.

TABLE 3.05-II – PROPORTIONS

Class of Concrete	Nominal Size of Coarse Aggregate Used – Inches	Fine Aggregate Percentage By Weight of Total Aggregate (See Note 1)
High-Early Strength	5/8 or 3/4	29 to 37
	1-1/2	26 to 34
Class A-40	5/8 or 3/4	29 to 37
	1-1/2	26 to 34
Class B-32	3/4	32 to 40
	1-1/2	29 to 37

Note 1 – Quantity of fine aggregate may be varied within the limits indicated according to the type of coarse aggregate used, to obtain a smooth, dense, homogeneous and plastic mixture.

Note 2 - Concrete of classes shown in Table 3.05-II shall have an air entrainment of 4 to 7 percent for size 357 coarse aggregate and 5 to 7 percent for size 67 or 57 aggregate, with 6.5 percent desired in either case. If concrete is pumped, air entrainment shall be measured after the pump.

Note 3 - When an air-entraining admixture is added to the concrete it shall comply with the requirements of ASTM Designation C260

TABLE 3.05-III – INGREDIENT MATERIALS

	Applicable Sections						
Type of Concrete	Portland Cement	Pozzolans	Sand (Fine Aggregate)	Coarse Aggregate	Air-entraining Admixture	Pigment	Retarder
IA	2.10 Type I*	2.11	2.21 Type 1A	2.02**	2.09	2.19	2.09
IIA	2.10 Type II*	2.11	2.21 Type 1A	2.02**	2.09	2.19	2.09
IIIA	2.10 Type II* or III*	2.11	2.21 Type 1A	2.02**	2.09	2.19	2.09

**To be used with an approved air-entraining admixture, which shall be added at the time concrete ingredients are mixed with water.*

***Coarse aggregate shall be Type 1, Grade A or Grade B, or Type 2, Size No. 357, Size No. 57 or Size No. 67 of ASTM Designation C33, as specified.*

TABLE 3.05-IV – MINIMUM COMPRESSIVE STRENGTH

Concrete Class	Minimum Compressive Strength Days after concrete placement		
	3 days	7 days	28 days
Minimum number of samples tested per ASTM C39 or C42	1	1	2
High Early (HE)	3200 PSI	---	4,000PSI
A-40	---	3,000 PSI	4,000PSI
B-32	---	3,000 PSI	3,200 PSI

No reduction in minimum compressive strength will be allowed for concrete colored with pigment or concrete containing any other additives.

TABLE 3.05-V

(Not Used)

TABLE 3.05-VI – SLUMP VALUES

Concrete Placement	Design Slump Range, Inches	Maximum Slump, Inches *(note 1)*
Sidewalks	1-1/2 to 3-1/2	4
Pavement Slipform Paving Form Paving	 1-1/2 to 2-1/2 1-1/2 to 2-1/2	 2-1/2 3
Pavement bases	1-1/2 to 4	4 *(note 2)*
Structural Slabs	3 to 4	4
Piers, Pedestals, Rigid Frames or Arches. Box Culverts throughout, Footing and Headwalls, general purpose structural.	2-1/2 to 3-1/2	4
Cast-in-Place Piles	2-1/2 to 3-1/2	5
Underwater Concrete 6 inch minimum slump	6 to 7	8
High early strength pavement slabs or structural sections	2 to 3	3
Structural placement 3 inches thick or less	2-1/2 to 3-1/2	3-1/2
Slip formed median barriers, parapet walls, curbs	1/2 to 1-1/2	1-1/2

NOTE 1: Maximum slump for pumping applications shall be 4 inches. When a slump test is conducted on concrete produced by a mobile mixing unit, the slump shall be measured 3 to 5 minutes after discharge from the unit.

NOTE 2: Maximum slump for pavement base may be increased to 5-1/2" if an approved water-reducing admixture is used. Design slump and strength requirements will remain unchanged.

The above slump requirements shall apply at the point of discharge.

The Contractor shall supply at each point of concrete delivery a slump cone and rod conforming to the requirements of ASTM Designation C143 for use by the Engineer.

3.05.6. CONCRETE BATCHING PLANT REQUIREMENTS. The batching plant shall be so designed, operated and coordinated as to produce a sufficient quantity of concrete for the construction specified.

(A) ACCEPTANCE

Each Portland cement concrete batching plant shall be subject to approval by DDC QA and their "MIX DESIGN, LABORATORY AND PLANT APPROVAL PROTOCOL". The minimum requirement for approval is that the proposed Portland cement concrete batching plant must be on the New York State Department of Transportation (NYSDOT) approved list for the current construction season.

The minimum requirement for approval of a pre-cast concrete plant is that the proposed plant must be on the NYSDOT approved list. A waiver for this requirement may be granted by the NYCDDC QA Director for special products that no NYSDOT approved plant is capable of producing.

Each Portland cement concrete batching plant shall also be subject to auditing and approval by NYCDDC QA. The NYCDDC QA Director may at any time discontinue the use of any previously approved equipment if non-conformance with the specifications result during the progress of the work. When the NYCDDC QA Director discontinues the use of the plant, production will not be acceptable for Department work until corrective measures satisfactory to the Director are carried out.

(B) FACILITY REQUIREMENTS

The batching plant must meet the requirements of NYSDOT Standard Specifications Section 501-2.03, except that all references to the Regional Director and Director, Materials Bureau refer to the NYCDDC QA Director. **3.05.7. HANDLING, MEASURING AND BATCHING MATERIALS.** The batch plant site, layout and equipment shall be such as to assure a continuous supply of material to the work.

The aggregates shall be batched at the batch plant site according to these specifications. When approved by the NYCDDC QA Director, bagged Portland cement may be incorporated into the mixture. The batch size shall be adjusted to use whole bags of Portland cement.

(A) STOCKPILES

Stockpiles shall be formed on bases approved by the NYCDDC QA Director or the Director's representative. The bases shall have adequate drainage and may consist of prepared aggregate bases, concrete, metal or wood surfaces, or barge floors. The stockpiles shall be built by methods which do not cause particle segregation. Aggregates from different sources and of different sizes shall be stockpiled separately in a manner such that the aggregates will not be contaminated by other sizes or aggregates from other sources. Department approved aggregates shall be stockpiled separately from the non-approved aggregates.

Aggregates shall be handled throughout the batching process in a manner such as to maintain uniform grading of the material. In case the aggregates contain a high or non-uniform moisture content, the aggregates shall be stockpiled a sufficient length of time to stabilize the moisture content.

Each plant shall be equipped with an approved moisture sensing device that will indicate on a readily visible scale or chart the moisture content of the fine aggregate as it is batched. The free moisture content of the fine aggregate at the time of batching shall not exceed 8 percent of its saturated-surface dry weight.

The requirements of NYSDOT Materials Method 9.1 apply to all aggregate stockpiles for concrete.

(B) HEATING MATERIALS FOR COLD WEATHER CONCRETING

The aggregates and/or water shall be heated prior to batching to obtain a plastic concrete temperature not less than 50^0F or more than 70^0F, at the time the mixture is placed in the forms. When the air temperature is 32^0F or above, and when the aggregates are free of ice and frozen lumps, the desired temperature of the plastic concrete may be obtained by heating the mixing water only, unless otherwise ordered by the Engineer or the Engineer's representative. When the air temperature is below 32^0F, or whenever ordered, both mixing water and aggregates shall be heated as herein specified.

For additional requirements to permit the placement of concrete base, curb and sidewalks during cold weather conditions, see **Section 9.04 – Allowance for Anti-freeze Additive in Concrete**.

All water used for mixing concrete shall be heated to a temperature of at least 70^0 Fahrenheit but not over 180^0 Fahrenheit. Aggregates shall be heated either by steam or by dry heat to a temperature of at least 40^0 Fahrenheit but not over 100^0 Fahrenheit. To avoid the possibility of flash set, when water is heated to a temperature above 100^0 Fahrenheit, water and aggregate shall be mixed together in the mixer in such a way that the high temperature of the water is reduced before Portland cement is added. The heating equipment shall be such as to heat the mass uniformly and preclude the possibility of the occurrence of hot spots which will overheat the material.

(C) BATCHING

All plants shall be equipped with an approved automatic weighing, cycling and monitoring system installed as part of the batching equipment, unless otherwise indicated in the specifications, on the plans or in the proposal. The system shall include equipment for accurately proportioning the various components of the mixture by weight, or by volume for admixtures and water, in the proper order and shall include equipment for controlling the cycle sequence. In addition, timing of the mixing operations for central mix plants shall be required. The automatic proportioning system shall be capable of consistently delivering each constituent within the tolerances indicated in Table 3.05—VII, Batching Tolerances. The system shall be designed so that the only manual operation(s) required to produce a preprogrammed batch within these specifications shall be a switch or button to initiate the batching sequence and discharge the completed batch.

There shall be auxiliary interlock cutoff circuits to interrupt and stop the automatic batching operations whenever an error exceeding the acceptable tolerance occurs in proportioning for all material components except water. The NYCDDC QA Director or the Director's representative may require the locking or sealing of any automated proportioning equipment that may be manually manipulated.

When the aggregate sizes are weighed cumulatively, the tolerance for each bin draw weight shall be based on the total aggregate batch weight. If aggregate sizes are weighed separately, the percentage shall apply

to each scale weight. When a pozzolan is weighed cumulatively with the Portland cement, the pozzolan shall be last in the weighing sequence and the tolerance for each material draw weight shall be based upon the total weight of Portland cement plus pozzolan. The electrical circuits used to check delivery tolerances may be set at any span within the full allowable tolerance for any approved batch size. For plants not equipped to automatically adjust tolerances, the tolerance span shall be set for the minimum approved batch size wherever varying batch sizes are being produced.

TABLE 3.05-VII
BATCHING TOLERANCES

Portland cement & Pozzolan	± 1% (by weight)
Aggregate	± 2% (by weight)
Water (Note 1)	± 1% (by weight)
Admixtures	± 3% (by weight)
Zero Return (Aggregate) (Note 2)	± 2%
Zero Return (Portland cement & Pozzolan) (Note 2)	± 1%
Zero Return (Water) (Note 1, 2)	± 1%

NOTES: 1: Tolerance applies to water added at central mix plants only.
2: Zero Tolerance is based on the minimum allowable batch size.
3: Based on the preprogrammed target quantity.

The system shall be interlocked during the batching of Portland cement and aggregates so that:

1. No inlet gate can be opened while the weigh hopper discharge gate is open.
2. No weigh hopper discharge gate can be opened:
   (a) While the hopper is being filled.
   (b) Until the full batch weight is within the delivery tolerance.
3. No new batch can be weighed until the hopper is entirely empty of the previous batch and the scale has returned to zero.

When manual batching is permitted, the constituents shall be batched within the indicated delivery tolerances for the automatic proportioning system.

(D) ADMIXTURE DISPENSING SYSTEMS

Plants shall be equipped with the number of dispensing systems necessary to incorporate the required admixtures into the concrete. At least two admixture dispensing systems shall be required for plants supplying structural concrete. These systems shall be capable of accurate measurement within the tolerance limits specified in Table 3.05-VII, Batching Tolerances. The measuring devices shall be equipped with a bypass valve suitable for obtaining a calibrated sample of admixture. Admixtures shall be dispensed in a manner that shall insure uniform distribution of the material throughout the mixture within the specified mixing period. When multiple admixtures are added to the concrete, they shall not come in direct contact with each other prior to mixing. Plants equipped with automatic proportioning systems shall include an approved automatic mechanical admixture dispensing system. The dispensing system shall consist of a volumetric measuring device, interlocked with the plant automated proportioning equipment in such a manner that will positively insure that the quantity of admixture preset into the system has been actually measured and completely discharged. The admixture system shall be interlocked with the automated system so that:

1. Aggregate and/or Portland cement weigh hopper discharge gates cannot be opened until the preset quantity of admixture has been satisfactorily batched or discharged.
2. The recordation of the presence of admixture shall be dependent upon the completion of the admixture discharge.

All plants shall provide at the operator's normal work station readable indication of the actual quantity of admixture batched.

(E) RECORDING OF BATCHING

All concrete batching plants equipped with automatic proportion systems shall have digital recording instruments approved by the NYCDDC QA Director and shall be so located as to be readily accessible and readable to the operator from the operator's normal work station. The recording instruments shall be designed to record the quantities of each aggregate component, Portland cement, pozzolan (when used), water (at central mix plants) and the presence of admixture for each batch of concrete produced. The Department shall be provided with a clear and legible copy of all batch records.

Weights and/or volumes shall be recorded as indicated on the batching scale or meter within an accuracy of ±1 scale or meter gradation. The minimum recorder resolution shall be equivalent to or less than the minimum gradation on the scale or meter, unless otherwise approved by the NYCDDC QA Director.

When the automation system is capable of producing other than standard size batches (full, half or quarter cubic yard increments), the recordation requirements shall be in accordance with written directives from the NYCDDC QA Director.

Every batch ticket must contain:

1. Plant name, address, and NYSDOT Facility Number
2. Portland cement, pozzolan, water, aggregate, and admixture weights, all recorded separately
3. Date (day/month/year) and time (to nearest minute) of batching
4. Batch number
5. Any out-of-tolerances

The batch ticket must also indicate the following conditions:

1. Any out-of-tolerance conditions
2. If the ticket was a re-print
3. If the batch was made with the system out of fully automatic mode
4. If the ticket is for a demonstration or simulated batch

Each plant site shall be equipped with an approved instrument capable of automatically applying a time-date stamp to each delivery ticket as the delivery vehicle departs from the plant site.

(F) FAILURE OF AUTOMATIC BATCHING, ADMIXTURE DISPENSING AND RECORDING EQUIPMENT

If at any time the automatic proportioning, admixture dispensing or recording instruments become inoperative, the plant may be allowed, with the approval of the NYCDDC QA Director, or the Director's representative, to batch and mix concrete mixtures for a period not exceeding 48 hours from the time of breakdown. Written permission of the NYCDDC QA Director will be required to operate without these instruments for periods longer than 48 hours.

3.05.8. CONCRETE MIXING, TRANSPORTING AND DISCHARGING.

(A) GENERAL

Concrete shall be mixed by the following methods:

1. Method A – Central Plant Mix
2. Method B – Transit Mix
3. Method C – Truck Mix
4. Method D – Mixed by hand or in job mixers not exceeding one-half (1/2) cubic yard capacity when permitted by the Engineer.

Central Plant Mix Concrete is concrete produced at an approved plant, ready for use prior to discharge into a transporting vehicle.

Transit Mix Concrete is concrete whose constituent materials are proportioned at a central plant and mixed with water in transit to or at the point of deposition in a transporting vehicle.

Truck Mix Concrete is concrete whose constituent materials are proportioned at a central plant and transported to the point of deposition where water is added and mixed in a transporting vehicle

Unless otherwise specified, concrete may be mixed by Method A, Method B or Method C.

Concrete may be mixed at a central plant, in truck mixers or at the site as described in these specifications. When mixed at a central plant, the concrete shall be transported in vehicles acceptable to the NYSDOT. All concrete shall be discharged from the discharge openings directly into the forms or into approved conveyance equipment while fresh and before there is evidence of initial set. No retempering of the concrete will be permitted. Retempering is defined as the addition of water after the mix has attained its desired initial slump. Temperature of the concrete mixture upon discharge shall not exceed 90° Fahrenheit.

The Contractor shall supply concrete at a rate consistent with placement operations as determined by the Engineer. The Engineer, or its representative, may discontinue the use of any type of concrete mixing or transporting units when unsatisfactory results are obtained. The requirements of this section shall apply unless otherwise stated in the specific item.

A summary of time limitations for the various types of Portland Cement concrete mixing equipment from the beginning of batching to the completion of discharge is given to Table 3.05-X, Summary of Concrete Batching, Mixing, Hauling and Discharging.

(B) CONCRETE UNIFORMITY

Mixing shall be performed in an approved mixer capable of combining aggregates, Portland cement, water and admixtures into a thoroughly mixed and uniform mass within the specified mixing period, and discharging the mixture without segregation. Each mixer shall display, in a clearly visible location, a manufacturer's supplied plate(s) stating the capacity of the mixer and the recommended drum speeds for each operation.

All concrete produced shall meet the uniformity requirements in Table 3.05-VIII, Concrete Uniformity. Tests shall be performed by the Department when required by the specifications or requested by the Engineer. It will not be necessary to verify that mixing equipment meets the uniformity requirement unless evidence of non-uniform concrete is found or unless the Contractor requests a reduced mixing time for central mixers. To obtain uniformity, the Contractor may reduce the batch size below the rated mixer capacity or reduce the mixing speed tolerance limit.

(C) CENTRAL MIXED CONCRETE

Central mixed concrete is defined as concrete mixed in a stationary mixer and transported in approved agitating or non-agitating units to the point of deposition. Central mixed concrete may be used for mixing all concrete mixtures unless otherwise specified on the plans or in the proposal. Batch sizes for any mixer shall be no larger than the rated capacity of the drum indicated on the manufacturer's plate.

Mixing units shall be equipped with an acceptable timing device that will not permit a batch of concrete to be discharged until the specified mixing time has elapsed. Mixing units and control devices will be disapproved by the NYCDDC QA Director, or the Director's representative if at any time they are found unfit to function properly. When the blades inside the drum have become loose, broken, bent, scalloped or worn away 20 percent in any dimension, they shall be properly repaired or replaced.

The constituents of the concrete mix shall be charged into the mixer in a manner approved by the NYCDDC QA Director or the Director's representative. The minimum mixing time after all materials are in the drum shall be 90 seconds, unless it can be demonstrated through tests that uniformity of the concrete meeting the requirements of Table 3.05-VIII, Concrete Uniformity, can consistently be obtained at lesser time as approved by the NYCDDC QA Director. Central mixers shall discharge the entire batch in an unrestricted manner into a hopper or directly into a delivery unit. The delivery unit shall transport the thoroughly mixed concrete to the point of use without loss of uniformity. Each delivery unit must be approved by the NYCDDC QA Director or the Director's representative prior to use and subjected to frequent inspections during its use. If found unfit, it will be disapproved until the proper operating condition has been restored. Both the agitating and non-agitating delivery units shall be completely emptied, clean and free from concrete and wash water before receiving the next load of concrete.

Delivery agitating units shall rotate at a drum speed of 2 to 6 revolutions per minute unless otherwise approved by the NYCDDC QA Director. Agitating units shall conform to the requirements for truck mixers under **Subsection 3.05.8.(E), Truck Mixed Concrete**, as they pertain to operating condition and condition of the drum. When central mixed concrete is transported in units approved for truck mixing, a minimum of

90 percent of the design water shall be added to the mix by the batch plant water system. The addition of water to obtain initial slump will be permitted at the work site in not more than two additions. After each addition, the concrete shall be mixed at least 30 revolutions in accordance to truck mix requirements before discharging.

The haul road used by non-agitating concrete delivery units shall be free from holes washboarding or any other features that would cause segregation in the mix. In addition, non-agitating concrete delivery units shall have cover, when ordered by the Engineer, to protect the concrete from adverse drying conditions and precipitation.

TABLE 3.05-VIII – CONCRETE UNIFORMITY

TEST	Permissible Variation concrete samples taken at two locations in the batch
1. Weight per cubic foot calculated to an Air-Free Basis	2.0 lbs. per C.F.
2. Air Content, % by volume of concrete	1.0 percent
3. Slump: Average slump 4 inches or less Average slump greater than 4 inches	 1.0 inches 1.5 inches
4. Coarse aggregate content, portion by weight of each sample retained on a No. 4 sieve	6.0 percent
5. Unit weight of air-free mortars based on average for all comparative samples tested	1.6 percent
6. Average compressive strength of 7 days for each sample based on average strength of all comparative test specimens	10.0 percent

NOTE: Samples shall be taken at the point of discharge of the concrete mixer. Sampling and testing procedures shall be as approved by the NYCDDC QA Director.

The time interval between completion of mixing at the central mix plant and completion of discharge shall be as noted in Table 3.05-IX, Time Limits for Delivery of Central Mixed Concrete.

TABLE 3.05-IX – TIME LIMITS FOR DELIVERY OF CENTRAL MIXED CONCRETE

Delivery Unit	Type of Placement	Maximum Time Minutes	Notes
Non-agitating including all open top units	All	30	
Agitating – rotating drum	Structural	90	1
Agitating – rotating drum	Pavement	60	1 & 2

NOTE 1. The concrete will be rejected if there is evidence of setting up in the mixer. The Engineer may reduce the total time limit in hot weather or under unusual conditions if unsatisfactory results are obtained.

NOTE 2. The Engineer may increase the allowable time to 90 minutes maximum for small or irregular sections of pavements where placing and finishing operations can be completed rapidly.

(D) TRANSIT MIXED CONCRETE

Transit mixed concrete is defined as concrete mixed completely in a truck mixer; mixing may occur at the following locations or combinations thereof: at the plant, while in transit, or at the point of deposition. Transit Mix may be used for all concrete items unless otherwise specified on the plans or in the proposal.

The truck mixer shall be the inclined axis rotating drum type equipped with a water tank(s) and water system having a measuring a device to measure water (U.S. gallons) introduced into the drum within an accuracy of two percent. In addition, each truck mixer shall be equipped with a hatch in the periphery of the drum shell of such design as to permit access to the inside of the drum for inspection.

Each truck mixer used for transit mixed concrete shall be equipped with an approved electrical revolution-counting device mounted in a clearly visible position.

The device shall show on separate counters (1) the number of drum revolutions at speeds within the mixing range and (2) the total number of drum revolutions. Both counters shall be legible to one revolution and shall be designed to accept a non-standard electric plug for resetting each counter to read zero at the time of loading at the batch plant. The revolution counting device shall be tamperproof such that if tampering occurs the counters will become inoperative or the device will otherwise indicate tampering including the interruption of electric power.

The revolution counting device shall be installed to count the number of revolutions of the drum in the direction of mixing. The device shall be adjusted so that it counts the number of revolutions specified for the mixing and agitating drum speed within the tolerances indicated on the manufacturers rating plate, but not to exceed the following requirements for truck mixers:

Mixing – 6 RPM minimum to 18 RPM maximum
Agitating – 2 RPM minimum to 6 RPM maximum

These limits may be adjusted for individual mixing units upon approval of the NYCDDC QA Director.

Each truck mixer unit shall be inspected and approved annually by the NYCDDC QA Director or the Director's representative for use in Department work. During its use, additional inspections will be made by the NYCDDC QA Director or the Director's representative to determine the operating condition of the equipment. Whenever improper conditions exist, the truck mixer unit shall be satisfactorily repaired or replaced. This will include blades inside the drum which have become heavily caked with mortar, loose, broken, bent, scalloped, worn 20 percent in any dimension or otherwise damaged.

Truck mixers will not be permitted to mix concrete batches having volumes greater than the maximum cubic yard capacity indicated on the manufacture's rating plate(s). The drum shall be drained of wash water before charging with the constituents of the concrete mixture, and the drum shall be revolving during loading.

Approximately 90% of the design water shall be added to the mix in a manner approved by the NYCDDC QA Director, by either a batch plant water system or from the water supply carried on the truck.

Mixing shall begin not more than 5 minutes after Portland cement has made contact with the aggregates. The load shall be mixed from 70 to 100 drum revolutions and then checked for consistency. If the truck is enroute to the project, the mixer speed shall be changed to agitating speed after 70 to 100 mixing revolutions. Under no circumstances shall the mixer drum be stopped.

Water may be added to the mixture in not more than two additions at the point of deposition before discharge to obtain initial slump. After each such addition the concrete shall be mixed at least 30 revolutions in the mixing speed range. The total number of revolutions in the mixing range shall not be less than 100 nor more than 160, or not more than 200 if the mix contains microsilica.

After completion of mixing, discharging may begin immediately, otherwise the mixer shall be revolved at agitating speed. Once discharge has commenced, the entire load shall be discharged in not more than 50 minutes.

Concrete shall be discharged through a completely opened discharge gate providing unrestricted flow. The discharge area or gate shall remain fully open throughout the discharge period and the rate of discharge shall be controlled by the speed of the drum.

The total time interval from the moment the Portland cement makes contact with the aggregates to the completion of discharge shall not exceed 90 minutes for structural concrete placements and 60 minutes for pavement concrete placements. The Engineer may increase the allowable time for pavement placements to 90 minutes maximum for small or irregular sections where placing and finishing operations can be completed rapidly. The Assistant Commissioner, Construction or the Assistant Commissioner's

representative may reduce the total time limit in hot weather or under unusual conditions, if unsatisfactory results are obtained.

(E) TRUCK MIXED CONCRETE

Truck mixed concrete is defined as concrete mixed completely in a truck mixer following the addition of mixing water at the point of deposition. The requirements of **Subsection 3.05.8.(D), Transit Mixed Concrete**, apply except as modified:

1. Each truck mixer shall have an approved revolution counter located in a position readily visible to the Engineer. The electrical revolution counting device will not be required but it may be used to count the number of revolutions of the drum in the direction of mixing.

2. The loading of the mixers shall be performed in the following manner:

   a. Regular Truck Mix (Portland cement in contact with moist aggregates). The drum many be rocked or revolved during the charging of coarse and/or fine aggregates with admixtures. Portland cement shall be charged last and the drum shall be stationary until mixing begins. Mixing shall begin no longer than 30 minutes after the Portland cement comes in contact with the aggregate.

   b. Layered Truck Mix (Portland cement in contact with saturated surface dry or drier coarse aggregate). Fine aggregate with admixtures, coarse aggregate and Portland cement that have been separately batched shall be charged through a hatch in the side of the drum in the following sequence: fine aggregate with admixtures, coarse aggregate and then Portland cement. The drum may be rocked after the addition of each aggregate size and shall remain stationary while charging the Portland cement and until mixing begins. Mixing shall begin no longer than 90 minutes after Portland cement comes in contact with the coarse aggregate.

3. Mixing shall begin at the point of deposition after the addition of water. The water shall be introduced into the drum either from the head section or by dual injection from both the head and discharge section. The mixing shall continue for a minimum of 100 revolutions or until uniform concrete of the required consistency is produced whichever is longer. The mixing period shall not exceed 15 minutes.

4. The entire load shall be discharged within 30 minutes after mixing has been completed.

TABLE 3.05-X

SUMMARY OF CONCRETE BATCHING, MIXING, HAULING AND DISCHARGING

Central Mixed Concrete	Transit Mixed Concrete	Truck Mixing Concrete	
	Requires electric revolution counting device	Regular Truck Mix	Layered Truck Mix
Begin Batching Charge mixer in an approved manner	Begin Batching Materials batch loaded or ribbon loaded thru back Add approximately 90% of design water	Begin Batching Drum can be rocked or revolved for aggregates Drum cannot be moved while cement is added	Begin Batching Fine agg. And SSD coarse agg. Is loaded thru hatch. Can rock after each fraction Drum cannot be moved while cement is added
End of Batching & Begin Mixing 90 Seconds Minimum — After all material are in the mixer	Cement In Contact W/Aggs. 5 Minutes Maximum	Cement In Contact W/Aggs. 30 Minutes Maximum	Cement In Contact W/Aggs. 90 Minutes Maximum
End of Mixing Open Haul Units: 30 Minutes Maximum Rotating Drum Agitators 2-6 rpm: 60 Mins. Max. (Pav't); 90 Mins. Max. (Struct.)	Beginning of Mixing At plant or in transit 100 revs Minimum — 160 revs Maximum Mix: 6-18 rpm End of Mixing Agitate 2-6 rpm Beginning of Discharge 50 Minutes Maximum	Beginning of Mixing At project, after the addition of water 100 revs Minimum — 15 Minutes Maximum Mix: 6-18 rpm End of Mixing 30 Minutes Maximum — Agitate 2-6 rpm	Beginning of Mixing At project, after the addition of water 100 revs Minimum — 15 Minutes Maximum Mix: 6-18 rpm End of Mixing 30 Minutes Maximum — Agitate 2-6 rpm
Completion of Discharge When concrete is transported in units approved for mixing, the remainder of the design water may be added at the work site to attain initial slump.	Completion of Discharge The remainder of the design water may be added at the work site to attain initial slump.	Completion of Discharge	Completion of Discharge

(F) MOBILE CONCRETE MIXING UNITS

A mobile concrete mixing unit, as approved by the Engineer, may be used in miscellaneous work defined as curb, sidewalk, concrete base, gutter, headwalls, catch basins, manholes, drop inlets, field inlets, sign foundations, lighting structure foundations, anchor units, pullboxes, leveling footings and similar placements.

Each mobile mixing unit shall be self contained and of the continuous mixing type, capable of carrying sufficient unmixed dry bulk cement, fine and coarse aggregate, water and admixtures to produce on site no less than six (6) cubic yards of concrete.

The mobile mixing unit shall be equipped with proportioning devices which shall deliver the materials within the following tolerances by weight:

Portland cement	0 to + 4%
Fine Aggregate	± 2%
Coarse Aggregate	± 2%
Water	± 1%
Admixtures	± 3%

The amount of Portland cement being introduced into the mix shall be measured by a meter which is clearly visible and kept clean at all times. The quantity of Portland cement shall be recorded by a ticket printer which shall, as a minimum, record the number of revolution counts of the Portland cement feeder.

The mixers shall provide positive control of the flow of water into the mixing chamber. Water flow shall be indicated by a flow meter and be readily adjustable to provide for minor variations in aggregate moisture. The system shall be equipped with a bypass valve or hose suitable to determine batching accuracy.

The mixers shall be equipped with at least one admixture delivery system. Each system shall provide positive control of the flow of admixture into the unit's mix water system. Flowmeters shall be used to control the amount of admixture added to the mix. Admixtures shall be dispensed in a manner that shall ensure uniform distribution of the material throughout the concrete. The system shall be capable of adding admixture in the amounts necessary to achieve the required air content. The system shall be equipped with a bypass valve suitable for obtaining a calibrated sample of admixture to determine batching accuracy. The mixers shall be capable of combining aggregates, Portland cement, water and admixture into a thoroughly mixed and uniform mass. Discharge of the mixture shall be accomplished without segregation.

When mobile mixing units are permitted, no specific mixing time will be required except that the concrete shall be properly and uniformly mixed as determined by the Engineer. All the constituents of concrete manufactured by a mobile mixing unit shall be stockpiled at the project site unless otherwise approved by the Engineer.

The Contractor shall calibrate the mobile mixing unit and shall provide a record of the calibration of the unit to the Engineer for the mix design to be used. The Engineer will furnish the mix design information and the written calibration procedure to the Contractor. The Department reserves the right to witness the calibration of the mixing unit.

Prior to actual use, the Contractor shall demonstrate, to the Engineer, that the concrete meets the specification requirements for slump, air content and proportioning. Proportioning may be verified in accordance with written Department procedures.

If, in the opinion of the Engineer, improper conditions exist, the conditions shall be corrected as approved by the Engineer. Improper conditions shall include, but not be limited to, hydrated cement deposits and mixing blades which are loose, broken, bent, scalloped, worn 20 percent in any dimension, or heavily caked with mortar.

If the Engineer determines that the mixer unit is not performing satisfactorily, the Engineer may discontinue use of the unit. The Contractor shall provide the necessary scales, containers and personnel approved by the Engineer to perform calibration of the unit.

(G) SMALL CONSTRUCTION MIXERS

In work involving small quantities of concrete, the Engineer may permit a small construction mixer. The mixer shall be capable of producing concrete having the specified slump and air content. Any concrete placed under such conditions shall be mixed no less than 90 seconds after all the materials are in the mixer drum.

3.05.9. TEMPERATURE OF CONCRETE. The concrete at the time of pouring shall be maintained at a temperature of not less than 50° nor more than 90° Fahrenheit.

When the air temperature exceeds 85° Fahrenheit, the concrete after initial set shall be protected for three (3) days after pouring to prevent it from going above 90° Fahrenheit.

When the air temperature is less than 38° F in the shade the Contractor may submit, to the Engineer for approval, proposed methods for placing and protecting concrete in the cold. At such temperatures concrete shall be poured only with the approval of the Engineer and shall be adequately protected.

If the air temperature falls below 50° F, an accelerator may be used. If the air temperature exceeds 85° F, a retarder may be used. Accelerators and retarders must be approved by the Engineer before use. Dosing of accelerators and retarders shall be per the manufacturer's published recommendations. Addition of an accelerator or retarder per this subsection will not require a separate mix design, unless requested by the Engineer.

3.05.10. QUALITY CONTROL PROCEDURES. The quality control procedures used for on site inspection, sampling and testing of Portland cement concrete shall conform to those procedures described in the NYSDOT Materials Method 9.2 – Field Inspection of Portland Cement Concrete.

SECTION 3.06 – Filler; Joint, Air-entrained Cement-grout

3.06.1. This section describes Air-entrained Cement-grout Joint Filler for use in the construction of block pavements.

3.06.2. (A) Cement-grout joint filler shall be of the following types:

Type 1 – Air-entrained Portland Cement-grout

Type 2 – Extra Strength Air-entrained Portland Cement-grout

(B) Type shall be as specified.

Type 1 shall be used unless Type 2 is specified.

3.06.3. (A) Type 1 Air-entrained Cement-grout Joint Filler shall consist of sand mixed with Portland cement and water in definite proportions to produce a mixture of cream-like consistency containing one (1) part of cement by volume and not more than two and one-half (2-1/2) parts of sand by volume, based on rodded volumetric measurement of dry material. Type 2 Extra Strength Air-entrained Cement-grout joint filler shall consist of sand mixed with Portland cement and water in definite proportions to produce a mixture of cream-like consistency containing one (1) part of cement by volume and not more than two (2) parts of sand by volume, based on rodded volumetric measurement of dry material. When aggregates are measured in the damp-loose condition, they will occupy greater volume than when dry-rodded and the percentage bulking shall be determined by test. Approximate average bulking value for sand is twenty-five (25) percent.

(B) Portland cement for Type 1 and Type 2 cement grout shall comply with the requirements of **Section 2.10**, Type I or Type IA. If Type I is used an acceptable admixture shall be used.

(C) Sand shall comply with the requirements of **Section 2.21**, Type 2A.

(D) Water shall be potable and drawn from municipal water mains.

3.06.4. (A) PROPORTIONING INGREDIENTS.

The materials comprising the charge for each batch shall be measured accurately by weight or volume.

(B) MIXING INGREDIENTS.

Grout shall be mixed in a suitable box or on a tight platform, and never upon pavement or ground. Cement and Sand Grout shall be thoroughly mixed dry, until the mixture has a uniform color. Clean, fresh water shall then be added and the mass worked until a mixture, which is uniform and of the required consistency, is produced. Grout shall be mixed in no greater quantity than is required for the work in hand. Grout that has set sufficiently to require retempering shall not be used.

When required by the Engineer, ingredient materials, after measuring, shall be mixed in an approved rotating drum type batch mixer. Mixing shall be for a period of not less than one and one half (1-1/2) minutes at a rate of not less than fourteen (14) nor more than twenty-two (22) revolution per minute and shall be continued until a homogeneous mixture is produced. The grout shall be kept constantly agitated until used.

3.06.5. (A) NON-SHRINK GROUTS.

The grouting and/or mortar material shall be an approved ready-to-use mixture requiring only water for use at the job site. The compressive strength of 2 in. cubes shall be 3000 psi at 7 days. The grouting and/or mortar material shall meet the following performance requirements. When mixed to a flow table consistency of 130 +/- 5 percent (ASTM C109 except that the reading shall be taken after 5 drops delivered in 3 seconds) the grout shall show complete vertical shrinkage correction in 3 to 7 days when placed in test cylinders 2 in. diameter by 4 in. high, covered immediately with a glass plate held firmly in place. Initial surface of the grout shall be determined by micrometer measurements to the top of the plate and the thickness of the plate gauged to determine the true initial level of the grout. The glass plate shall be removed at 24 hours and subsequent measurements at 3 and 7 days made to the free surface of the grout. The specimens shall be cured in laboratory air during the test period.

Non-shrink grouts containing additives such as iron or steel particles depending on oxidation to limit shrinkage shall not be used.

(B) DRY PACK.

Mortar for dry packing (to be packed or tamped in place) shall be made at no slump consistency. When mixing the batch, only enough water shall be added to the dry materials to produce a rather stiff mixture, then additions of water may be made in small increments until the desired consistency is secured. Settlement of the mortar can be reduced by delaying its placing.

The mortar shall be mixed; then allowed to stand in a mortar box or other container for about two (2) hours. The box or container shall be kept covered. When used, the mixture should be of such consistency that when a sample is squeezed in the hand only enough water will come to the surface to moisten the hand.

3.06.6. The mixing and use of grout in freezing weather shall be subject to the same requirements as herein specified for mixing and placing concrete under similar conditions.

SECTION 3.07 – Mortar, Air-entrained Portland Cement

3.07.1. This section describes Air-entrained Portland Cement Mortar for use in the construction of pavements.

3.07.2. (A) Mortar shall be of the following types:

Type 1 – Air-entrained Portland Cement Mortar

Type 2 – Extra Strength Air-entrained Portland Cement Mortar

(B) Type shall be as specified.

Type 1 shall be used unless Type 2 is specified.

3.07.3. (A) Type 1 Air-entrained Mortar shall consist of sand mixed with Portland cement and water in definite proportions to produce a stiff mixture containing one (1) part of air-entrained cement by volume and not more than three (3) parts of sand by volume, based on rodded volumetric measurement of dry material.

Type 2 Extra Strength Air-entrained Portland Cement Mortar shall consist of sand mixed with Portland cement and water in definite proportions to produce a stiff mixture containing one (1) part of air-entrained cement by volume and not more than two and one-half (2-1/2) parts of sand by volume, based on rodded volumetric measurement of dry material. When aggregates are measured in the damp-loose condition they will occupy greater volume than when dry-rodded and the percentage bulking shall be determined by test. Approximate average bulking value for sand is twenty-five (25) percent.

(B) Air-entrained Portland cement for Type 1 and Type 2 mortar shall comply with the requirements of **Section 2.10**, Type I or Type IA. If Type I is used, an acceptable admixture shall be used.

(C) Sand shall comply with the requirements of **Section 2.21**, Type 2A.

(D) Water shall be potable and drawn from municipal water mains.

3.07.4. (A) PROPORTIONING INGREDIENTS.

The materials comprising the charge for each batch shall be measured accurately by weight or volume.

(B) MIXING INGREDIENTS

Mortar shall be mixed in a suitable box or on a tight platform, and never upon pavement or ground. Cement and sand shall be thoroughly mixed dry, until the mixture has a uniform color. Clean, fresh water shall then be added and the mass worked until a mortar, which is uniform and of the required consistency, is produced. Mortar shall be mixed in no greater quantity than is required for the work in hand. Mortar that has set sufficiently to require retempering shall not be used.

When required by the Engineer, ingredient materials, after measuring, shall be mixed in an approved rotating drum type batch mixer. Mixing shall be for a period of not less than one and one half (1-1/2) minutes at a rate of not less than fourteen (14) nor more than twenty two (22) revolutions per minute and shall be continued until a homogeneous mixture is produced. The mortar shall be kept constantly agitated until used.

3.07.5. FREEZING WEATHER. The mixing and use of mortar in freezing weather shall be subject to the same requirements as herein specified for mixing and placing concrete under similar conditions.

SECTION 3.08 – Separating Agent, Calcium Chloride

3.08.1. This section describes Calcium Chloride Separating Agent for use in preventing asphaltic joint fillers from adhering to the surfaces of block pavements.

3.08.2. Calcium chloride separating agent shall be of one kind.

3.08.3. Calcium chloride separating agent shall consist of a mixture of calcium chloride, laundry starch and water.

3.08.4. (A) Separating agent shall be composed of 34 to 35 percent calcium chloride, 1 to 2 percent laundry starch and 63 to 65 percent water, all by weight. (To fill a 50 gallon drum with separating agent, use 170 to 175 lbs. calcium chloride, 5 to 10 lbs. starch and approximately 38 gallons of water. This will yield approximately 48 gallons of separating agent.)

(B) Calcium chloride shall comply with the requirements of **Section 2.08**.

(C) Laundry starch shall be either a boiling corn starch or a blended boiling starch, suitable for the purpose intended.

(D) Water shall be potable and drawn from municipal water mains.

3.08.5. The materials comprising the charge for each batch shall be measured accurately by weight or volume. The required water shall be placed in the drum. The starch shall be mixed with a small quantity of hot water in a separate vessel to a smooth paste, poured into the water in the drum and thoroughly mixed. The calcium chloride shall then be poured into the drum and thoroughly mixed. If used in a spray, the mixture shall be strained before application.

SECTION 3.09 (NO TEXT)

SECTION 3.10 – TEMPORARY ASPHALT PAVING MIXTURES

3.10.1. INTENT.

This section describes Temporary Asphalt Paving Mixtures which are to be laid hot. If the Contractor intends to propose placing temporary asphalt to remain as the permanent roadway, the Contractor must:

1) Provide written notice to the Engineer two weeks prior to placing the asphalt
2) Provide asphalt that meets all of the requirements of Section 3.01 and is laid in accordance with all of the requirements of Section 4.01.

3.10.2. MATERIAL.

For temporary pavement only, the Contractor may substitute open source hot mix asphalt with Recycled Asphalt Pavement (RAP) content that exceeds 30%. Up to 100% recycled content is desired and encouraged provided the resulting mix satisfies the following requirements:

1) Plants producing temporary asphalt must be approved by NYS Department Of Transportation (NYSDOT) and the NYCDDC QA Director.
2) Mix must be suitable for the intended use and have a gradation within ± 10% on any sieve of a Superpave 1/2" (12.5 mm) design. Laboratory air voids should average 4% and be greater than 2% but less than 7% at all times. AC content should be greater than 4.5% at all times. Marshall samples should be prepared and tested every 1,000 tons of production regardless if used on NYCDDC projects. Results of laboratory testing shall be made available to NYCDDC inspectors or NYCDOT personnel upon request.
3) For recycled content greater than 40%, adjustment must be made to compensate for the age hardened recycled binder. Acceptable adjustments include use of lower Performance Grade (PG) binder or addition of a petroleum based rejuvenator with less than 30% saturates. Rejuvenators should be added at a rate no less than 1/2% or greater than 1% of RAP feed rate.
4) Use of wood, tear-off shingles, concrete, topsoil, fly ash, bottom ash, slag, glass cullet, or rubber tires as recycled raw materials is not authorized by this specification. Care must be taken in stockpiling RAP to minimize contamination. The crushing/screening process should be designed to remove deleterious materials and debris either manually or by screening. RAP must be pre-screened to remove all subgrade aggregates prior to crushing for use as a recycled feed.

(NO TEXT ON THIS PAGE)

DIVISION IV - CONSTRUCTION METHODS

(NO TEXT ON THIS PAGE)

DIVISION IV

CONSTRUCTION METHODS

SECTION 4.01 – Asphalt Macadam Pavement

4.01.1. INTENT. This section describes construction of Asphalt Macadam Pavement.

4.01.2. DESCRIPTION.

(A) Asphalt Macadam Pavement shall consist of a base course after compaction of two (2") inches less than the total specified thickness of the Asphalt Macadam Pavement and a wearing course two (2") inches in thickness after compaction. The Contractor shall be responsible for continuous monitoring of the pavement density using nuclear density gauges and pavement coring as required by these specifications.

(B) Base course shall be of the following classes:

Class 1 Not Used.

Class 2 Not Used.

Class 3 -- Plant Mix Binder, conforming to Marshall Design Type 3 RA binder course conforming to the requirements of **Section 3.01**.

The initial first lift of base course shall not exceed four (4") inches in thickness after compaction and any additional lifts, as may be required, shall not exceed three (3") inches or be less than one and one-half (1-1/2") inches in thickness after compaction.

(C) Surface course shall be of the following classes:

Class 1 Not used.

Class 2 – Plant Mix shall be Marshall Design high friction Type 6F RA Asphaltic Concrete conforming to the requirements of **Section 3.01**.

(D) Class of base course and class of surface course shall be as specified.

4.01.3. MATERIALS.

Materials shall be as specified in Section 3.01.

4.01.4. METHODS, BASE COURSE.

(A) EARTH SUBGRADE

The earth subgrade, immediately before stone is placed upon it, shall be compacted with an approved roller weighing not less than two hundred and twenty-five (225) pounds per inch width of main roll. It shall be smooth, parallel to and at the required depth below the finished pavement surface and shall not be in a muddy or frozen condition. Unsuitable material shall be removed and replaced with acceptable material thoroughly compacted to a minimum of 95% of Standard Proctor Maximum Density.

(B) BASE COURSE, CLASS 3, PLANT MIX

Base Course, Class 3, Plant Mix shall be furnished and laid in layers the first of which shall not exceed four (4") inches in thickness after compaction and any additional lifts, as may be required, shall not exceed two (2") inches or be less than one and one-half (1-1/2") inches in thickness when compacted, to a total depth which after compaction shall be equal to the specified depth of pavement, less two (2") inches of wearing course. Installation methods including, but not limited to, the Contractor's Quality Control Plan, Certification of Laboratory and Technicians, Preparation of Surface, Test Strip Operations, and testing shall comply with

the requirements of installing binder mixture under **Section 4.02, Asphaltic Concrete Wearing Course**, except as otherwise modified herein:

1. A subbase course of granular material shall be furnished, installed, and rolled, to the satisfaction of the Engineer, under other Contract items.
2. Before any asphaltic mixture is laid, unpaved surfaces and paved surfaces shall be free from standing water. All asphaltic mixtures used for temporary ramping shall be removed and a layer of tack coat shall be applied. No mixture shall be deposited unless the surface on which it is to be laid is in a condition acceptable to the Engineer.
3. Tack coat shall be uniformly distributed, without atomization, over the entire surface to be paved at the rate specified under **Section 6.58, Tack Coat**, by means of a pressure distributor of approved type in such manner as not to defile or discolor curbs or other structures.
4. Tack coat must be applied between all layers of asphalt mixture, as specified in **Section 6.58**.
5. Binder mixture shall be placed in layers, the first of which shall be not more than four (4") inches, after final compression, and each additional lift as may be required, after final compression, shall be not more than two (2") inches. Binder shall be thoroughly compacted by approved tamping irons adjacent to curbs, manholes, rails, etc., and with approved rollers, in layers, each of which shall not be more than two (2") inches, and to a surface which shall be parallel to and two (2") inches below the finished grade and crown of the street.

(C) BACK ROLLING

The finished base shall be back rolled for such period and at such time as the Engineer may direct.

(D) DENSITY

After final compaction, a plant mix binder base course shall have a density between ninety percent (90%) and ninety-seven percent (97%) of the theoretical maximum density (G_{mm}) obtained in accordance with ASTM D2041. However, where the density of compaction for any two or more core samples within a block length are shown to fall between 92% and 90% of G_{mm}, a credit will be taken for that area of pavement in accordance with **Section 5.04(F)**.

(E) WEATHER LIMITATIONS

The provisions of **Section 4.02.4.(C)** shall apply to the work to be done under this section.

4.01.5. METHODS, SURFACE COURSE.

(A) SURFACE COURSE, CLASS 2, PLANT MIX

Surface Course, Class 2, Plant Mix shall be placed in one (1) two (2") inch thick course, after compaction. Installation methods including, but not limited to, the Contractor's Quality Control Plan, Certification of Laboratory and Technicians, Preparation of Surface, Test Strip Operations, and testing shall comply with the requirements of installing surface mixture under **Section 4.02, Asphaltic Concrete Wearing Course**, except as otherwise modified herein.

Tack coat must be applied between all layers of asphalt mixture, as specified in **Section 6.58**.

(B) DENSITY

After final compaction, surface or top courses shall have a density between ninety percent (90%) and ninety-seven percent (97%) percent of the theoretical maximum density (G_{mm}) obtained in accordance with ASTM D2041. However, where the density of compaction for any two or more core samples within a block length are shown to fall between ninety-two (92%) percent and ninety (90%) percent of G_{mm}, a credit will be taken for that area of pavement in accordance with **Section 5.04(F)**.

(C) WEATHER LIMITATIONS

The provisions of **Section 4.02.4.(C)** shall apply to the work to be done under this section.

4.01.6. TRAFFIC. During the period of construction, base and surface courses shall be protected from traffic other than that absolutely essential to its construction until permitted by the Engineer.

4.01.7. DEFECTIVE BASE AND WEARING COURSE. Such portions of the completed base or wearing course pavements that are defective in finish, compression, composition, density, or do not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable material properly laid in accordance with these specifications.

4.01.8. MEASUREMENT. In determining the area of pavement to be paid for, the areas occupied by rails, bases or columns, manhole heads, gate boxes, road boxes and similar structures will be deducted when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

All plant mixed materials shall be weighed separately in trucks on approved scales to be provided by the Contractor. The Contractor shall furnish delivery tickets on which shall be printed the time weighed and the metered net weight of materials, contained in each vehicle, upon delivery to the site.

4.01.9. PRICES TO COVER. The contract price per square yard for the type and thickness of Macadam Pavement shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and lay the pavement, complete, in full compliance with the requirements of the specifications, to furnish and lay test strips, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and to maintain the courses or mixtures, as laid, in good condition as specified in **Section 5.05**.

No separate payment will be made for the cost of furnishing and applying of tack coat as directed under **Subsections 4.01.4.(B)** and **4.01.5.(A)**. **Where a tack coat is required to be placed, in accordance with these specifications and the directions of the Engineer, and the Contractor fails to apply the required tack coat, the City will take a credit of one dollar and fifteen cents ($1.15) per square yard of pavement placed without the tack coat.**

No payment will be made under this Item where the Contractor fails to provide the Engineer with an approved Quality Control Plan and Mix Design. Additionally, no payment will be made for any asphalt work placed each work day in which acceptable plant daily QC tests per Subsection 3.01.3(E) were not submitted to the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
4.01 RAE	ASPHALT MACADAM PAVEMENT, 4” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 2” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAF	ASPHALT MACADAM PAVEMENT, 5” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 3” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAG	ASPHALT MACADAM PAVEMENT, 6” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 4” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAH	ASPHALT MACADAM PAVEMENT, 7” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 5” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAI	ASPHALT MACADAM PAVEMENT, 8” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 6” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAJ	ASPHALT MACADAM PAVEMENT, 9” THICK	

	(2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 7” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAK	ASPHALT MACADAM PAVEMENT, 10” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on an 8” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAL	ASPHALT MACADAM PAVEMENT, 11” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 9” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAM	ASPHALT MACADAM PAVEMENT, 12” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on a 10” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.
4.01 RAN	ASPHALT MACADAM PAVEMENT, 13” THICK (2” Class 2 – Plant Mixed, Marshall Design, Type 6F RA Asphaltic Concrete Surface Course on an 11” Class 3 – Plant Mixed, Marshall Design, Type 3 RA Binder Base Course)	S.Y.

SECTION 4.02 – Asphaltic Concrete Wearing Course

4.02.1. INTENT. This section describes construction of Asphaltic Concrete Wearing Course and placement of plant mixed asphaltic mixtures.

Recycled asphalt concrete pavement (consisting of reclaimed asphalt pavement blended with new materials) may be used up to the percentages specified in **Subsection 3.01.3.(C)1.(c)**.

For temporary pavement only, a temporary Asphalt material meeting the requirements of **Section 3.10** may be substituted by the Contractor at the unit price bid for Binder Mixture. However, all temporary material must be completely removed prior to the final paving operation.

4.02.2. DESCRIPTION.

(A) Asphaltic Concrete Wearing Course shall be one & one-half (1-1/2") inches, two (2") inches or three (3") inches in thickness when compressed, and shall consist of top course and binder course as follows:

Asphalt Concrete Wearing Course Thickness	**1-1/2"**	**2"**	**3"**
Item Number	4.02 AB-R	4.02 AF-R	4.02 AG
Top or Surface Course Thickness	1-1/2"	2"	1-1/2"
Binder Course Thickness	0"	0"	1-1/2"

(B) Binder Mixture for use in leveling courses, in areas to be built up, in areas of adjustment, for temporary pavements, for base for pavers, and where directed within designated limits shall consist of a plant mixed binder course.

Each lift of leveling course shall not exceed four (4") inches in thickness, unless otherwise provided or directed, in writing, by the Engineer.

(C) Asphaltic Concrete Mixture for use in leveling courses, in areas to be built up, in areas of adjustment, for temporary pavements, and where directed within designated limits shall consist of a plant mixed top or surface course. In areas required to be built up by more than two (2") inches in thickness, the Contractor will be permitted to substitute Binder Mixture for Asphaltic Concrete Mixture, at no additional cost to the City.

Each lift of leveling course shall not exceed two (2") inches in thickness, unless otherwise provided or directed, in writing, by the Engineer.

(D) On resurfacing contracts, when a leveling course is required, it may consist of the same material as is used for resurfacing.

4.02.3. MATERIALS.

(A) ASPHALT PAVING MIXTURES

All materials shall comply with the requirements of **Section 3.01, Asphalt Paving Mixtures**, for the type specified, except that for temporary pavement only the Contractor may substitute Temporary Asphalt material as specified in **Section 3.10**.

4.02.4. CONSTRUCTION METHODS.

(A) CONTRACTOR'S QUALITY CONTROL PLAN

A Quality Control Plan shall be furnished by the Contractor at least five (5) working days prior to paving for the Engineer's approval before commencing work. The plan shall indicate the number and type of rollers planned to do the work, methods of synchronizing the paver and rolling speeds, methods of compaction to be used around street hardware and along both longitudinal and transverse joints, and the back-up provision in case of roller breakdown. Approval of the Contractor's Quality Control Plan shall not relieve the Contractor of the responsibility for compliance with these specifications.

At the start of paving operations or as may be required to recertify the Contractors paving operations, the Contractor shall construct a test strip, as detailed in **Subsection 4.02.4.(G), Test Strip Operation**, on the project site at a location approved by the Engineer, using the same equipment and procedures to be used in the construction of the remainder of the course being laid. Where the entire paving operation can, in the judgment of the Engineer, be completed within one working day the Contractor may, subject to prior approval by the Engineer, construct the test strip as part of the Contractor's paving operations.

(B) CERTIFICATION OF LABORATORY AND TECHNICIANS

The testing laboratory used by the Contractor for testing core samples must be independent of those used at the plant and job site during placement of asphalt. Only laboratories approved by the NYCDDC QA Director shall be used. Technicians used for plant and field work shall possess current NYCDDC QA Qualification Cards. Technicians must have in their possession the current NYCDDC QA issued Qualification Card (no copies), and present their current NYCDDC QA Qualification Cards if so requested by authorized NYCDDC staff. Expired NYCDDC QA Qualification Cards will be kept by the NYCDDC staff for return to the NYCDDC QA Unit. Technicians shall have one of the qualifications listed below in order to apply for a NYCDDC QA Qualification Card:

Field Technician	**Plant Technician**
NICET Asphalt Level II	NICET Asphalt Level II
Alfred State HMA Density Testing Inspector	Alfred State QC/QA Technician
NETTCP HMA Paving Inspector	NETTCP HMA Plant Technician

Exceptions granted to any of the above requirements must be in writing by the NYCDDC QA Director.

(C) WEATHER LIMITATIONS

Mixtures shall be spread and compacted during daylight hours, unless otherwise permitted by the Engineer and then only when satisfactory artificial light is provided.

No paving may be performed in the rain. Except by permission of the Engineer, bituminous plant mixtures shall not be placed on any wet surface or when the surface temperature is less than 45°F, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures as determined by the Engineer. Therefore, the Contractor shall not schedule paving operations when the Precipitation Probability, obtained by the Contractor from the National Weather Service within three (3) hours prior to the start of such operations, equals or exceeds fifty (50) percent. Prior to each day's delivery of any bituminous paving materials, the Contractor shall notify the Engineer of the exact time and source from which the above information was obtained.

NOTE: All surface temperatures shall be measured on the surface to be paved and the controlling temperature shall be the average of three temperature readings taken at locations 25± feet apart as directed by the Engineer.

Generally, the laying of mixtures will not be permitted in wet weather. However, the Engineer may permit work of this character to continue when overtaken by sudden rain, up to the amount which may be in transit from the plant at the time. The plant shall, however, shut down on its orders under these conditions and no additional material will be permitted to be laid.

The Contractor shall schedule the paving operations such that all paving necessary to provide safe and adequate maintenance and protection of traffic or for protection of previously laid courses is completed within the above mentioned weather limitations. Such scheduling shall include expediting construction operations to permit paving before the seasonal change in weather or by limiting the length of work to that which can be completed before the seasonal shut-down of work occurs. The cost of scheduling and sequencing of work to conform with the seasonal limitations of paving work shall be reflected in the unit prices for the related contract items. If the Contractor fails to complete the necessary paving operations prior to weather and seasonal limitations, all temporary materials and work which become necessary as a

result of such failure, such as the shimming of castings and protrusions, drainage of the roadway, providing acceptable ride ability, and other work needed for the adequate maintenance and protection of traffic until paving operations can be completed the following paving season, shall not by reimbursable by the City. In addition, any binder course, placed by the Contractor, which will be permanently incorporated into the work and left open to traffic over the winter shall be cleaned in accordance with **Subsection 4.02.4.(H)** and tack coated in accordance with **Section 6.58 – Tack Coat** immediately prior to paving.

Any pavement damage which occurs because of the Contractor either not protecting previously laid courses or constructing any pavement course outside the specified weather requirements, whether or not a waiver was granted, shall be repaired by the Contractor at no expense to the City. All repairs shall be performed to the satisfaction of the Engineer.

Bituminous mixtures used for temporary pavement, which is not and will not become a part of the permanent pavement, will not be subject to the above temperature requirement but must be placed as approved by the Engineer.

(D) HAULING EQUIPMENT

The hot bituminous mixtures shall be transported to the work site in vehicles having clean, smooth and tight metal beds. During transporting, the mixture shall be completely covered. The cover shall be of canvas or other suitable material and shall overlap the vehicle's sideboards and be securely fastened. When necessary to deliver the mixture at the specified temperature, the truck bodies shall be properly insulated or heated. Haul units shall be subject to the approval of the Engineer.

The inside surface of the truck body may be lightly coated with an asphalt release agent on the NYSDOT Approved list for Release Agents and approved by the Engineer.

(E) MECHANICAL SPREADERS

Bituminous pavers shall be self-powered units, provided with an activated screed or strike-off assembly. The machine shall be capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thicknesses shown on the Contract Drawings. When screed extensions are permitted by the Engineer for placement of mainline pavement, such extensions shall be of the same design as the main screed. The pavers shall have a receiving hopper with sufficient capacity for uniform spreading operation and with automatic flow controls to place the mixture uniformly in front of the screed. The screed or strike-off assembly shall be heated as necessary to produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. When laying mixtures, the paver shall be capable of operating at forward speeds consistent with satisfactory placement of the mixtures.

All bituminous pavers, used to place base, binder, and surface courses shall be equipped with approved automatic transverse slope and longitudinal grade screed controls. The controls shall automatically adjust the screed and increase or decrease the mat thickness to compensate for irregularities that are in the surface being paved. The controls shall be capable of maintaining the proper transverse slope and be readily adjustable so transitions and super-elevation curves can be satisfactorily paved. The controls shall operate from suitable fixed or moving references. Widths more than seventeen (17') feet shall have approved automatic transverse slope and longitudinal grade screed controls that operate from references of both sides of the paver.

The transverse slope and longitudinal grade screed controls of the bituminous paver may be manually adjusted, where permitted by the Engineer.

The bituminous pavers shall be at the job site sufficiently ahead of the start of paving operations to be examined and approved by the Engineer. Any paver found worn or defective either before or during its use shall be immediately repaired to the satisfaction of the Engineer or replaced.

(F) ROLLERS

Rollers shall consist of steel wheel rollers, pneumatic rubber-tired rollers, or vibratory rollers as described herein.

There shall be technical literature available giving the weight and dimensions of the rollers to be used, and shall provide recommended settings for amplitude, frequency, and tire pressure (for pneumatic rollers). The recommendations can either be on a sticker or a plate installed on the roller or a document readily available to the Engineer. Rollers shall be in first class mechanical condition and adjustment so that they run smoothly without jerking or pounding. They shall be capable of reversing without backlash and shall be capable of operating at speed slow enough to avoid displacement of the mixture. The number and weight of rollers shall be sufficient to satisfactorily compact the mixture while it is still in a workable condition. The use of equipment which results in excessive crushing of aggregate will not be permitted. For night time paving, the roller shall be equipped with at least one light on each fender, or alternatively, at least one light above the roller, visible from a distance of 200 feet. The roller shall also be equipped with an automatic audible warning signal when operating in reverse.

Rollers shall have smooth, true rolls without flat spots, openings, projections or other imperfections which may mar the pavement surface. Rollers shall be kept clean at all times and moist to prevent bituminous concrete from sticking to the wheels; however, the amount of water used to prevent adhesion of asphaltic materials shall be kept to a minimum. The application of material to pneumatic drive wheels for the prevention of tire pickup shall be controlled by a momentary contact switch. Controls which provide a continuous flow of material will not be permitted.

Alternate types of rollers may be approved by the Engineer, if field tests or other data demonstrates that satisfactory results can be achieved.

The Contractor will control the operation of the rollers during the placement of these items including the speed, the amplitude settings, the vibration frequency, and the weight of the rollers.

1. STEEL WHEEL ROLLERS. Tandem type power driven steel rollers used in the breakdown mode shall have an operating weight of between 10 and 14 tons. Tandem type power driven steel rollers used in the intermediate and finished modes shall have an operating weight of between 8 and 10 tons.

2. PNEUMATIC RUBBER-TIRED ROLLERS. Where the Contractor elects to use pneumatic rubber-tired rollers in the intermediate rolling stage, they shall be self-propelled and shall have wheels mounted, grouped and spaced as to provide essentially uniform coverage with each pass. Rear group wheels shall not follow in the tracks of forward group wheels. Axles shall be mounted in a rigid frame provided with a platform or body suitable for ballast loading. Wheels shall be mounted to oscillate individually or in pairs. Tires shall be smooth, show no tread pattern, and be of equal size and diameter. Wheel loads and tire pressures shall be controlled to produce the required degree of compaction without rutting of the surface to be rolled. Tire roll surfaces shall be kept clean at all times and the amount of water used to prevent adhesion of asphaltic materials shall be kept to a minimum. Pneumatic Rubber-tired rollers shall meet the following requirements:

i.	Maximum Wheel Load	5,600 pounds
ii.	Minimum Rim Diameter	20 inches
iii.	Tire Inflation	90 PSI minimum. All tires shall be within 5 PSI.
iv.	Tire Compression on Pavement	80 PSI minimum contact pressure
v.	Operating Weight	22,400 pounds per axle maximum

3. VIBRATORY ROLLERS. In addition, the Contractor may substitute vibratory rollers in lieu of the conventional steel-wheel and rubber-tired roller equipment specified above. However, under this option, the pavement course shall be finish rolled with a steel-wheel tandem roller. This finish roller shall add a minimum of two (2) passes closely following the vibratory roller or as directed by the Engineer.

Vibratory rollers shall be of a type that are specifically designed for the compaction of bituminous concrete and shall meet the following requirements:

i.	Nominal Amplitude		0.05 inch (1.27mm) maximum
ii.	Vibration Frequency		2,300 vpm minimum
iii.	Drum Width	(dual drum)	54 inch minimum
		(single drum)	84 inch minimum
iv.	Speedometer		0.5 MPG (50 ft per min) increment maximum
v.	Speed Limitation Device		2.5 MPH (220 ft per min) maximum

vi. Operating Weight 6.0 tons minimum to 11.5 tons maximum

Acceptable dual vibrating drum rollers operating in the static mode may be used as the finish roller. However, this single vibratory roller shall not be used as both the initial roller and the finish roller.

Rollers shall be equipped with an automatic vibration disconnect system which automatically shuts off the vibration when the roller is in a stationary position. A mechanical override system shall be provided in the event of temporary failure of the automatic system which shuts off the vibration when the roller is in a stationary position.

The speed and frequency combination in use shall deliver a minimum of 12 impacts per linear foot. All turning of the compaction equipment shall be completed on material which has had a minimum of one roller pass. A calibrated optical tachometer shall be available for the exclusive use of the Engineer to verify the operation of the roller's vibration control system.

If the Engineer determines that damage to street components and/or adjacent property is occurring or that there is excessive aggregate fracture or crushing, lateral displacement or compaction waves using vibratory compaction equipment, the Contractor shall immediately cease using this equipment and proceed with the work in accordance with approved conventional compaction procedures, at no additional cost.

The Contractor shall note that if vibratory compaction equipment is used, the Contractor assumes full responsibility for the cost of repairing all damages which may occur, as a result, to street components and adjacent property.

Furthermore, the New York City Transit Authority may order the Contractor to stop using vibratory compaction equipment over their facilities and the Contractor shall be required to immediately cease using vibratory compaction equipment and proceed with the work in accordance with approved conventional compaction procedures, at no additional cost.

(G) TEST STRIP OPERATIONS

Demonstration of the Contractor's paving operations shall be done by placing a test strip for each lift of asphaltic concrete placed. The intent of the test strip is for the Contractor to demonstrate that the rolling train will meet the density requirements and the Contractor's productivity goals. Therefore, the test strip MUST simulate, in so far as possible, the way in which rollers and pavers will actually be used during construction, in accordance with the Contractor's approved Quality Control Plan.

Size of each test strip shall be no greater than: a length of one city block, 250 feet, an area of 1,000 square yards, and 125 tons of each course of asphaltic concrete. Test strip areas shall become part of the completed pavement if, in fact, they meet the requirements of these specifications. The Contractor shall be required to furnish and use a properly calibrated nuclear asphalt testing device in the field to monitor the effectiveness of compaction by rolling during construction for each lift of asphaltic concrete placed. The technician operating the nuclear asphalt testing device shall possess a current NYCDDC QA Asphalt Field Qualification Card. The amount of compaction shall be determined as a percentage of the theoretical maximum density of bituminous pavement mixture at the plant obtained in accordance with the requirements of ASTM Designation D2041. Acceptable in place compaction shall range between 92% and 97% of the theoretical maximum density of bituminous pavement mixture. Field testing for compacted asphaltic concrete with the nuclear asphalt testing device shall be done by the Contractor in accordance with ASTM Designation D2950, throughout all rolling operations. Number and locations of nuclear asphalt tests to be performed within each test strip area shall be of a sufficient number to obtain acceptable results, with a minimum of 12 randomly selected locations using statistically random number charts, except that none are to be within 18 inches of a longitudinal joints or edge of street hardware or within ten (10') feet of transverse joints; however, it is the Contractor's responsibility to take as many density readings as required to insure that the in place density after compaction falls within the specified range of 92% to 97% of the theoretical maximum density, obtained in accordance with ASTM Designation D2041, of the asphaltic concrete placed. A copy of all density monitoring results, including date, time, station, offset, and theoretical maximum density of pavement mixture obtained in the plant in accordance with ASTM Designation D2041, shall be given to the Engineer at the end of that day's operations.

Acceptance of all test strips will be determined by core sample results and smoothness tests.

a. A minimum of four (4) core samples shall be taken by the Contractor in each test strip and their test results must be delivered to the Engineer within 48 hours, without which no additional paving will be allowed. Cores shall be sampled as follows:

- A minimum of 4 full-depth core samples shall be taken;
- Core samples shall be taken at random locations selected by the Engineer using statistically random number charts;
- At least one of the core samples shall be within 18 inches of a randomly selected street hardware;

Core samples for the test strip shall be tested by the Contractor as follows:

- The laboratory testing the core shall be approved by NYCDDC QA for Asphalt Laboratory work, and shall be submitted for NYCDDC QA Vendor Approval;
- The following tests shall be performed:
    - Bulk density (Gmb) on each asphalt core segment per ASTM D2726;
    - Theoretical maximum density (Gmm) on one asphalt core segment of each top and binder mixture per ASTM D2041;
    - Percent compaction (air voids) on each asphalt core segment per ASTM D3203;
    - Asphalt content on one asphalt core segment of each top and binder mixture per ASTM D6307;
    - Gradation of recovered aggregate after asphalt content determination one asphalt core segment of each top and binder mixture per ASTM D5444;
- The acceptable compaction shall be between 92% and 97% of the theoretical maximum density obtained in the plant;
- The minimum and maximum design percentage of asphalt in any mixture shall be the asphalt percentage contained in the approved Contractor's Job Mix Formula (JMF) with a tolerance of ±0.7%.

If the contract has federal highway (FHWA) funding, the cores shall be sampled and tested by the Engineer, not the Contractor.

Where any two or more consecutive core samples taken within a test strip are shown to have a compaction density either more than 97% or below 92% of the theoretical maximum density, then the entire test strip shall be considered unacceptable.

b. Smoothness of the entire test strip shall be tested as required in Subsection 4.02.4.(P). If the test strip does not meet the requirements of Subsection 4.02.4.(P), then the entire test strip shall be considered unacceptable.

If the test strip does not meet the core test and smoothness requirements above, the Contractor shall then be required to remove and dispose of the test strip area and perform a second test within the same area at the Contractor's cost. Failure of the second test strip area shall result in a shutdown of all paving operations until remedial action is taken which will bring production within the permitted tolerances. A new test strip area shall be required for any change in the source of materials or in the materials from the same source, a change in the job mix formula, a change in compaction equipment, methods of operation, or failure of an asphaltic concrete course to meet the requirements of these specifications.

Where all the test strip core tests and smoothness requirements meet the requirements of Subsection 4.02.4.(P), the Contractor will be permitted to resume paving operations as indicated by the test strip.

NOTE: Except for the following option, routine paving shall only begin after successful test results have been established by the Contractor's independent testing laboratory. Also, construction of a test strip shall not begin unless both a nuclear density gauge and an operator are present.

OPTION: Paving may continue after completion of the test strip; however, payment adjustments in accordance with the requirements of **Subsection 5.04**, for density, asphalt content and mix tolerance will be applied to all material placed and each block length containing unsatisfactory material, as determined by the average of core samples taken within that block, shall be removed and replaced at the Contractor's own expense.

(H) PREPARATION OF SURFACE

Before any asphaltic mixture is laid, the surface shall be thoroughly swept and cleaned of all dirt, loose and foreign matter, and be free from standing water. All asphaltic mixtures used for temporary ramping shall be removed at no additional cost. No mixture shall be deposited unless the surface on which it is to be laid is in a condition acceptable to the Engineer.

Unless otherwise specified, shown on the plans or directed by the Engineer, surfaces on which asphaltic mixtures are to be laid shall be given a tack coat of Liquid Asphalt (RC-70) or Emulsified Asphalt (RS-1) complying respectively with the requirements of **Section 2.03** and **Section 2.04**. Tack coat shall be uniformly distributed, without atomization, over the entire surface of the base for pavement at the rate specified under **Section 6.58, Tack Coat**, by means of a pressure distributor of approved type in such manner as not to defile or discolor curbs or other structures.

(I) CONDITIONING OF EXISTING PAVEMENT FOR RESURFACING

The surface of the existing pavement shall be cleaned, joints and cracks filled, and the surface leveled to a uniform grade and cross slope in areas designated by the Engineer prior to the application of a new bituminous concrete course. The surface shall be cleaned using mechanical sweepers, hand brooms, or other effective means until the surfaces are free of all material which might interfere with the bond between the overlay material and the existing surfaces. All cleaning equipment shall be approved by the Engineer prior to use. Cleaning shall continue until adequate cleaning results, as determined by the Engineer. All debris shall be removed from the pavement surface and disposed of in a manner directed by the Engineer. The pavement shall be kept clean until the overlay operations are completed.

All unsealed and inadequately sealed joints and cracks, as determined by the Engineer, shall be subjected to a compressed air stream of at least 80 p.s.i.g. measured at the source. Joints and cracks in the pavement as designated by the Engineer shall be cleaned of all dirt and loose material holding the cleaning jet 1 inch above the pavement surface. Old joint and crack sealer remaining after such cleaning operation need not be removed. The cracks shall be kept clean until the sealing, filling and paving operations are completed.

Joints and cracks in the existing pavement from 1/4 inch to 1 inch wide shall be sealed with a bituminous material meeting the requirements of **Section 2.16 – Asphaltic Filler**. To ensure that space will be available for expansion of the asphalt when the hot bituminous mixture is paved over the joint or crack, the joint or crack shall not be filled completely to the surface. Blotting with fine aggregate may be required by the Engineer to prevent tracking the bituminous material over the pavement surface.

Joints and cracks greater than 1 inch wide shall be filled with asphalt concrete meeting the requirements of **Section 3.01**. Alternate materials may be used subject to the approval of the Engineer. Joints and cracks less than 1/4 inch will not be required to be cleaned or sealed.

Work on joints and cracks shall not begin until all stress relieving pavement repairs have been completed.

The expense for cleaning foreign material from the pavement because of the Contractor's construction operations shall be borne by the Contractor. Leveling of the surface shall be in conformance with the requirements stated below.

Where a Pre-Identified Binder Mixture course is specified on the Contract Drawings or in the itemized proposal, the work shall consist of placing a Marshall Design binder base mixture, Type 3 RA, of variable thickness necessary to contour the existing pavement in preparation for placement of the finished pavement surface. The work shall consist of removing irregularities in the old pavement, filling and patching holes, correcting variations in banked pavement, establishing pavement crowns, etc. as a separate leveling operation prior to the placing of the wearing course. All depression and wheel path ruts shall be filled prior to the paving of the binder mixture course, as directed by the Engineer. Where compacted thicknesses greater than two (2") inches are required, the Engineer may approve the use of the binder base course mixture in layers not to exceed 2 inches in thickness after compaction. The surface of this course shall be tested in the same manner prescribed in **Subsection 4.02.4.(P)**, except that the allowable variation from the true surface after compaction shall not exceed 3/8 inch.

(J) LAYING LEVELING COURSE MIXTURE FOR RESURFACING

Leveling course mixture, on reaching the street, shall be dumped on approved dumping boards or steel plates and shall be immediately deposited by means of hot shovels over the area to be leveled, built-up or adjusted. It shall be uniformly spread by means of hot iron rakes to a thickness that will provide a surface, after final compaction, which shall be a constant depth, equal to the specified thickness of wearing course, below the proposed final surface of the wearing course. Where practical, a mechanical spreader of approved design may be used. The no walking and luting requirements under **Section 4.02.4.(N)**, below, shall apply to the work under this section.

(K) LAYING BINDER MIXTURE

Prior to paving, all asphaltic mixtures used as temporary pavements shall be removed at no additional cost.

Binder mixture shall be furnished and laid by means of a mechanical spreader of approved design to a depth which after final compaction shall be equal to the specified depth. In areas where the use of a mechanical spreader is impractical, as determined by the Engineer, other approved means of spreading and compaction may be permitted.

The maximum length of bituminous mixture which can be placed by an approved mechanical spreader in a continuous strip shall not exceed one block or six hundred (600') feet, whichever is less, unless otherwise permitted, in writing, by the Engineer. Adjacent strips shall be laid, subject to the above limitations, immediately after each previous strip is placed until the full width of roadway surface has been covered in the said maximum or permitted length.

The compaction equipment shall conform to the requirements of **Subsection 4.02.4.(F), Rollers**, above. The Contractor shall control the operation of the rollers during the placement of these items including the speed, the amplitude settings, the vibration frequency, and the weight of the rollers.

Where permitted by the Engineer, hand laying of the mixture shall comply with the following requirements:

> Binder mixture, on reaching the street, shall be dumped outside the area on which it is to be spread, be deposited over the area to be covered by means of hot shovels. It shall be uniformly spread by means of hot iron rakes with tines not less than one-half (1/2") inch longer than loose depth mixture, or by means of a mechanical spreader of approved design, to a depth which, after final compression, shall be one and one-half (1-1/2") inches. Binder shall be thoroughly compacted by approved tamping irons adjacent to curbs, manholes, rails, etc., and with approved rollers to a thickness of one and one-half (1-1/2") inches, and to a surface which shall be parallel to and one and one-half (1-1/2") inches below the finished grade and crown of the street. If the binder mixture breaks up, shows lack of bond or other defects before the surface mixture is laid, it shall be taken up, removed and replaced with suitable material, properly laid in accordance with these specifications.

Immediately after the binder mix has been spread, struck off and surface irregularities adjusted, the Contractor shall compact the mix by rolling thoroughly and uniformly in accordance with the requirements of the following **Subsection 4.02.4.(O) Compaction**.

(L) BINDER SURFACE

The surface of the binder course shall be kept as free from traffic as is possible under working conditions, be clean, free from water, swept clean, and tack coated at the rate specified under **Section 6.58**, at no additional cost to the City, immediately before the surface mixture is laid. Binder shall be covered with surface mixture as soon as practicable and in all cases not later than seven (7) calendar days, unless otherwise approved in writing by the Engineer.

(M) PAINTING CONTACT SURFACES, ETC.

All contact surfaces of curbs, gutters, headers, manholes, etc., shall, before the surface mixture is laid, be well painted with a thin uniform coating of approved hot asphaltic cement or liquid asphalt or emulsified asphalt.

(N) LAYING SURFACE MIXTURE

Prior to paving, all asphaltic mixtures used as temporary pavements shall be removed at no additional cost.

Surface mixture shall be furnished and laid by means of a mechanical spreader of approved design to a depth which after final compaction shall be equal to the specified depth. In areas where the use of a mechanical spreader is impractical, as determined by the Engineer, other approved means of spreading and compaction may be permitted.

Where permitted by the Engineer, hand laying of the mixture shall comply with the following requirements:

> The surface mixture, on reaching the street, shall be dumped on approved dumping boards or steel plates, be deposited immediately by means of hot shovels over the area to be covered. It shall be uniformly spread by means of hot iron rakes with tines not less than one-half (1/2") inch longer than the loose depth of mixture, or be deposited and spread by means of a mechanical spreader of approved design, to a depth which, after final compression, shall be of the thickness required. No walking will be permitted on the surface mixture during the laying operations. If laid by hand, the surface mixture, after spreading and raking, shall be carefully luted from the sides before compaction. The width of the lute shall be approximately six (6') feet and the handle shall be sufficiently long to reach from edge to midway of the width under construction.

Immediately after the asphaltic mixture has been spread, struck off and surface irregularities adjusted, the Contractor shall compact the mix by rolling thoroughly and uniformly in accordance with the requirements of the following **Subsection 4.02.4.(O) Compaction**.

(O) COMPACTION

In accordance with the Test Strip operation and the Contractor's Quality Control Plan, the number and types of rollers and their method of use shall be sufficient to obtain an acceptable pavement density in accordance with these specifications.

Immediately after the asphaltic mixture has been spread, struck off and surface irregularities adjusted, compact the mix by rolling thoroughly and uniformly. The Contractor shall roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving. The initial roll of the pavement shall be with the roller traveling parallel to the centerline of the pavement beginning at the low edge and working toward the super-elevated edge. The rolling methods and patterns used shall be monitored by the certified technician operating the nuclear asphalt testing device to verify compliance with the compaction requirements.

In accordance with the Contractor's Quality Control Plan and results of the test strip operations, rolling shall proceed continuously within the time limit requirements specified in **Subsection 3.01.5.(D)** and until all roller marks are eliminated and the air voids conform to the specified requirement.

Field density shall be monitored by the Contractor in accordance with the requirements of **Subsection 4.02.4.(Q)**.

Placement and compaction on shoulders, ramps, maintenance widening, crossovers, and bridges will be deemed satisfactory by the Engineer when the procedures used in these areas are the same as those used on the mainline pavement sections.

When the rolling operation is complete there should be no visible shallow ruts, ridges, other roller marks, or irregularities in the pavement. If these imperfections are present, the Contractor shall correct the imperfections or relay the pavement to the satisfaction of the Engineer. All corrective work shall be performed by the Contractor at no additional cost to the City.

The Contractor shall correct at once any displacement occurring because of reversing the direction of the roller, or from other causes, using rakes and addition of fresh mixture as required. Exercise care in rolling not to displace the line and grade of the edges of the bituminous mixture. To prevent adhesion of the mixture to the drum(s) of the roller, they shall be kept properly moisten with water, or water mixed with small quantities of detergent or other Department approved asphalt release compounds, but in no case shall petroleum products or solvents having effect upon the bituminous pavement be used. In all instances, the

Contractor shall protect the surface of the pavement from drippings of fuel oil or any other solvents used in paving, compaction or cleaning operations.

Unless otherwise directed by the Engineer, the Contractor shall compact the longitudinal joint by using one of the pneumatic drive wheels to overlap the joint in two (2) passes with the drum operating static when vibratory rollers having pneumatic drive wheels are used. If dual vibrating drum rollers are used, the joint shall be compacted by overlapping the joints in two (2) passes with both drums operating static.

Along forms, curbs, headers, walls and other areas not accessible to the rollers, compact the mix thoroughly with mechanical tampers as approved or directed by the Engineer. On depressed areas, a trench roller or small vibratory roller approved by the Engineer may be used. Cleated compression strips also may be used under the roller to transmit compression to the depressed area. Hand tampers will not be permitted.

When compaction procedure used by the Contractor fails to produce results in compliance with these specifications, the procedure shall be immediately adjusted to obtain desired results or the paving operation shall be stopped as directed by the Engineer. All unacceptable asphaltic concrete will not be measured for payment and shall be removed from the site by the Contractor at no cost to the City. No additional areas may be paved until a new test strip is performed in accordance with **Section 4.02.4.(G)** and all bituminous pavement within each block containing unacceptable material is replaced by the Contractor to the satisfaction of the Engineer.

Suitable means shall be provided to keep pavers and other equipment and tools free from bituminous accumulations. The surface of the pavement shall be protected from drippings of oil, kerosene, or other materials used in paving and cleaning operations.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of bituminous material shall be corrected to the satisfaction of the Engineer. Care shall be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture.

If vibratory compaction equipment is used, the Contractor assumes full responsibility for the cost repairing all damage which may occur to highway components and adjacent property including buried utility and service facilities.

When multiple paving operations are utilized with material production from a single plant each paving operation will be evaluated separately.

Routine paving operations shall not begin unless both a project calibrated nuclear density gauge and an operator are present.

The Contractor shall backfill all core holes, with a similar hot mix asphalt material as was cored, as soon as possible after coring, using a procedure approved by the Engineer.

(P) SURFACE TOLERANCE

Pavement shall be constructed to a 1/4 inch surface tolerance. If, in the opinion of the Engineer, the pavement surface is not being constructed or has not been constructed to this tolerance based upon visual observation or upon riding quality, the Engineer may test the surface with a 16 foot straight edge or string line placed parallel to the centerline of the pavement and with a 10 foot straight edge or string line placed transversely to the centerline of the pavement on any portion of the pavement. Variations exceeding 1/4 inch shall be satisfactorily corrected or the pavement relaid at no additional cost to the City as ordered by the Engineer.

(Q) MONITORING FIELD DENSITY

Monitoring field density of compacted asphalt concrete shall be determined by the following methods:

1) The Contractor shall be required to furnish and use a properly calibrated nuclear asphalt testing device in the field to monitor the effectiveness of compaction by rolling during construction for each lift of asphaltic concrete placed. The nuclear density gauge should consist of a radioactive source, scaler and other basic components housed in a single backscatter unit. The technician operating the nuclear asphalt testing device shall possess a current NYCDDC QA Asphalt Field Qualification

Card. Only gauge(s) calibrated during the construction of the test strip will be used during normal paving operation. If another nuclear gauge is to be used, a new test strip must be constructed to calibrate that gauge.

The amount of compaction shall be determined as a percentage of the theoretical maximum density of bituminous pavement mixture at the plant obtained in accordance with the requirements of ASTM Designation D2041. Acceptable in place compaction shall range between 92% and 97% of the theoretical maximum density of bituminous pavement mixture. Field testing of compacted asphaltic concrete with the nuclear asphalt testing device shall be done by the Contractor in accordance with ASTM Designation D2950, throughout all rolling operations. A nuclear density gauge measurement shall be taken at least every 200 feet along the length of the pavement for each pass of the paver, but not less than three (3) tests per day will be required. Each measurement shall consist of taking four readings at the same location, rotating the device 90 degree between each reading. However, it is the Contractor's responsibility to take as many density readings as required to ensure that the in place density after compaction falls within the specified range of 92% to 97% of the theoretical maximum density of the asphaltic concrete placed each day. A copy of all nuclear density measurements, including date, time, station, offset, and theoretical maximum density of pavement mixture obtained in the plant, in accordance with the requirements of ASTM Designation D2041, shall be given to the Engineer at the end of each day's work.

If the average of two nuclear density gauge measurements taken over two consecutive locations falls below 90% or above 97% of the Theoretical Maximum Density (TMD), or if the moving average of the last 10 nuclear gauge measurements within each block falls below 92% or above 97% of the TMD, the Contractor shall stop routine paving operations, remove the pavement represented by those measurement results, and construct a new test strip. Normal production will only be allowed to resume after satisfactory completion of the new test strip.

2) For Contractor's quality control, core samples shall be taken by the Contractor at random locations and tested by the Contractor's approved independent testing laboratory in accordance with **Section 5.04** for pavement thickness, density, asphalt content, and compliance with the Marshall mix properties. Core samples shall include, but not be limited to, locations within 18 inches of a longitudinal joints or edge of street hardware, or within ten (10') feet of transverse joints.

   In addition, the Contractor shall be required to take full depth core samples at random locations selected by the Engineer using statistically random number charts (to be used as the Commissioner's cores) for determining payment. These cores shall be taken by the Contractor's independent laboratory within seven (7) days of completion of the Contractor's paving operations or after the 28 day curing period for the concrete base, whichever is later. One (1) full depth core sample shall be taken approximately every 200 feet along the length of pavement for each pass of the paver (with each pass of the paver being not more than 17 feet in width). A minimum of four (4) full depth core samples per block will be required, one of which shall be taken within 18" of a randomly selected street hardware. These cores along with a nuclear density gauge test results taken at the same locations and two loose mix samples taken for each batch of pavement placed each day shall be properly recorded, tagged and delivered by the Contractor, under the direct supervision of the Engineer, to the City's testing laboratory for testing to determine payment.

   However, these cores shall not relieve the Contractor of the responsibility for performing tests and inspection (i.e. cores), as may be required or directed, to maintain quality control of the work.

Unacceptable asphaltic concrete will not be measured for payment and shall be removed from the site by the Contractor at no cost to the City. No additional areas may be paved until the block length of unacceptable material is replaced by the Contractor to the satisfaction of the Engineer and a new test strip is performed in accordance with requirements of **Subsection 4.02.4.(R)**.

Where the density of compaction for any two or more core samples within a block length are shown to fall between 92% and 90% of the theoretical maximum density obtained in accordance with ASTM Designation D2041, a credit will be taken for that area of pavement in accordance with **Section 5.04(F)**.

The Contractor will not be allowed to re-roll cold in-place asphalt concrete to attempt to increase density after putting the finish roller on it.

(R) JOINTS

The surface mixture shall be laid in as nearly a continuous operation as possible and the roller shall pass over the unprotected end of the freshly laid mixture only when the laying of the course is to be discontinued for such length of time as to permit the mixture to become chilled. In all such cases, including the formation of joints, as herein required, provision shall be made for proper bond with new mixture by cutting or trimming back the joint to expose an unsealed or granular surface for the full specified depth of the course. At the end of each day's work, joints shall be formed by laying and rolling against boards of the thickness of the compacted mixture, placed across the entire width of the pavement or by such other method as may be approved by the Engineer. When the laying of the mixture is resumed, the exposed edge of the joint shall be painted with a thin coat of approved hot asphaltic cement or liquid asphalt and fresh mixture shall be raked against the joint and thoroughly tamped with hot tampers and rolled. Hot smoothing irons may be used for sealing joints.

4.02.5. TRAFFIC. No traffic of any kind will be allowed on the pavement until permitted by the Engineer.

4.02.6. DEFECTIVE WEARING COURSE. Such portions of the completed wearing course as are defective in finish, compaction, composition, density, or do not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable material properly laid in accordance with these specifications.

4.02.7. MEASUREMENT.

(A) In determining the area of wearing course to be paid for, the areas of the spaces occupied by rails, bases of columns, manhole heads, gate boxes, roadway boxes and similar structures will be deducted when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

(B) The measured quantity of wearing courses, laid to a specified thickness on an area basis, will be adjusted for deficiencies in thickness and density. The measured quantity of a binder or asphaltic mixture, laid to an unspecified thickness on a tonnage basis, will be adjusted for deficiencies in density. Adjustment shall be made in accordance with **Section 5.04**.

(C) The Contractor shall furnish a delivery ticket to the Engineer for all binder and asphaltic concrete delivered to the site on which shall be stamped the type, the time weighted and metered net weight of material contained in each vehicle. The certification of a licensed Weighmaster will be accepted in lieu of such delivery ticket. The Engineer will estimate the quantity of material from a given delivery which is wasted or not used in the work and deduct such quantity from the metered or certified weight in determining the quantity to be measured for payment.

(D) No payment for binder or asphaltic concrete mixture per ton will be made in areas where a specified thickness of wearing course is placed on a new base for pavement.

Where a wearing course of any specified thickness is placed on an existing base, in built-up areas, in areas of adjustment or on a leveling course and there is a separate price bid per ton for binder, asphaltic concrete mixture, the quantity of mixture per ton, placed more than the specified thickness of wearing course or placed in the leveling course, will be determined as follows:

1. When a three (3") inch wearing course consisting of a base course of binder, compacted to a thickness of one and one-half (1-1/2") inches, and a surface course of asphaltic concrete, compacted to a thickness of one and one-half (1-1/2") inches, is specified; a deduction of 340 pounds for each square yard of completed wearing course shall be made from the total weight of binder and asphaltic concrete incorporated in the work. The remainder, after such deduction, will be paid for as binder mixture at the price bid per ton.

2. When a wearing course of specified thickness consists solely of asphaltic concrete, a deduction of 113-1/3 pounds per inch of specified thickness for each square yard of completed wearing course shall be made from the total weight of asphaltic concrete incorporated in the work. The remainder, after such deduction, will be paid for as asphaltic concrete mixture at the price bid per ton.

4.02.8. PRICES TO COVER.

(A) ASPHALTIC CONCRETE WEARING COURSE. The unit price shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and lay the wearing course of the thickness specified, complete, in full compliance with the requirements of the specifications, to furnish and lay test strips, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and to maintain the courses or mixtures, as laid, in good condition as specified in **Section 5.05**.

No payment will be made under this Item where the Contractor fails to provide the Engineer with an approved Quality Control Plan and Marshall Design Mix. Also, no payment will be made for any asphalt work placed each work day in which a copy of all test results for gradation, asphalt cement content, and theoretical maximum density and the Marshall plug test results for stability, flow, and air voids were not submitted to the Engineer.

(B) BINDER MIXTURE. The unit price shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish, lay and remove when directed the binder mixture, complete, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and to maintain the courses or mixtures, as laid, in good condition as specified in **Section 5.05**.

(C) ASPHALTIC CONCRETE MIXTURE. The unit price shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish, lay and remove when directed the asphaltic concrete mixture, complete, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and to maintain the courses or mixtures, as laid, in good condition as specified **Section 5.05**.

(D) No separate payment will be made for the cost of furnishing and applying of tack coat as directed under **Subsection 4.02.4.(H)**. Where a tack coat is required to be placed, in accordance with these specifications and the directions of the Engineer, and the Contractor fails to apply the required tack coat as specified, the City will take a credit of one ($1.15) dollar per square yard of pavement placed without the tack coat.

(E) Where an item for Pre-Identified Binder Mixture is provided in the project for areas to be resurfaced, payment for resurfacing thereon more than the specified thickness of asphaltic concrete wearing course under Item No. 4.02 AB-R or 4.02 AF-R, as applicable, will be made as follows:

1. First one-quarter inch more than the specified thickness of resurfacing pavement will be paid under the price bid for Pre-Identified Binder Mixture, Item 4.02 BA-R.

2. All material more than both the specified resurfacing pavement plus the first one-quarter inch paid for under Item 4.02 BA-R, will be paid for at a cost of Twenty-Eight ($28) dollars per ton or the price bid for PRE-IDENTIFIED BINDER MIXTURE, Item 4.02 BA-R, whichever is the lesser.

Payment will be made under:

Item No.	Item	Pay Unit
4.02 AB-R	ASPHALTIC CONCRETE WEARING COURSE, 1-1/2” THICK	S.Y.
4.02 AF-R	ASPHALTIC CONCRETE WEARING COURSE, 2” THICK	S.Y.
4.02 AG	ASPHALTIC CONCRETE WEARING COURSE, 3” THICK	S.Y.
4.02 BA-R	PRE-IDENTIFIED BINDER MIXTURE	TON
4.02 CA	BINDER MIXTURE	TON
4.02 CB	ASPHALTIC CONCRETE MIXTURE	TON
4.02 CP	BINDER MIXTURE FOR BASE PAVERS	TON

SECTION 4.03 – Temporary Surfacing For Roadways

4.03.1. INTENT. This section describes construction of Temporary Surfacing for Roadways.

4.03.2. DESCRIPTION. Temporary Surfacing shall consist of a layer of screenings, with a bituminous and stone treatment or a single layer of plant-mixed binder mixture. Surfacing shall be four (4") inches in thickness after compression.

4.03.3. MATERIALS.

(A) Bituminous material shall comply with the requirements of **Section 2.03, Liquid Asphalt**, MC-250.

(B) (No Text)

(C) Stone shall comply with the requirements of **Section 2.02**, Type 1, Grade B, Size No. 8.

(D) Screenings shall comply with the requirements of **Section 2.02**, Type 1, Grade B, and the gradation given for screenings in TABLE 2.02-II.

(E) Plant-mixed binder mixture shall comply with the requirements of **Section 3.01, Asphalt Paving Mixtures**.

4.03.4. METHODS--PENETRATION METHOD.

(A) EARTH SUBGRADE

The earth subgrade, immediately before the surfacing is laid, shall be thoroughly compacted with an approved roller weighing not less than two hundred and twenty-five (225) pounds per inch width of main roll. It shall be smooth, parallel to and at the required depth below the finished surface, and shall not be in a muddy or frozen condition. Unsuitable material shall be removed and replaced with acceptable material thoroughly compacted.

(B) DEPOSITING SCREENINGS

The screenings shall be deposited and spread on the prepared subgrade in a uniform layer. They shall then be compacted in a satisfactory manner with an approved roller, weighing not less than eight (8) tons. Rolling shall proceed continuously until they do not creep or wave ahead of the roller.

(C) BITUMINOUS TREATMENT

When the surface is moderately dry, bituminous material shall be applied uniformly at the rate of from seven-tenths (0.7) gallon to nine-tenths (0.9) gallon per square yard of surface.

(D) PRESSURE DISTRIBUTOR

The pressure distributor shall distribute the bituminous material in a uniform spray without atomization and be equipped with an approved thermometer, tachometer and pressure gauge which can be easily read during operation, and have tires of such width as to prevent rutting. If provided with heating attachments, the distributor shall be so equipped and operated that the bituminous material shall be circulated or agitated throughout the entire heating process.

The distributor shall be operated to secure uniformity in distribution and in depth of penetration by the regulation of the speed of the vehicle and the discharge of the bituminous material, and by the prevention of overlapping at either the sides or ends of applications and the draining of pipes and nozzles onto the road.

An approved pouring pot or hose attachment to the distributor shall be used to touch up spots or cover narrow strips unavoidably missed by the distributor.

(E) STONE TREATMENT

The stone shall be deposited in piles adjacent to the road before the application of the bituminous material is begun, and shall be kept clean. It shall be moderately dry when used. It shall be spread immediately after the application of the bituminous material uniformly at the rate of 25 to 30 pounds per square yard.

The surface shall be broomed, if necessary, to prevent excess deposits in spots, and be rolled continuously until the bonding is thorough and the surface is hard, smooth and apparently immovable under the roller. The stone shall be applied in additional amounts at points where bituminous material adheres to the wheels of the roller.

4.03.5. METHODS--PLANT-MIX–INDER. All provisions of **Subsection 4.01.4.**, applicable to a Class 3, Plant Mixed Binder Base Course, shall apply when Plant Mixed Binder is used as a temporary surfacing for roadways.

4.03.6. DEFECTIVE WORK. Such portions of the completed surfacing as are defective in finish, compression, composition or that do not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable materials, properly laid in accordance with these specifications.

4.03.7. MEASUREMENT. In determining the area of temporary surfacing to be paid for, the areas occupied by rails, bases of columns, manhole heads, gate boxes, roadway boxes and similar structures will be deducted when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

All screenings, sand, stone and plant-mixed binder shall be weighed separately in trucks on approved scales to be provided by the Contractor. The Contractor shall furnish a delivery ticket to the Engineer on which shall be stamped the time weighed and the metered net weight and type of material contained in each vehicle when delivered to the site. The certification of a licensed Weighmaster will be accepted in lieu of such delivery ticket.

4.03.8. PRICE TO COVER. The contract price for Temporary Surfacing for Roadways per square yard shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and lay the temporary surfacing, complete in place, in full compliance with the requirements of the specifications, and to furnish such samples for testing and provide such test equipment, laboratory space and facilities as may be required.

Payment will be made under:

Item No.	Item	Pay Unit
4.03	TEMPORARY SURFACING FOR ROADWAYS	S.Y.

SECTION 4.04 - Concrete Base for Pavement

4.04.1. INTENT. This section describes construction of Concrete Base for Pavement and Pavers.

4.04.2. DESCRIPTION.

(A) CONCRETE BASE FOR PAVEMENT. Concrete base for pavement shall consist of a course of concrete of a specified thickness and type except for a space eighteen (18") inches wide around manhole heads and similar structures where it shall be two (2") inches thicker than the surrounding concrete.

(B) CONCRETE BASE FOR PAVERS. Concrete base for pavers shall consist of a course of concrete of a specified thickness and type, which shall be keyed into the adjacent base for pavement when used in roadway areas or keyed into the adjacent concrete sidewalk when used in sidewalk areas.

4.04.3. MATERIALS. Concrete must comply with the requirements of **Section 3.05**, Class B-32, Type IA, unless otherwise specified. Classes A-40 or High Early Strength Concrete, must be used when specified or directed.

Concrete cylinders shall be taken at each location of work, as directed by the Engineer, to be tested for 3-day and 28-day strengths.

Fine aggregate shall comply with the requirements of **Section 2.21**, Type 1A .

Coarse aggregate shall comply with the requirements of **Section 2.02**; Size No. 57; Type 1, Grade B, or Type 2.

Curing compound must meet the requirements of **Section 2.14,** Type 1D or Type 2.

Preformed expansion joint filler, Type IV, 1/4" thick, shall comply with the requirements of **Section 2.15**.

Asphaltic joint filler, blown type shall comply with the requirements of **Section 2.16**.

Concrete reinforcement shall comply with the requirements of the following sections:

Steel Bars–**Section 2.23**

Welded Steel Wire Fabric–**Section 2.25**

Kind of reinforcement, size and placement shall be as specified or as shown on the Contract Drawings.

4.04.4. METHODS.

(A) EARTH SUBGRADE

The earth subgrade, immediately before the concrete base is laid, shall be compacted with an approved roller weighing not less than two hundred and twenty-five (225) pounds per inch width of main roll. It shall be smooth, parallel to and at the required depth below the finished pavement surface, and be dampened with water sufficient only to be absorbed by the subgrade. The subgrade shall not be in a muddy or frozen condition, and unsuitable material shall be removed and replaced with acceptable material thoroughly compacted to obtain a minimum of 95% standard Proctor maximum density.

(B) DEPOSITING, COMPACTING, AND FINISHING CONCRETE

Concrete shall be placed, spread, internally vibrated, consolidated and struck off using methods and equipment approved by the Engineer. Spreading by shovels will be permitted.

Concrete shall be deposited before the initial set has taken place, crosswise of the street, in as nearly a continuous operation as practicable, and with approved tools which will prevent segregation. It shall not be deposited in standing water and shall be thoroughly compacted to the required depth and against rails and structures. Concrete shall have its top surface parallel to and at the required depth below the finished pavement surface.

The Contractor shall be required to furnish a minimum of three (3) hand operated immersion type vibrators to the job site, one of which shall be used as a backup for the other two. Immediately after concrete has

been placed, the Contractor shall use the hand operated immersion type vibrators to thoroughly consolidate the concrete in areas against and along the face of forms, when used, and along curbs, street hardware, and other structures. Vibrators shall not come in contact with forms, shall not be used for moving concrete in the work, and in no case shall any vibrator be operated longer than 4 seconds in any one location.

Where a block pavement is to be laid on the concrete base it shall be finished to a surface that is not rough and where an asphalt pavement is to be laid the surface of the concrete shall be left roughened by transverse brooming, except within one (1') foot of joints which shall be finished smooth for the application of a reflective cracking membrane.

Concrete base in roadways shall be finished three (3") inches below the surface of the new asphaltic concrete wearing course and shall conform to the profile and cross section of finished asphaltic concrete wearing course within a tolerance of ±1/4 inch throughout. Hand screeding and finishing of the concrete base will be permitted. The finished surface shall be struck uniformly and be free of ruts, depressions, bumps and unevenness, suitable for temporary use as a vehicular riding surface. For the application of reflective cracking membrane under Item 6.91, the surface of the concrete base within one (1') foot of joints shall be finished smooth. No other hand finishing of the pavement will be required except to correct surface irregularities.

(C) CONCRETE BASE FOR PAVERS

When installing concrete base for pavers particular care shall be taken by the Contractor to ensure that the concrete base for pavers be placed to its proper elevation and actual width required to minimize the need for sawcutting pavers during their installation. The Contractor shall layout a sample section of the actual pavers to be installed in the work, to determine the actual width of base for pavers required, prior to installation of the concrete base. Should the Contractor fail to meet the concrete base elevation required to maintain the bituminous setting bed thickness specified under the paver item, it shall be required to remove and replace the concrete base or portion thereof, as required, to maintain the specified bed thickness, at no additional cost to the City. Minimum concrete replacement thickness shall be two (2") inches.

In addition, the Contractor shall be required to install weep holes in the concrete base as directed.

Concrete base for pavers in sidewalk areas shall also include a six (6") inch foundation material, which shall comply with the requirements of **Subsection 4.13.3.(A)** and be placed in accordance with the requirements of **Subsections 4.13.4.(A)** and **4.13.4.(B)**; preformed expansion joint filler, Type IV, one-quarter (1/4") inch thick, which shall comply with the requirements of **Section 2.15**; and, asphaltic blown joint filler which shall comply with the requirements of **Section 2.16**. Installation of these materials shall be as shown on the Contract Drawings or directed by the Engineer.

(D) TESTING THE SURFACE

Any surface irregularity of the concrete found when testing the concrete surface prior to initial set, exceeding three-eighth (3/8") inches in ten (10') feet, shall be immediately corrected.

(E) CURING

Curing the Portland Cement Concrete foundation for pavement by the impervious membrane method will not be permitted. Curing shall be done by spraying bituminous curing material at the rate specified in **Section 2.14**.

The concrete shall be cured in accordance with the provisions of the specifications, Curing Materials, **Section 2.14**, Type 1D.

The sum of one (1) dollar will be deducted from any moneys due under the contract for each square foot of pavement base which the Contractor fails to cure as specified. Furthermore, the Contractor, pursuant to **Section 5.04**, shall take core borings at the Contractor's own expense to determine the compressive strength of the concrete at any location in which the concrete is not cured as specified.

(F) JOINTS

Transverse and construction joints shall be constructed as per the New York City Department of Transportation's Standard Details of Construction Standard Drawing Nos. H-1040 and H-1034. Construction joints will be required at paving stops and at other locations as directed by the Engineer.

(G) RAIN AND COLD WEATHER

Concrete placement operations may be started when the air temperature is 40° Fahrenheit and rising, or warmer, and when the surface temperature of the area to be paved is 40° F or higher. All temperatures shall be measured in the shade within an accuracy of ±2° Fahrenheit. Paving shall be discontinued when the air temperature falls below 40° Fahrenheit unless otherwise permitted in writing by the Engineer. Concrete paving will not be permitted when it is raining, except when permitted in writing by the Engineer.

When the air temperature is expected to fall below 35° Fahrenheit anytime during the curing period of the concrete placement, a sufficient supply of blanketing material approved by the Engineer shall be provided at the work site. Blankets must be from NYSDOT Approved List 711-03. At any time during the curing period of the concrete when the air temperature may be expected to reach 32° Fahrenheit and colder, the blanketing material so provided shall be spread over the pavement and maintained to prevent freezing of the concrete. Concrete damaged by cold weather as determined by the Engineer shall be removed and replaced at the Contractor's own expense.

The placing of concrete during wet or cold weather will not relieve the Contractor of any responsibilities under this contract.

4.04.5. TRAFFIC. No traffic of any kind will be allowed on the concrete base until permitted by the Engineer. Normally that shall be at least seven (7) days or at least seventy-two (72) hours for High Early Strength Concrete.

4.04.6. MEASUREMENT. The volume of concrete in cubic yards and the amount to be paid shall be determined from cores taken by the Contractor after twenty-eight (28) days of curing in accordance with **Section 5.04**. Where concrete is laid upon an existing concrete base, the volume of concrete in cubic yards shall be determined from cross sections.

In determining the volume of concrete to be paid for, the spaces occupied by rails, bases of columns, manhole heads, gate boxes, road boxes and similar structures will be deducted when their superficial areas measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

4.04.7. PRICES TO COVER.

(A) CONCRETE BASE FOR PAVEMENT. The contract price for Concrete Base for Pavement per cubic yard shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish, lay and cure the concrete, of the Class, Type and thickness specified, complete in full compliance with the requirements of the specifications, to furnish such samples and cores for testing and to provide such testing equipment, laboratory space and facilities as may be required, and to maintain the concrete base in good condition as specified in **Section 5.05**.

(B) CONCRETE BASE FOR PAVEMENT, WITH REINFORCEMENT. The contract price for Concrete Base for Pavement per cubic yard shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish, lay and cure the concrete, of the Class, Type and thickness specified, with steel reinforcement complete in full compliance with the requirements of the specifications, to furnish such samples and cores for testing and to provide such testing equipment, laboratory space and facilities as may be required, and to maintain the concrete base in good condition as specified in **Section 5.05**.

(C) CONCRETE BASE FOR PAVERS. The contract price for Concrete Base for Pavers per cubic yard shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish, lay and cure the concrete, of the Class, Type and thickness specified, complete in full compliance with the requirements of the specifications, including, but not limited to, furnishing and placing foundation material, to furnish such samples and cores for testing and to provide such testing equipment, laboratory

space and facilities as may be required, and to maintain the concrete base in good condition as specified in **Section 5.05**.

Payment will be made under:

Item No.	Item	Pay Unit
4.04 B	CONCRETE BASE FOR PAVEMENT, VARIABLE THICKNESS FOR TRENCH RESTORATION, CLASS B-32	C.Y.
4.04 H	CONCRETE BASE FOR PAVEMENT, VARIABLE THICKNESS FOR TRENCH RESTORATION, (HIGH EARLY STRENGTH)	C.Y.
4.04 AC	CONCRETE BASE FOR PAVEMENT, 6” THICK, CLASS B-32	C.Y.
4.04 BC	CONCRETE BASE FOR PAVEMENT, 7” THICK, CLASS B-32	C.Y.
4.04 BCR	CONCRETE BASE FOR PAVEMENT, WITH REINFORCEMENT, 7” THICK, CLASS B-32	C.Y.
4.04 CC	CONCRETE BASE FOR PAVEMENT, 8” THICK, CLASS B-32	C.Y.
4.04 CD	CONCRETE BASE FOR PAVEMENT, 8” THICK, CLASS A-40	C.Y.
4.04 DC	CONCRETE BASE FOR PAVEMENT, 9” THICK, CLASS B-32	C.Y.
4.04 DD	CONCRETE BASE FOR PAVEMENT, 9” THICK, CLASS A-40	C.Y.
4.04 EC	CONCRETE BASE FOR PAVEMENT, 10” THICK, CLASS B-32	C.Y.
4.04 ED	CONCRETE BASE FOR PAVEMENT, 10” THICK, CLASS A-40	C.Y.
4.04 FD	CONCRETE BASE FOR PAVEMENT, 11” THICK, CLASS A-40	C.Y.
4.04 GD	CONCRETE BASE FOR PAVEMENT, 12” THICK, CLASS A-40	C.Y.
4.04 AP	CONCRETE BASE FOR PAVERS, 4” TO 7” THICK, CLASS A-40	C.Y.
4.04 BP	CONCRETE BASE FOR PAVERS, 4” TO 7” THICK, CLASS B-32	C.Y.
4.04 HA	CONCRETE BASE FOR PAVEMENT, 6” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HB	CONCRETE BASE FOR PAVEMENT, 7” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HC	CONCRETE BASE FOR PAVEMENT, 8” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HD	CONCRETE BASE FOR PAVEMENT, 9” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HE	CONCRETE BASE FOR PAVEMENT, 10” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HF	CONCRETE BASE FOR PAVEMENT, 11” THICK (HIGH EARLY STRENGTH)	C.Y.
4.04 HG	CONCRETE BASE FOR PAVEMENT, 12” Thick (High Early Strength)	C.Y.

SECTION 4.05 – Concrete Pavement

4.05.1. INTENT.

This section describes construction of Concrete Pavement.

4.05.2 DESCRIPTION.

(A) Concrete Pavement shall be of the following types:

Type 1–Non-reinforced

Type 2–Reinforced (Unpigmented or pigmented when specified)

Type 3–High Early Strength Reinforced (Unpigmented or pigmented when specified)

Type 2 and Type 3 pavements shall consist of a concrete surface course which shall be unpigmented or pigmented when specified, laid on a concrete base course, which may or may not be pigmented at the Contractor's option, while the base course is still plastic, of the thickness shown on the Contract Drawings, with reinforcement placed between the surface and base courses.

(B) Concrete Pavement shall be of the type, thickness and finish specified, and shall be colored when specified.

4.05.3 MATERIALS.

(A) CONCRETE

Concrete shall comply with the requirements of **Section 3.05**, Class A-40, Type IIA, or High Early Strength, Type IIIA. Concrete shall be Class A-40, Type IIA, unless otherwise specified.

Coarse aggregate shall comply with the requirements of **Section 2.02**, broken stone, Type 1, Grade B or Type 2. Type 2 aggregate shall be crushed.

(B) PIGMENTING

Where pigmenting is specified, the concrete bus pads shall be pigmented with an admixture complying with the requirements of Section 2.19 of the Standard Highway Specifications.

Where the color of the concrete is required to simulate the red color of the Red Bus Lane Pavement Overlay (Item 6.44 POR in Section 6.44 PO), the surface course concrete shall be integrally pigmented to produce a red color equivalent to Scofield's quarry red (to match the Quest's StreetBondCL Terracotta color overlay to be used along the designated adjacent asphalt pavement).

Except for the use of an air-entraining agent complying with ASTM Designation C260 and water reducing admixtures complying with ASTM Designation C494 used in combination with the Pigment Admixture as per the pigment manufacturer's instruction, no other admixtures (including, but not limited to, calcium chloride) shall be used unless stated in writing by the manufacturer of the Pigment Admixture to be of no consequence to the colorfastness of the concrete mixture and is approved by the Engineer.

All pigmented concrete at different locations shall be identical, unless otherwise directed. Variations in color/tint/hue will not be acceptable. Therefore, the same brand and type of Portland cement and the same source and type of aggregate shall be used throughout the project.

Prior to the mix design being made, the Portland cement intended for use shall be checked to determine that its lightness/darkness is similar to the Portland cement used in the original approved sample. The Pigmented Admixture shall be added in the standard proportion specified by the manufacturer.

(C) CURING COMPOUND

Curing Compound for unpigmented concrete shall be Type 1-D as per **Section 2.14**. The compound shall contain a fugitive dye that will fade uniformly.

Curing Compound for pigmented concrete shall be a liquid membrane-forming compound color-matched to the pigmented concrete, as specified under **Section 2.19**. Additionally, the curing membrane shall be of a

type recommended by the Pigmented Admixture manufacturer and shall conform to both ASTM C309 and all local, State, and Federal regulations concerning volatile organic compounds (VOC). Plastic sheeting, burlap, paper, or other unspecified material shall not be used as a curing membrane.

(D) CONCRETE REINFORCEMENT

Concrete reinforcement shall comply with the requirements of the following sections:

Steel Bars–**Section 2.23**

Welded Steel Wire Fabric–**Section 2.25**

Kind of reinforcement, size and placement shall be as specified or as shown on the Contract Drawings.

(E) JOINT TIE BARS AND DOWEL BARS

Joint Tie Bars and Dowels shall be of the types, sizes and placement shown on the Contract Drawings. Epoxy coating of bars shall be furnished, applied, sampled, tested, repaired, handled and stored in accordance with the requirements of **Section 709-04, EPOXY-COATED BAR REINFORCEMENT**, of the State of New York, Department of Transportation, Standard Specifications. Acceptance of epoxy coated joint tie bars and dowels shall be based on: the names and locations of the reinforcing bar manufacturer, the epoxy reinforcing bar applicator, and the epoxy coating material appearing on the NYS Department of Transportation's Material and Equipment Approved List; and, certifications from the steel manufacturer, the coating manufacturer, and the coating applicator as to their compliance with these specifications. These certifications shall accompany the material delivered to the job site.

(F) JOINT SEALER

The Joint Sealer must be on the NYSDOT Approved list 705-02 for ASTM D6690 Type IV sealants. The Department reserves the right to sample and test this material after delivery at the project site.

(G) EXPANSION JOINT FILLER

Preformed Expansion Joint Filler shall comply with the requirements of **Section 2.15**, Type IV shall be used unless otherwise specified.

(H) SNOW PICKET FENCE

Snow Picket Fence shall be manufactured from one (1") inch wide, one-quarter (1/4") inch thick and three (3') feet long wood laths dyed or painted red, spaced approximately one-quarter (1/4") inch apart and bound together at the top and bottom of each stake with No. 16 wire. Snow picket fence shall be as described herein or an equivalent as approved by the Engineer.

4.05.4 EQUIPMENT.

(A) GENERAL

All equipment for placing and finishing concrete pavement shall be at the job site sufficiently ahead of the start of the paving operations to be examined thoroughly and approved by the Engineer. Any equipment found worn or defective either before or during its use shall be immediately repaired to the satisfaction of the Engineer or replaced. Paving operations shall be discontinued at any time equipment is not working properly and producing unsatisfactory results. The concrete for pavement shall be mixed and transported in conformance with the requirements of **Section 3.05**, unless otherwise stated herein.

(B) SPREADING AND FINISHING MACHINES

Spreading and Finishing Machines shall have the following characteristics:

1) Travel speed, direction, and elevation shall be controlled hydraulically.
2) Effective paving width must be sufficient to avoid adding longitudinal joints not specified.
3) A minimum of two independent function augers for controlled directional spreading of concrete.
4) A minimum of two oscillating screeds with variable stroke for working concrete slab.
5) Hydraulic or electric internal vibration.
6) Hydraulic crown control for contouring slab.

The spreading and finishing machines shall be self-powered and shall be capable of spreading, consolidating and finishing the freshly placed concrete to the required pavement elevation and cross-section within the specified tolerances. When the spreading or finishing machines are operated on adjacent pavement, the equipment shall be provided with either: approved rubber tires, flangeless wheels, sleeved steel wheels with quick removable flanges for travel and operation on the existing slab, to avoid damage to the adjacent lane slab. Approved pads may be used to protect the adjacent lane when tracked equipment is used for paving.

The finishing machine shall be equipped with a pan float attached to the finishing equipment behind the last screed.

(C) VIBRATORS

Vibrators for full width vibration of concrete paving may be either the surface pan type or internal type with either immersed tube or multiple spuds. The vibrators shall be capable of thoroughly consolidating the concrete, leaving the concrete free from honeycomb. Vibrators may be attached to the spreader or the finishing machine, or may be mounted on a separate carriage for either the slipform or fixed form paving methods. The vibrators shall be mounted to transmit a minimum of vibration to the spreader or finishing machine or forms and shall not be in contact with the forms. The vibrating equipment shall be designed to permit the vibrators to be raised or lowered during the progress of the paving operations and they shall be capable of being shut off. The frequencies of the vibrating elements for the various types of vibrators shall meet the following requirements for Vibrator Element Frequencies.

TABLE 4.05-A

VIBRATOR ELEMENT FREQUENCIES

Type	Frequency, Minimum Cycles/Minute
Surface, Pan or Screed	3500
Immersion Tube, Paving Machine Attachment	5000
Immersion Spud, Hand Operated	7000
Immersion Spud, Gang Mounted	7000

(D) SLIPFORMS

The slipform paving equipment shall be self-propelled and shall be capable of placing, spreading, consolidating, screeding and finishing the freshly placed concrete to the proper pavement elevation and cross-section within the specified tolerances. The equipment may consist of a placing machine followed by a separate paver unit. Sliding forms on the paver unit shall be rigidly held together laterally to prevent spreading of the forms. Mechanical floats designed to eliminate small surface irregularities may be utilized as a separate machine in the final finishing operation. The paving equipment shall finish the concrete pavement surface in a manner such that any hand finishing will be kept to a minimum. The slipform paving equipment shall be guided by an approved reference system for placing the concrete pavement at an established line and grade.

(E) FIXED FORMS

Straight fixed forms shall be made of metal having a thickness of not less than seven thirty-seconds of an (7/32”) inch and shall be furnished in sections not less than ten (10’) feet in length. They shall have a joint connection to insure unbroken lines across the joint and contain holes for bars as required. Forms shall have a depth equal to the prescribed edge thickness of the concrete, without horizontal joints, and shall have a minimum base width equal to the depth of the forms. Flexible, curved or wooden forms of a design acceptable to the Engineer may be used, but only for curved sections having a radius of less than two hundred (200’) feet. All forms shall have an approved section with the vertical face rounded on the upper corner to not more than three-quarters (3/4) of an inch radius and with a horizontal top face at least two inches wide. Flange braces shall extend outward on the base not less than two-thirds (2/3) the height of the form. The forms shall be designed for locking the ends of abutting form sections together tightly. The top of the form shall not vary from a true plane more than one-eighth (1/8”) inch in ten (10’) feet, and the

vertical face shall not vary more than one-fourth (1/4”) inch. Forms with battered top surfaces, or bent, twisted or broken forms shall not be used. Repaired forms shall not be used until inspected and approved by the Engineer.

(F) OTHER EQUIPMENT

Other Equipment for placing pavement concrete may be used subject to the approval of the Assistant Commissioner, Infrastructure Construction.

4.05.5. METHODS.

(A) GENERAL

In addition, the Contractor shall within eight weeks of the notice to proceed, prepare and submit for approval to the Director of Construction, Infrastructure Division, detailed shop drawings for the entire pavement showing: all proposed transverse and longitudinal construction, expansion and contraction joints; proposed curb joints; the proposed method of joint forming; the proposed method of dowel support; and the proposed sealant method.

For pigmented concrete, the Contractor shall within eight weeks of the notice to proceed, submit the name of its proposed roadway installer upon which its bid is based, along with their respective work history experience in placing pigmented concrete. The installer shall have documented experience in working with pigmented concrete.

Prior to making any field samples and the placing of any pigmented concrete, the Contractor, its concrete supplier, installer, cement producer, laboratory, the pigmented admixture’s representative, and the Engineer shall meet and agree on the specifications and methods of handling the pigmented concrete.

(B) WEATHER LIMITATIONS

Concrete placement operations may be started when the air temperature is forty (40) degrees Fahrenheit and rising, or warmer, and when the surface temperature of the area to be paved is forty (40) degrees Fahrenheit or higher. All temperatures shall be measured in the shade within an accuracy of plus two (+2) degrees Fahrenheit. Paving shall be discontinued when the air temperature falls below forty (40) degrees Fahrenheit unless otherwise permitted by the Engineer. Concrete pavement shall not be placed when it is raining. When the air temperature is expected to fall below thirty-five (35) degrees Fahrenheit anytime during the curing period of the concrete placement, a sufficient supply of blanketing material approved by the Engineer shall be provided at the work site. Blankets must be from NYSDOT Approved List 711-03. At any time during the curing period of the concrete when the air temperature may be expected to reach thirty-two (32) degrees Fahrenheit and colder, the material so provided shall be spread over the pavement and maintained to prevent freezing of the concrete. Concrete damaged by cold weather as determined by the Engineer shall be removed and replaced at the Contractor’s expense.

(C) PREPARATION OF SUBBASE

Before any concrete may be placed, the subbase course shall be fine graded to a tolerance of plus one-quarter (+1/4”) inch of true grade for the subbase. High areas shall be trimmed to proper elevation. Low areas may be filled with approved granular material mixed with two (2%) percent Portland cement by weight. The subbase course shall be fine graded at least twelve (12”) inches beyond the outside edge of either: 1) the slipform paving equipment, trackline or wheelpath; or, 2) the fixed forms.

Wherever possible as determined by the Engineer, concrete paving operations shall not begin until the subbase course has been fine graded ahead as follows:

500 Linear Feet, Minimum, for Slipform Paving; and,
200 Linear Feet, Minimum, for Fixed Form Paving.

The subbase course shall be uniformly moist when the concrete is placed. If it subsequently becomes too dry, the subbase course shall be sprinkled, but the method of sprinkling shall not be such as to form mud or pools of water.

During concrete paving operations, a roller weighting not less than five (5) tons shall be maintained in readiness to recompact the subbase course if the surface, for any reason, has become uneven or defective.

Soft spots in the subbase shall be corrected to the satisfaction of the Engineer. Traffic will not be allowed on the finished subbase unless permitted by the Engineer. It shall be protected, where required, against freezing by a layer of straw spread to a depth of six (6") inches and be unfrozen when concrete is laid.

(D) SETTING FIXED FORMS

The Contractor shall submit details of the forms intended for use to the Engineer for approval before starting construction of the forms.

1) Base Support. The subbase under the forms shall be compacted and true to grade so that the form, when set will be firmly in contact for its whole length and at the specified grade. Any part of the subbase course at the form line found below the established grade shall be filled with approved granular material for a distance at least six (6") inches on each side of the form base, and thoroughly compacted. Imperfections or variations above grade shall be corrected by cutting as necessary.

2) Form Setting. Forms shall be set wherever possible as determined by the Engineer, at least two hundred (200') feet ahead of the point where concrete is being placed. Forms shall be staked into place with not less than three (3) pins or stakes for each ten (10') foot section. A pin shall be placed at each side of every joint. Form sections shall be tightly locked, free from play or movement in any direction. The forms shall not deviate from true line by more than one-quarter (1/4") inch at any point. The forms shall resist the pressure of the concrete and the impact of the operating equipment without springing, and shall be left in place until the day following the laying of the concrete unless otherwise permitted, and be carefully removed without damaging the concrete. Forms shall be cleaned and oiled each time prior to using the forms for placing concrete.

3) Grade and Alignment. On curves, the forms shall be shaped to the required radius. The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete. When any form has been disturbed or any subbase has become unstable, the forms shall be reset and rechecked.

(E) STEEL REINFORCEMENT

Steel Reinforcement for reinforced concrete pavement shall be installed in accordance with the requirements of **Section 4.14**, unless otherwise specified herein.

Reinforcing steel mats shall be free from dirt, oil, grease, paint, loose mill scale, or thick rust which could impair bond of the steel with the concrete. Before being placed, all reinforcement shall be in a condition that is approved by the Engineer. All steel reinforcement shall be placed as shown on the Contract Drawings.

(F) CONCRETE MIXING, TRANSPORTING AND DISCHARGING

Concrete Mixing, Transporting and Discharging shall meet the requirements of **Section 3.05**. Concrete shall be mixed, transported, placed and spread by approved mechanical equipment only, except mechanical spreading equipment will not be required for bus stops and for concrete pavement limited to not more than five hundred (500') linear feet.

Concrete shall be deposited rapidly in successive batches by means of batcher trucks or other approved methods. It shall be thoroughly spaded and be handled with special care to prevent segregation. Along all joints, around all protrusions into the concrete such as manholes, drainage structures, etc., and along the inside of the forms, hand operated immersion type vibrators shall be used to thoroughly consolidate the concrete. Vibrators shall not come in contact with forms, shall not be used for moving concrete in the work, and in no case shall any vibrator be operated longer than four (4) seconds in any one location. The Contractor shall be required to furnish a minimum of three (3) hand operated immersion type vibrators to the job site, one of which shall be used as a backup for the other two.

Maintain uniform concrete quality and head in front of the paving machine and without running over the screeds. Delivery of concrete shall be coordinate to maintain continuous forward movement of the paver and avoid excessive delivery truck queues. The top of forms shall be kept clean before and during paving operations. Consolidate the entire concrete placement using internal vibrators attached to the paver. Combine paver forward speed, vibrator frequency, and vibrator depth to consolidate the concrete without segregation, vibrator trails, or contacting the joint assemblies. Discontinue vibration if the paver stops.

(G) CONCRETE PLACEMENT

Concrete shall be placed in one half the width of the roadway pavement at a time unless otherwise shown on the Contract Drawings or directed by the Engineer. Longitudinal lane joints shall be constructed in the new pavement by sawcutting the concrete within twenty-four (24) hours of its placing but not within four (4) hours after it has been placed.

Immediately before placing concrete, the entire subbase surface shall be wet without forming puddles or mud.

Concrete shall be unloaded into an approved spreading device and mechanically spread as near to final position on the subbase, unless otherwise permitted by the Engineer, and in such a manner as to prevent segregation of the material. If a spreader is not used, uniformly distribute the concrete in front of the paver by maneuvering the delivery truck chute. When concrete is placed adjoining bridges or existing intersecting pavements with slipform paving equipment, the start-off or ending procedures shall be subject to the approval of the Engineer. The concrete shall be placed to the depth and width of the paving operation continuously between the transverse joints without the use of intermediate bulkheads except when a disruption in the paving operation occurs. A transverse construction joint, meeting the requirements herein shall be formed whenever concrete paving operations are stopped longer than thirty (30) minutes. If, due to any disruption, concreting must be stopped within ten (10') feet after forming a transverse joint, the Contractor shall remove the concrete to the joint previously formed and no payment will be made for placing or removing this concrete.

The concrete shall be placed in such a manner to provide a dense and homogeneous pavement with a minimum of hand finishing. The equipment shall have as nearly a continuous forward movement as possible and all operations of delivery and spreading the concrete shall be so coordinated as to provide uniform progress with stopping and starting of the placing equipment held to a minimum. If, for any reason, it is necessary to stop the forward movement of the equipment, the vibratory elements shall be stopped immediately.

Where concrete will be placed adjacent to a previously constructed lane of pavement and hauling or finishing equipment will be operated upon the existing lane of pavement, that lane shall have cured for the minimum period of seventy-two (72) hours. Whenever concrete is mixed in a paver mixer, the paver will be allowed to operate on an adjacent paved lane provided that a mat at least six (6") inches wider than the treads, at least two (2") inches in thickness and of a length not less than the length of treads shall be maintained at all time while the equipment is on the pavement.

Pavement widening six (6') feet or less may be placed with pavement widening equipment as approved by the Engineer. Longitudinal forms will not be required when pavement widening equipment is used.

Necessary hand spreading shall be done with shovels. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or other foreign substances.

Immersion type vibrators, either hand operated or attached to the paving equipment, shall be used to thoroughly consolidate the concrete against and along the faces of forms, when used, and along the full length and on both sides of all joint support assemblies. The vibrators shall not come in contact with a joint support assembly, the subbase or forms. In no case shall any vibrator be operated longer than ten (10) seconds in any one (1) location.

The use of a mechanical spreader may be dispensed with on small or irregular areas if a substitute method satisfactory to the Engineer is provided. When paving small or irregular areas, the concrete shall be uniformly spread. If concrete is spread by hand, comealongs or shovels shall be use. Rakes or hand-held vibrators shall not be used to spread the concrete. Use hand-held vibrators ahead of the paving equipment to consolidate all concrete not vibrated by equipment mounted internal vibrators. Keep hand-held vibrators perpendicular to the pavement surface. Vibrate between two (2) and four (4) seconds in each location, overlapping adjacent locations. Do not drag handheld vibrators through the concrete. Do not walk through consolidated concrete.

Following the placing and spreading of the concrete, it shall be struck-off to conform to the cross-section shown on the Contract Drawings and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement will be at the elevation shown on the Contract Drawings.

Mark the midpoint (□1/2") of each transverse contraction joint with a shim placed into the plastic concrete immediately adjacent to each form. Use shims equal in width and depth to the contraction joint first-stage saw cuts depicted in the Contract Drawings. Set the shims perpendicular to the forms and the pavement surface. Make first-stage saw cuts from shim to shim as discussed in **Subsection 4.05.5(L)(3), Sawcutting Joints**. Use shims of sufficient lengths to allow complete first-stage saw cutting to each shim without striking the form.

Reinforced concrete pavement shall be placed in one layer. The reinforcement must be placed on chairs. The chairs must be submitted to the Engineer for approval.

Reinforcing steel mats shall be free from dirt, oil, grease, paint, loose mill scale, or thick rust which could impair bond of the steel with the concrete. Before being placed, all reinforcement shall be in a condition that is approved by the Engineer. All steel reinforcement shall be placed as shown on the Contract Drawings.

(H) SLIPFORM PAVING

When slipform paving machines are used, the Contractor shall establish a reference system to achieve the specified smoothness level.

A uniform concrete quality and head shall be maintained in front of the paving machine. Concrete delivery shall be coordinated to maintain continuous forward movement of the paver and avoid excessive delivery truck queues. Paver tracks shall be kept clear of concrete and debris before and during paving.

If concrete is placed directly on subbase, wet the entire subbase surface without forming puddles or mud immediately before placing concrete. Whenever possible, unload concrete into a mechanical spreader that deposits it near the final position before paving. If a spreader is not used, uniformly distribute the concrete in front of the paver by maneuvering the delivery truck chute.

Consolidate the entire concrete placement using internal vibrators attached to the slip form machine. Combine paver forward speed, vibrator frequency, and vibrator depth to consolidate the concrete without segregation, vibrator trails, or contacting the joint assemblies. Discontinue vibration if the paver stops.

(I) SCREEDING AND FINISHING CONCRETE

The strike-off and screeding of roadway slabs shall be done by machinery except where otherwise permitted by the Engineer. The machine shall be of a type approved by the Engineer. Flat finishing and brooming shall be done where directed by hand finishers.

Screeding shall be completed with as few passes of the machine as are necessary to produce a surface which is uniform in appearance, density and composition. The concrete shall be worked only sufficiently to embed the coarse aggregate, to close surface voids and to eliminate porous spots. This working shall not be carried to the point where excess mortar or water are drawn to the surface.

If hand screeding is permitted, the pavement surface shall be struck off in two (2) operations by means of approved steel channel or angle screeds which shall be not less than ten (10") inches in width and weigh not less than fifteen (15) pounds per linear foot. Screeds shall be at least two (2') feet longer than the width of the section, be moved forward with a longitudinal and cross-wise motion pushing an excess quantity of concrete ahead as required and with care to prevent tilting or riding up above the forms. The second screeding operation shall follow the first as late as possible in order that there may be a minimum of slumping down of the concrete surface.

Upon completion of the screeding, the concrete shall be finished by use of magnesium trowels and bull floats.

The finishing operation shall be such that the surface will be uniform, even and without dips, hollows or projections, in accordance with the following requirements:

(1) Mechanical Finishing.

Pavement finishing equipment shall maintain a uniform height of concrete ahead of the main transverse screed and along its entire length. The number of transverse screeds shall be the number required to produce the specified smoothness, but not less than two. No backing up of

any transverse screeding equipment will be permitted. The finishing equipment shall have as nearly a continuous forward movement as possible to provide uniform progress with stopping and starting of the finishing equipment held to a minimum.

When paving equipment utilizing tracks for mobility are used, the area on the prepared subbase course in the trackline shall be kept free from concrete or other debris that would affect the finished pavement surface. When fixed form paving is used, the tops of the forms shall be kept clean by a device attached to the machines and the travel of the machines on the forms shall be maintained true without lift, wobble, or other variations tending to affect the screeding operations.

Any edge slump of the pavement, resulting from slipform paving operations, exclusive of edge rounding, more than one-quarter (1/4") inch shall be corrected before the concrete has hardened.

In general, the addition of superficial water to the surface of the concrete to assist in finishing operations will not be permitted. Where application of water to the surface is permitted by the Engineer, it shall be applied as a fog spray by means of approved spray equipment.

(2) Hand Finishing.

After the mechanical finishing operations have been completed, hand-operated smoothing lutes approved by the Engineer shall, if needed, be used to smooth out irregularities in the surface. The cutting edge of the lute shall be kept parallel to the centerline of the pavement at all times as it is moved transversely over the surface of the concrete. Excess thin mortar accumulated ahead of the lutes shall be removed from the surface of the pavement and shall not be used in filling the depressions.

As part of the edging operation on the fixed form pavements, a trowel shall be inserted between the form and the concrete for a depth of approximately three (3") inches along the entire length of the slab before the edging tool is used. Finishing of the pavement slab edges for fixed form paving operations shall be performed in a manner approved by the Engineer using an approved edging tool.

All hand finishing of joint and surface irregularities, when necessary, shall be performed from a bridge which shall not rest on any part of the unhardened concrete.

Except on irregular or small areas or in the case of breakdown of the finishing machine, hand screeding and finishing of the pavement will not be permitted. When hand finishing is used, the surface shall be struck-off by means of two manually operated transverse screeds. The screed shall be moved forward with a longitudinal and crosswise movement. After the above screeding has been completed, approved hand operated smoothing lutes shall be used.

(J) INITIAL SURFACE TEST

The pavement surface shall be tested after the mechanical screeding is completed but before the initial set of the concrete occurs. The surface shall be tested with a standard ten (10') foot straight edge laid in contact with the pavement surface in successive positions parallel to and transverse to the center line of the pavement. Before the pavement hardens, any irregularities greater than one-eighth (1/8") inch in ten (10') feet should be promptly corrected in a manner approved by the Engineer.

(K) TEXTURING

(1) Full Width Pavement.

Immediately after finishing and prior to applying the curing compound, texture the concrete surface using one of the following procedures in accordance with the contract documents. Apply longitudinal tining if no texturing method is designated in the contract documents. Additional requirements, such as Mean Texture Depth measured by a sand patch test or a profiler may be performed to check texturing adequacy. For a closed drainage system, provide an 8 - 12 inch blank in the texture along the pavement edges to enhance drainage to catch basins.

A. Longitudinal Tining. Texture the concrete parallel to the pavement centerline with a set of evenly spaced spring steel tines. Use rectangular tines 1/8 inch wide, 1/32 inch thick, and approximately 5 inches long at a center-to-center spacing of 3/4 inches.

Operate the tine head manually or mechanically. In either case, hold the tines as near an angle of 45° to the concrete surface as possible to minimize mortar dragging. Produce tine texture 1/16 - 1/8 inch deep with minimal dislodging of aggregate. Do not make multiple tine passes in the same area. Keep tines 2 - 4 inches from the placement edges. Keep the tines free of hardened concrete.

B. Artificial Turf Drag. Use a seamless strip of artificial turf drag appearing on the NYSDOT Approved List entitled "Turf Drag" under "Equipment, Concrete Related." Produce a consistent texture, free of ridges or gouges, parallel to the pavement centerline either by hand or by attaching a weighted strip to the paver, texture/cure machine, or work bridge. Periodically replace or clean the drag to remove hardened concrete paste that compromises texture. (2) Bus Stop Pavements.

For bus stop pavements, the final finish shall be made by brooming after the water sheen has disappeared. Brooming shall proceed at right angles to the center line of the pavement for the full width of the slab in one operation, and with not more than one (1) stroke per width of broom. A smooth border three (3") inches in width on each side of the longitudinal joints, including joints along curb lines, and two (2") inches in width on each side of the transverse joints, shall be made with an approved tool.

(L) CONSTRUCTION JOINTS

Pavement surfaces shall be divided into strips by means of longitudinal joints, as required, and into slabs by means of transverse joints. Longitudinal and transverse joints shall be placed as specified and as shown on the Contract Drawings. In case of unforeseen delays, an approved transverse joint in a strip under construction may be placed not less than fifteen (15') feet or the length of one (1) reinforcement mat from the nearest joint in the completed adjacent strip.

Longitudinal and transverse joints shall be constructed as indicated in the typical layout for a section of the reinforced concrete pavement shown on the Contract Drawings and as specified herein, except that the arrangement of longitudinal and transverse joints at intersections, tapers, and other irregular pavement areas shall be subject to the approval of the Engineer prior to construction.

The limits of the proposed concrete pavement in intersecting streets shall be at or near the building lines as indicated in the Contract Drawings.

All joints shall be properly constructed in accordance with these specifications, the Contract Drawings and approved shop drawings. Alternate methods for constructing joints, that are different from those specified, shall require preapproval by the Assistant Commissioner, Infrastructure Construction. Any method may be discontinued by the Engineer if unsatisfactory joints are obtained. The Contractor shall have the option in choosing the particular devices for the various joints, but only one type of each shall be used on the project unless otherwise permitted by the Engineer.

(1) Longitudinal Joints. Longitudinal joints shall be constructed between adjacent slabs and halfway between the outside edges of pavement placed in two lanes wide, unless otherwise shown on the Contract Drawings. When adjacent lanes of pavement are placed separately, a keyway constructed to the dimensions shown on the Contract Drawings shall be formed along the longitudinal joint.

Tie bars shall be placed perpendicular to the longitudinal joints at the spacing shown on the Contract Drawings, unless otherwise directed by the Engineer. No ties shall be placed within twelve (12") inches of the end of the pavement slab. Longitudinal joint tie bars shall be of the type specified and shall meet the dimensions shown on the Contract Drawings. Tie bars shall be placed by approved equipment or rigidly secured by chairs or other approved supports to prevent displacement.

Longitudinal joints shall consist of either a sawed or formed groove extending downward from and normal to the surface of the pavement. The groove dimensions and the construction method shall be as shown on the Contract Drawings and as specified herein.

When adjacent lanes of pavement are placed separately, the longitudinal joint between the adjacent slabs shall be sawed. When the grooves are cut by means of an approved concrete saw,

suitable guidelines or devices shall be used to assure cutting the longitudinal joint on the true line. The longitudinal joint shall be sawn before the end of the curing period and before any equipment or vehicles are allowed on the pavement.

Tie bars shall not be coated with materials deleterious to bond, such as asphalt. When permitted by the Engineer, tie bars may be constructed of two-piece connectors when adjacent lanes of pavement are placed separately.

2) Transverse Joints. Transverse joints shall include contraction, expansion and construction joints. These joints shall be skewed to the center line with a maximum spacing of twenty (20') feet and a minimum spacing of fifteen (15') feet as shown on the Contract Drawings. Transverse joints shall be aligned to coincide with the joints in the adjacent curb. Expansion joints shall be provided in the pavement at or near the building lines along intersecting streets.

All transverse joints shall include dowel bars. Dowel bars shall be longitudinally spaced as shown on the Contract Drawings and indicated in these specifications. Transverse joint dowel bars shall be positioned by using basket assemblies installed and securely set in place on the prepared subbase in a manner approved by the Engineer, before placing concrete.

Transverse joint support assemblies shall space dowel bars as required herein and as indicated on the Contract Drawings, and shall hold the dowel bars at mid-depth of the pavement slab. Assemblies shall be capable of maintaining dowel bars in proper position and alignment within the limits of tolerance required herein both before and during concrete placement.

At transverse expansion joints, the joint supports assemblies shall provide support for and maintain the joint filler in the required position both before and during concrete placement.

At construction joints, the joint support assembly shall include a bulkhead device extending from the bottom of the pavement to the surface of the pavement.

Unless otherwise indicated by the Contract Drawings or herein, dowel bars shall be spaced at twelve (12") inch plus or minus one-half (± 1/2") inch centers transversely, with the first and last bar positioned six (6") inches from the edge of pavement. The dowel bars shall be placed at mid-depth of the pavement slab plus or minus one-quarter (± 1/4") inch with their longitudinal axes aligned and parallel to the centerline horizontally and vertically. The maximum allowable vertical and horizontal displacement of any individual dowel bar shall be no more than one-eighth (1/8") inch per foot. The maximum allowable longitudinal displacement of the midpoint of any one bar relative to the center of the joint shall be one (1") inch. When basket assemblies are used, the maximum longitudinal misalignment of one end of a basket with respect to the other end in achieving the required skew alignment to the centerline shall be no more than one (1") inch.

The Contractor shall place and maintain the dowel bars in their proper position and alignment during paving operations.

a) Transverse Contraction Joints shall be constructed by sawing the concrete pavement as soon as the concrete has hardened sufficiently to permit sawing without raveling and before uncontrolled shrinkage cracking takes place.

b) Transverse Expansion Joints shall be constructed in a straight line across the pavement as shown on the Contract Drawings. A one piece premolded bituminous joint filler, three-quarter (3/4") inch thick, shall be installed continuously across the pavement width. It shall be installed not less than three-quarters (3/4") inches or more than one and one-quarter (1-1/4") inches below the top of the pavement surface and shall extend to the bottom of the pavement slab. The bituminous joint filler shall be protected on top by a cap and supported at the center of the joint by an approved support assembly.

Transverse expansion joints shall be spanned by plain round dowels placed parallel to the center line and the finished grade. The projecting ends of the dowels shall be thoroughly greased or coated with bituminous paint for the entire one-half length and the extreme end of each bar for three (3") or four (4") inches shall be encased in an approved, snugly fitting, water-proofed tube which shall have one end closed. Provision shall be made for about

one (1”) inch expansion in the closed end of the tube. Other devices that are approved by the Engineer for transferring loads may be used.

Where expansion joint fillers are assembled in sections, such as full width paving operations, there shall be no offsets between adjacent units. No plugs of concrete shall be permitted anywhere within the expansion space.

The transverse expansion joint shall be constructed with beveled edges to the dimensions shown on the Contract Drawings. They shall be sawed using the procedures specified herein.

Expansion joints shall be made with a preformed filler or expansion joint form which, during construction, shall not extend above the finished pavement surface or in any way interfere with the proper operation of the finishing equipment. Before expansion joint material is placed, the joints shall be thoroughly cleaned out for the full depth of the pavement.

Joints shall have their planes at right angles with the pavement surface and have their edges rounded to a radius of one-half (1/2”) inch. They shall extend the full depth of the pavement.

c) Transverse Construction Joints shall be constructed at paving stops and when there is an interruption of more than thirty (30) minutes in the concreting operations. No construction joint shall be constructed within ten (10’) feet of an expansion joint or contraction joint, unless otherwise permitted by the Engineer.

Whenever concrete paving operations are stopped, a bulkhead shall be installed and concrete must immediately be removed from the subbase in front of the bulkhead device and from all the exposed parts of the joint support assembly and bulkhead plate. Paving operations may not be started if there is any concrete ahead of or on any exposed parts of the joint support assembly or on the exposed side of the bulkhead plate.

The construction joint shall be sawed to the dimensions and requirements for transverse contraction joints.

d) Special Joints shall be constructed as described in these specifications, as shown on the Contract Drawings or as ordered by the Engineer. Special joints shall be used around drainage, utility and other rigid structures located within the concrete pavement boundaries. Joints shall be constructed to meet the requirements of the transverse expansion joints except no joint support assemblies are required. Temporary forms used in constructing the joints shall be held securely in place by means of form pins.

3) Sawcutting Joints. Sawcutting Joints to the required widths, depths and shapes may be performed in one or two stage operations. The Contractor shall ensure that the cutting edges in each saw assembly will produce pavement grooves, having the dimensions and to the dimensional tolerances shown on the Contract Drawings. The Contractor shall check the dimensions of each groove immediately after it has been cut and shall adjust and or replace worn cutting edges as necessary before proceeding to the next joint.

Sawing operation shall be done in succession down the pavement. Sawing alternate joints initially and returning later to saw intermediate joints will not be allowed except for second stage sawing only. The first stage sawing shall be within one (1”) inch of the center of the dowels or bars. The second stage shall consist of sawing the joint to its final dimension. The second stage sawing shall be performed no sooner than thirty-six (36) hours after the concrete has been placed at the joint. The edges shall be beveled by either a cutting or grinding device attached to the sawing blade or a cutting or grinding device following the sawing operation. When unsatisfactory results are being obtained, the Contractor shall, at the direction of the Engineer, modify or change the method of producing bevels. The second stage sawing operation may be delayed at the Contractor’s convenience except that if this second stage sawing is done after October 15 and the joint to be sawed has opened more than one-eighth (1/8”) inch, as determined by measuring cracking on the slab side, the Contractor shall saw an additional one-sixteenth (1/16”) inch in width for each one-sixteenth (1/16”) inch of opening exceeding the one-eighth (1/8”) inch.

(M) CURING

Immediately after the finishing operations have been completed and the surface water has evaporated from the concrete, the entire surface including slipformed edges shall be sprayed uniformly with curing compound. All joints shall be protected by an approved method to prevent curing compound entering any joint. The curing compound shall not be applied during rainfall.

Self-propelled mechanical sprayers shall be used to apply the curing compound under pressure at the minimum rate of one (1) gallon per one hundred and fifty (150) square feet. The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the pigment shall be uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by effective mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms may be permitted by the Engineer. Curing compound shall not be applied to the inside faces of joints ready for sealing.

The curing compound may be applied as one or two coats in accordance with the manufacturer's instructions. If two coats are used, the second coat shall be applied not later than thirty (30) minutes after the first. Should the film become damaged from any cause, within the required curing period, the damaged portions shall be repaired immediately with additional compound.

The Contractor shall provide on the project a sufficient quantity of approved covering for protection of the pavement in case of rain, or when there is breakdown of the spray equipment and no other mechanical sprayers are available. In the event rain damages the curing compound film before it hardens, the Contractor shall apply, after the surface water leaves the pavement, a new coat to the affected areas at the coverage rate of one hundred and fifty (150) square feet per gallon, minimum.

Upon removal of the forms, the exposed sides of the slabs shall be protected immediately to provide a curing treatment equal to that provided for the top surface. When final saw cuts at joints are made prior to the expiration of the mandatory curing period, the concrete at the joints shall be cured for the remainder of the curing period in accordance with one of the following methods:

1) A tape, at least four (4“) inches wide, made from waterproof paper, polyethylene curing covers or other suitable moisture retention material and provided near each edge with adhesive material which will seal the tape to the pavement, shall be centered over the joint and pressed into place. The adhesive material shall be a type which can be readily removed from the pavement upon completion of curing.

2) A strip of waterproof paper, polyethylene curing covers or other suitable moisture retention materials at least twelve (12”) inches wide, shall be centered over the joint and weighted down for its full length with soil, sand or other material to hold it in place.

3) Alternate methods approved by the Engineer. Such methods shall satisfactorily prevent the escape of moisture from the concrete joint and leave no detrimental residue adhering to the pavement or joint surface.

The strips of curing materials shall extend down the slab edge for at least two (2”) inches below the bottom of the saw cut. Other means to prevent the escape or moisture at the pavement edge may be approved by the Engineer.

The joint curing materials shall be applied immediately following the sawing of the joint and removal of resulting dust or slurry. However, when the curing medium is sealed to the concrete by an adhesive material, the water on the pavement surface, resulting from sawing and removal of slurry, shall be allowed to dry sufficiently to provide proper adhesion of the material.

Where the Contractor fails to cure the concrete pavement in accordance with the requirements of this Subsection, the Contractor shall be required, at no addition cost to the City, to replace, in its entirety, any concrete pavement which did not receive, in part or in whole, the specified cure.

(N) REMOVING FORMS

Unless otherwise provided, forms shall not be removed from freshly placed concrete until it has cured for at least twelve (12) hours. Forms shall be removed carefully to avoid damage to the pavement. After the

forms have been removed, the sides of the slab shall be cured as specified above. Major honeycombed areas along the edge of a slab, as determined by the Engineer, will be considered defective concrete and shall be removed and replaced; minor honeycombed areas shall be patched smoothly with approved material.

(O) PROTECTION OF PAVEMENT

The work shall be protected from traffic by such devices as temporary curbs, barricades, warning lights and signs; and using crossing guards as required in the stipulations for the maintenance of traffic shown on the Contract Drawings, and as specified and directed by the Engineer.

Additionally, the Contractor shall provide, install, and remove snow picket fencing along the curb and sidewalk adjacent to the concrete pavement for the protection of the wet concrete from pedestrian traffic. The fencing shall be installed before the concrete finishing operation is completed at each location and shall be maintained in place until the concrete is sufficiently hardened or as directed by the Engineer.

(P) SURFACE TEST

After the concrete has hardened sufficiently, the Engineer shall test the pavement surface using a ten (10') foot straight-edge. Areas that contain high spots of more than one-eighth (1/8") inch but not exceeding three-eighth (3/8") inch in ten (10') feet shall be marked and ground down with an approved grinding tool. The surface deviations shall not exceed one-eighth (1/8") inch in ten (10') feet. The Contractor shall restore the ground area to a texture satisfactory to the Engineer.

Where the surface deviations exceed three-eighth (3/8") inch in ten (10') feet, the pavement shall be removed as specified herein and replaced by and at the Contractor's expense or the condition shall be remedied to the satisfaction of the Assistant Commissioner, Infrastructure Construction.

(Q) DEFECTIVE OR DAMAGED CONCRETE

All defective or damaged concrete which occurs prior to the final acceptance of the work shall be repaired or replaced at the Contractor's expense. The defects shall include but not be limited to spalling and irregular cracking at joints, edge spalls, honeycombing and damage or other imperfections caused by traffic and/or construction operations. Any concrete requiring complete replacement, as determined by the Engineer, shall be replaced in kind as concrete originally called for in the Contract Drawings or herein. The type of repair shall be subject to the approval of the Engineer. When a repair is made, the defective or damaged concrete shall be removed by chipping the unsuitable material to sound concrete with pneumatic tools. The type and size of tools and the depth at which sound concrete is reached shall be approved by the Engineer. All surfaces to be repaired shall be thoroughly blast cleaned with sandblast sand and repaired in accordance with the requirements under **Section 502-3.15** of the State of New York, Department of Transportation, Standard Specifications.

(R) PREFORMED JOINT FILLER

Preformed joint filler shall be held in place during the placing and finishing of concrete by a steel plate bulkhead, shall extend to the bottom of the pavement and have the top edge set three-quarters (3/4") to one and one-quarter (1-1/4") inch below the finished pavement surface and be adequately protected. Where a temporary strip is used over the preformed joint filler, it shall be securely anchored in place.

(S) JOINT FILLER FORMS

The steel plate bulkhead shall be three-eighths (3/8") inch in thickness, of a width not less than the pavement depth, and one-half (1/2") inch less in length than the width of the pavement. It shall be shaped to the exact cross-section of the pavement, and be kept straight, free from mortar or rust, and well oiled. Slots shall be cut into it corresponding with the spacing of the dowels. The steel plate bulkhead shall support the filler and a suitable form to provide space for the poured joint sealer. The bulkhead shall be set in the required position and be firmly staked into place by iron pins twelve (12") inches in length and two (2') feet apart driven into the subgrade alongside of the filler and the bulkhead. It shall have the top edge set to the finished pavement surface and be removed after the concrete has been placed on both sides of the bulkhead and been struck to a true surface conforming to the finished surface grade on both sides of the joint. It shall be removed by carefully lifting it slowly from one end and shall be replaced with concrete.

(T) SEALING JOINTS

All longitudinal and transverse joints, formed or sawed as required herein shall be sealed with joint sealing materials of the type and size shown on the Contract Drawings before the pavement is opened to traffic. Joints shall be sealed on all pavements before discontinuing paving operations when the work is suspended during the winter. Immediately before sealing, the joints shall be cleaned thoroughly using equipment approved by the Engineer. Any joints having concrete spalls or defective concrete shall be repaired according to the requirements under “Defective or Damaged Concrete”, above.

Special joints shall be sealed according to the requirements for transverse expansion joints.

Transverse joints shall be sealed across the full width of the entire pavement and down the full depth of the exposed pavement edges.

The Contractor may choose to place a temporary filler, of such material approved by the Engineer, in the joints and delay the placing of the sealer until the fall season. Thorough cleaning of the joint and joint faces must precede the installation of the permanent sealer.

(U) NO TEXT

(V) WEATHER PROTECTION

The Contractor shall be required to install snow fencing around the new pavement as directed by the Engineer, unless otherwise directed or shown on the Contract Drawings.

During unfavorable weather, or when otherwise required, pavement surfaces shall be protected with canvas supported by suitable frames to prevent it from resting on the concrete, or by other approved methods. The protective materials shall remain in place until the concrete has hardened sufficiently, in the judgment of the Engineer, to warrant their removal. Sufficient canvas or other approved materials necessary for full protection of the pavement shall be provided and be available for immediate use at all times.

The placing of concrete during wet or cold weather will not relieve the Contractor of any responsibilities under this contract.

4.05.6. TRAFFIC. No traffic of any kind will be allowed on the new concrete pavement until the concrete has been cured as specified, and until permitted by the Engineer.

4.05.7. DEFECTIVE PAVEMENTS. Such portions of the completed pavement as are defective in finish, compression, composition, or that does not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable materials, properly laid in accordance with these specifications.

4.05.8. MEASUREMENT. The quantity to be measured for payment shall be the number of cubic yards of each type of Concrete Pavement constructed, measured in place, adjusted for thickness and strength deficiencies in accordance with **Section 5.04**.

In determining the quantity of pavement to be paid for, the areas occupied by bases of columns, manhole heads, gate boxes, road boxes, and similar structures will be deducted when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

4.05.9. PRICES TO COVER. The contract prices bid per cubic yard for each type of concrete pavement shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and lay the pavement complete in place in full compliance with the requirements of the specifications, including, but not limited to: pigment when specified, furnishing and installing steel reinforcement, dowel bars and all other steel bars required; preparation and submission of shop drawings and concrete mix design criteria; supports, forms, joint filler and joint sealer; curing; repairs to and replacement of damaged and defective pavement; saw cutting joints; damping of the subgrade; snow fencing; etc.; to furnish such samples and cores for testing and to maintain the pavement in good condition as specified in **Section 5.05**; and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
4.05 A	NON-REINFORCED CONCRETE PAVEMENT	C.Y.
4.05 AC	REINFORCED CONCRETE PAVEMENT (BUS STOPS)	C.Y.
4.05 ACP	REINFORCED CONCRETE PAVEMENT (BUS STOPS)(PIGMENTED)	C.Y.
4.05 AX	HIGH-EARLY STRENGTH REINFORCED CONCRETE PAVEMENT (BUS STOPS)	C.Y.
4.05 AXP	HIGH-EARLY STRENGTH REINFORCED CONCRETE PAVEMENT (BUS STOPS)(PIGMENTED)	C.Y.
4.05 B	REINFORCED CONCRETE PAVEMENT (FULL WIDTH PAVEMENT)	C.Y.
4.05 BX	HIGH-EARLY STRENGTH REINFORCED CONCRETE PAVEMENT (FULL WIDTH PAVEMENT)	C.Y.

SECTION 4.06 – Concrete in Structures

4.06.1. INTENT. This section describes Concrete in Structures.

4.06.2. DESCRIPTION. Concrete in Structures under this section shall refer to all concrete in structures other than concrete curb, concrete sidewalk, concrete base for pavement, and concrete pavement. Finish, color and design shall be as specified.

4.06.3. MATERIALS.

(A) Concrete for deposit as a concrete structure shall comply with the requirements of **Section 3.05, Concrete**, and be of the class, type and method of mixing specified. Coarse aggregate shall be of the type, grade, size number and nominal size specified. Rubble aggregate shall be used when specified or shown on the Contract Drawings.

Where concrete is specified to be lightweight, the aggregate shall be in conformance with the requirements of ASTM designation C330, Lightweight Aggregates for Structural Concrete, and the Contractor shall design the mix for a unit weight of one hundred and twenty (120) pounds per cubic foot.

(B) Concrete reinforcement shall comply with the requirements of the following sections:

Steel Bars–**Section 2.23**

Welded Steel Wire Fabric–**Section 2.25**

Kind of reinforcement, size and placement shall be as specified and as shown on Contract Drawings. Reinforcement shall be installed in accordance with the requirements of **Section 4.14**.

(C) Elastic Type Concrete Expansion Joint Sealer shall comply with the requirements of **Section 2.22**, type as specified.

(D) Preformed Expansion Joint Filler shall comply with the requirements of **Section 2.15**, type as specified.

4.06.4. DESIGN AND CONSTRUCTION OF FORMS.

(A) Forms shall accurately conform to the shape, lines and dimensions of the structure for which they are required, be substantial and sufficiently tight to prevent leakage of mortar, and have, unless otherwise specified by the Engineer, moldings or chamfer strips at angles. They shall be of adequate strength and be braced or tied together with approved ties and spacers, to maintain position and shape, and to insure the safety of workmen and passersby, be clean and free from sawdust, chips, dirt, ice and other objectionable materials. Forms shall present smooth, true surfaces to the concrete placed against them, having temporary openings where necessary, to facilitate cleaning and inspection immediately before concrete is deposited. Forms shall be coated with non-staining oil before the reinforcement is placed, or be wetted except in freezing weather.

(B) Except in cases of curved, special, and exposed surfaces, the lumber for concrete forms, after being planed, shall be not less than one and one-sixteenth (1-1/16”) inches in actual thickness, shall be dressed on both surfaces, shall be tongued and grooved and shall be constructed to produce mortar tight joints. Plywood or other approved material shall be used on all exposed concrete surfaces, and lumber used in conjunction with it may be less than one and one-sixteenth (1-1/16”) inches, if approved by the Engineer.

(C) The metal used for forms shall be of such thickness that the forms shall remain true to shape. All bolt and rivet heads shall be countersunk. Clamps, pins, or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete. Metal forms which do not present a smooth surface or line up properly shall not be used. Special care shall be exercised to keep metal forms free from rust, grease, or foreign matter, such as will tend to discolor the concrete.

(D) If required, the Contractor shall submit details of the forms intended for use to the Engineer for approval before starting construction of the forms.

(E) Any metal ties or anchorages which are required within the forms to hold them to correct alignment and location shall be so constructed that the metal work can be removed to a depth of at least one (1") inch from the face surface of the concrete without injury to such surface by spalling or otherwise. Wire ties shall not be used unless permitted by the Engineer. All cavities produced by the removal of metal ties shall be filled carefully with a mortar of fine aggregate and Portland cement in the proportion that has been employed for the particular class of concrete treated and the surface left smooth and even and uniform in color.

4.06.5. EXPANSION JOINTS. Expansion and construction joints shall be provided of the shape, in the manner, and at the intervals required.

4.06.6. CONVEYING.

(A) LOSS OF INGREDIENTS

Concrete shall be conveyed rapidly from the job-mixer or transporting vehicles to the place of final deposit by approved methods which will prevent loss of ingredients.

(B) CONVEYORS

Concrete shall be conveyed by chutes, pipes, buckets, tremies, buggies, wheelbarrows, or other conveyors approved by the Engineer.

(C) CLEANING

When required, all conveyors shall be thoroughly cleaned and flushed with water which shall not fall on concrete in place.

(D) CHUTES

Chutes shall be of metal or metal-lined, but aluminum must not be used. They shall have a slope not flatter than one vertical to two horizontal and shall deliver concrete in a practically continuous flow. Concrete shall be discharged into hoppers when the depositing is intermittent.

(E) LONG CHUTES

The use of long chutes is prohibited:

(a) Generally, unless permitted under circumstances and in accordance with conditions prescribed by the Engineer, and

(b) Specifically, when the concrete is incorporated in structures which will be subject to salt water action.

(F) PIPES

When concrete is conveyed through pipes, the pipes shall be kept full of concrete and have discharge ends kept buried in the fresh concrete, unless otherwise permitted. Pipes must have a minimum internal diameter of 5".

(G) BOTTOM DUMP BUCKETS

When concrete is placed by means of a bottom dump bucket, the buckets shall have a capacity of not less than one-half (1/2) cubic yard. In depositing concrete from such a bucket, the bucket shall be lowered gradually and carefully until it rests upon the concrete already placed. It shall then be raised very slowly during the discharge travel.

(H) BUGGIES OR WHEELBARROWS

Buggies or wheelbarrows shall travel on runways which have smooth surfaces.

4.06.7. DEPOSITING.

(A) DEPOSITING ON SURFACES

Concrete shall be deposited on surfaces free from standing water, dirt, shavings, sawdust, ice or other undesirable matter. Where necessary to deposit on set concrete, the set concrete shall be roughened,

cleaned, washed and freshly coated with neat Portland cement grout. Concrete shall be deposited at points and by methods which will minimize rehandling, prevent flowing, and obviate the necessity of working along forms. In sections confined by temporary vertical bulkheads, the concrete shall be deposited in a continuous operation until the section is completed. No drop shall exceed five (5') feet. It shall be deposited by methods which will release entrapped air and produce a dense, compact mass. Concrete shall not be deposited on ground which is in a muddy or frozen condition.

(B) DEPOSITING UNDER WATER

For concrete to be deposited under water, the Portland cement content shall be increased by ten (10) percent over that indicated for the class and type of concrete specified.

Concrete shall not be deposited in water if it is practicable to deposit in air. No concrete shall be deposited in water having a temperature below thirty-five (35°) degrees Fahrenheit, unless permitted by the Engineer.

Concrete for deposit under water shall be conveyed by means of tremies, drop-bottom buckets or other approved methods.

When deposited by tremie method, the tremie shall be water-tight and sufficiently large to permit free flow of concrete. The discharge end shall be kept continuously submerged in the concrete and the shaft kept full of concrete.

When the bottom dump bucket method is used, the bucket shall be not dumped until after it has come to rest on the surface upon which the concrete is to be deposited. The bucket shall be provided with a suitable cover, and the bottom doors when tripped shall open freely. The bucket shall be filled completely and lowered slowly to avoid backwash, and, when tripped, it shall be withdrawn slowly until entirely free of the concrete.

(C) DEPOSITING IN FORMS

Unless specifically authorized to place concrete under water, there shall be no water in the forms at any time any concrete is deposited therein, and the work of depositing shall be kept well above the level of any rising water so that there will be no danger of entrance of water into the forms until the concrete is in place.

Concrete shall be deposited in continuous horizontal layers, each of which shall be placed before the one below has set and from which laitance and excess water shall be removed in such a manner that successive layers will be thoroughly bonded together to eliminate planes of separation between layers and prevent seepage of water.

Special care shall be taken to fill each part of the forms by depositing concrete directly as near final position as possible, to work the coarser aggregates back from the face and to force the concrete under and around the reinforcement bars without displacing them. After the concrete has taken its initial set, care shall be exercised to avoid jarring the forms or placing any strain on the ends of projecting reinforcement.

(D) VIBRATION

During and immediately after deposition, concrete shall be thoroughly consolidated by vibrating the concrete internally with mechanical vibrating equipment. The use of external vibrators will be permitted when satisfactory surfaces cannot be obtained by internal vibration alone or when it is impossible to use internal vibrators. The use of external vibrators shall be subject to the approval of the Engineer. External vibrators shall be attached to or held on the forms in such a manner as to effectively vibrate the concrete in a horizontal plane.

Internal mechanical vibrators shall be adequately powered, capable of transmitting vibration to the concrete in frequencies of not less than 5,000 vibrations per minute while inserted in concrete and shall produce a vibration of sufficient intensity to consolidate the concrete into place without separation of the ingredients. If any of the reinforcing steel has epoxy coating, an internal mechanical vibrator shall have a rubberized or elastomeric cover to prevent damage to the epoxy coating on the reinforcing bars. The vibrators and covers shall be inspected for defects prior to use.

A sufficient number of vibrators shall be employed, so that at the required rate of placement, thorough consolidation occurs throughout the entire volume of each layer of concrete. Extra vibrators shall be on hand for emergency use and when other vibrators are being serviced.

The vibrating element shall be vertically inserted in the concrete mass at a depth sufficient to vibrate the bottom of each layer effectively inserting the vibrator into the underlying lift. It shall be withdrawn completely from the concrete before being advanced to the next point of application.

Internal vibrators shall not be placed directly on the forms or the reinforcing steel. The vibratory element shall be inserted vertically into the concrete at the point of deposit and in areas of plastic concrete at evenly spaced intervals not farther apart than the radius over which the vibration is visibly effective and at a distance close enough to the forms to effectively vibrate the surface concrete. The time of vibration shall be of sufficient duration to accomplish thorough consolidation, complete embedment of the reinforcement, produce dense, smooth surfaces free from aggregate pockets, honeycombing, and air bubbles and to work the concrete into all angles and corners of the forms however, over-vibration shall be avoided. Vibration shall be continued in one place until the concrete has become uniformly plastic, but not to the extent that pools of grout are formed.

Vibration shall be supplemented by working or spading by hand in the corners and angles of forms and along form surfaces while the concrete is plastic. Vibrators shall not be used to push or distribute the concrete laterally.

4.06.8. CONCRETING DURING RAINFALL. During periods of rainfall, concrete may not be placed. Supply sufficient quilted covers, plastic coated fiber blankets, or polyethylene curing covers near the concrete placing operation when rain may be expected. Securely cover any concrete exposed to rain that has not reached initial set or will be visibly affected by the rain.

4.06.9. CARE OF CONCRETE DURING COLD WEATHER. During air temperatures are below 38° F. in the shade, concrete in structures shall, where required, be maintained in an atmosphere of not less than 50° F., for at least five (5) days after placing or until the concrete has thoroughly hardened, and sufficient protective coverings, fuel and heating equipment shall be furnished, installed, operated and maintained to secure the required temperature conditions without injury to the concrete.

4.06.10. SURFACE CURING AND PROTECTION. All surfaces of concrete shall be protected from injury and horizontal surfaces shall be cured in compliance with the requirements of **Section 2.14, Curing Materials**, Type 1-D, Clear.

From the moneys due the Contractor, under this item, the sum of one (1) dollar will be deducted for each square foot of horizontal surface which the Contractor does not cure, as herein required.

4.06.11. REMOVAL OF FORMS. Forms shall not be removed until the concrete has hardened sufficiently, and the removal shall be carried out in such a manner as to insure the complete safety of the structure. In no event however shall forms be removed in less than three (3) days after completion of pouring, which time may be extended at the discretion of the Engineer. The Contractor shall be responsible for all damage or injury resulting from the removal of forms.

4.06.12. (NO TEXT)

4.06.13. SURFACE FINISH.

(A) SAMPLE SLABS

The Contractor shall, where required by the Engineer, submit for approval sample concrete slabs of desired sizes, exhibiting the proposed surface finishes. Exposed surfaces of structures shall be finished, as required, to present appearances equal to those of samples on file in the office of the Engineer.

(B) VOIDS

The work of finishing shall not be started until all voids are filled with mortar of the same ingredients and proportions as used in the concrete.

(C) FLOAT, RUBBED AND SCRUBBED FINISHES

Forms shall be removed as early as possible to expose concrete while it is green (set but not hardened).

Float finish surfaces shall be finished smooth and true by means of wooden or steel floats and have edges, including those of joints, rounded or chamfered.

Rubbed finished surfaces shall be thoroughly wetted, be finished smooth and true by means of carborundum or other abrasive blocks, and have lather working up on the surface removed by brushing and washing. Only water shall be used in finishing. Scrubbed finished surfaces shall have the coarse aggregate uniformly exposed by scrubbing with wire brushes and water. Muriatic acid shall, where required, be added to the water in proportion of one to five (1:5), and be entirely removed with clean water when the desired finish is obtained.

(D) POINTED AND BUSH-HAMMERED FINISHES

Thoroughly cured concrete surfaces shall be dressed with tools to a uniform texture of an even face. The tools ordinarily used are electric, air, or hand tools, giving various textured surfaces such as hand-tooled, rough or fine pointed, crandalled or bush-hammered as specified.

4.06.14. MEASUREMENT. In determining the volume of concrete to be paid for, deductions will be made for the spaces occupied by pile heads, timbers and drains. Deductions will not be made for the spaces occupied by steel reinforcement, structural steel or water-proofing. Other deductions will or will not be made, as specified.

The measured volume of concrete will be adjusted for payment in accordance with the strength requirements under **Section 5.04**.

4.06.15. PRICES TO COVER. The contract price per cubic yard for Concrete in Structures, measured in place, except such concrete as otherwise paid for, shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and construct the concrete structure complete in full compliance with the requirements of the specifications, exclusive of steel reinforcement, and to furnish such samples for quality control testing and to provide such testing equipment, laboratory space and facilities as may be required.

The contract price per cubic yard for concrete placed under water shall include the cost of the additional ten (10) percent of Portland cement used for such concrete.

Payment will be made under:

Item No.	Item	Pay Unit
4.06	CONCRETE IN STRUCTURES, Class A-40	C.Y.
4.06 LA	LIGHTWEIGHT CONCRETE IN STRUCTURES, Class A-40	C.Y.

SECTION 4.07 – Curb, Bluestone and Granite

4.07.1. INTENT. This section describes the construction of Bluestone and Granite Curbs.

4.07.2. DESCRIPTION. Curbs must be bluestone or granite, as specified, and with concrete cradle, unless otherwise specified or shown on the Contract Drawings. Curbs must be new or recut and redressed, as specified.

4.07.3. MATERIALS.

(A) CURB

Curbs must comply with the requirements of **Section 2.12, Curbs, Headers and slabs, Granite and Bluestone**, for the type and corresponding class specified or shown on the Contract Drawings. Unless otherwise specified or shown on the Contract Drawings, Granite Curbs must be Type 1, Class A, cut and dressed as shown on the approved shop drawings to be submitted by the Contractor. The required shop drawings must show the Contractor's proposed straight and corner curb, including depressed and transitional curb details for use at pedestrian ramps and driveway locations, and all special non-standard shaped curb cuts, for the approval of the Engineer. Corner curbs must include the cost of all depressed and transitional curb required for pedestrian ramps at corner quadrants. Straight curb at mid-block crosswalks must include the cost of all depressed and transitional curb required for pedestrian ramps.

(B) CONCRETE CRADLE

Concrete cradles for curbs must comply only with the proportion and strength requirements of **Section 3.05**, Class B-32, Type IA. The requirements for an air entrainment will not apply.

Coarse aggregate must comply with the requirements of **Section 2.02**, Size No. 57; Type 1, Grade B, or Type 2.

Fine aggregate must comply with the requirements of **Section 2.21**, Type 1A.

4.07.4. METHODS (GENERAL). The Contractor must complete all curb construction before commencing any roadway grading operation; stripping, removing or placing any pavement; or commencing sidewalk work unless otherwise permitted by the Engineer, in writing. The Contractor will be permitted to encroach upon the area immediately adjacent to the curb only to the extent essential for curb construction.

Excavation for curbs must be safeguarded and protected in accordance with the requirements of **Sections 1.06.44** and **6.70, "Maintenance and Protection of Traffic**".

Existing concrete sidewalks, adjacent to or abutting a new curb or curbs to be reset and interfering with the setting or resetting of said curbs must be cut off to a line two (2') feet back of the curb line and parallel thereto, unless otherwise provided or directed by the Engineer. Cutting must be done by means of an approved power driven cutting machine with a carborundum cutting wheel. Full depth cuts must be made through the existing sidewalk pavement. The space between the curb and sidewalk must be filled with concrete sidewalk pigmented to match that of the adjacent walk.

No concrete sidewalk must be cut off or otherwise disturbed until the same has been examined by the Engineer.

4.07.5. NEW CURB WITH CONCRETE CRADLE.

(A) EXCAVATION

Excavation must be made to dimensions sufficient to permit the construction of cradle and setting of curbstones. It must be made to a depth of six (6") inches below the specified depth of the curb and to a width of not less than eighteen (18") inches or width of curb plus twelve (12") inches, whichever is greater. The trench mustbe open to its full width and depth for a distance of not less than twenty (20') feet in advance of the setting of the curb.

(B) UNDERLYING MATERIAL

The material underlying the curb cradle must be satisfactorily and thoroughly compacted. If unsatisfactory, it must be removed and replaced with acceptable material, thoroughly compacted to the satisfaction of the Engineer.

(C) CONCRETE CRADLE

The cradle must be composed of stiff concrete, thoroughly tamped in place to the satisfaction of the Engineer. The cradle must be not less than eighteen (18") inches wide or width of the curb plus twelve (12") inches, whichever is greater, and extend six (6") inches below the specified depth of the curb. The concrete must be brought up six (6") inches in front of the curb to the bottom of pavement base and in back of the curb concrete must be brought up to either: the bottom of proposed sidewalk foundation material; to within six (6") inches of the top of the curb where sidewalk adjacent to the curb is not required; or, as otherwise shown on the Contract Drawings. The concrete must be laid not more than twenty (20') feet in advance of setting the curb. The portions of the concrete cradle in front and at back of the curb must be placed and thoroughly compacted as soon as the curb is brought to line and grade and before the concrete under the curb has set.

(D) SETTING

Curbstones must be set centrally on the concrete cradle, with tops at grade outside of driveways, and below grade in driveways, as directed. Front faces must be set in a true smooth surface having a batter of one (1) in eight (8), unless otherwise specified, with joints not less than one-eighth (1/8") inch and not more than one-quarter (1/4") inch for ten (10") inches below grade.

(E) BACKFILLING

Backfilling must be of clean earth or other approved material, satisfactorily compacted.

4.07.6. NEW CURB WITHOUT CRADLE. Excavation for new curbs without concrete cradle must be made to dimensions sufficient to permit the setting of curbstones. Setting of a curb and backfilling must be as provided in **Subsection 4.07.5**.

4.07.7. OLD CURB, RECUT AND REDRESSED. Old curbstones which have been removed for re-use must be reset as nearly as may be practicable in front of the premises from which they have been removed.

Old curbstones must be recut and redressed and must, when reset, in all respects conform with the specifications for new curbs of the type and corresponding class specified for the Contract, except that the top width must not vary more than one-half (1/2") inch from the original specified width and the depth must not vary more than two (2") inches from the original specified depth. Concrete cradles, when required, must comply with **Subsection 4.07.5**.

4.07.8. RECURBING. On Contracts where resetting of a curb is required and there is no scheduled item for wearing course and/or concrete base for pavement, in excavating for a curb trench, the removal of a width of not more than one (1') feet of roadway pavement along the curb will be permitted. At the completion of the curb setting, the roadway strip must be backfilled to the subgrade of the pavement base, the backfill thoroughly compacted to the satisfaction of the Engineer and the pavement restored in accordance with applicable sections of these Standard Highway Specifications.

4.07.9. MEASUREMENT. The quantity to be measured for payment must be the number of linear feet of the several classes of the constructed curb, complete, as required, measured in place along the top of the exposed face of the curb, and adjusted in accordance with **Section 5.04**.

Curved granite curbs will be measured as straight curbs when the radius is greater than 100 feet and as corner curbs when the radius is 100 feet or less. Corner curbs will be measured only from PC to PT for corners without pedestrian ramps. Corner curbs will be measured as the larger of PC to PT or the curbs adjacent to 7" sidewalk concrete as shown on Standard Detail H-1011 for corners with pedestrian ramps. Depressed and transitional granite curbs will be measured for payment in driveways only.

4.07.10. PRICES TO COVER.

(A) NEW CURBS

The Contract price per linear foot of a new curb with a concrete cradle must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct the curb complete in place, including excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the Specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required, and to maintain the curb in good condition as required in **Section 5.05**.

(B) OLD CURBS, RECUT, REDRESSED AND/OR RESET

The Contract price per linear foot of an old curb, recut, redressed and/or reset, with a concrete cradle must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct the curb complete in place, including excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the Specifications, and to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required, and to maintain the curb in good condition as required in **Section 5.05**.

(C) RECURBING

The Contract price, in addition to the coverage listed under (A) and (B), above, must also include the removal of not more than one (1') feet width of roadway pavement along the curb line and the restoration of all removed pavement in full compliance with the applicable sections of these Standard Highway Specifications. Restoration of pavement, removed beyond the above defined limits, must be done by the Contractor at no additional cost to the City.

Payment will be made under:

Item No.	Item	Pay Unit
4.07 AB	RESET BLUESTONE CURB	L.F.
4.07 BA	RESET GRANITE CURB	L.F.
4.07 CB	NEW GRANITE CURB, STRAIGHT	L.F.
4.07 CC	NEW GRANITE CURB, CORNER	L.F.
4.07 CD	NEW STRAIGHT GRANITE CURB, DEPRESSED AND TRANSITION	L.F.
4.07 DB	NEW GRANITE CURB, STRAIGHT (1'-0" WIDE)	L.F.
4.07 DC	NEW GRANITE CURB, CORNER (1'-0" WIDE)	L.F.
4.07 DD	NEW STRAIGHT GRANITE CURB, DEPRESSED AND TRANSITION (1'-0" WIDE)	L.F.
4.07 NYHA	NEW NY HISTORICAL GRANITE CURB, STRAIGHT	L.F.
4.07 NYHC	NEW NY HISTORICAL GRANITE CURB, CORNER	L.F.
4.07 NYHD	NEW NY HISTORICAL STRAIGHT GRANITE CURB, DEPRESSED AND TRANSITION	L.F.

SECTION 4.08 - Curb, Concrete

4.08.1. INTENT. This section describes construction of Concrete Curb and Integral Concrete Curb and Gutter.

4.08.2. DESCRIPTION. Concrete Curb shall be made of concrete six (6") inches wide on top, eight (8") inches wide on the bottom, eighteen (18") inches deep or as otherwise specified, measured on the back.

Integral Concrete Curb and Gutter shall be made of concrete and be constructed to the dimensions shown on the Contract Drawings.

4.08.3. MATERIALS. Concrete for curb shall comply with the requirements of **Section 3.05**, Class B-32, Type IIA. Cement shall be Type II Portland. Coarse aggregate shall be broken stone or gravel and comply with the requirements of **Section 2.02**, Type 1, Grade B, or Type 2, Size No. 57. An approved air-entraining agent shall be added at the time concrete ingredients are mixed with water.

Where proposed adjacent sidewalk is designated to be pigmented, curb shall also be pigmented to match in color. Pigmenting material shall comply with the requirements of **Section 2.19**. No additional payment will be made for the cost of pigmenting the concrete curb.

4.08.4. METHODS.

(A) GENERAL

The Contractor shall complete all curb construction before commencing any roadway grading operation; stripping, removing or placing any pavement; or commencing sidewalk work unless otherwise permitted by the Engineer, in writing. The Contractor will be permitted to encroach upon the area immediately adjacent to the curb only to the extent essential for curb construction.

All other provisions of **Subsection 4.07.4**. shall apply to the work to be done hereunder.

Excavation for curb shall be safeguarded and protected as provided in **Sections 1.06.44** and **6.70, "Maintenance and Protection of Traffic."**

(B) EXCAVATION

Excavation shall be made to dimensions sufficient to permit the setting of forms. Where recurbing is required and there is no scheduled item for wearing course and/or concrete base, in excavating for curb trench, the removal of a width of not more than one (1') feet of roadway pavement along the curb will be permitted. At the completion of curb setting, the roadway strip shall be backfilled to the subgrade of the pavement base, the backfill thoroughly compacted to the satisfaction of the Engineer and the pavement restored in accordance with the applicable sections of these Standard Highway Specifications.

(C) UNDERLYING MATERIAL

The material underlying concrete curbs shall be satisfactory and thoroughly compacted. If unsatisfactory, the unsuitable material shall be removed and replaced with acceptable material and be thoroughly compacted.

(D) FORMS

Forms shall be either of metal of sufficient thickness, but not less than one-eighth (1/8") inch, to satisfactorily resist distortion when fastened together and secured in place, or be of acceptable planed and matched lumber of sufficient thickness to resist distortion, rigidly held in position and of such construction that a smooth surface will be provided. Forms shall have suitable metal dividing plates approximately three-sixteenths (3/16") inch thick; be of a depth including dividing plates not less than that of the curb, be properly located with tops at grade and be left in place until the concrete has hardened.

On curves, forms shall be of such construction as to provide true arcs with radial joints.

(E) WORKMANSHIP

Concrete curb shall be built in independent sections ten (10') feet long, except as otherwise specified, and shall have smooth plane ends separated by one-quarter (1/4") inch joints. Concrete shall be placed and compacted in accordance with the requirements of **Subsections 4.06.7.(C)** and **4.06.7.(D)**. In depositing, the concrete shall be tamped and the aggregate shall be carefully spaded away from the front forms. Curb shall be set across driveways with the top below grade, as required, and the ends of the sections adjacent to the depressed curb shall be rounded or splayed as required, in accordance with the New York City Department of Transportation's Standard Details of Construction Standard Drawings.

(F) SHAPE

The top shall pitch one-quarter (1/4") inch downward toward the front. The back shall be perpendicular to the base. The top front edge of plain concrete curb shall be rounded to a one (1") inch radius.

(G) SURFACE FINISH

The top shall be finished by troweling and finally by using wooden floats. Upon the removal of the forms, the exposed faces shall be rubbed to a smooth and uniform surface. The color of the finished curb shall be uniform.

(H) BACKFILLING

Backfilling shall follow the removal of the forms as soon as practicable and shall be of clean earth or other approved material satisfactorily compacted.

(I) SURFACE CURING AND PROTECTION

Concrete curb shall be carefully protected against injury from rain, frost, the drying effects of the sun and wind, traffic or other causes, by means of suitable guards and covering. The concrete shall be cured in compliance with the requirements of **Section 2.14**, Type 1-D, Clear.

From the moneys due the Contractor there will be deducted the sum of one (1) dollar for each linear foot of curb which is not cured as specified.

(J) SIDEWALKS TO BE CUT OFF

Existing concrete sidewalks, adjacent to or abutting new curbs and interfering with the setting of said curbs shall be cut off to a line two (2') feet back of the curb concrete and parallel thereto, unless otherwise provided or directed by the Engineer. Cutting shall be done by means of an approved power driven cutting machine with a carborundum cutting wheel. Cuts shall be a minimum depth of one and one-half (1-1/2") inches. The space between the curb and sidewalk shall be filled with concrete sidewalk colored to correspond to the adjacent walk.

No concrete sidewalk shall be cut off or otherwise disturbed until the same has been examined by the Engineer.

(K) CURB JOINTS

In constructing concrete curb in areas where existing concrete sidewalk abuts the curb or new concrete sidewalk will be laid immediately behind the curb, curb joints shall be made to coincide with sidewalk expansion joints. Also, all joints between sections of curb shall be filled with preformed expansion joint material in accordance with the requirements specified for filling sidewalk expansion joints.

(L) INTEGRAL CONCRETE CURB AND GUTTER

Integral concrete curb and gutter shall be formed to the size and shape shown on the Contract Drawings. Expansion joints one-quarter (1/4") inch or one-half (1/2") inch in width shall be filled with an approved preformed joint filler, at intervals specified by the Engineer. Filler shall completely fill the joint and shall be cut flush with all curb and gutter surfaces.

All materials and construction methods used are to conform to the requirements of **Subsections 4.08.3.** and **4.08.4.(A)** through **(K)**, above, unless otherwise specified herein.

The Contractor may use either conventional or machine formed integral curb and gutter.

Where the Contractor proposes to machine form integral curb and gutter, the following additional requirements shall be complied with:

1) The Contractor's concrete mix design formula, to be submitted to the Engineer for approval, shall include the design air content and design slump.

2) Machine forming of curb and gutter shall be done to the proper line and grade. The Engineer may require the Contractor to demonstrate that the specific equipment proposed for use is capable of satisfactorily placing the concrete mix.

   Any curb and gutter placed outside of tolerance of 1/2 inch of the established line or 1/4 inch of the established grade shall be removed and replaced at the Contractor's expense.

   Maximum placement slump shall be 2-1/2 inches. Air content shall be ±2% of design.

3) Contraction joints shall be formed or sawcut to depths slightly below the surface of the adjacent pavement every 20 feet or as ordered by the Engineer. The sawcut or formed joints shall be left unfilled.

4.08.5. MEASUREMENT. The quantity to be measured for payment shall be the length of concrete curb or integral concrete curb and gutter, constructed, complete, in place, as required, measured along the top of the exposed face of curb, and adjusted in accordance with **Section 5.04**.

4.08.6. PRICES TO COVER. When the proposed adjacent sidewalk is designated to be pigmented, no additional payment will be made for the cost of pigmenting the concrete curb to match the proposed adjacent pigmented sidewalk in color.

(A) CONCRETE CURB

The contract price per linear foot of Concrete Curb, of the depth specified, or Integral Concrete Curb and Gutter shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct the curb complete in place, including, but not limited to, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities, as may be required, and the cost of maintaining the curb in good condition as specified in **Section 5.05**.

(B) RECURBING, UNSCHEDULED ITEMS

The contract price, in addition to the coverage listed under (A), above, shall also include the removal of not more than one (1') feet width of roadway pavement along the curb line and the restoration of all removed pavement in full compliance with the applicable sections of these Standard Highway Specifications. The restoration of pavement, removed beyond the above defined limits, shall be done by the Contractor at no additional cost to The City.

Payment will be made under:

Item No.	Item	Pay Unit
4.08 AA	CONCRETE CURB (18" DEEP)	L.F.
4.08 AC	CONCRETE CURB (19" DEEP)	L.F.
4.08 AD	CONCRETE CURB (20" DEEP)	L.F.
4.08 BA	CONCRETE CURB (21" DEEP)	L.F.
4.08 AE	CONCRETE CURB (22" DEEP)	L.F.
4.08 AF	CONCRETE CURB (23" DEEP)	L.F.
4.08 AG	CONCRETE CURB (24" DEEP)	L.F.
4.08 AH	CONCRETE CURB (25" DEEP)	L.F.
4.08 AI	CONCRETE CURB (26" DEEP)	L.F.
4.08 AJ	CONCRETE CURB (27" DEEP)	L.F.
4.08 CG	INTEGRAL CONCRETE CURB AND GUTTER	L.F.

SECTION 4.09 - Curb, Concrete, Steel Faced

4.09.1. INTENT. This section describes the construction of Steel Faced Concrete Curbs.

4.09.2. DESCRIPTION. Steel Faced Concrete Curbs must consist of a steel curb facing set in a concrete cradle extending to a minimum depth of nine (9") inches below the bottom of angles or a minimum of seven (7") inches below the bottom of bent plates, to provide the depth of a specified curb. The cradle must be flush with the face of the steel. The steel must be backed with concrete for a width of eight (8") inches from the face of the steel facing or as shown on the Contract Drawings.

4.09.3. MATERIALS. A steel curb facing must comply with the requirements of **Section 2.13** and must be Type D, bent plate as per the New York City Department of Transportation's Standard Details of Construction Standard Drawing Nos. H-1010, H-1011, and H-1015, as required. Concrete must comply with the requirements of **Section 3.05**, Class B-32, Type IIA. Cement must be Type II Portland. Coarse aggregate must comply with the requirements of **Section 2.02**, Type 1, Grade B, or Type 2, Size No. 57. An approved air-entraining agent must be added at the time concrete ingredients are mixed with water.

Where proposed adjacent sidewalk is designated to be pigmented, the curb must also be pigmented to match in color. Pigmenting material must comply with the requirements of **Section 2.19**. No additional payment will be made for the cost of pigmenting the steel faced concrete curb.

4.09.4. METHODS.

(A) GENERAL

The Contractor must complete all curb construction before commencing any roadway grading operations; stripping, removing, or placing any pavement; or commencing sidewalk work unless otherwise permitted by the Engineer, in writing. The Contractor will be permitted to encroach upon the area immediately adjacent to the curb only to the extent essential for curb construction.

Excavation for the curb must be safeguarded and protected as provided in **Sections 1.06.44** and **6.70**.

All other provisions of **Subsection 4.07.4** must apply to the work to be done hereunder.

(B) EXCAVATION

Excavation must be made to dimensions sufficient to permit the setting of forms and as required for the installation of a curb. It must be made to a depth of not less than nine (9") inches below the bottom of single- or double-bulb angle facings nor less than seven (7") inches below the bottom of bent-plate steel facings, and to a width of not less than the specified width of the curb. The trench must be open to its full width and depth for a distance of not less than twenty (20') feet in advance of the setting of the curb facing.

Where curbs are to be set in areas which were formerly occupied by vaults, cellars of buildings or other voids, the Contractor must power tamp the subgrade material with machines approved by the Engineer. This power tamping must be continued until the subgrade has been sufficiently compacted to the satisfaction of the Engineer.

On Contracts for recurbing only, in excavating for a curb trench, the removal of a width of not more than one (1') foot of roadway pavement along the curb will be permitted. At the completion of curb setting, the roadway strip must be backfilled to the subgrade of the pavement base, the backfill thoroughly compacted to the satisfaction of the Engineer and the pavement restored in accordance with the applicable sections of these Standard Highway Specifications.

(C) UNDERLYING MATERIAL

The material underlying the concrete cradle must be satisfactory and thoroughly compacted. If unsatisfactory, the unsuitable material must be removed and replaced with acceptable material and be thoroughly compacted.

(D) FORMS

Forms must be of metal or planed lumber of sufficient thickness to resist distortion, support the front face of the steel curb facing and be rigidly held in position during construction. Back forms must be set parallel to the steel facing.

(E) PLACING CURB, STEEL FACING

Steel facing must be placed within the forms, upon suitable chairs, to the proper line and grade. When welding of joints is specified or directed, ends of steel facing must be butted together. When no welding is required, ends must be set one-eighth (1/8") inch apart except at expansion joints. At depressed curbs, facings must be splayed as shown on the Contract Drawings.

Steel curb facing, having less than two (2) welded anchors, must be welded to an adjacent steel curb facing, except that when the end of the above facing falls at an expansion joint, said end must not be welded.

Two (2) dowels, one-half (1/2") inch in diameter and twenty-four (24") inches long, must be installed longitudinal to and into the concrete backing at all unwelded intermediate joints between expansion joints in such manner that one-half (1/2) the length of the dowel falls on either side of the joint. Intermediate joints may be welded in lieu of installing the aforesaid dowels.

On curves whose radii are less than four hundred (400') feet, the curb must be constructed to true arcs with radial joints. On curves whose radii are four hundred (400') feet or in excess thereof, the curb may be constructed by using individual straight pieces of facing which must be not less than ten (10') feet nor greater than one-half of the square root of the radius of curvature in length. Joints must be radial.

(F) EXPANSION JOINTS

Expansion Joints in steel curb facing and curb backing must be coincident. The distance between expansion joints must not exceed twenty-four (24') feet, except as noted herein below for abutting concrete sidewalk.

Steel faced concrete curb expansion joints must line up with the expansion joints in existing abutting concrete sidewalk or with the proposed location of expansion joints in new abutting concrete sidewalk.

Expansion joints must be one-quarter (1/4") inch wide and must be filled with an approved premolded filler. Filler must completely fill the joint and must be cut flush with all curb surfaces.

(G) POURING CONCRETE

The concrete must be poured and compacted into the forms behind the steel facing to retain the facing in proper position in accordance with the requirements of **Subsection 4.06.7.(C)** and **4.06.7.(D)**. It must be worked around the anchors of the steel facing to insure satisfactory bond. It must be placed in sections equal in length to the length of the steel facing, unless otherwise permitted, and the ends must be provided with expansion joints as specified, directed or shown on the Contract Drawings.

(H) SURFACE FINISH

The top surface of the concrete must be finished by troweling, wood floating and, finally, by tooling all joints with approved tools. The top must pitch one-quarter (1/4") inch downward toward the front. The color of the exposed portion of the concrete must be uniform.

(I) BACKFILLING

Backfilling must follow the removal of forms as soon as practicable and must be of clean earth or other approved material, satisfactorily compacted.

(J) SURFACE CURING AND PROTECTION

The concrete must be cured in compliance with the requirements of **Section 2.14**, Type 1-D, Clear. The sum of one (1) dollar will be deducted from any moneys due under the Contract for each linear foot of curb which the Contractor fails to cure in accordance with this provision.

Concrete must be carefully protected against injury from rain, frost, the drying effects of the sun and wind, traffic or other causes by means of suitable guards and covering, and must be kept moist as required.

(K) PAINTING

All steel facing must be given one (1) shop coat of Primer. All steel facing which will be exposed to view after installation must be given one (1) shop coat of Intermediate Coat and one (1) shop coat (rolled field coat permitted) of Topcoat. The color of the Topcoat must be gray, as approved by the Engineer. All paints must be applied in compliance with the paint manufacture's data sheets. All components of paint must be compatible and supplied by a single manufacturer. Prior to field painting, the surfaces to be painted must be clean, dry, and lightly sand papered. The list of acceptable manufacturers of the paint system is shown in **Subsection 2.13.4**.

(L) SIDEWALKS TO BE CUT OFF

Concrete sidewalks interfering with curb setting must, when directed, be cut off to a line two (2') feet back of the curb concrete and parallel thereto. Cutting must be done by means of an approved power driven cutting machine with carborundum cutting wheel. Cuts must be a minimum depth of one and one-half (1-1/2") inches. The space between the curb and sidewalk must be filled with concrete sidewalk colored to correspond with the adjacent walk.

No concrete sidewalk must be cut off or otherwise disturbed until the same has been examined by the Engineer.

4.09.5. MEASUREMENT. The quantity to be measured for payment must be the number of linear feet of each type steel faced concrete curb constructed, complete, in place, as required, measured along the top of the exposed face of steel, and adjusted in accordance with **Section 5.04**.

Curbs constructed in accordance with the New York City Department of Transportation's Standard Details of Construction Standard Drawing H-1011, will be measured for payment under the appropriate Corner or Straight Steel Faced Concrete Curb item.

Curbs constructed in accordance with New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1015, will be measured for payment under the appropriate Straight or Depressed Steel Faced Curb item.

A curved steel faced concrete curb will be measured as a straight curb when the radius is greater than 100 feet and as a corner curb when the radius is 100 feet or less. Corner steel faced curbs will be measured only from PC to PT for corners without pedestrian ramps. Corner curbs will be measured as the larger of PC to PT or the curb adjacent to seven (7") inch sidewalk concrete as shown on Standard Detail H-1011 for corners with pedestrian ramps. All additional tangent lengths of a steel faced curb attached to the corner steel faced curb beyond the length measured as a corner curb will be measured for payment as a straight steel faced curb, except when there is no scheduled item for straight steel faced concrete curb. Where there is no scheduled item for straight steel faced concrete curbs, then the additional tangent lengths of straight steel faced concrete curbs required to clear pedestrian ramps and other street hardware must be paid for as a Corner Steel Faced Concrete Curb.

Transitional steel faced concrete curbs at driveways will be measured for payment as Depressed Steel Faced Concrete Curbs. All additional lengths of steel faced curbs, outside of the depressed and transitional curb in driveways, will be measured for payment as straight steel faced concrete curbs, except where there are no Contract items for straight steel faced concrete curbs. Where there is no scheduled item for straight steel faced concrete curbs, then the additional lengths of straight steel faced concrete curbs required must be paid for as Depressed Steel Faced Concrete Curbs.

4.09.6. PRICES TO COVER. When the proposed adjacent sidewalk is designated to be pigmented, no additional payment will be made for the cost of pigmenting the steel faced concrete curb to match the proposed adjacent pigmented sidewalk in color.

(A) The Contract price per linear foot of steel faced concrete curb for each type of steel faced curb must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct the curb complete in place, including, but not limited to, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the Specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required, and maintaining the curb in good condition as specified in **Section 5.05**.

(B) On Contracts where there is no scheduled item for wearing course and/or concrete base for pavement, the Contract price must also include the removal, by the Contractor, of not more than one (1') feet width of roadway pavement along the curb line and the restoration, by the Contractor, of all removed pavement in compliance with the applicable sections of these Standard Highway Specifications. The restoration of pavement removed beyond the above defined limit must be done by the Contractor at no additional cost to The City.

Payment will be made under:

Item No.	Item	Pay Unit
4.09 AD	STRAIGHT STEEL FACED CONCRETE CURB (18" DEEP)	L.F.
4.09 ADA	STRAIGHT STEEL FACED CONCRETE CURB (19" DEEP)	L.F.
4.09 ADB	STRAIGHT STEEL FACED CONCRETE CURB (20" DEEP)	L.F.
4.09 AE	STRAIGHT STEEL FACED CONCRETE CURB (21" DEEP)	L.F.
4.09 AEA	STRAIGHT STEEL FACED CONCRETE CURB (22" DEEP)	L.F.
4.09 AEB	STRAIGHT STEEL FACED CONCRETE CURB (23" DEEP)	L.F.
4.09 AEC	STRAIGHT STEEL FACED CONCRETE CURB (24" DEEP)	L.F.
4.09 AED	STRAIGHT STEEL FACED CONCRETE CURB (25" DEEP)	L.F.
4.09 AEE	STRAIGHT STEEL FACED CONCRETE CURB (26" DEEP)	L.F.
4.09 AF	STRAIGHT STEEL FACED CONCRETE CURB (27" DEEP)	L.F.
4.09 AG	STRAIGHT STEEL FACED CONCRETE CURB (28" DEEP)	L.F.
4.09 AH	STRAIGHT STEEL FACED CONCRETE CURB (29" DEEP)	L.F.
4.09 AI	STRAIGHT STEEL FACED CONCRETE CURB (30" DEEP)	L.F.
4.09 BD	DEPRESSED STEEL FACED CONCRETE CURB (18" DEEP)	L.F.
4.09 BDA	DEPRESSED STEEL FACED CONCRETE CURB (19" DEEP)	L.F.
4.09 BDB	DEPRESSED STEEL FACED CONCRETE CURB (20" DEEP)	L.F.
4.09 BE	DEPRESSED STEEL FACED CONCRETE CURB (21" DEEP)	L.F.
4.09 BEA	DEPRESSED STEEL FACED CONCRETE CURB (22" DEEP)	L.F.
4.09 BEB	DEPRESSED STEEL FACED CONCRETE CURB (23" DEEP)	L.F.
4.09 BEC	DEPRESSED STEEL FACED CONCRETE CURB (24" DEEP)	L.F.
4.09 BED	DEPRESSED STEEL FACED CONCRETE CURB (25" DEEP)	L.F.
4.09 BEE	DEPRESSED STEEL FACED CONCRETE CURB (26" DEEP)	L.F.
4.09 BF	DEPRESSED STEEL FACED CONCRETE CURB (27" DEEP)	L.F.
4.09 BG	DEPRESSED STEEL FACED CONCRETE CURB (28" DEEP)	L.F.
4.09 CD	CORNER STEEL FACED CONCRETE CURB (18" DEEP)	L.F.
4.09 CDA	CORNER STEEL FACED CONCRETE CURB (19" DEEP)	L.F.
4.09 CDB	CORNER STEEL FACED CONCRETE CURB (20" DEEP)	L.F.
4.09 CE	CORNER STEEL FACED CONCRETE CURB (21" DEEP)	L.F.
4.09 CEA	CORNER STEEL FACED CONCRETE CURB (22" DEEP)	L.F.
4.09 CEB	CORNER STEEL FACED CONCRETE CURB (23" DEEP)	L.F.
4.09 CEC	CORNER STEEL FACED CONCRETE CURB (24' DEEP)	L.F.
4.09 CED	CORNER STEEL FACED CONCRETE CURB (25" DEEP)	L.F.
4.09 CEE	CORNER STEEL FACED CONCRETE CURB (26" DEEP)	L.F.
4.09 CF	CORNER STEEL FACED CONCRETE CURB (27" DEEP)	L.F.
4.09 CG	CORNER STEEL FACED CONCRETE CURB (28" DEEP)	L.F.

SECTION 4.10 – Plant Establishment (Post Planting Care)

4.10.1. INTENT. This work consists of the care of newly planted and transplanted trees, shrubs, vines, groundcovers and other plants in accordance with the Contract Documents and as directed by the Engineer.

4.10.2. DESCRIPTION. The Contractor must provide plant establishment (post planting care), including repairs or replacement if necessary, for all trees, shrubs, and groundcover that have been planted or transplanted.

4.10.3. MATERIALS. Materials must comply with the requirements of Section 4.16 and Section 4.17.

4.10.4. CONSTRUCTION DETAILS.

(A) ESTABLISHMENT PERIOD.

The Contractor must water, weed and maintain mulch or jute mesh at no cost to the City until the newly planted or transplanted material is accepted. Plants will be accepted when all specified plants meet the following conditions:

1. Species has been verified and plant is in its designated location;
2. Planted or transplanted in accordance with ANSI Z60.1;
3. Planted or transplanted in accordance with Section 4.16 and/or Section 4.17;
4. Plant is living, healthy, unimpaired and in an undamaged condition;
5. Plant has successfully passed the Establishment Period, as shown in the flowchart below.

Successful completion of the Establishment Period prior to the Period of Guaranty shown in Schedule A does not relieve the Contractor of the responsibility to maintain plants until the end of the Period of Guaranty.

For trees, the Contractor must obtain the certificate of acceptance from NYC Department of Parks and Recreation (NYCDPR) in writing and file the certificate with the Engineer. For understory plantings, the Contractor must obtain a certificate of acceptance from the appropriate City Agency, either NYCDOT, NYCDEP or NYCDPR, as directed by the Engineer, and file the certificate with the Engineer.

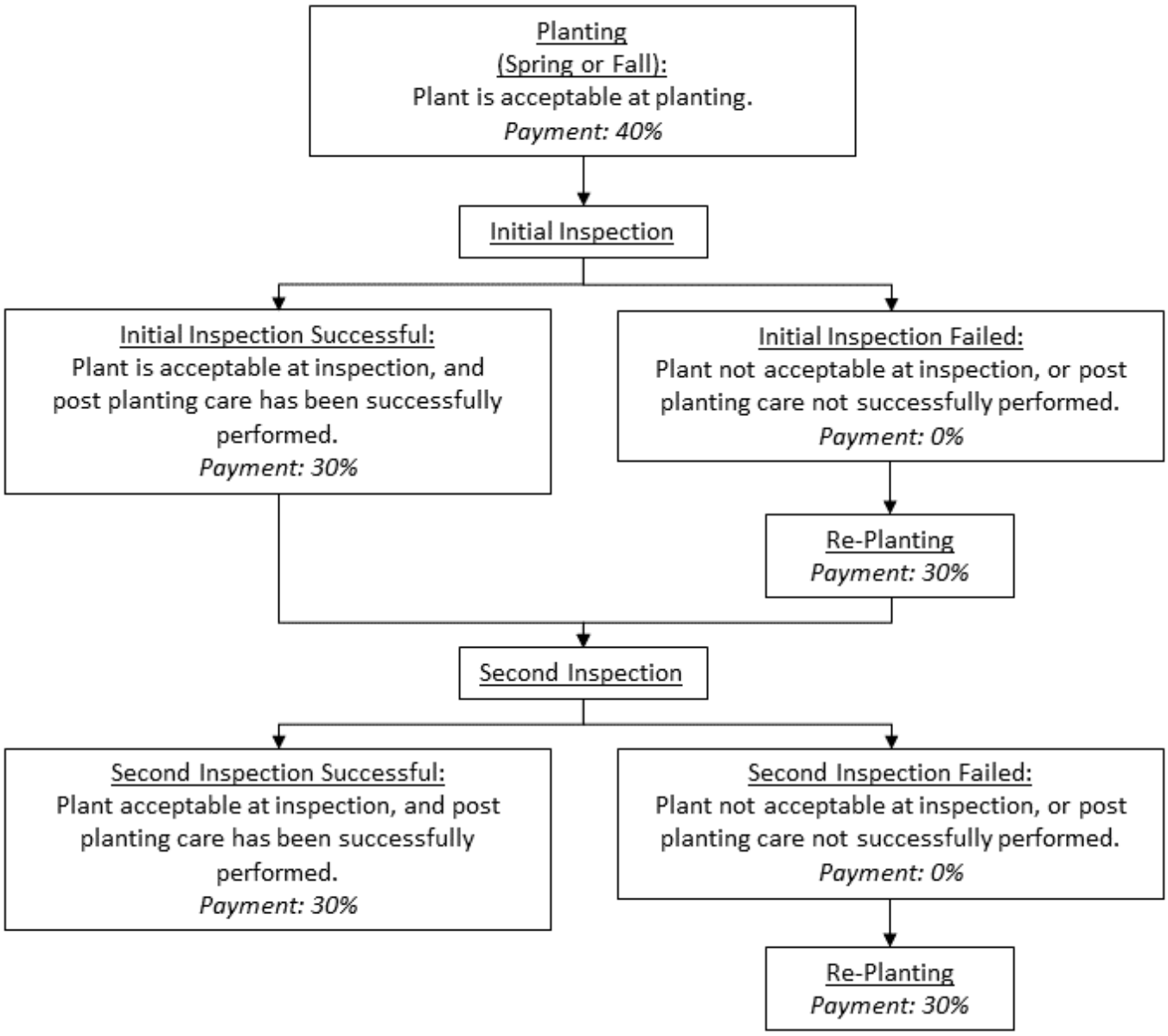
Successful completion of Post Planting Care in the flowchart below requires complete compliance with Subsection 4.10.4(E) ESTABLISHMENT PERIOD TASKS (POST PLANTING CARE), below, including all required watering and approval of the watering log.

The initial inspection and second inspection in the flowchart below must meet the following requirements:

1) The inspections will be scheduled for late summer, ideally in August, before the fall planting season.
2) The initial inspection will be scheduled for the first summer following the planting – the same calendar year for spring plantings, and the following calendar year for fall plantings.
3) The second inspection will be scheduled for the summer following the initial inspection.

The re-planting in the flowchart below must be performed at the next applicable planting season. For plants that may be planted in the fall or spring planting season, the Contractor may request to schedule the replanting during the next spring planting season instead of the next fall planting season.

The payment percentages in the flowchart below refer to the partial payment requirements in **Section 4.16.10** and **Section 4.17.10**.



(B) REPAIRS OR REPLACEMENT.

The Contractor must remove and replace all plant material under establishment which die or, in the opinion of the Engineer, seem unhealthy, stunted or unable to flourish, within the establishment period, except as otherwise provided, and replace said plant material with new plants of the same size and species as originally installed, except when such death, unhealthiness, stunting or inability to flourish is due to vandalism or damage resulting from causes over which the Contractor has no control, as certified by the Engineer. However, the Engineer may, at their discretion, direct a substitution of species.

All hardscape elements within the planting bed or tree pit must remain on site and be replaced neatly at no additional cost to the City. Plants or trees that die within the establishment period must be replaced as many times as necessary so that there is a live plant or tree at each location at the end of the establishment period.

All dead, missing or impaired plant material must be removed within 15 (fifteen) days of notification. Replacement plantings must occur within two (2) weeks or during the next species appropriate planting

season, as directed by the Engineer. The Contractor is advised that the appropriate planting season may be only in the spring.

If, in the opinion of the Engineer, the weather is unsuitable for making repairs or replacements at the time of such determination, the Contractor must make the required repairs or replacements when permitted by the Engineer.

Unless otherwise permitted or directed, defective trees, as determined by the Commissioner, must be replaced with new trees by the Contractor. The furnishing and planting of trees as replacements for defective trees must comply, in all respects, with the contract requirements.

(C) COMPLETE REPAIRS PRIOR TO EXPIRATION OF GUARANTY.

Just prior to the expiration of the Contract's Period of Guaranty, the entire work must be inspected, and any plants that are dead or unhealthy and unable to flourish must be immediately replaced by the Contractor in a manner acceptable to the Engineer. When required by the Engineer, such unhealthy or dead plants must be replaced in accordance with the requirements of the contract and the specifications. At the expiration of the Period of Guaranty, the Contractor must leave the planted area cultivated and weed free. This work will be in addition to the Establishment Period.

(D) CONTRACTOR TO NOTIFY ENGINEER BEFORE MAKING REPAIRS.

The Contractor must include all repair or replacement work on the weekly schedules submitted to the Engineer as required by Section 1.06.25. Additionally, the time and place of such work must be provided to the Engineer daily.

(E) ESTABLISHMENT PERIOD TASKS (POST PLANTING CARE).

Post-planting care must consist of watering, mulching, jute mesh maintenance, weeding, integrated vegetation and pest management, pruning, repair or removal of tree support systems if present, and other horticultural operations necessary for the proper growth of all plants, and for keeping the entire area within the contract limits neat in appearance as specified or directed by the Engineer. The Engineer may make interim assessments of the post planting care progress.

The contractor must prepare and submit to the Engineer a post-planting care work schedule for approval.

(1) Watering

The Contractor must be responsible for setting up a regular schedule for weekly watering between April 1st and November 15th and for notifying the Engineer of any deviation from that schedule at least 2 (two) working days in advance of the regularly scheduled watering date. If watering is to occur other than standard working hours (7 AM – 4 PM weekdays), the Contractor must coordinate with the Engineer for inspection.

The Contractor must provide water without damage to plants, mulch, jute mesh, stakes, plant saucers, sod or other areas to be watered. Each plant saucer must be carefully filled with water in a manner which does not erode the soil or the plant saucer. Watering must not cause uprooting or exposure of plant's roots to the air. Damage resulting from watering operations must be repaired at no additional cost to the City.

Watering must be applied at the following rates:

1. Turf, Wildflowers, Sod, Planting Beds. In the absence of 1 inch of rainfall within 5 consecutive calendar days the Contractor must apply a total of 1" of water to all turf, wildflowers, sod and planting beds once a week. The Contractor must install witness sticks, installed to the desired watering depth, to assist the watering personnel in providing the required depth of water.

2. Trees and Planting Pits. Between April 1st and November 15th, in the absence of 1 inch of rainfall within 5 consecutive calendar days, the Contractor must apply water to trees and planting pits once per week, except during July and August, when water must be applied twice per week, with a minimum of 2 days between applications. Soil saucers or portable drip irrigation systems must be filled once per watering. At least 10 gallons of water per tree caliper inch must be used per tree at each watering (for example, a 3" tree requires 30 gallons per watering). The contractor must use a water meter (flow meter) to verify the volume of water applied.

Water applied to seeded or sodded areas, plants or planted areas must be free from oil, have a pH not less than 6.0 nor greater than 8.0 and must be free from impurities injurious to vegetation. Unless otherwise directed, water may be drawn from mains owned by, or supplying water to, the City of New York.

Where water is supplied from City hydrants, the Contractor must obtain a hydrant permit from the Department of Environmental Protection. Permits are issued for a 30-day period, and the Contractor is responsible for keeping the permits current. The Contractor must have all tools and permits necessary for using city hydrants in their possession. If conditions do not allow the use of New York City water sources, the Contractor must obtain their own source of water. No direct payment must be made for water obtained from other than city sources, but the cost thereof will be deemed included in various items of the contract.

During dry conditions as defined by the Engineer, the Contractor will add to water a wetting agent product that is meant to aerate soil and allow for more water to penetrate such as Yuccah® Wetting Agent, or DIEHARD™ Soluble Yucca Extract as manufactured by Plant Health Care, or Horticultural Alliance, Inc., or an approved equal. An anti-desiccant to help prevent loss of water through transpiration must also be used when directed by the Engineer. The anti-desiccant product, approved by the Engineer, must be mixed into water at appropriate ratios (Contractor must follow product instructions). Wetting agent, if required, must be provided at no additional cost.

Any watering bags must be removed at the end of the watering season in October and replaced at the first watering in May during the establishment period.

The Contractor must maintain a watering log, which must be submitted monthly to the Engineer for approval. The watering log must:

- Indicate the dates and times all watering was performed and the employee that performed the watering;
- Verify the depths that water was applied to turf, wildflowers, sod, and planting beds;
- Verify the volume of water applied to trees and planting pits. This must include before and after readings from the water meter used.

If the Engineer determines, from inspection of the plants or by reviewing the watering logs, that the Contractor's watering effort is insufficient, the Engineer may direct the Contractor to increase the watering efforts, at no additional cost to the City.

(2) Mulching

The contractor must apply mulch in accordance with the requirements of Section 4.16 and Section 4.17, or jute mesh if required by a special specification. Mulch (or jute mesh if required) must not cover plants or be in contact with tree root flare, tree trunks, and plant stems.

Shredded Bark Mulch (or jute mesh if required) must be applied as a ground cover to the surface of all planting beds at the time of planting, one year after planting when the tree stakes are removed, and at the start of each watering season during the establishment period.

If necessary, the Contractor must add topsoil to planting beds prior to mulching or installing jute mesh if soil levels are below the grade of the surrounding sidewalk or pavement, or if soil levels do not match the grading shown on the plans.

(3) Weeding

The Contractor must remove and dispose of weeds including roots prior to flowering and seed formation by manual, chemical or mechanical means within the period from May 15th to October 31st, and such cultivating and weeding must be repeated at least every four (4) weeks. Chemical weed control methods may be used if applied by a NYSDEC Certified Pesticide Applicator and approved by the Engineer. Any method of weed removal that leaves live roots in the soil will not be permitted. Under no conditions will weeds be allowed to attain more than six (6) inches of growth including weeds within planting beds where plants have died, are missing, or have been vandalized and are scheduled to be replaced. The Contractor must ensure the preservation of desirable vegetation. Desirable plants unintentionally killed or removed by the Contractor must be replaced at no cost to the City.

(4) Integrated Vegetation and Pest Management

In the event of threat of serious damage from insects or diseases the plants must be treated by preventative or remedial measures. The Contractor must control insects, fungus, and other diseases. Methods may include spraying with an approved insecticide or fungicide.

(5) Pruning

Tree Pruning must be done in accordance with the requirements of Section 4.18 and as directed by the Engineer. Pruning of all plants must comply with ANSI A300 (Part 1) standards and must be conducted a minimum of two (2) times during the establishment period to remove dead or damaged branches.

(6) Repair and/or Removal of Tree Support Systems

If tree support systems are present, the Contractor must be responsible for inspecting and adjusting or repairing the systems once every six months during the establishment period. The Contractor must also be responsible for removal of the tree support system, if present, at the end of the establishment period.

(F) TRANSFER TO MAINTENANCE PARTNER.

Where the City has identified a long-term maintenance partner (entity that will maintain the plantings after completion of the Contract) for certain planting locations, and in the Engineer's sole discretion, the Contractor may be directed to turn over plant care activities for such plantings to the City's identified maintenance partner prior to substantial completion of the Contract. The Engineer will be solely responsible for deciding to turn over plant care activities, and requests from the Contractor will not be entertained. If the Engineer requests that plant care activities will be turned over to the maintenance partner, the Engineer will provide such direction in writing and shall include:

- Date for acceptance walkthrough with the maintenance partner;
- Date for turnover to the maintenance partner;
- Written confirmation from the maintenance partner for the turn over.

Where the Contractor has been directed to turn over plant care of plantings to the City's identified maintenance partner prior to substantial completion:

- The City's maintenance partner will be responsible for completing the plant establishment tasks and plant care.
- The Contractor will be responsible for fulfilling all NYC DPR permit requirements, and allowing the maintenance partner access, where necessary, to the plantings.

This provision will not be applicable to street trees. Nothing in this section shall relieve the Contractor of its obligation to protect the Work, the plantings, or other property in accordance with Article 7 of the Standard Construction Contract.

4.10.5. PRICE TO COVER. No separate payment will be made. The cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required must be included in the unit price items bid for the various plants (Trees, Shrubs, and Groundcover.)

SECTION 4.11 – Excavation and Filling

4.11.1. INTENT. This section describes Excavation and Filling.

4.11.2. DESCRIPTION.

(A) The location, general character and essential details shall be as specified and as shown on the Contract Drawings.

(B) Earth Excavation shall include the removal and disposal of material of whatever nature encountered in the prosecution of the work, unless otherwise specified. Materials of whatever nature encountered shall be defined as including, but not be limited to, soil, stones, soft weathered rock that can be removed by mechanical means other than air hammer or drilling and blasting, and miscellaneous fill (excluding contaminated materials, debris and building demolition material consisting primarily of large wooden objects, plastic, asphalt shingles, metals, etc.) which is not classified as rock excavation or contaminated or hazardous materials that materially affect the cost of removal and disposal to the Contractor.

Earth excavation shall not include the cost of excavation and disposal of boulders or parts thereof more than one-half (1/2) cubic yard in volume (to be measured by multiplying the maximum cross section area by seven tenths (7/10) of the length of that which is to be removed) in open cuts, rock as defined in **Subsection 4.11.2.(C),** materials which must be removed and disposed of as contaminated or hazardous material, manmade objects or structures not shown on the Contract Drawings or indicated in the specifications, that could not reasonably have been anticipated by the Contractor, were not anticipated by the City, and which materially affect the cost of excavation and disposal to the Contractor. Excavation and disposal of said materials will be paid for under other contract items where anticipated by the City or will be paid for as “Extra Work”, under Article 26 of the Standard Construction Contract, where the City deems the Contractor could not have reasonably anticipated the existence of such materials that significantly affects the Contractor’s costs of removal and disposal.

The dismantling and removal of the existing street lights, traffic signals and fire alarms will be done by the various departments having jurisdiction, except as otherwise provided. The existing foundations for these facilities shall be removed by the Contractor to a plane two (2’) feet below subgrade and such removal will be measured for payment under Earth Excavation.

(C) Rock Excavation shall include only the removal and disposal of unbroken ledge rock in its original formation which cannot be removed by ditching machines, ripper, rock plow, backhoe, or other mechanical means and which can only be removed by air hammers or by blasting, drilling or plug and feather to ensure the prompt and proper prosecution of the work. It is not intended to cover softer rock formations encountered which can be removed by mechanical means other than air hammer or drilling and blasting.

(D) Grade shall mean the plane or planes through the tops of both curb lines.

(E) Rock subgrade for roadway area shall mean a plane two (2’) feet below and parallel to grade and two (2’) feet wider on each side than the roadway. Rock subgrade for sidewalk area shall mean a plane one (1’) foot below and parallel to grade. Rock subgrade for structures shall be to the depths required for the cradle and foundation of the structure.

(F) Filling shall include the furnishing, re-use, placement and compaction of approved material required. Filling shall be by Place Measurement or Vehicle Measurement, as specified.

(G) Excavation in earth for the footings of structures shall be carefully conducted to approach the neat lines as closely as possible without disturbing the underlying soil and hand excavation shall be used within the last twelve (12”) inches. Under no circumstances shall any backfilling material be placed upon surfaces to be used as foundation for footings. Where, in the opinion of the Engineer, the slope of existing rock surfaces requires it, rock shall be suitably benched to give full and proper bearing to concrete in accordance with the directions of the Engineer. Rock surfaces shall be cleaned and if necessary washed before concrete is poured.

(H) All excavation and backfilling required for the installation of sewers (storm, sanitary, and combined), highway drains, and water wains shall be done under the appropriately scheduled items in accordance with the requirements of the NYC DEP Standard Sewer and Water Main Specifications.

4.11.3. MATERIALS FOR FILL AND BACKFILL.

(A) GENERAL

All material for fill or backfill shall have an optimum moisture content as determined by the Standard Proctor Test conducted in accordance with AASHTO T-99 Method. Gradation must be tested in accordance with ASTM C136.

All material for fill or backfill shall be free from frost at the time of placement.

Miscellaneous fill material removed from trenches and excavations shall not be considered as acceptable backfill material unless found to be in compliance with these specifications and approved in writing by the Engineer. The project site subsurface conditions may consist partially of variable thickness layers of unsuitable material. This material may not be considered to be acceptable backfill material as described herein, or as determined by the Engineer.

(B) FILL AND BACKFILL

Filling and Backfilling materials whose composition is inorganic soil, blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof, shall be considered suitable materials provided it is free of shale or other soft, poor durability particles.

Glass or Recycled Porcelain Aggregate (RPA) from recycling facilities that meets the requirements of **Subsection 4.11.3.(E)** for Glass and **Subsection 4.11.3.(F)** for RPA shall be considered suitable material for mixing with fill provided the Contractor maintains the gradations specified herein. However, glass shall not be placed in contact with synthetic liners, geogrids, geotextiles or other geosynthetics.

Glass and/or RPA incorporated into fill shall be thoroughly mixed with other suitable material so that glass, RPA or combination of both constitutes no more than 30 percent by volume anywhere in the fill as visually determined by the Engineer.

The material within the top one (1') feet of subgrade shall have the following gradation:

Sieve Size	Passing Percent By Weight
4 Inch	100
1/4 Inch	30 to 75
No. 40	5 to 40
No. 200	0 to 10

Stone in filling shall not exceed the following maximum dimensions:

More than thirteen (13') feet below grade . . . . . Unlimited
More than four (4') feet and less than thirteen (13') feet below grade . . . . . 2'-0"
More than one (1') feet and less than four (4') feet below grade . . . . . 1'-0"
Within one (1') feet of grade . . . . . 0'-4"
Within two (2') feet of structures . . . . . 1'-0"
In embankment slopes beyond street lines . . . . . 1'-0"
Within five (5') feet of the center line of existing or proposed sewers, water mains and their appurtenances . . . . . 1'-0"

The Contractor may use, as fill, that portion of the excavated material conforming to these specifications. However, all materials used for fill shall be free from organic material and other unsuitable material. The only exception would be the allowable contamination of recycled glass.

Excavated materials not complying with the above specifications shall be considered unsuitable for fill and shall be removed from the job site to an approved dump.

(C) SELECT GRANULAR FILL

Select Granular Fill shall be a natural sand, well graded crushed stone or approved clean earth of low silt and clay content, free from bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign material. All materials furnished under this item shall have no particles greater than 1/4 inch in maximum dimension for use in trenches and shall have the following gradation:

Sieve Size	Percent Passing by Weight
1/4”	100
No. 40	0-50
No. 200	0-8

(D) PROCESSED FILL

If approved in writing by the Engineer, excavated material determined to be unsuitable for fill may be processed (i.e. screened and/or crushed) to produce select granular fill material or fill material. Such processed materials for backfill must be in compliance with the material specifications herein for either Select Granular Fill or for Fill, as required. No separate or additional payment will be made for the cost of all labor, materials, plant, equipment, samples, tests and insurance necessary or required to perform this processing work. Payment for the costs of all labor, material, equipment and insurance necessary and required to furnish and deliver, and to place, compact, sample and test these processed acceptable backfill materials shall be in accordance with **Subsection 4.11.6(C)**. (Excavated material that is hand groomed and/or groomed with the use of excavating equipment of bricks, blocks, pavement materials, debris, stumps, roots, stones, boulders, timber, wood, etc., to render the excavated material acceptable for backfill, whether ordered by the Engineer or at the Contractor’s own discretion, shall not be considered as processed material but shall be considered as approved excavated suitable material. No separate or additional payment will be made for the use of this groomed excavated material as backfill, the cost of all labor and material shall be deemed included in the prices bid for all contract items of work.)

(E) GLASS

Glass shall be crushed to a maximum particle size of 3/8 inch.

Glass may contain up to a maximum of five (5%) percent by volume of china, ceramics, plate glass products, paper, plastics or other deleterious materials. The material shall be subject to visual inspection by the Engineer or the Engineer’s representative, and may be rejected based on this inspection. In case of rejection, the inspection must be documented in writing by the Engineer who shall indicate the basis of rejection.

(F) RECYCLED PORCELAIN AGGREGATE (RPA)

All porcelain to be used as RPA shall be crushed by a New York City Department of Environmental Protection (NYCDEP) approved recycling facility to a maximum particle size of 3/8 inch and graded to meet the gradation specified above for use in either fill, backfill or select fill, as may be required. RPA from any other source will not be permitted. The NYCDEP approved recycling facility will also certify that the RPA being furnished is free from organic material and other unsuitable material.
Should the Contractor desire to use RPA in fill or backfill material, the NYCDEP BEPA Sustainability Unit (Tel. No. 718-595-5522) shall be contacted to determine the availability of RPA and from which recycling facility it can be obtained.

The Contractor shall be required to make arrangement with the recycling plant, at least two (2) weeks in advance of when the material is needed, to schedule the time, date and quantity available for pickup. The Contractor shall be required to furnish the recycling facility with a complete list of trucks involved in transporting the material, which shall include the name of the registered owner (Contractor), Consumer Affairs or DOS Permit numbers, body license plate number, and truck volume. This information must be supplied to the facility prior to the start of picking up the RPA.

Weight ticket receipt slips given by the recycling facility to each truck driver picking up RPA shall be collected by the Contractor and given to the Engineer upon delivering fill or backfill material to the site that contains RPA, and the Contractor agrees and warrants that in obtaining the RPA that such material has

originated only from a NYCDEP approved recycling plant and it has not been mixed with porcelain material from any other source.

The Contractor shall be required to transport said material from the approved recycling facility to the Contractor's yard for storage and mixing with the Contractor's fill material; however, there is not guarantee that the material will be available.
The Contractor is advised that there is no guarantee that RPA will in fact be available for use from a NYCDEP approved recycling plant and shall make no claim against the City for loss of anticipated profits should the material not be available upon request by the Contractor.

All excess RPA not used in the fill or backfill shall remain the property of the NYCDDC Contractor.

The Contractor must comply with all rules and regulations of the NYCDOT and the Department of Environmental Protections governing the use of RPA in its fill and backfill material.

4.11.4. EARTH EXCAVATION METHODS.

(A) Excavation for streets shall:

(1) be made and maintained to roadway crowns, sidewalk area slopes and side slopes specified until the entire work is accepted;

(2) be made below grade to exposed rock, when soundings indicate the existence of rock between grade and rock subgrade;

(3) include the removal, as directed, of unsatisfactory material below grade;

(4) include the cutting of the side slopes in earth excavation to a slope of one and one-half (1-1/2) horizontal to one (1) vertical or such other approved slope as may be rendered necessary by local conditions, and no measurement beyond such approved limits of slope will be made or allowed for payment.

(B) Excavation for walls and other structures shall be made to the dimensions specified and shall be done as follows.

(1) GENERAL. Trenches and pits shall be excavated to the depths required for cradle and foundation of structures. All trenches in earth shall be excavated with vertical sides, and shall be supported by close sheeting, properly braced. Sheeting and bracing shall extend from at least the existing surface of the ground to an adequate depth below the subgrade of the structure, except where otherwise specified on the Contract Drawings, or permitted by the Engineer in writing. Sheeting must be driven below the area of the pilot cut. Driving of sheeting above the pilot cut is subject to the directions of the Engineer.

Pilot cuts for trenches shall not exceed five (5') feet at any time. The Engineer may reduce the depth of the pilot cut should soil and subsurface conditions warrant such action.

The Engineer may direct the Contractor to use other types of equipment, and to revise the procedure during the excavation of the pilot trench and the driving of the sheeting should it be found necessary to do so.

In accordance with 29 CFR 1926.650, a trench is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than fifteen (15') feet. If forms or other structures are installed or constructed in an excavation to reduce the dimension measured from the forms or structure to the side of the excavation to fifteen (15') feet or less, the excavation is also considered to be a trench. The Contractor shall provide protection from collapse and cave-in for any employee who enters a trench or other excavation in accordance with the requirements of 29 CFR 1926 Subpart P, unless the excavation is less than five (5') feet in depth and examination of the ground by the Contractor's "competent person" provides no indication of a potential cave-in. The Contractor shall include the proposed procedures to meet the excavation safety requirements in the Contractor's Project Safety and Health Plan. Trenching and excavation

work shall be carried out under the supervision of the Contractor's "competent person." The Contractor shall provide ladders or ramps for access and egress within twenty-five (25') feet of an employee work area if a trench is four (4') feet or deeper. The Contractor shall keep traffic, equipment and materials at least two (2') feet away from the edge of any trench or excavation, or use retaining devices. When mobile equipment is operated near an excavation or must approach the edge of an excavation, either the operator must have a clear and direct view of the edge of the excavation; or a warning system of barricades, hand signals or mechanical signals shall be used. Workers shall not be permitted under loads that are being handled by lifting or digging equipment.

Trenches under five (5') feet in depth need not be sheeted and braced, except where one of the following conditions exist: the trenches are in close proximity to existing structures or subsurface structures; where the Engineer, in writing, specifically prohibits the use of a non-sheeted trench; or where examination of the ground by a "competent person" provides indication of a potential cave-in, and trenches need to be sheeted and braced.

For the purposes of open excavations and trenches, the term "competent person" shall be defined as a person designated by the Contractor, in writing, who has had specific training in, and is knowledgeable about, soil analysis, the use of protective systems and the requirements of 29 CFR 1926 Subpart P, who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Where shown, specified or permitted in writing by the Engineer, the sides of the trenches shall be sloped to elevations approved by the Engineer. Side slopes must be stable and shall be, in the dry, at least one and one half (1-1/2) vertical on one (1) horizontal.

The subgrade of trenches shall be constructed neat and to the grades as shown in the Contract Documents, and as directed by the Engineer.

Upon completion of the trenches and excavations and prior to placement of structures, the Contractor shall take in-place soil density tests of the subgrade (the number and locations of these tests shall be as directed by the Engineer), and shall compact the subgrade, as directed by the Engineer, to a minimum of ninety five (95) percent of Standard Proctor Maximum Dry Density.

(2) ADDITIONAL REQUIREMENTS FOR TRENCHES

(a) Where structures are to be supported on piles and the Contractor deems it necessary to widen the trench beyond the maximum widths herein specified to permit the driving of such piles, the Contractor shall apply to the Engineer in writing for permission to widen the trench.

(b) Any widening or enlargement of excavation permitted in writing by the Engineer upon the request of the Contractor to perform the work as specified in the Contract Documents and/or to expedite construction operations, will not be measured for any separate or additional payment, but the costs thereof shall be deemed included in the prices bid for all contract items of work.

(c) In rock trenches the Contractor may, with the written permission of the Engineer, omit the use of side forms. No rock shall project inside the minimum width vertical rock cut lines herein specified.

(d) Where the Contractor elects to cut the trench in rock by means that will result in overbreakage, rather than resorting to means which will insure adherence to the maximum allowable width of trench, the spaces between the edges of the external neat line of the poured-in-place structure and the

sides of the rock cut with concrete shall be filled in from subgrade of trench to a minimum height of two (2') feet above the top of the footing.

(e) If the Contractor elects to carry the excavation in earth below the required subgrade of the trench, the Contractor shall backfill the trench to the required subgrade with either properly compacted Stone Ballast or with concrete, as directed by the Engineer. If the Contractor elects to carry the excavation in rock below the required subgrade of the trench, the Contractor shall backfill the trench to the required subgrade with concrete or stone ballast as directed by the Engineer. No separate or additional payment shall be made for such backfilling where required, nor for any additional excavation and sheeting, the cost thereof shall be deemed included in the prices bid for all contract items of work.

(f) The construction of adjacent sewers and/or water mains in the same trench shall be in accordance with the requirements of Section 4.07 of the NYC Department of Design and Construction, Division of Infrastructure, Standard Sewer Specifications and/or Standard Water Specifications.

(3) LENGTH OF TRENCH EXCAVATION. The maximum length of trench excavation in roadway any time shall be as stipulated for the maintenance and protection of traffic.

Unless otherwise specified in the Contract Documents or ordered in writing by the Engineer, all trenches in rock shall be excavated to its full depth for a minimum distance of twenty (20') feet in advance of the length of structure permitted to be laid; however, the total length of trench shall not be less than fifty (50') feet. The only exception to this is at its upper end or ends, where rock shall be excavated to its full depth to a distance of not less than five (5') feet beyond the sewer to be built.

(4) EXPOSED STRUCTURES TO BE PROTECTED. All exposed structures shall be carefully protected from the effects of blasts. Any damage done to such structures shall be promptly repaired by the Contractor at the Contractor's own expense.

(5) DISPOSAL OF WATER FROM EXCAVATIONS. The Contractor shall at all times during the progress of the work keep the trenches and excavations free from water. The water from the trenches and excavations shall be disposed of in such a manner as will not cause injury to the public health, nor to public or private property, nor to the work completed or in progress, nor to the surface of the streets, nor cause any interference with the use of the same by the public. All sewers used for disposal of water from the trenches and excavation during construction shall be acceptably cleaned.

When in order to comply with the above, it is deemed necessary to widen the trench beyond the allowable maximum width, to permit the installation of well-points, the Contractor shall, as directed by the Engineer, provide either pipe of additional strength or concrete encasement at no additional cost to the City.

The Contractor shall, with the Contractor's own equipment, provide dewatering where required at no additional cost to the City. The cost for all labor, equipment, materials, etc. required to dispose of water from the trenches shall be deemed included in the prices bid for all items of the Contract.

All dewatering and discharge pipes and hoses which cross traveled roadways shall be placed in such a manner to eliminate any disruption of traffic flow. If so ordered by the Engineer, the Contractor shall place the pipes and hoses in shallow trenches which will then be plated over. All header pipe shall be buried below existing roadway grade at driveways to maintain access to driveways.

All plates shall be firmly secured to eliminate any possible shift or movement.

All pumps used in the dewatering operation shall be electric and shall be powered directly from a Con Edison drop, unless otherwise unavailable.

Dewatering by means of well points or deep wells will not be allowed in the Boroughs of Brooklyn or Queens where the rate of pumping exceeds forty five (45) gallons per minute unless the appropriate permit has been secured from the New York State Department of Environmental Conservation.

Where the subgrade of the trench cannot be maintained in a dry condition, except in locations where the structures are on piles, the Contractor shall excavate the trench to an additional depth of six (6") inches below the subgrade of the sewer and backfill the trench to the subgrade of the sewer with stone ballast.

The cost for this additional excavation, sheeting, installation of stone ballast, labor, materials, plant, equipment and insurance required or necessary to complete this work shall be deemed included in the prices bid for the respective sewer or manhole items.

(C) Approved sheeting and bracing shall be used where necessary to support sides of excavation, to: prevent damage to subsurface structures and adjacent buildings; safeguard persons and property; minimize inconvenience to traffic and the public; protect the structure to be installed; and, provide suitable and safe working conditions. Except as otherwise provided, deviations from the above will be permitted only where, in the judgment of the Engineer, such exception will not result in any of the hazards described above.

In cases where sheeting and bracing will not adequately protect adjacent structures from damage and settlement, the Contractor will be required to use such methods as are necessary to safely support and maintain adjacent and abutting property and structures and to maintain the work safe to life, limb and property.

All sheeting and bracing systems that the Contractor elects to use or that are ordered to use by the Engineer or the Department shall comply with the requirements of **Section 40.05, "SHEETING AND BRACING**," of the NYC Department of Environmental Protection, Bureau of Water and Sewer Operations, Standard Sewer and Water Main Specifications, and must receive the approvals stated therein.

Unless otherwise specified in the Contract Drawings or these Specifications or specifically permitted in writing by the Engineer, the Contractor shall be required to withdraw and remove all sheeting and bracing simultaneously with the backfilling of trenches and excavations.

(D) When directed, soundings shall be made at intervals of about ten (10') feet to determine the existence of rock between grade and rock subgrade.

(E) When boulders, masonry, concrete, loose fragments of rock, tree stumps or other material are removed by blasting, all blasting operations shall be conducted in strict accordance with the City ordinances and regulations relative to rock blasting and the storage and use of explosives.

No blasting shall be done within five (5') feet of water mains, sewers or other structures.

(F) Excavation for the purpose of removing boulders, loose fragments of rock, tree stumps, roots and unsatisfactory material shall be backfilled with material complying with the specifications for Filling.

(G) Unless otherwise permitted, all earth excavation which is suitable and needed for fill shall be used within the contract limits.

4.11.5. ROCK EXCAVATION METHODS. When rock surfaces in streets, trenches or other excavations are uncovered, the Engineer shall be notified to provide the opportunity to make necessary measurements. Rock excavated before such measurements are made will not be paid for.

(A) Rock Excavation for Streets shall:
- (1) be made to rock subgrade, when specified;
- (2) be made and maintained to side planes specified until the entire work is accepted;
- (3) be made in sections not less than fifty (50') feet in length, unless otherwise permitted.

(B) Rock Excavation for walls and other structures shall be made to the dimensions specified.

In rock trenches the Contractor may, with the written permission of the Engineer, omit the use of side forms. No rock shall project inside the minimum width vertical rock cut lines herein specified.

If the Contractor elects to carry the excavation in rock below the required subgrade of the trench, the Contractor shall backfill the trench to the required subgrade with either concrete or properly compacted stone ballast, as directed by the Engineer. No separate or additional payment shall be made for such backfilling where required, nor for any additional excavation and sheeting, the cost thereof shall be deemed included in the prices bid for all contract items of work.

In addition, the filling of voids left by the removal of ledge rock from within the limits of rock excavation payment limits shall be done in accordance with the requirements of this **Subsection 4.11.6**.

Any widening or enlargement of excavation permitted in writing by the Engineer upon the request of the Contractor to perform the work as specified in the Contract Documents and/or to expedite construction operations, will not be measured for any separate or additional payment, but the costs thereof shall be deemed included in the prices bid for all contract items of work.

(C) No blasting will be permitted unless otherwise specified. The Contractor shall use line drilling or other acceptable methods to excavate rock. But if blasting is permitted, blasting operations shall be conducted in strict accordance with The City ordinances and regulations relative to rock blasting, the storage and use of explosives and prevention of silicosis. Any rock excavation within five (5') feet of a water main less than thirty-six (36") inches in diameter, and within ten (10') feet of a water main thirty-six (36") inches or more in diameter, shall be done with very light charges of explosives, or if directed, without blasting, and the utmost care shall be used to avoid breaking or disturbing the main. No blasting shall be done within five (5') feet of water mains, sewers or other structures except by written permission of the Engineer.

4.11.6. BACKFILLING METHODS.

(A) BACKFILLING AROUND STRUCTURES

Unless otherwise specified or directed, all trenches and excavations shall be backfilled immediately after the structures are built and inspected, and permission to backfill has been granted by the Engineer.

All backfill shall be carefully deposited and spread by approved methods.

Backfill shall proceed simultaneously with the withdrawal of sheeting. Withdrawal of sheeting below levels previously backfilled and compacted is prohibited.

The use of backhoe buckets for the compaction of backfill material in all trenches and excavations will not be permitted.

(1) Select Granular Fill. The Contractor shall use Select Granular Fill for backfilling trenches and excavations within any area less than two (2') feet wide in its least dimension (i.e. space between face of trench and outside face of cavities behind sheeting, filling of voids left by removal of boulders beyond the limits of sheeted trench, etc.) and within eighteen (18") inches around all underground facilities (i.e. conduit, cable, etc.).

Select granular fill shall be deposited and spread by approved methods in uniform horizontal layers not exceeding twelve (12") inches in depth and each layer shall be thoroughly compacted to the satisfaction of the Engineer, before a successive layer is deposited. A minimum of 95 percent of Standard Proctor Maximum Density will be required after compaction.

The cost of providing Select Granular Fill as specified hereinabove, together with all labor, materials, plant, equipment, samples, and tests necessary and required for delivering, placing, compacting and testing of Select Granular Fill, shall be deemed included in the prices bid for all respective items of work. No separate or additional payment shall be made for this work unless otherwise specified.

(2) All excavated material from within the project limits which is considered as suitable material under the requirements of **Subsection 4.11.3.(B)**, shall be utilized for backfill.

The cost for all labor, materials, plant, equipment, samples, and tests necessary and required for the hauling, storing, placing, compacting and testing of suitable excavated fill material all in accordance with the Specifications and as directed by the Engineer, shall be deemed included in the prices bid for all respective items of work. No separate or additional payment shall be made for this work unless otherwise specified.

(B) BACKFILLING AROUND SHEETING

When sheeting is withdrawn all cavities remaining in or adjoining the trench shall be filled and compacted. When sheeting is left in place all cavities behind such sheeting shall be filled as directed. All materials used for such backfill and the compaction of such materials shall be as specified herein.

(C) DEFICIENCY IN FILL MATERIAL

Unless otherwise shown on the plan, trenches shall be backfilled to the height of the surface of the ground as it existed at the commencement of the work. Should there be a deficiency of suitable material for that purpose, the Contractor shall furnish and place such additional material as may be required.

Payment for the cost of all labor, material, and equipment necessary and required to furnish and deliver these acceptable backfill materials, where a deficiency of acceptable backfill material occurs, shall be made as follows:

(1) For providing acceptable select granular fill (whether natural or processed) to satisfy the requirements of Section 4.11.6(A)(1), payment shall be deemed included in the prices bid for all contract items of work. No separate payment will be made for this work.

(2) For providing acceptable clean fill (whether natural or processed) to satisfy the requirements of Section 4.11.6(A)(3) to fill voids left by the removal of ledge rock, payment shall be made under the Contract Item – ROCK EXCAVATION.

(3) For providing acceptable clean fill (whether natural or processed) ordered by the Engineer, payment shall be made under the Contract Item – FILL.

(D) REMOVAL OF SURPLUS MATERIAL

As the trenches are backfilled, the Contractor shall remove all surplus material, and regrade and leave free, clear and in good order all roadways and sidewalks adjacent to the completed work and within fifty (50') feet of the end of the completed work. All surplus material or any part thereof shall be deposited, if required by the Engineer and at the Engineer's direction, on the streets and avenues within the limits of this Contract where they are below grade or contain depressions. Such fill shall be compacted to the required density (95% Standard Proctor Maximum Density) and in such a manner to leave the surfaces of the backfill even with the adjoining surfaces.

(E) TEMPORARY BULKHEADS

For retaining the backfilling only temporary bulkheads will be allowed over sewers, basin connections and drains. Such bulkheads shall not be of stone, and they shall be removed as the trenches are backfilled.

(F) SUBGRADE STRUCTURES NOT TO BE COVERED

Subgrade structures shall not be covered until the Engineer shall have inspected, measured and located the same and given permission to backfill the trenches over them.

(G) FILL

Fill shall be deposited, satisfactorily compacted, and maintained until the entire work is accepted, between:

(1) the subgrade of proposed pavement and the surface of proposed curbs and sidewalks and the existing ground surface;

(2) the planes of the slopes of the embankment or the backs of retaining walls, as specified;

(3) rock subgrade and the finished surfaces of roadways and sidewalks.

Embankment slope shall be one and one-half (1-1/2) horizontal to one (1) vertical.

(H) The Contractor shall fill or backfill with material having a moisture content suitable for the proper compaction of that material. The Contractor shall be responsible for determining the proper limits as the work is progressed. Water added shall be thoroughly incorporated into the soil, and manipulation shall be provided whenever necessary to attain uniform moisture distribution to the soil. When the moisture content of a lift, that is about to be compacted, exceeds the required amount, compaction shall be deferred until the required moisture content is achieved or a more suitable material shall be used. Fill material shall be carefully deposited and spread by approved methods in uniform horizontal layers not exceeding twelve (12") inches in depth, extending across the entire width of fill prior to compaction, and each layer being thoroughly compacted to the satisfaction of the Engineer before a successive layer is deposited. A minimum of 95 percent of Standard Proctor Maximum Density will be required after compaction.

No separate or additional payment be made for any costs associated with the achievement of optimum moisture content, including any additional excavation due to the removal of any layer not meeting the specified requirements and for the replacement of any layers with suitable material. Costs shall be deemed included in the prices bid for all items of work.

When placing fill or backfill around underground facilities in shallow excavations, twelve (12") inch layers shall be deposited to progressively bury the facility to equal depths on both sides and for the full depth and width of the trench excavated for the facility.

(I) In deep trenches, in lieu of depositing and compacting the backfill from two (2') feet above the underground facility to a plane five (5') feet below final surface in accordance with the above specified procedure, the Contractor may submit to the Engineer, for approval, an alternate backfill method (i.e. puddling, jetting, deeper compaction layers, etc.). This submittal must fully describe the alternate method, including proposed equipment, backfill material, depth of compaction layer, and trench locations where it will be employed. However, approval of any alternate backfill method shall not relieve the Contractor from obtaining a minimum 95% standard Proctor maximum density. Should the Engineer determine that the specified density is not being obtained, the area must be re-excavated and backfilled at the Contractor's own cost until the required compaction density is achieved.

(J) Backfill immediately adjacent to conduits shall not contain particles larger than one-quarter (1/4") inch in diameter. Compaction shall be attained using impact rammers, plate or small drum vibrators, or pneumatic button head compaction equipment and shall be capable of exerting a pressure equivalent to two hundred and fifty (250) to three hundred (300) pounds per inch width of compression roll, or an equivalent pressure if other than smooth wheel or pneumatic tired rollers are permitted.

Hand tamping will not be permitted except in the immediate area of the underground facility.

The backfill, within two (2') feet of such facilities, shall be wetted (except where clay is present) in twelve (12") inch lifts and lightly hand tamped with as many strokes as required to achieve maximum density.

(K) Where sheeting has been used for the excavation, it shall be pulled when the excavation has been filled or backfilled to the maximum unsupported depth allowed by New York State Department of Labor Industrial Code Rule 23 and Title 29 Code of Federal Regulations Part 1926, Safety and Health Regulations for Construction. Where a difference exists between regulations, the more stringent requirements shall apply.

(L) In-place soil density tests will be required to ensure that the soil compaction requirements of the specifications are met. In-place soil density tests shall be taken for each and every layer of backfill placed, at a maximum of one hundred (100') feet intervals along the length of each layer. However, the location of the tests shall vary horizontally along each successive layer, such that no two (2) tests are conducted at the same station location as any previous layers. The number and locations of in-place soil density tests shall be as directed by the Engineer.

For each one thousand (1,000) cubic yards of each type of backfill soil utilized, for which in-place soil density tests are to be performed, shall undergo a minimum of one (1) Proctor analysis to determine the maximum dry density and optimum moisture content of the soil material to be tested. Due to varying soil conditions,

additional Proctor analyses may be required by the Engineer. The number and locations of all samples to undergo Proctor analysis shall be as directed by the Engineer.

The Contractor shall retain the services of a testing laboratory, in accordance with Section 7.12 – Soil Density Testing, to make all compaction tests of backfill materials used and placed. All compaction tests shall be witnessed and verified by the Engineer. Proctor analyses and in-place soil density tests shall be performed in accordance with Section 7.12.

Unless otherwise provided for in the Contract no separate or additional payment shall be made for the depositing, compacting and sampling of backfill nor for the services of the approved testing laboratory, the costs thereof, shall be deemed included in the prices bid for all items of work.

The Contractor shall furnish the Engineer with copies of in-process compaction reports certified by a Professional Engineer as to the compliance with the requirements of the aforementioned filling and backfilling specifications. This certified compaction report shall be submitted as directed by NYCDDC QA.

The cost for all labor, materials, and equipment necessary and required to place, compact, sample and test provided acceptable backfill material shall be deemed included in the prices bid for all contract items of work. No separate or additional payment will be made for this work.

4.11.7. MEASUREMENT.

(A) EARTH EXCAVATION FOR STRUCTURES

Earth excavation within the limits of the work except for structures for which the contract prices include the cost of earth excavation, will be measured and allowed to the following limits:

	Payment Limits
For streets	Above the depth specified and between side limits specified.
For uncovering rock between grade and rock subgrade	Below grade and above the rock surface.
For the removal of boulders, loose fragments of rock, tree stumps, Roots and unsatisfactory material.	Below the depth specified and between side limits as directed.
For dry retaining walls. . . .	To depth specified and to vertical planes passing through the neat lines of the footings of the walls.
For masonry walls (except dry rubble), culverts and drains (except pipe drains)	To depths specified and to vertical planes passing one (1') feet outside of the neat lines of the structure.

(B) ROCK EXCAVATION IN STREETS, TRENCHES AND STRUCTURES

When rock surfaces in streets or trenches are uncovered, the Engineer shall be notified to provide the opportunity to make necessary measurements. Rock excavated or blasted before such measurements are made will not be paid for.

The qualities of rock to be measured for payment under each Rock Excavation item shall be the volume of ledge rock actually removed from within the following payment limits:

	Payment Limits
For streets	Above rock subgrade and between side limits specified.
For walls, culverts and other structures	Below rock subgrade to depths and to the payment lines specified.

(C) ADDITIONAL INCREMENTAL COST TO EXCAVATE ROCK AT DEPTHS GREATER THAN FIVE (5') FEET IN TRENCHES AND FOR STRUCTURES

For rock excavation within trenches and for structures, where the depth of rock excavation exceeds 5 feet below grade, that quantity of rock removed below five (5') feet of grade will be measured, under Item 4.11 BAA, for an additional incremental payment over and above that made for rock excavation under Item 4.11 AA. There is no minimum thickness of rock excavation for payment under Item 4.11 BAA.

(D) FILL, PLACE MEASUREMENT

All filling required to complete the work, between the ground surface as determined by the Engineer before the work of filling is commenced and the surfaces specified, and between rock subgrade and the surfaces specified, will be measured in place after compaction.

No payment or allowance will be made for:

(1) sinkage, shrinkage, and settlement;

(2) backfilling holes below grade caused by the removal of boulders, loose fragments of rock, tree stumps, roots and other unsatisfactory material;

(3) backfilling to original ground surface for culverts, drains, basin connections, and between structures and sides of excavations;

(4) fill which may be spread out beyond the embankment slopes specified;

(5) spaces occupied by subsurface structures over one (1) cubic foot in volume when the placement or construction of such structures is made on newly placed fill and is started while fill operations are in progress.

The spaces occupied by curbs, crosswalks, flagging, concrete sidewalks, gutters, culverts, drains, basin connections, manholes, receiving basins, seepage basins, inlets, and gas or water pipes or any appurtenances thereof, will not be deducted from the volume of filling to be paid for when the aforesaid structures are placed or constructed after filling operations have been completed and excavation of the newly placed fill is required for such placement or construction.

(E) FILL, VEHICLE MEASUREMENT

All fill required to complete the work of filling on unstable ground by vehicle measurement, between the limits specified, will be measured in cars, trucks, etc., at the place of deposit. In computing the amount of fill to be paid for, one (1) cubic yard of measured material in the vehicle will be paid for as eight-tenths (0.8) of a cubic yard of fill. For carload and truckload deliveries, only water level loads will be accepted and no allowance will be made for any crown or peak of the load.

(F) SELECT GRANULAR FILL, PLACE MEASUREMENT

The quantity of select granular fill to be measured for payment shall be the number of cubic yards of select granular fill used outside the limits of trench excavation, as ordered in writing by the Engineer, measured in place after compaction.

No payment or allowance will be made for fill placed beyond the limits specified.

(G) SELECT GRANULAR FILL, VEHICLE MEASUREMENT

All select granular fill required to complete the work of filling on unstable ground by vehicle measurement, between the limits specified, will be measured in cars, trucks, etc., at the place of deposit. In computing the amount of select granular fill to be paid for, one (1) cubic yard of measured material in the vehicle will be paid for as eight-tenths (0.8) of a cubic yard of fill. For carload and truckload deliveries, only water level loads will be accepted and no allowance will be made for any crown or peak of the load.

No payment or allowance will be made for fill placed beyond the limits specified.

4.11.8. PRICES TO COVER.

(A) EARTH EXCAVATION FOR STRUCTURES

The contract price per cubic yard for earth excavation for structures shall cover the cost of all labor, materials, equipment, and insurance required to complete the work of earth excavation within the contract limits, in full compliance with the requirements of the specifications, without regard to the subsequent use of the excavated materials.

(B) ROCK EXCAVATION IN STREETS, TRENCHES AND STRUCTURES

The contract price bid per cubic yard for rock excavation shall cover the cost of all labor, materials, equipment, and insurance required to complete the work of rock excavation within the contract limits, in full compliance with the requirements of the specifications without regard to the subsequent use of the excavated material.

In addition, included in the unit prices bid hereunder for rock excavation shall be the cost of all labor, material, plant, and equipment required to furnish and deliver acceptable select granular fill material required to fill the voids left by the removal of ledge rock.

(C) ADDITIONAL INCREMENTAL COST TO EXCAVATE ROCK AT DEPTHS GREATER THAN FIVE (5') FEET IN TRENCHES AND FOR STRUCTURES

The contract price bid per cubic yard for the additional incremental cost to excavate rock at depths greater than five (5') feet in trenches and for structures, shall cover the cost of all additional labor, materials, equipment required to complete the work of rock removal at depths exceeding five (5') feet below grade. Payment under this item will be made in addition to that made under Item 4.11 AA.

(D) FILL

The contract price per cubic yard for Fill, Place Measurement or Vehicle Measurement, shall cover the cost of all labor, materials, and equipment required to complete the work of filling within the contract limits in full compliance with the requirements of the specifications. All material excavated within the limits of the work which is used as filling will be paid for as filling.

When there is no price for Fill, the cost of furnishing and depositing any Fill required shall be covered by and included in the contract prices bid for all respective items of work.

(E) SELECT GRANULAR FILL

The contract price per cubic yard for Select Granular Fill, Place Measurement or Vehicle Measurement, shall cover the cost of all labor, materials, plant, equipment, insurance, and samples required to furnish and deliver the clean select granular fill material and to do all work incidental thereto, all in accordance with the Contract Drawings and Specifications and as directed by the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
4.11 AA	ROCK EXCAVATION IN STREETS, TRENCHES AND STRUCTURES	C.Y.
4.11 AS	EARTH EXCAVATION FOR STRUCTURES	C.Y.
4.11 BAA	ADDITIONAL INCREMENTAL COST TO EXCAVATE ROCK AT DEPTHS GREATER THAN FIVE (5) FEET IN TRENCHES AND FOR STRUCTURES	C.Y.
4.11 CA	FILL, PLACE MEASUREMENT	C.Y.
4.11 CB	FILL, VEHICLE MEASUREMENT	C.Y.
4.11 CC	SELECT GRANULAR FILL, PLACE MEASUREMENT	C.Y.
4.11 CD	SELECT GRANULAR FILL, VEHICLE MEASUREMENT	C.Y.

SECTION 4.12 – Header, Bluestone and Granite

4.12.1. INTENT. This section describes construction of Bluestone and Granite Header.

4.12.2. DESCRIPTION. Header shall be bluestone or granite as specified.

4.12.3. MATERIALS.

(A) HEADER

Header shall comply with the requirements of **Section 2.12, Curbs, Headers, and Slabs, Granite and Bluestone**, for the type and corresponding size specified.

(B) CONCRETE CRADLE

Concrete cradle for header shall comply with the proportion and strength requirements of **Section 3.05**, Class B-32, Type IA. The requirements for air entrainment shall not apply.

Coarse aggregate shall comply with the requirements of **Section 2.02**, Size No. 57, Type 1, Grade B, or Type 2.

Fine aggregate shall comply with the requirements of **Section 2.21**, Type 1A, except that 5 to 30 percent shall pass a No. 50 sieve.

4.12.4. METHODS.

(A) EXCAVATION

Excavation shall be made to dimensions sufficient to permit the construction of cradle and setting of header. It shall be made to a depth of six (6”) inches below the specified depth of header, and to a width of not less than eighteen (18”) inches. The trench shall be open to its full width and depth for a distance of not less than twenty (20’) feet in advance of the setting of the header.

(B) UNDERLYING MATERIAL

The material underlying the header cradle shall be satisfactory and thoroughly compacted. If unsatisfactory, it shall be removed and replaced with acceptable material, thoroughly compacted.

(C) CONCRETE CRADLE

The cradle shall be eighteen (18”) inches wide and extend six (6”) inches below the specified depth of header. The concrete shall be brought up on both sides of the header for a height of six (6”) inches. It shall be composed of stiff concrete thoroughly tamped in place. The concrete shall be laid not more than twenty (20’) feet in advance of setting the header. The portions of the concrete cradle in front and back of header shall be placed and thoroughly compacted as soon as the header is brought to line and grade, and before the concrete under the header has set.

(D) SETTING

Header shall be set centrally on the concrete cradle with top at grade, and with joints not less than one-eighth (1/8”) inch and not more than one-quarter (1/4”) inch for four (4”) inches below grade.

(E) BACKFILLING

Backfilling shall be of clean earth or other approved material satisfactorily compacted.

4.12.5. MEASUREMENT. The length of header constructed, as required, will be measured and paid for in accordance with **Section 5.04**.

4.12.6. PRICES TO COVER. The contract price per linear foot of header with cradle for each type of header shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct the header complete with cradle in place, including excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specification, to furnish such samples for testing, and to provide such testing equipment, laboratory space and facilities as may be required and to maintain the header in good condition as required in **Section 5.05**.

Payment will be made under:

Item No.	Item	Pay Unit
4.12 BH	NEW BLUESTONE HEADER, 4” x 12”	L.F.
4.12 GH4	NEW GRANITE HEADER, 4” x 12”	L.F.
4.12 GH6	NEW GRANITE HEADER, 6” x 12”	L.F.

SECTION 4.13 – Sidewalk, Concrete

4.13.1. INTENT. This section describes construction of Concrete Sidewalk.

4.13.2. DESCRIPTION.

(A) Concrete Sidewalk shall be of the width specified and shall be laid on a foundation six (6") inches thick, unless otherwise specified.

(B) Sidewalk shall consist of a single course of concrete four (4") inches thick, except in driveways and corner quadrants where it shall be seven (7") inches thick.

(C) Sidewalk joints shall be either the standard type where both expansion joints and scored dummy joints are tooled with neatly rounded edges and bounded on all sides by a troweled border about one (1") inch in width; or, sidewalk joints shall be of a saw cut type where expansion joints are given a saw cut finish and scored dummy joints are saw cut. When saw cut type joints are not specified the standard type joint shall be used.

(D) Concrete shall be pigmented when specified.

(E) Pigmented concrete shall have a silicon carbide surface treatment when specified.

4.13.3. MATERIALS.

(A) Material for foundation shall consist of:

1. Size No. 3 broken stone or gravel complying with the requirements of **Section 2.02**, 100 percent of which passes a 2-1/2" square sieve; or
2. approved broken concrete, 100 percent of which passes a 2-1/2" square sieve, containing not more than five (5) percent material passing a No. 200 mesh sieve, not more than five (5) percent material passing a 1/2" square sieve, not more than fifteen (15) percent passing a 1" square sieve, not more than thirty-five (35) percent passing a 1-1/2" square sieve, and not more than five (5) percent retained on a 2" square sieve; or
3. other approved granular material, 100 percent of which passes a 2-1/2" square sieve, containing not more than five (5) percent material passing a No. 200 mesh sieve and not more than five (5) percent retained on a 2" square sieve, with not more than 30 percent by weight of glass or Recycled Porcelain Aggregate (RPA) or the combination of both glass and RPA. If used, glass and/or RPA shall conform to the applicable paragraphs of **Sections 4.11.3.(B), 4.11.3.(E) and 4.11.3.(F)**.

(B) Concrete shall comply with the requirements of **Section 3.05**, Class B-32, Type IIA, unless otherwise specified. Concrete shall be mixed in compliance with Methods A, B, C, or D of **Section 3.05**, except that hand mixing shall not be permitted unless specifically authorized by the Engineer. Coarse aggregate for one course sidewalk shall comply with the requirements of **Section 2.02**, Type 1, Grade B, Size No. 57, or Type 2.

The target water cement ratio will be 0.44.

(C) Pigmenting material shall comply with the requirements of **Section 2.19**.

(D) Preformed expansion joints shall comply with the following requirements:

1) For Standard Type Sidewalks. The preformed expansion joints shall comply with the requirements of **Section 2.15**, and shall be one-quarter (1/4") inch or one-half (1/2") inch thick, at the Contractor's option. Joint sealer for sealing joints over preformed joint filler shall comply with the requirements of **Section 2.22**, Type 2 – Cold application sealer. Where concrete is designated to be pigmented then the sealant shall match that color.

2) For Sidewalks Designated to have Saw Cut Type Joints. The preformed expansion joints shall be an approved non-bituminous premolded joint material in compliance with the requirements of **Section 2.15**, and shall be one-quarter (1/4") inch thick except along the building line where they shall be one-half (1/2") inch thick. Joint sealant for sealing joints over preformed joint filler shall comply with the requirements of **Section 2.22**, Type 2 – Cold application sealer. Color of sealant

shall be charcoal to match that used at 120 Broadway in the Borough of Manhattan or shall match that of the adjacent existing sidewalk, as directed.

(E) Reinforcement shall comply with the requirements of **Section 4.14**, as applicable.

(F) Silicon Carbide shall be Silicarbid as manufactured by Anti-Hydro, telephone number (800) 777-1773; Sparkle Grain as manufactured by Pacific Palette Concrete Products, telephone number (831) 457-4566; Carborex WSC as manufactured by Washington Mills, contract Mr. Craig Williams, telephone number (508) 839-6511, ext. 214; or an approved equivalent. Silicon carbide crystals shall have a Moh Scale hardness of at least 9 and a grit size of either 16/30 or 16/36.

4.13.4. METHODS. To comply with ADA requirements, the Contractor may be required to break the transverse grade of sidewalks such that there shall be a minimum of five (5') feet width of sidewalk with a transverse slope not exceeding 2% and the remaining sidewalk slope not exceeding 5%. No additional payment will be made for this work which may include, but not be limited to, providing additional form work, finishing, contouring to meet adjacent, and placement operations.

(A) EXCAVATION AND EARTH SUBGRADE

Excavation shall be made to dimensions sufficient to accommodate placement of foundation material and to permit the setting of forms.

Where directed, the Contractor shall sawcut the existing sidewalk along existing score lines and other partial panel or slab locations, as directed by the Engineer, to facilitate replacement of sidewalk while at the same time minimizing the impact on good sidewalk not requiring replacement. All work must be done in a safe and workmanlike manner, to the satisfaction of the Engineer. The sawcut shall be for the full depth of sound concrete or stone sidewalk to the top of the underlying foundation. The sawcut shall be straight with sharp edges. No cutting or encroachment into adjacent panels or slabs will be permitted. All saw cutting shall be done with a water lubricated diamond blade. No separate payment will be made for sawcutting existing sidewalk. The cost of sawcutting sidewalk shall be deemed included in the price bid for the concrete sidewalk item.

The earth subgrade, immediately before foundation material is placed on it, shall be compacted to a minimum of 95 percent of Standard Proctor Maximum Density, smooth, parallel to and at the required depth below the finished sidewalk surface and be dampened with water sufficient only to be absorbed by the subgrade. The subgrade shall not be in a muddy or frozen condition and unsuitable material shall be removed and replaced with acceptable material thoroughly compacted.

(B) FOUNDATION

All existing material within the required six (6") inches of foundation shall be removed in its entirety and replaced with material complying with **Subsection 4.13.3.(A)** herein above. The excavated material shall become the property of the Contractor and shall be removed from the site to the Engineer's satisfaction.

Foundation material shall be placed on the prepared subgrade, in a manner to minimize segregation, using equipment and procedures approved by the Engineer. Uncontrolled spreading from piles dumped on the grade resulting in segregation will not be permitted. Foundation material shall then be wetted to the optimum moisture content, based on a laboratory 5 point Proctor density test, and thoroughly compacted using an approved plate compactor into a course not less than six (6") inches thick. Compaction of foundation material shall range between 90% and 95% of the Standard Proctor Maximum Density, as directed by the Engineer, depending upon material used. Unsatisfactory subgrade material shall be removed and replaced with acceptable material thoroughly compacted to a minimum of 95% of Standard Proctor Maximum Density. The top surface of the foundation material shall be parallel to the finished grade and at a distance below the grade equal to the specified thickness of concrete. Additional depth of foundation material for special conditions shall be placed as directed by the Engineer.

(C) FORMS

Forms shall be made of substantial material (preferably steel) with suitable metal dividing plates and of sufficient strength to satisfactorily resist distortion when fastened together and secured in place. Forms and dividing plates shall be of a depth not less than that of the concrete sidewalk, be properly located with tops set to the designated sidewalk surface and be left in place until the concrete has hardened.

(D) REINFORCEMENT

Where sidewalk is specified to be reinforced, the Contractor shall furnish and install a welded wire fabric as per the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1045. The wire fabric reinforcement shall be laid in sheets which are straight and true to form and shall be securely held in position by approved methods so that they will be in their prescribed position after the concrete has been placed.

(E) SLABS

Concrete sidewalk shall be built in approximately twenty (20') feet slabs between expansion joints, as specified, or if in independent slabs, as directed. Expansion joints in sidewalk shall coincide with expansion joints in curb.

Around hydrants and wood poles, sidewalk slabs shall be constructed as independent slabs, separated by expansion joints, as directed.

Dummy scored joints one-eight (1/8") inch wide shall be provided where directed. For standard finish sidewalks the dummy scored joints shall be not less than one-half (1/2") inch in depth. For sidewalks designated to have a saw cut type joint finish the dummy scored joints shall be saw cut not less than three-quarter (3/4") inch in depth.

(F) EXPANSION JOINTS

Unless otherwise directed by the Engineer and excluding sign and parking meter posts, expansion joints shall be installed at all joints between the sidewalk slabs and curb, street hardware, wood poles, street light and traffic pole foundations, bollard foundations, hydrant foundation slabs, buildings, bridges, etc.

Expansion joints for tooled joint sidewalks shall be one-quarter (1/4") inch or one-half (1/2") inch in width, at the Contractor's option, and shall be filled with preformed joint filler to within one (1") inch of the sidewalk surface. The top one (1") inch shall be sealed with Type 2 – Cold application sealer poured on an approved bond breaker in accordance with the manufacturer's instructions.

Expansion joints for saw cut joint sidewalks shall be one-quarter (1/4") inch wide except along the building line where they shall be one-half (1/2") inch wide, and shall be filled with preformed joint filler to within one (1") inch of the sidewalk surface. The top one (1") inch shall be sealed with Type 2 – Cold application sealer poured on an approved backer rod in accordance with the manufacturer's instructions. Color of sealant shall be charcoal to match that used at 120 Broadway in the Borough of Manhattan or shall match that of the adjacent existing sidewalk, as directed.

(G) CONCRETE COURSE

Foundation material shall be thoroughly wetted, to the satisfaction of the Engineer, immediately before concrete is placed. The greater the porosity of the material (i.e. broken concrete), the more water required to prevent water absorption from the concrete. The concrete shall be placed within the forms and thoroughly tamped until the surface is at the finished grade.

Along all joints and around all protrusions into the concrete such as manholes, valve boxes, vaults, etc., and along the inside of the forms, hand operated immersion type vibrators shall be used to thoroughly consolidate the concrete. Vibrators shall not come in contact with forms, shall not be used for moving concrete in the work, and in no case shall any vibrator be operated longer than four (4) seconds in any one location. The Contractor shall be required to furnish a minimum of three (3) hand operated immersion type vibrators to the job site, one of which shall be used as a backup for the other two.

(H) PIGMENTING

Where pigmenting is specified or required, the concrete sidewalks must be pigmented with an admixture complying with the requirements of **Section 2.19.**

Prior to Commencement of Work, the Contractor must submit the name of the proposed sidewalk installer upon which the Contractor's bid is based, along with their respective work history experience in placing pigmented concrete. The installer must have documented experience in working with pigmented concrete.

Prior to making any field samples and the placing of any pigmented concrete, the Contractor, its concrete supplier, installer, cement producer, laboratory, the pigmented admixture's representative, and the Engineer must meet and agree on the procedures and methods of handling the pigmented concrete.

All pigmented concrete at different locations must be identical, unless otherwise directed. Variations in color/tint/hue will not be acceptable. Therefore, the same brand and type of Portland cement and the same source and type of aggregate must be used throughout the Project.

Prior to the mix design being made, the Portland cement intended for use must be checked to determine that its lightness/darkness is similar to the Portland cement used in the original approved sample. The pigmented admixture must be added in the standard proportion specified by the manufacturer. No fly ash or other admixtures (including, but not limited to, calcium chloride) must be used except an air-entraining agent complying with ASTM Designation C260, when directed by the Engineer.

Prior to commencing the placement of concrete, but after acceptance and approval of the pre-construction field sample, the Contractor must submit properly labeled and identified samples of materials used in the approved sample, as follows:

Coarse Aggregate	20 pounds
Fine Aggregate	20 pounds
Portland cement	20 pounds
Pigmented admixture	1 pint
Joint sealer	2 linear feet
Surface sealer	1 pint
Mix design	1 certified copy
Silicon Carbide Aggregate	20 pounds (when specified)

These samples are in addition to the sampling required by **Section 5.02** and must be stored where directed by the Engineer and will constitute material standards for the Project. During construction, one (1) pint of Portland cement from each load of Portland cement delivered to the plant to be used in this specific job must be retained and, after comparison with retained master sample, dated and stored with other retained samples. The aggregate source must also be checked periodically, as directed by the Engineer, and compared with retained samples.

(I) SURFACE FINISH

1. Sidewalks with Standard Tooled Joint Finish. Top surfaces of sidewalk shall be finished to true smooth planes by screeding, and finally by wooden floats, then lightly broomed to a uniform texture. Each rectangular slab shall have all edges including, edges along buildings, walls, steps and other structures on abutting properties, neatly rounded with proper tools and be bounded on all sides by a troweled border about one (1") inch in width. Unless otherwise specified in the Contract Documents, the concrete surface shall be scored and tooled parallel to and perpendicular to the curb line at intervals of five feet.

The City has established for each Borough an esthetic and/or visual quality standard for concrete sidewalks consisting of a full scale reference installation. Reference standards are located within the Boroughs at:

Brooklyn:	Willoughby St. between Flatbush Avenue and Gold Street, North Side
Queens:	226th Street from South Conduit Avenue to 148th Avenue
Manhattan:	125 West End Avenue (in front of ABC Studios), Center Mall in Malcolm X Blvd. between 120th St. and 121st St., and pedestrian ramp in the southwest corner quadrant of Malcolm X Blvd. and 121st St.
Bronx:	West side of Whittier Street northward of Ryawa Avenue, between the northwest corner of the intersection at Ryawa Avenue and the first driveway.
Staten Island:	Watchogue Road from Wooley Ave. to Demorest Ave.

The Contractor shall be required to visit and inspect the applicable Borough location as it will be used as a standard of reference for approving and/or rejecting the Contractor's workmanship. Workmanship will be judged for uniformity in surface finish, texture, color, joint construction, joint tooling, line and grade, and overall appearance of sidewalk in comparison to the reference standard. Where the Contractor fails to

meet the established standard of workmanship for sidewalk installation, as determined by the Commissioner, the Contractor shall be required to replace or rebuild the finished work as directed, in accordance with the Maintenance and Guaranty provisions, under Article 24 of the Standard Construction Contract.

Furthermore, prior to the start of any concrete sidewalk installation work, the Contractor shall construct, for each different concrete color, test standard(s) for the project consisting of approximately 100 linear feet of ribbon sidewalk, if any, and approximately 100 linear feet of full-width sidewalk, if any, at location(s) directed by the Engineer, which shall match, in all respects, the below reference standard. When approved by the Engineer, these test standards shall become the quality standards for the project. The Contractor shall not proceed with the balance of the concrete sidewalk work required for the project until the Engineer has approved, in writing, these test standards.

2. Sidewalks with Saw Cut Joint Finish. Top surfaces shall be finished to true smooth planes by screeding, and finally by wooden floats, then lightly broomed to a uniform texture. Broom finish shall be applied in straight lines, at right angles to the direction of sidewalk traffic. Unless otherwise specified in the Contract Documents, shrinkage control joints in the concrete surface shall be scored by sawcutting one-eight (1/8") inch wide and three-quarters (3/4") deep immediately after the concrete has reached its initial set which is typically anywhere from 4 to 8 hours after the concrete has been poured, depending upon the weather, but in no case shall it be later than 12 hours after pouring. All sawcuts are to be straight, clean, and of consistent width. Joints are to be either perpendicular to the curb or parallel to the curb at 5'-0" on center, unless otherwise shown on the contract drawings.

Top surfaces shall be finished as specified above, except that the final color of concrete mix shall closely match the sidewalks in Manhattan at 120 Broadway, as approved by the Engineer, unless otherwise specified. Before providing the required sample panel(s) under **Section 2.19**, the Contractor shall prepare 6 inch x 6 inch x 4 inch samples of pigmented concrete. As many samples as necessary shall be produced until the color is satisfactory to the Engineer. Final color of concrete curing membrane shall match the pigmented concrete pavement.

Furthermore, prior to the start of any concrete sidewalk installation work, the Contractor shall construct, for each different concrete color, test standard(s) for the project consisting of approximately 100 linear feet of ribbon sidewalk, if any, and approximately 100 linear feet of full-width sidewalk, if any, at location(s) directed by the Engineer, which shall match, in all respects, the below reference standard. When approved by the Engineer, these test standards shall become the quality standards for the project. The Contractor shall not proceed with the balance of the concrete sidewalk work required for the project until the Engineer has approved, in writing, these test standards.

3. Sidewalks with Saw Cut Joint Finish and Silicon Carbide Surface. In addition to the requirements for Sidewalks with Saw Cut Joint Finish, above, the top surface of sidewalk shall have silicon carbide applied at the rate of 20 to 25 lbs./100 S.F., as follows, unless otherwise directed by the manufacturer.

Immediately after substrate surface has been leveled and wood floated, before bleed water has appeared, the silicon carbide shall be applied evenly while there is sufficient moisture in the slab to saturate at least two dust-on coats. Troweling must be started early enough to complete all operations without use of additional water on the surface. Distribute the silicon carbide crystals uniformly (at the rate of 20 – 25 lbs, per 100 sq.ft.) either by hand or mechanical spreader over prepared wet slab. Crystals shall be applied in three separate shake coats. Use one-third (1/3) of the required quantity of crystals for the first application. Apply second application slightly after first application is floated. Do not throw the crystals or broadcast them with a shovel. Use an evenly distributed hand broadcast.

Trowel crystals uniformly into surface after each shake coat. After the second shake coat of crystals have been troweled once, sprinkle the third coat over the surface. The surface must be uniformly coated. Use a steel trowel to leave grains at surface covered with a thin film of cement paste.

The final finish may be lightly troweled to produce a smooth surface free from defects or blemishes. Finish troweling shall be delayed until surface has set sufficiently to avoid burying the crystals, but must be accomplished before finish has hardened.

Exposure of the silicon carbide crystals shall be accomplished with either of the following methods provided it results in a satisfactory finish:

a) Water and a soft broom, or sponge. Allow concrete surface to set sufficiently so that light scrubbing will not cause pitting; or,

b) A light 5% to 10% Muriatic acid washing to expose grains after the concrete is at least 2 weeks old. Acid shall be removed from the finished surface with clean water within 15 minutes after application; or,

c) Other methods, as approved by the Engineer.

(J) BACKFILLING

Backfilling shall follow the removal of forms as soon as practicable and, unless otherwise permitted, shall be of clean earth, satisfactorily compacted.

(K) SURFACE CURING AND PROTECTION

Pigmented concrete sidewalk shall be covered with a color-matched curing membrane complying with the requirements of **Section 2.19**.

Unpigmented concrete sidewalk shall be covered with a clear curing compound consisting of a wax-free vehicle, ready mixed for immediate use without alteration, containing a fugitive dye that will fade uniformly, and complying with the requirements of **Section 2.14, Curing Materials**, Type 1-D, Clear. When applied to freshly placed damp concrete at the rate of one gallon per one hundred fifty (150) square feet, it shall provide a curing membrane displaying the following properties:

(1) Drying. The compound shall produce a uniform coating at a minimum temperature of 40 Deg. F. and shall dry tack-free within four (4) hours.

(2) Permeability. The moisture loss through the membrane shall be no more than 0.04 grams per square centimeter of surface area after three (3) days.

(3) Durability. The membrane shall remain intact for at least seven (7) days.

Curing compound for pigmented concrete and for unpigmented concrete shall each be delivered to the Project only in the manufacturer's original containers which shall be legibly marked with the manufacturer's name, trade name, batch number and date. One batch number shall be used to represent not more than one formula. The containers shall only be opened in the presence of the Engineer.

After their use and prior to their disposal, the Contractor shall have available, for inspection by the Engineer, the empty compound containers, and may dispose of them only after certification by the Engineer. The re-use of any of the containers will be permitted only if approved by the Engineer.

Curing compounds shall be sprayed on the exposed sidewalk surfaces prior to the hardening of the sidewalk concrete and immediately after the concrete water sheen has disappeared. The application of the compounds shall comply with the requirements of **Section 2.14**. The treated surfaces shall be protected from injury for at least ninety-six (96) hours.

Where the Contractor fails to cure the concrete sidewalk in accordance with the requirements of this provision, the Contractor shall be required, at no additional cost to the City, to replace, in its entirety, any sidewalk slab which did not receive, in part or in whole, the specified cure.

Concrete sidewalk shall be carefully protected against injury from rain, frost, the drying effects of the sun and wind, traffic or other causes, by means of suitable guards and covering.

(L) MEETING EXISTING SIDEWALK GRADES

Asphaltic concrete mixture shall be placed, as directed, at locations designated by the Engineer behind newly constructed sidewalk to meet existing sidewalk grades.

4.13.5. MEASUREMENT. The area of concrete sidewalk in square feet and the amount to be paid for under each item shall be determined by cores as provided in **Section 5.04**.

In determining the area of Concrete Sidewalk to be paid for, the areas occupied by the tree wells, bases of columns, manhole heads, gate boxes and similar structures will be deducted from the measured area of concrete sidewalk when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

The Engineer's estimate of quantity of concrete sidewalk for comparing bids is approximate and is based on non-compliance of the owners of the properties abutting this highway improvement with the Commissioner's notice to them to construct the sidewalk in front of their premises. The aforesaid quantity may be reduced or eliminated, after contract award, in the event property owners comply with the Commissioner's notice.

The Contractor is not to proceed with any sidewalk construction unless ordered to do so by the Commissioner or the Contractor's authorized representative.

4.13.6. PRICES TO COVER.

(A) CONCRETE SIDEWALK

The contract price per square foot for concrete sidewalk must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)**. The unit price must include, but not be limited to, pigment when specified, silicon carbide when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the Specifications, to construct test standards, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**. Proctor analysis and in-place soil density testing are not covered by this section and will be paid separately using appropriate item under **Section 7.12.**

(B) CONCRETE SIDEWALK WITH SPECIAL SCORING

The contract price per square foot for concrete sidewalk with special scoring must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)** and special scoring patterns shown on the Contract Drawings. The unit price must include, but not be limited to, pigment when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the Specifications, to construct test standards, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**. Proctor analysis and in-place soil density testing are not covered by this section and will be paid separately using appropriate item under **Section 7.12.**

(C) CONCRETE SIDEWALK ON EXISTING FOUNDATION

The contract price per square foot for concrete sidewalk must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place on existing foundation material. The unit price must include, but not be limited to, pigment when specified, silicon carbide when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**. Proctor analysis and in-place soil density testing are not covered by this section and will be paid separately using appropriate item under **Section 7.12.**

(D) REINFORCED CONCRETE SIDEWALK

The contract price per square foot for concrete sidewalk must cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct a reinforced concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)**. The unit price must include, but not be limited to, reinforcement, pigment when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to

furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**. Proctor analysis and in-place soil density testing are not covered by this section and will be paid separately using appropriate item under **Section 7.12.**

(E) SPECIAL SCORING FOR CONCRETE SIDEWALK

The contract price per square yard for special scoring of concrete sidewalk must cover the cost of scoring dummy joints in new concrete sidewalks within the limits and in the pattern(s) shown on the Contract Drawings for Special Scoring.

New 4” and 7” Concrete Sidewalks will be paid for separately under their respective items. No separate payment will be made for standard scoring of sidewalk. Where no separate item of work is included in the contract, the cost of Special Scoring must be deemed to be included in the price bid for Concrete Sidewalk.

(F) ASPHALTIC CONCRETE MIXTURE

Asphaltic concrete mixture placed in compliance with **Subsection 4.13.4.(L)** will be paid for at the upset price of Thirty Dollars ($30.00) per ton, in place, except that such mixture will be paid for at the price bid therefor per ton when there is a scheduled item for Asphaltic Concrete Mixture.

Payment will be made under:

Item No.	Item	Pay Unit
4.13 AAS	4” CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 ABS	4” CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 AAT	4” CONCRETE SIDEWALK ON EXISTING FOUNDATION (UNPIGMENTED)	S.F.
4.13 ABT	4” CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED)	S.F.
4.13 AAX	4” CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 ABX	4” CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 AR	4” REINFORCED CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 BAS	7” CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 BBS	7” CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 BAT	7” CONCRETE SIDEWALK ON EXISTING FOUNDATION (UNPIGMENTED)	S.F.
4.13 BBT	7” CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED)	S.F.
4.13 BAX	7” CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 BBX	7” CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 BR	7” REINFORCED CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 BRP	7” REINFORCED CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 BRX	7” REINFORCED CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 BRXP	7” REINFORCED CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 CABS	4" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSABS	4" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CABST	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CABXUN	4" CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSABST	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CBBS	7" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSBBS	7" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CBBST	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CBBXUN	7" CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED) (SAW CUT TYPE JOINTS)	S.F.

4.13 CSBBST	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 FR	5” REINFORCED CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 X	SPECIAL SCORING OF CONCRETE SIDEWALK	S.F.

SECTION 4.13 DWS – Detectable Warning Surface

4.13DWS.1. DESCRIPTION. This work will consist of furnishing and installing detectable warning surface as indicated on the plans or elsewhere in the Contract Documents. The sidewalk surface as specified in the Contract Drawings must be finished with a detectable warning surface as specified herein.

4.13DWS.2. MATERIALS.

A. GENERAL REQUIREMENTS: The Contractor must supply the Manufacturer's certification that the detectable warning surface material meets the requirements of these specifications, at least 30 calendar days prior to proposed installation. The detectable warning surface material must:

1. Meet the dimensional details and other requirements as noted on the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1011.
2. Be composed of cementitious material, steel, iron, clay, shale, plastics, polymeric materials, resins, pigments, or as approved by the Engineer.
3. Color must contrast visually with adjacent walking surfaces (either light-on-dark or dark-on-light per the US Department of Justice (DOJ) ADA Standards for Accessible Design, Section 705.1.3) as approved by the Engineer, and shall be as follows:
    a) The following sidewalk materials, or those that are visually approximate, must utilize detectable warning surfaces that are an approximate visual match to the Red color of SAE Standard AMS-STD-595 #31350:
        i) Unpigmented concrete per **Section 4.13**
        ii) Unpigmented concrete with silicon carbide surface treatment per **Section 4.13**
    b) The following sidewalk materials, or those that are visually approximate, must utilize detectable warning surfaces that are an approximate visual match to the Bright White of SAE Standard AMS-STD-595 #27925:
        i) "Commercial Grey" pigmented concrete per **Section 4.13**
        ii) "Commercial Grey" pigmented concrete with silicon carbide surface treatment per **Section 4.13**
        iii) "Granite" pigmented concrete per **Section 4.13**
        iv) Stony Creek pink granite
        v) Virginia Mist granite, including the Waterstorm, Thermal, and Split finishes
        vi) Red brick pavers
        vii) Black asphalt
4. Be uniform in color and texture.
5. Have a good appearance, free of cracks or other defects.
6. Have clean-cut and well-defined edges.
7. Be weather resistant and durable to normal pedestrian wear and maintenance activities.
8. Show no appreciable fading, lifting, or shrinkage.
9. Have friction characteristics similar to a broomed Portland cement concrete sidewalk surface as determined by the Engineer.
10. Setting bed material and/or surface preparation materials for installation of detectable warning units must be in accordance with the manufacturer's recommendations.
11. Adhere to granite slabs, hot mix asphalt (HMA), or Portland cement concrete surfaces, as applicable.

B. PHYSICAL PROPERTIES:

PROPERTY	REQUIREMENTS
Compressive Strength, Min., 28 days	8 ksi (55 Mpa) Minimum
Freeze-thaw Loss (25 Cycles, one per day, 10% NaCl solution)	1.0% Maximum

C. PACKAGING AND SHIPMENT: detectable warning surface must be shipped in accordance with commercially accepted standards. The following information must be marked on each package or on the shipping invoice: the name of the product, the name and address of the manufacturer, and the quantity of material.

D. BASIS OF MATERIALS ACCEPTANCE: Acceptance of materials will be based upon it being listed in the most current New York State Department of Transportation's Approved List of Detectable Warning Units.

4.13DWS.3. CONSTRUCTION DETAILS.

A. PLASTIC CONCRETE INSTALLATIONS

Preformed, embedded detectable warning units may be installed in plastic concrete, installed directly on existing subbase prior to placing concrete, inlaid on prepared concrete surfaces, or as otherwise recommended by the manufacturer or specified in the Contract Documents. The thickness of concrete sidewalk below the embedded detectable warning units is four (4") or seven (7") inches, as specified in the Contract Documents; the total thickness of sidewalk from the top of the embedded detectable warning units to the base of the concrete sidewalk must be the specified concrete thickness plus the thickness of the embedded detectable warning units. The concrete transition from the detectable warning surface location to adjoining concrete sidewalk must not be sloped greater than 50% (1:1).

Detectable warning units must not bridge between two concrete elements (i.e., not installed over the joint between a curb and sidewalk slab). Detectable warning units must be installed per manufacturer's written recommendations. Substrate edge conditions must be per manufacturer's written recommendation.

The Contractor will be required to follow all applicable manufacturer's requirements for environmental conditions, surface preparations, installation procedures, curing procedures, and materials compatibility.

Immediately prior to setting each warning unit in place, the installer must mortar the bottom of each unit to ensure that full contact is made with the setting bed after each unit is set firmly and evenly bedded to the required grade and pitch, and brought to an even surface across joints. After the first unit is set in place and periodically thereafter as directed by the Engineer, to verify the Contractor's method of work, warning units shall be lifted immediately after setting in place to verify that full contact is being made with the setting bed. Any gaps must be filled with additional wet bedding mixture, as may be required, and the work method adjusted, as approved by the Engineer, to prevent the occurrence of voids.

Preformed detectable warning units (excluding their raised truncated domes) must be set flush with a top surface elevation tolerance of 1/16" between adjacent units but not more than $\pm$1/32" at perimeters between pavers and adjacent curb or sidewalk surfaces.

B. SURFACE INSTALLATIONS

Surface applied detectable warning units may be applied to existing curb ramps, formed and bonded to existing granite slabs, Hot Mix Asphalt (HMA) or Portland cement concrete (PCC) surfaces, or as otherwise directed by the manufacturer or specified in the Contract Documents.

Detectable warning units must not bridge between two concrete elements (i.e., not installed over the joint between a curb and sidewalk slab).w

The Contractor must follow all applicable manufacturer's requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

Prior to the start of work, the Contractor must show evidence of successful completion of similar installations and provide a job site sample for the approval of the Engineer. The sample size must be five (5') feet x two (2') feet, minimum, and applied at a location selected by the Engineer. All subsequent work shall conform

to the appearance of the approved sample. The sample must not be incorporated into the work and shall be removed when ordered by the Engineer.

The Contractor must follow all applicable suppliers and manufacturer's requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility.

At a minimum, surfaces must be cleaned using mechanical sweepers, power brooming, or hand brooming. Curing compounds or heavier contamination shall be cleaned by abrasive blasting or other means as approved by the Engineer.

Differences in elevation between adjacent surfaces of sidewalk, curb and the detectable warning surface must not be more than 3/32" at the perimeters.

For temporary installation, the surface beneath the detectable warning surface must be repaired to the satisfaction of the Engineer. Any metal anchors must be removed or recessed at least 1-1/2" below the surface and anchor holes must be filled with mortar. Any mastic or adhesive must be removed.

4.13DWS.4. MEASUREMENT.

The quantity of Embedded Preformed Detectable Warning Units, Embedded Preformed Radial Detectable Warning Units, and Surface Applied Detectable Warning Units to be measured for payment will be the number of square feet, measured to the nearest tenth (0.1) of a square foot, installed to the satisfaction of the Engineer.

The quantity of Surface Applied Detectable Warning Units (temporary) to be measured for payment will be the number of square feet, measured to the nearest tenth (0.1) of a square foot, installed, maintained, and removed to the satisfaction of the Engineer.

4.13DWS.5. PRICE TO COVER. The unit price bid per square foot must include all labor, material, equipment, insurance, and incidentals necessary to complete the work, including but not limited to bedding material, job site sample(s), repairs, surface preparation, restoration of substrate surface, and clean up.

Payment for items Embedded Preformed Detectable Warning Units and Embedded Preformed Radial Detectable Warning Units will be in addition to payment for the concrete sidewalk pavement item on which the preformed detectable warning unit is installed.

Additionally, no adjustment in payment will be made for concrete removed to accommodate embedded units.

Payment will be made under:

Item No.	Item	Pay Unit
4.13 DE	EMBEDDED PREFORMED DETECTABLE WARNING UNITS	S.F.
4.13 DER	EMBEDDED PREFORMED RADIAL DETECTABLE WARNING UNITS	S.F.
4.13 DSA	SURFACE APPLIED DETECTABLE WARNING UNITS	S.F.
4.13 DSAT	SURFACE APPLIED DETECTABLE WARNING UNITS (TEMPORARY)	S.F.

SECTION 4.14 – Steel Reinforcement in Concrete

4.14.1. INTENT. This section describes installation of Steel Reinforcement in Concrete.

4.14.2. DESCRIPTION. Steel Reinforcement for Concrete shall be of steel bars or welded steel wire fabric, as specified and as shown on the Contract Drawings.

4.14.3. MATERIALS.

(A) Steel reinforcement shall comply with the requirements of the following sections:

Steel Bars – **Section 2.23**

Welded Steel Wire Fabric – **Section 2.25**

Epoxy Coating – Epoxy coating must be a material listed on NYSDOT Approved List 709-0400ER, and the epoxy coating must be applied by an applicator listed on NYSDOT Approved List 709-0400A. If epoxy coated bars are to be fabricated off site, the fabricator must be on NYSDOT Approved List 709-0400F.

(B) Size and placement shall be as specified and as shown on the Contract Drawings.

(C) Dowel bars, if required, shall be of a type, size and placement as specified and as shown on the Contract Drawings.

(D) Shop drawings of reinforcing steel showing the location and type of supports and tie wires shall be submitted to the Engineer for approval before any work covered by these drawings is undertaken.

Any errors discovered in these drawings will be corrected by the Engineer, but failure to discover errors shall not relieve the Contractor of responsibility, and any incorrect work resulting therefrom shall be corrected by the Contractor at no expense to The City.

The Contractor shall obtain the Engineer's approval of the proposed reinforcement before ordering.

4.14.4. METHODS.

(A) FABRICATION AND PROTECTION

Steel reinforcement bars shall be delivered in bundles or fabricated mats, and shall have the manufacturer and size of steel identified by attached metal tags when one-quarter (1/4") inch or less in size and by rolled raised symbols or letters when greater than one-quarter (1/4") inch, or by other means acceptable to the Engineer. Where reinforcement bars are delivered in bundles, they shall be securely wired. Bars shall be identified with heat number marked on attached tag.

Bar mats shall have bars of the size and spacing required and be made up in sections of the length and width required. They shall be fastened together in an approved manner at each intersection.

Reinforcement bars shall be protected at all times from mechanical injuries and from the weather and, when placed in the work, shall be free from injurious dirt, defects, paint and oil, and have a workmanlike finish. Bars which will remain exposed for some time after being placed in the work shall, if directed, be immediately coated with thin grout composed of equal parts of Portland cement and sand.

Steel wire fabric shall be protected from moisture, and, when placed in the work, shall be free from grease, injurious rust, dirt or other foreign substances.

(B) BENDING BARS

Reinforcement bars shall be bent cold to the exact shapes shown on the Contract Drawings and, if required, in conformity with approved templates. Bars having kinks or bends not shown on the plan will be rejected.

(C) SPLICES AND LAPS

Reinforcement bars under flexural stress shall be of the full lengths required, or if permitted, be spliced with approved clamps or other approved devices which will transfer the full working stress of the bar. Reinforcement bars under temperature and shrinkage stresses shall be as long as can be conveniently

used. Where necessary, laps shall be as directed. Laps shall be not less than forty (40) times the nominal diameter of the bars. Splices and laps shall be staggered. The distance between splices and laps and adjacent bars, and the distance between a splice or lap and the exposed surface of concrete shall be not less than two (2") inches, or as shown on the plan.

Welded steel wire fabric shall have transverse or longitudinal end members overlapping each other by not less than a full mesh length or width respectively. Overlapping sheets shall be securely and properly fastened together.

(D) SUPPORTS

Steel reinforcement shall be supported at the specified depth in such a manner that no displacement will occur during concreting operations. It shall be supported either on approved devices or upon a layer of concrete which has been evenly struck off. The method of supporting the steel at the proper elevation shall be as approved by the Engineer.

(E) PLACING

Reinforcement bars shall be placed, spaced, securely fastened together and held in their positions in an approved manner until the concrete is placed around them.

Steel wire fabric shall be laid in sheets which shall be straight and true to form and shall be securely held in position by approved methods so that they will be in their prescribed position after the concrete has been thoroughly compacted.

No concrete shall be deposited until the Engineer has inspected the placing of the reinforcing steel and has given permission to place the concrete. All concrete placed in violation of this provision will be rejected and removed at the Contractor's own expense.

(F) EPOXY COATED BARS

Epoxy coated bars shall be bent around a pin having a minimum diameter of four (4) times the nominal bar diameter. All chairs, tie wires, standees, or other devices used to support or position epoxy coated bars shall be made of or coated with a dielectric material, and approved by the Engineer. The contractor shall field repair all damage to the epoxy coating, including cut ends. The field repair shall be performed using materials supplied by the epoxy coating manufacturer. If more than five (5) percent of any bar requires epoxy repair, the Engineer may require it be replaced with a new coated bar at no additional cost to the City.

4.14.5. MEASUREMENT. The weight of steel reinforcement bars to be paid for will be that of all reinforcement bars incorporated in the work, as required, which shall be computed from theoretical lengths and weights of bars.

The weight of steel wire fabric to be paid for will be that of all material incorporated in the work, as required, which shall be computed from the theoretical lengths, widths and weights.

No payment will be made for steel reinforcement which is part of a structure for which there is a contract price including such reinforcement; nor will any payment be made for laps, splices and dowels shown on approved shop drawings but not shown on the Contract Drawings as bid upon, nor for chairs, wires, clamps or other spacing, fastening or supporting devices.

4.14.6. PRICES TO COVER. The contract price per pound for Steel Reinforcement in Concrete shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and install reinforcement complete in place in full compliance with the requirements of the specifications, and to furnish such samples for test as may be required.

Payment will be made under:

Item No.	Item	Pay Unit
4.14	STEEL REINFORCEMENT BARS	LBS.
4.14 E	EPOXY COATED STEEL REINFORCEMENT BARS	LBS.
4.14 W	WELDED STEEL WIRE FABRIC	LBS.

SECTION 4.15 – Topsoil

4.15.1. **INTENT**. This section describes Topsoil.

4.15.2. **MATERIALS**. Topsoil shall comply with the requirements of **Section 2.26**.

4.15.3. **METHODS**. Before placing topsoil, the subgrade shall be trimmed to a smooth uniform surface at the required distance below the finished grade. All hollows, depressions and gullies shall be filled with acceptable material free from stones over two (2") inches in diameter, rubbish and other material which is unsuitable in the opinion of the Engineer. All surplus material and debris shall be removed and disposed of as directed by the Engineer. This process of shaping and filling shall be repeated until there are no depressions.

Loosen subsoil by scarifying, ripping or tilling using disks, harrows or other suitable equipment to a depth of four (4) to six (6) inches immediately before placing topsoil. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

After the subgrade has been prepared to the proper grades, the topsoil shall be spread over such areas and to such depths as specified, shown on the Contract Drawings or as directed by the Engineer. No topsoil should be handled when, in the opinion of the Engineer, the topsoil is too wet or in a frozen condition.

Topsoil spread in grass areas shall be raked or otherwise manipulated to form smooth draining grades.

Topsoil shall be satisfactorily compacted.

4.15.4. **MEASUREMENT**. The quantity of Topsoil to be paid for shall be the number of cubic yards measured in place after compaction. No payment or allowance will be made for topsoil placed beyond the limits specified.

4.15.5. **PRICE TO COVER**. The contract price per cubic yard of topsoil shall cover the cost of all labor, materials, insurance, and equipment required to prepare the subgrade and to place the topsoil in its final compacted position, and in full compliance with the requirements of the specifications, and to furnish such samples for testing as may be required.

Payment will be made under:

Item No.	Item	Pay Unit
4.15	TOPSOIL	C.Y.

SECTION 4.15 SS – Structural Soil Foundation Material

4.15SS.1. DESCRIPTION. Under this Item, the Contractor shall furnish and install Structural Soil Foundation Material in accordance with the plans, specifications, and directions of the Engineer.

4.15SS.2. MATERIALS.

A. Structural Soil Foundation Material: Shall conform to CU-Soil™, as patented by Cornell University, patent #5,849,069. The product shall be obtained from a licensed producer and proof of such licensing shall be submitted to the Engineer prior to delivery. Tri-State licensed providers as of this date are East Coast Mines & Materials, Inc., East Quogue, NY 631-653-5445; Ascape Landscape, Blauvelt, NY, 845-353-6500; and, Advanced Soil Technologies, Brick, NJ, 732-840-1700. For further information on licensed providers or licensing requirements and application, contact Brian Kalter Operations Manager at Amereq, Inc., New City, NY 800-832-8788 (patentholder rights granted to Amereq, Inc. by Cornell Research Foundation).

Structural Soil components shall be mixed by the licensed producer to the following proportion:

Component	Unit of Weight (Dry)
Crushed Stone	83%
Clay Loam	17%
Hydrogel	As recommended by “CU Soil” licensed provider

B. Crushed Stone: Shall be crushed granite or traprock; no limestone or sandstone shall be accepted. No recycled material shall be accepted. Stone shall meet the AASHTO/ASTM C33 requirements for #4 crushed angular stone graded within the following limits:

Passing Sieve (dry analysis)	Percent by Weight
2 inch	100%
1-1/2 inch	90-100%
1 inch	20-55%
3/4 inch	0-15%
3/8 inch	0-5%

Stone shall be clean and certified to meet NYCDOT aggregate soundness requirements for use in road construction. A single sized stone near one-inch (1”) will be preferable to a wider size distribution or smaller single size stone fitting the general description.

C. Clay Loam: Shall be as determined by the USDA Classification System and mechanical analysis, as per ASTM D4221. Clay loam shall be of uniform composition, without admixture of subsoil, and free of stones greater than one-half inch (1/2”) diameter, leaves, roots, debris, toxic materials, or lumps or clods over one inch (1”) diameter. It shall have been obtained from naturally well drained areas which have never been previously stripped for topsoil and shall have a history of supporting satisfactory vegetative growth. It shall contain not less than two percent (2%) nor more than six percent (6%) organic matter, as determined by loss on ignition of oven-dried samples, dried to a constant weight at a temperature of 230° F, plus or minus 9° F. Mechanical analysis for clay loam shall be as follows:

Textural Class	Percent of Total Weight (Dry)
Gravel	Less than 5%
Sand	20 – 50%
Silt	20 – 45%
Clay	20 – 40%

Clay loam shall meet or be amended to meet the following chemical analysis criteria:

1. pH between 5.5 and 6.5.
2. Organic matter 2 – 6 percent by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the types of plants to be grown in the structural soil.

4. Toxic elements and compounds below the US EPA Standards for Exceptional Quality Sludge, or local standards, whichever are more stringent.
5. Soluble salts less than 1.0 millimho per cm.
6. Cation exchange capacity (CEC) greater than 10.
7. Carbon/ Nitrogen ratio less than 33: 1.

Clay loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No clay loam shall come from USDA classified prime farmland.

D. Slow Release Fertilizer: Commercial fertilizer shall comply with U.S. and N.Y. State fertilizer laws. Fertilizer shall be delivered in original unopened containers. The fertilizer shall be 15-2-15 liquid slow release (50%), or approved equivalent, formulated for mixing into the soil and certified by the manufacturer to provide controlled release of nitrogen continuously for a period of not more than twelve (12) months. Fertilizer shall be delivered in original unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis, and shall be furnished to the Engineer.

E. pH Adjustment: To lower the clay loam pH to acceptable levels, commercial granular ferrous sulfate, ninety-six percent (96%) pure sulfur may be added to lower soil pH above 6.5. To raise pH levels, the manufacturer may add agricultural limestone containing a minimum of eighty-five percent (85%) carbonates. Minimum gradation: 100% passing 10 mesh sieve, 98% passing 20 mesh sieve, 55% passing 60 mesh sieve, and 40% passing 100 mesh sieve.

F. Hydrogel: Shall be Gescape®, a potassium propenoate-propenamide copolymer hydrogel, as manufactured by Amereq, Inc., New City, N.Y., or an approved tested equivalent. However, no substitution is recommended since small changes in the hydrogel structure greatly change the quality of the structural soil.

4.15SS.3. SOIL MIXING AND QUALITY CONTROL TESTING. All Structural Soil shall be mixed using appropriate soil measuring, mixing, and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. Structural soil must be mixed in the presence of the licensee, and no soil shall be placed until inspected by the licensee. No mixing of Structural Soil at the project site will be permitted unless a large paved area is available for mixing and the site has been pre-approved for use by the Engineer. No Structural Soil shall be mixed or placed in air temperatures below 40° F or delivered or placed in frozen, wet, or muddy conditions. Material shall be delivered at or near optimal compaction moisture content, as determined by AASHTO T 99 (ASTM D698). No material shall be delivered or placed in an excessively moist condition, beyond two percent (2%) above optimal compaction moisture content, as determined by AASHTO T 99 (ASTM D698).

Warning: Do not mix or transport structural soil when rain is expected. Place pavement immediately after placing and compacting structural soil to prevent excessive hydration.

Structural Soil components and the finished mixture shall be protected from excess water absorption and erosion at all times. Do not store materials unprotected from rainfall, nor allow excess water to enter the site prior to compaction. If water is introduced into the material after grading, allow material to drain to near optimal compaction moisture content.

Add moisture gradually and evenly during the blending and mixing operation as required to produce the required moisture content. Add soil amendments to alter soil fertility, including fertilizer and pH adjustment at the rates recommended by soil test results. The soil pH shall be adjusted to fall between 5.5 and 6.5 two months after mixing, if the material is stored. The soil component Carbon/ Nitrogen ratio shall be adjusted to be less than 1:33 within two months after mixing.

The licensed supplier shall mix sufficient quantity in advance of the time the material is needed at the job site to allow adequate time for the required quality control testing. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.

4.15SS.4. INSTALLATION. The Contractor shall notify the Engineer of any subsurface conditions which will affect the Contractor's ability to complete the work, and shall locate and confirm the locations of all underground utility lines and structures prior to starting any excavation in the area to receive Structural

Soil by calling New York City/Long Island Call One Center, (800) 272-4480. The Contractor shall be liable to repair any damage to underground utilities or structures caused by their activity during the progress of this work, at their own expense. Where tree roots larger than one inch (1") diameter are damaged, the Contractor shall ensure that damaged root sections are cleanly cut with sterilized pruning equipment.

Structural Soil shall only be installed after the installation of all walls, curbs, footings, and utility work in the area has been completed. For site elements dependent on the Structural Soil for foundation support, postpone installation until immediately after the installation of the Structural Soil. The Contractor shall be responsible for any and all damage caused by the installation of structural soil and all disturbed areas shall be restored to their original condition, to the satisfaction of the Engineer.

Site Preparation: The Contractor shall excavate and compact the proposed subgrade to the required depths and dimensions indicated on the drawings or as directed in the field. Do not over excavate compacted subgrades of adjacent pavement or structures. Confirm that the subgrade is at the proper elevation and compacted as required. The excavation shall be cleared of all construction debris, trash, rubble, and foreign material.

Topsoil meeting the requirements of **Section 4.15** can be used around the tree ball, with CU-Soil™ under the ball and under any pavement, both pervious, and non-pervious.

Install the first six inch (6") lift of Structural Soil mix over the prepared subgrade. Install succeeding layers in six inch (6") lifts and compact each lift. Compact all materials to not less than ninety-five percent (95%) of peak dry density from a standard AASHTO compaction curve (AASHTO T 99). No compaction shall occur when moisture content exceeds the maximum listed herein. Delay compaction at least twenty-four (24) hours if moisture content exceeds the maximum allowable, and protect the Structural Soil during delays in compaction with plastic or plywood, as directed by the Engineer.

Prior to placing pavement, the licensed CU-Soil™ provider and the Engineer shall check the CU-Soil™ material for consistency with the color and texture of the approved sample supplied by the Contractor. If the material supplied varies significantly from the approved sample, the Engineer may request that the Contractor test the installed Structural Soil. Any mix which varies significantly from the approved testing results, as determined by the Engineer, shall be removed and new Structural Soil installed that meets the specifications.

4.15SS.5. SUBMITTALS. All submittals shall be in accordance with the requirements of the General Conditions, **Subsection 1.06.31**. The Contractor shall submit test reports for Structural Soil Foundation Material components from an approved independent testing laboratory indicating the following:

1. License: Submit the manufacturer's license to produce the patented CU-Soil™.

2 Clay Loam: Submit test results for particle size, bulk density, pH, percent organic content by weight, nutrient levels including nitrogen, phosphorus, and potassium, soluble salts in ppm, and chemical analysis. In addition, submit the locations of all field sources for the clay loam and a list of all chemicals, insecticides, and herbicides applied to the clay loam in the previous five (5) years, and a list of all crops grown in the clay loam source fields in the previous three (3) years.

3. Crushed Stone: A bag of crushed stone shall be submitted with test results and contract name and number attached for approval prior to installation. The sample size must be per ASTM D75 (15 gallons for 1.5" material). Submit test results for particle size, loose and rodded unit weight, bulk specific gravity, soundness, absorbance, and stone dimension description, as per ASTM D4791, for the crushed stone.

4.15SS.6. MEASUREMENT. The quantity of STRUCTURAL SOIL FOUNDATION MATERIAL to be paid for under this Item shall be the number of CUBIC YARDS incorporated in the finished work to the satisfaction of the Engineer, measured in trucks used for delivery at the project site. Only water level loads will be accepted and no allowance will be made for any crown or peak of the load.

4.15SS.7. PRICE TO COVER. The contract price bid per CUBIC YARD of Structural Soil Foundation Material, measured in trucks, shall include the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to prepare and place the structural soil mix, which shall include, but not be limited to,

clay loam, Hydrogel, crushed stone, fertilizer, pH adjustment, all required testing, submittals, licensing fees, and incidental expenses, in accordance with the plans, the specifications, and the directions of the Engineer.

Unclassified Excavation, Concrete Pavement without Base or Concrete Pavers, and Plant Material shall be paid for under their respective Contract Items.

Payment will be made under:

Item No.	Item	Pay Unit
4.15 SS	STRUCTURAL SOIL FOUNDATION MATERIAL	C.Y.

SECTION 4.16 – Trees (Removal, Transplanting, Planting)

4.16.1. INTENT. This section describes the removal, transplanting and planting of trees.

4.16.2. DESCRIPTION. The Contractor must comply with all Federal, State, and Local regulations for plant pest and disease control. NYS Department of Agriculture and NYS Department of Environmental Conservation require contractors operating in pest infested or disease infected areas to thoroughly clean all equipment units before moving equipment to non-infested or infected areas.

The Contractor and/or subcontractors who will perform tree work of any kind within a quarantine or protective zone is required to abide by all existing and any new or revised legislation and orders regarding quarantines and protective zones while working on this contract. Tree work includes, but is not limited to planting, transplanting, pruning, fertilizing, and removing trees; removing stumps; clearing and grubbing of trees or roots; and the transportation and disposal of plant material and vegetative debris.

The Contractor and/or subcontractors shall be certified by the New York State Department of Agriculture & Markets to perform work within the Asian Longhorned Beetle Quarantine Zone. The Contractor must review and abide by the description of the quarantine and compliance agreements as presented in the publication entitled Part 139 of the New York State, Department of Agriculture & Markets law. Full information can be obtained from Federal and State Pest Control personnel. Quarantine areas, for the purpose of this contract shall be defined as all five Boroughs of the New York City.

Due to current Federal and New York State laws and regulations concerning Asian Longhorned Beetle management, the following host species may not be planted in the quarantine zone. Host species are as follows: Acer-Maple, Aesculus-Horsechestnut/Buckeye, Salix-Willow, Betula-Birch, Populus-Poplar, Ulmus-Elm, Albiza-Mimosa/Silk Tree, Celtis-Hackberry, Fraxinus-Ash, Platanus-London Planetree, Sycamore, Sorbus-Mountain Ash.

The Contractor must comply with all Federal, State, and City laws pursuant to the handling and disposal of woody organic material that is host material for the Asian Longhorned Beetle. All wood that is host material for the Asian Longhorned Beetle must be chipped, ground, or shredded inside the quarantine zone to a size of less than one (1”) inch in at least two dimensions before it is permitted to leave the quarantine zone. Please refer to Part 139 of the New York State Department of Agriculture and Markets law and contact State personnel for further details.

In addition, Nurseries located within the quarantine zone shall comply with State and Federal Law and all Contractors and/or Subcontractors shall be certified by the New York State Department of Agriculture and Markets to perform work within the Quarantine Zone.

(A) REMOVAL

Removal of trees, for disposal away from the site, shall consist of topping, felling, removing and disposing of the entire tree, including the stump and root system, to a minimum depth of three (3’) feet below the existing adjacent grade, unless otherwise required.

Removal of tree stumps, for disposal away from the site, shall consist of removing and disposing of designated existing stumps over six (6”) inches in diameter. Stumps shall be defined as the lower end of a tree or plant remaining in the ground after most of the stem or trunk has been cut off by others prior to the start of work. All stumps six (6”) inches in diameter and under shall be removed in accordance with the requirements of **Section 6.01**.

Removal of trees and tree stumps shall include all necessary excavation of materials of whatever nature encountered; backfilling of excavations with acceptable material; and disposing of trees and stumps away from the site, as herein specified or as directed by the Engineer.

(B) TRANSPLANTING (up to four (4”) inch caliper)

Transplanting shall consist of the removal of existing trees; re-planting at new locations; establishing trees at new locations as provided in Section 4.10; storing on the site for later replanting; or delivering removed trees to such locations, away from the site, as the Engineer shall direct.

Transplanting shall include all necessary digging, bailing, burlapping, platforming, hauling, handling and heeling-in; and, when necessary or directed, re-digging, re-balling, re-burlapping, re-hauling and re-handling of trees designated to be transplanted and establishing said trees as provided in **Section 4.10.**

(C) PLANTING

Planting shall consist of furnishing, when required; delivering; hauling; handling and planting; and establishing of new trees at locations shown on the Contract Drawings or directed by the Engineer.

Planting shall include, but not be limited to, all labor, materials, plant and equipment required for excavation of all materials of whatever nature encountered; furnishing topsoil; placing topsoil in new tree pits; constructing tree wells; staking, spraying, pruning, protecting and establishing all trees; and furnishing and installing all other incidentals required for the proper performance of the work; all, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The Contractor must obtain and submit to the Engineer the required NYCDPR permit for trees planted in the Right-Of-Way.

All references to tree pits will also include green infrastructure practices, where applicable.

4.16.3. GENERAL.

(A) REMOVAL

A permit must be obtained from the Department of Parks and Recreation (NYCDPR) prior to the removal of any tree.

Trees which are wholly or partly within roadway areas shall be removed. Trees wholly within sidewalk areas shall only be removed when permitted by NYCDPR. Trees on abutting properties shall be removed when shown on the Contract Drawings or when directed by the Engineer.

Tree stumps shall be removed when directed.

(B) LANDSCAPE CONTRACTOR

All work shall be done by competent Landscape Contractors acceptable to the Engineer.

(C) PLANTING OPERATIONS

1. Tree planting shall commence at the first available planting season but no later than at 50% of contract duration period milestone and all newly planted trees shall be protected from adjacent construction as required for existing trees in accordance with the requirements of Section 4.22. Trees shall be transplanted and/or planted only while dormant in the season as the Engineer may direct. Container-grown trees, other than street trees, may be planted at other times, with prior written approval of the Engineer in consultation with the Landscape Architecture unit in DDC Infrastructure Design. Tree planting operations shall be done in accordance with the following specifications. Spring planting shall commence no earlier than March 1st and finish no later than May 15th. Fall planting shall proceed from October 1st through December 15th, unless otherwise directed by the Engineer and permitted by NYCDPR. Some species, such as the B&B evergreens, should not be planted later than November 1st. The Contractor should be aware of any tree species in use that have fall planting hazards, and schedule planting accordingly.

2. Upon the Engineer's determination that it is impracticable or impossible to plant all required new trees or transplant all required existing trees or any smaller number of them within a planting season which falls within the contract time, Substantial Completion may be issued, provided the Contractor deposits with the Commissioner a sum of money equal to eighty (80) percent of the contract unit price for each tree not then planted or transplanted, to cover the cost of furnishing or removing the tree; its planting or transplanting, as specified; and establishment per **Section 4.10**. Proof of the deposit shall be submitted to the Engineer.

3. The Contractor, however, will be required to excavate the tree pits to size and furnish and place topsoil in accordance with the requirements of the specifications. Such tree pits, in areas subject to pedestrian traffic and where directed by the Engineer, shall have the topsoil overlaid with a two (2") inch thickness of binder to be paid for under Item No. 4.02 CA or 4.02 CB

(as provided in the Bid Schedule). Tree pits should not be dug until the tree is on site, to ensure proper hole depth.

4.16.4. MATERIALS.

(A) TREES

1. Plant Schedule

Type and size of trees to be planted shall be as specified in the Bid Schedule or as shown on the Contract Drawings.

NOTE: All trees, except as otherwise permitted by the Engineer due to non-availability in certain species, shall have single straight trunks with leader intact, and symmetrical, well-branched tops.

Trees having limb cuts over three-quarters (3/4) of an inch on nursery-grown trees or over one and one-half (1-1/2") inches on collected trees which have not completely calloused over will not be accepted.

Heavy fibrous root system is essential. Heavy crown shearing will not be accepted, and no shearing is preferred.

2. Names

Plant names shall agree with the nomenclature of "Standardized Plant Names" as adopted by the American Joint Committee on Horticultural Nomenclature 1942 edition: size and grading standards shall conform to those of the American Association of Nurserymen *American Standards for Nursery Stock*, current edition, at the time of bid, unless otherwise specified. No substitutions shall be permitted except by written permission of the Engineer. The Contractor must provide the Engineer with written confirmation of availability by the supplying nursery or the request for similarly confirmed substitutes two months before intended planting season. All tree cultivars, patented or otherwise, must be certified by the supplying nursery. All nurseries shall be required to have a registration certificate from the New York State Department of Agriculture & Markets, Division of Plant Industry, certifying that plant material is free from injurious insect and plant diseases. A similar certificate shall be required from other states where plant material is obtained.

3. Quality

All trees shall be typical of their species or variety. They shall have normal well-developed branches and a vigorous fibrous root system. They shall be sound, healthy, vigorous trees, free from defects, disfiguring knots, sunscald injuries, abrasions of the bark, plant diseases, insect eggs, borers and all forms of infestations. Containerized material shall be free from girdling roots. Trees shall not have damaged or missing leaders, multiple leaders, Y-crotches, or indications of topping or heading back. All trees including replacement trees shall be inspected and tagged at the nursery prior to digging and planting. All trees shall be nursery grown and shall have been growing under the same climatic conditions as those occurring in New York City for at least two (2) years prior to date of the contract. Trees held in storage shall be rejected if they show signs of growth during storage. All trees shall be limbed up to a minimum of five feet (5') from the ground. The Contractor is responsible for ensuring that trees have been grown at the proper depth. Evergreens should be container-grown when possible.

4. Dimensioning

A tree shall be dimensioned as it stands in the nursery, and shall be calipered at a point six (6") inches above the ground for trees six (6") inches or less in diameter. The stock furnished shall be a fair average of the minimum and maximum sizes specified.

5. Preparation for Shipping

Care shall be exercised in digging and precautions customary in good trade practice shall be taken in preparing trees for shipment and transplanting. Workmanship that fails to meet the highest standards will be rejected and the Contractor shall replace the damaged or rejected stock with acceptable material at no additional cost to The City. Trees shall be dug to retain as many fibrous roots as possible and immediately before moving, unless otherwise specified. Balled and burlapped trees shall have a solid ball of earth securely held in place with biodegradable burlap and stout rope or wire baskets. No manufactured balls

will be accepted. If the specified tree size is unavailable, oversize trees may be substituted at no extra cost to the City. The root flare must not be covered with soil when the tree is balled and burlapped.

Ball diameters shall be not less than the following:

Tree Caliper	Minimum Root Ball Diameter
from 2-1/2" to under 3"	30"
from 3" to under 3-1/2"	36"
from 3-1/2" to under 4"	42"
from 4" to under 4-1/2"	46"
from 4-1/2" to under 5"	52"
from 5" to under 6"	60"

6. Shipments and Certification

All plants shall be packed, transported and handled with utmost care and in such manner as to insure adequate protection against desiccation, climatic, seasonal and other injuries. When transported in closed vehicles, plants shall receive adequate ventilation to prevent sweating. When transported in open vehicles, plants shall be protected by tarpaulins or other suitable cover material. Unloading shall be carefully done to prevent injury to plants. Balled and burlapped trees shall be set on the ground and balls covered with mulch if not immediately planted. Until planted, all materials shall be properly maintained and kept adequately watered. Each shipment shall be certified by the State and Federal Authorities to be free from disease and infestation. Any inspection certificates required by law to this effect shall accompany each shipping invoice or order of stock and on arrival, the certificate shall be filed with the Engineer. Plants from areas infested with London Plant Disease or Canker shall be accompanied by a certificate stating that the trees are free from these infestations.

Trees pre-tagged at the nursery by NYCDPR will be preferred for street trees.

7. Inspection

Inspection of plants may be made before digging if the Engineer directs but no shipment of plant materials shall be planted by the Contractor until such material has been inspected by the Engineer at the site of the work. All rejected material shall be immediately removed from the site and replaced with acceptable material at no additional cost. Final inspection will be made as described in **Section 4.10**.

(B) TOPSOIL

Topsoil shall comply with the requirements of **Section 2.26**. All references in this Section to topsoil will include a different planting medium, such as engineered soil or sand, where applicable.

(C) MULCH

Mulch shall be a natural forest product of at least 98% bark containing less than 2% wood or other debris. It shall be of White or Red Fir and/or Pine bark of a uniform grade with no additives or any other treatment. Size of bark shall be from 5/8" to 1-1/4". The pH factor should range from 5.8 to 6.2. Shredded bark may also be used. Samples shall be submitted to and approved by the Engineer prior to use.

Shredded bark mulch shall be applied to the surface of tree pit areas, as shown on the Contract Drawings and as directed by the Engineer. Mulch shall be applied to a uniform depth of three (3) to four (4) inches over the tree pit, and shall be so distributed as to create a smooth level cover over the exposed soil. If jute mesh is specified in the Contract Drawings or Standard Drawings, it will be used in place of mulch.

(D) WATER

If conditions do not allow the use of New York City water sources, the Contractor must obtain its own source of water.

(E) MYCORRHIZAL FUNGI INOCULANT

Mycorrhizal fungi inoculant shall be applied by means of a three ounce (3 oz.) premeasured dry formulation packet, such as Mycor Tree Saver Transplant®, as manufactured by Plant Health Care, Inc., Pittsburgh, PA; Rhizanova Tree Transplant, as manufactured by Becker Underwood, Inc., Ames, IA; DIEHARD®, as manufactured by Horticultural Alliance and distributed through Atlantic Irrigation, White Plains, NY; or, an approved equivalent. Packets shall contain, as a minimum: one thousand (1,000) live spores of Vesicular-Arbuscular fungi, including: *Entrephosphora columbiana*, *Glomus clarum*, *Glomus etunicatum*, and *Glomus sp.;* seventeen million five hundred thousand (17,500,000) live spores of Ectomycorrhizal fungi, including: *Pisolithus tinctorius*; biostimulants including *Yucca schidigera* extract; soluble sea kelp extract derived from *Ascophylum nodosum*; humic acids; and acrylamide copolymer gel as a water absorbent medium.

Inoculant shall be added after the trees have been placed in their hole. Three (3) packets for each 2-1/2" to 3" caliper tree and four (4) packets for each 3-1/2" to 4" caliper tree shall be added to the top six to eight inches (6 to 8") of backfill soil added to each pit and thoroughly mixed to distribute the inoculant. The opened packets shall be given to the Engineer at the end of each day. Mycorrhizal inoculant is a dated material and must be used before it expires.

The material shall be applied according to the following chart:

Size of rootball or container	Ounces per plant
30" B&B	9
36" B&B	12
42" B&B	12

(F) WATER RETENTION ADDITIVE

Water retention additives shall be a granular polyacrylamide polymer of a potassium base and not a sodium base that slowly releases water into the root zone such as Terra Sorb®, as manufactured by Plant Health Care, Inc., Pittsburgh, PA; Soil Moist™ as manufactured by JRM Chemical, Inc., Cleveland, OH; or, an approved equivalent. The water retention additive shall be applied at the time of planting during a dry planting season as defined by the Department of Parks and Recreation. Each tree shall receive three (3) ounces or an amount specified by the product instructions. When planting shrubs, perennials or annuals, apply as per product instructions.

(G) BURLAP

Burlap must be a natural bio-degradable fabric. No nylon or other synthetic burlap will be permitted.

(H) CORD OR ROPE

Cord or rope must be natural, bio-degradable sisal twine. Nylon or other synthetic rope will not be permitted.

4.16.5. METHODS.

(A) TREE REMOVAL

1. All tree removals must be completed by a tree company approved by NYCDPR, and said company must obtain the necessary permits from NYCDPR before undertaking any removal work.

2. Trees to be removed but not designated to be transplanted, shall be completely removed, including the root systems, to a depth of not less than three (3') feet below the existing adjacent grade. After removal, the Contractor shall dispose of said trees, away from the site. The disposal of trees by burning in open fires will not be permitted.

3. The topping of a tree without the immediate removal of its trunk will not be permitted. Once the Contractor initiates removal of a tree, the operation must continue without interruption to a height no greater than six (6") inches above existing grade. The remaining tree stump and root system may be removed during another operation subject to approval of the Engineer; however, the cost of removal and disposal of the remaining tree stump and root system shall be deem included in the price bid for tree removal.

(B) STUMP REMOVAL

1. Tree stumps designated to be removed and their roots shall be completely excavated to a minimum depth of three (3) feet below the existing grade. A portable stump cutter may be required in some locations. It may be necessary to remove concrete, asphalt, pavers, and/or other types of material surrounding the base of the stump. All excess debris, including chips from tree stumps, shall be removed and disposed of by the Contractor, away from the site prior to backfilling and the area shall be restored by completion of the workday, to the satisfaction of the Engineer. The disposal of tree stumps by burning in open fires will not be permitted.

2. All voids and excavations left after the removal of the stump and roots shall be backfilled to grade with clean earth fill. Fill shall be placed and compacted to a minimum of 95 percent of Standard Proctor Maximum Density by acceptable methods to the satisfaction of the Engineer. Where paving blocks exist, they are to be reset to the existing grade as directed.

3. Maximum safety and care must be used by Contractor during stump removal. The Contractor shall carefully protect against damage all existing trees, plants, curbs, sidewalks and utilities and other features to remain. The Contractor is responsible for locating and protecting underground utilities from damage during stump removal procedures. During stump grinding operations, plywood must be used to protect adjacent vehicles, real property, and pedestrians. If, when removing stumps, existing sidewalks or curbs are disturbed, the Contractor shall restore and/or reset these sidewalks and curbs, at no additional cost to the City. Restoration work shall be done to match the existing, to the satisfaction of the Engineer. All damaged trees, curbs, sidewalks, real property, vehicles and utilities must be addressed within three (3) days.

(C) TRANSPLANTING

1. The Contractor will transplant trees, establish, and replace all trees as specified, in accordance with the plans, the specifications, and directions of the Engineer. All transplanting must be completed by a tree company approved by NYCDPR, and said company must obtain the necessary permits from NYCDPR before undertaking any removal work

2. The Contractor will be liable for any damages to property by transplanting operations and all areas disturbed shall be restored to their original condition, to the satisfaction of the Engineer.

3. Preparation of Plants: All precautions customary in good trade practice will be taken in preparing plants for moving, and workmanship that fails to meet the highest standards will be rejected. All plants shall be dug immediately before moving unless otherwise directed. All plants shall be dug to retain as many fibrous roots as possible. Plants shall be balled and burlapped having a solid ball of earth of minimum specified size according to the American Association of Nurserymen Standards (November 1996) securely held in place by burlap and sisal twine. Root balls require Drum Lacing and shall be laced with three (3) ply sisal. All root balls shall be inspected by the Engineer before moving. Loose, broken, and wire caged balls will be rejected. All rejected material shall be immediately removed from the site and replaced with acceptable material at no additional cost.

4. Time of Transplanting: Unless otherwise approved by the Engineer, transplanting will be in the following timeframes:

Season	Tree Transplanting
Spring	March 1 to May 15
Fall	October 1 to December 15

5. Excavation of Planting Pits: Sizes of planting pits shall be determined by the Engineer, in consultation with the Contractor's Tree Consultant.

6 Planting: No transplanting shall be done except in the presence of the Engineer.

7. Replacement: The Contractor shall replace in accordance with the contract plans and specifications any transplanted trees that are dead or, in the opinion of the Engineer in consultation with the Tree Consultant, are in an unhealthy or unsightly condition, and/or have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or other causes.

8. Care shall be exercised in digging and preparing trees for transplanting. Each tree shall be dug with sufficient roots and shall have a solid ball of earth securely held in place by burlap and stout rope and shall be platformed. No manufactured balls will be accepted. Each tree shall be dug with a ball of earth not less in diameter than that specified for new trees. The root ball must be moist before digging, and at a minimum be watered by the Contractor no later than the day before digging.

9. Trees to be stored on the site for later replanting shall be prepared as in the preceding paragraph, hauled to a location to be designated by the Engineer and heeled-in at such location to the satisfaction of the Engineer until replanting may be progressed. At the time of replanting, heeled-in trees shall be dug up and hauled to the replanting or delivery location. When required by the Engineer, heeled-in trees shall be re-balled, re-burlapped or re-platformed before hauling to the replanting location or delivery point.

10. The Contractor shall haul and deliver designated trees, prepared for transplanting or replanting as above, to such locations on or away from the site as the Engineer shall direct.

11. Trees designated to be transplanted, damaged due to the Contractor's operations, shall be replaced with new trees, by the Contractor, to the satisfaction of the Engineer at no additional cost to The City.

12. Hauling and unloading of trees to be transplanted, shall be carefully done to prevent injury. All trees transplanted, or to be transplanted, shall be protected by the Contractor and such trees as are injured or removed before the acceptance of the work shall be replaced with new trees at the expense of the Contractor.

13. At the time of transplanting and as described in **Section 4.10**, the soil around each tree shall be thoroughly saturated with water during the establishment period. Trees that are not watered the day of transplanting to the satisfaction of the Engineer will be rejected. Precipitation is not an acceptable substitute for watering on the day of transplanting.

14. The Contractor must perform all services described in Section 4.10 to establish the trees during the Establishment Period.

15. The work of planting trees designated to be transplanted and trees furnished as replacements for injured trees shall be as specified in (D), below.

(D) PLANTING

All tree planting must be completed by a tree company approved by NYCDPR, and said company must obtain the necessary permits from NYCDPR before undertaking any removal work

1. Excavation for Tree Pits

The Contractor shall excavate all materials of whatever nature encountered (except excavation of boulders in open cut and ledge rock) for all tree pits to a minimum depth of twenty-four (24") inches, but not more than the depth of the root ball, so that the hole depth matches the actual depth from the bottom of the root ball and the top of the root flare.

For street trees, the pits shall be made as large as possible as determined by the Engineer, in accordance with the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1046, unless otherwise shown on the Contract Drawings, and the items provided in the Bid Schedule. For trees to be planted in open areas, the excavated pit shall be three (3) time the diameter of the rootball. All pits shall have vertical sides unless otherwise directed. The Contractor shall scar the surface of the excavated pit walls to avoid the smooth glaze created by machinery.

No plant pits shall be dug until the proposed locations have been staked on the ground by the Contractor and approved by the Engineer; no plant pits shall be backfilled until approved by the Engineer. Subsoil from planting excavation shall be removed from the site and disposed of as directed by the Engineer. The area is to be made safe and secure at the end of the work day.

2. Backfilling for Tree Pits

Backfill for tree pits must consist of topsoil.

3. Barricades

During excavation and planting operations, all pits, trees, and planting materials shall be protected carefully with strong, well-constructed temporary barricades, where required, to the satisfaction of the Engineer. Any material which for any cause is damaged during operations shall be replaced by the Contractor at no cost to The City, with the same size, type and quality approved by the Engineer.

4. Planting

No planting shall be done except in the presence of the Engineer or the Engineer's authorized representative. All trees shall stand, after settlement, at the same levels at which they have grown, i.e., at the base of the trunk flare. Care shall be exercised in setting the trees plumb. Ropes, stones, etc., shall be removed from the holes before backfilling; and all topsoil for backfilling shall be loose and friable and not frozen.

All girdling roots shall be removed. Circling roots shall be separated and spread out to not impede future growth. Place balled and burlapped material in the prepared planting pit by lifting, and carry it by the rootball so that the ball will not be loosened. Set the tree straight and in the center of the pit with the most desirable side facing toward the predominant view. The Contractor's attention is called to the different widths of curbs and that a uniform distance shall be maintained from the center of the tree to the outside of the curb, or as directed by the Engineer, in consultation with the Contractor's Tree Consultant. All trees shall set, after settlement, at the level of the base of the trunk and the beginning of the roots known as the "trunk flare." If the top of the rootball is not consistent with this area, soil will be added or removed to make it so, and the depth of the planting site adjusted accordingly. Care shall be exercised in setting the trees plumb.

Cut and remove rope or wire from the top two-thirds (2/3) of the rootball. Remove as much woven product and twine as possible Remaining lateral wires must be cut to prevent future root interference. Wire must not be galvanized or aluminum wire.

At least two-thirds (2/3) of the burlap shall be removed from the tree pit and the remaining burlap pulled back and adjusted to prevent the formation of air pockets. Where directed by the Engineer, in consultation with the Contractor's Tree Consultant, the burlap shall be entirely removed. All ropes, stones, etc. shall be removed from the planting site before backfilling. Backfilling mixture shall be loose and friable, and not frozen. Soil shall be firmed at six (6) to eight (8") inch intervals and thoroughly settled with water.

5. Tree Wrap

No tree trunks shall be wrapped. The Contractor shall be required to remove all nursery tags and protective wrapping prior to planting to allow inspection by the Engineer.

6. Staking of Trees

All staking of trees shall be done during planting operations and stakes shall be maintained completion of the Establishment Period described in **Section 4.10**. Trees shall stand plumb after staking. Stakes shall be removed by the Contractor after completion of the Establishment Period and prior to the final acceptance of the work.

All trees shall be supported by two (2) stakes. Stakes for street trees shall be parallel to the curb. Stakes shall be eight (8') feet long of white cedar with bark attached and shall show no sign of cracking or decay. They shall have a maximum allowable deflection of ten (10%) percent. If the stakes are not long enough to produce secure supports, the Contractor shall, when so directed by the Engineer, furnish and install longer stakes for the purpose, at no additional cost to the City. Stakes shall have a diameter at the middle of not less than two (2") inches nor more than two and three-quarter (2-3/4") inches and a diameter of not less than one and three-quarter (1-3/4") inches at the tip nor more than three (3") inches at the butt.

Stakes shall be driven about thirty (30”) inches into the ground and fastened securely to the trees with a suitable length of three-quarter (3/4”) inches wide, flat, woven polypropylene material such as Arbortie™ as manufactured by DeepRoot®, San Francisco, CA; Arborbrace Tree-tie Webbing as manufactured by Arborbrace Staking Systems, Inc., Miami, Fl. 33156, tel. (305) 992-4104; TreeTie™ as manufactured by Nelco, 22 Riverside Dr., Pembroke, MA. 02359, tel. (800) 491-2812; or, an approved equivalent that is knotted or nailed to the stakes with one (1”) inch galvanized roofing nails as directed by the Engineer. No wire or hose is to be used to stake trees.
All stakes shall be driven about one (1’) foot away from the trunk face, taking care to stay clear the root ball.

7. Pruning

Only dead, crossing, broken or badly bruised branches shall be removed by pruning with a clean cut. All pruning shall be done with sharp tools. At the time of planting, pruning cuts shall be made at the base of the branch at such a point and angle that neither the branch collar nor the bark of the stem is damaged, and that no branch stub extends from the collar. Crowns of young trees shall not be cut back to compensate root loss. No leaders shall be cut. All pruning must be done in the presence of and at the direction of the Tree Consultant.

8. Watering

At the time of planting, the soil around each tree shall be thoroughly saturated with at least twenty (20) gallons of water. Soil shall be firmed at six (6) to eight (8”) inch intervals and thoroughly settled with water. During the establishment period, watering must conform to the specifications provided under **Section 4.10**. Water shall be free from oil, have a pH not less than 6.0 nor greater than 8.9 and shall be free from impurities injurious to vegetation. Unless otherwise directed, water may be drawn from mains owned by or supplying water to the City of New York.

Water shall not be applied in a manner which damages plants, plant saucers, stakes or adjacent areas. Each plant saucer shall be carefully filled with water in a manner which does not erode the soil or the plant saucer. Watering shall not cause uprooting or exposure of plant’s roots to the air.

9. Concrete Sidewalk

When required for the construction of new tree pits, the Contractor shall carefully saw cut existing sidewalk so as not to destroy any sidewalk beyond the limits of the tree pit at no separate cost. Any sidewalk disturbed beyond the limits of the tree pit shall be restored by the Contractor at the Contractor’s own cost and expense; the restoration to be in accordance with the standard specification for concrete sidewalk.

4.16.6. ESTABLISHMENT. The Contractor must establish planted or transplanted trees as provided under **Section 4.10**.

4.16.7. REPLACEMENT. The Contractor must replace trees as required by **Section 4.10**.

4.16.8. MEASUREMENT.

(A) TREE REMOVAL

1. The quantity to be measured for payment shall be the number of trees, four (4”) inches or more in diameter, removed and disposed of as shown on the Contract Drawings, as specified and as directed by the Engineer.
2. No payment will be made hereunder for trees removed and disposed of under other Sections or other provisions of this Section when the contract prices bid for the work to be done thereunder includes the cost of removing and disposing of such trees.
3. No direct payment will be made for the removal of trees less than four (4”) inches in diameter but the cost thereof will be deemed to be included in all the scheduled contract prices.
4. The removal of existing stumps, including root systems, is provided for elsewhere and no payment will be made hereunder for such removal and disposal.
5. Measurement of the diameter of trees shall be made four and one-half (4-1/2’) feet above the adjacent ground.

6. A tree having a single root system and more than one trunk at a height four and one-half (4–1/2') feet above the adjacent ground shall be considered a multiple-trunk tree. The caliper of a multiple-trunk tree, to be measured for payment, shall be the square root of the summation of the squares of the calipers of the several trunks, except that trunks of less than three (3") inch caliper will not be considered or included.

(B) STUMP REMOVAL

The quantity of stump removal to be measured for payment will be the number of stump units of tree stumps over six (6") inches in diameter calculated in accordance with the payment schedule specified under **Subsection 4.16.9**, and the directions of the Engineer.

Measurement of the diameter of each tree stump shall be made two (2') feet above the adjacent ground or at the top of the tree stump, whichever is lower.

Tree stumps of trees removed under other contract items shall not be measured for payment under this item.

(C) TRANSPLANTING

The quantity to be measured for payment hereunder will be the number of existing trees transplanted and established in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(D) PLANTING

The quantity to be measured for payment hereunder will be the number of new trees, of each size, furnished, planted and established in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

4.16.9. PAYMENT SCHEDULE FOR STUMP REMOVAL. The Contractor will be paid at the following rates for the different size groups of stumps removed based on the unit bid price for removing a stump over six (6") inches to twelve (12") inches in diameter (base Unit).

STUMP DIAMETER	STUMP UNITS	PAYMENT PER STUMP REMOVED
Over 6" to 12"	1.0 (base Unit)	100% of Unit Bid Price
Over 12" to 18"	1.25	125% of Unit Bid Price
Over 18" to 24"	1.5	150% of Unit Bid Price
Over 24" to 30"	2.0	200% of Unit Bid Price
Over 30" to 36"	2.25	225% of Unit Bid Price
Over 36" to 42"	2.5	250% of Unit Bid Price
Over 42"	3.5	350% of Unit Bid Price

For example, removal of one (1) 16" diameter stump would receive payment for 1.25 stump units, removal of one (1) 36" diameter stump would receive payment for 2.25 stump units and one (1) 26" diameter stump would receive payment for 2.0 stump units for a total of 5.50 stump units.

4.16.10. PRICES TO COVER.

(A) TREE REMOVAL (UNIT PRICE)

The contract price shall be a unit price per existing tree, of the size specified, removed; and shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to complete the work including the necessary excavation of all materials of whatever nature encountered; backfilling of excavations with acceptable material; and the disposal of removed trees; all, together with necessary incidentals, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Additional trees to be removed and disposed of from abutting properties at the direction of the Engineer, when such removal and disposal is not shown on the Contract Drawings, will be measured and paid for in accordance with Provisions 4.16.8.(A).

(B) STUMP REMOVAL

The contract price per each stump unit shall cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to remove stumps, including, but not limited to, disposal of any generated

material and required fees for disposal, borrowed fill, restoration of walks and curbs disturbed by this operation, maintenance and repair of utilities and all other incidentals necessary to complete the work in accordance with the specifications to the satisfaction of the Engineer.

The stump diameter shall be measured in the presence of the Engineer.

Stumps 6" diameter and under shall be removed in accordance with the requirements of **Section 6.01**, "**Clearing and Grubbing**".

(C) TRANSPLANTING

The contract price for transplanting will be a unit price per tree and will cover the cost of all labor, material, plant, equipment, insurance, and incidentals necessary to complete the work of transplanting existing trees, including their establishment, as shown on the Contract Drawings, as specified and as directed by the Engineer.

The cost of furnishing and incorporating topsoil in tree pits, and spreading mulch over tree pits is also included in the unit price bid for each transplanting item.

The Contractor will be paid the unit price for transplanting in the following percentage increments as described in **Section 4.10**:

1) 40% - Initial Planting
2) 30% - Initial Inspection Successful, or Re-Planting
3) 30% - Second Inspection Successful, or Re-Planting

The Contractor will only be paid for the work completed. If the Contractor does not successfully complete the establishment period, no payment will be made for the percentage increments not completed. Completion of the establishment period includes completion of all establishment period tasks (post planting care items).

(D) PLANTING

The contract price for planting will be a unit price per tree and will cover the cost of all labor, materials, plant, equipment, inspections, insurance, and incidentals necessary to complete the work of planting new trees, including their establishment, as shown on the Contract Drawings, as specified and as directed by the Engineer.

The cost of furnishing and incorporating topsoil in tree pits, and spreading mulch over tree pits is also included in the unit price bid for each planting item.

The Contractor will be paid the unit price for planting in the following percentage increments as described in **Section 4.10**:

1) 40% - Initial Planting
2) 30% - Initial Inspection Successful, or Re-Planting
3) 30% - Second Inspection Successful, or Re-Planting

The Contractor will only be paid for the work completed. If the Contractor does not successfully complete the establishment period, no payment will be made for the percentage increments not completed. Completion of the establishment period includes completion of all establishment period tasks (post planting care items).

Payment will be made under:

Item No.	Item	Pay Unit
4.16 AA	TREES REMOVED (4" TO UNDER 12" CALIPER)	EACH
4.16 AB	TREES REMOVED (12" TO UNDER 18" CALIPER)	EACH
4.16 AC	TREES REMOVED (18" TO UNDER 24" CALIPER)	EACH
4.16 AD	TREES REMOVED (24" CALIPER AND OVER)	EACH
4.16 BA	TREES PLANTED, 2-1/2" TO 3" CALIPER, ALL TYPES	EACH
4.16 CA	TREES PLANTED, 3" TO 3-1/2" CALIPER, ALL TYPES	EACH
4.16 DA	TREES PLANTED 3-1/2" TO 4" CALIPER, ALL TYPES	EACH
4.16 AAT	TREES TRANSPLANTED, UP TO 4" CALIPER, ALL TYPES	EACH

4.16 BA405	TREES PLANTED, 2-1/2” TO 3” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 BA505	TREES PLANTED, 2-1/2” TO 3” CALIPER, ALL TYPES, IN 5’ X 5’ TREE PITS	EACH
4.16 BA510	TREES PLANTED, 2-1/2” TO 3” CALIPER, ALL TYPES, IN 10’ X 5’ TREE PITS	EACH
4.16 CA405	TREES PLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 CA505	TREES PLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 5’ X 5’ TREE PITS	EACH
4.16 CA510	TREES PLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 5’ X 10’ TREE PITS	EACH
4.16 DA405	TREES PLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 DA505	TREES PLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES, IN 5’ X 5’ TREE PITS	EACH
4.16 DA510	TREES PLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES, IN 5’ X 10’ TREE PITS	EACH
4.16 EA405	TREES PLANTED, 4” TO 4-1/2” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 EA505	TREES PLANTED, 4” TO 4-1/2” CALIPER, ALL TYPES, IN 5’ X 5’ TREE PITS	EACH
4.16 EA510	TREES PLANTED, 4” TO 4-1/2” CALIPER, ALL TYPES, IN 5’ X 10’ TREE PITS	EACH
4.16 CAT405	TREES TRANSPLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 CAT505	TREES TRANSPLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 5’ X 5’ TREE PITS	EACH
4.16 CAT510	TREES TRANSPLANTED, 3” TO 3-1/2” CALIPER, ALL TYPES, IN 5’ X 10’ TREE PITS	EACH
4.16 DAT405	TREES TRANSPLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES, IN 4’ X 5’ TREE PITS	EACH
4.16 DAT505	TREES TRANSPLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES IN 5’ X 5’ TREE PITS	EACH EACH
4.16 DAT510	TREES TRANSPLANTED, 3-1/2” TO 4” CALIPER, ALL TYPES IN 5’ X 10’ TREE PITS	EACH EACH
4.16 *xxxxxx*	TREES PLANTED, (*Size and type of tree and tree pit size as specified in Bid Pages*)	EACH
4.16 *xxxxxx*	TREES TRANSPLANTED, (*Size and type of tree and tree pit size as specified in Bid Pages*)	EACH
4.16 STUMP	STUMP REMOVAL	EACH

Note: *xxxxxx* denotes serialized pay item.

SECTION 4.17 – Shrubs and Groundcover

4.17.1. INTENT. This section describes the planting of shrubs and groundcovers.

4.17.2. DESCRIPTION. The Contractor and/or subcontractors shall be certified by the New York State Department of Agriculture & Markets to perform work within the Asian Longhorned Beetle Quarantine Zone. The Contractor must review and abide by the description of the quarantine and compliance agreements as presented in the publication entitled Part 139 of the New York State, Department of Agriculture & Markets law. Full information can be obtained from Federal and State Pest Control personnel. Quarantine areas, for the purpose of this contract shall be defined as all five Boroughs of the New York City.

Due to current Federal and New York State laws and regulations concerning Asian Longhorned Beetle management, the following host species may not be planted in the quarantine zone. Host species are as follows: Acer-Maple, Aesculus-Horsechestnut/Buckeye, Salix-Willow, Betula-Birch, Populus-Poplar, Ulmus-Elm, Albiza-Mimosa/Silk Tree, Celtis-Hackberry, Fraxinus-Ash, Platanus-London Planetree, Sycamore, Sorbus-Montain Ash.

The Contractor must comply with all Federal, State, and City laws pursuant to the handling and disposal of woody organic material that is host material for the Asian Longhorned Beetle. All wood that is host material for the Asian Longhorned Beetle must be chipped, ground, or shredded inside the quarantine zone to a size of less than one (1") inch in at least two dimensions before it is permitted to leave the quarantine zone. Please refer to Part 139 of the New York State Department of Agriculture and Markets law and contact State personnel for further details.

In addition, Nurseries located within the quarantine zone shall comply with State and Federal Law and all Contractors and/or Subcontractors shall be Certified by the New York State Department of Agriculture and Markets to perform work within the Quarantine Zone.

Planting shall consist of the furnishing, delivering, hauling, handling and planting, and establishing of new shrubs and groundcover at locations shown on the Contract Drawings or directed by the Engineer.

Planting shall include all labor, materials, plant and equipment required for all excavation of all materials of whatever nature encountered (except excavation of boulders in open cut and ledge rock); furnishing soil amendments and topsoil; incorporating soil amendments into topsoil; placing topsoil and incorporated soil amendments in new shrub and groundcover beds; fertilizing; spraying, pruning, protecting and establishing all plants; and furnishing and installing all other incidentals required for the proper performance of the work; all, in accordance with the Contract Drawings, the specifications and the direction of the Engineer.

4.17.3. GENERAL. Requirements for Landscape Contractor and Planting Operations shall comply with the requirements of **Subsection 4.16.3**.

4.17.4. MATERIALS.

(A) PLANT MATERIAL

Type and size of plants shall be as specified in the Bid Schedule or as shown on the Contract Drawings.

Requirements for Plant Names, Quality, Dimensioning, Preparation for Shipping, Shipments, Certification and Inspection shall comply with **Subsection 4.16.4**. The word "SHRUB" as used herein shall include all groundcover, vines and other planting materials required, except for plant material listed under Item Nos. starting with "4.16" and Item Nos. 4.19 and 4.20.

All plants shall be typical of their species or variety and nursery-grown, unless otherwise stated. They shall have normal, well-developed branches and vigorous fibrous root systems. They shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, dead or broken branches, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plant material shall be delivered in pots, pans, or other containers, or balled and burlapped. Containerized material shall be free from girdling roots. Bare root plant material, as well as any other plant material not meeting the above requirements, delivered to the site will be rejected. All rejected material shall be removed from the site and replaced with acceptable material at no additional cost to the City.

All shrubs shall have been grown under similar climatic conditions as the project site two (2) years prior to the date of the project. Plants held in storage will be rejected if they show signs of growth during storage. Collected plants shall be taken from a soil favorable to good root development. All collected materials shall be clean sound stock, free for decaying stumps.

Herbaceous plants, vines, and groundcover shall be vigorous healthy plants, a minimum two (2) years old, from cuttings, seed, or division, with well-developed root systems and crowns, as specified in the Plant Schedule. Bulbs, corms, tubers and rhizomes shall be firm, non-desiccated, and certified free of disease and viral infection, of the sizes, grades, and varieties indicated in the Plant Schedule.

There shall be no substitution of plant types by the Contractor without prior written approval by the Engineer.

(B) TOPSOIL

Topsoil shall comply with the requirements of **Section 2.26**. All references in this Section to topsoil will include a different planting medium, such as engineered soil or sand, where applicable.

(B) COMPOST

Compost shall contain organic matter, or material of generally humus nature capable of sustaining the growth of vegetation, with no admixture of refuse or material toxic to plant growth. The Compost shall be free of pathogens and stones, lumps, or similar objects larger than two (2") inches in greatest diameter, as well as roots, brush, and weeds.

Composts that have been derived from organic waste such as food and agriculture residues, animal manures, and sewage sludge that meet the above requirements, and are approved by the New York State DEC, are acceptable compost sources. Compost shall have an approximate N-P-K analysis of at least 1-1-0 as delivered, with a pH between 5.5 and 8.5 and a solids content of at least fifty (50%) percent. Compost shall have a minimum of fifty (50%) percent organic material.

Compost shall be "Nature's Choice Compost" by Nature's Choice Corp., Union, NJ, or an approved equivalent. For areas that are not community gardens, Contractor may also substitute an organic biosolid humus such as "Landscapers' Advantage™" Class A compost (30 cubic yard minimum), manufactured by J.P. Mascaro & Son, Harleyville, PA; or "AllGro Compost", as manufactured by AllGro, Inc., Hapton, NH; or an approved equivalent.

(D) FERTILIZER

Commercial fertilizer shall be a complete fertilizer, part of the elements of which are derived from organic non-toxic sources with low persistence, and shall contain the following percentages by weight: nitrogen 5%; phosphoric acid 10%; potash 5%. It shall be uniform in composition, dry, free flowing and shall be delivered to the site in unopened original containers, all bearing the manufacturer's guaranteed analysis.

Where indicated on the Contract Drawings or where directed by the Engineer, sludge compost shall be incorporated in the soil instead of, or in addition to, commercial fertilizer. The amount of sludge compost shall be as indicated on the Contract Drawings or directed by the Engineer.

(E) LIME

Lime shall be ground dolomitic limestone not less than 85% total carbonated, ground so that 50% passes 100 mesh sieve and 90% passes 20 mesh sieve. Amount of lime shall be determined by the soil test and the plant requirements.

(F) BONE MEAL

Bone meal shall be firmly ground and have a minimum analysis of 2% nitrogen and 20% phosphoric acid.

(G) HERBICIDE

Herbicide shall be equivalent to Balam, as manufactured by Elanco Products Corp., a division of Eli Lilly and Co., Indianapolis, Indiana 46206. Product is a selective preemergence herbicide for the control of crabgrass and other annual weed grasses. Product shall be used in planting beds. Product shall never be used on new lawns or topsoil designated for seeded areas.

(H) MYCORRHIZAL FUNGI INOCULANT

Mycorrhizal fungi inoculant shall be applied by means of a three ounce (3 oz.) premeasured dry formulation packet, such as Mycor Tree Saver Transplant®, as manufactured by Plant Health Care, Inc., Pittsburgh, PA; Rhizanova Tree Transplant, as manufactured by Becker Underwood, Inc., Ames, IA; DIEHARD®, as manufactured by Horticultural Alliance and distributed through Atlantic Irrigation, White Plains, NY; or, an approved equivalent. Packets shall contain, as a minimum: one thousand (1000) live spores of Vesicular-Arbuscular fungi, including: *Entrephosphora columbiana*, *Glomus clarum*, *Glomus etunicatum*, and *Glomus sp.;* seventeen million five hundred thousand (17,500,000) live spores of Ectomycorrhizal fungi, including: *Pisolithus tinctorius*; biostimulants including *Yucca schidigera* extract; soluble sea kelp extract derived from *Ascophylum nodosum*; humic acids; and acrylamide copolymer gel as a water absorbent medium.

Mycorrhizal inoculant should be used for planting trees, woody shrubs and woody groundcovers only; it is not needed for herbaceous material. Mycorrhizal fungi inoculant shall be added to the top six (6) to eight (8") inches of backfill soil in each planting pit and thoroughly mixed to distribute the inoculant. The opened packets shall be given to the Engineer at the end of each day. Mycorrhizal inoculant is a dated material and must be used before it expires.

The material shall be applied per the following chart:

Size of rootball or container	Ounces per plant
1 gallon	1
2 gal.	2
3 gal.	3
5 gal.	3
7 gal.	3
10 gal.	3
15 gal.	3
20" B&B	6
24" B&B	9
30" B&B	9
36" B&B	12
42" B&B	12

(I) WATER RETENTION ADDITIVE

Water Retention Additives shall comply with the requirements of **Subsection 4.16.4.(F)**.

(J) MULCH

Shredded bark mulch shall be a natural forest product of at least 98% bark containing less than 2% wood or other debris. It shall be of White or Red Fir and/or Pine bark of a uniform grade with no additives or any other treatment. Size of bark shall be from 5/8" to 1-1/4". The pH factor should range from 5.8 to 6.2. Shredded bark may also be used. Samples shall be submitted to and approved by the Engineer prior to use.

Shredded bark mulch shall be applied to the surface of the beds, as shown on the Contract Drawings or as directed by the Engineer. Mulch shall be applied to a uniform depth of three (3) to four (4) inches over shrub bed areas and two (2) to three (3) inches over groundcover beds, and shall be so distributed as to create a smooth level cover over the exposed soil. Where jute mesh is specified on the Contract Drawings or Standard Drawings, it will be used in place of mulch. Plants shall not be covered.

4.17.5. METHODS. Planting methods shall comply with **Subsection 4.16.5.(D) PLANTING** with the following exceptions:

(A) TIME OF PLANTING

Unless otherwise directed or approved by the Engineer, Planting must be performed in the following timeframes:

Plant Type	Deciduous Material	Evergreen Material
Spring Planting	March 1 to May 1	April 1 to May 15
Fall Planting	October 15 to December 15	September 1 to October 15

(B) EXCAVATION AND PLANTING

No planting shall be done except in the presence of the Engineer. All material shall be inspected by the Engineer as it is removed from the truck, prior to placing in an approved storage area or the designated planting site. All rejected material shall be removed from the site and replaced with acceptable material at no additional cost to the City.

Bare root material shall be adequately protected from drying out. It shall be removed from its plastic bag and planted immediately after inspection. The bundles of heeled-in plants shall be set upright on the ground, covered with mulch, and kept adequately moist until the time of installation. Until the time of planting, all plant material shall be stored in an approved location, securely fenced and maintained, to the satisfaction of the Engineer, at no additional cost to the City. All plants not planted immediately shall be watered as necessary to maintain optimal health until planting.

For containerized material, girdling roots shall be removed. Circling roots shall be separated and spread out to not impede future growth. All shrubs shall be planted in the planting beds previously prepared or, where free standing, in individual pits. Individual shrub pits shall be 18” deep and at least one foot wider than the ball of earth or spread of roots. All pits shall be circular in outline and dug with vertical sides. The Contractor shall scar the surface of the excavated pit walls to avoid a smooth glaze.

Place balled and burlapped material in the prepared planting pit by lifting, and carry it by the rootball. Set shrub straight and in the center of the pit, with the most desirable side facing toward the predominant view. All material shall be set, after settlement, at the same level at which they have grown in the nursery, i.e., at the base of the crown. Care shall be exercised in setting the plants plumb. All ropes, stones, etc. shall be removed from the pit before backfilling. Soil for backfill shall be loose and friable and not frozen or compacted. Cut and remove rope or wire from the top two-thirds (2/3) of the rootball and cut off the burlap back to the edge of the ball. Remove as much woven product and twine as possible. All plastic or synthetic fabric must be removed from the ball at the time of planting. Remaining lateral wire must be cut to prevent future root interference. Wire must not be galvanized or aluminum wire. Balled and burlapped plants shall be handled so that the ball will not be loosened. After the soil has been thoroughly firmed under and around the ball, the burlap shall be cut away from the upper half of the ball, and the remaining burlap shall be entirely removed. Soil shall be firmed at six (6) to eight (8”) inch intervals and thoroughly settled with water.

Plants with exposed roots shall be placed in the proper position in the center of the pit after the soil in the bottom of the pit has been firmed. Roots shall be arranged in their natural position and existing soil worked in among them, firmed at intervals, and mycorrhizal inoculant and water retention additive worked into the top eight (8”) inches of backfill soil in the correct proportions. The plants shall then be thoroughly settled in with water. Care shall be taken to avoid bruising or breaking the roots when tamping the soil. All large and fleshy roots that are bruised or broken shall be pruned, making a clean cut before planting.

Evergreen groundcovers shall be planted in 12 inch deep topsoil planting bed consisting of three parts by volume of topsoil thoroughly mixed with one part compost. Fertilizer shall be incorporated with the soil before setting out plants, at the rate of one (1) pound of fertilizer to twenty (20) square feet of area. Entire area shall be graded so that surface contour is not altered from the overall surface drainage pattern. Apply mulch and herbicide as herein specified.

Vines, Herbaceous, and Groundcover plants shall be carefully removed from containers or flats immediately prior to planting and set to the same depths as they were grown in the nursery bed or container, to the correct spacing indicated on the plans. Roots shall be arranged to their natural position and topsoil worked in among them, taking care to avoid bruising or damaging the roots, and fertilizer tablets added to the top four (4”) inches of backfill soil in the correct proportion for the respective pot size. No later than one hour after planting, all plants shall be thoroughly settled in with water.

Annual flowering plants shall be carefully removed from the flats or cell-packs to avoid damaging roots or stems and planted in prepared planting beds, at the same depth they were growing in the containers. Soil shall be thoroughly firmed around each crown, and plants thoroughly firmed around each crown, and plants thoroughly watered in no longer than one hour after planting.

Bulbs shall be planted in the locations indicated on the plans and to the depth and spacing indicated on the Plant Schedule. Spring Flowering Bulbs, Corms, Tubers, and Rhizomes shall be planted in late September or October, no more than six (6) weeks before frost. Summer and Fall Flowering Bulbs, Corms, Tubers, Rhizomes and Plugs shall be planted in spring, after the last frost, or as directed by the Engineer. Prior to planting, bulbs shall be stored in a cool, dry, well-ventilated location for no longer than two (2) weeks before planting.

All of the above shall be planted according to best horticulture practice.

(C) BACKFILLING

Backfill for shrub beds shall consist of topsoil as specified in **Section 2.26**. Commercial fertilizer shall be added at the rate of six ounces for each shrub under four (4') feet in height and eight ounces for each shrub four (4') feet in height or over.

(D) FINISHING SURFACE AFTER BACKFILLING

The Contractor shall cultivate and rake over finished planting areas and shall leave the site in an orderly condition. On level ground or slight slopes, a shallow basin a little larger than the diameter of the plant pit shall be left around each plant, as shown on the plans, or as directed by the Engineer. On steep slopes, the soil on the lower side of the plant shall be graded in such a manner that it will catch and hold water, as shown on the plans, or as directed by the Engineer. Upon completion of planting, all debris and waste material resulting from the planting operation shall be removed from the project area, and the affected area raked and cleaned as necessary. Green Infrastructure practices must be graded as shown on the plans.

All work done in preparing shallow basins or grading of plant pits on steep slopes and regarding and reseeding of plant saucers shall be deemed included in the unit price bid per plant. All berms raised for shallow basins in level or gently sloping grass areas shall be removed at the end of the establishment period, as well as tree stakes and irrigation bags, if present. This topsoil shall be cast evenly over the surrounding grass areas and grass seed sown over the removed berms.

4.17.6. SECURITY. Where indicated on the drawings, various types of shrubs shall be secured against theft by the provision and installation of steel anchoring cables, clips, bolts, rubber or plastic cable sheaths, and various anchoring devices, as detailed on the Contract Drawings. No separate payment will be made for this work when it is indicated on the Contract Drawings, the cost of which shall be deemed included in the unit price bid for the various shrub planting items.

4.17.7. ESTABLISHMENT. Establishment must comply with the requirements of **Subsection 4.10**.

4.17.8. REPLACEMENT. Replacement must comply with the requirements of **Subsection 4.10**.

4.17.9. MEASUREMENT. The quantity to be measured for payment hereunder shall be the number of plants of each species and size, furnished, planted and established in accordance with the Contract Drawings, specifications and directions of the Engineer.

4.17.10. PRICES TO COVER. The contract price for planting shall be a unit price per plant of each species and size and shall cover the cost of all labor, material, plant, equipment, inspection, insurance, and necessary incidentals required to complete the work of planting new plant materials, including their establishment, as shown on the Contract Drawings, as specified and as directed by the Engineer.

The cost of furnishing and incorporating topsoil, fertilizer and mulch are also included in the unit price bid for each planting item.

The Contractor will be paid the unit price for planting in the following percentage increments as described in Section 4.10:

1) 40% - Initial Planting
2) 30% - Initial Inspection Successful, or Re-Planting

3) 30% - Second Inspection Successful, or Re-Planting

The Contractor will only be paid for the work completed; if the Contractor does not successfully complete the establishment period, no payment will be made for the percentage increments not completed. Completion of the establishment period includes completion of all establishment period tasks (post planting care items).

Payment will be made under:

Item No.	Item	Pay Unit
4.17 AA	SHRUBS PLANTED, 15”-18” HIGH, ALL TYPES	EACH
4.17 AB	SHRUBS PLANTED, 30” TO 36” HIGH, ALL TYPES	EACH
4.17 AC	SHRUBS PLANTED, 18” TO 24” HIGH, ALL TYPES	EACH
4.17 ACA	SHRUBS PLANTED, 24” TO 30” HIGH, ALL TYPES	EACH
4.17 AD	SHRUBS PLANTED, 36” TO 48” HIGH, ALL TYPES	EACH
4.17 AE	SHRUBS PLANTED, 48” TO 60” HIGH, ALL TYPES	EACH
4.17 AF	SHRUBS PLANTED, 60” TO 72” HIGH, ALL TYPES	EACH
4.17 APS	PERENNIAL OR SHRUB PLANTED, 1 GALLON, ALL TYPES	EACH
4.17 C1G	GRASSES PLANTED, 1 GALLON, ALL TYPES	EACH
4.17 C1Q	GRASSES PLANTED, 1 QUART, ALL TYPES	EACH
4.17 CPL	PLUGS, GRASSES	EACH
4.17 D1G	SHRUBS PLANTED, DECIDUOUS. 1 GALLON. ALL TYPES	EACH
4.17 D3036	SHRUBS PLANTED, DECIDUOUS. 30” TO 36” HEIGHT, B&B. ALL TYPES	EACH
4.17 D34	SHRUBS PLANTED, DECIDUOUS, 3’ TO 4’ HEIGHT, B&B. ALL TYPES	EACH
4.17 D3G	SHRUBS PLANTED, DECIDUOUS.3 GALLON. ALL TYPES	EACH
4.17 D5G	SHRUBS PLANTED, DECIDUOUS. 5 GALLON. ALL TYPES	EACH
4.17 D78	SHRUBS PLANTED, DECIDUOUS. 7’ TO 8’ HEIGHT, B&B. ALL TYPES	EACH
4.17 EG3G	SHRUBS PLANTED, EVERGREEN. 3 GALLON. ALL TYPES.	EACH
4.17 EG5G	SHRUBS PLANTED, EVERGREEN. 5 GALLON. ALL TYPES.	EACH
4.17 FAT	FERN. ALL TYPES.	EACH
4.17 FB	FLOWERING BULB. PLANTED. ALL TYPES	EACH
4.17 MAS	SHRUBS PLANTED. ALL TYPES	EACH
4.17 OG10G	ORNAMENTAL GRASS PLANTED, 10 GALLON	EACH
4.17 OG1G	ORNAMENTAL GRASS PLANTED, 1 GALLON	EACH
4.17 OG1QT	ORNAMENTAL GRASS PLANTED, 1 QT	EACH
4.17 OG2G	ORNAMENTAL GRASS PLANTED, 2 GALLON	EACH
4.17 OG2QT	ORNAMENTAL GRASS PLANTED, 2 QT	EACH
4.17 OGG3G	ORNAMENTAL GRASS PLANTED, 3 GALLON	EACH
4.17 OG5G	ORNAMENTAL GRASS PLANTED, 5 GALLON	EACH
4.17 P1QT	PERENNIALS 1 QT	EACH
4.17 P2QT	PERENNIALS 2 QT	EACH
4.17 PB	GROUND COVER PLANTED. PERENNIAL BULBS. ALL TYPES	EACH
4.17 PG1G	PERENNIALS OR GROUNDCOVERS. PLANTED. 1 GALLON. ALL TYPES	EACH
4.17 PG2G	PERENNIALS OR GROUNDCOVERS. PLANTED. 2 GALLON. ALL TYPES	EACH
4.17 PG3G	PERENNIALS OR GROUNDCOVERS. PLANTED. 3 GALLON. ALL TYPES	EACH
4.17 PG5G	PERENNIALS OR GROUNDCOVERS. PLANTED. 5 GALLON. ALL TYPES	EACH
4.17 PG7G	PERENNIALS OR GROUNDCOVERS. PLANTED. 7 GALLON. ALL TYPES	EACH
4.17 *xxxxxx*	SHRUBS PLANTED, (*Size and type as specified in Bid Pages*)	EACH
4.17 *xxxxxx*	GROUNDCOVER PLANTED, (*Size and type as specified in Bid Pages*)	EACH
4.17 *xxxxxx*	PERENNIALS PLANTED, (*Size and type as specified in Bid Pages*)	EACH

Note: *xxxxxx* denotes serialized pay item.

SECTION 4.18 – Tree Pruning

4.18.1. INTENT. This section describes the pruning of trees.

4.18.2. DESCRIPTION. The Contractor shall prune designated trees in accordance with the specifications and as directed by the Engineer, under permit issued by the New York City Department of Parks and Recreation (D.P.R.) which may be obtained from the Borough's Forestry Office.

4.18.3. MATERIALS AND METHODS.

(A) GENERAL

The Contractor and/or subcontractors shall be certified by the New York State Department of Agriculture & Markets to perform work within the Asian Longhorned Beetle Quarantine Zone. The Contractor must review and abide by the description of the quarantine and compliance agreements as presented in the publication entitled Part 139 of the New York State, Department of Agriculture & Markets law. Full information can be obtained from Federal and State Pest Control personnel. Quarantine areas, for the purpose of this contract shall be defined as all five Boroughs of the New York City.

Due to current Federal and New York State laws and regulations concerning Asian Longhorned Beetle management, all wood that is host material for the Asian Longhorned Beetle must be chipped, ground, or shredded inside the quarantine zone to a size of less than one (1") inch in at least two dimensions before it is permitted to leave the quarantine zone. Host species are as follows: Acer-Maple, Aesculus-Horsechestnut/Buckeye, Salix-Willow, Betula-Birch, Populus-Poplar, Ulmus-Elm, Albiza-Mimosa/Silk Tree, Celtis-Hackberry, Fraxinus-Ash, Platanus-London Planetree, Sycamore, Sorbus-Montain Ash. Please refer to the Part 139 of the New York State Department of Agriculture and Markets law and contact State personnel for further details.

The tree care pruning contractor/subcontractor shall be a certified by the New York State Department of Agriculture and Markets to perform pruning work within the Asian Longhorned Beetle quarantine zone. The Contractor must review and abide by the description of the quarantine and compliance agreements as presented in the publication entitled Part 139 of the New York State, Department of Agriculture & Markets law. Full information can be obtained from Federal and State Pest Control personnel.

All pruning of limbs and roots must be performed by a qualified arborist trained in proper pruning techniques, tree biology, diagnosis and treatment of plant diseases, and cabling and bracing. The tree care pruning contractor/subcontractor shall have a minimum of three (3) years' experience performing non-utility pruning as well as documentation of eight (8) hours of education in any combination of the specialties listed above. Certification by the International Society of Arboriculture (I.S.A.), Champaign, Illinois, shall be considered proof of the requisite experience and educational requirements, provided that experience is non-utility pruning.

The Contractor shall prune designated trees and remove all trash and debris within the area limits, in accordance with the specifications and/or as directed by the Engineer and under permit issued by the Department of Parks and Recreation.

Trees shall be measured by diameter for size at the height of four feet six inches (4' – 6") above mean grade.

(B) EQUIPMENT

Workmen shall only be permitted to climb trees with climbing spurs if said tree is being removed. Otherwise, workmen shall employ accepted alternative tree-climbing methods. All tools used and methods employed shall be as approved by the Engineer. The cutting surfaces of all tools, ladders, ropes, soles of workmen's shoes and other objects coming into contact with the tree shall be washed with an approved disinfectant at the start of any work on a tree to prevent the spread of plant diseases.

(C) PRUNING

Tree Pruning (Preparatory): Pruning of tree limbs and roots shall be performed by the Contractor where directed. Pruning shall occur for, but not limited to, the following situations: interference with new fences, lights or utilities, to achieve the required clearance for pedestrian or vehicular passage, to permit establishment of grass, ground cover, and other plant material, or for aesthetic considerations.

All work shall be performed in a professional manner and in accordance with the most current revision of the American National Standards for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance and Standard Practices, A-300-(Part 1)-2001 Pruning, published by the American National Standards Institute (ANSI).

All pruning must be approved by the Department of Parks and Recreation (D.P.R.) and specified on the D.P.R. permit in advance of any tree work. No trees shall be pruned except as directed by the Engineer. Pruning of the crown shall be performed in such a manner as to maintain the shape of the particular species and the balance and symmetry of the tree in general while retaining as much fine growth as possible. All nails, spikes, wire or other materials driven into or fastened to the trunk or branches shall be removed or, if approved, they shall be cut flush in a manner to permit complete healing over. On trees known to be diseased or where there is known danger of transmitting disease, tools are to be disinfected with wood alcohol after each cut and after completion of each tree.

In general, pruning shall consist of cutting back and removal of all dead, broken, fungus- and insect-infected, or intertwining branches, suckers, and all other undesirable growth, as directed by the Engineer. All injured areas where healing is not taking place properly shall be bark traced in accordance with the accepted horticultural practice. All branches shall be removed to a height sufficient to permit free passage of both pedestrian and vehicular traffic, approximately eight (8') foot clearance for paths and fourteen (14') feet for roadways, as directed by the Engineer. All branches interfering with sight distance or signs shall also be removed as directed. In lifting the bottom branches of trees for underclearance, care shall be given to maintain symmetrical appearance. At no time shall more than 20% of a tree's canopy be removed. All reduction points must be no greater than 1/3 size of parent stem. Excessive lifting of trees and cutting back of large limbs to the main stem is not permitted by the Department of Parks and Recreation.

The Contractor shall carefully protect from damage all existing vegetation, site features, and all other property which is to remain. The Contractor shall be liable for any and all damage to the above resulting from tree pruning operations and shall be responsible for the replacement or restoration of same where damaged, at the direction of and to the satisfaction of the Engineer.

All trees which require pruning due to root and trunk damage shall be guaranteed for one year against death. If during this time, said trees die due to root and trunk damage, they shall be removed and replaced according to D.P.R.'s removal and tree planting specifications.

Prior to guarantee inspection and final acceptance, trees shall be pruned again to eliminate excessive water sprouts and to reshape them as described.

The Contractor shall carefully protect against damage all existing trees, plants, other growth and other features to remain as per **Section 4.22**. The Contractor shall be liable for any and all damage to such trees, plants and other growth, features and other real property, and vehicles caused by tree pruning operations, and all damaged trees, plants, other growth features and other real property, and vehicles shall be replaced or restored or provided for to their original condition to the satisfaction of the Engineer.

The Contractor shall prune every damaged tree directed except trees tagged for removal within the boundary specified. Pruning shall be performed by experienced pruners and with the proper tools in a good workmanlike manner. All cuts shall be made sufficiently close to the parent stem so that healing can readily start under normal conditions. All limbs one (1") inch in diameter (the size of a quarter) and over must be precut to prevent splitting.

(D) CLEANING AND DISPOSAL

All pruned material and all other debris shall be removed from the site within 24 hours, and disposed of as directed by the Engineer.

(E) SUBMITTALS

The Contractor shall submit the name and the following qualifications of the proposed tree care Contractor or Subcontractor for review and approval prior to performing work under this Section.

1. Proof of three (3) years of non-utility pruning experience or I.S.A. certification with documented non-utility pruning experience.
2. Documentation of eight (8) hours of required education or I.S.A. certification.
3. Name, address, and phone numbers for three (3) professional references associated with non-utility pruning work performed within the past three (3) years.
4. State Certification – The Contractor must submit a copy of a valid Compliance Agreement issued by the New York State Department of Agriculture and Markets, Division of Plant Industry.

4.18.4. MEASUREMENT. The quantity to be measured for payment under each item shall be the number of trees in each size group actually pruned where and as directed in accordance with these specifications, to the satisfaction of the Engineer.

4.18.5. PRICES TO COVER. The contract prices for Tree Pruning shall be a unit price per each tree size group maintenance pruned and shall cover the cost of all labor, materials, plant, equipment, inspection, insurance, and incidentals required to complete the work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
4.18 A	MAINTENANCE TREE PRUNING (Under 12” Cal.)	EACH
4.18 B	MAINTENANCE TREE PRUNING (12” to under 18” Cal.)	EACH
4.18 C	MAINTENANCE TREE PRUNING (18” to under 24” Cal.)	EACH
4.18 D	MAINTENANCE TREE PRUNING (24” Cal. And Over)	EACH

SECTION 4.18 DC – Decompact Trees

4.18 DC.1. DESCRIPTION.

Under this section, the Contractor shall Decompact Tree Over 6” To 12” DBH, in accordance with the plans, the specifications, and as directed by the Engineer, in consultation with the Contractor’s Tree Consultant (Item No. 4.21).

Note: DBH is defined as Diameter at Breast Height, which is 4’-6” above mean grade.

4.18 DC.2. QUALIFICATIONS REQUIRED.

Qualifications of the Contractor/ Subcontractor who will be performing the work under this Section shall comply with the requirements of those specified for the tree pruning Contractor/Subcontractor under Subsections 4.18.3 (A) and 4.18.3 (E) in the Standard Highway Specifications.

4.18 DC.3. MATERIALS.

Compost: shall contain organic matter, or material of generally humus nature capable of sustaining the growth of vegetation, with no admixture of refuse or material toxic to plant growth. The Compost shall be free of pathogens and stones, lumps, or similar objects larger than two inches (2”) in greatest diameter, as well as roots, brush, and weeds.

Composts that have been derived from organic wastes such as food and agriculture residues, animal manures, and sewage sludge that meet the above requirements, and are approved by the New York State DEC, are acceptable compost sources. Compost shall have an approximate N-P-K analysis of at least 1-1-0 as delivered, with a pH between 5.5 and 8.0 and a solids content of at least fifty percent (50%). Compost shall have a minimum of twenty five (25%) to a maximum of fifty percent (50%) organic material.

Compost shall be from Long Island Compost, Islip, NY or “Nature’s Choice Compost” by Nature’s Choice Corp., Union, NJ, or Agresoil compost by Agresource, Inc. Amesbury, MA or approved equal.

Organic biosolids are not acceptable. Compost available from NYC Department of Sanitation may be acceptable for purposes of this specification. See www.nyc.gov/sanitation or www.nyccompost.org for pick-up sites.

4.18 DC.4. METHODS.

Where specified, existing trees to remain shall be decompacted during construction operations before paving. Decompaction shall be performed utilizing one of the methods listed below as determined by the Engineer, in consultation with the Tree Consultant (Item No. 4.21). All tree root protection shall be removed prior to starting decompaction, and decompaction shall not be performed in frozen ground conditions.

(A) EXCAVATION: The line of hand excavation shall be routed to minimize damage to roots within the drip line of existing trees. To prevent damage to tree trunks, branches, and the compacting of soil, no material or equipment should be stored or operated over areas within the drip line of trees. Roots over 1” in diameter may only be cut as directed by the Tree Consultant (Item No. 4.21) and with written permission of the Engineer. Roots under 1” must be cleanly cut and removed. If directed, the root zone of a tree shall be covered with mulch to a depth of at least six (6) inches or with plywood to protect roots from damage caused by heavy equipment during construction. Revised for HWPLZ005K

(B) AIR-TILLING OF THE CRITICAL ROOT ZONE METHOD: Using a pneumatic device, the area within a 3 to 5 foot radius of the tree stem, as determined by the Tree Consultant (Item No.4.21), is to be tilled to a depth of 6 to 8-inches using a compressed air gun. Compost backfill shall be applied to the area at a depth of 1-inch and tilled into the soil using a compressed air gun. The area shall be top dressed with four-inches (4”) of shredded bark mulch and thoroughly watered.

(C) VERTICAL MULCHING METHOD: Three inch (3”) diameter holes, 12” deep, shall be spaced 30” on center, throughout the root zone of the tree. Compost backfill shall be used to fill the holes. The area shall be thoroughly watered after completion.

Tree DBH	Number of 3” Dia. Holes
Over 0-6”	40
Over 6-12”	60
Over 12-18”	80
Over 18-24”	100
Over 24-30”	120
Over 30-36”	160
Over 36-42”	180
Over 42-48”	200
Over 48”	220

Where a pneumatic device is required, work shall be performed using a pneumatic excavation tool with the following requirements:

1. The high air velocity excavation tool shall be specifically designed to fracture, pulverize, and displace porous and semi-porous soils without harming or causing damage to tree roots, existing subsurface utilities or other non-porous objects.
2. The Contractor shall submit catalog cuts from the manufacturer verifying that the Pneumatic excavation tool meets the following criteria:

   Rated Operating Pressure: 6.2 – 7.0 bar
   Air Stream Velocity at Cutting Head: 1,400 – 1600 m/hr
   Air Displacement: 1,100 – 1,300 gal/min

Different nozzles may be used to expedite the work or minimize the amount of airborne material. Where a pneumatic device is used, care shall be taken to avoid rocks being scattered and inadvertently damaging private or public property. In addition, operators must be equipped with adequate protective clothing and gear, in accordance with manufacturer’s recommendations. All tree roots exposed by the pneumatic or hand excavation operation must be kept constantly moist with burlap covered with white plastic and checked a minimum of two (2) times a day, once in the morning and once in the afternoon, for a maximum of forty-eight (48) hours, until backfill is complete or as directed by the Tree Consultant (Item No. 4.21).

(D) WATERING: Where excavations are performed within the “drip line” of trees the excavated area shall be backfilled immediately and/or roots shall be kept constantly moist with burlap covered with white plastic until backfill is complete as directed by the Engineer, in consultation with the Tree Consultant (Item No. 4.21).

Watering shall take place at one-week intervals for a period of three weeks following decompaction at a rate of 750 gallons of water per 1000 square feet of decompacted area. The Engineer may order less watering based on weather conditions, resulting soil water content or other factors. If drought conditions warrant, the Engineer may order more frequent watering than scheduled or during non-scheduled periods. A watering schedule shall be submitted to the Engineer each week.

Watering for trees shall be conducted by dispersing water to plants individually. Water shall be delivered to each plant under low pressure through the end of an appropriate sized hose or watering wand, or soaker hose anchored by pins where appropriate. The rate of watering should allow maximum penetration of water into the soil and at a rate that does not displace mulch or soil, cause uprooting or exposure of plant root to the air or break saucers around plants that were created to hold water.

Water shall not be applied in a manner which damages plants, stakes or adjacent areas. Watering shall not cause uprooting or exposure of plant‘s roots to the air. Damages resulting from these operations shall be immediately repaired at the Contractor’s expense.

(E) BACKFILLING: Prior to backfilling, some roots shall be once again pruned back to sound tissue with clean cuts as directed by the Engineer, in consultation with the Tree Consultant (Item 4.21). When excavated material is considered suitable for backfill as determined by the Engineer, in consultation with the Tree Consultant (Item 4.21), it shall be cleaned of large rocks, over three inches (3”) diameter, and general debris over three (3”) inch in diameter and used for backfill unless specific requirements for backfill have been provided in the respective items of work affected; i.e. retaining walls, curbs, etc. Backfill shall

be placed, hand tamped and watered in six (6”) inch lifts, immediately after completion, until finished grade is achieved.

(F) FERTILIZATION: If fertilization is considered necessary based on soil test results, it shall be applied according to the levels determined by the Chart below, and as directed by the tree consultant (Item 4.21). Fertilizer shall be applied directly into the holes or trenches and filled with compost as outlined above.

Tree DBH	Ounces per Tree
Over 0-6	120
Over 6-12”	180
Over 12-18”	240
Over 18-24”	300
Over 24-30”	360
Over 30-36”	480
Over 36-42”	540
Over 42-48”	600
Over 48”	660

4.18 DC.5. SUBMITTALS.

All submittals shall be as specified in Subsection 4.18.3 (E) of the NYCDOT Standard Highway Specifications. The Contractor shall submit the following for review and approval prior to performing work.

Revised for HWPLZ005K

4.18 DC.6. PAYMENT SCHEDULE.

The Contractor will be paid at the following rates for the different size groups of trees decompacted based on the bid price for decompacting a tree over six to twelve inch (6”-12”) DBH (base unit).

TREE DBH	TREE UNITS	PAYMENT PER TREE
Over 0” to 6”	0.75	75% of unit price bid
Over 6” to 12”	1.00 (base unit)	100% of unit price bid
Over 12” to 18”	1.25	125% of unit price bid
Over 18” to 24”	1.5	150% of unit price bid
Over 24” to 30”	2.0	200% of unit price bid
Over 30” to 36”	2.5	250% of unit price bid
Over 36” to 42”	3.0	300% of unit price bid
Over 42” to 48”	3.5	350% of unit price bid
Over 48”	4.0	400% of unit price bid

For example, decompacting of one thirty-one (31”) inch DBH tree would receive payment for 2.5 tree units, decompacting of one twenty-two (22”) inch DBH tree would receive payment for 1.5 tree units, and decompacting of one seven (7”) inch DBH tree would receive payment for one tree unit, for a total payment of 5.0 tree units.

4.18 DC.7. MEASUREMENT AND PAYMENT.

The quantity of DECOMPACT TREE OVER 6” TO 12” DBH to be measured for payment shall be the number of tree units decompacted, calculated in accordance with the payment schedule above, to the satisfaction of the Engineer.

The price bid shall be a unit price for EACH tree decompacted in the OVER 6” to 12” DBH size group, and shall include by the cost of all labor, materials, equipment, insurance, and incidentals necessary for decompacting trees, by either air tilling or vertical mulching, watering, applying fertilizer if so directed, and all other incidentals necessary to complete the work, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

No separate payment shall be made for protecting existing tree roots with woodchips 6” deep and/ or protecting existing tree roots with plywood as directed by the Engineer. The cost shall be deemed to be included in the unit price bid for this item.

Payment will be made under:

Item No.	Description	Pay Unit
4.18 DC	DECOMPACT TREE OVER 6” TO 12” DBH	EACH

SECTION 4.19 – Sodding

4.19.1. SCOPE. This section describes the work of sodding.

4.19.2. DESCRIPTION. Sodding shall consist of the preparation of the area to be sodded; the removal and disposal of existing soil and undesirable materials; the furnishing and incorporation of topsoil, ground limestone, and/or commercial fertilizer, when and as directed; furnishing, delivering, and incorporation of sod; and all required maintenance.

4.19.3. MATERIALS.

A. Topsoil. Topsoil shall comply with the requirements of **Section 2.26**.

B. Ground Limestone. The total carbonates in ground limestone (Calcium Carbonate) shall not be less than 80% (or 44.8% Calcium Oxide equivalent). For calculation purposes, total carbonates shall be considered as Calcium Carbonate.

C. Commercial Fertilizer: Low Phosphorus (Slow Release). Commercial fertilizer mixture shall contain, by weight, Nitrogen (N) 7% min. to 10% max. of which 50% is slow-release; Phosphorus (P) 1% min. to 2% max.; and soluble Potash (K) 4% min. to 12% max.

Fertilizer shall be *pesticide free* (no weed-and-feed) product such as Healthy Turf (8-1-9) as manufactured by Plant Health Care, Inc, Pittsburgh, PA; or Safer Ringer Lawn Restore (10-2-6) as manufactured by Woodstream Corp., Lifitz, PA; or Nutrients Plus (7-2-12) as manufactured by Nutrients Plus, Virginia Beach, VA; or an approved equivalent.

D. Stakes. Stakes for pegging sod shall be approximately 1” x 2” and of sufficient length to penetrate the sod, the topsoil, and a minimum depth of two inches of subsoil, and shall be of a material and size as approved by the Engineer.

E. Sod. The approved Sod shall be of superior quality, from seed of known origin and shall be accompanied by a certificate indicating compliance with the regulations of the New York State Department of Agriculture and Markets. Sources of sod shall be made known to the Engineer at least five days before cutting. Sod shall be cut into squares or rectangular portions which shall be twelve (12”) inches or eighteen (18”) inches wide, or as approved, and may vary in length, but must be of a size which will permit them to be lifted without breaking. The sod, when delivered to the contract site, shall be sufficiently moist so the soil will adhere firmly to the roots when it is handled. Before cutting, Sod shall be mowed uniformly to a height of one and one-half (1-1/2”) inches. The sod shall be cut to a minimum soil thickness of five-eights (5/8”) of an inch, plus or minus one-quarter (±1/4”) of an inch. The sod shall be reasonably free from weeds in conformance with accepted commercial practice and shall consist of a mixture of permanent grasses such as blue grass, rye grass, and/or fine leafed fescues, in proportions as follows:

65%-85% TALL FESCUE – One or more of the following varieties: Aache II, Arid 3, Conchise III, Coronado Gold, Falcon IV, Jaguar III, Lancer (SH), Masterpiece, Rebel IV, Rebel Jr. (SH), Rebel Sentry, Rembrandt, Tomahawk E+, RTF or approved equal.

15%-25% BLUEGRASS – One or more of the following varieties: Able I (SH), Blacksburg, Glade (SH), Moonlight, Midnight, America (SH), Brilliant, Ram (SH), Touchdown (SH), Warren’s A-34(SH), Bristol (SH), Lofts 1757(SH) or approved equal.

0-10% PERENNIAL RYEGRASS – One or more of the following varieties: Brightstar II, Manhattan 4, Citation, Elfkin, or approved equal.

F. Certifications. The Contractor, prior to ordering any of the foregoing materials into the work, shall submit Certificates of Compliance to the Engineer. The said certificates shall be obtained as follows:

1. For Sod – from an approved supplier and shall include a specification sheet from the supplier listing the percentage of each type of grass seed used in the mix; and

2. For Fertilizer, Limestone and Topsoil – from an approved analytical chemist.

The aforesaid certifications shall not, in any way, affect the Engineer's right of on-site rejection of materials because of deterioration, adulteration or patent inferiority; nor the Engineer's right to sample and test any of the supplied materials.

4.19.4. METHODS. When referred to or used herein, the words topsoil, limestone, fertilizer, and sod shall mean topsoil, ground limestone, commercial fertilizer, and sod, all of which are described and meet the requirements specified under **Subsection 4.19.3**., above.

When referred to or used herein, the word soil shall mean the fill placed in accordance with **Section 4.11** or existing soil found in the area to be sodded.

The Contractor may elect (a) to remove and dispose of soil from area to be sodded, or (b) to allow the soil in a portion of or all of the area to be sodded to remain provided it can be amended to meet the requirements for topsoil and is graded to a depth of one (1") inch below the proposed grade.

The removal and disposal of existing soil under (a), above, shall be made to a depth of six (6") inches below the proposed grade. Removed soil shall be replaced with five (5") inches of topsoil.

Before any sod is placed, all areas to be sodded shall be thoroughly loosened with a rototiller to a depth of nine (9") inches below the proposed grade. All sticks, stones, roots or other objectionable materials which might interfere with the formation of a finely pulverized bed shall be removed from the soil and a smooth uniform surface grade shall be established. Hollows, depressions, and gullies shall be filled by raking to level and topsoil added as necessary to provide a smooth surface prior to sodding. The area shall be thoroughly compacted with an approved lawn roller, to the satisfaction of the Engineer.

Soil allowed to remain under (b), above, shall be broken up by harrowing or other approved means to a minimum depth of nine (9") inches below the proposed grade and the top five (5") inches of soil to remain shall be amended in place, as necessary, to meet the requirements for topsoil for the full depth of five (5") inches.

The Contractor shall take a representative sample of soil or topsoil (existing or furnished and placed by the Contractor) from each four hundred (400) square feet of planting area (but not less than three samples from a given planting area) and have the said sample(s) tested by an approved analytical chemist. The Contractor shall obtain from the chemist a signed report showing the organic content, acidity range, sieve analysis and clay content of the sample(s) tested together with the chemist's recommendations, if required, for making the tested soils comply with the specified requirements for topsoil. That report shall be submitted to the Engineer and the Contractor shall make all recommended corrections prior to progressing further sodding operations.

Ground limestone shall be spread by machine and evenly distributed and worked lightly into the top three (3") inches of soil at least five (5) days before applying fertilizer. Rate of application shall be as follows, depending on the Hydrogen Ion concentration (pH) shown by a pH test (pH test to be provided by the Contractor at no additional cost to the City):

pH	RATE (LBS.)
5.0 to under 5.5	100
5.5 to under 6.0	50
6.0 to under 6.8	25
6.8 and over	0

Commercial fertilizer shall be worked lightly into the top three (3") inches of soil or topsoil prior to placement of sod. Commercial fertilizer shall be applied by machine at the rate of one thousand (1,000) pounds per acre. All areas to receive Sod shall then be compacted using a two hundred pound (200 lb.) roller. The area shall then be thoroughly watered prior to the placement of Sod; but only after it has dried out sufficiently shall the area be considered ready to receive the Sod.

The Contractor shall notify the Engineer at least forty-eight (48) hours in advance of the time sodding is to begin and shall not proceed with such work until permission has been granted. Under no condition shall frozen sod be placed or shall sodding be done on frozen earth. Sodding shall be laid on reasonable moist (not wet) soil which shall be wetted, if so directed.

The Contractor shall exercise extreme care to retain the native soil on the roots of the sod during transplanting operations. Dumping of sod from vehicles will not be permitted. Sod shall be placed within thirty-six (36) hours from the time of harvesting. Sod that is dry or fails to meet the specification requirements will be rejected.

When laid in strips adjacent to sidewalks and curbs, sod shall be flush with the surface of the adjacent structures.

The sod shall be laid smoothly, edge to edge and all openings shall be plugged with sod. Sod shall be laid with the longest dimension parallel to the contours. Sodding shall start at the base of slopes and progress upward in continuous parallel rows. Vertical joints between sods shall be staggered. Immediately after laying, sod shall be pressed firmly into contact with the sod bed by tamping, rolling, or by other approved methods to eliminate air pockets, provide true and even surface, insure knitting and protect all exposed sod edges, but without displacement of the sod or deformation of the sod surface. At the time of planting the sodded areas shall be watered evenly and at a rate of 5 gallons per square yard, unless otherwise directed.

On all slopes 1 to 2 or steeper and elsewhere where specified or as directed, sods shall be held in place by stakes. Pegging shall be done immediately after tamping. At least one (1) stake shall be driven through each sod to be pegged and the stakes shall be not more than two feet apart. Stakes shall have their flat sides against the slope and be driven flush.

4.19.5. MAINTENANCE. The sodded area shall be maintained by the Contractor until Substantial Completion. Such maintenance shall consist of providing protection against traffic by approved warning signs or barricades, and mowing to a height of between one and one-half (1-1/2”) and three (3”) inches, or as directed by the Engineer. At no time shall more than forty (40%) of the grass blade be removed.

When, in the judgment of the Engineer, at any time prior to the acceptance of the Contract, any area which has been sodded fails for any reason to produce a satisfactory turf after a suitable period of time has elapsed, the Contractor shall re-sod and re-fertilize such areas as specified for the original sodding. Re-sodding, and re-fertilizing shall be at the Contractor’s expense.

All sod shall be kept adequately moist. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary and in sufficient quantities to maintain moist soil to a depth of five (5”) inches. Watering shall be done in a manner which will not cause erosion nor other damage to the finished surfaces. Any surfaces which become gullied or otherwise damaged shall be repaired to re-establish the graded and conditions of the soil prior to sodding and shall then be refertilized and re-sodded as specified under this work.

4.19.6. MEASUREMENT. The work for this item shall be measured in square yards of surface area which have been acceptably sodded.

4.19.7. PRICE TO COVER. The contract price shall be a unit price per square yard of area initially sodded and shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

When there is a scheduled item for topsoil, its measurement and payment will be made only for the additional topsoil furnished and incorporated, as directed, added below the five (5”) inch depth of topsoil that is included for payment under this Sodding item.

Where fill is required to raise the subgrade to the required depth for placement of sod, it shall be deemed included in the contract price for Unclassified Excavation or Fill, Place Measurement, as appropriate.

Payment will be made under:

Item No.	Item	Pay Unit
4.19	SODDING	S.Y.

SECTION 4.20 – Seeding

4.20.1. INTENT. This section describes the work of planting grass seed.

4.20.2. DESCRIPTION. The planting of grass seed shall consist of the preparation of the area to be seeded; the removal and disposal of existing soil and undesirable materials; the furnishing and incorporation of topsoil, ground limestone, and/or commercial fertilizer, when and as directed; necessary reseeding; and all required maintenance.

4.20.3. MATERIALS.

(A) TOPSOIL

Topsoil shall comply with the requirements of **Section 2.26**.

(B) GROUND LIMESTONE

Ground limestone shall be spread by machine and evenly distributed and worked lightly into the top three (3") inches at least five (5) days before applying fertilizer. Rate of application shall be as follows, depending on the Hydrogen Ion concentration (pH) shown by a pH test (pH test to be provided by the Contractor at no additional cost to the City):

pH	RATE (LBS.)
5.0 to under 5.5	100
5.5 to under 6.0	50
6.0 to under 6.8	25
6.8 and over	0

(C) COMMERCIAL FERTILIZER

Commercial fertilizer mixture shall contain, by weight, Nitrogen (N) 7% min. to 10% max. of which 50% is slow-release; Phosphorus (P) 1% min. to 2% max.; and soluble Potash (K) shall be 4% min. to 12% max. Fertilizer shall be *pesticide free* (no weed-and-feed) product such as Healthy Turf (8-1-9) as manufactured by Plant Health Care, Inc, Pittsburgh, PA; or Safer Ringer Lawn Restore (10-2-6) as manufactured by Woodstream Corp., Lifitz, PA; or Nutrients Plus (7-2-12) as manufactured by Nutrients Plus, Virginia Beach, VA, or approved equivalent.

Fertilizer shall be worked lightly into the top three (3") inches of soil or topsoil. Commercial fertilizer shall be applied by machine at the rate of one thousand (1,000) pounds per acre. All areas to receive Seed shall then be compacted using a two hundred pound (200 lb.) roller. The area shall then be thoroughly watered prior to Seed placement; but only after it has dried out sufficiently shall the area be considered ready to receive the Seed.

(D) GRASS SEED

Grass seed shall be fresh, recleaned seed of the latest crop and mixed in the following proportions by weight and meeting the following standards of pure live seed content (Purity & Germination) and maximum allowable weed seed content. All seed shall be free of noxious weeds and undesirable grasses.

TABLE 4.20-A

GRASS SEED MIXTURE

Percent by Weight

Grass Seed		Seed Purity	Max. Germination	Max. Weed
60%	TALL FESCUE – One or more of the following varieties: Aache II, Arid 3, Cochise III, Coronado Gold, Falcon IV, Justice, Jaguar III, Lancer (SH), Masterpiece, Rebel IV, Rebel Jr.(SH), Rebel Sentry, Rembrandt, Tomahawk E+, RTF, or approved equivalent.	98%	85%	0.25%
20%	BLUEGRASS – One or more of the following varieties: Able I (SH), Blacksburg, Glade (SH), Moonlight, Midnight, America (SH), Brilliant, Ram (SH), Touchdown (SH), Warren's A-34(SH), Bristol (SH), Lofts 1757(SH), or approved equivalent.	98%	80%	0.10%
20%	PERENNIAL RYEGRASS – One or more of the following varieties: Brightstar II, Manhattan 4, Citation, Elfkin, or approved equivalent.	98%	85%	0.25%

(E) CERTIFICATIONS

The Contractor, prior to incorporating any of the foregoing materials into the work, shall submit Certificates of Compliance to the Engineer. The said certificates shall be obtained as follows:

1. For Seed – from an approved seed testing laboratory which is not engaged in selling seed;
2. For Fertilizer, Limestone and Topsoil – from an approved analytical chemist.

The aforesaid certifications shall not, in any way, affect the Engineer's right of on-site rejection of materials because of deterioration, adulteration or patent inferiority; nor the Engineer's right to sample and test any of the supplied materials.

4.20.4. METHODS. When referred to or used herein, the words topsoil, limestone, fertilizer, and seed shall mean topsoil, ground limestone, commercial fertilizer, and grass seed, all of which are described and meet the requirements specified under **Subsection 4.20.3**., above.

When referred to or used herein, the word soil shall mean the existing soil found in the area to be seeded.

The Contractor may elect (a) to remove and dispose of soil from, or (b) to allow soil to remain in, a portion of, or all of the area to be seeded.

The removal and disposal of soil under (a), above, shall be made to a depth of five (5") inches below the proposed grade. Removed soil shall be replaced with topsoil.

Soil, allowed to remain under (b), above, shall be broken up by harrowing or other approved means to a minimum depth of nine (9") inches below the proposed surface and the top five (5") inches of soil shall be amended in place, as necessary, to meet the requirements for topsoil for the full depth of five (5") inches below the proposed grade.

Before any seed is placed, all areas to be seeded shall be thoroughly loosened with a rototiller to a depth of nine (9") inches below the proposed grade. All sticks, stones, roots or other objectionable materials which might interfere with the formation of a finely pulverized bed shall be removed from the soil and a smooth uniform surface grade shall be established. Hollows, depressions, and gullies shall be filled by raking to level and topsoil added as necessary to provide a smooth surface prior to sodding. The area shall be thoroughly compacted with an approved lawn roller, to the satisfaction of the Engineer.

The Contractor shall take a representative sample of soil or topsoil (existing or furnished and placed by the Contractor) from each four hundred (400) square feet of planting area (but not less than three samples from a given planting area) and have the said sample(s) tested by an approved analytical chemist. The Contractor shall obtain from the chemist a signed report showing the organic content, acidity range, sieve analysis and clay content of the sample(s) tested together with the chemist's recommendations, if required, for making the tested soils comply with the specified requirements for topsoil. The said report shall be submitted to the Engineer and the Contractor shall make all recommended corrections prior to progressing further seeding operations.

All areas to be seeded shall be thoroughly loosened and graded to true lines, free from all unsightly variations, bumps, ridges or depressions. All sticks, stones, roots or other objectionable materials which might interfere with the formation of a finely pulverized seed bed shall be removed. The area shall be thoroughly compacted with an approved lawn roller, or equivalent, to the satisfaction of the Engineer.

Ground limestone, when required, shall be spread by machine at the recommended rate and shall be evenly distributed and worked lightly into the top three (3") inches at least five (5) days before applying fertilizer.

Grass seed shall be sown in the Fall during August and September or in the Spring during March, April or May, except when the Engineer permits otherwise. Seeding shall be done in moderately dry to moist (not wet) soil and at times when the wind does not exceed five (5) m.p.h. The rate of seeding shall be ten (10) pounds per thousand (1,000) square feet. The seed shall be sown and covered to the proper depth and firmed in such manner that a uniform stand will result.

4.20.5. MAINTENANCE. The seeded area shall be maintained by the Contractor until Final Acceptance.

Maintenance shall consist of all necessary watering, mowing, weeding and reseeding, as required. Initial watering shall be done carefully so that no washing out of planted grass seed occurs.

Mowing shall be done, when necessary, to maintain a maximum grass height of three (3") inches. At no time shall more than forty (40%) of the grass blade be removed. Prior to each mowing operation, the Contractor shall remove and dispose of all weed growths.

In areas where the stand of grass is deemed unsatisfactory by the Engineer, the Contractor shall resow grass seed to produce a stand which shall be acceptable. In these areas, the Contractor shall loosen, break up, pulverize, rake and roll the soil or topsoil and incorporate necessary corrective additives, all, as required for the initial seeding operation.

4.20.6. MEASUREMENT. The quantity to be measured for payment hereunder shall be the number of square yards of area initially seeded to the satisfaction of the Engineer. Measurement will be made on a one-time basis and no additional measurement will be made for any area resown as directed.

4.20.7. PRICE TO COVER. The contract price shall be a unit price per square yard of area initially seeded and shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals necessary to complete the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

When there is a scheduled item for topsoil, its measurement and payment will be made only for the additional topsoil furnished and incorporated, as directed, added below the five (5") inch depth of topsoil that is included for payment under this Seeding item.

Payment will be made under:

Item No.	Item	Pay Unit
4.20	SEEDING	S.Y.

SECTION 4.21 – Tree Consultant

4.21.1. INTENT. The Contractor must engage the services of a Certified Arborist who will serve as an advisor to the Engineer and to direct the Contractor's excavation work around existing trees under all stages of work.

4.21.2. DESCRIPTION. The Tree Consultant must be a Certified Arborist approved by the Engineer, who will advise the Engineer on which trees will be pruned and which trees will be removed. The Contractor must furnish to the Engineer the Tree Consultant's professional credentials for evaluation. Minimum qualifications for the Tree Consultant are as follows:

- B.S. in forestry, arboriculture, horticulture, or related plant science field, and two (2) years of full-time professional experience in field supervision of techniques to mitigate damage to existing trees from the negative impacts of construction and ISA Certification; or
- M.S. in forestry, arboriculture, horticulture, or related plant science field, and one (1) year of full-time professional experience and the field supervision of techniques to mitigate damage to existing trees from the negative impacts of construction and ISA Certification; or
- Associate degree in forestry, arboriculture, horticulture, or related plant science field, and three (3) years of full-time professional experience in arboriculture, specifically in the field supervision of techniques to mitigate damage to existing trees from the negative impacts of construction and International Society of Arboriculture (ISA) Certification; or
- Arborist certification by the International Society of Arboriculture (ISA) and four (4) years of full-time professional experience in arboriculture, specifically in the field supervision of techniques to mitigate damage to existing trees from the negative impacts of construction; or
- Independent of, not associated with, or not directly employed by, the Contractor or any subcontractors performing the tree pruning and tree removal operations under this contract.

The Tree Consultant will be required to appear on the work site when directed by the Engineer. The Tree Consultant will be required to advise the Engineer on tree pruning operations and the removal of trees where necessary; must personally witness and direct all excavation work around trees, approving both the Contractor's choice of hand tools for excavation under Items 8.02 A and 8.02 B, or 8.02 AB-S, as appropriate, and the manner of work around existing trees; must assess any damage caused by the Contractor's equipment, etc.; and, must identify trees, recommend construction alternatives to the Engineer in order to save existing trees from damage due to construction, recommend new tree planting locations, and evaluate an appropriate species mix.

For street trees and other trees that must meet NYCDPR requirements, the Tree Consultant must follow NYCDPR Forestry rules, including notifying NYCDPR Forestry of cutting all roots greater than 1" when exposed during excavation.

4.21.3. MEASUREMENT. The quantity to be measured for payment for Item No. 4.21 – TREE CONSULTANT will be the time, measured in person hours, that the Tree Consultant actually performed the work as specified and to the satisfaction of the Engineer.

The quantity to be measured for payment for Item No. 4.21 A – TREE CONSULTANT (PER TREE) will be each tree that is located near a concrete sidewalk or curb where the Tree Consultant actually performed the work as specified and to the satisfaction of the Engineer.

4.21.4. PRICE TO COVER. The contract price bid for Item No. 4.21 – TREE CONSULTANT will be a unit price per person hour and will cover the cost of all labor, material, reports, plant, equipment, inspection, insurance, and incidentals required to complete the work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The contract price bid for Item 4.21 A – TREE CONSULTANT (PER TREE) will be a unit price for all construction activities near an existing tree and will cover the cost of all labor, material, reports, plant, equipment, inspection, insurance, and incidentals required to complete the work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer. The price bid will be paid once for any individual tree. Item 4.21 A is intended for use on sidewalk, curb, and pedestrian ramp contracts, and is to be used in place of Item 4.21.

Payment will be made under:

Item No.	Item	Pay Unit
4.21	TREE CONSULTANT	PERSON-HOUR (P/Hr)
4.21 A	TREE CONSULTANT (PER TREE)	EACH

SECTION 4.22 – Protective Tree Barrier

4.22.1. INTENT. This section describes the work of providing a Protective Tree Barrier around existing trees during construction.

4.22.2. DESCRIPTION. The work shall consist of the fabrication, furnishing, installation, erection, maintenance, and subsequent removal and disposal of a Protective Tree Barrier around existing trees which are designated to remain.

4.22.3. MATERIALS. All timber shall be Douglas Fir Grade No. 1. Fasteners, such as nails, shall meet the standard industrial fastener specifications for the intended application, and be galvanized in conformance with ASTM Designation A123.

4.22.4. METHODS. The Contractor shall construct and install protective tree barrier as shown on the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1046A and as directed by the Engineer.

All work shall conform to National Design Specifications for Stress Grade Lumber and its fastenings.

All timber at the site of the work shall be stored in piles on supports at least twelve (12") inches above the ground surface, and so piled as to prevent warping and to shed water. When required by the Engineer, it shall be protected from the weather by suitable covering. The timber shall be close-stacked. The ground under and in the vicinity of all stacks shall be cleared of weeds and rubbish and shall be drained to prevent accumulation of water.

Workmanship shall be first class and only competent carpenters shall be employed. All timber shall be accurately cut and framed to a close fit in such manner that the joints will have even bearing over the entire contact surfaces. No blocking or shimming will be allowed in joints. Timber shall be cut off with a saw; no axe is to be used. Unless otherwise specified, heads of nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood. Deep hammer marks in wood surfaces shall be considered evidence of poor workmanship and sufficient cause for rejection of the pieces affected.

The timber shall be carefully handled, without sudden dropping, breaking of outer fibers, bruising, or penetrating the surface with tools. The timber may be handled with rope slings. Cant hooks, peaveys, pikes, or hooks shall not be used.

Protective Tree Barriers shall be maintained for the duration of the contract in a condition safe to the public and satisfactory to the Engineer.

Upon completion of construction work around the area, all Protective Tree Barriers shall be disassembled, removed and disposed of away from the site.

4.22.5. MEASUREMENT. The quantity of Protective Tree Barrier to be measured for payment shall be the number of Protective Tree Barriers, of each type, actually constructed according to the Contract Drawings, around each tree which is to remain, and subsequently removed at each location as directed by the Engineer.

4.22.6. PRICE TO COVER. The contract price bid per each type of Protective Tree Barrier shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to construct, maintain and subsequent removal of the barrier in the locations as directed by the Engineer, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Where there are no scheduled items for Protective Tree Barriers, the cost of fabrication, furnishing, installation, erection, maintenance, and subsequent removal and disposal of a Protective Tree Barrier around existing trees which are designated to remain shall be deemed included in the unit prices bid for all scheduled items.

Payment will be made under:

Item No.	Item	Pay Unit
4.22 A	PROTECTIVE TREE BARRIER, TYPE A	EACH
4.22 B	PROTECTIVE TREE BARRIER, TYPE B	EACH

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DIVISION V – INSPECTION AND TESTING OF MATERIALS, ADJUSTMENTS FOR DEFICIENCIES, AND MAINTENANCE

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DIVISION V

INSPECTION AND TESTING OF MATERIALS AND ADJUSTMENTS FOR DEFICIENCIES

SECTION 5.01- Inspection of Materials

5.01.1. RESPONSIBILITY FOR TESTING.

(A) The Contractor will be required to retain the services of an independent testing laboratory, that is licensed in the State of New York to perform quality control (QC) materials testing on the project. All laboratories shall be subject to approval by NYCDDC QA and their "MIX DESIGN, LABORATORY AND PLANT APPROVAL PROTOCOL". The minimum requirement for approval is that the laboratory must have the current AASHTO re:source (formerly AMRL) R-18 accreditation in the category of service proposed and must be currently licensed by the NYC Department of Buildings (DOB). Prior to the start of manufacture the Contractor shall submit the name of a Testing Laboratory to the Resident Engineer for approval. Upon approval this laboratory will be required to set up a program for QC testing materials to be utilized on the project. The tests that the Resident Engineer will require the laboratory to perform are for in-place soil density, concrete compressive strength, and in-place density of compressed bituminous mixtures.

The Laboratory shall provide, to the satisfaction of the Commissioner or the Commissioner's duly appointed representative, QC testing services in accordance with the procedures and specifications described herein.

Unless otherwise specifically provided for, all costs associated with the QC testing of materials shall be borne by the Contractor and the costs thereof shall be deemed included in the prices bid for all items of work.

(B) The City reserves the right, as part of its quality assurance (QA) program, that all materials, as well as the plant and methods of manufacture, shall be subject at all times to the inspection and approval of the NYCDDC QA Director. All materials inspected and approved at place of manufacture, quarry, dock or siding may be subject to further inspection at the place of use, and any materials failing to comply with the specification requirements will be rejected.

The NYCDDC QA Director may at any time order such other and further inspection, examination, and tests as deemed necessary and proper to be satisfied that the work and materials are in compliance with these Specifications, including the taking of samples and performance of tests by technicians employed by the City.

The Contractor shall give the NYCDDC QA Director sufficient advance notice prior to starting the manufacture of the materials. The NYCDDC QA Director shall have free entry at all times, while work on the Contract is being performed, to all parts of the manufacturer's works that concern the manufacture of the materials, and shall be permitted to take such samples therefrom as they may deem necessary. The manufacturer shall afford the Inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these Specifications. In the absence of an Inspector at the plant during manufacture, a certificate of test may be accepted by the NYCDDC QA Director.
The Contractor shall give the Engineer written notice of manufacture and of delivery of materials forty-eight (48) hours in advance of the beginning of the construction, and of any changes in the work force for the purpose of proper and timely inspection. Materials other than pipe and other castings, valves, or hydrants, may be inspected at the point of manufacture or upon delivery, as the Engineer may determine.

The Contractor hereby agrees not to use any materials which have not been inspected and accepted, nor to perform any Work except under inspection, and additionally agrees to notify the Engineer when lines, grades or inspection are required, so that the Engineer may have time to provide the same. It is hereby agreed that the right of inspection herein provided for is intended solely for the benefit of the City, and the City shall not in any manner be bound by such inspection or by failure to inspect, or by the failure to discover any defective Work or materials used in the Work or non-compliance with any provisions of the Contract Documents, to accept Work which does not in fact comply with the Contract Documents, or relieve the Contractor of the

obligation to comply with each of the provisions of this Contract. No inspection, approval or acceptance of any part of the Work herein contracted for, or of the materials used herein, or any payment on account thereof, shall prevent the Commissioner from refusing to accept the Work or materials at any time thereafter during the existence of this Contract, because the same do not comply with the requirements of the Contract.
The Commissioner reserves the right at all times to undertake and perform such work as may be necessary in opening or removing portions of the Work for the purpose of examination. The Contractor shall satisfactorily restore the Work so disturbed. Should the Work be found faulty in any respect, the portions disturbed shall be restored without cost to the City.

(C) The tests for in-place soil density, concrete compressive strength, and in-place density of compressed bituminous mixture required by the Resident Engineer, and testing performed by NYCDDC QA shall not relieve the Contractor of responsibility to conduct its own quality control program to ensure that all materials incorporated into the Work are in accordance with the Specifications.

5.01.2. ACCEPTANCE TEST. All equipment and appliances furnished and installations made under the Contract shall conform to the requirements of the Specifications, and shall in no event be less than that necessary to comply with the minimum requirements of all governmental agencies having jurisdiction. Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor shall give written notice to all concerned of the time when these tests will be conducted.

The Engineer is hereby authorized and empowered to reject and refuse all labor and materials or methods of installation or application, or any part thereof, offered under or in fulfillment of this Contract, that do not comply in kind, quality or quantity with the terms thereof. Any materials delivered or offered to be delivered under this Contract, which are rejected by the Engineer as not conforming to the terms thereof, shall be forthwith removed by the Contractor, and materials which do so conform shall be forthwith furnished and delivered by him in place thereof.

The Contractor shall furnish all labor, materials, energy, fuel, water, light and instruments for the tests at no additional cost to the City.

The final acceptance by the Commissioner shall be contingent upon the Contractor delivering to the Commissioner all necessary certificates evidencing compliance in every respect with the requirements of the agencies having jurisdiction.

If the results of tests and controlled inspections indicate that the material or procedures do not meet requirements as set forth on the drawings or in the specifications or are otherwise unsatisfactory, the Contractor shall only proceed as directed by the Engineer. Additional costs resulting from retesting, reinspecting, replacing of material and/or damage to the work of other trades and any delay caused to the schedule shall be borne by the Contractor.

5.01.3. CONCRETE, ASPHALT PAVING MIXTURE, AND ASPHALT PAVING BLOCKS. The manufacture of concrete, asphalt paving mixture and asphalt paving blocks shall be subject to inspection at all times. The Contractor shall give the Resident Engineer at least five (5) days advance notice prior to starting the manufacture. All apparatus, applicable specifications and other facilities needed for making the required tests or examinations including scales, sieves and facilities for moisture tests, shall be provided at the plant by the Contractor. All testing apparatus and equipment shall be of standard and approved type. The Contractor shall provide and maintain at the plant the following:

An enclosed laboratory and all facilities necessary to inspect, sample and test all materials and to check all measurements and measuring devices.

The laboratory shall be not less than 150 square feet in area, with approved electric lighting, adequate heating and suitable lavatory and toilet facilities.

The following laboratory equipment shall be provided and maintained in good order:

1 – Work bench, approximately 2-1/2 feet wide by 10 feet long.
1 – Sink with running water.
1 – Electric heating connection.
1 – Electric hot plate, approximately 8” diameter.

3 – Drying pans, 10” x 10” x 2”, or approved equivalent.

	Asphalt Paving Mixture Plants	Truck Mix Concrete Plants	Central Plant Mix Concrete Plants
An automatic recording thermometer for each tank	X	---	---
An electric pyrometer at the discharge chute of the “aggregate” drier	X	---	---
An electric pyrometer to register the temperature of each aggregate inside of and near the discharge chute of the hot aggregate storage bin	X	---	---
3 inspector’s armored thermometers or equal	X	---	X
1 set of standard sieves Nos. 200, 100, 50, 30, 16, 8, 4; 3/8”, 1/2”, 3/4”, 1”, 1-1/2”, 2”, and 2-1/2”	X	X	X
1 laboratory stone scale, 5 kilogram capacity	X	---	---
1 laboratory stone scale, 10 kilogram capacity	---	X	X
1 laboratory sand scale, 50 gram or 100 gram capacity	X	X	X
Manila paper and wood block for making pat tests	X	---	---
2 slump tests molds with rods	---	---	X

Pails, shovels, scoops and approved oil cloth for mixing samples.

5.01.4. TREATED WOOD. Timber and lumber to be treated shall be inspected and tested before and after treatment at the plant. No shipment of treated material shall be made unless it has been accepted by the Resident Engineer as satisfactory under the Inspector’s report. The Inspector shall seal or stamp accepted treated material prior to shipment.

5.01.5. APPROVAL OF MATERIALS AND MANUFACTURERS. The names of proposed manufacturers, materialmen and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted as early as possible to the NYCDDC QA Director for approval, to afford proper investigation and checking.

Approval of the material suppliers to the job should be obtained from the Department of Design and Construction far enough in advance to avoid delaying the shop drawing approval process.

5.01.6. LOCAL LAWS. All materials, appliances and types or methods of construction shall be in accordance with the Contract Documents and shall in no event be less than that necessary to conform to the requirements of the Administrative Code and Charter of the City of New York.

5.01.7. REPUTE OF MANUFACTURER. No manufacturer will be approved for any materials to be furnished under the Contract unless the manufacturer shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products.

5.01.8. TRANSACTIONS WITH MANUFACTURERS AND SUB-CONTRACTORS. All transactions with manufacturers and sub-contractors shall be through the Contractor unless the Contractor shall request, in writing to the Commissioner, that the manufacturer or subcontractor deal directly with the Commissioner. Any such transactions shall not in any way release the Contractor from the Contractor's full responsibility under the Contract.

5.01.9. MATERIALS. All materials, products and equipment furnished under the Contract, unless otherwise specifically called for herein, shall be new and unused, of standard first-grade quality and of the best workmanship and design. No inferior or low grade articles will be either approved or accepted, and all Work of assembling and construction must be done in a neat, first-class and workmanlike manner.

5.01.10. DOCUMENTARY EVIDENCE OF TESTS. For any materials which may not be inspected, at the sole discretion of the City or its designated representatives, satisfactory documentary evidence that the materials have passed the required inspection and testing must be furnished to the Commissioner prior to their incorporation into the Work.

5.01.11. INFORMATION TO SUPPLIERS. In asking for prices on materials under any item of the Contract, the Contractor shall provide the manufacturer or dealer with such complete information from the Specifications and Drawings as may in any case be necessary, and in every case the Contractor shall inform the manufacturer or dealer of all the General Conditions and requirements herein contained.

5.01.12. COMMISSIONER TO SELECT INSPECTORS. Except as specifically provided in the Contract Documents, the Commissioner will select or approve all persons, firms, or corporations to make or witness each and every inspection, test or analysis, with or without reports.

5.01.13. ACCESS TO MANUFACTURING PLANTS. The Commissioner shall have free access at all times to the works, factories, laboratories and refineries where the materials are prepared, and shall be permitted to take such samples therefrom as deemed necessary by the Commissioner.

5.01.14. SAMPLES OF MATERIALS. The Contractor shall submit to the Commissioner for approval, as and when required, samples of all materials specified to be used in the Project, as follows:

(A) Unless otherwise specified, samples shall be in triplicate, and sufficient to show the quality, type, range of color, finish and texture of materials.

(B) Each of the samples shall be labeled, bearing the name and quality of the material, the Contractor's name, date, Contract and Project, and the related Specification or Drawing reference to the samples submitted.

(C) A letter of transmittal, from the Contractor requesting approval must accompany all such samples. The Contractor shall provide, with the transmittal, written certification that the Contractor has inspected the samples being transmitted and that the samples conform with the Contract Drawings and Specifications.

(D) Transportation charges to the Commissioner's office must be prepaid on all samples forwarded.

(E) Samples for testing purposes shall be in accordance with the requirements of the Specifications.

5.01.15. SAMPLES ON DISPLAY. When samples are specified to be equal to samples in the Office of the Commissioner, they shall be carefully examined by the bidders and by those whom the bidder expects to employ for the furnishing of such materials.

5.01.16. TIMELY SUBMISSIONS OF SHOP DRAWINGS AND MATERIAL SAMPLES. Samples shall be submitted in due time and in accordance with the approved shop drawing and material samples schedule to permit proper consideration without delaying any operation under the Project. Materials should not be ordered until approval is received in writing from the Commissioner. All materials shall be furnished equal in every respect to the approved samples.

5.01.17. APPROVAL OF SAMPLES. The approval of any samples will be given as promptly as possible, and shall be only for the characteristic color, texture, strength, or other feature of the material

named in such approval, and no other. When this approval is issued by the Commissioner, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Specifications, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equal to the approved samples and complies in every respect with the Specifications, and the colors and textures of the samples on file in the Office of the Commissioner, for the Project.

The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.

5.01.18. VALUABLE SAMPLES. Valuable samples such as hardware, plumbing and electrical fixtures, etc., not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the Work after all questions of acceptability have been settled, provided suitable permanent records are made as to location of the samples, their properties, etc.

5.01.19. EQUIVALENT QUALITY OF MATERIALS. All materials and equipment which are designated in the Specifications by a number in the catalog of any manufacturer or by a manufacturer's grade or trade name are designated for the purpose of describing the article and fixing the standard or the quality and finish. Materials and equipment which are, in the opinion of the Commissioner, the equivalent to that specified, will be acceptable. Accordingly, unless otherwise provided for in the Contract, where a manufacturer's or brand name is specified, the words "or approved equivalent" are intended to be and shall be understood to follow said manufacturer's or brand name.

The submission of any material, or article, as the equal of the materials or articles set forth in the Specifications as a standard shall be accompanied by illustrations, drawings, descriptions, catalogs, records of tests, samples and any and all other information essential for judging the equality to the materials, finish and durability of that specified as standard, as well as information indicating satisfactory use under similar operating conditions. Samples taken from various deliveries during the progress of the Work and during the maintenance period, when tested and analyzed, shall exhibit qualities equal or superior to those of the sample submitted with or described in the Bid, and no change of materials shall be made without written permission of the Commissioner.

5.01.20. MANUFACTURER'S DIRECTIONS. Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Commissioner.

5.01.21. NOTICE TO COMMISSIONER PRIOR TO MANUFACTURE. The Contractor shall give notice in writing to the Commissioner, sufficiently in advance of commencing the manufacture of or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or will notify the Contractor that inspection will be waived.

5.01.22. NO SHIPPING BEFORE INSPECTION. The Contractor shall comply with the foregoing requirements for approvals of materials, including submission of shop drawings, sampling, inspection, and testing, before shipping any material.

5.01.23. CERTIFICATE OF MANUFACTURE. The Contractor shall furnish the Commissioner with authoritative evidence, in the form of Certificates of Manufacture, that all the materials to be used in the Work have been manufactured and tested in conformity with the Specifications. These certificates shall include copies of the results of physical tests and chemical analyses where necessary, that have been made directly on the product, or on similar products being fabricated by the manufacturer.

When materials or manufactured products shall comprise such quantity that it is not practical to make physical tests or chemical analyses directly on the product furnished, a certificate stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for the acceptance of such material or manufactured product.

5.01.24. TESTING COMPLIANCE. The testing personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Specifications, indicating thereon all analyses and/or test data and interpreted results thereof.

5.01.25. REPORTS. Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Commissioner as prerequisite for the acceptance of any material or equipment.

5.01.26. REJECTIONS. If by making any test the Commissioner ascertains that the material or equipment does not comply with the Specifications, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the Site or from the work and replace it with acceptable material without cost to the City.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract Documents, the Contractor shall immediately proceed to furnish the designated material or equipment.

5.01.27. IDENTIFICATION. Each delivery shall be accompanied by the required number of delivery tickets, stating the name, type and grade of the material, quantity contained in the delivery, name of Contractor, and Contract Number.

Each bag of Portland cement shall be plainly marked with the name and brand of the manufacturer. The type shall be identified on each bag by name by a suitable mark, tag, ribbon or similar device which will permit positive identification with the delivery tickets.

Invoices for bulk shipments of Portland cement shall contain information which will permit positive identification of the material delivered.

5.01.28. NEW DELIVERIES. Whenever, during the course of the work, new deliveries of materials are received by the Contractor, their use will not be permitted until they have been examined and approved by the Resident Engineer. Mixed lots varying in origin, brands or trademarks will not be accepted on any contract unless specifically permitted by the Resident Engineer.

5.01.29. MATERIALS TO BE EQUAL TO SAMPLES. Samples taken from the various deliveries during the progress of the work, when tested and analyzed, shall conform to the requirements of the Specifications and shall have qualities equal to those of the approved samples submitted. No material other than that equal to the approved samples shall be used without the written permission of the Resident Engineer.

SECTION 5.02 – Sampling

5.02.1. SAMPLES AND CERTIFICATIONS. The Contractor shall furnish the Resident Engineer with facilities and laborers to assist in the inspection and sampling of the materials in use or to be used at any time before the start and during the course of the work.

The Contractor shall furnish and deliver as directed, without charge, samples, certifications, shop drawings and other information required of the materials intended to be used.

All material certifications shall be signed by an authorized representative of the manufacturer or supplier, must state that the material meets all applicable Contract Specifications, that the latest applicable ASTM and other required tests have been performed, and that the test results have met the required standards. The certification shall list the tests performed, the dates on which the tests were performed, and copies of all test results shall be attached to the certification.

Certificates of mill tests for chemical and physical properties of metals shall be furnished on all deliveries, unless otherwise permitted. The Contractor shall indicate in the shipping invoices the heat or melt numbers which will permit positive identification of the mill tests with the materials delivered.

Samples, certifications and tests required, are as follows:

(A) FINE AND COARSE AGGREGATES

A statement in writing of the specific sources of the fine and coarse aggregates proposed for use.

(B) OTHER MATERIALS

Samples of adequate size and quantity of any of the other materials, in suitable containers, each properly labeled with the name or brand and specified source of the contents and name of the Contractor.

(C) ADDITIONAL SAMPLES

Additional samples as required.

5.02.2. METHODS.

(A) SAMPLING

Samples of all materials for tests shall be selected by the Resident Engineer. Except as herein otherwise specified, sampling of materials shall be in accordance with the methods prescribed in **Section 5.03**.

(B) COARSE AGGREGATE

1. BARGE LOAD – A gross sample shall be taken from at least four (4) points, at a depth of at least one (1') feet below the surface of the stone on the boat and at equal distance along a diagonal line from bulkhead to bulkhead. These samples shall be consolidated into one (1) sample for test purposes.
2. TRUCK LOAD PILE – A gross sample shall be taken from at least four (4) points, at a depth of at least one (1') feet below the surface of the pile, at equal distance between base and top. These samples shall be consolidated into one (1) sample for test purposes.
3. SIZE OF SAMPLE – The gross sample shall be not less than twice the weight of the laboratory sample, and it shall be quartered down to the size of a laboratory sample.

   At least one (1) laboratory sample of the aggregate weighing not less than fifty (50) pounds shall be taken from each size as representing the delivery thereof.

(C) CONCRETE TEST CYLINDERS

The Contractor shall provide, with each concrete delivery, an adequate quantity of molds, caps, and tags for making concrete test cylinders. The molds shall conform to the requirements specified therefor under

ASTM Designation C31, and shall be of a non-metallic, discardable type, as approved by the NYCDDC QA Director. The quantities and dates of deliveries of the molds and caps to the various project sites shall be as directed by the Resident Engineer.

At least four (4) 6 in x 12 in test cylinders will be taken for every fifty (50) cubic yards of concrete, or portion thereof, delivered to the site. Concrete test cylinders will be made by the Resident Engineer at the point of concrete delivery and shall be representative of the batch from which they are taken. The Contractor shall provide facilities for the proper care of these cylinders while on the site, and they shall be safeguarded against injury and protected from the elements. These facilities shall include, but not be limited to, curing boxes in sufficient size and quantities to satisfactorily cure all cylinders taken by the Resident Engineer. Curing boxes meeting the requirements of ASTM C31 and C511 shall be furnished in good operating condition, and shall maintain cylinders under water at a curing temperature of 73.5°F ±3.5°F. Curing boxes with rusted or corroded interior surfaces shall not be used. No separate payment will be made for the provision of molds, caps, tabs and curing boxes. The cost thereof shall be included in the prices bid for the respective items of work.

Cylinders are to be delivered by the Contractor to a designated area near 30-30 Thomson Ave, Long Island City, New York, or where otherwise directed, within the City of New York, within two (2) days after molding, where they will be properly stored and cured until the date of test, and tested, by others, upon removal from the curing room.

The cost of providing facilities for storing and protecting the cylinders on the site shall be deemed included in the prices bid for all the concrete items scheduled in the contract.

ADDITIONAL REQUIREMENTS FOR FHWA FUNDED CONTRACTS: The Engineer must maintain custody of cylinders at all times. In order to comply with this requirement, the Contractor must:

- Provide secure storage for curing boxes on site, near the concrete placement area. If requested by the Engineer, the storage shall b lockable using a lock provided by the Engineer.
- Strip the cylinders under the supervision of the Engineer, and allow the Engineer to transfer cylinder marks to stripped cylinders.
- Provide transportation for delivery of the cylinders to the designated area near 30-30 Thomson Ave, if requested by the Engineer. The Engineer will travel with the cylinders and maintain custody.

(D) CURBS AND HEADERS, GRANITE AND BLUESTONE

Test pieces of granite and bluestone curbs and headers shall be broken from sections of curb or header in such manner as to furnish approximately seventy-five (75) pounds of material.

(E) STEEL BARS FOR CONCRETE REINFORCEMENT

Three (3) pieces at least twenty-four (24”) inches in length shall be taken from each size and heat number delivered.

SECTION 5.03 – Methods of Sampling and Testing

5.03.1 METHODS. Except as herein otherwise specified, methods of sampling and testing that are to be used by the Contractor for the Contractor's quality control program when furnishing any of the following materials shall be as prescribed by the following and other applicable Designations of ASTM International. In addition, The City reserves the right to test any materials to be furnished on a random basis, at its own discretion, for quality assurance.

No.	Material or Item	Reference	Contractor's Test Frequency	Sample Size	Manufacturer's Certificate Required?	Manufacturer's Test Results Required?	Contractor's QC Test Required?
1	Aggregate	ASTM C136, D546	1/Source	1 bag	Yes	Yes	No
2	Aggregate, Lightweight	ASTM C330	Optional	1 bag	Yes	Yes	No
3	Aggregates for Concrete	ASTM C33, C87	Once/ 50CY/ Vendor*	1 bag	Yes	Yes	No
4	Asphalt	MS-2 (Asphalt Paving Manual) ASTM D2041	2 loose bags/batch/ day	2 bags	Yes	Yes	Yes
5	Asphalt	ASTM D2172	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
6	Asphalt	ASTM D6, D92	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
7	Asphalt	ASTM D5, D217, D946	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
8	Asphalt	ASTM D36	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
9	Asphalt	ASTM D70, D71, D139, D2041	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
10	Asphalt	ASTM D88	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
11	Asphalt	ASTM D95	800 Tons	2 sets of Marshall Plugs	Yes	Yes	Yes
12	Asphalt (Binder, Sheet Asphalt	ASTM C42, D2041	1/200'/pass, (min 4/block)	4 readings	Yes (Batch Report)	No	Yes
13	Asphalt Pavement, Sidewalk	ASTM D2950, D1188	1/200'/pass, (min 4/block)	4 Cores/block	Yes (Batch Report)	No	Yes
14	Asphalt Paving Block		Each Lot	12 Blocks	Yes	Yes	No
15	Asphalt, Emulsified (Tack Coat)	ASTM D244, D977	Per Truck	0.5 Gallon	Yes	No	No
16	Asphalt, Liquid (Tack Coat)	ASTM D2028, D 2027	Per Truck	0.5 Gallon	Yes	No	No
17	Brick – Type 1 Manhole Brick	ASTM C32-Grade MS, C279	Each Delivery	12 Bricks	Yes	Yes	No
18	Brick – Type 2 Sewer and Liner Brick	ASTM C32-Grade SS, C279	Each Delivery	12 Bricks	Yes	Yes	No
19	Brick Pavers	ASTM C67, C902	Each Delivery	1 percent	Yes	Yes	No
20	Cement Mortar	ASTM C109	Every Day	4- 2 inch cubes	Yes	No	No
21	Cement, Portland	ASTM C114, C115, C150, C151. C183, C187, C188, C191, C204	Each Delivery	As Required	Yes	Yes	No
22	Concrete	ASTM C231, NYCDDC Materials Method 9.2	1 per truck	As Required	Yes (Batch Report)	No	No
23	Concrete (Pigmented)	ASTM C94	1 per truck	As Required	Yes	Yes	Yes
24	Concrete	ASTM C403	3/Block	As Required	Yes	Yes	Yes
25	Concrete, Air entraining Agent	ASTM C260, NYCDDC Materials Method 9.2	1/Lot	1 Quart	Yes	Yes	No

No.	Material or Item	Reference	Contractor's Test Frequency	Sample Size	Manufacturer's Certificate Required?	Manufacturer's Test Results Required?	Contractor's QC Test Required?
26	Concrete	ASTM C31, C42, C39, C873, E4	Per 50 C.Y.	4 Cylinders	Yes (Batch Report)	No	No
27	Concrete (Pavements)	ASTM C42, C39	1/700 S.Y., 3 minimum	Cores	Yes (Batch Report)	No	No
28	Concrete Expansion Joint - Filler Hot Poured	ASTM D5329, D6690	1/block	0.5 Gallon	Yes	No	No
29	Concrete Expansion Joint - Type I	ASTM D1752-Type I	1/ Block	3 FT.	Yes	No	No
30	Concrete Expansion Joint - Type II	ASTM D1752-Type II	1/ Block	3 FT.	Yes	No	No
31	Concrete Expansion Joint - Type III	ASTM D1752-Type III	1/ Block	3 FT.	Yes	No	No
32	Concrete Expansion Joint - Type IV	ASTM D1751	1/ Block	3 FT.	Yes	No	No
33	Concrete Masonry Units	ASTM C90	Optional	As Required	Yes	Yes	No
34	Concrete, Accelerator	ASTM D98	Optional	As Required	Yes	Yes	No
35	Concrete	ASTM C143, NYSDOT Materials Method 9.2	1/Truck	As Required	No	No	No
36	Concrete, Pigment	ASTM C979	1/color/Project	4'x4'x4"	Yes	Yes	Yes
37	Concrete, Water-reducing and retarding	ASTM C494	1/Lot	1 Quart	Yes	Yes	No
38	Curing Materials- Type 1-D	ASTM C309-Type 1	1/Lot	0.5 Gallon	Yes	Yes	No
39	Curing Materials- Type 2	ASTM C309-Type 2	1/Lot	0.5 Gallon	Yes		
40	Curing Materials- Type 3	ASTM C309-Type 3	1/Lot	0.5 Gallon	Yes	Yes	No
41	Curing Materials- Type 4 (Sidewalk & Curbs)	ASTM D977, D2028	1/Lot	0.5 Gallon	Yes	Yes	No
42	Fill Materials	AASHTO T-99, AASHTO T-191, T-205, ASTM D698	In-place Density Tests at every 100 Ft. for Each Layer. Proctor Tests for each new source of fill material – 2 to 3, as directed.				Yes
43	Filter Fabric	ASTM D4632, D4533, D3787	1/Lot	3'X3'	Yes	Yes	No
44	Fly Ash	AASHTO M 302.	1/Lot	As Required	Yes	Yes	No
45	Geogrid	ASTM D4632, D4595, D3776, D1777	1/Lot	3'X3'	Yes	Yes	No
46	Granite Blocks	Los Angeles Machine Test	Each Delivery	1 percent	Yes	Yes	No
47	Hydrated Lime	ASTM C207	Each Delivery	As Required	Yes	Yes	No
48	Iron Castings Gray	ASTM A48	1/Lot	1	Yes	Yes	No
49	Iron Castings Malleable	ASTM A47	1/Lot	1	Yes	Yes	No
50	Iron, Wrought	ASTM E350	1/Lot	1	Yes	Yes	No

No.	Material or Item	Reference	Contractor's Test Frequency	Sample Size	Manufacturer's Certificate Required?	Manufacturer's Test Results Required?	Contractor's QC Test Required?
51	Mortar (Test for impurities in fine aggregates)	ASTM C87	1/Lot	1 Bag	Yes	Yes	No
52	Mortar and Grout –Portland Cement	ASTM C109	1/Batch	2" Cubes	Yes	No	No
53	Paint	ASTM D822,	Optional	0.5 Gallon	Yes	Yes	No
54	Paint, Reflectorized	ASTM B589	Optional	0.5 Gallon	Yes	Yes	No
55	Paint-Curbs	Fed. Spec. TTP86, TTP115	Optional	0.5 Gallon	Yes	Yes	No
56	Rip Rap	ASTM D75	Each Delivery	N/A	Yes	No	No
57	Sealer-Conc. Expansion Joint Type 1	ASTM D6690	Each Delivery	0.5 Gallon	Yes	Yes	No
58	Sealer-Conc. Expansion Joint Type 2	Fed. Spe. TTS001543A / 00230C	Each Delivery	0.5 Gallon	Yes	Yes	No
59	Sealers for Concrete Pavements	ASTM D2628, D5329	None	N/A	Yes	Yes	No
60	Slag, Ground Granulated Blast-Furnace Slag	AASHTO M 302	Each Delivery	As Required	Yes	Yes	No
61	Soil	AASHTO T 191,T 205	Per 100' of each layer	Test	No	No	Yes
62	Soil	ASTM D698, AASHTO T 99	Per 1000 C.Y.	Test	No	No	Yes
63	Soil	ASTM D4318	Optional	1 bag	Yes	No	Yes
64	Soil – Clean Backfill	ASTM D2487	Minimum of 3	1 bag	Yes	No	No
65	Steel Bars	ASTM A108	Each Delivery	N/A	Yes	Yes	No
66	Steel Bars and Shapes	ASTM A499	Each Delivery	N/A	Yes	Yes	No
67	Steel for Plates	ASTM A36, ASTM A135, ASTM A139, ASTM A283, ASTM A572			Yes	Yes	
68	Steel Fasteners	ASTM A502	Each Delivery	N/A	Yes	Yes	No
69	Steel Reinforcement Bars	ASTM A615 Grade 60	Three/size/heat	2 Feet	Yes	Yes	Yes
70	Steel Reinforcement Bars Type I	ASTM A615 Grade 40	Three/size/heat	2 Feet	Yes	Yes	No
71	Steel, Galvanizing	ASTM A90, A123, A153, A239	Each Delivery	N/A	Yes	Yes	No
72	Steel, Structural	ASTM A36	Each Delivery	N/A	Yes	Yes	No
73	Steel, Welded Wire Fabric	ASTM A1064	Each Delivery	N/A	Yes	Yes	No
74	Stainless Steel Bolts, Studs	ASTM A193	Each Heat		Yes	Yes	
75	Select Granular Fill	ASTM D1073			Yes		
76	Stone Ballast	ASTM C33	Each Delivery	1 bag	Yes	Yes	No
77	Stress Graded Timber and Lumber	ASTM D245	Each Delivery	N/A	Yes	Yes	No

No.	Material or Item	Reference	Contractor's Test Frequency	Sample Size	Manufacturer's Certificate Required?	Manufacturer's Test Results Required?	Contractor's QC Test Required?
78	Thermoplastic Pavement markings	ASTM D1535, D1155, E28, D1214, AASHTO T-250	1/Project	0.5 Gallon*	Yes	No	No
79	Thermoplastic Primer – Type I	As above	1/Project	0.5 Gallon*	Yes	No	No
80	Thermoplastic Primer – Type II	As above	1/Project	0.5 Gallon*	Yes	No	No
81	Topsoil	ASTMC 117, D2974, D2976	Once/ 50 C.Y./Vendor	1 bag	Yes	No	No
82	Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers	ASTM D412	Visual	N/A	Yes	No	No
83	Welding Rods, Electrodes, Filler Metals	ASME Section II			Yes	Yes	
84	Welded Wire Fabric	ASTM A1064			Yes	Yes	

5.03.2. ASPHALT PAVING BLOCKS.

ABSORPTION TEST

Four (4) asphalt paving blocks shall be dried at a temperature of 150° F., after which they shall be cleaned of loose particles, weighed to within one (1) gram and placed in water at a temperature of 65° F. to 80° F. for twenty-four (24) hours. The blocks shall then be removed from the vessel, all surface water shall be mopped off and the blocks reweighed to within one (1) gram. The increase in weight divided by the original dry weight and multiplied by one hundred (100) equals the percentage of absorption.

5.03.3. CONCRETE.

SAMPLING FROM REVOLVING DRUM MIXERS

The sample shall be taken during the discharge of the entire batch, except that samples shall not be taken at the beginning or end of discharge. Sampling shall be done by repeatedly taking shovels of concrete from the chute and placing in the concrete test molds in accordance with ASTM Designation C31. The concrete may also be collected by the above method in a wheelbarrow and taken to the place where the filled cylinders are to be prepared and stored.

5.03.4. COMPRESSED BITUMINOUS MIXTURE.

DENSITY (BULK SPECIFIC GRAVITY METHOD)

The density of compressed bituminous mixtures shall be determined from cores drilled from completed wearing courses or pavements. When a wearing course or pavement consists of a surface course placed on a base course, the surface and base courses shall be separated and density determinations made of both the surface course and the base course.

A test specimen shall be weighed in air, after it has been air-dried to constant weight at a temperature not exceeding 80 degrees F., and its weight ‘A’, in grams, recorded.

The specimen shall be immersed in water for not less than five (5) minutes. The water shall be maintained at a temperature of 77 degrees F. (25 degrees C.) and the specimen, after the immersion period, shall be weighed while suspended in the water and its weight ‘C’, in grams, recorded.

The specimen shall then be removed from the water and surface-dried by patting with absorbent cloth until all visible films of water are removed. It shall then be weighed in air and its weight ‘B’, in grams, recorded.

The bulk specific gravity shall be calculated as follows:

$$\text{Bulk Specific Gravity} = \frac{\text{‘A’}}{\text{‘B’} - \text{‘C’}}$$

SECTION 5.04 – Deficiencies in Bituminous Pavements and Concrete

Under this section, deficiencies in the thickness and density of bituminous pavements, percentages of bitumen in bituminous mixtures, and deficiencies in the strength and thickness of concrete shall be determined and adjustments made to payments for pavements and concrete that are found to be deficient.

(A) DETERMINATION BY CORE BORINGS, CONCRETE CYLINDERS OR SAMPLES

1. The thickness and density of a wearing course consisting of a single-layer of a homogeneous bituminous mixture; the thickness and density of each course in a two-layer wearing course consisting of a specified compacted thickness of surface course placed upon a specified compacted thickness of bituminous base course; the thickness and density of each course in an asphalt macadam pavement which consists of specified compacted thickness of a bituminous surface course placed on a specified compacted thickness of either a plant mixed bituminous or penetrated stone base course; and the thickness of concrete sidewalks shall be determined from cores.

   The thickness of concrete pavements or concrete base for pavements shall be determined from cores or as directed by the Resident Engineer.

   Concrete in concrete pavements, concrete bases for pavements, concrete curbs, steel faced concrete curbs, and concrete sidewalks shall have its strength determined from cores or test cylinders, as directed by the Resident Engineer.

   All other concrete construction shall have strength determined from concrete test cylinders.

   The average percentage of bitumen in an asphaltic mixture and the sieve analysis thereof shall be determined from all cores taken for thickness and density.

2. All cores shall be taken by the Contractor in accordance with the provisions of ASTM Designation C42; however, the City reserves the right to perform its own verification cores. Cores shall be delivered to a designated laboratory, for testing by the City, to determine compliance with the specifications for payment purposes. These cores shall be considered the Commissioner's Cores.

   Concrete test cylinders shall be taken and stored in the field in accordance with the provisions of ASTM Designation C31.

3. At least three (3) cores shall be taken in each two thousand one hundred (2,100) square yards, approximately, of roadway surface and in each four thousand (4,000) square feet of concrete sidewalk at points located by the Resident Engineer, but not less than three (3) core borings shall be made on any contract. On resurfacing contracts, cores shall be of the asphalt pavement only.

   If a concrete core at any location breaks during drilling, additional core borings shall be made within ten (10') feet of the original core boring, but not more than three (3) core borings shall be taken at a given location.

4. When concrete cylinders are used to determine strength, they shall be taken by the Resident Engineer during the progress of the work from each class and type of concrete. Cylinders shall be tested for 28-day compressive strength.

5. A sample for the determination of percentage of bitumen in asphaltic mixtures shall be not less than ten (10) pounds in weight. Two (2) samples shall be taken from each day's delivery of each class or type of mixture laid but not less than three (3) samples of a mixture will be taken on any contract.

   Samples will be taken from the spread mixture, prior to compaction by rolling, after approximately five (5) tons of mixture from a given truck load have been spread on the roadway. Material removed for samples shall be immediately replaced with new material and acceptably incorporated before rolling.

(B) THICKNESS TESTS, EXCESS DEPTH

Any measurement of a core which exceeds one hundred and ten (110) percent of the specified thickness of a course will be considered as being only one hundred and ten (110) percent of the specified thickness when used to determine the thickness of (1) a single-layer asphalt wearing course, (2) the surface course

in a two-layer asphalt wearing course, (3) the base course in a two-layer asphalt wearing course, (4) the surface course in an asphalt macadam pavement, or (5) the base course in an asphalt macadam pavement.

Any concrete core having an average depth exceeding one hundred and five (105) percent of the thickness specified will be considered to have a depth of only one hundred and five (105) percent of the specified thickness in determining the average thickness of the concrete.

(C) PAYMENT, EXCESS THICKNESS

When the average thickness equals or exceeds the specified thickness, the specified thickness only will be paid for.

(D) PAYMENT, DEFICIENT THICKNESS

When the average thickness of (1) a single-layer asphalt wearing course, (2) the surface course in a two-layer asphalt wearing course, (3) the base course in a two-layer asphalt wearing course, (4) the surface course in an asphalt macadam pavement, or (5) the base course in an asphalt macadam pavement is less than the specified thickness, the area to be paid for will be the area of the course multiplied by the average thickness as indicated by measurement of cores and divided by the specified thickness. (Note: If the base course thickness is deficient but the overlying wearing course thickness is excessive by an amount at least equal to the base course deficiency, no adjustment in payment will be made for either course.)
The area of surface course in a two-layer asphalt wearing course, adjusted as provided above, will be paid for at a price per square yard equal to a percentage of the price bid per square yard for the complete wearing course. The area of base course in a two-layer asphalt wearing course, adjusted as provided above, will be paid for at a price per square yard equal to a percentage of the price bid per square yard for the complete wearing course. The percentages to be used shall be as given in the following tabulation.

Specified Thickness (Inches)			Percentage of Price Bid	
Wearing Course	Surface Course	Base Course	Surface Course (%)	Base Course (%)
2-1/4	1	1-1/4	48.2	51.8
2-1/2	1-1/4	1-1/4	50.0	50.0
2-1/2	1	1-1/2	46.6	53.4
2-3/4	1-1/4	1-1/2	48.3	51.7
3	1-1/2	1-1/2	50.0	50.0

Percentages for untabulated combinations of wearing, surface and base course combinations shall be as specified.

The area of surface course in an asphalt macadam pavement, adjusted as provided above, will be paid for at a price per square yard equal to four-ninths (4/9) of the price bid per square yard for the complete asphalt macadam pavement. The area of base course in an asphalt macadam pavement, adjusted as provided above, will be paid for at a price per square yard equal to five-ninths (5/9) of the price bid per square yard for the complete asphalt macadam pavement.

When the average thickness of concrete pavement or base for pavement is deficient by one-half (1/2”) inch or less than the specified thickness, the volume of concrete to be paid for will be the product of the area of the pavement or base multiplied by its average depth as indicated by measurement of the cores.

When the average thickness of concrete base or pavement (d) is deficient by more than one-half (1/2”) inch from the specified thickness (D), the volume of concrete to be paid for will be the product of the area of the base or pavement and the specified thickness multiplied by the ratio $(d)^2 / (D)^2$.

When the average thickness of concrete sidewalk is deficient by three-tenths (0.3) of an inch or less than the specified thickness, the area of sidewalk to be paid for will be the product of the area of the sidewalk multiplied by the ratio of the average depth, as indicated by measurement of the cores, over the specified depth.

When the average thickness of concrete sidewalk (d), as determined by cores, is deficient by more than three-tenths (0.3) of an inch from the specified thickness (D), the area of concrete sidewalk to be paid for will be the area of the sidewalk multiplied by the ratio $(d)^2 / (D)^2$.

Where the deficiency in thickness of concrete sidewalk, base or pavement exceeds twenty-five (25) percent of the specified thickness, such sidewalk, base or pavement will be rejected and shall be completely removed and properly replaced. No payment will be made for rejected concrete sidewalk, base or pavement; nor for any wearing course required to be removed and replaced because of rejected concrete base; nor for the removal, disposal and replacement of any of the foregoing.

(E) TOLERANCE, THICKNESS

When the average thickness of an asphaltic wearing course, consisting of a single layer of a homogeneous bituminous mixture of specified compacted thickness, is not less than ninety-eight (98) per cent of the specified thickness, the specified thickness will be paid for.

The surface course in a two-layer asphaltic wearing course will be deemed non-deficient when the average thickness of the surface course is not less than ninety-eight (98) percent of the specified thickness, except as otherwise hereinafter provided.

The base course in a two layer asphaltic wearing course will be deemed non-deficient when the average thickness of the base course is not less than ninety-eight (98) percent of the specified thickness.

The surface course in an asphalt macadam pavement will be deemed non-deficient when the average thickness of the surface course is not less than ninety-eight (98) percent of the specified thickness, except as otherwise hereinafter provided.

The base course in an asphalt macadam pavement will be deemed non-deficient when the average thickness of the base course is not less than ninety-eight (98) percent of the specified thickness.

When a two-layer wearing course is placed on an existing pavement, an existing concrete base for pavement or a new concrete base for pavement, the surface course in such wearing course will be deemed non-deficient when the average thickness of the surface course is not less than ninety (90) percent of the specified thickness, provided that the average thickness of the completed wearing course equals or exceeds the specified thickness.

When the base course in an asphalt macadam pavement is a non-bituminous or a non-penetrated stone base course, the surface course in such asphalt macadam pavement will be deemed non-deficient when the average thickness of the surface course is not less than ninety (90) percent of the specified thickness, provided that the average thickness of the complete asphalt macadam pavement equals or exceeds the specified thickness.

(F) PAYMENT, DEFICIENT DENSITY OR GRADATION & ASPHALT CONTENT

For each lot of asphalt placed each day, if the required density or gradation of the compacted asphalt is outside of the required tolerances, the payment for the asphalt will be adjusted as follows:

DENSITY. Adjustment for payment will be based on the average daily density, calculated solely from cores of placed asphalt tested by the Engineer, per the following table:

Asphalt density payment adjustment factors	
Average daily density	Adjustment factor
Over 98.0%	0.60
98.0% through 97.1%	0.95
97.0% through 92.0%	1.00
91.9% through 91.0%	0.95
90.9% through 90.0%	0.90
89.9% through 88.0%	0.85
Less than 88.0%	0.60

GRADATION & ASPHALT CONTENT. Adjustment for payment will be based on the gradation and asphalt content calculated solely from cores of placed asphalt or field sampled bagged asphalt tested by the Engineer per the following table:

Aggregate gradation & asphalt content payment adjustment factors		
Requirements per Table 3.01-I		Adjustment Factor
Aggregate gradation	Asphalt content	
Out of tolerance: more than one sieve	In tolerance	0.95
Out of tolerance: one sieve	Out of tolerance	0.95
In tolerance	Out of tolerance	0.95
Out of tolerance: more than one sieve	Out of tolerance	0.90

For clarity, if the job mix formula production tolerances from the approved mix design fall outside the design general limits from Table 3.01-I, the design general limits from Table 3.01-I will govern.

Where a lot of asphalt is out of tolerance in both density and gradation & asphalt content, only the more severe of the two adjustment factors will be applied.

This adjustment for density or gradation & asphalt content is in addition to the adjustment specified in Subsection (D), PAYMENT, DEFICIENT THICKNESS above.

(G) STRENGTH TESTS, EQUATING RESULTS

In computing the compressive strength of each core, the height used in making such computation shall be the height of the core after capping and the test result shall be equated to a height-diameter ratio of two (2) to one (1).

(H) (NO TEXT)

(I) STRENGTH REQUIREMENTS

The average of the compressive strengths, determined and computed as specified, shall equal or exceed the minimum requirements of **Section 3.05** for concrete of the class and type specified.

(J) EXCESS STRENGTH

Cores having strengths exceeding one hundred and twenty-five (125) percent of the minimum strength specified will be considered to have a strength of only one hundred and twenty-five (125) percent of the specified minimum strength in determining the average strength of the concrete.

Concrete test cylinders having strengths exceeding one hundred and fifteen (115) percent of the minimum strength specified will be considered to have a strength of only one hundred and fifteen (115) percent of the specified minimum strength in determining the average strength of concrete.

The strength of the concrete determined from concrete cylinders will be recorded as the average of the strengths of all cylinders tested. Results from obviously faulty, defective, or improperly cured specimens will be disregarded in determining the average.

(K) PAYMENT, EXCESS STRENGTH

When the average strength equals or exceeds the specified minimum strength, the concrete will be paid for at the contract price.

(L) PAYMENT, DEFICIENT STRENGTH

Concrete whose average compressive strength is less than the specified minimum strength will be paid for at the contract price less an amount which will bear the same proportion to the contract price that the deficiency in strength bears to the specified minimum strength.

When the cost of furnishing and incorporating concrete is included in the prices bid for the items listed below and a deficiency in strength after test (f) from specified strength (F) occurs in the concrete, the quantity to be paid for under the said items shall be the measured quantity reduced by an amount equal to the measured quantity multiplied by the corrective factor K(1-f/F). Values of K for each of the items are tabulated below:

Description	K
Curb	
Granite, New.....	0.16
Granite, Reset.....	0.22
Bluestone, New.....	0.18
Bluestone, Reset.....	0.25
Curb, Concrete, Steel Faced	
New, Furnished by Contractor.....	0.40
Reset or Furnished by City.....	0.50
Header	
Granite, New..... ...	0.24
Granite, Reset.....	0.32
Bluestone, New.....	0.28
Bluestone, Reset.....	0.36

For the purposes of this section and solely for reduction in payment: when strength tests of cores or cylinders are made after the specified standard twenty-eight (28) day period after placing of the concrete from which they are taken, the results will be rectified by the Resident Engineer into twenty-eight (28) day results in accordance with the following table:

TIME STRENGTH TABLE
PORTLAND CEMENT CONCRETE

When compressive strength tests are made after the standard 28-day period following placing of the concrete, the strength at 28 days shall be determined from the actual compressive strength in accordance with the following table:

Tested at Days	Divide by	Tested at Days	Divide by	Tested at Days	Divide by	Tested at Days	Divide by
28	1.000	44	1.071	60	1.120	76	1.157
29	1.005	45	1.075	61	1.122	77	1.159
30	1.010	46	1.078	62	1.125	78	1.161
31	1.014	47	1.081	63	1.127	79	1.163
32	1.019	48	1.084	64	1.129	80	1.165
33	1.023	49	1.087	65	1.132	81	1.167
34	1.027	50	1.090	66	1.134	82	1.169
35	1.032	51	1.093	67	1.136	83	1.171
36	1.036	52	1.096	68	1.139	84	1.173
37	1.040	53	1.099	69	1.141	85	1.175
38	1.045	54	1.102	70	1.143	86	1.177
39	1.049	55	1.105	71	1.146	87	1.179
40	1.053	56	1.108	72	1.148	88	1.181
41	1.058	57	1.111	73	1.150	89	1.183
42	1.062	58	1.114	74	1.152	90	1.185
43	1.066	59	1.117	75	1.155	over 90	1.185

(M) PERCENTAGE BITUMEN TESTS, METHOD

The bitumen content of all asphaltic mixtures will be determined from samples in accordance with the requirements of ASTM Designation D2172, using chloroform as the solvent.

(N) PAYMENT, DESIGN PERCENTAGE OF BITUMEN

The minimum and maximum design percentage of bitumen in asphaltic mixture shall be the percentage contained in the approved Contractor's formulas with a tolerance of $\pm$ 7% of that bituminous percentage.

For each lot of asphalt placed each day, when the average percentage of all samples of a given mixture, determined from test results, is equal to or greater than the minimum design percentage or is equal to or less than the maximum design percentage, the mixture will be paid for at the contract price.

(O) PAYMENT, EXCESS OR DEFICIENT PERCENTAGES

When the average percentage of bitumen in asphaltic mixtures is less than the minimum or exceeds the maximum design percentage, payment will be made at the contract price less an amount which will bear the same proportion to the contract price that the deviation of average bitumen percentage bears below minimum or above maximum design percentage.

(P) TIME OF MAKING CONTRACTOR'S CORE BORINGS OR CONCRETE CYLINDERS

The Contractor, to confirm the results obtained from the Commissioner's borings or cylinders, will be permitted to make core borings or cylinders at the Contractor's own cost and expense under the following conditions:

1. The Contractor may make core borings at the same time or cylinders from the same batches that the Commissioner makes core borings or cylinders.

2. The Contractor may make core borings at any time subsequent to the determination of the results of the tests of the Commissioner's cores provided that the Contractor submits a written statement to the Engineer requesting to take additional core borings. This written statement must be submitted within ten (10) days of the date of notification of the results of the tests of the Commissioner's cores.

3. The Contractor will be granted a period of thirty (30) days following the date of notice to him of the results of the Commissioner's cores in which the Contractor may make core borings, at the Contractor's option, and submit results of the same. No submission of the Contractor's cores will be considered beyond the thirty (30) day period hereinbefore stipulated, unless otherwise approved by the Commissioner. Upon the failure of the Contractor to recore as provided above within the thirty (30) day period, the Commissioner's cores, only, will be used in determination of payment.

(Q) CONDITIONS OF MAKING CONTRACTOR'S CORE BORINGS OR CONCRETE CYLINDERS

Not more than one (1) Contractor's cylinder shall be made for any one (1) Commissioner's cylinder.

If the Contractor elects to recore, shall make two (2) core borings for each Commissioner's core boring which is deficient in thickness, strength and/or density.

The first Contractor's core boring shall be made within seven (7') feet of the Commissioner's core boring which is deficient. The second Contractor's core boring shall be made not less than seven (7') feet nor more than ten (10') feet from the Commissioner's core boring (1) which equals or is closest to 105% of the specified thickness when deficient thickness is the reason for recoring, (2) which equals or is closest to 125% of the specified strength when deficient strength is the reason for recoring, or (3) which is closest to the theoretical maximum density when deficient density is the reason for the recoring.

When the Contractor elects to make more than one (1) recore, the above requirements of closeness to specified thickness, specified strength and theoretical maximum density shall be applied in descending order to each subsequent second Contractor's core boring.

In the event that the core borings which the Contractor elects to make equals or exceeds 40% of the total number of the Commissioner's core borings, the Contractor shall make one (1) core boring for each of the Commissioner's core borings. In such case, Contractor's core borings shall be made within seven (7') feet of the Commissioner's core borings which are deficient, and not less than seven (7') feet nor more than ten (10') feet from Commissioner's non-deficient core borings.

Contractor's core borings shall:

1. be taken in the presence of, and marked for identification by a representative of the Commissioner;

2. be tested for thickness, density and/or strength in a recognized and approved testing laboratory after service of sufficient notice upon the Commissioner, who reserves the right of having a representative present when tests are being made; and

3. be completely tested for thickness, density and/or strength as if they were Commissioner's cores and have results computed in compliance with the methods used on the Commissioner's cores, and such results averaged in with the results of the Commissioner's cores.

(R) TESTS, CERTIFICATION OF RESULTS, AVERAGING RESULTS

The results of the tests of each Contractor's core or concrete cylinder shall be certified by the approved testing laboratory of the Contractor to the Commissioner and the dates on which tests are made shall appear in such certificate.

(S) REPLACING REMOVED RESULTS

All materials removed by the Contractor's core borings shall be replaced by the Contractor at the Contractor's own cost and expense immediately after making each core boring. If the Contractor fails to comply with the foregoing, the Commissioner's forces will make the necessary replacements.

All materials removed by the Commissioner's core borings will be replaced by the Commissioner's forces.

The cost of replacement of the Contractor's or the Commissioner's core borings by the Commissioner's forces will be deducted from any money due the Contractor under this contract before Final Acceptance at the following rates:

For the first 10 core holes.....$100.00 each

Succeeding core holes..... $80.00 each

(T) CERTIFICATES OF COMPLETION DEFERRED

When the Contractor elects to make core borings, Final Acceptance will be deferred until the results of all core tests shall have been certified to and determined and recorded by the Commissioner and all materials removed by all core borings shall have been satisfactorily replaced.

(U) CORE BORINGS BY THE CONTRACTOR, WHEN PERMITTED UPON REQUEST

The Contractor may request permission to make core borings and, if permitted, shall make core borings in sidewalks and pavements at locations to be designated by the Resident Engineer; deliver such borings to a designated laboratory for testing; and replace materials removed immediately after making each core boring; all, at the Contractor's own cost and expense.

Core borings made under the above provision will be deemed as having been made by the Commissioner; will be used for the same purposes as the Commissioner's core borings; and will be subject to the provisions of **Subsections 5.04.(P); 5.04.(Q).1.; 5.04.(Q).3.; 5.04.(S) and 5.04.(T)**.

SECTION 5.05 – Maintenance

(A) CONTRACTOR TO STAY INFORMED OF CONDITIONS OF PAVEMENT

The Contractor must stay informed of the condition of the curbs, sidewalks, roadway pavement, gutters, headers, trees and other structures which are under maintenance, and will be required to keep the same in repair or make replacements without notice from the Commissioner. In case of failure or neglect of the Contractor to do so, then the Commissioner shall have the right to purchase such material as the Commissioner shall deem necessary, and to employ such person or persons as the Commissioner shall deem proper, and to undertake and complete said repairs or make said replacements by contract or otherwise and to charge the expense thereof against the Performance Bond or any sum of money retained by The City, as herein provided, and the excess cost to the Contractor, and the Contractor shall pay all such expense to which The City may have been put by reason of the neglect of the Contractor to make such repairs or replacements as aforesaid.

(B) CONTRACTOR TO MAKE REPAIRS OR REPLACEMENTS

1. The Contractor shall immediately repair or make good to the satisfaction of the Engineer all disintegration, cracks, bunches, waves, deteriorations and defects of every nature, or settlements or depressions in the pavement, pavement base, subgrade material, headers, curb, sidewalk, gutters and other structures, which shall occur at any time during the maintenance period. The City will repair all defects for which, in the opinion of the Engineer, the Contractor is not responsible.

2. Where a settlement, depression, or defect in the pavement, pavement base, subgrade material, headers, curb, sidewalk or other structure is a result of backfilling not placed under this contract, as certified by the Engineer; or is caused by settlement of the backfill which is not due to the failure of the Contractor to comply with the requirements of the specifications but is due to the unstable condition of the soil underneath the backfill, as certified by the Engineer; the Contractor shall not be responsible for the restoration of such settled pavement, pavement base, subgrade material, headers, curb, sidewalk or other structure over such settled area to the original grade. The Contractor shall, however, repair all other defects to the satisfaction of the Engineer.

3. The Contractor shall remove and replace all trees under maintenance which die or, in the opinion of the Engineer, seem unhealthy, stunted or unable to flourish, within the period of maintenance, except as otherwise provided, and replace said trees with new trees of the same size and species as originally planted, except when such death, unhealthiness, stunting or inability to flourish is due to vandalism or damage resulting from causes over which the Contractor has no control, as certified by the Engineer. However, the Engineer may, at the Engineer's discretion, direct a substitution of species.

(C) PERIOD OF MAINTENANCE

The period of maintenance, except for trees planted or transplanted and otherwise provided, shall be for a period of eighteen (18) months after the date of substantial completion as certified by the Engineer. The period of maintenance for each individual tree planted or transplanted shall begin upon planting or transplanting and shall end twenty-four (24) months thereafter. The Contractor shall obtain the said certificate from the Department of Parks and Recreation, in writing, and file such certificate with the Engineer.

(D) MAINTENANCE NOT TO TERMINATE IN WINTER MONTHS

When the period of maintenance for the work, other than the work of planting or transplanting trees, shall terminate within the months of December, January, February and March, the said months, or such part thereof as the Commissioner may determine, shall not be included in the computation of the period of maintenance during which the said work is to be kept in repair by the Contractor, and also, in that case, the payment to be made under the provisions of this contract shall not be made before the first of April next thereafter, unless otherwise specifically permitted by the Commissioner.

When the termination date of the period of maintenance for planted or transplanted trees shall fall outside the planting periods specified in **Section 4.16**, hereof, the interval between the said termination date and next planting period thereafter, or such part as the Commissioner may determine, shall not be included in the computation of the period of maintenance during which the replacement of defective trees is to be made

by the Contractor, and also, in that case, the payment to be made under the provisions of this contract shall not be made until after the date appearing on the Certificate of Acceptance which the Contractor shall obtain from the Department of Parks and Recreation, and file with the Engineer, for trees planted as replacements for defective trees within the said next planting period thereafter, unless otherwise specifically permitted by the Commissioner.

If, in the opinion of the Engineer, the weather is unsuitable for making repairs or replacements at the time of such termination, the Contractor shall make the required repairs or replacements when permitted by the Engineer.

(E) EXPIRATION OF MAINTENANCE

The Contractor shall make all of the repairs required to produce a pavement, pavement base, subgrade material, headers, curb and sidewalk, etc., free from defects and substantially conforming in thickness, contour, surface and condition of the pavement, pavement base, headers, curb and sidewalks, etc., as originally laid, ten (10) days prior to the expiration of the maintenance period.

Unless otherwise permitted or directed, defective trees, as determined by the Commissioner, shall be replaced with new trees by the Contractor.

The furnishing and planting of trees as replacements for defective trees shall comply, in all respects, with the contract requirements.

In the event that The City incurs any expense in pursuance of this section of the contract, the certificate of the Commissioner as to the condition of the pavement, pavement base, headers, curb and sidewalk, other structures and trees, the nature and extent of the repairs and replacements made, and expense incurred for such repairs or replacements shall be binding and conclusive on the Contractor.

(F) COMPLETE REPAIRS PREVIOUS TO EXPIRATION OF GUARANTEE

Just previous to the expiration of the guarantee period, the entire work shall be inspected, and any defect or failure in the pavement, pavement base, subgrade material, headers, curbs or sidewalks, shall be immediately repaired by the Contractor in a manner acceptable to the Engineer. When required by the Engineer, such defective portions shall be taken up and relaid in accordance with the requirements of the contract and the specifications; provided, however, that when more than fifty (50) percent of the pavement surface of any one block requires repairing according to the above conditions, the Engineer may require the entire block to be taken up and relaid.

(G) CONTRACTOR TO NOTIFY COMMISSIONER BEFORE MAKING REPAIRS

The Contractor shall notify the Commissioner, at least two (2) days before making any repairs or replacements of the time and place of beginning such work and shall at all times keep the Commissioner or the Commissioner’s representatives informed of the proposed prosecution of the work from day to day.

(H) TEMPORARY REPAIRS IN WINTER

When weather conditions are such that permanent repairs or replacements are inadvisable, the Contractor shall make, at its own expense, temporary repairs satisfactory to the Engineer.

(I) PERIOD OF MAINTENANCE TO BE IN FULL FORCE REGARDLESS OF CHANGES TO STREET

The periods of maintenance shall be in force throughout their respective terms irrespective of any changes that may occur in traffic conditions, on or across said streets, whether due to the widening of said roadway or to the construction, reconstruction or arrangement of new or existing surface or subsurface structures thereon, or to any other cause.

(J) PAVEMENT OPENINGS

During the periods of maintenance, The City will restore or permit others to restore and The City will thereafter maintain the roadway pavement and base, over all openings made by the corporations or plumbers for making new service connections, or repairing, renewing or removing the same, and over all trenches made for carrying sewers, water or gas pipes, or any other subsurface pipes or conduits, for the building or laying of which permits may be issued by the Commissioner, including the cutting out of any adjoining pavement and base and such adjustment of the earth under the base, and resetting of headers,

as may be necessary for the restoration to the proper grade of the pavement surface, and The City will repair defects of the pavement, for which in the opinion of the Engineer, the Contractor is not responsible.

(K) MAINTENANCE OF RAILROAD TRACKS

In case there are railroad tracks in any street or public place within the limits of this contract, then this section shall not apply to those portions of the street or public place between such tracks, between the rails of the track and for two (2') feet in width outside the tracks.

SECTION 5.06 – Procedure For Estimating Concrete Strength By The Maturity Method

5.06.1. DESCRIPTION. The Maturity Method is a non-destructive procedure for estimating early concrete strength. The requirements of this section shall apply to all concrete placed under Item No 6.97 A and in accordance with **Section 6.97 – Extra-High-Early Strength Concrete Base**.

The Maturity Method will not be used by the Department for accepting the strength of a concrete. Strength testing by destructive means per the requirements of **Section 5.02** will still be used by the Department for strength acceptance.

5.06.2. PROCEDURE FOR DEVELOPING A MATURITY CURVE. For each proposed mix design develop the maturity curve in accordance with ASTM C1074. Make 6" x 12" cylinders and base the curve on compressive strength.

(A) Make all specimens from the same batch of concrete. Mix using the same materials, mix design and mixing technique that will be used for concrete on the project. Mix at the maximum w/c ratio of the design. Mix at or within 0.5% of the maximum air content of the design.

(B) Determine the plastic properties of the batch by performing slump, air content, unit weight, and concrete temperature before making specimens. Determine slump in accordance with ASTMC143, air content in accordance with ASTM C231 or ASTM C173, unit weight in accordance with ASTM C139, temperature in accordance with ASTM C1064, shrinkage in accordance with ASTM C157, and freeze/thaw in accordance with NYSDOT Method 502-3P, except a 3% NaCl solution shall be used.

(C) Make a minimum of twenty (20) cylinder specimens in accordance with ASTM C192 and one prism specimen in accordance with ASTM C157. Embed sensors in the center of two (2) of the cylinder specimens. Moist cure all specimens in a temperature controlled water bath or in a moist room meeting the requirements of ASTM C511. Test cylinders in accordance with ASTM C39. Additional specimens can be made and tested at other ages as well as unused specimens to help define the maturity curve.

The following samples shall be prepared per mix design, at a minimum:

- (2) 6x12 cylinders with imbedded sensors.
- (18) 6x12 cylinders tested in sets of (2) at the following approximate ages: 3H, 6H, 12H, 1D, 2D, 3D, 7D, 14D, 28D
- (3) prisms for shrinkage testing

(D) At a minimum, personnel making cylinders and performing slump, air content, unit weight, and concrete temperature shall be ACI certified as Concrete Field Testing Technicians, Grade I, and personnel testing cylinders for compressive strength shall be ACI certified as Concrete Strength Testing Technicians. The process shall be supervised by an ACI certified Concrete Laboratory Testing Technician, Level 2.

(E) Use digital data-loggers in conjunction with a commercial maturity instrument that automatically computes and displays maturity. Develop the curve using the temperature-time factor maturity function. Use a value of 32º F (0º C) for T_o (datum temperature) unless a more accurate value is determined in accordance with Annex A1 of ASTM C1074. The models of sensors, data-loggers, and maturity instruments used for development of the mix design need not be the same as used in the field.

5.06.3. MIX DESIGN. For each mix design, the Contractor shall submit a mix design and method used for monitoring maturity in the laboratory to the Engineer. The mix design shall meet the requirements of Section 3.05.4, CONTRACTOR'S FORMULA, except as modified below:

1) A single-point mix design is acceptable, and the mix shall be approved for two years.
2) In addition to the requirements of the NYCDDC QA "MIX DESIGN, LABORATORY AND PLANT APPROVAL PROTOCOL", the Contractor's mix design must include:
    - Age-Strength Data Table and Curve;
    - Maturity-Strength Data Table and Curve;
    - Age-Shrinkage Data Table and Curve Test results for freeze-thaw per NYSDOT Method 502-3P (PE Stamped).

Data Tables and Curves shall have shown interpolated data points for 2800 PSI and 4000PSI compressive strength.

5.06.4. USING CONCRETE MATURITY IN THE FIELD. Estimating concrete strength by maturity is acceptable when the concrete is batched using the same materials (including admixtures), material proportions, mix design, and mixing technique as that of the batch used to develop the maturity curve. The curve can be used on the project to estimate concrete strength if the w/c ratio of the concrete used on the project is less than or equal to the w/c ratio used to develop the curve.

(A) Maturity sensors shall be approved by the Engineer and be a self-contained commercial maturity unit that contains an internal logger and does not require continuous connection to an external meter or logger. Sensors may be wired or wireless. If wired sensors are used, the contractor shall install protection around the exposed wires to prevent vandalism. If the protection is inadequate to prevent vandalism, the Engineer may require the use of wireless sensors. Use the time-temperature maturity function. Use the same value for T_o (0º C) (datum temperature) that was used to develop the maturity curve.

(B) Install maturity sensors as follows:

1. At least (5) sensors shall be installed per day of placement.
2. One (1) sensor in each twenty (20) cubic yards or fraction thereof placed daily
3. One of the sensors shall be installed in the last load of concrete mixed and placed that day.
4. Sensor locations and placement shall be coordinated with the Engineer in the field.

(C) When installing sensors, use a placement strategy that targets areas where the concrete is expected to gain maturity the slowest. Place sensors near the edges, in thinner sections, or in shaded areas where the concrete will be cooler. Do not place sensors in the center of the pour or where the concrete will be the hottest. Typical sensor placement should be at least one (1) foot from an edge or corner and six (6) inches of cover in each direction. At a minimum, install sensors with at least three (3) inches of cover in each direction. Use traditional methods in lieu of maturity if the least dimension of a concrete is less than six (6) inches (i.e. if three (3) inches of cover cannot be maintained in each direction). If wireless sensors are used, the antenna shall be located per the manufacturer's recommendations. The Contractor shall secure sensors to prevent movement during concrete placement. Do not secure sensors with wood that will become embedded in the concrete.

(D) Provide the Engineer with one (1) set of the same maturity monitoring equipment reader that the Contractor will be using on the project so that the Engineer can independently monitor concrete maturity. Provide training to the Engineer's staff on how to operate the equipment. The monitoring equipment will be returned to the Contractor at the completion of the project.

(E) Maintain a separate log for each sensor which includes a unique ID; location; date and time of installation; date and time that the sensor began monitoring maturity; dates and times of all readings taken from the sensor; the corresponding temperature, maturity, and concrete age at each reading; and the date when readings were discontinued. Notify the Engineer immediately with problems or discrepancies with readings or if any sensors are found to be damaged or operating improperly, and document on the log the date and time this determination was made, what the problem is, and the steps taken to correct it. Have the log available for viewing by the Engineer at all times and provide an updated copy or the log to the Engineer on a weekly basis if the sensor is still in use.

5.06.5. BASIS OF PAYMENT. No additional payment will be made for compliance with the provisions of this section.

SECTION 5.07 – QUALITY ASSURANCE TESTING FOR MATERIAL ACCEPTANCE

5.07.1. DESCRIPTION

Acceptance of permanent materials will be based on the City's Quality Assurance (QA) testing and compliance with the requirements of the Contract Documents. The Contractor's Quality Control (QC) testing will not be used for acceptance of permanent materials; however failing QC tests will be cause for rejection of any materials.

5.07.2. QA TESTING

The City will perform, at a minimum, the QA testing shown in the table below for acceptance of permanent materials. Test methods are ASTM unless otherwise noted, and must be sampled per D3665. Materials that pass the QA testing but do not meet all other contract requirements are not acceptable.

Material	Parameter	Frequency	Test Method	Notes
Asphalt per Section 3.01	Marshall flow and stability	Loose asphalt: 1 test per lot, truck sampled at site. A lot is every 800 tons, no larger than daily. Cores: Per Section 5.04.(A).3	D6927	From loose asphalt sampled during placement or core samples
	Air voids (Density)		D3203	From core samples
	Gradation		D5444	From loose asphalt sampled during placement or core samples
	Asphalt Content		D6307	From loose asphalt sampled during placement or core samples
	Thickness		C174	From core samples
Concrete, all types except sidewalks	Compressive strength	Per Sec. 5.02.2.(C): 3 cylinders / 50 CY	C39	N/A
Concrete sidewalks and roadway base	Compressive strength	Per Section 5.04.(A).3	C42	If QA cylinders and cores are done on the same scope of work, the core results will govern.
	Thickness		C174	N/A
Backfill	Gradation	Every 150 CY, at least once a month.	C136	Volume for frequency to be measured as compacted CY. Imported backfill also requires an initial test for source approval.

SECTIONS 5.08 THRU 5.36 (NO TEXT)

SECTION 5.37 – Construction Report

5.37.1. INTENT.

The intent of this Section is to prepare construction reports as prescribed herein and summarize the effects of construction activities on structures located within the influence line of work to be performed under this project to ensure that the Contractor's proposed construction methods do not create or aggravate any potentially dangerous conditions. In order to ascertain the effects of construction, the Contractor will be required to retain the services of a qualified firm with experience in structural engineering, soil mechanics, foundations, installation of piles, evaluation of the effect of construction on buildings and structures, effects of dewatering and the associated movement of soil due to dewatering and the effect of vibrations upon structures.

5.37.2. SPECIAL EXPERIENCE REQUIREMENTS.

Within thirty (30) days of the award of this contract, the Contractor shall submit to the Commissioner qualifications of the firm it proposes to provide the engineering services described in this section. The proposed engineering firm must meet the following special experience requirements.

Such firm must, within the last three (3) consecutive years, have successfully provided engineering services similar to the services described in this section on a minimum of two (2) comparable projects.

Compliance with such special experience requirements will be determined solely by the Commissioner. Once a firm is approved, no substitution will be permitted, unless the Commissioner has approved the qualifications of the proposed replacement in writing in advance. If the qualifications of the proposed firm are not acceptable, the Contractor shall submit the qualifications of another proposed firm within fifteen (15) days of notice to do so.

5.37.3. SUBMISSIONS.

(A) Pre-Construction Report

Upon approval and prior to construction the chosen firm (hereinafter referred to as the "firm") shall submit six (6) copies of a report incorporating their findings and recommendations ("Pre-Construction Report"). The Pre-Construction Report shall be prepared by or under the immediate direction of a New York State Licensed Professional Engineer as evidenced by the imprint of the Licensed Engineer's seal and signature on the document. The Pre-Construction Report must include at minimum:

1. A detailed description of the Contractor's proposed method of construction including the demolition of wall; demolition of sidewalk, curb and roadway; excavation; installation of the temporary excavation support system, including drilling of the holes in the ground; and installing the lagging panels.
2. An inspection of the interior and exterior (including photographs and videotapes as required) of all buildings and/or structures that may be affected by the proposed method of construction.
3. A definition of the "radius of influence" that the proposed wall installation and other construction activity will impart on the surrounding soil.
4. A definition of the limits of horizontal and vertical movement each building and/or structure within the support of excavation can tolerate without damage to the structural integrity of that building and/or structure.
5. A complete study of the vibrations that each building can tolerate along with the anticipated vibrations promulgated by the construction methods, taking into account the age and condition of the buildings.
6. A statement that the limits of movement and vibrations as defined in (4) and (5) above will not be exceeded as a result of the proposed method of construction.
7. A geological profile of the soils in the area. This profile shall be based upon the boring logs taken for this project. See Record of Borings drawing.

The Pre-Construction Report shall include all field notes, measurements and photographs and videotapes, as required, of the existing wall conditions which may be aggravated by the proposed construction of the wall and shall include a visual inspection of the interior and exterior of all buildings and sewer within the

adjacent area of the construction activity. A view of each exterior face of the building and/or structure is required. Additional interior photographs shall be taken to show any existing cosmetic or structural damage on buildings. The Contractor shall install gages to monitor the cracks during the construction. The gages shall be able to determine crack opening or closing to the nearest one-sixteenth of an inch.

Applications for consents to enter buildings for the purpose of inspection shall state that the inspection is necessary to ensure the structural integrity of the building. One counterpart of each consent, duly signed and acknowledged by the owner or one of the owners, executors or administrators for himself and for the owner's agents, lessee and any other persons who shall have a vested or contingent interest in the building, or notice of refusal if consent is not obtained, shall be filed with the Engineer at least ten (10) days before the commencement of work which affect the building or structure.

The Pre-Construction Report must also include recommendations or comments regarding any potentially dangerous and/or unsafe conditions uncovered along with all other additional information required pursuant to other sections of the Specifications.

All results of the building or structure examinations must be incorporated into the Pre-Construction Report.

No work may begin until the NYCDDC has accepted the Pre-Construction Report. This pertains to all contract work and no exceptions will be allowed unless otherwise stated in these Specifications.

(B) Reports During Construction

The firm will be required to perform the monitoring during construction activity and submit reports to the Engineer as required or as directed by the Engineer. These reports shall include sketches noting the location of all monitoring points. Should any of the criteria set forth in the Pre-Construction Report be exceeded, the Engineer shall be notified immediately. Monitoring shall include but not be limited to the following:

1. Monitoring Settlement

A series of reference points shall be established outside of the "radius of influence" as previously described for monitoring structural settlements. All initial and subsequent readings shall be taken to the nearest 0.01 of a foot.

Structures and/or buildings shall be monitored daily for one week. If no horizontal or vertical movement is measured, then structures and/or buildings shall be monitored weekly for one month. If no horizontal or vertical movement is measured, then structures and/or buildings shall be monitored monthly for the duration of the contract. In the event of an unusual event (e.g. water main break or abnormal flooding) monitoring shall be performed within 24 hours of the event. A maximum value of 1/4" shall be used for vertical and horizontal settlements.

All readings shall be done by or under the immediate supervision of a Surveyor Licensed by the State of New York as evidenced by the imprint of Licensed Surveyor's seal and signature.

The Contractor shall transmit a copy of all readings to the Engineer on the same day they are taken.

Should the limit of horizontal and/or vertical movement, as set forth in the Pre-Construction Report, of any building and/or structure be exceeded, the Contractor shall immediately, at the Contractor's own expense, take steps to rectify the situation and prevent any further settlement of such building and/or structure. The Contractor shall be fully responsible for any damages to any foundations, walls or other portions of buildings and/or structures that may result during the courses of this construction. Any damage done by the Contractor, whether it is accidental or due to negligence or carelessness in performing the work included in this contract shall be made good by the Contractor at the Contractor's own expense.

2. Vibration Monitoring

Should the Contractor employ construction methods that will result in vibrations being imparted to the surrounding soil and/or buildings and/or structures, the Contractor shall monitor and record particle velocity. Locations of the monitoring points shall be placed in such a manner so as to ensure recordings that reveal any possibility of damage to existing buildings.

These points shall be monitored at all times when construction methods resulting in vibrations are employed. The maximum permissible peak particle velocity shall be that noted in the Pre-Construction Report. Under no circumstances shall a particle velocity of one-half (1/2") inch per

second be permitted. Should particle velocities be exceeded, the Contractor shall immediately cease operations and resort to another method which will eliminate or minimize the effect of vibrations.

It shall be the Contractor's responsibility to restore any buildings or structures damaged as a result of the Contractor's operations to its original condition or better.

The Contractor is advised that the parameter of one-half (1/2") inch per second shall be used as the maximum upper limit of particle velocity and it should be realized that particle velocities of less than one-half (1/2") inch per second could cause damage to buildings in the area.

The use of an upper limit of less than one-half (1/2") inch per second shall be discussed in the Pre-Construction Report and Contractor shall be required to abide by any limit other than one-half (1/2") inch per second limit at no additional cost to the City. The wall vibration monitoring shall be paid under 9.71WB.

(C) Post Construction Report

Within 30 days of the completion of all work that necessitated monitoring, the firm shall prepare a report detailing the results of the monitoring program ("Post Construction Report"). The Post Construction Report shall include a comparison of all assumptions and field-measured values. Should there be excessive discrepancies between the two, an explanation shall be presented within the report. This report shall include sketches of all monitoring points. Should this contract provide for the installation of piles the Post Construction Report shall include the location and length of all piles driven superimposed on the geological profile. The Resident Engineer shall provide the location and lengths of piles.

Pre-Construction Report, Reports During Construction, and Post Construction Report are collectively referred herein as "Construction Reports".

5.37.4. RESPONSIBILITIES OF THE CONTRACTOR.

Prior to bidding the Contractor shall examine the site and available subsurface inspection information and formulate methods of construction that will not result in any damage to existing structures. Should the Contractor lack the expertise in evaluating the effects of the Contractor's construction methods the Contractor's bid should be prepared in consultation with an experienced firm or authority. In any event, the Contractor will be held liable for any damage to any existing structures due to the Contractor's construction methods. In addition, should the results of a Pre-Construction Report indicate that damage will result from the Contractor's proposed construction methods, the Contractor will be required to amend the Contractor's means and methods in accordance with the Pre-Construction Report, at no additional cost to the City.

5.37.5. WORK INCLUDED.

The contract price for the Construction Reports shall be a Lump Sum Price and shall include the cost of all labor, materials, plant, equipment, and insurance necessary or required to prepare the reports including, but not limited to, building examinations, construction monitoring, preparation of Construction Reports and all other work incidental thereto; all in accordance with the specification and as directed by the Engineer.

5.37.6. NO SEPARATE PAYMENT.

No separate or additional payment will be made for compliance with the requirements of the Construction Reports including, but not limited to, any modification to the Contractor's means and methods of construction.

5.37.7. PRICE TO COVER.

Payment for this work shall be made under the appropriate Bid Item and proportional to the work completed as follows:

Acceptance of Pre-Construction Report	30%
Completion of Reports During Construction	40%
Acceptance of Post-Construction Report	30%

The cost for the Construction Reports of TV Sewer Inspection and digital audio-visual recording of newly constructed and repaired sewers shall be paid under Item 53.11DR.

Payment will be made under:

Item No.	Description	Pay Unit
5.37	CONSTRUCTION REPORT	L.S.

DIVISION VI - SUPPLEMENTAL CONSTRUCTION METHODS

(NO TEXT ON THIS PAGE)

DIVISION VI - SUPPLEMENTAL CONSTRUCTION METHODS

SECTION 6.01 – Clearing and Grubbing

6.01.1. INTENT. This section describes Clearing and Grubbing.

6.01.2. DESCRIPTION. Clearing and Grubbing shall include the removal and disposal of all fences, trees less than four (4") inches in diameter, branches, down timber, snags, brush and other vegetation, debris, tires, batteries, automobile parts, kitchen appliances, rubbish, stumps, roots and root systems, miscellaneous minor structures, and all other objectionable materials as noted on the Contract Drawings, from within areas shown on the Contract Drawings and where directed by the Engineer.

The Contractor must comply with all Federal, State, and City laws pursuant to the handling and disposal of woody organic material that is host material for the Asian Longhorned Beetle. All wood that is host material for the Asian Longhorned Beetle must be chipped, ground, or shredded inside the quarantine zone to a size of less than one (1'') inch in at least two dimensions before it is permitted to leave the quarantine zone. Please refer to the publication entitled Part 139 of the New York State Department of Agriculture and Markets law and contact State personnel for further details. Also see **Section 1.06.23.(R), PLANT PEST CONTROL REQUIREMENTS**, of the General Conditions, herein, for additional requirements.

6.01.3. DISPOSAL OF SALVAGEABLE MATERIAL. Salvageable fence, including all appurtenances, or other salvageable materials shall be carefully dismantled, removed, cleaned and stored on the site for re-use in the work; delivered, after cleaning, to a designated City-owned Yard, or disposed of away from the site of the work, whichever the Engineer shall direct.

6.01.4. DISPOSAL OF NON-SALVAGEABLE MATERIAL. Non-salvageable materials shall be disposed of away from the site of the work. The disposal of materials resulting from Clearing and Grubbing operations by burning in open fires will not be permitted.

6.01.5. METHODS. In cut areas and in fill areas where the depth of fill is two foot six inches (2'-6") or less, all stumps, roots and root systems shall be removed to a depth of three (3') feet below the existing ground surface. In fill areas where the depth of fill varies between two foot six inches (2'-6") and three feet (3'-0"), stumps shall be cut to provide not less than two foot six inches (2'-6") of fill above the top of stumps. In this case, roots and root systems need not be removed, except as the Engineer shall deem necessary. In fill areas where depth of fill exceeds three feet (3'-0"), stumps shall be cut six inches (6") above the existing ground surface and roots and root systems shall not be removed.

(A) PRUNING

Branches of trees overhanging roadways, or other branches designated by the Engineer, shall be pruned to provide a clearance of fourteen (14') feet above the proposed final surface. Wound treatment shall not be used to cover wounds or pruning cuts, except when necessary for disease, insect, mistletoe, or sprout control, or for cosmetic reasons. Wound treatments that are damaging to tree tissue shall not be used. All trees within the City Right of Way (canopy, roots, and/or trunk) require a pruning permit from the Department of Parks and Recreation and must by performed according to ANSI A300 Standards.

(B) PARKS DEPARTMENT APPROVAL

The Department of Parks and Recreation's prior approval of methods for felling, cutting or pruning trees shall be obtained for all trees which are under their jurisdiction.

(C) PROTECTION

Clearing and Grubbing operations shall be progressed in a manner and with equipment which will not damage trees, structures and adjoining grounds or vegetation which are to remain nor create any pedestrian or vehicular traffic hazards.

In addition, all clearing and grubbing operations under the drip line of existing trees shall be performed by hand methods lonely. Tree protection fences shall not be moved or removed without the written permission of the Engineer.

(D) FENCING

Approved protective fencing or barricades shall be furnished and erected around or adjacent to individual trees, groups of trees and structures which are to remain, and at other required locations, when and as directed by the Engineer.

(E) CLEAN UP

All materials resulting from Clearing and Grubbing operations shall be disposed of, as specified, and the site shall be left in a condition satisfactory to the Engineer.

(F) REMOVAL OF FENCING

Protective fencing and barricades shall be removed and disposed of away from the site when directed by the Engineer.

6.01.6. MEASUREMENT.

(A) PER LUMP SUM

Payment for Clearing and Grubbing will be made on a Lump Sum basis for work satisfactorily completed. Monthly payments will be made in proportion to the amount of work done as determined by the Engineer.

(B) PER ACRE

Payment for Clearing and Grubbing will be made at the unit price bid per acre computed to the nearest tenth acre, for work satisfactorily completed.

(C) PER SQUARE YARD

Payment for Clearing and Grubbing will be made at the unit price bid per square yard for work satisfactorily completed.

6.01.7. PRICES TO COVER. The contract prices for Clearing and Grubbing shall include the cost of all labor, materials, equipment, insurance, and incidentals required to complete the work, together with all other work in connection therewith and incidental thereto, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer.

When there is no scheduled item provided therefor, the cost of the work required for Clearing and Grubbing shall be deemed included in the prices bid for all the scheduled contract items.

Unless otherwise provided for under other scheduled contract bid items, no separate payment will be made for tree pruning required herein to provide a clearance of fourteen (14') feet above the proposed final surface.

Payment will be made under:

Item No.	Item	Pay Unit
6.01 AA	CLEARING AND GRUBBING	L.S.
6.01 AB	CLEARING AND GRUBBING	ACRE
6.01 AC	CLEARING AND GRUBBING	S.Y.

SECTION 6.02 - Unclassified Excavation

6.02.1. INTENT. This section describes Unclassified Excavation.

6.02.2. DESCRIPTION. Unclassified Excavation shall include the excavation, removal and disposal of all materials of whatever nature encountered (except for ledge rock, unanticipated structures which cannot be removed using conventional excavating equipment, and materials designated to be removed as contaminated or hazardous material) in areas, including of roadway to be repaved or widened, pavements, foundations, curbs, sidewalks, and tree stumps; backfilling; grading; compacting and preparation of subgrades.

The location, general character and essential details shall be as specified and as shown on the Contract Drawings.

Not included under this section is excavation under other sections when necessary excavation is included in the work to be done under the other sections.

6.02.3. GENERAL REQUIREMENTS.

(A) DISPOSAL OF MATERIALS.

1. Excavated material that is suitable, in the opinion of the Engineer, shall be re-used, so far as practicable, in backfilling.
2. The disposal of materials removed hereunder shall comply with the applicable requirements of **Sections 1.06.47 and 1.06.48** in the General Conditions.
3. Tree stumps, indicated to be removed by the Contractor, shall be removed and disposed of, to the satisfaction of the Engineer, and pits shall be backfilled with acceptable materials.
4. The Contractor shall carefully remove, clean and store on the site all items interfering with construction which, in the opinion of the Engineer, are suitable for re-use in work to be done under other Sections. All items designated by the Engineer or shown on the Contract Drawings, to be salvaged but not re-used in the work shall be delivered by the Contractor to locations designated by the Engineer and shall be neatly stacked at such points as directed, except as otherwise specified.
5. Salvageable items, delivered to designated locations, shall contain no loose earth, mortar, concrete, asphaltic surface material, rubbish, waste, debris, or other undesirable materials. Granite block, brick and similar materials, having adherent joint materials which will not dislodge during transit, will be accepted for delivery.
6. Remaining items, not designated, ordered or shown to be salvaged for re-use at the site of the work or to be delivered by the Contractor to other locations, shall become the property of the Contractor and shall be removed from the site of the work at no additional cost to The City.

(B) UNSUITABLE MATERIAL

Any objectionable materials encountered in excavated areas (except for materials designated to be removed as contaminated or hazardous material) shall be properly disposed of away from the site by the Contractor at no additional cost to The City.

(C) EXPOSED STRUCTURES TO BE PROTECTED

All exposed sewers, manholes, receiving basins, water mains, and other structures shall be carefully protected. Any damage done to such structures shall be promptly repaired by the Contractor at no additional cost to The City.

6.02.4. CONSTRUCTION METHODS, UNCLASSIFIED EXCAVATION.

(A) EXCAVATION.

All excavations shall be carried to the required depths in such a manner as to produce an undisturbed subgrade.

1. Cutting existing sidewalks: When directed by the Engineer, sidewalks shall be removed to the nearest parallel joint in back of the new curb or to where designated. No concrete sidewalk shall be cut off or otherwise disturbed until the same has been examined by the Engineer.

2. Removal of existing pavement foundation: No existing concrete base for pavement shall be broken up or removed until test borings have been made and until it has been examined by the Engineer. Any concrete base for pavement so broken up or removed, except by direction of the Engineer, shall be replaced by the Contractor at the Contractor's own expense.

   Where the existing composite pavement consisting of asphalt wearing course on concrete base is to be removed and then restored, the concrete shall be removed for a minimum distance of six (6") inches beyond the outside limits of the area of the subgrade disturbed and the asphalt wearing course shall be removed for a minimum distance of one (1') foot beyond the outside limits of the concrete removed as shown on Drawing # H-1042A of the New York City Department of Transportation, Standard Details of Construction.

   Where the existing reinforced concrete pavement is to be removed and then restored, the concrete shall be removed for a distance of one (1') foot beyond the outside limits of the area of the subgrade disturbed as shown on Drawing # H-1042B of the New York City Department of Transportation, Standard Details of Construction.

   Where the existing pavement base is ordered to be retained, it shall be stripped of all existing wearing course, bed materials, binder, or any other material of whatever nature encountered by approved means, and the concrete shall be left clean and ready to receive the new build-up leveling course or new wearing course, as required.

3. Excavation for curb limited: Where a new roadway pavement is to be constructed, all curb shall be set along the street prior to removal of any existing adjacent pavement or pavement foundation, except for a width of not more than three (3') feet along the curb, except by special permission of the Engineer.

   At locations identified for recurbing only (where roadway pavement is not designated to be reconstructed), the removal of a width of not more than one (1') feet of roadway pavement along the curb line will be permitted, and the cost thereof shall be included in the contract price bid for the appropriate curb item.

(B) GRADING AND COMPACTING

The Contractor shall clean the subgrade of all debris, foreign material and all other undesirable material designated by the Engineer. If the subgrade becomes muddy, rutted or displaced, due to any cause whatsoever, the Contractor shall regrade the area affected.

The subgrade for pavements, foundations and slabs shall be brought to line, slightly above the proposed grade, wetted and then rolled and compacted with an approved self-propelled roller weighing not less than ten (10) tons. Portions of the subgrade inaccessible to the roller shall be wetted and tamped or rolled with a smaller roller as may be directed by the Engineer.

All hollows and depressions, which develop under rolling, shall be filled with acceptable material and all high spots shall be removed and the area again rolled. This process of shaping, filling and compacting shall be repeated until no depressions develop and there is no movement of the material under the roller.

Where the filling necessary to bring the roadway to a uniform subgrade exceeds six (6") inches in depth, the fill shall be placed in maximum twelve (12") inch layers and rolled as above specified.

A minimum of 95 percent of Standard Proctor Maximum Density will be required after compaction of each lift.

(C) HAND EXCAVATION

Hand Excavation shall be limited to the extent required by the Contract Drawings, the Specifications and the directions of the Engineer, and shall not be paid for separately when said work is deemed to be included for payment under other contract items.

Hand excavation shall include excavation that requires a combination of intermittent probing or digging carefully done with hand labor using hand held tools only, alternating with machine excavating using

mechanized earth moving equipment at locations where the hand probing or digging clearly indicates that machine excavating is permissible, where directed and approved by the Engineer.

(D) PUMPING, FLUMING

The Contractor shall at all times keep trenches and excavations free from water and do all necessary pumping and fluming.

(E) BRIDGING, DECKING, FENCING

The Contractor shall construct all required or ordered temporary timber bridging and decking for pedestrian and vehicular traffic. Steel plates shall be provided over excavations to conform with **Section 1.06.44.(E)**.

6.02.5. ROCK EXCAVATION. Rock excavation and measurement shall be in accordance with **Section 4.11**.

6.02.6. MEASUREMENT. The quantity of Unclassified Excavation, including widened areas, to be measured for payment shall be the number of cubic yards of material of whatever nature encountered (except for ledge rock, unanticipated structures which cannot be removed using conventional excavating equipment, and hazardous materials) actually removed and disposed of from the existing or proposed roadway area, between the existing surface of the roadway, or area to be widened, and the finished subgrade of the pavement base. When ordered by the Engineer, additional excavation outside the payment planes specified herein will be measured for payment hereunder.

The dismantling and removal of the existing street lights, traffic signals and fire alarms will be done by the various departments having jurisdiction, except as otherwise provided. The existing foundations for these facilities shall be removed by the Contractor to a plane two (2') feet below subgrade and such removal will be measured for payment under Unclassified Excavation.

At street locations where curb is to be set to the lines of the widened roadway, the removal of all materials between the existing and proposed curb lines shall be measured for payment under Unclassified Excavation.

6.02.7. PRICES TO INCLUDE. The contract prices for Unclassified Excavation shall include the cost of all labor, materials, plant, equipment, insurance, and incidentals required for excavating and disposing of all materials of whatever nature encountered (except for ledge rock, unanticipated structures which cannot be removed using conventional excavating equipment, and hazardous materials) including, but not limited to, pavements, foundations, curbs and sidewalks in areas to be widened; removal of trees not otherwise provided; salvaging items designated for re-use in the work; delivery of salvaged materials to designated City yards, where not otherwise provided; grading; backfilling; compaction and preparation of subgrades; additional excavation, when ordered by the Engineer; all, together with necessary incidentals, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

When there is no scheduled Item No. 4.11 CA or 4.11 CB, to pay for fill or backfill as may be required, the cost of furnishing and placing fill or backfill shall be deemed included in the contract price for Unclassified Excavation.

The quantity of excavation to be measured for payment under Unclassified Excavation shall not include excavation required under other Sections whose contract prices include the cost of excavation.

Payment will be made under:

Item No.	Item	Pay Unit
6.02 AAD	UNCLASSIFIED EXCAVATION (To be used when a quantity of Suitable Excavated Material is required to be delivered to a City Yard)	C.Y.
6.02 AAN	UNCLASSIFIED EXCAVATION (To be used when Suitable Excavated Material is NOT required to be delivered to a City Yard)	C.Y.

SECTION 6.02 PA – Pneumatic Excavation Around Trees

6.02PA.1. INTENT.

This Section describes the excavation of trenches to be performed pneumatically around existing trees to remain.

6.02PA.2. DESCRIPTION.

The Contractor must perform pneumatic excavation work at locations where trees existing within the work area are required to remain. This work requires the Contractor to protect tree roots during excavation and implement, as needed, a temporary excavation support system. Work covered under this section must be performed at the locations indicated on the Contract Drawings, in accordance with the specification, and as directed by the Engineer, in consultation with and under the supervision of a Tree Consultant in accordance with **Section 4.21**.

6.02PA.3. SUBMITTALS.

Qualifications: Submit letter documenting prior experience of Contractor and Operator performing pneumatic excavation.

Shop drawings: Where required, the Contractor must submit design shop drawings for any temporary excavation support system to be used during the pneumatic excavation work. The shop drawings must be prepared, signed, and sealed by a Professional Engineer currently licensed in the State of New York, and must be submitted to the Engineer at least two (2) weeks before commencement of excavation. Excavation work may not commence until the shop drawings are approved by the Engineer.

6.02PA.4. QUALITY CONTROL

(A) OPERATOR QUALIFICATIONS: The Contractor or Subcontractor performing this excavation work must have at least one year of documented experience operating the pneumatic excavation tool in conjunction with related equipment as described herein.

(B) TREE CONSULTANT: Unless otherwise directed by the Engineer, all pneumatic excavation work must be performed under the direction of the Engineer, in consultation with the Tree Consultant.

(C) PRE-PNEUMATIC EXCAVATION MEETING: Prior to the start of such excavation, the Contractor and its approved operator for pneumatic excavation must attend a meeting arranged by the Engineer, with the Tree Consultant and other parties as appropriate, to review the requirements of this item including the schedule of operations, the mandatory presence of the Tree Consultant, safety measures, reporting, etc. The Contractor is required to submit a schedule of his anticipated pneumatic excavations at this meeting.

6.02PA.5. MATERIALS

Materials must meet the following requirements, as modified by any supplemental landscape specifications or special notes included in the Contract Documents.

(A) PNEUMATIC EXCAVATING TOOL. Excavation must be performed through the use of a pneumatic excavation tool with the following requirements:

(1) The high air velocity excavation tool must be specifically designed to fracture, pulverize, and displace porous and semi-porous soils without harming or causing damage to tree roots, existing subsurface utilities or other non-porous objects.

(2) The Contractor must submit catalog cuts from the manufacturer verifying that the Pneumatic excavation tool meets the following criteria:

Rated Operating Pressure:	6.2 – 7.0 bar
Air Stream Velocity at Cutting Head:	2,200 – 2,500 km/hr
Air Displacement:	4,000 – 5,000 L/min

(B) AIR COMPRESSOR. The air compressor may be either a portable or truck-mounted unit and must be adequately sized as required to power the pneumatic excavation tool in accordance with the manufacturer's recommendations for the pneumatic excavating tool.

(C) VACUUM TRUCK. A vacuum truck should be used to collect excavated spoil directly from the trench or pit.

(D) CONTAINMENT STRUCTURE. To prevent the spread of excavated soil onto adjacent roadways and areas beyond the designated work zone limits, the Contractor must provide a mobile structure or barrier to contain the material dislodged by the pneumatic excavation tool from the trench or pit. Timber or corrugated metal shields, tents supported on tubular frames or other structures as approved by the Engineer may be used.

(E) ROOT PROTECTION. The following is required for root protection:
Quilted Covers, meeting the requirements of NYSDOT Section 711-02
Burlap, meeting the requirements of NYSDOT 711-06

6.02PA.6. METHODS.

The work must be performed where shown on the Contract Drawings and as directed by the Engineer.

(A) RESPONSIBILITIES OF THE CONTRACTOR: Prior to bidding, the Contractor must examine the site and available information, and formulate methods of construction that will not result in any damage to existing trees during excavation. In any event, the Contractor will be held liable for irreparable and/or irreversible damage to any trees harmed due to the Contractor's methods and must replace those trees as directed by NYCDPR, at no additional cost to the City.

(B) WORK SITE SAFETY: In addition to NYCDDC's Safety Requirements policy and responsibilities, the pneumatic excavation must be performed in accordance with the manufacturer's operating instructions. The Contractor will be responsible to provide adequate equipment and perform pneumatic excavation techniques properly to preclude movement of any air-borne soils onto adjacent roadways or other areas beyond the designated work zone limits. Failure to contain and/or collect the excavated soil will result in the immediate termination of pneumatic excavation until soil containment and/or collection procedures are determined adequate by the Engineer. The Contractor must keep the public at a safe distance from the work zone at all times by means approved by the Engineer.

(C) DUST CONTROL: The work area must be watered thoroughly at least twenty-four (24) hours in advance of, but no more than forty-eight (48) hours, prior to the start of any pneumatic excavation in order to reduce the incidence of airborne dust resulting from the pneumatic excavation operation.

(D) EXCAVATION – GENERAL: All excavation using the pneumatic excavation tool must be performed in accordance with the manufacturer's recommendations in order to remove soil without causing damage to the roots of trees, buried structures, and/or utilities either in or adjacent to the excavation. The Contractor must excavate within limits designated for pneumatic excavation shown on the Contract Drawings or as directed by the Engineer, in consultation with the Tree Consultant, using the pneumatic excavating tool. When working near utilities, the Contractor will be responsible to locate underground facilities as required under 16 NYCRR Part 753 and **Section 1.06.28**.

(E) EXCAVATION – TEMPORARY EXCAVATION SUPPORT SYSTEM: Approved sheeting and bracing must be used where necessary to support the sides of the excavation, to prevent damage to subsurface structures and adjacent buildings; safeguard persons and property; minimize inconvenience to traffic and the public; protect the structure to be installed; support the adjacent tree(s); and, provide suitable and safe working conditions. Except as otherwise provided, deviations from the above will be permitted only where, in the judgment of the Engineer, such exception will not result in any of the hazards described above.

In cases where sheeting and bracing will not adequately protect adjacent structures from damage and settlement, the Contractor will be required to use such measures as are necessary to safely support and maintain adjacent and abutting property and structures, support the tree without causing damage to the tree, and to maintain the work safe to life, limb, and property.

All sheeting and bracing systems that the Contractor elects to use or that are ordered to use by the Engineer must comply with the requirements of **Section 40.05, "SHEETING AND BRACING**," of the NYCDEP, Standard Sewer and Water Main Specifications, and must receive the approvals stated therein.

Unless otherwise specified in the Contract Drawings or these Specifications or specifically permitted in writing by the Engineer, the Contractor will be required to withdraw and remove all sheeting and bracing simultaneously with the backfilling of the excavation.

(F) ROOT PROTECTION: The Contractor must place wet burlap or cotton mats upon both the fibrous and structural roots immediately after they have been exposed by the pneumatic excavating tool. The burlap or cotton covering may be removed to perform inspection or construction operations, but the Contractor will be required to keep the burlap or cotton towels wet and the roots moist until backfilling is complete.

The Engineer must be immediately informed of any damaged tree roots. No tree roots may be pruned except as specifically authorized by the Tree Consultant (Item 4.21). In case the concentration of roots obstructs the placement of utilities, footings or other structures, limited pruning may be necessary as directed by the Tree Consultant. Tree roots in excess of one (1) inch in diameter, measured at the edge of the excavation, must be cut cleanly at the edge of excavation using a sharp cutting tool. All root pruning must be performed under the direction of the Tree Consultant.

(G) TREE CONDITION REPORT: The Contractor must supply the Tree Consultant with information as needed for the Tree Consultant to prepare periodic reports to the Engineer summarizing the number, type and condition of trees adjacent to each area of pneumatic excavation. These reports must also indicate the duration of open excavation and identify any root damage and mitigation actions taken.

(H) BACKFILLING: Refer to **Section 6.02 PB** for the requirements and procedures for backfilling excavated areas.

6.02PA.7. MEASUREMENT.

The quantity to be measured for payment hereunder will be the number of cubic yards of soil and fill material removed by pneumatic excavation, completed, as described herein and to the satisfaction of the Engineer. The volume to be obtained by vehicle measurement.

In determining the vehicle measurement, only water level loads that have been raked by the Contractor to a flat exposed surface will be accepted by the Engineer and no allowance will be made for any crown or peak of the load.

6.02PA.8. PRICE TO COVER.

The contract price bid for “PNEUMATIC EXCAVATION AROUND TREES” will be a unit price per cubic yard of material excavated as described herein, at the locations and to the limits indicated on the Contract Drawings or directed by the Engineer, in consultation with the Tree Consultant. The unit price bid will include the cost of all labor, materials, plant, equipment, professional engineering design services, insurance, and all other work incidental thereto needed to perform the excavation work; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer. Disposal of excess and unsuitable (excluding contaminated) materials will also be deemed included in the unit price bid for this Item 6.02 PA “PNEUMATIC EXCAVATION AROUND TREES.”

No separate payment will be made for replacement trees required by NYCDPR that the Contractor must acquire and plant as a result of damage to trees caused by the Contractor’s excavation methods.

Payment will be made under:

Item No.	Item	Pay Unit
6.02 PA	PNEUMATIC EXCAVATION AROUND TREES	C.Y.

SECTION 6.02 PB – Backfilling Around Trees

6.02PB.1. INTENT.

This Section describes the materials and methods for backfilling pneumatically excavated areas around existing trees to remain.

6.02PB.2. DESCRIPTION.

The Contractor will be required to backfill pneumatically excavated areas around existing trees to remain. This work requires the Contractor to protect existing tree roots and minimize grade changes around trees. Work covered under this section must be performed at the locations indicated on the Contract Drawings, in accordance with the Contract Documents, and as directed by the Engineer, in consultation with and under the supervision of a Tree Consultant.

6.02PB.3. QUALITY CONTROL

(A) TREE CONSULTANT: Unless otherwise directed by the Engineer, all backfilling must be performed under the direction of the Engineer, in consultation with the Tree Consultant (Item 4.21), also referred to as the Contractor's Certified Arborist.

All work limits to be determined in the field by the Tree Consultant.

(B) PRE-BACKFIILLING MEETING: Prior to the start of backfilling, the Contractor and its approved Operator for backfilling must attend a meeting arranged by the Engineer, with the Tree Consultant (Item 4.21) and other parties as appropriate, to review the required composition of backfill material, the necessity of maintaining the existing grade, the mandatory presence of the Tree Consultant, safety measures, etc.

No staging or storage of equipment or materials must occur within the tree protection zone of the project.

6.02PB.4. RESPONSIBILITIES OF THE CONTRACTOR.

Prior to bidding, the Contractor must examine the site and formulate methods and equipment that will not result in any damage to existing trees during backfilling operations. In any event, the Contractor will be held liable for irreparable and/or irreversible damage to any trees harmed due to the Contractor's methods and must replace those trees as directed by the NYCDPR, at no additional cost to the City.

6.02PB.5. MATERIALS.

Backfill material must be composed of 5% compost, mycorrhizal fungi, and 95% excavated soil (from Item No. 6.02PA – Pneumatic Excavation Around Trees). Mix to be determined by volume, not weight. Materials must meet the following requirements, as modified by any supplemental landscape specifications or special notes included in the contract drawings. Materials must be thoroughly mixed before spreading, to the satisfaction of the Engineer.

(A) COMPOST. Compost must meet the requirements of **Section 4.17**.

(B) MYCORRHIZAL FUNGHI INOCULANT. Inoculant must meet the requirements of **Section 4.16**.

(C) EXCAVATED SOIL. Excavated soil should be stored on site in a mobile structure or protected by barriers and tents.

If recapture of excavated soil is less than 95% for the backfill of excavated volumes, the difference must be made up with additional topsoil. Additional topsoil must meet the requirements of **Section 4.15**. If recapture of excavated soil is more than 95% for the backfill of excavated volume, the excess soil must be removed from the site or reused as directed by the Engineer.

6.02PB.6. BACKFILL PROCEDURES.

(A) WORK SITE SAFETY: The Contractor will be responsible to provide adequate equipment and perform backfilling operations properly to preclude movement of any air-borne soils onto adjacent roadways or other areas beyond the designated work zone limits. Failure to contain and/or collect the soil will result in the immediate termination of backfilling operations until soil containment and/or collection

procedures are determined adequate by the Engineer. The Contractor must keep the public at a safe distance from the work zone at all times by means approved by the Engineer.

(B) DUST CONTROL: The work area must be watered thoroughly at least twenty-four (24) hours in advance of, but no more than forty-eight (48) hours, prior to the start of any backfilling to reduce the incidence of airborne dust.

(C) BACKFILLING – GENERAL: The Contractor must backfill within limits designated shown on the Contract Plans or as directed by the Engineer, in consultation with and under direct supervision of the Tree Consultant.

No backfill material must be handled when, in the opinion of the Tree Consultant, is too wet. Place and spread approved backfill in dry weather on dry unfrozen grade. Ensure that all lumps are broken up and surface is smooth.

(D) ROOT PROTECTION: Roots must be protected by wet burlap or cotton mats upon exposure from excavation. The burlap or cotton covering may be removed to perform inspection or construction operations, but the Contractor will be required to keep the burlap or cotton towels wet and the roots moist until backfilling is complete.

The Engineer must be immediately informed of any damaged tree roots. No tree roots may be pruned except as specifically authorized by the Tree Consultant. In case the concentration of roots obstructs the placement of utilities, footings or other structures, limited pruning may be necessary as directed by the Tree Consultant. Tree roots in excess of one (1) inch in diameter, measured at the edge of the excavation, must be cut cleanly at the edge of excavation using a sharp cutting tool. All root pruning must be performed under the direction of the Tree Consultant.

(E) TREE CONDITION REPORT: The Contractor must supply the Tree Consultant with information as needed to prepare periodic reports to the Engineer summarizing the number, type, and condition of trees impacted by backfilling operation. These reports must also indicate the duration of open excavation and identify any root damage and mitigation actions taken.

6.02PB.7. MEASUREMENT.

The quantity to be measured for payment hereunder will be the number of cubic yards of soil and fill material added by backfilling, completed, as described herein and to the satisfaction of the Engineer. The volume to be obtained by vehicle measurement.

In determining the vehicle measurement, only water level loads that have been raked by the Contractor to a flat exposed surface will be accepted by the Engineer and no allowance will be made for any crown or peak of the load.

6.02PB.8. PRICE TO COVER.

The contract price for “BACKFILLING AROUND TREES” will be the unit price bid per cubic yard of material added as described herein, at the locations and to the limits indicated on the Contract Drawings or directed by the Engineer, in consultation with the Tree Consultant. The unit price bid will include the cost of all labor, materials, equipment, professional engineering design services, insurance, and all other work incidental thereto needed to perform the backfilling work; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer. Disposal of excess and unsuitable (excluding contaminated) materials will also be deemed included in the unit price bid for Item 6.02 PB “BACKFILLING AROUND TREES.”

No separate payment will be made for replacement trees required by NYCDPR that the Contractor must acquire and plant as a result of damage to trees caused by the Contractor’s excavation methods.

Payment will be made under:

Item No.	Item	Pay Unit
6.02 PB	BACKFILLING AROUND TREES	C.Y.

SECTION 6.02 XHEC – Incremental Cost for Modifying Work Methods Near (Within 3 Feet of) Transit Facilities and Building Vaults

6.02XHEC.1. DESCRIPTION. Under this section, the Contractor shall be required to modify the Contractor's work methods of construction when performing City work under other scheduled contract items within three (3') feet of Transit Facilities (i.e. NYCT, MTA, LIRR, MNRR, etc.) and building vaults. The 3' will be measured horizontally. Modification of work methods shall include, but not be limited to, hand excavation, extra care preparation of subgrade, placement and compaction of backfill, and providing all materials and methods required to maintain, support, and protect the integrity of Transit Facilities and building vaults, as directed by the Engineer, in consultation with the Transit Facility Operator. Private Utility work will not be deemed to be included under this item.

6.02XHEC.2. MATERIALS. (No text)

6.02XHEC.3. METHODS. Modification of work methods within three (3') feet of Transit Facilities and building vaults shall be defined as including, but not limited to, the following:

(A) Excavation of all materials of any nature whatsoever encountered, through the use of hand held pick axes, hand held shovels, and/or other approved type hand-held tools within the limits defined herein.

(B) Providing extra care preparation of subgrade, placement and compaction of backfill, and all materials and methods required to maintain, support, and protect the integrity of Transit Facilities and building vaults, through the use of hand-held tool for compaction, and the use of sheeting, bracing, etc., as may be required.

All Hand Excavation and Extra Care work shall be performed in accordance with the contract drawings, the specifications and the directions of the Engineer, and in consultation with the Transit Facility Operator for their facilities.

6.02XHEC.4. MEASUREMENT. The quantity of "Incremental Cost for Modifying Work Methods Near (Within 3 Feet of) Transit Facilities and Building Vaults" to be measured for payment shall be the actual number of cubic yards of material excavated under other contract items for City work from within three (3') feet of a Transit Facility and building vaults in compliance with the requirements of this Section.

6.02XHEC.5. PRICE TO COVER. The contract price per cubic yard for the "Incremental Cost for Modifying Work Methods Near (Within 3 Feet of) Transit Facilities and Building Vaults" shall be the incremental cost difference of all labor, material, equipment, and incidentals required to complete all work under other scheduled contract items for City work within three (3') feet of a Transit Facility and building vaults, using hand excavation and extra-care work methods in order to maintain, support, and protect the integrity of Transit Facilities and building vaults.

This item will be paid only in conjunction with other scheduled City work contract items for installing waterproofing of Transit Facilities, water mains, sewers, manholes, valves, roadways, etc., in order to complete said work in close (within 3 feet) proximity of Transit Facilities and building vaults (e.g. Payment would be made under the unit price bid for Item No. 60.12D12 – Laying 20-Inch Ductile Iron Pipe and Fitting, for the length of pipe installed plus payment would be made under the unit price bid for Item No. 6.02 XHEC – Incremental Cost for Modifying Work Methods Near (Within 3 Feet of) Transit Facilities and Building Vaults, for the quantity of excavation made within three (3') feet of a Transit Facility in order to install the pipe). However, payment shall be made under this item only for the initial volume of material excavated at a particular location and excludes all Private Utility work items.

The incremental cost for modifying work methods within curb and sidewalk areas will be paid for under Item Nos. 8.02 A, 8.02 JA, 8.02 B, and 8.02 JB, as applicable, and not under 6.02 XHEC.

The incremental cost for modifying work methods within 12" of an oil-o-static pipe will be paid for under Item JB 301 as applicable, and not under item 6.02 XHEC.

When there is no scheduled item provided for this work, the incremental cost for modifying work methods near (within 3 feet of) Transit Facilities and Building Vaults shall be deemed included in the prices bid for all the scheduled contract items.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
6.02 XHEC	INCREMENTAL COST FOR MODIFYING WORK METHODS NEAR (WITHIN 3 FEET OF) TRANSIT FACILITIES AND BUILDING VAULTS	C.Y.

SECTION 6.02 XSCW - Incremental Cost for Using Special Care Work Methods Near (from 3 Feet to 50 Feet) Transit Facilities

6.02XSCW.1. DESCRIPTION. Under this section, the Contractor shall be required to modify the Contractor's work methods of construction when performing City work, under other scheduled contract items, anywhere within a zone of protection consisting of the area over and up to fifty (50') feet adjacent to Transit Structures (i.e. NYCT, MTA, LIRR, MNRR, etc.) or up to the curb line, whichever is closer, and from the top of pavement down to the bottom of the required excavation, but no closer than three (3') feet of the Transit Structure. The measurement to determine the zone of protection will be measured horizontally. Using special care work methods shall include, but not be limited to, a combination of probing or digging carefully done with hand labor using hand held tools only, and machine excavating with mechanized earth moving equipment when hand probing clearly indicates that machine excavating is permissible, special care preparation of subgrade, placement and compaction of backfill, and providing all materials and methods required to maintain, support and protect the integrity of Transit Facilities, as directed by the Engineer in consultation with the Transit Facility Operator. Private Utility work will not be deemed to be included under this item.

6.02XSCW.2. MATERIALS. (No text)

6.02XSCW.3. METHODS. Special care work methods near Transit Facilities, excluding work within three (3) feet of Transit Facilities which will be paid for under Item 6.02 XHEC, shall be defined as including, but not limited to, the following:

(A). Full depth sawcutting of existing pavement to be removed by lifting from the adjacent pavement, where and when directed; and, below the pavement, a combination of probing or digging carefully done with hand labor using hand held tools only, and machine excavating with mechanized earth moving equipment when hand probing clearly indicates that machine excavating is permissible for the excavation within the limits defined herein.

(B) Providing special care preparation of subgrade, placement and compaction of backfill, and the use of materials and methods required to maintain, support, and protect the integrity of Transit Facilities, through the use of approved compaction tools, the use of sheathing, bracing, etc.

All special care work shall be performed in accordance with the contract drawings, the specifications and the directions of the Engineer, in consultation with the Transit Facility Operator.

6.02XSCW.4. MEASUREMENT. The quantity of "Incremental Cost for Using Special Care Work Methods Near Transit Facilities" to be measured for payment shall be the actual number of cubic yards of material excavated using special care operations to perform construction work under other Scheduled contract items for City work, from within the limits specified in Subsection 6.02XSCW.1, above.

6.02XSCW.5. PRICE TO COVER. The contract price per cubic yard for the "Incremental Cost for Using Special Care Work Methods Near Transit Facilities" shall be the incremental cost difference of all labor, material, equipment, and incidentals required to complete all work under other scheduled contract items for City work using special care operations in order to maintain, support and protect the integrity of Transit Facilities.

This item will be paid only in conjunction with other scheduled City work contract items for installing waterproofing of Transit Facilities, water mains, sewers, manholes, valves, roadways, etc., in order to complete the work of other scheduled contract items within the zone of protection specified in Subsection 6.02XSCW.1, above (e.g. Payment would be made under the unit price bid for Item No. 60.12D12 – Laying 12-Inch Ductile Iron Pipe and Fitting, for the length of pipe installed plus payment would be under the unit price bid for Item No. 6.02 XSCW – Incremental Cost for Using Special Care Work Methods Near Transit Facilities, for the quantity of excavation made within the zone of protection in order to install the pipe). However, payment shall be made under this item only for the initial volume of material excavated at a particular location and excludes all Private Utility work items.

The incremental cost for modifying work methods within curb and sidewalk areas will be paid for under Item Nos. 8.02 A, 8.02 JA, 8.02 B, and 8.02 JB, as applicable, and not under 6.02 XSCW.

The incremental cost for modifying work methods within 12" of an oil-o-static pipe will be paid for under Item JB 301 as applicable, and not under 6.02 XSCW.

When there is no scheduled item provided for this work, the incremental cost for using special care work methods near (from 3 feet to 50 feet) Transit Facilities shall be deemed included in the prices bid for all the scheduled contract items.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
6.02 XSCW	Incremental Cost for Using Special Care Work Methods Near (from 3 Feet to 50 Feet) Transit Facilities	C.Y.

SECTION 6.03 – Stripping of Pavement Surfaces

6.03.1. INTENT. This section describes the stripping of existing pavement surface materials and related work.

6.03.2. DESCRIPTION. Stripping of Pavement Surfaces shall include the removal and disposal of surface materials from existing concrete base for pavement, the cleaning of such base for pavement to receive new surfacing materials and the removal and disposal, when directed, of unsatisfactory existing concrete base for pavement.

6.03.3. EQUIPMENT. Material and equipment used in stripping and removal operations shall be in satisfactory working condition.

6.03.4. METHODS.

(A) REMOVAL

The existing pavement surface, including binder, mortar bed, or any other materials of whatever nature encountered, regardless of thickness, shall be stripped from the foundation where directed. Care shall be taken not to damage the foundation or to extend the stripping beyond the limits designated.

The foundation shall be cleaned of all foreign matter and thoroughly broomed or flushed in a satisfactory manner.

Where directed, test holes shall be made by the Contractor to determine the quality and depth of foundation.

When directed, unsatisfactory existing concrete foundation or base for pavement, exposed by stripping operations, shall be removed to limits designated by the Engineer and disposed of away from the site. Concrete base removed beyond the designated limits shall be replaced at no additional cost to The City.

(B) DUST CONTROL

During the progress of the work, the Contractor shall carry on the work in such a manner as to prevent the creation of a dust nuisance to the local residents and general public.

At all times during the prosecution of the work, the Contractor shall employ such dust allaying materials or methods as will keep the dust nuisance at a minimum, to the satisfaction of the Engineer.

(C) DISPOSAL

Non-salvageable stripped materials shall be disposed of by the Contractor outside the limits of the contract.

All the applicable provisions of **Subsection 6.02.3.(A)** shall be deemed included hereunder.

(D) DAMAGE BY THE CONTRACTOR

Concrete base for pavement damaged as a result of stripping operations shall be removed, disposed of or cleaned for resetting, and reinstalled or replaced at no additional cost to The City, as directed and to the satisfaction of the Engineer.

Surface materials stripped beyond the limits designated shall be removed, disposed of and replaced by the Contractor at its own expense, as directed and to the satisfaction of the Engineer.

6.03.5. MEASUREMENT.

(A) STRIPPING OF PAVEMENT SURFACES

The quantity to be measured for payment shall be the number of square yards of surface materials stripped as specified.

(B) REMOVAL OF EXISTING BASE

Existing concrete base, removed in compliance with the provisions of **Section 6.03.4.(A)** hereof, will be measured and paid for under the scheduled item for Excavation at the contract price per cubic yard bid therefor.

(C) DEDUCTIONS FOR ROADWAY HEADS, ETC.

In determining the area of stripping and the area and volume of concrete base removed, the areas occupied by rails, bases of columns, manhole heads, gate boxes, road boxes, and similar structures will be deducted when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

6.03.6. PRICES TO COVER.

(A) The contract prices per square yard bid for Stripping of Pavement Surfaces of the several classes shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to complete the work, together with necessary incidentals, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) In addition, under Item 6.03 CA, the Contractor shall also be required to include the cost of disposal of blocks away from the work site.

(C) In addition, under Item 6.03 CC, the Contractor shall also be required to include the cost of delivering blocks to a designated City yard.

(D) In addition, under Item 6.03 CD, the Contractor shall also be required to include the cost of cleaning and storing blocks for relaying under other Contract Items.

Payment will be made under:

Item No.	Item	Pay Unit
6.03 AA	STRIPPING PAVEMENT SURFACE (ASPHALTIC CONCRETE)	S.Y.
6.03 BA	STRIPPING PAVEMENT SURFACE (SHEET ASPHALT)	S.Y.
6.03 CA	STRIPPING PAVEMENT SURFACE (GRANITE BLOCK) (DISPOSAL OF BLOCK)	S.Y.
6.03 CC	STRIPPING PAVEMENT SURFACE (GRANITE BLOCK) (DELIVER BLOCK TO YARD)	S.Y.
6.03 CD	STRIPPING PAVEMENT SURFACE (GRANITE BLOCK)	S.Y.

SECTION 6.04 – Granite Block and Slab Wearing Course

6.04.1. INTENT. This section describes the laying or relaying of Granite Block and Slab Wearing Courses.

6.04.2. DESCRIPTION. Where directed by the Engineer, specified types of wearing courses shall be laid or relaid to the grades shown on the Contract Drawings, specified or directed by the Engineer. Relaid blocks shall consist of existing granite blocks that were removed, cleaned and stored, under Item 6.03 CD. All blocks and slabs shall be thoroughly cleaned before being laid or relaid.

Any shortage in blocks due to laying or from any other cause shall be supplied and incorporated in the work by the Contractor at the Contractor's expense.

6.04.3. MATERIALS. Materials shall comply with the following requirements:

Asphaltic Joint Filler--**Section 2.16**

Bitumen-sand Bed--**Section 3.02**

Cement-grout Joint Filler--**Section 3.06**, Type 2

Liquid Asphalt--**Section 2.03**, Grade RC-70

Emulsified Asphalt (for joint filler)--**Section 2.04**, Type RS-1

Mortar Bed and Mortar — shall conform to ASTM Designation C270, Type N, with a 750 psi Average Compressive Strength at 28 days. Mix shall consist of one (1) part Portland Cement and a maximum of two (2) parts sand with not more than five (5%) percent of the cement content of hydrated lime.

Preformed Expansion Joint Filler--**Section 2.15**, Type as specified

Sand--**Section 2.21**, Type 1A or 2A

Separating Agent--**Section 3.08**

Granite Block--**Section 2.06**, Grade 1 or 2, except that no block shall be less than six (6") inches long, four (4") inches wide and five (5") inches deep.

ADA Compliant Granite Block — as per **Section 2.06**, Grade 1, except that the top surface shall be saw cut flat and have a thermal finish; the bottom shall be relatively smooth surface to accommodate a full setting bed free of voids; and, edges shall be split. Color of pavers shall be gray to match existing pavers, unless otherwise specified.

Granite Slab – as per **Section 2.06**, except that granite shall be a slab in the dimensions shown on the Contract Drawings and it shall have sawed tops and sides, with a thermal finish on the top face and no depressions exceeding 3/16 inch on the top face when measured with a straight edge laid in any direction. The bottom face may be sawn or quarry split. New granite slabs shall be from the same quarry as the samples furnished by the Contractor for approval. The top two (2) inches of slabs shall be of the lengths and widths specified and below the top two (2) inches the dimensions of any slab shall not exceed the dimensions of the top two (2) inches. No side or end shall be more than one-quarter (1/4) inch off the rectangle. No drill holes or bull wedge marks will be permitted in the wearing surfaces of the granite slabs. Color shall be gray, unless otherwise specified or required to match the existing slabs or granite pavers.

Granite Block may be rejected by the Engineer for re-use in relaid wearing courses because of excessive roundness, insufficient cleaning or other objectionable characteristics.

6.04.4. SUBMITTALS.

Schedule: The Contractor shall submit a work schedule and advise of anticipated lead-times for material delivery to the site.

Samples: The Contractor shall furnish, for approval by the Engineer, two (2) samples of blocks and slabs before starting work. Blocks and slabs used in the work shall conform to the approved samples, in the opinion of the Engineer.

6.04.5. METHODS. The Company performing this work shall have installation of natural stone pavements represent a substantial proportion, if not a majority, of its regular work.

(A) PREPARATION OF SURFACE

Before operations begin, the concrete base to be furnished and laid under other contract items shall be thoroughly set if freshly poured. The concrete base shall be swept and cleaned of all dirt, loose and foreign matter, and be free of standing water. No block or slab shall be laid unless the surface on which it is to be laid is in a condition acceptable to the Engineer. No granite block or slab shall be laid or grouted in freezing weather. The concrete base shall be moistened with water immediately before placing mortar but do not allow puddles of water.

(B) CLEANING BLOCKS FOR RELAYING

Granite blocks salvaged at the site under other contract items for relaying under this section shall be cleaned of all adherent materials by the Contractor to the satisfaction of the Engineer before incorporation into the work.

(C) SEPARATING AND HANDLING

Granite blocks and slabs from different quarries shall be delivered, piled and laid separately in different sections of the work, as required. They shall be handled with care to prevent the chipping and breaking of edges and corners.

(D) MORTAR UNDER TROLLEY CAR TRACKS

Where there are trolley car tracks in the street and they are not designated to be removed under other items, the spaces between the web of the rail and the block and directly under the car tracks shall be filled with a stiff mortar. The mortar shall be carefully struck so as not to project beyond a vertical plane through the edge of the rail head and shall be kept in position until the wearing course is laid.

(E) SPREADING AND SHAPING OF THE BED

The mortar for setting bed shall be mix as stiff as practicable. Do not use mortar that has set up. Retempering of mortar will not be permitted. The mortar bed shall be spread directly on the clean and moistened concrete base, to a depth of one (1”) inch to one and one-half (1-1/2”) inches, shaped by approved methods to a surface approximately parallel to and at the required depth below the finished surface. The finished surface of the mortar bed shall not be disturbed after shaping prior to the laying of the granite blocks and slabs.

(F) LAYING GRANITE BLOCK

Block shall be laid on the mortar bed before it has set, in straight courses at right angles to the line of the street or at such other angles as may be directed, with top surfaces conforming to the crown of the street.

Blocks shall be laid in courses of uniform width, with joints broken by a lap of at least three (3”) inches, and not more than twenty-five (25’) feet in advance of the ramming. The maximum width of joints shall be one-half (1/2”) inch as measured between the edges of the top surfaces of the blocks. The blocks shall be laid to guide blocks or head stones at such intervals as directed. All blocks shall be clean when placed in the pavement. Blocks which in the opinion of the Engineer are not satisfactorily clean shall be well washed before being placed.

(G) LAYING GRANITE SLABS

Slabs shall be cut and laid on the mortar bed before it has set, in the patterns shown on the Contract Drawings to provide a uniform surface conforming to the crown of the street. Each granite slabs shall be carefully place by hand in straight courses with hand tight joints and uniform top surfaces conforming to the patterns shown on the Contract Drawings, and then carefully lifted. Any non-bearing surface shall then be filled with mortar to provide a full surface contact between the mortar and the bottom of the slab. This procedure shall be repeated until it has been determined that the bottom of the slab is in full surface contact with the mortar. Each slab shall be thoroughly rammed and adjusted until it is thoroughly and satisfactorily bedded to the proper grade and crown. The maximum width of joints shall be one-half (1/2”) inch as measured between the edges of the top surfaces of the slabs.

The Contractor shall perform all necessary field cutting and dressing to have stones fit the required patterns and street hardware.

(H) RAMMING GRANITE BLOCK AND SLABS

Blocks and slabs shall have no sand or gravel placed in the joints and shall be rammed to a solid bearing with a rammer weighing not less than thirty (30) pounds handled by a skilled rammersman. Not less than one (1) rammersman shall be employed to three (3) pavers. Blocks and slabs that are found low shall be raised to a true and even surface by adding to the bed. Those found broken or otherwise unsatisfactory shall be removed by tongs and replaced by approved blocks. Pinch bars shall not be used in removing blocks and slabs.

(I) TESTING SURFACE

After a sufficient area of wearing course has been laid, as determined by the Engineer, the surface shall be tested with an approved straight edge ten (10') feet long or with an approved surface testing machine laid parallel with the center line of the roadway. Any irregularity in the alignment of granite block wearing courses, exclusive of depressions in individual blocks, exceeding one-half (1/2") inch or one-quarter (1/4") inch for ADA compliant block shall be immediately corrected and brought to the proper grade to the satisfaction of the Engineer. Any irregularity in the alignment of granite slab pavement, exclusive of depressions in individual slabs, exceeding one-quarter (1/4") inch shall be immediately corrected and brought to the proper grade to the satisfaction of the Engineer. All stones disturbed in making replacements or correcting depressions shall be settled into place by carefully ramming or tamping to grade by the use of a hand tamper applied upon a two inch thick board. Each section of granite pavement must be acceptable to the Engineer before the joints in that section are filled.

(J) SEPARATING AGENT

When an asphaltic joint filler is specified in granite block wearing courses, upon completion of ramming of granite block and immediately prior to the application of the filler, the wearing course shall be swept clean and coated with a separating agent. The solution shall be applied to the surface of the pavement with care to prevent entrance into the joints. It may be applied by pressure sprayers, flexible rollers, brushes or other approved devices and the proportions of the solution may be varied within the specification limits to secure the proper consistency for the method of application used.

In addition to those agents described in **Section 3.08**, other approved agents may be used to remove excess joint filler.

(K) ASPHALTIC JOINT FILLER

Asphaltic joint filler shall be heated in suitable vessels equipped with approved calibrated thermometers and be satisfactorily agitated as required to maintain a uniform consistency. It shall have a temperature between 350 degrees Fahrenheit and 450 degrees Fahrenheit when applied. The filler shall be applied only when the joints are dry and clean and when the air temperature will permit the filler to flow freely into the joints. The filler shall be applied by means of either approved pouring pots applied directly into the joints or it may be flushed on the surface of the wearing course and worked into the joints by hot iron squeegees or other approved appliances as directed. If necessary, the joint shall be repoured until they remain permanently flush with the surface of the wearing course.

(L) REMOVING AND UTILIZING EXCESS ASPHALTIC JOINT FILLER IN GRANITE BLOCK WEARING COURSES

The asphaltic joint filler shall, after hardening, be removed from the wearing course by cutting in an approved manner, leaving the surface clean and free from bituminous matter. Filler may, after removal, be combined with fresh filler and the whole reheated and used.

(M) CEMENT-GROUT JOINT FILLER

The wearing course shall be sprinkled with clean water as directed. The cement-grout joint filler shall be flushed on the surface and worked into the joints with brooms, rubber edged squeegees or other approved appliances. The joints shall be repoured, if necessary, before initial set has taken place until they are filled flush with the surface of the wearing course.

Cement-grout used for joints between slabs shall be colored with mineral oxide pigments to match the granite slabs.

Immediately after the joints are filled, the pavement shall be swept clean. The amount of filler left on the surface of the wearing course shall be as little as possible and all surplus filler shall be satisfactorily removed.

(N) SUFFICIENCY OF APPARATUS

The apparatus for heating and/or agitating the filler shall, in numbers and efficiency, be sufficient to permit the filler gang to closely follow the pavers or rammers, as the case may be, and in no case shall a wearing course be left overnight or when work is stopped without the joint filling being completed.

(O) JOINT FILLING IN COLD OR WET WEATHER

When air temperature is below 38 degrees Fahrenheit in the shade, cement-grouting may be done only if permitted by the Engineer.

In case of rain, the wearing course shall be protected as required and in no case shall filler be put into wet joints.

(P) TRAFFIC

No traffic of any kind will be allowed on the wearing course until permitted by the Engineer.

(Q) DEFECTIVE WEARING COURSE

Such portions of the completed wearing courses as are defective in finish, compression, composition, or that do not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable materials properly laid in accordance with these specifications, at the Contractor's own expense.

(R) REMOVAL OF EXISTING CONCRETE BASE

Where directed by the Engineer, the Contractor shall break up, remove and dispose of the existing underlying concrete base. Payment will be made for this work under the appropriate item for Excavation. Replacement of the concrete base will be paid for under the appropriate bid item of **Section 4.04, Concrete Base for Pavement**.

6.04.5. MEASUREMENT.

(A) The quantity to be measured for payment for

Item No. 6.04 ADA - FURNISHING AND INSTALLING ADA COMPLIANT GRANITE BLOCK PAVEMENT; and,

Item No. 6.04 NGS - NEW GRANITE SLAB PAVEMENT, FURNISHED AND INSTALLED

shall be the number of square yards of ADA compliant granite block or new granite slab pavement actually installed, in place, to the satisfaction of the Engineer. In determining the area of granite block pavement to be paid for, the areas occupied by rail heads, bases of columns, manhole heads, gate boxes, road boxes and similar structures will be deducted when their superficial areas measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

(B) The quantity to be measured for payment for

Item No. 6.04 BA - GRANITE BLOCK CLEANED; and,
Item No. 6.04 BB - FURNISH NEW GRANITE BLOCK PAVERS

shall be the number of blocks actually cleaned or furnished new, as specified, to the satisfaction of the Engineer.

(C) The quantity to be measured for payment for

Item No. 6.04 DA - FURNISH GRANITE SLAB PAVEMENT

shall be the number of square yards of granite slabs actually furnished, as specified, to the satisfaction of the Engineer. Generally the quantity of furnished slabs shall equal the quantity of installed slabs. In determining the area of slabs to be paid for, the areas occupied by rail heads, bases of columns, manhole heads, gate boxes, road boxes and similar structures will be deducted when their superficial areas measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

(D) The quantity to be measured for payment for

Item No. 6.04 BC - INSTALL GRANITE BLOCK PAVEMENT (NEW OR EXISTING);
Item No. 6.04 DB - INSTALL GRANITE SLAB PAVEMENT; and,
Item No. 6.04 RGB - GRANITE BLOCK PAVEMENT RELAID

shall be the number of square yards of granite pavers or slabs actually installed, in place, to the satisfaction of the Engineer. Generally the quantity of furnished pavers or slabs shall equal the quantity of installed pavers or slabs. In determining the area of pavers or slabs to be paid for, the areas occupied by rail heads, bases of columns, manhole heads, gate boxes, road boxes and similar structures will be deducted when their superficial areas measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

6.04.6. PRICES TO COVER.

(A) The contract prices per square yard for

Item No. 6.04 ADA - FURNISHING AND INSTALLING ADA COMPLIANT GRANITE BLOCK PAVEMENT; and,

Item No. 6.04 NGS - NEW GRANITE SLAB PAVEMENT, FURNISHED AND INSTALLED

shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish and install ADA compliant granite block pavement or new granite slab pavement, as specified, complete, in place, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer, to furnish such samples for testing as may be required and to maintain the wearing courses in good condition as required **Section 5.05**.

New concrete base for pavement will be paid for separately under the CONCRETE BASE FOR PAVEMENT item.

(B) The contract prices per each for
Item No. 6.04 BA - GRANITE BLOCK CLEANED; and,

Item No. 6.04 BB - FURNISH NEW GRANITE BLOCK PAVERS

shall cover the cost of all–labor, materials, equipment, insurance, and incidentals required to clean existing blocks salvaged under other contract items or to furnish new blocks, as specified, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(C) The contract price per square yard for

Item No. 6.04 DA - FURNISH GRANITE SLAB PAVEMENT;

shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to furnish new granite slabs, all in accordance with the Contract Drawings, the specification and directions of the Engineer.

(D) The contract prices per square yard for

Item No. 6.04 BC - INSTALL GRANITE BLOCKS PAVEMENT (NEW OR EXISTING);
Item No. 6.04 DB - INSTALL GRANITE SLABS PAVEMENT;
Item No. 6.04 RGB - GRANITE BLOCKS PAVEMENT RELAID

shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to be furnished in the cleaning, dressing, redressing, and relaying of wearing courses, complete, in place, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer, to furnish such samples for testing as may be required and to maintain the wearing courses in good condition as required **Section 5.05**.

New concrete base for pavement will be paid for separately under the CONCRETE BASE FOR PAVEMENT item.

Payment will be made under:

Item No.	Item	Pay Unit
6.04 ADA	FURNISHING AND INSTALLING ADA COMPLIANT GRANITE BLOCK PAVEMENT	S.Y.
6.04 BA	GRANITE BLOCK CLEANED	EACH
6.04 BB	FURNISH NEW GRANITE BLOCK PAVERS	EACH
6.04 BC	INSTALL GRANITE BLOCK PAVEMENT (NEW OR CLEANED EXISTING)	S.Y.
6.04 DA	FURNISH GRANITE SLAB PAVEMENT	S.Y.
6.04 DB	INSTALL GRANITE SLAB PAVEMENT	S.Y.
6.04 NGS	NEW GRANITE SLAB PAVEMENT, FURNISHED AND INSTALLED	S.Y.
6.04 RGB	GRANITE BLOCK PAVEMENT RELAID	S.Y.

SECTION 6.05 (NO TEXT)

SECTION 6.06 – Granite Block and Concrete Paver Sidewalk

6.06.1. INTENT. This section describes the construction of Granite Block Sidewalk and Concrete Paver Sidewalk, as specified.

6.06.2. DESCRIPTION.

(A) GRANITE BLOCK SIDEWALK

Granite Block Sidewalk shall consist of block furnished by the Contractor, salvaged block or block furnished by The City, laid or relaid on a sand cushion in required patterns, with sand or cement-grout joints.

(B) CONCRETE PAVER SIDEWALK

Concrete Paver Sidewalk shall consist of pavers furnished by the Contractor, laid on a sand cushion in required patterns, with sand or cement-grout joints.

6.06.3. MATERIALS.

(A) GRANITE BLOCKS

Granite block for use hereunder shall meet the requirements of **Section 2.06**, Grade 2, except that permissible tolerances in dimensions shall be as follows:

	Tolerance	
	Plus	Minus
Length	2-1/2”	1/2”
Width	1/2”	0”
Depth	1/4”	1/4”

(B) CONCRETE PAVERS

Concrete pavers shall be “Appian” size, eleven and three-quarter (11-3/4”) inches in length by five and seven-eighths (5-7/8”) inches in width by four (4”) inches in depth; “Medium Gray” in color with a natural finish, 8,000 psi concrete, as manufactured by: Hanover Architectural Products, Inc., Hanover, Pennsylvania, (800) 426-4242; Hastings Pavement Co., Inc. of Freeport, New York, (800) 874-4717; Nicolock of Long Island, New York, (516) 669-0700; or an approved equivalent. All blocks shall be uniform in size, color and finish.

(C) SAND

Sand for sand cushion and joint filler shall consist of clean, hard, durable uncoated stone particles free from lumps of clay and all deleterious substances and shall be so graded that when dry, one hundred percent (100%) shall pass a 1/4” square opening sieve; not more than thirty-five percent (35%) by weight shall pass a No. 50 sieve. Cushion sand may be rejected if it contains more than ten percent (10%) by weight of loam and/or silt.

(D) CEMENT-GROUT

Cement-grout shall meet the requirements of **Section 3.06**, Type 2.

6.06.4. METHODS.

(A) INSTALLING SAND CUSHION

The subgrade shall be compacted to the satisfaction of the Engineer. A sand cushion of a minimum thickness of one (1”) inch shall be placed over the subgrade. The sand cushion shall be compacted by being rolled with a roller weighing one hundred and fifty (150) pounds per foot of width, or by tamping as directed by the Engineer. Before being rolled, the sand cushion shall be brought to the proper elevation and grade as shown on the Contract Drawings, by a template of a shape and size satisfactory to the Engineer. After being rolled, all irregularities of the surface shall be eliminated and the sand cushion shall be brought to the exact form and section by the use of lutes or hand templates.

(B) CLEANING BLOCKS FOR RELAYING

Granite blocks shall be cleaned of all adherent materials by the Contractor to the satisfaction of the Engineer before incorporation into the work.

(C) LAYING BLOCKS

Blocks shall be carefully laid on the sand cushion according to the patterns shown on the Contract Drawings or as directed by the Engineer and shall be rammed solidly in position. Blocks to be relaid shall be approximately 4" x 5" x 8" and shall be laid with the better 4" x 8" surface showing. Joints between blocks shall be approximately one inch in width. Joints in adjacent courses shall be staggered, except where otherwise specified, shown on the Contract Drawings, or directed by the Engineer. All blocks shall be clean when placed in the work. Blocks, which in the opinion of the Engineer are not satisfactorily clean, shall be well washed before being placed. Cutting of blocks to meet the pattern requirement will be permitted, subject to the approval of the Engineer.

After a sufficient area of granite blocks has been laid, the surfaces shall be tested with a ten foot straight edge laid parallel with the center line and any depression exceeding one-quarter (1/4") inch shall be corrected and brought to the proper grade. All stones disturbed in making replacements or correcting depressions shall be settled into place by carefully ramming or tamping to grade by the use of hand tamper.

Each section of sidewalk must be acceptable to the Engineer before the joints in that section are filled.

(D) JOINT FILLER

Where sand joints are called for, the joints shall be filled with cushion sand firmly packed between blocks. Immediately after joints are filled, the sidewalk surface shall be swept clean of excess sand.

Where cement-grout joints are called for, the joints shall be completely filled with a grout mixture of one (1) part Portland cement and two (2) parts sand.

6.06.5. GRANITE BLOCK FURNISHED BY THE CITY. The Contractor shall pick up granite block to be used in the work at designated City yards, haul and deliver the block to the site of the work, clean the block to the satisfaction of the Engineer and incorporate the said block into the work in full compliance with the specifications and the directions of the Engineer.

6.06.6. MAINTENANCE. The Contractor shall maintain all granite block sidewalk and all concrete paver sidewalk in accordance with the provisions of **Section 5.05**, to the satisfaction of the Engineer.

The Contractor shall replace, according to the original specifications, any defective granite block or concrete paver sidewalk, prior to the expiration date of the guarantee period.

6.06.7. MEASUREMENT. The quantity of granite block sidewalk or concrete block sidewalk to be measured for payment shall be the number of square yards of each type and class placed to the lines, grades and patterns shown on the Contract Drawings, specified or directed, measured in place in final position.

6.06.8. PRICES TO COVER.

(A) GRANITE BLOCK SIDEWALK (CONTRACTOR FURNISH BLOCK)

The contract price per square yard for Granite Block Sidewalk (Furnish Block) with Sand and/or Grouted Joints shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to lay and/or relay such sidewalk on a sand cushion with sand and/or cement-grout joints and shall include the furnishing of new blocks to the site; furnishing additional blocks as replacements for blocks which are broken or damaged as a result of the Contractor's operations; cleaning, redressing, cutting and incorporating block into the work; furnishing and placing sand for sand cushion and sand joints; and maintaining the sidewalk in conformity with **Section 5.05**; all, together with necessary incidentals, as required, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) CONCRETE PAVER SIDEWALK (CONTRACTOR FURNISH PAVER)

The contract price per square yard for Concrete Paver Sidewalk (Furnish Paver) with Sand and/or Grouted Joints shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to lay such sidewalk on a sand cushion with sand and/or cement-grout joints and shall include the furnishing of new pavers to the site; furnishing additional pavers as replacements for pavers which are

broken or damaged as a result of the Contractor's operations; cleaning, redressing, cutting and incorporating pavers into the work; furnishing and placing sand for sand cushion and sand joints; and maintaining the sidewalk in conformity with **Section 5.05**; all, together with necessary incidentals, as required, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer.

(C) GRANITE BLOCK SIDEWALK (SALVAGED BLOCK)

The contract price per square yard for Granite Block Sidewalk (Salvaged Block) with Sand and/or Grouted Joints shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to lay and/or relay such sidewalk on a sand cushion with sand and/or cement-grout joints and shall include the removal and salvaging of existing block; furnishing additional block as replacements for block which are broken or damaged as a result of the Contractor's operations; cleaning, redressing, cutting and incorporating block into the work; furnishing and placing sand for sand cushion and sand joints; and maintaining the sidewalk in conformity with **Section 5.05**; all, together with necessary incidentals, as required, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer.

(D) GRANITE BLOCK SIDEWALK (CITY FURNISHED BLOCK)

The contract price per square yard for Granite Block Sidewalk (City Furnished Block) with Sand and/or Grouted Joints shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to lay and/or relay such sidewalk on a sand cushion with sand and/or cement-grout joints and shall include the removal and salvaging of existing block; furnishing additional block as replacements for block which are broken or damaged as a result of the Contractor's operations; hauling block to the site of the work from designated City yards; cleaning, redressing, cutting and incorporating block into the work; furnishing and placing sand for sand cushion and sand joints; and maintaining the sidewalk in conformity with **Section 5.05**; all, together with necessary incidentals, as required, in full compliance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.06 AA	GRANITE BLOCK SIDEWALK (SAND JOINTS)(FURNISH BLOCK)	S.Y.
6.06 AB	GRANITE BLOCK SIDEWALK (GROUTED JOINTS)(FURNISH BLOCK)	S.Y.
6.06 AC	GRANITE BLOCK SIDEWALK (SAND AND GROUTED JOINTS) (FURNISH BLOCK)	S.Y.
6.06 BA	GRANITE BLOCK SIDEWALK (SAND JOINTS)(SALVAGED BLOCK)	S.Y.
6.06 BB	GRANITE BLOCK SIDEWALK (GROUTED JOINTS) (SALVAGED BLOCK)	S.Y.
6.06 BC	GRANITE BLOCK SIDEWALK (SAND AND GROUTED JOINTS) (SALVAGED BLOCK)	S.Y.
6.06 CA	GRANITE BLOCK SIDEWALK (SAND JOINTS)(CITY FURNISHED BLOCK)	S.Y.
6.06 CB	GRANITE BLOCK SIDEWALK (GROUTED JOINTS)(CITY FURNISHED BLOCK)	S.Y.
6.06 CC	GRANITE BLOCK SIDEWALK (SAND AND GROUTED JOINTS) (CITY FURNISHED BLOCK)	S.Y.
6.06 PA	CONCRETE PAVER SIDEWALK (SAND JOINTS)(FURNISH PAVER)	S.Y.
6.06 PB	CONCRETE PAVER SIDEWALK (GROUTED JOINTS)(FURNISH PAVER)	S.Y.
6.06 PC	CONCRETE PAVER SIDEWALK (SAND & GROUTED JOINTS) (FURNISH PAVER)	S.Y.

SECTION 6.07 – Bluestone Flags

6.07.1. INTENT. This section describes the removing, cutting, and relaying of existing bluestone flags; the furnishing and laying of new bluestone flags; and the removing and delivering to a City yard of existing bluestone flags. Where existing bluestone slabs are designated to be relaid, it is the intent of this section to preserve as much of the existing bluestone flags as possible and re-establish their original hand-tight joint patterns. This shall be accomplished by relaying the existing bluestone flags and to furnish new bluestone flags, which match the existing, only as need to replace missing or existing damaged flags. Unless otherwise directed or shown on the Contract Drawings, this work shall be limited to replacement or resetting of sidewalk flags at designated locations within Historic Landmark areas which present potential hazards to users or which do not maintain the historic pattern, and not for replacement of entire block face(s) and/or entire property frontage(s).

6.07.2. DESCRIPTION. Relaid flags shall consist of existing in place bluestone flags which are to be removed, cleaned, cut, dress and relaid where directed.

New flags shall consist of bluestone flags furnished when there are insufficient existing flags available for relaying to complete the work and are to be laid where directed.

Flags removed and delivered shall consist of existing bluestone flags, in place, which are to be removed and delivered to a designated City yard when there is an excess of existing flags after completion of work.

At corner quadrants, only those stone slabs which exist outside the pedestrian ramps, or outside the ramp side slopes and transition areas, shall be subject to relaying, unless otherwise directed by the Engineer. Any badly damaged flags or flags that are otherwise inappropriate for reuse, as determined by the Engineer, shall not be relaid.

6.07.3. MATERIALS.

(A) BLUESTONE FLAGS. Bluestone flags shall conform to the requirements of **Section 2.31**.

Bluestone filler pieces ("Dutchmen Pieces") shall be used to facilitate relaying of existing bluestone flags which may have portions missing. Deteriorated existing bluestone flags shall be the first source of filler pieces; where this is not possible, new bluestone shall be used.

(B) BASE MATERIAL. Base material shall consist of limestone or traprock screenings, consisting of hard, durable, sharp-edged fragments, free from any deleterious matter, with 100% passing a 1/2” square-opening screen, 20% to 40% passing a No. 20 mesh sieve, and 5% to 15% passing a No. 200 mesh sieve. No recycled screenings will be accepted.

(C) SETTING BED. Setting bed shall be a minimum one (1”) inch thickness consisting of one (1) part Portland cement and seven (7) parts clean sand. Portland cement shall comply with the requirements of ASTM Designation C150, for Type II or IIA cement. Sand shall meet the applicable requirements of **Section 2.21**, for Type 1A sand.

(D) JOINT MATERIAL. Joint material between Bluestone Flags is to be pigmented cement-grout in accordance with requirements of **Section 3.06**, Type 2. Color is to match the adjacent flags and shall be based on samples previously approved.

(E) MATERIAL AROUND STREET HARDWARE (METAL). The material around street hardware (metal) shall be a caulking type silicone sealant compound approved by the Engineer, installed in accordance with the manufacturer's requirements. Color is to match adjacent flags as approved by the Engineer.

6.07.4. METHODS.

(A) GENERAL

No flag shall be removed from its bed, cut, or otherwise disturbed until examined and directed by the Engineer. Where the Engineer determines that the defective flag consists of only chipped or broken corners, not more than two (2) square inches in area, it shall be left in place and repaired with a pigmented epoxy mortar under Item 7.02. The admixture used to pigment the epoxy mortar shall comply with the requirements of **Section 2.19** and shall be of color and quantity necessary to obtain a match of the epoxy

mortar with that of the existing bluestone, to the satisfaction of the Engineer. However, no additional payment will be made for the cost of pigmenting the epoxy mortar.

Prior to any work, the Contractor shall submit Shop Drawings to the Engineer for approval. These Shop Drawings shall show in detail the entire proposed bluestone pattern, with all joint lines and dimensions of each individual flag shown, within each block where bluestone flags are designated to be relaid or laid. Drawings are to clearly show which existing flags are to be relaid in their existing position, or relaid elsewhere, which flags are to be resized and relaid, and which flags are to be new bluestone furnished and laid. All street hardware to remain shall be shown with dimensioned cut-outs in the bluestone. Filler pieces ("Dutchmen") where required are to be shown. Also, a detailed representative slab showing all proposed cuts and finishes as well as all other pertinent information shall be shown.

Any damage to a flag, resulting from the Contractor's operations, shall be made good by the Contractor, as directed by the Engineer, at no additional cost to The City.

The quality of workmanship shall be of a superior quality suitable for historical restoration. The Company performing this work shall have installation of natural stone pavements represent a substantial proportion, if not a majority, of its regular work.

(B) REMOVAL OF EXISTING SIDEWALK

The Contractor may not remove any existing bluestone from the site unless specifically approved by the Engineer. All other sidewalk materials (concrete, asphalt, dirt, etc.) shall be excavated and disposed of away from the site, as necessary to install bluestone flags.

Prior to removal of flags, the Contractor shall sawcut the existing joint lines between existing bluestone flags, as required, unless otherwise permitted. Flags to be relaid shall be carefully lifted by barring under an exposed edge or by other approved methods and, after removal, shall be stacked or stored on the site until such time as they are to be relaid at locations designated by the Engineer. Barring at joints will not be permitted. Subsequent to the initial lifting by barring, all contact with the flag is to be by hand.

All existing bluestone flags that are exposed, lifted or removed are to be inspected by the Engineer. The Engineer, in consultation with the Landmarks Preservation Commission, will make the final determination as to the suitability of existing bluestone flags for reuse.

Any damage to existing bluestone flags resulting from the Contractor's operations shall be corrected or replaced by the Contractor to the satisfaction of the Engineer at no additional cost to the City.

(C) FURNISHING AND PLACING BASE MATERIAL

The Contractor shall be required to furnish and place a four inch (4") base layer of screenings on compacted subgrade, prior to laying flags. However, where the existing base material is deemed acceptable by the Engineer, the Contractor may elect to leave that material in place. Should additional bedding material be required, Contractor shall furnish and place that additional material at no additional cost.

After spreading, the screenings must be saturated with water and compacted to the satisfaction of the Engineer.

For any portion of the four inch (4") base not furnished and placed by the Contractor, the City will take a credit of ten dollars ($10.00) per cubic yard.

(D) FLAGS RELAID

Prior to relaying existing bluestone flags, the Contractor is to perform all work associated with adjusting street hardware.

Existing flags that are to be relaid in specific patterns and broken flags that can be salvaged for re-use in the work shall be resized, by sawcutting as directed, and dressed so that joints will be square with the upper surface and free from feather edges, drill marks and tool marks. Size of relaid flag shall be not less than two (2') feet wide, not less than five (5) square feet in area, and of the thickness specified above for new flags.

Cut-outs for street hardware shall be entirely within one flag, i.e. not to straddle a joint line, with a minimum of six inches of slab (bluestone) completely around any cut-out, unless otherwise approved by the Engineer.

A setting bed mixture of one (1) part Portland cement to seven (7) parts sand shall be placed over the base material. Then immediately prior to the laying of each flag, the setting bed mixture shall be sufficiently

wetted, as approved by the Engineer, and the flag firmly and evenly bedded to the required grade and pitch and brought to an even surface across joints. Then that flag shall be lifted to verify that full contact is made with the setting bed and any gaps shall be filled with additional wet bedding mixture, as may be required. Joints shall be hand tight, unless otherwise directed.

Flags shall be relaid in the specific patterns approved by the Engineer. Broken flags which can be salvaged for re-use in the work may be resized, by sawcutting as directed, and dressed so that joints will be square with the upper surface and free from feather edges, drill marks and tool marks.

Every effort is to be made to retain the existing bluestone flags. Accordingly, minor blemishes in existing bluestone are to be treated by accepted stone work procedures as directed by the Engineer, in consultation with the Landmarks Preservation Commission. Also, to retain existing bluestone, the Engineer may permit utilizing resized pieces smaller than specified herein.

Existing flags are to be thoroughly cleaned using a non-toxic detergent steam-clean wash and thorough rinse with water, prior to relaying.

(E) NEW FLAGS

New Flags shall be bedded and jointed as specified above for flags relaid.

(F) JOINTS AND PATCHES

Joints shall be hand tight. After setting flags, the setting bed mixture shall be brushed into the joints. Irregularities in flag size of old flags or adjacent curbs or walls may result in some larger joints. These joints are to be pointed for the full depth with mortar pigmented with bluestone dust to match the bluestone color. In order to salvage larger, historic flags which have spalled, small amounts of cementitious patching may be undertaken, as directed by the Engineer, using a mixture incorporating bluestone dust to match the existing stone. Where historic flags that are reset have an irregular surface that would create a trip hazard at the joint, the joint may be ground down to produce a level surface, only as directed by the Engineer. However, every effort shall be made to reset flags so that grinding is not necessary.

After setting flags, the surfaces of flags shall be cleaned of excess joint material and water applied to saturate the joints, all to the satisfaction of the Engineer.

(G) FLAGS REMOVED AND DELIVERED

Where directed the Contractor shall carefully remove existing flags as specified above for flags relaid, and shall deliver them to a designated City yard and stack them as directed by the Engineer.

6.07.5. MEASUREMENT. The quantity to be measured for payment hereunder shall be the number of square feet of surface area of existing bluestone flags relaid and new bluestone flags laid, complete, in place, and existing bluestone flags, in place, removed and delivered to a City yard. No deduction will be made for joints or areas occupied by heads, castings or other structures which are less than one (1) square foot. Areas occupied by the above structures which equal or exceed one (1) square foot will be deducted.

Existing defective flags that have been repaired in place with a pigmented epoxy mortar under Item 7.02, as directed by the Engineer, will not be measured for payment under this Section.

New bluestone flags furnished and laid as a replacement for flags broken, due to the Contractor's operations, will not be measured for payment.

6.07.6. PRICES TO COVER. The contract price per square foot of Existing Bluestone Flags Relaid, New Bluestone Flags Furnished and Laid, and Existing Bluestone Flags Removed and Delivered to a City Yard, shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to furnish shop drawings; lift, remove, salvage, stack, store, sawcut, fit, resize, dress, and perform all other work as may be required; clean existing flags to be relaid; furnish and place base and setting bedding; make necessary cut outs in bluestone flags; perform all sawcutting operations; provide filler pieces, as necessary; provide joints as required; perform a final cleaning of slabs; and maintain the completed work in compliance with the provision of **Section 5.05**; all, together with necessary incidentals, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

At corner quadrants, pedestrian ramps and their ramp side slopes and transition areas, shall be furnished and placed under Item 4.13 BBS, unless otherwise directed by the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.07 AA	EXISTING BLUESTONE FLAGS RELAID	S.F.
6.07 AB	NEW BLUESTONE FLAGS FURNISHED AND LAID	S.F.
6.07 AC	EXISTING BLUESTONE FLAGS REMOVED & DELIVERED TO CITY YARD	S.F.

SECTION 6.08 - Concrete Curb, Re-used Steel Facing

6.08.1. INTENT. This section describes the construction of steel faced concrete curb using steel facing salvaged at the site or steel facing furnished by The City.

6.08.2. DESCRIPTION, MATERIALS AND METHODS. Description, materials and methods shall comply with the requirements of **Subsection 4.09.2**. through **Subsection 4.09.4.(L)**, inclusive.

6.08.3. ADDITIONAL REQUIREMENTS.

(A) GENERAL

Salvaged steel facing and steel facing furnished by The City shall be cleaned and painted as specified under **Subsection 2.13.4**.

Facing shall be bent or rebent to a true line and set to the proper grade without springing or wedging. The ends of corner facing, after setting, shall be welded on the back for its full depth to the adjacent straight steel facing to secure a joint equivalent to one hundred (100) percent strength of the material.

When shown or ordered, the Contractor shall install curb sleeve ties or clips for fastening ends of corner facing to adjacent straight facing in lieu of the welding specified above.

All the provisions of **Subsection 4.09.4**. shall apply to the work to be done hereunder.

(B) FACING FURNISHED BY THE CITY

The steel facing, furnished by The City, is stored at the several City Yards. The Contractor shall load such facing at the City Yard, haul the said facing to the site of the work and incorporate the facing into the work, at locations shown on the Contract Drawings or designated by the Engineer.

6.08.4. MEASUREMENT AND PRICE TO COVER.

(A) Concrete curb under

Item No. 6.08 AA - RESET STEEL FACED CONCRETE CURB (18” DEEP);
Item No. 6.08 AJ - RESET STEEL FACED CONCRETE CURB (27” DEEP); and,
Item No. 6.08 BA – RESET STEEL FACED CONCRETE CURB

shall be constructed with steel facing salvaged at job site, shall be measured and paid for in accordance with the provisions of **Subsection 4.09.5.** and **Subsection 4.09.6.**, inclusive.

Payment will be made under:

Item No.	Item	Pay Unit
6.08 AA	RESET STEEL FACED CONCRETE CURB (18” DEEP)	L.F.
6.08 AJ	RESET STEEL FACED CONCRETE CURB (27” DEEP)	L.F.
6.08 BA	RESET STEEL FACED CONCRETE CURB	L.F.

SECTION 6.09 - Concrete Headers

6.09.1. INTENT. This section describes the construction of Concrete Headers.

6.09.2. DESCRIPTION. Concrete Headers shall be rectangular in shape, six (6”) inches wide and fifteen (15”) inches deep, unless otherwise specified.

Concrete headers shall be constructed to the lines and grades shown on the Contract Drawings.

6.09.3. MATERIALS. Concrete for headers shall comply with the requirements of **Section 3.05**, Class B-32, Type IIA.

Coarse aggregate shall be broken stone or gravel and comply with the requirements of **Section 2.02**, Type 1, Grade B, Size No. 57, or Type 2.

Fine aggregate shall comply with the requirements of **Section 2.21**, Type 1A, except that 5 to 30 percent shall pass a No. 50 sieve.

6.09.4. METHODS.

(A) EXCAVATION

Excavation shall be made to dimensions sufficient to permit the setting of forms.

(B) UNDERLYING MATERIALS

The material underlying concrete headers shall be satisfactory and thoroughly compacted. If unsatisfactory, the unsuitable material shall be removed and replaced with acceptable material and be thoroughly compacted.

(C) FORMS

Forms shall be either of metal of sufficient thickness but not less than one-eighth (1/8”) inch to satisfactorily resist distortion when fastened together and secured in place, or be of acceptable planed and matched lumber of sufficient thickness to resist distortion, rigidly held in position and of such construction that a smooth surface will be provided. Forms shall be of a depth of not less than that of the header, be properly located with tops at grade and be left in place until the concrete has hardened.

(D) WORKMANSHIP

Concrete header shall be built as a continuous header across the pavement, without intermediate joints, unless otherwise specified and shall have smooth, plane ends. Concrete shall be tamped and aggregate shall be carefully spaded away from the front forms.

(E) SURFACE FINISH

The top of the header shall be finished by wood floating.

(F) BACKFILLING

Backfilling shall follow the removal of the forms as soon as practicable and shall be of clean earth or other approved material, satisfactorily compacted.

(G) PROTECTION AND CURING

Concrete headers shall be carefully protected against injury from rain, frost, the drying effects of the sun and wind, traffic or other causes, by means of suitable guards and covering.

Curing shall be done in accordance with the requirements of **Section 2.14**, Type 4, except when the Engineer orders the use of Type 1-D.

The sum of one (1) dollar will be deducted from any moneys due to the Contractor, under the contract, for each linear foot of concrete header which is not cured as required.

6.09.5. MEASUREMENT. The quantity to be measured for payment hereunder shall be the number of linear feet of concrete header constructed, complete, in place, measured along the center line of the header.

Payment for concrete header will be adjusted in accordance with the strength provisions of **Section 5.04**.

6.09.6. PRICE TO COVER. The contract price per linear foot of concrete header shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to construct concrete header, complete, in place, and shall include excavation (except rock excavation), backfilling and all necessary incidentals, furnishing such samples for testing as may be required and maintaining the concrete header in good condition as required in **Section 5.05**, all, in full compliance with the Contract Drawings, the specifications and directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.09	CONCRETE HEADER (6” WIDE X 15” DEEP)	L.F.
6.09 A	CONCRETE HEADER ”8" WIDE X ”10" DEEP)	L.F.
6.09 AA	CONCRETE HEADER (6” WIDE X 18” DEEP)	L.F.
6.09 AB	CONCRETE HEADER (8” WIDE X 18” DEEP)	L.F.
6.09 AC	CONCRETE HEADER (6” WIDE X 20” DEEP)	L.F.
6.09 AD	CONCRETE HEADER (12” WIDE X 12” DEEP)	L.F.
6.09 B	CONCRETE HEADER (”12" WIDE X ”24" DEEP)	L.F.
6.09 C	CONCRETE HEADER (6” WIDE X 24” DEEP)	L.F.

SECTIONS 6.10 THRU 6.17 (NO TEXT)

SECTION 6.18 – Picket Fence

6.18.1. DESCRIPTION. Under this Section, the Contractor shall furnish and erect Picket Fence of the type and size shown on the Contract Drawings, in accordance with the Specifications and directions of the Engineer.

6.18.2. MATERIALS. Fences and gates shall be constructed of bars, posts, rails and braces, of the sizes shown on the Contract Drawings.

All material shall conform to Specification C1015 of the American Iron and Steel Institute (A.I.S.I), unless otherwise specified.

Padlock. Where gates are specified, the Contractor shall be required to furnish one (1) padlock for each single gate and each leaf of a double leaf gate. All padlock shall be keyed alike with a master key, with two (2) inch width by three-quarter (3/4) inch thick brass body, maximum security, five (5) pin tumblers with hardened alloy steel chrome plated shackle no less than three-eights (3/8) inch diameter and two (2) inches clearance (elongated shackle). A galvanized steel chain, nine (9) inches long shall be fastened to the gate and the body of the lock. The chain shall be five-sixteenths (5/16) inch by one and three-eights (1-3/8) inch. The Contractor shall furnish two (2) keys for each padlock.

6.18.3. FABRICATION. No fabrication work is to be performed until shop drawings are approved by the Engineer.

Fences, complete with gates where required, shall be fabricated in strict accordance with Contract Drawings and shop drawings. Posts and rails shall be formed into panels of the shapes shown on the Contract Drawings and joints completely welded with welds of proper size and shape, riveted or bolted all as directed or shown on the Contract Drawings. All welds shall be ground smooth to a neat finish. Connections shall be provided as indicated on the Contract Drawings. Welds and weldments shall conform to the requirements of the American Welding Society.

Posts, braces and pickets shall in all cases be truly vertical; rails and bars shall be parallel to grade as shown on the Contract Drawings. Panels shall be curved as required by the work.

6.18.4. GALVANIZATION AND POWER COATING. All components of the fencing including the casting, angle iron frames, posts, and rails shall be hot dipped galvanized in accordance with the provisions of the NYSDOT Standard Specifications. All galvanized surfaces will be given thermo-setting polyester powder finish for extra protection and added aesthetic appeal. The coating shall be lead free and without solvents. The final color shall be black as approved by the Engineer, unless otherwise shown on the Contract Drawings.

The Powder Coating Process:

The Powder coating process shall consist of the following steps unless directed otherwise by the Engineer:

- The material shall be suspended on Transport Beams.
- The material shall be alkaline cleaned and then rinsed.
- The material shall be pickled in a bath with inhibited phosphoric acid and then rinsed.
- An active anti-corrosive layer of zinc phosphate shall be applied and rinsed.
- The layer of zinc phosphate shall be sealed with a hexavalent chromating agent of very low weight and then the material shall be rinsed.
- The material shall be rinsed with e-ionized water to remove any remaining salts which can cause osmosis.
- The material shall be dried in the drying oven.
- The powder shall be charged to 80,000 volts and then sprayed onto the grounded steel.
- The material shall be heated to a temperature between 340°-390° F, in accordance with the powder manufacturer's specifications, to melt the resin cores and to form a smooth homogeneous coating.
- The final product shall be inspected and tested by the Department's Quality Assurance designated inspectors.

The approved product shall be carefully packed to prevent damages during shipping and unapproved product shall be removed at the Contractor's expense.

6.18.5. ERECTION. The fences shall be erected in holes which shall have been formed in the concrete or stone to receive them. After the posts have been set in place and properly supported to hold them to line and grade, the annular space shall be filled to the depth shown on the Contract Drawings with grout composed of one part Portland cement to two (2) parts sand. After grout has hardened, the remaining space shall be filled with an epoxy sealer filler as approved by the Engineer. The sealer shall be applied in strict accordance with the manufacturer's instructions, and shall be tooled in to fill and seal hole and form a one-quarter (1/4) inch wash away from the post. Concrete for individual post footing shall be Class B-32.

Any fence not set plumb and true to line and grade shall be removed and replaced at the Contractor's expense. The Contractor shall maintain the fences and gates during the life of the Contract and shall repair and replace all members that are disturbed, damaged or destroyed.

6.18.6. SAMPLES. Prior to fabrication of the fence, the Contractor shall submit, for approval of the Engineer, finished samples of parts of fences. The workmanship and finish of the fences shall be equivalent to the approved samples.

6.18.7. REMOVAL OF EXISTING PICKET FENCE. At the required location, the Contractor shall carefully remove existing picket fence between the limits shown on the Contract Drawings or directed by the Engineer, and demolish its foundation wall and/or footing to at least two (2) feet below grade. The Contractor shall then fill the area with compacted clean sand to the subgrade of the new sidewalk.

All fence elements removed shall be delivered to the property owners for their re-use, unless otherwise directed in writing by the Engineer and the property owner. All other materials removed during the removal of the fence and the demolition of the foundation wall shall be disposed of away from the site by the Contractor.

Care shall be exercised by the Contractor in the removal of the fence. Any damage caused by the Contractor's operations shall be repaired or replaced in kind, to the satisfaction of the Engineer, at the expense of the Contractor.

6.18.8. MEASUREMENT.

(A) PICKET FENCE. The quantity of Picket Fence to be paid for shall be the number of linear feet of each type fence furnished and erected complete, to the satisfaction of the Engineer. Measurement shall be made in place along the centerline of the top rail, from center to center of end posts.

(B) PICKET FENCE REMOVED. The quantity of Picket Fence Removed to be paid for shall be the number of linear feet of fence actually removed, to the satisfaction of the Engineer. Measurement shall be made in place along the centerline of the top rail, from center to center of end posts.

6.18.9. PRICES TO COVER.

(A) PICKET FENCE. The price bid shall be a unit price per linear foot of Picket Fence and shall include the cost of all labor, material, equipment, and incidentals required to furnish and erect fence of the type specified including, but not limited to, shop drawings, gates, excavation, concrete post footings, backfill, and painting as required, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) PICKET FENCE REMOVED. The price bid shall be a unit price per linear foot of Picket Fence Removed and shall include the cost of all labor, material, equipment, and incidentals required to carefully remove existing fence, demolish its foundation wall and/or footing as applicable, and backfill the area, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer. Removed fence shall be either delivered to the property owner or disposed of away from the site, as directed.

Payment will be made under:

Item No.	Item	Pay Unit
6.18 A	STEEL BAR PICKET FENCE	L.F.
6.18 D	DECORATIVE STEEL FENCE	L.F.
6.18 X	PICKET FENCE REMOVED	L.F.

SECTION 6.19 (NO TEXT)

SECTION 6.20 – Broken Stone Ballast

6.20.1. INTENT. This section describes the placing of Broken Stone Ballast.

6.20.2. DESCRIPTION. Broken Stone Ballast shall be placed where indicated on the Contract Drawings or directed.

Where the material underlying the structure is unsatisfactory the unsuitable material shall be removed and replaced with broken stone of the size number designated by the Engineer.

6.20.3. MATERIALS. The broken stone shall comply with the requirements of **Section 2.27**.

6.20.4. EXCAVATION. Excavation for the purpose of removing unsatisfactory material shall be made to the dimensions as directed.

6.20.5. METHODS.

(A) DEPOSITING AND COMPACTING BROKEN STONE

The broken stone shall be deposited and spread on the prepared earth subgrade in uniform horizontal layers not greater than six (6”) inches in depth and each layer shall be thoroughly compacted.

(B) EARTH SUBGRADE

The subgrade shall not be in a muddy or frozen condition. No broken stone shall be placed unless the earth subgrade on which it is to be placed is in a condition acceptable to the Engineer.

6.20.6. MEASUREMENT. The quantity to be measured for payment shall be the number of cubic yards of compacted broken stone placed as shown on the Contract Drawings or as ordered by the Engineer, in accordance with the specifications.

6.20.7. PRICE TO COVER. The contract price, per cubic yard, for broken stone ballast, in place, shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to furnish and place broken stone ballast, complete, in place, and shall include all excavation (except rock excavation); the furnishing of such samples for testing as may be required; and furnishing all other necessary incidentals; all, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.20	BROKEN STONE BALLAST	C.Y.

SECTION 6.21 (NO TEXT)

SECTION 6.22 – Additional Hardware

6.22.1. INTENT. This section describes Additional Hardware.

6.22.2. DESCRIPTION. Additional Hardware shall include, but not be limited to, the furnishing and installation of metal eyes, bolts, nuts, washers, plates, steps, hooks, hoods, traps, frames, grates, covers and castings as replacements for broken or missing items in manhole, valve box, catch basin and inlet heads.

6.22.3. MATERIALS. New metal items shall comply with the requirements of the standards of the Department or Agency owning the hardware, which are on file, for the type of head in which the replacement is to be made.

Other materials, required to be removed and restored for proper installation of replacement parts, shall comply with the requirements of Division II, Materials.

Mortar, when required, shall meet the requirements of **Section 3.07**, Type 2.

Concrete shall meet the requirements of **Section 3.05**, Type IIA, Class B-32. The materials used therein shall comply with the requirements of **Section 2.10**, Portland cement, Type II with an approved air-entraining agent added at the time of mixing; **Section 2.21**, sand, Type 1A; and **Section 2.02**, coarse aggregate, Type 1, Grade B, or Type 2, Size No. 57.

6.22.4. METHODS. When it is necessary to remove any part of an existing wearing course, concrete base, sidewalk, curb or masonry to expedite installation of replacement hardware, the manner and extent of such removal shall be made to the satisfaction of the Engineer, and to the limits directed by the Engineer. Restoration of removed materials shall be made as directed by the Engineer.

Broken hardware shall be removed and broken or missing hardware shall be replaced, as shown on the Department's Standards and as directed by the Engineer.

6.22.5. MEASUREMENT. The quantity to be measured for payment shall be the number of pounds of additional hardware incorporated into the work, complete. The weights of individual items shall be based upon catalog weight, a manufacturer's certification, or the certification of a licensed Weighmaster, whichever the Engineer shall deem acceptable.

6.22.6. PRICE TO COVER. The contract price per pound for Additional Hardware shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to furnish and install said hardware, complete, in place, and shall include, but not be limited to, the removal and restoration of existing materials, the removal of broken or damaged existing hardware, replacement of broken, damaged or missing hardware with new hardware, and the installation of such new hardware, all, together with necessary incidentals, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.22 F	ADDITIONAL HARDWARE	LBS.

SECTION 6.23 – Fire Department Facilities

6.23.1. INTENT. This Section describes the removal, relocation and resetting of existing Fire Department of New York (F.D.N.Y.) facilities.

6.23.2. DESCRIPTION. The work to be done under this section of the Specifications shall consist of constructing new fire communication facilities to replace similar existing facilities which will be in interference with the construction of new structure to be installed under the contract. Fire Department facilities shall consist of boxes; housings; posts, including sub-bases and bases with integral terminal boxes; concrete foundations; fastening materials; conduit, bends and miscellaneous fittings; cable; and other necessary appurtenances.

6.23.3. MATERIALS. All materials shall comply with the standards and material specifications of the New York City Fire Department.

Any required Fire Alarm Post, Subbase and Hardware, Wire Terminal Boxes and fire alarm cables must be purchased and picked up from the Fire Department Storehouse, 87 Union Street, Brooklyn, N.Y. 11231-1416. Prior to bidding, the Contractor shall contact the Plant Operations Engineering Unit at (718) 281-3846 or (718) 281-3933 for the latest material cost of Fire Communications items. The Contractor shall also notify the Fire Department's Plant Operations Engineering Unit, telephone (718) 281-3846 or (718) 281-3933, at least forty-eight (48) hours in advance to arrange for pickup of materials purchased from the Fire Department. Pick up hours are between 8:30 A.M. and 1:30 P.M.

6.23.4. METHODS.

(A) GENERAL

A–least **one (1) month** in advance of the start of construction, the Contractor shall be required to notify the Fire Department's Bureau of Facilities Management, Plant Operations Engineering Unit, as per **Subsection 1.06.23. (D), NOTICES**, to make an appointment to pick up FDNY base maps at 316 Sgt. Beers Avenue, Fort Totten, Bayside, Queens 11359 and to request street markouts of Fire Communications underground facilities.

All Fire Department work shall be done In accordance with the latest regulations, specifications and standards of The New York City Fire Department, under the direction of the Fire Department Engineer and the supervision of the Resident Engineer. Said Standards and Specifications for the work involved in the replacing of Fire Communications System facilities will be made available to the Contractor for reference at the:

Bureau of Facilities Management, Plant Operations Engineering Office
316 Sgt. Beers Avenue, Fort Totten, Bayside
Queens, New York 11359

Installation of new Fire Communications System facilities shall be made at locations indicated on the Contract Drawings or as directed by the Engineer and may include: removal and/or salvage of such portions of the existing system as may be required by the Fire Department, Bureau of Facilities Management; connection of the new facilities to the existing adjoining portions of the fire communication network; furnishing and placing of select granular fill material for backfilling all around fire duct; cutting out portions of the existing fire ducts without damage to the cable or cables contained therein; testing of the completed work; protection and maintenance of the system for the duration of the guarantee period, and all work incidental thereto.

The Contractor shall be required to furnish and install all necessary Fire Department facilities, conduits, cables, etc., under the appropriately scheduled items. Any obstruction encountered in pulling the cable shall be cleared by the Contractor to the satisfaction of the Engineer. The F.D.N.Y. Communications Electricians will perform the live splicing operations in manholes and make all transfers of alarm boxes and/or aerial cables.

The electrical subcontractor must make an appointment with Plant Operations Engineering to attend a brief tutorial on terminating fire alarm cables to terminal boxes.

At the close of any project involving construction or alterations to fire alarm facilities, one hard copy and one electronic copy (PDF Format) of proposed utility plan sheets and/or sketches of "AS-BUILT" changes

must be provided to the Bureau of Facilities Management, Plant Operations Engineering Office at 316 Sgt. Beers Avenue, Fort Totten, Bayside, Queens 11359.

The Contractor's attention is directed to the requirement that the existing Fire Alarm Communications System shall be maintained continuously in service until the communications services are transferred to the new facilities, except as otherwise permitted by written authorization of the New York City Fire Department. The Contractor shall not schedule or commence any phase of the work of the contract which would disrupt or interfere with the operation of the existing Fire Communications System until the new system is operational to the satisfaction of the New York City Fire Department.

Temporary Fire Alarm Communications facilities may be installed upon written authorization by the New York City Fire Department whenever the scheduling of other phases of the work of the contract may be adversely affected, in the opinion of the Engineer, by the necessity of prior completion of the installation of the new Fire Alarm Communications System facilities. Except upon written authorization for this installation of temporary fire alarm communication facilities, the Contractor shall not schedule or commence any phase of the work that would disrupt or interfere with the operation of the existing Fire Communications System until the new system is operational to the satisfaction of the New York City Fire Department.

The Contractor shall notify the Fire Department Bureau of Facilities Management, telephone (718) 281-3846, at least two (2) weeks in advance of starting work on any Fire Department facilities to permit the Department to de-energize their facility, if necessary. Removal operations shall not start until Fire Department permission has been obtained.

The Fire Department may install part or parts of a facility. The extent of such Fire Department installation shall be as noted on the Contract Drawings. Unless so noted, installation shall be made by the Contractor.

All bends not at fire alarm posts or poles are to be forty-eight (48") inches in radius.

The Contractor shall notify the Fire Department when relocation of each facility is completed. The said Department will make the live splices at the manhole required to energize the facility and transfer the alarm box, if applicable, to the new facility. Allow the Fire Department at least two (2) weeks to perform this work.

Also, see **Subsection 1.06.23. (Q)** for additional requirements.

(B) EXCAVATION

Excavation shall be made to the depths and dimensions required for the removal of existing foundations and conduit; construction of new foundations; and the installation of new conduit. Where a double conduit is specified, they shall be installed in the same trench, one on top of the other, with the top conduit installed at least thirty (30") inches below grade. All excavations shall be backfilled with acceptable materials and compacted to the satisfaction of the Engineer.

(C) REMOVAL

Old deactivated fire alarm empty housings and posts and unused cable reels shall be removed, hauled, and delivered by the Contractor to the Fire Department Storehouse after making an appointment with the FDNY Plant Operations Engineering office, and only after written permission has been obtained from authorized Fire Department personnel (Borough Supervisor or Engineer).

Old terminal boxes, conduit and cable, to the extent designated by the Engineer, and existing foundations shall be removed and disposed of away from the site of the work.

(D) NEW CONSTRUCTION

The Contractor, under the appropriately scheduled items, shall be required to furnish and install concrete for foundations; furnish and install all necessary Fire Department facilities, conduits, conduit bends, cables, etc.; and, provide all necessary fastening, supporting or anchoring materials. Any obstruction encountered in pulling the cable shall be cleared by the Contractor to the satisfaction of the Engineer.

Where a double conduit is specified, they shall be installed in the same trench, one on top of the other, with the top conduit installed at least thirty (30") inches below grade.

Unless otherwise noted on the Contract Drawings, the Contractor shall furnish and install new conduit and cables and shall make all necessary connections, except for the live splice in the appropriate manhole and the transfer of the alarm box and/or aerial cable which shall both be performed by Fire Department Communications Electricians.

(E) LETTER OF ACCEPTANCE

Upon completion of the Fire Communications System work, the Contractor shall be required to apply for and obtain a letter of acceptance from the New York City Fire Department, Bureau of Facilities Management indicating that all Fire Communications System work has been completed in accordance with the Specifications.

Final payment of the contract will be withheld until such letter is filed with the Department of Design and Construction.

(F) PERMITS

The Contractor shall obtain all necessary permits from the New York City Fire Department, the telephone company and/or the New York City Department of Transportation.

(G) DAMAGE REPLACEMENT

In accordance with requirements of **Subsection 1.06.23.(Q)** concerning protection of City structures, no separate payment will be made for work involved in protecting the existing Fire Communications System from damage, or for work involved in replacing or repairing such system, and the cost thereof shall be deemed included in the price bid for all the items of the contract.

Any such repair or replacement work to be done in regard to the fire communication structures including workmanship and testing shall be performed in accordance with the latest Specifications, Standards, practices and under the inspection of the New York City Fire Department.

(H) PAINTING EXISTING F.D. POSTS AND/OR BOXES

Where and when directed, the Contractor shall be required to paint existing Fire Department Posts and/or Boxes in accordance with the latest Specifications, Standards, and practices of the New York City Fire Department.

(I) COMPLETION OF FIRE DEPARTMENT FACILITIES

Installation of appurtenances and completion of punchlist items for New York City Fire Department facilities must be completed in a timely manner following the installation of the facilities. This includes installation of bollards, all paint work, and all punchlist work. For contracts with phased scheduling, unless otherwise approved in advance by the Engineer, this work must be completed before proceeding to the next schedule phase.

6.23.5. MEASUREMENT.

(A) The quantities of

ITEM NO. 6.23 AA	FURNISH AND INSTALL FIRE ALARM POST IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 AB	REMOVE EXISTING FIRE ALARM POST
ITEM NO. 6.23 AC	ADJUST FIRE ALARM POST TO NEW GRADE IN ACCORDANCE WITH F.D. STD. DWG. #167
ITEM NO. 6.23 BA	FURNISH AND INSTALL FIRE ALARM POST AND SUBBASE IN ACCORDANCE WITH F.D. STD. DWG. #141

to be measured for payment shall be the number of fire alarm posts with or without subbases, as specified, incorporated in the work as shown, specified or required, to the satisfaction of the Engineer; the number of fire alarm posts and/or empty housings actually delivered to the Fire Department's storehouse as shown, specified or required, to the satisfaction of the Engineer; or, the number of fire alarm posts adjusted to the new grade as shown, specified or required, to the satisfaction of the Engineer.

(B) The quantities of

ITEM NO. 6.23 AF	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA
ITEM NO. 6.23 AFA	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA WITHOUT TERMINATING CABLES

ITEM NO. 6.23 BF FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146

ITEM NO. 6.23 BFE FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146 WITHOUT TERMINATING CABLES

to be measured for payment shall be the number of pole terminal boxes of each type, incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(C) The quantities of

ITEM NO. 6.23 BBS FURNISH AND INSTALL 3" 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141

ITEM NO. 6.23 BBSE FURNISH AND INSTALL 3" 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141

ITEM NO. 6.23 BH FURNISH AND INSTALL 4" 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA

ITEM NO. 6.23 BHE FURNISH AND INSTALL 4" 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA

ITEM NO. 6.23 CB FURNISH AND INSTALL 2 – 3" 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141

ITEM NO. 6.23 CBE FURNISH AND INSTALL 2 – 3" 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141

ITEM NO. 6.23 XBB FURNISH AND INSTALL 2" GALVANIZED STEEL 90 DEGREE BEND (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB

ITEM NO. 6.23 XBBE FURNISH AND INSTALL 2" GALVANIZED STEEL 90 DEGREE BEND (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB

ITEM NO. 6.23 XCC FURNISH AND INSTALL"3" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)

ITEM NO. 6.23 XCCE FURNISH AND INSTALL"3" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)

ITEM NO. 6.23 XDD FURNISH AND INSTALL"4" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)

ITEM NO. 6.23 XDDE FURNISH AND INSTALL"4" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)

to be measured for payment shall be the number of bends of each type and size of eighteen (18") inch radius for fire alarm posts or poles installed in the work, complete, as shown, specified or required, to the satisfaction of the Engineering.

(D) The quantities of

ITEM NO. 6.23 BCS FURNISH AND INSTALL 3" P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)

ITEM NO. 6.23 BCSE FURNISH AND INSTALL 3" P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)

ITEM NO. 6.23 BGS FURNISH AND INSTALL 4" P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)

ITEM NO. 6.23 BGSE FURNISH AND INSTALL 4" P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)

ITEM NO. 6.23 BGT FURNISH AND INSTALL 2 – 4" P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)

ITEM NO. 6.23 BGTE FURNISH AND INSTALL 2 – 4" P.V.C. CONDUITS, SCHEDULE 40,

	U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 CC	FURNISH AND INSTALL 2 – 3" P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 CCE	FURNISH AND INSTALL 2 – 3" P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 XB	FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XBE	FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 XC	FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XCE	FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 XD	FURNISH AND INSTALL"4" GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XDE	FURNISH AND INSTALL"4" GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)

to be measured for payment shall be the number of linear feet of each size, number and kind of fire communication conduit and forty-eight (48") radius bends incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer, measured along the center line of each run of fire communication conduit, from center line of manhole to center line of manhole or to center line of fire alarm post or pole, as is applicable.

(E) The quantities of

ITEM NO. 6.23 BD	FURNISH AND INSTALL 4-PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DC	FURNISH AND INSTALL 10 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDA	FURNISH AND INSTALL 15 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDB	FURNISH AND INSTALL 20 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDC	FURNISH AND INSTALL 25 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDD	FURNISH AND INSTALL 30 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDE	FURNISH AND INSTALL 40 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DF	FURNISH AND INSTALL 45 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DG	FURNISH AND INSTALL 50 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DH	FURNISH AND INSTALL 55 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DJ	FURNISH AND INSTALL 60 PAIR FIRE ALARM CABLE

to be measured for payment shall be the number of linear feet of each size and type of fire alarm cable, including slack, incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer, measured along the centerline of each run of fire alarm cable, continuously through manholes.

(F) The quantities of

ITEM NO. 6.23 BE	FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE "A" WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, & #144E
ITEM NO. 6.23 BES	FURNISH AND INSTALL FIRE DEPARTMENT SLOTTED MANHOLE TYPE "A" WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144S & #144E
ITEM NO. 6.23 EB	FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE "B" WITH FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, #144C, #144CC, & #144E
ITEM NO. 6.23 HH	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144B OR #144E
ITEM NO. 6.23 HHA	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143

ITEM NO. 6.23 HHS FURNISH AND INSTALL F.D.N.Y. SIDEWALK SLOTTED HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144E OR #144BS

to be measured for payment shall be the number of each type manhole or handhole installed in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(G) The quantities of

ITEM NO. 6.23 BFA FURNISH AND INSTALL FIRE DEPARTMENT 48 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES
ITEM NO. 6.23 BFB FURNISH AND INSTALL FIRE DEPARTMENT 24 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES
ITEM NO. 6.23 BFC FURNISH AND INSTALL FIRE DEPARTMENT 12 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES

to be measured for payment shall be the number of terminal boxes of each type, incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(H) The quantity of

ITEM NO. 6.23 BGB FURNISH AND INSTALL”4" PVC CONDUIT TO”4" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146
ITEM NO. 6.23 BGD FURNISH AND INSTALL”3" PVC CONDUIT TO”3" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146
ITEM NO. 6.23 BGR FURNISH AND INSTALL 4” PVC CONDUIT TO 2” GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA
ITEM NO. 6.23 BGRA FURNISH AND INSTALL”4" PVC CONDUIT TO”3" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146
ITEM NO. 6.23 BGRC FURNISH AND INSTALL”3" PVC CONDUIT TO”2" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146
ITEM NO. 6.23 BGRE FURNISH AND INSTALL”3" PVC CONDUIT TO”4" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

to be measured for payment shall be the number of bushings incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(I) The quantity of

ITEM NO. 6.23 BP FURNISH AND INSTALL FIRE ALARM PEDESTAL BUMPERS (2 REQUIRED PER SET) IN ACCORDANCE WITH F.D. STD. DWG. #168

to be measured for payment shall be the number of sets of bumpers, incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer. Each set shall consist of two (2) bumpers.

(J) The quantities of

ITEM NO. 6.23 FC REMOVE EXISTING F.D.N.Y. MANHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140
ITEM NO. 6.23 HFC REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 & #144B

to be measured for payment shall be the number of each type of existing F.D.N.Y. manhole frame & cover or sidewalk handhole frame & cover that have been replaced, at the locations shown or as directed and as shown on the Fire Department Standards, to the satisfaction of the Engineer.

(K) The quantities of

ITEM NO. 6.23 FCA FURNISH AND INSTALL F.D.N.Y. MANHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140
ITEM NO. 6.23 FCB FURNISH AND INSTALL F.D.N.Y. MANHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #140

ITEM NO. 6.23 HC FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B

ITEM NO. 6.23 HFCA FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B

to be measured for payment shall be the number of new manhole or sidewalk handhole frames with covers or manhole or sidewalk handhole covers incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(L) The quantities of

ITEM NO. 6.23 RH REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE

ITEM NO. 6.23 RM REMOVE EXISTING F.D.N.Y. MANHOLE

to be measured for payment shall be the number of F.D.N.Y. manholes or sidewalk handholes actually removed, as specified, at the location shown or as directed, to the satisfaction of the Engineer.

(M) The quantities of

ITEM NO. 6.23 RIC RODDING AND INSTALLING FIRE ALARM CABLE IN EXISTING TELEPHONE CONDUIT SYSTEM

ITEM NO. 6.23 RICA ROD AND ROPE CONDUIT AND INSTALL 4 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICB ROD AND ROPE CONDUIT AND INSTALL 10 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICC ROD AND ROPE CONDUIT AND INSTALL 15 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICD ROD AND ROPE CONDUIT AND INSTALL 20 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICE ROD AND ROPE CONDUIT AND INSTALL 25 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICF ROD AND ROPE CONDUIT AND INSTALL 30 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICG ROD AND ROPE CONDUIT AND INSTALL 40 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICH ROD AND ROPE CONDUIT AND INSTALL 45 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICI ROD AND ROPE CONDUIT AND INSTALL 50 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICJ ROD AND ROPE CONDUIT AND INSTALL 55 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RICK ROD AND ROPE CONDUIT AND INSTALL 60 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM

ITEM NO. 6.23 RR ROD AND ROPE EXISTING CONDUIT

ITEM NO. 6.23 XY FURNISH AND INSTALL POLYPROPYLENE DRAG ROPE

to be measured for payment shall be the number of linear feet of drag rope, with or without rodding, or cable with rodding, including slack, incorporated in the work, complete, as shown, specified or required, to the satisfaction of the Engineer, measured along the center line of each run of drag rope.

(N) The quantities of

ITEM NO. 6.23 XAPE FURNISH AND INSTALL 1/2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA

ITEM NO. 6.23 XBPE FURNISH AND INSTALL 2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA

ITEM NO. 6.23 XCPE FURNISH AND INSTALL”3" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146

ITEM NO. 6.23 XDPE FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146

to be measured for payment shall be the number of each type of conduit pole riser installed in the work, complete, as shown, specified or required, to the satisfaction of the Engineer.

(O) The quantity of

ITEM NO. 6.23 PP PAINT EXISTING FIRE ALARM POST AND/OR BOX

to be measured for payment shall be the number of fire alarm posts and/or boxes painted, complete, as specified or required, to the satisfaction of the Engineer.

6.23.6. PRICES TO COVER. Before payment is made for work done under this Section, the Contractor shall obtain a Certificate of Compliance from the Fire Department and file such certificate with the Engineer. The said certificate shall certify that all work at each location complies with the standards of, and is acceptable to, the Fire Department, Bureau of Communications.

The following contract items shall also include the cost of the permits and the letter of acceptance required and necessary to construct the new Fire Communications System at the locations shown or required all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(A) The contract prices bid for

ITEM NO. 6.23 AA FURNISH AND INSTALL FIRE ALARM POST IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 AB REMOVE EXISTING FIRE ALARM POST
ITEM NO. 6.23 AC ADJUST FIRE ALARM POST TO NEW GRADE IN ACCORDANCE WITH F.D. STD. DWG. #167
ITEM NO. 6.23 BA FURNISH AND INSTALL FIRE ALARM POST AND SUBBASE IN ACCORDANCE WITH F.D. STD. DWG. #141

shall be a unit price for each and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install fire alarm post with or without subbase, as specified, and at the location shown or as directed and as shown on the Fire Department Standards; or to remove the fire alarm post and/or empty housing at the locations shown and deliver them to the Fire Department's Storehouse as directed; and shall include, but not be limited to, adjustment of base, subbase, and terminal box appurtenances, as may be required, at the locations shown or as directed. Said work shall include, but not be limited to, furnishing and installing base, subbase when specified, and appurtenances; connections; and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(B) The contract prices bid for

ITEM NO. 6.23 AF FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA
ITEM NO. 6.23 AFA FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA WITHOUT TERMINATING CABLES
ITEM NO. 6.23 BF FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146
ITEM NO. 6.23 BFE FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146 WITHOUT TERMINATING CABLES

shall be a unit price for each type pole terminal box and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the pole terminal box of the type and at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not limited to, connections, cable terminations, and furnishing and installing all other items necessary to complete this work and doing all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(C) The contract prices bid for

ITEM NO. 6.23 BBS	FURNISH AND INSTALL 3” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 BBSE	FURNISH AND INSTALL 3” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 BH	FURNISH AND INSTALL 4” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA
ITEM NO. 6.23 BHE	FURNISH AND INSTALL 4” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA
ITEM NO. 6.23 CB	FURNISH AND INSTALL 2 – 3” 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 CBE	FURNISH AND INSTALL 2 – 3” 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141
ITEM NO. 6.23 XBB	FURNISH AND INSTALL 2” GALVANIZED STEEL 90 DEGREE BEND (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB
ITEM NO. 6.23 XBBE	FURNISH AND INSTALL 2” GALVANIZED STEEL 90 DEGREE BEND (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB
ITEM NO. 6.23 XCC	FURNISH AND INSTALL”3" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XCCE	FURNISH AND INSTALL”3" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 XDD	FURNISH AND INSTALL”4" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XDDE	FURNISH AND INSTALL”4" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)

shall be a unit price for each type of conduit bend, single or double, with or without pavement excavation, as specified, and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install a two (2”) or three (3”) or four (4”) inch bend, single or double in one trench, of eighteen (18”) inch radius for fire alarm posts or poles at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, excavation and backfilling, connections, and furnishing and installing all other items necessary to complete this work and doing all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(D) The contract prices bid for

ITEM NO. 6.23 BCS	FURNISH AND INSTALL 3” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 BCSE	FURNISH AND INSTALL 3” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 BGS	FURNISH AND INSTALL 4” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 BGSE	FURNISH AND INSTALL 4” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 BGT	FURNISH AND INSTALL 2 – 4” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 BGTE	FURNISH AND INSTALL 2 – 4” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 CC	FURNISH AND INSTALL 2 – 3” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)

ITEM NO. 6.23 CCE FURNISH AND INSTALL 2 – 3” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)
ITEM NO. 6.23 XB FURNISH AND INSTALL 2” GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XBE FURNISH AND INSTALL 2“ GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 XC FURNISH AND INSTALL 3” GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XCE FURNISH AND INSTALL 3” GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)
ITEM NO. 6.23 XD FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)
ITEM NO. 6.23 XDE FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)

shall be a unit price per linear foot for each size and kind of fire communication conduit and forty-eight (48”) inch radius bends, single or double, with or without pavement excavation, as specified, and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the fire communication conduit (single or double in one trench) of the sizes and kind (P.V.C. or Galvanized Steel) specified, to the lines and grades and at the locations shown or as directed, with or without pavement excavation, as specified, of all materials of whatever nature encountered (except excavation of boulders in open cut and ledge rock). Said work shall also include, but not limited to, concrete cradles and encasements as required; all sheeting and bracing; pumping; bridging, decking; removal or abandonment, as required, of parts of the existing Fire Communications System; breaking down and filling in of abandoned fire appurtenances; furnishing and installing select granular fill material for backfill; backfilling; compaction; cleaning up; temporary restoration of street surfaces; installation and removal of temporary fire alarm communication facilities, if required; connections; and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(E) The contract prices bid for

ITEM NO. 6.23 BD FURNISH AND INSTALL 4 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DC FURNISH AND INSTALL 10 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDA FURNISH AND INSTALL 15 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDB FURNISH AND INSTALL 20 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDC FURNISH AND INSTALL 25 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDD FURNISH AND INSTALL 30 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DDE FURNISH AND INSTALL 40 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DF FURNISH AND INSTALL 45 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DG FURNISH AND INSTALL 50 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DH FURNISH AND INSTALL 55 PAIR FIRE ALARM CABLE
ITEM NO. 6.23 DJ FURNISH AND INSTALL 60 PAIR FIRE ALARM CABLE

shall be a unit price per linear foot for each size and type of fire alarm cable, and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the fire alarm cable of the sizes and at the locations shown or as directed. Said work shall also include, but not be limited to, the cost of splices as required; cutting existing conduit, if required; protection and maintenance of the system for the duration of the guarantee period as required; and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(F) The contract prices bid for

ITEM NO. 6.23 BE FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE “A” WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, & #144E
ITEM NO. 6.23 BES FURNISH AND INSTALL FIRE DEPARTMENT SLOTTED MANHOLE TYPE “A” WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144S & #144E

ITEM NO. 6.23 EB FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE “B” WITH FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, #144C, #144CC, & #144E

ITEM NO. 6.23 HH FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144B OR#144E

ITEM NO. 6.23 HHA FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143

ITEM NO. 6.23 HHS FURNISH AND INSTALL F.D.N.Y. SIDEWALK SLOTTED HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144E OR #144BS

shall be a unit price for each type manhole or sidewalk handhole and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the Fire Department manhole with frame and cover or sidewalk handhole with frame and cover, as specified, at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not limited to, excavation of all materials of whatever nature encountered (except excavation of boulders in open cut and ledge rock); reinforcement; all sheeting and bracing; pumping; bridging, decking; removal or abandonment, as required of parts of the existing Fire Communications System; breaking down and filling in of abandoned fire appurtenances; backfill; compaction; cleaning up; temporary restoration of street surfaces; installation and removal of temporary fire alarm communication facilities, if required; connections; and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(G) The contract prices bid for

ITEM NO. 6.23 BFA FURNISH AND INSTALL FIRE DEPARTMENT 48 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES

ITEM NO. 6.23 BFB FURNISH AND INSTALL FIRE DEPARTMENT 24 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES

ITEM NO. 6.23 BFC FURNISH AND INSTALL FIRE DEPARTMENT 12 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES

shall be a unit price bid for each type cable terminal box and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the cable terminal box of the type and at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, connections, cable terminations, and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(H) The contract price bid for

ITEM NO. 6.23 BGB FURNISH AND INSTALL”4" PVC CONDUIT TO”4" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

ITEM NO. 6.23 BGD FURNISH AND INSTALL”3" PVC CONDUIT TO”3" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

ITEM NO. 6.23 BGR FURNISH AND INSTALL 4” PVC CONDUIT TO 2” GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA

ITEM NO. 6.23 BGRA FURNISH AND INSTALL”4" PVC CONDUIT TO”3" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

ITEM NO. 6.23 BGRC FURNISH AND INSTALL”3" PVC CONDUIT TO”2" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

ITEM NO. 6.23 BGRE FURNISH AND INSTALL”3" PVC CONDUIT TO”4" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146

shall be a unit price bid for each reducer and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install a bushing of the type specified and at the location shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(I) The contract price bid for

ITEM NO. 6.23 BP FURNISH AND INSTALL FIRE ALARM PEDESTAL BUMPERS (2 REQUIRED PER SET) IN ACCORDANCE WITH F.D. STD. DWG. #168

shall be a unit price for each set of bumpers (2 required per set) and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install bumpers at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, excavation and backfill; furnishing and installing concrete; compaction; cleaning up; temporary restoration of sidewalk surfaces; painting; and furnishing and installing all other items necessary to complete this work; and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(J) The contract prices bid for

ITEM NO. 6.23 FC REMOVE EXISTING F.D.N.Y. MANHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140

ITEM NO. 6.23 HFC REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 & #144B

shall be a unit price for each and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to remove existing F.D.N.Y. manhole frame and cover or sidewalk handhole frame & cover and furnish and install manhole frame and cover or sidewalk handhole frame & cover, at the locations shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(K) The contract prices bid for

ITEM NO. 6.23 FCA FURNISH AND INSTALL F.D.N.Y. MANHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140

ITEM NO. 6.23 FCB FURNISH AND INSTALL F.D.N.Y. MANHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #140

ITEM NO. 6.23 HC FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B

ITEM NO. 6.23 HFCA FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B

shall be a unit price bid for each type and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install the Fire Department manhole frame and/or cover or furnish and install sidewalk handhole fame and/or cover, at the location shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, the excavation of all materials of whatever nature encountered (except excavation of boulders in open cut and ledge rock); reinforcement; removal or abandonment, as required of parts of the existing Fire Communications System; breaking down and filling in of abandoned fire appurtenances; backfill; compaction; cleaning up; temporary restoration of street surfaces; installation and removal of temporary fire alarm communication facilities, if required; connections; and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(L) The contract prices bid for

ITEM NO. 6.23 RH REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE

ITEM NO. 6.23 RM REMOVE EXISTING F.D.N.Y. MANHOLE

shall be a unit price for each manhole or sidewalk handhole and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to remove an existing Fire Department manhole or sidewalk handhole, as specified, at the location shown or as directed. Said work shall also include, but not limited to, the removal or abandonment of an existing F.D.N.Y. manhole or sidewalk handhole; breaking down and filling in of abandoned fire appurtenances; furnishing and installing backfill; compaction; cleaning up; temporary restoration of street surfaces, if required; and furnishing and

installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(M) The contract prices bid for

ITEM NO. 6.23 RIC	RODDING AND INSTALLING FIRE ALARM CABLE IN EXISTING TELEPHONE CONDUIT SYSTEM
ITEM NO. 6.23 RICA	ROD AND ROPE CONDUIT AND INSTALL 4 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICB	ROD AND ROPE CONDUIT AND INSTALL 10 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICC	ROD AND ROPE CONDUIT AND INSTALL 15 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICD	ROD AND ROPE CONDUIT AND INSTALL 20 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICE	ROD AND ROPE CONDUIT AND INSTALL 25 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICF	ROD AND ROPE CONDUIT AND INSTALL 30 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICG	ROD AND ROPE CONDUIT AND INSTALL 40 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICH	ROD AND ROPE CONDUIT AND INSTALL 45 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICI	ROD AND ROPE CONDUIT AND INSTALL 50 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICJ	ROD AND ROPE CONDUIT AND INSTALL 55 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RICK	ROD AND ROPE CONDUIT AND INSTALL 60 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM
ITEM NO. 6.23 RR	ROD AND ROPE EXISTING CONDUIT
ITEM NO. 6.23 XY	FURNISH AND INSTALL POLYPROPYLENE DRAG ROPE

shall be a unit price per linear foot for drag rope with or without rodding, or cable with rodding and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install drag rope of the type specified at the locations shown or as directed and as shown on the Fire Department Standards, including furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(N) The contract prices bid for

ITEM NO. 6.23 XAPE	FURNISH AND INSTALL 1/2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA
ITEM NO. 6.23 XBPE	FURNISH AND INSTALL 2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA
ITEM NO. 6.23 XCPE	FURNISH AND INSTALL”3" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146
ITEM NO. 6.23 XDPE	FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146

shall be a unit price for each type of conduit pole riser and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to furnish and install each type of pole riser at the location shown or as directed and as shown on the Fire Department Standards. Said work shall also include, but not be limited to, connections, and furnishing and installing all other items necessary to complete this work and doing all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

(O) The contract price bid for

ITEM NO. 6.23 PP	PAINT EXISTING FIRE ALARM POST AND/OR BOX

shall be a unit price for each fire alarm post and/or box and shall cover the cost of all labor, materials, plant, equipment, insurance, samples, and tests required and necessary to paint existing fire alarm posts and/or boxes as directed and doing all work incidental thereto, all in accordance with the Contract Drawings, Specifications and Standards, and as directed by the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.23 AA	FURNISH AND INSTALL FIRE ALARM POST IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 AB	REMOVE EXISTING FIRE ALARM POST	EACH
6.23 AC	ADJUST FIRE ALARM POST TO NEW GRADE IN ACCORDANCE WITH F.D. STD. DWG. #167	EACH
6.23 AF	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY)BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA	EACH
6.23 AFA	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (CHIPPY) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA WITHOUT TERMINATING CABLES	EACH
6.23 BA	FURNISH AND INSTALL FIRE ALARM POST AND SUBBASE IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 BBS	FURNISH AND INSTALL 3” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 BBSE	FURNISH AND INSTALL 3” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 BCS	FURNISH ANC INSTALL 3” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)	L.F.
6.23 BCSE	FURNISH AND INSTALL 3” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)	L.F.
6.23 BD	FURNISH AND INSTALL 4-PAIR FIRE ALARM CABLE	L.F.
6.23 BE	FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE “A” WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, & #144E	EACH
6.23 BES	FURNISH AND INSTALL FIRE DEPARTMENT SLOTTED MANHOLE TYPE “A” WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144S & #144E	EACH
6.23 BF	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146	EACH
6.23 BFA	FURNISH AND INSTALL FIRE DEPARTMENT 48 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES	EACH
6.23 BFB	FURNISH AND INSTALL FIRE DEPARTMENT 24 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES	EACH
6.23 BFC	FURNISH AND INSTALL FIRE DEPARTMENT 12 WIRE TERMINAL BOX AND TERMINATE FIRE ALARM CABLES	EACH
6.23 BFE	FURNISH AND INSTALL FIRE DEPARTMENT POLE TERMINAL (HOFFMAN) BOX IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #146 WITHOUT TERMINATING CABLES	EACH
6.23 BGB	FURNISH AND INSTALL”4" PVC CONDUIT TO”4" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146	EACH
6.23 BGD	FURNISH AND INSTALL”3" PVC CONDUIT TO”3" GALVANIZED STEEL BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146	EACH
6.23 BGR	FURNISH AND INSTALL 4” PVC CONDUIT TO 2” GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA	EACH
6.23 BGRA	FURNISH AND INSTALL”4" PVC CONDUIT TO”3" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD.	

	DWG. #145AA OR 146	EACH
6.23 BGRC	FURNISH AND INSTALL”3" PVC CONDUIT TO”2" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146	EACH
6.23 BGRE	FURNISH AND INSTALL”3" PVC CONDUIT TO”4" GALVANIZED STEEL REDUCER BUSHING AS SHOWN IN F.D. STD. DWG. #145AA OR 146	EACH
6.23 BGS	FURNISH AND INSTALL 4” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION)	L.F.
6.23 BGSE	FURNISH AND INSTALL 4” P.V.C. CONDUIT, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION)	L.F.
6.23 BGT	FURNISH AND INSTALL 2 – 4” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)	L.F.
6.23 BGTE	FURNISH AND INSTALL 2 – 4” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)	L.F.
6.23 BH	FURNISH AND INSTALL 4” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA	EACH
6.23 BHE	FURNISH AND INSTALL 4” 90 DEGREE P.V.C. WIDE BEND, SCHEDULE 40, U.L. 651 (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141 OR #145AA	EACH
6.23 BP	FURNISH AND INSTALL FIRE ALARM PEDESTAL BUMPERS (2 REQUIRED PER SET) IN ACCORDANCE WITH F.D. STD. DWG. #168	SETS
6.23 CB	FURNISH AND INSTALL 2 – 3” 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 CBE	FURNISH AND INSTALL 2 – 3” 90 DEGREE P.V.C. WIDE BENDS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #141	EACH
6.23 CC	FURNISH AND INSTALL 2 – 3” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITHOUT PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)	L.F.
6.23 CCE	FURNISH AND INSTALL 2 – 3” P.V.C. CONDUITS, SCHEDULE 40, U.L. 651 IN ONE TRENCH (WITH PAVEMENT EXCAVATION, ONE ON TOP OF THE OTHER)	L.F.
6.23 DC	FURNISH AND INSTALL 10 PAIR FIRE ALARM CABLE	L.F.
6.23 DDA	FURNISH AND INSTALL 15 PAIR FIRE ALARM CABLE	L.F.
6.23 DDB	FURNISH AND INSTALL 20 PAIR FIRE ALARM CABLE	L.F.
6.23 DDC	FURNISH AND INSTALL 25 PAIR FIRE ALARM CABLE	L.F.
6.23 DDD	FURNISH AND INSTALL 30 PAIR FIRE ALARM CABLE	L.F.
6.23 DDE	FURNISH AND INSTALL 40 PAIR FIRE ALARM CABLE	L.F.
6.23 DF	FURNISH AND INSTALL 45 PAIR FIRE ALARM CABLE	L.F.
6.23 DG	FURNISH AND INSTALL 50 PAIR FIRE ALARM CABLE	L.F.
6.23 DH	FURNISH AND INSTALL 55 PAIR FIRE ALARM CABLE	L.F.
6.23 DJ	FURNISH AND INSTALL 60 PAIR FIRE ALARM CABLE	L.F.
6.23 EB	FURNISH AND INSTALL FIRE DEPARTMENT MANHOLE TYPE “B” WITH FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140, #144, #144C, #144CC, & #144E	EACH
6.23 FC	REMOVE EXISTING F.D.N.Y. MANHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140	EACH
6.23 FCA	FURNISH AND INSTALL F.D.N.Y. MANHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #140	EACH
6.23 FCB	FURNISH AND INSTALL F.D.N.Y. MANHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #140	EACH
6.23 HC	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B	EACH

6.23 HFC	REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER AND FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME & COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 & #144B	EACH
6.23 HFCA	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143 OR #144B	EACH
6.23 HH	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144B OR #144E	EACH
6.23 HHA	FURNISH AND INSTALL F.D.N.Y. SIDEWALK HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #143	EACH
6.23 HHS	FURNISH AND INSTALL F.D.N.Y. SIDEWALK SLOTTED HANDHOLE WITH FRAME AND COVER IN ACCORDANCE WITH F.D. STD. DWG. #144E OR #144BS	EACH
6.23 PP	PAINT EXISTING FIRE ALARM POST AND/OR BOX	EACH
6.23 RH	REMOVE EXISTING F.D.N.Y. SIDEWALK HANDHOLE	EACH
6.23 RIC	RODDING AND INSTALLING FIRE ALARM CABLE IN EXISTING TELEPHONE CONDUIT SYSTEM	L.F.
6.23 RICA	ROD AND ROPE CONDUIT AND INSTALL 4 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICB	ROD AND ROPE CONDUIT AND INSTALL 10 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICC	ROD AND ROPE CONDUIT AND INSTALL 15 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICD	ROD AND ROPE CONDUIT AND INSTALL 20 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICE	ROD AND ROPE CONDUIT AND INSTALL 25 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICF	ROD AND ROPE CONDUIT AND INSTALL 30 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICG	ROD AND ROPE CONDUIT AND INSTALL 40 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICH	ROD AND ROPE CONDUIT AND INSTALL 45 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICI	ROD AND ROPE CONDUIT AND INSTALL 50 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICJ	ROD AND ROPE CONDUIT AND INSTALL 55 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RICK	ROD AND ROPE CONDUIT AND INSTALL 60 PAIR FIRE ALARM CABLE IN EXISTING VERIZON OR FIRE DEPARTMENT CONDUIT SYSTEM	L.F.
6.23 RM	REMOVE EXISTING F.D.N.Y. MANHOLE	EACH
6.23 RR	ROD AND ROPE EXISTING CONDUIT	L.F.
6.23 XAPE	FURNISH AND INSTALL 1/2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA	EACH
6.23 XB	FURNISH AND INSTALL 2” GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)	L.F.
6.23 XBB	FURNISH AND INSTALL 2” GALVANIZED STEEL 90 DEGREE	

	BEND (WITHOUT PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB	EACH
6.23 XBBE	FURNISH AND INSTALL 2” GALVANIZED STEEL 90 DEGREE BEND (WITH PAVEMENT EXCAVATION) IN ACCORDANCE WITH F.D. STD. DWG. #145BB	EACH
6.23 XBE	FURNISH AND INSTALL 2“ GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)	L.F.
6.23 XBPE	FURNISH AND INSTALL 2” GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA	EACH
6.23 XC	FURNISH AND INSTALL 3” GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)	L.F.
6.23 XCC	FURNISH AND INSTALL”3" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)	EACH
6.23 XCCE	FURNISH AND INSTALL”3" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)	EACH
6.23 XCE	FURNISH AND INSTALL 3” GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)	L.F.
6.23 XCPE	FURNISH AND INSTALL”3" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146	EACH
6.23 XD	FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT (WITHOUT PAVEMENT EXCAVATION)	L.F.
6.23 XDD	FURNISH AND INSTALL”4" GALVANIZED STEEL 90-DEGREE BEND (WITHOUT PAVEMENT EXCAVATION)	EACH
6.23 XDDE	FURNISH AND INSTALL”4" GALVANIZED STEEL 90-DEGREE BEND (WITH PAVEMENT EXCAVATION)	EACH
6.23 XDE	FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT (WITH PAVEMENT EXCAVATION)	L.F.
6.23 XDPE	FURNISH AND INSTALL”4" GALVANIZED STEEL CONDUIT POLE RISER IN ACCORDANCE WITH FIRE DEPARTMENT STANDARD DRAWING #145AA OR #146	EACH
6.23 XY	FURNISH AND INSTALL POLYPROPYLENE DRAG ROPE	L.F.

SECTION 6.24 – Asphaltic Concrete Sidewalk

6.24.1. INTENT. This section describes Asphaltic Concrete Sidewalk.

6.24.2. DESCRIPTION.

(A) Asphaltic Concrete Sidewalk shall consist of a course of fine asphaltic concrete, two (2") inches in thickness, after compaction, laid on a three (3") inch foundation course of screenings.

(B) Asphaltic Concrete Mowing Strip shall consist of a course of fine asphaltic concrete, two and one-half (2-1/2") inches in thickness, after compaction, laid on a three (3") inch foundation course of screenings.

6.24.3. MATERIALS. Fine asphaltic concrete shall comply with the requirements of Section 3.01, subject to **Subsection 6.24.4.(E)** herein below.

Screenings shall comply with the requirements of **Section 2.02** for Type 1, Grade B, Table 2.02-II, Screenings.

Preformed joint filler shall comply with the requirements of Type IV, **Section 2.15**.

Lumber for side and end forms, to remain in place, shall have a nominal thickness of two (2") inches and a depth equal to the combined thickness of compacted surface and foundation courses.

6.24.4. METHODS.

(A) Excavation, preparation of subgrade and placement of the foundation course (except for thickness) shall comply with **Subsections 4.13.4.(A)** and **4.13.4.(B)**.

(B) Prior to placing the foundation course, side and end forms shall be installed with tops set to the proposed sidewalk grade. Forms shall be securely anchored and braced to prevent any movements or changes in sidewalk width or alignment during construction operations. Forms shall be left in place at the completion of sidewalk construction.

(C) The Contractor shall remove all braces, anchors and supports from forms and backfill behind forms after sidewalk is completed.

(D) After compaction of the foundation course to the required thickness and to the satisfaction of the Engineer, the surface course shall be laid in accordance with the applicable requirements of **Subsection 4.02.4**.

(E) The roller used for compacting the surface course shall be of sufficient weight to insure that the density of the compacted mixture, determined in accordance with ASTM Designation D1188, shall not be less than 90% of the theoretical maximum density. When the weight of a furnished roller is less than five (5) tons, the asphalt cement content of the surface mixture shall be increased one-half (1/2) percent.

(F) Immediately after spreading or as soon thereafter as is practicable without causing undue displacement, the surface course shall be thoroughly compacted by rolling with an approved tandem steel-wheeled roller. Rolling shall be progressed longitudinally and shall be continuous from commencement to final completion of compression at a speed not exceeding three (3) m.p.h. until no further compression results, the mixture has cooled, no marks show under the roller, and the surface is smooth and free from all depressions, waves, bunches and unevenness. The final surface shall be tested with an approved straightedge, ten (10') feet long, or approved surface testing machine, laid parallel with the center line of the sidewalk and any irregularity exceeding one-quarter (1/4") inch shall be immediately corrected to the satisfaction of the Engineer.

(G) Preformed joint filler shall be placed between asphaltic concrete sidewalk and abutting curbs, non-bituminous sidewalks and buildings. Filler shall be one-quarter (1/4") inch or one-half (1/2") inch thick and the width shall equal the depth of the surface plus the foundation course.

6.24.5. MEASUREMENT. The quantity to be measured for payment shall be the number of square feet of asphaltic concrete surface course in the asphaltic concrete sidewalk, as placed in the work.

6.24.6. PRICE TO COVER. The contract price bid per square foot shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work, including but not limited to the furnishing and incorporation of all forms and preformed joint filler, and

the furnishing of samples for testing, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.24	ASPHALTIC CONCRETE SIDEWALK	S.F.
6.24 MS	2-1/2” ASPHALTIC CONCRETE MOWING STRIP	S.F.

SECTION 6.25 – Temporary Signs

6.25.1. INTENT. This section describes the work of providing Temporary Signs.

6.25.2. DESCRIPTION. The work shall consist of the fabrication, furnishing, installation, erection, assembly and maintenance of temporary warning, detour, regulatory, guide and directional signs required to properly stage the work and maintain traffic and shall include the furnishing and incorporation of sign supports and posts; the furnishing and installation of all fastening devices and miscellaneous appurtenances; and the relocation, removal and disposal of signs or sign assemblies.

6.25.3. MATERIALS AND METHODS. All materials and the details of fabrication, location, relocation, and assembly shall be as shown on the Contract Drawings, outlined in the Special Provisions, and in accordance with the applicable standards of the New York City Department of Transportation, Division of Traffic Operations or the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition, where applicable, the following requirements, and as approved by the Engineer.

Sign panels may be made of aluminum or plywood except when placed on Type III Breakaway Barricades, then sign material shall conform to the requirements for aluminum panels. Aluminum sign panels shall be 0.025” thick. Plywood sign panels and plywood battens shall be 3/4” thick, exterior grade.

The back of each sign shall be clearly labeled with the Contractor’s Company Logo, the Agency Name (NYCDDC) and the Contract Number, each from 1-1/2 to 2 inches in height, as approved by the Engineer.

The erection of the signs shall comply with the applicable details of Drawing Nos. SD-225A, SD-225B and SD-225F of the Division of Traffic Operations, and the directions of the Engineer.

Where signs are mounted on barricades, as required, or as approved by the Engineer, the signs shall be sturdily fastened to the barricades using adequate metal brackets and supports and a minimum of three (3) bolts with nuts along the upper and lower portions of the signs (6 bolts total), comparable to the installation of signs on lampposts as shown on Traffic Drawing No. SD-225B, all as approved by the Engineer. All signs shall be erected plumb and facing in the proper direction and angle as directed by the Engineer. The use of wire, twine or other similar temporary measures to fasten the signs to the barricades will not be permitted.

No painted signs will be permitted and all orange reflective sheeting applied to rigid substrates shall be one of the following listed fluorescent orange reflective sheeting materials or an approved equal:

> Scotchlite Durable Fluorescent Diamond Grade Sheeting 3924 F/G Orange as manufactured by the 3M Company, Traffic Control Materials Division. Diamond shaped signs shall use 3924F reflective sheeting. Square or rectangular shaped signs shall use 3924G reflective sheeting.
>
> Stimsonite Florescent Orange High-Performance Grade Retroreflective Sheeting No. 4380.

Approved reflective sheeting shall be installed in accordance with the manufacturer's written instructions, and to the satisfaction and approval of the Engineer. Intermixing of fluorescent orange sheeting signs with non-fluorescent orange flexible "roll-up" signs within the same series of signs will not be allowed.

All temporary regulatory and/or “NO PARKING - CONSTRUCTION” signs used during the construction period are to be furnished by the Contractor, as required. The Contractor shall install these signs where directed by the Engineer, and, when no longer required, shall carefully remove these signs and deliver them to the New York City Department of Transportation, Bureau of Traffic. A credit of fifty (50) dollars will be taken for each sign not so delivered.

6.25.4. MEASUREMENT. The quantity to be measured for payment shall be the number of square feet of legend face of signs initially furnished and installed. The area of relocated signs will not be measured for payment.

6.25.5. PRICE TO COVER. The contract price per square foot shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.25 RS	TEMPORARY SIGNS	S.F.

SECTION 6.26 – Timber Curb

6.26.1. INTENT. This section describes the construction and placement of Timber Curb.

6.26.2. DESCRIPTION. The work shall include the furnishing of all necessary timber, lumber, reflective material, anchoring and fastening materials; drilling and cutting, as required; paints and painting; and constructing, placing, maintaining and disposing of timber curb as required.

6.26.3. MATERIALS. Timber and lumber shall be dense, structural grade Douglas Fir or Southern Yellow Pine, conforming to the requirements of Section 2.40.

Lag screws shall be 3/4" diameter by ten (10") inches long. Anchor spikes shall be one (1") inch diameter by not less than twenty-four (24") inches long. Splice spikes shall be 40d.

Striping shall be done with white and orange enamel as required by the New York City Department of Transportation's Standard Details of Construction Standard Drawing.

Reflective material shall conform to the requirements of ASTM Designation B589 "Standard Specification of Refined Palladium."

6.26.4. METHODS. Construction of timber curb shall comply with the Department's Standard Dwg. H-1012 or as shown on the Contract Drawings.

Spike holes in 12" x 12" timber and in the 2" x 8" splice plates shall be predrilled.

Reflective material shall be wrapped around posts, lapped and tacked on a side opposite the traffic face or side of post.

After assembly, the front and rear faces and the top of 12" x 12" timbers shall be painted with alternate white and orange stripes. Two (2) coats of each color shall be used. White stripes shall be thirteen (13") inches wide and orange stripes shall be eleven (11") inches wide.

Timber curb units shall be placed where shown or directed with traffic faces flush. Abutting ends of units shall be spliced. Unless otherwise directed by the Engineer, both ends of all units shall be spiked into the ground or surface material.

Timber curb shall be maintained in first class condition at all times to the satisfaction of the Engineer. Maintenance shall include the replacement of damaged components; refastening; repainting; anchoring or re-anchoring; replacing and re-affixing reflective material; and re-splicing; all, when necessary or ordered and directed by the Engineer.

At the completion of the work or when directed by the Engineer, timber curb shall be removed and disposed of away from the work site.

6.26.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of timber curb constructed and placed, complete, based upon the summation of the lengths of the individual units so constructed and placed measured along the center line on top of the 12" x 12" timbers.

Payment will be made for timber curb only for the initial installation at any location. Whenever timber curbs are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Whenever the Contractor proposes to move curb to a new location it is subject to approval of the Engineer and must be in accordance with the latest approved progress schedule. Minor movement of the timber curbs within a work area will <u>not</u> be considered as a movement to a new location and will <u>not</u> entitle the Contractor to additional payment. Minor movement within a work area includes, but is not limited to:

- Movement from one side of the roadway to the other side;
- Movement to adjust the roadway or work zone width;
- Movement required to access the work zone or to secure the work zone;
- Linear movement of less than one block within an established work zone; or
- Rearrangement within a work area.

No payment will be made: for movements of curbs made for the Contractor's convenience; for movement of curbs at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of curbs at a given location during a work period

and subsequent replacement at the same location during the same work period; or for the interchanging of curbs between initial installations.

6.26.6. PRICES TO COVER. The contract prices bid per linear foot for Timber Curb shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Where there is no scheduled item for Timber Curb, the cost of furnishing, installation, maintenance, relocation, and subsequent removal of Timber Curb as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic item.

Payment will be made under:

Item No.	Item	Pay Unit
6.26	TIMBER CURB	L.F.

SECTION 6.27 – Demolition of Structures

6.27.1. INTENT. This section describes the demolition of buildings and other structures.

6.27.2. DESCRIPTION. In addition to furnishing all necessary labor, materials, plant, equipment, and necessary incidentals required, the work shall include the demolition, removal and disposal of entire or portions of buildings or other structures, as indicated on the Contract Drawings, specified or directed by the Engineer, together with all appurtenances, sheds, extensions, fences, railings, stoops, steps, porches, areaways, chimneys, cellars, sub-cellars, debris and refuse of all kinds, and other miscellaneous structures.

6.27.3. GENERAL.

(A) LAWS, PERMITS, ETC.

The Contractor shall comply with all laws, ordinances, statutes, rules and regulations relating to the demolition of buildings or structures; the removal and disposal of materials resulting from demolition operations; the protection of adjacent properties and the general public; and the furnishing and maintenance of passageways, guard fences and other protective facilities. The Contractor shall obtain all required permits and licenses, pay all fees and give all notices necessary for the prosecution of the work.

(B) DISPOSAL

All materials resulting from demolition operations or required to be excavated in connection with such operations, except as otherwise provided or directed, shall be disposed of by the Contractor away from the demolition site and the site of the contract work. Said materials shall not be dumped, placed, stored or disposed of within the limits of any existing or projected public street or road. The burning of debris or other demolition materials will not be permitted except as approved and authorized by the New York City Fire Department, the New York State Department of Environmental Conservation, and the Engineer.

(C) CLEAN AIR ACT

The U.S. Environmental Protection Agency (E.P.A.) requires that, under the Clean Air Act and its implementing regulations, New York City agencies must notify the E.P.A. at least ten (10) days prior to demolition of any institutional, commercial or industrial building in which asbestos is used for insulation or fireproofing. Under the demolition provisions of the National Emissions Standards for Hazardous Air Pollutants Program, the U.S. Government exercises jurisdiction over the uses of asbestos, beryllium and mercury, including their disposal.

These regulations specify that E.P.A. shall be notified of such information as to the methods of demolition to be employed, description and location of the building(s) to be demolished, and scheduled starting and completion dates. Advance notification enables E.P.A. to send observers to the site to ensure that proper demolition procedures are being followed.

The Contractor shall therefore notify the Engineer at least twenty (20) days in advance of any building demolition work to be performed under the contract, furnishing him the information required above, so that the Engineer can notify the E.P.A. at least ten (10) days prior to building demolition work, of the said information.

(D) DAMAGES

The Contractor shall be responsible for all damages resulting from and due to the Contractor's demolition operations. Said responsibility shall include, but not be limited to, the grounds; buildings; structures; and portions of buildings or structures which are adjacent to the demolition site and are to remain. No additional payment or compensation will be made or allowed the Contractor for costs incurred for repairs and replacements required to satisfactorily remedy the aforesaid damages or for the settlement of any claims resulting therefrom.

(E) RODENT EXTERMINATION

When required by any code, law, ordinance, statute, rule or regulation, the Contractor shall employ a licensed exterminator to rid a building or structure of rats; file an extermination certificate with the regulating agency; and submit a copy of the said certificate to the Engineer, before starting demolition operations.

(F) SALVAGE

The City assumes no responsibility for the condition or presence of salvageable materials in or on the premises. All damage to or loss of salvageable materials, whether by reason of fire, theft or other happening, shall be at the risk of the Contractor and no such loss or damage shall relieve him from any obligation under the contract or form the basis of any claim against the City.

(G) FIRE PROTECTION, ETC.

The Contractor shall furnish, employ and pay for all necessary appliances required for the adequate protection of the work against fire and to safeguard existing structures and the public. The Contractor shall at all times maintain adequate facilities for the thorough saturation of all debris and materials with water to the extent required to prevent dust arising from the work. All water used including temporary piping, connections, permits therefor, and removal of piping, when directed, shall be provided and paid for by the Contractor.

(H) DISCONNECTING UTILITY AND PUBLIC SERVICES

a. Prior to commencement of work, the Contractor shall give notice to the New York City Department of Citywide Administrative Services to have the steam, gas and electricity to the buildings to be demolished, disconnected by the utility companies owning the services. The Contractor shall obtain certifications from the utilities that the services have been terminated, and shall submit them to the Engineer, for the Engineer's approval, prior to commencement of demolition operations.

b. The Contractor shall seal or plug all storm or sanitary sewers or other connections to the sewers leading from the structure to be demolished. The Contractor shall disconnect all water services and shall make the necessary arrangements with the New York City Department of Environmental Protection, Bureau of Water and Sewer Operations, to destroy or plug the tap in the City water main. The Contractor shall obtain all permits necessary to do such work prior to the commencement of demolition. All such work shall be done in full accordance with the rules and regulations of, and to the satisfaction of the City of New York Bureaus having jurisdiction thereof.

c. The Contractor shall maintain and preserve all utilities, other than those covered by paragraphs a and b above, traversing the premises. The Contractor shall maintain in a safe condition all street openings made by him, and shall backfill and tamp them.

d. All expenses arising from or in connection with the performance of the provisions of paragraphs b and c above shall be borne by the Contractor.

(I) BLASTING

Blasting operations, when permitted by the Engineer, shall be conducted in strict conformity to all City and State ordinances and regulations relative thereto and to the storage and use of explosives. All damage to existing structures shall be promptly repaired by the Contractor at no cost to the City.

(J) CITY MONUMENTS

The Contractor shall not progress demolition operations within five (5') feet (or such greater distance which the Engineer shall direct) of any City monument which may be within the limits of or be disturbed by the herein contemplated work, nor in any manner disturb the same, but shall cease work at such places until the said monuments have been referenced and reset or otherwise disposed of, except upon special permit from the Commissioner, in accordance with the City ordinances therefor.

After permission is given to remove any monument, the Contractor shall take up and preserve such monument, and if required remove same to the nearest Department yard. The Contractor shall preserve all benchmarks, reference points and stakes placed or established on the line of the work until authorized to remove the same.

6.27.4. METHODS.

(A) EXTENT OF REMOVAL

Within the limits shown, all structures and appurtenances shall be completely removed except that foundation walls shall be removed to a depth of two (2') feet below new subgrade of pavement. Basement, vault, yard, garage and areaway floors shall be broken up to prevent accumulation of water and to expose voids and hollows beneath the floors. No piece of masonry or concrete, when broken, shall exceed eighteen

(18”) inches in its greatest dimension. When the top of an existing floor lies above or less than eighteen (18”) inches below the proposed final surface, the said floor shall be removed and disposed of by the Contractor away from the site or at such location on the site as the Engineer shall direct.

(B) PARTIAL DEMOLITION

Where the demolition consists of only a portion of a building or structure, the Contractor shall cooperate with the owner of the remaining portion to the end that annoyance and inconvenience may be minimized.

The Contractor shall close the open ends of buildings which are partially demolished with construction consisting of studs, sheathing and building paper. Supporting members and framing shall be furnished and installed and foundations shall be constructed to support remaining construction in position. Construction shall be of a strength and type to meet the requirements of the New York City Building Code and to provide for the loadings specified therein. The construction materials for the structural supports shall be of the same materials as the existing supporting members to which they frame or with which they share the load; or they shall be consistent therewith. The Contractor may use salvaged lumber for sheathing provided that such lumber is sound and suitable, in the opinion of the Engineer, for the purpose. New timber and lumber shall be used for all other purposes. The building paper used shall weigh at least 30 pounds per 100 square feet and shall be completely saturated with asphalt. All work must be approved by and meet the requirements of the Engineer. Workmanship shall be of the best and the finished work shall be neat in appearance.

(C) DELAYS IN VACANCY

A building or structure shall be demolished as it becomes vacant. There is no guarantee as to when such vacancy will occur. The Contractor will be notified when a vacancy occurs. The Contractor agrees that the Contractor has taken into consideration and made allowances for delays and expenses resulting from the uncertainty of the time when a building or structure may be vacated and made available for demolition. The Contractor shall have no claim against the City for such delays or expenses.

(D) REMOVAL AND DISPOSAL OF MATERIALS

All materials in buildings or structures, demolished hereunder, shall become the property of the Contractor, unless otherwise provided, and shall be removed and disposed of away from the site by him, including all wood, plaster, lath and debris of every kind which has been allowed to fall and accumulate in the cellars, vaults and areaways of a demolished building or structure. Before determination of Substantial Completion can be made, the Contractor must remove all falsework, temporary structures, plant of all description, equipment, and debris of every nature from the demolition area, and dispose of them away from the site.

(E) BACKFILL

All areas of demolition shall be backfilled to a level of two (2’) feet below the top of proposed curb, or to such elevation as the Engineer shall direct, with material consisting of earth and not more than fifty (50) percent of broken stone, brick masonry, and/or broken concrete. This fill shall be graded from coarse to fine with no single piece having a dimension greater than eighteen (18”) inches, and it shall be deposited so that no voids will occur. Wood, plaster, lath or any such material shall not be used. All material not acceptable for backfill shall be removed from the site. The depth between two (2’) feet below top of curb or directed elevation and the top of curb or directed elevation shall be backfilled with acceptable fill material consisting of clean earth, clean ashes, clean cinders, broken stone and broken masonry; all of which shall be free from muck, garbage, rubbish and any other perishable or objectionable material. This fill shall be graded uniformly from coarse to fine and deposited so that no voids will occur. It shall have no material larger than three (3”) inches in its greatest dimension. No frozen material will be permitted to be used for backfill.

(F) CLEAN UP

The demolition areas and the portions of the streets affected by the work shall be cleaned of all materials resulting from or used in the work to be done hereunder and shall be left in a condition satisfactory to the Engineer.

6.27.5. BREAKDOWN OF LUMP SUM PRICE. Where the demolition work involves more than one parcel, the Contractor shall submit a breakdown of the lump sum price bid which shall indicate the cost of demolition of each of the parcels. When approved by the Engineer, such breakdown shall be used as a basis for payment for all or part of the work or demolition to be done hereunder.

6.27.6. MEASUREMENT.

For 6.27: The Contractor will be paid the lump sum price bid for completing all of the work required to be done hereunder. In the event of deletion of parcels by the Engineer or if demolition of a parcel is performed by others, the lump sum price bid will be adjusted in accordance with the approved breakdown required above.

For 6.27 A: The quantity to be measured for payment shall be the number of CUBIC YARDS of material removed for disposal, measured in place, within the limits as per the specification and directed by the Engineer.

6.27.7. PRICE TO COVER. The lump sum price bid, the adjusted lump sum price, or the unit price bid per CUBIC YARD shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.27	DEMOLITION OF STRUCTURE	L.S.
6.27 A	DEMOLITION OF STRUCTURES	C.Y.

SECTION 6.28 A – Timber Barricades

6.28A.1. INTENT. This section describes the work to be done in connection with Timber Barricades.

6.28A.2. DESCRIPTION. The work shall consist of the construction, installation, erection, placement, maintenance, removal and disposal of lighted and unlighted timber barricades. It shall include the furnishing and incorporation, as required, of all timber, lumber, fastenings, anchors, reflectorizing materials, battery operated flashers, and other warning devices; all necessary excavation and backfilling; and paints and painting.

6.28A.3. MATERIALS. Timber and lumber shall be dense, structural grade Douglas Fir or Southern Yellow Pine, conforming to the requirements of Section 2.40. (See New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1013).

Reflectorizing materials shall conform to the requirements of ASTM Designation B589 "Standard Specification of Refined Palladium."

Battery operated flashing units shall be as approved by the Engineer.

All other unspecified materials shall be as approved by the Engineer.

6.28A.4. METHODS. Lighted or unlighted timber barricades shall be placed at the locations shown on the Contract Drawings or designated by the Engineer.

Unless otherwise shown on the Contract Drawings or directed by the Engineer, barricades shall be constructed, installed, erected, placed, reflectorized and lighted in conformity with the standards of the Department.

Barricades at all times shall be maintained in a condition satisfactory to the Engineer. Maintenance shall consist of the replacement of all damaged or worn out components; repainting, as required or directed; replacement of reflectorizing materials; and general rehabilitation to keep barricades in good condition during the life of the contract.

When barricades are required to be lighted, the lighting shall be by battery operated flashing units.

At the completion of the work or when directed by the Engineer, barricades shall be removed and disposed of away from the work site.

6.28A.5. MEASUREMENT AND PAYMENT. The quantity to be measured for payment shall be the number of linear feet of lighted and unlighted timber barricades installed in the work, complete, based on the summation of the lengths of individual units, measured along the center line on the face of the top rail between the ends of each unit.

Payment will be made for lighted or unlighted barricades only for the initial installation at any location. Whenever barricades are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Minor movement of the barricades from one side of the roadway to the other side, or rearrangement within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made: for movements of barricades made for the Contractor's convenience; for movement of barricades at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of barricades at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of barricades between initial installations.

6.28A.6. PRICES TO COVER. The contract prices bid per linear foot for lighted and for unlighted barricades shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Where there is no scheduled item for Timber Barricades, the cost of furnishing, installation, maintenance, relocation, and subsequent removal of Timber Barricades as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic item.

Payment will be made under:

Item No.	Item	Pay Unit
6.28 AA	LIGHTED TIMBER BARRICADES	L.F.
6.28 AB	UNLIGHTED TIMBER BARRICADES	L.F.

SECTION 6.28 B – Type III Breakaway Barricades (Alternate A or Alternate B)

6.28B.1. INTENT. This section describes the work to be done in connection with Type III Breakaway Barricades.

6.28B.2. DESCRIPTION. The work shall consist of the construction, installation, erection, placement, maintenance, removal and disposal of lighted and unlighted Type III breakaway barricades (Alternate A or Alternate B). It shall include, but not be limited to, the furnishing and incorporation, as required, of all barricade materials, fastenings, reflectorizing materials, lamps, bulbs, battery operated flashers and other warning devices.

6.28B.3. MATERIALS. All materials used for Type III Breakaway Barricades shall conform to the materials details shown on the detail drawings for the barricade used. (See New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1038). Water (H_2O) calcium chloride ($Ca\ Cl_2$) mixture shall be used for ballast in the Alternate A Barricade and shall be capable of resisting freezing to -40°F (-40°C). Calcium chloride anti-freeze will not be required from May 15 to October 1, and these dates may be extended by the Engineer with a written notice to the Contractor.

Battery operated flashing units shall be as approved by the Engineer.

All other unspecified materials shall be as approved by the Engineer.

6.28B.4. METHODS. Lighted or unlighted Type III Breakaway Barricades shall be placed at the locations shown on the Contract Drawings or designated by the Engineer.

The Type III Breakaway Barricades shall be fabricated to the dimensions shown on the detail drawings. The aluminum face panels shall be attached to the plastic frame with four (4) 1" No. 14 pan head metal screws for each panel.

Barricades, at all times, shall be maintained in a condition satisfactory to the Engineer. Maintenance shall consist of the replacement of all damaged or worn out components; replacement of reflectorizing materials; and general rehabilitation to keep barricades in good condition during the life of the contract.

When barricades are required to be lighted, the lighting shall be by battery operated flashing units which shall be so mounted to accommodate the breakaway design.

At the completion of the work or when directed by the Engineer, barricades shall be removed and disposed of away from the work site.

6.28B.5. MEASUREMENT AND PAYMENT. The quantity to be measured for payment shall be the number of linear feet of lighted and unlighted Type III breakaway barricades installed in the work, complete, based on the summation of the lengths of individual units, measured along the center line on the face of the top rail between the ends of each unit.

Payment will be made for lighted or unlighted barricades only for the initial installation at any location. Whenever barricades are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Minor movement of the barricades from one side of the roadway to the other side, or rearrangement within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made: for movements of barricades made for the Contractor's convenience; for movement of barricades at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of barricades at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of barricades between initial installations.

6.28B.6. PRICES TO COVER. The contract prices bid per linear foot for lighted and for unlighted barricades shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Where there is no scheduled item for Type III Breakaway Barricades, the cost of furnishing, installation, maintenance, relocation, and subsequent removal of Type III Breakaway Barricades as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic item.

Payment will be made under:

Item No.	Item	Pay Unit
6.28 BA	LIGHTED TYPE III BREAKAWAY BARRICADES	L.F.
6.28 BB	UNLIGHTED TYPE III BREAKAWAY BARRICADES	L.F.

SECTION 6.29 – Tubular Markers

6.29.1. INTENT. This section describes the work of furnishing, installing, maintaining, and removing tubular markers (flexible delineators).

6.29.2. DESCRIPTION.

(A) PERMANENT TUBULAR MARKERS.

Under this section, the Contractor must furnish and install permanent tubular markers as indicated on the Contract Drawings and as directed by the Engineer.

(B) TEMPORARY TUBULAR MARKERS.

Under this section, the Contractor must furnish, install, maintain, relocate, and remove, when directed, temporary tubular markers as indicated on the contract drawings and as directed by the Engineer.

6.29.3. MATERIALS. Tubular markers must conform to the specifications set forth in the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD) plus the New York State Supplemental (NYS Supplement) and shall be NCHRP 350 approved as a Category 1 device. Tubular markers must have a minimum height of 36” (900-mm) and a minimum outside diameter of 2” (50-mm). Tubular Markers must be circular or elliptical in cross section and must have a maximum weight of 13-lb (6-kg), not including a mounting base.

Tubular marker colors must be as follows:

- Temporary tubular markers: Orange with white reflective stripes
- Permanent tubular markers at pedestrian areas, mall nosings, at bollards, at white pavement markings, and all other permanent markers: White with white reflective stripes
- Permanent tubular markers at yellow pavement markings: Yellow with yellow reflective stripes
- Tubular markers at Green Infrastructure practices: Black with white stripes
- Or as directed by the Engineer

Tubular markers must have two horizontal circumferential stripes of reflective sheeting a minimum of 3” (75-mm) wide. The top edge of the upper band shall be a maximum of 2” (50-mm) from the top of the marker. The space stripes between shall not exceed 6” (150-mm).

Reflective sheeting must conform to NYSDOT Standard Highway Specification Section 730-05 Reflective Sheeting ASTM D4956 Type I or Type III. The sheeting must be bonded to the post with a precoated, pressure-sensitive adhesive or a tack-free, heat activated adhesive. Mechanical fasteners to bond reflective sheeting to the post will not be allowed.

For free-standing temporary tubular markers, the base and/or any nonflexible portion of the marker shall not be more than 2” (50-mm) in height.

For tubular markers fastened to pavement, the bonding system used must be a fast-setting chemical compound, mastic-type material, or mechanical fastener capable of fixing the tubular marker to either concrete or asphalt pavement. The bonding system must not present a hazard to traffic if the tubular marker or base unit becomes unfixed from the pavement.

Acceptance of materials will be based on the manufacturer’s name and type of tubular marker appearing on the most current NYSDOT Approved List titled “Tubular Markers (730-09).”

6.29.4. METHODS. The Contractor must install tubular markers in accordance with the Contract Documents or as directed by the Engineer. The Contractor must attach the tubular markers to the pavement in a manner that prevents them from being moved or dislodged by traffic. Tubular markers must be installed on pavement that has been cleaned to remove pavement markings, oil, dirt, or other debris or substances that may interfere with a proper bond. Attachment to the pavement must be by mechanical fastener or by adhesive, in accordance with the manufacturer’s recommendations. Bonding agents must be of sufficient amount or size to ensure proper bonding of the base to the pavement.

All temporary tubular markers must be maintained upright, at proper spacing, in proper alignment and orientation, kept clean, and replaced as required during the various stages of construction.

Temporary tubular markers removed or damaged by the Contractor's operations or by traffic must be replaced immediately, so that positive separation is maintained between opposing lanes of traffic at all times. Damaged reflective sheeting on interim tubular markers must be replaced before nightfall as necessary to maintain adequate visibility of the markers. In cases where only isolated individual markers are lost or damaged, and adequate visibility is maintained by the remaining markers, replacement will not be required until more than one (1) consecutive markers have been damaged or lost.

At the completion of the work or when directed by the Engineer, the temporary tubular markers must be removed and disposed of away from the work site.

6.29.5. MEASUREMENT.

(A) PERMANENT TUBULAR MARKERS.

The quantity to be measured for payment will be the actual number of Permanent Tubular Markers placed in the work, to the satisfaction of the Engineer.

(B) TEMPORARY TUBULAR MARKERS.

The quantity to be measured for payment will be the actual number of Temporary Tubular Markers placed in the work, to the satisfaction of the Engineer.

Payment will be made only for the initial installation of temporary tubular markers at any location. Whenever temporary tubular markers are moved to a new location, as required by the contract drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. However, only tubular markers that are in satisfactory conditions may be relocated to a new location. Minor movement of the temporary tubular markers from one side of the roadway to the other side, or rearrangement within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made for movements of Temporary Tubular Markers made for the Contractor's convenience; for movement of Temporary Tubular Markers at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of Temporary Tubular Markers at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of Temporary Tubular Markers between initial installations.

6.29.6. PRICE TO COVER.

(A) PERMANENT TUBULAR MARKERS.

The contract price bid per each for Item No. 6.29 PTM – PERMANENT TUBULAR MARKERS, will cover the cost of furnishing all labor, materials, equipment, insurance, and necessary incidentals required to complete the work of furnishing and installing permanent tubular markers, all in accordance with the contract drawings, the specifications and the directions of the Engineer. No additional payment will be made for replacing damaged markers.

(B) TEMPORARY TUBULAR MARKERS.

The contract price bid per each for Item No. 6.29 TT– - TEMPORARY TUBULAR MARKERS, will cover the cost of furnishing all labor, materials, equipment, insurance, and necessary incidentals required to complete the work of furnishing, installing, maintaining, relocating, and removing temporary tubular markers, all in accordance with the contract drawings, the specifications and the directions of the Engineer. No additional payment will be made for replacing damaged markers.

Payment will be made under:

Item No.	Item Description	Pay Unit
6.29 PTM	PERMANENT TUBULAR MARKERS	EACH
6.29 TTM	TEMPORARY TUBULAR MARKERS	EACH

SECTION 6.30 – Beam Type Guide Rail and Mall Barrier

6.30.1. INTENT. This section describes Beam Type Guide Rails and Mall Barriers.

6.30.2. DESCRIPTION. Beam Type Guide Rails and Mall Barriers shall consist of steel rail elements affixed to and supported by structural steel beam posts with blockouts. Except as otherwise shown on the Contract Drawings, specified or directed by the Engineer, the material, manufacture, fabrication and installation or erection of rails and barriers shall be in compliance with latest revision of the New York State Department of Transportation (NYSDOT) Standard Specifications, with timber, plastic or synthetic blockouts.

Relocated beam type guide rails shall consist of removing existing beam type guide rail in its entirety, cleaning the posts to the satisfaction of the Engineer, storing, and reinstalling the beam type guide rail where shown on the Contract Drawings or as directed by the Engineer. The Contractor shall be required to furnish all additional materials as may be required to reinstall the guide rail with new timber block-outs, including the replacement of parts that are missing or damaged as a result of the Contractor's operations. All material furnished shall comply with the requirements of **Subsection 6.30.3.** and shall be included in the price bid for this item.

Removal of existing guide rails shall consist of removing and disposal of the existing beam type guard rails designated to be removed.

6.30.3. MATERIALS. Materials must meet the requirements of the NYSDOT Standard Specifications as follows:

Item	NYSDOT Standard Specification Section
Wood and Timber Posts and Timber Blockouts	710-13
Galvanized Steel Barrier Posts	710-14
Guide Railing and Barrier	710-20
Plastic and Synthetic Block-outs for Heavy Post Guiderail Systems	710-26

Posts, plates and anchorage units shall be as detailed on NYSDOT Standard Sheets .

Concrete for end assembly anchors shall be Class B-32, A-40, or HE, conforming to the requirements of Section 3.05.

Reinforcement shall comply with ASTM A615, Grade 40 or higher.

The Contractor shall obtain from the manufacturer and submit to the Engineer certificates of compliance with the foregoing references. Said certificates shall in no way abridge the right of the Engineer to require or take samples for testing.

6.30.4. SHOP DRAWINGS. The Contractor shall prepare and submit shop drawings to the Engineer for approval. No installation work shall be started until the said approval has been obtained. Drawings shall show the relative positioning of mall barriers with respect to the proposed malls; the spacing of posts, including those in the adjustment panels (approximately midway between ends of malls); all necessary marking and dimensioning; and the details of fabrication and geometry of the special rail elements to be used in the adjustment panels.

The Contractor shall be responsible for the proper fit of all components and completed installations.

6.30.5. CURVED RAIL ELEMENTS. Straight lengths of rail elements may be used between posts when the radius of curvature of a line passing through the center line of installed posts is equal to or greater than 150 feet. When the said radius of curvature is less than 150 feet, rail elements shall be shop curved to match the actual radius of curvature.

6.30.6. METHODS. Immediately prior to erection, the rail elements shall be inspected for damage. Bends or kinks in the railing, not specifically required by the Contract Documents, shall constitute sufficient cause for rejection. Straightening of such bends or kinks will not be allowed.

Erection of all guide rail, median barrier, transitions and connections shall be subject to the inspection of the Engineer who shall be given all facilities required for a visual inspection of workmanship and materials.

Field galvanizing repair shall be allowed only when the total damaged area on each piece or component is less than 2 percent of the coated surface, or 16 square inches, whichever is less. Any single piece or component with total damaged area greater than the amount specified above shall be rejected and replaced by the Contractor. Field galvanizing repair shall Meet the requirements of NYSDOT Section 719, and of the material used shall be one which appears on the NYSDOT approved list 719-01.

This repair procedure is allowed only for those field repairs directed by the Engineer and shall not be allowed for shop repairs. All repairs shall be made at no cost to the City.

Posts, timber block-outs, railing, mall barriers, end assemblies and rail transitions shall be erected in the position and manner indicated on NYSDOT Standard Sheets, and in a manner approved by the Engineer.

Posts shall be driven vertically plumb to the required depth in such manner and by such means as to insure no damage to the galvanized coating material. Water jetting in driving posts will not be permitted. The driving shall be accomplished with approved equipment and methods that will leave the posts in their final position, free of any distortion, burring or other damage. When posts are driven through asphalt concrete or a bituminous treated material, the Contractor shall take care to prevent damage to the paved or treated areas. Large holes and voids caused by driving the posts shall be filled and compacted with a bituminous treated material or asphalt concrete similar to that damaged. The small area adjacent to the post disturbed during installation or where gaps exist at the post after pavement repairs shall be sealed with a bituminous material approved by the Engineer.

On structures and paved medians, base plates for posts shall be anchored as shown on the Contract Drawings and as specified by the Engineer. Where drilling and grouting is required, the Contractor shall take care to prevent damage to the concrete, asphalt or other paved surfaces. The proposed construction method and equipment for drilling and grouting of holes shall be submitted to the Engineer for approval before drilling and grouting operations begin. Anchoring devices shall be grouted with a cement grout material complying with **Section 3.06**.

The work of installing the guide railing system when it abuts stabilized shoulder courses shall be coordinated and progressed to provide the least disturbance between the two phases of the work.

All posts shall be aligned to a tolerance of 1/4 inch for plumb and grade line.

Rail elements shall be spliced at each post so that the rail element which is nearest on-coming traffic overlaps the element which is furthest. In the erection procedures, the free end of the rail element shall not be allowed to swing free and cantilever around the mounting bolt. The free end shall be supported in a manner approved by the Engineer while the splice bolts and mounting bolts are fastened. The rail elements shall be installed so the weight of the beam rests on the double nutted support bolt before the 5/16” mounting bolts are torqued. Before the final torqueing, six of the 5/16” mounting bolts in the installation shall be selected at random and with a suitable torque wrench tightened to failure. The six readings shall be averaged, the six failure bolts replaced and all the mounting bolts in the installation torqued to 50% of the average value.

Support bolts shall be installed on all the guide rail posts except the three posts adjacent to the anchors.

During non-working hours, free ends on the approach end of the guiderail shall be dropped to the ground and pinned in a manner approved by the Engineer and no uncompleted anchorage units or heavy posts without rail will be permitted on either heavy post block-out guide rails or median barrier.

For heavy post blocked-out corrugated beam guide railing connections to walls (trailing ends), the holes for the expansion anchors shall be drilled to the depths and diameters specified by the manufactures. The holes shall be drilled with care to avoid damage to the wall. Any damage caused by the drilling operation shall be repaired by the Contractor to the satisfaction of the Engineer, at no cost to the City.

To prevent loosening, bolt threads close to the nut shall be upset after a connection has been tightened to final position. Upset threads shall be completely sealed against corrosion by the application of an approved aluminum paint.

Existing beam type guiderail designated to be relocated shall be removed in its entirety by the Contractor. The Contractor shall clean the posts to the satisfaction of the Engineer, store, and reinstall the beam type guide rail in the new sidewalk where shown on the Contract Drawings or as directed by the Engineers. Reinstallation of the guiderail shall comply with the methods specified herein for installing new guiderail.

Existing beam type guiderail designated to be removed shall be completely removed by the Contractor. Removal shall include all railing, posts, foundations and other appurtenances designated as railing. The length of railing to be removed shall be as shown on the Contract Drawings, unless otherwise directed by the Engineer. All removed materials shall become the property of the Contractor and shall be disposed of by him away from the work site. All holes left by the removal operations shall be backfilled with a suitable material and compacted in a manner approved by the Engineer.

6.30.7. MEASUREMENT.

(A) BEAM GUIDE RAILING AND MALL BARRIER

The quantity of guide railing or mall barrier measured for payment shall be the number of linear feet measured along the axis of the railing and between its extreme outer limits as shown on the Contract Drawings and/or the NYSDOT's Standard Sheets or as directed by the Engineer. Where shop curved guide railing or mall barrier is required, the quantity of guide railing or mall barrier shall be the number of linear feet measured along the axis of the curved railing between the point of beginning of curvature and the point of ending of curvature as defined by the Engineer. If the railing is anchored to a structure instead of an anchorage unit, the railing will be measured up to the structure.

(B) ANCHORAGE UNITS FOR BEAM GUIDE RAILING AND MALL BARRIER

The quantity to be measured for payment shall be the number of each type anchorage unit actually incorporated into the work.

(C) RELOCATE BEAM TYPE GUIDE RAIL

The quantity of relocated beam type guide rail measured for payment shall be the number of linear feet of beam type guide rail actually reinstalled to the satisfaction of the Engineer, measured along the axis of the railing in its final position.

(D) REMOVE EXISTING GUIDE RAIL

The quantity to be measured for payment shall be the number of linear feet of existing guard rail removed and disposed of as herein specified or ordered by the Engineer, measured from center to center of end posts.

6.30.8. PRICES TO COVER.

(A) BEAM GUIDE RAILING AND MALL BARRIER

The contract prices bid for beam guide railing and for mall barrier shall be a unit price per linear foot and shall cover the cost of furnishing all labor, material, plant, equipment, insurance, and incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) ANCHORAGE UNITS FOR BEAM GUIDE RAILING AND MALL BARRIER

The contract prices bid for anchorage units shall be the unit price per each type and shall cover the cost of furnishing all labor, material, plant, equipment, insurance, and incidentals required and completing the work of constructing anchorage units, including necessary concrete, excavation and backfill within the anchorage unit pay limit shown on the NYSDOT's Standard Sheets; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(C) RELOCATE BEAM TYPE GUIDE RAIL

The contract price for relocate beam type guide rail shall be a unit price per linear foot and shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required to remove the existing beam type guide rail in its entirety, clean the posts to the satisfaction of the Engineer, store, and reinstall the beam type guide rail in the new sidewalk where shown on the Contract Drawings or as directed by the Engineers.

(D) REMOVE EXISTING GUIDE RAIL

The contract price bid to remove existing guard rail shall be a unit price per linear foot and shall cover the cost of furnishing all labor, materials, plant, equipment, insurance and incidentals required to complete the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.30 AA	BEAM TYPE GUIDE RAIL	L.F.
6.30 UA	ANCHOR UNIT FOR BEAM TYPE GUIDE RAIL	EACH
6.30 AR	REMOVE EXISTING GUIDE RAIL	L.F.
6.30 AB	MALL BARRIER	L.F.
6.30 UB	ANCHOR UNIT FOR MALL BARRIER	EACH
6.30 RE	RELOCATE BEAM TYPE GUIDE RAIL	L.F.

SECTION 6.31 – Precast Concrete Wheel Stops

6.31.1. INTENT. This section describes the construction and installation of precast concrete wheel stops at locations indicated on the Contract Drawings or as designated by the Engineer.

6.31.2. DESCRIPTION. Precast concrete wheel stops shall be six (6') feet minimum in length and six (6") inches minimum in height.

Each wheel stops shall be fixed to the pavement surface with a minimum of two galvanized steel bolts.

6.31.3. MATERIALS.

(A) Concrete for precast concrete wheel stops shall comply with requirements of Section 3.05, Class A-40, Type IIA. An approved air entraining agent shall be added at the time concrete ingredients are mixed with water.

(B) Reinforcement shall comply with the requirements of ASTM A615, Grade 40.
Anchor bolts shall be one (1") inch in diameter by not less than twenty-four (24") inches long, unless otherwise shown on the Contract Drawings, and shall be galvanized in accordance with the requirements of ASTM A123.

(C) Setting cement for bolts shall be a hydraulic type cement which, when mixed with water, will harden rapidly to produce a permanent anchoring bond. It shall contain neither Portland Cement, ferrous metals, nor rust promoting agents. Unit weight shall not exceed 125 pounds per cubic foot.

The material shall require no more than 48 fl. oz. of water to 10 lbs. of cement to achieve a pourable consistency and no more than 38 fl. oz. of water to produce a plastic consistency.

The compound when prepared in either of the consistencies above shall show no shrinkage on setting, but may exhibit a slight expansion of not more than 0.002 inches per linear inch.

Two (2") inch cubes cast from this material shall have the following minimum compression strengths:

At age 1 hour 4500 psi

At age 24 hours 5000 psi

6.31.4. METHODS.

(A) Precast concrete wheel stops shall be manufactured in accordance with the requirements of the approved shop drawings. The Contractor shall be required to furnish shop drawings of the proposed precast concrete wheel stops for approval prior to fabrication.

Precasting of wheel stops shall be done in accordance with the either subsections (1) or (2), below:

(1) When precasting of wheel stops are supplied by an approved manufacturer, the Contractor shall furnish the manufacturer's certification that the precast wheel stops furnished are, at a minimum, in compliance with the requirements of this Section 6.31; or,

(2) When precasting of wheel stops are made by the Contractor, the location of casting shall be as selected by the Contractor, subject to the approval of the Engineer. Casting beds and longitudinal forms shall be made with metal forms. Longitudinal forms shall be adequately braced to prevent displacement during concreting operations. Wooden braces will not be permitted to remain in the concrete after pouring.

Concrete shall not be placed into the forms until the Engineer has inspected and approved the placing of reinforcement. The concrete shall be vibrated internally or externally, or both, as ordered by the Engineer. Vibrating shall be done with care and in such manner as to avoid both displacement of reinforcement and segregation of aggregate.
Steam curing will be permitted in lieu of water curing. If steam curing or other special method of curing is used, the method and its details shall meet with the approval of the Engineer.
Not less than two (2) test cylinders shall be taken from each batch or truck load of concrete used in the manufacture of precast concrete wheel stops. These cylinders will be used to determine the compressive strength of the concrete required and specified under

Subsection 6.31.3., above. Test cylinders shall be made and cured in accordance with the requirements of ASTM C31.

(B) The Contractor shall use extreme care in handling and moving the precast concrete wheel stops. Wheel stops damaged in storage, handling, hauling, delivery or setting shall be replaced at the Contractor's expense.

All surfaces of the wheel stops which will be exposed after installation shall be smooth and uniform in color with no coarse aggregate showing through. Mortar, used in filling holes, honeycombs or pock marks, shall be a 1:1 mix of Portland cement and sand, colored to match the color of the wheel stop on which it is to be used. Mortar shall be applied to fill all depressions and shall be rubbed flush with adjacent surfaces.
Each precast concrete wheel stop to be installed shall be set in place where shown on the Contract Drawings or as directed by the Engineer.

After being set in place, each wheel stop shall be fixed to the pavement using two galvanized steel anchor bolts. The Contractor shall be required to drill two holes per wheel stop of sufficient depth into the pavement and install the anchor bolts and non-shrink hydraulic cement in each hole as shown on the Contract Drawings or as directed by the Engineer. The spacing of anchor bolts shall be as approved by the Engineer.

Equipment used for drilling shall be as approved by the Engineer, prior to use.

Drilling method shall not cause spalling or other damage to the concrete. Concrete spalled or otherwise damaged by the Contractor's operations shall be repaired in a manner approved by and to the satisfaction of the Engineer. Such repair shall be done at the expense of the Contractor. Holes shall have all foreign and loose material removed immediately prior to grout placement.

6.31.5. MEASUREMENT. Precast concrete wheel stops shall be measured for payment by each wheel stop installed to the satisfaction of the Engineer.

6.31.6. PRICE TO COVER. The unit price bid per each Precast Concrete Wheel Stop shall cover the cost of furnishing all labor, material, equipment, insurance, and incidentals required to furnish, deliver and install precast concrete wheel stops, complete, and shall include, but not be limited to, the furnishing and incorporation of all concrete; reinforcement; curing; finishing; samples; testing equipment and facilities for testing; all, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.31 WS	PRECAST CONCRETE WHEEL STOPS	EACH

SECTION 6.32 (NO TEXT)

SECTION 6.33 – Steel Faced Mall Nosings

6.33.1. INTENT. This section describes steel faced concrete mall nosings.

6.33.2. DESCRIPTION. Nosings shall consist of solid concrete slabs, faced with steel, constructed to the radii and dimensions shown on the Contract Drawings.

6.33.3. MATERIALS. Concrete shall be Class B-32, Type IA; cement - Type I Portland; sand - Type 1A; and coarse aggregate - Type 1, Grade B, or Type 2, Size No. 57. An approved air-entraining agent shall be added at the time concrete ingredients are mixed with water.

Steel curb facing shall comply with the requirements of **Section 2.13** and shall be Type D, bent plate as per the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1010. All steel facing shall be given one (1) shop coat of Primer. All steel facing which will be exposed to view after installation shall be given one (1) shop coat of Intermediate paint and one (1) shop coat (rolled field coat permitted) of Finish topcoat. The color of the top coat shall be pigmented gray, as approved by the Engineer. All components of paint shall be compatible and supplied by a single manufacturer. Prior to field painting, the surfaces to be painted shall be clean, dry, and lightly sand papered. The list of acceptable manufacturers of the paint system shall be as specified under **Subsection 2.13.4**.

6.33.4. METHODS. Subsections 4.06.4. to **4.06.13.**, inclusive, shall apply to the work to be done hereunder.

Exposed concrete surfaces shall be given a wood float finish and shall be cured in accordance with **Section 2.14**, Type 1-D, Clear.

6.33.5. MEASUREMENT. The quantity to be measured for payment shall be the number of mall nosings of the several sizes shown on the Contract Drawings, actually incorporated into the work, complete.

6.33.6. PRICES TO COVER. The contract prices bid per each of the several sizes of mall nosings shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work, including, but not limited to, painting steel facing, curing and all other necessary incidental work, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.33 A	STEEL FACED MALL NOSING, 1' TO UNDER 3' RADIUS	EACH
6.33 B	STEEL FACED MALL NOSING, 3' TO UNDER 6' RADIUS	EACH

SECTION 6.34 – Chain Link Fence

6.34.1. DESCRIPTION. Under this section, the Contractor shall furnish and erect new chain link fence, posts, gates, coil wire and all necessary incidentals in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Relocated chain link fence shall consist of removing existing fence in its entirety, cleaning posts to the satisfaction of the Engineer, storing fence, and reinstalling chain link fence in the new work where shown on the Contract Drawings or as directed by the Engineer.

Removed chain link fence shall consist of removing and disposing of existing chain link fence, including foundation, where shown on the Contract Drawings or as directed by the Engineer.

6.34.2. MATERIALS. All materials shall comply with the New York City Department of Transportation's Standard Details of Construction Standard Drawing Nos. H-1009 and H-1021, with the following exceptions:

(A) Fabric for fencing shall be aluminum-coated steel wire complying with the requirements of AASHTO Designation M 181.

(B) Tie wire shall be aluminum alloy 1100-H14.

(C) Concrete for footings shall be Class B-32, Type IIA; cement - Type II Portland; sand - Type 1A; coarse aggregate Type 1, Grade B, or Type 2, Size No. 57; and an approved air-entraining agent shall be added at the time that concrete is mixed. Concrete, cement and aggregate shall comply with the requirements of Section 3.05.

6.34.3. METHODS. All methods shall comply with New York City Department of Transportation's Standard Details of Construction Standard Drawing Nos. H-1009 and H-1021. All debris shall be satisfactorily disposed of away from the site by the Contractor.

Relocating chain link fence shall consist of removing existing fence in its entirety, cleaning posts to the satisfaction of the Engineer, storing fence, and reinstalling chain link fence in the new work where shown on the Contract Drawings or as directed by the Engineer. All additional materials as may be required to re-erect the fence including the replacement of missing or damaged parts as a result of the Contractor's operations, shall comply with the requirements of **Subsection 6.34.2.**, above, and shall be deemed included in the price bid to Relocate Chain Link Fence.

Removing chain link fence shall consist of careful removal of the existing fence and demolish of its foundation to at least two (2') feet below existing grade or proposed grade, whichever is deeper, between the limits shown on the Contract Drawings or directed by the Engineer. The Contractor shall then fill the excavated areas with compacted clean sand to the subgrade of the new proposed pavement. Unless otherwise directed, all materials removed shall become the property of the Contractor and shall be removed and disposed of away from the site. In addition, care shall be exercised by the Contractor in the removal of the fence. Any damage to adjacent areas to remain caused by the Contractor's operations shall be repaired or replaced in kind, to the satisfaction of the Engineer, at the expense of the Contractor.

6.34.4. MEASUREMENT. The quantities of Chain Link Fence, Chain Link Fence Gate, and Relocate Chain Link Fence to be measured for payment shall be the number of linear feet of each type satisfactorily installed, complete, measured in place along the top of fence, from center to center of end posts.

The quantity of Remove and Dispose of Existing Chain Link Fence to be measured for payment shall be the actual number of linear feet of existing fence removed, complete with its foundation, measured in place along the top of fence, from center to center of end posts.

6.34.5. PRICES TO COVER. The price bid for Chain Link Fence and for Chain Link Fence Gate shall be a unit price per linear foot of each size fence or gate, and shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required to furnish and install new posts, chain link fabric, top and bottom coil wires, and all fittings and hardware necessary to erect the chain link fence and gate, complete in place, including excavation, backfilling and concrete footings where necessary; furnish samples for testing, as may be required; and completing the work; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The price bid for Relocate Chain Link Fence shall include the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required to remove the existing chain link fence in its entirety, clean the posts to the satisfaction of the Engineer, store, and reinstall the chain link fence in the new sidewalk where shown on the Contract Drawings or as directed by the Engineer. Reinstallation of the chain link fence shall comply with the methods specified under **Subsection 6.34.3.**, above.

The price bid for Remove and Dispose of Existing Chain Link Fence shall be a unit price per linear foot of existing fence removed and disposed, and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to complete the work, including but not limited to the demolition of fence foundations and backfilling as required, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.34 AA	CHAIN LINK FENCE, 3'- 6" HIGH	L.F.
6.34 AB	CHAIN LINK FENCE, 4'- 0" HIGH	L.F.
6.34 AC	CHAIN LINK FENCE, 6'- 0" HIGH	L.F.
6.34 AD	CHAIN LINK FENCE, 8'- 0" HIGH	L.F.
6.34 AE	CHAIN LINK FENCE, 10'- 0" HIGH	L.F.
6.34 AF	CHAIN LINK FENCE, 12'- 0" HIGH	L.F.
6.34 AG	CHAIN LINK FENCE, 14'- 0" HIGH	L.F.
6.34 AH	CHAIN LINK FENCE, 16'- 0" HIGH	L.F.
6.34 AI	CHAIN LINK FENCE, 18'- 0" HIGH	L.F.
6.34 BA	CHAIN LINK FENCE GATE FOR 3'- 6" HIGH FENCE	L.F.
6.34 BB	CHAIN LINK FENCE GATE FOR 4'- 0" HIGH FENCE	L.F.
6.34 BC	CHAIN LINK FENCE GATE FOR 6'- 0" HIGH FENCE	L.F.
6.34 BD	CHAIN LINK FENCE GATE FOR 8'- 0" HIGH FENCE	L.F.
6.34 BE	CHAIN LINK FENCE GATE FOR 10'- 0" HIGH FENCE	L.F.
6.34 BF	CHAIN LINK FENCE GATE FOR 12'- 0" HIGH FENCE	L.F.
6.34 BG	CHAIN LINK FENCE GATE FOR 14'- 0" HIGH FENCE	L.F.
6.34 BH	CHAIN LINK FENCE GATE FOR 16'- 0" HIGH FENCE	L.F.
6.34 BI	CHAIN LINK FENCE GATE FOR 18'- 0" HIGH FENCE	L.F.
6.34 CC	CHAIN LINK FENCE WITH TENSION WIRES, 6'- 0" HIGH	L.F.
6.34 E	RELOCATE CHAIN LINK FENCE	L.F.
6.34 X	REMOVE AND DISPOSE OF EXISTING CHAIN LINK FENCE	L.F.

SECTION 6.34 A – Temporary Chain Link Fence

6.34A.1. DESCRIPTION. Under this section, the Contractor shall furnish, erect, maintain, and remove, when directed, each type of Temporary Chain Link Fence as shown on the contract drawings and directed by the Engineer.

6.34A.2. MATERIALS AND METHODS. All materials and methods shall be as specified in Section 6.34 of the Standard Highway Specifications, with the following modifications and additions:

Temporary Chain Link Fence to be furnished under Item No. 6.34 ACT - TEMPORARY CHAIN LINK FENCE, 6'-0" HIGH, Item No. 6.34 ADT - TEMPORARY CHAIN LINK FENCE, 8'-0" HIGH, or Item No. 6.34 AET - TEMPORARY CHAIN LINK FENCE, 10'-0" HIGH, shall consist of chain link fence fabric, top and bottom tension wires, gates, posts to be embedded in the pavement, and all necessary incidentals in accordance with the contract drawings and the directions of the Engineer.

Temporary Chain Link Fence to be furnished under Item No. 6.34 ACTP - TEMPORARY CHAIN LINK FENCE, 6'-0" HIGH, (WITH TOP AND BOTTOM RAILS AND POSTS MOUNTED ON STEEL PLATES) or Item No. 6.34 ADTP - TEMPORARY CHAIN LINK FENCE, 8'-0" HIGH, (WITH TOP AND BOTTOM RAILS AND POSTS MOUNTED ON STEEL PLATES), shall consist of chain link fence fabric, top and bottom rails for mounting a decorative mesh (to be furnished under Item No. 9.06 HW), gates, and posts. Posts shall be mounted on two (2) feet square steel plates with a vertical pin not less than two (2) feet high welded to the center of the plate, all as approved by the Engineer. The Contractor shall also be required to secure the fence with sand bags to hold fence in place, and all necessary incidental in accordance with the contract drawings and the directions of the Engineer.

When directed by the Engineer, the Contractor shall remove and dispose of the temporary chain link fence to the satisfaction of the Engineer. The Contractor shall then fill any holes left in the pavement with compacted clean sand to grade.

6.34A.3. MEASUREMENT. The quantities of Temporary Chain Link Fence to be measured for payment shall be the number of linear feet of each type satisfactorily installed, complete, measured in place, from center to center of end posts.

Payment will be made for each type of Temporary Chain Link Fence only for the initial installation at any location. Whenever temporary chain link fence are moved to a new location, as required by the plans or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Minor movement of temporary chain link fence from one side of the roadway to the other side, or rearrangement within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made: for movements of each type of temporary chain link fence made for the Contractor's convenience; for movement of temporary chain link fence at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of temporary chain link fence at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of temporary chain link fence between initial installations.

6.34A.4. PRICES TO COVER. The contract prices bid per linear foot for each type of "TEMPORARY CHAIN LINK FENCE" shall be a unit price per linear foot and shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required to furnish, install, maintain, and remove temporary chain link fence; all in accordance with the contract drawings, the specifications and the directions of the Engineer. Temporary chain link fence shall also include, but not limited to, any gates as may be required.

Payment will be made under:

Item No.	Item Description	Pay Unit
6.34 ACT	TEMPORARY CHAIN LINK FENCE, 6’-0” HIGH	L.F.
6.34 ACTP	TEMPORARY CHAIN LINK FENCE, 6’-0” HIGH, (WITH TOP AND BOTTOM RAILS AND POSTS MOUNTED ON STEEL PLATES)	L.F.
6.34 ADT	TEMPORARY CHAIN LINK FENCE, 8’-0” HIGH	L.F.
6.34 ADTP	TEMPORARY CHAIN LINK FENCE, 8’-0” HIGH, (WITH TOP AND BOTTOM RAILS AND POSTS MOUNTED ON STEEL PLATES)	L.F.
6.34 AET	TEMPORARY CHAIN LINK FENCE, 10’-0” HIGH	L.F.

SECTION 6.35 (NO TEXT)

SECTION 6.36 – Structural Repair and Adjustment of (City Owned) Utility Structures

6.36.1. INTENT. This section describes the work of performing the necessary structural repairs to damaged City-owned utility structures by rebuilding the existing installation and resetting the castings, or by any other method if approved by the Engineer and the Department having jurisdiction over the structure, and for the adjustment of manholes, including vaults, etc., and valve boxes, by building up installations. In addition, in pavement areas to be resurfaced, where milling alone does not provide the necessary hardware elevation for resurfacing, the Contractor shall build-up installations as necessary to adjust hardware with respect to the proposed adjacent elevation.

6.36.2. DESCRIPTION. Structural repair and adjustment of City-owned utility structures, which include manholes, valve boxes, catch basins and other City-owned utility structures, shall consist of removing the existing frame and cover, and rebuilding, adjusting or modifying the existing damaged or not at proper elevation installation and/or roof slab, as directed by the Engineer.

In roadway pavement areas designated to be reconstructed, the cost of raising or lowering City-owned manhole, basin, and inlet heads to proposed grades will be deemed included in the prices bid for all the scheduled items when the vertical upward movement of all heads is twenty-four (24”) inches or less, when the vertical downward movement of manhole heads is six (6”) inches or less, and when the vertical downward movement of basin heads is three (3”) inches or less, unless otherwise provided or directed, and where the adjustment is within the limit of brick. When the existing structure consists of a brick chimney on a concrete roof slab or brick on concrete walls, the maximum allowable height of brick, after adjustment, shall be twenty-four (24”) inches. All other structural repair and adjustments will be paid for under this item, unless otherwise directed or provided for in other contract items.

In roadway pavement areas designated to be resurfaced, the cost of structural repair and adjustment of City-owned utility structures shall be paid for under this item, unless otherwise directed or provided for in other contract items.

6.36.3. MATERIALS. All materials used shall comply with the standards of the Department having jurisdiction over the installation, except that concrete shall be a high-early strength concrete complying with the requirements as specified under Section 3.05 and the requirements for mortar shall be quick setting, capable of obtaining a minimum compressive strength of 1,500 psi in two (2) hours.

6.36.4. METHODS. All work shall comply with the standards of the Department having jurisdiction over the installation, unless otherwise directed by the Engineer.

The Contractor shall perform the necessary structural repair and adjustment, where directed by the Engineer, to rebuild or modify existing damaged utility structure walls, including roof slabs, where applicable, which shall be removable, cast on the job site, with high-early strength concrete.

Resetting existing or new castings (new castings to be paid for under Item 6.22 F), as determined by the Engineer, shall be done with brick and mortar according to the standards of the appropriate Department having jurisdiction over the installations.

All work shall be done in a workmanlike manner and any damage resulting from the Contractor’s operations, to the existing installation which is to remain, shall be satisfactorily corrected, as directed by the Engineer, at the Contractor’s expense and at no additional cost to the City.

Removed and damaged pavement shall be replaced with high-early strength concrete to grade of the adjacent existing pavement as directed by the Engineer.

6.36.5. MEASUREMENT. The quantity to be measured for payment shall be the number of cubic yards of concrete, brick and mortar actually placed in the structure to the grade of the existing frame, to the satisfaction of the Engineer. In determining the volume of concrete, brick and mortar to be paid for, no deductions will be made for the spaces occupied by steel reinforcement and measurement for payment shall be made to the nearest hundredth of a cubic yard.

Use of this item shall be limited to locations specifically directed in writing by the Engineer and shall not be used in conjunction with other hardware adjustment items.

6.36.6. PRICE TO COVER. The contract price bid under this item shall be a unit price per cubic yard of concrete, brick and mortar placed in the utility structure and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to structurally repair and adjust City-owned utility structures, including all excavation, backfill, sheeting, bracing, steel bar reinforcement, pavement restoration to the existing grade with high-early Strength concrete, and the furnishing of samples, as required; all in accordance with the specifications and the directions of the Engineer.

No separate payment will be made for adjustment of hardware in sidewalk area the cost of which shall be deemed included in the prices bid for all scheduled items. The cost of adjustment in the roadway area shall be per cubic yards of installed (or removed where adjusted lower) of the utility structure. The cost of restoration of the roadway adjacent to the structure is included in the price bid for this item.

New frames and/or covers, where required, will be paid for under Item 6.22 F, “Additional Hardware,” or furnished by others.

Payment will be made under:

Item No.	Item	Pay Unit
6.36 DR	STRUCTURAL REPAIR & ADJUSTMENT OF UTILITY STRUCTURES	C.Y.

SECTIONS 6.37 THRU 6.38 (NO TEXT)

SECTION 6.39 – Mobilization

6.39.1. DESCRIPTION. Under this section, the Contractor must set up all necessary general plant and facilities, including shops, storage areas, office and such sanitary and other facilities as are required by City, State or Federal law or regulation. Unless otherwise provided, the cost of required bonds and/or any other similar significant initial expenses required for the initiation of the contract work must also be included in this section. The determination of the adequacy of Contractor's facilities, except as noted above, will be made by the Engineer.

6.39.2. MATERIALS. Unless otherwise specified, materials required under this section are not part of the completed contract, and may be as selected by the Contractor.

6.39.3. CONSTRUCTION METHODS. Such work as is done in providing the facilities and services under this section must be done in a safe and workmanlike manner and must conform with any pertinent City, State or Federal law, regulation or code. The Contractor must provide facilities and services under this section that are planned and executed to ensure the maintenance of safety and good housekeeping at the construction site.

6.39.4. PRICE TO COVER.

(A) General

Payment will be made by lump sum. The amount bid will include the furnishing and maintaining of any plant, services or other facilities noted under "Description" to the extent and at the time the Contractor deems them necessary for the Contractor's operations, consistent with the requirements of this section and the contract.

(B) Payment Amounts

The Mobilization amount bid for this lump sum item will be payable to the Contractor in two Mobilization Payments – the Initial Mobilization Payment and the Remaining Mobilization Payment.

The Initial Mobilization Payment will not exceed 12.5% of the Mobilization amount included in the bid schedule. The Remaining Mobilization Payment will not exceed 87.5% of the Mobilization amount included in the bid schedule.

(C) Prerequisites for Payments

Upon issuance of the Notice to Proceed, the Contractor may requisition for the Initial Mobilization Payment upon submission and approval of all required insurance certificates and bonds.

The Contractor may requisition for the Remaining Mobilization Payment when the following items are submitted and approved by the Engineer:

1. The provision of a Field Office per **Section 6.40** of the NYCDOT Standard Highway Specifications;
2. The Site Safety Plan per the Safety Requirements section of the Information for Bidders;
3. The Schedule of Operations (project baseline schedule) per **Section 1.06.25** of the NYCDOT Standard Highway Specifications;
4. The Progress Schedule per Standard Construction Contract Article 9;
5. Preconstruction Photographs per **Section 6.43** of the NYCDOT Standard Highway Specifications are submitted to the Engineer;
6. Construction Report per Item 76.11CR of the NYCDEP Standard Sewer and Water Main Specifications, if item is required as part of the Contract;
7. Storm Water Pollution Prevention Plan (SWPPP) per Item 9.30 of the NYCDOT Standard Highway Specifications, if item is required as part of the Contract; and
8. Environmental Health and Safety Plans including Field Sampling Plan (FSP), Investigation Health and Safety Plan (IHASP), Environmental Health and Safety Plan (EHASP), Material Handling Plan (MHP), and Water Handling Plan (WHP) per Section 8.01 of the NYCDOT Standard Highway Specifications
9. MTA Notice to Proceed for all work locations within 200' of an MTA facility, if required as part of the Contract.

(D) Adjusted Mobilization Payment

However, should the Contract be terminated or its term expires prior to completion of at least fifty percent (50%) of the original price bid for the Contract, then the Contractor will be paid a proportionate amount of this item (hereinafter referred to as the "Adjusted Mobilization Payment") based on the following formula:

$$\text{Adjusted Mobilization Payment} = \text{As Bid Mobilization Cost} \times \frac{\text{Total Actual Payments to the Contractor approved by the Engineer}}{\text{Original Total Bid Price} + \text{Approved and Registered Change Orders}}$$

Where the Contractor has already received the original total payment for this item and the Contract has been terminated or expired prior to completion of at least fifty percent (50%) of the work covered under the original price bid for the Contract, then any funds owed by the City due to the above specified reduction in payment will be withheld from the funds the City owes to the Contractor and/or the City reserves a claim to such funds from the Contractor.

(E) Bid Amount

The amount bid for Mobilization must be eight percent (8%) of the total contract price, excluding the price bid for Mobilization, and in no case will payment under this item exceed the original price bid for this item.

Payment will be made under:

Item No.	Item	Pay Unit
6.39 B	MOBILIZATION	L.S.

SECTION 6.40 – Engineer's Field Office

6.40.1. DESCRIPTION. The Contractor must provide, furnish and maintain a fully equipped field office (Type A, B, C, CU, D, DC, or DU, as specified) for the exclusive use of and occupancy by the Department's engineering personnel and/or Supervising Consultant, and by the engineering personnel of private utilities when specified (herein after called "City personnel" in this Section). The field office must be at a location approved by the Engineer and must be a commercial building, store front, or with the approval of both Office of Construction Mitigation and Coordination (OCMC) and the Community Board it may be a mobile trailer(s). If a trailer is used it must be subject to approval by the Engineer, and all necessary permits must be obtained by the Contractor. The Contractor may have facilities in an adjoining area separated by a lockable door, provided such facilities are in a location approved by the Engineer. The field office must be within ½ mile of the job site. Field offices located further than ½ mile from the job site will require approval by the Director or Assistant Commissioner for Construction.

The field office structure and occupancy thereof must conform to the requirements of all laws, rules, regulations and orders applicable to it.

The field office and all equipment, except as otherwise specified, may be new materials or may be used materials in good condition and satisfactory to the Engineer.

6.40.2. MATERIALS.

(A) GENERAL CONSTRUCTION. The Engineer's Field Office must be in an approved and weatherproof building. It must have a minimum ceiling height of seven (7') feet and be partitioned to provide the number of rooms required for the type of office specified. Floor space for Field Office Types C, CU, D, and DU must be subdivided into work areas based on a floor plan provided by the City to the Contractor upon notification of space availability.

(B) GENERAL FACILITIES. The field office must contain or have the following facilities incorporated:

(a) Lighting - Electric light, non-glare type luminaries to provide a minimum illumination level of 100 ft.- candles at desk height level.

(b) Heating and Cooling - Adequate equipment to maintain an ambient air temperature of 70° F. ±5°.

(c) Electrical Energy Outlets - in the type, quantity, and rating required for the equipment supplied.

(d) Toilet - A separate enclosed room, properly ventilated per code and complying with applicable sanitary codes must contain a lavatory with a sink that provides running hot and cold water, flush-type toilet, mirror, electric hand dryer, and paper towel dispenser.

(e) Potable Water - Potable water supplied from an existing system or five (5) gallon capacity water cooler of a type to be approved by the Engineer must be provided for use by City personnel. Replacement bottles of water must be provided by the Contractor, when required.

(f) Signs - Store front locations must have a window graphic sign in black and white lettering with the following inscription. Other locations must have a wood or metal sign affixed on the outside wall of the building with the following inscription painted in black block lettering on a white background. Paints must be approved exterior enamels.

CITY OF NEW YORK	2-1/2"
DEPARTMENT OF DESIGN AND CONSTRUCTION	3-1/2"
INFRASTRUCTURE	2-1/2"
RESIDENT ENGINEER'S FIELD OFFICE	2-1/2"

(g) Electric Refrigerator - Five (5) cubic feet minimum capacity for use by City personnel.

(h) Microwave, Toaster Oven, and Coffee Maker - Basic reheating equipment or approved appliances for use by City personnel.

(i) Windows and Doors - All windows and doors must be weatherproof and each equipped with adequate locking devices. Each window must be equipped with vertical blinds. Exterior doors must be provided with two (2) separate "high security" dead bolt type cylinder locks, keyed alike, and three (3) keys must be furnished for each lock.

(j) Partitions - Partitions for work space enclosures shall be either permanent walls or of the modular type similar to Herman Miller's standard fabric covered line.

(k) Kitchen Sink – Mechanism to provide non-drinking, hot and cold, running water. If the water in the sink is not potable, it must be clearly marked as such.

(l) Security Cameras – Wifi enabled security cameras must be provided at all entrances and exits, except that fire escapes / emergency stairwells do not require cameras. One security camera must be provided for the interior of the field office, with the location to be determined by the Engineer. Cameras must be minimum 1080p video resolution. Cameras must have internet cloud storage, with all videos stored for a minimum of two weeks. The cloud storage must be accessible via desktop or mobile. Cameras may be hardwired for power or battery powered; battery powered cameras must have the batteries changed by the Contractor as required to ensure no lapses of service. Signs must be posted indicating that the area is under video surveillance.

(C) OFFICE EQUIPMENT.

(a) Pencil Sharpener - One standard pencil sharpener for use by City personnel.

(b) Telephone Answering Machine - The telephone answering machine to be provided must be an electronic digital voice machine with emergency call forwarding capability. It must be operable twenty four (24) hours per day and, when unattended, must transmit to the caller the following message:

"You have reached the Field Office of the New York City Dept. of Design and Construction. No one is here now. We check our incoming messages frequently. We will get back to you as soon as possible. Please leave your name, message and phone number where you may be reached. In case of emergency, call the New York City Hotline at 311. Again, the emergency number is 311."

All electronic voicemail messages must be automatically forwarded as email attachments, to allow for the voicemails to be played remotely.

(c) Computer Equipment - Computers must be provided for all contracts regardless of construction duration.

Computers furnished by the Contractor for use by Department personnel and supervising consultant, for the duration of the contract, must be in accordance with Table I - ADDITIONAL SPECIFIC REQUIREMENTS, contained herein, and shall meet the following minimum requirements:

(1) Personal Computers – Personal Computers must meet the requirements outlined in the latest version of the US General Services Administration (GSA) Government-Wide Strategic Solutions (GSS) Standard Laptop, Desktop, and Tablet Specifications. (Available online at https://sewp.nasa.gov/gss_techspecs.shtml).

(a) Computer type for Personal Computers to be "Desktop Small Form Factor." Computer type for projector laptop to be "Lightweight Notebook" or "Notebook"

(b) The following components listed as optional in the GSA specification must be provided with each personal computer: monitor, speakers, optical drive, smart card reader, webcam, and headset.

(c) The following additional software must be provided with licenses for each computer:

1. Adobe Acrobat Pro DC or Bluebeam Revu
2. Microsoft Office Professional
3. Autodesk AutoCAD LT
4. Anti-virus software (McAfee or as approved by the Engineer)

5. Microsoft Visio (only one license required per field office)

(2) All field offices requiring computers must be provided with the following:

(a) One (1) broad-band internet service account. See table below for minimum required upload and download speeds. Because of throughput requirements Verizon FIOS is the preferred connectivity provider where available.

Office Personnel #	Download Speeds (*Minimum*)	Upload Speeds (*Minimum*)
1 – 5	10 Mbps	15 Mbps
6 – 10	20 Mbps	15 Mbps
11 – 15	25 Mbps	15 Mbps
16 – 20	50 Mbps	15 Mbps

This account will be active for the life of the project. The e-mail name for the account must be the NYCDDC Field Office/project Id (preferably Gmail or Outlook – e.g. HWK666@gmail.com).

(b) All necessary Cabling.

(c) UPS/Surge Suppressor combo.

(d) 10 USB Thumb (or Flash) Drive – 16 GB each

(3) All computers required for use in the Engineer's Field Office must be delivered, installed, and setup in the Field Office by the Contractor.

(4) All Computer Hardware must come with a three (3) year warranty for on-site repair or replacement. Additionally, and notwithstanding any terms of the warranty to the contrary, the Contractor is responsible for rectifying all computer problems or equipment failures within one (1) business day.

(5) An adequate supply paper and toner cartridges for the printer must be provided by the Contractor, and must be replenished by the Contractor as required by the Engineer.

(6) It is the Contractor's responsibility to ensure that electrical service, data, and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty-four (24) hours each day.

Broadband connectivity is preferred at each field office location. Please take into consideration that an extra phone line dedicated to the modem must be ordered as part of the contract unless Internet broadband connectivity, via Cable or FiOS, is available at the planned field office location. Any questions regarding this policy should be directed to the Director of Information Technology Services at 718-391-1761.

(d) Data Access - Electronic access to the EquipmentWatch Retail Rental Rates database (formerly known as The AED Green Book, published by Equipment Watch), must be provided for all contracts that have a total Consecutive Calendar Days for General Construction duration as set forth in Schedule A of greater than 545 CCD's. Contracts of lesser duration do not require any data access.

(D) Field Testing Equipment. The equipment below must be provided, and include all necessary certifications, calibration, and re-calibration, as necessary.

(a) Air Entrainment Meters - Pressure Type, with carrying case for use by City personnel. Each meter must be capable of producing an accurate test result in approximately five (5) minutes and must comply with ASTM Designation C231.

(b) Slump Test Sets - Slump cone and test sets conforming to the requirements of ASTM Designation C143, complete with rod and scoop for use by City personnel.

(c) Thermometers: For use by City personnel.

(1) 1 Minimum-maximum thermometer.

(2) 3 Asphalt thermometers of stainless steel construction with an accuracy of 0.5% of the full scale, able to measure temperatures from 50 to 500 degrees F. in 5 degree increments.

(3) 3 Surface Thermometers able to measure temperatures of flat surfaces similar to Sargent-Welsh Model S81441-D, or an approved equivalent.

(d) Nonsparking Pinch Bar - For use in opening manholes.

(e) Gas Meters - For use in detecting the presence of explosive gases and vapors for use by City personnel.

(f) Straight Edge - One 10 foot long straight edge for use by City personnel, suitable for detecting pavement surface tolerance.

(g) 48" Smart Level – Suitable For use in determining pedestrian ramp and sidewalk slopes.

(h) Chlorine Test Kits – For testing residual chlorine levels following water main flushing.

(i) Green Florescent Power Trace-Dye – For testing sewer connections.

(j) One Million Candlepower Rechargable Flashlight.

(k) Distance Measuring Wheel – For measuring long distances.

(E) Additional Office Electronics –

(a) Photocopying machine must be a stand-alone, heavy duty, electric, dry-process color photocopying type with color scan and send capability via e-mail, a minimum production rate of 70 pages per minute and an adequate supply of copy paper, toner, etc. The machine must be capable of duplex copying paper sizes of 8-1/2 x 11 inches, 8-1/2 x 14 inches and 11 x 17 inches, and have separate trays for each paper size. It must have a document feeder, collator, stapler, and the capability to reduce/enlarge copies between each paper size. The supply of each size copy paper, toner, etc. must be replenished and the machines must be maintained for the duration of the contract by the Contractor as required by the Engineer. Make and model can be Minolta, Canon, IBM, Epson, or an approved equivalent, and must be networked to the office computers for printing capability.

(b) Fax machine must be provided with an adequate supply of copy paper, toner, etc. The supply of copy paper, toner, etc. must be replenished and the machines must be maintained for the duration of the contract by the Contractor as required by the Engineer.

(c) Paper shredder must be a heavy duty commercial grade diamond cut shredder with automatic start. The shredder must be able to receive 8-1/2 inch wide paper and shred a minimum of 15 sheets simultaneously along with CDs and staples.

(d) Projector must be 1080p LCD with a min. of 2200 ANSI Lumens, 1920 x 1080, 16:9, 40,000:1 contrast ratio, HDMI, VGA, USB, and a 10’ diagonal, 16:9 Projection Screen. A screen must be provided if directed by the Engineer. A laptop must be provided for use with the projector, and all required cables for connecting the laptop to the projector.

6.40.3. SPECIFIC REQUIREMENTS FOR ENGINEER’S FIELD OFFICE.

In addition to the general requirements, each type of Field Office must have the minimum floor area indicated in Table 6.40-I calculated based on usable area only, excluding any loss factors. Loss factors are defined as those areas such as lobby, sidewalk window ledge, elevator shafts and stairways. The Contractor must provide and maintain furnishings for each type of Field Office in the quantity specified in Table 6.40-I. The furnishings must be new or used equipment satisfactory to the Engineer:

(a) Each Type must have a minimum of one outside door and four windows.

(b) Type C must be partitioned to provide three (3) rooms.

(c) Type CU must be partitioned to provide four (4) rooms, one of which shall be at least 150 s.f. in area (for use by private utilities).

(d) Type D and DC must be partitioned to provide four (4) rooms.

(e) Type DU must be partitioned to provide five (5) rooms, one of which shall be at least 150 s.f. in area (for use by private utilities).

TABLE 6.40-I – ADDITIONAL SPECIFIC REQUIREMENTS

SPECIFIC REQUIREMENTS	FIELD OFFICE TYPE						
	A	B	C	CU	D	DC	DU
Minimum useable floor space (Square Feet)	400	800	1,200	1,200	1,800	2,320	1,800
Office desks, at least 4'-8" x 2'-8", with drawers, locks, and keys.	2	2	4	8 [a]	8	8	12 [a]
Swivel chairs, with arms, for the above.	2	2	4	8 [a]	8	8	12 [a]
Office folding chairs, metal, with padded seats and backs.	2	3	6	14 [b]	8	8	16 [b]
Steel supply cabinets (approximate size 72" high by 36" wide by 18" deep), with four adjustable shelves, tumbler lock and 3 keys.	1	1	1	1	1	1	1
Fire resistant cabinet, 4-drawer, legal size with lock and three (3) keys, meeting the requirements for "Filing devices, Insulated (36 E 9)" Class D Label, of the Underwriters' Laboratories, Inc. Specifications.	1	1	1	3 [c]	4	4	6 [c]
Individual lockers (17" wide x 18" deep x 72" high) with flat key locks and two (2) keys each.	1	1	4	4	4	4	4
Calculating machines, tape type with digital display registering at least ten (10) digits.	1	1	2	2	3	3	3
Waste paper baskets (metal, approximately 12" square by 16" high).	1	2	2	6 [a]	4	4	8 [a]
Fire extinguishers, non-toxic, dry chemical type meeting Underwriters Laboratories, Inc., approval for Class A, Class B and Class C fires with a minimum rating of 2A:lOB:10C.	1	1	2	3 [d]	4	8	5 [d]
First Aid Kit kept properly stocked with appropriate first aid supplies at all times.	1	1	1	1	2	2	2
Drafting tables (3'-0" x 5'-0") with storage drawers and stool.	1	2	2	3 [d]	4	4	5 [d]
Photocopying Machine	1	1	1	1	1	1	1
Standalone networked color laser printer. (Not required if photocopying machine prints in color)	1	1	1	1	1	1	1
Vertical filing plan racks for six sets of 22"x36" plans each rack.	1	1	2	3 [d]	4	4	5 [d]
Telephone lines for calls, where one must be dedicated for the Fax Machine, one for each computer fax/modem and the others for telephone instruments.	4	6	6	7 [e]	8	8	9 [e]
Telephone instruments.	2	2	3	5 [e]	4	4	6 [e]
Telephone answering machine.	1	1	1	1	1	1	1
Fax Machine	1	1	1	1	1	1	1
Personal Computer	1	3	3	3	4	4	4
Bottled water with refrigerator unit-hot/cold water. (For private utilities room.)	0	0	0	1	0	0	1
Paper Shredder	1	1	1	1	1	1	1

SPECIFIC REQUIREMENTS	FIELD OFFICE TYPE						
	A	B	C	CU	D	DC	DU
Projector	0	0	1	1	1	1	1
Conference Room, 320 square foot (20'x16' minimum, equipped with (2) 3'x6.5' tables and (30) chairs.	0	0	0	0	0	1	0

[a] *Provide four (4) each of Office Desks, Swivel Chairs and Waste Paper Baskets in private utilities room.*

[b] *Provide eight (8) Folding Chairs in private utilities room.*

[c] *Provide two (2) Fire Resistant 4- Drawer Legal Size Cabinets in private utilities room.*

[d] *Provide one (1) each of Fire Extinguisher, Drafting Table and Vertical File Rack in private utilities room.*

[e] *Provide one (1) telephone line and two (2) telephone instruments for the exclusive use by private utilities personnel. The line must interconnect the two telephone instruments by push button control.*

6.40.4. CONSTRUCTION METHODS. The building must be fully equipped and made available for use and occupancy by the Department's personnel and/or Supervision Consultant not less than thirty (30) days prior to the start of any contract work.

The building interior (including access foyers, stairwells, etc.) must be maintained in good, clean, and sanitary working condition by the Contractor for the duration of the contract. The Contractor must provide and pay all costs for electrical service, telephone service for calls within New York City limits, hot and cold water, heat and fuel, and daily janitor service. Staples, such as paper towels, hand soap, toilet paper, and similar supplies, must always be available.

Where necessary, the site for a mobile trailer(s) must be graded and shoulder stone placed and maintained as directed by the Engineer to provide a parking area for City personnel and, if necessary, an approach road must be provided. Plumbing work must include all water supply, drainage and piping required for the operation of a complete installation. Temporary water service must be provided from an existing main and extended into the trailer and all fixtures requiring water supply must be properly connected up. All necessary soil, waste, vent and drainage piping must be provided and connected to the existing sewer or as otherwise directed.

The office, incorporated facilities, equipment, and personal property of the Department's employees must be protected by the Contractor against loss or damage from fire, theft, or other causes, at all hours of the day and night. The Contractor must provide fire insurance, extended coverage and vandalism, malicious mischief and burglary, and theft insurance coverage in the amount of forty thousand dollars ($40,000.00) for office equipment of the City of New York in the Engineer's field office and for property of City personnel that is used in the contract work and stored in the office. All insurance coverage must be written by a company approved by the Commissioner and payable in case of loss to the City of New York. The office must be maintained by the Contractor in first class condition until Final Acceptance of the work.

At the direction of the Engineer, any equipment on the above lists may be deleted. The Engineer may direct that other equipment of equivalent value be supplied by the Contractor or an appropriate credit be taken for the value of equipment not provided.

When directed by the Engineer, the Contractor must disconnect all services and remove and dispose of all temporary installations from the site, including fencing, surfacing and utilities, the area must then be cleaned, loamed and seeded if required and left in a neat and acceptable condition. On and after the date of the Engineer's Final Acceptance, the temporary structure and all installed equipment must become the property of the Contractor, and shall be disposed of, by him, away from the site of the work. Engineer's Final Acceptance must be when the Contractor has completed all punch list work and Official Completion Date has been set.

6.40.5. NONCONFORMANCE. No payment will be made under Engineer's Field Office for each calendar day during which there are deficiencies in compliance with the requirements of any subsection of this specification. The first calendar day must commence twenty-four (24) hours after notice to the Contractor of such a deficiency. This non-payment must be deducted from the Contractor's next estimate as a charge to the Contractor on the item. The amount of such calendar day non-payment will be determined by dividing the unit price bid per month by 30.

In addition, the Contractor may be subject to liquidated damages in accordance with Schedule A.

6.40.6. MEASUREMENT. The quantity to be measured for payment under this item must be the number of months, to the nearest quarter (¼) month, that the Field Office is available for occupancy by the Field Engineers during the period of the contract. Payment will begin the first month that the office is fully equipped, serviced as specified, and made available for occupancy. The Field Office is to be continuously made available and monthly payments will continue for the duration of the contract through a period not to exceed 6 months past the Substantial Completion date. When directed in writing by the Commissioner, the Field Office will be provided and paid for a period of time beyond 6 months past the Substantial Completion date. Payment for each month's occupancy after the date of Substantial Completion acceptance will be made as part of the final estimate. Monthly payments may be terminated on a specified date prior to acceptance of the contract by written notification by the Engineer that such office will no longer be required on the contract.

To incentivize early Substantial Completion of the Project, payment under this item will be determined as follows:

If the determination of Substantial Completion is reached at least two (2) months earlier than the Substantial Completion date set forth in the Notice to Proceed letter, plus any approved time extensions, the Contractor will receive an incentive on this item equal to half of the value of the saved amount. This payment will be in addition to any payments of incentive for early completion, if one is specified for the Project.

For example, using a contract with a 30-month duration for achievement of substantial completion, with the Engineer's Field Office directed by the Commissioner to remain open six (6) months after the substantial completion date per Subsection 6.40.6 above, the following would apply under these two scenarios:

1. Project substantial completion is achieved in 28.5 months: Because the contract was completed within two (2) months of the scheduled substantial completion date, the contractor will receive payment for the 28.5 month project duration plus the six (6) months after Substantial Completion, amounting to 34.5 months to be paid to the Contractor for the Engineer's Field Office, with no additional amounts due to the Contractor from any incentives.
2. Project substantial completion is achieved in 26 months: Because the contract was substantially completed more than two (2) months early, the contractor will be paid for the 26 month project duration plus six (6) months after substantial completion plus an incentive equal to half of the four months saved, amounting to 34 months to be paid to the contractor for the Engineer's Field Office.

6.40.7. PRICE TO COVER. The unit price bid per month for the item Engineer's Field Office must include the cost of furnishing all labor, materials, equipment, ground rental, fire and theft insurance, and utility charges necessary to complete the work of providing or constructing the field office; making all necessary electrical, water, sewer, and other connections required to make the above facilities operative; payment of all rental costs; furnishing and paying for heating fuel, as required; all electrical energy; private telephone services; staples, as specified; and all necessary incidentals to complete the work - all in accordance with the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.40 A	ENGINEER'S FIELD OFFICE (Type A)	MONTH
6.40 B	ENGINEER'S FIELD OFFICE (Type B)	MONTH
6.40 C	ENGINEER'S FIELD OFFICE (Type C)	MONTH
6.40 CU	ENGINEER'S FIELD OFFICE (Joint Use) (Type CU)	MONTH
6.40 D	ENGINEER'S FIELD OFFICE (Type D)	MONTH
6.40 DC	ENGINEER'S FIELD OFFICE WITH CONFERENCE ROOM	MONTH
6.40 DU	ENGINEER'S FIELD OFFICE (Joint Use) (Type DU)	MONTH

SECTION 6.41 – Line-and-Grade Surveys

6.41.1. INTENT. This section describes the survey work required for the establishment of lines and grades and for the staking out and layout of the work.

6.41.2. DESCRIPTION. The work under this section shall consist of the following:

(A) Obtaining necessary information, such as bench marks, location of monuments, monument coordinates, bearings of monument lines, angular and linear measurements, and other required data, from the Topographical Bureau in the Office of the President of the Borough in which the work is to be done.

(B) Based upon the information obtained in (A) above, make all necessary computations required and run a survey to tie the points of intersection of the building line of the street which is to be improved and the building lines of intersecting streets to the monument system. Intermediate points shall be provided when the building line of the street under improvement changes direction or is curved.

(C) Establish the control points on each side of the street to be improved for the offset base line which will be used for the curb construction line. The control points shall be fixed at some convenient offset, measured from corner building line intersection points along a line extending toward the curb at right angles to the building line of the street under improvement. Control points at changes in direction and on curves shall be established where directed by the Engineer.

All control points shall be properly referenced to permit re-establishment in the event such points are disturbed or lost. The Contractor shall re-establish such lost or disturbed points at such time as the Engineer shall direct.

(D) Using the established control points, the Contractor shall lay out corner grade stakes or marks and also, at intervals not exceeding fifty (50') feet, all intermediate grade stakes or marks which may be required for curb construction and establishment of gutter grades. Grade stakes or marks shall be placed at all breaks in grade.

(E) The extension of the line used for the establishment of a control point, as described in (C) above, shall be continued to the proposed curb line. The extended line shall be given an arbitrary station and all stationing along the work shall be based upon such arbitrary station. Where street improvements extend over consecutive blocks, the stationing in subsequent blocks shall be referenced to that in the initial block.

(F) Preliminary transverse cross-sections, from building line to building line, shall be taken by the Contractor along the street which is to be improved at longitudinal intervals not exceeding fifty (50') feet, at all grade breaks, and at the ends of streets midway into intersecting streets. The transverse cross-sections shall be plotted on approved cross-section paper, or by computer plot to a scale of 1" = 1– - 0", vertical, and 1" = 10– - 0", horizontal, and in a format that shall be subject to prior approval by the Engineer. The Contractor shall plot to the same scale a longitudinal profile for each curb line, showing the proposed and existing curb line elevations at not more than twenty-five (25') feet intervals and at intermediate points where unusual sidewalk conditions occur and where trees may be affected. The Contractor shall also prepare two (2) copies of curb and gutter grade sheets: one (1) for the Contractor's use and one (1) for the Engineer's use. All plotting shall be done in 25" x 36" size sheets unless otherwise approved by the Engineer. All plotted material, curb and gutter grade sheets and supporting data shall be submitted to the Engineer, for approval, at least one (1) week before any work is started. Where the Contractor fails to comply with this requirement the Contractor will be held responsible for and shall bear all costs resulting from any changes in grade.

(G) Copies of all survey notes and sketches, together with a certification that lines and grades used in the completed work comply with contract requirements, shall be delivered to the Engineer. All such copies shall be signed by and bear the seal of a Professional Engineer or Professional Land Surveyor who is licensed to practice in the State of New York.

(H) The Contractor shall provide the required survey party or parties and all necessary surveying equipment. The Contractor shall make all necessary computations and determine the alignment, elevation and position for all construction work and shall be responsible for the accuracy of all lines and grades which are established by the Contractor. Any check made by the Engineer of the work done by the Contractor shall not relieve the Contractor of such responsibility.

(I) The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks, made or established on or near the line of the work and agrees to accept responsibility for and to remedy at the Contractor's cost and expense any mistakes that may be caused by the unauthorized disturbance or removal of such points, stakes, grade marks, monuments and bench marks.

The Contractor shall not disturb or excavate within five (5') feet of any City monument which may be within the limits of the work but shall cease operations at such places until the Contractor has referenced the said monument to enable him to reset it. No monument shall be disposed of unless, in accordance with the City ordinances therefor, the Contractor obtains special permission from the Commissioner for such disposal.

In the event the Contractor fails to reference a monument, as required, or the Contractor fails to reset a monument when special permission for its disposal is not or cannot be obtained from the Commissioner and such resetting is ordered by the Engineer, the City may use its own forces or obtain the services of a Professional Land Surveyor, licensed to practice in the State of New York, to perform such referencing or resetting work, or both.

(J) The Contractor shall furnish the necessary forms, templates, lines, spirit levels, stakes and other tools, implements and material and employ competent and skillful men to correctly set out from the grade marks or stakes all details of the work, in full accord with the Contract Drawings, the specifications and the directions of the Engineer.

6.41.3. ACCURACY OF SURVEYS. In general, angular measurements shall be at least equal in precision to that given for the horizontal controls.

The precision of horizontal control for the establishment, referencing and re-establishment of building line intersection points and for the referencing and resetting of existing monuments, if required, shall be 1/50,000. For the establishment and re-establishment of base line control points the control traverse shall have an error of closure no greater than 1/20,000 after initial angular adjustment.

Precision for vertical controls shall be 0.05 feet multiplied by the square root of the distance through which levels are taken in miles.

6.41.4. PAYMENT. The Engineer may make partial payments for work done hereunder, in the Engineer's discretion, based upon the approved breakdown of the lump sum price bid, which is provided for elsewhere in the contract. The total payment will not exceed the lump sum price bid.

6.41.5. PRICE TO COVER. The lump sum price bid shall cover the cost of furnishing all labor, surveyors, Professional Engineer or Land Surveyors, materials, plant, equipment of all kinds, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.41	LINE AND GRADE SURVEYS	LUMP SUM

SECTION 6.42 – Beam Barriers for Dead-End Streets

6.42.1. INTENT. This section describes constructing beam barriers, of the several types, for dead-end streets.

6.42.2. DESCRIPTION. Barriers shall be as shown on New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1022 and shall consist of corrugated steel rail elements mounted one above the other on steel posts. Posts shall be driven into sand-filled steel shells and shells then capped with concrete, except as otherwise provided. Rail elements shall be painted with alternate reflectorized and non-reflectorized stripes; and terminal sections affixed to rail elements at ends of barriers, shall be painted with an approved reflective coating.

Signs, bearing the legends "DEAD" and "END" shall be mounted on the rail elements, as shown.

6.42.3. MATERIALS. Concrete for capping shells shall be Class C-25, Type II A; cement - Type II Portland; sand - Type 1 A; coarse aggregate - Type 1, Grade B, or Type 2, Size No. 57; and an approved air-entraining agent shall be added at the time concrete ingredients are mixed with water.

All steel components, including hardware but excepting steel shells, shall be galvanized.

Materials for barrier components shall be as shown on Standard Drawing No. H-1022.

Welds and weldments shall conform to the requirements of the American Welding Society.

6.42.4. METHODS. Except as otherwise directed by the Engineer, excavation for steel shells shall be made to the dimensions and depths required for their installation. After shells are installed they shall be filled with sand, as shown, and the space between the outside of the shells and the sides of the excavation also filled with sand. Sand fill shall be thoroughly compacted to the satisfaction of the Engineer.

Posts shall be centered and driven into the sand-filled shells to the depths required in such manner as not to injure the galvanizing coating.

Rail elements shall be mounted on the posts and secured. Shells shall then be capped with concrete as shown.

The details of assembly of barrier components, the mounting of signs and the stripping and coating of rail elements and terminal sections are shown on New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1022.

When barriers are to be placed in sidewalk areas, the top of the steel shells shall be set four (4") inches below proposed sidewalk grade, shells shall be completely filled with sand flush with the adjacent sidewalk and the concrete capping, unless otherwise directed, omitted. The vertical positioning of barrier components, however, shall be maintained, as shown on the Standard Drawing.

6.42.5. MEASUREMENT. The quantities to be measured for payment shall be the number of beam barriers for dead-end streets, of the several types, installed in the work, complete, as specified to the satisfaction of the Engineer.

6.42.6. PRICES TO COVER. The unit prices bid for each of the several types of barriers constructed shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.42 A01	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 1	EACH
6.42 A02	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 2	EACH
6.42 A03	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 3	EACH
6.42 A04	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 4	EACH
6.42 A05	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 5	EACH
6.42 A06	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 6	EACH
6.42 A07	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 7	EACH
6.42 A08	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 8	EACH

6.42 A09	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 9	EACH
6.42 A10	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 10	EACH
6.42 A11	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 11	EACH
6.42 A12	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 12	EACH
6.42 A13	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 13	EACH
6.42 A14	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 14	EACH
6.42 A15	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 15	EACH
6.42 A16	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 16	EACH
6.42 A17	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 17	EACH
6.42 A18	BEAM BARRIERS FOR DEAD-END STREETS, TYPE 18	EACH

SECTION 6.43 – Photographs

6.43.1. INTENT. This section describes the work of providing a photographic record of contract work.

6.43.2. DESCRIPTION. The work shall consist of the furnishing of all required photographic equipment and materials; the taking of digital photographs; making prints from digital files; and submitting prints and digital files to the Engineer.

6.43.3. MATERIALS.

(A) PRINTS

Prints shall be 7-1/2" x 9-1/2" image area on 8" x 10" single-weight, gloss paper, and shall be in color. Prints shall be inserted in standard weight Archival Quality clear poly sheet protectors and submitted in a hard cover three (3) ring binder. The following information shall be printed on an archival quality 1" high x 4" wide adhesive label on the bottom right corner on the front of each photograph:

(a) Contract Number and Job Location
(b) Photograph Number
(c) Photograph Type: Preconstruction Photograph or Construction Progress Photograph
(d) Date - (The date the photograph was taken.)
(e) Address – street address where photograph was taken
(f) Borough

The Contractor shall furnish to the Commissioner one (1) set for each view taken, each set consisting of two (2) 8" x 10" prints and one (1) digital file.

All prints and digital files shall become the property of the Commissioner. All completed prints and digital files shall be delivered to the Engineer within two (2) weeks after the photographs have been taken. Approved binders for the clear poly sheet protectors containing all materials shall be furnished by the Contractor and delivered to the designated construction office at the time of the initial submission of prints and DVDs at such other times as may be required thereafter.

(B) DIGITAL FILES

Digital files shall be captured as 7.2 megapixel files or greater, with a minimum pixel array of 2,400 pixels by 3,000 pixels. The camera used to capture the digital files shall be a Digital SLR (Single Lens Reflex) camera or approved equal; "point and shoot" cameras or cameraphones are not acceptable. Digital cameras shall produce images using true optical resolution; "digital zoom" is not acceptable. Images shall not be resized or interpolated. The file format for digital files shall be Joint Photographic Experts Group format ("JPG"). The digital files shall not be modified or processed in any way to alter the JPG file's metadata, including the photograph's original capture date.

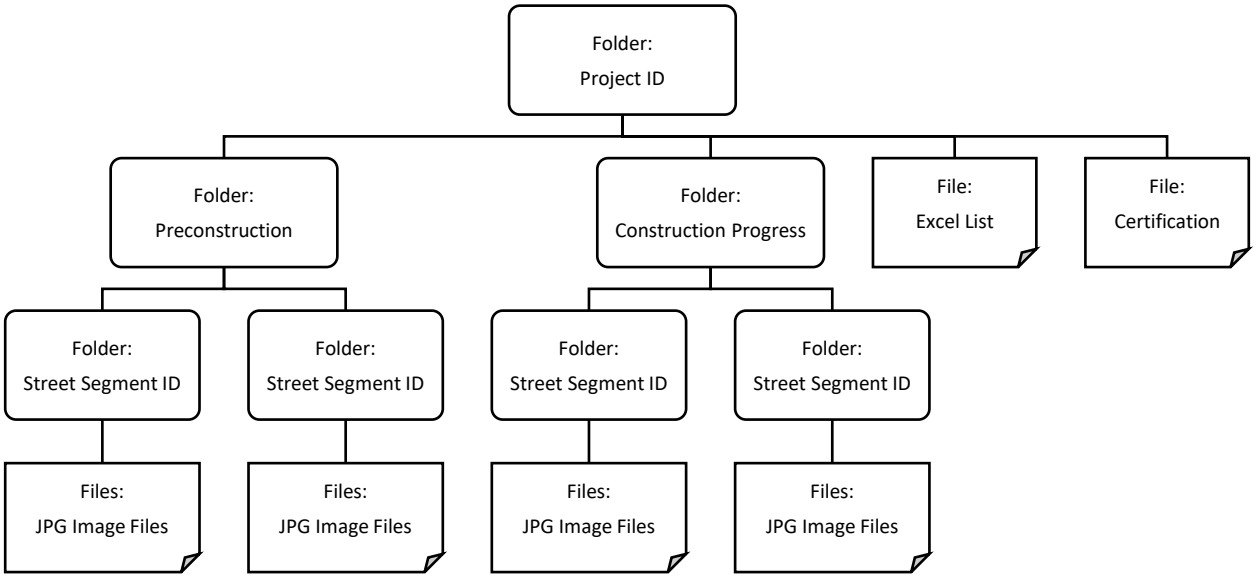
Digital files shall be submitted on Digital Versatile Disk ("DVD"). DVDs shall be inserted in standard weight Archival Quality clear poly sheet protectors, and submitted in a hard cover three (3) ring binder. The DVD shall be labeled with the Project ID and the geographical area and streets depicted in the photographs. Labeling using adhesive labels is not acceptable.

Digital files shall have file names in the following format: a^b^c^d^e^f.JPG, where "a" through "f" are as follows:

(a) Contract Number
(b) Date, in YYYY-MM-DD format (The date the photograph was taken.)
(c) Address – street address where photograph was taken
(d) Borough
(e) Street Segment ID
(f) Photograph Number

A sample file name would be "HBX123^0021^2016-04-19^123 Main St^Queens^55555.JPG" Additionally, the underscore "_" charater may be used instead of the "^" charater in the file name.

The files on the DVD shall be organized in folders by Photograph Type and Street Segment ID as follows:



Street segment ID's may be found on NYC Planning's Geographic Online Address Translator (GOAT), at http://a030-goat.nyc.gov/goat/Default.aspx. The field "Segment ID" in response to an address lookup is the Street Segment ID to be used, without the leading zeros (last five digits).

(C) CERTIFICATION

The Photographer shall provide a signed certification that the files on the DVD are unaltered and are an accurate representation of the subject photographed. The original certification, in a clear poly sheet protector, shall be submitted with the prints and digital files, and a scanned copy shall be included on the DVD.

(D) PHOTO LOG

The Photographer must provide a log (Excel list) of the photographs. The log must be in MS Excel format. The Excel file must be included on the DVD with the digital files, and must be printed and submitted with the prints and digital files in a clear poly sheet protector. The log must include the following information:

(a) Contract Number and Job Location
(b) Photograph Number
(c) View and Description – (Indicating a general description of what the photograph represents)
(d) Photograph Type: Preconstruction Photograph or Construction Progress Photograph
(e) Date – (The date the photograph was taken.)
(f) Address – street address where photograph was taken
(g) Borough
(h) Street Segment ID
(i) Name of Photographer
(j) Department Witness

6.43.4. METHODS. The Contractor shall employ and pay for the services of a competent Professional Photographer who, at the direction of the Commissioner or the Commissioner's authorized representative, shall take Preconstruction Photographs and Construction Progress Photographs and such other photographs which may be required during the period of the contract.

The Photographer shall be available for taking the required photographs within forty-eight (48) hours after receiving notification from the Commissioner or the Commissioner's authorized representative.

Photographs shall be taken under the supervision and direction of the Engineer. The Engineer reserves the right to reject any and all views that are not reasonably clear and definitive. No separate or additional payment will be made for any additional photographs that are required as a result of the rejection of views.

6.43.5. PRECONSTRUCTION PHOTOGRAPHS. Preconstruction Photographs shall show the conditions existing on the work site prior to the commencement of the contract work. The Preconstruction Photographs will generally represent views of:

- The original surface conditions of streets, curbs and walks, and buildings;
- Evidence of damage, disrepair, or emergency situations;
- All encumbrances and/or encroachments which may be affected by the construction of the proposed work.

When there is no pay item listed in the Bid Schedule, the number of Preconstruction Photographs shall be as follows:

(A) Highway Street Reconstruction projects: 150 sets per million dollars of street reconstruction work;

(B) Highway Resurfacing projects: 4 sets per 250 linear feet of roadway for resurfacing work;

(C) Sewer and Water Main projects: 2 sets (1 set each side of street) per 25 linear foot of sewer and water main.

When there is an item listed in the Bid Schedule, the quantity to be measured for payment shall be the number of sets, each set consisting of a digital file and the two (2) prints made from the digital file, of Preconstruction Photographs including photographs showing the original condition of all encumbrances and/or encroachments which may be affected by construction of the proposed work, and which are delivered as directed by the Engineer.

6.43.6. CONSTRUCTION PROGRESS PHOTOGRAPHS. Construction Progress Photographs shall show the conditions existing during the progress of, and at the completion of the contract work. The photographs will generally represent views of the work under construction and completed work. Construction Progress Photographs shall be taken monthly and upon completion of the work.

The approximate number of Construction Progress Photographs is as follows:

(A) Highway reconstruction and resurfacing projects: Minimum 2 sets per 250 linear feet of roadway under construction or completed in the last month.

(B) Pedestrian ramps on all projects: Minimum of 1 set for every pedestrian ramp under construction or completed in the last month, in addition to other progress photographs.

(C) Sewer and Water Main projects: Minimum of 4 sets for every 100 feet of sewer or water main under construction.

No separate payment will be made for Construction Progress Photographs. The cost of taking and providing sets of Construction Progress Photographs shall be included in the prices bid for all other items of work.

6.43.8. PRICE TO COVER (PRECONSTRUCTION PHOTOGRAPHS ONLY). When there is an item listed in the Bid Schedule, the contract price bid per set shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required, including the cost of the photographer, and the cost of furnishing the required prints, digital files, DVDs, labels, poly sheet protectors, and ring binders, and completing the work in accordance with the specifications and the directions of the Engineer.

When there is no item listed in the Bid Schedule, no separate payment will be made. The cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required, including the cost of the photographer, and the cost of furnishing the required prints, digital files, DVDs, labels, poly sheet protectors, and ring binders, and completing the work in accordance with the specifications and the directions of the Engineer shall be included in the prices bid for all other items of work.

Payment will be made under:

Item No.	Item	Pay Unit
6.43 D	DIGITAL PHOTOGRAPHS	SETS

SECTION 6.44 – White and Yellow Thermoplastic Reflectorized Pavement Markings

6.44.1. INTENT. This section describes the furnishing and application of hot extruded reflectorized white and yellow thermoplastic pavement markings, for lane lines, centerlines, gore lines, edge lines, shoulder striping, etc., in specified constant widths and at locations indicated on the Contract Drawings, as ordered by the Engineer, and as specified herein.

6.44.2. DESCRIPTION. Under this section the Contractor shall be required to clean and prime the pavement surface and to apply the markings on the surface.

6.44.3. MATERIALS. The markings shall be a reflectorized thermoplastic pavement striping material, hereinafter referred to as "composition," of a type that is applied to the pavement surface in a molten state by mechanical means with surface application of glass beads and which, upon cooling to normal pavement temperature, produces an adherent reflectorized stripe of a specified constant width and of a uniform cross-section, between 1/8" and 3/16" in thickness, and is capable of resisting deformation.

(A) COMPOSITION REQUIREMENTS

The thermoplastic composition shall be specifically formulated for application at temperatures greater than 400° F. The components in the composition shall show no significant breakdown, or deterioration at 475° F.

The binder component shall be formulated as a hydrocarbon resin; or it shall be formulated as a mixture of high boiling point nonhydric primary alcohol and modified maleic resin. The pigment, beads and filler shall be uniformly dispersed in the binder resin.

The thermoplastic composition shall be free from all skins, dirt and foreign objects and shall comply with the following requirements:

	% by Weight	
Component	White	Yellow
Binder	17.0 min.	17.0 min.
Titanium Dioxide	10.0 min.	--
Glass Beads	20.0 min.	20.0 min.
Calcium Carbonate & Inert Fillers	49.0 max.	*
Yellow Pigments	--	*

* *Amount and type of yellow pigment, calcium carbonate and inert fillers must be used per the written recommendations of the manufacturer, providing the other composition requirements of this specification are met.*

(B) PHYSICAL PROPERTIES OF COMPOSITION

1. Color. White thermoplastic composition, as placed, shall be white, free from dirt or tint.

   Yellow thermoplastic composition, as placed, shall be yellow, free from dirt or tint and shall be a reasonable visual match to Munsell Book Notation 10Yr8/14 (ASTM D1535).

2. Drying Time. When installed at 70°, and in thicknesses between 1/8 and 3/16", the composition shall be completely solid and shall show no damaging effect from traffic after ten (10) minutes.

3. Yellowness Index. White thermoplastic composition shall not exceed a yellowness index of 0.12 when tested in accordance with AASHTO Designation T-250.

4. Softening Point. The composition shall have a softening point of not less than 194° F when tested in accordance with ASTM E28.

5. Specific Gravity. The specific gravity of the composition as determined by a water displacement method of 25° C shall be between 1.9 and 2.2 (referred to water at 25° C).

(C) REFLECTIVE GLASS BEADS (PRE-MIX AND DROP-ON)

Reflective glass beads for use in the composition and for drop-on shall conform to the following requirements:

1. The glass beads shall be colorless; clean; transparent; free from milkiness or excessive air bubbles; and essentially clean from surface scarring or scratching. They shall be spherical in shape and at least 70% of the glass beads shall be true spheres when tested in accordance with ASTM D1155.

2. The refractive index of the spheres shall be a minimum of 1.50 as determined by the liquid immersion method at 25° C.

3. The silica content of the glass spheres shall not be less than 60%.

The crushing resistance of the beads shall be as follows: A forty (40) pound dead weight, for 20 to 30 mesh spheres.

The glass beads shall have the following grading when tested in accordance with ASTM D1214:

U.S. Standard Sieve	Mass % Passing
No. 20	100
No. 30	79-95
No. 50	15-60
No. 80	0-15

Glass beads for drop-on shall be treated with a moisture-proof coating.

(D) PRIMER

All pavement surfaces shall be primed except that on new bituminous pavements, when the thermoplastic pavement markings are applied within the same calendar year as the completion of paving operations, primer shall not be required.

The primer shall be either a one-component or a two-component, cold or hot applied material of the type recommended by the manufacturer of the thermoplastic pavement marking material and have a maximum VOC requirements of 2.1 lbs./gal. On Portland cement concrete pavements the primer shall be of a bitumen mixture of asphalt binder and mineral filler or epoxy resin type, black in color. At least five working days prior to the start of thermoplastic application, the Contractor shall provide the Engineer with the manufacturer's written instructions for primer application. The application of the primer shall be performed in accordance with the manufacturer's written recommendations which shall include the method of application, the application rate, and the drying time.

(E) In addition, the materials furnished shall meet the following requirements:

1. Composition shall be packed in slab form in individual boxes.

2. Each packaged unit shall be identified by the manufacturer’s name, manufacturing designation, date of manufacture, and color. Each shipment shall be accompanied by a notarized certification from the supplier certifying that the material is in conformance with the material specifications designated herein. Samples may be required to be submitted to the Engineer for tests and approval prior to its use. Materials received without a notarized certification, or materials which fail to pass the test, shall not be used and shall be removed from the site of the work.

3. Composition shall be reusable on the job site without deterioration of useful properties when subjected to three reheatings to its application temperature, and after being held at such temperature for one hour during each reheating.

4. All materials shall be composed of 100% pure virgin stock. No scrap or reprocessed materials may be used.

5. The composition when installed on and supported by pavement shall:

   a. be textured so as not to be slippery when wet.

   b. adhere securely to the pavement under repeated freezing and thawing.

   c. not discolor on prolonged exposure to sunlight.

d. not crack, chip or craze.

e. not spread or smear at temperatures at or below 140 Degrees F.

f. not deteriorate by contact with sodium chloride, calcium chloride, cinders or other similar pavement ice preventatives, or by contact with lubricant or fuel drippings from vehicles.

6. Thermoplastic material shall not give off toxic fumes which are harmful to persons or property when it is heated to application temperature.

(F) PREFORMED REFLECTORIZED PAVEMENT MARKINGS

The Contractor may request to use preformed reflectorized pavement markings for letters and symbols in lieu of hot extruded thermoplastic markings, at no extra cost. The preformed markings must be from the NYSDOT Approved List 727-04.

6.44.4. METHODS.

(A) GENERAL

Any pavement upon which two-way traffic will be maintained shall be properly marked with a centerline pavement lane marking before nightfall or the end of the working day, whichever comes sooner. In order to comply with this requirement, the Contractor may furnish and apply a temporary painted pavement marking in accordance with the requirement of Section 6.49. But where neither Temporary Painted Pavement Markings nor the final Thermoplastic Reflectorized Pavement Markings can be immediately installed as directed, the Contractor shall be required to furnish, install, maintain, and remove, when directed, rubber cones or other treatment deemed appropriate by the Engineer to safely maintain traffic at no additional cost to the City.

All final Thermoplastic Reflectorized Pavement Markings shall be installed as directed by the Engineer within 14 days after paving each block. Should the Contractor fail to install said final Thermoplastic Reflectorized Pavement Markings within 14 days after paving due to atmospheric conditions being inappropriate for satisfactory results as determined by the Engineer, the Contractor shall be required to install all pavement markings (e.g. edge lines, ten foot broken lines, stop bars, cross walks and arrows) using temporary painted pavement markings. Said temporary painted pavement marking shall be maintained as directed until the final Thermoplastic Reflectorized Pavement Markings are installed under this item. Maintenance of temporary painted pavement markings shall be done by re-applying the painted pavement markings where directed by the Engineer. Payment for the application of temporary painted pavement markings and each re-application, as may be directed, will be made in accordance with the requirements of Section 6.49.

Failure to meet this requirement shall be deemed a substantial deficiency in compliance with the specification requirements of Section 1.06.44(I) of the General Conditions, and will be cause for assessment of liquidated damages stipulated therein.

Where necessary, the Contractor shall establish marking line points at 25-foot intervals throughout the length of pavement, or as directed by the Engineer. Before any work is begun, a schedule of operations shall be submitted for the approval of the Engineer.

On bituminous concrete pavements that have been in-place since at least the previous calendar year, a thermosetting adhesive primer shall be placed at a wet film thickness of approximately 5±1 mils (265-400 sf/gal) prior to the application of the thermoplastic pavement markings.

On Portland cement concrete pavements a primer of bitumen or epoxy resin type shall be applied at a temperature range of between 55 and 110 Degrees F., at a width of two (2”) inches greater than the width of the thermoplastic pavement marking such that it extends one (1”) inch on each side of the thermoplastic pavement marking, and at a wet film thickness of between 4 and 5 mils or at a rate of 320-420 square feet per gallon. The marking material shall not be applied until the primer reaches a tack free condition (approximately 15 minutes under normal conditions). To shorten the curing time of the epoxy resin, an infrared heating device may be employed.

The thermoplastic material shall be applied to the pavement at composition temperatures no lower than 400 Degrees F. nor higher than 425 Degrees F. at the point of disposition. Marking shall be done only in seasonable weather in accordance with good practice and in a neat, workmanlike manner. Immediately after installation of the composition, drop-on glass beads shall be mechanically applied while still sufficiently

molten such that the beads will be held by and mechanically imbedded in the surface of the composition, in order to provide immediate night reflectivity.

The work included herein shall be pleasing to the eye, and shall be kept straight and aligned. Spilling of marking material will not be tolerated, especially if due to carelessness or lack of skill on the part of the Contractor, and must be removed by the Contractor. The line, or portion thereof, shall be protected from both vehicle and pedestrian traffic by use of adequate warning devices, until thoroughly past the point of tracking or smearing.

The Engineer's decision as to the acceptability of any installed line shall be final and binding on all parties to the contract. The Engineer may, at the Engineer's discretion, require the Contractor to remove all extraneous marks on the pavement made by the agents or employees of the Contractor. Unacceptable lines, damaged by others due to improper protection, or poor workmanship, poor appearance, poor performance, poor materials, improper width or improper alignment shall be reworked by the Contractor at no cost to the City to the satisfaction of the Engineer, within fifteen (15) days after written notification of the rejection of such completed work is received by him.

When raised reflectorized pavement markers exist, special care shall be taken to prevent the reflector from being covered by the thermoplastic material. Any reflectors so damaged shall be replaced by the Contractor at no cost to the City.

(B) SURFACE PREPARATION OF PAVEMENT

The Contractor shall be responsible for cleaning the pavement, to the satisfaction of the Engineer, such that at the time of application the pavement surface shall be free of oil, dirt, grease, concrete curing compounds and other foreign contaminants. Concrete curing compounds shall be removed by sandblasting or grinding the pavement surface.

The pavement shall be dry, to the satisfaction of the Engineer, before installation will be permitted (surface dry only, shall not be considered an acceptable condition). At the time of installation, the pavement surface temperature shall be a minimum of 55 Degrees F. and the ambient temperature shall be a minimum of 49 Degrees F. and rising. The Engineer shall be the sole determiner as to when atmospheric conditions are such as to produce satisfactory results

Note: To comply with the 55 Degrees F. pavement surface temperature requirement, the Contractor must schedule this striping work for seasons of warm weather. In cooler conditions, if so ordered and at locations directed by the Engineer, the Contractor must, temporarily, furnish and apply painted pavement markings complying with the requirements of Section 6.49 of the contract. Unless otherwise specified, payment therefor will be made at the unit price bid for Item No. 6.49 in the contract. Then at a later date when the pavement surface temperature is acceptable, as determined by the Engineer, the Contractor shall place the permanent thermoplastic markings over the temporary painted markings in a satisfactory manner.

(C) EQUIPMENT

1. Pavement Cleaning Equipment. Equipment must be provided to insure removal of dust, debris, and other foreign matter from the pavement immediately prior to the application of primer and subsequent installation of composition.

2. Primer Applicating Equipment. Application of primer shall be accomplished using equipment having the following features:

   a. The main storage tank shall be equipped with a visible gauge which will allow the Engineer to readily ascertain the rate of application.

   b. The main storage tank shall be equipped with a heating device which will maintain the primer at a constant efficient temperature.

   c. The spray nozzle shall be protected from the action of wind to insure placement where needed.

3. Thermoplastic Melting Equipment. A special kettle mounted on a mobile unit is required for melting and heating the composition. Such equipment shall incorporate the following features:

   a. The kettle shall be of sufficient capacity to satisfy the minimum installation requirements of the composition as specified hereinafter.

b. The kettle shall provide means of heating the composition by means of thermostatically controlled heat transfer liquid rather than by direct flame, so as to provide positive temperature control and prevent overheating of the composition.

c. Suitable temperature gauges to indicate liquid and composition temperatures at all times shall be provided in the kettle.

d. The kettle shall provide means of continually agitating the composition while the composition is being heated.

e. The kettle shall have a means of rapidly and efficiently discharging the liquid composition into appropriate application equipment.

f. The kettle shall be so equipped that, at the point where the liquid composition is discharged into the application equipment, a suitable temperature gauge shall be mounted in such a manner that the temperature of the liquid composition, at the point of discharge, shall be easily read at all times.

g. The kettle shall be equipped and constructed in such a manner so as to satisfy the requirements of the National Board of Fire Underwriters and the appropriate agencies of the City of New York.

4. Thermoplastic Applicating Equipment. Equipment shall be provided to place the composition on the pavement as a finished line, and shall include the following features:

a. The applicator shall provide agitation for the composition prior to its actual installation.

b. Applicator shall provide means of maintaining the composition at its proper application temperature (not lower than 400 Degrees F. nor higher than 425 Degrees F.).

c. Applicator shall maintain uniformity of specified width, and thickness of not less than 1/8" nor more than 3/16" of generally uniform cross-section.

d. Applicator shall provide a means of cleanly cutting off the ends of each length of line.

e. Applicator shall be capable of providing lines of variable widths by use of easily interchangeable parts.

f. Applicator shall be provided with a bead dispenser capable of uniformly dispensing reflective glass beads at controlled rates of flow. The bead dispenser shall be automatically operated in such a manner that it will only dispense beads while the composition is being applied. The beads shall be dispensed at a rate of one (1) pound per 20 square feet of composition.

g. Applicating equipment shall be of two general types:

Portable applicator - The portable applicator, capable of being propelled by the operator, shall be a device typically used for traffic line installations such as crosswalk lines, stop bars, and short lane, edge and center lines. The applicator shall be easily maneuverable and so constructed as to permit the installation of curved lines.

Mobile applicator - The mobile applicator shall contain equipment to provide for the automatic installation of skip lines in any combination of line and skip up to 40 feet. The mobile applicator shall be moved in conjunction with the melting and heating kettles in such a manner as to provide continuous highway operation of the kettles and the mobile applicator as an integral unit. The mobile applicator shall be capable of installing from 15,000 to 20,000 linear feet of line in an 8-hour day.

h. The applicators shall be equipped and constructed in such a manner so as to satisfy the requirements of the National Board of Fire Underwriters and the appropriate agencies of the City of New York.

(C) PREFORMED MARKINGS

Preformed reflectorized pavement markings shall be installed in accordance with the requirements above and the following additional requirements:

1. Pavement surface temperature: 70F Minimum, 170F Maximum

2. Ambient air temperature: 60F Minimum
3. Allowable Installation Dates: May 1 to September 30

Equipment used for the placement of preformed markings shall be of the type recommended by the manufacturer of the preformed material.

If required by the marking manufacturer, a primer or adhesive from NYSDOT Approved List 727-04 shall be used in accordance with the manufacturer's recommendations.

6.44.5. MEASUREMENT.

(A) THERMOPLASTIC REFLECTORIZED PAVEMENT MARKINGS.

The quantity to be measured for payment shall be the actual number of linear feet of 4" wide pavement markings measured along the centerline of the surface stripe. No payment will be made for the number of linear feet of skips in dashed lines. Payment for markings wider than 4" will be made at the contract price per linear foot of the 4" line multiplied by the factor:

$$\frac{\text{Actual Width of Marking (Inches)}}{4}$$

Payment for non-linear markings will be made at the contract price per linear foot of the 4" line multiplied by the factor:

$$\frac{\text{Actual square footage of marking}}{3}$$

The following markings will be paid for under Item 6.44:

1. Lane lines
2. Channelizing lines
3. Stop Bars
4. Crosswalks
5. Gore markings
6. Railroad crossing "X" (Per MUTCD Figure 8B-7, with the "R R" letters paid under item 6.44 L)
7. Diamond HOV marking
8. Chevrons in bike shared lane sharrows (Per MUTCD Figure 9C-9, with the Bike symbol paid under Item 6.44 S)
9. Cross-hatching in Do Not Block boxes
10. Parking space markings
11. Yield Ahead Triangles (20' and 13' per MUTCD Figure 3B-26)
12. Speed hump markings (per MUTCD Figure 3B-29)

(B) PRIMER FOR PORTLAND CEMENT CONCRETE PAVEMENTS.

The quantity of Primer for Portland Cement Concrete Pavements to be measured for payment shall be the actual number of linear feet of black colored primer satisfactorily applied to Portland cement concrete pavement. Measurement shall be made along the surface of the pavement and shall equal the number of linear feet of Thermoplastic Reflectorized Pavement Markings applied under Item No. 6.44, 6.44 L, or 6.44 S to new Portland Cement Concrete pavements. No payment will be made for the number of linear feet of skips in dashed lines or for any additional width of primer applied beyond that width of pavement markings to be applied, under Item No. 6.44, to new Portland Cement Concrete pavements.

(C) PAVEMENT MARKINGS – LETTERS AND NUMBERS

The quantity to be measured for payment will be the actual number of letters and numbers applied.

Item 6.44 L will be used for all 26 letters and 10 numbers, where the letters and numbers are 6' or greater in height. For example, the marking "SCHOOL" will be paid as 6 EACH.

(D) PAVEMENT MARKINGS – SYMBOLS

The quantity to be measured for payment will be the actual number of symbols applied.

Item 6.44 S will be used for all standard symbols, including:

1. All arrows, regardless of size or number of arrowheads.
2. Helmeted bicyclist symbol, regardless of size

3. Bike symbol, regardless of size (Per MUTCD Figure 9C-9, with the chevrons paid under item 9.44)
4. Bicycle detector pavement marking, including 2”x6” lines (per MUTCD Figure 9C-7)
5. Handicap symbol, regardless of size
6. Pedestrian symbol, regardless of size
7. Roller skater symbol, regardless of size
8. Yield line triangles (12”x18” and 24”x36” per MUTCD Figure 3B-16).

6.44.6. PRICES TO COVER.

(A) THERMOPLASTIC REFLECTORIZED PAVEMENT MARKINGS.

The contract price per linear foot of 4” wide pavement markings, white and/or yellow, shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required including, but not limited to, the cleaning of surfaces and priming the Asphaltic Concrete Wearing Courses where required, and application of striping materials, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) PRIMER FOR PORTLAND CEMENT CONCRETE PAVEMENTS.

The contract price per linear foot of Primer for Portland Cement Concrete Pavements shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required including, but not limited to, removal of concrete curing compounds and surface laitance by high pressure water, sandblasting, or grinding, and vacuuming the concrete surface, and furnishing and applying the black colored primer striping materials, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(C) PAVEMENT MARKINGS – LETTERS AND NUMBERS

The contract price per EACH pavement marking letter and number, white and/or yellow, will cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required including, but not limited to, the cleaning of surfaces and priming the Asphaltic Concrete Wearing Courses where required, and application of striping materials, all in accordance with the Contract Drawings, the Specifications, and the directions of the Engineer.

(D) PAVEMENT MARKINGS – SYMBOLS

The contract price per EACH pavement marking symbol, white and/or yellow, will cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required including, but not limited to, the cleaning of surfaces and priming the Asphaltic Concrete Wearing Courses where required, and application of striping materials, all in accordance with the Contract Drawings, the Specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.44	THERMOPLASTIC REFLECTORIZED PAVEMENT MARKINGS (4” WIDE)	L.F.
6.44 L	PAVEMENT MARKINGS – LETTERS AND NUMBERS	EACH
6.44 PR	PRIMER FOR PORTLAND CEMENT CONCRETE PAVEMENTS	L.F.
6.44 S	PAVEMENT MARKINGS – SYMBOLS	EACH

SECTION 6.44 CST – COLOR SURFACE TREATMENT FOR PAVEMENTS (CST)

6.44CST.1. DESCRIPTION.

Under this work, the Contractor must furnish and apply CST at various locations in accordance with the patterns specified in the Work Orders or Contract Drawings and in conformance with these specifications and as directed by the Engineer.

6.44CST.2. REFERENCES.

1. ASTM D7234: Pull-Off Adhesion Strength of Coatings on Concrete using Portable Pull-Off Adhesion Testers
2. ASTM E303: Measuring Surface Frictional Properties Using the British Pendulum Tester
3. EPA 24 ASTM D3960-05 Volatile Organic Compounds (VOC)

6.44CST.3. SUBMITTALS.

A. A copy of the current year accreditation certificate available from the Contractor or Subcontractor who will be performing this work or written verification from the coating supplier that the Contractor or Subcontractor is qualified to perform this Work.
B. Confirmation of coating color.
C. Manufacturer's lot certification of the aggregate hardness.

6.44CST.4. MATERIALS.

The following table outlines minimum performance properties for CST:

Characteristic	Test Specification	Measured Result
Adhesion to Asphalt	ASTM D7234	Substrate Failure
Wet Friction	ASTM E303	>55 BPN
Aggregate Hardness	Mohs' Hardness Scale	Corundum and Calcined Bauxite: 8 minimum Recycled Glass: 6 minimum

The CST must be capable of application on new and existing asphalt and Portland cement concrete surfaces, and must:

a) Be VOC compliant and lead chromate free.
b) Not contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the US Occupational Safety and Health Administration (OSHA) as a carcinogen.
c) Conform to current Federal, State and Local air pollution regulations, including those for the control (emission) of VOC.
d) Be packaged and stored in accordance with the manufacturer's instructions and requirements for shelf life and storage conditions in original unopened containers. Shipping documents and containers shall have identification numbers or batch dates for confirmation of when products were manufactured, clearly labeled as to the type material and the ratio of the components to be mixed by volume as well as showing resin or hardener components, brand name, name of manufacturer, lot or batch number, temperature range for storage, expiration date and the quantity contained. Include any special instructions regarding mixing and the Material Safety Data Sheets. The Contractor must have this information available for inspection at any time.
e) Provide a surface where color and chemical resistance will not degrade under normal exposure to weather, street sweeping, snow plowing, calcium chloride, sodium chloride, oils (automotive or food) and automotive fuels.
f) Use color pigments that remain stable under exposure to ultraviolet light, preferably have a positive rating on the LEED Solar Reflective Index.
g) The Engineer must approve CST color prior to the purchase of materials by the Contractor. Colors shall be:
    a. Bicycle Lanes: Green;
    b. Bus Lanes: Red;
    c. Plazas: Truffle;

d. As specified by Work Orders or Plans.

h) Friction aggregate:

a. Type: As specified and provided by the CST manufacturer and must match the aggregate types listed in the table below.

b. Hardness: Aggregate used must have a minimum hardness as listed in the table above. Adequate aggregate hardness will not relieve the Contractor of the Wet Friction performance requirement listed in the table above.

c. Aggregate particle size must be:

i. Bicycle facilities: between 0.8mm - 1.2mm;

ii. Bus and waling facilities: between 1.0mm - 3.0mm.

6.44CST.5 APPROVED MATERIALS.

Only products with a manufacturer's certification that the product meets the requirements of this specification, or a product approved equal as determined by the Engineer, are deemed acceptable for use. The Contractor must receive pre-approval for all materials by the Engineer prior to purchase.

COLOR SURFACE TREATMENT FOR PAVEMENTS (CST) – APPROVED MATERIALS LIST

Product	Manufacturer	Contact Information	Approved Aggregate	Manufacturer Recommendations
ColorSafe	Transpo Industries	20 Jones Street New Rochelle, NY 10801 800-321-7870 transpo.com	Calcined bauxite or Corundum	Primer plus two coats
CycleGrip MMAX	Ennis-Flint	115 Todd Court Thomasville, NC 27360 336-475-6600 ennisflint.com	Corundum	Bike lane: one coat (90 mils)
Safe-T-Grip	Epoplex	1000 East Park Avenue Maple Shade, NJ 08052 800-822-6920 epoplex.com	Bauxite / Granite mix	Thin overlay one coat
High Friction Surface Treatment	Ruby Lake	493 State Route 28 Richfield Springs, NY 13439 914-523-3766 rubylakeglass.com	Recycled glass	One epoxy coat plus one layer
Safetrack SC	Stirling Lloyd	Rockwell Road, Building A, Newington, CT 06111 860-666-5008 northamerica.stirlinglloyd.com	Calcined bauxite	
Endurablend	Pavement Surface Coatings, LLC	81 Ball Road Mountain Lakes, NJ 07046 866-215-6120 Pavementsurfacecoatings.com	Calcined bauxite	One layer

6.44CST.6 CONSTRUCTION DETAILS.

General: The Contractor must place CST as shown in the Contract or Work Order Documents or as ordered by the Engineer.

Before the Contractor may begin any surface treatment work, the Contractor must submit a schedule of operations for the approval of the Engineer. At least five (5) days prior to starting application, the Contractor must provide the Engineer with the color manufacturer's written instructions for use and provide access to aggregate for random testing. These instructions must include, but not be limited to, material mixing ratios and acceptable application temperatures.

When the Contractor applies CST under traffic, the Contractor must provide all necessary flags, markers, signs, etc. in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) to maintain and protect traffic, and to protect marking operations and the markings until thoroughly set.

The Contractor is responsible for removing, to the satisfaction of the Engineer, all tracking marks and spilled CST applied in unauthorized areas such as utilities, drainage structures, curbs and manhole covers.

The Contractor must apply the asphalt pavement coating system to the pavement in accordance with the manufacturer's specification. In its hardened state, the color shall be as specified and as approved by the Engineer.

Asphalt pavement must be stable, well compacted and generally in excellent condition for the application of the asphalt pavement coating. The Engineer will make the final determination as to the suitability of the existing asphalt pavement.

The asphalt pavement surface must be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials and chemical residue.

The asphalt pavement coating must only be applied in the correct environmental conditions as instructed by the coating supplier and as approved by the Engineer.

Refer to the instructions provided by the coating supplier regarding when the painted lane may be opened to traffic. Wait time is typically a function of the dry rate of the coating and climate conditions.

The Engineer may, at his/her discretion, require the Contractor to remove all extraneous marks on the pavement made by the agents or employees of the Contractor, or made by others due to improper control or protection of the work area by the Contractor, his agents or employees. The Contractor must repair or replace at no cost to the City any installation which, in the opinion of the Engineer, is not acceptable, whether by reason of poor workmanship, poor appearance, poor performance, poor materials, improper width or improper alignment. The Contractor must replace rejected installation as directed by the Engineer within fifteen (15) days after receiving written notification of the rejection of such completed work.

Atmospheric Conditions: The Contractor may only apply CST during dry weather conditions and on dry pavement surfaces. At the time of installation, the pavement surface temperature must be at or above manufacturer recommendations.

Surface Preparation: The Contractor must clean the pavement and existing durable markings to the satisfaction of the Engineer. At the time of application, all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials.

Application Equipment: Per manufacturer's instructions. The Contractor must receive written pre-approval from the Engineer before spray applying any CST product.

Application: The Contractor must place CST at the width, thickness and pattern designated by the Contract Documents or work orders. Surface treatment operations shall not begin until applicable surface preparation work is completed and approved by the Engineer, and the atmospheric conditions and pavement surface temperature are acceptable to the Engineer. The applied film thickness must comply with manufacturer recommendations.

Defective Results: The Contractor must repair CST, which after application and curing, is determined by the Engineer to be defective and not in conformance with this specification. The Contractor is responsible for the cost of the repair of defective CST and the Contractor must perform the work to the satisfaction of the Engineer as follows:

a) Insufficient film thickness: The Contractor must clean and prepare the surface of the CST to the satisfaction of the Engineer by reapplying CST over the cleaned surface in accordance with the requirements of this specification at the full thickness.

b) Uncured or discolored CST and/or insufficient bond (to pavement surface or existing durable marking): The Contractor must completely remove defective CST and clean the underlying pavement surface to the satisfaction of the Engineer. After surface preparation work is complete, the Contractor must repair the CST by reapplying the CST over the cleaned pavement surface in accordance with the requirements of this specification.

c) Insufficient Wet Friction as determined by the Engineer: The Contractor must remove and clean defective CST to the underlying pavement surface or re-coat with CST and friction aggregate. The

repair method must be approved in advance in writing by the Engineer. After surface preparation work is complete, the Contractor must repair by reapplying CST over the cleaned pavement surface in accordance with the requirements of this specification.

d) The Contractor must also repair or replace any other defects not noted above, but determined by the Engineer to need repair, as directed by and to the satisfaction of the Engineer.

The Contractor will perform all work in conjunction with the repair or replacement of defective CST at the Contractor's expense.

Personal Protective Equipment: The Contractor must follow all exposure, respiratory and personal protective equipment controls, handling and safety precautions, as well as spill and disposal procedures as identified by safety data sheets (SDS), labels and other manufacturer's recommendations for the products used.

Work Zone Traffic Control (WZTC): The Contractor is responsible for ensuring appropriate WZTC in compliance with the MUTCD appropriate for the dry time of the selected material applied. The Contractor is responsible to ensure adequate WZTC to prevent those walking, skating, bicycling, and driving from coming into contact with applied material that is still capable of being tracked. The Contractor will be liable for such tracking and property damage should it occur.

6.44CST.7. MEASUREMENT.

The quantities to be measured for payment shall be the number of square feet of CST, of each color. This amount be computed within the payment lines shown on the plans, Work Order or as otherwise ordered in writing by the Engineer.

6.44CST.8. PRICES TO COVER.

The unit prices bid per square feet of CST shall cover the cost of all labor, materials, plant, equipment, insurance and necessary incidentals required including, but not limited to, testing, cleaning, preparation of surfaces and application of the CST, all in accordance with the contract plans and specifications, and as directed by the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.44 CST	COLOR SURFACE TREATMENT FOR PAVEMENTS (CST)	S.F.

SECTION 6.45 (NO TEXT)

SECTION 6.46 – Dense-Graded Stone Base

6.46.1. INTENT. This section describes the construction of a dense-graded stone base.

6.46.2. DESCRIPTION. Dense-graded stone base shall consist of the furnishing and placing of broken stone in the places designated on the Contract Drawings, and in such other locations as field conditions require. The thicknesses and locations of the "dense-graded stone base" shall be as shown on the Contract Drawings, or as determined by field conditions and ordered by the Engineer.

6.46.3. MATERIALS. All materials for this work shall be of sound, hard, durable, broken stone or mechanically crushed recycled concrete, free from any organic or other deleterious material (broken asphalt will not be acceptable). Prior to the placement of any base material, the Contractor shall submit a representative sample to the Engineer and obtain approval, in writing. The material shall meet the following gradation requirements:

Sieve Size	Percent Passing (By Weight)
1 inch	100
1/2 inch	75-90
No. 4	40-55
No. 8	30-45
No. 30	16-27
No. 50	12-19
No. 200	3-7 (Dry Analysis)

The quality of the stone particles shall be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss at 4 cycles, by weight, shall be 20.

Should, at any time during work and for any reason, the material fail to conform to the specified quality and gradation requirements, the Contractor shall, by the addition of selected acceptable material, and/or satisfactory manipulation, produce a material meeting the above requirements.

6.46.4. METHODS. The material shall be spread in equal thickness layers. The spreading of any layer of this material shall be done with spreader equipment approved by the Engineer, and shall be spread to such thickness that the maximum depth of the layer, after compaction, will be six (6") inches. Spreading from piles dumped on the roadway will not be permitted. No segregation of large or fine particles will be allowed, but the material, as spread, shall be well graded, with no pockets of fine material. Water shall be added in such amounts as the Engineer may consider necessary to obtain satisfactory compaction.

When the moisture content of the layer is within the limits for proper compaction, the entire surface shall be rolled with a pneumatic tired roller, having an operating weight of between 1,000 and 2,500 pounds per tire, or a smooth steel wheel roller, having a minimum weight of ten (10) tons. Each portion of the layer shall be covered by a minimum of eight (8) passes of the roller.

For heavier, vibratory or more efficient types of approved compaction equipment, the minimum number of passes required on all portions of each layer shall be determined by the Engineer after appropriate field tests to evaluate the efficiency of such equipment. In limited areas, where the use of a roller is impractical, approved vibrating plate compactors or impact rammers shall be used to compact the material.

After compaction, the top surface of this base shall not extend above, nor more than 1/2 inch below, true grade and surface at any location. The base, at any location, shall be compacted, finished and completed to the above tolerance and approved by the Engineer, before any succeeding pavement course is placed at that location. Any depressions or holes shall be filled with approved coarse sand or screenings and the surface re-rolled.

In all cases, the stone base must be so thoroughly compacted that it will not weave under the roller.

The width of the layer of the base shall be restricted to that required for placement of the lane being paved and shall not be laid in excess of 500 linear feet without being compacted. No traffic, or hauling other than that necessary for bringing material for the next course, shall be permitted over this base. Should the subgrade, subbase, or any other material become churned up into, or mixed with the base, for any reason

whatsoever, the Contractor shall, at the Contractor's own expense, remove such mixtures and replace with dense-graded stone acceptable for this item.

The Contractor shall assume full responsibility for any contamination and/or degradation of any part of this base during construction and shall, at the Contractor's own expense, remove any and all portions of this base which do not conform to the requirements of these specifications and replace these portions with specified material.

6.46.5. MEASUREMENT. The quantity to be measured for payment shall be the number of cubic yards of compacted material placed as shown on the Contract Drawings or as ordered by the Engineer, in accordance with the specifications.

6.46.6. PRICE TO COVER. The contract price bid per cubic yard shall cover the cost of all labor, materials, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer. No direct payment will be made for any losses of material which may result from shrinkage, compaction, foundation settlement, waste, overflow, erosion, leakage, or any other causes; the cost of such losses shall be included in the price bid for this item.

Payment will be made under:

Item No.	Item	Pay Unit
6.46	DENSE-GRADED STONE BASE	C.Y.

SECTION 6.47 – Interlocking Concrete Pavers

6.47.1. DESCRIPTION. This section describes the furnishing and installation of interlocking concrete pavers.

6.47.2. MATERIALS.

(A) INTERLOCKING CONCRETE PAVERS. Interlocking concrete pavers shall be of the range of colors, size, shape, intensity, and surface texture of the pavers as shown on the Contract Drawings, subject to the approval of the Engineer.

Pavers shall have a minimum compressive strength of 7,000 psi.

(B) BITUMINOUS SETTING BED. Asphalt cement to be used in the bituminous setting bed shall conform to ASTM Designation D 946 with a Penetration Grade of 8– - 100.

The fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coatings, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from “coarse” to “fine” and all passing the No. 4 sieve and meet the gradation requirements when tested in accordance with the standard method of test for sieve or screen analysis of fine and coarse aggregates ASTM Designation C136.

The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees Fahrenheit at an asphalt plant. The approximate proportion of materials shall be seven and one-half (7-1/2%) percent cement asphalt, eighty-seven and one-quarter (87-1/4%) percent sand, and five and one-quarter (5-1/4%) percent mineral filler. Each ton shall be apportioned by weight in the approximate ratio of 150 lbs. asphalt to 1,745 lbs. sand and 105 lbs. mineral filler. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

(C) NEOPRENE TACK COAT. Neoprene Tack Coat shall be as approved by the Engineer.

(D) SAND. Sand shall be Type lA in accordance with Section 2.21.

The Contractor shall submit four sample pavers of each color and shape clearly identified by the manufacturer’s name, date of production and contract number and these sample pavers shall represent the range of colors to be produced, the size, shape, intensity and surface texture of the pavers it plans to use in the work. Pavers with discoloration, cracks, honeycombs, and extreme surface irregularities shall not be considered acceptable as samples. The Contractor shall hand deliver samples to Department of Design and Construction, Infrastructure Division, Bureau of Design at 30-30 Thomson Avenue, Long Island City, New York 11101, with transmittal letter and obtain a signed receipted acceptance of delivery. There will be no material delivery to job site without prior written approval; all material delivered to site without such approval shall be rejected. Contractor shall submit samples in sufficient time as to not delay progress of Construction.

6.47.3. METHODS. Concrete base for pavers shall be installed at proper elevation to accept pavers and bituminous setting bed. Pavers shall be laid, on a 3/4 inch setting bed, in straight courses with hand tight joints and uniform top surfaces, keeping good alignment and starting rows alternately with full and half pavers, or according to pattern shown on the Contract Drawings. Newly laid pavers must be protected at all times by panels of plywood on which the paver stands. These panels can be advanced as work progresses; however, the plywood protection must be kept in areas which will be subjected to the continued movement of material and equipment. These precautions must be taken in order to avoid depressions and protect paver alignment. Black and White pavers shall be installed at crosswalks.

(A) PLACING BITUMINOUS SETTING BED

The concrete base shall be sufficiently cured prior to installation of the bituminous setting bed as approved by the Engineer. To install the setting bed over the surface of the base, place 3/4 inch deep control bars directly over the base. If grades must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately eleven (11’) feet apart to serve as guides for striking board (12’ long 2” x 6” board). The depth control bars must be set carefully to bring the pavers, where laid, to proper grade.

Place some bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce a smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.

The setting bed shall be rolled with an approved hand roller after the bed has cooled to eliminate a spongelike surface.

A coating of two (2) percent neoprene modified asphalt adhesive shall be applied by mopping or squeegeeing or troweling over the top surface of the bituminous setting bed so as to provide a bond under the pavers. If it is troweled, the trowel shall be serrated with serrations not to exceed one-sixteenth (1/16) of an inch. Minimum adhesive thickness shall be 1/16 inch.

(B) INSTALLATION OF CONCRETE PAVERS

Pavers shall also be adequately protected from discoloration, due to adjacent paving operations, by an approved method.

The pavers should be placed at right angles with the center of the paving surface. Alignment should be verified periodically.

The pavers should be arranged with the rows touching so that the “ends” of the pavers will form the proper corresponding angle and the proper distance between “ends” not to exceed 1/8 inch.

A plate vibrator should be used to compact and level the pavers after they have been installed. It is important that the correct type and size compactor be used.

(C) JOINT TREATMENT

After the pavers are laid, sand is to be swept into the hand tight joints until the joints are filled.

All uncompleted edges and end of pavers shall be adequately braced and/or retained at the end of each workday with temporary asphaltic concrete mixture or other approved method.

All cutting and setting of pavers shall progress with the setting operation. Under no circumstances shall area requiring cut pavers be permitted to remain at the end of each work day.

When asphaltic concrete wearing course is cut and removed for pavers, no over cut shall be permitted. Pavers shall fit snugly between cut pavements with no more than 1/8” edge space.

6.47.4. MEASUREMENT.

(A) FURNISH INTERLOCKING CONCRETE PAVERS

The quantity to be measured for payment shall be the number of square feet of Interlocking Concrete Pavers furnished and delivered to the site, measured in place. This area shall be equal to the area of installed concrete pavers measured under Item 6.47 B.

(B) INSTALL INTERLOCKING CONCRETE PAVERS

The quantity to be measured for payment shall be the number of square feet of Interlocking Concrete Pavers actually installed measured in place.

6.47.5. PRICES TO COVER.

(A) FURNISH INTERLOCKING CONCRETE PAVERS

The contract price bid for Furnish Interlocking Concrete Pavers shall be a unit price per square foot and shall cover the cost of all labor, materials, plant, equipment, and incidentals necessary to furnish and deliver interlocking concrete pavers to the work site.

(B) INSTALL INTERLOCKING CONCRETE PAVERS

The contract price bid for Install Interlocking Concrete Pavers shall be a unit price per square foot and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to install interlocking concrete pavers in designated areas including the cost of furnishing and installing bituminous setting bed, neoprene modified asphalt adhesive, joint filler and all other incidental work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.47 A	FURNISH INTERLOCKING CONCRETE PAVERS (Z-BLOCKS)	S.F.
6.47 B	INSTALL INTERLOCKING CONCRETE PAVERS (Z-BLOCKS)	S.F.

SECTION 6.48 (NO TEXT)

SECTION 6.49 – Temporary Pavement Markings

6.49.1. DESCRIPTION. Under this section, the Contractor shall furnish, apply and when so ordered, remove temporary pavement markings where shown on the Contract Drawings, or directed by the Engineer, in accordance with the requirements of these specifications.

6.49.2. MATERIALS. Temporary pavement markings shall consist of reflectorized pavement marking paints, removable reflectorized pavement marking tape, or non-removable reflectorized pavement marking tape. Removable reflectorized pavement marking tape shall be selected from the N.Y. State Department of Transportation (NYSDOT) Approved List of "Removable Reflectorized Pavement Markings". Pavement marking paints shall be premixed traffic zone reflective paint, complying with the requirements of Federal Specification TT-P-115 "Paint, Traffic, Highway, White and Yellow". Non-removable pavement marking tape shall be specifically designed for use as a pavement marking and shall be as approved by the Engineer prior to application. All line segments shall not be less than four (4") inches nor greater than six (6") inches in width, and colors shall be as specified in the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition.

6.49.3. METHODS.

(A) GENERAL

The Contractor shall furnish, apply, maintain, and when so ordered, remove the temporary pavement markings, where shown on the Contract Drawings or where directed by the Engineer, in accordance with this section. Any pavement upon which traffic will be maintained shall be properly marked before nightfall or the end of the working day, whichever comes sooner, in accordance with this section.

Before any pavement marking work is begun a schedule of operations shall be submitted to and approved by the Engineer.

When pavement markings are applied under traffic, the Contractor shall provide all the necessary flags, signs, cones, shadow vehicles, flashing arrow boards, etc., to maintain and protect traffic, to protect the work operation, and to protect the painted pavement markings until thoroughly dry and serviceable. No additional payment will be made for these items. The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of normal flow of traffic shall not be allowed.

The Contractor shall be responsible for cleaning the pavement of dust, dirt, and other foreign material which may be detrimental to the adhesion of the paint film or tape. When required by the Engineer, the Contractor shall establish marking line points at thirty (30') foot intervals throughout the length of the pavement, or as directed by the Engineer, to control the lateral position of the line.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, all tracking marks, spilled paint, and paint applied in unauthorized areas.

(B) PAVEMENT MARKINGS FOR PERIODS LESS THAN FOURTEEN (14) DAYS

Where pavement markings are expected to remain in place for periods not longer than fourteen (14) days, they shall be installed and maintained in accordance with the patterns and colors indicated below:

a. Yellow broken lines, partial barrier lines and full barrier lines used to separate opposing traffic flows on two-way roadways.

b. White broken lane lines to separate traffic flows in the same direction on multi-lane highways.

Stop bars, hatch lines and edge lines will not normally be required but may be ordered by the Engineer. Broken lines may be as short as four (4) feet. Pavement markings as described above, will be considered acceptable as the only pavement markings in place for periods not longer than fourteen (14) days.

(C) PAVEMENT MARKINGS FOR PERIODS MORE THAN FOURTEEN (14) DAYS

Within 14 days after paving, if the Contractor fails to install either the succeeding pavement course or the final pavement markings on contracts with pay items for such, the pavement markings installed for periods

of less than fourteen (14) days shall be supplemented with edge lines, ten foot broken lines, stop bars, cross walks and arrows, as directed by the Engineer.

Removable tape may be used as pavement markings for solid and broken lines on any pavement course. However, on the final pavement surface, it shall be offset, if possible, from the location of the final mark in order to prevent interference with the adhesion of the final mark.

Pavement marking paint may be used as pavement markings for solid and broken lines on all underlying pavement courses (i.e. base, binder, leveling and shim). On top course, or final pavement surface, paint may only be used if the final marking pattern is known prior to paving and the contract does not contain durable markings (i.e. thermoplastic marks) or when Item No. 6.44, Thermoplastic Reflectorized Pavement Markings, cannot be placed due to the pavement surface temperature requirements. Where paint is used on the final pavement surface, it shall be applied in the final location.

Non-removable tape may be used as pavement markings only for broken lines on underlying pavement courses. Non-removable tape will not be allowed to mark barrier lines on any pavement course.

If paint is used for pavement markings, the methods of application and mixing of paint shall be in accordance with the manufacturer's instructions and the approval of the Engineer. The Contractor shall follow for the new pavement markings the same pattern, color and widths of pavement markings as are on the existing roadway surfaces, unless otherwise shown on the Contract Drawings or directed by the Engineer. .

Any pavement markings that fail to adhere to the pavement, become abraded, dislodged by snowplowing, or in the opinion of the Engineer become ineffective in any manner during the "period of use" shall be replaced by the Contractor at no additional expense to the City. The "period of use" shall be defined as the time from when the pavement markings are first applied to the time when the pavement markings are either paved over, the project's permanent markings are applied, or contract acceptance, whichever is first. After their period of use, the temporary pavement markings shall be removed from the pavement by the Contractor, if ordered by the Engineer.

(D) APPLICATION OF PAVEMENT MARKINGS

Painted pavement markings shall be applied in workmanlike manner and of first class quality. The markings shall be of uniform width and shall have a uniform thickness of not less than four (4) mils and shall be capable of resisting deformation.

Prior to application of the paint, the surface to be painted shall be cleaned of all oil, grease, dirt, debris and foreign matter, and shall be dry. No paint shall be applied when the roadway surface temperature is below forty (40°) degrees F. or above (85°) degrees Fahrenheit.

If tape is used, it shall be applied to a clean, dry pavement in accordance with the manufacturer's recommendations. Tape shall conform to the shape of, and adhere to the surface upon which it is applied.

All pavement marking materials shall be installed in accordance with the manufacturer's instructions. In addition, pavement marking paints shall be installed according to the following provisions:

Painted pavement markings shall be applied with either atomizing or airless type striping equipment. The striping equipment may be either truck mounted or hand operated, and shall be equipped with glass bead dispensing equipment. The striping equipment shall be compatible with and suitable for the application of the type of paint being used.

At the time of paint application, the pavement surface and ambient temperature shall not be less than 10°C, the relative humidity shall not exceed 85%, and the pavement surface shall be dry. Painted pavement markings shall not be applied during periods of rain or if rain is imminent. Waterborne type paints shall not be applied if rain is expected within 4 hours after the paint application. Paint shall be applied in strict accordance with the manufacturer's recommendations for use. In no case shall the paint be heated above 65°C.

The painted pavement markings shall be uniformly applied to the pavement surface at the minimum specified wet film thickness. The applied pavement markings shall have clean-cut edges, and true and smooth alignment. Immediately following paint application reflective glass beads shall be uniformly applied to the wet paint film at the rate of 6.25 lbs./gal. (0.75 kg/L) of paint. The Contractor shall immediately follow the glass bead application with a vacuum to remove any spillage of beads on dry pavement that could create a pedestrian slipping hazard.

On pavements where traffic is to be maintained and the final marking pattern is known, the permanent thermoplastic reflectorized pavement markings shall be applied before nightfall or before the end of the working day, whichever comes sooner, under Item No. 6.44. If the Contractor is unable to apply these final pavement markings, where traffic is to be maintained, then Pavement Markings as described above shall be installed using removable reflectorized pavement markings, offset from the location of the project's final pavement markings, until the permanent thermoplastic reflectorized pavement markings are installed.

(E) MAINTENANCE OF PAVEMENT MARKINGS

The Contractor shall be responsible for maintaining and re-applying, as may be required, the temporary pavement markings for the duration of the temporary traffic pattern or detour, or a maximum of six (6) months from the time of placement.

Any marking material that fails to provide for any reason, both satisfactory daytime and nighttime delineation, in the opinion of the Engineer, shall be replaced immediately by the Contractor at no additional cost to the City when within six (6) months of application or as a pay item when re-applied after six (6) months of first application. Replacement shall, as a minimum, be required for the following degrees of material loss:

1. Removable Tape. Any gap exceeding fifty (50') feet in length in a solid line, or loss of shorter segments exceeding ten (10%) percent of the total length in any eight hundred (800') feet segment of solid line, or more than two (2) consecutive segments of broken line.

2. Traffic Paint. Abrasion of the line such that more than 10 percent of the underlying pavement is visible within any segment of broken line or within any three hundred (300') feet section of solid line; failure of any line to be clearly visible at night under low-beam headlamp illumination when viewed from a distance of two hundred (200') feet.

(F) REMOVAL OF PAVEMENT MARKINGS

Temporary pavement markings used to delineate temporary traffic patterns shall be removed at the completion of that phase of the work and prior to the installation of the next temporary pattern, or return to the permanent pattern.

Traffic paint shall be removed by mechanical means subject to their ability to achieve satisfactory results. After removal, there shall be no paint residue or pavement scarring that conflicts with successive pavement markings under any viewing condition– - wet or dry, day or night.

Marking tapes shall be removed, intact or in large pieces, using manual methods or a mechanical roll-up device. The use of heat, solvents or other chemicals, grinders, or blasters will not be allowed on top-course pavement that is to remain in place without overlaying, or on other pavement surfaces where subsequent temporary traffic patterns are to be placed. After removal, there shall be no resultant damage to or permanent marks or scars on the pavement surface.

Temporary adhesive residues that will eventually be worn from the pavement will be allowed to remain, providing that they are not left in a pattern that will mislead or misdirect motorists. The Engineer will be the sole determiner of misleading temporary marks.

The removal of construction zone pavement markings shall not be required from detours or other areas directed by the Engineer where they do not conflict with permanent markings at the completion of the work. Removal shall be required where it is necessary to transition pavement marking patterns on the detour into permanent markings at the completion of the detour phase.

(G) DAMAGE TO PAVEMENT SURFACES

Any damage to the finished pavement surface, any permanent marks or scars on the finished pavement surface (including remaining pavement marking material), or any adhesive residues left in a pattern that may mislead or misdirect traffic, that results from the removal of pavement markings shall be removed or repaired as directed by and to the satisfaction of the Engineer at no expense to the City. Repairs may include complete removal and replacement of the damaged pavement section if necessary. The Engineer shall be the sole determiner of satisfactory repair.

6.49.4. MEASUREMENT. Temporary pavement markings will be measured in linear feet along the center line of the pavement stripe and shall be based on a four (4") inch wide stripe. Measurement for striping with a plan width greater than the basic four (4") inches, as shown on the Contract Drawings or as directed by the Engineer, will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{\text{4 (inches)}}$$

No payment will be made for the number of linear feet of skips in broken or dashed lines.

6.49.5. PRICE TO COVER. The contract price per linear foot of Temporary pavement markings shall include the cost of furnishing all labor, materials, equipment, insurance, and necessary incidentals to apply, maintain and remove temporary pavement markings when so ordered. A separate payment will be made each time temporary pavement markings are first applied on a pavement course in accordance with the contract requirements. No payment will be made for the re-application of Temporary pavement markings, as may be required, during the period of six (6) months from the time of placement.

Payment will be made under:

Item No.	Item	Pay Unit
6.49	TEMPORARY PAVEMENT MARKINGS (4" Wide)	L.F.

SECTION 6.50 – Cleaning of Drainage Structures

6.50.1. DESCRIPTION. Under this section, the Contractor shall clean the basins, drains, inlets and connecting pipes designated, and remove all dirt from site, and do all incidental work, all in accordance with the Contract Drawings, specifications and the directions of the Engineer.

6.50.2. METHODS. All cleaning methods must receive the approval of the Engineer, and final inspection must be made prior to approval for payment.

Prior to construction and as needed at the end of construction, the Contractor shall be required to clean existing drainage structures within the project limits that are specifically designated by the Engineer, in writing, to be cleaned. Payment under this item will be made on a one time basis for each designated drainage structure satisfactorily cleaned prior to construction.

Also during the progress of the work, and until the completion and acceptance thereof, all drainage structures, both new and existing, shall be kept thoroughly serviceable throughout the progress of work, and left serviceable at the completion of the contract at no direct payment, in accordance with **Subsection 1.06.28(B)** of the General Conditions and the requirements in the Maintenance of Site item.

6.50.3. MEASUREMENT. The quantity to be measured for payment shall be the number of drainage structures cleaned.

6.50.4. PRICE TO COVER. The contract price bid per each structure cleaned shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to clean the basins, drains, inlets and connecting pipes designated, to the satisfaction of the Engineer, and all other incidentals, all in accordance with the Contract Drawings, specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.50	CLEANING OF DRAINAGE STRUCTURES	EACH

SECTION 6.51 (NO TEXT)

SECTION 6.52 – Flaggers, Crossing Guards, and Pedestrian Managers

6.52.1. DESCRIPTION.

(A) Intent

The Contractor must furnish an adequate number of competent personnel to control all traffic (vehicular, bicycle, micromobility, and pedestrian) when it is necessary to maintain alternating one-way traffic in one lane of a two-way roadway, and at all other locations where construction operations, construction vehicles and equipment, and temporary traffic patterns related to the construction operations require positive temporary traffic control (TTC) for safe, efficient traffic operations.

(B) Definitions

1. Flagger: A person who actively controls the flow of traffic into and/or through a temporary work zone using hand signaling devices. This position may consist of a full-time responsibility or a temporary responsibility.

2. Crossing Guard: A person who assists traffic navigate around a work zone. This position is always a full-time responsibility.

   For the purposes of this specification, a Crossing Guard is not a School Crossing Guard as described in the Manual on Uniform Traffic Control Devices (MUTCD).

   Where the term “uniformed flagperson” is used in the Contract Documents, this reference will mean Crossing Guard.

3. Pedestrian Manager: A subset of flaggers who specifically manage and control the movement of pedestrians through a work area. Pedestrian Managers are also responsible for coordinating the actions of multiple Flaggers and / or Crossing Guards. This position is always a full-time responsibility.

   Where the term “Flagger” is used in the Contract Documents, it will not mean Pedestrian Manager unless specifically noted.

(C) Distinguishing between Flaggers, Crossing Guards, and Pedestrian Managers

Conditions that make a worker a Flagger and not a Crossing Guard or Pedestrian Manager:

1 The worker performs tasks during the day other than assisting traffic navigate around a work zone.

2 They work from within the work zone.

6.52.2. MATERIALS.

(A) High-Visibility Safety Apparel

All Flaggers, Crossing Guards, and Pedestrian Managers must wear high-visibility safety apparel that meets the requirements of MUTCD Section 6E.02 and is approved by the Engineer.

(B) Hand-Signaling Devices

Stop/slow paddles and flags must meet the requirements of MUTCD Section 6E.03.

(C) Radios

Two-way radios must be provided for communication where necessary, or as ordered by the Engineer. Cellular phones are not an acceptable alternative for radios.

6.52.3. METHODS.

(A) Training and Certifications.

All Flaggers, Crossing Guards, and Pedestrian Managers must meet the following minimum requirements:

Because they are responsible for public safety and make the greatest number of contacts with the public of all workers, they should be trained in safe traffic control practices and public contact techniques. The training must be by recognized training programs, including the American Traffic Safety Services

Association, the National Safety Council, unions, or construction industry associations, or by an individual who holds a current certification as a flagger training instructor from such a program.

They must be able to satisfactorily demonstrate the following abilities:

1. Ability to receive and communicate specific instructions clearly, firmly, and courteously;
2. Ability to move and maneuver quickly in order to avoid danger from errant vehicles;
3. Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to traffic approaching a TTC zone in frequently changing situations;
4. Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and
5. Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.
6. Ability to speak, write, and read English proficiently.

(B) Submittals

The following must be submitted to the Engineer for approval prior to the start of construction operations:

1. A list of personnel to be used as Crossing Guards, with their certifications, if Crossing Guards are to be used.
2. The high visibility safety apparel to be used for Flaggers, Crossing Guards, and/or Pedestrian Managers.

(C) Electronic Devices

The use of cell phones, music players, or other personal electronic devices by Flaggers or Crossing Guards while on duty is not allowed. This specifically includes earbuds, earphones, and other hands-free devices. Violation of this requirement will result in removal and replacement of the Flagger or Crossing Guard if requested by the Engineer.

(D) Crossing Guard and Pedestrian Manager quantities on Contractor's Maintenance and Protection of Traffic (MPT) Plans

If the Contractor prepares MPT plans for the work per **Section 6.70.1**, additional quantities of Crossing Guards and Pedestrian Managers will not be payable, unless specific prior written approval is granted by the Engineer. Approval of the MPT plans is specifically not approval of quantities for Crossing Guards and Pedestrian Managers.

(E) Verification of Competency

When requested by the Engineer, Crossing Guards shall demonstrate their competency in crossing guard procedures. Crossing Guards not competent in controlling vehicular and pedestrian traffic procedures to the satisfaction of the Engineer shall be retrained or replaced immediately.

6.52.4. MEASUREMENT.

(A) Flaggers

Flaggers will not be measured separately for payment; the costs of Flaggers must be included in the costs of all work being flagged.

(B) Crossing Guards

The quantity to be measured for payment shall be the number of person-hours of Crossing Guard service actually performed, as authorized by the Engineer. Laborers who are not full-time Crossing Guards will not be measured for payment as Crossing Guards under this or any other item. Each Crossing Guard shall be required to work a minimum of eight (8) hours a day and the Contractor will be given a minimum of twelve (12) hours advanced notice by the Engineer as to when to furnish a Crossing Guard.

(C) Pedestrian Managers

The quantity to be measured for payment shall be the number of person-hours of Pedestrian Manager service actually performed, as authorized by the Engineer. Laborers who are not full-time Pedestrian Managers will not be measured for payment as Pedestrian Managers under this or any other item. Each

Pedestrian Manager shall be required to work a minimum of eight (8) hours a day and the Contractor will be given a minimum of twelve (12) hours advanced notice by the Engineer as to when to furnish a Pedestrian Manager.

6.52.5. PRICE TO COVER.

The contract price per person by the hour shall cover the cost of all labor, materials, equipment, and insurance necessary to employ full-time Crossing Guards, and equip the Crossing Guards with safety vests, hard hats, and signaling devices, including all other incidental costs necessary to control and detour traffic, as shown on the Contract Drawings or as directed by the Engineer.

The Contractor is advised that Crossing Guards and Pedestrian Managers are "traffic control workers" and must be paid the New York City Comptroller prevailing wage rate under the Laborer – Heavy and Highway trade classification. Flaggers must be paid the correct prevailing wage rate for the work they are performing based on the underlying trade classification of work being performed and the applicable New York City Comptroller prevailing wage rate.

Where there is no scheduled item for Crossing Guard, the cost of furnishing Crossing Guards as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic item.

The costs for Flaggers are never paid separately and are included in the costs of the work related to the flagging.

Payment will be made under:

Item No.	Item	Pay Unit
6.52 CG	CROSSING GUARD	PERSON-HOUR (P/HR)
6.52 PM	PEDESTRIAN MANAGER	PERSON-HOUR (P/HR)

SECTION 6.53 – Remove Existing Lane Markings

6.53.1. INTENT. This section describes the removal of existing lane markings.

6.53.2. DESCRIPTION. The work shall include the obliterating of designated lane markings on streets, where shown on the Contract Drawings and as directed by the Engineer.

6.53.3. METHODS. The Contractor shall remove, as soon as practicable, existing pavement markings where indicated on the Contract Drawings or where ordered by the Engineer. This shall include any pavement markings that are added during the course of the work. If darkness or inclement weather interferes with removal operations, such operations should be accomplished during the next daylight period or as soon thereafter as weather conditions permit.

The method of removal is subject to the approval of the Engineer. Painting out pavement markings will only be approved for very short term use. Grinding, scraping, sandblasting, etc., must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.

6.53.4. MEASUREMENT. The quantity to be measured for payment shall be the actual number of linear feet of existing 4” wide lane markings actually removed. Payment for removed markings wider than 4” will be made at the contract price per linear foot of the 4” wide markings removed multiplied by the factor:

$$\frac{\text{Actual Width of Marking Removed (Inches)}}{4}$$

6.53.5. PRICE TO COVER. The contract price bid per linear foot shall cover the cost of all labor, plant, materials, equipment, insurance, and incidentals necessary to obliterate designated lane markings, as shown on the Contract Drawings and as directed, and do all incidental work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.53	REMOVE EXISTING LANE MARKINGS (4” WIDE)	L.F.

SECTION 6.54 (NO TEXT)

SECTION 6.55 – Sawcutting Existing Pavement

6.55.1. INTENT. This section describes the full depth sawcutting of the existing pavement at the locations shown on the Contract Drawings, and as and where directed by the Engineer.

6.55.2. METHODS. Where directed, or shown on the Contract Drawings, the Contractor shall sawcut through the full depth of the existing pavement with a straight sawcut edge, and do all work as shown on the detail drawing. All work must be done in a workmanlike manner, to the satisfaction of the Engineer.

6.55.3. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of existing pavement actually full depth sawcut.

No measurement for payment will be made for any partial depth sawcutting of bituminous pavement, the cost of which shall be deemed included in the price bid for this item.

The following table summarizes which pavement sawcuts are payable under Item 6.55, and which sawcuts are included in the costs of other items. Please note that the table is a guide, and the specifications referenced in the table below govern.

Description	Pay under Item 6.55	No Separate Payment	Specifications
WATER MAIN TRENCHES:			
Full-depth saw cutting of pavements along the initial opening limits of all water main trenches and excavations.	☐	☒	NYCDEP 71.11.3.A
Full-depth saw cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required for water mains 24-Inches and larger in diameter and appurtenant structures.	☐	☒	NYCDEP 71.11.3.A
Full-depth saw cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14) for water mains 20-inches and less in diameter.	☒	☐	NYCDEP 71.11.3.A
Full-depth saw cutting of asphaltic top course along the edges of all water main trenches and excavations for cutbacks of asphaltic top course.	☐	☒	NYCDEP 71.11.3.A
Full-depth saw cutting of pavements across the widths of all water main trenches, excavations and cutbacks.	☐	☒	NYCDEP 71.11.3.A
SEWER TRENCHES:			
Full-depth saw cutting of pavements along the initial opening limits of all sewer trenches and excavations	☐	☒	NYCDEP 71.11.3.B
Full-depth saw cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required for sewer conduits and appurtenant structures.	☐	☒	NYCDEP 71.11.3.B

Description	Pay under Item 6.55	No Separate Payment	Specifications
Full-depth saw cutting of asphaltic top course along the edges of all sewer trenches and excavations for cutbacks of asphaltic top course.	☐	☒	NYCDEP 71.11.3.B
Full-depth saw cutting of pavements across the widths of all sewer trenches, excavations and cutbacks.	☐	☒	NYCDEP 71.11.3.B
CATCH BASINS:			
Saw cutting of existing sidewalk and curb 1' from the perimeter of the catch basin where sidewalk and curb restoration is not called for under the contract.	☐	☒	NYCDEP 51.41.3.B.3
MICROTRENCHING:			
Saw cutting of sidewalks and/or streets for microtrenching.	☐	☒	NYCDOT 8.00MT.2
OTHER TRENCHES AND PAVEMENT RESTORATION AREAS:			
Full-depth saw cutting of all sidewalks and curbs along the limits of all sewer and water main trenches and excavations.	☐	☒	NYCDEP 71.11.3.C
Full-depth saw cutting and/or partial-depth saw cutting of all pavement keys, and pavement adjustment and transition sections.	☐	☒	NYCDEP 71.11.3.C
Partial-depth precutting or scoring of existing pavement.	☐	☒	NYCDEP 71.11.6
PAVEMENTS, SIDEWALKS, AND CURBS:			
Saw cutting construction joints for concrete pavement.	☐	☒	NYCDOT 4.05.5
Saw cutting construction joints for integral concrete curb and gutter.	☐	☒	NYCDOT 4.08.4 (L)
Saw cutting existing sidewalk for new sidewalk installation.	☐	☒	NYCDOT 4.13.4.(A)
Saw cutting sidewalks to remain for replacement of curbs (cut existing sidewalk 2' parallel from the curb).	☐	☒	NYCDOT 1.06.48 (T)
Full depth saw cutting of existing pavement to be removed by lifting from the adjacent pavement as part of special care work methods near transit facilities	☐	☒	NYCDOT 6.02 XSCW.5
Saw cutting the existing joint lines prior to removal of existing bluestone flags.	☐	☒	NYCDOT 6.07.6
Saw cutting the existing asphaltic wearing course pavement 1-1/2" deep prior to milling.	☐	☒	NYCDOT 6.75.2.(D)
Saw cutting of curb and sidewalk to be removed by hand demolition as part of special care excavation.	☐	☒	NYCDOT 8.02.3

Description	Pay under Item 6.55	No Separate Payment	Specifications
NEW SIDEWALK TREE PITS:			
Saw cutting existing sidewalk to install new tree pits.	☐	☒	NYCDOT 4.16.5.D.9
The planting of trees requires saw cutting and removal of existing sidewalks, the cost of such work shall be deemed included in the prices bid for the respective Tree Planting items of the contract.	☐	☒	NYCDEP 10.06.C
TEST PITS:			
Saw cutting for test pits.	☐	☒	NYCDOT 7.16.2
Saw cutting for exploratory test pits for vaults.	☐	☒	NYCDOT 9.00.4
SAWCUTS SHOWN TO BE PAID OR AS DIRECTED:			
Full depth sawcuts shown to be paid under Item 6.55 or as directed by the Engineer.	☒	☐	NYCDOT 6.55

6.55.4. PRICE TO COVER. The contract price per linear foot shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to cut existing pavement with sawcuts, do all necessary chiseling, tack coating of edges, etc., and do all other necessary incidental work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Sawcutting of sidewalk, to allow for curb reconstruction, shall be deemed included in the contract prices bid for curb construction.

Sawcutting of pavement for test pits in pavements designated to be removed under other contract items and to install sewer and water main pipe and/or their facilities shall be deemed included in the contract prices bid for those items, unless otherwise specified.

Payment will be made under:

Item No.	Item	Pay Unit
6.55	SAWCUTTING EXISTING PAVEMENT	L.F.

SECTIONS 6.56 AND 6.57 (NO TEXT)

SECTION 6.58 – Tack Coat

6.58.1. WORK TO INCLUDE. Under this section, the Contractor shall apply an approved tack coat to areas designated by the Engineer.

6.58.2. MATERIALS. Liquid Asphalt (RC-70), Emulsified Asphalt (RS-1), or Asphalt Cement (AC-20) complying with the requirements of Sections 2.03, 2.04, and 2.05 respectively, shall be furnished and applied.

6.58.3. EQUIPMENT. The Contractor shall provide a distributor for applying tack coat.

The distributor shall be self-propelled of an approved type designed, equipped, maintained and operated so that the tack coat can be heated and applied uniformly on variable widths of surface up to 15 feet at readily determined and controlled rates from 0.03 to 2.0 gallons per square yard, with uniform pressure, and with an allowable variation from any specified rate not to exceed 0.02 gallons per square yard. Distributor equipment shall include a tachometer capable of registering the rate of travel in feet per minute, an accurate continuous metering device certified by an approved testing laboratory, and a certified thermometer for measuring the temperature of tank contents. Distributors shall be equipped with a power unit for the pump, and full circulation spray bars adjustable laterally and vertically.

The distributor may be equipped with an attached bristle broom designed such that it drags on the pavement behind the spray bars. If the broom is used, it shall be adjustable laterally and vertically so that the full width of the applied tack coat is broomed uniformly into the pavement surface.

Distributor shall be equipped with an approved bituminous material sampling valve capable of producing representative samples of all material in the tank.

Hand held power spray units or manual hand spray equipment will not be permitted except where specifically approved by the Engineer and only in areas where the Engineer determines that the use of a self-propelled distributor is impractical. Where hand operated units are approved it shall be understood that an approved material metering procedure shall be provided.

6.58.4. METHODS.

(A) SURFACE PREPARATION

Surfaces to be tack coated shall be thoroughly swept and cleaned, as often as required, to remove all dirt, loose and foreign matter, and be free of standing water. Street sweeping equipment shall be a power operated sweeper/broom in combination with a vacuum debris lifter and shall be of a type approved by the Engineer. No tack coat shall be applied unless the surface on which it is to be applied is in a condition acceptable to the Engineer.

All structures such as manhole, basin, valve box, and electrical box frames and covers, joints, and steel faced curbs within areas to be tack coated shall be masked with tar paper, polyethylene film or other approved material. A splash board may be substituted to protect the curb face from being stained with tack coat spray.

(B) TACK COAT APPLICATION

Tack coat shall be uniformly applied by a pressure distributor to a prepared clean pavement. The tack coat shall be applied as approved by the Engineer to offer the least inconvenience to traffic and to prevent pickup or tracking of the bituminous material.

No tack coat shall be applied on a wet or frozen pavement surface. RS-1 shall not be applied when the surface temperature is below 45 degrees F. RC-70 and AC-20 shall not be applied when the surface temperature is below 35 degrees F.

Tack coat material should be heated to the proper temperature so that it is fluid enough to be sprayed from the distributor nozzles. The Contractor shall furnish to the Engineer a temperature-viscosity chart for the material to be used.

Tack Coat

Material	Spray Temp. (Deg. F.)	Application Rate (Gal./Sq. Yd.)
Liquid Asphalt (RC-70)	120-190	0.0– - 0.08
Emulsified Asphalt (RS-1)	70-140	0.0– - 0.06
Asphalt Cement (AC-20)	275-400	0.0– - 0.06

Within the above specified tack coat application rate, the actual amount used will be dependent upon the existing surface texture. An open texture or milled surface will require more tack coat than a tight surface or one that is "fat" or flush because of the increased surface area. In general, the correct amount of tack coat sprayed on the surface will leave some of the existing surface still visible through the tack coat.

The application rate shall be 0.03 to 0.07 gallons/yard^2 as approved by the Engineer. Table 6.58-I contains recommended application rates for tack coat on various surfaces:

TABLE 6.58-I
TACK COAT APPLICATION RATES

Surface Type	**Application Rate (gallons/yard^2)**
New Hot Mix Asphalt	0.03 - 0.04
Milled Surfaces	0.05 - 0.06
Existing Hot Mix Asphalt	0.05 - 0.06
Portland Cement Concrete	0.04 - 0.07
Vertical Surfaces (curbs, concrete drainage structures and appurtenances)	0.06 - 0.07

Application rate of tack coat shall be constantly controlled by the Contractor and monitored by the Engineer in job segments using the tachometer and distributor metering gauges, not by the total quantity of tack coat used averaged over the entire project area applied.

Tack coat shall be uniformly distributed, without atomization, over the areas designated by the Engineer by means of a pressure distributor and in such manner as not to defile or discolor adjacent curbs or other structure surfaces. Approximately 50 gallons of tack coat should be left in the distributor to prevent air from entering the applicator, causing insufficient application in the end area of the spread.

Contractor shall be required to keep on hand an adequate supply of sand or other approved absorbent material at the job site when applying tack coat. Where the application rate of tack coat exceeds that required by more than 0.02 gallons per square yard, as determined by the Engineer, the Contractor shall be required to immediately soak up the excess material with an application of sand or other absorbent material before the tack coat cures. The absorbed tack coat shall then be removed and disposed in an appropriate manner away from the site. No additional payment will be made for this work, including but not limited to removal of sand, additional sweeping, and cleaning.

Prior to paving, the tack coat shall be allowed to cure to a condition where it is tacky to the touch. No greater area shall be treated in any one day than is planned to be covered by asphaltic concrete during the same day, unless otherwise authorized in writing by the Engineer.

All vehicular traffic must be kept off the tack coat at all times. Under unusual circumstances, if traffic must travel over the tack coat before the overlay is placed, a light layer of sand shall be spread on top of the Liquid Asphalt (RC-70) or Emulsified Asphalt (RS-1) tack coats, to prevent the pickup of tack coat material by traffic. Excess sand should be broomed from the pavement surface before the overlay is placed to assure proper bond between the overlay and the existing surface.

All pedestrian traffic shall be blocked from entering areas of newly applied tack coat using suitable traffic control devices and procedures under the appropriately scheduled contract items.

Failure to comply with the above requirements shall result in a shutdown of both the tack coat and paving operations until remedial actions are taken by the Contractor to bring the tack coat application within the

permitted tolerance. In addition, any asphaltic concrete wearing course material placed on improperly applied tack coat shall be removed and replaced by the Contractor at no additional cost to the City.

6.58.5. MEASUREMENT. The quantity to be measured for payment shall be the number of square yards of surface actually tack coated.

6.58.6. PRICE TO COVER. The contract price per square yard shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to prepare the surfaces, spray tack coat, and do all other incidental work, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

When there is no scheduled item provided therefore, the cost of furnishing and placing Tack Coating shall be deemed included in the prices bid for the various asphaltic concrete wearing course and/or macadam pavement items, as appropriate.

Payment will be made under:

Item No.	Item	Pay Unit
6.58	TACK COAT	S.Y.

SECTION 6.59 – Concrete Barrier

6.59.1. INTENT. This section describes the construction of concrete barriers.

6.59.2. DESCRIPTION. The Contractor shall construct concrete barriers of the types and conforming to the various details shown on the New York State Department of Transportation Standard Sheet for Concrete Barrier.

6.59.3. MATERIALS.

(A) Concrete shall be Class B-32, Type IA, conforming to the requirements of Section 3.05. An approved air-entraining agent shall be added at the time concrete ingredients are mixed with water, to achieve an air content of 7% (5% Min., 9% Max.). Cement shall be White Portland Type I; light colored sand-Type IA; light colored coarse aggregate Type I, Grade B, or Type 2, Size No. 57. Slump shall be 4 inches $\pm$ 1 inch.

(B) Joint filler shall comply with the requirements of Section 2.15, Type IV, Bituminous Fiber.

(C) Joint sealer shall comply with the requirements of Federal Specification TT-S-230, Sealing Compound, Synthetic-Rubber Base, Single Component, Chemically Curing. The color of the compound shall be white.

6.59.4. METHODS.

(A) The Contractor shall pour each type of concrete barrier in monolithic form, in lengths not exceeding 60 linear feet. Transverse joints shall extend through the entire section. Joints shall be filled with premolded joint filler, placed flush with a recess of 1/2" from the face and top of the barrier, and caulked with joint sealer.

When the ambient temperature falls below 40 degrees F., no pouring of concrete will be permitted.

(B) All forms, including forms for curved sections, shall be made of metal and of such construction that there will be minimum interference to inspection for grade and alignment. Forms shall be braced and secured adequately so that no discernible displacement from alignment or grade will occur during placement of concrete. Where radii are less than 40 feet, forms shall be curved to the design radius.

(C) Concrete Placing and Vibrating: Concrete shall be compacted by means of approved immersion type mechanical vibrators. The vibrator shall be inserted into the concrete at one foot intervals. The vibrator shall be of a size and weight sufficient to thoroughly vibrate the entire concrete mass without damaging or misaligning the forms and reinforcement.

(D) Removal of Forms and Finishing Surfaces: Forms shall be left in place for 24 hours or until, in the judgment of the Engineer, the concrete has sufficiently set so the forms may be removed without injury to the barrier. Immediately after the forms have been removed, surfaces exposed to view shall have all projections and irregularities carefully removed and all cavities neatly filled with mortar of the proportion used in the concrete. The same brand of cement and the same kind of aggregate shall be used for filling cavities as was used in the original concrete mix. Plastering of repaired surfaces will not be allowed. The surface film of all such repaired surfaces shall be carefully removed before setting occurs.

The finished surface of the barrier shall be smooth, dense, unpitted and free from air bubble pockets, depressions and honey combs. If the Engineer deems it necessary, the barrier shall be given a wood float finish in order to obtain the above mentioned finish.

(E) Concrete Curing: Curing of concrete barrier shall conform to the requirements specified therefor under **Subsection 4.06.10**.

(F) Where the Contractor chooses to precast the concrete barrier, it shall be constructed in accordance with the following requirements:

Precast Concrete Barrier:

1. Fabrication: Precast concrete barrier shall be fabricated to conform to the shapes and sizes shown on the Contract Drawings. The length of precast concrete barrier shall be 30 foot maximum. All surfaces exposed after installation shall be cast in steel forms.

The Contractor shall provide the Engineer with shop drawings and detailed construction procedures of the barrier. The shop drawings shall show the form dimensions and location and type of reinforcement in the precast concrete barrier. The drawings shall be delivered to the Engineer for approval ten (10) working days before fabrication is to begin. No work shall begin until the drawings are approved.

The tolerance on placement of reinforcing steel in the barrier shall be ± 1 inch. The chairs, spacers or other devices used to maintain the reinforcement in position shall have rust resistant tips so that no spots will show on the finished faces. The cost of any steel reinforcement required to transport the precast barrier shall be included in the cost of these items.

Concrete shall be consolidated in the forms by internal vibrators. Exposed surfaces shall be free from objectionable imperfections, such as honeycomb and air voids as determined by the Engineer. If air voids collect at the interface of the concrete and forms, the forms shall be tapped on the outside with rubber mallets or similar devices to displace the entrapped air.

2. Curing: The precast barrier sections may be cured by means of quilted covers which shall be kept wet, or by using polyethylene coated burlap blankets which will not require wetting. Polyethylene coated blankets shall be laid dry with the burlap side against the concrete, and adjoining blankets shall be lapped sufficiently to provide a moisture seal. Retention of moisture for curing by any of the above methods shall be continued for a minimum of 7 days.

   If the precast concrete barrier sections are steam cured, the sections shall be cured in an enclosure free from outside drafts, and cured in a moist atmosphere. The temperature shall be maintained at a temperature between 125 degrees and 160 degrees F. by the injection of steam for a period of not less than 12 hours. Steam curing shall not begin in less than 2 hours from the time that the last concrete was placed. Care shall be taken by the Contractor to prevent localized “hot spots” caused by the steam lines. A continuous temperature time recorder is required for each enclosure. The temperature of the curing atmosphere for any method shall not be increased or decreased at a greater rate than 40 degrees F. per hour.

3. Repair: Where approved by the Engineer, occasional imperfections in manufacture or those caused by mishandling may be repaired. The repairs shall be properly finished and cured. The color of the repaired area shall match as closely as possible with the rest of the barrier color. The repairs may be made with a mixture of sand and Portland cement. The repairs shall be made to the satisfaction of the Engineer.

4. Sampling and Testing: The concrete in the precast concrete barrier shall be sampled and tested by an approved testing laboratory. Costs for testing and sampling shall be paid by the Contractor.

5. Basis of Acceptance: The precast barrier sections shall be accepted at the job site.

6.59.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of each type of concrete barrier actually constructed, including transition sections, measured along the centerline of the top surface of each barrier.

6.59.6. PRICES TO COVER. The contract price bid per linear foot for each type of concrete barrier shall cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work, including forms, joint materials of any type, finishing, curing, and any other work or materials required to satisfactorily complete the work, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.59 A	CONCRETE BARRIER, TYPE A	L.F.
6.59 B	CONCRETE BARRIER, TYPE B	L.F.
6.59 C	CONCRETE BARRIER, HALF SECTION	L.F.

SECTION 6.59 P – Temporary Concrete Barrier

6.59P.1. INTENT. This section describes the work to be done in connection with temporary concrete barriers.

6.59P.2. DESCRIPTION. The Contractor shall furnish, install, move, maintain and remove lighted temporary concrete barriers. Except as otherwise shown on the Contract Drawings, specified or directed by the Engineer, the material, manufacture, fabrication and installation or erection of temporary concrete barrier shall be in compliance with current New York State Department of Transportation (NYSDOT) Standard Sheets for Temporary Concrete Barrier.

6.59P.3. MATERIALS. Temporary concrete barriers shall conform to the dimensions, joint connection, material details, and anchoring details shown on the NYSDOT'S Standard Sheet 619-01, except as otherwise shown on the Contract Drawings. The barrier sections shall be precast portable concrete units. The Manufacturer shall certify that the temporary concrete barrier units conform to the details shown on the aforementioned NYSDOT'S Standard Sheet or approved drawing.

The Engineer will inspect the temporary concrete barrier sections upon delivery to the project site for conformance to specifications. Any barrier sections having damage and/or defects in the concrete and/or joint connections will be rejected by the Engineer when in the Engineer's judgment the performance of the barriers will be affected.

The temporary concrete barrier sections shall form a smooth and continuous barrier when joined together. Any sections damaged or misaligned while in service shall be corrected or replaced to the satisfaction of the Engineer.

Unless otherwise directed, all barricades shall be striped on the roadway side of the barricade with reflective sheet material in accordance with the Contract Drawings, the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition, or as directed by the Engineer. The reflective sheet material shall conform to photometric and color (Orange and White) requirements of **Subsection 730-05.02**, Reflective Sheeting (Class B), of the State of New York, Department of Transportation, Standard Specifications.

Where indicated on the Contract Drawings, concrete barricades shall be supplemented by approved low intensity steady burning yellow lights in accordance with the requirements of **Subsection 619.3.03** of the NYSDOT Standard Specifications.

For temporary concrete barrier with fence, the barrier shall be modified to accommodate a chain link fence with posts. Top and bottom rails will not be required for the fence. The Contractor shall be required to provide a solid, secure chain link fence system consisting of posts, post embedment, fence fabric, and all other incidentals as may be required. Fence posts shall be embedded in the concrete barrier and the chain link fence shall extend from the barrier to a height of at least six (6) feet above grade. Maximum spacing of fence posts shall be eight (8) feet from center to center. Minimum embedment of fence posts into the barrier shall be four (4) inches deep. Fence fabrication shall be continuous for the length of the concrete barrier; however, at joints between concrete barriers, the gap between fence sections shall not be more than four (4) inches.

6.59P.4. METHODS. The Contractor shall furnish, erect, move, and remove temporary concrete barriers where and as indicated on the Contract Drawings or as directed by the Engineer.

Where indicated on the Contract Drawings or in the proposal, temporary concrete barriers shall be supplemented by approved steady burning lights.

Each run, or bay, of temporary concrete barrier unit shall be fastened together to form a continuous chain. After placement, each successive unit shall be moved longitudinally to remove the slack in the joint between units. The units at each end of a run or bay shall be anchored as shown on the Standard Sheet. Where shown on the Contract Drawings or directed by the Engineer, the ends of the barrier run shall be fitted with a tapered end section, flared back.

6.59P.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of temporary concrete barrier actually placed including transition sections, measured along the centerline of the top surface of each barrier.

Payment will be made for temporary concrete barrier only for the initial installation at any location. Whenever temporary concrete barriers are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Whenever the Contractor proposes to move curb to a new location, it is subject to approval of the Engineer and must be in accordance with the latest approved progress schedule. Minor movement of the temporary concrete barrier within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment. Minor movement within a work area includes, but is not limited to:

- Movement from one side of the roadway to the other side
- Movement to adjust the roadway or work zone width
- Movement required to access the work zone or to secure the work zone
- Linear movement of less than one block within an established work zone
- Rearrangement within a work area

6.59P.6. PRICE TO COVER. The contract price bid per linear foot for each type of concrete barrier shall cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to erect, maintain, and remove the required barrier, including any required connection devices, orange and white reflective stripes on the faces of the barriers, steady burning yellow lights, delineation or guiding devices, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.59 P	TEMPORARY CONCRETE BARRIER	L.F.
6.59 PF	TEMPORARY CONCRETE BARRIER WITH FENCE	L.F.
6.59 PH	TEMPORARY CONCRETE BARRIER, HALF SECTIONS	L.F.

SECTION 6.60 – Asphalt Block Pavers

6.60.1. WORK TO INCLUDE. Under this section, the Contractor shall furnish and install new asphalt block pavers and relay existing asphalt block pavers. Pavers shall be installed on a three-quarter (3/4") inch thick bituminous setting bed, laid on a three (3") inch foundation course of screenings, unless otherwise shown on the Contract Drawings.

6.60.2. MATERIALS.

(A) NEW ASPHALT BLOCK PAVERS

New Asphalt Blocks shall be hexagonal and/or rectangular, of the type(s) shown on the Contract Drawings and in compliance with the requirements of Section 3.04, unless otherwise specified herein or indicated on the Contract Drawings.

Color, size, texture, and surface appearance of new asphalt block pavers shall match that of the existing adjacent pavers, unless otherwise specified on the Contract Drawings.

(B) WATER BOUND STONE SCREENINGS BASE

Stone screening shall be either limestone or traprock and shall consist of hard, durable, sharp angled fragments, free from dirt or other deleterious, matter, graded within the following limits:

100% passing 1/2" square opening screen
20% to 40% passing 20 mesh sieve
5% to 15% passing 200 mesh sieve

Material substitutions will not be approved under any circumstances. All recycled materials will be rejected.

(C) BITUMINOUS SETTING BED

Asphalt cement to be used in the bituminous setting bed shall conform to ASTM Designation D 946 with a Penetration Grade of 85 - 100.

The fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coatings, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from "coarse" to "fine" and all passing the No. 4 sieve and meet the gradation requirements when tested in accordance with the standard method of test for sieve or screen analysis of fine and coarse aggregates ASTM Designation C136.

The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees Fahrenheit at an asphalt plant. The approximate proportion of materials shall be seven and one-half (7-1/2%) percent cement asphalt, eighty-seven and one-quarter (87-1/4%) percent sand, and five and one-quarter (5-1/4%) percent mineral filler. Each ton shall be apportioned by weight in the approximate ratio of 150 lbs. asphalt to 1,745 lbs. sand and 105 lbs. mineral filler. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

(D) NEOPRENE-MODIFIED ASPHALT ADHESIVE

Neoprene-Modified Asphalt Adhesive shall consist of two (2) percent neoprene (Grade WM 1) oxidized asphalt with a 155 degree softening point (80 penetration).

(E) JOINT FILLER

Joint Filler shall be clean, hard sand with durable particles free from adherent coatings, lumps of clay, alkali salts, and organic matter.

6.60.3. METHODS. Prior to Commencement of Work, the Contractor shall submit the name of the block manufacturer(s) and installer proposed to use and upon which the Contractor's bid is based, along with their respective work history experience, and at least one sample of each different block which will be used in the project. The manufacturer and installer shall have a minimum of five (5) years of documented experience in block paver work.

UNDER NO CIRCUMSTANCE SHALL ANY EXISTING ASPHALT PAVERS BE EXCAVATED OR REMOVED WITHOUT WRITTEN PERMISSION AND DIRECTION BY THE ENGINEER AS TO WHICH PAVERS ARE TO BE RESET IN THE NEW WORK.

Existing pavers designated to be removed and reset shall be carefully removed, cleaned of all adherent material, and stored for resetting by the Contractor.

(A) PREPARATION OF SURFACE

The Contractor shall trim subgrade to smooth uniform lines to the satisfaction of the Engineer. The subgrade shall be compacted with equipment that will yield the following density:

Cohesive Subgrade – Minimum of 95% of AASHTO T180 Method density.
Cohesionless Subgrade – Minimum of 100% of AASHTO T180 Method D density.

The Contractor shall remove from the subgrade all debris, foreign and other undesirable material which interferes with satisfactory construction. The fine grade shall not be muddy or otherwise unsatisfactory when the base course material is placed upon it. If the fine grade becomes rutted or displaced, due to any cause whatsoever, the Contractor shall regrade same without additional payment. The Contractor shall trim subgrade to smooth uniform lines to the satisfaction of the Engineer.

(B) SPREADING OF STONE SCREENING BASE

The spreading of stone screenings shall be done from suitable spreading equipment or from piles dumped along the edge of the proposed pavement. Screening shall be evenly spread so that the foundation course will have, after rolling, the required thickness of three (3”) inches, unless otherwise shown on the Contract Drawings. No segregation of large or fine materials will be allowed, but the screening as spread shall be well graded with no pockets of fine material.

(C) ROLLING OF STONE SCREENINGS

After the screenings have been properly spread, they shall be thoroughly compacted by rolling with an approved roller weighing not less than ten (10) tons except in tree pit area. The stone screenings shall be sprinkled and saturated immediately before being rolled, the sprinkler being followed by the roller. If the material becomes wet to such an extent that the pavement becomes unstable and waves under the roller, the roller shall be taken off and this portion left to dry out before it is resumed.

More screenings shall be added where necessary, and the sprinkling and rolling shall continue until the foundation has been properly compacted. If necessary to secure satisfactory results in the opinion of the Engineer, the foundation shall be sprinkled and backrolled on succeeding days. The Contractor shall maintain and repair the foundation courses until the blocks have been placed.

(D) PLACING BITUMINOUS SETTING BED

The bituminous setting bed cushion shall be placed to proper elevation and grade by the use of depth control bars (3/4” thickness) placed directly over the stone screenings. If grades must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately eleven (11’) feet apart to serve as guides for striking board (12’ long 2” x 6” board). The depth control bars must be set carefully to bring the pavers, where laid, to proper grade.

Place some bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce a smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.

The bed shall be spread in a continuous workmanlike manner. Installation of bed in spotted, different and isolated areas will not be accepted. Bed depth greater than one and one-eighth (1-1/8”) inch will not be acceptable. The Contractor shall remove and replace stone screening base required to maintain specified bed thickness. Minimum replacement thickness of stone screening base shall be two (2”) inches.

After the bed has cooled, it shall be rolled by hand with a one hundred (100 lb.) pound roller to eliminate sponginess and to prepare the surface for the installation of the tack coat. The setting bed shall be protected against all pedestrian traffic and construction equipment to insure a level surface for setting pavers.

In tree pit areas after trees have been planted and topsoil placed, a layer of stone screenings shall be placed and tamped.

The Sand Cushion around tree pits shall consist of clean, hard durable uncoated stone particles free from lumps of clay and all deleterious substances and shall be so graded when dry, one hundred per cent shall pass a one-quarter (1/4") inch square opening sieve: not more than thirty-five (35) percent by weight shall pass a No. 50 sieve. Sand Cushion may be rejected if it contains more than ten per cent by weight of loam and silt.

(E) NEOPRENE-MODIFIED ASPHALT ADHESIVE

The neoprene-modified asphalt adhesive tack coat shall be applied by mopping, squeegeeing or troweling over the top of the setting bed to a uniform thickness of approximately 1/16" so as to provide a bond between the bituminous setting bed and the paver. If it is troweled, the trowel shall be serrated with serrations not to exceed one-sixteenth (1/16) of an inch.

(F) LAYING ASPHALT BLOCK PAVERS

When the modified asphalt adhesive is dry to the touch, carefully place the pavers by hand, ground finish side up unless otherwise specified, in straight courses, with hand tight joints and uniform top surfaces, keeping full alignment according to the patters shown on the Contract Drawings. Block shall be laid on the bed before it has set. The blocks shall be carefully laid with the best face up, in straight courses at right angles to the line of the street or at such other angles as may be directed. Joints shall be hand tight and read from zero (0) to one-eighth (1/8") inch maximum.

All blocks shall be clean when placed in the pavement. Blocks which in the opinion of the Engineer are not satisfactorily clean shall be washed before placing.

Pavers may vary slightly in shade and tonality. Where four or more pallets of pavers are required to be laid in the project, the installer shall work from at least four (4) pallets at a time in order to create a uniform blend of paver shades.

All blocks shall be clean when placed in the pavement. Blocks which in the opinion of the Engineer are not satisfactorily clean shall be washed before placing. Cutting of blocks shall be clean, straight and smooth and performed in strict accordance with the manufacturer's recommendations. All cut block that is chipped, cracked or otherwise flawed shall be discarded as directed by the Engineer, at no additional cost to the City.

In no case shall the bituminous setting bed in front of the pavement be disturbed or walked on during the laying of the blocks.

After a sufficient number of blocks have been laid, all broken or misshapen blocks shall be marked by the Engineer and removed and replaced by the Contractor at no additional cost to the City.

When all objectionable blocks have been removed from the pavement and all replacements made, the pavement shall be swept clean and shall be tested with straightedge laid parallel with the center line and any depression exceeding one-quarter (1/4") inch shall be corrected and brought to proper grade. All blocks disturbed in making replacements or correcting depressions shall be settled into place by ramming, and the filler shall then be applied.

Each section of pavement must be acceptable to the Engineer before the application of filler.

In no case shall the setting bed in front of the pavement be disturbed or walked on during the laying of blocks.

Cutting of blocks shall be clean, straight, and smooth and performed in strict accordance with the manufacturer's recommendations. All cut blocks that are chipped, cracked, or otherwise flawed shall be discarded and replaced, as directed by the Engineer, at no additional cost to the City.

Existing asphalt block pavers may be rejected by the Engineer for re-use because of excessive roundness or other objectionable characteristics.

Any shortage in block to be relaid due to the Contractor's negligence as determined by the Engineer shall be supplied and incorporated in the work by the Contractor at the Contractor's own expense.

After a sufficient number of blocks have been laid, all broken or misshapen blocks shall be marked by the Engineer and removed and replaced by the Contractor.

When all objectionable blocks have been removed from the pavement and all replacements made, the pavement shall be swept clean and shall be tested with an approved straight-edge ten (10') feet long or with an approved surface testing machine laid parallel with the center line and any depression exceeding one-quarter (1/4") inch shall be corrected and brought to proper grade. All blocks disturbed in making replacements or correcting depressions shall be settled into place by ramming, and the filler shall then be applied.

Each section of pavement must be acceptable to the Engineer before the application of filler.

(G) JOINT FILLER

Upon the completion of the work of laying the blocks in each section to the satisfaction of the Engineer, the surface of the blocks shall be swept clean, and the joints filled with dry sand.

All joints shall be filled the same day as the blocks are laid. In no case shall a wearing course be left overnight or when work is stopped without the joint filling being completed. Filler shall not be applied if the blocks are wet or if the air conditions are such that the filler does not readily enter the joints.

Filler shall be well worked into the joints by means of squeegees or other approved devices operating slowly backward and forward. Squeegeeing shall continue until the joints are full, flush with the top surface.. Immediately after the joints are filled, the pavement shall be swept clean, fog lightly with water and clean of all stains.

(H) SUFFICIENCY OF APPARATUS

The apparatus for agitating the filler shall be sufficient in numbers and efficiency to permit the filler gang to closely follow the pavers or rammers, as the case may be.

(I) TRIAL INSTALLATION

The Contractor shall install approximately 400 sq. ft. area of pavers in a location to be determined by the Engineer for the purpose of establishing a standard of comparison for the remaining work. Said area shall include a typical corner quadrant with pedestrian ramp areas. The Engineer shall inspect and approve the trial area for overall appearance and joint spacing before proceeding with the remainder of the work.

(J) TRAFFIC

No traffic of any kind will be allowed on the wearing course until permitted by the Engineer.

Newly laid pavers must be protected at all times by panels of plywood on which the installer stands. These panels can be advanced as work progresses. However, the plywood protection must be kept in areas which will be subjected to continued movement of materials and equipment. These precautions must be taken in order to avoid depressions and protect paver alignment.

(K) DEFECTIVE WEARING COURSE

Such portions of the completed wearing courses as are defective in finish, compression, composition, or that do not comply with the requirements of these specifications, shall be taken up, removed and replaced with suitable materials, properly laid in accordance with these specifications at the Contractor's own expense.

6.60.4. SUBMITTALS.

Prior to ordering pavers, the Contractor shall submit four (4) samples of each type of paver they propose to use for approval by the Engineer. The samples shall be clearly labeled with the Contract No., manufacturer, and finish. All pavers used in the work shall conform to the approved samples. A three (3) pound bag of stone screenings shall be submitted to the Engineer for approval, with a sieve analysis and the name of the supplier attached.

6.60.5. MEASUREMENT.

(A) ASPHALT BLOCK PAVERS RELAID

The quantity to be measured for payment shall be the number of square yards of asphalt block pavers relaid on the site, measured in place, to the satisfaction of the Engineer.

(B) FURNISH AND INSTALL ASPHALT BLOCK PAVERS

The quantity to be measured for payment shall be the number of square yards of new asphalt block pavers installed on the site, measured in place, to the satisfaction of the Engineer.

6.60.6. PRICES TO COVER.

(A) ASPHALT BLOCK PAVERS RELAID

The contract price bid shall be a unit price per square yard and shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required to remove, clean, store, and relay existing asphalt block pavers on the site, including but not limited to stone screenings, bituminous setting bed, neoprene-modified adhesive and sand, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

(B) FURNISH AND INSTALL ASPHALT BLOCK PAVERS

The contract price bid shall be a unit price per square yard and shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals required to furnish, deliver and install new asphalt block pavers in place on the site, including but not limited to stone screenings, bituminous setting bed, neoprene-modified adhesive, asphalt block pavers and sand, all in accordance with the Contract Drawings, the specifications, and directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.60 A	ASPHALT BLOCK PAVERS RELAID	S.Y.
6.60 B	FURNISH AND INSTALL ASPHALT BLOCK PAVERS	S.Y.

SECTIONS 6.61 THRU 6.65 (NO TEXT)

SECTION 6.66 – Brick Pavers

6.66.1. WORK TO INCLUDE. Under this section the Contractor shall furnish and install brick pavers in the appropriate design pattern(s), sizes, shades and colors as shown on the Contract Drawings.

6.66.2. MATERIALS.

(A) BRICK PAVERS

Brick pavers shall be of the sizes, colors and patterns as shown on the Contract Drawings and shall comply with the requirements of ASTM Designation C 902, "Pedestrian and Light Traffic Paving Brick", Class SX, Type I Application PX, except that they shall be fired to produce a dense paver with an absorption of less than 6% (in a 24-hour cold water absorption test), have a Modulus of Rupture of at least 2,000 psi, and a compressive strength of not less than 8,000 lbs. per square inch. Brick pavers must be capable of withstanding at least the equivalent of 50 cycles of freeze-thaw conditions, with no visible deterioration, have a straight wire-cut finish, be dimensionally stable, and all colors shall be as approved by the Design Engineer. Circular wire cut pavers will not be allowed. The Contractor shall provide certification from an approved testing laboratory attesting to the brick's compliance with the aforementioned water absorption, compressive strength, Modulus of Rupture, and freeze-thaw requirements as defined under ASTM Designation C 67.

Prior to commencement of Work, the Contractor shall submit the name of the brick manufacturer and installer proposed to use and upon which the Contractor's bid is based, along with their respective work history experience, and at least one sample of each different brick which will be used in the project. The manufacturer and installer shall have a minimum of five (5) years of documented experience in brick paver work. Roadway and sidewalk pavers shall be a standard product of a single manufacturer.

Brick pavers shall be produced by any of the manufactures shown on the Contract Drawings or an approved equivalent.

(B) BITUMINOUS SETTING BED

Asphalt cement to be used in the bituminous setting bed shall conform to ASTM Designation D 946 with a penetration at 77 degrees F, 100 G., 5 Sec. of minimum 85 millimeters and maximum of 100 millimeters.

The fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coatings lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from "coarse" to "fine" and all passing the No. 4 sieve and meet the gradation requirements when tested in accordance with the standard method of test for sieve or screen analysis of fine and coarse aggregates ASTM Designation C136.

The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F. at an asphalt plant. The approximate proportion of materials shall be seven and one-half (7-1/2%) percent cement asphalt, eighty-seven and one-quarter (87-1/4%) percent sand, and five and one-quarter (5-1/4%) percent mineral filler. Each ton shall be apportioned by weight in the approximate ratio of 150 lbs. asphalt to 1,745 lbs. sand and 105 lbs. mineral filler. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

(C) NEOPRENE-MODIFIED ASPHALT ADHESIVE

Neoprene-Modified Asphalt Adhesive shall consist of two (2%) percent neoprene (Grade WM 1) oxidized asphalt with a 155 degree softening point (80 penetration).

(D) JOINT FILLER

Joint Filler shall meet the applicable requirements of **Section 3.06** Type 2, and shall be pigmented with brick dust to match the color of the brick pavers.

(E) CUT BACK ASPHALT

The Contractor shall use an approved cut back asphalt placed on the concrete base for roadway pavers prior to setting of bituminous setting bed.

6.66.3. METHODS.

(A) PLACING BITUMINOUS SETTING BED

The concrete base, which shall be furnished and installed under another contract item, shall be sufficiently cured prior to installation of the bituminous setting bed as approved by the Engineer. To install the setting bed over the surface of the base, place three-quarter (3/4") inch deep control bars directly over the base. If grades must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately eleven (11') feet apart to serve as guides for striking board (12' long 2" x 6" board). The depth control bars must be set carefully to bring the pavers, where laid, to proper grade.

Place some bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce a smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.

The bed shall be spread in a continuous workmanlike manner. Installation of bed in spotted, different and isolated areas will not be accepted. Bed depth greater than one and one-eight (1-1/8") inch will not be acceptable. The Contractor shall remove and replace the concrete required to maintain specified bed thickness. Minimum concrete replacement repair thickness shall be two (2") inches.

After the bed has cooled, it shall be rolled by hand with a one hundred (100 lb.) pound roller to eliminate sponginess and to prepare the surface for the installation of the tack coat. The setting bed shall be protected against all pedestrian traffic and construction equipment to insure a level surface for setting pavers.

The neoprene-modified asphalt adhesive tack coat shall be applied by mopping, squeegeeing or troweling over the top of the setting bed to a uniform thickness of approximately 1/16" so as to provide a bond between the bituminous setting bed and the paver. If it is troweled, the trowel shall be serrated with serrations not to exceed one-sixteenth (1/16) of an inch.

(B) INSTALLATION OF BRICK PAVERS

All brick pavers shall be laid in the pattern shown on the Contract Drawings or as directed by the Engineer to provide a uniformly even surface. No brick pavers shall be laid or grouted in freezing weather.

Prior to installation of brick pavers, all steel plates required to be installed adjacent to tree pits as shown on the plan shall have been installed and painted with a shop coat of epoxy primer, an epoxy intermediate coat and a polyurethane topcoat in accordance with the requirement specified under **Subsection 2.13.4.**, for the painting of steel facing for concrete curb.

When the modified asphalt adhesive is dry to the touch, carefully place the pavers, best side up, by hand in straight courses with hand tight joints and uniform top surface. Good alignment must be kept, and the pattern(s) shall be that shown on the Contract Drawings. All straight patterns shall be straight and all curved patterns shall be smooth curved. Pavers shall be set flush with a top surface elevation tolerance of 1/16" between adjacent pavers but not more than $\pm$1/32" at perimeters between pavers and adjacent curb or sidewalk surfaces. Where bricks are to be cut, only machine full depth diamond saw-cut bricks will be accepted in the work. Brick pavers in corner quadrant or curvilinear patterns shall be cut on a radial. Brick pavers for meter posts shall be cored through as directed by the Engineer. Brick shall not be cut to less than one (1") inch in the least dimension. Areas with dimensions less than 1" shall be wet grouted.

One half inch weep holes at bituminous base shall be provided through curb joints and/or concrete base as shown on the Contract Drawings.

Newly laid pavers must be protected at all times by panels of plywood on which the installer stands. These panels can be advanced as work progresses. However, the plywood protection must be kept in areas which will be subjected to continued movement of materials and equipment. These precautions must be taken in order to avoid depressions and protect paver alignment.

(C) JOINT TREATMENT

Hand tight joints shall read from 0" to maximum 1/8". Sweep a dry mixture of joint filler until joints are completely filled. Fog lightly with water. Brick pavers shall be cleaned of excess grout and joints finished prior to the grout setting up. All brick paving shall be kept moist for 4 days after filling the joints with grout.

Cement stains that remain after the 4 day curing period shall be cleaned with a 10% solution of muriatic acid or mortar cleaner, or sweep with moist sand, followed by flushing clean with water. Care shall be taken to avoid the use of acid in areas where runoff could damage trees or other vegetation.

(D) BRICK DELIVERY & TEST STRIPS

Pavers shall be suitably packaged, delivered and unloaded at the site to minimize breakage and chipping of bricks. Bricks shall be delivered to site prior to installation of concrete base and adjacent sidewalk. Sample test width strip shall be laid out prior to pouring of concrete base and adjacent sidewalk to conform to exact number and unit width of selected pavers. Test strip shall be minimum 3 brick courses from curb to concrete sidewalk and as directed by the Engineer. Test strip locations shall be as shown on the Contract Drawings and as directed by the Engineer.

(E) TRIAL INSTALLATION

The Contractor shall construct approximately 400 sq. ft. area of brick pavers in a location to be determined by the Engineer, for the purpose of establishing a standard of comparison for the remaining work. Said area shall include a typical corner quadrant with pedestrian ramp areas. The Engineer shall inspect and approve the trial area for color, overall appearance and joint spacing before proceeding with the remainder of the work.

6.66.4. SAMPLES. A sample of the brick paver(s) of the color, range and dimensions shown on the Contract Drawings shall be furnished to the Engineer for the Engineer's written approval prior to delivery and installation, and after approval shall be used as a Standard for all pavers incorporated into the work. Samples shall be approved for surface texture, color variations, dimensional stability, color contrast (where more than one brick or pattern is indicated) and shall generally be equal to sample(s) on display for the project, and written approval will be required prior to installation.

6.66.5. TRAFFIC CONTROL. The Contractor shall provide suitable traffic and pedestrian control during the paver installation until all work is completed. Traffic of other trades, while installation is in progress, will not be approved and damaged work shall be removed and replaced as directed by the Engineer, at the Contractor's own expense.

6.66.6. MEASUREMENT.

(A) FURNISH BRICK PAVERS

The quantity to be measured for payment shall be the number of square feet of brick for brick pavement delivered to the site, measured in place. This area shall be equal to the area of installed brick pavers.

(B) INSTALL BRICK PAVERS

The quantity to be measured for payment shall be the number of square feet of brick pavers actually installed on site, measured in place, to the satisfaction of the Engineer.

(C) FURNISH AND INSTALL BRICK PAVERS FOR PARKING METERS

The quantity to be measured for payment shall be the actual number of square feet of brick pavers installed for parking meters on site, measured in place, to the satisfaction of the Engineer.

6.66.7. PRICES TO COVER.

(A) FURNISH BRICK PAVERS

The contract price bid shall be a unit price per square foot and shall cover the cost of all labor, materials, plant, equipment, and incidentals necessary to furnish and deliver brick pavers to the work site, including the cost of all samples and testing required for certification of the brick pavers.

(B) INSTALL BRICK PAVERS

The contract price bid shall be a unit price per square foot and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to install brick pavers, including the cost of furnishing and installing the bituminous setting bed, neoprene modified asphalt adhesive, and joint filler, installing weep holes, all cleaning, cutting, and other incidental work, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

(C) FURNISH AND INSTALL BRICK PAVERS FOR PARKING METERS.

The contract price bid shall be a unit price per square foot and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to furnish, deliver and install brick pavers for parking meters, all in accordance with the Contract Drawings, the specifications, and the direction of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.66 AA	FURNISH BRICK PAVERS (4”X 8” X 2-1/4”)	S.F.
6.66 AB	INSTALL BRICK PAVERS (4”X 8” X 2-1/4”)	S.F.
6.66 BA	FURNISH AND INSTALL BRICK PAVERS (FOR PARKING METERS)	S.F.
6.66 DA	FURNISH BRICK PAVERS (4”X 4” X 2-1/4”)	S.F.
6.66 DB	INSTALL BRICK PAVERS (4”X 4” X 2-1/4”)	S.F.

SECTION 6.67 – Subbase Course, Select Granular Material

6.67.1. INTENT. This section describes the work to be done in connection with the construction of a subbase course, of the thickness specified.

6.67.2. DESCRIPTION. Under this section, the Contractor shall furnish, place and compact a subbase course of granular material in conformity with the lines, grades, thickness and typical sections indicated on the Contract Drawings, or as determined by field conditions and ordered in writing by the Engineer.

Unless otherwise specified, the Contractor shall, at the Contractor's option, furnish and place material conforming to any of the following types: Material A, Material B, Material C, Material D, or Material E (Milled Asphaltic Concrete Aggregate). However, only one material shall be used on a project, unless the Contractor has received written permission from the Engineer to use more than one material, and Milled Asphalt Concrete Aggregate may not be used less than three (3) feet above the highest seasonal high groundwater table.

6.67.3. MATERIALS. All granular material acceptable under this section shall be sound, hard, durable stone, gravel, glass, blast furnace slag, mechanically crushed recycled concrete (broken asphalt will not be accepted), or milled asphalt concrete aggregate. It shall be well graded from coarse to fine and may contain no more than thirty (30) percent by weight of glass. Material tests and quality control methods pertaining to the work of this section will be performed in conformance with the procedures contained in the appropriate New York State Department of Transportation publications in effect on the advertisement date of the project. These publications are available upon request to the N.Y.S. Department of Transportation Regional Director or the Director, Geotechnical. Of the particles retained on the one-quarter (1/4") inch square sieve, not more than thirty (30%) percent by weight, shall consist of flat or elongated pieces. A flat or elongated piece is defined herein as one where the greatest dimension of which is more than three times the least dimension. Aggregate gradation shall be tested in accordance with ASTM C33. The Plasticity Index shall be tested in accordance with ASTM D4318.

The above material requirements shall apply along with the additional requirements below.

Should, at any time during work and for any reason, the material fail to conform to the specified quality and gradation requirements of the type chosen by the Contractor, addition of selected acceptable material and/or satisfactory manipulation of the material is required to produce a material meeting the requirements of the type selected by the Contractor.

Deleterious material shall be defined as any material that does not consist of concrete, asphalt, glass, brick, stone, sand, gravel or blast furnace slag, when these materials are used in the subbase in conformance with the specifications requirements, or any material which in the opinion of the Engineer may adversely affect the performance of this product during handling, during construction, or in its final application.

Recycled Portland cement concrete material may be used for Material A and Material D, below.

MATERIAL A

All of this material shall consist solely of Recycled Portland Cement Concrete Aggregate (RPCCA) the product of mechanical crushing or at least 95 percent of the material by weight shall be mechanical crushed RPCCA mixed with Stone or Sand Gravel, and be free from organic and other deleterious material. This material may contain up to 5% by weight asphalt and/or brick.

The quality of Material A shall be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss, by weight, after 4 cycles shall be 20.

This material shall conform to the following gradation:

Passing Sieve	Percent by Weight
2"	100
1/4"	30-45
No. 100	5-40
No. 200	0-10

The Plasticity Index of the material passing the 40 mesh sieve shall not exceed 5.0.

MATERIAL B

All of this material shall consist solely of Stone which is the product of mechanical crushed ledge rock.

The quality of Material B particles shall be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss after 4 cycles, by weight, shall be 20.

This material shall conform to the following gradation:

Passing Sieve	Percent by Weight
1/2”	100
1/4”	70-100
No. 10	40-75
No. 40	15-40
No. 200	5-15

The Plasticity Index of the material passing the 40 mesh sieve shall not exceed 5.0.

MATERIAL C

This material shall consist of a granular soil or a mixture of granular soil and crushed stone.

The quality of Material C particles shall be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss after 4 cycles, by weight, shall be 20.

This material shall conform to the following gradation:

Passing Sieve	Percent by Weight
2”	100
1”	80-100
1/4”	50-85
No. 10	30-70
No. 40	15-40
No. 200	6-12

The Plasticity Index of this material passing the 40 mesh sieve shall not exceed 5.0.

MATERIAL D

All of this material shall consist solely of Recycled Portland Cement Concrete Aggregate (RPCCA) the product of mechanical crushing or at least 95 percent of the material by weight shall be mechanical crushed RPCCA mixed with Stone or Sand Gravel, and be free from organic and other deleterious material. This material may contain up to 5% by weight asphalt and/or brick.

The quality of Material D shall be determined by the Magnesium Sulphate Soundness Test. The maximum percent loss, by weight, after 4 cycles shall be 20.

This material shall conform to the following gradation:

Passing Sieve	Percent by Weight
1”	100
3/4”	65-90
3/8”	45-75
1/4”	30-55
No. 100	4-15

The Plasticity Index of the material passing the 40 mesh sieve shall not exceed 5.0.

MATERIAL E

MILLED ASPHALTIC CONCRETE AGGREGATE

All of this material shall consist of asphaltic concrete millings to be furnished by the Contractor. Areas to be milled shall be cleared of all debris, soil and vegetation, and power broomed to remove fine particles prior to milling to prevent contaminating the milled material. Milling equipment shall be operated in such a manner as to produce milled material which passes a two (2”) inch sieve. The presence of any added material to each truck load of millings will be cause for rejection of the

entire truck load. No soundness or Plasticity Index testing will be required for this alternate. Field compaction of millings should be conducted using moisture contents from 3% to 7%.

6.67.4. METHODS.

(A) STRIPPING THE SOURCE. The source of material shall be stripped of all sod, topsoil, overburden and other objectionable material before the excavation operations for the material are started, and shall be kept stripped at a minimum thirty (30') feet from the top of the working face of the source at all times.

(B) STOCKPILING AND SAMPLING. All material shall be stockpiled, unless otherwise directed. Stockpile construction requirements, sampling, testing and acceptance/rejection procedures shall be as stipulated in the appropriate New York State Department of Transportation publication in affect at the time of advertisement.

After excavation from the source, and processing and blending, if necessary, the material shall be stockpiled. Stockpiles shall be located at a distance of not less than fifty (50') feet from the outside bottom edge of the conical stockpile built up under the processing plant conveyor, or not less than 50 feet from the toe of the working face of the source. Unless otherwise approved, in writing, these stockpiles shall be formed in layers having a maximum thickness of two (2') feet and to a height not exceeding twelve (12') feet, and shall contain not less than one thousand (1,000) cubic yards or the amount needed for the job, whichever is smaller. Removal of material from stockpiles for placement on the grade shall be by side excavation along nearly vertical faces for the full depth of stockpile. The use of a clam shell type bucket for loading the removal trucks or the use of pan type scrapers for moving the stockpile material to its final position as subbase course will not be permitted. No material shall be added to a stockpile after the stockpile has been sampled for approval. Only material from approved stockpiles shall be placed on the grade for this section. The presence of any oversize particles in the stockpile will be cause for rejection of the entire stockpile. No material shall be removed for use from any stockpile until the stockpile has been sampled, tested, and approved in writing, by the Engineer, for placement on the grade. It shall be the duty of the Contractor to furnish suitable and approved excavating equipment for such sampling. Approval of a stockpile for placement on the grade shall not relieve, in any degree, the full responsibility of the Contractor to furnish, in its compacted position, a subbase course of select granular materials, the final condition of which conforms to all the requirements of the specifications for this section. In the event the Contractor shall have a plant or procedure resulting in subbase course material of uniform quality, at a rate satisfactory to the Engineer, and such that satisfactory samples for tests can be obtained, the requirement for stockpiling may be waived. Prior approval of the Engineer must be obtained and the work must be done in accordance with such conditions as may be imposed in the approval. Such waiver shall remain in force only so long as a satisfactory material is produced.

The stockpiling of the milled asphaltic concrete aggregate is not required.

(C) PLACING. Prior to placing the subbase course, the finished subgrade surface shall not extend above the design elevation at any location and filter fabric material shall be furnished and installed under Item No. 6.68, on the prepared subgrade surface.

Do not place materials blended with glass in contact with geotextile filter fabric. Ensure that glass incorporated into subbase is thoroughly mixed so that glass constitutes not more than thirty (30%) percent by weight anywhere in the subbase.

The spreading of any layer of subbase material shall be done with spreader equipment approved by the Engineer and shall be spread to such thickness that the maximum depth of the layer, after compaction, will be six (6") inches, unless otherwise specified in the Contract Documents. The minimum loose lift thickness is 1.5 times the maximum particle size. Spreading from piles dumped on the roadway will not be permitted. No segregation of large or fine particles will be allowed. The material, as spread, shall be well graded with no pockets of fine material. Water shall be added in such amounts as the Engineer may consider necessary to obtain satisfactory compaction.

When the moisture content of the layer is within the limits for proper compaction, the entire surface shall be rolled with a pneumatic tired roller, having an operating weight of between one thousand (1,000) and two thousand five hundred (2,500) pounds per tire, or smooth steel wheel roller having a minimum weight of ten (10) tons. Each portion of the layer shall be covered by a minimum of eight (8) passes of the roller.

For heavier, vibratory or more efficient types of approved compaction equipment, the minimum number of passes required on all portions of each layer shall be determined by the Engineer after appropriate field tests to evaluate the efficiency of such equipment. In limited areas, where the use of a roller is impractical, approved vibrating plate compactors or impact rammers shall be used to compact the material.

After compaction, the top surface of this course shall not extend above nor more than one-quarter (1/4") inch below true grade and surface at any location. The subbase course, at any location, shall be compacted, finished and completed to the above tolerance and approved by the Engineer, before any forms for concrete pavement or succeeding pavement course is placed at that location. Any depressions or holes that develop during rolling shall be filled with the material used for the subbase course and re-rolled.

In all cases, the subbase course must be so thoroughly compacted that it will not weave under the roller.

The width of the layer of subbase course shall be restricted to that required for placement of the lane being paved and shall not be laid in excess of five hundred (500) linear feet without being compacted. No traffic or hauling, other than that necessary for bringing material for the next course, shall be permitted over this course. Should the subgrade, subbase, or any other material become churned up into or mixed with this subbase course for any reason whatsoever, the Contractor shall at the Contractor's own expense remove such mixtures and replace it with material acceptable for this item.

The Contractor shall assume full responsibility for any contamination and/or degradation of any part of this course during construction and shall, at the Contractor's own expense, remove any and all portions of this course which do not conform to the requirements of these specifications and replace those portions with acceptable material.

6.67.5. TRAFFIC AND CONTAMINATION. No highway or construction equipment traffic shall be permitted over the final finished subbase course surface except as necessary for the construction of the overlying course at that location. Prior to final finishing of the course, however, traffic over the course may be permitted at locations designated by and under such restrictions as may be imposed by the Engineer. In locations where permission is given to route construction equipment over the subbase course, the Contractor shall place the course to not less than two (2) inches above the design subbase course grade, to form a temporary protective layer. After traffic in these locations has been terminated, the protective layer shall be removed and the surface of the course fine-graded to the proper grade.

Contamination of the subbase course with any deleterious material, such as silt, clay, mud or organic material, through any cause whatsoever, shall be corrected by the Contractor by excavation and replacement of the subbase material in the affected areas.

6.67.6. FINE GRADE TOLERANCE. The final surface of the subbase course shall be fine graded so that, after final compaction and just prior to placement of base or pavement courses, the surface elevation shall not vary above nor more than one-quarter (1/4") inch below the design line and grade at any location. The surface shall be completed to the above tolerance and approved by the Engineer prior to any work at a given location to place an overlying course. If, after approval, the subbase course becomes displaced or disturbed in any way for any reason, the Contractor shall repair and regrade the damage to the satisfaction of the Engineer prior to placing the overlying course.

6.67.7. MEASUREMENT. The quantity of subbase course to be measured for payment shall be the number of cubic yards of subbase course material, of the type specified, placed in the final compacted position computed from payment lines indicated on the Contract Drawings or, where changes have been ordered, from payment lines established by the Engineer.

No deductions shall be made for the volumes occupied by manholes, catch basins and other such objects.

6.67.8. PRICE TO COVER. The unit price bid per cubic yard shall include the cost of furnishing all labor, plant, material, equipment, and insurance necessary to satisfactorily complete the work. The cost of adding water as may be required shall also be included in the price bid. No direct payment will be made for losses of material which may result from compaction, foundation settlement, erosion or any other cause; the cost of such losses shall be deemed included in the price bid for this item.

Progress payments will be made after the subbase course has been properly placed and compacted. Payment will be made at the unit price bid for seventy-five (75%) percent of the quantity. The balance of the quantity will be paid for after the final finishing to the required tolerance and just prior to the placing of the next course.

No separate payment will be made for furnishing, placing, removing and disposing of protective layers where traffic is permitted, for fine grading to specified tolerances, corrective work, or losses of material.

Payment will be made under:

Item No.	Item	Pay Unit
6.67	SUBBASE COURSE, SELECT GRANULAR MATERIAL	C.Y.

SECTION 6.67MAC – Subbase Course, Milled Asphaltic Concrete Aggregate

6.67MAC.1. INTENT. This section describes the work to be done in connection with the construction of a subbase course, of the thickness specified.

6.67MAC.2. DESCRIPTION. Under this section, the Contractor shall construct a subbase course, of the thickness specified, consisting of milled asphaltic concrete aggregate. Milled asphaltic concrete aggregate will be furnished to the Contractor at a designated City yard. The Contractor shall be required to pick-up, transport, place and compact asphaltic concrete aggregate millings to form a subbase course in conformity with the lines, grades, thickness and typical sections indicated on the Contract Drawings, or as determined by field conditions and ordered in writing by the Engineer.

6.67MAC.3. MATERIALS.

Asphaltic concrete aggregate millings for the subbase course shall be furnished by the City to the Contractor at a designated City yard.

6.67MAC.4. CONSTRUCTION METHODS.

(A) PICKING UP AND DELIVERING

The Contractor shall be required to pick up asphaltic concrete millings at the City's Hamilton Avenue asphalt plant (the "Yard"). At least (7) days prior to requiring millings, and also the day before each arranged pickup date, the Contractor shall be required to contact the City's Yard to arrange for the City's personnel to be available at the Yard to load the Contractor's trucks.

Yard Address:	448 Hamilton Ave, Brooklyn, NY 11232
Primary Contact:	Mr. David Sterman at (212) 839-2072 or (212) 839-2355
Yard Hours:	8:00 AM to 3:00 PM

Millings will be loaded on to Contractor's trucks, by the Yard's personnel, for delivery by the Contractor to the site. No material shall be added to the millings supplied by the City. Only millings from the City's yard shall be placed on the subgrade under this Section. The presence of any added material by the Contractor will be cause for rejection of the entire truck load. The Contractor agrees and warrants that each truck load of such asphaltic concrete aggregate milling picked up from the designated City's yard has originated only from that City yard and has not been mixed with material from any other site.

Protection of the vehicles used by the Contractor is the sole responsibility of the Contractor and the cost of repairs or towing is deemed to be the Contractor's responsibility. The New York City Departments of Transportation and their Representatives or employees, shall be held harmless for any damages incurred to the Contractor's vehicles while on City property.

(B) PLACING

Prior to placing the subbase course, the finished sub-grade surface shall not extend above the design elevation at any location. The spreading of subbase course material shall be done with spreader equipment approved by the Engineer. Each subbase course shall be constructed in layers not to exceed four (4") inches in thickness after compaction. Spreading from piles dumped on the roadway will not be permitted. No segregation of large or fine particles will be allowed, but the material, as spread, shall be well graded, with no pockets of fine material. Water shall be added in such amounts as the Engineer may consider necessary to obtain satisfactory compaction.

When the moisture content of the course is within the limits for proper compaction, the entire surface shall be rolled with a pneumatic tired roller, having an operating weight of between 1,000 and 2,500 pounds per tire, or a smooth steel wheel roller, having a minimum weight of ten (10) tons. Each portion of the course shall be covered by a minimum of eight (8) passes of the roller.

For heavier, vibratory or more efficient types of approved compaction equipment, the minimum number of passes required on all portions of each course shall be determined by the Engineer. In limited areas, where the use of a roller is impractical, approved vibrating plate compactors or impact rammers shall be used to compact the material.

6.67MAC.5. TRAFFIC AND CONTAMINATION. No highway or construction equipment traffic shall be permitted over the final finished subbase course surface except as necessary for the construction of the overlying course at that location. Prior to final finishing of the course, however, traffic over the course may be permitted at locations designated by and under such restrictions as may be imposed by the Engineer. In locations where permission is given to route construction equipment over the subbase course, the Contractor shall place the course to not less than 2 inches above the design subbase course grade, to form a temporary protective layer. After traffic in these locations has been terminated, the protective layer shall be removed and the surface of the course fine-graded to the proper grade.

Contamination of the subbase course with any deleterious material, such as silt, clay, mud or organic material, through any cause whatsoever, shall be corrected by the Contractor by excavation and replacement of the subbase material in the affected areas.

6.67MAC.6. FINE GRADE TOLERANCE. The final surface of the subbase course shall be fine graded so that, after final compaction and just prior to placement of base or pavement courses, the surface elevation shall not vary more than one-quarter (1/4") inch above or below the design line and grade at any location. The surface shall be completed to the above tolerance and approved by the Engineer prior to any work at a given location to place an overlying course. If after approval, the course becomes displaced or disturbed in any way for any reason, the Contractor shall repair and regrade the damage to the satisfaction of the Engineer prior to placing the overlying course.

6.67MAC.7. MEASUREMENT. The quantity of subbase course to be measured for payment will be the number of cubic yards of milled asphaltic concrete aggregate subbase course material placed in the final compacted position computed from payment lines indicated on the Contract Drawings, or, where changes have been ordered, from payment lines established by the Engineer.

6.67MAC.8. PRICE TO COVER. The contract unit price bid per cubic yard shall cover the cost of furnishing all materials, labor, equipment, insurance, and incidentals required to satisfactorily complete the work. No separate payment will be made for furnishing, placing, removing, and disposing of protective layers where traffic is permitted, for fine grading to specified tolerances, corrective work, or losses of material.

Payment will be made under:

Item No.	Item	Pay Unit
6.67 MAC	SUBBASE COURSE, MILLED ASPHALTIC CONCRETE AGGREGATE	C.Y.

SECTION 6.68 – Plastic Filter Fabric

6.68.1. WORK TO INCLUDE. Under this section, the Contractor shall furnish and install plastic filter fabric in the manner shown on the Contract Drawings. The purpose of the plastic filter fabric is to provide a permeable layer which allows water but not soil particles to pass through. The plastic filter fabric shall be installed in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

6.68.2. MATERIALS. The filter fabric shall be composed of a strong polymer type fiber, resistant to both rot and insects, and formed into a non-woven fabric with the following minimum requirements:

Grab Tensile Strength, ASTM D 4632	180 lbs.
Trapezoid Tear Strength, ASTM D 4533	50 lbs.
Puncture Strength (5/16”), ASTM D 3787 modified (with 5/16” dia. flat tip with 1/32” x 45° chamfer)	75 lbs.

The fabric shall be free of any treatment which might significantly alter its physical properties. During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protective covering to protect it from direct sunlight, mud, dirt, dust and other debris.

The manufacturer shall submit certified test data to cover each shipment of material.

6.68.3. CONSTRUCTION DETAILS. Plastic filter fabrics which are subject to deterioration by ultraviolet rays shall be protected from sunlight during transport and storage. For those fabrics which are subject to damage from sunlight, the information on the packaging material shall warn against exposing the filter fabric to sunlight.

The filter fabric shall be spread on a prepared surface as called for on the Contract Drawings or as directed by the Engineer. The fabric shall be laid loosely, so that placement of overlaying materials will not stretch or tear it. Stone placement shall be done in a manner that will not prove injurious to the fabric. Should the fabric become torn or otherwise damaged by any cause, it shall be patched by placing an additional section of plastic filter fabric over the tear with a three-foot overlap on all sides.

The overlaying material shall be placed within a period of two (2) weeks whether the fabric is subject to damage from sunlight or not. Fabric shall be anchored in an approved manner that will hold it in position. Adjacent sheets shall be overlapped by at least thirty-six (36”) inches. No traffic or Contractor’s equipment will be permitted to travel directly on the plastic filter fabric.

Should the roadway be done one-half at a time, the Contractor shall excavate three (3’) feet further on the first half to allow for 36-inch overlap at the center of pavement. This overlap shall be rolled and covered over with temporary fill to protect fabric from sunlight and the cost of this temporary fill shall be included in the price bid for the plastic filter fabric.

Filter fabric installed in sidewalk and curb areas shall be placed transverse to the street so as to avoid overlapping at critical points (such as under curb, etc.). The Engineer will determine the method of placement.

The Contractor is required to maintain the integrity of the filter fabric around new catch basins by draping lengths of filter fabric over basin excavation that will provide enough slack so that overlap does not occur in the basin cavity or on the slope but rather at the subgrade level. Slack should allow for load dispersal of stone aggregate about the catch basin.

6.68.4. MEASUREMENT. The quantity of Plastic Filter Fabric to be measured for payment shall be the number of square yards computed between the limits shown on the Contract Drawings or within the limits established in writing by the Engineer prior to performing the work. No quantity will be included for material used for repair of tears or for material used to provide the overlaps.

6.68.5. PRICE TO INCLUDE. The unit price bid per square yard for this item shall include the cost of furnishing all labor, materials, plant, equipment, insurance, samples, and incidentals necessary to complete the work including the cost of preparing the surface upon which the plastic filter fabric is placed, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.68	PLASTIC FILTER FABRIC	S.Y.

SECTION 6.69 (NO TEXT)

SECTION 6.70 – Maintenance and Protection of Traffic

6.70.1. DESCRIPTION. Under this section the Contractor shall be required to complete the work of maintaining and protecting all pedestrian and vehicular traffic within the limits of the contract. This shall include, but not be limited to furnishing, placing, relocating and removing, when directed, all necessary temporary warning and regulatory signs and temporary traffic control devices to re-route and protect traffic - all in accordance with an approved Maintenance and Protection of Traffic (MPT) Plan, the Contract Drawings, the specifications and directions of the Engineer.

Prior to performing any work in the Contract, if there are no MPT plans provided in the Contract Documents or the Contractor is proposing a change to the contract MPT plan, the Contractor shall prepare and submit an MPT Plan for the work required under the contract. The MPT Plan shall be prepared by a New York State Licensed Professional Engineer who is qualified and experienced in Traffic Engineering and Work Site Safety. The MPT Plan shall include all necessary and required legal precautions for the protection of traffic and for the safety of the public, and shall be subject to approval by the New York City Department of Transportation's Office of Construction Mitigation and Coordination (OCMC) and the Engineer.

The provisions of this section are supplementary to and do not abrogate the General Conditions (**Section 1.06**), the General Notes on the Contract Drawings relating to maintenance and protection of traffic or the OCMC Traffic Stipulations. Furthermore, any conditions pertaining to the maintenance and protection of traffic during the life of the contract which are addressed in the General Conditions and in the General Notes on the Contract Drawings, whether or not addressed under this Section, shall be deemed as having been addressed under this Section.

6.70.2. GENERAL. The Contractor shall adhere to the following requirements and to any additional maintenance of traffic requirements that are included in the Contract Drawings. If there are any discrepancies between the following requirements and the requirements shown on the Contract Drawings, then the Contract Drawings shall take precedence.

(A) The Contractor shall observe the laws and ordinances of the City in relation to obstructing the streets, keeping open passageways, and protecting the same where they are exposed and would be dangerous to the public travel.

(B) The Contractor shall provide for a clear demarcation between the work area and the remainder of the right-of-way that is open to traffic. This includes sidewalk areas open to pedestrians on streets that are permitted to be closed except to Local and Emergency Traffic. However, under no circumstances shall the Contractor discriminate against an individual with a disability, as defined in the Americans with Disabilities Act, in providing services, programs or activities pursuant to the contract.

(C) Unless otherwise shown on the Contract Drawings or approved by the Engineer, the Maintenance and Protection of Traffic (MPT) Plan shall conform to the Specifications set forth in the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition, and shall also conform with the directions of the OCMC and the Engineer.

(D) Access for local and emergency vehicular traffic shall be provided at all times in construction work areas. The Contractor shall move and restore barrels, barricades and other traffic control devices as ordered by the Engineer for local and emergency access at no additional compensation.

(E) Throughout the course of the work, the health and welfare of people shall be provided for. The Contractor shall, at least one (1) week prior to start of work, ascertain the specific needs of individuals whose homes or place of business may require special consideration for access while required construction work is in progress. In all such cases, the Contractor shall make all arrangements with health, safety and protective agencies to ensure that any and all emergency or incidental needs of seriously ill and/or handicapped people will be cared for. One (1) week advance notification of construction shall be given to affected residents.

The Contractor shall maintain traffic at all times at all highway ramps, hospital emergency entrances, subway stations, schools (and for school busses), fire houses, police precincts and major institutions within the project locations as directed by the Engineer. Suitable ingress and egress shall be provided at all times

for all abutting properties, residences and businesses. The Contractor shall, where required, provide travel lanes and pedestrian passageways. Travel lanes and pedestrian passageways shall be drained and kept reasonably smooth, safe and in suitable condition at all times and shall cause a minimum interference to traffic consistent with the proper prosecution of the work. Unless otherwise specified or stipulated by the OCMC, construction work on streets which must be completely closed to traffic shall be performed during the normal work week (Monday thru Friday).

(F) Where the Contractor is specifically ordered to perform night work between the hours of 6:00 P.M. and 6:00 A.M. or to work on weekends, the Contractor will, in addition to the non-conformance clause included herein, be subject to liquidated damages of the amount specified in Schedule A for each and every hour, or any part thereof, that the entire width of roadway and sidewalk are not available to traffic after 7:00 A.M. the morning following this night or weekend work operations. The Contractor shall be required to clear the sidewalk of all the Contractor's materials, equipment, etc., for the entire width of roadway and sidewalk to be available for traffic, except for excavated or freshly poured concrete sidewalk.

(G) All excavated material shall be loaded directly into dump trucks. No debris shall be allowed to accumulate.

(H) The Contractor is placed on notice that the maintenance and protection of traffic during construction is considered as important as is the actual construction.

(I) Pursuant to Article 7 of the Standard Construction Contract and the requirements stipulated hereinabove, the Contractor shall provide personnel to patrol the work site, as necessary, to ensure that conditions on the site are adequate for public safety and convenience at all times.

6.70.3. MAINTENANCE AND PROTECTION OF TRAFFIC PLANS.

(A) The Contractor shall notify the Mayor's Traffic and Construction Coordinating Council (OCMC), in writing, at least twenty (20) days prior to the start of construction in order that preconstruction meetings can be scheduled to finalize measures needed to control traffic flow. The notice must include the Contract Number, Name of Contract and OCMC File Number. The Contractor shall prepare and submit Preliminary Maintenance and Protection of Traffic (MPT) Plans a minimum of fourteen (14) days prior to the OCMC's preconstruction meeting for review by the OCMC and the Department's Assistant Commissioner for Construction. The Preliminary MPT Plans shall outline the Contractor's proposed staging, sequence and schedule of construction operations; and proposed traffic lanes configuration, traffic routing and detours. All stipulations provided by the OCMC shall be in writing.

(B) The Contractor is advised that other contractors may be working in the general area during the term of the project. In such cases, the Contractor may be required to modify and coordinate the MPT Plans with that of any other contractor who may be operating within the contract limits or adjacent areas as directed by the Engineer.

(C) When MPT Plans have not been provided to the Contractor as part of the Contract Documents or if the Contractor proposes to modify the provided MPT Plans, the Contractor shall be required to prepare and furnish, to the Engineer, MPT Plans that have been approved by the OCMC. The MPT Plans submitted to the Engineer shall be subject to further review and approval by the Department's Assistant Commissioner for Construction. The MPT Plans shall include, but not be limited to, the following:

(1) Proposed stages, sequence and schedule of construction operations;
(2) Maximum size and extent of Contractors work area for each stage of construction;
(3) Proposed signage, application and removal of pavement markings, methods and devices for traffic lane(s) delineation and channelization, placement and maintenance of devices, lighting, traffic regulations, and surveillance and inspection. All drawings are to be drawn to scale as applicable to the various street systems. The use of not to scale schematic MPT drawings shall be subject to approval by the Engineer;
(4) Size, depth and location of construction (trench and excavation) as it relates to street usage;
(5) Width of roadways, traffic lanes and sidewalks;
(6) Existing and proposed direction of traffic, proposed traffic routing and detours;
(7) Land use - i.e. commercial, residential, schools, churches, hospitals, etc.;
(8) Bus routes, truck routes, temporary bus stop relocations;
(9) Existing street furniture - i.e., meters, traffic signals, lampposts, etc.;
(10) Traffic regulations - i.e., curbside (No Parking Anytime, etc.); regulatory (Stop Sign, etc.);

(11) All relevant existing street and traffic conditions and proposed conditions.

As the project advances, the Contractor shall update and/or submit new MPT Plans for review and approval by the OCMC and the Department's Assistant Commissioner for Construction.

6.70.4. TRAFFIC ROUTING AND DETOURS.

(A) Where the MPT Plans, the Specifications and/or the directions of the Engineer call for the closing of a street (curb to curb), the Contractor shall obtain a "Street Closure Permit" from the OCMC.

(B) The Contractor shall contact the OCMC, local Police Precinct, Fire Department, Community Board, Borough President's Office - Chief Engineer, and Emergency Medical Services, (also New York City Transit Authority, Metropolitan Transportation Authority, and Long Island Railroad when applicable) forty eight (48) hours prior to the implementation of any roadway closure or the setting up of any detour.

(C) Where directed by the Engineer, the Contractor shall have the detour roadway stabilized and paved prior to setting up any detour. Detour route(s) developed as a requirement for the Maintenance and Protection of Traffic must be maintained throughout the duration of the detour. Maintenance by the Contractor shall include, but not be limited to, repairs of potholes or depressions, and the installation, maintenance and removal of all the necessary pavement markings, detour signs, and regulatory and/or no parking signs required for the detour. The Contractor shall be required to restore all original signs and pavement markings when the detour is no longer required, as directed by the Engineer. All such work shall be done in accordance with these Standard Highway Specifications.

6.70.5. TRAFFIC CONTROLS. The Contractor shall maintain and protect all existing traffic control devices, traffic and street name signs and sign posts, etc., throughout the project area. Where existing traffic control devices of any type are disturbed, whether by the construction operation or by the Contractor's negligence, the Contractor shall restore or replace same, as soon as possible, to the satisfaction of the Engineer and at no additional cost to the City, unless otherwise provided for in the contract. Should a traffic signal or street light be damaged, the Contractor shall immediately contact the New York City Department of Transportation, Division of Traffic Operations, Signals Engineering and Street Lighting, to report the damage.

The Contractor shall provide, place, and maintain all temporary traffic control devices, barricades, lights, flags, flashers, barrels, flashing arrow boards, variable message boards, safety orange construction fence, pedestrian steel barricades, construction signs, flagpersons and warning signals in accordance with the National MUTCD; unless otherwise shown on the Contract Drawings; required in the specifications and/or ordered by the Engineer. The use of unauthorized or unapproved signs, barricades, lights, barrels, flags and other temporary traffic control devices will not be permitted. Any damaged or defective temporary traffic control devices must be immediately removed and replaced.

Notwithstanding the provisions contained herein, it remains the Contractor's responsibility to provide for and implement minor additional measures that are necessary to maintain the safety of vehicular traffic and pedestrians during construction. The provision and use of supplies such as traffic cones, high visibility ribbons and flags where needed or directed by the Engineer shall be considered as minor and incidental items.

(A) SIGNS:

(1) The Contractor shall develop an inventory of traffic signs along the construction route by taking an adequate number of preconstruction photographs.

(2) The Contractor shall install temporary signs, as per the requirements of **Section 6.25**, prior to the start of each phase of construction and shall cover each temporary sign to the satisfaction of the Engineer until the start of construction. The exact location, size, wording and details of sign panels and mountings shall be subject to approval by the Engineer.

(3) The Contractor may be directed by the Engineer to install additional construction signs and markings where it is deemed necessary for proper maintenance and protection of traffic.

(4) The Contractor shall keep all signs in proper position, clean and legible at all times. Care shall be taken to ensure that weeds, shrubbery, soil, and construction materials and

equipment are not allowed to obscure any sign, light, warning signal or other traffic control device.

(5) The backside of all temporary signs to be furnished under the contract shall be clearly labeled with the Contractor's Company Logo, the Agency's name (NYCDDC) and the Contract Number, with lettering from 1-1/2 to 2 inches in height, and at a location where this information will not be obstructed by sign supports, as approved by the Engineer. A sample of each type of proposed signs must be submitted to the Engineer for the Engineer's approval, prior to any signs being posted.

(6) The Contractor shall provide, install and maintain all regulatory construction signs, as required. These regulatory signs shall conform to the standards and specifications of the New York City Department of Transportation Bureau of Traffic.

(7) Unless otherwise approved by the Engineer, the Contractor shall remove all temporary advanced warning signs and temporary traffic control devices that pertain to a specific roadway, immediately after construction has been completed on that roadway, and/or from the detour routes or locations where advisory signs may have been required.

(8) The Contractor is advised that the New York City Department of Transportation has special standards for regulatory and "No Parking Construction" signs and that the details of these new signs and information concerning the option of purchasing them from the NYC Department of Transportation can be obtained through the OCMC Borough Coordinator.

(B) BARRICADES AND BARRIERS: To permit adequate visibility at intersections, all barricades shall be placed so as not to hinder pedestrian or vehicular sight lines. Similarly, no sheeting shall extend more than twenty-four (24") inches above the existing pavement grade within forty (40') feet of an intersection.

(1) TEMPORARY PEDESTRIAN STEEL BARRICADES:

Temporary Pedestrian Steel Barricades shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 7.36**.

Temporary pedestrian steel barricades are to be used to delineate work areas from pedestrian areas, within the sidewalk area as specified or directed by the Engineer.

(2) TYPE III BREAKAWAY BARRICADES:

Type III Breakaway Barricades shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 6.28B** and, unless otherwise approved by the Engineer, are to be used on Federal Highway Administration (FHWA) Funded Projects only.

(3) LIGHTED TIMBER BARRICADES:

Lighted Timber Barricades shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 6.28A**.

(4) TEMPORARY CONCRETE BARRIERS:

Temporary Concrete Barriers shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 6.59 P**.

(C) BARRELS: Plastic Barrels, including flashers where required, shall be furnished, installed and maintained in accordance with the requirements of **Section 6.87**.

(D) PAVEMENT MARKINGS: The Contractor shall obliterate or remove, by scarification, all permanent lane markings and install all temporary lane markings, as shown on the MPT plans unless otherwise directed by the Engineer. The Contractor shall remove all temporary lane markings and reinstall permanent lane markings within forty-eight (48) hours of permanent pavement restoration. All permanent markings shall be thermoplastic reflectorized (unless directed otherwise by OCMC), regardless of the conditions and type of markings prior to construction. Thermoplastic Reflectorized Pavement Markings shall meet the requirements of **Section 6.44**.

(E) TIMBER CURBS: Timber Curb shall be in accordance with **Section 6.26**.

(F) BRIDGING AND STEEL PLATES: Bridging and/or steel plates shall be provided over all excavations in front of driveways and excavations over which pedestrian or vehicular traffic is to be maintained. Plates shall be of a thickness sufficient for the loads to be carried and shall have not less than two (2') feet of bearing on either side of an excavation. Width of bridging or plates for vehicular traffic shall not be less than ten (10') feet, and for pedestrian traffic not less than four (4') feet. Bridging or plates for pedestrian traffic shall be equipped with approved dismountable handrails on both sides, for the full length of bridging or plates. The Contractor shall be responsible for the adequacy of all bridging and/or plates.

The Contractor shall provide and maintain bridging and/or steel roadway plates over any and all excavations not backfilled and restored at the end of the work period. Open excavations, within street limits, shall not be permitted at the close of each work period excepting sewer trenches and trenches for water mains that are 20 inches in diameter or larger, where approved by the Engineer. Bridging and/or steel plates shall be provided as directed by the Engineer.

(G) UNIFORMED FLAGPERSONS: Uniformed Flagpersons shall be furnished in accordance with the requirements of **Section 6.52**.

(H) FLASHING ARROW BOARDS: Flashing Arrow Boards with or without impact attenuators, as may be required, shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 9.99**.

(I) VARIABLE MESSAGE BOARDS: Variable Message Boards, as may be required, shall be furnished, installed, maintained, and removed in accordance with the requirements of **Section 8.08**.

6.70.6. PROVISIONS FOR VEHICULAR TRAFFIC.

(A) Unless otherwise shown on the Contract Drawings or specified herein, the minimum level of demarcation between the work area and a lane open to vehicular traffic shall be by the use of Plastic Barrels. Plastic barrel spacing for demarcating work areas shall not exceed ten (10') feet on centers.

(B) Plastic barrels may be used for cut-and-cover operations (e.g., laying distribution water mains) or for other operations where the work area is in the same location for less than two (2) days (e.g., curb/sidewalk work).

(C) Where trenches will not be backfilled and temporarily restored with asphaltic concrete or binder mixture, or plated at the end of the work day, timber curb with fence or concrete barrier shall be used in lieu of barrels. Timber curb must be placed according to the specifications (either staked or overlapped). The only exception to this is where it may be physically impossible to maintain a through or local/emergency lane as per OCMC stipulations due to limited roadway width; in such cases the contractor may be permitted to omit the timber curb or concrete barrier provided that the trench sheeting is maintained a minimum of two (2') feet above the pavement.

(D) Pedestrian Steel Barricades and Class 2 (sawhorses) Barricades are not acceptable MPT devices in the roadway, and shall not be used in the roadway. The use of cones may be permitted only for short-term routing of traffic and/or to delineate lanes, but not to divide the work area from the right-of-way.

(E) Motorists must be given advance notice of a lane/street closure and/or changed lane patterns to safely channel traffic through the work zone. This notification shall include the use of Type III Barricades or concrete barriers, plastic barrels, signage, lane tapers, and flashing arrow boards as appropriate.

Unless otherwise directed by the Engineer the taper length and barrel spacing in traffic lane transitions approaching construction work areas in City Streets shall be as follows:

Along the project street - 150 feet taper length with barrels spaced 10 feet on centers

Along intersecting streets - 50 feet taper length with barrels spaced 10 feet on centers.

(F) In the event the Contractor is required to maintain two way traffic on a street that is not wide enough to accommodate two separate traffic lanes, or where heavy machinery or trucks are being operated immediately adjacent to vehicular or pedestrian traffic, uniformed flagperson(s) shall be used to assist in maintaining traffic as directed by the Engineer.

(G) Commercial driveway access shall be maintained, unless otherwise directed or approved by the Engineer. Unless otherwise specified in the Contract Documents or directed by the Engineer, the Contractor shall not be required to provide residential driveway access.

6.70.7. PROVISIONS FOR PEDESTRIAN TRAFFIC.

(A) Sidewalks may be occupied or closed only as provided for in the contract, or as otherwise approved by the New York City Department of Transportation (NYCDOT).

(B) Where permission is granted to the Contractor to close a sidewalk, provisions must always be made for a clearly signed pedestrian passage on at least one side of the street and for pedestrian crossing at each intersection.

(C) The Contractor shall maintain at least one (1) pedestrian crossing in each direction at each intersection or as otherwise directed by the Engineer. Designated pedestrian crossings shall be protected from all excavation areas through the use of an approved barrier, temporary fence or other temporary devices, and in a manner approved by the Engineer. Pedestrian crossings over excavations shall be constructed with timber decking or steel plates lined with temporary fence attached to timber curbs on both sides.

(D) Pedestrian passageways must be separated from the work area using pedestrian steel barricades. The only exception to this is during the installation of final asphalt pavement at locations where pedestrian traffic density is low, in which case plastic barrels and caution tape may be approved as a substitute. If the pedestrian passageway is moved into the street, then the pedestrian passage should be separated from traffic using timber curb with orange plastic fence, or concrete barrier.

(E) If the traffic stipulations provide for the street to be closed except for Local and Emergency (L&E) Traffic, then pedestrian steel barricades shall be placed on both sides of the street (i.e., the entire street is considered to be the work area). If there are driveways, then after working hours the pedestrian fence shall be removed from each driveway opening on the side of the street abutting the L&E lane.

(F) Pedestrians must be notified of closed sidewalks by appropriate signage (“Sidewalk Closed/Use Other Side) at the corners of street intersections.

(G) Maintenance of pedestrian access to all abutting properties and pedestrian usage of the sidewalk areas, both new and existing, shall be continued at all times unless otherwise directed by the Engineer. Access may be provided by the use of planks with handrails and/or metal ramps and/or binder mixture ramps, for properties with residential usage (3-family or less) or, additionally, with an aluminum pedestrian bridge for higher density residential and/or commercial frontages. If the entrance is a double-wide entrance, access may be provided by working on only half of the width of entranceway at a time.

(H) Where any crosswalk is permitted to be closed, pedestrian steel barricades and a sign indicating “Crosswalk Closed” with an arrow pointing in the direction of the nearest open crosswalk shall be placed at the closure. In no case shall all parallel crosswalks be closed at two consecutive intersections (i.e., no pedestrian should have to walk more than one block to find an open crosswalk across the same street).

(I) The Contractor shall construct and maintain, as directed, suitable temporary walks and bridges for pedestrians. Temporary walks must be installed across trenches at all hydrant locations, and at crosswalks and commercial establishments as required or specified and as directed by the Engineer.

(J) Excavations shall be completely enclosed with timber curbs and/or lighted barricades and/or temporary fence as shown on the Contract Drawings, the Contractor’s approved MPT Plans, and as directed by the Engineer.

6.70.8. PROVISIONS FOR BUSES AND PASSENGERS.

(A) The Contractor is required to contact OCMC and New York City Transit Authority - Transportation Planners at least six (6) weeks in advance of the projected start of construction work that may result in any bus stop relocation and/or bus rerouting (detour).

(B) The Contractor shall maintain access to and egress from buses along existing and proposed routes at all times during the execution of the work by temporarily relocating bus stops as shown in the MPT Plan - Temporary Relocation Plan for Bus Stops, and as directed and approved by the Engineer.

(C) The Contractor shall not commence working in the area of any existing bus stop until the Contractor has temporarily relocated the bus stop as required and has received the approval of the Engineer.

(D) The Contractor shall keep the area, to which a bus stop is relocated, free from and undisturbed by any construction activity or other impediment during the period of its use as a bus stop.

(E) The Contractor shall not work within an area to which a bus stop has been temporarily located until work within the area of the permanent bus stop (including work on its adjacent curb and/or sidewalk) has been substantially completed and until the area of the permanent bus stop has been restored for public use to the satisfaction and approval of the Engineer.

6.70.9. FIRE DEPARTMENT REQUIREMENTS.

(A) The preferred access for emergency vehicles shall be for two-way traffic; however, a minimum of one (1) eleven (11') feet lane will be acceptable if two-way access cannot be provided.

(B) Free access must be maintained to every fire hydrant, fire alarm box and standpipe connection. Hydrants shall be retained in service and shall be maintained accessible to the fullest extent feasible during construction. If a trench is located between the lane designated for emergency traffic and a hydrant(s), a walkway must be provided over the trench for access to each such hydrant location.

(C) The Fire Department shall be notified in advance by the Contractor whenever water mains and/or hydrants are to be placed in or out of service.

(D) When fire alarm boxes or fire alarm facilities will be affected by the construction work, the Contractor shall notify the Bureau of Facilities Management in advance of work.

(E) During the course of the work the Contractor may be required to relocate and/or support, protect and maintain existing Fire Department subsurface facilities within the limits of construction. The approximate location of Fire Department Facilities can be obtained by contacting the Bureau of Facilities Management. Base maps will be furnished to the Contractor upon request, in accordance with the requirements of **Subsection 1.06.23.(D)**.

6.70.10. STORAGE OF MATERIALS AND EQUIPMENT.

(A) Storage of equipment and materials within the right-of-way is a privilege granted to the Contractor, and is not a right, and shall be done in accordance with the requirements of **Sections 1.06** and **7.13**, herein.

6.70.11. STIPULATIONS.

(A) GENERAL:

(1) These stipulations shall become part of the New York City Department of Transportation's Permit for the subject project. To be valid such permit must be issued within three (3) months of the effective day thereof, otherwise permission to proceed after this time is contingent on review.

(2) The Contractor shall initiate the work in each stage within the limits of a defined work area as shown on the approved MPT Plan. The Contractor shall not advance the work area without the approval of the Engineer. The Contractor will be permitted to advance a work area only when work within the existing work area has been substantially completed. Substantial completion is hereby defined as including temporary pavement restoration and the return of such completed work area to public use as approved by the Engineer.

(3) All Contractor's vehicles, equipment and personnel must be kept within the limits of the designated work areas.

(4) The Contractor shall work in one half (1/2) the width of intersecting streets at a time and shall maintain the other half open to traffic during construction by either decking over open trenches or limiting trench construction, unless otherwise directed or approved by the Engineer.

(B) FOR SEWER AND WATER MAIN WORK:

(1) Unless otherwise specified in the Contract Documents or ordered in writing by the Engineer, there shall not be more than six hundred (600) linear feet of open trench in a roadway at any one time. Trenches backfilled but not yet temporarily paved, are considered open trenches.

(2) At all construction locations where traffic approaches sewer and trunk water main trenches, flashing lights shall be installed and maintained on the trench fencing at five (5') feet intervals along the entire length of the construction fencing. The appropriate large left/right arrows shall be installed on the approach face of the construction fencing.

(3) In addition, at all construction locations where traffic approaches perpendicular to the sewer and water main trench fencing, a Type lll timber barricade (or Type III breakaway barricade for FHWA Funded projects) with two (2) flashing lights shall be installed and maintained. The barricade shall also have the appropriate large left/right arrows installed.

(4) Fill shall be provided, placed and compacted as directed by the Engineer at no direct payment.

(5) Asphaltic Concrete Mixture and/or Temporary Binder Mixture shall be provided and laid where directed by the Engineer. Cold patch will not be permitted.

(6) Final pavement restoration shall commence in a reasonable and timely manner as required in the Specifications and/or as stipulated by the Department and OCMC.

(7) The Contractor shall notify the Engineer prior to the installation of temporary or permanent paving in each location. Failure to send such notification promptly may result in rejection of the work.

(8) For Distribution Water Mains:

(i) Barrels shall be used to separate the work area from the vehicular lanes that are open to traffic.

(ii) Pedestrian steel barricades shall be placed along the sidewalk to separate pedestrian passage from the work area.

(iii) These provisions shall be maintained for each water main operation including excavation, main installation, backfill, temporary paving, and installation of concrete base, but excluding final asphalt paving.

(iv) For maintenance and protection of traffic in low pedestrian density areas MPT can be provided by using barrels and caution tape during laying of permanent asphaltic wearing course only, subject to approval by the Engineer.

(9) For Sewers/Trunk Water Mains:

(i) Timber Curb shall be used to divide the work area from the lanes that are open to traffic. The only exception to this shall be that if it is physically impossible to maintain a through or local/emergency lane according to OCMC stipulations due to insufficient roadway width, then in such cases the Contractor may be permitted to omit the timber curb so long as the sheeting is at least 2 feet above the pavement, and that the area outside the sheeting is properly backfilled.

(ii) Pedestrian steel barricades shall be placed along the sidewalk if there is no open traffic lane maintained along the curb line. If the street is closed except to Local and Emergency Traffic, then pedestrian steel barricades shall be placed on both sides of the street.

(C) FOR CURB AND/OR SIDEWALK WORK:

(1) The Contractor will be permitted to occupy one (1) ten (10') feet wide traffic lane immediately adjacent to the curb as a part of the work area for conducting construction operations during work periods. The work area shall be separated from the portion of the street that is open to traffic by the use of plastic barrels.

(2) For Maintenance and Protection of Traffic along sidewalks, pedestrian traffic density shall be rated as follows:

High Density Location: Where a pedestrian passageway provides less than fifteen (15) square feet of area per pedestrian during a continuous period of one or more hours during the Contractor's working day.

Low Density Location: Where a pedestrian passageway provides not less than fifteen (15) square feet of area per pedestrian during any continuous period of one or more hours during the Contractor's working day.

Pedestrian density shall be determined by dividing an area of passageway having a minimum length of one hundred (100') feet by the pedestrian count within that area.

(3) For Sidewalk Work:

(i) Case I: Low Pedestrian Density Areas

- Sidewalk may be closed
- Plastic barrels shall be used to separate the work area, [generally ten (10') feet wide parking lane and the width of sidewalk] from the vehicular driving lanes.
- Pedestrian steel barricades shall be placed at each corner, with a sign indicating "Sidewalk Closed/Use Other Side"

(ii) Case II: High Pedestrian Density Areas

- Maintain Pedestrian Pathway [four (4) to five (5') feet wide] in the Street
- Timber Curb shall be used to separate the vehicular lanes from the pedestrian pathway.
- Pedestrian steel barricades shall be used to separate the pedestrian pathway from the work area (which will be in the parking lane and width of sidewalk).

(4) One "PLEASE EXCUSE INCONVENIENCE, WE ARE INSTALLING SIDEWALK" sign, with two (2") inch lettering, shall be posted on a temporary pedestrian steel barricade at the end of each block on which sidewalk work is in progress.

Two cardboard or metal signs stating "PLEASE EXCUSE INCONVENIENCE, D.D.C. IS INSTALLING PEDESTRIAN RAMPS" sign, with two (2") inch lettering, shall be posted on temporary steel barricades at every intersection at which pedestrian ramps are being installed.

Signs are to be furnished by the Contractor and shall be installed where directed by the Engineer. Signs shall be installed prior to the start of sidewalk work at each location and removed immediately at the completion of the work at that location.

(5) Straight curb and its adjacent sidewalk areas are not to be disturbed simultaneously with corner curb and its adjacent sidewalk areas in the same block. One or the other must be in acceptable condition to be utilized by pedestrians.

(6) The Contractor may occupy and install pedestrian ramps at a maximum of two corners of any intersection at a time and shall complete and restore pedestrian ramps to service on one side of a street before disturbing curb and/or sidewalk on the other side of the street.

(7) A pathway having a minimum width of five (5') feet shall be provided at each work site for the maintenance of pedestrian traffic at all times, unless otherwise directed by the Engineer.

When sidewalk width, measured from back of curb, is fifteen (15') feet or greater, the pedestrian pathway may be provided in the sidewalk area. This will necessitate two separate excavation and concrete pouring operations and the use of flagperson to control pedestrian traffic while the Contractor's equipment is being operated across pedestrian pathways.

When sidewalk width is less than fifteen (15') feet, the Engineer will determine if sidewalk may be closed, and the location of the pedestrian pathway, if required. The surface of the pedestrian pathway, where required, shall be made safe and maintained by removing debris and by the use of temporary wooden bridging and ramps.

(8) All boundaries between construction work areas and pedestrian routes along sidewalks shall be clearly and continuously delineated with temporary pedestrian steel barricades.

(9) All boundaries between construction work areas and pedestrian pathways in the roadways must be protected by Type III Lighted Timber Barricades facing traffic, with a sign in two (2") inch lettering reading "Pedestrian Pathway", and demarcated by barrels, and heavy duty orange safety construction fencing. Fencing shall be orange in color and be of heavy duty construction grade flexible plastic (light duty plastic screening will not be accepted). Fencing shall have a minimum height of three (3') feet, of a type approved by the Engineer, and shall be held vertically in place for its full length. The Contractor shall securely attach fencing to barricades, barrels or other traffic control devices as may be directed.

(10) The Contractor shall provide adequate barricades lights and warning signs to demarcate and protect vehicular traffic and pedestrians from work areas and unoccupied work sites.

(11) When the Engineer permits a sidewalk to be closed, a sign reading "Sidewalk Closed-Use Other Side" with two (2") inch lettering shall be posted on a Temporary Pedestrian Steel Barricade, at points of closure.

(12) "NO PARKIN– - CONSTRUCTION" signs are to be furnished by the Contractor and shall be installed where directed by the Engineer. Where cardboard signs are used they shall have a minimum of 18 points and one side coated. Signs shall be installed at least twenty-four (24) hours prior to the start of work in each section and removed within twenty-four (24) hours after completion of the work in that section. At any section and during periods between construction phases (curbing and sidewalk) when no work is being performed, the Contractor shall remove these signs appropriately to permit normal parking until work is resumed in that section, all as directed by and to the satisfaction of the Engineer.

In addition, the Contractor shall furnish and display notification signs at each work site or at least one per block as directed along a series of or continuous work sites indicating thereon the name of the Contractor doing the work and the name of the agency for whom the work is being done. The names of subcontractors, when employed, shall be indicated thereon. Signs shall also include the permit number, the purpose of the street opening (e.g. installation of sidewalks), the start and scheduled completion dates of the work, and the Engineer's Field Office telephone number for receiving complaints. Signs shall be conspicuously displayed and of sufficient size to contain appropriate text. Such signs shall be clean, readable and in letters at least one and one-half (1-1/2") inches in height and shall conform to the Department of Transportation's specifications.

With approval of the Engineer, the Contractor may combine both required notification and no parking signs together.

(13) The Contractor shall make the full width of roadways, excluding a three (3') feet width adjacent to curb excavation or newly installed curb, available for traffic during non-working hours.

(14) Work on any corner from start of excavation to completion of sidewalk pavement shall not be more than seven (7) working days, except for corners requiring reset granite curb where completion of sidewalk pavement shall be extended to not more than fifteen (15) working days.

(15) The Contractor shall complete curb and/or sidewalk work on one side of street before disturbing curb and/or sidewalk on the other side of the street.

(16) All curb and sidewalk work shall be completed on a block prior to the start of pavement work along that block.

(17) Reconstruction of new sidewalks at each location shall be completed within seventy-two (72) hours of the start of excavation at that location. Failure to comply with this requirement shall be deemed a failure to maintain the site, thereby making the Contractor subject to the assessment of liquidated damages under the "Nonconformance" article of this Section.

(D) FOR ISOLATED OPERATIONS (e.g., Basins, Street Lights, etc.)

(1) Pedestrian steel barricades shall be used in sidewalk areas to separate pedestrian passageways from work areas.

(2) Barrels shall be used to separate the work area from vehicular lanes that are open to traffic.

(3) Open excavations shall be plated over at the end of each workday.

(E) FOR ROADWAY BASE

(1) Timber Curb shall be used to separate the work area from the remainder of the street.

(2) Pedestrian steel barricades shall be placed along the sidewalk abutting the work area. If the operation is in the full-width of roadway, then pedestrian steel barricades shall be placed on both sides of the street.

(F) FOR PAVEMENT MILLING (GRINDING) CONTRACTS

(1) Pavement milling on any block shall be completed within two (2) working days from the start of such work.

(2) Immediately after milling, the Contractor shall construct temporary ramps of Binder Mixture or Asphaltic Concrete Mixture (Item 4.02 CA or 4.02 CB) as provided in the Bid Schedule, around and to the top of all City owned and privately owned street hardware that protrude above adjacent pavement areas, that have been milled, as directed by the Engineer; and, the Contractor shall maintain said ramps until they have been removed by others to permit laying of the new wearing course but not beyond a period of fifteen (15) days after completion of all the Contractor's work within that City block, as approved by the Engineer. After this period of fifteen (15) days, maintenance of those ramps shall be the responsibility of others.

(3) The Contractor shall, likewise, immediately construct and maintain temporary ramps of binder mixture or asphaltic concrete mixture, as provided in the Bid Schedule, at pedestrian ramps, transition areas, and at driveways as deemed necessary and directed by the Engineer. The use of binder mixture or asphaltic concrete mixture at driveways shall be limited to a width of not more than eight (8') feet for single driveways and not more than twelve (12') feet for double driveways. The slope of temporary ramps at street hardware shall range between 1:10 and 1:6 (rise:run). The use of binder mixture or asphaltic concrete mixture at pedestrian ramps shall be limited to a width of not more than four (4') feet and a slope of approximately 1:12. The slope of temporary ramps at driveways and transition areas shall be approximately 25% [approx. a three (3") inch rise in one (1') feet]. Where there is no existing concrete, binder or stabilized soil base the

milling of the wearing course shall be limited to a six (6') feet wide pavement key adjacent to curbs. Where soil base is exposed, the use of binder mixture or asphaltic concrete mixture is limited to a depth of one and one-half (1-1/2") inches.

(4) Plastic barrels shall be used to divide the work area from the vehicular lanes that are open to traffic. Barrels and caution tape shall be placed on the sidewalk abutting the work area; if the milling/paving is full-width, then the barrels and tape shall be placed on both sides of the street.

(5) The Contractor shall furnish, install and maintain a plastic barrel, with a battery operated flasher unit mounted on it, to be placed on every street casting that requires temporary asphaltic ramp under the contract while it is unsafe, in the opinion of the Engineer, for motor vehicles to pass over the casting. No direct payment will be made for the provision of plastic barrels at such unramped street hardware. In addition, no street casting shall remain in that unsafe condition for more than forty-eight (48) hours or through a weekend or holiday period without being temporarily ramped with binder mixture.

(6) Maintenance of temporary ramps is deemed included under Item 6.70-R, MAINTENANCE AND PROTECTION OF TRAFFIC, except that asphalt will be paid for under other scheduled contract item. Therefore, the Contractor shall be subject to the "NONCONFORMANCE" provisions of this Section for each hardware ramp not installed or maintained by the Contractor as directed by the Engineer.

(7) Pavement grinding in all streets shall be executed along one curb line at a time in each block and traffic shall be maintained as indicated for each case in the sketch titled "MAINTENANCE OF TRAFFIC TYPICAL SCHEMES DURING GRINDING OPERATIONS" included at the end of this Section.

(8) When grinding pavement in mainly residential, low traffic volume streets narrower than thirty (30') feet wide, the Contractor may be permitted to close the roadway but shall be required to maintain access for local and emergency traffic at all times.

(9) Where the pavement being ground in a two way roadway is not wide enough to maintain two separate traffic lanes, flagpersons shall be used to maintain traffic as directed by the Engineer.

(10) The full width of all roadways shall be available for traffic during non-working hours.

(11) Not more than one-quarter (1/4) of any intersection may be ground at a time where two-way traffic is being maintained. For one-way streets crossing one-way streets, up to one-half of the intersections may be ground at a time. The Contractor shall install Plastic Barrels [six (6') feet on center] at the perimeter of ground intersections until the grinding is completed, and binder mixture or asphaltic concrete mixture has been installed.

(12) A minimum of one sign shall be installed for each direction of traffic at streets crossing the grinding operations, which shall notify vehicular traffic of "bump ahead" and shall be installed fifty (50') feet away from the edge of grinding at the intersections. The signs shall remain while the Contractor is responsible for street maintenance.

(G) FOR RESURFACING CONTRACTS

(1) The work on any block from start of curb and sidewalk work to completion of final roadway pavement shall not be more than thirty (30) calendar days.

(2) The Contractor shall occupy not more than one lane in the roadway when adjusting street hardware, replacing or resetting curb, or performing milling at the curb.

(3) In addition to notification signs, the Contractor shall furnish and display no parking signs. These signs shall have a white glossy finish with black one (1") inch block lettering. Where cardboard signs are used they shall have a minimum of eighteen (18) points and one side coated. Each of these signs shall be a minimum of fourteen (14") inches wide by eighteen (18") inches high and contain the following text:

NO PARKING
THIS STREET IS SCHEDULED FOR RESURFACING WORK STARTING ON (*insert specific date*). YOUR COOPERATION IS REQUESTED.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CONTRACT NO. (*insert Contract No*.)

The Contractor shall post these no parking signs on all street lampposts for a spacing of at least one sign every one hundred (100') feet on streets to be milled or resurfaced, a minimum of forty-eight (48) hours prior to the start of any work by the Contractor. Where lampposts are not available for the posting of at least one sign every one hundred (100') feet of curb on each side of the street, signs may be posted on trees, traffic posts, wood posts, etc., as directed, to obtain a sign spacing of not more than one hundred (100') feet on each side of the street. The Contractor will not be allowed to advance the Contractor's work in any street unless said signs have been posted or a written waiver is secured from the Assistant Commissioner, Infrastructure Construction prior to start of work. Where such waiver has been granted, a credit of fifty ($50) dollars will be taken for each block not posted; however, a credit of one thousand ($1,000.00) dollars will be taken for each block not posted where such waiver has not been granted.

With approval of the Engineer, the Contractor may combine both required notification and no parking signs together.

Where resurfacing work does not occur immediately after the milling operation, new signs with the new dates shall be installed at least forty-eight (48) hours prior to the resurfacing work. As the resurfacing work progresses, the Contractor shall remove and dispose of the cardboard signs.

(4) Roadway Preparation Work for Paving.

(i) Roadway preparation work on any block, which shall include but not be limited to all curb, milling, pavement key, and hardware adjustment work, shall be completed within seven (7) calendar days from the start of preparation work.

(ii) Contractor shall delineate the area of work in progress at the curb line for pedestrians by installing orange safety tape on plastic barrels [ten (10') feet o.c.]. Some of these plastic barrels may be eliminated when the tape can be supported on poles, trees, etc., providing support at ten (10') feet intervals.

(iii) At the ends of work areas and at street crossings the Contractor shall install plastic barrels at eight (8') feet ± o.c. At partial street closings the Contractor shall separate the work area and the traffic by installing plastic barrels at ten (10') feet ± o.c.

(iv) Installation of plastic barrels and orange safety tape must be completed prior to start of work within any city blocks, and be removed within twenty-four (24) hours after completion of milling or paving, etc.

(v) The Contractor shall construct temporary safety ramps around adjusted roadway hardware, as ordered by the Engineer, and shall maintain these ramps prior to placement of the wearing course. Ramps shall not exceed a 1:10 slope and shall be installed to the top of hardware under Item 4.02 BA-R, PRE-IDENTIFIED BINDER MIXTURE. The Contractor shall remove the temporary ramp material immediately prior to placing the finished pavement. The cost of removing temporary ramp material shall be included in the price bid for the appropriate Grinding Existing Asphaltic Concrete Wearing Course.

(vi) Maintenance of temporary ramps is deemed included under Item 6.70-R, MAINTENANCE AND PROTECTION OF TRAFFIC. Therefore, the Contractor shall be subject to the "NONCONFORMANCE" provisions of

this Section for each hardware ramp not installed or maintained by the Contractor as directed by the Engineer.

(vii) The Contractor shall furnish, install and maintain a plastic barrel, with a battery operated flasher unit mounted on it, to be placed on every street casting that projects above the roadway surface while it is unsafe, in the opinion of the Engineer, for motor vehicles to pass over the casting.

(H) PAVING WORK.

(1) Unless otherwise directed by the Engineer or prescribed in the Contract, all streets shall be paved one-half their width at a time while maintaining traffic on the other half.

(2) During resurfacing of all roadways, access must be made available for emergency vehicles at all times. All local thru traffic shall be detoured and signs indicating "Street Closed to Thru Traffic" and detour signs shall be posted by the Contractor in accordance with the National MUTCD.

(3) When paving mainly residential, low traffic volume streets narrower than thirty (30') feet wide, the Contractor will be permitted to close the roadway but shall be required to maintain access for local and emergency traffic at all times.

(4) The full width of all roadways shall be available for traffic during non-working hours.

(5) Unless otherwise noted, one-half width or three-quarters of all intersections shall be maintained for traffic, during working hours, in order to maintain traffic in all directions.

(6) Where adjustment of street hardware is required, the Contractor shall complete the paving operations within fifteen (15) working days of the start of roadway preparation work (milling of pavement, adjusting manholes and catch basins, etc.) within each block.

(7) Where adjustment of street hardware is not required, the Contractor shall complete the paving operations within six (6) working days of the start of roadway preparation work (milling of pavement, etc.) within each block.

(8) Pavement marking on any block shall be completed within ten (10) calendar days after completion of the paving work.

(I) FIVE BOROUGH BIKE TOUR, NYC MARATHON ROUTE AND OTHER SCHEDULED EVENT LOCATIONS:

In order to accommodate the Five Borough Bike Tour and the New York City Marathon Race, the Contractor shall be required to open the full width of streets along the routes of the Five Borough Bike Tour/NYC Marathon, as applicable, at least fifteen (15) days prior to the date of the scheduled event. Also, the Contractor shall be required to complete all work started within a half mile radius of the marathon route. Generally, the Five Borough Bike Tour occurs the first Sunday of May and the New York City Marathon occurs the first Sunday in November. For date and route information of these events, see the following:

Five Borough Bike Tour: Bike New York, 891 Amsterdam Avenue, New York, NY 10025 · 212 932 BIKE · info@bikenewyork.org

New York City Marathon: New York City Sports Commission, 2 Washington Street, 15th Fl., New York, NY 10004 / Toll Free: 877.NYC.SPORTS / Fax: 212.788.7514

The Contractor shall be required to perform the following work within the project limits along the Five Borough Bike Tour/NYC Marathon route, as applicable, at least fifteen (15) days prior to the date of the scheduled event:

- All stored materials shall be removed.

- All excavations and trenches which cannot be permanently restored shall be backfilled (no plates allowed) and temporarily paved with Asphaltic Concrete Mixture [two (2") inches thick in sidewalk areas and four (4") inches thick in roadway areas].

  A temporary overlay of the existing pavement designated to be reconstructed shall consist of 1-1/2 inches of Asphaltic Concrete Wearing Course laid on a leveling course of asphaltic concrete mixture or binder mixture, as provided in the Bid Schedule, from curb to curb. Likewise, the Contractor will not be permitted to proceed with work at any location where any civic parade or other official activity is scheduled and where the Contractor cannot complete such work fifteen (15) days prior to the date of the scheduled activity.

Payment for all work required herein above, including removing of stored materials, backfilling, removal of plates, removal of temporary asphaltic concrete overlay, and all other work required to meet these requirements, shall be deemed to be included in cost of the item for MAINTENANCE AND PROTECTION OF TRAFFIC, except that the cost of providing a temporary one and one-half (1-1/2") inches asphaltic concrete wearing course overlay and leveling course shall be paid under the applicable items.

6.70.12. NONCONFORMANCE. No payment will be made under Maintenance and Protection of Traffic for each calendar day during which there are deficiencies in compliance with the foregoing requirements that last more than 1-hour, as determined by the Engineer.

The amount of such calendar day non-payment will be determined by dividing the lump sum amount bid for Maintenance and Protection of Traffic by the number of calendar days between the date the Contractor commences work and the date of completion as designated in the proposal, without regard to any extension of time.

If the Contractor fails to maintain and protect traffic adequately and safely for a period of three (3) hours, the Engineer may correct the adverse conditions by any means deemed appropriate, and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the non-payment for Maintenance and Protection of Vehicular & Pedestrian Traffic stated above.

However, where major nonconformance with the requirements of this specification is noted by the Engineer, and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Engineer, regardless of whether corrections are made by the Engineer as stated in the paragraph above.

Furthermore, in addition to the remedies specified above, in the event the Contractor fails to comply, within three (3) consecutive hours after written notice from the Engineer, with the requirements of the contract and the specifications in the matter of providing facilities and services for the maintenance and protection of traffic, the Contractor shall pay to the City of New York, until such notice has been complied with or rescinded, the sum specified in Schedule A per calendar day, for each instance of such failure, as liquidated damages and not as a penalty, for such default.

Any money due the City of New York under this provision shall be deducted from the amounts due or to become due to the Contractor for work performed under the contract.

6.70.13. PRICE TO INCLUDE. The lump sum price bid shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to maintain and protect pedestrian and vehicular traffic, including furnishing, installing, relocating and maintaining lighted barricades, plastic barrels with flashers, temporary timber curbs, construction signs, flashing arrow boards, variable message signs, safety orange construction fencing, temporary pedestrian steel barricades, warning devices, cones, flags, lights, temporary ribbon, temporary pavement markings, etc., unless otherwise provided for under other scheduled contract bid items; providing and maintaining roadway plates; constructing and maintaining temporary ramps; and all incidentals necessary for completing the work, all in accordance with the Contract Drawings, approved MPT Plans, the specifications, and the directions of the Engineer.

Payment will be made in proportion to the percentage of actual contract completion. The final payment for this item will be in direct proportion (whether higher or lower) to the final contract value (minus all change orders of any kind and any overruns for Traffic Enforcement Agents, Crossing Guards, Uniformed Flagpersons, Tree Consultants, BMP items, clean fill, contaminated/hazardous materials and other bid item

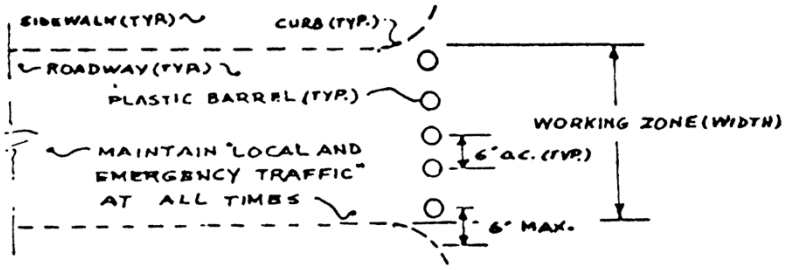
overruns that do not require MPT as determined by the Engineer) as compared to the original contract value.

Providing and placing of Asphaltic Concrete Mixture and/or Binder Mixture for temporary ramps and temporary pavement and trench restorations will be paid for under the appropriate scheduled contract items.

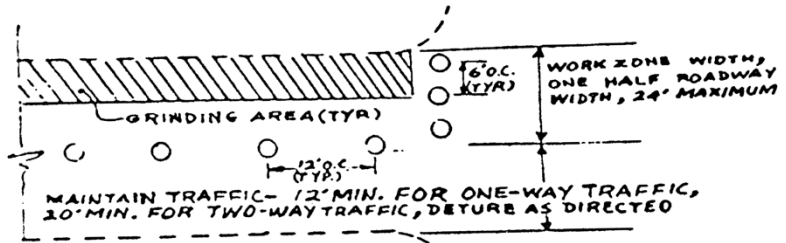
Where there is no scheduled Lump Sum item provided for this work, all MPT work shall be done in compliance with the requirements of this section and payment will be made under the unit price items bid for the various MPT devices provided in the bid schedule. Any additional MPT devices not provided for in the bid schedule but shown on the Contract Drawings, specified herein this Section 6.70, or specified in the OCMC Traffic Stipulations shall be deemed to be included in the unit prices bid for all of the scheduled contract items.

Payment will be made under:

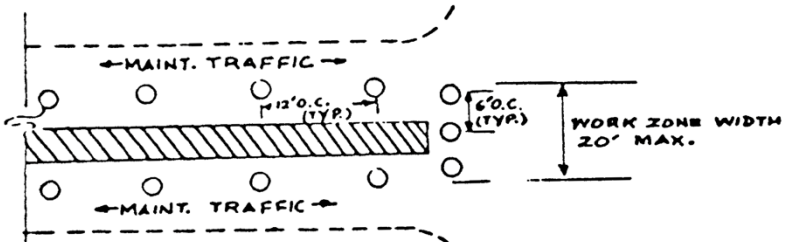
Item No.	Item	Pay Unit
6.70	MAINTENANCE AND PROTECTION OF TRAFFIC (for Construction and Reconstruction type Contracts)	LUMP SUM
6.70 -G	MAINTENANCE AND PROTECTION OF TRAFFIC (for Grinding type Contracts)	LUMP SUM
6.70 -P	MAINTENANCE AND PROTECTION OF TRAFFIC (for Installation of Pedestrian Ramp type Contracts)	LUMP SUM
6.70 -R	MAINTENANCE AND PROTECTION OF TRAFFIC (for Resurfacing type Contracts)	LUMP SUM
6.70 -S	MAINTENANCE AND PROTECTION OF TRAFFIC (for Installation of Sidewalk type Contracts)	LUMP SUM



CASE I: CLOSE STREET



CASE II: MAINT. TRAFFIC



CASE IIA: MAINT. TRAFFIC

Notes

1. *See Section 6.70 for additional requirements for the Maintenance of Traffic.*
2. *Contractor shall maintain minimum of one-twelve foot (12') lane for one way traffic streets wider than 30, at all times*
3. *Length of occupied grinding work zone is limited to 6 city blocks up to 2000' maximum, at a time.*
4. *Work zone shall be delineated with plastic barrels and signs as directed.*

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC
TYPICAL SCHEMES
DURING GRINDING OPERATIONS
(NOT TO SCALE)

SECTIONS 6.71 AND 6.72 (NO TEXT)

SECTION 6.73 – Removing, Furnishing and Installing Parking Meter Posts

6.73.1. DESCRIPTION. Under this section, the Contractor shall remove existing parking meter posts where they interfere with new construction, and furnish and install new parking meter posts in the new work at locations designated by the New York City Department of Transportation's Division of Traffic Operations, Parking Operations, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

6.73.2. MATERIALS. Posts shall consist of 2 inch Nominal Schedule 40 (ASTM A 53) hot-dipped galvanized, continuous welded steel pipe.

6.73.3. METHODS. The Contractor shall notify Parking Operations, Meter Maintenance section fourteen (14) days prior to start of work to remove the parking meters from the posts which are required to be removed. The following information must be given: (1) parking meter numbers; (2) location of meters; and, (3) date when meters can be re-installed. The posts shall then be removed from their foundations and discarded away from the site by the Contractor.

Within 24 hours of being directed by the Engineer, in writing, and **following** the installation of Parking Signs in accordance with **Section 6.83**, **Subsection 3.(G)2**, the Contractor shall be required to install new posts in the new work at the locations designated by Parking Operations and in compliance with their standards. Under no circumstances are posts to be installed without first installing parking signs. New additional posts may be required by Parking Operations to be furnished and installed by the Contractor at locations where existing posts are missing or at other locations on the site designated by that agency. The Contractor shall promptly notify Parking Operations, Meter Maintenance section to reinstall the parking meters on the installed posts. Failure to install all specified parking meter posts within 24 hours of being notified to do so will result in the Contractor being assessed $300 per day as Liquidated Damages and not as a penalty for each post not in place within 24 hours of receiving written notification from the Engineer to have it installed.

Any money due to the City of New York under this provision shall be deducted from the amounts due or to become due to the Contractor for work performed under the contract.

Meter posts are to be installed vertically plumb. The Contractor shall be responsible for selecting the proper meter post installation type (Type – - standard in-ground, Type – - bumper pipe, Type – - vault anchor base, or Type – - in-ground dirt) and corresponding meter pipe fabrication (Bureau of Parking Standard Drawings SK-1A, SK-2A, SK-3A, and SK-4A) based upon field conditions and installation type originally removed from the specific location, in accordance with the applicable Bureau of Parking Standard Drawings.

6.73.4. MEASUREMENT.

(A) The quantity to be measured for payment under Removing Existing Parking Meter Posts shall be the number of posts actually removed from their present locations.

(B) The quantity to be measured for payment under Furnishing and Installing Parking Meter Posts shall be the number of new posts required by Parking Operations that were actually installed in the new work by the Contractor, to the satisfaction of the Engineer. Payment under this item will only be made following the issuance of a Letter of Acceptance by Parking Operations, Meter Maintenance section, to the Engineer.

6.73.5. PRICES TO COVER.

(A) The contract price for Removing Existing Parking Meter Posts shall be the unit price bid per each post removed and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to remove and dispose of the existing parking meter posts, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

(B) The contract price for Furnishing and Installing Parking Meter Posts shall be the unit price bid per each post satisfactorily furnished and installed and shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to furnish and install new parking meter posts, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.73 A	REMOVING EXISTING PARKING METER POSTS	EACH
6.73 B	FURNISHING AND INSTALLING PARKING METER POSTS	EACH

SECTION 6.74 – Steel Plate at Tree Wells

6.74.1. INTENT. This section describes the construction and installation of steel plate for tree wells.

6.74.2. DESCRIPTION. Under this section, the Contractor shall fabricate and install steel plate for tree wells as shown on the Contract Drawings, and in accordance with specifications and the directions of the Engineer.

6.74.3. MATERIAL. Steel plate shall comply with requirements of ASTM Designation A36 and be of the dimensions shown on the Contract Drawings.

Stud anchors, furnished in the dimensions shown on the Contract Drawings, shall conform to the specification for Cold-Finished Carbon Steel Bars and Shafting, ASTM A 108, Grade 1015 or 1020.

Galvanized coating shall be in accordance with the requirements of ASTM A 123.

Primer shall be a zinc dust-zinc oxide primer conforming to Federal Specifications TT-P-641d.

Paint shall meet the requirements of Federal Specification TT-P-37C and shall be of an approved black color.

6.74.4. CONSTRUCTION METHODS. The Contractor shall fabricate and install steel plate at the tree wells as shown on the Contract Drawings and to the satisfaction of the Engineer.

Steel plates shall be cut to the lengths shown on the Contract Drawings. Where joints are required, plates shall be welded together at the corners to form the tree well perimeters.

Prior to welding, all surfaces that are to be welded shall be cleaned for all rust, dirt, paint and other adhering material to bright bare metal. The cleaning shall be done with wire brush, sandblasting, or other approved means.

After welding, all welds shall be ground smooth, all steel surfaces shall be galvanized, and a coat of primer shall be applied to all surfaces of the steel plates.

The Contractor shall shop weld four (4) stud anchor bars equally spaced to each steel plate, for a total of sixteen (16) studs per tree well frame.

Studs shall be end-welded by the electric-arc method. Welding operators shall have had previous experience and proficiency in the application of studs by the use of automatic end-welding electric-arc equipment, and shall be licensed by the State of New York.

The stud itself shall serve as the electrode in an electromechanical circuit which automatically controls the arc, welding time, and final plunging home of the stud. Equipment shall include a stud welding tool, control for welding time and current, the prefluxed stud, a ceramic ferrule, and a DC power source. All equipment that the Contractor proposes to use shall be subject to the approval of the Engineer.

The welding procedures shall be in accordance with those as recommended by the stud manufacturer.

After the studs have been welded to the plates, they shall be visually inspected and given a light blow with a hammer. Any stud which does not have a complete end weld and any stud which does not emit a ringing sound when given a light blow with a hammer shall be struck and bent towards the nearest end of the steel member until it is about twenty (20) degrees from its normal position. Studs which fail under this test shall be replaced at the Contractor's expense.

Fabricated steel plates shall be set in place prior to placement of new trees and adjacent concrete base to be placed under other contract items, at the grades and locations as shown on the Contract Drawings and as directed by the Engineer.

Then after embedment in the concrete base but before placement of the adjacent paving blocks or other paving materials, the Contractor shall apply two (2) coats of finish paint to all exposed surfaces of the plates.

6.74.5. MEASUREMENT. The quantities to be measured for payment shall be the total number of linear feet of steel plate actually installed to the satisfaction of the Engineer.

6.74.6. PRICE TO COVER. The contract price bid per linear foot for Steel Plate at Tree Wells shall cover the cost of all labor, material, plant, equipment, insurance, and incidentals required to furnish and install steel plate frames at tree wells, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.74	STEEL PLATE AT TREE WELLS	L.F.

SECTION 6.75– - Grinding Existing Asphaltic Concrete Wearing Course

6.75.1. WORK TO INCLUDE. Under this section, the Contractor shall be required to grind (mill) and remove a portion of the existing asphaltic wearing course and granular base to contour the roadway to the required grade, depth, elevations and limits specified by the Engineer and shall dispose of all asphaltic millings and other material; all in accordance with the specifications, the Contract Drawings, and the directions of the Engineer.

6.75.2. METHODS.

(A) GENERAL. Grinding of existing asphaltic concrete wearing course, under this Section, shall be used in the following situations as ordered by the Engineer: to eliminate high points in the existing pavement prior to resurfacing; to maintain clearances under bridges or structures when additional pavement thickness would hamper clearances; to achieve appropriate curb reveal; and, to remove poor wearing course or correct ponding situations.

The Contractor shall fully grind these areas down to the required depth, from curb to curb or along the curb line, to contour the roadway pavement as directed by the Engineer. All grinding operations shall be done using an acceptable milling method, taking care not to damage the pavement to remain and in a manner that prevents dust and other particulate matter from escaping into the air.

For Item 6.75, the intent is to grind to an average depth of 1-1”2" to”2", as directed by the Engineer, except as noted in the attached sketch.

For Item 6.75 A, the intent is to grind to the limits shown on the drawings or as directed by the Engineer.

Where the Contractor exceeds the intended grinding limits, without prior approval from the Engineer, it shall restore the roadway with Binder Mixture to the intended elevation, at no cost to the City. In addition, no payment will be made for any additional grindings made beyond the intended grinding limits specified above. (B) EQUIPMENT. All grinding equipment shall be as approved by the Engineer. Any teeth in the milling drum that become dislodged, broken or unevenly worn shall be replaced immediately with teeth of the same length as the remaining teeth in that row.

(C) ASBESTOS TESTING. Prior to performing any grinding operations at any site location, the Contractor shall be required to take two 2” diameter pavement core sample of the existing asphaltic concrete wearing course for every 5,000 linear feet of roadway, or portion thereof, to be tested for the presence or absence of asbestos by the Contractor’s independent testing laboratory. The exact location of each pavement core sample shall be as directed by the Engineer. This work shall be performed and the test results known to both the Contractor and the Engineer at least two (2) weeks prior to performing grinding operations under this Section.

The Contractor’s independent testing laboratory shall be an approved N.Y.S. licensed testing laboratory certified to test for the presence of asbestos in an asphaltic concrete material mix. The testing laboratory shall be required to take immediate chain-of-custody of the core samples as they are taken in the field, transport the samples to their laboratory for testing, and dispose of them at the end of the work. Under no circumstance shall core samples be taken without the direct supervision of the testing laboratory. The testing laboratory shall then notify both the Contractor and the Engineer of the results.

Should the presence of asbestos be found to exist within the asphalt pavement designated to be removed under this item, the Contractor shall immediately stop all grinding operations until otherwise directed by the Engineer and the limits of asbestos contamination has been determined by subsequent sampling. Asbestos contaminated asphaltic concrete wearing course shall <u>not</u> be removed under this item but if it is required to be removed, said work shall be done as “Extra Work” under Article 26 of the Standard Construction Contract.

No additional payment will be made for this work.

(D) PREPARATION WORK. Where new proposed asphaltic concrete pavement is to meet existing asphalt pavement, the Contractor shall saw-cut a joint line in the existing asphaltic wearing course, for a depth of 1-1”2" for milling performed under Item 6.75, or to the milling depth specified by the Engineer for milling performed under Item 6.75 A. The joint line shall cross the full width of roadway pavement or where directed by the Engineer for localized areas. Asphaltic concrete material adjacent to these sawcut lines shall be removed to a depth of 1-1”2" for milling performed under Item 6.75, or to the milling depth

specified by the Engineer for milling performed under Item 6.75 A to form a squared out joint for the proposed of keying the new asphalt pavement to the existing asphalt pavement. Rounded transition areas will not be acceptable.

At all street hardware the asphaltic concrete material shall be removed for a depth of 1-1”2" for milling performed under Item 6.75, or to the milling depth specified by the Engineer for milling performed under Item 6.75 A by grinding and cutting out the asphaltic material to expose existing frames of street hardware. Any remaining material, within that depth, around and adhering to street hardware shall be completely removed by hand and/or hand held cleaning equipment. Rounded transition areas will not be acceptable.

Where snow plowable raised pavement markers exist in the roadway pavement, the Contractor shall be required to carefully remove and dispose of said markers in a manner approved by the Engineer and at no additional cost to the City.

(E) MILLING (GRINDING) OPERATIONS. The Contractor shall grind the specified areas down to the required depth and grades in the existing asphaltic concrete wearing course and/or granular base using an acceptable milling and dust control methods and equipment. Care shall be taken to minimize dust pollution and damage to the pavement to remain. For dust control methods and equipment, the Contractor shall employ dust collection and/or watering devices, as approved by the Engineer, without which no milling will be allowed.

All grindings shall be removed and the remaining surface immediately swept, mechanically, so that the surface of the remaining pavement is free of loose asphaltic concrete, to the satisfaction of the Engineer. The grindings shall be loaded directly into dump trucks and shall be satisfactorily disposed of away from the site as excavated material by the Contractor. Each truck load shall be hand leveled by raking prior to measurement and covering for removal.

Furthermore, grinding in streets without a formal base is limited to a’6' wide pavement key adjacent to curbs, otherwise milling is only permitted within the asphaltic concrete wearing course. Where dirt base is exposed, the use of binder mixture is limited to a depth of 1-1”2".

The Contractor shall exercise care during the grinding operations to avoid damaging any concrete base or granite block pavers existing beneath the asphaltic wearing course. Where concrete base or granite blocks are encountered during the grinding operations, the Contractor shall immediately halt operations and notify the Engineer. The Contractor is not permitted to grind into granite blocks.

The City may require the Contractor to perform additional grinding at locations ground previously under the contract to correct any deficiency, or at areas where resurfacing has been completed by others.

Provisions shall be made for removal of any water that may be trapped due to the milling operation and surface of milled areas shall be swept clean prior to being opened to traffic and prior to the subsequent resurfacing operation.

6.75.3. MEASUREMENT.

Item 6.75: The quantity to be measured for payment shall be the number of cubic yards of existing asphaltic concrete wearing course millings removed, from within the designated limits specified above, calculated as either the number of square yards of pavement surface milled divided by eight (8) or the volume obtained by vehicle measurement, whichever is less.

In determining a vehicle measurement, only water level loads that have been raked by the Contractor to a flat exposed surface will be accepted by the Engineer and no allowance will be made for any crown or peak of the load.

No measurement or payment will be made for any additional grindings made beyond the intended grinding limits specified above, unless the Contractor is specifically ordered, in writing, by the Engineer; to grind below the above specified limits.

Item 6.75 A: The quantity to be measured for payment shall be the number of tons of existing asphaltic concrete wearing course millings removed, from within the designated limits specified above, as verified by certified truck scale tickets.

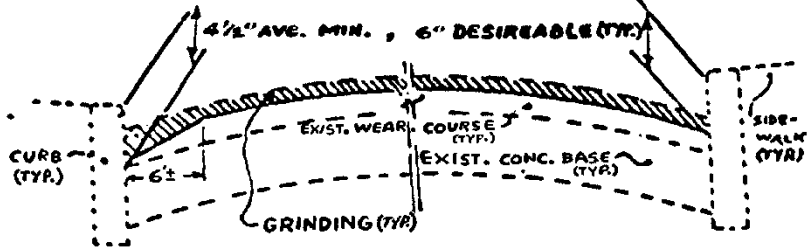
No measurement or payment will be made for any additional grindings made beyond the intended grinding limits specified above, unless the Contractor is specifically ordered, in writing, by the Engineer to grind below the above specified limits.

6.75.4. PRICE TO COVER. The contract price per cubic yard of Grinding Existing Asphaltic Concrete Wearing Course shall cover the cost of furnishing all labor, plant, equipment, insurance, and necessary incidentals required and completing the work, including, but not limited to, sawcutting joints, grinding and cutout of existing asphaltic material at street hardware and at sawcut joints, removing pavement markers where applicable, loading said material into dump trucks, and disposing of ground materials (millings); all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

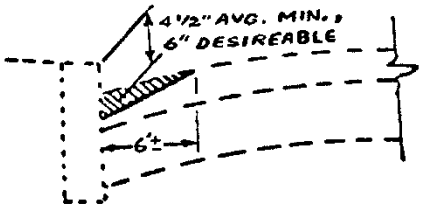
Installation of binder mixture for temporary ramps will be measured and paid for under other items.

Payment will be made under:

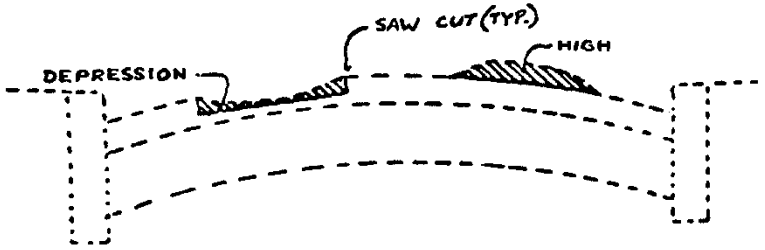
Item No.	Item	Pay Unit
6.75	GRINDING EXISTING ASPHALTIC CONCRETE WEARING COURSE	C.Y.
6.75 A	GRINDING EXISTING ASPHALTIC CONCRETE WEARING COURSE	TONS



CASE I: FULL WIDTH



CASE II: PAV'T KEY



CASE III: LOCALIZED

Notes:

1. *See Section 6.70 for additional requirements for the Maintenance of Traffic*
2. *Payment for the grinding Item (and its delivery) is limited only to the asphaltic roadway materials (where applicable).*
3. *(No Text).*
4. *Removal of asphaltic materials at street hardware, to a depth of 1-1/2" below cover (rim) is included in the prices bid for all the grinding items.*
5. *Contractor shall safely ramp all street hardware and sharply grinded edges in the in the roadway with binder mixture, within 24 hours after grinding.*
6. *Where the Contractor grinds (mills) outside the limits of specified or directed by the Engineer, no payment will be made for that additional grinding (milling) work.*

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION

TYPICAL GRINDING DETAIL
ASPHALTIC MATERIALS
NOT TO SCALE

SECTION 6.76 (NO TEXT)

SECTION 6.77 – Public Space Receptacle Bins

6.77.1. DESCRIPTION. This section describes public space receptacle bins which shall be furnished and installed, all in accordance with the Contract Drawings, the Specifications and directions of the Engineer.

6.77.2. MATERIALS. Public Space Receptacle Bins shall be of similar design and construction to the following manufacturers:

MANUFACTURER:

1- FOR CITY FUNDED PROJECTS

A- Landscape Forms, Inc., #SF 1288 series model receptacles
431 Lawndale Avenue,
Kalamazoo, Michigan 49048.
Phone: (800) 521-2546
Fax: (269) 381-3455
Email: specify@landscapeforms.com

Suppliers:

a. Landscape Forms, Inc
431 Lawndale Avenue,
Kalamazoo, Michigan 49048.
Phone: (800) 521-2546

b. Arenson,
1115 Broadway, New York, NY 10010.
Phone: (212) 633-2400.

c. AFD Contract Furniture, Inc.
810 7th Avenue #2,
New York, NY 10019
Phone: (212) 721-7100.

d. Empire Office
105 Madison Avenue, New York, NY 10016
Phone: (212) 607-5500.

B- Maglin, #MLWR600-32 series model receptacles
Maglin Site Furniture
6-27 Bysham Park Drive
Woodstock, ON.
Phone: 800-716-5506
Fax: 877-260-9393
Email: corporate@maglin.com

C- JGW Machine Limited, #NYC-PS-32G-LTRRECP series model receptacles
259 Third Concession Rd
Princeton, Ont. N0J 1V0
Phone: 519-458-4882
Fax: 519-458-8087
Email: sales@jgwmachine.com

D- Approved Equivalent

2- FOR FEDERALLY FUNDED (FHWA or FTA) PROJECTS (BUY AMERICA)

A- Landscape Forms, Inc., #SF 1288 series model receptacles
431 Lawndale Avenue,
Kalamazoo, Michigan 49048.
Phone: (800) 521-2546
Fax: (269) 381-3455
Email: specify@landscapeforms.com

Suppliers:

a. Landscape Forms, Inc
431 Lawndale Avenue,
Kalamazoo, Michigan 49048.
Phone: (800) 521-2546

b. Arenson,
1115 Broadway, New York, NY 10010.
Phone: (212) 633-2400.

c. AFD Contract Furniture, Inc.
810 7th Avenue #2,
New York, NY 10019
Phone: (212) 721-7100.

d. Empire Office
105 Madison Avenue, New York, NY 10016
Phone: (212) 607-5500.

(A) CLASSIFICATION:

Receptacles shall conform to the style, size and type as specified in this Contract and installation shall be ADA compliant.

(B) SALIENT CHARACTERISTICS:

The Contractor shall furnish public space receptacles for Recycling Bottles & Cans, for Mixed Paper, and for Litter.

(C) EXTERIOR MATERIAL:

The exterior frame shall be manufactured utilizing 333 or 319 cast aluminum, tubular steel, 11 GA Hot rolled carbon steel, galvanneal steel, or a combination of comparable materials. The receptacles shall incorporate a decorative configuration or perforated pattern designed and marked with the manufactured date, warranted to withstand outdoor use for a minimum of five (5) years. All exterior and interior frame components shall be (electro coated) rustproofed and/or powder coated as directed. The exterior receptacle color shall be RAL 9023.

(D) FLOOR:

The floor of the outside receptacle is to be solid A36 Hot Rolled Steel, Ductile Cast-iron or comparable material capable of supporting the weight of the inner receptacle. The floor shall have 3/8” weep holes, as well as a triangulated pattern of holes that support leveling provisions.

(E) FRAME/SWING DOOR/LID:

The frame shall be designed to accommodate the insertion of either a plastic liner basket with a minimum capacity of either 32 gallons for a smaller receptacle option or 44 gallons for the larger receptacle option.

The 44 gallon receptacle must have a swing door and the 32 gallon receptacle must have a removable lid that allow for easy access and removal of inner liner can.

The swing door on the 44 gallon receptacle shall be of a simple latch mechanism to secure the door and prevent scavenging. A door stop provision is required to regulate the full open position and to allow full

access to the inner liner while preventing the receptacle from tipping over. Hinges and latch must be fully welded while leaving provisions to replace the door if damaged. The swing door should also have an installed locking mechanism to prevent scavenging. The locking mechanism shall be both simple and easy for anyone authorized to service the container to use, but at the same time prohibits access to anyone not authorized (to prevent poaching of the receptacle's contents). All such mechanisms shall be keyed alike.

The 32 gallon receptacle shall be serviced through the lid without a swing door. The lid shall be manufactured from 16 gauge hot rolled steel, or spun aluminum, or comparable strength. The lid shall be attached to the receptacle using a vinyl coated steel chain in order to ensure the lid remains attached and to prevent the steel chain from damaging the rest of the receptacle. The steel chain must attach from the interior of the receptacle to the underside of the lid. The lid shall also have an installed locking mechanism. One that is both simple and easy for anyone authorized to service the container to use, but at the same time prohibits access to anyone not authorized (to prevent poaching of the receptacle's contents).

All such mechanisms shall be keyed alike.

All fasteners, screws, rivets used in construction of the receptacles shall be non-corrosive stainless steel. All Metal materials held by rivets or hex bolts must be fully secured to prevent dislodging and separation.

(F) EDGES & SEAMS:

The receptacle shall have no sharp edges or seams which a user or someone authorized to service the receptacle could come into contact with.

(G) WEIGHT:

The weight of outer receptacle shall be substantial to prevent it from easily being blown away or moved (32 gallons 115 to 150 pounds; 44 gallons 115 to 175 pounds).

The outer receptacle shall not move or tip when the side door is opened to remove or replace the inner receptacle.

Top lid must have an opening aligned precisely in the center of the slightly domed top. The shape of the lid must be slightly convex to act as a watershed so that litter cannot accumulate on it.

(H) TOP LID PAPER RECYCLING RECEPTACLES:

Top lid must have a 3.5 x 12 inch slot in the exact center of the domed top and must be part of the outer receptacle - not removable if it has the swing door or removable if there is no swing door. The shape must be convex to act as a watershed so that precipitation and litter cannot accumulate on it.

The color of the lid shall be RAL 6018 Green for the Paper Receptacle.

(I) TOP LID METAL/GLASS/PLASTICS RECEPTACLES:

The top lid must have a 5-inch diameter round opening in the exact center of the domed top and must be part of the outer receptacle - not removable if it has the swing door or removable if there is no swing door.

Color shall be RAL 5015 Blue for "Metal/Glass/Plastic" receptacle.

(J) TOP LID LITTER RECEPTACLES:

The top lid must have a minimum of a 9-inch diameter round opening in the exact center of the domed top and must be part of the outer receptacle - not removable if it has the swing door or removable if there is no swing door.

Color shall be RAL 9011 Black for "Litter" receptacle.

(K) DECALS:

Lid labels shall have a clear background. The material icons and text shall be white, except for multi-color graphics. Decal designs are shown at the end of this Section and will be provided by the Engineer to the manufacturer in an Adobe *.pdf file. The file is not to be altered for composition, type font or image from the version provided by the Engineer. The digital file shall be provided by the Engineer to the Contractor (on a CD or via E-mail) for printing.

For the 44 gallon receptacles to be directly serviced by the New York City Department of Sanitation (DSNY): A label shall be placed on the outer bin between the lid top and the beginning of the perforated area, with a decal that is approximately ”2" high. The length of this label shall be exactly 1/2 the circumference of the receptacle at the point of placement such that two decals can be placed around the receptacle and just meet each other. The decals shall have a clear background and the colored lettering as indicated.

For the 32 gallon receptacles to be serviced initially by partner or sponsoring group: Four decals shall be placed on the outer bin between the lid top and the beginning of the perforated area, with a decal that is approximately ”2" high. Two decals, approximately ”2"x”2" are to be placed on opposite sides of the receptacle, and are for sponsoring groups. The other two decals shall be ”2" high and the length determined in order to fill the space between the two sponsor decals. All four of the decals shall have a clear background and the colored lettering as indicated. If a sponsorship decal is needed, it will be indicated at the time of ordering.

Decals for the top of the lid of the receptacles shall be circular and have the same diameter as the lid. There shall be an appropriate cutout for the decal, accommodating the hole for placing items into the receptacle. All of the decals shall have a clear background and the colored lettering as indicated.

Decals for the side edge of the lid of the receptacles shall be a rectangular repeated graphic and lettering around the circumference of the lid. All of the decals shall have a clear background and the colored lettering as indicated.

All decals are to be coated with "Tedlar" or other compound of equal composition and are to have a sticky back (adhesive glue) which is weatherproof in order to withstand the impact of precipitation, heat, cold, and wind without dislodging. All lettering is also to be weatherproof, i.e. is not to degrade due to precipitation, heat, cold, or the effects of the sun's UV rays.

(L) INTERIOR RECEPTACLE:

The receptacle must not weigh more than 30 pounds.

The receptacle must fit into the outer shell.

The receptacle shall be constructed of durable plastic material, formed polyethylene with 3– - 100% post-consumer content and be UV resistant.

The receptacle must have 3”8" weep/drain holes in bottom and the outer rim of the bottom to allow for rainwater and liquids to drain.

The receptacle shall have a minimum capacity of either 32 or 44 gallons.

The receptacle shall be easily removed or replaced into the outer shell.

The receptacle shall have hand grips or openings on two sides.

(M) RECYCLED CONTENT:

A recycled content certification from the manufacturer shall be provided upon the request of the City of New York.

6.77.3. METHODS. The Contractor shall furnish and install receptacles of the types specified at locations shown on the contract drawings or as directed by the Engineer. Attachment of each receptacle to the sidewalk pavement shall be done using three (3) 3”8" x”4" minimum length, noncorrosive, concrete expansion anchors.

Immediately prior to installation of each receptacle the Contractor shall be required to sweep clean the area of sidewalk and remove all debris to the satisfaction of the Engineer.

6.77.4. SUBMITTALS. The Contractor shall submit the following to the Engineer, for the Engineer’s approval, in advance of ordering receptacle:

- Manufacturer’s shop drawings.
- Catalog cut of receptacle(s) with manufacturer name and features included.
- Submit color samples upon request.

6.77.5. MEASUREMENT. The quantities of PUBLIC SPACE RECEPTACLE BINS to be measured for payment shall be the number of receptacle of each type actually installed at the site as specified, to the satisfaction of the Engineer.

6.77.6. PRICES TO COVER. The contract prices bid shall be a Unit Price per EACH type of Public Space Receptacle Bin installed complete, and shall include the cost of furnishing all labor, material, equipment, insurance, and incidentals necessary to complete the work including, but not limited to, anchoring receptacle to the pavement and providing one plastic liner, all in accordance with the Contract Drawings, the Specifications and directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.77 PSR-L32G	PUBLIC SPACE RECEPTACLE BIN FOR LITTER, 32 GALLON	EACH
6.77 PSR-L44G	PUBLIC SPACE RECEPTACLE BIN FOR LITTER, 44 GALLON	EACH
6.77 PSR-MGPC32G	PUBLIC SPACE RECEPTACLE BIN FOR METAL, GLASS, PLASTIC & CARTONS, 32 GALLONS	EACH
6.77 PSR-MGPC44G	PUBLIC SPACE RECEPTACLE BIN FOR METAL, GLASS, PLASTIC & CARTONS, 44 GALLONS	EACH
6.77 PSR-MP32G	PUBLIC SPACE RECEPTACLE BIN FOR MIXED PAPER, 32 GALLON	EACH
6.77 PSR-MP44G	PUBLIC SPACE RECEPTACLE BIN FOR MIXED PAPER, 44 GALLON	EACH

Decals:

Top View:

Front View:

SECTIONS 6.78 THRU 6.81 (NO TEXT)

SECTION 6.82 – Removing Existing Traffic and Street Name Signs and Sign Posts

6.82.1. DESCRIPTION. Under this section, the Contractor shall be required to remove those existing traffic and street name signs and traffic and street name sign posts designated by the Engineer.

6.82.2. METHODS. Prior to the removal operations, the Contractor shall notify the Engineer to have the location surveyed. The Contractor shall remove the designated signs and posts and accessories at the locations as directed by the Engineer. Care shall be exercised in the operation so as not to damage the materials to be removed.

All existing regulatory, informational, directional, and street name signs designated to be removed and replaced with new or temporary regulatory, informational, directional, and street name signs, shall remain in place until immediately prior to their replacements, as directed by the Engineer, so as to avoid any disruption to vehicular and pedestrian traffic and the community. No sign location shall remain unsigned for any period of time beyond the working hours of the day of sign removal at that location.

All removed materials shall be delivered to the New York City Department of Transportation's Division of Traffic Operations (D.T.O) Yard designated by the Engineer. For each delivery, the Contractor shall prepare a list of all materials returned to the D.T.O Yard. Each list shall be signed off at the yard by an authorized D.T.O representative, as verification of the Contractor's delivery. The original and one (1) copy of the verified list shall be submitted to the Engineer for the Engineer's records. Payment for any removed and delivered materials will not be made without an accompanying verified list.

After the removal of the existing sign posts, the Contractor shall restore the disturbed sidewalk or pavement with materials approved by and to the satisfaction of the Engineer.

6.82.3. MEASUREMENT. The quantity to be measured for payment shall be the actual number of square foot area of existing traffic and street name signs removed and delivered to the Division of Traffic Operations Yard.

The quantity to be measured for payment shall be the actual number of linear foot length of existing traffic and street name sign posts removed and delivered to the Division of Traffic Operations Yard.

6.82.4. PRICE TO COVER. The contract price per square foot of existing traffic and street name signs removed, shall cover the costs of all labor, materials, plant, equipment, and incidentals required to remove the designated signs including accessories and delivering them to the Division of Traffic Operations Yard, all as shown on Contract Drawings and in accordance with the specifications and directions of the Engineer.

The contract price per linear foot of existing traffic and street name sign posts removed shall cover the costs of all labor, materials, plant, equipment, insurance, and incidentals required to remove the designated sign posts including accessories and deliver to the Division of Traffic Operations Yard, all as shown on Contract Drawings and in accordance with the specifications and directions of the Engineer. The costs shall also include repairing the sidewalk disturbed by the removal of the posts.

Payment will be made under:

Item No.	Item	Pay Unit
6.82 A	REMOVING EXISTING TRAFFIC AND STREET NAME SIGNS	S.F.
6.82 B	REMOVING EXISTING TRAFFIC AND STREET NAME SIGN POSTS	L.F.

SECTION 6.83 – Furnishing and Installing Traffic Signs and Posts

6.83.1. DESCRIPTION. Under this section, the Contractor shall be required to furnish new regulatory, informational, or directional signs, and new traffic sign posts, including all accessories; to install traffic signs and traffic sign posts, including footings, at locations as directed by the Engineer; all in accordance with the specifications, the New York City Department of Transportation's Division of Traffic Operations (D.T.O) Standard Drawings and Work Orders, and directions of the Engineer.

6.83.2. MATERIALS.

(A) Signs shall be made of flat unpainted Aluminum, Alloy 6061-T6 or approved equivalent, of the thickness indicated on the appropriate Bureau of Traffic Standard Drawing. Each sign blank shall be cut from one piece of aluminum and shall be free from wind, buckle, dents, or twist, and the face shall be substantially a plane surface. All edges and corners shall be filed or ground smooth, leaving the entire blank free from sharp edges and burrs. Welded or jointed sign blanks will not be accepted. The blank shall be cut and drilled in accordance with the appropriate drawings. The distances between holes must be accurately maintained to permit interchangeability of signs on existing sign brackets or sign posts.

(B) Posts shall be of the steel rail type, furnished with a baked green alkyd resin, without anchor plates and shall be rolled from material meeting the requirements of ASTM Designation A 499.

(C) Concrete for footings shall be Class B-32, Type IIA; cement - Type II Portland; sand - Type 1A; coarse aggregate Type 1, Grade B, or Type 2, Size No. 57; and an approved air-entraining agent shall be added at the time that concrete is mixed. Concrete, cement and aggregate shall comply with the requirements of Section 3.05.

(D) All other unspecified materials shall be approved by the Engineer.

6.83.3. METHODS.

(A) PARKING SIGNS (e.g.: R7 or SP SERIES)

1. General. Parking signs shall be either Type I or Type II Signs. Type I signs shall be aluminum signs with white enamel paint and Type II signs shall be aluminum signs with white vinyl sheeting. The appropriate legends shall be silk screened on the white sign blanks.

   Each sign blank shall be thoroughly cleaned of all grease, dirt, and other foreign matter and then treated with Alodine, Bonderite 710, Bonderite 170, or an approved equivalent, in accordance with manufacturer's recommendations. After treatment, gloves shall be used in handling sign blanks until painted.

Sign layouts shall be in accordance with the appropriate D.T.O drawings.

2. Type I Signs.

   (a) Construction Requirements. The finished signs shall be able to withstand two years of accelerated naval weathering tests without appreciable loss of legibility or change in color, in accordance with Federal paint, varnish and lacquer Specification TP-141B on file with the inspection sampling and testing Department of U.S. Navy.

   The finished surface shall be a true color tone, free from iridescent undertones. White backgrounds that are yellowish or creamy will not be accepted. All colors must be satisfactory to the Division of Traffic Operations.

   The finish shall have such adhesion and elasticity that it shall not crack, chip, flake or separate from the undersurface when the sign is struck with a hammer or scratched with the point of a knife.

   The finished designs shall be clear and sharp, with the lines of all details true, regular and free from waviness, unevenness or furry edges. The surface of the finished sign shall be clear of cracks, scale, pits, blisters, pin holes, runs, gaps, dirt particles, skins and blemishes of any kind.

   All signs and blank signs shall be constructed in accordance with the details as shown on the Division of Traffic Operations Standard Drawings. In the event a particular detail or

sketch is not shown, construction shall be as directed by the Division of Traffic Operations and the Engineer.

(b) Painting. A primer coat, at least 0.8 mil dry film thickness shall be sprayed on both sides of the treated sign blank. The paint shall be DeLux Baking Sign Primer 64-907, or approved equivalent. Baking time and temperature shall be specified by the paint manufacturer.

After the primer is thoroughly dry, a finish coat, at least 1.2 mil dry film thickness, shall be sprayed on both sides, and all edges of the sign. The paint shall be DeLux Sign Background Finish 86-805 White, or approved equivalent. Baking time and temperature shall be as specified by the paint manufacturer.

(c) Lettering & Placement of Legends. After the background is thoroughly dry, the signs shall be inscribed by means of the silk screen process with the borders and lettering indicated on the appropriate drawing.

All lettering for "Guide" type signs shall be in accordance with the Clearview fonts. All lettering for "Regulatory" and "Warning" type signs shall be in accordance with the Federal Highway Administration (FHWA) "Standard Alphabets for Traffic Control Devices". The paint shall be DeLux 24 line Baking Stencil Paste or approved equivalent, of color satisfactory to the Division of Traffic Operations. Baking time and temperature shall be as specified by the paint manufacturer.

The legends on signs shall be in accordance with the D.T.O work orders to be furnished by the Engineer to the Contractor. The sign numbers with the suffix "A" shall have a right arrow on one face, and a left arrow on the other face. These signs are to be used where the regulation changes at the sign location, and the arrows are to point in the direction where the regulation is in effect. The column headed "Arrow Points" shall be used for all signs with the suffix "A" and the cardinal direction of the arrow shall be as shown in this column.

3. Type II Signs.

(a) Construction Requirements. The sign shall be weather resistant and following cleaning shall show no appreciable discoloration, cracking, crazing, blistering, or dimensional change when exposed to accelerated weathering for either 175,000 Langleys (approximately 1 year) south facing, unprotected at 45 degrees in Miami Florida, or 1,200 Atlas Twin arc weathering in accordance with ASTM D 822.

The sign surface shall be readily refurbished by cleaning and clear overcoating in accordance with the manufacturer's recommendations.

(b) Application of Vinyl Sheeting. The sheeting shall be applied to the treated sign in accordance with the manufacturer's specifications.

(c) Acceptable Brands of Vinyl Sheeting. Vinyl sheeting furnished by the following manufacturers, or approved equivalent, are acceptable for use in the contract:

Avery Dennison Reflective Films Division
65-65 West Howard Street
Niles, LI 60714

3M Company
PO Box 33225
St. Paul, MN. 55133-3225

Nippon Carbide Industries
12981 East Florence Ave.
Santa Fe Spring, CA 90670

(d) Lettering & Placement of Legends. The signs shall be inscribed by means of the silk screen process with the borders and lettering indicated on the appropriate drawing and/or directions of the Engineer. All lettering shall be in conformance with the current edition of the FHWA "Standard Alphabets for Traffic Control Devices". The paint shall be as specified

by the manufacturer of the vinyl sheeting and of a color satisfactory to the Division of Traffic Operations.

The legends on signs shall be in accordance with the work orders to be furnished by the Engineer. The sign numbers with suffix “A” shall have a right arrow on one face, and a left arrow on the other face. These signs are to be used where the regulation changes at the sign location and the arrows are to point in the direction where the regulation is in effect. The column headed “Arrow Points” shall be used for all signs with the suffix “A” and the cardinal direction of the arrow shall be as shown in this column.

(B) SCHOOL CROSSING SIGNS (W9-1 AND W9-2)

1. Treatment. Each sign blank shall be thoroughly cleaned of all grease, dirt, and other foreign matter and then treated by the Alodine Method, in accordance with manufacturer’s recommendations. After treatment, gloves shall be used in handling sign blank until the vinyl sheeting is applied.

2. Screening. The signs shall be inscribed by means of a silk screen process on yellow vinyl sheeting. The paint shall be black, and compatible with the vinyl sheeting.

3. Sign Layout. The sign shall be laid out in accordance with Division of Traffic Operations Drawings SG-145, SG-146, and SG-147.

4. Application of Vinyl Sheeting. The sheeting shall be applied to the treated sign in accordance with the manufacturer’s specifications.

5. Finish. The finished sign shall be clear coated with a Finishing Clear in accordance with the specifications of the manufacturer of the vinyl sheeting.

6. Acceptable Brands of Vinyl Sheeting. Vinyl sheeting furnished by the following manufacturers, or approved equivalent, are acceptable for use in the contract:

Avery Dennison Reflective Films Division
65-65 West Howard Street
Niles, LI 60714

3M Company
PO Box 33225
St. Paul, MN. 55133-3225

Nippon Carbide Industries
12981 East Florence Ave.
Santa Fe Spring, CA 90670

7. Requirements. The sign shall be weather resistant and, following cleaning, shall show no appreciable discoloration, cracking, crazing, blistering, or dimensional change, and not less than 80% of the specified minimum brightness values when exposed to accelerated weathering for either 175,000 Langleys (approximately 1 year) south facing, unprotected at 45 degree in South Florida, or 1,200 hours Atlas Twin arc weathering (E42-64 Type D) in accordance with ASTM D 822.

The sign surface shall be readily refurbished by cleaning and clear overcoating in accordance with the manufacturer’s recommendations.

(C) ALL OTHER REGULATORY & WARNING SIGNS

1. Treatment. Each sign blank shall be thoroughly cleaned of all grease, dirt, and other foreign matter and then treated by the Alodine method, in accordance with the manufacturer’s recommendations. After treatment, gloves shall be used in handling the sign blank until the reflective sheeting is applied.

2. Lettering. The signs shall be inscribed by means of a silk screen process on white reflective sheeting. The paints shall be transparent red and opaque black, and shall be compatible with the reflective sheeting. The colors shall be approved by the Engineer.

All lettering shall be in conformance with the current edition of the FHWA “Standard Alphabets for Traffic Control Devices”.

3. Sign Layout. The sign shall be laid out in accordance with the appropriate Division of Traffic Operations drawings.

4. Application of Reflective Sheeting. The sheeting shall be applied to the treated sign in accordance with the manufacturer's specifications.

5. Finish. The finished sign shall be clear coated with a Finishing Clear, unless the manufacturer of the sheeting recommends that the sign not be coated. The Finishing Clear shall be compatible with the sheeting and applied in accordance with the specifications of the manufacturer of the reflective sheeting.

6. Sheeting. Reflective sheeting shall be either Prismatic Sheeting Type III or IX, and shall conform to the Federal Highway Administration's standard specifications for construction of roads and bridges on Federal Highway Projects (FP 79).

   Reflective sheeting furnished by the following manufacturers, or approved equivalent, are acceptable for use in the contract:

MANUFACTURER	PRODUCT
Avery Dennison Reflective Films Division	Engineer Grade, High Intensity, Prismatic
3M Company	Engineer Grade, High Intensity, Prismatic
Nippon Carbide Industries	Engineer Grade, High Intensity, Prismatic

7. Requirements. The sign shall be weather resistant and following cleaning shall show no appreciable discoloration, cracking, crazing, blistering, or dimensional change, and not less than 80% of the specified minimum brightness values when exposed to accelerated weathering for either 175,000 Langleys (approximately 1 year), south facing, unprotected at 45 degree in South Florida, or 1,200 hours Atlas Twin Arc Weathering (E42-64 Type D) in accordance with ASTM D 822).

   The sign surface shall be readily refurbished by cleaning and clear overcoating in accordance with the manufacturer's recommendations.

(D) DELIVERY AND PACKING OF SIGNS & POSTS

All signs and sign posts furnished, but not installed shall be delivered to the designated Division of Traffic Operations Sign Shop.

The signs and posts shall be packed and delivered in such manner that no injury or defacement may occur to the finished unit. Approved corrugated cardboard boxes containing not more than twelve signs shall be used for shipping, delivering and storing of signs.

The Contractor is required to deliver, unload, and stack at a site accessible to truck delivery inside the Bureau of Traffic Operation Sign Shop, as directed by the Shop Superintendent. Delivery shall be effected between the hours of 9 AM and 3 PM only, Monday thru Friday, inclusive.

(E) SAMPLING

The Contractor shall submit for approval, to the Division of Traffic Operations, the number and type of samples listed below, as appropriate, before commencing production. The samples shall be fabricated in accordance with the appropriate Division of Traffic Operations Standard drawings. The sample shall be shipped to the Bureau of Traffic Sign Shop, in the Borough of Queens, as directed by the Division of Traffic Operations.

Item	Quantity
Steel Rail -12 ft.	2
Elastic Stop Nut	2
Machine Bolts	2
Stainless Steel Strap 12" Long	2
Stainless Steel Strap 3" Long	2
2 Pc. Stainless Steel Bracket	2
Stainless Steel Buckle	2
Sign Post	2
Signs	2 Parking and 2 Traffic Control (Message & Type to be Selected by the Engineer.)

(F) TRAFFIC SIGN POSTS

All traffic sign posts of the steel rail type furnished shall be of a uniform, modified, flanged channel section such that the area of contact between the post and the sign is symmetrical with the vertical axis of sign and posts.

The minimum dimensions of posts shall be as follows:

Width of Flange Face	Width of Back	Depth from Face of Flange to Back
3-1/2”	1-7/8”	1-3/4”

The minimum weight of each post before holes are punched shall be 3.0 pounds per foot. There may be a weight tolerance of plus or minus 5%.

The length shall be 12’- 0” with a tolerance of plus or minus one inch.

All posts shall be punched with 3/8” diameter holes on the centerline spaced at 1” centers beginning 1” from top of post for the entire length.

The finished posts shall be machine straightened and have a smooth uniform finish free from cracks, flaws, injurious seams, laps, blisters, ragged, sharp and imperfect edges, or other defects affecting strength, durability, or appearance. Bolt holes of the diameter specified shall be accurately spaced vertically and centered horizontally, so that the holes will register for back to back application. All holes and sheared ends shall be free from burrs.

All posts shall be painted with a weather-resistant, rust-inhibitive, high-quality, dark green enamel, which shall produce hard, mar-resistant coating, free from paint cracks, blisters or other defects. Before painting, all posts shall be thoroughly cleaned of all dirt, rust, loose scale, oil or grease. The quality of the paint and prior preparation shall be such that when the finished post is struck a light blow with a sharp tool, the paint shall not crack or chip, and if scratched with a knife, shall not powder. The minimum thickness of the dry film enamel shall be one mil. It shall pass a standard 100 hour salt spray test (20% solution by spray or fog at 70 degrees). Painting shall be the final process after fabrication and punching has been completed.

(G) INSTALLATION OF TRAFFIC SIGNS

1. General. All signage in each block shall be installed within fourteen (14) calendar days of completion of final pavement within that block. Failure to meet this requirement shall be deemed a substantial deficiency in compliance with the specification requirements of **Subsection 6.70.12**, and will be cause for assessment of liquidated damages stipulated therein.

   The erection of a sign shall include all work necessary to secure the sign to the sign post, lamppost, traffic signal posts, or traffic signal mast arms, including the furnishing and installation of clamps, brackets, and all necessary appurtenances and the attachment of the sign in the prescribed location and alignment, as indicated on the Contract Drawings, Division of Traffic Operations Work Orders and Standard Drawings, or as directed by the Engineer.

   Where the Contractor is required to install signs other than those to be furnished by him, the Bureau of Traffic will furnish to the Contractor the appropriate signs. These signs shall be made available to the Contractor at the designated Bureau of Traffic Operation’s Sign Shop.

2. Parking Sign Installation. The installation of parking signs shall include all work necessary to secure the signs in the prescribed positions on the supporting posts. The most restrictive regulation sign shall be mounted on the top, with top of sign 10’ above the sidewalk or as directed by the Engineer. The proper stacking of signs will be shown on each Work Order by listing the signs at each installation in order with the top sign first, and each additional sign below in proper sequence.

   The traffic signs shall be mounted on “EL” columns, street light posts, traffic signal posts, or sign posts of the steel rail type in accordance with the locations and types as shown on Contract Drawings, D.T.O’s Work Orders, or as directed by the Engineer.

   For signs mounted on “EL” columns, street light posts, or traffic signal posts, a two-piece bracket of aluminum fabricated in accordance with Division of Traffic Operations Standard Dwg. No. SG-22, and fastened with stainless steel strapping, as shown on Division of Traffic Operations Standard Dwg. SG-30, shall be used.

For signs mounted on post of the steel rail type, cadmium-plated 5/16"-18NC 2" x 3/4" hex head, 1/2" across flats and elastic stop nuts cadmium-plated 5/16"-18T 9/16" across flats shall be used. Two machine bolts and nuts shall be used for each sign in accordance with D.T.O's Standard Drawings SG-104 and SG-105.

All signs shall be installed in such a manner that the sign faces are plumb, and at 45 degree angle with the curb facing the direction of traffic with the top of sign to be 10'- 0" high or as directed by the Engineer.

3. School Crossing Signs. Installation of School Crossing sign on a sign post of the steel rail type comprises the installation of the appropriate sign in accordance with Division of Traffic Operations Drawing No. SD-225B.

Installation of a School Crossing sign on a lamppost or traffic signal post comprises the installation of the appropriate sign on a lamppost or traffic signal post in accordance with Division of Traffic Operations Drawing No. SD-225B.

4. All Other Regulatory & Warning Signs. Installation of a sign on a sign post of the steel rail type comprises the installation of the appropriate sign in accordance with Division of Traffic Operations Drawing No. SD-225B.

Installation of a sign on a lamppost or traffic signal post comprises the installation of the appropriate sign on a lamppost or Traffic Signal Post in accordance with Division of Traffic Operations Drawing No. SD-225B.

Installation of a sign on a traffic signal mast arm comprises the installation of the appropriate sign, including the drilling of any necessary holes in the sign blank, on a traffic signal mast arm, in accordance with Division of Traffic Operations Drawing SD-225D, using a unibrace adjustable, self-leveling overhead sign bracket, as manufactured by Lyle Signs, Inc., "Model MFS", or an approved equivalent.

(H) INSTALLATION OF TRAFFIC SIGN POSTS

1. General. The work to be done shall be the installation of traffic sign posts of the steel rail type only. The posts shall be installed in new sidewalk, existing sidewalk, or earth. The work shall include excavation, backfilling, the restoration of the sidewalk, and the placement of concrete footing for the posts.

2. Installation Method. The installation of steel rail type sign posts shall be done in accordance with the details shown on the appropriate Division of Traffic Operations Standard Drawings Nos. SG-104, SG-105, SG-104B, or SG-105B. The Contractor may elect to set the sign post in concrete foundation as shown on the Standard Drawings, as modified by the Engineer.

For parking regulatory sign posts, the installation shall be in accordance with D.T.O Drawing Nos. SG-104 or SG-105, and as directed by the Engineer. The sign posts shall be plumb and the vertical plane of the back of the sign posts shall be at 45° angle to the curb line facing the direction of the traffic.

For all other type regulatory and warning sign posts, the installation shall be in accordance with D.T.O drawing Nos. SG-104B or SG-105B, and as directed by the Engineer.

3. Concrete Footing for Posts. The Contractor shall cut a neat hole in the sidewalk or earth, and excavate to the required depth, then pour the concrete and install the sign post in the fresh concrete, as shown on the D.T.O Standard Drawings. Where the sidewalk is made of brick paver, the concrete footings shall be poured prior to installation of the brick paver sidewalk. The concrete mix and placement shall meet the requirements of Section 3.05 and 4.06 respectively. The exposed surface shall be troweled to a neat, smooth finish, sloped to provide drainage away from the post.

The Contractor shall dispose of all unused fill and other materials, leaving the site in a clean and neat condition. The Contractor shall also restore sidewalk areas which have been disturbed, in a neat and workmanlike manner, to the satisfaction of the Engineer.

To protect the restored sidewalk areas from mutilation, the Contractor shall use a temporary protective disc of cardboard, of sheetmetal, or other satisfactory method, and remove same when concrete is cured as determined by the Engineer.

6.83.4. MEASUREMENT. The quantity to be measured for payment for each of the items is as follows:

Number of square feet of new non-reflectorized traffic signs (Type I or Type II) furnished.
Number of square feet of new reflectorized traffic signs furnished.
Number of square feet of traffic signs installed.
Number of linear feet of new traffic sign posts furnished.
Number of linear feet of traffic sign posts installed.

6.83.5. PRICES TO COVER. The contract prices per square foot of new non-reflectorized traffic signs (Type I or Type II) furnished and new reflectorized traffic signs furnished shall cover the costs of all labor, materials, plant, equipment, insurance, and incidentals necessary to fabricate the signs, including painting, sheeting, lettering, placement of legends, packing and delivering extra signs to designated Division of Traffic Operations Sign Shop, and to provide samples to Division of Traffic Operations for approval, all as shown on Contract Documents and in accordance with the specifications and directions of the Engineer. There will be no additional payment for double-faced signs.

The contract price per square foot of traffic signs installed shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to mount the signs on supporting posts (EL columns, street light poles, traffic light posts and mast arms, and sign posts of the steel rail type) at locations as directed and in accordance with the specifications and directions of the Engineer. The costs shall also include the supplying and sampling of bolts, nuts, clamps, brackets, and all necessary appurtenances as required and, where applicable, picking up signs furnished by the Division of Traffic Operations at their designated Sign Shop.

The contract price per linear foot of new steel rail type traffic sign posts furnished shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to fabricate the posts and to deliver the posts to locations designated by Division of Traffic Operations, all as shown on Contract Documents and in accordance with the specifications and directions of the Engineer. The cost shall also include samples and extra posts required to be delivered to designated Division of Traffic Operations Sign Shops.

The contract price per linear foot of steel rail type traffic sign posts installed shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to install the post on sidewalk or earth, to excavate and backfill for footing, to place the concrete footing and to restore all disturbed areas, all as shown on Contract Documents, and in accordance with the specifications and directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.83 AA	FURNISHING NEW NON-REFLECTORIZED TRAFFIC SIGNS	S.F.
6.83 AR	FURNISHING NEW REFLECTORIZED TRAFFIC SIGNS	S.F.
6.83 BA	INSTALLING TRAFFIC SIGNS	S.F.
6.83 AB	FURNISHING NEW TRAFFIC SIGN POSTS	L.F.
6.83 BB	INSTALLING TRAFFIC SIGN POSTS	L.F.

SECTION 6.84 –Bus Signs

6.84.1. DESCRIPTION. Under this item, the Contractor shall be required to pay New York City Department of Transportation (NYCDOT) for them to furnish, install, remove, store, and/or reinstall existing bus signs (including bus stop no standing signs, bus stop information panels, bus layover signs, bus parking signs, and related supports), as may be required, during construction under the project. Payment for said work shall be made to NYCDOT at least thirty (30) calendar days prior to any removal or installation of bus signs.

6.84.2. MATERIALS. (Not applicable)

6.84.3. CONSTRUCTION DETAILS. At least forty five (45) calendar days prior to the date of any required diversion of buses, the Contractor shall be required to: 1) contact the General Superintendent, Special Operations, NYC Transit, 2 Broadway, Room B17.123, Telephone Number (646) 252-5517 to arrange for diversion of buses; 2) make arrangements with the NYCDOT's Bus Stop Management Division, Telephone Number (646) 892-1252, to have them remove, store and reinstall their existing bus signs and/or remove existing bus signs and furnish and install new bus signs, as may be required; and, 3) to pay NYCDOT their fee to remove, store and reinstall or furnish and install new bus signs, as may be required.

6.84.4. METHOD OF MEASUREMENT. The fixed price lump sum shown in the Bid Schedule for this item shall be included in the total bid price; however, actual payment to the Contractor will be based on the actual billing cost submitted by NYCDOT to the Contractor for payment. The fixed sum is not to be altered in any manner by the bidder.

It is agreed that all work shall be based on the actual number of bus signs that are removed and installed.

6.84.5. BASIS OF PAYMENT. The Contract price for this item shall be the total price for the work performed by NYCDOT under this item. Payment shall be equal to the sum total of all vouches submitted to the Contractor by NYCDOT, as approved by the Engineer, for payments made by the Contractor to NYCDOT for the cost to remove, store, and re-install existing bus signs and/or remove existing bus signs and furnish and install new bus signs.

Payment under this item shall be made by the City on a reimbursement basis only, for payments made by the Contractor to the NYCDOT for providing the materials and services required to remove, store, and re-install existing bus signs and/or remove existing bus signs and furnish and install new bus signs, as required. Said payments shall be equal the total amount of invoices submitted by the NYCDOT to the Contractor during the period for which a requisition is submitted. The Contactor shall be required to submit to the Engineer satisfactory evidence of payment to NYCDOT. No retainage will be withheld by the Department on such payments made under this section.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule. No guarantee is given that the actual lump sum cost for this item will in fact be the "fixed sum" amount. The "fixed sum" amount is included in the total bid solely to insure that sufficient monies will be available to pay the Contractor for the work performed under this item.

The Contractor shall maintain separate books of accounts and shall not charge any portion of the cost for removing, storing, reinstalling and/or furnishing new bus signs to another part of the work. Payment and partial payments under this item shall be treated separately from the rest of the contract items.

The voucher for payment shall be submitted to the Engineer on a monthly basis.

The "fixed sum" is for bidding purposes only and shall not be varied in the bid. The Contractor will be paid for the actual amount regardless of the fixed sum, which may be more or less than the fixed amount.

Payment will be made under:

Item No.	Item	Pay Unit
6.84 B	LOLLIPOP TYPE BUS STOP SIGNS	F.S.

SECTION 6.85 – Traffic Enforcement Agents

6.85.1. DESCRIPTION. Under this item, professionally trained NYC Traffic Enforcement Agents (TEAs) from the Police Department shall be provided in order to properly maintain the flow of traffic in the vicinity of the construction site, as specified in the Contract Documents and as ordered by the Engineer.

6.85.2. MATERIALS. The Contractor shall arrange for TEAs to be provided by the New York City Police Department (NYPD) with a uniform readily identifiable to the traveling public. It is understood that the Contractor is not responsible for providing the "professionally trained" agents. Each TEA will be equipped with all items necessary to carry out their assigned duties. Bookkeepers assigned to the Police Department will provide administrative support related to the reimbursement procedure for the NYPD for the duration of the project in processing the TEA timesheets.

6.85.3. METHODS. The TEAs will be deployed to provide adequate traffic control throughout the construction site. The location, hours and days to be worked by the TEAs shall be jointly evaluated and determined by the Resident Engineer and the Office of Construction Mitigation and Coordination, Streets (OCMC) before the start of the contract and reevaluated with modifications made if necessary at regular meetings. Emergency situations, as determined by the New York City Department of Transportation (NYCDOT) Commissioner or a designee, may be cause for deviation from the previously determined TEA locations, hours or days.

Each TEA will be required on a daily basis to sign a time sheet prepared by NYPD showing date, time and the hours worked at each assigned location. These time sheets along with the report which shall contain the name of the agent, badge number and in-out time will be submitted to the Engineer, on a monthly basis, for the Engineer’s verification.

6.85.4. METHOD OF MEASUREMENT. The fixed price lump sum shown in the bid proposal for this item shall be considered the price bid, although actual payment will be based on the work performed. The fixed sum is not to be altered in any manner by the bidder.

It is agreed that all work shall be based on the actual number of hours that each TEA performs at a post in addition to travel time. Travel time will not exceed two hours per day. Furthermore, it is understood that the total estimated costs shall include a fringe/leave allowance equal to no more than 60% of the hours worked by the TEAs, supervisory personnel and administrative personnel (bookkeepers).

For every four (4) TEAs on duty there shall be one (1) relief TEA. Relief TEAs are required to provide coverage for regularly posted TEAs during lunch or dinner period and breaks. They shall be paid at the same rate as the agents they are relieving that day.

The hours for supervisory personnel will be based on a percentage basis of man-hours worked by TEAs including travel time. Supervision will consist of level I, level II, and level III supervisors. Payment for the supervisory personnel will be made based on work as follows: level I at 12.50%, level II at 2.50%, and level III at 1.33% of all hours worked by TEAs. Supervisory personnel hours are not subject to audit.

Bookkeeper reimbursements will be based on the percentage of time spent preparing time sheets for the duration of the project. This will not exceed 5% of the TEA agreement and will not be subject to audit.

The hourly rate paid shall be the T’A's actual yearly salary, including uniform allowance, divided by the number of normal hours paid per year, including leave and holiday hours for TEAs, Bookkeepers and all levels of supervision. Those TEAs, Bookkeepers and supervisors working overtime, including weekends and holidays, will be paid one and one-half (1-1/2) times their regular hourly rate. In addition, those TEAs, Bookkeepers and supervisors starting work prior to 8:00 AM and/or working beyond 6:00 PM shall be entitled to a 10% night shift differential.

6.85.5. BASIS OF PAYMENT. The Contract price for this item shall be a lump sum price for the work performed under this item and shall be equal to the sum total of all vouchers submitted to the Contractor by the New York City Police Department (NYPD), as approved by the Engineer, for payment by the Contractor for the cost incurred, in providing the services of TEAs, Bookkeepers and supervisors.

Payment under this item shall be made by the City on a reimbursement basis only for payments made by the Contractor to the NYPD for providing the services of TEAs, Bookkeepers and supervisors and shall equal the total amount of invoices submitted by the NYPD and paid by the Contractor during the period for which a requisition is submitted. The Contactor shall be required to submit to the Engineer satisfactory

evidence of payment for all TEA, Bookkeeper and supervisor services being requisitioned. No retainage will be withheld by the Department on such payments made under this section.

The total estimated cost of this item is the “fixed sum” amount shown for this item in the Bid Schedule. No guarantee is given that the actual lump sum cost for this item will in fact be the “fixed sum” amount. The “fixed sum” amount is included in the total bid solely to insure that sufficient monies will be available to pay the Contractor for these services.

The Contractor shall maintain separate books of accounts and shall not charge any portion of the cost of Traffic Enforcement Services to another part of the work. Payment and partial payments under this item shall be treated separately from the rest of the contract items.

The voucher for payment shall be submitted to the Engineer on a monthly basis and shall include the signed copies of the daily report.

The “fixed sum” is for bidding purposes only and shall not be varied in the bid. The Contractor will be paid for the actual amount regardless of the fixed sum, which may be more or less than the fixed amount.

Payment will be made under:

Item No.	Item	Pay Unit
6.85 A	TRAFFIC ENFORCEMENT AGENTS	F.S.

SECTION 6.86 – Furnishing and Installing Street Name Signs and Posts

6.86.1. DESCRIPTION. Under this section, the Contractor shall be required to furnish new street name signs, and new street name sign posts, including all accessories; to install street name signs and street name sign posts, including footings, at locations as directed; all in accordance with the specifications, the New York City Department of Transportation's Division of Traffic Operations (D.T.O) Standard Drawings and Work Orders, and directions of the Engineer.

6.86.2. MATERIALS.

(A) Sign blanks for Type II street name signs shall be made of flat unpainted aluminum, Alloy 6061-T6 or approved equivalent. Each sign blank shall be cut from one piece of aluminum and shall be free from wind, buckle, dents, or twist, and the face shall be substantially a plane surface. All edges and corners shall be filed or ground smooth, leaving the entire blank free from sharp edges and burrs. Welded or jointed sign blanks will not be accepted. The blank shall be cut and drilled in accordance with Division of Traffic Operations Drawing SG-123B. Sign blanks shall be 9-1/2 inches wide, furnished in lengths of 24, 30, 36 and 42 inches, and shall be 0.080 inches thick. The distances between holes must be accurately maintained to permit interchangeability of signs on existing sign brackets or sign posts.

(B) Sign posts shall be 2-1/2" inside diameter, 2-7/8" outside diameter steel pipe, 14 feet long. A force fit cast iron pipe end closure shall be installed at one end. The cost of the enclosure shall be included in the cost of the pipe. The pipe and pipe end closure shall be galvanized in accordance with ASTM Designation A 123, and conform with D.T.O Drawing SG-125A.

(C) Concrete for footings shall be Class B-32, Type IIA; cement - Type II Portland; sand - Type 1A; coarse aggregate Type 1, Grade B, or Type 2, Size No. 57; and an approved air-entraining agent shall be added at the time that concrete is mixed. Concrete, cement and aggregate shall comply with the requirements of Section 3.05.

(D) All other unspecified materials shall be approved by the Engineer.

6.86.3. METHODS.

(A) TREATMENT

Each sign blank shall be thoroughly cleaned of all grease, dirt, and other foreign matter and then treated with Alodine, or an approved equivalent, in accordance with the manufacturer's recommendations. After treatment, clean gloves shall be used in handling sign blanks until the reflective sheeting is applied.

Sign layouts shall be in accordance with the appropriate D.T.O Drawings.

(B) LETTERING

The street name shall be reversed silk screened on reflective sheeting, using transparent paint compatible with the sheeting, and of the colors conforming to that specified by the Division of Traffic Operations.

The Contractor may apply reflective sheeting cut out letters on reflective sheeting.

All lettering shall be in accordance with the Clearview fonts.

(C) SIGN LAYOUT

The street name sign shall be laid out using the following rules:

1. All suffixes as st, rd, th and nd after numbered streets shall be omitted.

2. Cardinal directions used as prefixes shall be abbreviated as directed by the Division of Traffic Operations. Cardinal directions used as a suffix shall not be abbreviated, unless authorized by the Engineer.

3. 24" and 30" signs. The Street Name is to be 6" Capital and Lower Case Letters, Clearview Series 1-W, 2-W or 3-W, as indicated on D.T.O Dwg. SG-124. Street, Avenue, Place, etc., shall be abbreviated as listed in Article D, below, in 3" Capital and Lower Case Letters, Clearview Series 3-W, aligned with the top of the street name. The sign is to be laid out using the largest possible letter series, and conform with D.T.O Drawing No. SG-124.

4. 36" Sign. The Street Name is to be 6" Capital and Lower Case Letters, Clearview Series 1-W, 2-W or 3-W, as indicated on D.T.O Dwg. SG-124. Street, Avenue, Place, etc., shall be abbreviated as listed in Article D, below, in 3" Capital Letters, Clearview Series 3-W, aligned with the top of the street name.

If the legend cannot be accommodated within the designated area in 6" letters on a 42" sign, the street name shall be reduced to 4" Capital and Lower Case Letters, Clearview Series 1-W, 2-W or 3-W, and Street, Avenue, Place, etc., shall be placed below in 2" Capital and Lower Case Letters, Clearview Series 3-W. Street, Avenue, Place, etc., shall not be abbreviated when on second line, unless authorized by the Engineer. The sign is to be laid out using the largest possible letter height and series, and conform with D.T.O Drawing SG-124.

(D) STANDARD ABBREVIATIONS

NAME	ABBREVIATION	
Avenue	Av	
Avenue*	Ave	* Ave shall be used for streets where prefix is Avenue, i.e. Ave B
Boulevard	Blvd	
Court	Ct	
Drive	Dr	
Crescent	Cres	
Expressway	Expwy	
Highway	Hwy	
Lane	La	
Place	Pl	
Parkway	Pkwy	
Road	Rd	
Terrace	Terr	
Turnpike	Tpke	
Street	St	
Square	Sq	
North	N	
South	S	
East	E	
West	W	

Words not listed above shall not be abbreviated without written permission of the Engineer. The period after the abbreviation shall be omitted.

(E) APPLICATION OF REFLECTIVE SHEETING

The reflective sheeting shall be applied in accordance with the specifications of the manufacturer, in a neat, workmanlike manner. Signs with air pockets, wrinkling, or other defects will not be accepted.

(F) FINISH

The finished sign shall be clear coated, using a Finishing Clear, compatible with the sheeting, and applied in accordance with the manufacturer's specifications.

(G) SHEETING

Reflective sheeting shall conform to the Federal Highway Administration's standard specifications for construction of roads and bridges on Federal Highway Projects.

Reflective sheeting furnished by the following manufacturers, or approved equivalent, are acceptable for use in the contract:

MANUFACTURER	PRODUCT
Avery Dennison Reflective Films Division	Engineer Grade, High Intensity, Prismatic
3M Company	Engineer Grade, High Intensity, Prismatic
Nippon Carbide Industries	Engineer Grade, High Intensity, Prismatic

(H) REQUIREMENTS

The sign shall be weather resistant and following cleaning shall show no appreciable discoloration, cracking, crazing, blistering, or dimensional change, and not less than 80% of the specified minimum brightness values when exposed to accelerated weathering for either 175,000 Langleys (approximately 1 year), south facing, unprotected at 45 degree in Miami Florida, or 1,200 hours Atlas Twin Arc Weathering (E42-64 Type D) in accordance with ASTM D 822.

The sign surface shall be readily refurbished by cleaning and clear overcoating in accordance with the manufacturer's recommendations.

(I) STREET NAME SIGN POSTS

The Contractor shall furnish sign posts in accordance with D.T.O Drawing SG-125A.

(J) INSTALLATION OF STREET NAME SIGNS

1. General. All signage in each block shall be installed within fourteen (14) calendar days of completion of final pavement within that block. Failure to meet this requirement shall be deemed a substantial deficiency in compliance with the requirements of **Subsection 6.70.12**, and will be cause for assessment of liquidated damages stipulated therein.

   The Contractor shall perform all necessary work to secure street name signs in the prescribed position on the supports, specified on the work order, and as indicated on D.T.O Drawings SG-123A, SG-123B, and SG-125A, including: the attachment of the sign to the sign brackets; the installation of clamps and brackets; the attachment of the sign to the supports; any work necessary to locate the sign in the prescribed location; the furnishing of sign brackets, bolts, nuts, strapping and any other appurtenances, except filler blocks. Filler blocks will be furnished by the Division of Traffic Operations.

   Where the Contractor is required to install signs other than those to be furnished by him, the Bureau of Traffic will furnish to the Contractor the appropriate signs. These signs shall be made available to the Contractor at the designated Bureau of Traffic Operation's Sign Shop and may be either or both Type I and Type II Street Name signs.

2. Type I Street Name Signs. The cross-section shall be similar to Alcoa Section 83779 Type A, and conform to D.T.O Drawing No. SG-123A.

   Type I Street Name sign bracket shall be extruded Aluminum Alloy 6062-T6.

   The bracket cross-section shall be Alcoa Aluminum 74845 Type A, or approved equivalent, and conform to D.T.O Drawing SG-123A.

   Two (2) shims 1-1/2" x 7/8" Aluminum Alloy 6063 or 6061, 0.0875" thick (US Standard Sheet metal gage #14 Nominal 0.0781") are required for each Type I sign installation. Holes in the shims shall be as indicated on D.T.O Drawing SG-123A.

   Three (3) aluminum bolts with self locking nuts and washers are required for each Type I sign installation as indicated on D.T.O Drawing SG-123A.

3. Type II Street Name Signs. Type II Street Name sign bracket shall be a Stainless Steel Type 304, Universal Cantilever bracket, with a Double "T" Aluminum Alloy 6061-T6 extruded section riveted to the brackets as manufactured by Signfix of North America, Inc. (Item #SF-30 CA, 30 inches long, and #SF-42CA, 42 inches long), or approved equivalent, as indicated on D.T.O Drawing SG-123B.

   Two (2) sign brackets are required for each Type II sign installation.

   Pop rivets, as specified on D.T.O Drawing SG-123B are required to attach the sign blank to the sign bracket.

(K) INSTALLATION OF STREET NAME SIGN POSTS

The work to be done shall be the installation of street name sign posts, including excavation, backfilling, the restoration of the sidewalk, and the placement of concrete footing for the posts, in accordance with D.T.O Drawings SG-125A and SG-127, and the following specifications.

The Contractor shall cut a neat hole in the sidewalk or earth, and excavate to the required depth, then pour the concrete and install the sign post in the fresh concrete, as shown on the D.T.O Standard Drawing.

Where the sidewalk is made of brick paver, the concrete footing shall be poured prior to installation of the brick paver sidewalk. The concrete mix and placement shall meet the requirements of Section 3.05 and 4.06 respectively. The exposed surface shall be troweled to a neat, smooth finish, sloped to provide drainage away from the post.

The Contractor shall dispose of all unused fill and other materials, leaving the site in a clean and neat condition. The Contractor shall also restore sidewalk areas which have been disturbed, in a neat and workmanlike manner, to the satisfaction of the Engineer.

To protect the restored sidewalk areas from mutilation, the Contractor shall use a temporary protective disc of cardboard, of sheet metal, or other satisfactory method, and remove same when concrete is cured as determined by the Engineer.

(L) SAMPLING

The Contractor shall submit for approval, before commencing production, to the Division of Traffic Operations, the number and type of samples listed below, as appropriate. The samples shall be shipped to the Bureau of Highway Control, at the Division of Traffic Operations Main Office, 28-11 Queens Plaza North, Long Island City, N.Y. 11101, 7th Floor.

ITEM	QUANTITY
Type I Bracket, Shims for Type I Bracket	2 Sets
Nuts & Bolts for Type I Bracket	8 Sets
Type II Bracket	2 Sets
Rivets for Type II Bracket	20
Stainless Steel Strapping, 12” Length	2
Buckles for Strapping	2
Sign Post	2
Cast Iron Pipe End Closure	2
Signs	2 (Message & Type to be Selected by the Engineer.)

6.86.4. MEASUREMENT. The quantity to be measured for payment for each of the items is as follows:

Number of square feet of new reflectorized street name signs furnished.
Number of square feet of street name signs installed.
Number of linear feet of new street name sign posts furnished.
Number of linear feet of street name sign posts installed.

6.86.5. PRICES TO COVER. The contract prices per square foot of new reflectorized street name signs furnished, shall cover the costs of all labor, materials, plant, equipment, insurance, and incidentals necessary to fabricate the signs, including painting, sheeting, lettering, placement of legends, and to provide samples to Division of Traffic Operations for approval, all as shown on Contract Documents and in accordance with the specifications and directions of the Engineer. There will be no additional payment for double-faced signs.

The contract price per square foot of street name signs installed shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to mount the signs on supporting posts (EL columns, street light poles, traffic light posts and sign posts of the steel pipe type) at locations as directed and in accordance with the specifications and direction of the Engineer. The costs shall also include the supplying and sampling of bolts, nuts, clamps, brackets, and all necessary appurtenances as required and, where applicable, picking up signs furnished by the Division of Traffic Operations at their designated Sign Shop.

The contract price per linear foot of new steel pipe type street name sign posts furnished shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to fabricate the posts and to deliver the posts to locations designated by Division of Traffic Operations, all as shown on Contract Documents and in accordance with the specifications and directions of the Engineer. The cost shall also include samples required to be delivered to a designated Division of Traffic Operations Sign Shops.

The contract price per linear foot of steel pipe type street name sign posts installed shall cover the costs of all labor, materials, plant, equipment, and incidentals necessary to install the posts on sidewalk or earth, to excavate and backfill for footing, to place the concrete footing and to restore all disturbed areas, all as shown on Contract Documents, and in accordance with the specifications and directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.86 AA	FURNISHING NEW STREET NAME SIGNS	S.F.
6.86 BA	INSTALLING STREET NAME SIGNS	S.F.
6.86 AB	FURNISHING NEW STREET NAME SIGN POSTS	L.F.
6.86 BB	INSTALLING STREET NAME SIGN POSTS	L.F.

SECTION 6.87 – Plastic Barrels

6.87.1. INTENT. This section describes the work of furnishing and installing Plastic Barrels for the purpose of traffic lane delineation during construction.

6.87.2. DESCRIPTION. The work shall include the furnishing and installing of plastic barrels, sand ballast, and flashers (for every fourth barrel). The barrels are to be placed as indicated on the Contract Drawings and as directed by the Engineer. The barrels shall be maintained and replaced as required during the various stages of construction.

6.87.3. MATERIALS. Barrels and flashers shall be in accordance with New York City Department of Transportation's Standard Details of Construction Standard Drawing H-1049.

6.87.4. METHODS. The barrels shall be placed in a straight line ten (10') feet apart, within the work area, unless otherwise shown on the Contract Drawings or directed by the Engineer. A flashing light shall be affixed to every fourth barrel. The barrels shall be stabilized with sand bags or approved rubber collars

At the completion of the work or when directed by the Engineer, the plastic barrels shall be removed and disposed of away from the work site.

6.87.5. MEASUREMENT. The quantity to be measured for payment shall be the actual number of plastic barrels placed in the work.

Payment will be made only for the initial installation at any location. Whenever barrels are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Minor movement of the barrels from one side of the roadway to the other side, or rearrangement within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made for movements of barrels made for the Contractor's convenience; for movement of barrels at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of barrels at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of barrels between initial installations.

6.87.6. PRICE TO COVER. The contract price bid for each plastic barrel shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Where there is no scheduled item for Plastic Barrels, the cost of furnishing, installation, maintenance, relocation, and subsequent removal of Plastic Barrels as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic item.

Payment will be made under

Item No.	Item	Pay Unit
6.87	PLASTIC BARRELS	EACH

SECTIONS 6.88 THROUGH 6.90 (NO TEXT)

SECTION 6.91 – Reflective Cracking Membrane (18” Wide)

6.91.1. DESCRIPTION. Under this section, the Contractor shall furnish and install a membrane over the joints of new concrete base as shown on New York City Department of Transportation’s Standard Details of Construction Standard Drawings H-1034 and H-1040, prior to the placement thereon of asphaltic concrete overlay in order to inhibit reflective cracking from the pavement to the overlay. The membrane shall be installed where required, in accordance with the specifications and the directions of the Engineer.

6.91.2. MATERIALS. The membrane shall be a pavements fabric system at least eighteen (18”) inches wide. The following types, or approved equivalents, are acceptable:

Type	Manufacturer	Product
Glass fiber woven fabric, primer, and binder system	Owens-Corning Fiberglas Corp., Granville, Ohio 43023	Roadglas reinforcement, Roadbond X-100 primer, and Roadbond binder
Non-woven polypropylene fabric precoated with a rubberized adhesive base	Phillips Fibers Corp., Engineered Products Marketing, P.O. Box 66, Greenville, S.C. 29602	Petrotac
	W.R. Grace & Co. Construction Products Div. Cambridge, Mass. 02140	Bituthene S-5300

6.91.3. METHODS. The surface on which the membrane is to be placed shall be dry and free from dust, dirt, mud, oil, grease, vegetation and other contaminants.

All joints greater than one-eight (1/8) inch wide shall be cleaned by pneumatic means and filled with Asphaltic Cement (A.C.) filler, as directed by the Engineer.

The membrane shall be placed over the joints in strict accordance with the manufacturer’s instructions and the Standard Drawings. Roll ends shall be overlapped four (4) to six (6) inches.

Placement of the asphaltic concrete overlay shall closely follow membrane laydown. No more membrane than can be overlaid on the same working day shall be placed.

6.91.4. MEASUREMENT. The quantity of Reflective Cracking Membrane to be measured for payment shall be the number of linear feet of membrane, eighteen (18) inches wide, actually and satisfactorily installed, excluding overlaps.

6.91.5. PRICE TO COVER. The unit price bid per linear foot for this item shall include the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals necessary to complete the work, including the cost of preparing the surface upon which the membrane is placed, all in accordance with the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.91	REFLECTIVE CRACKING MEMBRANE (18” Wide)	L.F.

SECTIONS 6.92 THRU 6.93 (NO TEXT)

SECTION 6.94 – Cast Iron Under-Sidewalk

6.94.1. INTENT. This section describes the work of constructing new cast iron under-sidewalk drains from existing roof drains to curb face.

6.94.2. DESCRIPTION. New cast iron under-sidewalk drains shall be furnished and installed at the locations as shown on the Contract Drawings and in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

6.94.3. MATERIALS. All cast iron pipes and fittings shall comply with **Section 2.03, "CAST IRON PIPE"**, of the Department of Environmental Protection, Bureau of Water and Sewer Operations, Standard Sewer Specifications.

Cast iron pipes shall be four (4") inches in diameter without hubs. Fittings shall be as required to connect pipes to existing roof drain.

Wire fabric shall comply with **Section 2.25**.

Concrete shall comply with **Section 4.06**.

Expansion Joint shall comply with **Section 2.15, Type IV**.

6.94.4. METHODS. Installation of under-sidewalk drains shall comply with the Department's Standard Details of Construction for Highways H-1037, or as otherwise shown on the Contract Drawings.

The cast iron pipes shall be cut to the lengths required, installed in the locations, and laid true to the lines and grades, all as shown on the Contract Drawings or ordered by the Engineer.

Holes required for the cast iron pipe shall be cut in the face of the curb steel facing at the locations shown on the Contract Drawings.

Connections to existing roof drains shall be made as required by existing field conditions and as directed by the Engineer.

After the installation of the cast iron pipe, the pipe end that protrudes the new curb face shall be cut flush with the curb face and ground smooth.

Prior to the placement of concrete for cradle and sidewalk, the drain pipe shall be secured in place and all connections shall be tested for water drainage and leaks.

6.94.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of cast iron under-sidewalk drains placed in the completed work.

6.94.6. PRICE TO COVER. The contract price per linear foot of cast iron under-sidewalk drains shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to furnish and install cast iron under-sidewalk drains, complete with connections, concrete and wire fabric, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.94	CAST IRON UNDER-SIDEWALK DRAINS	L.F.

SECTION 6.95 – Stabilization of Subgrade

6.95.1. INTENT. This section describes the work of treating existing in place subgrade soil with cement or lime to stabilize the subgrade prior to paving.

6.95.2. DESCRIPTION. Under this section, the Contractor shall be required to stabilize the subgrade at locations indicated on the Contract Drawings or where directed by the Engineer. Stabilized subgrade shall consist of in-place subgrade soil for a depth of six (6”) inches being mixed uniformly with either hydrated lime or cement, and compacted and cured in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

6.95.3. MATERIALS.

(A) Cement shall meet the requirements of **Section 2.10** for a Type II Portland Cement.

(B) Hydrated Lime shall meet the requirements of ASTM C 207, Hydrated Lime for Masonry Purpose– - Type N. Hydrated Lime which has slaked prior to mixing, for any reason, shall not be incorporated in the work. The Contractor is cautioned to obtain only freshly manufactured hydrated lime and to store it after delivery under conditions which will prevent moisture absorption and slaking.

6.95.4. METHODS.

(A) EQUIPMENT

No work will be permitted until all necessary equipment is on hand, inspected and approved by the Engineer.

(1) Mixers. A rotary pulverizing mixer or heavy plow shall be used for all mixing of the Portland cement or hydrated lime with the subgrade soil. The use of a heavy plow will be permitted only if the rotary pulverizing mixer is not capable of adequately mixing the cement or lime-soil mixture to the full depth of treatment. Rotary mixers shall be equivalent to the seaman Duo-Stabilizer Model DS730 or the Brothers Master Mixer Model LSPRM84A.

(2) Compactors. Compaction equipment shall be a pneumatic tired or smooth steel wheel roller type.

(3) Graders. Grading equipment shall be of a type approved by the Engineer.

(B) WEATHER LIMITATIONS

Stabilization of the subgrade shall not be done when the subgrade temperature is below forty (40) degrees F., except by written permission of the Engineer. Portland cement or hydrated lime shall not be mixed with frozen subgrade soil or when the subgrade contains frost.

Portland cement or lime shall not be applied when wind conditions, as determined by the Engineer, are such that blowing Portland cement or lime becomes objectionable or hazardous to traffic, workmen, and adjacent property owners.

(C) PREPARATION OF FOUNDATION

Prior to the addition of any Portland cement or lime to the subgrade, the area to be stabilized shall be compacted, graded and shaped in close conformity to the typical sections, lines and grades as shown on the Contract Drawings or as specified by the Engineer.

(D) APPLICATION OF PORTLAND CEMENT OR LIME

Portland cement or hydrated lime shall be applied to the prepared subgrade materials by an approved method and at the rate of twenty-two (22) pounds of Portland cement or lime per square yard of subgrade (4% by weight of compacted stabilized subgrade), unless otherwise specified or directed by the Engineer. Spreading equipment shall uniformly distribute the Portland cement or lime without excess loss. No equipment, except that used for spreading and mixing, shall be permitted to pass over the spread Portland cement or lime until it is mixed. The Engineer may require the spread Portland cement or lime to be sprinkled with water to reduce dusting.

Where application of Portland cement or lime is done by bags, the bags shall be delivered to the project and spotted by hand on the roadbed to be stabilized. Spacing between bags shall be such to obtain the

specified mixture with the soil for the given depth of six (6”) inches. The bags shall then be split open, emptied and spread uniformly by hand before mixing.

Where additional Portland cement or lime is ordered by the Engineer, in writing, in addition to that specified above, the City will pay for the additional Portland cement or lime at the actual (material) cost per additional bag. The Contractor’s attention is called to the fact that the use of this Item is contingent upon field conditions at the time of construction; therefore, no claim shall be made against the City for loss of anticipated profit due to the reduction of work under this item or the deletion of this item in its entirety.

(E) MIXING, COMPACTION AND SHAPING

After the required amount of Portland cement or lime has been uniformly spread, it shall be mixed into the subgrade to the full depth of six (6”) inches using a traveling rotary mixing machine or heavy plow. A minimum of three passes will be required to assure uniform incorporation of the Portland cement or hydrated lime. The mixing operation shall be completed within four hours after application of the Portlan cement or lime. At this time, all of the Portland cement or lime shall be thoroughly mixed in such a manner that the result is a homogeneous, friable mixture of subgrade soil and Portland cement or lime, free from clods or lumps exceeding two (2”) inches in size.

Immediately after the mixing operations are completed, the surface of the subgrade shall be rough graded, rolled, finish graded, and rerolled in order to obtain a compacted surface that is ready for the placement of the base or subbase pavement course. The surface of the finished subgrade course shall not extend above design grade at any location.

Thickness of the completed stabilized subgrade will be determined from measurements made in test holes located at random intervals not to exceed 500 feet. The measured thickness shall not deviate from the six (6”) inch compacted depth specified by more than plus 1-1/2 inches or minus 1 inch.

Areas of Portland cement or hydrated lime stabilized subgrade not meeting the specified thickness requirements shall be reconstructed when and where directed by the Engineer.

(F) CURING

Following mixing operations, the stabilized course shall be allowed to cure for at least 24 hours plus any additional time required for the Portland cement or lime to properly react with the subgrade soil. Curing periods in excess of 24 hours shall be as determined and specified by the Engineer. During the curing period, the surface of the material shall be kept moist up to the time of pavement material placement to prevent drying and cracking.

(G) PROTECTION OF UNDERGROUND FACILITIES

Extreme care shall be exercised by the Contractor while performing the work prescribed herein to insure that continuing service to all underground facilities will be maintained, without incurring damage to any of these facilities.

6.95.5. MEASUREMENT. The quantity of Cement Stabilization of Subgrade or Lime Stabilization of Subgrade to be paid for will be the number of square yards of 6” deep subgrade material treated with Portland cement or hydrated lime, respectively, and satisfactorily stabilized within the payment lines shown on the Contract Drawings or otherwise specified in writing by the Engineer.

6.95.6. PRICES TO COVER. The unit prices bid per square yard for Cement Stabilization of Subgrade, for Lime Stabilization of Subgrade, and for Cement or Lime Stabilization of Subgrade shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to complete the work under this section.

No payment will be made for any maintenance, repairs, or reconstruction of the stabilized subgrade made before acceptance.

Payment will be made under:

Item No.	Item	Pay Unit
6.95 A	CEMENT STABILIZATION OF SUBGRADE	S.Y.
6.95 B	LIME STABILIZATION OF SUBGRADE	S.Y.
6.95 AB	CEMENT OR LIME STABILIZATION OF SUBGRADE	S.Y.

SECTION 6.96 (NO TEXT)

SECTION 6.97 – Extra High-Early Strength Concrete

6.97A.1. DESCRIPTION. This Section describes the construction of an extra-high-early strength (XHE) concrete.

In intersections where the street must be fully opened to traffic by the end of each work period, in accordance with the Contract Drawings, the Specifications, the traffic stipulations, and the directions of the Engineer, the concrete shall be laid with XHE concrete.

The Contractor will be subject, under Section 6.70 of the Standard Highway Specifications, to liquidated damages in the amount shown on Schedule "A" for each and every hour, or any part thereof, that the entire width of pavement designated to be reconstructed with XHE concrete base is not available to traffic one (1) hour after the end of each work period.

6.97A.2. MATERIALS AND METHODS. All materials and methods for the concrete base shall comply with the requirements specified for Item 4.04 H and Section 5.06, except for the following modifications and additions:

(A) Concrete shall be XHE meeting the strengths in the table below. Contractor shall provide a sufficient size work crew in the working time before initial set to allow for proper placement of the concrete. Modification of concrete shall be with increased cement factor (up to 10-bag mix of Portland cement), reduced water content, superplasticizer, high-range water reducer, or accelerator. Pozzolans (Fly ash, Slag, and/or Microsilica) shall be used.

		Maximum time to achieve minimum compressive strength	
Item	Type	2,800 psi	3,200 psi
6.97 A	XHE Concrete	(6) Hours	(3) Days
6.97 BA	XHE Concrete for Roadway Base	(12) Hours	(3) Days
6.97 BB	XHE Reinforced Concrete for Bus Stop	(12) Hours	(3) Days
6.97 BC	XHE Reinforced Concrete for Bus Stop (Pigmented)	(12) Hours	(3) Days
6.97 C	XHE Concrete for Roadway Base	(24) Hours	(3) Days
6.97 D	XHE Concrete for Roadway Base	(48) Hours	(3) Days

(B) Contractor shall be required to provide a mix design meeting the requirements of Section 5.06.3, MIX DESIGN, including maturity-strength curves.

(C) All materials and equipment to be used by the Contractor shall be as approved by the Engineer.

(D) The earth subgrade, immediately before the concrete is laid, shall be thoroughly compacted by an approved method to the satisfaction of the Engineer. It shall be smooth, finished to the bottom elevation of the adjacent concrete pavement, and be dampened with water sufficient only to be absorbed by the subgrade. The subgrade shall not be in a muddy or frozen condition and unsuitable material shall be removed and replaced with acceptable material, thoroughly compacted.

(E) All constituents of concrete shall be delivered to the project site each work period as required. The Contractor shall supply concrete at a rate consistent with placement operations as determined by the Engineer. Concrete must be batched in sufficient quantity to prevent cold joints from being formed during placement. The Engineer may discontinue the use of any type of concrete mixing or transporting units when unsatisfactory results are obtained.

(F) All concrete shall be discharged directly into the forms or into approved conveyance equipment while fresh and before there is evidence of initial set. Concrete shall be deposited before the initial set has taken place, in as nearly a continuous operation as practical, and with approved tools which will prevent segregation. Concrete shall not be deposited in standing water and shall be thoroughly compacted by use of external vibration (poker nose of screed). No retampering of the concrete will be permitted. Retampering is defined as the addition of water after the mix has attained its desired initial slump.

(G) Concrete cylinders shall be taken at each location of work, as directed by the Engineer, to be tested at 28 days by the City.

(H) No traffic is to be permitted on newly placed XHE concrete until it has obtained the minimum 2,800-psi compressive strength specified, as estimated by the embedded maturity sensors and the approved maturity curve per Section 5.06.

6.97A.3. MEASUREMENT. The quantity to be measured for payment under this item shall be the volume, in cubic yards, of XHE concrete laid where directed by the Engineer, measured in place, and adjusted for strength deficiencies in accordance with Section 5.04 of the Standard Highway Specifications.

In determining the volume of concrete to be paid for, the spaces occupied by bases of columns, manhole heads, gate boxes, road boxes, and similar structures will be deducted when their surface areas measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

6.97A.4. PRICE TO COVER. The contract price per cubic yard of XHE concrete shall cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to furnish, lay and cure the concrete, complete in place, in full compliance with the requirements of the specifications, to furnish such samples and cores for testing and to provide such testing equipment, laboratory space and facilities as may be required, to maintain the concrete in good condition as specified in Section 5.05 of the Standard Highway Specifications, and completing the work in accordance with the contract drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item Description	Pay Unit
6.97 A	EXTRA-HIGH-EARLY STRENGTH CONCRETE	C.Y.
6.97 BA	EXTRA-HIGH-EARLY STRENGTH CONCRETE BASE PAVEMENT, VARIABLE THICKNESS (12 HOURS TRAFFIC-READY)	C.Y.
6.97 BB	EXTRA-HIGH-EARLY STRENGTH REINFORCED CONCRETE PAVEMENT (BUS STOP) (12 HOURS TRAFFIC-READY)	C.Y.
6.97 BC	EXTRA-HIGH-EARLY STRENGTH REINFORCED CONCRETE PAVEMENT (BUS STOP) (12 HOURS TRAFFIC-READY) (PIGMENTED)	C.Y.
6.97 C	EXTRA-HIGH-EARLY STRENGTH CONCRETE BASE PAVEMENT, VARIABLE THICKNESS (24 HOURS TRAFFIC-READY)	C.Y.
6.97 D	EXTRA-HIGH-EARLY STRENGTH CONCRETE BASE PAVEMENT, VARIABLE THICKNESS (48 HOURS TRAFFIC-READY)	C.Y.

SECTION 6.98 (NO TEXT)

SECTION 6.99 – Audio and Video Documentation Survey

6.99.1. DESCRIPTION. Under this section, the Contractor shall provide color video taping of surface features located within the scope of the project, supported by simultaneous audio description of said features.

Such coverage shall include, but not be limited to, all existing sidewalks and driveways. Of particular concern are any existing faults, fractures or defects.

6.99.2. METHODS. The location of the sidewalks and driveways shall be identified visually by house or building number, and through the commentary of the electrographer on the audio portion of the tape.

The person performing this work shall be a fully qualified, professional electrographer, actively engaged in pre-construction color audio-video tape documentation and survey projects. Prior to commencing work, the contractor shall provide the following:

(A) A sworn and notarized statement identifying all pertinent equipment owned or controlled, which is available to perform the work herein specified by the contract.

(B) A sworn statement outlining the firm's experience in performing the work covered by the contract.

(C) Three (3) letters of reference from Municipalities or Authorities where the firm's pre-construction documentation service has been performed on the same/similar types of projects.

(D) Sample tape submitted to the electrographer at the firm's expense, covering a specific sample route prescribed by the Engineer. Such sample tape shall cover at least fifteen hundred (1,500) linear feet, and a minimum of thirty (30) minutes surveying time.

Audio-video tape shall be XHG Professional Grade, one-half inch (1/2") color video cassette (VHS format) and shall be recorded on at "Standard" speed. Reprocessed tapes will not be acceptable. Video output from camera(s) used must be capable of producing NTSC-500 lines. Resolution in the Y channel, minimum 500 TV lines at center. Geometric distortion shall not exceed 2% of picture height at any point in picture area.

The audio-video tape shall have the potential to convey one (1) video track and one (1) audio track. The video and one audio track (audio track 1) shall be recorded simultaneously as original live recordings and shall not be copies of other audio or video recordings. These recordings shall consist of a video record of all curbs and sidewalks within the limits of construction, and the commentary of the electrographer making the video record.

All video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording, the name of the street location within the project limits, the project name, direction of travel and the viewing side. The date and time shall appear in the upper left hand corner of the picture--example:

Time 8:35:15
Date 9/20/79

The project name, name of street location within project limits, direction of travel and viewing side shall appear on the lower half of the screen - example:

N. on First Ave. W/S
33rd St. to 34th St.

All taping shall be done during times of good visibility. Adequate lighting shall be provided, where necessary. Written authorization by the Engineer to proceed with video documentation shall be done with consideration of existing seasonal climate conditions. The Contractor will not be responsible for the removal of snow, leaves, debris or parked vehicles.

Coverage of the sidewalk areas may be obtained by use of conventional wheeled vehicles and/or by walking. The tape quality and content requirements, as specified, apply for both methods of conveyance.

The speed in the general direction of travel of the conveyance used during taping shall be of a slow enough rate to ensure the proper coverage and clarity. Panning and zooming rates shall be controlled sufficiently that the playback will produce optimum clarity of the sidewalk being viewed.

All tapes produced under the contract shall be turned over to the Engineer on an every other day basis in order for the Engineer to review and monitor quality and progress. Any portion of the tape coverage deemed unacceptable by the Engineer shall be retaped by the Contractor at the Contractor's own expense.

All tapes (cassettes and cases) shall be properly identified by tape number, location, project name, and shall become the property of the Engineer. A record of the contents of each tape shall be supplied by a run sheet identifying each segment in the tape by location, i.e., roll number, street or easement viewing, tape counter number, viewing side, point starting from, traveling direction and ending point.

The audio-video taping, as specified herein, shall be conducted prior to construction. No construction work which might affect the area to be videotaped shall commence until such taping has been completed and accepted by the Engineer.

The work described herein is in addition to the photographs required by Item 6.43, Photographs, if scheduled in the contract.

6.99.3. PRICE TO COVER. The lump sum price bid for Audio/Video Documentation Survey shall cover the cost of furnishing all labor, materials, equipment, insurance, and necessary incidentals required and completing the work, in accordance with the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
6.99	AUDIO AND VIDEO DOCUMENTATION SURVEY	L.S.

SECTION 7.00 (NO TEXT)

SECTION 7.01 – Subway Sidewalk Frames and Gratings

7.01.1. INTENT. This section describes the replacement and/or reset of existing subway sidewalk gratings and frames where directed.

7.01.2. DESCRIPTION. Under this section, the Contractor must reset existing and/or replace existing worn or damaged subway sidewalk frames and gratings where directed; all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

7.01.3. MATERIALS. Standard Frames and Gratings must be of a Press-Locked rectangular design, similar to Type “D” by IKG Industries , Type “19-DT-4” by Ohio Gratings Inc. and Type “15-4” by SlipNOT Metal Safety Flooring, or an approved equivalent, and must comply with the following requirements:

(A) Material to be steel.

(B) Main bars to be 2-1/2” x 3/16” spaced 15/16 inches center to center, except for heavy gratings which must be 4” x 1/4” spaced 1-3/16 inches center to center.

(C) Cross bars to be of rectangular cross section having a depth of 1”, flush top, and spaced 2 inches center to center, except for heavy gratings which must be 1-1/2” x 3/16” spaced 2 inches center to center.

(D) Main bars and cross bars to be slotted at their intersections so as not to remove excessive material from the load sustaining members.

(E) Main bars to be “dovetail” slotted and have their slots solidly filled by the cross bars.

(F) Grating and Frames must be hot dipped galvanized after fabrication.

(G) Removable grating panels must be one (1) panel wide and provided with NYC Transit Authority (NYCTA) Standard locking device.

(H) Grating frame supports must be of 2-1/2” x 2-1/2” x 1/4” angles with 1/2” diameter welded studs spaced 3 inches center to center.

(I) Overall dimensions, details, directions of bearing bars, and number of panels must be in accordance with the Contract Drawings and the requirements of the NYCTA.

(J) Grate surface areas must have a metallized friction treatment. The surface treatment must provide a minimum wet dynamic coefficient of friction of 0.42, measured per ANSI/NFSI B101.3. Metallic coatings such as Mebac from IKG Industries, OnGrip from Ohio Gratings Inc. ,SlipNot from SlipNOT Metal Safety Flooring, or approved equivalent products may be used to fulfill this requirement.

Cement grout must comply with the requirements of Section 3.06, Type 2.

Concrete must be Class B-32, Type IIA, in accordance with the requirements for concrete under Section 4.13, and pigmented where indicated and where required to match adjoining sidewalk.

7.01.4. CONSTRUCTION METHODS.

(A) GENERAL

A– work must be done in accordance with the requirements of the NYCTA and the directions of the Engineer.

Existing frames and gratings designated to be removed must become the property of the Contractor and must be removed and disposed of away from the site.

Existing subway construction designated to remain must be maintained and protected. Damage caused by the Contractor’s operations must be repaired or replaced at the Contractor’s own expense, to the satisfaction of the Engineer.

The Contractor must provide shields as required in the vent opening to prevent debris from entering the subway. Shop drawings showing the type and construction of shields must be submitted by the Contractor to the Engineer for approval.

Removable grating panels must be installed in the same location as existing panels.

Except for the removable grating panels, all other grating panels must have their ends grouted in place to their frame angles.

Where the Contractor is required to install gratings and/or frames that are provided by the NYC Transit Authority, the gratings and frames will be made available to the Contractor at a designated NYC Transit Authority Storage Yard.

(B) FURNISHING AND INSTALLING SUBWAY SIDEWALK GRATING

The Contractor must, where indicated on the Contract Drawings or ordered by the Engineer, carefully remove existing subway sidewalk gratings and replace them with new gratings.

Where the concrete in the periphery of the gratings is spalled or damaged, it must be repaired by the Contractor with epoxy mortar as shown on the Contract Drawings or as directed by the Engineer.

(C) FURNISHING AND INSTALLING SUBWAY SIDEWALK FRAMES & GRATINGS

The Contractor must carefully remove both existing subway sidewalk frames and gratings that are designated to be replaced and replace them with new frames and gratings.

New frames must be set true to line and grade, flush with the adjoining pavement, and cast in a concrete collar as indicated on the Contract Drawings or as directed by the Engineer.

7.01.5. MEASUREMENT. The quantities to be measured for payment under each item must be the number of square feet of sidewalk subway gratings satisfactorily installed, new or reset, measured within the frame perimeter.

7.01.6. PRICES TO COVER.

(A) INSTALL NEW OR RESET EXISTING SIDEWALK SUBWAY FRAMES AND GRATES

The contract price bid must be a unit price per square foot and must cover the cost of all labor, material, plant, equipment, and incidentals necessary to remove and dispose of existing sidewalk subway frames and gratings, and install new frames and grates, or remove and reset existing frames and gratings, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Epoxy mortar repairs, when required, must be paid for under Item 7.0– - Epoxy Mortar Repairs.

(B) PICK-UP & DELIVER SIDEWALK SUBWAY FRAMES AND GRATES

The contract price bid must be a unit price per square foot and must cover the cost of all labor, material, plant, equipment, and incidentals necessary to pick-up sidewalk subway grates, with or without frames, from a designated NYC Transit Authority Storage Yard and deliver them to the site, in accordance with the specifications and the directions of the Engineer.

(C) FURNISH NEW SIDEWALK SUBWAY FRAMES AND GRATES

The contract price bid must be a unit price per square foot and must cover the cost of all labor, material, plant, equipment, insurance, and incidentals necessary to furnish new frames and gratings, complete with shop drawings, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.01 AB	INSTALL NEW OR RESET EXISTING SIDEWALK SUBWAY FRAMES & GRATINGS	S.F.
7.01 B	PICK-UP & DELIVER SIDEWALK SUBWAY GRATINGS	S.F.
7.01 C	FURNISH NEW SIDEWALK SUBWAY FRAMES AND GRATINGS	S.F.

SECTION 7.02 – Epoxy Mortar Repairs

7.02.1. DESCRIPTION. Under this Section, the Contractor shall remove deteriorated concrete and apply epoxy mortar in areas prepared for patching on the existing wall, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

7.02.2. MATERIALS. Epoxy mortar shall consist of a mix of one (1) part, by volume, of binder compound, and one (1) part, by volume, of sand.

Binder compound shall be a two-component epoxy-resin system in compliance with the requirements of **Subsection 721-01** Epoxy Resin System, of the State of New York, Department of Transportation, Standard Specifications. The two components of the binder compound shall be mixed in the proportion as specified by the manufacturer.

Sand shall average 20 to 40 mesh fineness and shall be bagged, clean, hard, high grade silica sand, free of all foreign, deleterious or other objectionable materials.

7.02.3. METHODS. The Contractor shall remove the deteriorated concrete on the repair surface to a depth where sound concrete is reached. The location and limits of repair area shall be as designated by the Engineer. In no case will payment be made for repair extending beyond the designated limits, unless directed by the Engineer.

All surfaces to be patched with epoxy mortar shall be thoroughly cleaned to the satisfaction of the Engineer. After cleaning and just prior to the application of epoxy mortar, the surface shall be air blown.

Epoxy mortar shall be applied only to clean and dry surface and shall be applied at a surface temperature range of 40 degrees F to 85 degrees F. The method of application shall be in accordance with the binder manufacturer's instructions.

The epoxy mortar shall completely fill the patched area to its full depth. Edges shall be flush with the existing concrete. The finished surface shall be smooth and shall show no bumps, ridges, depressions, sags or other blemishes and shall not be out of line with respect to the existing concrete surface at the periphery of the patched area. The surface of the existing concrete shall be primed with a light brush coat of binder immediately prior to application of the epoxy mortar to assure complete wetting of the existing surface.

7.02.4. MEASUREMENT. The quantity to be measured for payment shall be the number of cubic feet of epoxy mortar actually used to repair the wall to the satisfaction of the Engineer.

7.02.5. PRICE TO COVER. The unit price bid per cubic foot for Epoxy Mortar Repairs shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to remove the deteriorated concrete, to clean and prepare the designated surfaces for patching, and to apply the epoxy mortar, all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.02	EPOXY MORTAR REPAIRS	C.F.

SECTION 7.03 (NO TEXT)

SECTION 7.04 – Painting Handrailing

7.04.1. WORK TO INCLUDE. Under this Section the Contractor shall prime and paint handrailing all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

7.04.2. MATERIALS. The primer coat for galvanized surfaces shall be zinc dust-zinc oxide, conforming to Federal Specifications TT-P 641G as shown on Contract Drawings. The finish coat shall match Pantone Color Specifier #350. Apply three (3) coats of paint (Epoxy Primer, Epoxy Intermediate, and Polyurethane Top Coat) in compliance with the requirements of **Subsection 2.13.4**.

7.04.3. METHODS. New galvanized steel handrailing shall be primed as specified above and shall receive three (3) coats as specified above.

Surfaces to be painted shall be cleaned of all dirt, grime, oil, or other materials which will affect the proper application and bonding of paint to the surface which is to be painted in accordance with the recommendations of the paint manufacturer.

The Contractor shall take all necessary measures to insure that all paint is applied to dry surfaces. Costs incurred for corrective actions required as a result of failure to comply with this provision shall be borne by the Contractor and such corrective measure shall be taken by him at the Contractor's own expense.

7.04.4. PRICE TO INCLUDE. The price bid for painting new handrailing shall be a lump sum price and shall include the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required; and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.04	PAINTING HANDRAILING	L.S.

SECTIONS 7.05 THRU 7.06 (NO TEXT)

SECTION 7.07 – Martello Bollard

7.07.1. DESCRIPTION.

Under these items, the Contractor shall furnish and install the Martello Bollard, in accordance with the Contract Drawings, the pecifications, and directions of the Engineer.

7.07.2. MATERIALS.

(A) Bollard shall be manufactured by:

Reliance Foundry Co. Ltd.
6450 148 Street #207
Surrey, BC V3S 7G7
Phone: 1-888-735-5680
Fax (604) 590-8875
Website: www.reliance-foundry.com
E-mail info@reliance-foundry.com

(B) Description:

1. Model: Reliance Foundry; R-7651-EM-V4, consisting of:
    a. Bollard base, to be embedded in and filled with concrete;
    b. Bollard cap with reflective striping, ready for permanent installation on top of base once concrete has been poured into body;
2. Drawing: R7651V4LPW Rev A1;
3. Size:
    a. 22-1/2 inches high above grade;
    b. 25-1/2 inch base diameter;
    c. 3”5" high overall;
4. Design: Low profile, sloped-sided oval;
5. Material: Steel meeting ASTM A36;
6. Coating shall be black textured semi-gloss polyester powder coat over epoxy primer.
7. Reflective stripe must be white or yellow, matching the adjacent line striping color.

(C) Concrete used for embedding bollards shall comply with the requirements of Section 4.13.3.(B) in the NYCDOT Standard Highway Specifications.

7.07.3. INSTALLATION AND SITE STORAGE.

(A) DELIVERY, STORAGE, AND HANDLING: Bollard shall be protected from the elements with a waterproof and ventilated covering to avoid condensation. Protect steel from corrosion, deformation, and other damage during delivery, storage, and handling. Store bollards on platforms or pallets sloped to provide drainage. Box and plastic wrapping of bollard shall not be removed until just prior to installation.

(B) BOLLARD PLACEMENT: Bollards to be placed where shown on Contract Drawings and directed by Engineer.

(C) INSTALLATION: Installation shall be performed as described here and as shown on the Contract Drawings.

1. Excavate to required depth and width needed to form for concrete foundation to the size as shown on the Reliance Foundry Drawing. Concrete shall be placed a minimum of 3” below and a minimum of 6” around the perimeter of the embedded bollard.

2. Place bollard in correct location using rebar and tie downs such that the bollard is plumb and true to the satisfaction of the Engineer.

3. Pour concrete to level just below embedding hole in bollard embedding steel; ensure that the bollard does not move laterally, upward, downward due to buoyancy of concrete.

4. Proceed to open bollard cap and pour concrete into bollard embedment and bollard itself. Be sure to fill bollard and bollard embedment entirely, checking for voids, to the satisfaction of the Engineer.

5. When the bollard is entirely filled and concrete extrudes from embedding hole, fill the rest of the form up to grade. Replace bollard cap.

7.07.4. FIELD QUALITY CONTROL.

(A) Engineer shall verify model and color of product and also verify that the product is built to dimensions specified in Subsection 7.07.2, above.

7.07.5. SUBMITTALS.

All submittals shall be as per Section 1.06.13 of the NYCDOT Standard Highway Specifications and in accordance with the following requirements:

(A) CATALOG CUTS: Bollard manufacturers' catalogue and supporting literature shall be submitted for approval along with color sample.

(B) SHOP DRAWINGS: All Shop Drawing submittals shall be as per section 1.06.13 of the NYCDOT Standard Highway Specifications. Before the work is started, the Contractor shall submit shop drawings for approval.

7.07.6. MEASUREMENT.

The quantity of Martello Bollards to be paid for under this item shall be the number of bollards actually installed to the satisfaction of the Engineer.

7.07.7. PRICE TO COVER.

The price bid shall be unit price for each Martello Bollard and shall include the cost for all labor, materials, hardware, equipment, insurance, and incidentals necessary to complete the work including, but not limited to, excavation, furnishing and installing the bollard, cap, concrete foundation and fill, reflective tape, and any rebar or other necessary items required to set and install the Martello Bollard; all in accordance with the Contract Drawings, the Specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.07 MB2	MARTELLO BOLLARD, VERSION 2.0	EACH

SECTION 7.08 – Pipe Bollard, Cover Protected

7.08.1. DESCRIPTION.

Under these items, the Contractor must furnish and install cover protected pipe bollards certified for low-speed vehicle impact, in accordance with the Contract Drawings or Work Orders, the specifications, and directions of the Engineer.

7.08.2. MATERIALS.

(A) Pipe bollard protective cover.

1. The pipe bollard protective cover should be as shown on sketch 7.08-1A titled "PIPE BOLLARD PROTECTIVE COVER"

(B) Concrete for bollard foundation and sidewalk pavement restoration.

Concrete for bollard foundations and hollow pipe bollard cores must comply with the requirements of **Section 3.05**, Concrete, class B-32.

Where the adjoining sidewalk is pigmented, the final cured concrete for pavement restoration must also be pigmented to match in color. Pigmenting must comply with the requirements of **Section 4.13**. No additional payment will be made for the cost of pigmenting the concrete for pavement restoration.

(C) Steel for solid pipe bollard cores must comply with the requirements of **Section 2.35** and the requirements of ASTM Designation A36. Steel for hollow pipe bollard cores must comply with the requirements of Section 2.35 and the requirements of ASTM Designation A500 grade C. Steel must be thoroughly cleaned and primed in accordance with the requirements of **Section 2.13.4**.

(D) Steel bars for concrete reinforcement must comply with the requirements of **Section 2.23** and the requirements of ASTM Designation A615, unless otherwise specified by the manufacturer.

(E) Standoffs, sleeves, or energy damper bushings must comply with manufacturer's requirements, as approved by the Engineer.

(F) Sub grade and soil stabilization materials must be either unslaked lime or cement in accordance with the requirements of **Section 6.95**.

(G) Fill And backfill materials must comply with the requirements for Select Granular Fill in accordance with **Section 4.11**.

(H) Sidewalk expansion joints must comply with the requirements of **Section 2.15**, Type IV.

7.08.3. CERTIFICATION RATING.

The Contractor must furnish pipe bollards that are ASTM F3016/F3016M-19 low-speed vehicle impact certified by the manufacturer.

Each pipe bollard must comply with one of the impact condition designations indicated in Table 7.08-I, and must be installed where specified in the Contract Drawings or Work Orders.

Table 7.08 Error! No text of specified style in document.**- I – ASTM F3016/F3016M-19 Impact Condition Designations**

Impact Speed Rating	Surrogate Test Vehicle Weight (pounds)	Nominal Minimum Test Speed (miles per hour)	Permissible Speed Range (miles per hour)
S10	5000 ± 110	10	9 to 18.9

7.08.4. METHODS.

(A) Delivery, Storage, And Handling.

Stored pipe bollards must be protected from the elements with a covering, waterproof and ventilated to avoid condensation. The Contractor must protect all steel from corrosion, deformation, and other damage during delivery, storage, and handling. Pipe bollards must be stored on platforms or pallets sloped to

provide drainage. Pipe bollards must be stored in the manufacturer's original packaging, or a packaging of equal or greater strength and integrity.

(B) Excavation.

All excavation and backfilling work required for the installation of pipe bollard foundations, including the removal of curbs, sidewalks, pavement, and other materials necessary to complete the Work in accordance with the Contract Drawings or Work Orders, must be made to dimensions sufficient to accommodate the installation of pipe bollard foundation materials, and must be done in accordance with the requirements of Section 6.02, and the requirements herein. Pipe bollards must not be installed within 36 inches of any portion of gas mains and appurtenances, shallow (less than four (4') feet) water mains and appurtenances, electrical conduits and duct banks, and communication conduits and duct banks.

Where directed, the Contractor must either saw-cut or core-drill the existing concrete sidewalk to facilitate installation of pipe bollards, while at the same time minimizing the impact on existing sidewalk, as directed by the Engineer. When saw-cutting, the Contractor must saw-cut along existing score lines and other partial sidewalk flags, or slab locations. All work must be done in a safe, neat, competent, and efficient manner to cause the least possible damage to streets, sidewalks, and other infrastructure, to the satisfaction of the Engineer. All saw-cutting and core-drilling must be done with water to prevent dust. Saw-cutting or core-drilling must be for the full depth of sound concrete, granite slab, or bluestone sidewalk, to the top of the underlying sidewalk foundation. The saw-cut must be straight and vertical with sharp edges. The core-drill must be vertical with sharp edges. No saw-cutting, core-drilling or encroachment into adjacent sidewalk flags, panels or slabs will be permitted. Any property damage caused by the excavations must be repaired at the Contractor's expense to the satisfaction of the Engineer.

Excavation for bollard foundation must not exceed 42 inches below sidewalk grade. Excavations for bollard foundation must be carefully conducted to approach the neat lines of the bollard foundation as closely as possible without disturbing the underlying soil; hand excavation must be used within the last twelve (12") inches, using augers, clamshell diggers, pickaxes, hand-held shovels, and any other approved hand-held tools. No forms will be permitted as the concrete must be placed directly against the undisturbed sides of the excavation. If an exception to this is necessary due to poor soil conditions, an alternate method must be used, such as flowable fill, as approved by the Engineer, at no separate cost. Any unsuitable material must be removed and replaced with acceptable material thoroughly compacted.

The excavation of ledge rock and boulders must comply with the requirements of Section 4.11.

(C) Installation.

The Contractor must prepare the site for installation, laying out in accordance with the Contract Drawings or Work Orders the placement of pipe bollards to the satisfaction of the Engineer. Where a pipe bollard, or bollard foundation, or both, are required to be installed in a particular orientation to resist vehicle impact loads, such orientation will be indicated on the Contract Drawings, and Contractor must indicate the orientation on the site layout to the satisfaction of the Engineer.

Pipe bollards must be installed in accordance with the Manufacture's installation instructions as approved by the Engineer, and the requirements herein. Concrete bollard foundation for pipe bollards must not be placed during periods of rainfall.

(D) Pavement Restoration.

Where the adjoining sidewalk material is concrete, the permanent restoration of sidewalk pavement must conform to the requirements of Section 4.13, and the requirements herein, including the installation of expansion joints to isolate the bollard foundation from the adjoining concrete sidewalk pavement. Where existing adjoining concrete sidewalk pavement is pigmented, the top six (6") inches of bollard foundation must be pigmented to match the adjoining concrete sidewalk pavement to the satisfaction of the Engineer.

Where the adjoining sidewalk material is granite block paver, concrete paver, bluestone flags, asphalt block pavers, or brick pavers, the permanent restoration of sidewalk pavement adjoining the bollard foundation must conform to the requirements of Section 6.06, Section 6.07, Section 6.60, or Section 6.66, as directed by the engineer. Expansion joint is not required between the bollard foundation and sidewalk material that is not concrete flags.

The top surface of the bollard foundation must be pitched away from the pipe bollard steel core, at a slope of ten (10) horizontal to one (1) vertical, to a nominal horizontal distance of two (2") inches away from the

protective cover of the pipe bollard or to the pipe bollard foundation expansion joint, whichever distance is closest to the protective cover of the pipe bollard.

7.08.5. SUBMITTALS.

All submittals must comply with Section 1.06.13 and in accordance with the following requirements:

(A) Certifications and Catalog Cuts: The Contractor must submit for approval, the pipe bollard manufacturers' catalog, supporting literature, detail drawings, and accredited independent testing laboratory certification for ASTM impact speed ratings.

(B) Shop Drawings: Before the Work is started, the Contractor must submit shop drawings for approval.

(C) The Contractor must submit digital photographs in a format approved by the Engineer, of the following views:

1. Site conditions prior to pipe bollard layout;
2. Site view with mark-out of bollard locations, rod or tape measure evidence of minimum foundation depth;
3. Clear view (top-down) of excavated subgrade for bollard foundation;
4. Final site view with installed pipe bollards and restored sidewalk pavement.

7.08.6. MEASUREMENTS.

The quantity measured for payment will be the number of Pipe Bollards, Cover Protected installed in accordance with the specifications, in accordance with the Contract Drawings or Work Orders, and to the satisfaction of the Engineer.

7.08.7. PRICE TO COVER.

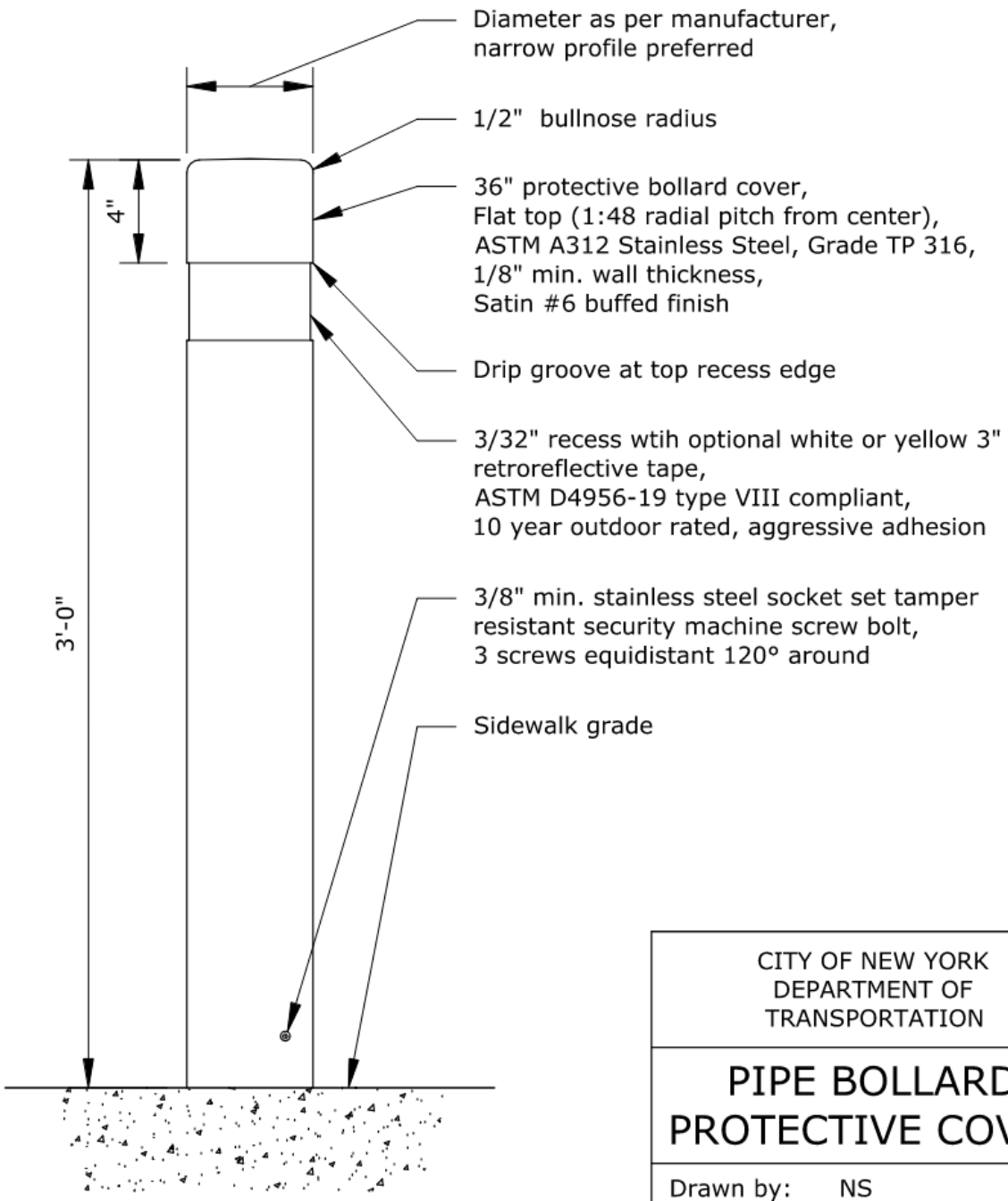
The unit price bid for each Pipe Bollard, Cover Protected, of each ASTM certified impact speed rating, retroreflective option, and protective cover type, must cover the cost of all labor, materials, equipment, insurance, and accessories necessary to furnish and install approved protective cover pipe bollard complete with pavement and sub grade excavation and removals, bollard foundation installation, sawcutting, coring, backfill, sidewalk pavement restoration, as specified, all in accordance with the Contract Drawings or Work Orders, the specifications, and the directions of the Engineer.

No separate payment will be made for unclassified excavation and removal of sidewalk pavement and subbase material. Removal of encountered boulders and ledge rock will be paid for under item 4.11 – Excavation and Filling. The cost of unclassified excavation and removal of sidewalk pavement and subbase material, and hand excavation will be deemed included in the price bid for the pipe bollard item.

No separate payment will be made for saw-cutting or core-drilling existing sidewalk. No separate payment will be made for the restoration and reconstruction of excavated sidewalk pavement. The cost of either saw-cutting or core-drilling existing sidewalk, and the cost of sidewalk pavement reconstruction will be deemed included in the price bid for the pipe bollard item.

Payment will be made under:

Item No.	Item	Pay Unit
7.08 AR	S10 RATED PIPE BOLLARD WITH RETROREFLECTIVE TAPE ON PROTECTIVE COVER	EACH
7.08 ARL	S10 RATED PIPE BOLLARD WITH RETROREFLECTIVE TAPE ON PROTECTIVE LANDMARK COVER	EACH



Notes:

1. Bollard offset from face of curb: 18" min. between intersections, 36" min. at intersections, corner quadrants, and driveways.
2. 4' min. clear space between bollards.
3. Prior to installing decorative sleeve, surface of pipe cleaned of debris.

CITY OF NEW YORK
DEPARTMENT OF
TRANSPORTATION

PIPE BOLLARD PROTECTIVE COVER

Drawn by:	NS
Checked by:	RW
Approved by:	NP
Scale:	2" = 1'-0"
Date:	10/11/2022

Sketch:

7.08-1A

SECTIONS 7.09 THRU 7.11 (NO TEXT)

SECTION 7.12 – Soil Density Testing

7.12.1. INTENT. This section describes the performance of Proctor analyses of designated soils and the testing of designated soils for in-place density, to ensure that soil compaction requirements for the Project are met. The Contractor must retain the services of an independent Soils Testing Laboratory, approved in accordance with Section 5.01 and subject to the pre-qualification requirements hereinafter specified, to perform the Work under this section.

7.12.2. APPROVAL OF TESTING LABORATORY AND QUALIFICATION OF THE TECHNICIANS. The testing laboratory used by the Contractor must be independent of the Contractor and any subsidiary. All proposed testing laboratories must be duly licensed by the NYC Department of Buildings. Only laboratories approved by the NYCDDC QA Director must be used for all work performed and technicians qualified by NYCDDC QA must be used for field work. Laboratory technicians used for field work **who are not applying for renewal** of the NYCDDC QA Qualification cards (new entrants) must have current NICET Level 2 certification. Field technicians must present their current NYCDDC QA Qualification Cards if so requested by authorized NYCDDC staff. Staff used for laboratory testing must have current NICET Level 2 certification. Exceptions granted to any of the above requirements must be in writing by the NYCDDC QA Director.

It is understood that no subcontract for the performance of required soil testing work will release the Contractor from the Contractor's responsibility under the contract to execute all work in conformance with the Contract Drawings and specifications.

7.12.3. SCOPE OF WORK. Under this section, the Contractor and approved Laboratory must furnish all labor, materials, plant, equipment, and necessary incidentals required to: obtain soil samples from the site or other locations, transport samples to Laboratory, perform Proctor analysis of soil samples, and submit written documentation of results; perform in-place soil density tests and submit written documentation of results; and perform all work incidental thereto, all in accordance with these specifications and the directions of the Engineer.

(A) Proctor Analysis of Soil Samples.

Soils for which in-place density tests are to be performed must undergo a Proctor analysis in order to determine the maximum dry density and optimum moisture content of the soil material to be tested. Soils designated for Proctor analysis may include existing subbase and/or subgrade materials as well as proposed fill material, as directed. The number and location of soil samples to undergo Proctor analyses must be as directed by the Engineer.

Each soil sample designated for Proctor analysis must be recovered from the site or other location (stockpile, etc.) and transported to the Laboratory, in a manner acceptable to the Laboratory and the Engineer.

The maximum dry density and the optimum moisture content of each soil sample must be determined by the Standard Proctor Test in accordance with AASHTO T 99 (ASTM D 698). If, in the opinion of the Laboratory, a soil sample is too granular to achieve realistic maximum density/optimum moisture readings by the Standard Proctor Test method, other appropriate test methods (Vibratory Table, etc.) may be substituted, subject to the approval of the Engineer.

Written documentation on Laboratory stationery of the results of each Proctor analysis must be furnished to the Engineer, such documentation to include the following:

1. Date sample was tested.
2. Location and date sample was obtained.
3. Brief description of sample (Soil type, color, consistency, etc.) or other identification.
4. Maximum Dry Density (lbs. per cu. ft.).
5. Optimum Moisture Content (%).
6. Test method (if other than Standard Proctor).

7. Signature and seal of qualified Laboratory Representative.

Distribution of copies of Proctor analysis results must be as directed by the Engineer.

(B) In-Place Soil Density Tests.

In-place soil density tests will be required to ensure that soil compaction requirements for the project are met.

Test locations may include:

- Existing subbase and/or subgrade material upon which fill material is to be placed, or upon which water/sewer pipe, catch basins, basin connection pipe or other structures are to be constructed.
- Compacted fill material for pavement, sidewalk, or curb construction or for backfill of water/sewer pipe, catch basins, basin connection pipe, or other structures.
- Any other locations directed by the Engineer.

The number and location of in-place- soil density tests must be as directed by the Engineer.

The Contractor's attention is directed to the fact that it will be necessary, in some cases, to excavate through temporary pavements in order to test the compaction of backfill over water mains, etc., and upon completion of the test, backfill and place new temporary pavement as necessary. No direct payment will be made for such excavation, backfill or replacement of temporary pavement.

The preferred test method for determining the in-place dry density and moisture content of the soil is the Sand Cone Test, in accordance with AASHTO T 191, T 205. Other approved types of density tests (nuclear, etc.) are permitted, provided that density values corresponding to those obtained by the Sand Cone Test method are established to the satisfaction of the Engineer. Such alternate density test methods shall be checked at least once every fifty (50) tests against the Sand Cone Test method, as directed, to minimize equipment calibration errors. No direct payment will be made for additional density tests taken solely for calibration purposes.

After the in-place dry density of the soil is determined, the Degree of Compaction shall be computed by the following formula:

$$\text{Degree of Compaction (\%)} = \frac{\text{In-Place Dry Density(lbs./cu.ft.)}}{\text{Maximum Dry Density (lbs./cu.ft.)}} \times 100$$

Written documentation on Laboratory stationery of the results of each in-place soil density test shall be furnished to the Engineer, such documentation to include the following:

1) Date of Field Test.
2) Location of Field Test.
3) Brief Description of Tested Soil (Soil Type, Color, Consistency, etc.) or other identification.
4) In-Place Dry Density (lbs. per cu.ft.).
5) In-Place Moisture Content (%).
6) Density Test Method (if other than Sand Cone).
7) Maximum Dry Density (lbs. per cu.ft.) from corresponding Proctor analysis of same soil type.
8) Degree of Compaction (%).
9) Signature and seal of Qualified Laboratory Representative.

Distribution of copies of Density Test results shall be as directed by the Engineer.

7.12.4. EVALUATION OF SOIL TEST RESULTS. All natural earth subbase and/or subgrade, fill and backfill material under the contract must be compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density.

The Degree of Compaction, as determined above, will be used for control purposes in determining compliance with project compaction requirements. However, it will be the responsibility of the Engineer to evaluate the results of the soil tests performed and determine the acceptability of subbase and/or subgrade preparation and fill construction.

7.12.5. ESTIMATED QUANTITIES. The quantity of Proctor analysis and in-place density tests, as listed under Item Nos. 7.12 A, 7.12 B, and 7.12 C on the BID SCHEDULE, are estimated quantities, and no guarantee or assurance of these quantities is given. The Commissioner reserves the right to reduce the

quantities stated and neither the Contractor nor the laboratory will have any claim for damages for anticipated profits or loss of profits due to any disparity between estimated quantities and “as-built” quantities.

The NYCDDC QA Director reserves the right to arrange for other testing laboratories to perform a portion of the work contemplated herein. In such instance, neither the Contractor nor the Laboratory will have any right to damages for anticipated profits or loss of profits for the work performed by others

7.12.6. MEASUREMENT. The quantity to be measured for payment under Item No. 7.12 A must be the actual number of Proctor Analyses completed, for which results have been documented in writing and furnished to the Engineer, as described herein.

The quantity to be measured for payment under Item No. 7.12 B must be the actual number of In-Place Soil Density Tests performed, for which results have been documented in writing and furnished to the Engineer, as described herein.

The quantity to be measured for payment under Item No. 7.12 C must be the actual number of days on which In-Place Soil Density Tests were performed, provided that such test results have been documented in writing and furnished to the Engineer, as described herein. For the purposes of this section, a day is defined as a single eight (8) hour work shift, with no additional pay for nights, weekends, or overtime.

Separate payment will be made for items 7.12 A, 7.12 B, and 7.12 C when required and included in the contract bid. No direct payment will be made for in-place density tests performed for the sole purpose of checking equipment calibration when alternate density test methods are used.

7.12.7. PRICES TO COVER. The contract price per each Proctor Analysis, under Item No. 7.12 A, must include the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals to obtain soil samples, transport samples to the Laboratory, perform Proctor analyses, provide written documentation of the results, and perform all work incidental thereto, all in accordance with these specifications and the directions of the Engineer.

The contract price per each In-Place Soil Density Test, under Item No. 7.12 B, must include the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals to perform density tests, provide written documentation of the results, and perform all work incidental thereto, all in accordance with these specifications and the directions of the Engineer.

The contract price per each day of In-Place Soil Density Test, under Item No. 7.12 C, must include the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals to perform density tests for the entire day, provide written documentation of the results, and perform all work incidental thereto, all in accordance with these specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.12 A	PROCTOR ANALYSIS	EACH
7.12 B	IN PLACE SOIL DENSITY TEST	EACH
7.12 C	IN PLACE SOIL DENSITY TEST	DAY

SECTION 7.13 – Maintenance of Site

7.13.1. DESCRIPTION. This section describes the maintenance, protection and cleanup of the construction site. The Contractor is placed on notice that a safe and clean site throughout all phases of the work and during all operations must be provided by the Contractor, and further that the monitoring by the City of the Contractor's site maintenance, site protection and site cleanup is considered for the purposes of the contract to be a Project objective necessary to eliminate and/or mitigate public disruption and inconvenience, and to insure public health and safety. The Contractor shall therefore, at all times, conduct this operation in a manner which promotes a clean site and ensures the convenience, safety and health of general users including, but not limited to, the motorist, the pedestrian and the abutting property owners/tenants, as well as those of the Contractor's employees. This includes compliance with the Contractor Code of Conduct in **Section 1.06.19**.

The provisions of this section are supplementary to and do not abrogate the General Conditions (Section 1.06) or the General Notes on the Contract Drawings relating to the protection and cleanup of the site, and the delivery and storage of materials at the site. Furthermore, any conditions pertaining to the maintenance, protection and cleanup of the construction site during the life of the contract which are addressed in the General Conditions and in the General Notes on the Contract Drawings, whether or not addressed under this Section, shall be deemed as having been addressed under this Section.

7.13.2. METHODS.

(A) GENERAL

The Contractor shall be responsible for the maintenance of the contract streets or portions of streets pursuant to Article 7 of the Standard Construction Contract.

The Contractor shall provide the necessary personnel and equipment for adequate site maintenance within and adjacent to the contract site and all detour routes. The Contractor shall keep the work site and adjacent areas free and clean from all rubbish, debris, dust, idle construction equipment, discarded or leftover construction material and excavated material as outlined below. The Contractor shall also keep all haul routes outside the work site free and clean from all rubbish, debris and dust resulting from the Contractor's operations.

The Contractor shall protect the public from damage to persons and property, which may result directly or indirectly from any construction operation. Such protection shall include, but not be limited to, providing proper street drainage and diversion of runoffs from private properties.

All existing Fire Department Communication facilities shall be protected and provisions made for their continuous operation during construction. ALL ALARM BOXES AND POSTS MUST REMAIN ACCESSIBLE. If, due to the Contractor's operations, Fire Alarm Service is inadvertently interrupted or Fire Communication System equipment or facilities are damaged, the Contractor will be held responsible and shall replace them at its own expense and in accordance with Fire Department requirements.

The Contractor shall be fully responsible for maintaining the completed work in an acceptable condition and protecting the completed work until relieved of such responsibility by acceptance of the contract or the completed items of work. Upon completion of each phase of work, or when ordered by the Engineer, and before acceptance and final payment are made, the Contractor shall remove all surplus and discarded material, rubbish, equipment, debris, and temporary structures from the site, and restore the working site as directed by and to the satisfaction of the Engineer. All sewers, water mains, appurtenant structures, etc., shall be clean, free from debris and deposits.

(B) MAINTENANCE OF STREETS

Maintenance of streets and detours for vehicles shall include any repairs, as directed, including the filling of pre-existing and new potholes that may be necessary due to usage of streets by traffic. This repair work will be paid for under Item No. 4.02 CB - ASPHALTIC CONCRETE MIXTURE, or 4.02 CA - BINDER MIXTURE, as provided in the Bid Schedule.

Also, the Contractor shall provide reasonably safe and convenient walkways and passageways for pedestrian traffic. Where required by the Contract Documents or when ordered by the Engineer, the Contractor shall construct and maintain, as directed, temporary asphalt walkways and ramps in accordance with the requirements of Subsection 7.13.2.(G)(1), below, temporary wood plank or steel plate ramps or

other configurations and materials, as may be required, and provide temporary pedestrian passageways (as per the NYC Department of Transportation's Standard Details of Construction, Standard Drawing H-1004, or as otherwise approved). The Contractor shall make the surface(s) of the pedestrian pathway(s) safe by eliminating ponding conditions, removing debris, sweeping, and wetting for dust control. All walkways and passageways must be in compliance with all ADA requirements.

The Contractor shall maintain access to all abutting properties and pedestrian usage of sidewalk areas, both old and new, at all times, as directed by the Engineer and as shown on the Contract Drawings, except at "Sidewalk Closings" as designated or as directed.

The Contractor shall maintain the traveled way in such a condition and conduct operations in such a manner that snow and ice may be readily removed by others as and when necessary, and in such a manner that proper drainage is provided for the melting of snow in the banks resulting from normal plowing. However, the Contractor will not be responsible for snow or ice removal on the pavement or traveled way opened for public usage, except within the limits of the work zone(s) which may include, but is not limited to, stairway, promenades, esplanade areas, and sidewalk, including those fronting the Contractor's office and the Engineer's field office all of which will be the responsibility of the Contractor. In order to minimize the amount of salts entering the storm sewer system, snow melt must not be used in place of shoveling, but must be used after all standing snow is removed. This does not prohibit applying reasonable amounts of snow melt prior to snowfall.

(C) CONTROL OF DUST AND DEBRIS

The Contractor shall control dust and debris within the work area and the traveled way. The Contractor shall mitigate material spilling from trucks with the use of tarpaulin covers. All dust producing materials shall be wet down with water to the extent necessary to minimize dust. When public or local inconvenience is caused by dust occasioned by the sweeping and cleaning operations, the Contractor shall furnish and sprinkle water onto the affected surfaces during the sweeping and cleaning operations; however, the application of water shall not be used as a substitute for sweeping.

The Contractor shall perform all work operations so that dust and debris is minimized within the work zone and mitigated before any of it leaves the work zone. Movement of dust and debris by wind, vehicles, persons, and the Contractor's operations shall be cause for sweeping and watering to be implemented immediately as directed by the Engineer. Also, should dust and dirt cover over all or portions of the work site it shall also be cause for immediate sweeping and watering by the Contractor.

All water furnished and applied under this item shall be free from harmful materials and shall be reasonably clean. Water shall be delivered in tanks or tank trucks, or by use of hydrants as permitted by the Department of Environmental Protection; however, no guarantee is made by the City as to the availability of suitable hydrants at the site. Where no suitable hydrants exist at the site, the Contractor shall be required to furnish water in tanks or tank trucks at no additional cost to the City.

(D) CLEANING OF SITE AND WASTE DISPOSAL

The Contractor shall be responsible for the removal of all rubbish and debris from the site of the project. The Contractor shall remove all piles of rubbish, debris, waste material and wood cratings as a result of the Contractor's operations as they accumulate. When directed by the Engineer the Contractor shall cart them away from the site. The Contractor shall employ and keep engaged for this purpose an adequate force of laborers.

The Contractor shall at the beginning and end of each day be required to pick up all litter, trash and debris (excluding garbage and recycled material set to be picked up by scheduled private and/or public sanitation pickups) adjacent to and within the work zone on a daily basis, seven (7) days a week. The Contractor shall also during the day keep clean all roadways, sidewalks and other places in which the work is being performed or which are to be used in connection therewith.

The Contractor shall protect the site against unauthorized dumping of waste materials by patrolling the site and reporting violations to the Engineer, and should any unauthorized dumping occur, it shall be immediately removed by the Contractor to the Engineer's satisfaction.

While performing the above site cleaning work, the Contractor shall have available an approved mechanical street sweeper, with operator, suitable for removing dirt, debris, dust and loose stones; a sprinkler truck; adequate size pick-up truck with driver and laborers; an adequate supply of brooms, sixteen (16) inch wide or larger; and necessary hand tools and materials. The Contractor shall arrange to have necessary persons

and equipment assigned to satisfy concerns relating to required clean up and restoration work. These persons with equipment shall be available to correct all matters requiring attention and shall be immediately available to respond to directives issued by the Engineer regarding specified problems of maintenance and cleaning.

The Contractor shall perform this work during the normal or extended working days. However, when required in accordance with the approved schedule or directed, the Contractor shall be prepared to extend this work beyond the normal work day, including weekends.

The Contractor shall provide trash receptacles for use by its construction staff. The trash shall be periodically removed and disposed of in compliance with local ordinances.

(E) DISPOSAL OF REMOVED MATERIALS

Except as may be otherwise specified herein or in the General Conditions, all materials which are permanently removed from the existing construction by the Contractor in accordance with the Contract Documents shall become the Contractor's property and shall be disposed of by him away from the site.

In addition, it is the intent of NYCDDC to have all metals that are excavated and removed from the site, such as iron castings street hardware (i.e. manhole frames and cover, valve box covers, hydrants, etc.), ductile iron sewer pipe, steel and ductile iron water main pipe, trolley track rails, etc. (excluding steel reinforcement embedded in concrete), recycled provided that they are not deemed contaminated or hazardous. Therefore, the Contractor shall agree to make every effort possible to recycle said metals removed from the site. As a record of such compliance, the Contractor shall be required to keep an accurate log of said materials that are excavated and removed from the site and where and how said materials are either processed for reuse or disposed of away from the site. A copy of said log shall be submitted to the Engineer along with the invoice submitted by the Contractor for payment each month.

(F) REMOVAL OF SURPLUS PLANT AND EQUIPMENT

When ordered by the Engineer, the Contractor shall be required to promptly move from any location within the contract area all such items of plant and equipment determined to be no longer necessary for the effective prosecution of the work at such point, to other locations to be designated by the Engineer. If, in the opinion of the Engineer, plant and equipment are no longer required on any portion of the work, they shall be removed from the site when so ordered.

Where access to regularly scheduled private and/or public sanitation pickups, such as garbage and recycled materials, is blocked due to the Contractor's operations, the Contractor shall coordinate a schedule for collection of said materials, and/or shall collect and transport garbage and recycled materials to collection points, as directed by the Engineer, for disposal by public or private collections, as appropriate.

Waste material shall not be dumped in or on any part of the City's property except by special permission of the Engineer. Concrete mixing trucks shall not be washed on City streets nor shall the waste material from the washing out of concrete mixing trucks be discharged to any street, public property, sewer manhole, catch basin, sewer, street gutter, or other above or below ground structures. All excavated materials falling on roadways and sidewalks shall be promptly swept up and removed.

(G) MAINTAINING ACCESS TO PROPERTIES AT CUT AND FILL LOCATIONS

When it is necessary to cut or fill at abutting properties in accordance with the contract requirements, the Contractor shall immediately commence construction to provide entrance to and egress from said properties as shown on the Contract Drawings and/or by one of the following methods, or modifications made thereto, when so ordered by the Engineer:

(1) "Asphalt Ramps"

Temporary access ramps shall be made hard and smooth surfaced with asphaltic material (to be paid for under Item No. 4.02 CB or 4.02 CA, as provided in the Bid Schedule) The slope of temporary ramps at driveways and transition areas shall be approximately 25% [approximately a three (3") inch rise in one (1') foot] and be limited to a width of not more than eight (8') feet for single driveways and not more than twelve (12') feet for double driveways. The slope of temporary ramps at street hardware shall range between 1:10 and 1:6 (rise:run). The slope of temporary pedestrian ramps shall be limited to a width of not less than four (4') nor more than five (5') feet and a slope of approximately 1:12.

(2) "Benching"

In locations where embankments are to be constructed on existing slopes or against existing embankments with slopes steeper than 1 (vertical) on 3 (horizontal), slopes shall be benched as shown on the Contract Drawings. Benches shall be constructed as a "Temporary Retaining Wall" (Item No. 8.12). Access to abutting properties shall be provided as shown on the Contract Drawings or as per the details shown on the NYC Department of Transportation's Standard Details of Construction, Standard Drawing for Temporary Wooden Steps (Item No. 7.15).

(3) "Specified"

By methods specified and detailed on the Contract Drawings.

(H) FINAL CLEARANCE OF SITE

Immediately after the completion of the contract and before final acceptance of the Work by the Department, the Contractor shall remove all surplus material, temporary structures, and debris resulting from the Contractor's operations. Any painted markings (layout survey, etc.), excluding utility markings made under 16 NYCRR Part 753 (utility markings made under Part 753 shall not be removed), that have been placed by the Contractor and which are still remaining at the end of the contract shall be removed. Removal of painted markings shall be done using an approved power-washing method. The entire area shall be cleared and left in a neat presentable manner satisfactory to the Commissioner.

If as a result of the Contractor's operations, obstructions have fallen into a waterway, they must be removed and the waterway and channel cleared; and the Contractor must obtain a release from the United States Coast Guard.

7.13.3. STORAGE OF MATERIALS AND EQUIPMENT. Roadways, sidewalks, gutters, crosswalks, and driveways shall at all times be kept clear and unobstructed unless a permit has been obtained from NYC Department of Transportation authorizing encumbrance of the roadway and/or sidewalk with equipment and/or material, provided it is in a manner which will not prevent the safe passage of vehicular traffic on such roadway designated to remain open, or the safe passage of pedestrians on such sidewalk and crosswalks, or block the normal drainage flow within the streets.

(A) DELIVERED MATERIALS NOT TO OBSTRUCT TRAFFIC

All materials delivered upon but not placed in the work shall be neatly piled so as not to obstruct public travel and shall be removed from the line of the work, at the direction of the Engineer, at no additional cost to the City. Unless the materials are so removed by the Contractor within the timeframe specified in the notice from the Engineer, the materials may be removed by the Commissioner and the expense thereof charged to the Contractor.

(B) PILING OF MATERIALS DELIVERED TO WORK SITE

Materials placed on the sidewalk or roadway shall be piled or stacked in a satisfactory and safe manner, enclosed with plastic barrels (Section 6.87) or barricades (Section 6.28 AA or 6.28 BA), and with pedestrian steel barricades (Section 7.36), "WARNING: KEEP OUT" signs (Section 6.25), and heavy duty safety orange construction fencing. The heavy duty safety orange construction fencing shall be safety orange in color, of heavy duty construction grade flexible plastic (light duty plastic screening fence will not be accepted), have a minimum height of four (4') feet, and shall be of a type approved by the Engineer. The heavy duty safety orange construction fencing shall be held vertically in place for its full length and shall be securely attached to barrels, utility poles, or a combination thereof, or other traffic control devices shown on the Contract Drawings or directed, in a manner approved by the Engineer. Loose materials shall be covered with tarpaulins, suitably held down. Areas adjacent to stored materials shall be kept clean and watered as required and as directed by the Engineer. When such materials are removed, the sidewalks and roadways must be immediately swept clean by the Contractor and control of dust shall be mitigated in accordance with the requirements of Subsection 7.13.2.(C), above.

Materials to be used in the work shall be compactly piled within limits to be designated by the Engineer. Sand and coarse aggregate may be piled within the roadway area. All old and such new material as has been approved, except sand and coarse aggregate, shall be neatly piled by the Contractor on the front half of the sidewalk, on planks or plates, if the same be flagged or otherwise improved.

Stored material shall be neatly stacked, placed at locations designated by the Engineer, and suitably enclosed or covered, protected, and wet down, as stipulated above. Streets under such construction

material or equipment shall be shielded by wooden planking, skids or other protective covering approved by the Engineer. All pipes, fittings and appurtenances must be carefully stored, as approved by the Engineer, so as to prevent surface drainage, excavation material or other foreign matter from entering into the pipes, fittings and appurtenances.

Waste material and excavated material will under no conditions be permitted to remain on the work site or provisions must be made by the Contractor to maintain curb-line drainage through storage areas. Stored materials shall not block the normal drainage flow or cause ponding conditions within streets, and shall not be placed within fifteen (15') feet of any fire hydrant (working or not), at bus stops, within tree root zone areas, or any other areas as set forth in the rules of the department the obstruction of which would impair the safety or convenience of the public (also see General Notes on Contract Drawings for any additional information). In a street upon which there is a surface railroad, construction materials or equipment shall not be placed nearer to the track than five (5) feet.

The Contractor shall not be permitted to store, stockpile or lay down any construction material within the boundaries of tree pits or critical root zone (CRZ) of existing trees. This material includes but is not limited to: lumber, fuel and oil containers, pipes, pipe fittings, barricades, hand tools, hoses, hardware, bricks, salvaged stone or granite, trash receptacles, or asphalt. Bulk material, equipment, or vehicles shall not be stockpiled or parked within the CRZ of any tree, or within ten (10') feet of the trunk (whichever is greater). This is done to minimize surface and subsurface root and soil compaction. This applies to all CRZs within or outside the project limit line. CRZ is calculated as (DBH x 1.5 ft = Radius). The radius calculation is equal to the critical root zone.

When no work is in progress, at least one half of the roadway must be left clear at all times.

The Contractor must remove any stored materials/equipment from the project street(s), as directed by the Engineer, within forty-eight (48) hours' notice, at no additional cost to the City. Payment for compliance with such a directive shall be deemed included in the unit price bid for this "Maintenance of Site" item.

(C) ILLUMINATION OF BUILDING MATERIAL AND EQUIPMENT ON STREETS

Pursuant to Section 19-121 of the Administrative Code of the City of New York, the Contractor's attention is directed to the following:

1. Whenever a permit is issued for any construction material or equipment, the outer surface of such construction material or equipment shall be clearly marked with high intensity fluorescent paint, reflectors, or other marking which retroreflective.

2. Each approved storage area shall have at least one (1) sign identifying the Contractor's name, Project ID/Name, and the phone number of the Engineer's Field Office.

3. Violations. Any person who shall violate any of the above provisions, upon conviction thereof, shall be subject to the Criminal penalties pursuant to Section 19-149 of the Administrative Code of the City of New York or Civil penalties pursuant to Section 19-150 of the Administrative Code of the City of New York, or both such fines and imprisonment.

(D) STORAGE WITHIN THE PROJECT LIMITS

The Contractor will not be permitted to store construction equipment, construction material or excavated material within the project limits, except where specifically approved by the Engineer and only under the following conditions:

The Contractor will not be permitted to allow the personal vehicles of the Contractor's work force to be stored, parked, or to stand within the limits of any designated work area or in "no parking", "no standing", and/or other restricted zones; vehicles so stored, parked, or found standing may be ticketed and/or towed at the owner's expense. This restriction shall exclude Contractor owned vehicles transporting and/or storing specialized equipment and/or materials necessary for the execution of ongoing contract work, as approved by the Engineer. The Contractor shall be responsible for properly notifying the Contractor's work force of these restrictions.

Payment for traffic control devices such as plastic barrels, barricades, pedestrian steel barricades, and warning signs used to enclose stored materials and equipment within the project limits will be paid for under

the appropriately scheduled items; however, when no appropriately scheduled item or items are provided in the bid schedule, the cost of those items shall be deemed included under all scheduled items.

Materials stored on site shall be "Installed in Place" within two (2) consecutive working days of delivery to the job site, unless otherwise specified or permitted by the Engineer. (Construction supervisor will be required to maintain accurate records of all delivery dates.) No material shall be stored on site during construction shutdowns and/or stoppages scheduled to last more than five (5) consecutive working days.

(E) STORAGE OUTSIDE THE PROJECT LIMITS

The Contractor may be permitted to occupy off site street/roadway areas for material storage, subject to their availability and conformance with City wide permitting requirements for storage of materials; however, this neither implies nor guaranties the Contractor the availability and/or approval of any off site street/roadway areas.

Materials and/or equipment must be stored safely and neatly as specified above, with appropriate Maintenance and Protection of Traffic devices separating the storage area from vehicular traffic and pedestrians. Loose materials must be properly and neatly stored.

No separate payment will be made for providing off site storage site(s) where approved or for providing any traffic control devices used for off site storage, the cost of which shall be deemed included under all scheduled items.

7.13.4. NONCONFORMANCE. No payment will be made under Maintenance of Site for each calendar day during which there are deficiencies in compliance with the foregoing specification requirements, as determined by the Engineer and made evident by the Engineer's failure to sign documents each day approving payment to be made under this item.

The amount of such calendar day non-payment will be determined by dividing the unit price bid per month by thirty (30).

If the Contractor fails to maintain and protect the site, or any portion thereof, adequately and safely for a period of three (3) or more consecutive hours, the Engineer may correct the adverse conditions by any means deemed appropriate, including, but not limited to, "outside services," and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the nonpayment for site maintenance listed above.

However, where continued nonconformance with the requirements of this specification is noted by the Engineer, and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Engineer, regardless of whether corrections are made by the Engineer as stated in the paragraph above.

Furthermore, in addition to the remedies specified above, in the event the Contractor shall fail to comply, within three (3) consecutive hours after written notice from the Engineer, with the requirements of the contract and the specifications in the matter of providing facilities and services for the maintenance, protection and cleanup of the construction site, the Contractor shall pay to the City of New York, until such notice has been complied with or rescinded, the sum shown per calendar day in Schedule A, for each instance of such failure, as liquidated damages and not as a penalty, for such default.

Any money due the City of New York under this provision shall be deducted from the amounts due or to become due to the Contractor for work performed under the contract.

7.13.5. MEASUREMENT.

(A) MAINTENANCE OF SITE (LUMP SUM)

Payment will be made by lump sum.

(B) MAINTENANCE OF SITE (PER MONTH)

The quantity to be measured for payment under this item shall be the number of months (to the nearest 1/4 month increment) that the Contractor satisfactorily provides for the Maintenance of Site in accordance with these specifications, including winter shut down, holiday embargo, and other work suspension periods for which the Contractor remains responsible for site maintenance. Measurement for this item shall not begin until the following conditions are met, but no earlier than the date of written notice to commence work.

1. All DOT Street opening and storage permits are obtained and valid

2. The Contractor has mobilized to the project site and set up a storage area and MPT devices.

3. Excavation must commence within 30 calendar days of mobilization to the job site. If the excavation does not begin within 30 days, the payment for Maintenance of Site will begin from the day when excavation begins.

Periods where the Contractor is demobilized and not continuing the site maintenance will not be measured for payment. The Engineer will provide written notice two weeks in advance of the Contractor being deemed demobilized. For the avoidance of doubt, reduced activity during winter shut downs, holiday embargos, and other work suspension periods as shown on the Contractor's approved CPM schedule do not count as demobilization, provided the Contractor continues to be responsible for site maintenance and responsive to notifications of nonconformance per **Subsection 7.13.4** above. Should such nonconformance occur during periods of demobilization, the liquidated damages described in **Subsection 7.13.4** above may be assessed during periods where maintenance of site is not being measured for payment.

In order to incentivize early completion, the City agrees to share the savings resulting from the reduction of the quantity measured for payment under this item.

If the determination of Substantial Completion is reached at least two (2) months earlier than the Substantial Completion date set forth in the Notice to Proceed letter, plus any approved time extensions, the Contractor and the City will evenly split the saved amount. This payment will be in addition to any payments of incentive for early completion, if one is specified for the Project.

For example, using a contract with a 30-month duration for achievement of substantial completion, the following would apply under these two scenarios:

1. Project substantial completion is achieved in 28.5 months: Because the contract was completed within two (2) months of the scheduled substantial completion date, the contractor is entitled to be paid the 28.5 month project duration for the Maintenance of Site, with no additional amounts due to the contractor from any savings.
2. Project substantial completion is achieved in 26 months: Because the contract was completed more than two (2) months prior to the scheduled substantial completion date, the contractor is entitled to be paid the 26 month project duration plus half of the four months saved, amounting to 28 months to be paid to the contractor for the Maintenance of Site.

7.13.6. PRICE TO COVER.

(A) MAINTENANCE OF SITE (LUMP SUM)

The lump sum price bid for Maintenance of Site shall include the cost of furnishing all labor, materials, plant, disposal, equipment, insurance and incidentals required to maintain, protect and clean up the site, all in accordance with the Contract Drawings, these specifications, and the directions of the Engineer. Payment will be made in proportion to the percentage of actual contract completion. The final payment for this item will be in direct proportion (whether higher or lower) to the final contract value as compared to the original contract value.

(B) MAINTENANCE OF SITE (PER MONTH)

The unit price bid per month for Maintenance of Site shall include the cost of furnishing all labor, materials, plant, disposal, equipment, insurance and incidentals required to maintain, protect and clean up the site, all in accordance with the Contract Drawings, these specifications, and the directions of the Engineer.

Where no separate item is provided for this work, the cost thereof shall be deemed to be included under all scheduled items.

Payment will be made under:

Item No.	Item	Pay Unit
7.13 A	MAINTENANCE OF SITE	L.S.
7.13 B	MAINTENANCE OF SITE	MONTH

SECTION 7.14 (NO TEXT)

SECTION 7.15 - Temporary Wooden Steps

7.15.1. INTENT. This section describes the construction and maintenance of temporary wooden steps.

7.15.2. DESCRIPTION. Under this section, the Contractor shall construct and maintain temporary wooden steps where shown on the Contract Drawings, and shall furnish all labor, materials, plant, equipment and incidentals required to complete the work as specified and to the satisfaction of the Engineer.

7.15.3. MATERIALS. All timber shall be Douglas Fir Grade No. 1, with full depth penetration of wood preservative.

Wood Preservative shall be either water-borne or oil-borne, at the Contractor's option, and shall conform to the following applicable requirements:

Wood Preservative-Water Borne. Water-borne wood preservatives shall be Ammoniacal Copper Arsenite conforming to the requirements of American Wood Preservers' Association Standard P5. Water-borne wood preservatives shall be applied in conformance with American Wood-Preservers' Association Standards C1, C2, C5 and C14. Minimum net retention shall be as required for material in contact with soil.

Wood Preservative-Oil Borne. Pentachlorophenol for pressure treatment shall conform to American Wood-Preservers' Association Standard P8. Oil-borne wood preservative shall be applied in conformance with American Wood-Preservers' Association Standards C1, C2, C5 and C14. The net retention of pentachlorophenol shall be as required for material in contact with soil.

Fasteners, such as nails, shall meet the standard industrial fastener specifications for the intended application, and galvanized in conformance with ASTM Designation A 123.

7.15.4. METHODS. The construction of temporary wooden steps where shown on the Contract Drawings, and all work related thereto, shall be performed in compliance with the details shown on the Contract Drawings and as directed by the Engineer.

All work shall conform with National Design Specifications for Stress Grade Lumber and its Fastenings.

All timber at the site of the work shall be stored in piles on supports at least 12" above the ground surface, and so piled as to prevent warping and to shed water. When required by the Engineer, it shall be protected from the weather by suitable covering. The treated timber shall be close-stacked. The ground under and in the vicinity of all stacks shall be cleared of weeds and rubbish and shall be drained to prevent accumulation of water.

Workmanship shall be first class and only competent carpenters shall be employed. All timber shall be accurately cut and framed to a close fit in such manner that the joints will have even bearing over the entire contact surfaces. No blocking or shimming will be allowed in joints. Timber shall be cut off with a saw; no axe is to be used. Unless otherwise specified, heads of nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood. Deep hammer marks in wood surfaces shall be considered evidence of poor workmanship and sufficient cause for rejection of the pieces affected.

The timber shall be carefully handled, without sudden dropping, breaking of outer fibers, bruising, or penetrating the surface with tools. The timber may be handled with rope slings. Cant hooks, peaveys, pikes, or hooks shall not be used.

Temporary wooden steps shall be maintained for the duration of the contract in a condition safe to the public and satisfactory to the Engineer.

7.15.5. MEASUREMENT. The quantity of Temporary Wooden Steps to be measured for payment shall be the number of linear feet of wood steps actually constructed, measured along the toe of each step, between the limits of payment set at each location by the Engineer.

7.15.6. PRICE TO COVER. The contract price per linear foot for Temporary Wooden Steps shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and incidentals required to

construct and maintain temporary wooden steps where shown on the Contract Drawings, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.15	TEMPORARY WOODEN STEPS	L.F.

SECTION 7.16 - Test Pits

7.16.1. DESCRIPTION. Under this section, the Contractor shall be required to excavate test pits for the purpose of ascertaining the location of proposed catch basins, inlets, and pipe connections to be installed under other contract items; for vault investigation purposes; for locating NYC Transit Authority (NYCTA) facilities; and, for investigation of trolley tracks and their yokes, vaults and structures as directed by the Engineer

All test pits shall be covered with steel plates during non-working hours and uncovered only as required for excavation and inspection work.

7.16.2. METHODS.

(A) GENERAL

Test pits shall be any excavation in sidewalk, pavement, soil, hardpan, weathered rock or other unconsolidated or partially consolidated overburden which has an open cross-sectional area large enough to permit the installation of the proposed inlet, catch basin, or pipe connection and as directed by the Engineer for other subsurface investigation. The maximum depth of each test pit will be to the depth of the proposed catch basin, inlet, or pipe connection to be installed under other contract items. The approximate dimensions of the test pits shall be five feet by six feet for inlets and basins, and four feet by the length of the trench for pipe connections, unless otherwise directed by the Engineer.

(B) EXCAVATION

Excavation of test pits shall be performed in conformance with the requirements of Section 6.02 for Unclassified Excavation, and as modified herein.

Existing pavements and sidewalks to be removed shall be neatly cut along the lines of removal with a saw or other approved equipment which will leave a neat straight joint line along the juncture with subsequently replaced pavement and sidewalk. Where excavation through curbs is required, the existing curbs shall be left in place wherever possible or carefully removed and stored for subsequent resetting in the restoration work. All excavation work for test pits shall be performed using hand tools. Use of hand operated pneumatic and electric jack hammers will be permitted only for breaking pavements and removal of masonry, concrete, and boulders or as otherwise directed by the Engineer. Pavement and sidewalk above the NYCTA structures shall be broken by hand where directed by the Engineer.

The Contractor shall be required to excavate all material of whatsoever nature encountered, including large masses of concrete, cemented masonry, and boulders, until the buried utility ducts, foundations, structures, etc. have been exposed as directed by the Engineer.

All materials excavated from each test pit shall be immediately removed from the site by the Contractor.

Test pits shall be excavated at the locations shown on the Contract Drawings for special shallow catch basins and inlets and where directed by the Engineer.

Additional test pits may be required and shall be excavated where and as required by the Engineer. Care shall be taken that no existing utility or structure is broken or damaged. All broken or damaged facilities due to the Contractor's operations shall be immediately repaired or replaced by the Contractor at the Contractor's own cost, to the satisfaction of the Engineer and the owner of the utility or structure, at no additional cost to the City.

Temporary timber sheeting will be required for depth of pits greater than five (5} feet and may be required for pits of depth less than five (5') feet depending on site conditions. However, the Contractor shall be held accountable and responsible for the sufficiency of all sheeting and bracing used and for all damage to persons or property resulting from the improper quality, strength, placement, maintenance, or removal of the same.

Regardless of the type of excavation protection used, it shall be provided to satisfy the following:

1) Rule 23 of the New York State Industrial Code.

2) To prevent injury to workmen and the public or to avoid damage to existing water and sewer pipes or other structures, or to pavements and their foundations, through caving or sliding of the bank of the excavation.

Should it become necessary as determined by the Engineer, to enlarge the test pit in any dimension after sheeting has been placed, the Contractor shall remove portions of the sheeting as necessary, enlarge the test pit as directed and replace the sheeting without additional compensation for this work, other than for the additional volume of material excavated.

(C) MAINTENANCE OF THE PIT

The excavated test pit shall be maintained free of debris and kept dry by the Contractor in order to permit the inspection of structures and utilities by the Engineer and representatives of the Department. The Contractor shall, upon completion of excavation and inspection each day, immediately backfill the test pit and place a temporary pavement of 4" (unless otherwise specified) Asphaltic Concrete Mixture over the excavated area to meet the existing pavement. Where the Contractor cannot complete the required excavation, inspection by the Engineer, and backfilling that same day, the Contractor shall be required to provide steel plates to cover the excavation and open the full width of street to traffic during non-working hours as directed by the Engineer, at no additional cost. To assist the Engineer in making the Engineer's inspection, all labor, ladders, electric lamps, etc., as maybe required, shall be furnished by the Contractor.

At all times when work is being performed and the pits are not covered with steel bridging, the Contractor shall provide construction barricades and maintain traffic as shown on the Contract Drawings and as directed by the Engineer.

(D) BACKFILL

Immediately upon completion of each test pit and when directed by the Engineer, the Contractor shall backfill each test pit, as specified under Section 4.11, to a depth of four (4") inches (unless otherwise specified) below the top of the adjacent existing pavement in the roadway area and to a depth of two (2") inches below the top of the adjacent sidewalk in the sidewalk area.

(E) PAVEMENT AND SIDEWALK RESTORATION

After backfilling each test pit, the Contractor shall cover the filled test pits with adequate steel plates. Steel plates shall be maintained until they are replaced with a temporary pavement or sidewalk placed to match the adjacent grade. In the roadway, the temporary pavement shall consist of four (4") inch thick (unless otherwise specified) asphaltic concrete. In the sidewalk, the temporary sidewalk shall consist of a two (2") inch thick layer of asphaltic concrete.

7.16.3. MEASUREMENT. The quantity of Test Pits to be measured for payment under this item shall be the number of cubic yards of material removed from within the limits of the test pit dimensions as directed by the Engineer. Volume occupied by existing pipes, utility lines, foundation, or other structures remaining within the maximum payment lines will not be deducted from the total volume measured except where the cross sectional area of these facilities exceeds four (4) square feet.

7.16.4. PRICE TO COVER. The unit price bid per cubic yard for Test Pits shall include the cost of all labor, materials, equipment, insurance, and appliances required to excavate test pits, including cutting existing pavement, removal of all materials regardless of their nature; removing and disposing of surplus and unsuitable excavated materials off the site; remove, store, and reset curb when necessary; sheeting and re-sheeting; steel bridging and posting; and furnishing and depositing fill material as required; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment for temporary pavement and sidewalk will be made under Item 4.02 CB - Asphaltic Concrete Mixture or 4.02 CA – Binder Mixture. Payment for providing traffic control devices will be made under the appropriately scheduled contract items.

Payment will be made under:

Item No.	Item	Pay Unit
7.16 D	TEST PITS	C.Y.

SECTION 7.17 (NO TEXT)

SECTION 7.18 - Controlled Low Strength Material (CLSM)

7.18.1. DESCRIPTION. The work consists of mixing and placing Controlled Low Strength Material (CLSM) or Controlled Low Strength Material (CLSM) with slag/fly ash (fly ash may not be used without the written approval of the NYCDDC's Assistant Commissioner of Infrastructure Design) at the locations shown on the Contract Drawings or where ordered by the Engineer.

7.18.2. MATERIALS.

(A) GENERAL

The Contractor shall provide CLSM containing aggregate, Portland cement and water. It may also contain, at the Contractor's option, slag/fly ash* or chemical admixtures in any proportions such that the final product meets the strength and flow consistency requirements included in this specification.

Materials used in this work shall conform to the following requirements of the NYS Department of Transportation, Standard Specifications:

Portland Cement, Type 1 or Type 2:	§ 701-01	
Aggregates:	§ 703-01	
Chemical Admixtures:	§ 711-08	(The mix may include high air generators manufactured for CLSM)
Fly Ash*:	§ 711-10	(Waive the loss on ignition requirement)
Slag:	§ 712-12	
Water:	§ 712-01	

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* *The use of fly ash shall be in strict compliance with the requirements of **Subsection 7.18.3(B)**, herein, and the Contractor must obtain written approval from NYCDDC's Assistant Commissioner of Infrastructure Design prior to its use.*

(B) TESTS AND CONTROL METHODS

Certification from an approved testing laboratory that the CLSM will have a 28 day compressive strength between 40 PSI and 150 PSI shall be furnished by the Contractor and provide to the Engineer prior to delivery of any materials.

Hardened mixtures shall reach a minimum compressive strength of 15 PSI within 48 hours; a long term density between 90 to 110 PCF; and, a minimum of 20% and a maximum of 40% Air, when measured in accordance with ASTM D 6023. In order to allow for future manual excavation the 28 days density shall be 90 to 110 PCF.

Design the CLSM mix so that it sets within the time stated in the Contract Documents. If no set time is required by the Department, the set time shall conform with the Maintenance and Protection of Traffic scheme and requirements of the project.

The CLSM shall have a minimum diameter spread of 8" as determined by the following procedure to be performed by the Engineer:

Fill a hollow plastic or metal cylinder 8" in length and 3" inside diameter with the CLSM and strike off the surface.

Raise the flow cylinder in a continuous motion without rotation.

Immediately measure the spread of the CLSM along two diameters which are perpendicular to each other.

The Contractor shall cast four (4) specimens (cylinders) for each batch in accordance with the Department's Materials Method 9.2 - Field Inspection of Portland Cement Concrete, and deliver them to a NYCDDC QA approved Material Testing Laboratory within seven days of the pour date for evaluation.

For each 50 Cubic Yard or portion thereof, the following Field Testing shall be performed to confirm the material conformance with the approved design mix:

ASTM D 6023	Unit Weight, Yield Cement Content & Air Content
ASTM D 5971	Sampling Freshly Mixed CLSM
ASTM D 4832	Preparation and Testing of CLSM
ASTM D 6103	Flow Consistency of CLSM

Prior to proceeding with subsequent construction operations, either one of the following Field Tests shall be performed on the surface of the in-place CLSM to estimate its surface bearing value and its suitability for load application.

ASTM D 6024	Ball Drop on CLSM
ASTM D 3441	Cone and Friction Cone Penetration Tests

A minimum of three (3) tests shall be performed for each 200 Square Feet or portion thereof, and evaluated against the following criteria:

ASTM D 6024	Inspect the indentations for visible water or sheen brought to the surface by the dropping action of the ball.

If the diameter of the indentation is equal or less than 3 inches, than the CLSM is suitable for load application, provided that:

a. The surface looks similar to that before the test with the exception of the indentation, and;

b. There is no visible surface water or sheen visible in the indentation.

ASTM D 3441	The average value of the three (3) tests shall be not less than Four (4) Tons/Square Foot.

The minimum value per individual test shall not be less than Three (3) Tons/Square Foot.

7.18.3. CONSTRUCTION DETAILS.

(A) GENERAL.

The Contractor shall provide all equipment for this work subject to approval of the Engineer. Mix the materials at a stationary mixing plant which is either a continuous or a batch type plant, designed to accurately proportion either by volume or by weight, so that when the materials are incorporated in the mix, a thorough and uniform mix will result.

The mix may be transported in open haul units provided the material is placed within 30 minutes of the end of mixing. Use a rotating drum unit capable of 2 - 6 rpm to transport material that cannot be placed within 30 minutes after the end of mixing. In cases where placement cannot take place within 30 minutes from the end of mixing, the material shall be transported in a rotating drum capable of 2 – 6 rpm.

Provide a mixer capable of mixing CLSM that has the specified compressive strength and flow consistency. Mix all components so as to produce a uniform product. For work involving CLSM quantities of less than two (2) cubic yards, the Engineer may permit the Contractor to use a small construction mixer.

Narrower trench widths can be employed when using CLSM due to the self-compacting properties of the material. Construction personnel and equipment are not required to be in the trench for compaction operations. Refer to the current NYSDOT Metric Standard Sheet No. M204-1, issued under EB 02-003, for Controlled Low Strength Material (CLSM) Installation Details for Circular and Elliptical Corrugated Metal Pipes, Structural Plate Pipes and Pipe Arches, and Reinforced Concrete and Other “Rigid” Pipes for additional requirements.

For installations that require construction personnel to temporarily occupy the trench, the Contractor shall follow all OSHA requirements.

(B) FILL AND BACKFILL AT STRUCTURES, CULVERTS, PIPES, CONDUITS AND DIRECT BURIAL CABLES.

The Contractor shall place the CLSM using a method approved by the Engineer, in accordance with the appropriate NYSDOT Standard Sheet for additional guidance on the use of CLSM as backfill material.

When placing CLSM for pipe backfill, discharge the material onto the top of the pipe at the center.

Do not place CLSM in contact with aluminum pipe, including connections, fixtures, etc., unless the aluminum has been coated with an approved primer.

Do not place CLSM containing fly ash in contact with cast iron or ductile iron pipes, fittings or appurtenances, or in contact with steel reinforcement bars, wires, metal conduits, etc.

CLSM should be kept encapsulated with soil, as it is highly erodible and disintegrates when left exposed to the environment

In situations where CLSM is used as backfill around lightweight pipe, take precautions to counteract the pipe's buoyancy.

7.18.4. MEASUREMENT.

For 7.18 CM: The quantity to be measured for payment shall be the number of Cubic Yards of satisfactorily placed CLSM computed between the payment lines shown on the Contract Documents or from payment lines established in writing by the Engineer.

A deduction shall be made for pipes (based on nominal diameters) and other payment items when the combined cross-sectional area exceeds one (1) sq. ft.

Unless otherwise shown, no deduction will be made for the cross-sectional area of an existing facility. No additional quantity shall be measured for payment to make up losses due to foundation settlement, compaction, erosion, or any other cause.

Cross sectioning, for the purpose of determining quantities for payment, shall be employed only where payment lines are not shown on the Contract Documents and drawings, and cannot be reasonably established by the Engineer.

For 7.18 CM-V: The quantity to be measured for payment shall be the number of Cubic Yards of CLSM furnished and placed in the work, complete, as determined by (a) truck delivery tickets form an approved concrete batching plant, or (b) the volume of CLSM batched and mixed on the site, specified and approved by the Engineer.

7.18.5. BASIS OF PAYMENT. The unit price bid per cubic yard of CLSM shall include the costs of furnishing all labor, materials, equipment, insurance, and incidentals necessary to complete the work, except where specific costs are designated or included in another pay item of work.

Payment will be made under:

Item No.	Description	Pay Unit
7.18 CM	CONTROLLED LOW STRENGTH MATERIAL (CLSM)	C.Y.
7.18 CM-V	CONTROLLED LOW STRENGTH MATERIAL (CLSM) (VEHICLE MEASUREMENT)	C.Y.

SECTION 7.19 - Load Transfer Joint

7.19.1. INTENT. This section describes the construction of Load Transfer Joints.

7.19.2. DESCRIPTION. Load Transfer Joints shall consist of the installation of steel dowels to be placed between existing concrete base for pavement and new concrete base for pavement to be placed under another contract item.

7.19.3. MATERIALS.

(A) DOWELS shall be of the types, sizes and placement shown on the Contract Drawings. Epoxy coating of bars shall be furnished, applied, sampled, tested, repaired, handled and stored in accordance with the requirements of **Section 709-04, EPOXY-COATED BAR REINFORCEMENT**, of the State of New York, Department of Transportation, Standard Specifications. Acceptance of epoxy coated joint tie bars and dowels shall be based on: the names and locations of the reinforcing bar manufacturer, the epoxy reinforcing bar applicator, and the epoxy coating material appearing on the NYS Department of Transportation's Material and Equipment Approved List; and, certifications from the steel manufacturer, the coating manufacturer, and the coating applicator as to their compliance with these specifications. These certifications shall accompany the material delivered to the job site.

(B) GROUT shall be a quick-setting, non-shrinking mortar of a type approved by the Engineer. It shall contain no ferrous metals, nor rust or corrosion promoting agents. The material shall show no shrinkage on setting but may exhibit slight expansion of no more than 0.002 inch per linear inch. The compressive strength (two inch cubes cast from this material) shall have a minimum strength of 4,500 psi at age one (1) hour and 5,000 psi at age twenty-four (24) hours.

7.19.4. METHODS. The load transfer joint shall be constructed as shown on the Contract Drawings.

Holes shall be drilled into the existing concrete base at the longitudinal spacing and depth shown on the Contract Drawings for the placement of dowel bars. A frame, as approved by the Engineer, must be used to hold the drill in a horizontal position at the correct height and provide the means to force the bit into the concrete by lever action.

Dowel bars shall then be grouted into the holes drilled in existing slab. Care must be taken to insure good coverage of the grout in the hole. The longitudinal axis of the dowel must be perpendicular to the joint line and parallel to the surface of the pavement slab when the grout has set. Tolerance of placement shall be $\pm$1/4" inch from end to end of bar.

Concrete shall be furnished and placed under the appropriate "Concrete Base for Pavement" item.

After the concrete base for pavement has hardened, all joints shall be cleaned of all loose and undesirable materials before sealing the joints with the reflective cracking membrane under Item 6.91.

7.19.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of Load Transfer Joint constructed, measured in place, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

7.19.6. PRICE TO COVER. The contract price bid per linear foot of Load Transfer Joint shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to furnish and install the load transfer expansion joint complete in place, including all steel dowel bars, grout, etc., to furnish such samples for testing as may be required and to maintain the pavement in good condition as specified in Section 5.05, and completing the work in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The cost of concrete placed at the joint shall be paid for under the appropriate "Concrete Base for Pavement" item.

Payment will be made under:

Item No.	Item	Pay Unit
7.19	LOAD TRANSFER JOINT	L.F.

SECTION 7.20 - Reset Basement Access

7.20.1. INTENT. This section describes the work to be done in new sidewalk areas to reset existing access doors and hatches leading to the basement areas of adjacent buildings.

7.20.2. DESCRIPTION. The work shall consist of the removal, storage and resetting of existing access doors and frames to the new sidewalk elevations, including any required alterations to the supporting walls and all other walls under the frame. If, in the opinion of the Engineer, the existing doorway is in an unsafe physical condition, it shall not be reset and a steel safety closure plate shall instead be placed over the doorway opening to maintain the security of the basement.

7.20.3. MATERIALS. The existing frame and doors or hatches shall be reused wherever possible.

Brick shall meet the requirements for manhole brick, ASTM C 32, Grade MS.
Concrete shall be Class B-32, Type IIA;
Cement shall be Type II Portland;
Sand shall be Type 1A;
Coarse Aggregate shall be Type 1, Grade B, or Type 2 Size No. 57;
Air Entraining Agent shall be as approved and added at the time the concrete ingredients are mixed with water.

Steel Safety Closure Plate shall be capable of supporting pedestrian loading over the required span and shall have a safety tread anti-slip finish acceptable to the Engineer.

All other unspecified materials required for the work shall be as approved by the Engineer.

7.20.4. METHODS. The Contractor shall not remove or in any way disturb an existing basement access doorway or hatch until approved by the Engineer.

The Contractor shall, to the satisfaction of the Engineer, indicate at each basement access the locations of new sidewalk elevations. When directed by the Engineer that a specific basement access is to be reset, the Contractor shall progress the work generally as follows:

(A) Carefully remove the existing doors and/or hatch covers and frame. Removal shall be done in a manner approved by the Engineer and shall not damage the existing material to be reused. If, in the opinion of the Contractor, the existing frame and doors are of a physical condition not permitting damage-free removal or resetting, this must be made known to the Engineer.

(B) The frame shall be cleaned of all loose concrete and other materials as may be existent, to the satisfaction of the Engineer.

(C) The Contractor shall store the frame and doors in a secure location.

(D) All existing walls around the opening shall be broken down or built up the minimum height required to meet the new sidewalk elevations, and any required frame pocket, anchors and supports shall be provided.

(E) The existing frame and doors shall be reset on the rebuilt walls to the satisfaction of the Engineer.

(F) At all times, the Contractor shall maintain the security of the basement area in a manner approved by the Engineer.

When the work of removing, rebuilding and resetting of the existing doors extends beyond the working period and the entrance is left in an unfinished open state until the next working period, the Contractor shall do the following and as directed by the Engineer:

(A) At sidewalk level, the area shall be fully enclosed and/or barricaded to prevent accidental entry by pedestrian traffic.

(B) At basement level, the entrance shall be sealed against entry by the construction of a corrugated metal enclosure. When directed by the Engineer, the enclosure provided shall be constructed so as to permit authorized entrance to the basement area.

(C) During all non-working periods that the basement entrance remains incomplete, the Contractor shall provide continuous Security Guard Service.

When directed by the Engineer, due to the original condition of the frame and doors or due to other conditions, the Contractor shall remove and dispose of the existing frame and cover, rebuild the walls to the proper elevations and then place a steel safety closure plate over the entire basement entrance to maintain security of the area. The steel safety closure plate shall be securely held in place in a manner approved by the Engineer, which will permit only authorized access to the basement areas. However, if the owner at the Owner's own expense supplies the replacement frame and doors or hatch covers the Contractor shall install the replacement frame and doors or hatch covers under this Item 7.20, as a basement access reset, in lieu of the steel safety closure plate.

7.20.5. MEASUREMENT. The quantity of Reset Basement Access to be measured for payment shall be the perimeter in linear feet of the doorway or hatch reset, measured along the outside of the frame at the elevation of the top of new sidewalk. Any basement access reset without the prior approval of the Engineer will not be measured for payment.

Steel Safety Closure Plate installed at approved locations, in conformance with the orders of the Engineer, will be measured for payment under Item 6.22 F, Additional Hardware. Closures required due to the need for maintaining security during the work of this Section will not be measured for payment.

Resetting of vault covers, manhole covers, etc., owned by private utility companies will not be a part of the work of this Section and will not be measured for payment.

7.20.6. PRICE TO COVER. The contract price per linear foot for Reset Basement Access shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals needed to remove, clean, store and rebuild supports, maintain security (including enclosures and Security Guard) and reset the basement access doors as directed by the Engineer. Any damage to the frames, doors or any part thereof caused by the Contractor's operations shall be replaced to the satisfaction of the Engineer, at no additional cost to the City.

Payment will be made under:

Item No.	Item	Pay Unit
7.20	RESET BASEMENT ACCESS	L.F.

SECTION 7.21 (NO TEXT)

SECTION 7.22 - Slope Protection

7.22.1. INTENT. This section describes the work of providing slope protection throughout the project where there are sloped areas to be graded steeper than 1 vertical on 2 horizontal. These slopes must be protected from erosion until such time as the topsoiled and seeded areas can permanently establish themselves.

7.22.2. DESCRIPTION. The work under this item shall consist of preparing the ground surface, furnishing and placing jute mesh on designated areas, and caring for the work as specified.

7.22.3. MATERIALS. The material to be used for slope protection shall meet the following requirements:

(A) JUTE MAT

Jute mat shall be cloth of a uniform plain weave of undyed and unbleached single jute yarn, 48 inches plus or minus 1 inch in width and weighing an average of 0.9 pounds per linear yard of cloth with a tolerance of plus or minus 5 percent, with approximately 60 warp ends per yard width of cloth and forty weft ends per linear yard of cloth. The yarn shall be of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than one half its normal diameter.

(B) STAKES

Stakes for pinning mats shall be approximately 1” by 3” lumber cut in a triangular shape with a minimum length of 18 inches of sound, unsplit wood with no defects that may impair their usefulness.

7.22.4. METHODS.

(A) TIME OF PLACEMENT

The slope protection material shall be applied as soon as possible but not more than 24 hours after application of topsoil. In the event of impending inclement weather, rain, high winds, or other adverse conditions, the Contractor shall be directed to place the slope protection immediately after the topsoil operations. At no time shall the jute mesh be placed on frozen ground. Any erosion or damage due to the Contractor’s tardiness or improper application of slope protection shall be repaired, as directed by the Engineer, at the Contractor’s own expense.

(B) GROUND PREPARATION AND INSTALLATION

Areas to receive jute mesh shall be shaped, graded, and compacted to the lines and grades shown on the Contract Drawings or as directed by the Engineer.

Jute mesh shall be placed without stretching on the freshly prepared surface so that it lays loosely on the soil and in contact with the soil at all points and then rolled or tamped firmly into the soil surface. The upper end of each roll of jute shall be turned down and buried to a depth of 6 inches with the soil firmly tamped against it.

Check slots shall be constructed at 50 ft. intervals unless otherwise approved. The construction procedure shall consist of placing a fold of jute 6 inches vertically into the ground and tamping soil firmly against it.

Jute mesh shall be placed so that all edges shall have a minimum overlap of 6 inches. The ends of rolls shall be placed with the upgrade section on top.

Jute mesh shall be held tightly to the soil by wooden pegs driven firmly into the ground. Wooden pegs shall be spaced not more than 3 feet apart along the sides of the jute mesh and not more than 1 foot apart at roll ends, check slots, and other critical areas as determined by the Engineer.

Areas of jute mesh shall be fertilized and seeded in accordance with the specifications for the seeding item in the contract.

(C) CARE AND REPAIR

The Contractor shall care for the areas of jute mesh installation until acceptance of the contract. Such care shall consist of providing approved warning signs or barricades for protection against traffic, and repairing

areas damaged by vehicles, erosion, fire or other causes, to re-establish the grade and conditions of the area as specified.

In addition, until acceptance of the contract, grass shall be moved to a height of three inches when growth reaches six inches or when the growth tends to smother seedlings or as directed.

7.22.5. MEASUREMENT. The quantity to be measured for payment shall be the number of square yards of the surface area acceptably treated with slope protection.

7.22.6. PRICE TO COVER. The contract price for Slope Protection shall be the unit price per square yard and shall cover the cost of all labor, material (including stakes), equipment, excavation and backfill for anchorage, insurance, and all other incidentals required to complete the work in accordance with the Contract Drawings, specifications, and directions of the Engineer.

The cost of furnishing and placing of topsoil and seeds with fertilizer will be paid for under the topsoil and seeding items in the contract.

Payment will be made under:

Item No.	Item	Pay Unit
7.22	SLOPE PROTECTION	S.Y.

SECTIONS 7.23 THRU 7.28 (NO TEXT)

SECTION 7.29 – Security Guards

7.29.1. SCOPE. Under this section, the Contractor shall furnish all personnel, materials, equipment, and incidentals required to provide uniformed unarmed security guards to continuously patrol the work site in accordance with the specifications and the directions of the Engineer.

7.29.2 PERSONNEL. Each unarmed security guard shall be employees of a firm bonded and licensed by the State of New York to provide security and protective services. The Contractor shall provide security guards as specified.

7.29.3. PATROL SERVICE. The Contractor shall provide the services of a security guard for the continuous patrol of the contract site and facilities during non-working hours.

It shall be the responsibility of the security guard to assure that all barricades, lights, advance warning signs, construction signs and all other temporary traffic control devices are erect, in good condition, and performing their intended function which shall include, but not be limited to, the prevention of unauthorized cars being parked within the work site area.

In the event that the security guard cannot physically take care of a hazardous or unsafe condition, the Contractor shall make arrangements for emergency assistance to the security guard, upon notice from the guard or the Engineer.

During sewer work, the security guard shall also assure that all pollution control devices are functioning properly.

7.29.4. PROCEDURES. The Contractor shall submit to the Engineer for the Engineer's approval proposed patrol station layouts for the areas to be patrolled (as designated by the Engineer). Each patrol station and the base station shall be supplied with a protective housing and key for a watchmen's clock system. The Contractor shall also provide a tape model watchman's clock for use of the guard. The Contractor shall furnish an enclosed base location with a toilet and cellular telephone for use by the guard.

The security guard shall patrol the designated areas at least once every half hour, proceeding from patrol station to patrol station in the proper sequence and punching in at each patrol station and the base station. The security guard shall report by telephone to the guard's home office at the beginning and end of the guard's shift. If the guard fails to call, a relief guard shall be dispatched to determine the cause and take over patrol duties if necessary. At the end of each patrol period, the clock tape shall be removed in the presence of an authorized Department representative and submitted to said representative for time record purposes.

Security guards will be required to prepare a daily report on the condition of all barricades, delineators, flares, markers, lights, advance warning signs, etc., and shall also note any deficiencies. All hazardous conditions along with reporting of any accidents shall also be included in this report. Reports shall be hand delivered on a daily basis to the Engineer.

7.29.5. MEASUREMENT. The quantity to be measured for payment under each item shall be the actual number of person hours worked by each approved person rendering security guard services.

The minimum hours of payment for any period of security guard service in any one (1) day shall be four (4) hours.

7.29.6. PRICE TO COVER. The contract prices bid per person hour shall cover the cost of furnishing all personnel, materials, guard uniforms, equipment, insurance, and incidentals required to complete the work in accordance with the specifications and the directions of the Engineer.

It shall be noted that the Contractor is responsible for the security of the Contractor's own materials and equipment, at the Contractor's own expense.

Payment will be made under:

Item No.	Item	Pay Unit
7.29	SECURITY GUARDS	PERSON-HOURS

SECTION 7.30 - Removal of Tracks

7.30.1. DESCRIPTION. Under this section, the Contractor shall be required to remove and dispose of existing trolley tracks, which may include, but not be limited to, rails, creosoted ties, yokes, "I" beams, concrete ducts, main conduit, rail and yoke footings and foundations where they exist, all of which are outside the limits of roadway vaults, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer. Each set of tracks shall include a pair of rails; associated electrical ducts, ties and tie foundations and/or yokes spaced approximately five (5') feet apart and their concrete foundations. The existing rail size and weight is indeterminate.

The removal of trolley tracks within the limits of roadway vaults shall be paid for under Item 7.31 A, Demolition of Roadway Vaults.

7.30.2. METHOD. The Contractor shall be required to excavate and dispose of trolley tracks which may include, but not be limited to, rails, creosoted ties, yokes, "I" beams, concrete ducts, main conduit, rail and yoke footings and foundations. The work shall also include any cutting of trolley tracks and their appurtenances as required to accommodate their removal. Width of excavation shall be as shown on the Contract Drawings. Length of excavation shall be limited to length of track located within the pavement designated to be reconstructed. Depth of excavation shall be to the bottom of existing track foundation or to the bottom of the proposed street concrete base, whichever is lower, unless otherwise specified.

A section of existing trolley rail shall be exposed for a more accurate determination of existing conditions. The method of splicing rails, the method of fastening rails to ties or yokes, and the materials and dimensions of the rails and yokes shall be noted. A written sequence of operations shall be submitted by the Contractor for approval of the Engineer.

All material removed hereunder shall become the property of the Contractor, unless otherwise provided, and shall be disposed of away from the site by him.

7.30.3. MEASUREMENT.

(A) PER CUBIC YARD

The quantity to be measured for payment shall be the number of cubic yards of track and their appurtenances actually removed and disposed of, inclusive of rails, ties, yokes, concrete ducts, main conduit, rail and yoke foundations, measured within the limits shown on the Contract Drawings.

(B) PER LINEAR FOOT

The quantity to be measured for payment shall be the number of linear feet of tracks removed and disposed of, inclusive of rails, ties, yokes, concrete ducts, main conduit, rail and yoke foundations, measured along the center line of each pair of rails.

7.30.4. PRICES TO COVER. The contract prices bid per linear foot or per cubic yard of track removed shall cover the cost of all labor, plant, material, equipment, insurance, and necessary incidentals required for completing the work in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.30 A	REMOVAL OF TRACK	C.Y.
7.30 B	REMOVAL OF TRACK	L.F.

SECTION 7.31 - Demolition of Roadway Vaults and Truss Blocks

7.31.1. WORK TO INCLUDE. Under this section, the Contractor shall be required to demolish, remove, and dispose of concrete, steel rails, concrete reinforcement, brick walls, and debris in roadway vaults and concrete and reinforcement in truss blocks for curved sections of trolley tracks as indicated on the Contract Drawings or directed by the Engineer.

7.31.2. GENERAL.

(A) DISPOSAL

The Contractor shall remove all debris from within the vaults. No debris arising from the demolition of the vaults or otherwise deposited therein will be allowed to remain in the vaults.

Material resulting from the demolition will not be accepted as fill. All materials resulting from demolition operations or required to be excavated in connection with such operations, except as otherwise provided or directed, shall be disposed of by the Contractor away from the demolition site and the site of the contract work. Said materials shall not be dumped, placed, stored or disposed of within the limits of any existing or projected public street or road. The burning of debris or other demolition materials will not be permitted.

(B) DAMAGES

The Contractor shall be responsible for all damages resulting from and due to the Contractor's demolition operations. No additional payment or compensation will be made or allowed the Contractor for costs incurred for repairs and replacements required to satisfactorily remedy the aforesaid damages.

(C) PROTECTION OF UTILITIES

The Contractor shall seal or plug all storm sewers leading from the structures to be demolished. The Contractor shall maintain and preserve all utilities traversing the structures to be demolished.

7.31.3. METHODS. Within the limits shown or directed, all structures and appurtenances shall be completely removed except that walls shall be removed to a depth of two (2') feet below new subgrade of pavement. Vault floors shall be broken up to prevent accumulation of water. No piece of masonry or concrete when broken, shall exceed eighteen (18") inches in its greatest dimension.

All material demolished hereunder shall become the property of the Contractor, unless otherwise provided, and shall be disposed of away from the site by him, including all debris of every kind which has accumulated in the vaults.

7.31.4. MEASUREMENT. The quantity to be measured for payment under Item 7.31 A, Demolition of Roadway Vaults, shall be the total number of cubic yards of material demolished, removed, and disposed of from the specified vaults, measured in place before demolition.

The quantity to be measured for payment under Item 7.31 B, Demolition of Trolley Track Truss Blocks, shall be the total number of cubic yards of material demolished, removed, and disposed of from the specified truss blocks, measured in accordance with Section 4.11.7.(B), Rock Excavation.

7.31.5. PRICES TO COVER.

(A) DEMOLITION OF ROADWAY VAULTS

The contract price bid for Demolition of Roadway Vaults shall be a unit price per cubic yard and shall cover the cost of all labor, plant, equipment, insurance, and necessary incidentals required to demolish, remove, and dispose of concrete, steel rails, concrete reinforcement, brick walls, and debris in roadway vaults in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

(B) DEMOLITION OF TROLLEY TRACK TRUSS BLOCKS

The contract price bid for Demolition of Trolley Track Truss Blocks shall be a unit price per cubic yard and shall cover the cost of all labor, plant, equipment, insurance, and necessary incidentals required to demolish, remove, and dispose of concrete and reinforcement in trolley track truss blocks in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Backfill for Demolished Roadway Vaults will be provided for under the item for "Fill, Place Measurement", unless otherwise specified.

Payment will be made under:

Item No.	Item	Pay Unit
7.31 A	DEMOLITION OF ROADWAY VAULTS	C.Y.
7.31 B	DEMOLITION OF TROLLEY TRACK TRUSS BLOCKS	C.Y.

SECTIONS 7.32 THRU 7.33 (NO TEXT)

SECTION 7.34 - Tow Truck Service

7.34.1. DESCRIPTION. Under this item, the Contractor shall provide tow service for any disabled vehicles within the contract limits that affects the flow of traffic during the hours specified elsewhere in the Contract Documents or directed by the Engineer. The intent is to remove the disabled vehicle to a location off the traveled way.

7.34.2. MATERIALS. The Contractor shall provide tow trucks capable of handling a gross weight of 18,000 pounds. Each truck shall be equipped with an amber cab mounted flashing light, two-way radio capable of operating on an assigned frequency, tow rig, cushioned bumper and rear pintle hooks.

7.34.3. SERVICE REQUIREMENTS. The Contractor, in providing Tow Truck Service, shall utilize only tow trucks and tow truck drivers licensed by the New York City Department of Consumer Affairs as per City Code.

7.34.4. CONSTRUCTION DETAILS. Stationed Towing Service:

(A) The Tow Truck Service shall be stationed at the location specified by the Engineer. The Tow Truck shall expedite removal of disabled vehicles and shall be on duty during periods specified elsewhere in the Contract Documents.

(B) The Tow Truck Service may also be required to provide towing service during other periods of anticipated heavy traffic flow as determined by the Engineer. Notification requiring this service shall be given to the Contractor 24 hours in advance.

Disabled vehicles shall be towed to the nearest acceptable location approved by the Engineer. The location shall be selected such that the operators of the disabled vehicles may readily obtain or arrange to obtain further service at their own expense. Upon delivery of the disabled vehicle to the approved location, the tow truck shall be required to immediately return to its assigned duty station thus providing maximum towing coverage during the specified duty hours. The operators of disable vehicles shall not be charged for the Towing Service provided under this item.

In the case of serious vehicular accidents, the tow truck must not remove the disabled vehicle or vehicles until authorized by the police or by the Engineer.

7.34.5. MEASUREMENT. The quantity to be measured for payment shall be the number of hours that a tow truck and operator are on duty as ordered by the Engineer.

7.34.6. PRICE TO COVER. The unit price bid per hour shall include the cost of all labor, insurance, tools, equipment, materials, insurance, and necessary incidentals to provide the towing service. The hourly rate price bid shall include the cost of a fully functional tow truck and operator.

No payment will be made for any hour of required duty that the tow truck is not on duty.

Should the Contractor not provide the specified Tow Truck during the required hours of duty, the Engineer shall arrange for towing of all disabled vehicles from the project site to an approved location and such towing charges shall be deducted from monies owed to the Contractor by the City.

Payment will be made under:

Item No.	Item	Pay Unit
7.34 H	TOW TRUCK SERVICE	HRS

SECTION 7.35 (NO TEXT)

SECTION 7.36 - Pedestrian Steel Barricades

7.36.1. INTENT. This section describes the work of providing temporary pedestrian steel barricades between pedestrian and construction work areas.

7.36.2. DESCRIPTION. The work shall consist of furnishing, maintaining, relocating, and removing temporary pedestrian steel barricades in sidewalk areas as shown on the Contract Drawings or where otherwise directed by the Engineer.

7.36.3. MATERIALS. Temporary pedestrian steel barricades shall consist of pedestrian barricade units having a geometry similar to that shown on the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1014 and complying with the following requirements:

Size: For straight runs of barricade each unit shall range in length from seven (7) to nine (9') feet.

For curved runs of barricade each unit shall range in length from three (3) to four (4') feet.

Height of barricades shall range from 41 to 45 inches; however, all barricades in the project shall be of the same height.

Components: Outside perimeter (main frame) shall be of 1-1/2 inch O.D., 16 gauge (minimum) steel tubing.

Inside vertical members shall be of 5/8 inch O.D., 16 gauge (minimum), steel tubing extend into the main frame tubing, both top and bottom, for a minimum of 3/4 inch. The spacing between inside vertical members shall not exceed 4-3/4 inches.

Weight: Each unit shall not exceed 60 pounds in weight.

Interlock: Each barricade unit shall be equipped with interlocking ends for attachment to adjacent units for stability.

Feet: Flat steel feet, of sufficient dimension for stability, shall be welded to each end of barricade. These feet shall be capable of accommodating stabilizing weights to be placed upon them in order to secure barricades in place.

Finish: Fabricated steel barricades shall be hot dipped galvanized, then prime coated with a paint compatible with galvanized steel surface, and then surface coated with a safety orange colored paint compatible with the prime coating.

7.36.4. METHODS. Temporary pedestrian steel barricade units of the various sizes required shall be furnished to the site, complete, ready to use. All units shall be in good condition and acceptable to the Engineer.

The Contractor shall install the barricades by placing them where shown on the Contract Drawings or where otherwise directed by the Engineer. Adjacent units shall be interlocked. Weights (sandbags, concrete blocks, etc.) shall then be placed, as directed, on each work area side footing only, for stability. The minimum number of interlocked barricade units in a given run shall be two, unless otherwise approved by the Engineer. Where less than three units are required and approved by the Engineer, additional measures shall be taken by the Contractor to stabilize the shorter length of interlocking barricade and prevent overturning.

At corners, three (3') to four (4') foot long units shall be used to form smooth curved runs of barricade.

Contractor shall continuously maintain the temporary pedestrian steel barricades, where shown on the Contract Drawings or directed by the Engineer, until ordered by the Engineer to remove the barricades at the completion of a work stage. Should a unit or units of barricades become damaged or otherwise unacceptable to the Engineer, the Contractor shall replace said units within twenty-four (24) hours of notice by the Engineer, at no additional cost to the City.

7.36.5. MEASUREMENT. The quantity to be measured for payment shall be the number of linear feet of temporary pedestrian steel barricades constructed and placed, complete, based upon the summation of the lengths of the individual units so constructed and placed.

Payment will be made for only the initial installation at any location. Whenever pedestrian steel barricades are moved to a new location, as required by the Contract Drawings or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Whenever the Contractor proposes to move temporary pedestrian steel barricades to a new location, it is subject to approval of the Engineer and must be in accordance with the latest approved progress schedule. Minor movement of the temporary pedestrian steel barricades within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment. Minor movement within a work area includes, but is not limited to:

- Movement from one side of the roadway to the other side
- Movement to adjust the roadway or work zone width
- Movement required to access the work zone or to secure the work zone
- Linear movement of less than one block within an established work zone
- Rearrangement within a work area

No payment will be made: for non-interlocked units of barricade; for barricade units greater than four (4') feet in length used in corner quadrants; for movements of barricades made for the Contractor's convenience; for movement of barricades at a given location at the end of a work period and subsequent replacement at the same location at the beginning of the next work period; for movement of barricades at a given location during a work period and subsequent replacement at the same location during the same work period; or for the interchanging of barricades between initial installations.

7.36.6. PRICE TO COVER. The contract price bid per linear foot for temporary Pedestrian Steel Barricades shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and necessary incidentals required to furnish, install, maintain, relocate, and remove temporary pedestrian steel barricades, complete with weights for stability, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Where there is no scheduled item for temporary Pedestrian Steel Barricades, the cost of furnishing, installation, maintenance, relocation, and subsequent removal of Temporary Pedestrian Steel Barricades as required shall be deemed included in the unit price bid for the Maintenance and Protection of Traffic Item.

Payment will be made under:

Item No.	Item	Pay Unit
7.36	PEDESTRIAN STEEL BARRICADES	L.F.

SECTIONS 7.37 THRU 7.49 (NO TEXT)

SECTION 7.50 – City Bench

7.50.1. INTENT. This section describes the furnishing and installation of a City Bench. This specification includes the backed and backless bench types.

7.50.2. DESCRIPTION. Under these items, the Contractor shall furnish and install each bench in accordance with the Contract Drawings, the specifications and directions of the Engineer.

7.50.3. MATERIALS.

(A) Bench shall be manufactured by Landscape Forms, Inc., 431 Lawndale Avenue, Kalamazoo, Michigan 49048.Toll Free: (800) 521-2546. Phone: (269) 381-0396. Fax: (269) 381-3455. Website: www.landscapeforms.com

(B) Bench Distributors:

1. Landscape Forms, Inc.,
   431 Lawndale Avenue
   Kalamazoo, Michigan
   49048.
   Phone (269) 381-0396
2. Arenson Furniture Rental
   1115 Broadway
   New York, 10010
   Phone (212) 633-2400
3. AFD Contract Furniture Inc.
   810 7th Avenue
   New York NY, 10019
   Phone (212) 721- 7100
4. Empire Office Inc.
   105 Madison Ave. #15
   New York, NY 10016
   Phone (212) 607-5566
5. Or other manufacturer's approved distributor

(C) STYLE

For quantities of 25 units or less:	For quantities of 26 units or more:
Chelsea Bench, Backed, QASF0886-035	Chelsea Bench, Backed, QASF0886-030
Chelsea Bench, Backless, QASF0886-036	Chelsea Bench, Backless, QASF0886-031

7.50.4. METHODS.

(A) DELIVERY, STORAGE, AND HANDLING

Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer. All material shall be bundled and fully supported during shipping and storage to prevent creep. Material manufacturer's directions for storage and use shall be adhered to. Material surfaces shall be protected during shipment so as to arrive mar and scratch free in the field. Keep materials in manufacturer's original, unopened containers and packaging until installation. Any damage or excessively scratched will be rejected and replaced with new at no additional cost to the City. All material must be straight and true when placed in the construction. Store any and all tooling, fixtures, process drawings and project files until last project phase is complete.

Deliver all tooling, fixtures and documentation to the Engineer upon completion of the work.

(B) INSTALLATION

Benches shall be uniquely fabricated and pre-assembled before being installed in their final location in the work. Benches shall be installed in their final position and properly secured in place, as indicated on the Contract Drawings. Protect installed product to ensure that, except for normal weathering, benches will be without damage or deterioration at time of Substantial Completion.

Note: Do not drag bench across concrete or other rough surfaces. This could damage the powder coat on the bottom of the base plate.

(C) TOUCHUP AND REPAIR

For all bolted connections and minor damage caused by transportation and installation of metal powder coated surface, the touch-up finish shall be in conformance with powder coating manufacturer's recommendations. Provide touch-up such that the repair is not visible from a distance of six feet (6') under bright sunlight. The touch up color shall match the color of the powder coat.

(D) FOUNDATION

If directed by the Engineer due to the condition of the sidewalk or where drilling will crack distinctive pavements, two unreinforced concrete footings, 12 "x 12" in plan and 18" deep shall be provided. Concrete shall be Class B-32 per **Section 3.05**. Foundation shall be centered under the bench leg base. Where footings are required, the openings for the footings are to be sawcut and the joints are to be finished per **Section 4.13.4 (F), EXPANSION JOINTS**.

(E) ANCHORING

Benches shall be anchored using sleeve anchors. Sleeve anchors shall be zinc-plated, ½" diameter, 2-1/2" length. An additional 3/4" zinc-plated flat washer shall be used under the ½" zinc-plated washer that comes with the sleeve anchor.

Anchoring Details are as follows:

1. Holes shall be drilled using a full-size template, not by drilling through the bench. Place template in desired position, and drill anchor holes in the desired locations. Hole depth shall be at least 2-1/2'" to allow for full engagement of sleeve anchors.

2. Remove template and clean the holes per the anchor manufacturer's requirements.

3. Place bench in desired position and install anchors. Tighten as recommended by anchor manufacturer. After anchors are properly tightened, mar the threads with a center punch in two places on each anchor to prevent removal of the nuts.

7.50.5. SUBMITTALS. All submittals shall be as per **Section 1.06.31** of the NYCDOT's Standard Highway Specifications, and in accordance with the following requirements:

WARRANTY: The manufacturer guarantees a standard warranty that the products will be free from defects in material and/or workmanship for a period of three years from the date of invoice.

7.50.6. MEASUREMENT. The quantity of City Bench to be paid for under this item shall be the number of City Bench(es) of each type installed at the site to the satisfaction of the Engineer.

7.50.7. PRICE TO COVER. The unit price bid for EACH type City Bench shall include the cost of furnishing all labor, materials, equipment, insurance, and incidentals necessary to furnish, assemble and install benches including, but not limited to, bench arm rests and hardware; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The unit price bid for this item shall also include the cost of concrete footings, saw cutting, sleeve anchors with nuts and washers, touch-up and repair.

Payment with be made under:

Item No.	Item	Pay Unit
7.50 CB2	CITYBENCH WITH BACK (V 2)	EACH
7.50 CBB2	CITYBENCH BACKLESS (V 2)	EACH

SECTION 7.50 FCR - ALLOWANCE FOR FURNISHING CITYRACK

7.50 FCR.1. DESCRIPTION: Under this item, the Contractor will be required to furnish CityRacks, in accordance with the Contract Drawings, Specifications and as directed by the Engineer.

7.50 FCR.2. MATERIALS: (Not applicable)

7.50 FCR.3. CONSTRUCTION DETAILS: Contractor will order CityRacks with base plates, per prevailing NYCDOT contract rates, from General Foundry Inc., the fabricator of CityRack, located at:

1 Progress Road, North Brunswick Township, NJ
08902 Phone: (732)-951-9001
Email: ajayn@generalfoundries.com

Once the foundation has been installed, the Contractor must order and pick up from the supplier, deliver to the project site, and install the CityRack in accordance with the Contract Drawings, Specifications and as directed by the Engineer. All costs for pick up, delivery to the project site and installation of the CityRack, along with anchors, will be deemed to be included in all scheduled items for installation of the CityRack.

7.50 FCR.4. METHOD OF MEASUREMENT: For payment of the CityRack, all work will be based on the actual number of CityRacks that are installed by the Contractor to the satisfaction of the Engineer.

7.50 FCR.5. BASIS OF PAYMENT: The fixed sum shown in the proposal for the CityRack and accessories will be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded, and the original price will be used to determine the total amount bid for the contract.

The fixed sum payment made under this item will be equal to the sum of all invoices submitted by the Contractor as proof of work performed for this item, as approved by the Engineer.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and must not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

Payment will be made under:

Item No.	Item	Pay Unit
7.50 FCR	ALLOWANCE FOR FURNISHING CITYRACK	F.S.

SECTION 7.50 FLB - Allowance for Furnishing DOT Leaning Bar

7.50 FLB.1. WORK. Under this allowance, the Contractor must furnish each DOT leaning bar in accordance with the prototype plans, the specifications, and directions of the Engineer, in consultation with the Landscape Architecture unit in DDC Infrastructure Design.

7.50 FLB.2. MATERIALS. DOT leaning bars or leaning bar items furnished by the following manufacturer will be used in this contract:

Edsal Machine Products, Inc.
126 56 Street
Brooklyn, New York 11220-2575
Tel: 718 439 9163
Fax: 718 748 4984
email: edsalny@aol.com

NOTE: The Contractor must inform the Engineer prior to ordering the DOT leaning bar. The Engineer, in consultation with NYCDOT, will provide the unit price to the contractor. The Contractor must present vouchers of its purchase to the Engineer. Price will be same as the agreed contract unit price between NYCDOT and the specified vendor.

7.50 FLB.3. SUBMITTALS.

(A) CERTIFICATES

The Contractor must furnish certificates from the Manufacturer certifying the stainless steel and aluminum used in the DOT leaning bar fabrication meets the above standards.

(A) WARRANTY

The manufacturer guarantees a standard warranty. Products will be free from defects in material and/or workmanship for a period of three years from the date of invoice. The warranty does not apply to damage resulting from accident, alteration, misuse, tampering, negligence, or abuse. Product, at the option of manufacturer, repair, replace, or refund the purchase price of any items found defective upon inspection by an authorized service representative. Purchasers should be aware that normal use of these high-quality products can result in superficial damage affecting the finish. Scratches, nicks, and dents are to be considered normal wear and tear, and are not the responsibility of the manufacturer.

7.50 FLB.4. INSTALLATION. Fully assembled DOT leaning bars must be installed in their final position and properly secured in place in accordance with **SECTION 7.50 ILB**, as directed by the Engineer and as indicated on the plans.

(A) DELIVERY, STORAGE, AND HANDLING

The Contractor must pick up and deliver to the project site the DOT leaning bars. Delivered materials to site as instructed by NYCDDC Construction must be in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer. Protect installed product to ensure that, except for normal weathering, DOT leaning bar assemblies will be without damage or deterioration at time of Substantial Completion. All material must be bundled and fully supported during shipping and storage to prevent creep. Keep materials in manufacturer's original, unopened containers and packaging until installation.

Any damage or excessively scratched will be rejected and replaced with new. All material must be straight and true when placed in the construction.

7.50 FLB.5. METHOD OF MEASUREMENT. The fixed price lump sum shown in the Bid Schedule for this item will be included in the total bid price; however, actual payment to the Contractor will be based on the actual invoices submitted for the DOT leaning bar by the Contractor.

7.50 FLB.6. PRICE TO COVER. The fixed sum for DOT leaning bar will be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

The fixed sum payment made under this item will be equal to the sum of all invoices submitted for the DOT leaning bars as proof of work performed for this item, as approved by the Engineer.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and must not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

The unit price will cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Furnishing Anchor Bolts, Epoxy, and foundation materials, and delivery & storage of DOT leaning bars will be paid separately and are not included in the cost of this item.

Payment will be made under:

Item No.	Item	Pay Unit
7.50 FLB	ALLOWANCE FOR FURNISHING DOT LEANING BAR	F.S.

SECTION 7.50 ICR - CITYRACK INSTALLATION

7.50 ICR.1. DESCRIPTION: Under this section, the Contractor must install CityRack and all necessary incidentals on the following base types:

(A) Concrete.
(B) Pavers over concrete base, and
(C) Subway grating

as the case may be, in accordance with the Contract Drawings, the Specifications and the directions of the Engineer.

7.50 ICR.2 MATERIALS: Anchor bolts must be as shown on the Contract Drawings, as directed by the Engineer, or as follows:

(A) Installation onto concrete, including sidewalks: Four ½" Ø x 3-½" deformed round head pin anchors ("Mushroom Spikes"), such as Powers SPIKE, DeWalt SPIKE or approved equal.

(B) Installation onto pavers over concrete base: Four ½" Ø threaded studs with 2" Ø washers, tamper-resistant nuts, and 3-½" long drop-in style anchors. Threaded stud length to be 6-1/4", or as required to install the drop-in anchors fully in the concrete base.

(C) Installation onto subway grating: Four ½" Ø J-bolts, with 2" Ø washers and tamper-resistant nuts. J-bolt length to be 6", or as required to properly hook to the grating.

All metal anchor hardware to be stainless steel.

7.50 ICR.3. CONSTRUCTION DETAILS: The CityRacks must be installed as shown on the Contract Drawings, or as specified by the Engineer, in accordance with the NYCDOT Bicycle Parking Standards. The Contractor will be responsible for coordinating and picking up the CityRacks from the NYCDOT specified vendor, at no separate cost.

7.50 ICR.4. MEASUREMENT: The quantity measured for payment must be the number of CityRacks installed in accordance with the Contract Drawings and the Specifications, to the satisfaction of the Engineer.

7.50 ICR.5. PRICE TO COVER: The contract price for each **CITYRACK INSTALLATION** must cover the cost of labor, materials, equipment, insurance, and incidentals required to pick up and install CityRacks, including but not limited to, the furnishing and incorporation of all anchors, bolts, and washers; all, in accordance with the Contract Drawings, the Specifications and the directions of the Engineer.

Footings, if required, will be paid for under other scheduled items.

Payment will be made under:

Item No.	Item	Pay Unit
7.50 ICR	CITYRACK INSTALLATION	EACH

SECTION 7.50 ILB - Installation of the DOT Leaning Bar

7.50 ILB.1. WORK. Under these items, the Contractor must install each DOT leaning bar in accordance with the plans, the specifications, and directions of the Engineer, in consultation with the Landscape Architecture unit in DDC Infrastructure Design.

7.50 ILB.2. MATERIALS. DOT leaning bars or leaning bar items furnished in accordance to **SECTION 7.50 FLB**. Delivery and storage of DOT leaning bars is included in this item.

Anchor Bolts must be 3/4” dia. x 8” 316 stainless steel or equivalent L-hook with conical tamper proof nuts.

Concrete must meet with the requirements of **Section 3.05**, Concrete, and be of the class, type and mixing specified and will be done in accordance with **Section 4.06**.

Steel bars for concrete reinforcement must comply with the requirements of **Section 2.23**. Kind of reinforcement, size and placement must be as specified and as shown on Contract Drawings. Reinforcement must be installed in accordance with the requirements of **Section 4.14**.

Subbase material must be of the type, grade, size number and nominal size specified and must be done in accordance with **Section 6.67**; Type MATERIAL B.

Plastic Filter fabric must be done in accordance with **Section 6.68**.

7.50 ILB.3. INSTALLATION. Fully assembled DOT leaning bars furnished by the Contractor in accordance with **Section 7.50 FLB**, must be installed in their final position and properly secured in place, as indicated on the plans. The leaning bar assembly must be anchor bolted into a solid concrete foundation base, with embedment as indicated on plans.

(A) TOUCHUP AND REPAIR

For all clean welds, bolted connections, and aluminum seats, the touch-up must be in conformance with manufacturer's recommendations. Provide touch-up such that the repair is not visible from a distance of six feet (6’). The touch up color must match the color of the material being repaired. Material manufacturer's directions for storage and use must be adhered to. Material surfaces must be protected during shipment to arrive mar and scratch free in the field.

(B) FOUNDATION

Three reinforced concrete footings, 12 "x 12" in plan and 18" deep must be provided. Foundation must be centered under the DOT leaning bar leg base. Where footings are placed, expansion joints must be finished per **Section 4.13.4 (F), EXPANSION JOINTS**.

7.50 ILB.4. MEASUREMENT. The quantity of DOT leaning bar to be paid for under this item will be the number of complete leaning bars installed in accordance with the plans, the specifications and to the satisfaction of the Engineer.

7.50 ILB.5. PRICE TO COVER. The price bid shall be a unit price per each DOT leaning bar and will include the cost of all labor, materials, plant, equipment, and incidentals necessary, including, but not limited to, all finishes, hardware, anchors, delivery and storage, all in accordance with the plans, the specifications, and the directions of the Engineer.

Excavation, concrete foundation, steel bars for concrete reinforcement, subbase and plastic filter fabric will be paid for separately under their respective Contract Items.

Payment will be made under:

Item No.	Item	Pay Unit
7.50 ILB	INSTALLATION OF DOT LEANING BAR	EACH

SECTIONS 7.51 THRU 7.87 (NO TEXT)

SECTION 7.88 - Rodent and Waterbug Pest Control

7.88.1. DESCRIPTION. The Contractor shall provide all labor, materials, plant and equipment, and incidentals required to survey and monitor rodent activity and control any infestation or outbreak of rodents and waterbugs (cockroaches) within the project limit.

New York City ("NYC") Local Law 37 of 2005 requires that the Contractor, or any subcontractor that the Contractor hires, shall comply with Chapter 12 of Title 17 of the NYC Administrative Code with respect to the application of pesticides to any property owned or leased by the City of New York.

The use of rodenticide, poisoned bait, or pesticides for waterbugs inside of catch basins and sewers within the area served by the City's Municipal Separate Storm Sewer System ("MS4 area") is strictly prohibited. The term "MS4 area" means those portions of the city of New York served by separate storm sewers and separate stormwater outfalls owned or operated by the city of New York and areas in which municipal operations and facilities drain by overland flow to waters of the state, as determined by the New York City Department of Environmental Protection ("DEP") and described on maps of the MS4 area set forth in the rules of DEP. The MS4 area includes parts of the City with two separate systems of sewer pipes-- sanitary sewers that carry wastewater from buildings to treatment plants and Municipal Separate Storm Sewer System (MS4), which carry water from the streets to local waterways. This prohibition does not apply to monitoring blocks, such as "Detex Blox," that do not contain pesticide active ingredients.

7.88.2. MATERIALS. All materials shall be Registered by the New York State Department of Environmental Conservation ("NYSDEC") and comply with the NYC Health Code for the intended usage. Materials classified as Toxicity Category I, carcinogenic to humans by the US Environmental Protection Agency ("USEPA"), or classified as a developmental toxin by the State of California's Office of Environmental Health Hazard Assessment shall not be used. The Contractor shall verify that materials are:

- "NOT PROHIBITED" by the NYC Department of Health and Mental Hygiene ("NYC-DOHMH") using the NYC-DOHMH's Pesticide Product Search, available at:
  < https://a816-healthpsi.nyc.gov/ll37/ProductTestPesticide.aspx >.
- On the NYSDEC's list of Currently Registered Pesticides, available at:
  < http://pims.psur.cornell.edu/ >.
  - Not applied in catch basins or sewers within the MS4 area.

Rodenticide weatherproof (wax based) bait blocks shall be multiple dose anticoagulants such as Chlorophacinone, or single feed anticoagulants such as Brodifacoum (Weatherblok XT, Final All-Weather Blox), Bromadiolone (Contrac Blox), or an approved equivalent, registered by NYSDEC and not prohibited by NYC-DOHMH. Loose rodenticide meal or rodenticide pellet bait shall not be used.

Tamper proof bait station boxes shall be designed to exclude other mammals and shall be used with poisoned bait to attract rats. Information on "tamper proof bait station boxes" is available from the NYC-DOHMH Office of Pest Control Services (646-632-6600).

Live traps shall be of proper dimensions for trapping rats and mice, and shall not be used with poisoned bait.

Insecticide bait shall be a residual type registered by NYSDEC and not prohibited by NYC-DOHMH.

(A) SUBMITTALS

Prior to commencement of construction activities the Contractor shall submit to the Engineer manufacturer's installation instructions for all materials required for rodent and waterbug pest control work and product data which shall include illustrations, catalog data, pesticide labels, product characteristics, typical use, performance and limitation criteria of all rodent and waterbug pest control materials required. All pesticides and rodenticide submittals shall be accompanied by a printout from the NYC-DOHMH Pesticide Product Search showing that the specific brand of pesticide and rodenticide is "NOT PROHIBITED."

7.88.3. PERSONNEL. The Contractor shall employ two independent licensed exterminators: one to engage in survey and monitoring work to establish the level of infestation of rodents and insects and

provide recommendations for specific Integrated Pest Management ("IPM") actions, and one to execute the rodent and waterbug pest control work to deal with such infestations. All pest control personnel employed by each exterminator company shall be licensed by NYSDEC as a Commercial Pesticide Applicator, Commercial Pesticide Technician or Commercial Pesticide Apprentice and must be supervised by an exterminator licensed by NYSDEC as a Commercial Applicator in categories 7A ("Structural & Rodent Control") & 8 ("Public Health Pest Control"). It is recommended (but not required) that all personnel engaged in survey and monitoring work or rodent control work possess a certificate of completion from the NYC-DOHMH's half-day or three-day "Rodent Academy." The Contractor shall submit the names and license credentials of the two exterminator companies to the Engineer for approval prior to the commencement of any work under this section.

7.88.4. METHODS. Application and dosage of all materials shall be done in strict compliance with the manufacturer's recommendations. All surveying, monitoring, baiting, and/or live trapping work shall be performed in the presence of the Engineer, without which no payment will be made under this Section.

(A) GENERAL

The Contractor's construction activity is expected to disturb any established rodent and/or waterbug population that may exist within the project limits, possibly causing their dispersion. The Contractor shall take all appropriate action to eliminate and/or control these populations within the construction corridor: the construction corridor shall be defined as being the full width of streets under the contract and intersecting streets up to the limits of construction, from property line to property line, excluding buildings and under sidewalk building vaults.

Under the Maintenance of Site requirements for the contract, any unsanitary conditions, such as uncollected garbage or debris, resulting from the Contractor's activities which will provide food and shelter to the resident rodent population shall be corrected by the Contractor immediately after notification of such condition by the Engineer. Non-compliance shall be subject to the application of the "Nonconformance" provisions of the Item for Maintenance of Site, and no payment will be made for any additional application of rodenticide or insecticide needed to control resultant infestations.

(B) SURVEY AND MONITORING WORK

(1) Prior to Construction - The Contractor's designated survey and monitoring exterminator shall execute a survey of the project area and estimate the level of rodent (Norway rat, House mouse) infestation and the waterbug population within the construction corridor. An appropriate sample of utility manholes (sewer, electrical, telephone, etc.) and catch basins should be opened and surveyed to the satisfaction of the Engineer. Contractor shall maintain all survey records in the manner described in 7.88.6., Records and Reports.

(2) During Construction - The Contractor shall monitor the rodent activity through trapping (snap, glue traps or live traps), fecal count methods, and inspection of the conditions of all installed baits every week during construction activity or as otherwise directed by the Engineer. Monitoring during construction shall cover Contractor's plant and temporary facilities. Contractor shall maintain all monitoring records in the manner described in Section 7.88.6. on "Records and Reports" of this specification.

(C) RODENT CONTROL WORK

The "Buffer Zone" around a body of water is defined as one hundred feet (100') for fresh water or one hundred twenty five feet (125') for tidal waters.

(1) Wetlands, Woodlands and Areas Within the Buffer Zone around a body of water: In wetlands, woodlands and areas adjacent to a body of water, special precautions must be taken to protect water quality and to ensure the safety of other wildlife. To prevent poisoned bait from entering a body of water, no poisoned bait shall be used in areas within the Buffer Zone around the body of water. Live traps must be used within the Buffer Zone and within wetland and woodland areas.

(2) Outside Wetland Areas, Woodland Areas and Beyond the Buffer Zone around a body of water: In areas outside the Buffer Zone around a body of water, and areas outside wetlands and woodlands, tamper proof bait stations with poisoned bait shall be established

during the period of construction and any consumed or decomposed bait shall be replenished as directed.

(3) Storm Sewers and Combined Sewers: No poisoned bait shall be used in any sewer that flows to a body of water. No poisoned bait or pesticides shall be used in sewers or catch basins located within the MS4 area.

Rodent control shall be achieved in two stages as follows:

Stage I. At least one month prior to initiation of the construction work, and periodically thereafter, live traps and/or rodenticide bait, as directed above, shall be placed at locations [e.g., burrows, utility manholes (sewer, electrical, phone, etc.), and catch basins] that are inaccessible to pets, human beings, children and other non-target species, particularly wildlife (e.g., birds) in the construction corridor. Locations of initial bait placement and quantities of bait shall be determined by the survey and monitoring exterminator's written report of his survey and monitoring results, or as otherwise directed by the Engineer.

Stage II. During Construction - Infested sites as determined by the survey and monitoring exterminator's monitoring report shall be baited and/or rebaited, and live traps shall be collected and replaced, the rates and quantities of which shall be determined by the written monitoring reports submitted weekly or as otherwise directed by the Engineer in consultation with the City's Office of Pest Control.

Bait may be placed in dry utility or sanitary sewer manholes without a tamper-proof bait station box, if the manhole configuration does not permit the use of a bait station box. If a sanitary sewer manhole has a concrete invert platform of sufficient size, a bait box shall be used. Bait placed in a manhole outside of a tamper-proof box shall be strung on a stainless-steel wire, and secured to the manhole structure. No separate payment shall be made for the wire or securing the wire to the manhole, and shall be deemed included in the bid price for Baiting of Rodent Base Stations. Rodent control personnel entering manholes shall comply with the confined space requirements required by the Occupational Safety and Health Administration ("OSHA") 29 CFR 1929 - Subpart AA – Confined Spaces in Construction.

Poisoned bait and pesticides shall not be used in catch basins or sewers located within the MS4 area.

The use of tamper proof bait station boxes shall be used with rodenticide in all other cases.

The baiting exterminator shall be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper proof bait stations. Non-target species captured in live traps shall be released by the baiting exterminator within twenty-four (24) hours after notification by the Engineer. The baiting exterminator shall also be responsible for posting and maintaining signs announcing the baiting of each particular location. The signs shall be placed at least twenty-four (24) hours prior to the application of any pesticide or rodenticide, and shall meet the requirements of Local Law 37 of 2005. This requirement does not apply to monitoring blocks, such as "Detex Blox," that do not contain pesticide active ingredients. NYC-DOHMH provides a sample template sign for pesticide notification purposes in compliance with the law at: http://www1.nyc.gov/assets/doh/downloads/pdf/pesticide/notification-sign.pdf.

The Contractor, under his maintenance of site operations, shall be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalk within the project limits. Any visible remains shall be placed into double plastic bags. No more than five (5) carcasses shall be placed into each bag. Each bag shall be a minimum of three (3) mils thick, black plastic. The bag shall have a note taped on with the contents (e.g., "dead rat"), and disposed as required by the NYC Department of Sanitation. No additional payment will be made for this work.

It is anticipated that public complaints will be addressed to the Engineer's Field Office. The Contractor, where directed by the Engineer, shall take appropriate Integrated Pest Management ("IPM") actions, such as baiting, trapping, proofing, etc., to remedy the source of a complaint within the next six (6) hours of normal working time, which is defined herein, for the purposes of this section, as 7 A.M. to 6 P.M. on Mondays through Saturdays.

(D) WATERBUG CONTROL

Waterbugs shall include American Cockroaches, Oriental Cockroaches, Smoky Brown Cockroaches, Madeira Cockroaches, and other similar species.

Infested sites (e.g., sewers) shall be baited at least two (2) times per month with insecticides, or as directed by the Engineer in consultation with the exterminator monitoring the work and the NYC-DOHMH Office of Pest Control Services.

No poisoned bait or pesticides shall be used in sewers or catch basins located within the MS4 area.

7.88.5. EDUCATION & TRAINING. The Contractor shall post notices in all Construction Bulletin Boards advising workers, employees, and residents to call the Engineer's Field Office to report rodent and waterbug infestations. The Contractor shall provide and distribute literature pertaining to IPM techniques of rodent control to affected businesses and superintendents of nearby residential buildings to ensure their participation in maintaining their establishments free of unsanitary conditions, harborage removal and rodent proofing.

Prior to application of any chemicals, the Contractor shall furnish copies or sample labels for each pesticide, antidote information and Material Data Safety Sheets ("MSDS") for each chemical used.

7.88.6. RECORDS AND REPORTS.

(A) GENERAL

The Contractor shall be responsible for assigning within the construction corridor an identifying number to each manhole, catch basin, and other location where bait and/or live trap placement and/or waterbug control work is proposed by the survey and monitoring exterminator. The Contractor shall then provide that list of locations and corresponding reference numbers along with a drawing showing the locations, as a reference for the exterminator(s) performing the work, to indicate locations of bait placement and waterbug control work and rodent and waterbug activity (droppings, bait consumed, dead rodents, etc.)

(B) SURVEY AND MONITORING WORK

1) Prior to Construction – Contractor shall submit to the Engineer, for approval, a written survey report including proposed IPM procedures, including specific materials, quantities, locations, methods and time schedule for the implementation of the exterminating work. The written report shall also include a survey with a drawing (provided by the Contractor) marked with locations indicating all signs of rodent (Norway rat, House mouse) infestation and waterbug activity discovered during the execution of the survey indicating that rodent and waterbug pest control work is necessary. The report will be developed with input from the NYC-DOHMH Rat Information Portal at:

http://maps.nyc.gov/doitt/nycitymap/template/?applicationName=DOH_RIP

(2) During Construction - Based on monitoring results, Contractor shall submit to the Engineer a weekly written monitoring report identifying all locations and conditions of installed bait and/or other rodent control work. The monitoring report shall also include any other recommended IPM techniques, such as baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.

The survey and monitoring exterminator shall keep a record of all rodent and waterbug infestation surveys that have been conducted. The Contractor shall be required to submit a copy of all survey and monitoring reports to the Engineer each week, prior to payment.

(C) RODENT AND WATERBUG CONTROL WORK

The baiting exterminator shall maintain records using the NYC Pesticide Use Reporting System ("NYCPURS"). These records will be kept by the Engineer. A weekly report from NYCPURS shall be prepared, signed and certified by the approved licensed exterminator, and such reports shall be submitted to the Engineer each week, prior to payment.

7.88.7. NONCONFORMANCE. If the Contractor fails to perform as directed to control the rodent and/or waterbug population at any location within the project limits for a period of more than one week, the Engineer will correct the adverse conditions by any means deemed appropriate, including but not limited to, the use of "outside services" and shall deduct the cost of the corrective work from any monies due to

the Contractor. The deducted cost of this work shall be in addition to the non-payment for rodent and waterbug pest control.

7.88.8. MEASUREMENT.

(A) RODENT INFESTATION SURVEY AND MONITORING

The quantity to be measured for payment under Item No. 7.88 AA, RODENT INFESTATION SURVEY AND MONITORING, shall be a Lump Sum measurement.

(B) RODENT BAIT STATIONS

The quantity to be measured for payment under Item No. 7.88 AB, RODENT BAIT STATIONS, shall be the number of tamper-proof rodent bait station boxes and/or live traps satisfactorily installed or reinstalled after inspection within the construction corridor, as approved by the Engineer. However, the initial baiting, and subsequent rebaiting as may be required, of any bait station will be paid for under Item No. 7.88 AC.

(C) BAITING OF RODENT BAIT STATIONS

The quantity to be measured for payment under Item No. 7.88 AC, BAITING OF RODENT BAIT STATIONS, shall be the number of tamper-proof rodent bait station boxes, utility manholes, catch basins, or other locations approved by the Engineer, satisfactorily baited or rebaited to replenish consumed or decomposed bait within the construction corridor, as approved by the Engineer.

(D) WATERBUG BAIT APPLICATION

The quantity to be measured for payment under Item No. 7.88 AD, WATERBUG BAIT APPLICATIONS, shall be the number of blocks satisfactorily treated with insecticide bait within the construction corridor, as approved by the Engineer. A block shall be defined as the area of street, measured between property lines, from intersection to intersection. Each rebaiting of any block shall be considered as a new block for measurement purposes.

7.88.9. PRICES TO COVER.

(A) RODENT INFESTATION SURVEY AND MONITORING

Payment will be made at the lump sum price bid for RODENT INFESTATION SURVEY AND MONITORING which shall include the cost of furnishing all the labor, materials, plant, equipment (traps, etc.), insurance, and other incidentals required, including but not limited to providing all required maintenance of traffic equipment, to perform a rodent infestation survey of the project area and then monitor the site each week for rodent activity, all in accordance with the specifications and the directions of the Engineer.

Ten (10%) percent of the lump sum price bid will be paid when the initial survey of the project area has been completed and the written survey report has been submitted to the satisfaction of the Engineer. The remainder will be paid in proportion to the percentage of contract completion.

(B) RODENT BAIT STATIONS

The Contract price bid for RODENT BAIT STATIONS shall be a unit price per each tamper proof bait station box and/ or live trap installed or reinstalled after inspection and shall cover the cost of furnishing all labor, materials, plant, equipment (bait stations, etc.), insurance, and other incidentals, including but not limited to providing all required maintenance of traffic equipment, required to control the rodent population found within the project limits in accordance with the specifications and the directions of the Engineer.

In addition to the payment for Rodent Bait Stations installed or reinstalled under this Item No. 7.88 AB, the Contractor will also be paid for each baiting or rebaiting, when required, of each bait station, under Item No. 7.88 AC.

(C) BAITING OF RODENT BAIT STATIONS

The Contract price bid for BAITING OF RODENT BAIT STATIONS shall be a unit price per each bait station, utility manhole, catch basin or other location approved by the Engineer satisfactorily baited or rebaited, when required, and shall cover the cost of furnishing all labor, materials, plant, equipment (bait), insurance, NYCPURS recordkeeping, and other incidentals, in accordance with the specifications and directions of the Engineer. Installation or resetting of the bait station will be paid for under Item No. 7.88 AB.

(D) WATERBUG BAIT APPLICATION

The Contract price bid for WATERBUG BAIT APPLICATION shall be a unit price per block treated by the exterminator and shall include the cost of furnishing all the labor, materials, plant, equipment (bait, etc.), insurance, NYCPURS recordkeeping, and other incidentals, including but not limited to providing all required maintenance of traffic equipment, necessary to control the waterbug population found within the project limits for the duration of the contract in accordance with the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
7.88 AA	RODENT INFESTATION SURVEY AND MONITORING	L.S.
7.88 AB	RODENT BAIT STATIONS	EACH
7.88 AC	BAITING OF RODENT BAIT STATIONS	EACH
7.88 AD	WATERBUG BAIT APPLICATION	EACH

SECTIONS 7.89 THRU 7.95 (NO TEXT)

SECTION 7.96 - Anti-Graffiti Coating

7.96.1. DESCRIPTION. Under this item, the Contractor shall clean, furnish and apply a Graffiti-Resistant Coating to exterior stone, concrete, wood, or other surfaces in accordance with OSHA guidelines, the manufacturer's recommendations, in accordance with the Contract Drawings, the specifications, and directions of the Engineer.

The Contractor shall apply the protective coating on selected surfaces specified in the Contract Documents.

7.96.2. MATERIALS. THE PROTECTIVE COATING SHALL BE A BREATHABLE, ONE COMPONENT CLEAR NON-SACRIFICIAL URETHANE OR ACRYLIC WATER BASED FORMULATION DESIGNED AS AN ANTI-GRAFFITI SOLUTION.

THE CONTRACTOR SHALL PROVIDE THE MANUFACTURER'S PRODUCT LITERATURE INCLUDING SURFACE PREPARATION DATA, MIXING, APPLICATION, SPREAD RATES, STORAGE AND VOLATILE ORGANIC COMPOUNDS (VOC) COMPLIANCE CERTIFICATION.

ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER, IN CONSULTATION WITH THE AGENCY OR DEPARTMENT FOR WHOM THIS WORK IS BEING PERFORMED, BEFORE ANY WORK CAN BEGIN.

7.96.3. METHODS.

(A) QUALITY CONTROL

Graffiti-Resistant Coating shall be applied only by an approved installer and in accordance with the coating manufacturer's instructions. The approved installer shall be trained by the manufacturer of the product and shall be certified by the manufacturers as qualified to install their graffiti-resistant coating materials. Only qualified Contractors or Subcontractors and their trades persons, meeting the above requirements shall be deemed approved. Submit a copy of current Society of Protective Coatings (SSPC) Certificate if applicable.

(B) PRODUCT DELIVERY, STORAGE AND HANDLING

1. THE CONTRACTOR SHALL DELIVER MATERIALS IN SUFFICIENT QUANTITY TO ALLOW FOR CONTINUITY OF WORK. PROTECT ALL MATERIALS AND EQUIPMENT DURING TRANSIT, DELIVERY, STORAGE AND HANDLING TO PREVENT DAMAGE AND DETERIORATION.
2. AVOID FIRE: OPEN FLAME AND SPARKS. CONTAINER CONTENTS, EVEN WHEN EMPTY, MAY IGNITE EXPLOSIVELY WHEN EXPOSED TO HEAT, WELDING, CUTTING TORCH, PILOT LIGHTS AND OTHER FLAMES AND IGNITION SOURCES AT LOCATIONS DISTANT FROM THE MATERIAL STORAGE AND HANDLING POINT.
3. AVOID INHALATION, INGESTION, SKIN CONTACT, AND EYE CONTACT.
4. PROTECT SHRUBS, PLANTS AND GRASS DURING APPLICATION. AVOID WIND DRIFT WHICH MAY INJURE PASSERSBY OR DAMAGE VEHICLES AND ADJACENT PROPERTIES.
5. FOR ADDITIONAL CAUTIONS, HUMAN HEALTH DATA AND PROTECTIVE EQUIPMENT TO BE USED (INCLUDING RESPIRATORY) REFER TO MATERIAL SAFETY DATA SHEETS.
6. CONTAINERS SHALL BE KEPT CLOSED WHEN NOT IN USE.
7. DISPOSE OF EXCESS WASTE MATERIALS AND EMPTY CONTAINERS IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS. EMPTY CONTAINERS AS MAY BE CLASSIFIED AS HAZARDOUS; THEY RETAIN PRODUCT RESIDUES SUCH AS VAPOR, LIQUID OR SOLID. DO NOT TRANSFER CONTENTS INTO OTHER CONTAINERS FOR STORAGE.

(C) EXECUTION

1. Surface Preparation. The Contractor shall be required to make surfaces, to be coated under this item, thoroughly dry, cleaned and free of dust, surface dirt, oil, grease and other contaminants that might prevent penetration of the coatings. Newly constructed surfaces, repointed surfaces and concrete shall be cured for at least 28 days before application. Glossy, glazed and slick troweled surfaces should be lightly etched before application of coatings. Surface defects, voids, joints or cracks must be properly sealed or filled, allowing any patching compounds to be completely cured before application. Cleaning may be accomplished by high pressure washing or chemical cleaning. No sandblasting will be allowed. When chemicals are used, they should be removed by high pressure water cleaning before application of the sealant. Use of raw acids shall not be permitted. Allow cleaned surfaces to dry completely. A test must always be made prior to application using the same cleaning and application procedures as to be used on the project. This test area shall remain available to be inspected by the Engineer.

Anti-graffiti coating shall be applied as soon as practicable after cleaning is completed. If in the opinion of the Engineer, the surface has become soiled, or otherwise contaminated, prior to the application of the protective coating; the surface shall be re-cleaned at no additional cost to the City.

2. Application Procedures. .

a) General product application must not be initiated during inclement weather, or when precipitation appears imminent. Application should be completed at least four (4) hours before precipitation begins. Surface and material temperatures shall be a minimum of 40° F or as recommended by the manufacturer.

b) Material shall be applied by brush, roller or low-pressure spray. The rolling shall be done only on smooth surfaces and at such a pace that no spinning of the roller or throwing off of protective coating material occurs when the roller is lifted from the surface. Coverage rate shall be as recommended by the manufacturer and as approved by the Engineer.

c) The protective coating shall be applied in a uniform manner to evenly coat all pores and textured areas. Extremely textured or porous surfaces will require a second coat. Unless otherwise designated by the Engineer, the protective coating shall be applied from joint to joint or scoremark to scoremark and from bottom to a height of eight (8') feet for abutments, walls or other surfaces.

d) Avoid high wind and rain, prolonged exposure in summer sunlight, and keep from freezing 12 hours after application.

e) A test panel 5 foot x 5 foot shall be provided and coated to insure suitability, number of coats required, and desired results. The test panel application and results shall be inspected and approved by the Engineer.

f) All work must conform to the OSHA standards referred to in the Information for Bidders, Section 41. DDC SAFETY REQUIREMENTS.

g) No dilution can happen of solution or cleaner.

(D) CLEAN UP INSTRUCTIONS

Clean application equipment immediately after each use as per the manufacturer's directions.

(F) GRAFFITI REMOVAL

The Contractor shall remove any graffiti which may accumulate until final completion as directed by the Engineer.

For graffiti removal procedures, see manufacturer's literature and instructions. Use of chemicals which are not included in manufacturer's list of components for remover will not be permitted.

7.96.4. SUBMITTALS.

(A) The Contractor shall submit manufacturer's technical data sheets, vapor transmission testing results, and applicable OSHA regulations for storage, handling, and application of both the Graffiti Resistant Coating and the Graffiti Remover products to the Engineer for approval.

(B) The Contractor shall submit manufacturer's product guarantee/warranty for a period of ten (10) years from the date of purchase, stating that the coatings will allow for the removal of all types of paint and other graffiti materials when same manufacturer's removal product has been used subject to listing of manufacturer's limitations which shall be included with the submittal. Should the product fail, the Manufacturer and/or its Certified Applicator shall remove the graffiti and recoat the surface at their own expense. The Graffiti Coating Contractor/Subcontractor shall provide, sealed in plastic, a statement of the warranty with the name, telephone number, and address of the manufacturer of the product to be contacted in the event that the product fails. The Contractor shall forward two (2) copy of the warranty to the Engineer at the time of final acceptance, one copy of which shall be delivered to the Borough President's Office.

(C) The Contractor shall submit written certification from the respective manufacturers of coatings, certifying that installers have been properly trained and are currently approved by the manufacturers to install the specified graffiti resistant coatings. Provide copy of certification to the Engineer prior to start of Contract work.

7.96.5. MEASUREMENT. The quantity of Anti-Graffiti Coating to be measured for payment shall be the number of square feet of surface to which an approved graffiti resistant coating has been applied to the satisfaction of the Engineer.

7.96.6. PRICE TO COVER. The price bid shall be a unit price per square foot of Anti-Graffiti Coating shall include the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work of furnishing and installing a graffiti resistant coatings. This work shall include, but not be limited to, surface preparation, application and proper curing of coating, and maintenance of surfaces coated for the duration of the contract, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer. The cost of providing necessary test panels shall also be included in the price bid for this item.

Payment will be made under:

Item No.	Item	Pay Unit
7.96 A	ANTI-GRAFFITI COATING	S.F.

SECTIONS 7.97 THRU 7.99 (NO TEXT)

SECTION 8.00 MT – Microtrenching

8.00MT.1. INTENT. This section describes Microtrenching.

8.00MT.2. DESCRIPTION. Microtrenching involves the placement of shallow depth microduct systems in street and sidewalk applications. This process includes the saw cutting of sidewalks and/or streets, installation of microduct systems and fiber optic wiring, restoration of sidewalks and/or streets and disposal of all unused debris. Locations of saw-cut can be from manhole (if necessary) in street to curb entrance; either at curb seam or below curb; and then in sidewalk expansion joint between flag and curb. All microduct systems must be placed at a minimum depth of 4" below sidewalk grade and 6" in depth below street grade locations. If manhole entrance is necessary the excavation to enter manhole system shall be the minimum required to gain entrance to said manhole.

8.00MT.3. GENERAL REQUIREMENTS.

(A) DISPOSAL OF MATERIALS

1. All materials that are not reused pursuant to Subsection 6.02.3 of the NYC Department of Transportation, Standard Highway Specifications shall be disposed of in compliance with the applicable requirements of **Sections 1.06.47 and 1.06.48** in General Conditions.

(B) EXPOSED STRUCTURES TO BE PROTECTED

1. All exposed sewers, manholes, receiving basins, water mains and other hardware and structures shall be carefully protected.

8.00MT.4. MICROTRENCHING CONSTRUCTION METHODS.

All trenching/excavations shall be carried to the required depths in such a manner as to produce a pathway that produces an undisturbed subgrade and allows for standard restoration.

1. Cutting expansion joints in Sidewalks: Expansion joints shall be cut using a wet-cut methodology to reduce damage to adjacent sidewalk flags. All cuts shall be approximately 1" wide to approximately 9"-12" in depth to allow for the microduct system to be placed at a minimum of 4" below sidewalk grade. The depth of the cut will depend upon the depth of the existing flags, pathway required and existing sidewalk furniture and fixtures (including but not limited to tree pits, roots, parking meters, mailboxes, bike racks, etc.).

2. Sidewalk flags and placement of utility handholes and/or grade-level boxes: All handholes/grade-level boxes shall be centered in a sidewalk flag. This flag will be removed in whole, sub-grade access placed and sidewalk flag restored. At no time will handhole or grade-level box be in the corner of a sidewalk flag to ensure concrete integrity of the flag. In the event of the removal of a sidewalk flag, the flag should be removed in its entirety and replaced in accordance with all applicable sidewalk restoration rules and regulations.

    a. All handholes and/or grade-level boxes must meet weight bearing requirements for the application and comply with ANSI / SCTE 77 2007:

Application	Loading Requirements			
	Design Load (lbs)	Test Load w/ F.S. 1.5 (lbs)	Design Load (psf)	Test Load w/ F.S. 1.5 (psf)
Tier 5 – Sidewalk applications with a safety factor for occasional non-deliberate vehicular traffic	5,000	7,500	600	900
Tier 8 – Sidewalk applications with a safety factor for non-deliberate vehicular traffic	8,000	12,000	600	900

Application	Loading Requirements			
	Design Load (lbs)	Test Load w/ F.S. 1.5 (lbs)	Design Load (psf)	Test Load w/ F.S. 1.5 (psf)
Tier 15 – Driveway, parking lot, and off roadway applications subject to occasional non-deliberate heavy vehicular traffic	15,000	22,500	800	1,200
Tier 22 – Driveway, parking lot and off roadway applications subject to occasional non-deliberate heavy vehicular traffic	22,500	33,750	800	1,200
AASHTO H-20 - Deliberate vehicular traffic applications	Certified pre-cast concrete, cast iron, or AASHTO recognized materials			

b. Minimum handhole size is 17”x30”x24”
c. Grade-level Box minimum size is 3’x5’x3’
d. All handholes/grade-level boxes must be composite to negate slippage due to environmental factors

3. Manhole entrance: Manholes are generally located within the street/vehicular pathway. Access to any manhole shall be kept to a minimum to gain entrance for microduct pathway, unless other obstructions exist which would make it necessary to continue the pathway in the roadway. Entrances to manhole shall be via pit directly adjacent to manhole and in direct line with pathway direction to minimize vehicular and pedestrian impact. All manhole related activities shall be performed in accordance with applicable rules and regulations.

4. Duct pathway placement: All microducts shall be placed vertically into the saw-cut trench, and the microduct should always be covered with requisite backfill material

8.00MT.5. RESTORATION.

1. Sidewalk expansion joint restoration:

a. Sidewalk expansion joints are to be restored using only NYCDOT approved materials. All expansion joints shall be recessed 1/2” below finished sidewalk surface and sealed with sealer, on an approved bond breaker, as soon as practical.

b. All expansion joints shall be sealed with a sealant meeting ASTM C 920, Type M, Grade P, Class 25, Use $T_{1,}$, and color to match to that of the adjacent sidewalk. The sealant shall be a rapid-setting, polyurethane-based joint sealant and shall be a self-leveling compound that provides for elongation. The sealant should be applied to avoid spillage onto sidewalk surface area.

i. Joints are to be recessed 1/2” with the finished surface.
ii. Joints should not be sealed during inclement weather.
iii. Application of sealant shall be as per the manufacturer’s written instructions.

2. Sidewalk flag restoration:

a. Any flags that need to be restored must be done in accordance with the NYCDOT Standard Highway Specifications.

b. Any flags that are below the standards set forth in the NYCDOT Standard Highway Specifications, and are directly adjacent to the original flag being replaced shall be replaced in accordance with Section 2(a) above.

3. Street/Asphalt restoration:

a. All street/asphalt restoration must be done according to Section 2.22, Type 1 – Hot poured sealer as outlined in the Standard Highway Specifications Volumes I and II, latest version and as currently amended. Joints are to be finished flush with the pavement.

4. Street/Concrete restoration:

   a. All street/concrete pavement restoration shall be done in accordance with the requirements for sidewalk expansion joint restoration, above.

SECTION 8.01 Handling, Transporting, and Disposal of Potential and Identified Contaminated and Hazardous Materials

8.01.1. DESCRIPTION. This Section provides common references and requirements for **Sections 8.01 C1**, **8.01 C2**, **8.01H**, **8.01S**, **8.01W1**, and **8.01 W2**.

8.01.2. MATERIALS. None.

8.01.3. METHODS.

(A) NYCDEP Limitations for Discharge to Sewer

NYCDEP Bureau of Wastewater Treatment – Limitations for Effluent to Sanitary or Combined Sewers

Parameter[1]	Daily Limit	Units	Sample Type	Monthly Limit
Non-polar material[2]	50	mg/l	Instantaneous	---
pH	5-11	SU's	Instantaneous	---
Temperature	< 150	Degree F	Instantaneous	---
Flash Point	> 140	Degree F	Instantaneous	---
Cadmium	2 0.69	mg/l mg/l	Instantaneous Composite	--- ---
Chromium (VI)	5	mg/l	Instantaneous	---
Copper	5	mg/l	Instantaneous	---
Lead	2	mg/l	Instantaneous	---
Mercury	0.05	mg/l	Instantaneous	---
Nickel	3	mg/l	Instantaneous	---
Zinc	5	mg/l	Instantaneous	---
Benzene	134	ppb	Instantaneous	57
Carbontetrachloride	---	---	Composite	---
Chloroform	---	---	Composite	---
1,4 Dichlorobenzene	---	---	Composite	---
Ethylbenzene	380	ppb	Instantaneous	142
MTBE (Methyl-Tert-Butyl-Ether)	50	ppb	Instantaneous	---
Naphthalene	47	ppb	Composite	19
Phenol	---	---	Composite	---
Tetrachloroethylene (Perc)	20	ppb	Instantaneous	---
Toluene	74	ppb	Instantaneous	28
1,2,4 Trichlorobenzene	---	---	Composite	---
1,1,1 Trichloroethane	---	---	Composite	---
Xylenes (Total)	74	ppb	Instantaneous	28
PCB's (Total)[3]	1	ppb	Composite	---
Total Suspended Solids (TSS)	350[4]	mg/l	Instantaneous	---
CBOD[5]	---	---	Composite	---
Chloride[5]	---	---	Instantaneous	---
Total Nitrogen[5]	---	---	Composite	---
Total Solids[5]	---	---	Instantaneous	---

Notes for table above:

1. All handling and preservation of collected samples and laboratory analyses of samples must be performed in accordance with 40 C.F.R. pt. 136. If 40 C.F.R. pt. 136 does not cover the pollutant in question, the handling, preservation, and analysis must be performed in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater." All analyses must be performed using a detection level less than the lowest applicable regulatory discharge limit. If a parameter does not have a limit, then the detection level is defined as the least of the Practical Quantitation Limits identified in NYSDEC's Analytical Detectability and Quantitation Guidelines for Selected Environmental Parameters, December 1988.

2. Analysis for ***non-polar materials*** must be done by USEPA method 1664 Rev. A. Non-Polar Material will mean that portion of the oil and grease that is not eliminated from a solution containing N–Hexane, or any other extraction solvent the USEPA will prescribe, by silica gel absorption.

3. Analysis for PCBs is required if ***both*** conditions listed below are met:
   a. if proposed discharge ≥ 10,000 gpd;
   b. if duration of a discharge > 10 Days.

   Analysis for PCBs must be done by USEPA method 608 with MDL=<65 ppt. PCB's (total) is the sum of PCB-1242 (Arochlor 1242), PCB-1254 (Arochlor 1254), PCB-1221 (Arochlor 1221), PCB-1232 (Arochlor 1232), PCB-1248 (Arochlor 1248), PCB-1260 (Arochlor 1260) and PCB-1016 (Arochlor 1016).

4. For discharge ≥ 10,000 gpd, the TSS limit is 350 mg/l. For discharge < 10,000 gpd, the limit is determined on a case-by-case basis.

5. Analysis for Carbonaceous Biochemical Oxygen Demand (CBOD), Chloride, Total Solids and Total Nitrogen are required if proposed discharge ≥ 10,000 gpd.

(B) Applicable Regulations

Applicable regulations include, but are not limited to:

1. 49 CFR 100 to 179 - DOT Hazardous Materials Transport and Manifest System Requirements
2. 6 NYCRR 375-6 - NYSDEC Remedial Program Soil Cleanup Objectives
3. 6 NYCRR 360-1 NYSDEC Solid Waste Management Facilities
4. 6 NYCRR 364- Waste Transporter permits
5. Local restrictions on transportation of waste/debris
6. 40 CFR 260 to 272 - Hazardous Waste Management (RCRA)
7. 6 NYCRR 371 - Identification and Listing of Hazardous Wastes
8. 6 NYCRR 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
9. 6 NYCRR 373-1 - Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements
10. 6 NYCRR 376 - Land Disposal Restrictions
11. Posted weight limitations on roads or bridges
12. Transportation Skills Programs, Inc. 1985 - Hazardous Materials and Waste Shipping Papers and Manifests
13. Other local restrictions on transportation of waste/debris
14. Occupational Safety and Health Administration (OSHA), Standards and Regulations, 29 CFR 1910 (General Industry)
15. OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
16. OSHA Safety and Health Standards 29 CFR 1926 (Construction Industry)
17. OSHA 29 CFR 1910.146 Confined Space Entry Standard
18. Standard Operating Safety Guidelines, USEPA Office of Emergency and Remedial Response Publication, 9285.1-03
19. NIOSH / OSHA / USCG / USEPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1986)
20. U.S. Department of Health and Human Services (DHHS) "NIOSH Sampling and Analytical Methods," DHHS (NIOSH) Publication 84-100
21. ANSI, Practice for Respiratory Protection, Z88.2 (1980)
22. ANSI, Emergency Eyewash and Shower Equipment, Z41.1 (1983)
23. ANSI, Protective Footwear, Z358.1 (1981)
24. ANSI, Physical Qualifications for Respirator Use, Z88.6 (1984)
25. ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1968)
26. Water Pollution Control Federation "Manual of Practice No. 1, Safety in Wastewater Works"
27. NFPA No. 327 "Standard Procedures for Cleaning and Safeguarding Small Tanks and Containers"
28. Occupational Safety and Health Act Confined Space Entry Standard 29 CFR 1910.146.87
29. Department of Transportation 49 CFR 100 through 179
30. Department of Transportation 49 CFR 387 (46 FR 30974, 47073)
31. Environmental Protection Agency 40 CFR 136 (41 FR 52779)

32. Environmental Protection Agency 40 CFR 262 and 761
33. Resource Conservation and Recovery Act (RCRA)
34. Any transporter of hazardous or non-hazardous materials must be licensed in the State of New York and all other states traversed in accordance with all applicable regulations.

(C) Definitions

Contaminated Groundwater and Decontamination Fluids: Groundwater within the excavation trench or decontamination water that contains regulated compounds above the NYCDEP Discharge to Sewer Effluent limits.

Disposal or Treatment Facility: A facility licensed to accept either non-hazardous regulated waste or hazardous waste for either treatment or disposal.

Exclusion Zone: Work area that will be limited to access by Contractor personnel specifically trained to enter the work area only. The exclusion zone will be set up to secure the area from the public and untrained personnel. The project health and safety program will apply to all construction personnel including persons entering the work area.

Hazard Assessment: An assessment of any physical hazards that may be encountered on a work site.

Hazardous Soils: Soils that exhibit any of the characteristics of a hazardous waste, namely ignitability, corrosivity, reactivity, and toxicity, as defined in 6 NYCRR Part 371, Section 371.3 and 40 CFR Section 261.

Hazardous Substance Evaluation: An evaluation of the possible or known presence of any hazardous substances that may be encountered on a job site. This evaluation is included in the Health and Safety Plan and will include the identification and description of any hazardous substances expected to be encountered. Material Safety Data Sheets (MSDS) will be included for each substance.

Health and Safety Plan: A plan employed at a work site that describes all the measures that will be taken to assure that all work is conducted in a safe manner, and that the health of the workers and the public will be insured.

Material Handling Plan: A plan outlining the methods that will be employed to handle, transport and dispose of contaminated materials.

Non-Hazardous Contaminated Soils: Soils which exhibit a distinct chemical or petroleum ordor or exhibit elevated photoionization detector readings but are not classified as hazardous waste under 6 NYCRR Part 371, Section 371.3 and 40 CFR Section 261.

New York State Health Department's Environmental Laboratory Approval Program: A program by which the state of New York approves and accredits environmental testing laboratories.

PCBs: Polychlorinated biphenyls are a group of toxic compounds commonly used as a coolant in transformers and other electrical components.

Photoionization Detector: A handheld instrument used to measure volatile organic compounds in air. The instrument ionizes the organic molecules through the use of an ultraviolet lamp.

RCRA Hazardous Waste Characteristics: Characteristics of a material which may indicate the material is hazardous. These include ignitability corrosivity, reactivity, and toxicity.

Total Petroleum Hydrocarbons: An analytical procedure used to determine the total amount of petroleum compounds in a material.

(D) Phase I and Phase II Investigation Reports

If Phase I and / or Phase II investigation reports have been prepared for the Project, they will be included in the HAZ-Pages in Volume 3 of the Contract.

If there are no Phase I and / or Phase II investigation reports in the HAZ-Pages in Volume 3 of the Contract, but 8.01 bid items are included in the Bid Schedule, the Contractor is to assume the excavated soil is contaminated and bid on the quantities listed. The Contractor must use the Contractor's engineering judgement for pricing those items.

8.01.4. MEASUREMENT AND PAYMENT. No separate payment will be made for complying with the requirements of this Section.

SECTION 8.01 C1 Handling, Transportation, And Disposal Non-Hazardous Contaminated Soil

8.01 C1.1. WORK TO INCLUDE

A. General

This work will consist of the handling, transportation, and disposal of non-hazardous contaminated soils.The materials covered by this specification are soils that are contaminated with petroleum or other chemicals (including but not limited to metals, pesticides, polychlorinated biphenyls [PCBs], volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], etc.) but cannot be classified as hazardous waste. For the purpose of this specification, soil will be defined as any material excavated below the pavement (concrete and/or asphalt) and pavement base (concrete and/or asphalt). Soil will also be defined as any material excavated from wetlands and/or wetlands adjacent area, or any areas that are not covered with hard pavement (e.g., concrete, asphalt), such as grass or dirt areas.

Soil to be excavated can be classified as non-contaminated, non-hazardous contaminated, or hazardous soil. Non-contaminated soils are defined as soils not exhibiting any of the following characteristics:

- Exceedances of New York State Department of Environmental Conservation (NYSDEC) Part 375-6 Restricted Commercial Soil Cleanup Objectives (SCOs) for street work, with the exception of benzo(a)pyrene which will have a limit of 3 parts per million (ppm), Restricted Residential SCOs for work areas in parkland, Residential SCOs for work in housing project areas, and Protection of Ecological Resources SCOs for work in wetlands and/or wetlands adjacent area.
- Elevated Photo-Ionization Detector (PID) readings (readings of greater than 10 parts per million [ppm] on a calibrated PID), which is subsequently confirmed by laboratory analysis specified under 8.01 C2.1.B.3
- Visual evidence of contamination, such as the presence of staining, discoloration, which is subsequently confirmed by laboratory analysis and exhibits exceedances of applicable SCOs.
- Petroleum and/or chemical odors, which are subsequently confirmed by laboratory analysis and exhibits exceedances of applicable SCOs.
- Physical evidence of coal ash, municipal solid waste, dredged spoils, or greater than 50% of the material is construction and demolition debris.

Non-hazardous contaminated soils are defined as soils exhibiting one or more of the above characteristics. Non-hazardous contaminated soils must be handled, transported, and disposed of in accordance with the specifications for Item 8.01 C1 – Handling, Transporting and Disposal of Non-Hazardous Contaminated Soil.

Hazardous soils are defined as soils showing exceedances of Toxicity Characteristic Leaching Procedure (TCLP) Regulatory Levels for Hazardous Waste published in Resource Conservation and Recovery Act (RCRA), 6 New York Codes, Rules, and Regulations (NYCRR) Part 371, or 40 Code of Federal Regulations (CFR) Section 261. Hazardous soils must be handled, transported, and disposed of in accordance with the specifications of this section.

This entire specification 8.01 covers the handling, transportation, and disposal of non-hazardous contaminated soils and hazardous soils only. Non-contaminated soil can be reused at the Project site, provided it meets other Contract requirements. Non-hazardous contaminated soils and hazardous soils cannot be reused. Excess non-contaminated soil becomes the property and responsibility of the Contractor.

The Contractor must ensure that all operations associated with the handling, sampling, loading, transportation, and disposal of non-hazardous contaminated soils are in compliance with all applicable Federal, State, and City statutes and regulations.

The Contractor must supply all equipment, material and labor required to conduct the specified work of this Item. The Contractor must document the excavation, handling, transportation and disposal of non-hazardous contaminated soils with analytical reports, manifests, photos, and clean fill documentation.

B. Request for Approval of Subcontractors

In accordance with Article 17 of the Contract, a subcontractor/subconsultant, such as the Environmental Consultant and the waste hauler, is not permitted to start work until approved by the Engineer. If the Contractor performs work using a subcontractor/subconsultant prior to approval, the Contractor will not be

paid for the work performed by that subcontractor/subconsultant and the Contractor may be subject to penalties including, but not limited to, initiation of default proceedings.

The Contractor must submit a completed original Request for Approval of Subcontractors (RFAS) form and all required documents, such as legal identity, project reference list, Corporate Health and Safety Plan (HASP), waste transporter permits, Occupational Safety and Health Administration (OSHA) 10 certification, Hazardous Waste and Emergency Response (HAZWOPER) certification, etc., to the Engineer at least 30 days prior to the scheduled subcontract work start date. The Engineer must then submit the original RFAS to DDC Safety and Site Support, Office of Environmental and Hazmat Services (OEHS) for review and approval. If the RFAS is denied by OEHS, OEHS will issue the final denial and return the original RFAS to the Engineer. If the RFAS is approved by OEHS, OEHS will forward the original RFAS package and an approval memo to the DDC Agency Chief Contracting Officer (ACCO) for further review and approval. The ACCO's Vendor Integrity Unit and Office of Contract Opportunity (OCO) will review the subcontractor/subconsultant's overall business integrity and compliance with the vendor integrity requirements in the PASSPort system, Executive Order 50, Local Law 1, and Minority- and Women-Owned Business Enterprise/ Disadvantaged Business Enterprise (MWBE/DBE) participation as per the Contract. ACCO will issue the final Approval or Denial. The original RFAS will be returned to the Engineer, who will subsequently notify and return the original RFAS to the Contractor.

C. Environmental Consultant

The Contractor must retain an independent Environmental Consultant to obtain all permits, prepare the plans required in the specification 8.01 and as per DDC issued templates, and perform all field screening, sampling, air monitoring, and other health and safety services. The Contractor is not permitted to self-perform this work. The Environmental Consultant must be approved under the RFAS process and must demonstrate the minimum requirements as set forth below:

1. The Environmental Consultant project supervisor on site and other designated key personnel must have a minimum of three (3) years of experience in the environmental field dealing with issues associated with contaminated/hazardous soils. Such experience must include oversight of environmental investigations, specifically including VOC and dust monitoring services as a routine part of daily operations.
2. The Environmental Consultant must be experienced in work of similar nature, size, and complexity and must have previous experience in working with DDC.
3. The Environmental Consultant must furnish a list of at least five (5) projects completed within the last 3 years, identifying the location, nature of services provided, owner, owner's contact, contact's working telephone number, project duration and value of the projects..

D. Sampling and Analysis

Prior to the performance of soil sampling, the Contractor will submit a Field Sampling Plan (FSP). Soil sampling must not be conducted until OEHS has approved the FSP. The Contractor must conduct sampling and analysis of the impacted soils as specified under Item 8.01 C2 – Sampling and Testing of Non-Hazardous Contaminated/Potentially Hazardous Soil for Disposal Purposes. The laboratory results must be forwarded to OEHS for review to determine if the soils would be handled and disposed of as non-hazardous contaminated soils or hazardous soils.

E. Material Handling Plan

At least 45 days prior to the commencement of work, the Contractor must submit to the OEHS for review a Material Handling Plan (MHP). The MHP must be approved by the OEHS prior to the Contractor beginning any soil excavation work. The MHP must, at a minimum, consist of:

1. The Contractor's procedures for identifying non-hazardous contaminated soils during excavation, including the specific model and manufacturer of intended organic vapor monitoring equipment and calibration procedures to be used. It should also include the training and experience of the personnel who will operate the equipment.
2. The Contractor's procedures for safely handling non-hazardous contaminated soils. The procedures must include personnel safety and health as well as environmental protection considerations.

3. For the proposed laboratory for analysis of representative soil samples, provide the following: (a) name, (b) address, (c) telephone number, and (d) New York State Department of Health's (NYSDOH) Environmental Laboratories Accreditation Program (ELAP) status.

4. Identification of the Contractor's proposed waste transporter(s) (hauler). This information must include:

   a) Name and Waste Transporter Permit Number;
   b) Address;
   c) Name of responsible contact for the waste transporter;
   d) Telephone number for the contact;
   e) All necessary permit authorizations for each type of waste transported; and,
   f) Previous experience in performing the type of work specified herein.

5. The name and location of the facility where an off-site scale is located. The Contractor must outline the procedures for controlling trucks leaving the work site and en-route to the off-site scale.

6. All staging/stockpiling areas (if stockpiling areas are intended and available), or alternate procedures that will be used. Alternate procedures may include, but are not limited to, agreements from the intended disposal facilities to accept boring data and/or analytical data previously obtained during the site characterization so that materials may be directly loaded into vehicles for shipment to the disposal facility.

7. A backup facility must be provided, should the staging/stockpile areas become unavailable, insufficient in area, or presented by some other unforeseen difficulty.

8. Identification of the Contractor's two proposed Treatment Storage or Disposal (TSD) facilities for contaminated soils (primary and back-up) for final disposal of the soils. Both primary and backup TSD facilities must be currently state-licensed disposal facilities approved to receive contaminated soil. The information required for each facility must include:

   a. General Information
      i. Facility name and the State identification number;
      ii. Facility location;
      iii. Name of responsible contact for the facility;
      iv. Telephone number for contact;
      v. Signed letter of agreement to accept waste as specified in this Specification. The letter must indicate agreement to handle and accept the specified estimated quantities and types of material during the time period specified in the project schedule and any time extension as deemed necessary; and,
      vi. Unit of measure utilized at disposal facility for costing purposes.
   b. A listing of all permits, licenses, letters of approval, and other authorizations to operate, which are currently held and valid for the proposed facility.
   c. A listing of all permits, licenses, letters of approval, and other authorizations to operate which have been applied for by the proposed facility but not yet granted or issued.
   d. The Contractor must specify and describe the disposal/containment unit(s) that the proposed facility will use to manage the waste. The Contractor must identify the capacity available in the units and the capacity reserved for the subject waste.
   e. The Contractor must provide the date of the proposed facility's last compliance inspection.
   f. A list of all active (unresolved) compliance orders (or agreements), enforcement notices, or notices of violations issued to the proposed facility must be provided. The source and nature of the cause of violation must be stated, if known.

9. Description of all sampling and field/laboratory analyses that will be needed to obtain disposal facility approval.

8.01 C1.2. MATERIALS

A. The Contractor must provide containers as specified in the United States Department of Transportation (USDOT) regulations.

B. The Contractor must provide polyethylene sheeting, which is to be placed under (20 mil. thickness minimum) and over (10 mil. thickness minimum) soil piles.

C. The Contractor must assure that the waste transporter's appropriate choice of vehicles and operating practices are fitted to prevent spillage or leakage of non-hazardous contaminated material during transportation.

D. The Contractor must provide, install, and maintain any temporary stockpiling or loading facilities on site as required until completion of material handling activities. The location and design of any such facilities must be included in the MHP.

8.01 C1.3. CONSTRUCTION DETAILS

A. Material Handling

1. Immediately after excavation of non-hazardous contaminated soil, the Contractor must:

   a. Load material directly onto trucks/tankers/roll offs for disposal off site; or,

   b. If interim stockpiling is required, place non-hazardous contaminated soil on a minimum of 20 mil. polyethylene sheeting and cover it securely by minimum of 10 mil. polyethylene sheeting to protect against cross contamination, airborne dust, leaching or runoff of contaminants into the subsurface, groundwater, or stormwater. Weight or secure the sheeting by appropriate means and seal seams as approved by the DDC to prevent tearing or removal by wind or weather. Grade surrounding surface to provide for positive drainage away from pile. Each stockpile must not exceed 500 cubic yards. Non-hazardous contaminated soils must be stockpiled separately from non-contaminated and hazardous soil at an off-site location approved by DDC or secured on-site by the Contractor, meeting all required Federal, State and Local stipulations. Stockpiles must be at least 800 feet away from any sensitive receptors, such as schools, daycare center, hospitals, nursing homes, etc., and at least 100 feet away from any water body.

2. Institute appropriate procedures and security measures to ensure the protection of site personnel and the public from non-hazardous contaminated materials as described in the approved MHP, Environmental Health & Safety Plan (EHASP), and Item 8.01 S - Health and Safety.

3. Any soil encountered that appears to contain unknown contaminants (based on visual, odor, or other observation), or that vary substantially from the material originally identified must be segregated in stockpiles and the Environmental Consultant promptly notified to collect soil samples for analysis. Construct stockpiles to the same requirements as stated in subsection (A)(1)(b) above.

4. Provide any dewatering that is necessary to complete the work. Contaminated water must be disposed of in accordance with Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water.

5. Provide and operate field organic vapor test equipment, a PID or a flame ionization detector (FID), to detect general organic vapor levels at intervals of approximately 50 cubic yards of soil excavated, when visual or odor observations indicate the material may substantially differ from the soil previously excavated, and/or as directed by the Environmental Consultant.

B. Off-Site Transportation to Disposal Facility

1. General

   a. The Contractor must furnish all labor, equipment, supplies and incidental costs required to transport non-hazardous contaminated material from the work area to the off-site disposal facility, and any other items and services required for transporting non-hazardous contaminated material for disposal at an off-site facility.

   b. The Contractor will be responsible for tracking all materials and vehicles from the site to the off-site scale at the final TSD facility.

   c. The Contractor must submit to the Engineer the certified tare and gross weight slips for each load received at the accepted facility which must be attached to each returned manifest. These documents must be maintained and kept with project field records.

   d. Non-hazardous contaminated soils must be delivered to the disposal or treatment facility within 30 calendar days after excavation.

e. The Contractor must coordinate the schedule for truck arrival and material deliveries at the job site to meet the approved project schedule.

f. The Contractor must inspect all vehicles leaving the project site to ensure that non-hazardous contaminated soils adhering to the wheels or undercarriage are removed prior to the vehicle leaving the site.

g. The Contractor must obtain letters of commitment from the waste haulers and the TSD facility to haul and accept shipments when directed by the Engineer in consultation with OEHS.

h. The Contractor must provide waste profile forms to OEHS for review and approval before transporting non-hazardous contaminated soil to the approved TSD facility.

2. Hauling

a. The Contractor must coordinate manifesting, placarding of shipments, and vehicle decontamination. All quantities must be measured and recorded upon arrival at the disposal facility. If any deviation between the two (2) records occurs, the matter is to be reported immediately to the Engineer and to be resolved by the Contractor to the satisfaction of the Engineer.

b. The Contractor will be held responsible, at its own cost, for any and all actions necessary to remedy situations involving material spilled in transit or mud and dust tracked off-site.

c. The Contractor must ensure that trucks are protected against contamination by properly covering and lining them with polyethylene sheeting or by decontaminating them prior to and between acceptance of loads. Trucks with loaded non-hazardous contaminated soil must be covered securely with tarps before leaving the project site to prevent generation of airborne dust during hauling.

d. The Contractor will be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions.

e. The Contractor must only use the transporter(s) identified in the approved MHP for the performance of work. A revised MHP or an addendum to the original approved MHP must be submitted to OEHS for review and approval at no additional cost to the City for any use of substitute or additional transporters.

f. The Contractor must develop, document, and implement a policy for accident prevention.

g. The Contractor must not combine non-hazardous contaminated materials from other projects with material from this project.

h. No material will be transported until approval by the Engineer is obtained.

3. Off-Site Disposal

a. The Contractor must use only the disposal facility(ies) identified in the approved MHP for the performance of the work. A revised MHP or an addendum to the original approved MHP must be submitted to OEHS for review and approval at no additional cost to the City for any use of substitutions or additions of disposal facilities.

b. The Contractor must be responsible for acceptance of the materials at an approved facility, for ensuring that the facility is properly permitted to accept the stated materials, and for ensuring that the facility provides the stated treatment and/or disposal services.

c. The City reserves the right to contact and visit the TSD facility, and regulatory agencies to verify the agreement to accept the stated materials and to verify any other information provided.

d. In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, it is the Contractor’s responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. The alternate facility(ies) must be approved in writing by the Engineer in the same manner and with the same requirements as for the original facility(ies). This must be done at no extra cost or delay to the City.

e. The Contractor must obtain manifest forms and complete the shipment manifest records required by the appropriate regulatory agencies for verifying the material and quantity of each

load in unit of volume and weight. Copies of each manifest must be submitted to the Engineer within four (4) business days following shipment, and within three (3) business days after notification of receipt of the facility. The signed manifests must be maintained and kept with the project field records. Any manifest discrepancies must be reported immediately to the Engineer and be resolved by the Contractor to the satisfaction of the Engineer.

4. Equipment and Vehicle Decontamination

   a. The Contractor must design and construct a portable decontamination station to be used to decontaminate equipment and vehicles that have been used to handle contaminated soil. The cost for this work will be paid under Item 8.01 S - Health and Safety.

   b. Water generated during the decontamination process must be disposed of in accordance with Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water.

8.01 C1.4 METHOD OF MEASUREMENT

A. Quantities for contaminated soils will be measured in tons. The tonnage will be determined by off-site truck scales, as per Subsection 8.01 C1(3)(B)(1), that are capable of generating load tickets.

B. Final disposal of hazardous soil will be paid for under Item 8.01 H – Handling, Transporting and Disposal of Hazardous Soil.

C. Disposal of contaminated water will be paid for under Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water. Backfill will be paid for under its respective item as specified in the Contract Documents.

D. The Environmental Consultant will be paid under Item 8.01 S – Health and Safety.

8.01 C1.5 PRICE TO COVER

The unit bid price per ton for Item 8.01 C1 must include the cost of furnishing all labor, materials, equipment plan, and insurance for excavation, handling, transportation, disposal, documentation, fees, permits, loading, stockpiling, hauling, and any other incidentals necessary to complete all the work as specified herein for handling, transporting, and disposal of non-hazardous contaminated soil.

Payment will be made under:

ITEM NUMBER	DESCRIPTION	PAY UNIT
8.01 C1	HANDLING, TRANSPORTATION, AND DISPOSAL OF NON-HAZARDOUS CONTAMINATED SOIL	TONS

SECTION 8.01 C2 – Sampling And Testing Of Non-Hazardous Contaminated/Potentially Hazardous Soil For Disposal Purposes

8.01 C2.1 WORK TO INCLUDE

A. Description

The work will consist of collecting and analyzing representative samples of soil to be excavated in-situ and/or ex-situ from stockpiles for parameters typically requested by the disposal facilities to determine if the soil to be excavated is suitable for reuse, or to be hauled off-site for disposal purposes as contaminated and/or hazardous soil.

B. Sampling and Laboratory Analysis

1. At least forty-five (45) days prior to the commencement of work, the Contractor's Environmental Consultant must submit an FSP and an Investigation Health and Safety Plan (Investigation HASP) to OEHS for review and approval, prior to conducting the field sampling. The FSP must include, at a minimum, the following information:

   a. Project information;
   b. Description of sample collection methodology for soil which appears to contain contaminants based on PID readings and field observation;
   c. Type of analyses;
   d. Sample preservation and handling;
   e. Training and experience of the personnel who will collect the samples;
   f. Equipment decontamination;
   g. Analytical laboratory's name, address, New York State Department of Health's ELAP certification number, and telephone number;
   h. Map of the project area;
   i. Sample location plan; and,
   j. Chain of Custody.

   The Investigation HASP must identify actual and potential hazards associated with planned sampling field activities and stipulate appropriate health and safety procedures, so as to minimize field personnel exposures to physical, biological, and chemical hazards that may be present in the sampling media. The Investigation HASP must include, at a minimum, the following information:

   a. Project information;
   b. Description of work to be performed;
   c. Names of responsible health and safety personnel;
   d. Worker training;
   e. Job hazard analysis;
   f. Confined Space Entry Plan (if applicable);
   g. Personal monitoring (if applicable);
   h. Community Air Monitoring Plan (CAMP, if applicable);
   i. Personnel Protection Equipment (PPE);
   j. Decontamination;
   k. Safety rules;
   l. Spill prevention and control, dust control, vapor/odor suppression procedures;
   m. Identification of nearest hospital and route; and,
   n. Emergency Incident Reporting.

2. The Contractor's Environmental Consultant must collect one (1) grab sample and one (1) composite sample per 500 cubic yards of soil to be excavated in-situ and/or ex-situ from stockpiles. Sample locations must be placed A) throughout or along areas within the project limits, and B) within any portion of the project area that exhibits any of the characteristics described in Section 8.01 C1.1 A (evidence of potential contamination via elevated PID readings, olfactory or visual evidence). For in-situ sampling, each grab soil sample must be collected from either the 6-inch interval above the water table (when encountered), or the 6-inch interval above the bottom of the proposed excavation depth (where recovery allowed), or from the 6-inch interval showing the highest potential for contamination based on field observation. For composite soil sampling, grid sampling must be performed for projects with excavation depth deeper than six (6) feet below

grade. Each composite sample must consist of five (5) grab samples and discrete aliquots collected from various intervals along the depth of excavation at each sampling boring location. For stockpiled soils, each composite sample must consist of five (5) grab samples collected from various depths within each soil stockpile, at least two feet below the soil surface. For drummed soil, one (1) composite sample per 10 drums must be collected. Each composite soil sample must consist of one (1) grab sample from each of the 10 drums.

3. Laboratory sampling should include analyses for VOCs, Polycyclic Aromatic Hydrocarbons (PAHs), PCBs, Toxicity Characteristic Leaching Procedure (TCLP) Metals (Resource Conservation and Recovery Act [RCRA] 8), the three RCRA Characteristics, ignitability, reactivity, and corrosivity, and Paint Filter Test. Additionally, should the disposal facility(ies) require specific analyses to accept material, the additional analyses should be included at no additional cost to the City.
4. Should the Contractor seek to remove non-contaminated excess soils from the site, the Contractor will be required to coordinate the Beneficial Use Determination (BUD) with NYSDEC prior to moving the soils in accordance with the 6 New York Code, Rules, and Regulations (NYCRR) Parts 360.12 and 360.13. The Contractor must keep the Engineer informed of the approval status and removal schedule of any and all soils being removed from the site which are not going to an approved disposal facility.
5. The quality of the data from the sampling program is the Contractor's responsibility. The Contractor must furnish all qualified personnel, materials, equipment and instruments necessary to carry out the sampling. Unless directed otherwise, all sampling procedures must follow the NYSDEC sampling guidelines and protocols. All sampling must be conducted by a qualified person trained in sampling protocols using standard accepted practices for obtaining representative samples.
6. Each grab and composite sample must be analyzed for all parameters required by disposal facilities accepting contaminated and hazardous soil, in addition to any specific criteria a sample is being analyzed for.
7. All sample containers must be marked and identified with legible sample labels, which must indicate the project name, sample location and/or container, the sample number, the date and time of sampling, preservatives utilized and other information that may be useful in determining the character of the sample. Chain-of-custody must be tracked from laboratory issuance of sample containers through laboratory receipt of the samples.
8. The Contractor must maintain a bound sample logbook. The Contractor must provide the Engineer access to it at all times and must turn it over to the Engineer in good condition at the completion of the work. The following information, at a minimum, must be recorded to the log:

    a. Sample identification number;
    b. Sample location;
    c. Field observation;
    d. Sample type;
    e. Analyses;
    f. Date/time of collection;
    g. Collector's name;
    h. Sample procedures and equipment utilized; and,
    i. Date sent to laboratory and name of laboratory.

9. The City reserves the right to direct the Contractor to conduct alternative sampling in lieu of the parameters described in subsection 8.01 C2(1)(B)(4) if the situation warrants. The substitute sampling parameters will be of equal or lesser monetary value than those described in subsection 8.01 C2(1)(B)(4), as determined by industry laboratory pricing standards.
10. Only dedicated sampling equipment may be used to collect these samples. All equipment involved in field sampling must be decontaminated before being brought to the sampling location and must be properly disposed after use.
11. The Contractor's Environmental Consultant must prepare a Field Sampling Result Report (FSSR), tabulate the analytical results, and compare the data to the applicable NYSDEC Part 375.6 SCOs and TCLP for Hazardous Waste published in RCRA and 6 NYCRR Part 371, or 40 CFR Section 261. If the soil is to be disposed of in a disposal facility outside of the State of New York, the soil sampling data must also be compared to the applicable regulatory criteria established by the state

in which the disposal facility is located. The FSSR, with the tabulated tables and laboratory analytical data, must be submitted to OEHS for review and approval prior to any soil reuse or disposal activities.

12. Soils exceeding any of the hazardous characteristic criteria meet the legal definition of hazardous soils (rather than non-hazardous contaminated soils) and must be transported or disposed of under Item 8.01 H – Handling, Transporting and Disposal of Hazardous Soil. All analyses must be done by a laboratory that has received approval from the ELAP for the methods to be used. The Contractor must specify the laboratory in the MHP.
13. The Contractor must contact the disposal facility where the waste will be sent for permanent disposal, and arrange to collect any additional samples required by the facility. The cost associated with additional sampling and testing must be included in the bid price of this Item.

8.01 C2.2 METHOD OF MEASUREMENT

Quantities for samples must be measured as the number of sets of samples that are tested. A set will be defined as one (1) grab and one (1) composite samples per 500 cubic yards to be analyzed for the full range of parameters as specified in subsection 8.01 C2(1)(B)(3).

8.01 C2.3 PRICE TO COVER

The unit price bid per set for Item 8.01 C2 will include the cost of furnishing all labor, materials, equipment, plan, and insurance necessary for sampling, handling, transporting, testing, documentation, fees, permits, and any other incidentals necessary to complete the work as specified herein for in-situ and ex-situ soil sampling and analysis for waste disposal parameters.

Payment will be made under:

Item No.	Description	Pay Unit
8.01 C2	SAMPLING AND TESTING OF CONTAMINATED/POTENTIALLY HAZARDOUS SOIL FOR DISPOSAL PURPOSES	SETS

SECTION 8.01 H – Handling, Transporting, And Disposal Of Hazardous Soil

8.01 H.1 WORK TO INCLUDE

A. General

This work will consist of the handling, transportation, and disposal of hazardous soils, which are defined as soils showing exceedances of TCLP for Hazardous Waste published in RCRA, 6 NYCRR Part 371, or 40 CFR Section 261. Hazardous soil can also be contaminated soils, as defined in Item 8.01 C1, but must be handled, transported, and disposed of as hazardous soil under Item 8.01 H, in accordance with the specifications herein. For the purpose of this specification, soil will be defined as any materials excavated below the pavement and base for pavement. Soil will also be defined as any material excavated from wetlands and/or wetlands adjacent areas, or any areas that are not covered with hard pavement (e.g., concrete, asphalt), such as grass or dirt areas.

The Contractor must ensure that all operations associated with the handling, sampling, loading, transportation, and disposal of hazardous materials are in compliance with the applicable Federal, State, and Local statutes and regulations, including Local Law 72 which becomes effective upon discovery of a TCLP lead exceedance. A sampling report, along with the executive summary, must be transmitted to OEHS within 48 hours of discovery to post on DDC website, as required by Local Law 72.

The Contractor must supply all equipment, material and labor required to conduct the specified work under this section.The Contractor must document the excavation, handling, sampling, and testing, transportation, and disposal of hazardous soils. The City must be listed in the disposal documents as the waste generator.

The Contractor must decontaminate all equipment prior to its removal from the exclusion zone and/or following contact with hazardous materials, as detailed in Item 8.01 S - Health and Safety. Water generated during the decontamination process must be disposed of under Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water.

The Contractor must retain an Environmental Consultant, meeting the requirements specified in Section 8.01 C1, and the Contractor is not permitted to self-perform this work. The Environmental Consultant must conduct sampling for laboratory analysis of soil to be excavated to determine whether the soil is contaminated and/or hazardous.

Hazardous soils are defined as soils showing exceedances of Toxicity Characteristic Leaching Procedure (TCLP) Regulatory Levels for Hazardous Waste published in Resource Conservation and Recovery Act (RCRA), 6 New York Codes, Rules, and Regulations (NYCRR) Part 371, or 40 Code of Federal Regulations (CFR) Section 261. Hazardous soils must be handled, transported, and disposed of in accordance with the specifications of this section.

All work under Item 8.01 H must be performed under the direct supervision of the Contractor's Environmental Consultant, as approved by the OEHS.

B. Material Handling Plan:

At least 45 days prior to the commencement of work, the Contractor must submit to the OEHS for review an MHP. The MHP must be approved by the OEHS prior to the Contractor beginning any soil excavation work. The MHP must, at a minimum, consist of:

1. The Contractor's procedures for identifying hazardous soils during excavation, including the specific model and manufacturer of intended organic vapor monitoring equipment and calibration procedures to be used. It should also include the training and experience of the personnel who will operate the equipment.
2. The Contractor's procedures for safely handling hazardous soils or soils which have not yet been tested but are believed to be potentially hazardous. The procedures must include personnel safety and health, as well as environmental protection considerations.
3. Name, address, NYSDOH ELAP status and telephone number of the proposed laboratory for analysis of representative soil samples.
4. Identification of the Contractor's proposed waste transporter(s). This information must include:
    1. Name and Waste Transporter Permit Number;

2. Address;
3. Name of responsible contact for the waste transporter;
4. Telephone number for the contact;
5. All necessary permit authorizations for each type of waste transported; and,
6. Previous experience in performing the type of work specified herein.

5. The name and location of the facility where an off-site scale is located. The Contractor must outline the procedures on controlling trucks leaving the work site and en-route to the off-site scale.

6. All staging/stockpiling areas (if stockpiling areas are intended and available), or alternate procedures that will be used. Alternate procedures may include, but are not limited to, agreements from the intended disposal facilities to accept boring data and/or analytical data previously obtained during the site characterization so that materials may be directly loaded into vehicles for shipment to the disposal facility.

7. A backup facility must be provided, should the staging/stockpile areas become unavailable, insufficient in area or not be present by some other unforeseen difficulty.

8. Identification of the Contractor's two proposed Treatment Storage or Disposal (TSD) facilities for hazardous soils (primary and back-up) for final disposal of the hazardous soils. Both primary and backup TSD facilities must be currently USEPA or State-approved RCRA TSD facilities for hazardous soils. The information required for each facility must include:

    a. General Information
        i. Facility name and the USEPA identification number;
        ii. Facility location;
        iii. Name of responsible contact for the facility;
        iv. Telephone number for contact;
        v. Signed letter of agreement to accept waste as specified in this Specification. The letter must indicate agreement to handle and accept the specified estimated quantities and types of material during the time period specified in the project schedule and any time extension as deemed necessary; and,
        vi. Unit of measure utilized at disposal facility for costing purposes.
    b. A listing of all permits, licenses, letters of approval, and other authorizations to operate, which are currently held and valid for the proposed facility.
    c. A listing of all permits, licenses, letters of approval, and other authorizations to operate which have been applied for by the proposed facility but not yet granted or issued.
    d. The Contractor must specify and describe the disposal/containment unit(s) that the proposed facility will use to manage the waste. The Contractor must identify the capacity available in the units and the capacity reserved for the subject waste.
    e. The Contractor must provide the date of the proposed facility's last compliance inspection under RCRA.
    f. A list of all active (unresolved) compliance orders (or agreements), enforcement notices, or notices of violations issued to the proposed facility must be provided. The source and nature of the cause of violation must be stated, if known.

9. Description of all sampling and field/laboratory analyses that will be needed to obtain disposal facility approval.

8.01 H.2 MATERIALS

A. The Contractor must provide containers as specified in the USDOT regulations.

B. The Contractor must provide polyethylene sheeting, which is to be placed under (20 mil. thickness minimum) and over (10 mil. thickness minimum) soil piles.

C. The Contractor must assure that the waste transporter's appropriate choice of vehicles and operating practices are fitted to prevent spillage or leakage of contaminated material during transportation.

D. The Contractor must provide, install, and maintain any temporary stockpiling or loading facilities on site as required until completion of material handling activities. The location and design of any such facilities must be included in the MHP.

8.01 H.3 CONSTRUCTION DETAILS

A. Material Handling

1. Immediately after excavation of hazardous soil, the Contractor must:

   a. Load material directly onto drums/trucks/tankers/roll offs for disposal off site. Containers must be labeled as hazardous soil while being held for disposal; or

   b. If interim stockpiling is required, place hazardous soil on a minimum of 20 mil. polyethylene sheeting and cover it securely with polyethylene sheeting a minimum of 10 mil. to protect against cross contamination, airborne dust, leaching or runoff of contaminants into the subsurface, groundwater, or stormwater. Weight or secure the sheeting by appropriate means and seal seams as approved by the Engineer to prevent tearing or removal by wind or weather. Grade surrounding surface to provide for positive drainage away from pile. Each stockpile must not exceed 500 cubic yards. Hazardous soils must be stockpiled separately from uncontaminated and contaminated soil at an off-site location approved by the Engineer or secured on-site by the Contractor, meeting all required Federal, State and Local stipulations. Stockpiles must be labelled as hazardous soil and situated at least 800 feet away from any sensitive receptors, such as schools, daycare center, hospitals, nursing homes, etc., and at least 100 feet away from any water body.

2. Institute appropriate procedures and security measures to ensure the protection of site personnel and the protection of the public from hazardous soils as described in the approved MHP, EHASP, and Item 8.01 S – Environmental Health and Safety.

3. Any soil encountered that appears to contain unknown contaminants (based on visual, odor, or other observation), or that vary substantially from the material originally identified must be segregated in stockpiles and the Environmental Consultant promptly notified to collect soil samples for analysis. Construct stockpiles to the same requirements as stated in subsection (A)(1)(b) above.

4. Provide any dewatering that is necessary to complete the work. Contaminated water must be disposed of in accordance with Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water.

5. Provide and operate field organic vapor test equipment, a PID or an FID, to detect general organic vapor levels at intervals of approximately 50 cubic yards of soil excavated, when visual or odor observations indicate the material may substantially differ from the soil previously excavated and/or as directed by the Environmental Consultant.

C. Off-Site Transportation to Disposal Facility

1. General

   a. The Contractor must furnish all labor, equipment, supplies and incidental costs required to transport hazardous material from the work area to the off-site disposal facility, and any other items and services required for transporting hazardous material for disposal at an off-site facility.

   b. The Contractor is responsible for obtaining the USEPA hazardous waste generator identification number for the City. The application must be submitted to OEHS for review and approval prior to submission to USEPA. The Contractor must prepare the annual hazardous waste report for the project and submit to the NYSDEC and USEPA.

   c. The Contractor will be responsible for tracking all material/vehicles from the site to the off-site scale and to the approved disposal facility.

   d. The Contractor must provide to the Engineer certified tare and gross weight slips for each load received at the accepted facility which must be attached to each returned manifest. These documents must be maintained and kept with project field records.

   e. Hazardous soils must be delivered to the disposal or treatment facility within 30 calendar days after excavation.

   f. The Contractor must coordinate the schedule for truck arrival and material deliveries at the job site to meet the approved project schedule.

g. The Contractor must inspect all vehicles leaving the project site to ensure that hazardous soils adhering to the wheels or undercarriage are removed prior to the vehicle leaving the site.

h. The Contractor must obtain letters of commitment from the waste haulers and the TSD facility to haul and accept shipments.

i. The Contractor must provide waste profile forms to OEHS for review and approval before transporting hazardous soil to the approved TSD facility.

2. Hauling

a. The Contractor must coordinate manifesting, placarding of shipments, and vehicle decontamination. All quantities must be measured and recorded upon arrival at the disposal facility. If any deviation between the two records occurs, the matter is to be reported immediately to the Engineer and be resolved by the Contractor to the satisfaction of the Engineer.

b. The Contractor will be responsible, at its own cost, for any and all actions necessary to remedy situations involving material spilled in transit or mud and dust tracked off-site.

c. The Contractor must ensure that trucks are protected against contamination by properly covering and lining them with polyethylene sheeting or by decontaminating them prior to and between acceptance of loads. Trucks with loaded hazardous soil must be covered securely with tarp before leaving the project site to prevent generation of airborne dust during hauling.

d. The Contractor will be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions.

e. The Contractor must only use the transporter(s) identified in the approved MHP for the performance of work. Only a transporter with a current Part 364 Waste Transporter Permit from NYSDEC may transport hazardous soil. A revised MHP or an addendum to the original approved MHP must be submitted to OEHS for review and approval at no additional cost to the City for any use of substitute or additional transporters.

f. The Contractor must develop, document, and implement a policy for accident prevention.

g. The Contractor must not combine hazardous materials from other projects with material from this project.

h. No material will be transported until approval by the Engineer is obtained.

3. Off-Site Disposal

a. The Contractor must use only the disposal facility(ies) identified in the approved MPH for the performance of the work. A revised MHP or an addendum to the original approved MHP must be submitted to OEHS for review and approval at no additional cost to the City for any use of substitutions or additions of disposal facility.

b. The Contractor will be responsible for acceptance of the materials at an approved facility, for ensuring that the facility is properly permitted to accept the stated materials, and for ensuring that the facility provides the stated treatment and/or disposal services.

c. The City reserves the right to contact and visit the TSD facility and regulatory agencies to verify the agreement to accept the stated materials and to verify any other information provided.

d. In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, it is the Contractor’s responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. The alternate facility(ies) must be approved in writing by the Engineer in the same manner and with the same requirements as for the original facility(ies). This must be done at no extra cost or delay to the City.

e. The Contractor must obtain manifest forms, and complete the shipment manifest records required by the appropriate regulatory agencies for verifying the material and quantity of each load in unit of volume and weight. Copies of each manifest must be submitted to the Engineer within four (4) business days following shipment, and within three (3) business days after notification of receipt of the facility. The signed manifests must be maintained and kept with the

project field records. Any manifest discrepancies must be reported immediately to the Engineer and be resolved by the Contractor to the satisfaction of the Engineer.

f. The Contractor must submit all results and weights to the Engineer.

g. The Contractor is responsible to pay all fees associated with the generation and disposal of all excavated hazardous waste. These fees include, but are not limited to, the New York State Department of Finance and Taxation (DFT) quarterly fees for hazardous waste and the NYSDEC annual hazardous waste regulatory fee program. The Contractor must submit a copy of proof of payment to the Engineer and OEHS.

4. Equipment and Vehicle Decontamination

a. The Contractor must design and construct a portable decontamination station to be used to decontaminate equipment and vehicles that have been used to handle hazardous soil. The cost for this work will be paid under Item 8.01 S – Health and Safety.

b. Water generated during the decontamination process must be disposed of in accordance with Item 8.01 W1 – Removal, Treatment, and Discharge/Disposal of Contaminated Water.

8.01 H.4 METHOD OF MEASUREMENT

A. Quantities for hazardous soils will be measured in tons. The tonnage will be determined by off-site truck scales, as per Subsection 8.01 H3(C)(1)(C), that are capable of generating load tickets.

B. Final disposal of non-contaminated soil will be paid for under Item 8.01 C1 – Excavation, Handling, Transporting and Disposal of Non-Hazardous Contaminated Soil.

C. Disposal of decontamination water will be paid for under Item 8.01 W1 – Removal, Treatment and Discharge/Disposal of Contaminated Water.

D. Backfill will be paid for under its respective item as specified in the contract document.

E. The Environmental Consultant will be paid under Item 8.01 S – Health and Safety.

8.01 H.5 PRICE TO COVER

The unit bid price bid per ton for Item 8.01 H will include the cost of furnishing all labor, materials, equipment, plan, and insurance for excavation, handling, transportation, disposal, documentation, fees, permits, loading, stockpiling, hauling, and any other incidentals necessary to complete all the work as specified herein for excavation, handling, transporting, and disposal of hazardous soil.

Payment will be made under:

Item No.	Description	Pay Unit
8.01 H	HANDLING, TRANSPORTING, AND DISPOSAL OF HAZARDOUS SOIL	TONS

SECTION 8.01 S Health And Safety

8.01 S.1 WORK TO INCLUDE

Health and Safety Requirements

A. Scope of Work

It is the Contractor's responsibility to stage and conduct the Contractor's work in a safe manner. The Contractor must implement an EHASP for non-hazardous contaminated or hazardous soil intrusive activities as set forth in OSHA Standards 1910.120 and 1926.650-652. The Contractor must ensure that all workers have at a minimum hazard awareness training. The Contractor must segregate contaminated work area in secured exclusion zones. These zones must limit access to Contractor personnel specifically trained to enter the work area. The exclusion zone must be set up to secure the area from the public and untrained personnel. The project health and safety program will apply to all construction personnel including persons entering the work area. In addition, the Contractor must protect the public from on-site hazards, including subsurface contaminants associated with on-site activities. The EHASP must be signed off by a Certified Industrial Hygienist and reviewed and approved by OEHS.

Work must include, but not be limited to:

1. Implementation of a baseline medical program.
2. Providing safety equipment and protective clothing for site personnel, including maintenance of equipment on a daily basis; replacement of disposable equipment as required; decontamination of clothing, equipment and personnel; and providing all other health and safety measures.
3. Providing, installing, operating and maintaining on-site emergency medical first aid equipment as specified in this section for which payment is not provided under other pay items in this Contract.
4. Providing, installing, operating, maintaining and decommissioning all equipment and personnel decontamination facilities specified within this section, including, but not limited to, the decontamination pad, decontamination water supply, decontamination water collection equipment and all other items and services required for the implementation of the health and safety requirements for which pay items are not provided elsewhere in this Contract.
5. Provide the minimum health and safety requirements for excavation activities within the limits of this Contract.
6. Implement and enforce an EHASP: The EHASP as presented in these specifications is dynamic with provisions for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public. The EHASP will also address measures for community protection, accident prevention, personnel protection, emergency response/contingency planning, air monitoring, odor control and hazardous chemicals expected on site. Providing a Confined Space Entry Program as defined in the Occupational Safety and Health Act, Confined Space Entry Standard, 29 CFR 1910.146.

B. Environmental Consulting Services

The Contractor must retain an Environmental Consultant to obtain all permits and perform all field screening, air monitoring, community air monitoring, soil and water sampling, and health and safety services.

1. If conditions within the exclusion zone are deemed hazardous, then the Contractor and its Environmental Consultant must ensure that all personnel working within identified exclusion zones and/or involved (direct contact) with the handling, storage or transport of hazardous and contaminated materials must have completed a minimum of forty (40) hours of Health and Safety Training on Hazardous Waste Sites in accordance with 29 CFR 1910.120(e). The training program must be conducted by a qualified safety instructor. If conditions in the exclusion zone are deemed to be non-hazardous, the Environmental Consultant must provide site specific training.
2. The Contractor must ensure that on-site management and supervisors directly responsible for or who supervise employees engaged in hazardous waste operations must receive the training specified in above and at least eight (8) additional hours of specialized training on managing such operations at the time of job assignment.

C. Submittals

1. The Contractor must submit a written EHASP, as specified herein, to OEHS for review and approval. The written EHASP must be submitted, within thirty (30) calendar days after the availability of analytical results of the soil and groundwater testing, as required under Section 8.01 C2 and Section 8.01 W2. The Contractor must make all necessary revisions required by OEHS and resubmit the EHASP to OEHS for acceptance. Start-up work for the project will not be permitted until written acceptance has been issued by OEHS.
2. Daily safety logs must be maintained by the Contractor and must be submitted to the Engineer either on request or on completion of the work. Training logs must be maintained by the Contractor and submitted to the Engineer either on request or on completion of the work. Daily logs on air monitoring during excavation activities must be prepared and maintained by the Contractor and submitted to the Engineer either on request or upon completion of the work.
3. A closeout report must be submitted by the Contractor to the Engineer upon completion of the work within the defined exclusion zones. This report must summarize the daily safety and monitoring logs and provides an overview of the Contractor's performance regarding environmental and safety issues. The report must carefully document all areas where contamination has been found including pictures, addresses of locations, and potential sources.
4. Medical Surveillance Examinations: The Contractor must submit to the Engineer the name, office address and telephone number of the medical consultant utilized. Evidence of baseline medical examinations together with the evidence of the ability to wear National Institute for Occupational Safety and Health (NIOSH) approved respirators (as specified in American National Standards Institute (ANSI) Z88.6) must be provided to the Engineer for all construction personnel who are to enter the exclusion zones.
5. Accident Reports: All accidents, spills, or other health and safety incidents must be reported to the Engineer.

D. Health and Safety Plan

The EHASP must comply with OSHA regulations 29 CFR 1910.120/1926.65. This document must at a minimum contain the following:

1. Description of work to be performed
2. Site description
3. Key personnel
4. Worker training procedures
5. Work practices and segregation of work area
6. Hazardous substance evaluation
7. Hazard assessment
8. Personal and community air monitoring procedures and action levels
9. Personal protective equipment
10. Decontamination procedures
11. Safety rules
12. Emergency procedures
13. Spill prevention and control, as well as spill reporting procedures
14. Dust control, vapor/odor suppression procedures
15. Identification of the nearest hospital and route
16. Confined space procedures
17. Excavation safety procedures

8.01 S.2 MEASUREMENT

Health and Safety Requirements

A. 25% of the lump sum price will be paid when the following items are implemented or mobilized:

Medical surveillance program
Health and safety training
Health and safety plan
Environmental and personnel monitoring

Instrumentation
Spill control
Dust control
Personnel and equipment decontamination facilities
Personnel protective clothing
Communications
Mobilization

B. 50% will be paid in proportional monthly amounts over the period of work.

C 25% will be paid when the operation is demobilized and removed from the project site.

8.01 S.3 PRICE TO COVER

Health and Safety Requirements

The lump sum price bid for the health and safety requirements will include all labor, materials, equipment, and insurance necessary to complete the work in accordance with these specifications. The price bid will include, but not be limited to, the following:

A. Providing training, safety personnel, air monitoring and medical examinations as specified.

B. Providing safety equipment and protective clothing for site personnel, including maintenance of equipment on a daily basis; replacement of disposable equipment as required; decontamination of clothing, equipment and personnel; and all other health and safety activities or costs not paid for under other pay items in this Contract.

C. Providing, installing, operating and maintaining on-site emergency medical and first aid equipment. This includes all furnishings, equipment, supplies and maintenance of all medical equipment, and all other health and safety items and services for which payment is not provided under other pay items in this Contract.

D. Providing, installing, operating, maintaining, and decommissioning all personnel and equipment decontamination facilities, including decontamination pad, decontamination water supply, and all other items and services required for the implementation of the health and safety requirements for which pay items are not provided elsewhere in this Contract. Vehicle decontamination pads will be included in the price of this item. Disposal of decontamination fluid will be paid for under Item 8.01 W1 – Removal, Treatment, and Discharge/Disposal of Contaminated Water.

E. Spill Control

1. Payment will account for furnishing, installing, and maintaining all spill control equipment and facilities. Payment will include equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage during work within the exclusion zones and handling of excavated soils and liquids from these areas. This collected spill material will be properly disposed of.

2. Payment under this item will not include testing, handling, transportation or disposal of petroleum-contaminated/potentially hazardous soils excavated during construction. The price for this work will be paid for under Items 8.01 C1 – Excavation, Handling, Transporting and Disposal of Non-Hazardous Contaminated Soil, 8.01 C2 – Sampling and Testing of Contaminated/Potentially Hazardous Soil for Disposal Purposes or 8.01 H – Excavation, Handling, Transporting and Disposal of Hazardous Soil, as appropriate.

F. Dust Control

Payment will account for furnishing, installing, and maintaining dust control equipment and facilities to be used whenever applicable dust levels are exceeded. Payment will include all necessary labor, equipment, clean water, foam, and all other materials required by the Dust Control Plan. The NYSDOH Community Air Monitoring Plan (CAMP) may be used as guidance.

G. Vapor/Odor Suppression

Payment will account for furnishing, installing and maintaining vapor/odor control equipment and facilities to be used whenever organic vapor monitoring or the presence of odors indicates that vapor suppression is required to protect workers or the public. Payment will include all necessary

labor, equipment, clean water, foam and all other materials required by the Vapor/Odor Suppression Plan.

H. Mobilization/Demobilization

1. Mobilization

Payment will include the following, but not be limited to:

a. All work required to furnish, install and maintain all signs, fencing, support zone facilities, parking areas and all temporary utilities;

b. All work required to furnish, install, and maintain an office space with phone and utilities for health and safety personnel;

c. All work required for complete preparation of lay down area for roll-off containers, including sampling, and any required fencing;

d. All direct invoiced cost from bonding companies and government agencies for permits and costs of insurance; and

e. All other items and services required for mobilization and site preparation.

2. Demobilization

Payment will include but not be limited to: All work required to sample the area; remove from the site all equipment, temporary utilities and supporting facilities; performance of necessary decontamination and repairs; disposal of disposable equipment and protective gear and other items and services required for complete demobilization.

Payment will be made under:

Item No.	Description	Pay Unit
8.01 S	HEALTH AND SAFETY	LUMP SUM

SECTION 8.01 W1 – Removal, Treatment, And Disposal / Discharge Of Contaminated Water

8.01 W1.1 WORK TO INCLUDE

General: This work must consist of the proper removal and disposal of all contaminated groundwater and decontamination water generated during construction operations. The Contractor must be solely responsible for the proper disposal or discharge of all contaminated water generated at the job site. The Contractor will have the option of treating water on-site for discharge to the sewer system or removing contaminated water for off-site disposal. The Contractor must be responsible to choose a method compatible to the construction work and will be compensated on a per day basis regardless of method employed. The Contractor will be compensated for only those days where the system is in full operation.

The Contractor must retain a dewatering/water treatment Specialist (hereinafter the "Specialist") and laboratory as specified under Item 8.01 W2 – Sampling and Testing of Contaminated Water, to conduct any testing that may be required for disposal of impacted water.

The dewatering/water treatment Specialist is responsible to obtain all permits; perform all water sampling, testing; and provide ancillary services related to dewatering and water treatment. The Specialist must at a minimum provide documentation to OEHS demonstrating the minimum requirements as set forth below:

1. The Specialist must demonstrate that it has, at a minimum, three (3) years' experience in the design of dewatering plans. The Specialist should demonstrate expertise dealing with issues associated with contaminated water. During that three (3) year period, the Specialist must demonstrate that it provided dewatering and water treatment systems as a routine part of its daily operations.
2. The Specialist must be experienced in work of this nature, size, and complexity and must have previous experience in working with the NYSDEC.
3. The Specialist must furnish a list of at least five (5) projects completed within the last (3) years, identifying the location, nature of services provided, owner, owner's contact, contact's telephone number, project duration and value of the projects.
4. If conditions within the exclusion zone are deemed hazardous, then the Contractor and its Environmental Consultant must ensure that all personnel working within identified exclusion zones and/or involved (direct contact) with the handling, storage or transport of hazardous and contaminated material must have completed a minimum of forty (40) hours of Health and Safety Training on Hazardous Waste Sites in accordance with 29 CFR 1910.120(e). The training program must be conducted by a qualified safety instructor. If conditions in the exclusion zone are deemed to be non-hazardous, the Specialist will be responsible to provide site-specific training to its employees and other affected personnel.
5. The Contractor must ensure that on-site management and supervisors directly responsible for or who supervise employees engaged in hazardous waste operations must receive the training specified in above and at least eight (8) additional hours of specialized training on managing such operations at the time of job assignment.

The Contractor must document all operations associated with the handling, sampling and disposal of contaminated water, and ensure that they are in compliance with applicable Federal, State and Local statutes and regulations.

The Contractor must supply all labor, equipment, transport, plant, material, treatment, and other incidentals required to conduct the specified work of this section.

If water will be disposed of into the sewer system, the Contractor must ensure the Specialist treats the water to comply with the New York City Department of Environmental Protection (NYCDEP) Sewer Effluent Limit concentrations prior to discharge. The Contractor is responsible for providing settling or filtering tanks and any other apparatus required by NYCDEP. Alternatively, the Contractor can provide a plan for transport and disposal at an off-site waste disposal facility.

Within forty-five (45) calendar days after award of Contract, the Contractor must submit to OEHS for review and approval, a Water Handling Plan (WHP). The WHP must be approved by OEHS prior to the Contractor's commencement of work. The minimum requirements for the WHP are specified herein Item 8.01W 1.2, for

each type of disposal (disposal into the sewer or off-site disposal). The Contractor must maintain a complete, up to date copy of the WHP on the job site at all times.

8.01 W1.2 CONSTRUCTION DETAILS

For each disposal method the Contractor proposes to utilize (disposal to sewer or off-site disposal), the WHP must include the information required in paragraphs A and B below, as appropriate.

A. On-site treatment and discharge into New York City sewers.

1. Regulations: The Contractor must comply with all applicable regulations. This includes but may not be limited to:

   Title 15-New NYCDEP Sewer Use Regulations.

2. Permits: The Contractor is solely responsible to obtain all necessary and appropriate Federal, State and Local permits and approvals. The Contractor will be responsible for performing all and any system pilot tests required for permit approval. This includes but may not be limited to:

   a. Industrial waste approval for the New York City sewer system.

   b. Groundwater discharge permit for the New York City sewer system (NYCDEP Division of Sewer Regulation and Control), if discharge to sewer exceeds 10,000 gallons per day.

   c. The Contractor must comply with NYSDEC State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity ~~(~~SPDES General Permit~~)~~ GP-0-20-001 or its successor.

   d. Long Island well permit for Brooklyn and Queens sites, if well points are used for dewatering.

   e. Wastewater quality control application, NYCDEP.

3. The WHP for this portion of the work must include the following at a minimum:

   a. Identification and design of Contractor's proposed treatment to assure that the water meets the NYCDEP sewer use guidelines prior to discharge to the sewer, including identification of all materials, procedures, settling or filtering tanks, filters and other appurtenances proposed for treatment and disposal of contaminated water.

   b. The name, address and telephone number of the contact for the Contractor's proposed chemical laboratory, as well as the laboratory's certifications under Federal, State or non-governmental bodies.

   c. The name, address and telephone number of the contact for the Contractor's proposed Environmental Consultant.

   d. Copies of all submitted permit applications and approved permits the Contractor have received.

4. Materials

The Contractor must supply all settling or filtering tanks, pumps, filters, treatment devices and other appurtenances for treatment, temporary storage and disposal of contaminated water. All equipment must be suitable for the work described herein.

5. Execution

   a. The Contractor is solely responsible for disposal of all water, in accordance with all Federal, State and Local regulations.

   b. The Contractor is solely responsible for any treatment required to assure that water discharged into the sewer is in compliance with all permits and Federal, State and Local statutes and regulations.

   c. The Contractor is solely responsible for the quality of the water disposed of into the sewers.

d. The Contractor is responsible for sampling and testing of water for the NYCDEP Sewer Effluent Limit concentrations. The quality of the data is the Contractor's responsibility. Any sampling and testing must be conducted and paid in accordance with Item 8.01 W2 – Sampling and Testing of Contaminated Water.

e. The Contractor will be responsible to maintain the discharge rate to the sewer such that all permit requirements are met, the capacity of the sewer is not exceeded and no surcharging occurs downstream due to the Contractor's actions. Dewatering by means of well points or deep wells will not be allowed in the Boroughs of Brooklyn or Queens where the rate of pumping exceeds forty-five (45) gallons per minute unless the appropriate permit has been secured from the NYSDEC.

f. Disposal of Treatment Media

(1) The Contractor will be responsible for disposal or recycling of treatment media in accordance with all Federal, State and Local regulations.

(2) The Contractor must provide the Engineer with all relevant documentation concerning the disposal of treatment media, including manifests, bills of lading, certificates of recycling or destruction and other applicable documentation.

(3) **Disposal of treatment media will not be considered a separate pay item; instead it will be considered as incidental work thereto and included in the unit price bid.**

B. Off-Site Disposal

1. Regulations: The Contractor must conform to all applicable Federal, State and Local regulations pertaining to the transportation, storage and disposal of any hazardous and/or non-hazardous materials as listed in Attachment 2.

2. The following must be submitted to the Engineer prior to initiating any off-site disposal:

a. (1) Name and waste transporter permit number

(2) Address

(3) Name of responsible contact for the waste transporter

(4) Any and all necessary permit authorizations for each type of waste transported

(5) Previous experience in performing the type of work specified herein

b. General information for each proposed treatment/disposal facility and at least one backup treatment/disposal facility

(1) Facility name and USEPA identification number

(2) Facility location

(3) Name of responsible contact for the facility

(4) Telephone number for contact

(5) Unit of measure utilized at facility for costing purposes

c. A listing of all permits, licenses, letters of approval and other authorizations to operate, which are currently held and valid for the proposed facility as they pertain to receipt and management of the wastes derived from this Contract.

d. A listing of all permits, licenses, letters of approval and other authorizations to operate which have been applied for by the proposed facility but not yet granted or issued. Provide dates of application(s) submitted. Planned submittals must also be noted.

e. The Contractor must specify and describe the disposal/containment unit(s) that the proposed facility will use to manage the waste and provide dates of construction and beginning of use, if applicable. Drawings may be provided. The Contractor must identify the capacity available in the units and the capacity reserved for the subject waste.

f. The Contractor must provide the date of the proposed facility's last compliance inspection.

g. A list of all active (unresolved) compliance orders, agreements, enforcement notices or notices of violations issued to the proposed facility must be submitted. The source and nature of the cause of violation must be stated, if known. If groundwater contamination is noted, details of the facility's groundwater monitoring program must be provided.

h. Description of all sampling and field/laboratory analyses that will be needed to obtain disposal facility approval.

3. Materials

All vessels for temporary storage and transport to an off-site disposal facility must be as required in DOT regulations.

4. Execution

a. General

(1) The Contractor must organize and maintain the material shipment records/manifests required by Federal, State and Local laws. The Contractor must include all bills of lading, certificates of destruction, recycling or treatment and other applicable documents.

(2) The Contractor must coordinate the schedule for truck arrival and material deliveries at the job site to meet the approved project schedule. The schedule must be compatible with the availability of equipment and personnel for material handling at the job site.

(3) The Contractor must inspect all vehicles leaving the project site to ensure that contaminated liquids are not spilling and are contained for transport.

(4) The Contractor must obtain letters of commitment from the waste haulers and the treatment, disposal or recovery facility to haul and accept shipment. The letter must indicate agreement to handle and accept the specified estimated quantities and types of material during the time period specified in the project schedule and any time extension as deemed as necessary.

(5) The Contractor must verify the volume of each shipment of water from the site.

(6) The Contractor is responsible for sampling and testing of water for off-site disposal. The quality of the data is the Contractor's responsibility. Any sampling and testing must be conducted and paid in accordance with Item 8.01 W2 – Sampling and Testing of Contaminated Water.

(7) The Contractor is responsible for any additional analyses required by the TSD facility, and for the acceptance of the water at an approved TSD facility.

b. Hauling

(1) The Contractor must not deliver waste to any facility other than the TSD facility(ies) listed on the shipping manifest.

(2) The Contractor must coordinate manifesting, placarding of shipments, and vehicle decontamination. All quantities must also be measured and recorded upon arrival at the TSD facility(ies). If any deviation between the two records occurs, the matter is to be reported immediately to the Engineer and must be resolved by the Contractor to the satisfaction of the Engineer.

(3) The Contractor will be responsible for any and all actions necessary to remedy situations involving material spilled in transit or mud and dust tracked off-site. This cleanup must be accomplished at the Contractor's expense.

(4) The Contractor will be responsible for inspecting the access routes for road conditions, overhead clearance and weight restrictions.

(5) The Contractor must only use the transporter(s) identified in the WHP for the performance of work. Only a transporter with a current Part 364 Waste Transporter Permit from NYSDEC may transport this material. Any use of substitute or additional

transporters must have previous written approval from the Engineer at no additional cost to the City.

(6) The Contractor must develop, document, and implement a policy for accident prevention.

(7) The Contractor must not combine waste materials from other projects with material from this project.

(8) The Contractor must obtain for the City a hazardous waste generator identification number and will sign the manifest as the generator, if necessary.

(9) No material must be transported until approved by the Engineer.

c. Disposal Facilities

(1) The Contractor must use only the TSD facility(ies) identified in the WHP for the performance of the work. Substitutions or additions must not be permitted without prior written approval from OEHS, and, if approved, must be at no extra cost to the City.

(2) The Contractor will be responsible for acceptance of the material at an approved TSD facility, for ensuring that the facility is properly permitted to accept the stated material, and that the facility provides the stated storage and/or disposal services.

(3) The City reserves the right to contact and visit the disposal facility and regulatory agencies to verify the agreement to accept the stated material and to verify any other information provided. This does not in any way relieve the Contractor of the Contractor's responsibilities under this Contract.

(4) In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, it is the Contractor's responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. The Contractor is responsible for making the necessary arrangements to utilize the facility(ies), and the alternate facility(ies) must be approved in writing by the Engineer in the same manner and with the same requirements as for the original facility(ies). This must be done with no extra cost or delay to the City.

d. Equipment and Vehicle Decontamination

(1) The Contractor must design and construct a portable decontamination station to be used to decontaminate equipment and vehicles exiting the exclusion zone. The cost for this work will be paid under Item 8.01 S – Health and Safety.

8.01 W1.3 METHOD OF MEASUREMENT

The quantity for on-site treatment and discharge or off-site disposal will be on a per day basis.

8.01 W1.4 PRICE TO COVER

A. The per day price bid for Item 8.01 W1 will include the cost of furnishing all labor, materials, equipment, plan, and insurance for handling, transportation, disposal, documentation, permits, hauling, mobilization and demobilization, and any other incidentals thereto to complete the work.

B. The Contractor will not be paid for water that is within the NYCDEP Sewer Discharge Limits.

Payment will be made under:

Item No.	Description	Pay Unit
8.01 W1	REMOVAL, TREATMENT AND DISCHARGE/DISPOSAL OF CONTAMINATED WATER	DAY

SECTION 8.01 W2 –Sampling and Testing of Contaminated Water

8.01 W2.1 WORK TO INCLUDE

A. Description

The work will consist of sampling and testing of potentially contaminated groundwater, surface runoff within the excavated area and all contaminated water generated during the decontamination process.

B. Sampling and Testing

1. The Contractor is responsible, at a minimum, for sampling and testing of contaminated water for the NYCDEP Sewer Effluent Limit concentrations as listed in Attachment 1, and in accordance with the Engineer-approved FSP and the Investigation HASP, as specified in Section 8.01 C2. The quality of the data is the Contractor's responsibility. Any additional testing required by the Federal, State and/or disposal facilities must be included in the bid price of this Item.
2. All sampling and testing must be conducted by a person trained in sampling protocols using accepted standard practices and/or the NYSDEC sampling guidelines and protocols.
3. All sample containers must be marked with legible sample labels which must indicate the project name, sample location and/or container, the sample number, the date and time of sampling, preservatives utilized, how the sample was chilled to 4 degrees Celsius, and other information that may be useful in determining the character of the sample.
4. Chain-of-custody must be tracked from laboratory issuance of sample containers through receipt of the samples.
5. The Contractor must maintain a bound sample log book. The Contractor must provide the Engineer access to it at all times and must turn it over to the Engineer in good condition at the completion of the work. The following information, as a minimum, must be recorded to the log:
   a. Sample identification number
   b. Sample location
   c. Field observation
   d. Sample type
   e. Analyses
   f. Date/time of collection
   g. Collector's name
   h. Sample procedures and equipment used
   i. Date sent to laboratory/name of laboratory
6. Only dedicated sampling equipment may be used to collect these samples. All equipment involved in field sampling must be decontaminated before being brought to the site, and must be properly disposed of after use.
7. Samples must be submitted to the Contractor's laboratory within the holding times for the parameters analyzed.
8. All analyses must be done by a laboratory that has received approval from the NYSDOH's ELAP for the methods to be done. The Contractor must specify the laboratory in the WHP.
9. Analytical results for water discharged to the sewer and for off-site disposal must be submitted to the Engineer no later than five (5) days after sample collection.
10. The City reserves the right to direct the Contractor to conduct alternative sampling in lieu of the parameters described above, if the situation warrants. The substitute sampling parameters will be of equal or lesser monetary value than those described above, as determined by industry laboratory pricing standards.

8.01 W2.2 METHOD OF MEASUREMENT

Quantities for samples will be measured as the number of sets of samples that are tested for the NYCDEP Sewer Effluent Limit concentrations. A set will be defined as one (1) representative sample analyzed for the full range of NYCDEP parameters as specified in Attachment 1.

8.01 W2.3 PRICE TO COVER

The unit price bid per set for Item 8.01 W2 will include the cost of furnishing all labor, materials, equipment, plan, and insurance for handling, transport, sampling, testing, documentation, permits, other incidentals necessary to complete the work of sampling and testing of contaminated water. Any additional costs incurred by the Contractor for sampling and testing of contaminated water will be included in the bid price of this Item.

Payment will be made under:

Item No.	Description	Pay Unit
8.01 W2	SAMPLING AND TESTING OF CONTAMINATED WATER	SETS

SECTION 8.02 – Special Modification of Work for Installation of New Curb and Sidewalks

8.02.1. DESCRIPTION. Under this Section, the Contractor shall be required to modify work methods of installing new curb and sidewalk in order to maintain, protect and accommodate the integrity of NYC Transit Authority (NYCTA) facilities, trees, under-sidewalk building vaults, and existing sidewalk encroachments to remain (such as brick and/or masonry walls and fences) located within a zone of protection immediately beneath or adjacent to the existing sidewalk and curb designated to be replaced under other contract items. The zone of protection shall define an area of curb and sidewalk where: work is within three (3') feet of NYCTA or railroad facilities or under-sidewalk building vault facilities, and/or work is within one (1') foot of existing sidewalk encroachments to remain in place, and/or work is within the Critical Root Zone (CRZ) of existing trees. Work in the CRZ shall be as directed by the Engineer, in consultation with the Tree Consultant. For the purposes of this specification, the CRZ is defined as Tree Diameter at Breast Height in inches (DBH) x 1.5 feet. For example, a tree with a 10" DBH would have a 15' CRZ. The CRZ is a radius that extends each way from the center of the tree (30' diameter in this example).

This section is not intended to cover sidewalk replacement of monolithic vault roof/sidewalk slabs, where there is no separation between the vault roof and sidewalk slabs.

8.02.2. MATERIALS. - Not applicable.

8.02.3. METHOD OF OPERATION/CONSTRUCTION: Once clearances have been verified by available records, and/or information obtained from test pits (excavated under other contract items), to the satisfaction of the Engineer in consultation with the Transit Authority/Tree Consultant, the Contractor shall exercise extreme caution to install new curb and sidewalks within zoned areas of protection. Exercising extreme caution shall mean utilizing appropriate methods of operation/construction, special operations and sequencing, and by employing hand labor, using hand held tools only, under the personal direction of the Engineer in consultation with the NYCTA, railroad facility operator or Tree Consultant. The work shall incorporate, but not be limited by, the following restrictions:

1) Removal of Existing Curb and Sidewalk. Removal of existing curb and sidewalk material shall be performed by sawcutting of curb and sidewalk, for a depth of not less than 2", to assist the Contractor in breaking up the concrete curb and sidewalk for removal by hand. Curb and sidewalk removal shall be done with hand labor, using hand held tools only, working from adjacent undisturbed sidewalk and/or pavement. It shall be understood to mean that digging and/or excavating directly with power mechanized earth moving equipment will not be permitted; any materials to be removed from the Critical Root Zone of an existing tree must be hand and/or pneumatically excavated. Further, the subbase should be reused when roots are encountered in proximity to the drip line of trees, when reconstructing sidewalks and/or resetting pavers. New sidewalks shall be ramped over the roots of existing trees and remain as close to the original grade as possible.

Power mechanized earth moving equipment may only be used as a depository of material removed from the excavation by hand as described above. All equipment, methods, and maintenance and protection provisions shall require full authorization by the Engineer in consultation with the facility operator(s)/Tree Consultant.

No excavation work will be allowed adjacent to existing trees without the Tree Consultant personally witnessing and directing the work. Every reasonable effort shall be taken so as not to cut or damage tree roots, particularly roots larger than 2", during removal work. Exposed tree roots shall be covered and protected with clean damp topsoil and/or wet burlap, as approved by the Tree Consultant, immediately after exposure to keep the roots from drying out. Topsoil or burlap shall be kept damp with applications of water, as directed by the Engineer and/or the Tree Consultant. Any fill or backfill placed within the immediate vicinity of existing tree root zones shall be hand firmed only. No separate payment will be made for any topsoil or burlap used to cover and protect tree roots.

2) Preparation & Installation of New Curb and Temporary & New Sidewalk. Backfilling, filling, grading of subbase, and installation of new curb and both temporary and new sidewalk, as required under other Contract Items, shall be performed utilizing materials, equipment and methods of construction that will insure the integrity of the NYCTA under-sidewalk building vaults, existing

street trees, existing sidewalk encroachments to remain, and at the same time meet all requirements for this work as specified in other sections of the contract.

3) Compaction. The Contractor shall compact all subgrade and new subbase materials in areas designated as being within the specified zones of protection by utilizing native and/or blended fill material, equipment and methods of construction that will ensure integrity of the NYCTA under-sidewalk building vaults, and existing sidewalk encroachments to remain, and at the same time meet all requirements for compaction as specified in Section 4.11.

In unpaved areas where heavy equipment or vehicles must operate within the CRZ of a tree (under the drip line), a 12" layer of wood chips must be spread to prevent soil compaction and root loss. Steel plates or construction mats should be added if requested by the Tree Consultant and approved by the Engineer, to further abate soil compaction. Such covering shall be maintained during the course of construction and removed by hand or as specified by the contracted Tree Consultant inspector with associated photos reported accordingly. Heat sources, flames, ignition sources, and smoking are prohibited within the CRZ and within the above mentioned mulched area.

4) Powered Excavating Equipment Limitations. The Contractor shall not employ powered or mechanical excavating equipment within the zone of protection as defined above. Powered or mechanical excavating equipment may only be used as a depository for material removed from the excavation by hand as described above.

The Contractor shall not be permitted to store, stand and/or travel equipment/vehicles on specified unpaved zoned protection areas.

The Contractor will not be permitted to operate auxiliary equipment that generates exhaust or other heat upward under the branches of trees less than 25 feet above the ground, unless approved by the Engineer, in consultation with the NYCDPR and the Tree Consultant.

8.02.4. MEASUREMENT.

(A) ITEM NO. 8.02 A. The quantity of "Special Care Excavation and Restoration for Sidewalk Work" to be measured for payment shall be equal to the number of square feet (S.F.) of new sidewalk actually installed under other contract items within the zone of protection area.

(B) ITEM NO. 8.02 B. The quantity of "Special Care Excavation and Restoration for Curb Work" to be measured for payment shall be equal to the number of linear feet (L.F.) of new curb actually installed under other contract items within the zone of protection area.

(C) ITEM NO. 8.02 AB-S. The quantity of "Special Care Excavation and Restoration for Curb and Sidewalk Work" to be measured for payment shall be equal to the number of square feet (S.F.) of new curb and sidewalk actually installed under other contract items within the zone of protection area.

(D) For payment purposes, the horizontal limits for a zone of protection area shall be defined, for the purpose of this section, as: the area designated on the Contract Drawings or an area equal to the length of the designated facility multiplied by its width plus three feet on either side; an area equal to the length of the existing encroachment to remain multiplied by a width of one (1') foot adjacent thereto; or, the area within the vicinity of existing tree roots as directed by the Tree Consultant for a minimum distance equal to the CRZ. Where overlapping of the zones occur due to multiple facilities and trees, the area will be modified to one zone measured from the outside limits. Where the zone of protection area falls beyond the curb line the outside boundary shall be the curb line.

8.02.5. PRICE TO COVER.

(A) ITEM NO. 8.02 A. The contract price per square foot for "Special Care Excavation and Restoration for Sidewalk Work" shall be the incremental cost difference of all labor, materials, equipment, insurance, and incidentals required for excavation and disposal of pavement, base and all other material to new subgrade within and adjacent to zone of protection areas; sawcutting, grading, preparation of subgrades, backfilling, and compaction within zone of protection areas; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer in consultation with the facility operator(s)/Tree Consultant. The price bid shall further include the cost of maintaining, protecting, and accommodating the integrity of existing NYCTA facilities, existing sidewalk encroachments to remain, and existing street trees during the performance of sidewalk reconstruction (under other Contract Items) within

zone of protection areas designated on the Contract Drawings or as directed by the Engineer in consultation with the NYC Transit Authority/Tree Consultant.

(B) ITEM NO. 8.02 B. The contract price per linear foot for "Special Care Excavation and Restoration for Curb Work" shall be the incremental cost difference of all labor, materials, equipment, insurance, and incidentals required to install new curbs and temporary restoration material under other Contract items, within and adjacent to zone of protection areas; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer in consultation with the NYCTA /Tree Consultant. The price bid shall further include the cost of maintaining, protecting, and accommodating the integrity of the existing Transit Authority facilities, existing sidewalk encroachments to remain, and existing street trees during the performance of sidewalk reconstruction (under other Contract Items) within zone of protection areas designated on the Contract Drawings or as directed by the Engineer in consultation with the NYCTA /Tree Consultant.

(C) ITEM NO. 8.02 AB-S. The contract price per square foot for "Special Care Excavation and Restoration for Curb and Sidewalk Work" shall be the incremental cost difference of all labor, materials, equipment, insurance, and incidentals required to install curb and sidewalk under other contract items within zone of protection areas; all in accordance with the Contract Drawings, the specifications and the directions of the Engineer in consultation with the NYCTA, railroad facility operator, or/Tree Consultant. The price bid shall further include the cost of maintaining, protecting, and accommodating the integrity of railroad facilities and existing street trees during the performance of sidewalk and curb reconstruction (under other Contract Items) within zone of protection areas designated on the Contract Drawings or as directed by the Engineer in consultation with the railroad facility operator/Tree Consultant.

(D) Payment for all work specified herein shall be made on a one-time basis only; no payment will be made for the same area of sidewalk or length of curb more than one time.

Payment for Tree Consultant will either be made under Item No. 4.21 or will be furnished directly by the City where no Tree Consultant item is provided.

Payment will be made under:

Item No.	Item	Pay Unit
8.02 A	SPECIAL CARE EXCAVATION AND RESTORATION FOR SIDEWALK WORK	S.F.
8.02 B	SPECIAL CARE EXCAVATION AND RESTORATION FOR CURB WORK	L.F.
8.02 AB-S	SPECIAL CARE EXCAVATION AND RESTORATION FOR CURB AND SIDEWALK WORK	S.F.

SECTIONS 8.03 THRU 8.06 (NO TEXT)

SECTION 8.07 – Temporary Aluminum Pedestrian Bridge

8.07.1. SCOPE. Under this section, the Contractor shall fabricate, construct, maintain, relocate and remove temporary aluminum bridges over sidewalk work areas to provide pedestrian access to the existing buildings and other areas of the properties, as directed by the Engineer.

8.07.2. DESCRIPTION. The bridge shall be fabricated of aluminum construction framing and deck surfacing. Deck surface of ramps shall be textured to create a non-skid or high traction surface. Bridge ramps shall have a clear usable width which is at least equal in dimension to the size of door to which access is being provided, but in no instance less than a usable width of four (4) feet. Each bridge shall be provided with side guide rails composed of wire stays, posts, and rope. No sharp or adverse projections are to be permitted.

8.07.3. METHOD. Bridges shall be capable of supporting pedestrian traffic including intermittent hand carts.

Shop Drawing and design calculations under the seal of a licensed N.Y.S. Professional Engineer, shall be submitted by the Contractor to the Engineer for approval. The shop drawing shall show framing and other details, including, but not limited to, structural calculations verifying the adequacy of the design to support the loading conditions and handling.

Should the Contractor use a commercially manufactured bridge, the Contractor is to submit the manufacturer's specifications and requirements to the Engineer for approval. Bridges are to be installed in accordance with manufacturer's requirements.

Temporary pedestrian bridge shall remain securely in place during sidewalk work as directed by the Engineer. The Contractor shall repair broken or loose members, remedy any deficiency as required or as directed by the Engineer. Bridge shall not be removed without approval of the Engineer.

8.07.4. MEASUREMENT. The quantity to be measured for payment shall be the actual number of (each) Temporary Aluminum Pedestrian Bridge actually furnished and installed.

Payment will be made for Temporary Aluminum Pedestrian Bridge only for the initial installation at a given location. Where a temporary pedestrian bridge is moved to a new location, as required or directed by the Engineer, payment will be made in the same manner as if it were an initial installation. Minor movement, removal and subsequent reinstallation at the same site, or rearrangement of the temporary pedestrian bridge within a work area will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

No payment will be made for movements of the temporary pedestrian bridge made for the Contractor's convenience.

8.07.5. PRICE TO COVER. The contract price bid per each Temporary Aluminum Pedestrian Bridge shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals required to complete the work in accordance with the Contract Drawings, specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
8.07	TEMPORARY ALUMINUM PEDESTRIAN BRIDGE	EACH

SECTION 8.08 – Variable Message Boards

8.08.1. DESCRIPTION. Under this item the Contractor shall furnish, install, maintain and remove Variable Message Board (VMB) warning devices for the duration of the contract in accordance with the specifications, the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition, and the directions of the Engineer. Message Boards are intended for use as temporary traffic warning devices during construction and obstruction periods. The number of Message Boards required to be installed and the locations at which they are to be used shall be as directed by the Engineer.

8.08.2. MATERIALS. Variable Message Boards shall be in accordance with the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD) plus the New York State Supplement (NYS Supplement). They may be either the reflectorized dot matrix type, electric lamp matrix type, or other approved type. The board shall have a minimum of three lines of display with a minimum of eight 18-inch high bright yellow characters per line. The unit shall have a programmable memory with self-contained keyboard control, and shall be capable of displaying up to six messages in a cyclical sequence. The control console shall include a screen for the operator to preview message content, flash rate and message sequence. The control console shall be mounted in a lockable compartment. Each Message Board shall be capable of displaying various texts applicable to road reconstruction work.

Illumination intensity shall be automatically adjustable for various day and nighttime ambient conditions. The message board shall be trailer mounted. The board shall be solar powered and/or may be energized from utility company service, with battery backup for continuous 24 hour use, unattended.

8.08.3. METHODS. Variable Message Boards shall be placed and programmed by the Contractor as directed by the Engineer. Message boards shall be mounted so that the base of the panel is at least seven (7') feet above the pavement surface and properly aligned to provide optimum viewing by approaching motorists. Variable Message Boards may be relocated or reoriented on a daily basis or more frequently as ordered by the Engineer, at no additional cost to the City.

The Contractor shall be responsible for maintenance, repair, and continuous operation of each Variable Message Board until progress of work no longer requires their use, as directed by the Engineer.

8.08.4. NONCONFORMANCE. Failure to repair or replace an out-of-order Variable Message Board within twenty-four (24) hours of written notice by the Engineer shall be deemed a failure to maintain the site, thereby making the Contractor subject to the assessment of liquidated damages under the "Nonconformance" Article of the Maintenance of Site item.

8.08.5. MEASUREMENT. The quantity to be measured for payments shall be the number of Variable Message Boards satisfactorily installed where specified.

8.08.6. PRICE TO COVER. The unit price bid for each Variable Message Board shall include the cost of all materials, equipment and labor necessary to furnish, install, maintain and remove, when directed, a variable message board in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment for each Variable Message Board will be made as follows:

40% payable upon equipment installation and satisfactory completion of installation tests to verify that the unit is operational.

60% payable in monthly installments for the remainder of the Contract duration following the project acceptance of the variable message board. Monthly payments will be dependent upon the Contractor performing all maintenance duties as may be required.

Payment will be made under:

Item No.	Item	Pay Unit
8.08	VARIABLE MESSAGE BOARD	EACH

SECTION 8.09 (NO TEXT)

SECTION 8.10 – Survey Monuments

8.10.1. DESCRIPTION. Under this section, the Contractor shall furnish and place permanent survey monuments of the Order specified at locations indicated on the Contract Drawings or as directed by the Engineer, and in accordance with these specifications and the details shown on the following Sketch No. 8.10A, titled “DETAILS - NEW SURVEY MONUMENT”, for standard monuments to be use in the Boroughs of Brooklyn, Queens and Staten Island; and Sketch Nos. 8.10B and 8.10C, titled “NEW SURVEY MONUMENT” and “STANDARD BOROUGH MONUMENTS”, respectively, for monuments to be used in the Borough of Manhattan. For monuments in the Borough of The Bronx, the Contractor shall furnish and place survey monuments in accordance with the requirements of **Section 8.10M**.

8.10.2. MATERIALS. Concrete shall be Class A-40 and shall comply with the requirements of **Section 3.05, Concrete**, except that the requirements for inspection facilities, automated batching controls and recordation do not apply. The batching, mixing and curing methods, and the inspection facilities shall meet the approval of the Department or its representative. Concrete shall have a minimum compressive strength of 4,000 PSI at 28 days.

The monument plate shall be a 3” diameter, bronze or brass, domed top marker similar to U.S. Army Corps of Engineers “Concrete Marker Disk”. The plate shall have a top thickness and stem diameter as shown on Sketch No. 8.10A, titled “DETAILS – NEW SURVEY MONUMENT”, or Sketch No. 8.10B, titled “NEW SURVEY MONUMENT”, as applicable, and shall have a three (3”) inch long stem with a one (1”) inch long flare.

Each plate shall carry the following inscriptions: "BOROUGH PRESIDENT OF (insert borough name) – TOPOGRAPHICAL BUREAU", the appropriate Borough President’s Topographical Bureau plate reference numbers, cross hairs centered on the plate, “PENALTY FOR REMOVAL” or “DO NOT DAMAGE”, as shown in the sketches, and “TOPOGRAPHICAL BUREAU”. The inscription shall be raised or embossed or cast into the plate to a height or depth of not less than 1/16”.

8.10.3. CONSTRUCTION METHODS. Prior to construction of the monuments, the Contractor shall submit, for the Engineer’s review and approval, shop drawings showing monument locations, construction details, plate marker design or monument cover design as applicable, a description of the proposed survey procedure, and information on equipment to be used.

The Contractor shall neatly sawcut and excavate the pavement and subbase, as required, and construct and install survey monuments at the locations shown on the Contract Drawings or as directed by the Engineer, at such time as the Engineer directs them to be placed. However, in no case shall monuments be installed prior to construction of the corner sidewalk quadrants at monument locations.

Each new survey monument to be installed in Brooklyn, Queens and Staten Island shall be installed by constructing a sheet metal form at least four (4’) feet long and of the dimensions and shape shown on Sketch No. 8.10A. The form shall be filled with concrete and the plate marker or copper bar, as required, embedded at the top, as shown in the monument sketch.

Each new survey monument to be installed in Manhattan shall consist of a precast concrete monument 3’-8” long tapering from a 10” x 10” square base to a 5” x 5” square top, with an embedded plate marker at the top. Each precast concrete monument shall then be set in place in a two (2’) foot square by four (4’) feet deep hole, with the bottom of the monument embedded one foot six inches (1’- 6”) deep into a one foot ten inch (1’- 10”) deep concrete foundation, such that the monument plate will be set flush with the surrounding sidewalk pavement, as shown in Sketch No. 8.10C.

The remaining excavated area surrounding the monument shall be backfilled with compacted sand, or other approved granular material, up to the base of the adjacent sidewalk pavement and the sidewalk pavement restored with concrete to match the existing pavement as directed by the Engineer.

The monument shall remain undisturbed during the required setting and curing period. Thereafter, the Contractor shall be responsible for the monument’s maintenance, keeping them in their proper location and condition at all times, until the final acceptance of the contract work.

8.10.4. MONUMENT REFERENCING. Monuments shall be referenced to the New York State Geocoordinate System and their location shall be certified by a New York State Licensed Surveyor.

Horizontal coordinates of survey monuments shall be referenced to the New York State Geocoordinate System as follows:

(A) For Order B Surveys. The horizontal coordinates of the Order B survey monument shall be established using the Global Position System (GPS) and shall be referenced to the New York State Geocoordinate System using an Order B survey in accordance with the Federal Geodetic Control Committee publication Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques, Version 5.0, dated August 1, 1989, except as otherwise noted herein.

(B) For Order C-1 Surveys. The horizontal coordinates of the Order C-1 survey monument shall be established using Ground Survey Methods and shall be referenced to the New York State Geocoordinate System using an Order C-1 survey in accordance with the Standards and Specifications for Geodetic Control Networks published by the Federal Geodetic Control Committee.

Elevations of monuments shall be provided. Elevations shall be referenced to an existing benchmark or monument to be furnished by the Borough President's Topographical Bureau at the time of transmittal of the monument locations. Such benchmark or monument shall be no further than seven (7) City blocks or 2,500 feet (whichever is less) from the limits of the contract. If no such existing benchmark is available, the Surveyor shall furnish elevations of new monuments relative to each other.

The precision of horizontal and vertical control for the establishment and for the referencing of the new monuments shall be in accordance with the standards and limits for Order B or Order C-1 surveys as shown in the Federal Geodetic Control Committee standards cited above. The Contractor shall furnish the information on the new monument locations and their coordinates to the Borough President's Topographical Bureau and to the Survey Coordination Group of the New York State Department of Transportation.

Full documentation shall be provided by the Surveyor in the form of a report under the Seal of the Surveyor. The report shall include, but not be limited to, the following: a detailed site plan, coordinates, computations (including all field notes), computer tapes and computer print outs.

8.10.5. SUBMITTALS. The Contractor shall submit the following for review and approval by the Engineer and additional sets for the records of the Borough President's Topographical Bureau, the Survey Coordination Group of the New York State Department of Transportation, and the Technical Support Office of the Department of Design and Construction:

(A) Shop drawings of monument locations, construction materials and procedures, and plate design.

(B) Information on the equipment and labor to be used in installing and surveying the new monuments.

(C) A description of the proposed survey procedures.

(D) A complete set of survey notes, plans, computer tapes, computer print outs and computations.

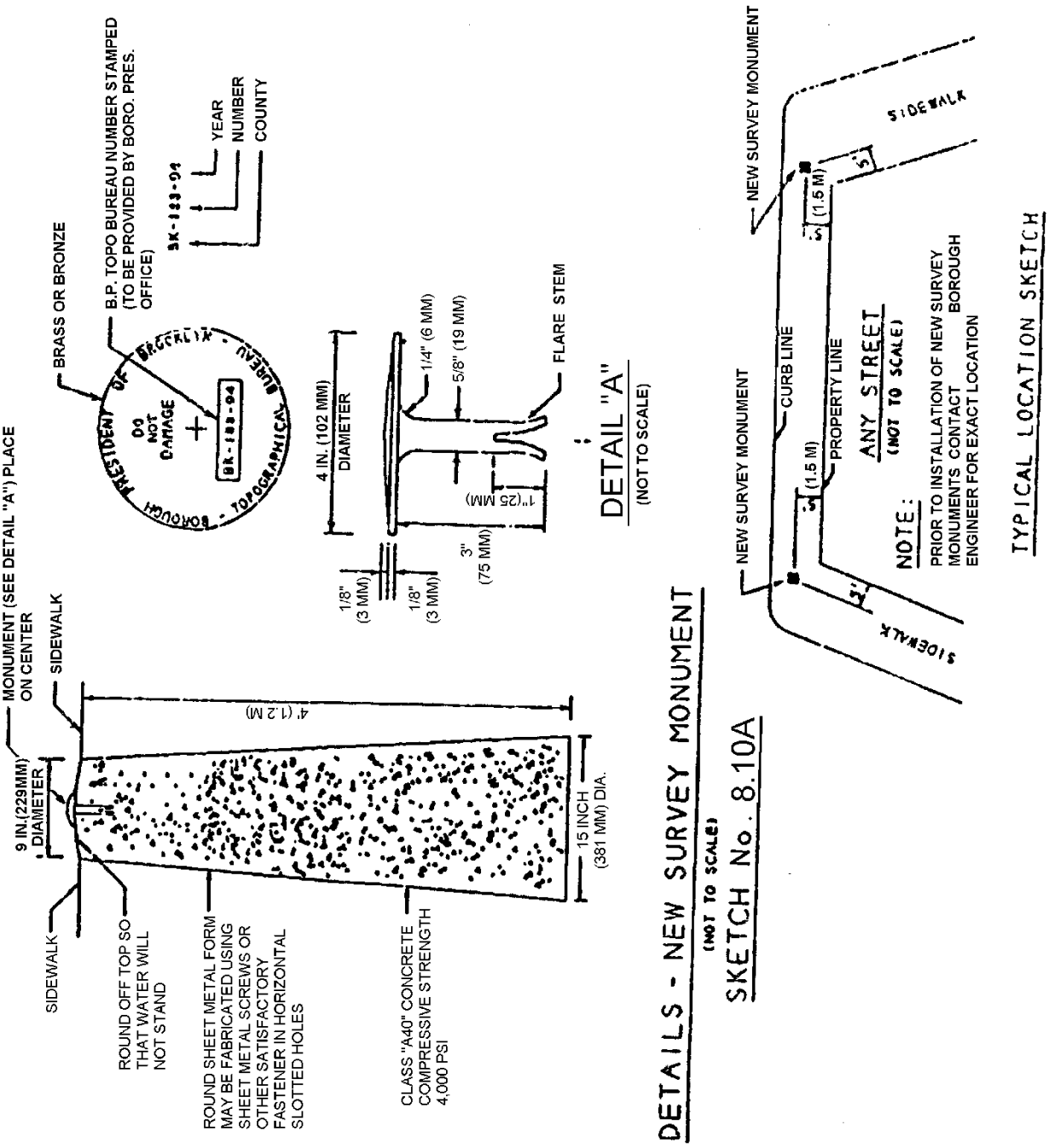
(E) A notarized certification by a New York State licensed Surveyor that the survey results comply with the specified accuracy of an Order B survey or an Order C1 survey, as applicable.

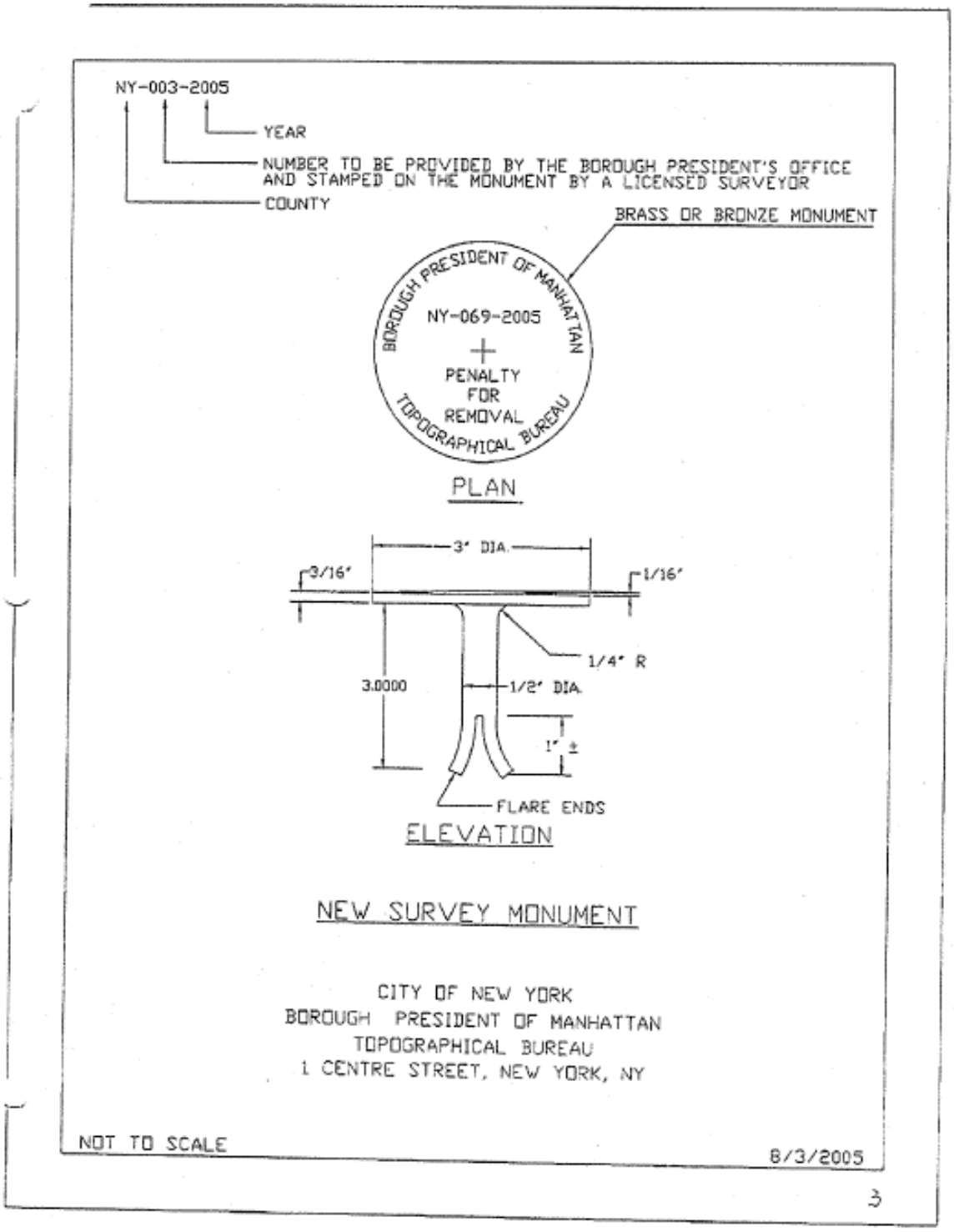
8.10.6. MEASUREMENT. The number of permanent survey monuments, of each type and Order, to be paid for under this section shall be the number of fully documented permanent survey monuments furnished and installed in accordance with these specifications and to the satisfaction of the Engineer.

8.10.7. PRICES TO COVER. The unit price bid per each New Survey Monument, of each type and Order, shall cover the cost of all labor, materials, equipment, insurance, and accessories necessary to furnish and install approved survey monuments complete with excavation, backfill, sidewalk pavement restoration, monument plates or copper bars and covers, as specified, and a fully documented survey, plan and report, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

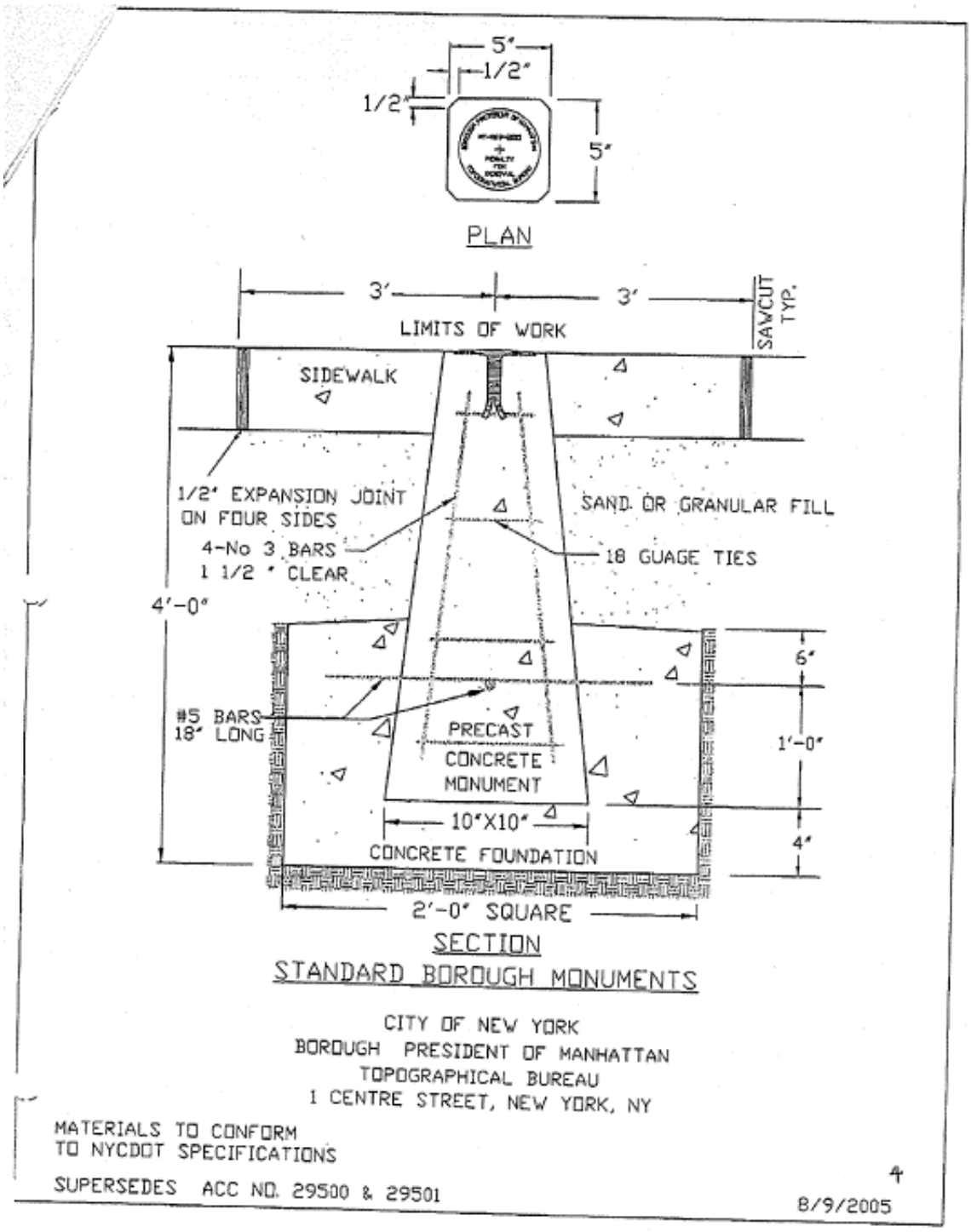
Payment will be made under:

Item No.	Item	Pay Unit
8.10 B	NEW SURVEY MONUMENTS, TYPE "B"	EACH


MONUMENT (SEE DETAIL "A") PLACE ON CENTER
SIDEWALK
9 IN.(229MM) DIAMETER
4' (1.2 M)
15 INCH (381 MM) DIA.
SIDEWALK
ROUND OFF TOP SO THAT WATER WILL NOT STAND
ROUND SHEET METAL FORM MAY BE FABRICATED USING SHEET METAL SCREWS OR OTHER SATISFACTORY FASTENER IN HORIZONTAL SLOTTED HOLES
CLASS "A40" CONCRETE COMPRESSIVE STRENGTH 4,000 PSI
DETAILS - NEW SURVEY MONUMENT
(NOT TO SCALE)
SKETCH No. 8.10A
BRASS OR BRONZE
B.P. TOPO BUREAU NUMBER STAMPED (TO BE PROVIDED BY BORO. PRES. OFFICE)
BK-183-94
YEAR
NUMBER
COUNTY
PRESIDENT OF BOROUGH - TOPOGRAPHICAL BUREAU
DO NOT DAMAGE
BK-183-94
4 IN. (102 MM) DIAMETER
1/8" (3 MM)
1/8" (3 MM)
1/4" (6 MM)
5/8" (19 MM)
3" (75 MM)
1" (25 MM)
FLARE STEM
DETAIL "A"
(NOT TO SCALE)
NEW SURVEY MONUMENT
CURB LINE
PROPERTY LINE
ANY STREET
(NOT TO SCALE)
NOTE:
PRIOR TO INSTALLATION OF NEW SURVEY MONUMENTS CONTACT BOROUGH ENGINEER FOR EXACT LOCATION
5' (1.5 M)
5' (1.5 M)
5'
SIDEWALK
SIDEWALK
TYPICAL LOCATION SKETCH



Sketch No. 8.10B


5"
1/2"
1/2"
5"
PLAN
3'
3'
LIMITS OF WORK
SAWCUT TYP.
SIDEWALK
1/2" EXPANSION JOINT ON FOUR SIDES
4-No 3 BARS 1 1/2 " CLEAR
SAND OR GRANULAR FILL
18 GUAGE TIES
4'-0"
#5 BARS 18" LONG
PRECAST CONCRETE MONUMENT
6"
1'-0"
4"
10"X10"
CONCRETE FOUNDATION
2'-0" SQUARE
SECTION
STANDARD BOROUGH MONUMENTS
CITY OF NEW YORK
BOROUGH PRESIDENT OF MANHATTAN
TOPOGRAPHICAL BUREAU
1 CENTRE STREET, NEW YORK, NY
MATERIALS TO CONFORM TO NYCDOT SPECIFICATIONS
SUPERSEDES ACC NO. 29500 & 29501
4
8/9/2005

Sketch 8.10C

SECTION 8.10M - Survey Monuments

8.10M.1. DESCRIPTION. Under this section, the Contractor shall furnish and place permanent survey monuments of the Order specified at locations indicated on the Contract Drawings or as directed by the Engineer, and in accordance with these specifications and the details shown on the following Sketch Nos. 8.10MA, 8.10MB, and 8.10MC, titled “STANDARD CONCRETE MONUMENT”, “SETTING OF STANDARD CONCRETE MONUMENTS FOR BOROUGH SURVEY”, and “STANDARD-MONUMENT-COVER”, respectively, for monuments to be used in the Borough of The Bronx.

8.10M.2. MATERIALS. Concrete shall be Class A-40 and shall comply with the requirements of **Section 3.05, Concrete**, except that the requirements for inspection facilities, automated batching controls and recordation do not apply. The batching, mixing and curing methods, and the inspection facilities shall meet the approval of the Department or its representative. Concrete shall have a minimum compressive strength of 4,000 PSI at 28 days.

All other materials required shall be as shown on the attached sketches and be as approved by the Engineer.

8.10M.3. CONSTRUCTION METHODS. Prior to construction of the monuments, the Contractor shall submit, for the Engineer’s review and approval, shop drawings showing monument locations, construction details, monument cover design, a description of the proposed survey procedure, and information on equipment to be used.

The Contractor shall construct and install survey monuments at the locations shown on the Contract Drawings or as directed by the Engineer, at such time as the Engineer directs them to be placed. However, in no case shall monuments be installed prior to construction of the corner sidewalk quadrants at monument locations.

Each new survey monument shall be installed by constructing a sheet metal form at least 4-1/3 feet long and of the dimensions and shape shown on the following Sketches. The form shall be filled with concrete and the plate marker embedded at the top, as shown in the following Sketch No. 8.10MA - Standard Concrete Monument.

The monument shall remain undisturbed during the required curing period. Thereafter, the Contractor shall be responsible for the monument’s maintenance, keeping them in their proper location and condition at all times, until the final acceptance of the contract work.

8.10M.4. MONUMENT REFERENCING. Monument referencing shall be provided as specified under **Subsection 8.10.4**.

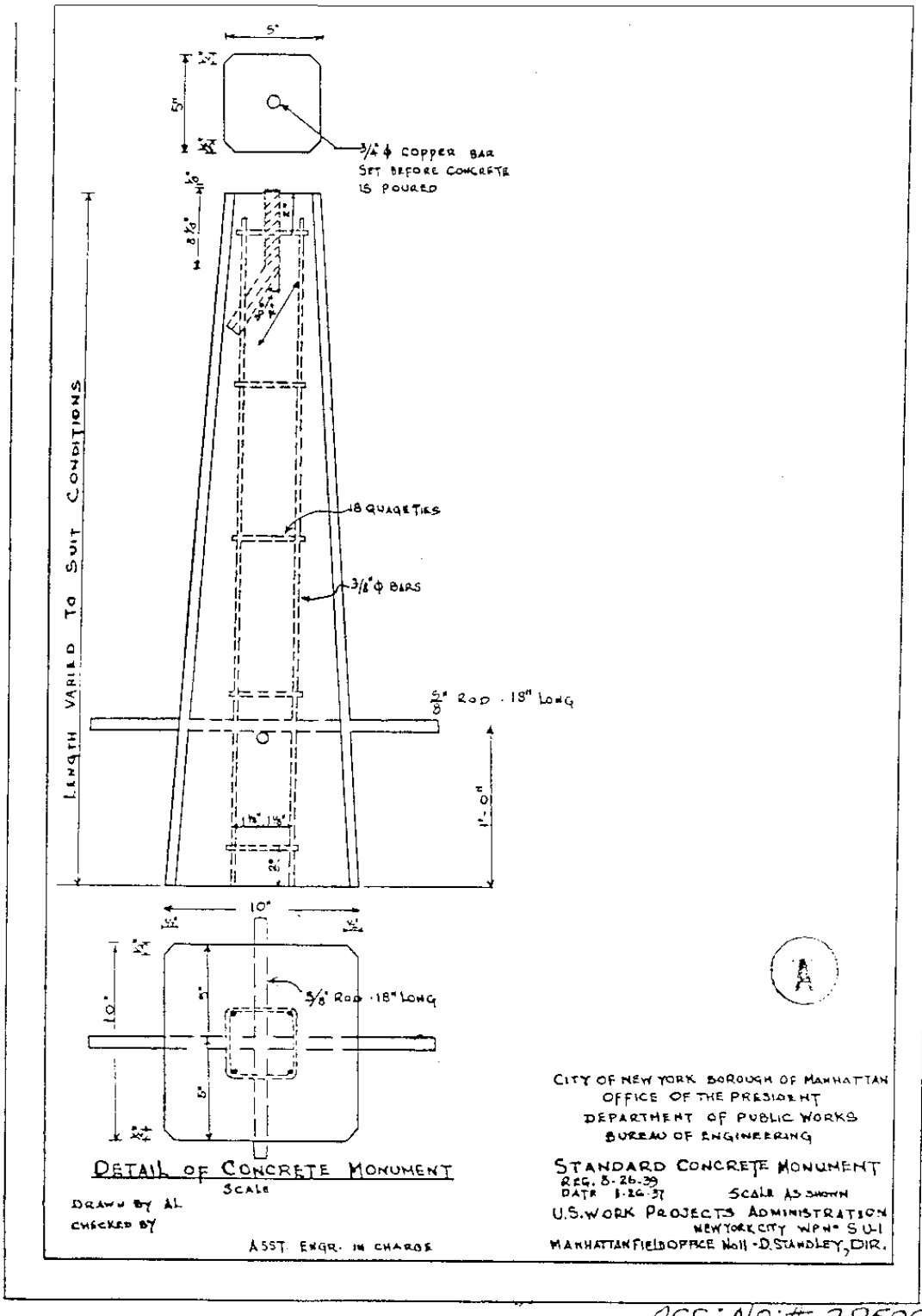
8.10M.5. SUBMITTALS. Submittals shall be provided as specified under **Subsection 8.10.5.**

8.10M.6. MEASUREMENT. The number of permanent survey monuments, of each type and Order, to be paid for under this section shall be the number of fully documented permanent survey monuments furnished and installed in accordance with these specifications and to the satisfaction of the Engineer.

8.10M.7. BASIS OF PAYMENT. The unit price bid per each New Survey Monument, in each Order, shall cover the cost of all labor, materials, equipment, insurance, and accessories necessary to furnish and install approved survey monuments complete with monument plates and a fully documented survey, plan and report, all in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
8.10 BM	NEW SURVEY MONUMENTS, TYPE “B” (WITH MONUMENT COVER)	EACH
8.10 C-1M	NEW SURVEY MONUMENTS, TYPE “C” CLASS 1 (WITH MONUMENT COVER)	EACH

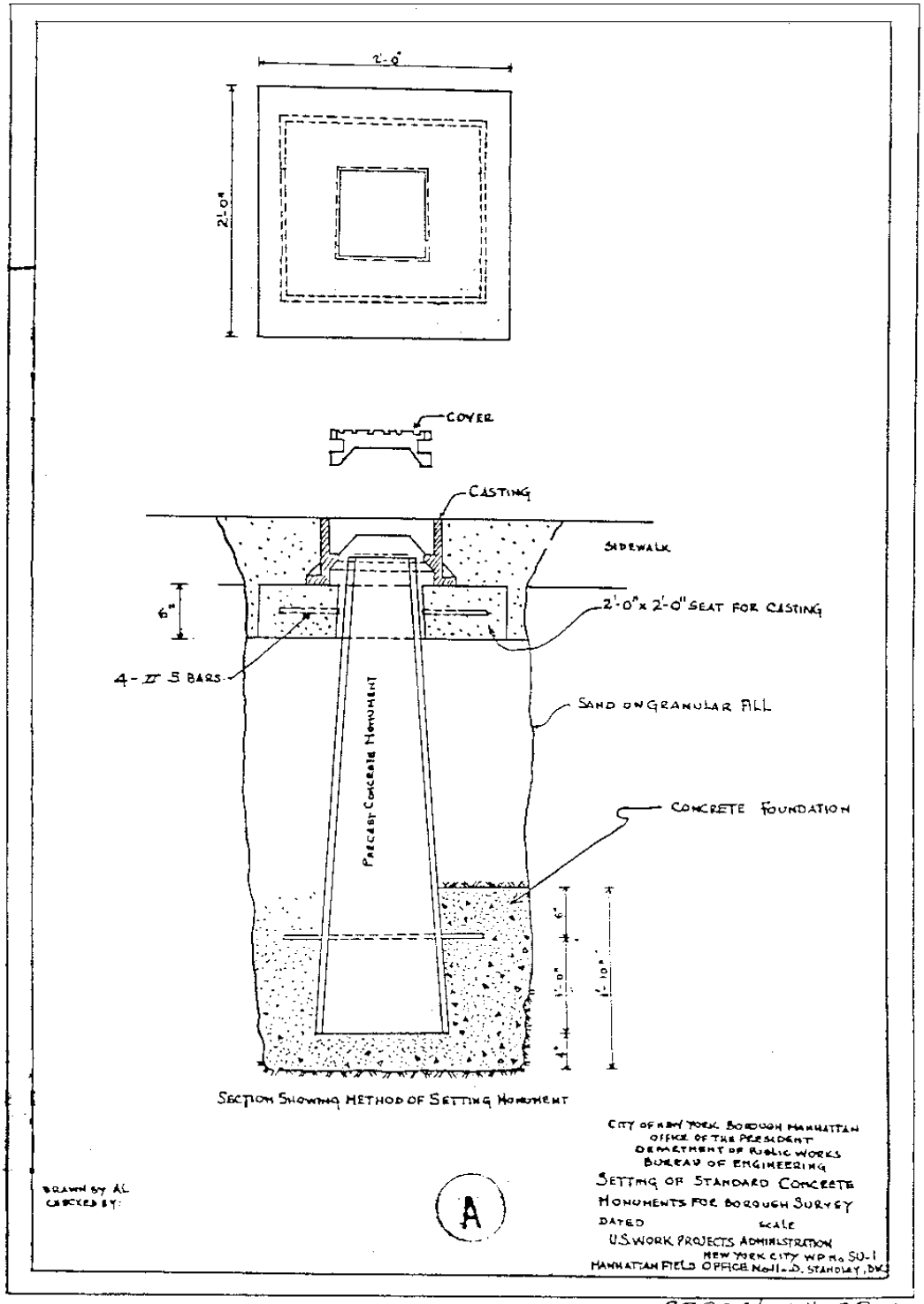


#29500

ACC: NO: # 29500

EXHIBIT 10-A - DRAWING SHOWING CONSTRUCTION DETAILS OF CONCRETE TRAVERSE MONUMENTS

Sketch No. 8.10MA



ACC: NO: #29501

#29501

EXHIBIT – 10-8 – DRAWING SHOWING CONSTRUCTION DETAIL OF CONCRETE COLLARS AND METHOD OF SETTING MONUMENTS

Sketch No. 8.10MB

Sketch No. 8.10MC

SECTION 8.11 (NO TEXT)

SECTION 8.12 - Temporary Retaining Wall

8.12.1. INTENT. This section describes the work required for construction of Temporary Retaining Walls.

8.12.2. DESCRIPTION. Under this section, the work shall consist of furnishing and installing new precast concrete block retaining walls in accordance with the Contract Drawings, the specifications, and the direction of the Engineer.

8.12.3. MATERIALS.

(A) WALL BLOCKS

Concrete blocks shall be similar to KEYSTONE retaining wall units as manufactured by Anchor Products, Inc., or an approved equivalent. Concrete modular blocks shall be manufactured in accordance with the requirements of ASTM designation C 90. Only aggregates complying with ASTM C33 shall be used in the retaining wall units. Concrete modular units shall be free of cracks, depressions, and spalled, patched, or plastered surfaces or edges, or any other defect that may impair their strength, durability, and appearance. The minimum unit weight of the in-place filled blocks is to be 130 pounds per cubic foot, including fill.

(B) WALL CAP

Wall cap is to be the same composition as the wall blocks.

(C) COLOR

The entire wall system is to be a gray color as approved by the Engineer.

(D) CONNECTING PINS AND ATTACHMENTS

Connecting pins and attachments required for erection of the wall are to be compatible with the wall block and tie back system, and shall comply with the block manufacturer's recommendations. Pins shall be thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods or an approved equivalent and shall have a minimum flexural strength of 128,000 psi and short beam shear of 6,400 psi.

(E) TIE BACK SYSTEM

The geogrid tie back system shall be as shown on the Contract Drawings. It shall be a two directional grid composed of 100% polyester multifilament yarns, interlocked into a stable network such that the yarns retain their relative positions. The grid is to have ultraviolet-resistant finish and be inert to biological degradation. Also, it must be resistant to naturally encountered chemicals, alkalis, and acids.

Tie back grids are to be continuous from the wall block to its back end without splices. The geogrid shall have all properties at least equivalent to those of the MIRAGRID 5T by MIRAFI INC. The geogrid is to conform to the following:

Grid Property	Unit	Test Method	Minimum Average Roll Value	
			Warp	Fill`
Long Term Allowable Design Load (LTADL)	lb/ft	Calculated Per TF-27	1000	600
Maximum Allowable Total Strain at LTADL after 2000 hours	(%)	Tension Creep	5	5
Tensile Strength	lb/ft	*ASTM D 4632	2900	1700
Elongation	(%)	*ASTM D 4632	20	25
Wide Width Tensile Strength	lb/ft	**ASTM D 4595	2600	1500
Wide Width Elongation	(%)	**ASTM D 4595	15	20
Retained Modulus	(lb/ft)	Calculated	20,000	12,000
Open Area	%	COE Method	65	

Ph Resistant Range			2	12
Grid Aperture Size	inch	Measured	1.2	1.3
Thickness	Mils	ASTM D 1777		80
Weight	Oz/yd	ASTM D 3776		8

*Modified for geogrid using sample size; 1 strand by 4 junctions with two junctions between jaws.
**Modified for geogrids using an approximate 8-inch wide x 4-inch gauge length sample.

TF-27 is Task Force 27, advisory committee to FHWA.

The Contractor shall submit certified test data for each shipment of material.

(F) GRANULAR DRAINAGE MATERIAL

Used for Unit Fill and Drainage Material wrapped in Plastic Filter Fabric behind the wall. Material shall be gravel with a maximum size of 3/4" with the following gradation:

Sieve Size	Percent Passing by Weight
3/4"	100
3/8"	70 - 90
No. 4	60 - 80
No. 16	30 - 60
No. 40	10 - 35
No. 200	0 - 3

(G) SELECT GRANULAR MATERIAL

Used for wall bedding. Material shall be a natural sand or stone, 1/2" maximum aggregate with the following gradation:

Sieve Size	Percent Passing by Weight
1/2"	100
1/4"	30 - 100
No. 4	0 - 50
No. 200	0 - 10

(H) PLASTIC FILTER FABRIC

The purpose of the plastic filter fabric is to provide a permeable layer which allows water but not soil particles to pass through.

The plastic filter fabric shall be composed of a strong polymer type fiber, resistant to both rot and insects, and formed into a non-woven fabric with the following minimum requirements:

Grab Tensile Strength, ASTM D 4632	180 lbs.
Trapezoid Tear Strength, ASTM D 4533	50 lbs.
Puncture Strength (5/16"), ASTM D 3787 modified	
(with 5/16" diameter flat tip with 1/32" x 45° Chamfer)	75 lbs.

The fabric shall be free of any treatment which might significantly alter its physical properties. During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protective covering to protect it from direct sunlight, mud, dirt, dust and other debris.

The Contractor shall submit certified test data to cover each shipment of material.

(I) TILE DRAIN

To be concrete, or plastic with perforations as shown on the Contract Drawings.

8.12.4. PRE-CONSTRUCTION.

(A) SAMPLES

Contractor is to submit samples of all materials in the proposed color to be used on the project including wall blocks, wall cap, connections, and tie back system.

(B) COLOR

The color of the wall and the cap is to be submitted to the Engineer for approval.

(C) SHOP DRAWINGS

Prior to manufacturing precast modular blocks, the Contractor shall furnish five (5) copies of shop drawings and supporting calculations to the Engineer for approval. Retaining walls shall be designed for a superimposed load of 600 psf and an overturning load caused by pedestrians leaning over a chain link fence anchored at the top of the retaining wall. Shop drawings shall show typical blocks layouts for fabrication and erection purposes. Shop Drawings showing the entire wall system with tie backs and footing pads, and anchor details for fence post shall be prepared and certified by the contractor's Professional Engineer, registered in the State of New York and shall be submitted to the Engineer for approval. Representative cross sections of the wall system are to show that the back-slope of the walls does not exceed 1 on 2. The pattern of stepping of the top of the wall is to be shown on the drawings.

The shop drawings shall also reflect all information needed to fabricate and erect the walls including, but not limited to, the proposed footing elevations; the shape and dimensions of blocks; the size and details of the joint fillers; the size of the concrete (Class B-32) leveling pad; and any additional details necessary.

Also, shop drawings shall clearly show the layout and connection details of geogrid tie back system. Shop drawings shall show installation of Cap Units in compliance with the manufacturer's recommendations including, but not limited to, the joint details at the sidewalks.

(D) MANUFACTURERS REQUIREMENTS AND RECOMMENDATIONS

All documents which pertain to erection of the wall which are provided by manufacturers of the individual components are to be submitted to the Engineer.

Only after all the above mentioned items have been submitted and approved, as well as the Contractor meeting all other requirements of the contract will the Contractor be permitted to begin work.

8.12.5. METHODS.

(A) GENERAL

Contractor is to perform required operations including sawcutting of pavements, removal of existing walls, and other excavation (Item 6.02 AAD or 6.02 AAN, as applicable), preparation of foundation, constructing new walls, placing tie backs, backfilling with Select Granular Fill (Item 4.11 CC or 4.11 CD, as applicable), grading and Sodding (Item 4.19).

(B) FOUNDATION

Excavation of any existing walls and for the foundation of the new replacement wall shall comply with the requirements of Section 6.02. Special care shall be taken so that the foundation bearing material key at the base of the wall is not disturbed during the site preparation. All material resulting from excavation shall be removed from the site immediately.

Bed course material of Select Granular Material shall be placed and compacted to form a bed course of the required thickness.

Both the prepared foundation and bedding for the new retaining wall shall be firm and normal to the face of the proposed wall and shall have been approved by the Engineer before any of the wall is placed. In areas where foundation materials are not acceptable to the Engineer, that material shall be excavated to the depth and width as directed by the Engineer, and backfilled with Select Granular Material, and compacted to a density of at least 95% of the Standard Proctor Maximum Density.

(C) ERECTION

The wall members shall be erected as shown on the Contract Drawings and in accordance with approved shop drawings.

Wall members shall be carefully handled and erected in a manner to avoid any damage. Any members which become creaked or otherwise damaged during erection shall be completely removed and replaced at the Contractor's expense.

All necessary connections, clips or incidental hardware is to be furnished and installed by the Contractor.

(D) BACKFILLING WALLS

The cells formed by the wall members shall be backfilled with granular drainage material. Granular drainage material shall also be placed in back of each retaining wall, wrapped in plastic filter fabric as shown on the Contract Drawings.

Filling of the interior of the walls or cells may progress simultaneously with the erection of the walls or cells. The granular drainage material shall be placed in approximately six (6") inch layers and tampered or compacted. Each layer shall be compacted to a density of at least 95% of the Standard Proctor Maximum Density.

Backfilling of the area behind the wall (Item 4.11 CC or 4.11 CD, as applicable) is to progress simultaneously with the erection of the wall and placement of the tie back system and placing granular drainage material and plastic filter fabric. Tie back system is to be pulled taut and staked. Backfilling is to progress with the geogrid taut. Materials excavated from the project site will not be permitted as backfill for walls.

Contractor is to schedule the Contractor's operations so that construction of the wall and backfilling is performed as rapidly as practical after excavation.

Wall cap is to be securely attached to the top of the wall using a high strength adhesive compound in compliance with the manufacturer's recommendations.

Grading, Sodding (Item 4.19) to be performed in accordance with Contract Drawings and specifications.

8.12.6. MEASUREMENT. The quantity to be measured for payment shall be the number of square feet of exposed outside facial area of masonry block Temporary Retaining Wall, actually incorporated into the work, complete in place and accepted. End returns and side returns are to be included in areas to be measured. Measurement will be made on the plane of the face and will be made to the outermost elements of the structure. Wall cap is not to be measured for payment.

8.12.7. PRICE TO COVER. The contract price bid per square foot of Temporary Retaining Wall shall cover the cost of furnishing all labor, materials, plant, equipment, insurance, and all other incidentals required to complete the work, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
8.12	TEMPORARY RETAINING WALL	S.F.

SECTIONS 8.13 THRU 8.21 (NO TEXT)

SECTION 8.22 Three Ply Membrane Waterproofing

8.22.1. WORK TO INCLUDE. Under this section, the Contractor shall furnish and apply three ply membrane waterproofing, in accordance with the Contract Drawings, the specifications, and the directions of the Engineer. Three ply membrane waterproofing, except as otherwise specified herein, shall consist of a membrane of minimum three layers of treated fiberglass fabric mopped with asphalt, applied to the structure as indicated on the Contract Drawings. Where required, free drainage shall be provided by pipe drains, hollow tile, or broken stone.

8.22.2 MATERIALS.

A. General.

1. Materials shall be delivered to the Site in the manufacturer's sealed containers, marked with the manufacturer's name and brand indicating the grade and quality of the materials.

2. Materials showing evidence of damage, deterioration, or having been opened will be rejected.

3. Rejected materials shall be removed from the Site before the application of Membrane Waterproofing is started.

4. Materials shall be stored so that they will not be subject to physical damage or contamination. These materials shall be protected from oils, greases, waxes and solvents.

B. Material Properties.

1. Fabric Requirement.

a. The fabric to be used shall be a fiberglass asphalt treated fabric conforming to ASTM D 1668, Type I which shall have been treated before being brought to the Site. The untreated fabric shall weigh not less than 1.4 ounces per square yard, which when treated shall weigh not less than 2.0 ounces per square yard. The thread count shall be between 20 and 24 per linear inch in each direction. The strength of the fabric shall not be less than 75 pounds in either direction by the Strip Method (ASTM D 5035).

b. The material used in treating the fabric shall have the same general characteristics as that used in cementing the layers on the work. The melting point of the asphalt used for treating fabric shall be between 135 degrees and 170 degrees Fahrenheit.

2. Asphalt Primer Requirements.

a. The waterproofing system shall be used with a cold applied primer conforming to ASTM D 41.

3. Asphalt Requirements.

a. Asphalt for waterproofing shall consist of fluxed natural asphalt, or asphalt prepared by the careful steam distillation of asphaltic petroleum, or by the careful steam distillation and air-blowing of asphaltic petroleum conforming to ASTM D 449. The samples of asphalt, the materials used in its preparation, and the documents related to the method of manufacture shall be maintained for the inspection of the Engineer. The asphalt shall comply with the following requirements:

(1) The melting point of fluxed natural asphalt shall be between 115 degrees and 140 degrees Fahrenheit, as determined by the Ring and Ball method. The melting point of steam distilled asphalt shall be between 125 degrees and 140 degrees Fahrenheit as determined by the Ring and Ball method. The melting point of steam-distilled and airblown asphalt shall be

between 125 and 140 degrees Fahrenheit as determined by the Ring and Ball method.

(2) The consistency of the asphalt shall be determined by the penetration, which shall be between 50 and 100 at 77 degrees Fahrenheit, and not less than 5 at 32 degrees Fahrenheit. Penetration shall be the depth of 0.0039 inch of a No. 2 cambric needle. At 77 degrees Fahrenheit, the needle shall be weighted to 3.527 oz. and shall act for 5 seconds. At 32 degrees Fahrenheit the needle shall be weighted to 7.054 oz. and shall act for one minute.

(3) A briquette of the asphalt of cross-section of 0.155 square inch shall have ductility of not less than 11.81 inch at 77 degrees Fahrenheit, the material being elongated at the rate of 1.97 inch per minute. (Dow molds).

(4) The specific gravity of the asphalt shall be not less than 1.00 at 77 degrees Fahrenheit.

(5) Fluxed natural asphalt shall be not less than ninety-five (95) percent soluble in cold carbon disulphide. Steam-distilled asphalt shall be not less than 99 percent soluble in cold carbon disulphide. Steam-distilled and airblown asphalt shall be not less than 99 percent soluble in cold carbon disulphide.

(6) When a fifty gram sample of the asphalt is heated for 5 hours at a temperature of 325 degrees Fahrenheit in a tin box approximately 2-3/16 inches in diameter it shall not lose over one percent by weight.

(7). The penetration of the residue of the asphalt at 77 degrees Fahrenheit after heating as specified in the preceding paragraph shall be not less than 60 percent of the original penetration.

(8) Temperature of asphalt at time of application shall be in accordance with the manufacturer's recommendations.

4. Waterproofing Protection Board.

a. Waterproofing protection shall be 1/4-inch thick asphalt-impregnated glass fiber rigid board conforming to ASTM D 6506 “Asphalt Based Protection Board for Below Grade Waterproofing”.

5. Asphalt Mastic Waterproofing.

a. Where indicated on the Contract Drawings, asphalt mastic of the quality specified in **Subsection 8.22.2.B.3., “Asphalt Requirements”**, shall be used.

8.22.3. METHODS.

A. Preparation of Surface.

1. Existing concrete surfaces to which membrane waterproofing is to be applied shall be thoroughly cleaned, all projections removed and all voids made smooth by applying a mortar bed to the existing concrete. Bevels or fillets shall be provided where surfaces intersect. The asphalt primer shall be applied to a dry substrate and in no case shall it be applied until at least 7 days after concrete placement, or longer if so recommended by the manufacturer.

2. All surfaces to which waterproofing is to be applied shall, if practicable, be made dry before applying the waterproofing. If it is impractical to make such surfaces dry then there shall be first laid a dry ply consisting of a layer of asphalt-treated felt of approved quality on the upper surface of which shall be spread the first layer of asphalt. The dry ply shall be held in place with thumbtacks. The membrane shall be applied when the weather is dry and the temperature in the shade is above 40 degrees F (5 degrees C).

3. The substrate shall be free of dust, oil, grease and loose, weak and unsound materials. In order to insure a suitable surface, one of the following blast cleaning methods shall be used:

a. dry sandblasting

b. wet sandblasting

c. high-pressure water jetting

B. Application

1. Heating.

a. The kettles in which the asphalt is heated on the Site shall be equipped with thermometers.

b. The asphalt shall be heated to a temperature of approximately 250 degrees Fahrenheit, but in no case shall asphalt be heated to a temperature of more than 350 degrees Fahrenheit. Asphalt heated above 350 degrees Fahrenheit shall not be used in the Work. Asphalt overheated by more than 50 degrees Fahrenheit for more than 1 hour shall be removed from the Site.

c. The fuel for heating the asphalt shall be as nearly as practicable non-smoke-producing. Depending upon local conditions, portable or non-portable heating containers may be used.

C. Membrane Waterproofing; How Laid.

1. The membrane waterproofing shall not be laid unless concrete is cured for seven days. On smooth surfaces there shall be spread hot melted asphalt in a uniformly thick layer; on this layer of asphalt shall be laid a treated fiberglass fabric; this process shall be repeated until such number of layers as indicated on the Contract Drawings have been placed and a final coat of asphalt shall then be applied. Waterproofing shall not be applied if frothing or bubbling occurs when hot asphalt is applied to the surface. Flat asphalt must stick tightly to the surface.

2. The fabric shall be rolled out into the asphalt while the asphalt is still hot, and pressed against the asphalt so as to insure the fabric being completely stuck over its entire surface and free from air pockets.

3. To prevent cooling of the asphalt, only an area of the size to be determined by trial shall be mopped before rolling the fabric into place.

4. Asphaltic Waterproofing shall be laid over compatible Waterproofing type. If the Waterproofing types are not compatible, metal flashing shall be used to physically separate two incompatible types.

5. Special care shall be taken to lay Waterproofing Membrane over vertical surface during warm weather. Concrete shall be placed as soon as possible. Waterproofing which has sagged or cracked due to water build-up shall be replaced. When the structural wall or slab is placed against Waterproofing, special efforts are needed to avoid honeycomb in the concrete.

D. Asphalt to Completely Cover Surface.

1. Each layer of asphalt shall completely and entirely cover the surface on which it is spread without cracks or blowholes.

E. Joints.

1. Membrane waterproofing shall be so laid that at any cross-section through the fabric there shall be at least the full number of plies required. In order to insure this result there shall be an overlap of at least two inches at the ends and edges of each strip of fabric. The joints shall be staggered between plies.

2. All joints in membrane waterproofing not laid in a continuous operation shall be lapped so as to secure a full lap of at least one foot at the ends and edges.

3. In joining membrane waterproofing to asphaltic waterproofing in place, the surfaces of the waterproofing in place shall be cleaned and heated before joining the new waterproofing to that previously laid.

F. Leaks To Be Stopped.

1. Any membrane waterproofing that is found to leak at any time prior to the completion of the Work and final acceptance thereof by the Authority shall be made watertight and any masonry, to which membrane waterproofing is not applied, that is found to leak at any time prior to the completion of the Work and final acceptance thereof shall be made watertight. In order to make the masonry watertight, portions shall be cut out and replaced if necessary, or the Contractor shall use such other means as may be required to make the masonry or membrane waterproofing watertight. In exceptional cases, leaks may be diverted or otherwise disposed of.

G. Use of Asphalt Mastic.

1. Asphalt mastic shall be, poured in place, for seals between existing and new waterproofing.

H. Precautions After Laying Membrane Waterproofing.

1. When concrete is laid against the membrane waterproofing material, care shall be taken not to break, tear or injure in any way the outer surface of the asphalt. The concrete shall be placed as soon as practicable after the membrane waterproofing is laid. No loads shall be placed upon exposed membrane waterproofing and no walking over or working upon exposed membrane waterproofing will be allowed.

2. Where membrane waterproofing is applied to concrete of inverts, said waterproofing shall be protected with a one-inch thick mortar (or pea gravel aggregate concrete) layer, which shall be placed on top of the waterproofing within 24 hours after installation of waterproofing. The mortar layer shall not be placed until waterproofing has been inspected. Mortar protection shall be omitted if a structural slab is placed within 24 hours after installation of waterproofing.

3. Waterproofing protection board shall be placed over membrane waterproofing if indicated on the Contract Drawings. Such protection shall be placed in accordance with manufacturer's recommended procedures. Particular attention is called to the Contractor that the intent is to protect the membrane waterproofing from damage during construction and therefore, the protection must be placed immediately upon completion of the placement of membrane waterproofing and prior to subsequent work that may result in damage thereto.

a. Waterproofing protection board shall be pressed into the final application of asphalt while the asphalt is still hot, with edges of boards brought into moderate contact and joints staggered. Waterproofing protection shall be carefully and neatly fitted around pipes and projections and shall cover the entire surface of the waterproofing.

I. Rehabilitation of Waterproofing.

1. Where protection concrete is removed from an existing structure, extreme care shall be taken to insure that the existing membrane waterproofing is protected and portions that are disturbed or damaged shall be patched and repaired by the application of asphalt, fabric or any other materials deemed necessary to restore the membrane waterproofing and provide the surface necessary for proper lapping.

8.22.4. MEASUREMENT AND PAYMENT.

A. Payment for multiple-ply membrane waterproofing will be made at the unit price bid for ITEM 8.22 D, which price shall include the cost of all labor, materials, insurance, and incidental work.

B. Measurement for membrane waterproofing will be made on the basis of the area in square feet covered with 3-plies of waterproofing with no account being taken of laps.

C. At joints where membrane waterproofing having any number of plies is lapped over membrane waterproofing having a different number of plies, payment for membrane waterproofing over the area covered by the overlap will be made under the item for the membrane waterproofing having the greater number of plies, to which the lesser number of plies is joined. In no case will payment be made for the laps of membrane waterproofing.

D. Payment for 6-ply membrane waterproofing ordered to be used when severe water conditions are encountered will be made at 200 percent of the price stipulated in the PRICE SCHEDULE for 3-ply membrane waterproofing.

E. Mortar protection layer and protective concrete for membrane waterproofing in place, as required for precaution after laying membrane waterproofing shall be deemed included in the cost of all work, labor and materials necessary therefore or incidental thereto.

Payment will be made under:

Item No.	Item	Pay Unit
8.22 D	THREE PLY MEMBRANE WATERPROOFING	S.F.

SECTIONS 8.23 THRU 8.31 (NO TEXT)

SECTION 8.32 – BARK CHIP MULCH

8.32.1. DESCRIPTION. Under this section, the Contractor shall furnish and place Bark Chip Mulch in accordance with the plans and specifications and as directed by the Engineer.

8.32.2. MATERIAL. Bark Chip Mulch shall be a natural forest product composed of shredded bark or wood not exceeding three inches (3”) in length and one inch (1”) in width. Mulch must be derived from tree materials, not from wood waste or byproducts like sawdust, shredded pallets, or other debris. It must be natural in color and not died, with no additives or any other treatment. Mulch with leaves, twigs, and/or debris will not be acceptable. The pH factor should range from 5.8 to 6.2.

8.32.3. METHODS. Bark Chip Mulch shall be applied where required on the plans or directed by the Engineer as a ground cover. Mulch shall be applied to a uniform depth of three (3”) inches and shall be so distributed as to create a smooth, level cover over the exposed soil.

8.32.4. MEASUREMENT. The quantity of Bark Chip Mulch to be paid for will be the number of square yards of ground surface area that has been satisfactorily covered with bark chip mulch as indicated on the plans and where directed by the Engineer.

8.32.5. PRICE TO COVER. The unit price bid per square yard for Bark Chip Mulch shall cover the cost of all labor, materials, plant, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the plans, the specifications and the directions of the Engineer.

No payment will be made under this item for furnishing and placing mulch in tree pits around newly planted or transplanted trees, shrubs, grasses, or perennials.

Payment will be made under:

Item No.	Item	Pay Unit
8.32	BARK CHIP MULCH	S.Y

SECTIONS 8.33 THRU 8.51 (NO TEXT)

SECTION 8.52 – Allowance for Wayfinding Totems

8.52.1. DESCRIPTION. Under this item, the Contractor will be required to pay to the NYCDOT Totem sign contractor(s) for furnishing and installing new Wayfinding Totems. NYCDOT may have separate Totem sign contractors for furnishing and installing totems.

8.52.2. CONSTRUCTION DETAILS. The NYCDOT Totem sign installation contractor will only install Wayfinding Totems signs once the foundation (including paving tray and steel foundation plate) has been installed by the Contractor. The Contractor must pick up from NYCDOT, deliver to the project site and install the paving tray and steel foundation plate in accordance with plans, specifications and as directed by the Engineer. All costs for pick up, delivery to the project site and installation of the paving tray and steel foundation plate will be deemed to be included in all scheduled items for foundation work pertinent to Wayfinding Totems signs.

8.52.3. METHOD OF MEASUREMENT. The fixed price lump sum shown in the Bid Schedule for this item must be included in the total bid price; however, actual payment to the Contractor will be based on the actual invoices submitted by the NYCDOT Totem sign contractor.

For payment of paving tray and steel foundation plates, it is agreed that all work will be based on the actual number of paving trays and steel foundation plates delivered to the project site by the Contractor to the satisfaction of the Engineer.

For payment of Wayfinding Totems, it is agreed that all work will be based on the actual number of Wayfinding Totem signs that are installed by the NYCDOT Totem sign contractor to the satisfaction of the Engineer.

Partial payments for materials fabricated specifically for the contract and stored at a NYCDOT facility may be made in accordance with Section 1.06.35, provided that the materials are identified, set aside, and marked as only for use only for use on this Project.

8.52.4. BASIS OF PAYMENT. The fixed sum shown in the proposal for the Wayfinding Totems sign will be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

The fixed sum payment made under this item will be equal to the sum of all invoices submitted by the NYCDOT Totem sign contractor as proof of work performed for this item, as approved by the Engineer.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and must not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

The unit price will cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

No separate payment will be made for the Contractor to pick up, deliver to the project site, and install the paving tray and steel foundation plate. The cost shall be deemed to be included in all scheduled items for foundation work pertinent to Wayfinding Totem signs.

No separate payment will be made for furnishing and installing metal conduit, reinforcing bar, or plastic filter fabric. The cost shall be deemed to be included in all scheduled items for foundation work pertinent to Wayfinding Totem signs.

Payment will be made under:

Item No.	Item	Pay Unit
8.52	ALLOWANCE FOR WAYFINDING TOTEMS	F.S.

SECTION 8.52 FP – Steel Foundation Plate

8.52FP.1. INTENT. This section describes the furnishing of the Steel Foundation Plate.

8.52FP.2. DESCRIPTION. The Steel Foundation Plate shall be embedded in the poured concrete footing to the nominal dimensions as indicated on the contract drawings and specifications.

8.52FP.3. MATERIALS. Steel Foundation Plates shall comply with the requirements of the NYCDOT Standard Highway Specifications **Sections 2.35, Structural Steel** and shall be galvanized in accordance with **Section 2.34**. Steel Foundation Plates must be procured from the NYCDOT Totem sign contractor, as specified in **Section 8.52**.

8.52FP.4. PRICE TO COVER. No separate payment will be made for Steel Foundation Plates, which will be paid for under item 8.52.

SECTION 8.52 PT – Paving Tray

8.52PT.1. INTENT. This section describes the furnishing of the ground level Paving Tray.

8.52PT.2. DESCRIPTION. Fabricated steel plate frame, angle and flat textured cover plate assembly, configured and to nominal dimensions as indicated on the contract drawings and specifications. Paving Trays must be procured from the NYCDOT Totem sign contractor, as specified in **Section 8.52**.

Paving Tray Dimensions

Type	Item	Length	Width
A	Paving Tray (Pathway Totem)	1’-7¼”	8½”
B	Paving Tray (Area Totem)	2’-11¼”	8½”
C	Paving Tray (Neighborhood Totem)	4’-3¼”	8½”
D	Paving Tray (SBS Sign)	2’-1½ “	8½”

8.52FP.3. PRICE TO COVER. No separate payment will be made for the Paving Trays, which will be paid for under item 8.52.

SECTION 8.52 WSF – Wayfinding Sign Footing

8.52 WSF.1. INTENT. Under this section, the Contractor must furnish concrete footing for the Wayfinding sign and all necessary incidentals in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

8.52 WSF.2 MATERIALS.

(A) Saw cut must be done in accordance with **Section 6.55** and price must be deemed included in the price of this item.

(B) Excavation must be done in accordance with **Section 6.02** and its **Item No. 6.02 AAN** and price must be deemed included in the price of this item.

Special care excavation must be done in accordance with **Section 8.02** and **Item No. 8.02 A** and must be paid accordingly under its respective pay item number in the BID SCHEDULE.

(C) Concrete must meet with the requirements of **Section 3.05, Concrete**, and be of the class, type and mixing specified and will be done in accordance with **Section 4.06**; price must be deemed included in the price of this item.

Subbase material must be of the type, grade, size number and nominal size specified and must be done in accordance with **Section 6.67**; Type MATERIAL B, price must be deemed included in the price for this for this item.

(D) Concrete reinforcement must comply with the requirements of the following sections:

Steel Bars--**Section 2.23.** Kind of reinforcement, size and placement must be as specified and as shown on Contract Drawings. Reinforcement must be installed in accordance with the requirements of **Section 4.14** and price is deemed included in the price of this item.

(E) Joint Sealer and pre-molded joint filler as shown on Contract Drawings must comply with the requirements of **Section 2.22** and **Section 2.15** respectively type as specified and price is deemed included in the price of this item.

(F) Anchor Bolt ASTM A240, Grade 304, ½" dia., to be drilled and installed with epoxy filler as shown on Contract Drawings or as directed by the Engineer.

(G) Galvanized Steel Footing Plate to be installed as per Contract Drawings and **Section 8.52 FP**, cost of installation is deemed included in the price of this item. Furnishing of this plate must be made under **Section 8.52**.

Paving tray and temporary cover plate to be installed as per drawing and **Section 8.52 PT**, cost of installation is deemed included in the price of this item. Furnishing paving tray and temporary cover plate must be made under **Section 8.52**.

Galvanized rigid metal conduit and Schedule 40 HDPE pipe, where required, must be in accordance with **Chapter 5** of the NYCDOT Specifications for Traffic Signals; as directed by the Engineer and as shown in the drawings.

Plastic Filter fabric must be done in accordance with **Section 6.68** and price must be deemed included in the price of this item.

8.52 WSF.3. DESIGN AND CONSTRUCTION OF FORMS

Forms must accurately conform to the shape, lines and dimensions of the footing for which they are required, be substantial and sufficiently tight to prevent leakage of mortar, and have, unless otherwise specified by the Engineer, moldings or chamfer strips at angles. They must be of adequate strength and be braced or tied together with approved ties and spacers, to maintain position and shape, and to insure the safety of workmen and passersby, be clean and free from sawdust, chips, dirt, ice and other objectionable materials. Forms must present smooth, true surfaces to the concrete placed against them, having temporary openings where necessary, to facilitate cleaning and inspection immediately before concrete is deposited. Forms must be coated with non-staining oil before the reinforcement is placed, or be wetted except in freezing weather.

8.52 WSF.4. MEASUREMENT. The quantity measured for payment shall be the number of footings of type specified, installed in accordance with the Contract Drawings, the specifications and to the satisfaction of the Engineer.

8.52 WSF.5 BASIS OF PAYMENT. The contract price for each way finding sign footing of the type specified must cover the cost of labor, materials, equipment, insurance, and incidentals required to construct respective wayfinding footings, including but not limited to, the furnishing and incorporation of all concrete; reinforcement; curing; finishing; samples; testing equipment and facilities for testing; all, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

The cost of all items referenced in this Section, with the exception of Items 4.13 AAS, 6.05 DP and 8.02 A, must be deemed included in the contract price of wayfinding sign footings of type specified.

Payment will be made under:

Item No.	Item	Pay Unit
8.52 WSF-A	WAYFINDING SIGN FOOTING TYPE A	EACH
8.52 WSF-B	WAYFINDING SIGN FOOTING TYPE B	EACH
8.52 WSF-C	WAYFINDING SIGN FOOTING TYPE C	EACH
8.52 WSF-D	WAYFINDING SIGN FOOTING TYPE D	EACH

SECTIONS 8.53 THRU 8.99 (NO TEXT)

SECTION 9.00 - Exploratory Test Pits

9.00.1. DESCRIPTION. This section describes the work of performing Exploratory Test Pits, at corners suspected of having vaults as directed by the Engineer, for the purpose of:

(A) Identifying the outline and roof elevation of possible building vaults, subway vaults, and utility structures (hereinafter referred to as vaults) which extend under the sidewalk area and/or curb line.

(B) Determining if elevation and construction type of vault roofs interfere with construction of standard pedestrian ramps.

9.00.2. METHODS. Work to be performed by the Contractor, or the Contractor's agent, shall consist of excavating exploratory test pits to determine the depth of vault roofs and establish the vault roof envelope where other inspection methods of identifying vault roof structures have failed.

A typical test pit shall be twelve (12") inches square by twelve (12") inches deep. The surface perimeter of test pits shall be sawcut to a depth of at least one (1") inch. The remaining test pit area shall be broken out and removed by chipping/digging carefully performed with hand labor without the use of any heavy power tools. Use of hand operated small electric jack hammers will be permitted for breaking sidewalks or pavements in test pits as approved by the Engineer.

The Contractor shall be required to excavate all materials of whatsoever nature encountered, until the underground structures have been located, as directed by the Engineer, or to a depth of approximately twelve (12") inches, whichever comes first. All materials excavated from each test pit shall be immediately removed from the site by the Contractor.

Excavated test pits shall be maintained free of debris and kept dry by the Contractor in order to permit inspection and observations to be made by the Engineer.

Test pits shall be covered with steel plates during non-working hours and uncovered only as required for excavation and observation work. The steel plate covers will then be allowed to remain on the test pits/cores/holes for up to three (3) working days for the Project Engineer to inspect the test pits/core holes.

Immediately after inspection of each test pit by the Engineer, the test pit shall be backfilled as specified under **Section 4.11** and capped with two (2") inches of (cold) asphaltic binder mixture.

Should a test pit encounter a vault or a void the restoration and backfill is to be as directed by the Engineer.

Where a test pit is not included in the new pedestrian ramp work area, then it shall be permanently restored with 4" or 7" concrete sidewalk under the appropriate sidewalk item.

9.00.3. MEASUREMENT. The quantity of Exploratory Test Pits to be measured for payment shall be the number of cubic feet of material actually removed from within the limits of the test pit as prescribed herein.

9.00.4. PRICE TO COVER. The contract price per cubic foot for Exploratory Test Pits shall include the cost of all labor, materials, equipment, appliances, insurance, and all other incidentals required to excavate test pits including removal of all materials; sawcutting of sidewalk pavement; assisting the Engineer in inspecting analyzing the excavated area; steel plating; backfilling and temporary restoration; and maintaining pedestrian traffic; all in accordance with these specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.00 C	EXPLORATORY TEST PITS	CUBIC FEET

SECTIONS 9.01 THRU 9.03 (NO TEXT)

SECTION 9.04 - Allowance for Anti-freeze Additive in Concrete

9.04.1. DESCRIPTION. Under this Section, the Contractor shall be required to furnish an accelerator admixture in the amount and type as directed by the Engineer, in consultation with the admixture manufacturer. Said accelerator addmixture must permit the placement of concrete base, curb and sidewalks during cold weather conditions, and must be a Non-Chloride Accelerator, per **Section 2.09**. Cold weather conditions shall be defined as when, for more than three (3) consecutive days, the following conditions exist:(1) the average daily air temperature is less than 40° F (4° C) and (2) the air temperature is not greater than 50° F (10° C) for more than one-half of any 24 hour period. The average daily air temperature is the average of the highest and lowest temperatures occurring during the period from midnight to midnight.

9.04.2. MEASUREMENT AND PAYMENT. Payment made under this item shall be equal to the sum total of all vouchers submitted by the material supplier to the Contractor as proof of payment for the cost of furnishing and delivering the approved admixture to the Contractor's concrete supplier. All other direct or indirect cost of using the admixture are be deemed included in the bid prices for installing concrete curb, sidewalk and roadway base. Payment under this item, including partial payments, will not be made until the Contractor has furnished satisfactory evidence to the Engineer that the Contractor has reimbursed the supplier for said costs in providing the approved admixture. Payment and partial payments under this item will be treated separately from the rest of the contract items.

Payment will be made under:

Item No.	Item	Pay Unit
9.04 HW	ALLOWANCE FOR ANTI-FREEZE ADDITIVE IN CONCRETE	FIXED SUM

SECTION 9.05 – Allowance for New Electrical and Gas Service Connections

9.05.1. DESCRIPTION. Under this Section, the Contractor will be required to pay for electrical and / or gas utility companies (such as Con Edison / National Grid) for furnishing and installing new electrical and / or gas services (including meters) for plazas, kiosks and similar items. This item will only be used for services that are installed by the electrical and/or gas utility companies on behalf of the City of New York and will be paid for by the City of New York.

Filing the application for the utility service, including preparing Load Letters if required, will be the responsibility of the Engineer.

9.05.2. MEASUREMENT AND PAYMENT. The fixed sum shown in the proposal for the new electrical and gas service connections will be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

The fixed sum payment made under this item will be equal to the sum of all invoices submitted by the electrical and/or gas utility company as proof of work performed for this item, as approved by the Engineer, with no markup for overhead, profit, or other fees allowed.

The fixed sum amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

The unit price will cover the cost of all labor, materials, equipment, insurance and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.05	ALLOWANCE FOR NEW ELECTRICAL AND GAS SERVICE CONNECTIONS	FIXED SUM

SECTION 9.06 – Allowance for Decorative Mesh Fabric

9.06.1. DESCRIPTION. Under this Section, the Contractor will be paid to furnish and install panels of breathable mesh fabric upon which art work is printed in a maximum of 4-colors, as directed by the Engineer. Each panel shall also contain metal grommets installed at a 1’ maximum spacing around the perimeter of the fabric for mounting on TEMPORARY CHAIN LINK FENCE, 8’-0” HIGH (WITH TOP AND BOTTOM RAILS AND POSTS MOUNTED ON STEEL PLATES) (Item No. 6.34 ADTP), unless an alternate method of mounting the fabric is proposed by the Contractor and approved by the Engineer. All art work to be printed on the fabric will be provided to the Contractor by the City.

If directed by the Engineer, the Contractor will replace the mesh fabric with new panels, reimbursable under this item.

At the completion of the work the panels shall remain the property of the City and shall be delivered to the Engineer, unless otherwise directed.

The lump sum payment made under this item shall be equal to the sum total of all invoices submitted by the Contractor, as approved by the Engineer, for furnishing and installing decorative mesh fabric materials, to the satisfaction of the Engineer, plus an allowance of 12% overhead and 10% profit.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and shall not be varied in the bid. No guarantee is given that the actual lump sum cost for this item will in fact be the "fixed sum" amount. The "fixed sum" amount is included in the bid solely to insure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed amount. This "fixed sum" amount shall be included with the other amounts bid by the Contractor for all the other items under this contract.

The unit price shall cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer

Payment will be made under:

Item No.	Item	Pay Unit
9.06 HW	ALLOWANCE FOR DECORATIVE MESH FABRIC	F.S.

SECTION 9.07 – Non-Woven Geotextile

9.07.1. INTENT. This section describes the installation of the non-woven geotextile that is to be furnished and installed as part of this project.

9.07.2. DESCRIPTION. Under these Items, the Contractor shall furnish and install non-woven geotextile to separate landscape materials in accordance with the plans and specifications, as directed by the Engineer.

9.07.3. MATERIALS. All non-woven geotextile shall be synthetic and rot proof. It shall be manufactured for the purpose of separating two different materials.

(A) Definition: Separation application is defined as the placement of a flexible porous geotextile between dissimilar materials so that the integrity and functioning of both materials can be maintained or improved.

(B) Non-woven geotextile used in separation applications shall be US 160NW as manufactured by US Fabrics, FX-60HS manufactured by Carthage Mills, or 160N (non-woven) as manufactured by Mirafi, Inc., or an approved equivalent with the following minimum requirements:

Non-woven geotextile used shall conform to the following AASHTO-M-288 Class 2 properties for separation geotextiles:

	ASTM TEST	TYPE
Application		Separation
Elongation	D 4595	≥50%
Grab Strength	D 4632	157 LBF
Tear Strength	D 4533	56 LBF
Puncture Strength	D 4833	85 LBF
Permittivity (minimum)	D 4491	0.02 sec^{-1}
Maximum Apparent Opening Sieve Size/Sieve Designation	D 4751	0.0234 in./No. 30

(C) Submittals: All submittals shall be submitted in accordance with the requirements of the contract. The Contractor shall submit the following for the Engineer's review and approval prior to purchase.

Manufacturer's Data: The Contractor shall submit manufacturer's data with sufficient detail to demonstrate compliance with the requirements of this specification.

Samples: The Contractor shall furnish the required number of samples of the non-woven geotextile intended for use in the work for approval by the Engineer. The label shall include the manufacturer's product name, the type of fabric, and the weight of grade of the material. Non-woven geotextile used in the work shall conform to the approved samples.

9.07.4. METHOD.

(A) Delivery, Storage and Handling:

Delivery: Deliver materials to site in manufacturer's original, unopened packaging, with labels clearly identifying product name and manufacturer.

Storage: Store materials in clean, dry area in accordance with manufacturer's instructions.

Handling: Protect materials during handling and installation to prevent damage.

(B) Examination:

Examine subgrade areas to receive non-woven geotextile. Notify Engineer if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

(C) Installation:

Install non-woven geotextile in accordance with manufacturer's instructions at locations indicated on the Drawings.

The non-woven geotextile shall be rolled directly on the ground. All seams shall be overlapped a minimum of six (6”) inches.

No equipment, materials or machinery shall be placed on or be transported over exposed geotextile.

Topsoil as shown on the plans and as directed by the Engineer shall then be carefully placed to prevent dislocation of the fabric. If the fabric is damaged during installation, the rupture shall be removed and the damaged area shall be covered with a patch of new fabric that will overlap the undamaged fabric by at least six (6”) inches in all directions. All repaired fabric surface costs shall be done at no additional cost to the City. Cost of the Topsoil shall be pay separately under Item No.4.15.

9.07.5. MEASUREMENT. The quantity of Non-Woven Geotextile to be paid for shall be the number of SQUARE YARDS, measured in its final position, installed to the satisfaction of the Engineer. No additional measurement will be made for overlaps of material.

9.07.6. PRICE TO COVER. The price bid shall be a unit price per SQUARE YARD of Non-Woven Geotextile and shall include the cost of furnishing all labor, material, equipment, insurance, submittals, and incidental expenses necessary to complete the work; all in accordance with the plans and specifications and to the satisfaction of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.07	NON-WOVEN GEOTEXTILE	S.Y.

SECTIONS 9.08 THRU 9.22 (NO TEXT)

SECTION 9.23 – Asphalt, Fuel, and Steel Price Adjustment Allowance

9.23.1 SCOPE AND INTENT

(A) This section will provide for additional compensation to the Contractor for increases, or repayment by the Contractor for decreases, in the price of asphalt, fuel, or steel products.

(B) Price Adjustments will be made only for eligible work as defined below. With respect to asphalt and steel eligible work items, price adjustment will be paid, if eligible, only after the items have been permanently incorporated into the Work and accepted by the Commissioner. With respect to fuel, price adjustment will be paid, if eligible, only after fuel has been delivered to the Project site.

(C) No adjustment will be provided for any extra work paid by fixed price in accordance with the Standard Construction Contract Article 25.3.2 or paid for on a time and material basis per Standard Construction Contract Article 26. Additional quantities of existing Contract pay items at original bid prices will be considered eligible for asphalt, fuel, and steel price adjustments.

(D) Temporary work performed by the Contractor at its own expense will not be eligible for price adjustment. Notwithstanding the foregoing, temporary asphalt will be eligible if shown on the Contract Drawings or required to complete the Work and must be approved in advance by the Engineer.

(E) The Contractor, its Subcontractor(s) and/or Materialmen, must, when directed by the Commissioner, provide any and all Project documents and/or records the Commissioner deems pertinent to his/her determination with respect to the price adjustment. If requested by the Commissioner, the Contractor, its Subcontractor(s) and/or Materialmen, must provide copies of Project documents and/or records.

(F) Failure by the Contractor, its Subcontractor(s) and/or Materialmen, to comply strictly with the requirement to provide Project records will constitute a waiver of any claim for additional compensation the Contractor may have in connection with the price adjustment request.

(G) Project documents and/or records include, without limitation, Bid and Contract Documents, shop drawings, manufacturing and/or shipping data, as-built drawings, books of account, financial statements, invoices, vouchers, records, daily job diaries and reports.

(H) If the Contractor is paid additional compensation in accordance with this Section, the Contractor must pay a properly allocated share of such additional compensation to the applicable Subcontractor(s) and/or Materialmen.

9.23.2 PRICE ADJUSTMENT VALUES

(A) The monthly average asphalt prices, monthly average fuel prices, steel cost basis and steel index values will be posted on the NYS Department of Transportation (NYSDOT) website: https://www.dot.ny.gov/main/business-center/contractors/construction-division/fuel-asphalt-steel-price-adjustments

(B) Historical index values are available as issued Engineering Bulletins on the NYSDOT website: https://www.dot.ny.gov/eieb

9.23.3 ASPHALT PRICE ADJUSTMENT

(A) Price Changes.

The asphalt price adjustment will be based solely on the price changes for asphalt as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $15.00 of the asphalt index price. No consideration will be given to the situation where the price paid by the Contractor, its Subcontractors, or the Contractor's or Subcontractor's supplier(s) exceeds the monthly average posted price.

(B) Applicability.

The asphalt price adjustment will apply to all permanent asphalt pavement items. The asphalt price adjustment will apply to temporary asphalt pavement if the temporary asphalt is shown on the Contract Drawings or approved in advance by the Commissioner. No price adjustment will be made for tack coat or pothole cold patch.

(C) Prices.

The asphalt index price and the monthly average posted price are defined as follows:

1. Asphalt Index Price. The asphalt index price is a price per ton of binder (also referred to as liquid bitumen or asphaltic cement) used solely as a basis from which to compute asphalt price adjustments. The asphalt index price will be the monthly average posted price for the month and year the bid opening for the Project.
2. Monthly Average Posted Price. The monthly asphalt index prices will be determined by NYSDOT using the methods set forth in NYSDOT Standard Specification Section 698.

(D) Quantity.

The quantity of asphalt in tons considered for adjustment will be determined by the tons of asphalt actually placed. This will be calculated using the measured volume of asphalt placed, and the asphalt's in-place density, as measured in the field. Quantities of asphalt will be determined to the nearest 0.1 ton.

(E) Adjustment.

Asphalt price adjustment will be based on the following formulas, to the nearest cent:

1. When price increases: Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price – Asphalt Index Price - $15.00)
2. When price decreases: Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price – Asphalt Index Price + $15.00)

(F) Payment of the Price Adjustment.

The Contractor is required to keep a log of all asphalt incorporated into the Project that is eligible for the price adjustment. The log must keep track of the date when the asphalt was purchased, the quantity of the asphalt, the Asphalt Index Price and the Monthly Average Posted Price, as determined in accordance with 9.23.3.C.

When the adjustment amount, calculated in accordance with 9.23.3.E, exceeds $10,000.00 for all eligible asphalt incorporated into the Project, the Contractor must submit with its monthly payment requisition, the request for payment of the asphalt price adjustment.

9.23.4 FUEL PRICE ADJUSTMENT

(A) Price Changes.

The fuel price adjustment will be based solely on the price changes for fuel as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $0.10 per gallon of the fuel index price. No consideration will be given to the situation where the price paid by the Contractor, its Subcontractors, or the Contractor's or Subcontractor's supplier(s) exceeds the monthly average posted price.

(B) Applicability.

The intent of the fuel price adjustment is to cover on-site equipment and vehicles only as delineated below.

1. The fuel price adjustment will apply for fuel used in:
    a. Diesel equipment used on site, such as backhoes, excavators, cranes.
    b. Stationary equipment used on site, such as trailer or skid mounted compressors, generators, or light towers.
    c. Gasoline or diesel trucks and vans that are assigned to the site full-time, which may be used for off-site pickups and deliveries.
    d. Equipment used for temporary heating.

2. The fuel price adjustment will not apply to:
    a. On-site gasoline powered hand tools, such as chainsaws, cut-off saws, pressure washers, small generators, etc.
    b. Vehicles (cars, pickup trucks) that are also used for commuting.
    c. Delivery vehicles.
    d. Any equipment at the Contractor's shop, manufacturer's shop, or other off-site facility.

(C) Prices.

The fuel index price and the monthly average posted price are defined as follows:

1. Fuel Index Price. A price per gallon of fuel used solely as a basis from which to compute fuel price adjustments. The fuel index price will be the monthly average posted price for the month of the bid letting.
2. Monthly Average Posted Price. The monthly fuel index prices will be determined by NYSDOT using the methods set forth in NYSDOT Standard Specification Section 698.

(D) Quantity.

The quantity of fuel in gallons considered for adjustment will be determined by invoices for fuel delivered to the Project site. Quantities of fuel will be measured to the nearest 0.01 gallon.

(E) Adjustment.

Fuel price adjustment will be based on the following formulas to the nearest cent:

1. When price increases: Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price - $0.10)
2. When price decreases: Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price + $0.10)

(F) Payment of the Price Adjustment.

The Contractor is required to keep a log of all fuel incorporated into the Project that is eligible for the price adjustment. The log must keep track of the date when the fuel was purchased, the quantity of the fuel, the Fuel Index Price and the Monthly Average Posted Price, as determined in accordance with 9.23.4.C.

When the adjustment amount, calculated in accordance with 9.23.4.E, exceeds $10,000.00 for all eligible fuel delivered to the Project site, the Contractor must submit with its monthly payment requisition, the request for payment of the fuel price adjustment.

9.23.5 STEEL PRICE ADJUSTMENT

(A) Applicability.

The intent of the steel price adjustment is to cover steel materials as follows. For the purposes of this section, steel includes all steel alloys, stainless steel alloys, iron, and ductile iron.

1. Steel price adjustment will apply to groups of similar material content.
2. The steel price adjustment will apply to the following Material Groups:
    a. Structural steel
    b. Reinforcing bars
    c. Steel water mains, appurtenances, and valves
    d. Ductile iron water and sewer pipes, appurtenances, fittings, and valves
    e. Steel piles and minipile casings
    f. Municipal steel and iron castings (manhole covers, sewer grates, etc.)
3. The steel price adjustment will not apply to the following:
    a. Steel in fabricated elements, such as traffic signal cabinets, or electrical fixtures and boxes

b. Handrails, access ladders, edging strips and other miscellaneous metals

c. Anchor bolts and fasteners

(B) For each Material Group listed, the Contractor must also identify the parties whose relationship establishes the invoice date. If the parties are known, they must be identified by name. If the two parties are not known, they must be identified by role (Contractor, Subcontractor, Materialman, fabricator, etc.). Different parties may be identified for scopes within a Material Group for the purposes of establishing an invoice date. If the Contractor does not provide a list of materials within 30 days of the date set forth in the Notice to Proceed to which to apply the steel price adjustment, no steel price adjustment will be made.

(C) If the percentage change for a given month does not exceed 5% plus or minus, from the benchmark steel index, no adjustments will be made for materials invoiced that month.

(D) The percentage change for each material group identified in Article 9.23.5.A.2 above will be determined using the month that the largest value of materials were invoiced.

(E) The weight of the steel must exclude minor appurtenances individually weighing less than 5 lbs (i.e., nuts, bolts, washers, etc.) and non-steel components, such as door insulation or glazing. Precast or prestressed concrete items must have total reinforcing steel weight listed on the approved shop drawings. The following sources must be used, in declining order of precedence, to determine the weight of steel: approved shop drawings; verified shipping documents; Contract Documents; industry standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and manufacturer's data.

1. Indexes and Prices. Adjustments are based on the Producer Price Index (PPI) for Semifinished Steel Mill Products (WPU 101702). PPI values are published by the US Department of Labor, Bureau of Labor Statistics (BLS). Recent PPI values are posted on the NYSDOT website linked above. The Cost Basis, Benchmark Steel Index, Monthly Steel Index, and the Percentage Change are defined as follows:

    a. Cost Basis (CB). An average price of steel products in dollars per ton used solely as a cost basis from which to compute steel price adjustments. The cost basis for original Contract bid price items and additional work at the original Contract bid price will be the cost basis listed for the month of the bid letting. The cost basis for additional work at agreed price will be the value of the cost basis for the month the agreed price was submitted to the Commissioner.

    b. Benchmark Steel Index (BI). The benchmark steel index for original Contract bid price items and additional work at the original Contract bid price will be the value of the preliminary PPI for the month of the bid letting. The benchmark steel index for additional work at agreed price will be the value of the preliminary PPI for the month the agreed price was submitted to the Commissioner.

    c. Monthly Steel Index (MI). Value of the final PPI for the month the material is invoiced.

    d. Percent Change. The percent change in any given month will be determined as follows:

$$Percentage\,Change = \left(\frac{MI - BI}{BI} \right) x\,100$$

(F) The quantity of steel for adjustment of each Material Group will be measured to the nearest 0.1 tons.

1. Percent Change Greater Than +5%. If the Percentage Change is greater than +5% from the benchmark steel index, Price Adjustments will be made for materials invoiced that month. The Contractor must provide the Commissioner a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the Contract pay item, the weight of steel, the month(s) of invoice, the source used to determine the weight, and if requested by the Engineer, copies of invoices to verify the month of invoice.

2. Percent Change -5% to +5%. If the Percentage Change is between -5% and +5%, inclusive, from the benchmark steel index, no adjustments will be made for materials invoiced that month.

3. Percent Change Lower Than -5%. If the Percentage Change is lower than -5% from the benchmark steel index, a Price Adjustment will be charged to the Contractor for materials invoiced that month. The Contractor must provide the Commissioner a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the Contract pay item, the weight of steel, the month(s) of invoice, the source used to determine the weight, and copies of invoices to verify the month of invoice.

(G) Adjustment.

Steel price adjustment will be made for all the materials which the Contractor opted to apply the steel price adjustment, based on the following formulas, to the nearest cent:

1. When price increases:

$$Price\ Adjustment = \left[\left(\frac{MI - BI}{BI}\right) - 0.05\right](CB)\,Qty$$

2. When price decreases:

$$Price\ Adjustment = -\left[\left(\frac{MI - BI}{BI}\right) + 0.05\right](CB)\,Qty$$

(H) Payment of the Price Adjustment.

Steel Price Adjustment will be paid once during the Project duration for each eligible Material Group after the final PPI is available to set the Monthly Steel Index for the invoice month determined in Article 9.23.5.D above.

9.23.6 MEASUREMENT AND PAYMENT

(A) The fixed sum shown in the Bid Schedule for Price Adjustments Allowance will be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded and the original price will be used to determine the total amount bid for the Contract. The fixed sum payment made under this item will be equal to the sum of payments and credits for price adjustments, as approved by the Commissioner, with no markup for overhead, profit, or other fees allowed. The fixed sum amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for the price escalation adjustment payments as delineated herein, which may be more or less than the fixed sum amount.

Payment will be made under:

Item No.	Item	Pay Unit
9.23	PRICE ADJUSTMENTS	F.S.

SECTIONS 9.24 THRU 9.27 (NO TEXT)

SECTION 9.28 – Expanded Work Allowance

9.28.1 PURPOSE

An Allowance has been established for the items set forth in sub-Section 9.28.3 below ("Expanded Work Allowance" or "EWA"). Payment for the items set forth in sub-section 9.28.3 ("Expanded Work Items") may be made through the EWA, as directed by the Engineer. "Extra Work", "overrun", and "Allowance" are defined by the Standard Construction Contract (*see* Articles 2.1.16, 26.1, and 2.1.4, respectively) and nothing in this Section alters, or will be deemed to alter the interpretation or application of, the Standard Construction Contract, including but not limited to Articles 25, 26, 28, and 78 of the Standard Construction Contract.

9.28.2 PROCESS

(a) If the Engineer determines that use of the EWA is appropriate, in their sole discretion, the Engineer will prepare a written scope document for the Expanded Work Items for the Contractor's execution ("EWA Scope Memo"). The EWA Scope Memo will set forth the maximum amount payable from the EWA prior to the execution of a final cost memorandum ("Maximum Amount"), in accordance with this Section. The Maximum Amount may be increased from time to time by the Engineer, in their sole discretion, except that the Maximum Amount may not exceed 80% of the Engineer's estimated total cost for such Work (the "Estimated Cost") unless and until a final cost is determined and a final cost memorandum ("Final Cost Memo") executed in accordance with this Section.

(b) Neither the Maximum Amount nor the Estimated Cost will be deemed to be the final cost of the Expanded Work Items. The final cost for the Expanded Work Items will be determined in accordance with Article 26 of the Standard Construction Contract. The Contractor must submit its detailed price proposal for the Expanded Work Items, calculated in accordance with the Contract, within the time period set forth in the EWA Scope Memo or within 90 Days after the executed EWA Scope Memo is issued to the Contractor, whichever is sooner.

(c) Once the EWA Scope Memo is executed and the Contractor is directed to proceed with the Work, DDC will make progress payments, as provided in the Contract, up to the Maximum Amount or until the submission period has expired, whichever occurs sooner.

(d) DDC will not make any progress payments for the performance of the Expanded Work Items beyond the submission period set forth in sub-Section C, above, unless and until a final cost has been determined and a Final Cost Memo executed in accordance with this Section. No amounts above the Maximum Amount set by the Engineer will be payable from the EWA, unless and until a final cost has been determined and a Final Cost Memo executed in accordance with this Section. In all events, the Contractor shall promptly and diligently comply with the Engineer's direction and perform all Work required by the Contract and the EWA Scope Memo.

(e) Upon receipt of the Contractor's cost detailed proposal, DDC will evaluate the proposal and initiate negotiations, as necessary, to determine the final cost of the Expanded Work Items in accordance with Article 26 of the Standard Construction Contract. The Contractor is responsible to furnish time and material records in accordance with Article 28 of the Standard Construction Contract until a Final Cost Memo is executed. If the parties cannot agree on a unit price or fixed price, the Contractor will be paid on the basis of time and material records in accordance with Article 26 the Standard Construction Contract.

(f) A Final Cost Memo will be prepared by the Engineer to be executed by the parties. The total net sum of the amounts added and/or credited under the EWA Scope Memo and payment of the finalized Final Cost Memo constitutes full accord and satisfaction for the costs resulting from the Expanded Work Items. In the event the EWA is insufficient to pay the full amount of the Final Cost Memo, the parties agree to execute change order documents for the remaining funds, subject to registration in accordance with the New York City Charter.

9.28.3 PRICE TO COVER

Expanded Work Items are those items set forth below. The EWA may be used, in the Engineer's discretion, for the following Expanded Work Items:

Non-material changes in the Work necessary to complete Contract Work due to site conditions that differ from those included in the Contract Documents and that could not have been anticipated by the Contractor.

Non-material changes in the Work directed by the Commissioner that result in a net change in the cost to the Contractor for the Work to be performed under this Contract, including but not limited to the following:

Overruns of unit price items and quantity increases in portions of work within a lump sum item.

NYCDOT traffic stipulations or permit requirements that significantly differ from those included in the Contract Documents and that could not have been anticipated by the Contractor.

Changes to the sizes of materials or changes to specifications of materials.

Materials/structures not included in the Contract Documents that are necessary to complete Contract Work and that could not have been anticipated the Contractor.

9.28.4 BASIS OF PAYMENT

(a) The fixed sum must be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded, and the original price will be used to determine the total amount bid for the contract.

(b) The payment(s) made under this item will be equal to the Final Cost Memo prepared by the Engineer and executed by the parties in accordance with 9.28.2(f) above as proof of work performed for this item as approved by the Engineer.

(c) The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and shall not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

(d) The price will cover the cost of all labor, materials, equipment, insurance and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.28	EXPANDED WORK ALLOWANCE	F.S.

SECTION 9.29 - Allowance For Railroad Facility Permitting (All Types)

9.29.1. DESCRIPTION.

Under this item the Contractor must negotiate with the railroad to obtain a permit to enter railroad property and comply with all relevant railroad work and financial requirements.

9.29.2. MATERIALS.

(Not applicable)

9.29.3. CONSTRUCTION DETAILS.

Prior to the Contractor providing any services under this Section, the Engineer will provide written direction to the Contractor. The written direction will include:

- The name and contact information of the railroad;
- Additional Insurance requirements;
- Special railroad requirements and provisions;
- Scope and area of work where railroad coordination is required.

When directed by the Engineer, the Contractor must negotiate with the railroad to obtain a permit to enter railroad property, comply with all relevant railroad requirements, and, if required, provide a payment fund to the railroad for all miscellaneous expenses incurred by the railroad due to the contractor entering the railroad property. These expenses may include the costs incurred by the railroad to provide flaggers, spotters, engineering services (plan review/comments), accounting services (cost work-up and negotiations), construction inspection, or any other labor, material or equipment necessary to provide a safe environment to both the contractor and the railroad. The right-of-entry permit must be obtained prior to commencement of any work within the boundaries of the railroad. The railroad will not provide any services necessitated by the Contractor's operations until the permit is obtained.

This allowance must include all the railroad insurances costs as required by the railroad.

9.29.4. METHOD OF MEASUREMENT.

The fixed sum shown in the Bid Schedule for this item must be included in the total bid price; however, actual payment to the Contractor will be based on the actual invoices submitted by the Contractor in connection with the railroad works as described above.

9.29.5. BASIS OF PAYMENT.

The fixed sum must be considered the price bid for this item. The fixed sum is not to be altered in any manner by the bidder. Should the amount shown be altered, the new figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

The fixed sum payment made under this item will be equal to the sum of all invoices submitted by the Contractor as proof of work performed for this item, as approved by the Engineer.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule and must not be varied in the bid. The "fixed sum" amount is included in the bid solely to ensure that sufficient monies will be available to pay the Contractor for this work, which may be more or less than the fixed sum amount.

The unit price will cover the cost of all labor, materials, equipment, insurance, and incidentals necessary to complete the work under this section in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.29	ALLOWANCE FOR RAILROAD FACILITIES INCLUDING INSURANCE AND FORCE ACCOUNT (ALL TYPES)	F.S.

SECTION 9.30 - Stormwater Pollution Prevention

9.30.1. INTENT. The intent of this section is to address Erosion and Sediment Control (ESC) and pollution prevention during construction and maintenance and guaranty period. The Contractor is advised that within NYC boundaries, in compliance with the Rules of the City of New York Title 15 Chapter 19.1 (15 RCNY Chapter 19.1), DEP is required to review and approve Stormwater Pollution Prevention Plans (SWPPP) that have been prepared to meet the requirements listed in Chapter 19.1. All covered development projects must implement ESC measures in accordance with the NYS Standards and Specifications for Erosion and Sediment Control (also known as The "NYS DEC Blue Book"), dated November 2016 (https://www.dec.ny.gov/chemical/8694.html), as amended.

The objective is to develop and implement a SWPPP that will minimize the pollutants entering the storm sewer systems in compliance with 15 RCNY Chapter 19.1, and the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Runoff from Construction Activity, SPDES General Permit GP-0-20-001 or its successor.

9.30.2. DEFINITIONS.

1. **Designer –** The Design Engineer or Qualified Professional responsible for the design
2. **Qualified Inspector -** A person who is knowledgeable in the principles and practice of erosion sediment control, such as a licensed Professional Engineer, a Certified Professional in Erosion and Sediment Control, or a Registered Landscape Architect.
3. **Qualified Professional -** A person who is knowledgeable in the principles and practice of stormwater management and treatment such as a licensed Professional Engineer or a registered landscape architect or other NYSDEC endorsed individuals.
4. **SWPPP Preparer** - Must be a qualified professional. Creates the SWPPP for review and submittal to the SWPTS (as defined in Section 9.30.3). The SWPPP Preparer must certify that the SWPPP was prepared in accordance with RCNY Title 15 Chapter 19.1.
5. **Trained Contractor-** An employee of the Contractor who has received four hours of NYSDEC endorsed training in the past 3-Years, in the principals and practices of proper erosion and sediment control as required. Such employee must have a certificate of training and wallet card showing their certification number.
6. **Owner** – applicant agency.

9.30.3. SCOPE AND METHODS.

The ESC portion of the SWPPP must include ESC and pollution prevention practices. Practices must be designed in compliance with 15 RCNY Chapter 19.1 and the New York State Standards and NYS DEC Blue Book. Within thirty (30) days after the Contract is registered, the Contractor must submit a completed SWPPP to the NYCDDC Office of Environmental & Hazmat Services (OEHS) for review and acknowledgement. After approval by OEHS, the SWPPP must also be submitted to NYCDEP Stormwater Permitting Unit through the Stormwater Permitting and Tracking System (SWPTS) portal by the SWPPP Preparer for approval.

Contractor and SWPPP Preparer must be registered on SWPTS portal at:
https://deppermits.microsoftcrmportals.com/Account/Login?returnUrl=/my-application/

Projects in Municipal Separate Storm Sewer System (MS4) areas require coverage under SPDES General Permit GP-0-20-001 or its successor and a NYCDEP Stormwater Construction Permit. Project areas serviced by a Combined Sewer System (CSS) will only require SWPPP approval from DEP.

The SWPPP must be prepared considering the topography of the subject area. It must also identify potential sources of pollution at the project site that may reasonably be expected to affect the quality of stormwater discharges. The plan must describe the specifics of Post-Construction Stormwater Management Practices (PCSMPs) that are to be used to reduce the pollutants in stormwater discharges, their sequence of implementation and associated design details. All practices included in the SWPPP must be designed in conformance with NYCDEP Stormwater Manual and with the most current version of the Blue Book.

The SWPPP template is available at https://www1.nyc.gov/site/dep/water/stormwater-permits.page.

For the Qualified Professional, the Contractor must retain the services of an independent licensed/certified professional with practical experience in the principles and practices of erosion and sediment control and stormwater management, to prepare and certify a site specific SWPPP, along with all necessary shop drawings. The SWPPP Preparer must verify that the SWPPP has been developed in a manner that will assure compliance with the NYCDEC water quality standards and with the substantive intent of the SPDES General Permit GP-0-20-001 or its successor and 15 RCNY Chapter 19.1.

Construction work must only commence in MS4 areas upon issuance of NYSDEC permit identification number and NYCDEP Stormwater Construction Permit. In addition, an initial inspection must be conducted by the Qualified Inspector certifying that the appropriate control measures specified in the SWPPP have been adequately implemented to the satisfaction of the Resident Engineer (RE) and the OEHS Project Manager (PM). In areas serviced by CSS, Work must not commence until issuance of NYCDEP Stormwater Construction Permit and completion of initial inspection.

The Contractor will be responsible for maintenance of the PCSMPs during the period of construction and the period of guarantee. The Contractor will be responsible for allowing access to DDC and DEP Inspectors during the guarantee period. The Contractor will be responsible for preparing documentation for Stormwater Maintenance Permit Application which includes the final Operation & Maintenance (O&M) Plan with as-built drawings. The maintenance is outlined in Chapter 5 of the NYC Stormwater Manual; however, the Contractor will also be held to maintaining as directed in the design documents and as per the approved Stormwater Construction Permit. Also, should it be needed, the Contractor will be responsible for preparing the required documents for Lead Agency/landowner to use when renewing the maintenance permit every 5 years as outlined in the NYC Stormwater Manual. At the completion of the guaranty period and upon final approval, the City takes over the responsibility for maintenance.

9.30.4. DEVIATIONS AND AMENDMENTS. A SWPPP that deviates from the NYCDEP and NYSDEC technical standards must have a section justifying any non-conformance. The justification must include, but not be limited to, the following:

a. Statement of each deviation from State or City requirements;
b. Statement of the reasons for each deviation and reasons for supporting adopted alternatives;
c. Provide information which demonstrates that the deviation or alternative design is equivalent to the Technical Standards; and,
d. Analysis of the water quality impacts.

In instances when the approved SWPPP is included in the Contract Documents, the Contractor is still responsible for reviewing the SWPPP, updating the Construction team contacts, identifying a need for any major or minor amendments and obtaining OEHS and NYCDEP Stormwater Permitting Unit approvals along with updating coverage under SPDES General Permit.

9.30.5. INSPECTION AND MAINTENANCE. The Trained Contractor must provide regular inspection and maintenance of the ESC measures which were deployed as part of the Contractor's construction process. Site inspection and Maintenance of ESC must be implemented in accordance with Part IV of SPDES General Permit GP-0-20-001 (or most recent version). The Contractor will also be responsible for maintenance of the PCSMPs which are constructed throughout the construction and period of guarantee according to the requirements of Chapter 5 of the NYC Stormwater Manual or the requirements given in the design documents by the Designer. The Qualified Inspector is responsible to inspect the site at least once every 7-days to assure compliance with the approved SWPPP. The Trained Contractor is also responsible for providing access to NYCDEP or City representatives to inspect the measures for proper maintenance..

9.30.6. CERTIFICATION.

The SWPPP (site logbook) must clearly identify a Trained Contractor for the Contractor and all the Subcontractors that will implement each measure identified in the SWPPP. The Trained Contractors identified in the SWPPP who perform professional services at the site must implement the provisions of the plan and provide certification of the SWPPP in accordance with the provisions of the, NYCDEP Stormwater Construction Permit, the Blue Book, and SPDES General Permit GP-0-20-001 or its successor. The

Contractor and all Subcontractors must ensure that updates to construction operations, ESC/PCSMP practices, etc. are communicated/approved by DEP Stormwater Permitting Unit prior to proceeding with implementation. The Lead Agency/landowner is advised that the City must receive yearly certifications that PCSMP's are properly maintained and in support of that certification the Trained Contractor is required to provide a copy of inspections performed.

9.30.7. STABILIZATION.

Stabilization must be implemented in accordance with Part 1.B.1.b of SPDES General Permit GP-0-20-001 or its successor.

9.30.8. CONTRACTOR'S LIABILITY. The Contractor will be liable for any discharge that either causes or contributes to a violation of water quality standards as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York. Should any stormwater runoff from the site violate the water quality standards, the Contractor will be directed to take immediate steps, at the Contractor's own expense, to rectify the situation and prevent any further sediment from entering the storm sewer system.

In the event that pollutants are discharged to the storm sewer system due to the Contractor's negligence, the RE will direct the Contractor to cease any or all construction activities contributing to the release of these pollutants. The Contractor will be held responsible, at the Contractor's own cost, for any and all necessary actions to remedy the damage.

Furthermore, failure of the Contractor and/or their Subcontractor(s) to strictly adhere to any permit requirements will constitute a permit violation that could result in substantial criminal, civil, and administrative penalties.

It is the Contractor's responsibility to pay all associated permit fees which includes the DEP Stormwater Construction Permitting Fees and SPDES permit fees. DEP Stormwater Construction Permits must be renewed every two years by submitting to DEP no less than 30 days prior to the permit expiration date and must be accompanied by a processing fee in the amount of $1,000 dollars in addition to a $2,000 dollar fee per acre of land disturbed or the applicable amount at the time of renewal. NYSDEC SPDES consists of the yearly regulatory fee, the initial authorization fee per acre of land disturbed and per acre of future impervious area. The Contractor is liable for all penalties incurred due to the Contractor's failure to pay these fees on time.

9.30.9. MEASUREMENT.

(A) STORM WATER POLLUTION PREVENTION (Lump Sum)

Payment will be made by lump sum.

Ten percent (10%) of the lump sum price bid will be paid when the SWPPP is "satisfactorily" furnished by the Qualified Professional and accepted by the Department.

Seventy percent (70%) will be paid in proportion to the percentage of construction completion.

Twenty percent (20%) will be paid when the construction and the guaranty period is complete, the Stormwater Maintenance Permit has been granted by NYCDEP, the Notice of Termination (NOT) is filed with NYSDEC, and all SPDES permit fees have been paid. For clarity, the Contractor must include the final twenty percent (20%) in the Contractor's requisition for substantial completion payment; however, this amount will be not payable until completion of the above specified requirements.

(B) STORM WATER POLLUTION PREVENTION (per Month)

The quantity to be measured for payment under this item will be the number of months (to the nearest 1/4-month increment) that the Contractor satisfactorily provides for the Storm Water Pollution Prevention in accordance with these specifications, including winter shut down, holiday embargo, and other work suspension periods for which the Contractor remains responsible for site maintenance. Measurement for

this item will not begin until the NYCDEP Stormwater Construction Permit is granted and actual SWPPP work is started at the site.

9.30.10 PRICE TO COVER.

Payment will be made at the lump sum price or monthly price bid for the item , which includes, but is not be limited to, the cost of furnishing all the labor, materials, fees, permits and testing required to provide and construct all ESC devices in accordance with the approved SWPPP; providing a Qualified Professional/Inspector to design, report, inspect and monitor the Work; comply with NYCDEP and NYSDEC permitting requirements and all necessary incidentals to complete the Work in accordance with the specifications and the directions of the Engineer.

For PCSMPs the payment for inspection and permitting administration will be paid from the lump sum price bid for the item 9.30 Stormwater Pollution Prevention. However, the cost of labor, materials, and maintenance associated with PCSMPs will be paid under the relevant pay item for PCSMP construction.

Payment will be made under:

Item No.	Item	Pay Unit
9.30	STORM WATER POLLUTION PREVENTION	L.S.
9.30 B	STORM WATER POLLUTION PREVENTION	MONTH

SECTIONS 9.31 (NO TEXT)

SECTION 9.32 – Reinforced Silt Fence

9.32.1. DESCRIPTION OF WORK. The Contractor shall furnish all materials, labor, equipment and incidentals necessary to construct a reinforced silt fence, comprised of a construction (limiting) fence, filter fabric, and staked hay bales, as specified herein.

Upon furnishing and installing the approved reinforced silt fence but prior to commencing any other work on-site, the Contractor shall notify the Engineer and arrange for an on-site inspection.

The reinforced silt fence shall be maintained in good condition and repaired as necessary by the Contractor during the construction and post-construction/site stabilization phases as directed by the Engineer.

9.32.2. MATERIALS AND METHODS.

(1) Construction (Limiting) Fence: The construction (limiting) fence shall be a welded wire fence with a minimum height of six (6) feet. The fence shall be constructed of wire fabric fastened to the middle rails and to vertical line posts.

Wire fabric shall be of No. 6 gauge wire with a mesh of approximately 2-inches. The upper edge of the fabric shall be twisted and barbed. The fabric shall be securely fastened to vertical line posts and middle rails by means of ties and spaced not more than 12-inches apart on rails and not more than 14 inches apart on line posts.

Post shall have the following nominal outside diameters and minimum weights per linear foot:

(a) Line posts 2-1/2-inches @ 3.7-lbs.
(b) End and corner posts 3-inches @ 5.8-lbs.
(c) Middle rails 1-5/8-inches @ 2.3-lbs.

The construction (limiting) fence shall be located where directed. The fence shall be adjusted to avoid interference with trees and to maintain access.

Line posts shall be spaced not more than 6-feet on centers. Posts shall be securely set in the ground. Line posts shall extend at least 4-feet below finished grade. Post locations shall be adjusted to avoid tree roots as appropriate.

(2) Filter Fabric: Filter fabric shall be securely attached to the vertical line posts and wire fabric, and shall be situated between the wire fabric and staked hay bales.

The filter fabric shall be purchased and delivered in a continuous roll and cut on-site to the length of the barrier(s) to avoid the use of joints. Dimensions of the roll shall be thirty-six (36) inches by one hundred (100) feet in length. When joints are necessary, filter cloth shall be spliced together only at a line post, with a minimum 6-inch overlap, and securely sealed. The filter fabric shall meet NYSDOT specifications on same, and shall be on the NYSDOT approved list Geotextiles, ”silt fence” application.

A trench shall be excavated approximately 4-inches wide and 4-inches deep along the line of posts and up slope from the barrier. The filter fabric shall be extending into the trench, the trench backfilled, and the soil compacted over the filter fabric.

Siltation fences shall be removed when they have served their useful purpose, but not before the up slope area has been permanently stabilized.

(3) Hay Bales: All hay bales shall be of straw, and shall be standard sized bales. Bales shall be placed in a single row, with ends of adjacent bales tightly abutting one another. Bales shall be placed up slope of the filter fabric, and shall at all times run parallel to the construction (limiting) fence and abut the filter fabric.

All bales shall be fiber-bound. No string bound hay bales are accepted. Hay bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings.

The hay bale barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a depth of 4-inches. After the bales are staked and chinked, the

excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4-inches against the uphill side of the hay bale barrier.

Each bale shall be securely anchored by at least two stakes or steel reinforcing bars driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or reinforcing bars shall be driven deep enough into the ground to securely anchor the bales.

The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between the bales. The Contractor shall scatter loose hay over the area immediately uphill from the straw bale barrier to increase barrier efficiency.

Hay bale barriers shall be removed when they have served their usefulness, but not before the up slope areas have been permanently stabilized.

9.32.3. MAINTENANCE. The reinforced silt fence shall be inspected periodically (at least once per week), or as directed by the Engineer. Any required repairs shall be made immediately.

Filter fabric shall be inspected at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately. Should the fabric decompose or become ineffective prior to the end of the expected usable life while the barrier is still necessary, the fabric shall be replaced promptly.

Hay bales shall be inspected at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits should be removed after each rainfall. They must be removed when the level of deposition reaches approximately one-half foot deep in front of the hay bale. Any sediment deposits remaining in place after the hay bale barrier is no longer required shall be dressed to conform to the existing grade.

9.32.4. MEASUREMENT. The quantity to be measured for payment under this section shall be the total number of linear feet of Reinforced Silt Fence installed and maintained in accordance with the plans, specifications and directions of the Engineer. Each linear foot of Reinforced Silt Fence shall be comprised of the following three elements: a construction (limiting) fence, filter fabric and staked hay bales.

9.32.5. PRICE TO COVER. The contract prices bid per linear foot for reinforced silt fence shall cover the cost of furnishing all labor, materials, equipment, insurance and necessary incidentals required and completing the work in accordance with the Contract Drawings, specifications and the direction of the Engineer.

Payment will be made under:

Item No.	Item Description	Pay Unit
9.32	REINFORCED SILT FENCE WITH STAKED HAY BALES	L.F.

SECTIONS 9.33 THRU 9.94 (NO TEXT)

SECTION 9.95 - Dimensioned Granite Masonry

9.95.1. WORK TO INCLUDE. Under this section, the Contractor shall furnish and install granite block masonry in accordance with the details indicated on the Contract Drawings, specified, or directed by the Engineer.

9.95.2. MATERIALS. Granite masonry, to be cut and installed, shall be free of cracks, seams, or starts which may impair its structural integrity. All exposed surfaces shall be finished as shown on the Contract Drawings. Each color of granite masonry specified shall be uniform and equivalent to that shown on the Contract Drawings.

Prior to Commencement of Work and the ordering of any granite work, the Contractor shall submit for approval of the Engineer the name of the installer proposed for use and upon which the Contractor's bid is based, along with their respective work history experience, and at least one sample of each different color granite masonry that will be used in the project. The installer shall have a minimum of five (5) years of documented experience in setting stone. Each different color of granite masonry shall be a product of a single quarry.

All anchors, cramps, dowels and other anchoring devices shall be Type 304 stainless steel or suitable non-ferrous metal of the types and sizes shown on approved shop drawings.

Mortar for setting and pointing shall be one part Portland cement and one part plastic lime hydrate to three parts of clean, non-staining sand. It shall be mixed in small batches, using clean, non-alkaline water, until it is thoroughly homogeneous, stiff and plastic. After mixing, the mortar shall set for not less than one hour or more than two hours before being used.

Concrete for cradles shall comply with the requirements specified under **Subsection 4.07.3.(B)**.

9.95.3. METHODS. The Contractor shall furnish and submit detailed shop drawings for approval by the Engineer, showing accurately the dimensions, sections, and joining of granite work. Shop drawing shall show the setting number of each piece and each piece shall bear the corresponding number in a non-staining paint.

All granite shall be cut to shape in strict accordance with approved shop drawings. Jointed surfaces shall be cut full square from the face at least two-thirds of the piece thickness. From that point the bed may fall under square not more than 1".

Maximum variation in the dimensions of any piece shall be 1/2 of the specified bed and joint width.

Variation from true plane of flat surfaces shall be determined by use of a 4' foot long straightedge applied in any direction on the surface. The maximum variation from true plane shall not exceed 1/4 of the specified joint width.

Pieces shall be bedded and jointed as shown on the approved shop drawings and bed and joint surfaces shall be cut as follows: 1/4" beds and 1/4" joints.

Moldings, washes and drips shall be constant in profile throughout their length, in strict conformity with details shown on approved shop drawings.

Holes and sinkages for anchors, cramps, and dowels shall be provided in accordance with approved shop drawings.

Lifting clamps of sufficient strength shall be used to handle and install pieces weighing more than 100 pounds.

All setting shall be done by competent stone setters in accordance with approved shop drawings. Before setting, all granite shall be free of ice and frost.

All granite shall be anchored and/or doweled as shown on approved shop drawings, the anchor and dowels being inserted in mortar filled holes provided in the granite and the concrete foundations.

Where dimensioned granite masonry is shown on the Contract Drawings to be set in a concrete cradle, the Contractor shall set the granite in a concrete cradle in accordance with the applicable requirements of **Subsection 4.07.5**.

Except where otherwise specified or directed by the Engineer, all joints and beds previously raked shall be brushed clean and pointed with mortar to a flat cut joint. When thumb print hard, the joints and beds shall be tooled with a round jointer having a diameter 1/8" larger than the width of the joint.

After being pointed the granite work shall be carefully cleaned starting at the top, removing all dirt, excess mortar, stains and other defacements. Stainless steel wire brushes or wool may be used, but the use of other wire brushes, or of acid or other solutions which may cause discoloration is expressly prohibited.

Where shown on the Contract Drawings or directed by the Engineer, the Contractor shall be required to sandblast or chisel "V" cut letters, as specified, in to granite blocks in accordance with full-size details to be furnished by the Engineer.

9.95.4. MEASUREMENT.

(A) DIMENSIONED GRANITE MASONRY

The quantity of Dimensioned Granite Masonry to be measured for payment shall be the number of cubic yards of granite blocks installed, in place, to the satisfaction of the Engineer.

(B) LETTER

The quantity of Sandblasted Letters or "V" Cut Letters, as specified, to be measured for payment shall be the number of units sandblasted or cut, as specified, into the granite masonry to the satisfaction of the Engineer. A unit shall consist of one letter or one symbol. (Example: "ABCDEF" would be measured as six units.)

9.95.5. PRICES TO COVER.

(A) DIMENSIONED GRANITE MASONRY

The unit price bid per cubic yard of Dimensioned Granite Masonry shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals as required to furnish and install dimensioned granite masonry in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

(B) LETTERS

The unit price bid per each Sandblasted Letter or "V" Cut Letter, as specified, shall cover the cost of all labor, materials, plant, equipment, insurance, and necessary incidentals as required to complete the work of inscribing letters into the granite masonry in accordance with the Contract Drawings, the specifications, and the directions of the Engineer.

Payment will be made under:

Item No.	Item	Pay Unit
9.95	DIMENSIONED GRANITE MASONRY	C.Y.
9.95 L	SANDBLASTED LETTERS	EACH
9.95 LV	V- CUT LETTERS	EACH

SECTIONS 9.96 THRU 9.98 (NO TEXT)

SECTION 9.99 - Flashing Arrow Boards

9.99.1. DESCRIPTION. Under this item, the Contractor shall furnish, install, maintain and remove Flashing Arrow Board warning devices and Flashing Arrow Board with Impact Attenuator warning devices made necessary by the Contractor's operations in accordance with the Contract Drawings, the specifications, the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition, and the directions of the Engineer. Flashing arrow boards, with or without impact attenuators, are intended for use as temporary traffic warning devices during construction and obstruction periods. The number required shall be the number necessary in accordance with criteria given below, to satisfactorily guide traffic through the construction. The actual number will depend upon the Contractor's sequence of operations.

9.99.2. MATERIALS.

(A) FLASHING ARROW BOARDS.

Flashing Arrow Boards shall be a transportable self-contained unit with a flashing symbol consisting of flashing amber lights arranged on a panel to form an arrow. The arrow panel shall consist of a 4' x 8' rectangular solid panel finished in non-reflective black. The arrow indication shall cover the entire area of the panel and be composed of lamp units with 5 lamps in the arrowhead and 5 lamps in the shaft. Lamps shall be arranged and controlled to provide the following mode selections: Left Arrow, Right Arrow, Left and Right Arrow, and Caution. In the three directional modes, the lamps in the shaft next to the arrow point shall not illuminate. The caution mode shall consist of four or more lamps arranged in a pattern which will not indicate direction. The rear face of the arrow panel shall contain one or more clear lamps to indicate that the arrow board is operating properly. Arrow panel operating controls shall be mounted in a lockable enclosure.

The arrow shall be visible at a minimum distance of one mile on a bright sunny day or a clear night. The lamps shall flash at a rate of 25 to 40 flashes per minute with the period of flash at least 50 percent of the cycle.

Lamps shall be equipped with an automatic solar cell controlled dimming switch. Activation will be at a level of approximately 5 candelas. The solar cell shall be located and equipped with a delay to prevent undesirable actuation from car lights. The dimming voltage to the lamps shall be manually controllable over a 5 to 12 volts effective range.

Arrow panels shall be trailer mounted, or with the permission of the Engineer, truck mounted. All Flashing Arrow Boards shall be solar powered with battery backup for continuous 24 hour use, unattended. Flashing Arrow Boards also may be energized from utility company service, in addition to the solar power.

(B) FLASHING ARROW BOARD, TRUCK MOUNTED TYPE, WITH IMPACT ATTENUATOR

The Flashing Arrow Board shall be as specified in **Subsection 9.99.2.(A)**, above, except that it shall be mounted on a truck equipped with an impact attenuator, all of which shall be as approved by the Engineer.

Design criteria and submittals for the truck and impact attenuation system shall be as follows:

1) Maximum deceleration rate of 6 G's over (10 milliseconds average) for impacts of 15 degrees or less.
2) Design Vehicle Weight 1800 - 4500 lbs.
3) Design Speed - 60 MPH
4) The impact attenuator and truck shall be of such design so as not to reduce the width of adjacent travel lanes beyond the limits specified on the Contract Drawings.
5) Submittals - The Contractor shall have the manufacturer of the Impact Attenuation System submitted to the Engineer for review and approval of the following material:
   a) A copy of the manufacturer's recommendation for an impact attenuation device meeting the above criteria.
   b) A plan view of the system showing its placement and relationship to the fixed object being protected
   c) Complete set of material specification.

d) Complete installation procedure and repair methods.

9.99.3. METHODS. The Contractor shall provide Flashing Arrow Boards, with or without impact attenuators as specified, on multilane highways whenever a lane is closed to traffic and vehicles are required to merge with traffic in adjacent lanes. One Flashing Arrow Board will be required for each lane closed to traffic regardless of the duration.

Flashing Arrow Boards, with or without impact attenuators, will not be required where they would interfere with the operation controlled by a signal or flagperson. Flashing Arrow Boards will not be required for detours where the number of through traffic lanes is not reduced unless specifically indicated on the Contract Drawings.

Flashing Arrow Boards shall be placed in accordance with the National Manual on Uniform Traffic Control Devices for Streets and Highways (National MUTCD), 2009 or latest Edition. They shall be used as a substitute for the W7 or W7A large arrow sign located nearest the beginning of the taper. The arrow boards shall be mounted so that the base of the panel is at least seven feet above the pavement surface and properly aligned to provide optimum viewing by approaching motorists. Flashing Arrow Boards may be relocated or reoriented on a daily basis or more frequently as ordered by the Engineer.

The Contractor shall be responsible for maintenance, repair and continuous operation of the Flashing Arrow Board until progress of work no longer requires its use, as directed by the Engineer.

9.99.4. MEASUREMENT.

(A) PER EACH Payment for Flashing Arrow Boards or Flashing Arrow Boards with Impact Attenuators, as specified, will be made at the unit price bid per each flashing arrow board actually installed at the job site to the satisfaction of the Engineer.

(B) PER DAY Payment for Flashing Arrow Boards or Flashing Arrow Boards with Impact Attenuators, as specified, will be made at the unit price bid per day that each flashing arrow board is actually installed at the job site to the satisfaction of the Engineer.

(C) PER MONTH Payment for Flashing Arrow Boards or Flashing Arrow Boards with Impact Attenuators, as specified, will be made at the unit price bid per month that each flashing arrow board is actually installed at the job site to the satisfaction of the Engineer.

9.99.5. PRICE TO COVER. The contract price per bid for Flashing Arrow Board or Flashing Arrow Board with Impact Attenuator, as specified, shall include the cost of all materials, equipment, labor, insurance, and incidentals necessary to complete the work as required in a manner approved by the Engineer, in accordance with the Contract Drawings, the specifications and the directions of the Engineer.

Payment will be made for Flashing Arrow Boards or Flashing Arrow Boards with Impact Attenuators only for the initial installation at the job site. No additional payment will be made for: movements of Flashing Arrow Boards to a new location, as required by the Contract Drawings or directed by the Engineer; movements of Flashing Arrow Boards made for the Contractor's convenience; movement of Flashing Arrow Boards at a given location at the end of a work Period and subsequent replacement at the same location at the beginning of the next work period; movement of Flashing Arrow Boards at a given location during a work period and subsequent replacement at the same location during the same work period; or, interchanging of Flashing Arrow Boards between initial installations.

Payment will be made under:

Item No.	Item	Pay Unit
9.99	FLASHING ARROW BOARD	EACH
9.99 A	FLASHING ARROW BOARD WITH IMPACT ATTENUATOR	EACH
9.99 D	FLASHING ARROW BOARD	DAY
9.99 AD	FLASHING ARROW BOARD WITH IMPACT ATTENUATOR	DAY
9.99 M	FLASHING ARROW BOARD	MONTH
9.99 AM	FLASHING ARROW BOARD WITH IMPACT ATTENUATOR	MONTH

APPENDIX A – STAKED STRAW BALES

A. Description of Work

The Contractor shall furnish all materials, labor and equipment necessary to install staked straw bales specified herein and as shown on the detail, including all incidental and appurtenant work required for a complete job.

Upon furnishing and installing the above sedimentation and erosion control device, but prior to commencing any other work on-site, the Contractor shall notify the Department and arrange for an on-site inspection.

The staked straw bales shall be maintained in good condition and repaired as necessary by the Contractor during both construction and post-construction/site stabilization phases as directed by the Engineer.

B. Materials and Methods

1. Straw Bales: All straw bales shall be of straw and shall be standard sized bales. Bales shall be placed in a single row, with ends of adjacent bales tightly abutting one another.

   All bales shall be fiber-bound. No string-bound straw bales are acceptable. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings.

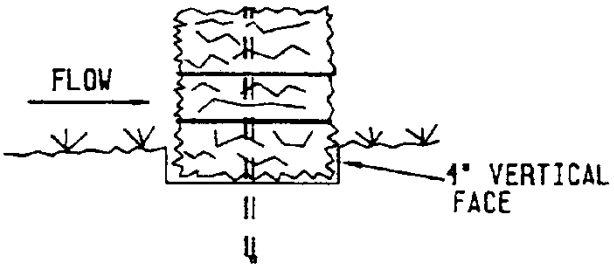
   The straw bale barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a depth of 4 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the straw bale barrier.

2. Stakes: Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes shall be driven deep enough into the ground to securely anchor the bale as shown on the details.

C. Maintenance

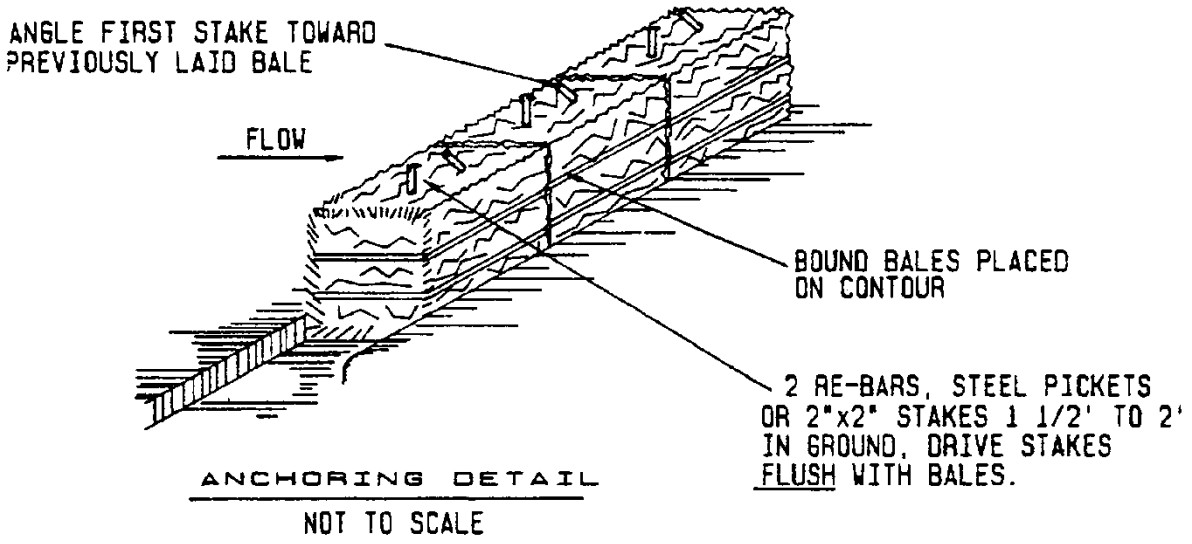
Straw bales shall be inspected at least once per week and immediately after each rainfall of 0.5 inches or greater. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits should be removed after each rainfall and when the level of deposition reaches approximately one-half foot deep in front of the straw bales. Any sediment deposits remaining in place after the straw bale barrier is no longer required shall be dressed to conform to the existing grade.

STAKED STRAW BALES DETAILS



BEDDING DETAIL

DRAINAGE AREA NO MORE THAN 1/4 AC. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

NOT TO SCALE

1. BALES SHALL BE SECURELY ANCHORED IN PLACE BY TWO STAKES DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALES.
2. STAKES SHALL BE DRIVEN TO AN 18" MINIMUM DEPTH OR UNTIL SECURE AS DETERMINED BY NYCDDC FIELD REPRESENTATIVE.

APPENDIX B – REINFORCED SILT FENCE

A Description of Work

The Contractor shall furnish all materials, labor, and equipment necessary to construct reinforced silt fence specified herein and as shown on the detail, including all incidental and appurtenant work required for a complete job. The purpose of the silt fence is to reduce runoff velocity and effect deposition of transported sediment load.

Upon furnishing and installing the approved reinforced silt fence but prior to commencing any other work on-site, the Contractor shall notify the Engineer and arrange for an on-site inspection.

The reinforced silt fence shall be maintained in good condition and repaired as necessary by the Contractor during the construction and post-construction/site stabilization phases as directed by the Engineer.

B. Materials and Methods

The Reinforced Silt Fence shall consist of a construction (limiting) fence with filter fabric and straw bales constructed as shown on the details.

1. Construction (Limiting) Fence: The construction (limiting) fence shall be a welded wire fence with a minimum height of six (6) feet. The fence shall be constructed of wire fabric fastened to the middle rails and to vertical line posts.

Wire fabric shall be of No. 6 gauge wire with a mesh of approximately 2 inches. The upper edge of the fabric shall be twisted and barbed. The fabric shall be securely fastened to vertical line posts and middle rails by means of ties and spaced not more than 12 inches apart on rails and not more than 14 inches apart on line posts.

Post shall have the following nominal outside diameters and minimum weights per linear foot;

(a) Line posts 2 1/2 inches @ 3.7 lbs.

(b) End and corner posts 3 inches @ 5.8 lbs.

(c) Middle rails 1 5/8 inches @ 2.3 lbs.

The construction (limiting) fence shall be located as indicated on the SWPPP and as directed by the Resident Engineer. The fence shall be adjusted to avoid interference with trees and to maintain access to houses.

Line posts shall be spaced not more than 6 feet on centers. Posts shall be securely set in the ground. Line posts shall extend at least 4 feet below finished grade. Post locations shall be adjusted to avoid tree roots as appropriate.

2. Filter Fabric: Filter fabric shall be securely attached to the vertical line posts and wire fabric, and shall be situated between the wire fabric and staked hay bales.

The filter fabric shall be purchased and delivered in a continuous roll and cut on-site to the length of the barrier(s) to avoid the use of joints. Dimensions of the roll shall be thirty-six (36) inches by one hundred (100) feet in length. When joints are necessary, filter cloth shall be spliced together only at a line post, with a minimum 6-inch overlap, and securely sealed. The filter fabric shall meet NYSDOT specifications and shall be fabric MUTUAL MISF 1776 as manufactured by Mutual Industries Inc., 707 W. Grange Street, Philadelphia, PA 19120; Tel # (215) 927-6000; Fabric # GTF190 as manufactured by Linq Industrial Fabric, 2550 West 5th North Street, Sommerville, S. Carolina, 29483, Tel # (800) 543-9966; Fabric # 2130 as manufactured by Propex, 260 Bluffs, Austell, Georgia, 30168, Tel # (770) 944-4579, or an approved equivalent.

A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upslope from the barrier. The filter fabric shall be extending into the trench, the trench backfilled, and the soil compacted over the filter fabric.

Siltation fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

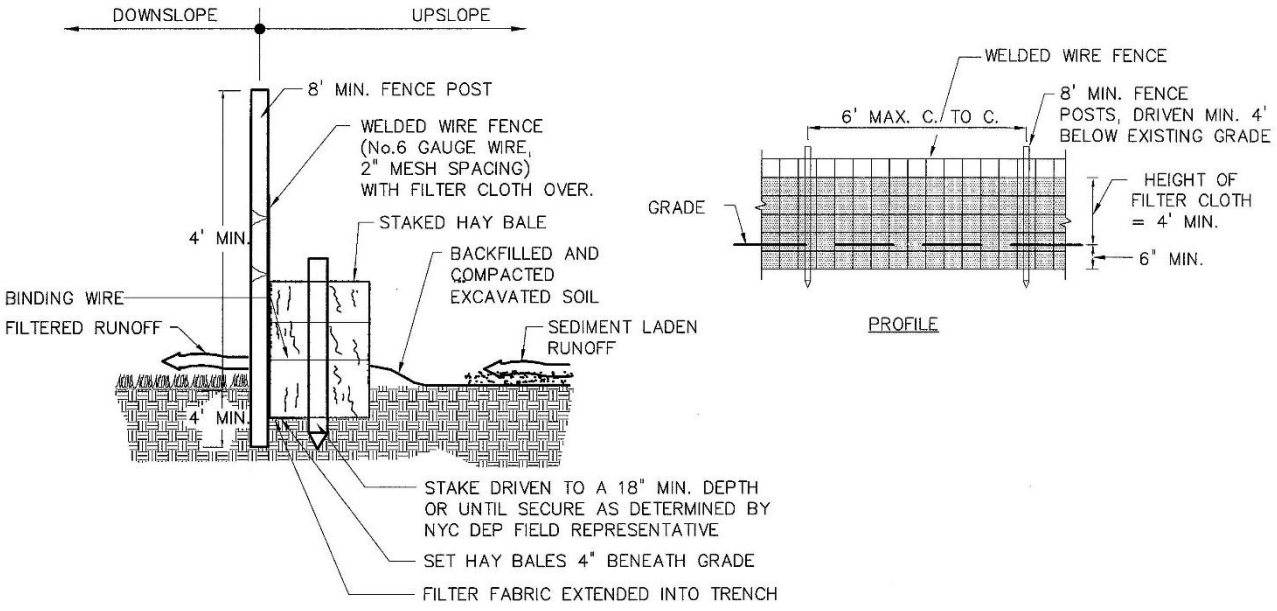
3. Straw Bales: Straw bales shall be as specified in the detailed specification in Appendix A- staked Straw Bales. Bales shall be placed upslope of the filter fabric, and shall at all times run parallel to the construction (limiting) fence and abut the filter fabric.

Straw bale shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

C. Maintenance

The reinforced silt fence shall be inspected periodically (at least once per week), or as directed by the Engineer. Any required repairs shall be made immediately.

Filter fabric shall be inspected at least once per week and immediately after each rainfall event of 0.5 inches or greater. Any required repairs shall be made immediately. Should the filter fabric decompose or become ineffective prior to the end of the expected usable life while the barrier is still necessary, the fabric shall be replaced promptly.



CONSTRUCTION SPECIFICATIONS

1. WELDED WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 12" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED REGULARLY AND MATERIAL REMOVED AS SPECIFIED.

REINFORCED SILT FENCE

NOT TO SCALE

APPENDIX C – TEMPORARY SEDIMENT TRAP WITH FILTER

A. Description of Work

The Contractor shall furnish all materials, labor, and equipment necessary to construct the Sediment Trap specified herein and as shown on the detail, including all incidental and appurtenant work required for a complete job. A Sediment Trap is typically intended to serve a drainage area of three acres or less. Therefore, it is not as large as a sediment basin.

Upon furnishing and installing the approved sediment trap but prior to commencing dewatering operations, the Contractor shall notify the Engineer and arrange for an on-site inspection.

The sediment trap shall be maintained in good condition and repaired as necessary by the Contractor during the construction and post-construction/site stabilization phases as directed by the Engineer.

B. Materials

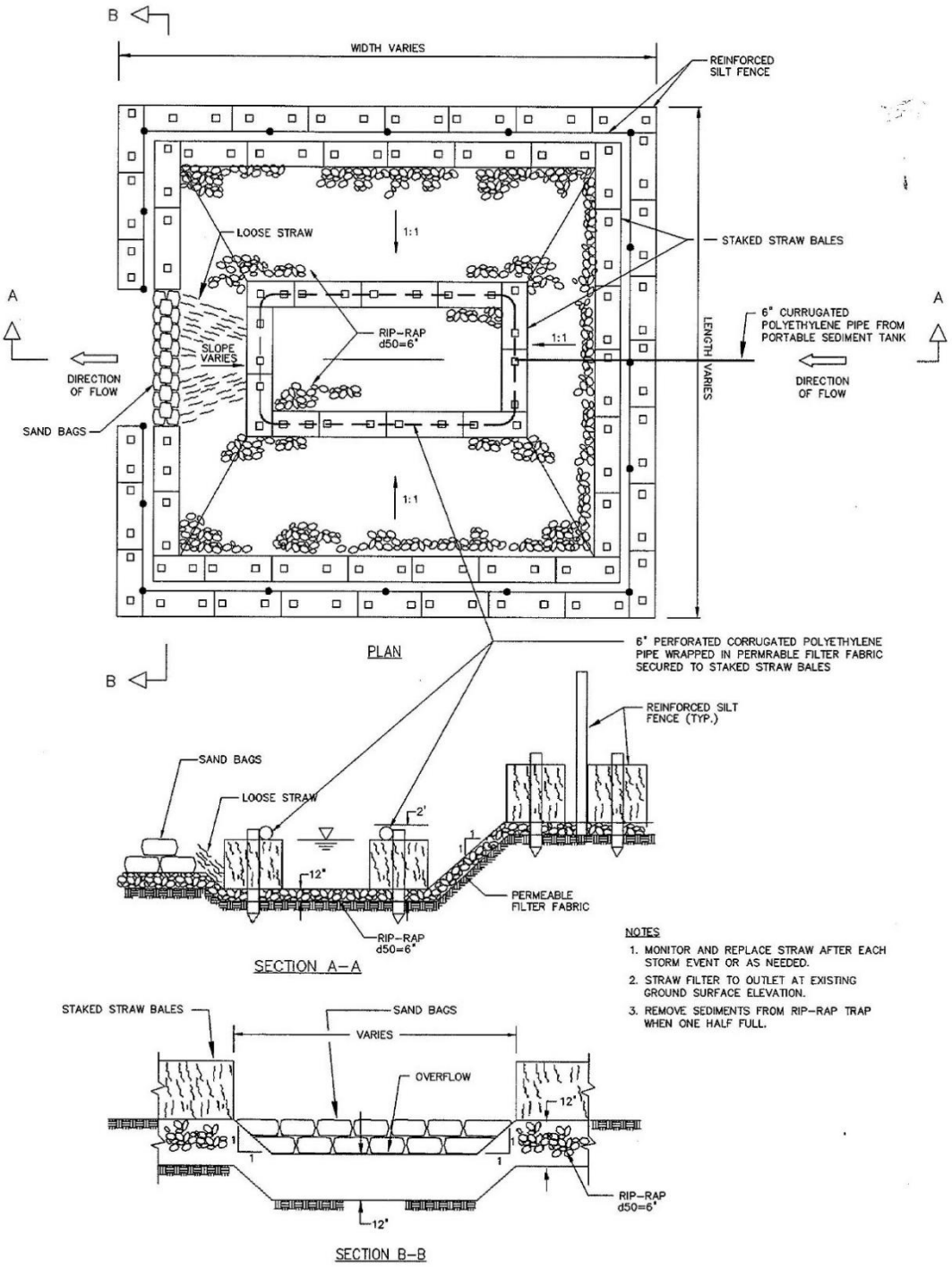
1. Rip-Rap: The rip-rap shall have a median rip rap diameter (d50) of 6".
2. Staked Hay Bales. All Straw Bales shall be of straw and shall be standard sized bales as shown on the detail in Appendix A.
3. Perforated Corrugated Pipe. A six-inch diameter pipe shall be used as shown on the detail.
4. Sand bags. The bags shall be of coarse heavy woven fabric (burlap). The sand shall meet ASTM C33 concrete specifications.
5. Filter Cloth. The filter cloth used for wrapping the corrugated pipe shall meet the following specifications:

Property	Test Method	Unit	Criteria
Material	Non-woven geotextile fabric		
Unit Weight	ASTM D1777	oz./sq. yd.	4.3 (min)
Flow Rate	Falling Head Test	gpm/sq.ft.	120 (min)
Puncture	ASTM D751	lbs.	60 (min)
Thickness		in.	0.8 (min)
UV Resistance	ASTM D4355	%	90 (min)

6. Reinforced Silt Fence as described in Appendix B.

C. Construction Method

1. The area under embankment shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared.
2. Place the filter cloth in the bottom of the pool.
3. Place the rip- rap over the cloth as shown on the detail.
4. Place the straw bales and sand bags in a single row, with ends of adjacent bales and bags tightly abutting one another.
5. Wrap the perforated, corrugated pipe with the filter cloth and place it where is shown on the detail.
6. The structure shall be inspected after each rain and repaired as needed.



TEMPORARY SEDIMENT TRAP (TYP.)

NOT TO SCALE

SPEC. SECT. 7.506

APPENDIX D – TEMPORARY SEDIMENT FILTER

A. Description of Work

The Contractor shall furnish all materials, labor and equipment necessary to construct the sediment filter specified herein and as shown on the detail. A sediment filter is intended as a small device to "polish" sediment laden water before final discharge. Therefore, it may be used in conjunction with larger erosion control devices such as a sediment trap and sediment basin.

Upon furnishing and installing the approved sediment filter but prior to commencing dewatering operations, the Contractor shall notify the Engineer and arrange for an on-site inspection.

The sediment filter shall be monitored in good condition and repaired as necessary by the Contractor during the construction and post-construction/site stabilization phases directed by the Engineer.

B. Materials

1. Reinforced Silt Fence. The fence shall be as specified in this Detailed Specification in Appendix B - Reinforced Silt Fence.

2. Straw Bales. All Straw bales shall be standard sizes bales as shown in the detail in Appendix A.

3. Crushed Stones. Stones shown on the detail shall conform to the following gradation and shall be compacted to 98 percent density as determined by ASTM D698.

	Percentage of Dry Weight
Sieve Size	Passing Designated Sieve Size
1"	100
1/2"	90-100
1/4"	0-15

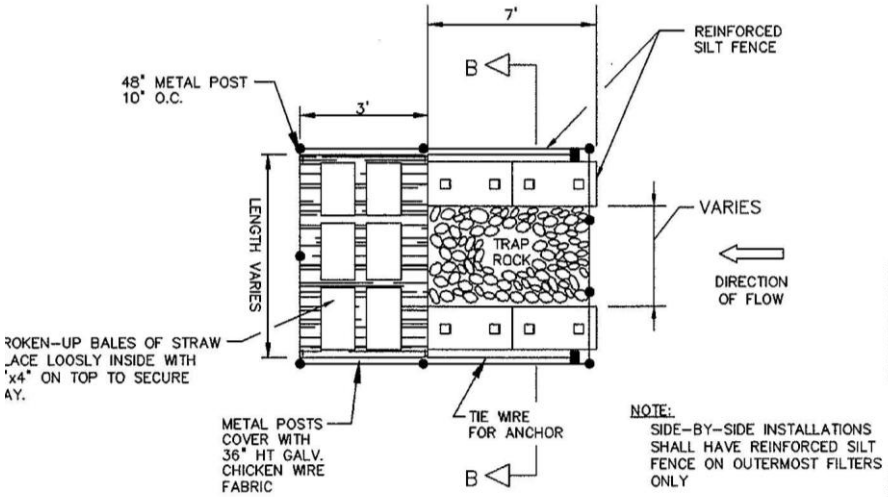
C. Construction Method

1. Clear the area where the sediment filter is to be constructed.

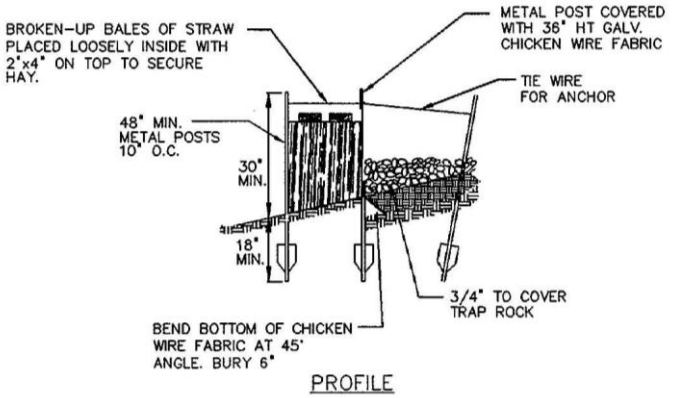
2. Place the crushed stone as shown on the detail.

3. Place the straw bales in a single row, with ends of adjacent bales tightly abutting one another as shown on the detail.

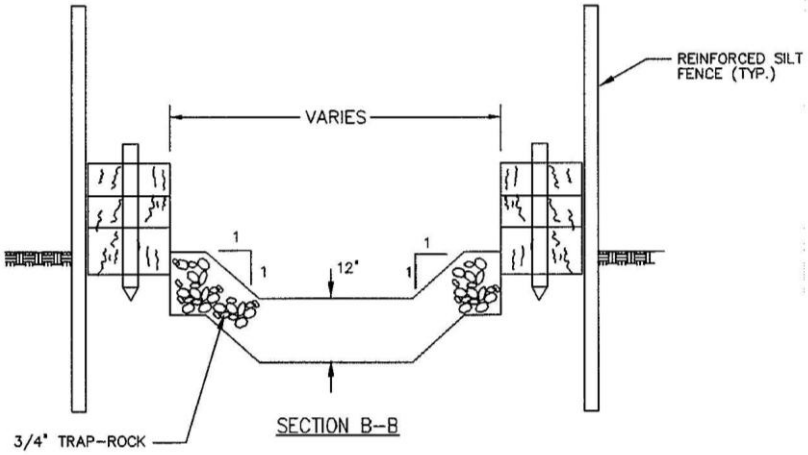
4. The structure shall be inspected after each rainfall and repaired as needed



PLAN



PROFILE



SECTION B-B

TEMPORARY SEDIMENT FILTER (TYP.)

NOT TO SCALE

SPEC. SECT. 7.507

APPENDIX E – PORTABLE SEDIMENT TANK

A. Description of Work

The Contractor shall furnish all materials, labor and equipment necessary to install the portable sediment tank specified herein and as shown on the detail. A sediment tank is a compartmented tank container through which sediment laden water is pumped to trap and retain the sediment.

The purpose of the portable sediment tank is to trap and retain sediment prior to pumping the water to drainageways, adjoining properties and rights-of-way below the sediment tank site. The sediment tank shall be located for ease of cleanout and disposal of the trapped sediment and to minimize the interference with construction activities and pedestrian traffic. The temporary relocation of the tank(s) during clean-out shall be included in the cost of this item. Relocating the tank(s) from one work area to another before, during and after construction shall be included in the cost of this item.

B. Design Criteria

The following formula should be used in determining the storage volume of the sediment tank: pump discharge (gpm) x 16 = cubic foot storage.

Certified pump curves are to provide to ensure that the pump provided can meet the hydraulic requirements.

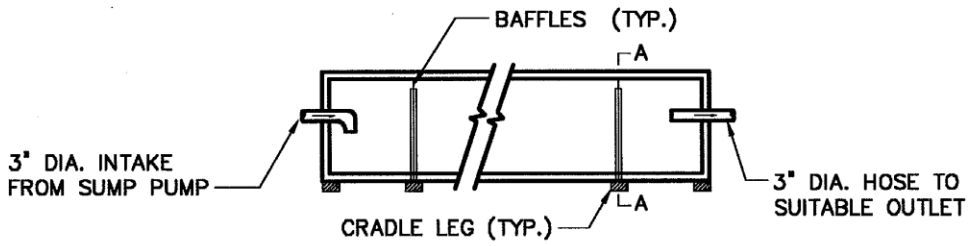
C. Tank Specifications

The Contractor shall use steel containers or a steel drum to provide that the volume requirements necessary.

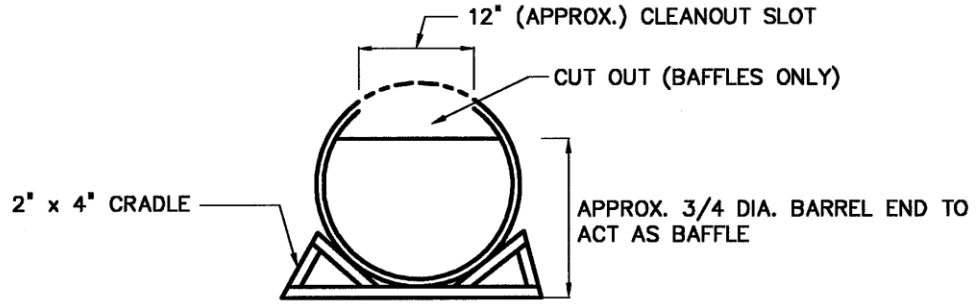
Steel drums previously used for oil storage are not acceptable.

D. Maintenance

The Contractor shall be responsible to clean out the sediment tank when one third (1/3) is filled with silt. All sediment collected in the tank shall be disposed of off-site.



LONGITUDINAL SECTION



GENERAL NOTES
1. CLEAN OUT THE SEDIMENT TANK WHEN ONE THIRD (1/3) FILLED WITH SILT.
2. ALL SEDIMENT COLLECTED IN THE TANK SHALL BE DISPOSED OF OFF SITE AT AN APPROVED LOCATION.

SECTION A–A

PORTABLE SEDIMENT TANK

NOT TO SCALE

SPEC. SECT. 7.510

APPENDIX F – STORM DRAIN INLET PROTECTION MEASURES

A. Description of Work

The Contractor shall furnish all materials, labor and equipment necessary to install the storm drain - inlet protection measures. Storm drain inlet protection measure consists of a sediment filter, sediment control device or an excavated impounding area around a storm drain drop inlet, curb inlet or catch basin. The purpose of the storm drain - inlet protection measures is to prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

B. Conditions Where Practice Applies

Where storm drain inlets are or are to be made operational before permanent stabilization of the corresponding disturbed drainage area.

C. Planning Considerations

Storm sewers which are, or become operational prior to stabilization of the associated drainage areas can convey large amounts of sediment to natural drainageways. In case of extreme sediment loading, the storm sewer itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets or capturing it in the storm drain inlet.

This practice contains several types of inlet filters and traps which have different applications dependent upon site conditions and type of inlet. Other innovative techniques for accomplishing the same purpose are encouraged, but only after specific plans and details are submitted to and approved by the Engineer, and NYCDDC Field Representatives.

Care shall be taken when choosing a specific type of inlet protection. Field experience has shown that inlet protection which causes excessive ponding in an area of high construction activity may become so inconvenient that it is removed or bypassed, thus transmitting sediment-laden flows unchecked. In such situations, a structure with an adequate overflow mechanism should be utilized.

The best way to prevent sediment from entering the storm sewer system is to stabilize the site as quickly as possible, preventing erosion and stopping sediment at its source. Stone is utilized as the chief ponding/filtering agent in most of the inlet protection types described in this specification. The various types of "coarse aggregates" which are depicted are able to filter out sediment mainly through slowing down flows directed to the inlet by creating an increased flow path for the stormwater (through void space in the respective stone). The stone filtering medium by no means slows stormwater flow rate as does filter cloth and therefore cannot provide the same degree of filter efficiency when smaller silt and clay particles are introduced into stormwater flows. However, as mentioned earlier, excessive ponding in busy areas adjacent to stormwater inlets is in many cases unacceptable - that is why stone must be utilized with many installations.

Fortunately, in most instances, inlet protection utilizing stone should not be the sole control measure. At the time that storm sewer inlet and associated appurtenances become operational, areas adjacent to the structures are most likely at final grade or will not be altered for extended periods; this is the time when temporary seeding and other appropriate controls should be implemented to enhance sediment-loss mitigation. In addition, by varying stone sizes used in the construction of inlet protection, a greater degree of sediment removal can be obtained. As an option, filter cloth can be used with the stone in these devices to further enhance sediment removal. Notably, the potential inconvenience of excessive ponding must be examined with these choices, especially the latter. In addition to sediment filtering options a sediment control device can be installed. A sediment control device is installed inside the storm drain thereby catching sediment that was not removed by the inlet filters while allowing water to pass through. A sediment control device is a secondary device to be used in conjunction with other storm drain inlet protection.

D. Design Criteria

1. The drainage area shall be no greater than 1 acre.
2. The inlet protection device shall be constructed in a manner that will facilitate cleanout and disposal of trapped sediment and minimize interference with construction activities.
3. The inlet protection devices shall be constructed in such a manner that any resultant ponding of stormwater will not cause excessive inconvenience or damage to adjacent areas or structures.
4. For the inlet protection devices which utilize stone as the chief ponding/filtering medium, a range of stone sizes is offered; New York State Department of Transportation (NYSDOT) #2 or #3A Coarse Aggregate shall be used (See NYSDOT Specification Section 703-02).
5. In all designs which utilize stone with a wire-mesh support as a filtering mechanism, the stone can be completely wrapped with the wire mesh to improve stability and provide easier cleaning.
6. Filter Fabric is added to any of the devices which utilize "coarse aggregate" stone to significantly enhance sediment removal. The fabric shall be secured between the stone and the inlet (on wire-mesh if it is present). As a result of the significant increase in filter efficiency provided by the fabric, a larger range of stone sizes NYSDOT #3 or #4A Coarse Aggregate may be utilized with such a configuration. The larger stone will help keep larger sediment masses from clogging the cloth. Notably, significant ponding may occur at the inlet if filter cloth is utilized in this manner.
7. Sediment Control Device is a woven polypropylene bag which is inserted into a catch basin or drop inlet to capture sediment. The sediment control devices are equipped with lifting loops or lugs to allow the devices to be removed, cleaned and reinserted back into catch basin or drop inlet.

E. Construction Specifications

1. Gravel and Wire Mesh Drop Inlet Sediment Filter

   a. Wire mesh shall be laid over the drop inlet so that the wire extends a minimum of 1 foot beyond each side of the inlet structure. Wire mesh with 2-inch openings shall be used. If more than one strip of mesh is necessary, the strips shall be overlapped.
   b. Coarse aggregate shall be placed over the wire mesh as indicated on Plate B. The depth of stone shall be at least 12 inches over the entire inlet opening. The stone shall extend beyond the inlet opening at least 18 inches on all sides.
   c. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and/or replaced.

Note: This filtering device has no overflow mechanism; therefore, ponding is likely especially if sediment is not removed regularly. This type of device must never be used where overflow may endanger an exposed fill slope. Consideration should also be given to the possible effects of ponding on traffic movement, nearby structures, working areas, adjacent property, etc.

2. Block and Gravel Curb Inlet Sediment Filter

   a. Two concrete blocks shall be placed on their sides abutting the curb at either side of the inlet opening.
   b. A 2-inch x 4-inch stud shall be cut and placed through the outer holes of each spacer block to help keep the front blocks in place.

c. Concrete blocks shall be placed on their sides across the front of the inlet and abutting the spacer blocks as depicted in Plate A.
d. Wire mesh shall be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Wire mesh with 2-inch openings shall be used.
e. Coarse aggregate shall be piled against the wire to the top of the barrier as shown in Plate A.
f. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the blocks, cleaned and/or replaced.

Sediment Control Devices

The sediment control device shall be manufactured from woven polypropylene and sewn using high strength nylon thread.

The sediment control device should be sized to fit a standard catch basin or drop inlet.

The sediment control device should include dumping straps and a visual means to indicate when the device needs to be emptied.

The sediment control device should be manufactured by ACF Environmental Inc. (800) 448-3636; Price and Company (800) 248- 8230 and Transpo Industries (914) 636-100 or approved equivalent.

The fabric shall be woven polypropylene fabric with the following properties:

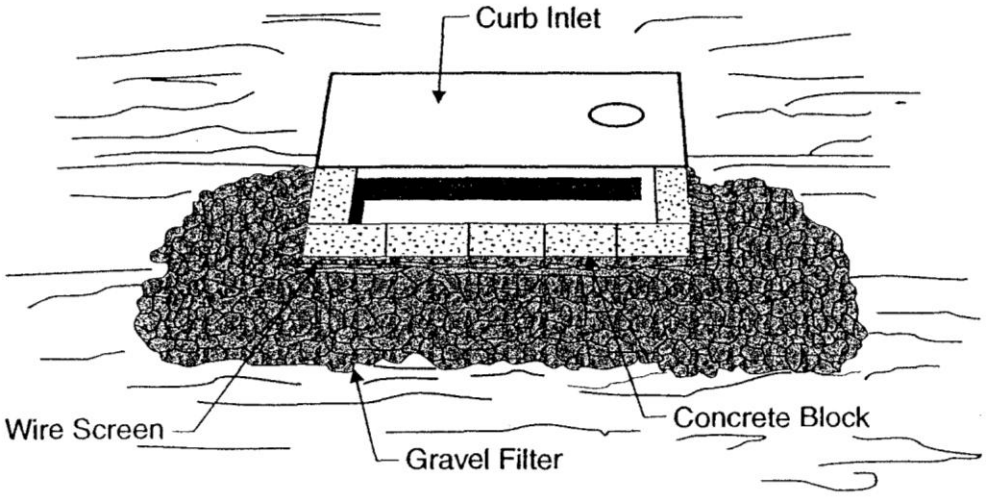
Property	Test Method	Test Result
Grab Tensile	ASTM D-4632	265 lb to 300 lbs.
Grab Elongation	ASTM D-4632	20%
Puncture	ASTM D-4833	120 lbs.
Min. Mullen Burst	ASTM D-3786	420 lbs
Min. Trapezoid Tear	ASTM D-4533	120 lbs.
Min. UV Resistance	ASTM D-4355	80%
Apparent Opening	ASTM D-4751	20 to 40 US Sieve
Min. Flow Rate	ASTM D-4491	40 Gal/Min/Ft^2
Permittivity	ASTM D-4491	0.55 $sec.^{-1}$

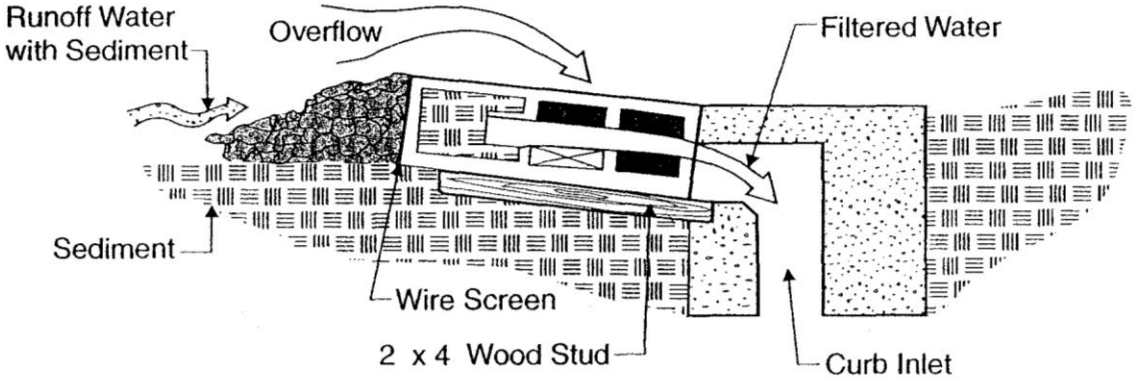
F. Maintenance

1. The structure shall be inspected after each rain and repairs made as needed.
2. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.
3. Structures shall be removed and the area stabilized when the remaining drainage area has been properly stabilized.
4. To empty the sediment control device place a #8 rebar through the lifting straps and lift out of the catch basin. This will lift and turn the device inside out thereby dumping its contents. Clean out and wash with water. Reinstalled when clean. Dispose sediment off site.

Plate A

Block and Gravel Curb Inlet Sediment Filter

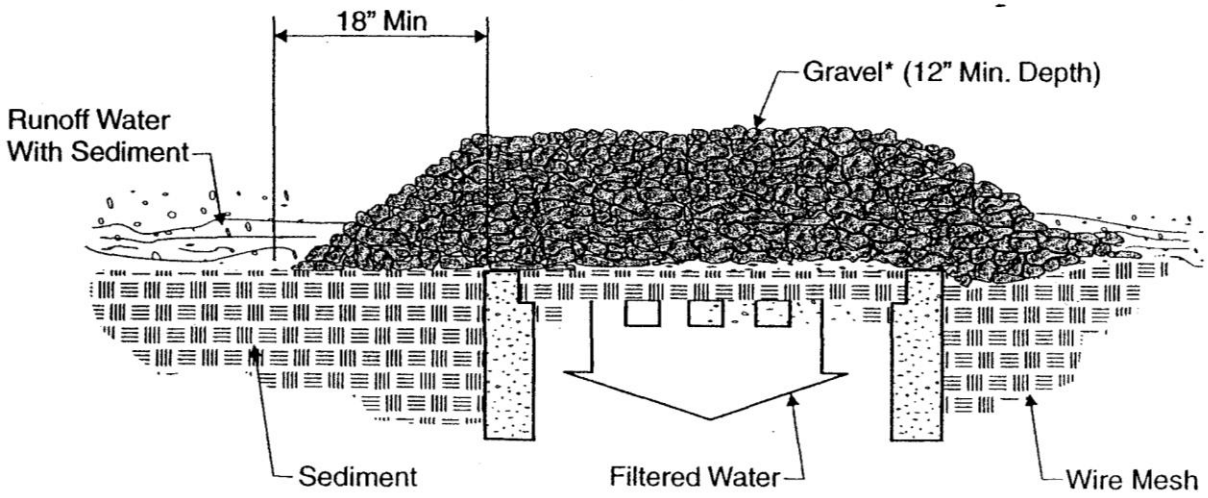




Gravel shall be NYSDOT #2 or #3A Coarse Aggregate

Plate B

Gravel and Wire Mesh Drop Inlet Sediment Filter



Gravel shall be NYSDOT #2 or #3A Coarse Aggregate

APPENDIX G – TEMPORARY SEEDING FOR DISTURBED AREAS

A. Description of Work

The Contractor shall furnish all materials, labor and equipment necessary to apply the temporary seeding mixture to stabilize all areas to be cleared and graded unless they are to be landscaped or planted in less than thirty 30 days.

B. Materials

1. Seed Mixture. Temporary seeding shall be Ryegrass (annual or perennial) at a rate of 30 lbs per acre of 0.7 lbs per 1,000 square feet. If area is seeded during the months of October and November, certified “Aroostook” winter rye (cereal rye) shall be used at a rate of 100 lbs. per acre of 2.5 lbs per 1,000 square feet.
2. Temporary seeding shall be made within 24 hours of construction/disturbance. If not, the soil must be scarified prior to seeding.
3. Method of seeding – seed shall be evenly applied with broadcast seeder, drill or cultipack seeder.
4. If temporary seeding is made under favorable soil and site conditions during the optimum seeding dates (March 21 – May 20 or August 25 – October 15) mulch is not required. Any temporary seeding outside of those dates shall be mulched with salt hay mulch at a rate of 2 tons per acre (100-200 bales/acre).
5. Any area that fails to establish vegetative cover adequate to prevent rill erosion shall be reseeded as soon as such areas are identified.

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