APPENDIX A

TDA AND GREEN INFRASTRUCTURE ASSET ID NAMING CONVENTIONS

Environmental Protection

No. 1: TDA Naming Convention

Onsite TDAs must have consistent naming within project sites. Each TDA ID corresponds to a unique TDA on the site.

The TDA name is a combination of: **Site ID + Number of TDAs** on the site

1. **The Site ID:** Used to reference the site where the Green Infrastructure (GI) is being installed. The Site ID Naming convention follows:
    - **DOE**: 4-character Building ID

      Example: For the school P.S. 123, the DOE given Building ID is K123, so the Site ID for the GI is also K123.

    - **Parks**: 4-character DPR ID

      Example: For XYZ Parks, the DPR ID is Q041, so the Site ID for the GI is also Q041.

    - **NYCHA**: First 4 letters of the site name

      Example: For the NYCHA property Jones Houses, the Site ID for the GI is JONE.

2. **Number of TDAs**: Since most sites will have more than one TDA for the Green Infrastructure, each TDA ID will also have the following numbering system:
    - 01: The first TDA on the site
    - 02: The second TDA on the site
    - 03: The third TDA on the site

      The numbering system will follow consecutively (04, 05, etc.).

TDA ID Examples:

DOE: For the school P.S. 123, there are three TDAs.

1. The TDA IDs: K123-01, K123-02, K123-03

Parks: XYZ Parks in Queens, there are two TDAs.

1. The TDA IDs: Q041-01, Q041-02

NYCHA: At Jones Houses, there are 10 TDAs.

1. The last three TDA IDs are: JONE-08, JONE-09, JONE-10

<u>GI ID Naming Convention</u> (Appendix A)

For each TDA, there will be at least one corresponding GI practice. Each proposed GI practice will have a unique ID connected to their TDA.

The GI ID is a combination of: **TDA ID + GI Practice Type + Number of GI Practice Types for each TDA.**

1. **The TDA ID (see above)**

2. **GI Practice Type:** The consultant, along with DEP and the site agency's guidance, will select the most appropriated GI practice for the site. The reference table below should be used for GI practice naming.

GI Practice Type*	2-Letter Design GI Type Identifier	
Rain Garden (also referred to as raingardens, bioretention,	RG	
Permeable Pavement (including porous concrete, permeable pavers, porous asphalt, etc.)	PP	
Synthetic Turf	ST	
Subsurface Practice (also referred to as underground storage, storm chambers, etc.)	SP (design)	

**for other GI Practice Types, contact DEP*

3. **Letter Suffix for GI Practices at each TDA:** Letter suffixes will be used to distinguish GI practices of the same Type within the same TDA. The first GI practice of a certain type will begin with "a" and will follow consecutively. See examples below.

<u>GI ID Examples:</u>

DOE: The first of three TDAs at P.S. 123 containing a synthetic turf field (DOE ID# K123). The second TDA contains permeable pavement. The third TDA at P.S. 123 contains a rain garden and permeable pavement (managing different impervious areas).

1. The GI ID for the GI practice within TDA K123-01 is **K123-01STa**.
2. The GI ID for the GI practice within TDA K123-02 is **K123-02PPa.**
3. The GI IDs for the GI practices within TDA K123-03 are **K123-03PPa** and **K123-03RGa**.

Parks: The second of four TDAs at XYZ Park in Queens with three permeable pavement practices (each managing different impervious areas) (DPR ID# Q041).

1. The GI IDs for the GI practices within TDA Q041-02 are **Q041-02PPa, Q041-02PPb, Q041-02PPc.**

NYCHA: 3. The sixth of ten TDAs at NYCHA's Jones Houses that is managed by subsurface retention (no agency site ID#).

1. The GI ID for the GI practice within TDA JONE-06 is: **JONE-06SPa**.

APPENDIX B

SUMMARY OF H&H ANALYSIS SPREADSHEET AND DRAINAGE REPORT OUTLINE

Summary of H & H Analysis

Location	Tributary Drainage Area		Flow in	Existing Connection		If Yes, Q in (cfs)*		Soil Permeability	Comments or Remarks
	(SF)	(Acres)	(cfs)	Yes	No	Ext. Q	Prop. Q	(in/hr)	

Notes: Ext. Q = Flowrate in site connection under existing conditions
Prop. Q = Flowrate in site connection under proposed (after GI implementation) conditions
*Ext. Q and Prop. Q are only required when capturing street flow

APPENDIX C

GREEN INFRASTRUCTURE PRACTICE STANDARDS (DESCRIPTIONS AND TYPICAL DETAILS)

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS

ONSITE GREEN INFRASTRUCTURE: GENERAL DESIGN GUIDELINES

UPDATED: MAY 2019

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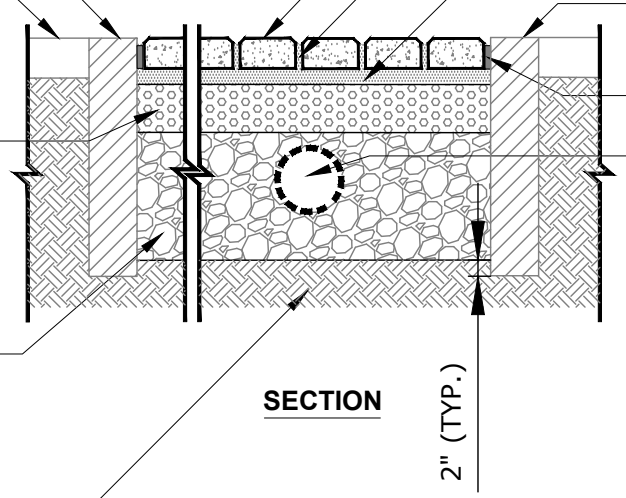
GENERAL NOTES:

1. THESE DRAWINGS ARE INTENDED AS AN EXAMPLE ONLY, AS AN ENGINEERING AID, AND ARE NOT TO BE USED FOR CONSTRUCTION.
2. ALL DESIGN ELEMENTS ARE DEPENDENT ON SOIL CONDITIONS, INFILTRATION RATES, STORAGE VOLUME REQUIREMENTS, WATER QUALITY REQUIREMENTS, AND OTHER PROJECT-SPECIFIC CONSTRAINTS.
3. ALL COARSE AGGREGATE MATERIAL SHALL BE CRUSHED ANGULAR STONE, DOUBLE-WASHED, CLEAN, AND FREE OF ALL FINES.
4. TWO OBSERVATION WELLS SHALL BE INCLUDED FOR ALL PRACTICES THAT INCLUDE A STONE STORAGE LAYER. OBSERVATION WELLS SHALL BE LOCATED NEAR THE LONGITUDINAL CENTER OF THE SYSTEM, CAPPED AND FLUSH WITH THE GROUND SURFACE, AND ANCHORED TO THE SUBSURFACE SYSTEM.
6. THE MINIMUM DEPTH FROM THE BOTTOM OF THE PRACTICE TO THE TOP OF BEDROCK OR THE SEASONALLY HIGH GROUNDWATER TABLE IS 3 FEET.
7. ALL PROPOSED GI PRACTICES MUST NOT BE INSTALLED ON SURFACE SLOPES GREATER THAN 5% AND THE SUBSURFACE BASE OF THE GI MUST BE SET LEVEL TO PROMOTE INFILTRATION, UNLESS OTHERWISE APPROVED BY DEP.
8. FOR ADDITIONAL INFORMATION ON THE TREATMENT AND REDUCTION OF THE TOTAL WATER QUALITY VOLUME (WQ_V) IN SEPARATELY SEWERED OR DIRECT DRAINAGE AREAS, REFER TO THE NEW YORK STATE STORMWATER MANAGEMENT DESIGN MANUAL.



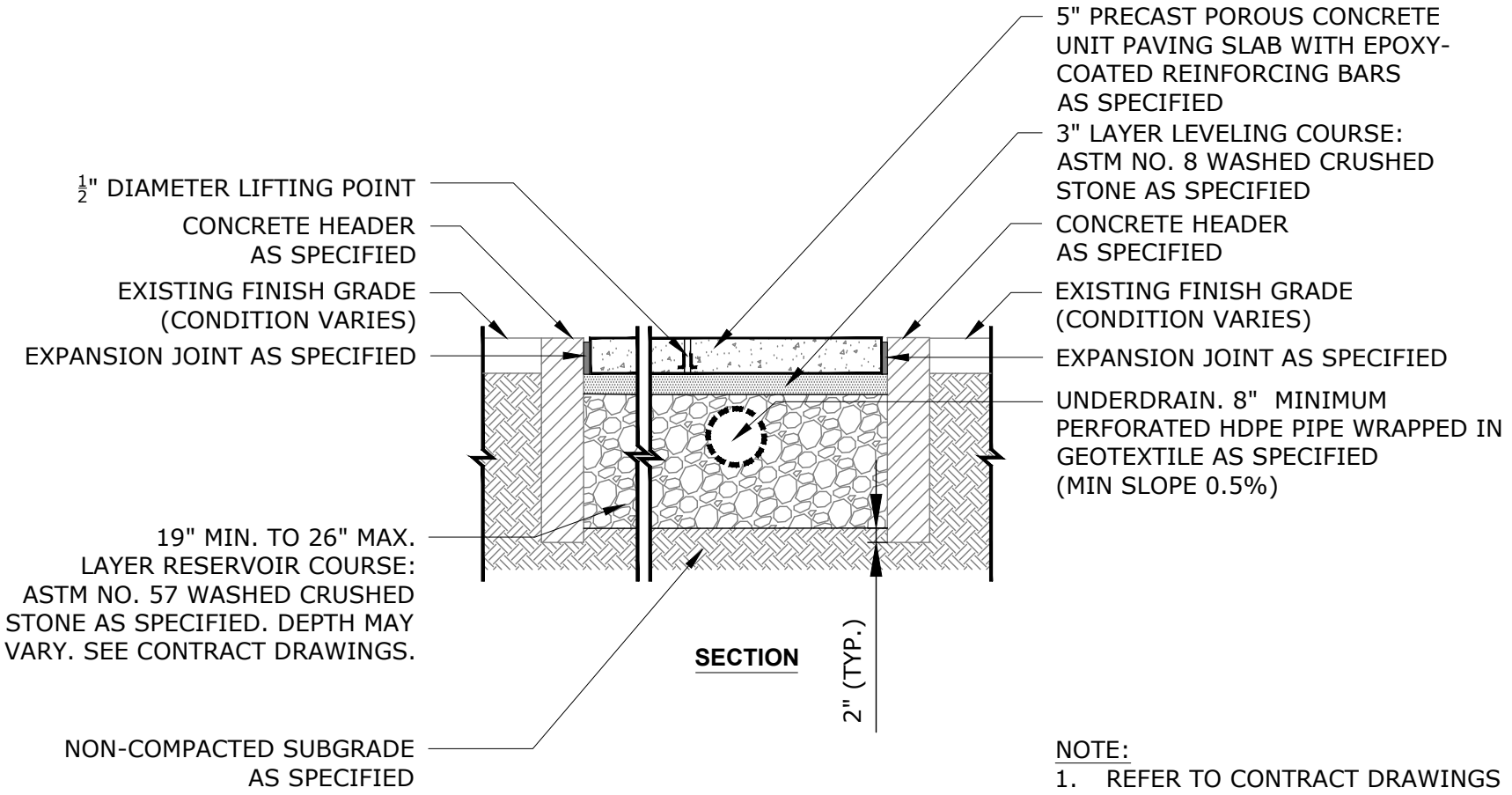
SECTION

PERMEABLE PAVERS ON AGGREGATE BASE

DETAIL	1
NTS	-

NOTE:

1. REFER TO CONTRACT DRAWINGS FOR SIZE, REINFORCEMENT, AND COMPACTION REQUIREMENTS FOR CONCRETE HEADER.
2. REFER TO MANUFACTURER REQUIREMENTS FOR TYPE AND DEPTH OF LEVELING COURSE AND RESERVOIR COURSE.



PRECAST POROUS CONCRETE ON AGGREGATE BASE

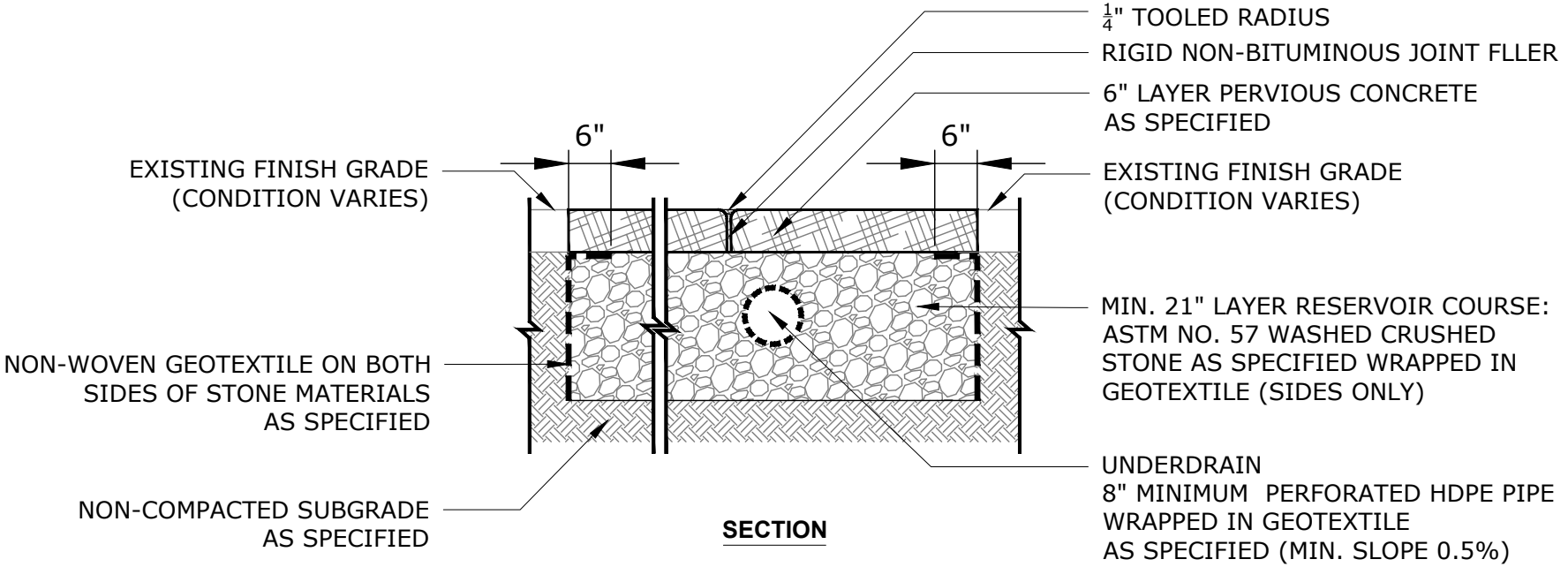
DETAIL	2
NTS	-

NOTE:

1. REFER TO CONTRACT DRAWINGS FOR SIZE, REINFORCEMENT, AND COMPACTION REQUIREMENTS FOR CONCRETE HEADER.
2. REFER TO MANUFACTURER REQUIREMENTS FOR TYPE AND DEPTH OF LEVELING COURSE AND RESERVOIR COURSE.

NOTE:

1. EXPANSION JOINTS SHALL BE LOCATED 30 FEET MIN. ON CENTER AND AT THE END OF EACH DAY'S POUR.

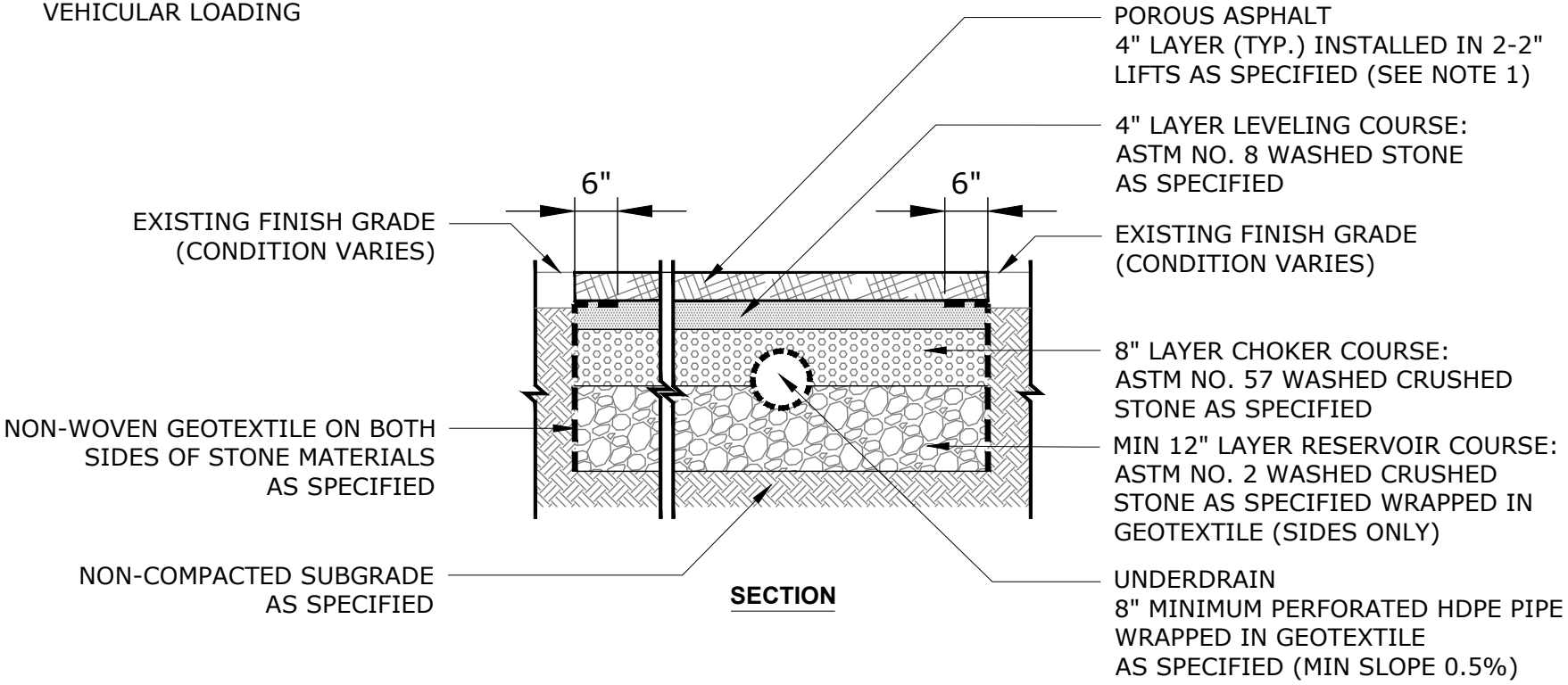


CAST-IN-PLACE POROUS CONCRETE

DETAIL	3
NTS	-

NOTE:

1. ASPHALT THICKNESS AND INSTALLATION MAY VARY DEPENDING ON SOIL TYPE AND VEHICULAR LOADING



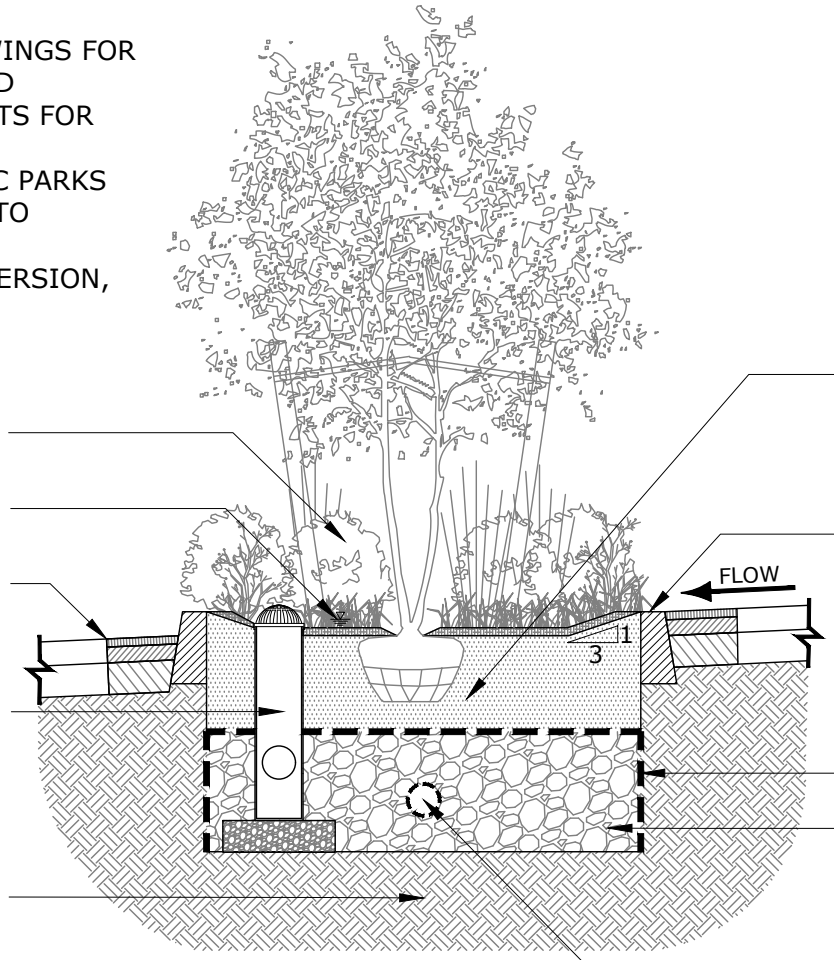
SECTION

POROUS ASPHALT ON AGGREGATE BASE

DETAIL	4
NTS	-

NOTE:

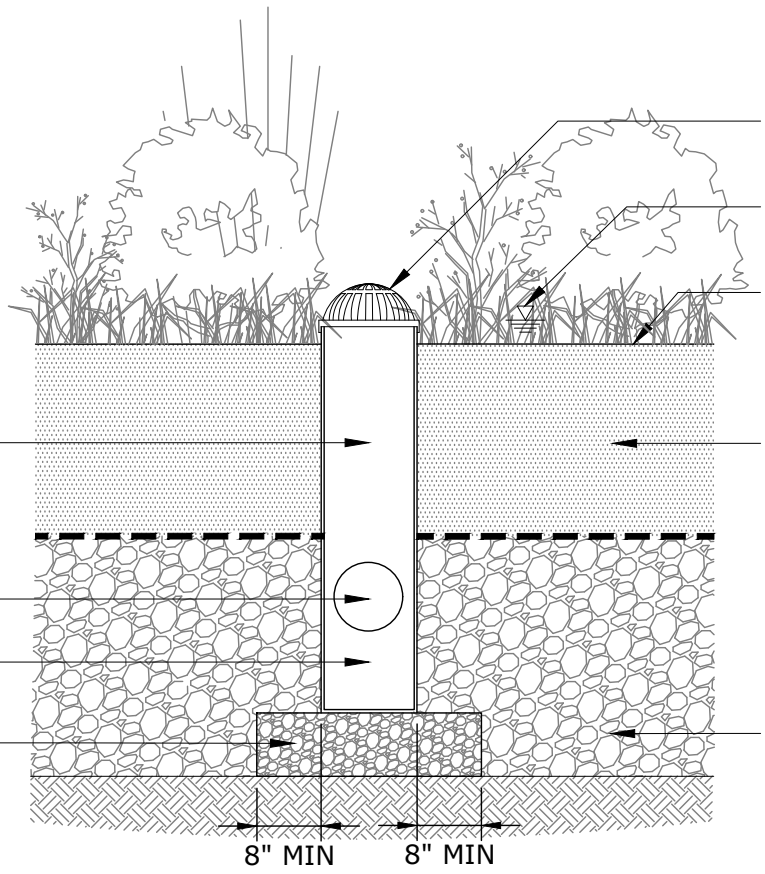
1. REFER TO CONTRACT DRAWINGS FOR SIZE, REINFORCEMENT, AND COMPACTION REQUIREMENTS FOR CONCRETE CURB.
2. FOR RAIN GARDENS ON NYC PARKS (D.P.R.) PROPERTY, REFER TO STANDARD D.P.R. DETAIL TYLA/146-R9, OR LATEST VERSION, FOR MINIMUM SOIL DEPTH.



SECTION

RAIN GARDEN / VEGETATED BIORETENTION AREA

DETAIL	5
NTS	-



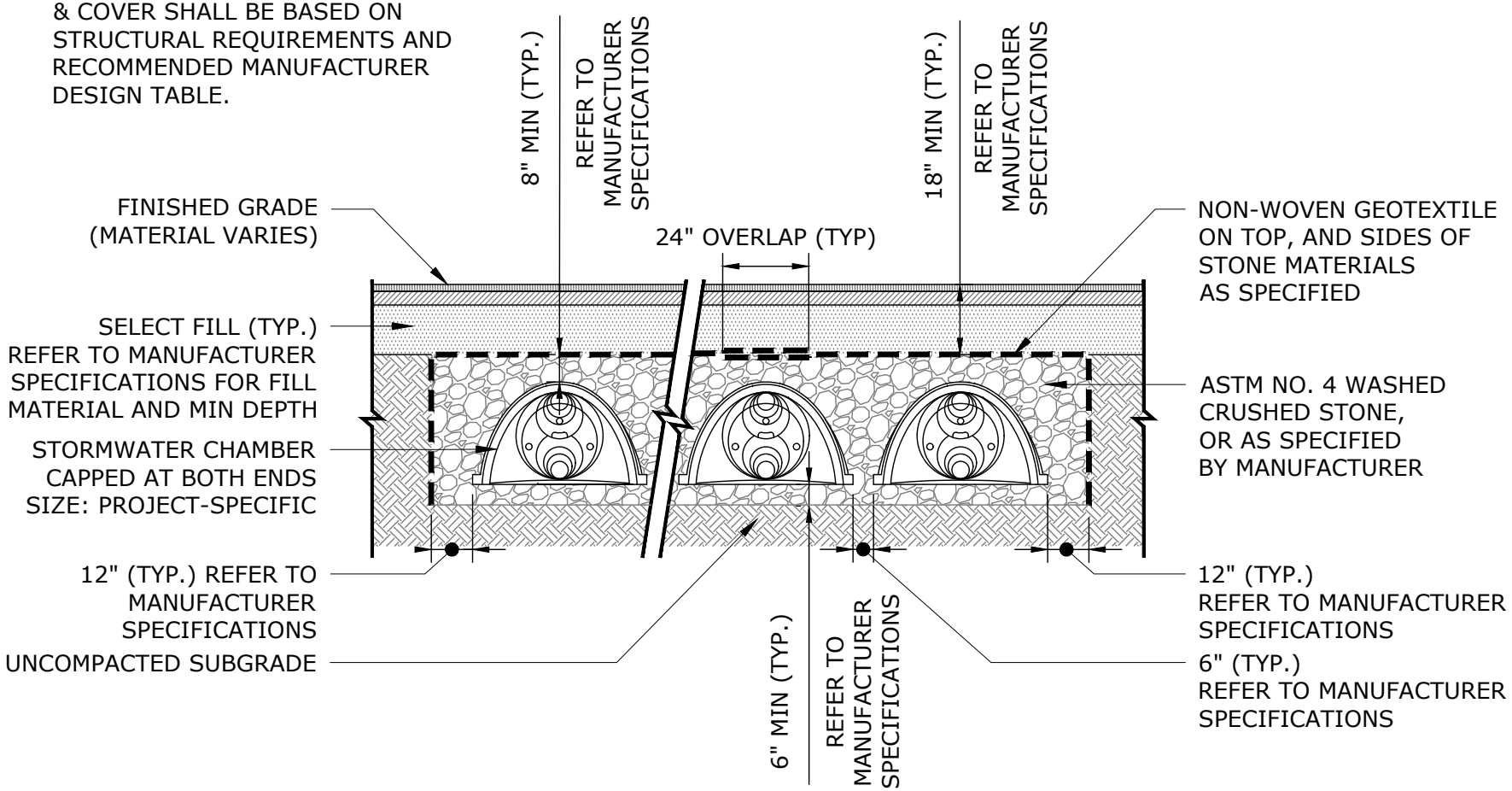
SECTION A

VEGETATED BIORETENTION OVERFLOW STRUCTURE

DETAIL	6
NTS	

NOTE:

1. ACCEPTABLE FILL MATERIALS AND ALL DIMENSIONS OF MIN. BEDDING & COVER SHALL BE BASED ON STRUCTURAL REQUIREMENTS AND RECOMMENDED MANUFACTURER DESIGN TABLE.

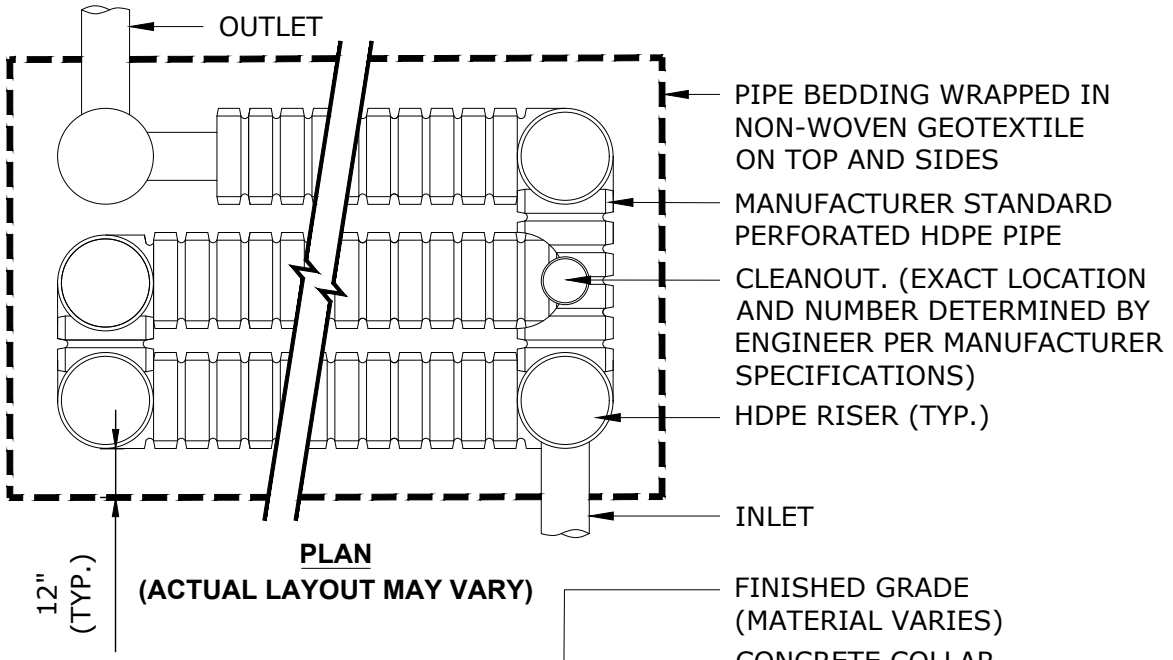


SUBSURFACE CHAMBERS

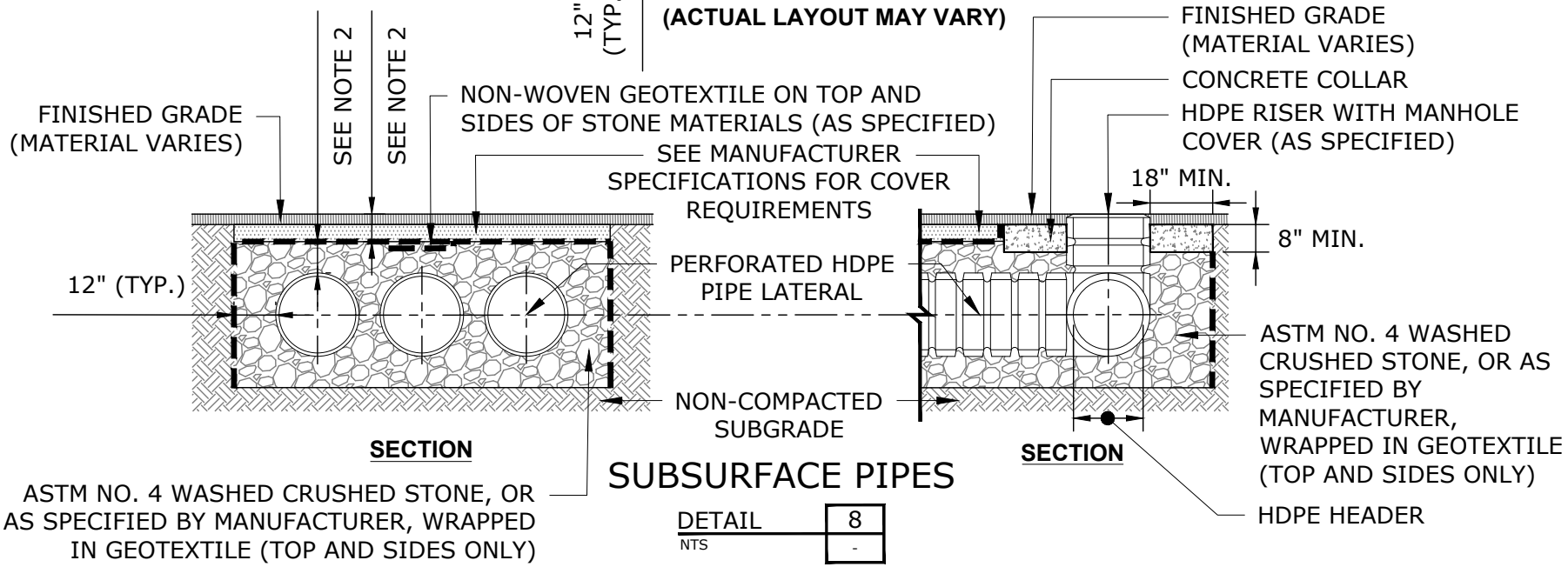
DETAIL	7
NTS	-

NOTE:

1. THE MIN. SPACING BETWEEN PIPES, CENTER TO CENTER NOMINAL PIPE DIAMETER, NUMBER OF PIPES AND MANIFOLD CONNECTIONS, AND MAXIMUM STORAGE DEPTH SHALL BE DETERMINED PER THE UNIT VOLUME PER LENGTH OF PERFORATED PIPE.
2. ACCEPTABLE FILL MATERIALS AND ALL DIMENSIONS OF MIN. BEDDING & COVER SHALL BE BASED ON STRUCTURAL REQUIREMENTS AND RECOMMENDED MANUFACTURER DESIGN TABLE.
3. ALL RETENTION AND DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.



PLAN
(ACTUAL LAYOUT MAY VARY)



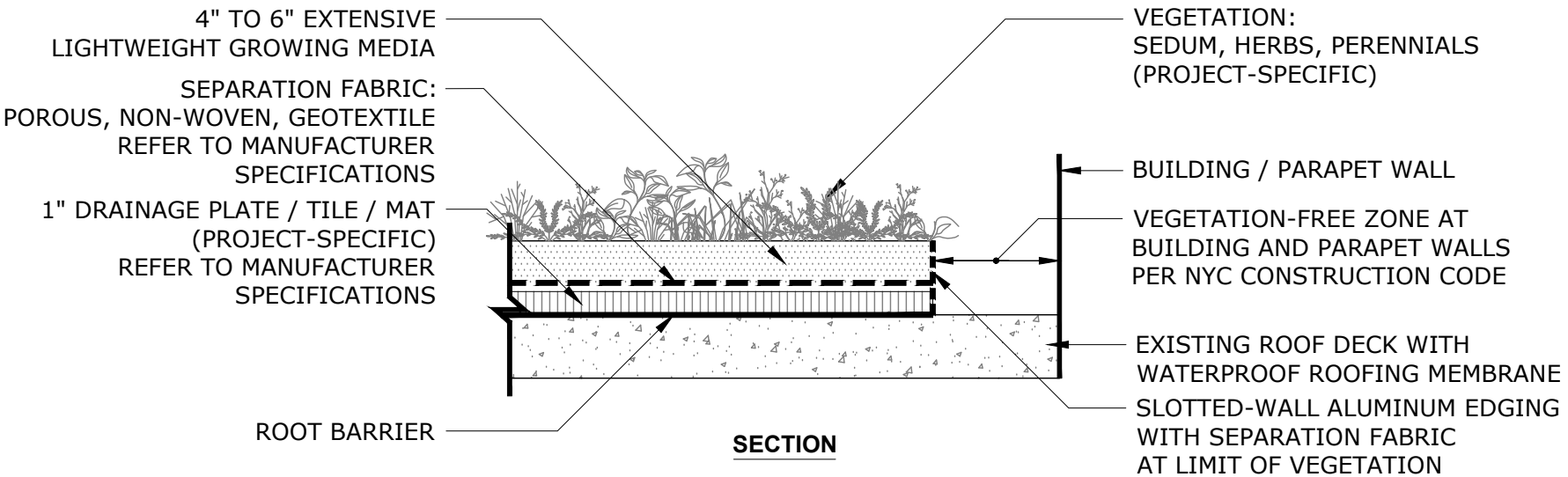
SECTION

SECTION

SUBSURFACE PIPES

DETAIL 8
NTS -

NYC Environmental Protection	ON-SITE GREEN INFRASTRUCTURE: GENERAL DESIGN GUIDELINES	DATE: MAY 2019 VERSION: 1.0 REVISED: MAY 2019	SUBSURFACE PIPES	SCALE: N.T.S. PAGE: 10 OF 11 SHEET: GI-08



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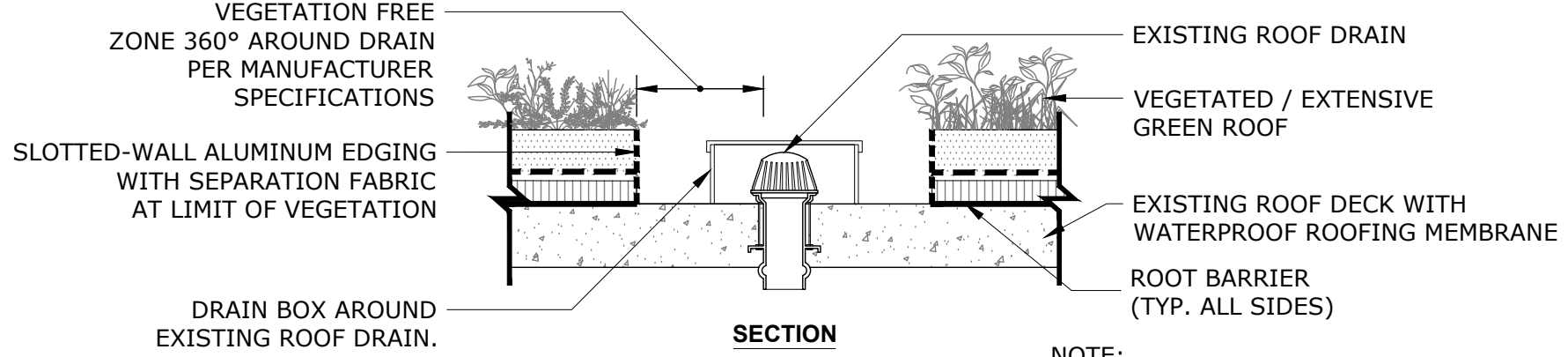


SECTION

EXTENSIVE GREEN ROOF

DETAIL	9
NTS	-

NOTE:

1. GREEN ROOFS ARE HIGHLY VARIABLE SYSTEMS, DEPENDENT ON SITE SPECIFIC REQUIREMENTS. THIS DETAIL REPRESENTS THE DESIRED COMPONENTS OF A STANDARD EXTENSIVE GREEN ROOF SYSTEM.

NYC Department of Environmental Protection
Bureau of Environmental Planning and Analysis
Borough of X, New York

DEP Contract ID: [Contract]
DEP Project: [Project Description]
Prepared By: [Consultant/Sub Name]

Site Name: [Property Name, Owner Agency Name]
Site Address: [Site Address, Borough]
Date: [Date of Submission]

Stormwater Calculation Table for On-site GI Practices

Submission Stage: [Conceptual/Schematic/60%/90%/100% Plans]

	GI ID	GI Asset Data					Stormwater Storage Calculations									Total Stormwater Managed (Infiltration + Storage)					As Built Stormwater Managed (Infiltration + Storage)			Additional Notes
								Surface Storage			Engineered Soil			Stone Subbase											
		Managed Impervious Tributary Area	Volume 1.25" Rainfall on Impervious Area	GI Footprint Surface Area	GI Perimeter	Permeability Coefficient	Stormwater chambers, pipes, tanks, etc. volume	Surface Storage Area	Surface Storage Depth	Surface Storage Volume	Soil Depth	Soil Voids	Stormwater Captured by Soil	Stone Depth	Stone Voids	Stormwater Captured by Stone Layer	Estimated Total Infiltration Volume	Estimated Total Storage Volume	% Impervious Surface Managed	Calculated Volume of Rainfall Captured	Calculated Volume of Rainfall Captured	Double Ring Infiltrometer Permeability Coefficient	Calculated Volume of Rainfall Captured	Calculated Volume of Rainfall Captured	
		sf	cf	sf	ft	in/hr	cf	sf	in	cf	ft	%	cf	ft	%	cf	cf	cf	%	cf	gal	in/hr	cf	gal	
Alternative 1	No retention, sized for static volume to capture 1.25 in	43560	4537.5	2420	197	0.00	-	1815.0	2	302.5	2.00	25	1210.0	2.50	50	3025.0	0.0	4537.5	100%	4537.5	33940.5	0.00	4537.5	33940.5	To be used for all detention-based practices with 0.1 cfs/ac release rate
	Retention credit, sized for static volume to capture 1.25 in (as above) but manages 1.5 in	43560	4537.5	2420	197	0.50	-	1815.0	2	302.5	2.00	25	1210.0	2.50	50	3025.0	1019.8	4537.5	100%	5557.3	41568.9	0.50	5557.3	41568.9	
	Retention credit, sized for static volume to capture 1.25 in (as above) but manages 1.8 in	43560	4537.5	2420	197	1.00	-	1815.0	2	302.5	2.00	25	1210.0	2.50	50	3025.0	2039.7	4537.5	100%	6577.2	49197.3	1.00	6577.2	49197.3	

Notes:
See instructions for specificdirections and guidance in filling out the calculation table.
Shaded cells require input. Unshaded cells contain formulas or static values.
Table is to be inserted into drawings and reports as specificed in the Onsite Design Guideline.

Instructions for On-Site GI Practice Stormwater Calculation Table		
1)	'GI ID':	Proposed practices that will be considered across all site-wide "alternative" options should be duplicated in each option. Among the site-wide alternative options, indicate which specific GI practice alternatives are alternatives to each other.
		Use assumed permeability coefficient of 0.50 in/hr until actual permeability data is available. Assume a maximum of 5 in/hr for bioretention

rev 2/2/2016

Instructions for On-Site GI Practice Stormwater Calculation Table		
1)	'GI ID':	Proposed practices that will be considered across all site-wide "alternative" options should be duplicated in each option. Among the site-wide alternative options, indicate which specific GI practice alternatives are alternatives to each other.
2)	'Permeability Coefficient':	Use assumed permeability coefficient of 0.50 in/hr until actual permeability data is available. Assume a maximum of 5 in/hr for bioretention practices and 10 in/hr for all other practices. Update with double ring infiltrometer results for final submittal.
3)	'Stormwater chambers, pipes, tanks, etc. volume':	For nonzero values, please explain the method used to determine the indicated value.
		If using a calculator provided by a subsurface storage manufacturer, please submit the calculator that was used.
4)	'Surface Storage':	Accounts for ponding area in bioretention practices and void spaces in porous asphalt/concrete surfaces.
		Assume a ponding area of (0.75*total surface area) in bioretention practices.
		Assume 33% void space in porous asphalt/concrete surfaces. Modify per manufacturer's specs as necessary.
5)	'Engineered Soil':	Only for vegetated (bioretention) practices. Soil depth is determined based on proposed planting. Use a standard 25% for soil voids.
6)	Stone Storage Layer':	For all types of GI practices. Stone depth is determined by sizing for 100% management of 1'' rainfall on the corresponding TDA. Assume a minimum depth of 12'', unless otherwise indicated by the manufacturer.
		For bioretention and subsurface retention, use default of 50%. Use a default of 40% for PP and synthetic turf. Modify per manufacturer's specs as necessary.
		For subsurface retention practices, use an equivalent depth that includes the depth of the chambers. When calculating the stone storage capacity, subtract the storage volume of the chambers from the calculated storage volume of the stone layer before multiplying by stone void percentage.
7)	'Estimated Total Infiltration Volume':	For bioretention practices, subtract the height of the header from the total depth of the practice (if applicable) when determining horizontal infiltration.
8)	'% Impervious Surface Managed':	Adjust other variables in table to approximate 100% management for each practice. Undersized or oversized practices may be acceptable on a case-by-base basis.
9)	'Additional Notes':	Use this column to provide other relevant information, including but not limited to: - the proposed bottom depths for subsurface storage practices - if the permeability coefficient was inferred from a location outside of the practice footprint - if the permeability coefficient used for the calculation was different from the measured value (i.e., using the maximum allowable value where rapid infiltration was encountered)

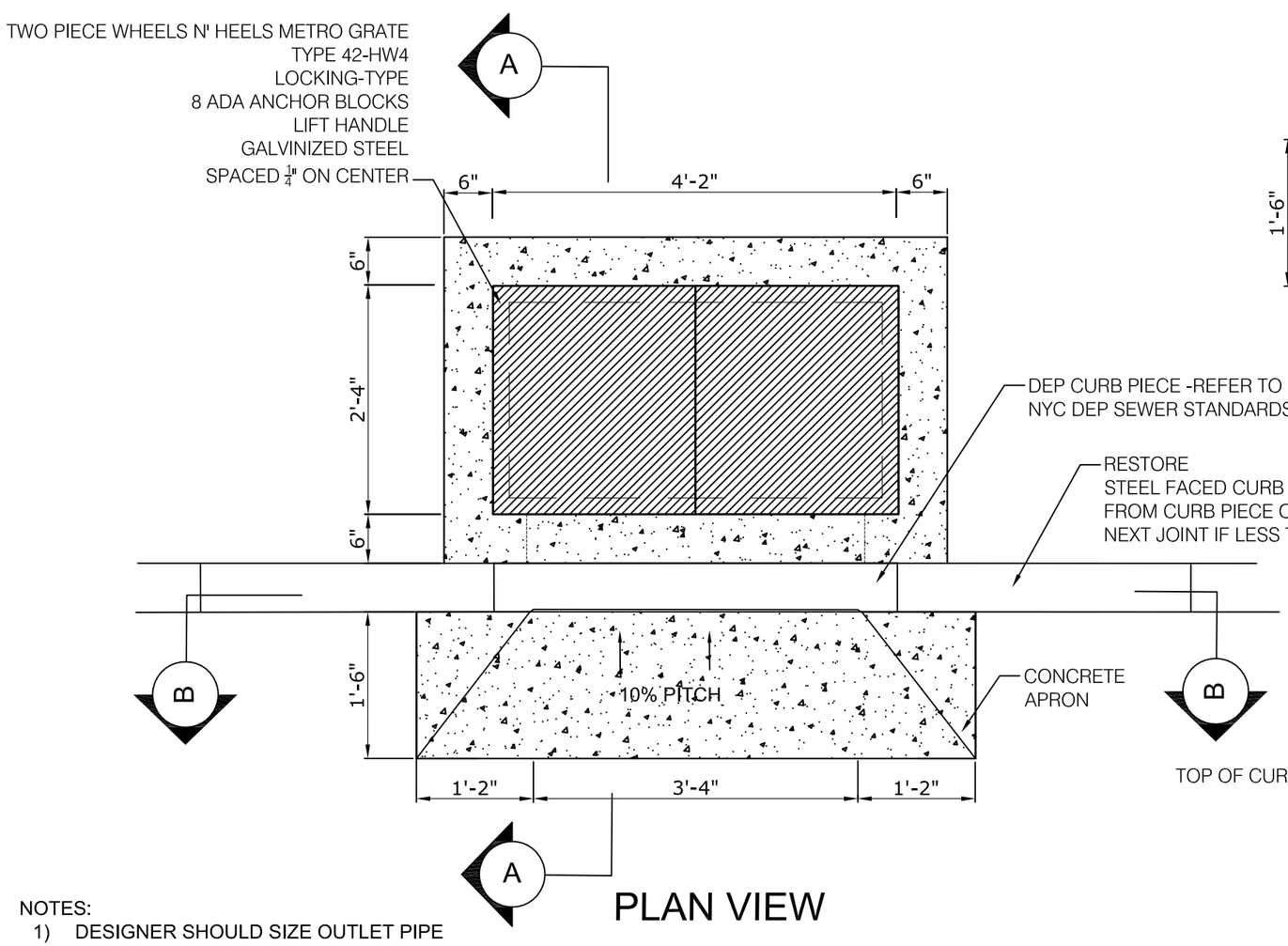
APPENDIX E

MODIFIED PARKS INLET DETAIL FOR OFF-SITE RUNOFF

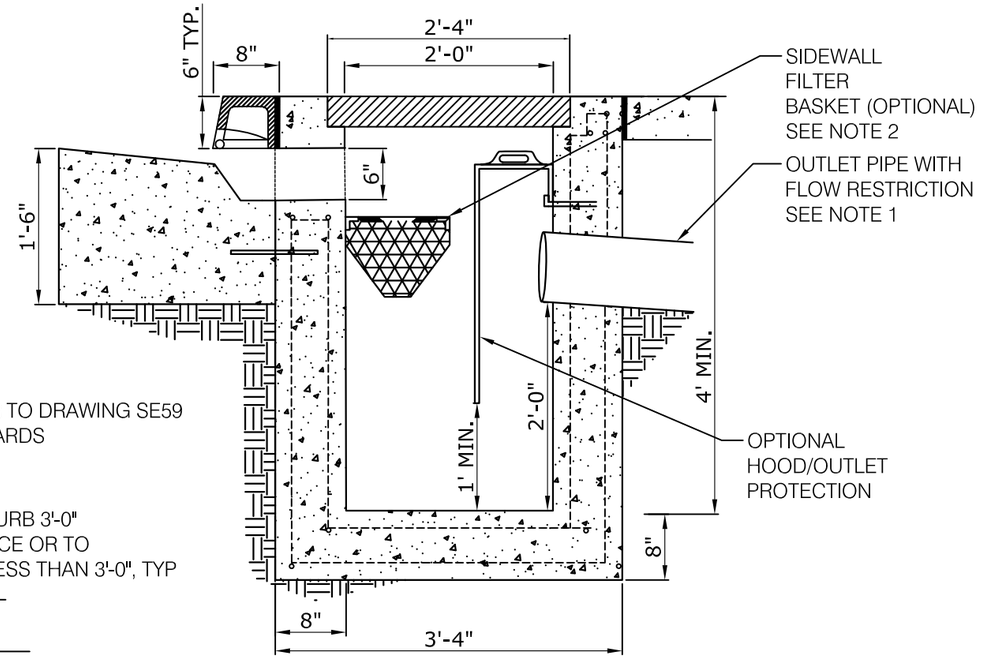
CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

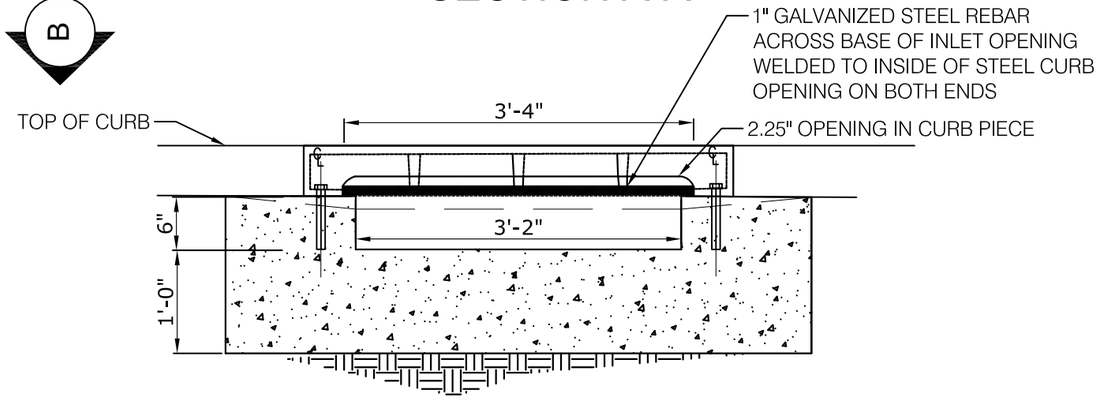
BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
TYPICAL MODIFIED CURB INLET TYPE-A



PLAN VIEW



SECTION A-A



SECTION B-B

NOTES:

1) DESIGNER SHOULD SIZE OUTLET PIPE ACCORDING TO SYSTEM CAPACITY.
2) ATTACH SIDEWALL FILTER 2" BELOW OPENING WITH BOLTS, OR PER MANUFACTURER INSTRUCTIONS

10/20/2018

MODIFIED DATE

APPENDIX F

LIMITED GEOTECHNICAL INVESTIGATION PROCEDURES FOR NEW YORK CITY ON-SITE GREEN INFRASTRUCTURE PRACTICES

TABLE OF CONTENTS

1. General Guidelines

A Limited Geotechnical Investigation is required at each proposed onsite project, unless otherwise directed by DEP, prior to the full design and construction of green infrastructure (GI) practices. The investigation consists primarily of soil borings and falling-head in-situ permeability tests (permeability tests, or PTs) to determine (but not be limited to):

- subsurface soil characteristics, including permeability rate;
- depth to groundwater;
- depth to bedrock; and
- any hydraulically limiting layer(s) that would potentially inhibit vertical infiltration.

Ideally, a minimum of one soil boring and PT shall be performed within the actual footprint of each GI practice. However, where site access or field constraints prohibit performing the geotechnical investigation within the footprint, the investigation may be performed up to a maximum distance of 50 - 75 feet from the proposed GI practices(s). A soil boring may not be necessary if relevant soil data can be inferred from an existing boring within 50 - 75 feet of the practice.

A Geotechnical Report including the above information, stamped and signed by a NYS Licensed Professional Engineer (P.E.), shall be submitted to DEP for review. The following sections provide details of the geotechnical investigation and reporting procedure.

2. Pre-Investigation and Planning

2.1 Geotechnical Investigation Location Plan

Soil boring and PT locations informed during the site visit with consultants, DEP and Owner Agency staff for each GI practice shall be further refined and resubmitted as the Geotechnical Investigation Location Plan (GILP or Boring Plan) to be submitted to DEP for review and approval. At a minimum, the GILP shall contain all pertinent information including, but not limited to:

- proposed GI practice footprints (with correct GI IDs and GI types where applicable);
- utilities layout;
- proposed soil boring and permeability test locations;
- existing historical soil data, if any;
- existing structures (buildings, fences, walls, curbs, stairs, etc.);
- recommended access routes and staging area for equipment showing vertical and horizontal clearances;
- summary table of proposed and historical borings and PTs; and
- photographs of area around soil boring and PT locations to document conditions.

2.2 Historical Borings

Historical soil borings and PT data in proximity of proposed GI practices may be obtained from DEP or from the Department of Design and Construction (DDC). Soil data for proposed GI practices may be represented by historical soil boring(s) within 50 - 70 feet of the practice in place of an intended soil boring, provided that the available information is sufficient. For example, if the boring log for a historical boring location shows the soil characteristics up to 20 feet below ground surface (bgs) as well as depths to the groundwater and bedrock, then only a PT will be necessary for that location.

A summary of all historical boring data in the vicinity of the GI practice(s) shall be included in the summary table on the Boring Plan. The actual historical boring data in its entirety shall be submitted as part of the Geotechnical Investigation Report.

2.3 Pre-Drilling Site Checklist

Prior to any drilling work, the on-site Professional Engineer or Representative of the Engineer (Engineer) must complete and sign DEP's Pre-Drilling Site Checklist. The Checklist is specific to the Owner Agency and covers all required utility mark-outs, investigation tasks, permits, and necessary documentations for each soil boring and/or PT location. The Checklists are attached to this manual.

The Checklist must be kept on-site at all times during drilling operations, along with all associated documentation, and available to DEP personnel upon request. If, upon a site inspection, the Checklist is not found on-site, drilling operations shall cease immediately and permission to resume must be requested from and granted by DEP before any drilling operation resumes.

The Engineer shall be on-site at all times during drilling operations to observe all geotechnical investigations and is responsible for ensuring that geotechnical sub-consultants, drilling contractors, and other field representatives are following DEP's standard procedures and protocol when performing geotechnical work.

The Engineer shall document, including photographs, any pre-existing conditions at the site. The Engineer shall be liable for any damages incurred as a result of not following appropriate protocol.

3. Geotechnical Investigation Locations

3.1 Identifying Boring Locations on the Field

Soil borings and PTs shall be conducted in separate locations no closer than 5 feet apart. The specified locations may be shifted 5 - 10 feet in the field to avoid any unforeseen utility or other buried obstructions encountered during drilling. If a boulder or other obstruction is encountered during drilling for any GI practice, another attempt shall be made within 5 - 10 feet of the original borehole. Any adjustments greater than 10 feet require approval from DEP but in all cases shall remain within the limits of the utility mark outs. Prior to conducting any geotechnical borings, all boring and testing locations must be cleared for subsurface utilities by the contractor.

Soil borings and PTs must be performed within the footprint of the proposed GI practice or within 50 - 75 feet of the proposed practice when site constraints prevent access to the proposed GI location and always within the utility mark-out zone. No drilling is permitted in a location that blocks a driveway or vehicle access to site facilities.

If drilling cannot be conducted at the planned location and no relocation options are feasible, consultant shall submit a recommended action (e.g. provide alternative drilling options, recommend rejection of the GI practice, etc.) for DEP review and approval.

3.2 Field Measurements

All GI practice, soil boring and PT locations represented on the Boring Plan shall be accurately dimensioned.

The Boring Plan shall be updated in a timely manner to reflect any deviations noted between the Boring Plan and actual field measurements.

4. Geotechnical Investigation Methodology

4.1 Soil Boring Procedure and Equipment

Soil borings are to be conducted using a 4-inch inner diameter hollow-stem auger (HSA) or by a 4-inch inner diameter drilled casing. If a HSA cannot be used in a location, soil borings can be completed using a rotary tri-cone roller bit with potable water as drilling fluid. Mud drilling is not an acceptable method of boring.

The Engineer shall be at the drilling location to observe the boring operation and keep a continuous and accurate Boring Log for each location recording all pertinent data. Refer to Section 7.1.2 for details on the Boring Log.

In the event that no water and/or sewer records were obtained in time and/or the Engineer chooses, pneumatic and/or hand excavation is an acceptable method of boring up to the depth of the first soil sample or PT (see Section 4.4 for boring, soil sampling and PT depths). The reason for conducting this procedure must be properly documented and reported to DEP.

4.1.1 STANDARD PENETRATION TEST

In each soil boring location, a Standard Penetration Test (SPT) shall be conducted continuously

in accordance with ASTM D1586 (i.e. a 24-inch long, 2-inch outside diameter split-barrel sampler driven by blows from a 140-pound hammer falling freely from a height of 30 inches) to the depth detailed in Section 4.4.

The number of blows required to drive the 24-inch split-barrel sampler every 6-inch increment will be recorded. The Standard Penetration Resistance (N-value) shall be determined as the sum of the blows required to drive the sampler to the second and third 6-inch increments.

4.1.2 SOIL SAMPLING

The Engineer shall make observations of the soil at all sampling depths during the time of drilling and shall record and submit observations for each soil boring location as individual Boring Logs.

The Engineer shall collect soil samples that are representative of the actual recovered soil core at specific depth intervals for laboratory analysis. Collected samples shall be stored in labeled jars, to be delivered to an approved AASHTO-certified laboratory for subsequent examination and testing. Samples for laboratory analysis shall be tested as outlined in Section 6.

4.2 Permeability Test Procedure and Equipment

The permeability test procedure is as follows:

- Drive the 4-inch inner diameter casing to the required test depth (refer to soil boring procedure for allowable equipment). The space (annulus) between the casing and borehole must be kept at a minimum. If the casing cannot be driven and a larger hole is first bored to allow for the casing, the annulus must be properly sealed with bentonite before any water is introduced for testing into the casing.
- Measure the depth to the bottom of the hole to the nearest inch.
- Ensure that the depth to the bottom of the hole is within 1 inch of the depth to the bottom of the casing.
- Place approximately 6 - 8 inches of coarse sand (4.75mm - 2mm) at the bottom of the casing.
- Wash out casing using a continuous flow of potable water at low water pressure (the water shall not disturb the coarse sand layer at the bottom of the casing) until the water exiting the casing runs clear.
- Saturate the soil beneath the bottom of the casing for at least thirty (30) minutes using potable water.
- Fill casing to the top with clean water and record the temperature of the water (see Section 4.2.1 for details on temperature measurement).
- Record the time at the beginning of the test.
- Record the falling water level in the casing at 1, 2, 3, 4, 5, 10, and 15 minutes after the beginning of the test or until the water level in the casing has stopped falling.

- At the conclusion of the test, fill the casing to the top with clean water and maintain the water at this level for five (5) minutes.
- Repeat the test once for each PT depth using the same procedure.

Potable water must be used in conducting PTs; PTs conducted using dirty water creates faulty results and shall be rejected.

If a soil boring was conducted within 20 feet of a planned PT location, the borehole from the soil boring must be completely backfilled before the PT is commenced.

The Engineer must maintain continuous data of PTs and report them accurately in Permeability Test Logs (PT Logs). Refer to Section 7.1.3 for details on the PT Log.

4.2.1 TEMPERATURE MEASUREMENT

Permeability tests shall not be performed when the ambient temperature is below 0°C, in frozen soils, or with water at temperatures less than 5°C. Temperatures shall be measured in °C using equipment meeting the specifications as shown in Table 1 and calibrated against a National Institute of Standards and Technology (NIST) Standard or with certified calibration traceable to NIST.

TABLE 1 – ACCEPTABLE TEMPERATURE MEASUREMENT EQUIPMENT

Equipment	Specifications
Liquid-in-glass thermometer (nonmercury)	Temperature range, at least -5 to +45°C 0.5°C gradations or smaller Calibrated accuracy within 1 percent of full scale or 0.5°C, whichever is less
Thermistor	Calibrated accuracy within 0.1 to 0.2°C Digital readout to at least 0.1°C

4.3 Termination and Cancellation of Soil Borings and Permeability Tests

Various conditions at the drilling site may prevent completion of the geotechnical investigation. Soil borings and/or PTs are referred to as "terminated" if the drilling was commenced but could not be completed to the intended depth. "Cancellation" refers to situations where drilling for the soil boring and/or PT did not commence. In general, soil borings shall not be cancelled without prior approval by DEP.

The following list provides general guidance on when drilling may be terminated without prior approval by DEP:

- If soil and/or groundwater contamination is suspected (i.e., visually or olfactory) during the investigation, drilling shall be terminated immediately. The borehole shall be properly filled, surface repaired and the proposed location shall be abandoned. Indications of contamination during geotechnical investigations must be brought to the attention of DEP immediately.
- If an obstruction (e.g. boulder, abandoned utility, large debris, etc.) is encountered at or less than 15 ft bgs, another drilling location shall be identified according to Section 3.1. If the obstruction is confirmed at a third (3) reattempted location, the soil boring or PT shall be terminated. If the obstruction is encountered at a depth greater than 15 ft bgs, drilling may be terminated without a reattempt.
- If bedrock is encountered, drilling shall be terminated and the depth to bedrock and rock classification (based on visual observation) shall be recorded. Where possible, drilling shall proceed through weathered or decomposed bedrock.

If obstructions and/or bedrock are encountered at less than 9 ft bgs at three or more sites within a 75 ft radius, drilling operations shall cease, and DEP must be contacted to obtain approval to proceed with subsequent drillings within the 75 ft radius.

If a water table is encountered, the depth to the water table shall be recorded and the boring shall proceed to the intended depth. The water table shall be identified as either perched water or the groundwater table.

4.3.1 TERMINATION OF PERMEABILITY TESTS AFTER THE SATURATION PERIOD

PTs may be terminated after the 30 minute saturation period and reported accordingly for the following conditions:

- If the casing is completely filled during the saturation period and there is no visible drop in water level after 30 minutes, the PT shall be reattempted for the same depth at another location no less than 5 feet away. If there is no visible drop in water level after 30 minutes at the reattempted location, the PT shall be terminated for that depth only and the permeability coefficient reported as "0.000 in/hr".
- If the casing cannot be filled due to rapid infiltration (RI) during the saturation period and no water is retained in the casing after 30 minutes, the PT shall be reattempted for the same depth at another location no less than 5 feet away. If rapid infiltration is observed during the saturation period for the reattempt, the PT shall be terminated for that depth only and the permeability coefficient reported as "RI".

4.4 Geotechnical Investigation Depths

The depth at which Geotechnical Investigation procedures are to be conducted shall be determined by the depth of the undisturbed soil below the base of the proposed GI practice.

Table 2 shows the total soil boring depths, soil sampling (for laboratory testing) depths, and PT depths for various types of GI practices.

TABLE 2 – DEPTH OF SOIL BORINGS FOR ON-SITE GI PRACTICES

Type of GI Practice	Total Soil Boring Depth	Lab Sample Depth Intervals[1]	PT Depths[3]
All On-site GI practices	15 ft bgs[2]	3-5 ft bgs 5-7 ft bgs 7-9 ft bgs 9-11 ft bgs 11-13 ft bgs 13-15 ft bgs	3 ft bgs 5 ft bgs 10 ft bgs

[1] Acceptable deviation from the sampling depth, without prior approval by DEP:

- Three (3) feet depths for lab samples and PTs only apply to shallow practices (under 5 feet)
- Two samples may be taken from a depth interval if there is a significant change in soil layer (e.g. differences in consistency, color or major component).
- If a sample cannot be retrieved or the recovery length is extremely low (less than 2 in) and additional soil cannot be obtained, soil from the immediately following depth interval shall be collected.

[2] bgs = below ground surface

[3] If the bottom of the casing cannot be properly sealed due to soil conditions or obstructions, the casing may be drilled up to an additional foot below ground surface.

5. Cleanup

Upon termination or completion of any soil boring or PT, all boreholes conducted on impervious surfaces are to be backfilled with soil cuttings to the ground surface level and sealed with an asphalt or concrete patch to restore the surface to its original condition. On pervious surfaces, seeding to match appropriate existing conditions shall be performed. All other holes, depressions, cracks, surface inconsistencies, and other hazards caused by the work must be properly mitigated. The contractor will return to the site two weeks following the work, one month following the work, and as necessary to make repairs to backfilled holes.

Photographs shall be taken documenting the condition of all drilling locations that are abandoned or completed. These shall be matched with the pre-drilling photographs as described in Section 2.1 Geotechnical Investigation Location Plan

6. Geotechnical Laboratory Testing

Laboratory tests shall be conducted by an AASHTO-certified laboratory to determine the distribution of all particle sizes of the soil – including the fines (silts and clays) content – in accordance with ASTM ASTM D6913 and D7928.

7. Geotechnical Report

7.1 Geotechnical Investigation Data

7.1.1 BORING PLAN AND SHAPEFILES

Field-measured locations of all GI practices and geotechnical investigations (including those which were terminated) must be accurately recorded. This location data shall be submitted as a finalized Boring Plan and shapefile (Section 7.2.2 contains additional details on shapefile requirements).

7.1.2 BORING LOGS

Boring Logs must be submitted for all soil borings, including those which were terminated. At a minimum, Boring Logs must include the following:

- Identification number (ID No.) and location of the soil boring (nearest building address or cross streets)
- Number of blows per 6-inch intervals of continuous penetration
- Length of sample recovery (inches) for each 2-ft interval
- Thickness of each soil stratum encountered (including pavement, fill or topsoil layers).
- Characteristics of the soil (based on field observations) for all depths, including:
  1. Soil description per Modified Burmister
  2. Soil classification per Unified Soil Classification System (USCS), in parentheses
  3. Color
  4. Soil moisture (dry, moist, or wet)
  5. Soil compaction: Loose, moderately compacted, or very compacted
  6. If present:
     - Debris (brick, concrete, wood, glass, etc.)
     - Cobbles, boulders, etc.
     - Odor (organic, chemical, etc.)
     - Notable soil formations which may affect permeability (e.g. “bull’s liver”, glacial till, etc.)
     - Indication of possible contamination (ash, petroleum, slag, etc.)
     - Decomposed vegetation
- Notes of subsurface conditions encountered during drilling (e.g. utilities, structures, etc.)
- Additional notes (e.g. interaction with community, etc.)

7.1.3 PERMEABILITY TEST LOGS

Permeability Test Logs (PT Logs) must be submitted for all PTs, including those which were terminated. At a minimum, PT Logs must include PT ID number, ambient temperature, test location, test depth, depth to groundwater table and/or bedrock (if encountered), , water temperature at the start of the test, and all water depth readings, results, and calculations.

Average permeability values shall be calculated based on a modification of ASTM D6391 using the following formula. The PT Log template with the formula and associated calculation methods is included in the Attachments. In general, no permeability calculations are necessary at the time of drilling since permeability values (and other variables used to calculate permeability values) are automatically calculated in the PT Log once all the data recorded during the PT (see Section 4.2) are inputted into the template.

$$K_m = \pi \cdot Rt \cdot (D \cdot (\ln h1/h_2))/(11 \cdot (t2 - t1))$$

Where: Km = Mean permeability [in/hr], and
$Km=\sqrt{(kh \cdot kv)}$

kh = Horizontal permeability [in/hr]

kv = Vertical permeability [in/hr]

Rt = 2.2902(0.9842T)/T0.1702 and
T is temperature in °C

D = Inner diameter of casing [in]

h = Height of water above bottom of casing at time t[in]

t = Time [hr]

- Early termination of PTs (see Section 4.3.1) shall be noted in the “Inspectors Remarks” section of the PT Logs. No field data shall be reported as “Depth (in)”, and no permeability values shall be calculated for terminated PTs.

- PT Logs (and Geotechnical Report Summary Tables) must accurately reflect the actual depths the PTs were performed.
- The PT Log template contains default time values of 1, 2, 3, 4, 5, 10, and 15 minutes after the start of the test. If the water level drops below the casing before the 15-minute measurement period, these default values must be modified to the actual time values for which water depth measurements were recorded.
- If the PT cannot be calculated (for example, due to RI), the PT Log shall clearly indicate that PT calculations are not valid.

7.1.4 LABORATORY TEST RESULTS

Laboratory testing and reporting must include a sieve analysis and hydrometer analysis of soil samples and plotting of gradation curves, as well as soil classification based on the USCS.

The following USCS-classified sieve sizes are to be included with data points for all sampled depths overlaid on the same gradation curve:

4”

3”

1-1/2”

3/4”

3/8”

#4

#10

#20

#40

#60

#100

#200

The template for Laboratory Test Results showing sample sieve analyses and gradation curves is included in the Attachments.

7.1.5 GEOTECHNICAL REPORT SUMMARY TABLE

Pertinent data from the soil borings (including data available from historical boring logs), PTs laboratory test results, and any other information acquired during the Geotechnical Investigation shall be summarized in the Geotechnical Report Summary Table.

7.1.6 INTERIM PERMEABILITY TEST RESULTS

Interim Permeability Test results may be submitted prior to the completion and subsequent submittal of the Geotechnical Report. Interim Permeability Test results shall be submitted as Excel worksheets following the template provided by DEP (see the Attachments for sample).

7.2 Geotechnical Report Submission

7.2.1 GENERAL REQUIREMENTS

The complete Geotechnical Report, stamped and signed by a Professional Engineer, must include the following as a minimum:

- Project Description
- Site Conditions (Topographic, Geological, Hydrogeological Setting)
- Geotechnical Investigation Results
- Summary and Conclusion
- Attachments (samples and templates)
  - Attachment 4 – Onsite Boring and PT (if applicable) Plan (Sample)
  - Attachment 5 – Geotechnical Report Summary Table (Sample):
  - Attachment 6 – Soil Boring Logs (Template):
  - Attachment 7 – Laboratory Test Results (Sample)
  - Attachment 8 – Permeability Test Log (if applicable) (Template)
  - Attachment 9 – Geotechnical Report Submission Checklist

7.2.2 ELECTRONIC DATA REQUIREMENTS

Electronic versions of the Geotechnical Report shall be submitted in pdf format, along with the following:

- Excel versions of Attachment 2 - Geotechnical Report Summary Table
- Geospatial data of all GI practices and geotechnical investigation locations in shapefile format, conforming to the following GIS requirements:
  - Coordinate System: NAD_1983_StatePlane_New_York_Long_Island_FIPS_3104_Feet
  - Projection: Lambert_Conformal_Conic
  - Coordinates for Onsite GI Practices shall be the center of the practice
  - Points representing all soil boring and PT locations shall have the following attribute fields: 'Contract_No', 'Phase_No', 'B_PT_ID', and 'Geo_Type' (either 'B' or "PT' to differentiate the tests)

An updated Project Tracking Spreadsheet containing all pertinent data in the Geotechnical Report must be submitted with the Geotechnical Report.

Attachments

OWNER AGENCY SPECIFIC PROCEDURES

Attachment 1: DPR Boring Location Approval Form

- Attachment 1A: DPR Pre-Drilling Checklist

Attachment 2: NYCHA Coordination Procedure for Geotechnical Investigations

- Attachment 2A: NYCHA Notification Template for Geotechnical Investigations
- Attachment 2B: NYCHA Pre-Drilling Checklist

Attachment 3: DOE Permitting Procedure for Geotechnical Investigations

- Attachment 3A: DOE Pre-Drilling Checklist

SAMPLES AND TEMPLATES FOR GEOTECHNICAL REPORT

Attachment 4: Onsite Boring Plan (Sample)

Attachment 5: Geotechnical Report Summary Table (Sample)

Attachment 6: Soil Boring Logs (Template)

Attachment 7: Laboratory Test Results (Sample)

Attachment 8: Permeability Test Log (Template)

Attachment 9: Geotechnical Report Submission Checklist

APPENDIX F
ATTACHMENT 1

DPR BORING LOCATION APPROVAL FORM

BORINGS FOR GI – SITE APPROVAL

Park: Park ID#:

Address:

Borough: BK BX M Q SI

Parks Representative:

DEP Project Manager:

Consultant:

Boring Contractor/Permitee:

Proposed date of boring work:

Permit Approval needed by Borough Forestry: Yes No

NOTES:

This site is approved for borings as noted by the Borough Chief of Operations or their representative.

Signature of Borough Chief of Operations
Or their Representative

Printed Name

The approved Boring Location Plan must be attached to this form for approval.

APPENDIX F ATTACHMENT 1A

DPR PRE-DRILLING CHECKLIST

PRE-DRILLING SITE CHECKLIST
NYC PARKS & RECREATION (DPR) PROPERTY

DEP Contract No:

Consultant:

Managing Agency:

Site Supervisor:

Site Name:

Drilling Contractor:

Site Address:

Boring/Permeability Test ID No(s):

The following investigation activities must be completed prior to commencement of drilling:

Coordinate access and finalize testing dates with DPR contact

Install notification signage (as required by DPR)

Review and mark-out utilities as per As-Built Records

Mark-out water and sewer utilities based on available maps, tap cards, and service connection information

Complete subsurface preliminary investigation with Ground Penetrating Radar (GPR) or other subsurface utility detection equipment

Complete vault investigation

Mark-out cleared drilling location

Take photos of existing conditions making note of any existing cracks or damages

Ensure construction materials, equipment, debris, etc. are not blocking driveways, entrances, etc.

Ensure sufficient pedestrian clearance – 5 ft. pedestrian clear path or signage indicating that path is closed

The following documentation must be obtained and kept on-site during all drilling activities:

DPR Permit

Health and Safety Plan (HASP)

Other agency permits (as required)

Approval from MTA, LIRR, bridges, tunnels, AMTRAK, PATH, NYS or NYC DOT, etc. (as required)

Hydrant permit for clean water to conduct Permeability Tests (unless using water truck)

DEP-reviewed Boring Location Plan

I, , (P.E. or Representative) attest that all of the above have been completed and that this checklist along with the pertinent documentation mentioned above will be maintained on-site.

Date Signature of Onsite P.E. or Representative

APPENDIX F
ATTACHMENT 2

NYCHA COORDINATION PROCEDURE FOR GEOTECHNICAL INVESTIGATIONS

1. The consultant will prepare a notification memo on company letterhead (see template on following page) to Keith Marshall (contact information above). Attach the boring plan for reference.

2. Keith Marshall will designate a facilities staff person for coordination on site.

3. The consultant must also complete the Pre-Drilling Checklist on the following page.

4. Copy the NYCHA GI Administrator on email correspondence.

APPENDIX F
ATTACHMENT
2A

NYCHA NOTIFICATION TEMPLATE FOR GEOTECHNICAL INVESTIGATIONS

MEMORANDUM

Subject: Notification of DEP Geotechnical Investigation at [NYCHA Development Name] for On-Site Green Infrastructure Practices

To: Energy & Sustainability, Capital Projects Department, New York City Housing Authority

From: [Consultant name, Project Manager Name]

Date: [Date]

A site visit to [NYCHA Development Name] took place on [Date of site visit] with [DEP staff in attendance], [Consultant name], [NYCHA Capital Projects Rep Name in attendance], [Property Manager Name], [Property Superintendent Name], and [Resident Association Rep Name]. Based on information provided by NYCHA, the site visit and subsequent discussion, the following geotechnical work is planned.

The Geotechnical Investigation work will consist of soil borings and in-situ permeability testing. In advance of the boring contractor commencing work, [Consultant Name] will mark out the boring locations shown on the attached Geotechnical Plan at the Development on [Date for mark outs]. The contractor's name is [Driller Name] and is expected to perform the work between [Enter dates of planned geotech work] during the hours of [hours].

Two weeks before the planned work the contractor will confirm with the Superintendent the dates of the planned work, and notify them of any necessary protections for pedestrians that will be installed during the work. The contractor will also discuss any disruptions to parking lots or spaces and provide 48 hours in advance notice in the form of a posted sign to inform the Development's residents. On the day(s) of the work, the contractor will check in with the Superintendent upon arriving at the Development using the phone number provided at the site visit.

[Consultant name] will be on-site full time to monitor the contractor, ensure all advance communication and notification has been carried out satisfactorily, observe the borings, collect soil samples, and conduct in situ permeability testing.

Please contact [Enter Consultant contact name] with any further questions or concerns at [contact name's phone number and email], with a carbon copy to [enter DEP Project Manager] and [EDC project manager].

Cc – NYCHA: (consult PM for appropriate cc'd contacts)

DEP: (consult PM for appropriate cc'd contacts)

Attachment 1 – Geotechnical Plan for [NYCHA Development Name]

APPENDIX F
ATTACHMENT
2B

NYCHA PRE-DRILLING SITE CHECKLIST

PRE-DRILLING SITE CHECKLIST
NYC PARKS & RECREATION (DPR) PROPERTY

DEP Contract No:

Consultant:

Managing Agency:

Site Supervisor:

Site Name:

Drilling Contractor:

Site Address:

Boring/Permeability Test ID No(s):

The following investigation activities must be completed prior to commencement of drilling:

Contact NYCHA Property Owner/Superintendent two weeks in advance to confirm boring schedule

Install notification signage (as required) for interruptions to normal site activities (i.e., parking lot use, pedestrian egress/access, etc.)

Review and mark-out utilities as per As-Built Records

Mark-out water/sewer utilities based on available maps, tap cards, service connection information

Complete subsurface preliminary investigation with Ground Penetrating Radar (GPR) or other subsurface utility detection equipment

Complete vault investigation

Mark-out cleared drilling location

Take time and date stamped photos of drilling locations and paths of access prior to entry, noting any existing cracks or damages

Ensure that construction materials, equipment, debris, etc. are not blocking driveways and/or designated emergency access points

Ensure 5 ft. pedestrian clear path or post signage indicating that path is closed

The following documentation must be obtained and kept on-site during all drilling activities:

Health and Safety Plan (HASP)

Other agency permits (DOT, DPR, and other permits as required)

Approval from MTA, LIRR, bridges, tunnels, AMTRAK, PATH, NYS or NYC DOT, etc. (as required)

Hydrant permit for clean water to conduct Permeability Tests (unless using water truck)

DEP-reviewed Boring Location Plan

I, , (P.E. or Representative) attest that all of the above have been completed and that this checklist along with the pertinent documentation mentioned above will be maintained on-site.

Date Signature of Onsite P.E. or Representative

APPENDIX F
ATTACHMENT 3

DOE PERMITTING PROCEDURE FOR GEOTECHNICAL INVESTIGATIONS

1. The drilling company will be the permittee for all drilling work at school sites.

2. Consultant must obtain an original carbon copy permit form for each site at the NYC Department of Education-Division of School Facilities (DSF) Permits office. DSF's permits office is located at 44-36 Vernon Boulevard, 5th Floor, Long Island City, NY 11101.

3. DEP will provide the consultant with contact information for the school custodian, who must review the proposed locations and schedules and sign off on the permit.

4. Consultant must meet with the custodian at the site in order to obtain the permit. DEP should be notified in advance of all site meetings scheduled. At the custodian meeting, the consultant should:

a. Have all pertinent information on hand, including DEP contract#, as-built site plans/survey, boring locations, DEP's current geotech procedure, schedule, subconsultant (driller) information, etc.

b. Schedule the drilling work with the custodian during this visit. Drilling can only be performed when school, after-school, or any summer programs are not in session. Note that if the available times are not within normal business hours (8:00 to 5:00 Monday through Friday), then a fee will be applied to the permit. See item 5 below.

c. Fill out the permit form with the custodian and retain carbon copies for the DSF permits office.

5. Return the completed permit forms to DSF's Permits office for approval.

6. The fee for any drilling performed outside of regular business hours is $41/hour, payable by official bank check or money order to New York City Department of Education.

7. In addition to following this procedure for securing permits, the consultant must also complete the Pre-Drilling Checklist on the following page.

8. When the permit is approved, the consultant must give the custodian at least two days' prior notice and a copy of the approved permit before the scheduled drilling. Permittee must have the approved permit and the completed Pre-Drilling Checklist and associated documents on site when work is being performed.

9. DEP and Project Managers will be copied on all correspondence. The consultant will inform DEP of testing dates and locations in advance.

APPENDIX F ATTACHMENT 3A

DOE PRE-DRILLING CHECKLIST

PRE-DRILLING SITE CHECKLIST
NYC DEPARTMENT OF EDUCATION (DOE) PROPERTY

DEP Contract No:

Consultant:

Managing Agency:

Site Supervisor:

Site Name:

Drilling Contractor:

Site Address:

Boring/Permeability Test ID No(s):

The following investigation activities must be completed prior to commencement of drilling:

Provide two days' advance notice to school Principal/Custodian

Install notification signage (as required by Custodian or representative)

Review and mark-out utilities as per As-Built Records

Mark-out water and sewer utilities based on available maps, and service connection information

Complete subsurface preliminary investigation with Ground Penetrating Radar (GPR) or other subsurface utility detection equipment

Complete vault investigation

Mark-out cleared drilling location(s)

Take photos of existing conditions making note of any existing cracks or damages

Ensure construction materials, equipment, debris, etc. are not blocking driveways, entrances, etc.

Ensure sufficient pedestrian clearance – as required by Custodian or representative

The following documentation must be obtained and kept on-site during all drilling activities:

Health and Safety Plan (HASP)

Required permits (DOT, DPR, and other as required)

Approval from MTA, LIRR, bridges, tunnels, AMTRAK, PATH, NYS or NYC DOT, etc. (as required)

Hydrant permit for clean water to conduct Permeability Tests (unless using water truck)

DEP-reviewed Boring Location Plan

I, , (P.E. or Representative) attest that all of the above have been completed and that this checklist along with the pertinent documentation mentioned above will be maintained on-site.

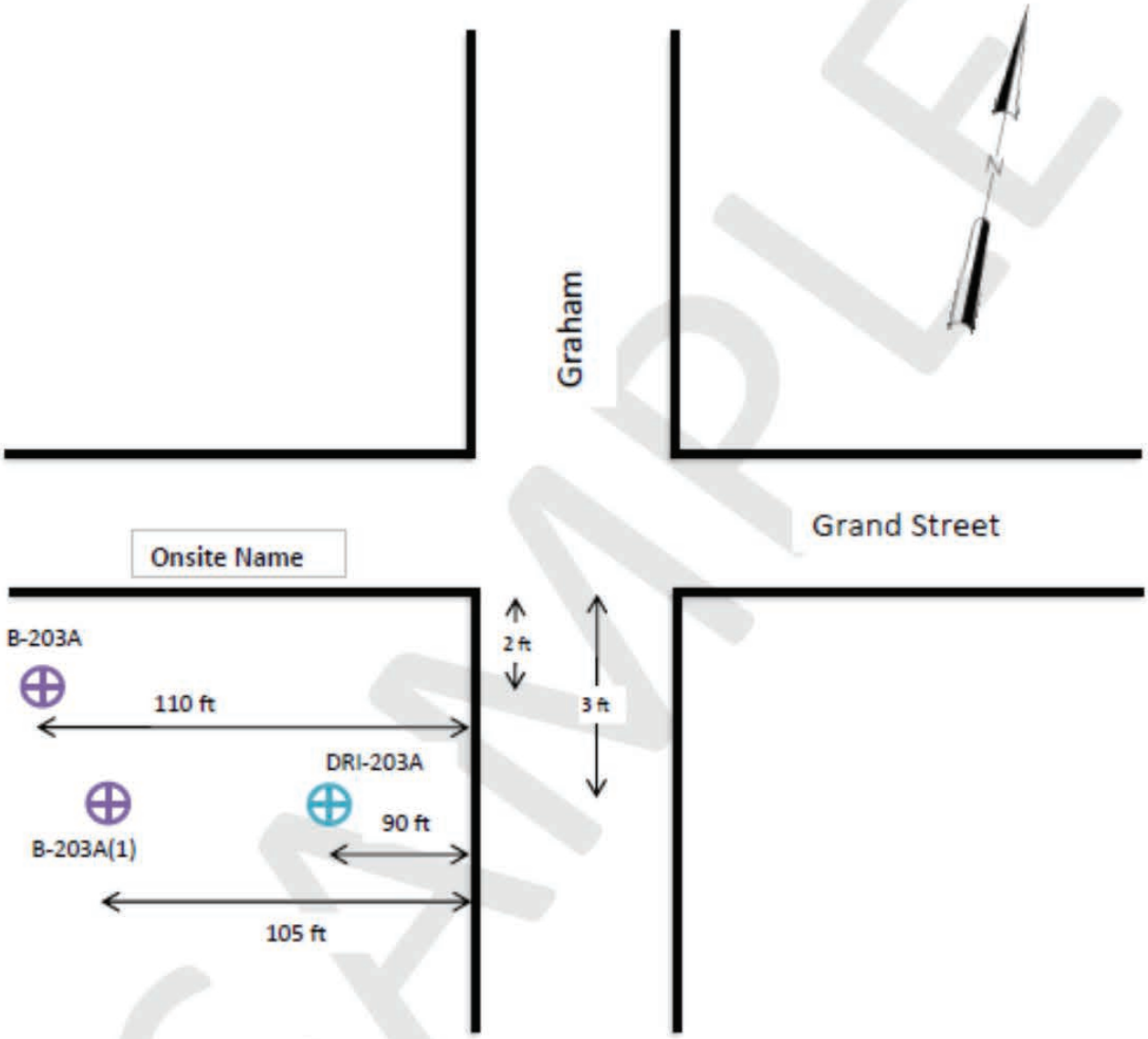
Date Signature of Onsite P.E. or Representative

APPENDIX F
ATTACHMENT 4

ONSITE BORING PLAN (SAMPLE)

COMPANY NAME/LOGO	ID No.	B-203A, B-203A(1), DRI- 203A
Prepared for: AGENCY NAME / LOGO	PROJECT:	<contract area & project description>
	BOROUGH:	<borough>
	LOCATION:	<address or cross streets>

Attachment 1 - Onsite Borehole and Double-Ring Infiltrometer (if applicable) Location Diagram



*Not to scale

Inspectors Remarks:

Soil boring location relocated due to obstruction encountered at 3 ft bgs

APPENDIX F
ATTACHMENT 5

GEOTECHNICAL REPORT SUMMARY TABLE (SAMPLE)

DEP Contract ID: X272-115M
DEP Project: Ranaqua Park
Prepared By:

New York City Environmental Protection
Bureau of Environmental Planning and Analysis
Borough of Bronx, New York

Geotechnical Report Summary Table

GI ID No.	Nearest Boring ID No.	Laboratory Testing Data / Historical Boring Soil Description			Permeability Analysis			Groundwater Table Depth(ft)	Bedrock Depth (ft)	General Geotechnical Notes	Interim Report Submission No.	Last DEP Review	Consultant Recommendation [Date]		
		Depth (ft)	USCS Symbol	% Passing No 200 Sieve	Nearest Permeability Test ID No.	Permeability Test Depth (ft)	Average Permeability Coef. (in/hr)					Accepted for Survey (Yes/No)	Proceed to Contract Plans (Yes/No)	Stone Column Length (ft), if applicable	Additional Notes
B-1		3-5	SC	27.7%	PT-1A	NP				Refusal at 9.7'					
		5-7	SC	18.4%	PT-1B	NP		NE	9.7	PT-1A & PT-2A terminated due to					
		9-11			PT-1C	8	2.04			lack of equipment	N/A	N/A	N/A	N/A	N/A
		13-15			PT-2A	NP				PT-1B terminated due to auger refusal					
		17-19			PT-2B	5	6.55								
B-2A		3-5	SC	20.1%						Refusal at 9.1'					
		5-7	SC	13.7%	NP			NE	NE	con'd drilling at offset location					
		9-11									N/A	N/A	N/A	N/A	N/A
		13-15													
		17-19													
B-2B		5-7	NT		PT-3	10	1.40			Refusal at 10.2'					
		9-11	NT		PT-4	5	9.90	10.2	NE		N/A	N/A	N/A	N/A	N/A
		13-15	NT												
		17-19	NT												
B-3		5-7	NT							Refusal at 25.1'					
		9-11	NT		NP			NE	NE		N/A	N/A	N/A	N/A	N/A
		13-15	NT												
		17-19	NT												
B-4		5-7	NT							Refusal at 9.75'					
		9-11	NT		NP			9.75	NE						
		13-15	NT								N/A	N/A	N/A	N/A	N/A
		17-19	NT												
TP-1		5-7	NT							Terminated at 8.2'					
		9-11	NT		NP			8.2	NE						
		13-15	NT								N/A	N/A	N/A	N/A	N/A
		17-19	NT												

Notes: Laboratory sample testing was not required below refusal depths for soil test pits performed. Refusal is defined as the inability to advance augers and split spoon samplers. In addition laboratory sample testomg was not required for test pits performed.

Abbreviations:

N/A	Not Applicable	B	Boring
NE	Not Encountered	PT	Permeability Test
NP	Not Performed	TP	Test Pit

APPENDIX F
ATTACHMENT 6

SOIL BORING LOGS (TEMPLATE)

		Boring ID No.	B- x248-01SRa
Prepared for:		PROJECT:	GXHP02-02
		LOCATION / BOROUGH :	Barretto Park, Bronx, NY
INSPECTOR:	DRILLER:	Start Date: 2/28/2018	Weather: 45 °F Sunny
CONTRACTOR:	HELPER:	Start Time: 9:47	
P.E./REP.:			
Total Boring Depth: 14.8 ft	Drill Bit Type: Direct Push	Weight of Hammer for casing: 140 lbs	
Rig Type: Geoprobe 7822 DT	Casing Inner Diameter: 4 in	Weight of Hammer for spoon: 140 lbs	
	Depth of Casing: 5 ft	Type of Hammer: Automatic	
Depth to Groundwater Table (bgs): 10 ft		Drop: 30 in	
Depth to Bedrock (bgs): NE ft		Split Spoon Diameter: 2 in	

B- x248-01SRa BORING LOG

Depth Below Ground Surface (ft)	Soil Description (Field Observations)	SPT Blows per 6"	N Value	Recovery Length (inches)	Remarks
0	Asphalt				
	Blck/Br mf SAND, so cmf Grvl, tr Silt (SW-SM)	5 / 1 / 1 /12"	2	12	Fill and Asphat crushed glass ash rock debris etc. Dry
	Bulk Sample 1 (S1) Gry/Br mf GRAVEL, so cm Sand, tr Silt (GW-GM)	8 / 3 / 5 / 4	8	12	Brick, ash, asphalt, sand, glass present micacious and decomp rock- Dry
5	Bulk Sample 2 (S2) Lt Gry/Br mf SAND, so silt, tr f Gravel (SM)	3 / 3 / 6 / 10	9	16	Moist and Soft- loose, dry, decomp rock
	Bulk Sample 3 (S3) Gry/Br mf SAND, so Silt, lt mf Gravel (SM)	7 / 10 / 9 / 8	19	24	Decomposed rock, micacious- Dry
10	Bulk Sample 4 (S4) Gry mf SAND, so Silt, tr f Gravel (SM)	7 / 1 / 15 / 23	16	24	Stratified decomposed rock - Extremely compact, Water at 10'
	Bulk Sample 5 (S5)	2 / 2 / 12 / 23	14	24	top 18 " saturated- bottom 6" dry
15	Br/Gry mf SAND, lt Silt (SM) Decomp Bedrock	26 / 33 / 54 / 50 /3"	87	24	top 16" saturated- botom 8" dry
20					

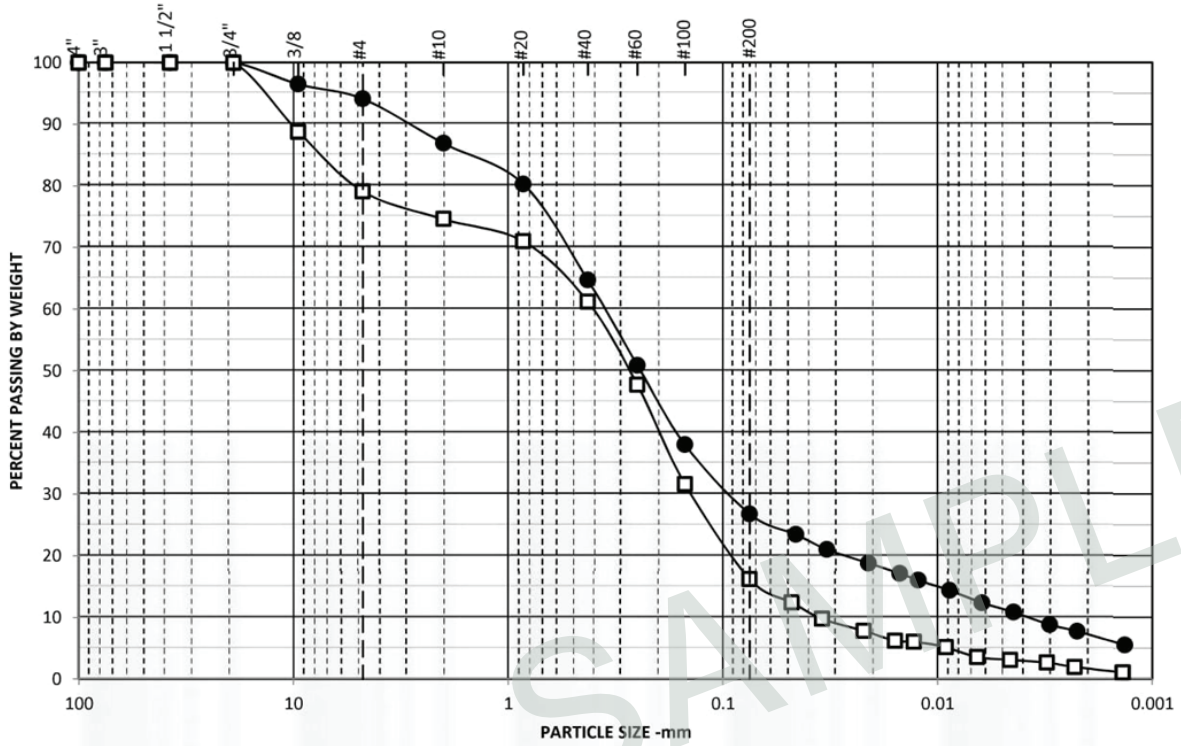
Boring terminated at 20 feet below ground surface unless otherwise instructed.

Inspector's Remarks:

APPENDIX F
ATTACHMENT 7

LABORATORY TEST RESULTS (SAMPLE)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



Boring ID No. B-X108-01RGa

Symbol	●	□	▲	○	◆
Depth	3-5	5-7	-	-	-
% Gravel	5.9	20.9	-	-	-
% Sand	67.3	62.9	-	-	-
% Fines	26.8	16.2	-	-	-
% -2µ	-	-	-	-	-
Cc	-	-	-	-	-
Cu	-	-	-	-	-
D_{100} (mm)	19.00	19.00	-	-	-
D_{60} (mm)	0.37	0.41	-	-	-
D_{30} (mm)	0.10	0.14	-	-	-
D_{10} (mm)	-	-	-	-	-
USCS	SM	SM	-	-	-
w (%)	12.2%	4.4%	-	-	-

Particle Size (Sieve #)	Percent Finer				
	●	□	▲	○	◆
4"	100.0	100.0	-	-	-
3"	100.0	100.0	-	-	-
1 1/2"	100.0	100.0	-	-	-
3/4"	100.0	100.0	-	-	-
3/8"	96.5	88.8	-	-	-
4	94.1	79.1	-	-	-
10	86.9	74.6	-	-	-
20	80.3	71.0	-	-	-
40	64.7	61.2	-	-	-
60	50.9	47.7	-	-	-
100	38.0	31.6	-	-	-
200	26.8	16.2	-	-	-

Depth (ft bgs)	Symbol	DESCRIPTION AND REMARKS
3-5	●	Silty sand
		Color/Odor/Impurities: brown
5-7	□	Silty sand with gravel
		Color/Odor/Impurities: gray
-	▲	
-	○	
-	◆	

Prepared for: NYCEDC New York City Economic Development Corporation

NYC Environmental Protection

Comments:

APPENDIX F
ATTACHMENT 8

PERMEABILITY TEST LOG (TEMPLATE)

			PT ID No.	PT(2)-	FAIR-01RGa
			Sheet	2	of 3
Prepared for: NYC Environmental Protection			PROJECT:	GXHP04-04	
			LOCATION / BOROUGH :	Fairmount Playground, Bronx, NY	
INSPECTOR:		DRILLER:	Start Date:	2/26/2018	Weather: 50°F Sunny
CONTRACTOR:		HELPER:	Start Time:	1:00	
P.E./REP.:					
Depth of PT:	6 ft	Drill Bit Type:	Direct Push	Weight of Hammer for casing:	140 lbs
Rig Type:	Geoprobe 7822 DT	Casing Internal Diameter:	4 in	Type of Hammer:	Automatic
		Casing Length:	64 in		

ASTM D-6391 – 11
PERMEABILITY COEFFICIENT (Km) FORMULA:

General Formula:

$$K_m = \pi R_t \times \frac{\left[D\left\{Ln\left(\frac{h_1}{h_2}\right)\right\}\right]}{11 \times (t_2 - t_1)}$$

Formula for 4" internal diameter casing (in/hr):

$$K_m = 1.142 R_t \times \frac{\left[Ln\left(\frac{h_1}{h_2}\right)\right]}{(t_2 - t_1)}$$

where:

$$R_t = {2.2902(0.9842^T)}/{T^{0.1702}}$$

PT(2)-FAIR-01RGa @ 6 ft

TEST 1

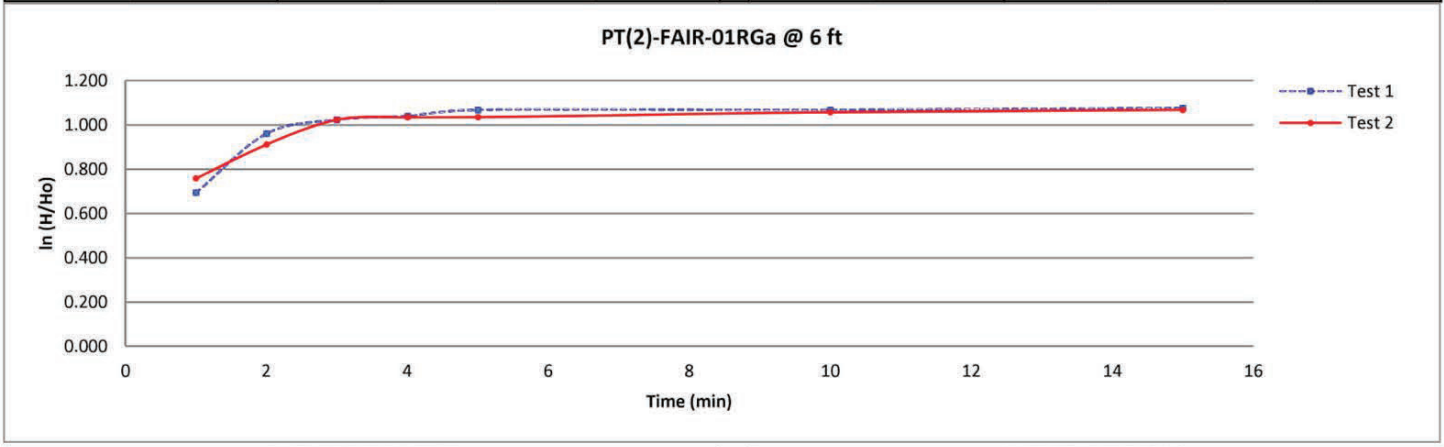
Water temperature (°C), T: 8.5 Rt= 1.39

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
1	32.000	32.000	0.693	0.017	66.0220
2	39.500	24.500	0.960	0.017	25.4376
3	41.000	23.000	1.023	0.017	6.0178
4	41.370	22.630	1.040	0.017	1.5447
5	42.000	22.000	1.068	0.017	2.6893
10	42.000	22.000	1.068	0.083	0.0000
15	42.180	21.820	1.076	0.083	0.1565

TEST 2

Water temperature (°C), T: 9.1 Rt= 1.36

FIELD DATA		CALCULATED DATA			
Time (min)	Depth (in)	Height (in)	Ln (H/Ho)	(t_1-t_2)	*Kv (in/hr)
1	34.000	30.000	0.758	0.017	70.6579
2	38.250	25.750	0.910	0.017	14.2459
3	41.000	23.000	1.023	0.017	10.5322
4	41.250	22.750	1.034	0.017	1.0192
5	41.250	22.750	1.034	0.017	0.0000
10	41.750	22.250	1.057	0.083	0.4145
15	42.000	22.000	1.068	0.083	0.2107



TEST 1 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 6.8329 in/hr

TEST 2 FINAL RESULTS

Time Weighted Average Permeability Coefficient **Km=** 6.6388 in/hr

AVERAGE PT(2)-FAIR-01RGa @ 6 ft

Time Weighted Average Permeability Coefficient **Km=** 6.7358 in/hr

Inspectors Remarks:

PT(2) FAIR-01RGa- successful

10 ft. PT refusal at 6'4". Two refusals means terminated PT.

DEFINITION OF VARIABLES

*Km= Mean permeability

T = Temperature of permeant (water), in °C

Ln = Natural Logarithmic

t1 = Time at the start of the test in the same units selected for Km

Rt = Ratio of viscosity of water at test temperature to the viscositye of water at 20°C

t2= Time at the end of the test in the units selected for Km

h1= Height of the water above the bottom of the casing at the start of the test in the same units selected for Km

h2= Height of the water above the bottom of the casing at the end of the test in the same units selected for Km

APPENDIX F
ATTACHMENT 9

GEOTECHNICAL REPORT SUBMISSION CHECKLIST

Environmental Protection

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
GREEN INFRASTRUCTURE GEOTECHNICAL CHECKLIST

Geotechnical Report Submission Checklist

This checklist outlines the requirements for each submission to DEP.

All requirements will be checked by the DEP project manager prior to review. If a project is found to be incomplete, it will be returned to the provider and one week will be allotted for revision. Checklists can be modified based on project specific requirements.

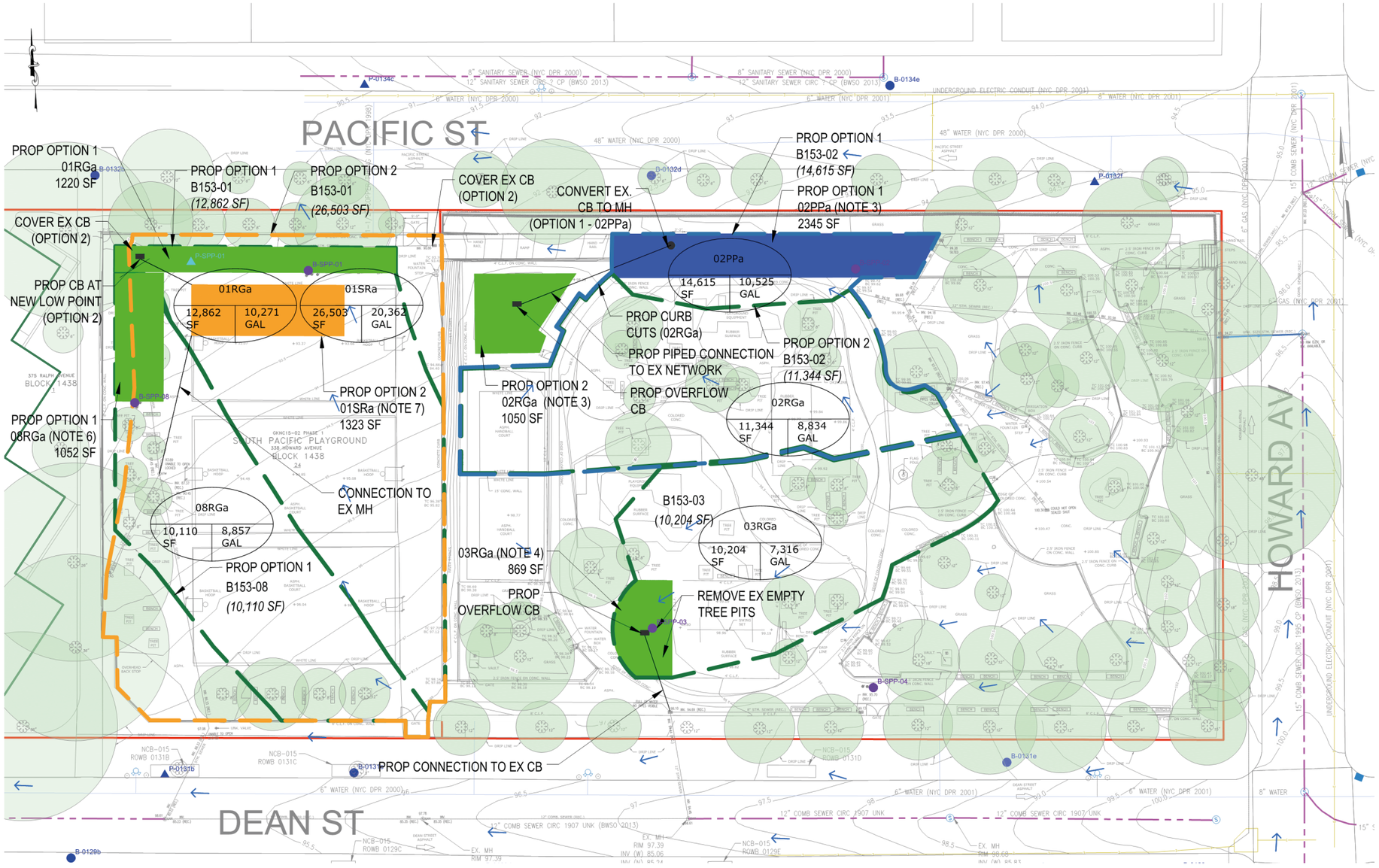
"[DEP Work Number and Project Description]"	[Date]
Geotechnical Report Submission *Conduct geotechnical testing for all requested locations and prepare final summary report.*	
Geotechnical Report (.PDF) including: • Final test location plan • Boring Logs • Permeability Test and Logs • Laboratory test results • Geotechnical Report Summary Table • Interpretation of testing results • Recommendations for appropriate GI practices • Copies of pre- and post- testing photographs (image files)	

Submitted by:

Date:

APPENDIX G

CONCEPTUAL PLAN TEMPLATES



Legend

Proposed GI Footprint/Surface Area

- BR3 — Bioretention
- PP1 — Permeable Pavement
- SR4 — Subsurface Retention
- TF2 — Synthetic Turf Field
- XXX SF — Size of Proposed Green Infrastructure Practice (Sq Ft)
- Proposed Manhole
- Proposed Inlet
- Proposed Drainage Piping

Managed Impervious Tributary Drainage Area (TDA)

- Bioretention TDA
- Permeable Pavement TDA
- Subsurface Retention TDA
- Synthetic Turf Field TDA
- (XXX SF) — Tributary Area of Green Infrastructure Practice (Sq Ft)

NOTES

1. ALL BORING AND PERMEABILITY TEST RESULTS FOR SOUTH PACIFIC PLAYGROUND SHOWED UNFAVORABLE CONDITIONS FOR INFILTRATION. ALL PRACTICES SHOWN ARE STORMWATER MANAGEMENT.
2. TDA B153-01 AND B153-08 HAVE TWO SEPARATE OPTIONS: 01RGa AND/OR 08RGa (OPTION 1), OR 01SRa (OPTION 2).
3. B153-02 HAS 2 OPTIONS FOR STORMWATER MANAGEMENT (02RGa OR 02PPa). 02RGa CONTAINS A PROPOSED CATCH BASIN AND DRAINAGE PIPING TO CONNECT INTO THE EXISTING DRAINAGE NETWORK. 02PPa REQUIRES THE CONVERSION OF THE EXISTING CB TO A MH.
4. RG08 IS PROPOSED TO FIT WITHIN THE TREE PLANTERS CONTAINING TREES EITHER RECOMMENDED FOR REMOVAL OR WHOSE CALIPERS SHOW SUITABLE FOR TRANSPLANT.
5. 01SRa REQUIRES THE CONVERSION OF THE EXISTING CATCH BASIN TO A MANHOLE, A NEW CATCH BASIN AT THE LOW POINT, AND ADDITIONAL DRAINAGE PIPING TO CONNECT INTO THE EXISTING STORM NETWORK.

Construction Cost Estimates

01RGa	$126,943.98	03RGa	$82,854.36
01SRa	$82,378.43	08RGa	$99,021.24
02RGa	$94,880.80		
02PPa	$74,925.69		

NYC Parks

Newtown Creek
South Pacific Playground | Conceptual Plan

NYC Environmental Protection

N

0’ 50’ 100’

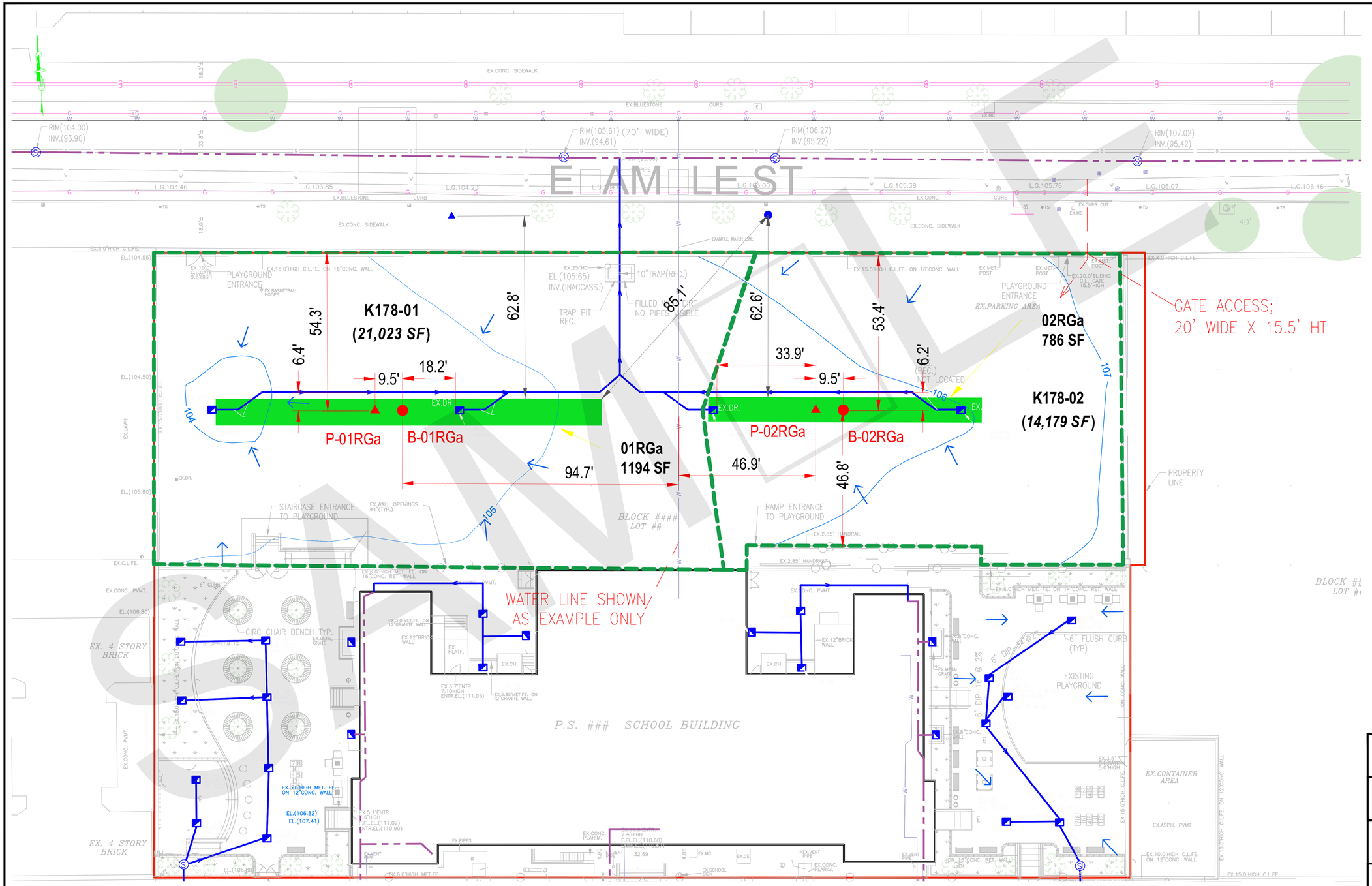
Environmental Protection

□r□□□ □□E□r□□□ □□□□□□ □□□□□□ □ A□□□□□□

□C□□r□□□□□O□-S□□ Gr□□□ I□r□□□r□□□r□

G□□□□□□□□□□I□□□□□□□□□□ L□□□□□□□ □□□□

□CSO Tr□□□□r□ Ar□□□S□□ N□□ □□□Sr□□□Addr□□□□



LEGEND

Proposed GI Footprint/Surface Area

- 03RG□ □□r□□□□□□
- 02□□□ □□r□ □□□□□ □□□□□ □□□
- 04SR□ S□□□□r□□□ R□□□□□□□
- 01ST□ S□□□□□□□ T□r□F□□d

Managed Impervious Tributary Drainage Area (TDA)

- □□r□□□□□□□ TDA
- □□r□ □□□□□ □□□□□ □□□TDA
- S□□□□r□□□ R□□□□□□□ TDA
- S□□□□□□□ T□r□F□□d TDA
- (XXX SF) Tr□□□□r□ Ar□□ □□Gr□□□ I□r□□□r□□□□r□ □r□□□□□ □S□F□□

Existing Site Conditions & Drainage

- □r□□□r□□ □□□□d□r□
- □□□d□□□ □r F□□□r□ □ □□□L□□ □C□r□
- Ⓢ E□□□□□ M□□□□□
- E□□□□□ Y□rd Dr□□□I□□□
- Dr□□□□□ □□□□□
- E□□□□□ RO□ C□□□ □□□□
- DE□ S□□□r M□□□
- DE□ □ □□□r M□□□
- □ □□□r S□r□□□ L□□□
- E E□□□r□□□S□r□□□ L□□□
- G G□□S□r□□□ L□□□
- E□□□□□ Tr□□ C□□□□□
- S□r□□S□□□□r□S□r□□□r
- Dr□□□□□ F□□□□□□
- S□r□□□ F□□□ Dr□□□□□
- A□□□□□R□□□

Geotechnical Plan

- DDC-0019-5 □ □□□r□□□□□r□□□
- B-ST1 □r□□□□□d S□□□□r□□
- P-BR3 □r□□□□□d □□r□ □□□□□T□□□
- B-28a N□□r□□ □□r□□ r□□ RO□ C□□□r□□□
- P-28b N□□r□□ □□r□ □□□□□T□□□r□□ RO□ C□□□r□□□

NOTES

1. 01□R □ ILL RE□UIRE T□E EASTERN MOST CATC□ □ASIN TO □E CA□□ED AND T□E □ ESTERN MOST CATC□ □ASIN TO □E RELOCATED □ IT□IN T□E RAIN GARDEN AND RAISED.
2. 02□R □ ILL RE□UIRE T□E EASTERN MOST CATC□ □ASIN TO □E CA□□ED AND T□E □ ESTERN MOST CATC□ □ASIN TO □E RAISED.
3. 01□R AND 02□R ARE SI□ED SUC□ T□AT T□E □AR□ING LOT CAN SU□□ORT A□□RO□IMATELY 50 CARS □ IT□ 2 □ANDICA□□ED □AR□ING S□ACES □ER ADA REGULATIONS OF □AR□ING LOT DESIGN.

ON-SITE GREEN INFRASTRUCTURE
□CSO□□□ ATER □ODY□
□□OROUG□ □□NY

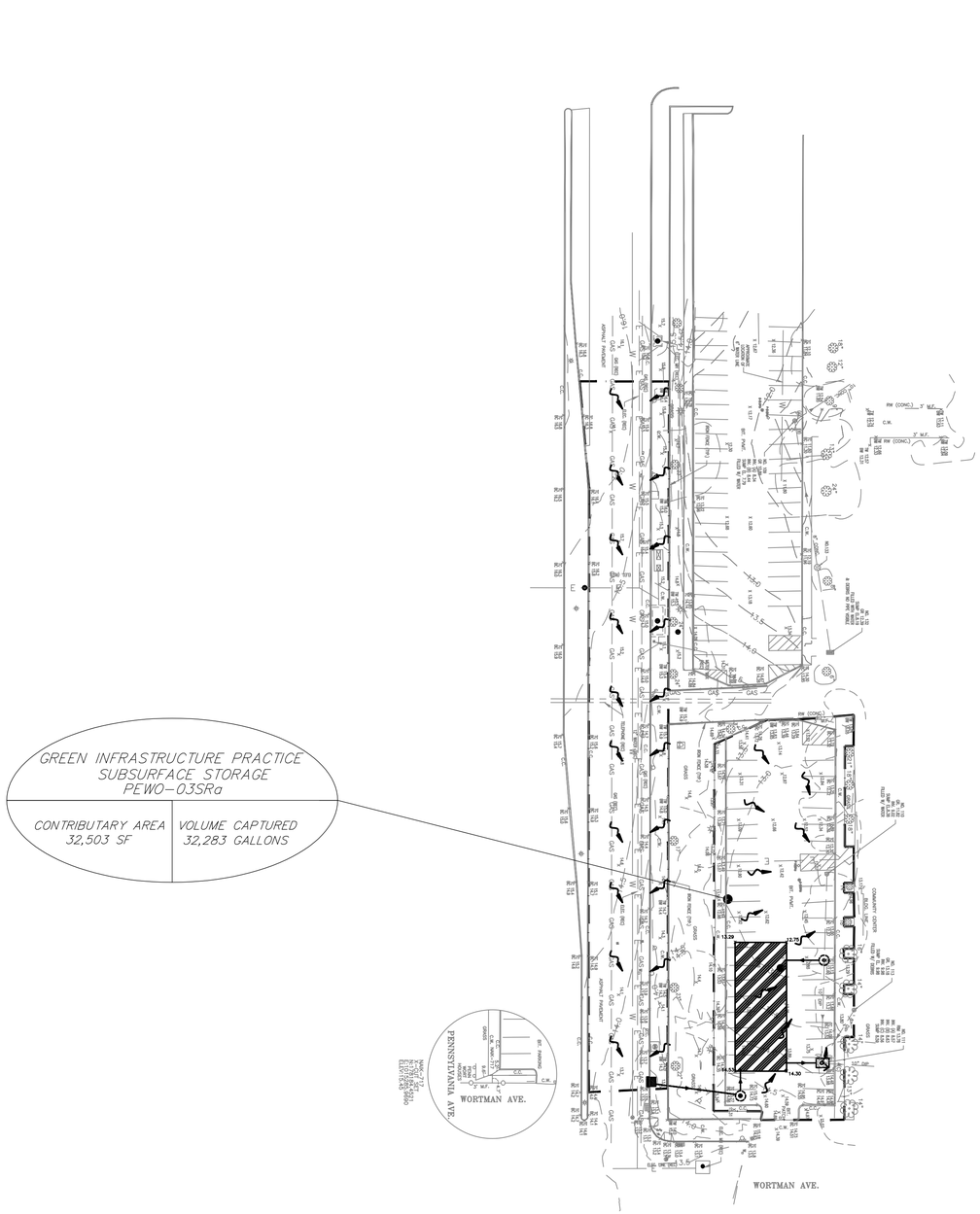
LEAD AGENCY: NYC Environmental Protection

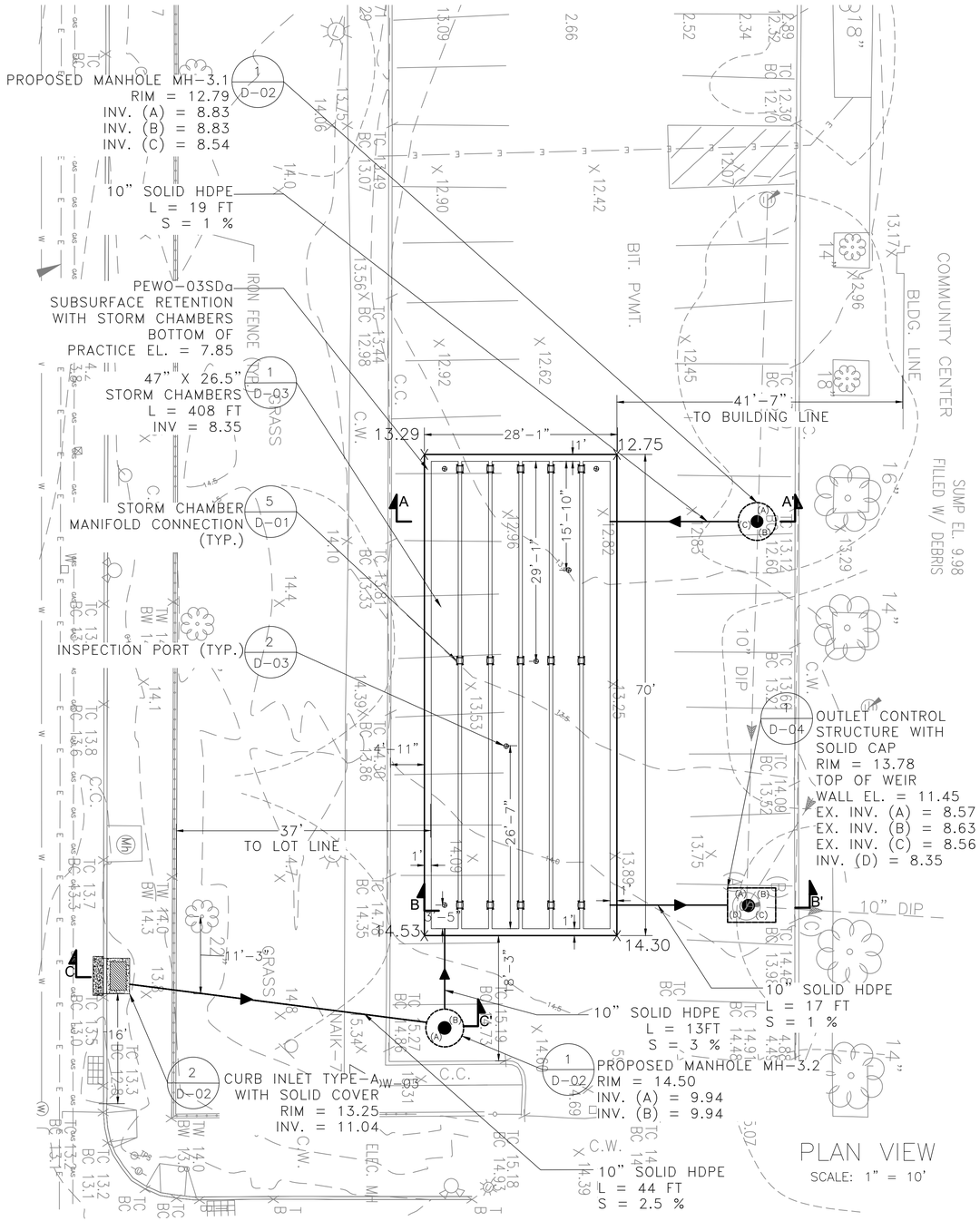
CONSULTANT ENGINEER:
□LOGO□

DE□ □RO□ECT ENGINEER:
□NAME LASTNAME□

CONTRACT NO:
GXXXX-XX [SITE NAME] [STREET ADDRESS]

SCALE	DATE	S□EET
0 SCALE IN FEET		





NO.	DATE	ISSUED FOR	BY

DESIGNED _____
DRAWN _____
CHECKED _____
DRAFTED BY _____

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING

ENGINEER'S SEAL

DESIGN FIRM LOGO

NYC Environmental Protection

CITY OF NEW YORK
ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS

EXAMPLE NYCHA CONCEPTUAL PLAN (WITH SURVEY)

DATE

PAGE

SHEET

APPENDIX H

GREEN INFRASTRUCTURE SURVEY DRAWING LEGEND

ABBREVIATIONS

ABANDONED	ABDN.
APARTMENT	APT.
ASPHALT	ASPH.
BASEMENT	BSMT.
BITUMINOUS	BIT.
BLOCK	BLK.
BLUESTONE	B.S.
BLUESTONE CURB	B.S.C.
BLUESTONE WALK	B.S.W.
BOTTOM OF CURB	B.C.
BRICK	BRK.
BUILDING	BLDG.
BUILT	BLT.
CALIPER	CAL.
CAST IRON	C.I.
CENTER LINE	C.L.
CHAIN LINK FENCE	C.L.F.
CHAMBER	CH.
CLASS NUMBER	CL. #
COMBINED	COMB.
COMMERCIAL	COMM.
CONCRETE	CONC.
CONCRETE CURB	C.C.
CONCRETE WALK	C.W.
DIAMETER	DIA.
DOUBLE BARREL	D.B.
DOWN	DN.
DRAWING	DWG.
DUCTILE IRON PIPE	D.I.P.
EXISTING	EXIST.
EXTRA STRENGTH VITRIFIED PIPE	E.S.V.P.
FIRE ALARM	F.A.
FIRE DEPARTMENT	F.D.
FLAT TOP REINFORCED CONCRETE	F.T.R.C.
FRAME	FR.
GRANITE	GRAN.
GRANITE CURB	GRAN. C.
INTERCEPTOR	INT.
INVERT ELEVATION	INV.
IRREGULAR	IRR.
MANHOLE	MH
NOT IN CONTRACT	N.I.C.
NOT TO SCALE	N.T.S.
PAVEMENT	PVMT.
POINT OF CURVATURE	P.C.
POINT OF INTERSECTION	P.I.
POINT OF TANGENCY	P.T.
PRECAST REINFORCED CONCRETE	P.R.C.
RADIUS	R
REINFORCED CONCRETE PIPE	R.C.P.
ROADWAY	RDWY.
SANITARY	SAN.
SEWER	SWR.
SIDEWALK	SW.
STANDARD	STD.
STEAM	ST.
STEEL	STL.
STEEL FACED CURB	SFC
STEEL NOSED CURB	S.N.C.
STONE	STN.
STORM	STM.
STORY	STY.
TOP OF CURB	T.C.
TRAFFIC SIGN	T.S.
VACANT	VAC.
WORKING POINT	W.P.

LEGEND

	EXISTING	PROPOSED
MANHOLES		
ELECTRIC	(E)	E
CABLE TV	C	
TELEPHONE	T	
TRAFFIC	Tf	
NYC MH	NYC	
GAS	G	
WATER	W	
FIRE DEPT.	F	
SUBWAY	SU	
COAL CHUTE	CC	
STORM SEWER	STM	STM
COMBINED SEWER	COMB	COMB
SANITARY SEWER	SAN	SAN
INTERCEPTOR SEWER	INT	INT
UNIDENTIFIED MANHOLE (NO RECORD AVAILABLE)	MH	
BUILT MANHOLE REPLACED BY NEW MANHOLE		
RECORD MANHOLE	S	
HARDWARE RIM EL. & INV. EL. (SEWER, ETC.)	S 61.23 INV.47.89	
INLETS/OUTLETS		
STORMWATER INLET		
ROWB, ROWG, ROWSGS INLET		INLET
ROWB, ROWG, ROWSGS OUTLET		OUTLET
CATCH BASINS		
CATCH BASIN WITH CURB PIECE - TYPE 1	1	
CATCH BASIN WITHOUT CURB PIECE - TYPE 2	2	2
CATCH BASIN WITHOUT CURB PIECE - TYPE 3	3	3
EXISTING CATCH BASIN TO BE REMOVED		
TO BE ABANDONED		A
TO BE MODIFIED		M
TO BE ADJUSTED		A
CATCH BASIN - NON-STANDARD		N
NEW CATCH BASIN TO BE CONSTRUCTED IN SAME LOCATION AS OLD BASIN		
INLET		
SEEPAGE BASIN	SB	SB
HYDRANTS		
LOW PRESSURE HYDRANT		
HIGH PRESSURE HYDRANT		
LOW PRESSURE HYDRANT TO BE RELOCATED		R
HIGH PRESSURE HYDRANT TO BE RELOCATED		R
LOW PRESSURE HYDRANT TO BE ADJUSTED (VERTICALLY)		A
HIGH PRESSURE HYDRANT TO BE ADJUSTED (VERTICALLY)		A
SIAMESE CONNECTION		
STREET LIGHTING AND TRAFFIC SIGNALS		
WOOD UTILITY POLE		
WOOD UTILITY POLE WITH STREET LIGHT		
WOOD UTILITY POLE WITH TRAFFIC SIGNAL		T
WOOD UTILITY POLE WITH STREET LIGHT AND FIRE ALARM BOX		F
WOOD UTILITY POLE WITH FIRE ALARM BOX		F
WOOD UTILITY POLE WITH PEDESTRIAN SIGNAL		PS
WOOD UTILITY POLE WITH TRAFFIC AND PEDESTRIAN SIGNAL		TPS
WOOD UTILITY POLE WITH STREET LIGHT AND TRAFFIC AND PEDESTRIAN SIGNAL		TPS
WOOD UTILITY POLE WITH STREET LIGHT AND PEDESTRIAN SIGNAL		PS
STREET LIGHT (METAL POLE)		
STREET LIGHT AND TRAFFIC SIGNAL		T
STREET LIGHT AND TRAFFIC SIGNAL WITH PEDESTRIAN SIGNAL		TPS
STREET LIGHT WITH PEDESTRIAN SIGNAL		PS
STREET LIGHT WITH FIRE ALARM BRACKET		F
TRAFFIC SIGNAL POST		T
TRAFFIC SIGNAL CONTROL BOX		
STANCHION WITH TRAFFIC SIGNAL		T
STANCHION W/PEDESTRIAN SIGNAL		TPS
TRAFFIC SIGNAL POST W/PEDESTRIAN SIGNAL		TPS
VALVE BOXES		
GAS	G	
WATER	W	
STEAM	St	

LEGEND

	EXISTING	PROPOSED
TREES		
EXISTING TREE (SIZE AS LABELED)		
EXISTING TREE DRIPLINE		
EXISTING TREE TO BE REMOVED		
NEW TREE TO BE PLANTED		
SHRUB		
HEDGE (HEIGHT AS LABELED)		
MISCELLANEOUS		
VAULT (SIDEWALK)	V	
CELLAR WINDOW GRATING		
CELLAR DOOR	CD	
SUBWAY GRATING		
STORMWATER RUNOFF	SVO	
TRAFFIC DIRECTION		
PARKING METER		
OIL FILL CAP OR OIL VENT	OR OFILL	
FIRE ALARM BOX	F	
POLICE CALL BOX	P	
MAIL BOX, PUBLIC PHONE	MB TEL.	
COLUMN - FOUNDATION (OF ELEVATED STRUCTURES)	OR	
HEADER		
AREA OF ADJUSTMENT		
LIMIT OF NEW PAVEMENT		
BUS PAD		
SIGN (GROUND MOUNTED)		
SIGN (OVERHEAD)		
TRAIN STATION ENTRANCE	DOWN	
SHAFT TO BUILDING BASEMENT	SH	
PEDESTRIAN RAMP		
CURB (CONCRETE UNLESS OTHERWISE INDICATED)		
CURB WITH DROP CURB (DRIVEWAY)	DC	DC
EDGE OF PAVEMENT WITHOUT CURB		
PROPOSED CONSTRUCTION (TOP OF CURB) ELEVATION AND STATION		T.C. 13.8 STA. 26+33
ROCK OUTCROP		
NORTH ARROW		
SURVEY MARKER		
BARRIERS		
BEAM TYPE MALL BARRIER		
PORTABLE PRECAST CONCRETE BARRIER		
CAST IN PLACE CONCRETE BARRIER		
RETAINING WALL (W/TYPE)	RW (STN.)	
RAILROAD/TROLLEY TRACK		
FENCE (WITH HEIGHT AND TYPE)		
CHAIN LINK FENCE	6'	
IRON PICKET FENCE	5'	
WIRE FENCE	5'	
IRON ON CONCRETE COPING		
WOOD PICKET FENCE	4'	
GUARD POST	GP	
BUILDINGS		
HOUSE INFORMATION (HOUSE NUMBER, BLDG TYPE, FIRST FLOOR ELEV., (CE) CELLAR ENTR., (GE) GARAGE ENTR.)	95-02 2-STY.FR. ▼ FF 25.3 G.E.17.5	
STAIRS OR STOOPS		
CANOPY	CANOPY	
ENTRANCE**		
GEOTECHNICAL		
BORING LOCATION	B	
PERMEABILITY TEST LOCATION	PT	

LEGEND

	EXISTING	PROPOSED
CONDUITS		
6" WATER MAIN	6" WATER	
8" WATER MAIN	8" WATER	
12" WATER MAIN	12" WATER	
16" WATER MAIN*	16" WATER	
20" WATER MAIN*	20" WATER	
24" WATER MAIN*	24" WATER	
30" WATER MAIN*	30" WATER	
36" WATER MAIN*	36" WATER	
42" WATER MAIN*	42" WATER	
48" WATER MAIN*	48" WATER	
54" WATER MAIN*	54" WATER	
60" WATER MAIN*	60" WATER	
66" WATER MAIN*	66" WATER	
72" WATER MAIN*	72" WATER	
84" WATER MAIN*	84" WATER	
96" WATER MAIN*	96" WATER	
STORM SEWER (WITH SIZE - LESS THAN 24")	15" STM. SEWER	15" STM. SEWER
STORM SEWER (WITH SIZE - 24" AND GREATER)*	24" STM. SEWER	24" STM. SEWER
SANITARY SEWER (WITH SIZE - LESS THAN 24")	15" SAN. SEWER	15" SAN. SEWER
SANITARY SEWER (WITH SIZE - 24" AND GREATER)*	24" SAN. SEWER	24" SAN. SEWER
COMBINED SEWER (WITH SIZE - LESS THAN 24")	15" COMB. SEWER	15" COMB. SEWER
COMBINED (WITH SIZE - 24" AND GREATER)*	24" COMB. SEWER	24" COMB. SEWER
INTERCEPTOR SEWER (WITH SIZE - LESS THAN 24")	15" INTERCEPTOR SEWER	15" INTERCEPTOR SEWER
INTERCEPTOR SEWER (WITH SIZE - 24" AND GREATER)*	24" INTERCEPTOR SEWER	24" INTERCEPTOR SEWER
CATCH BASIN CONNECTION		
GAS LINE (WITH SIZE)	4" GAS	
STEAM (WITH SIZE)	16" STEAM	
ELECTRIC	ELECTRIC	
TELEPHONE	TELEPHONE	
CABLE	CABLE	
FIRE ALARM	FIRE ALARM	
OVERHEAD (AERIAL) UTILITY LINE	A/E,T,F	
TA SUBWAY CONDUIT		
LEGAL DATA		
LOT & BLOCK NUMBER	39 BLOCK 2109	
ESTABLISHED/LEGAL GRADE	0.00	
ANGLE	86°30'48"	
BLOCK LENGTH	167.01' (65.75 m)	
INTERPOLATED/CALCULATED ANGLE OR LENGTH	[86°30'48"] [167.01'(65.75 m)]	
MAPPED PROPERTY LINE (RIGHT-OF-WAY LINE)	PL	
LOT LINE		
SURVEY MONUMENT (CITY) - IDENTIFY BY TOPO NUMBER	M#	
BENCH MARK (LABEL)	BM#	
SURVEY CONTROLS		
CONTROL SURVEY TRAVERSE		
CENTER LINE BASE LINE	10+00 10+50	

* LINE SPACING IN SYMBOL TO BE SCALED TO CONDUIT SIZE
** WIDTH OF ENTRANCE SYMBOL SHALL BE TO SCALE

NO.	DATE	ISSUED FOR	BY

DESIGNED XXX
DRAWN XXX
CHECKED XXX
PROJ.ENGR. XXX

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.

ENGINEER'S SEAL

DESIGN FIRM LOGO

APPROVED FOR THE CITY OF NEW YORK

PROJECT MANAGER P.E.

NYC Environmental Protection

CITY OF NEW YORK
ENVIRONMENTAL PROTECTION
BUREAU OF ENGINEERING DESIGN AND CONSTRUCTION
GREEN INFRASTRUCTURE
NYCDEP CAPITAL PROJECT ########
<AGENCY> CAPITAL PROJECT ########

RIGHT-OF-WAY GREEN INFRASTRUCTURE <CONTRACT #>
<WATERBODY> - <OUTFALL NO.> - <BOROUGH>
LEGEND

DATE PROJECT DATE
PAGE ## OF ##
SHEET I-3

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Project Name:
Prepared by:
Date:

TREE_PROTECTION_SCHEDULE

TREE #	SPECIES (common name)	DBH (inches)	CTLA CONDITION RATING	ISA CRITICAL ROOTZONE (CRZ) RADIUS (ft.)	TREE REMOVAL	STUMP REMOVAL	TRANSPLANT TREE	PREPARATORY PRUNING							TREE PROTECTION						DECOMPACT				PREPARATORY FERTILIZE	TREE GROWTH REGULATOR	COMMENTS
								ANSI A-300																			
								Cleaning	Raising	Reducing	Restoring	Structural	Thinning	Limb Tying	Temporary Wooden Tree Guard	Temporary Wooden Tree Guard For Groves	Temporary Fence Boundary	Protect Existing Tree Roots w/ Woodchips	Protect Ex. Tree Roots w/ Plywood or Mats	Air-Tilling 3 Ft Radius	Air-Tilling 5 Ft Radius	Radial Trench	Vertical Mulch			
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Project Name:
Prepared by:
Date:

TREE_PROTECTION_SCHEDULE

TREE #	SPECIES (common name)	DBH (inches)	CTLA CONDITION RATING	ISA CRITICAL ROOTZONE (CRZ) RADIUS (ft.)	TREE REMOVAL	STUMP REMOVAL	TRANSPLANT TREE	PREPARATORY PRUNING							TREE PROTECTION						DECOMPACT				PREPARATORY FERTILIZE	TREE GROWTH REGULATOR	COMMENTS
								ANSI A-300																				
								Cleaning	Raising	Reducing	Restoring	Structural	Thinning	Limb Tying	Temporary Wooden Tree Guard	Temporary Wooden Tree Guard For Groves	Temporary Fence Boundary	Protect Existing Tree Roots w/ Woodchips	Protect Ex. Tree Roots w/ Plywood or Mats		Air-Tilling 3 Ft Radius	Air-Tilling 5 Ft Radius	Radial Trench	Vertical Mulch			
2493																											
2494																											
2495																											
2496																											
2497																											
2498																											
2499																											
2500																											

Project Name:
Prepared by:
Date:

Arborist Summary Report

TREE #	SPECIES	DBH (in.)	TOTAL TREE HEIGHT (ft.)	CROWN HEIGHT (ft.)	CROWN WIDTH (ft.T)	CTLA CONDITION RATING	SPECIES TOLERANCE TO CONSTRUCTION IMPACTS	AGE CLASS **Y**-<20% **M**-20-80% **OM**->80% of Life Expectancy	TREE REMOVAL	STUMP REMOVAL	TRANSPLANT TREE	ISA CRITICAL ROOT ZONE (CRZ) RADIUS (ft.)	STRUCTURAL CRZ RADIUS (ft.)	PRUNING ANSI A-300 Cleaning	Raising	Reducing	Restoring	Structural	Thinning	Limb Tying	COMMENTS
1																					
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6																					
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Project Name:
Prepared by:
Date:

CRZ'S_UNIT_ESTIMATES

Contract Unit Estimates (For Parks' Capital Contract Only)							UNIT TOTALS (minimum 1 unit)					
							1	1	1	1	1	1
Tree #	SPECIES	DBH	Age Class	SPECIES TOLERANCE	ISA CRZ RADIUS (ft.)	STRUCTURAL CRZ RADIUS (ft.)	TREE REMOVAL UNITS	PRUNING UNITS	DECOMPACT UNITS	PREP FERT UNITS	TREE GROWTH REGULATOR UNITS	STUMP REMOVAL UNITS
2497							0.00	0.00	0.00	0.00	0.00	0.00
2498							0.00	0.00	0.00	0.00	0.00	0.00
2499							0.00	0.00	0.00	0.00	0.00	0.00
2500							0.00	0.00	0.00	0.00	0.00	0.00

Tree Valuations

** The Trunk Area Replacement (TAR) is the NYC Tree Valuation method calculated for all trees on a project. It is measured in square inches (in2). Resitution is required for all Design Removals, and is calculated as a hypothetical for condition removals as well as the remaining trees (preservation TAR), which reveals their current value, and the potential cost of their loss.*

*** The Required TAR for Design Removals (column P) can never fall below the Caliper TAR (column I) for any tree or for a project overall. For each tree, if the value in Column I is higher than the value in column P, that value is automatically substituted for P. The project totals are shown on the summary tab. The TAR of caliper is calculated for a 3-inch dbh tree.*

Column Summaries		
Required TAR**	Exempt TAR	Preservation TAR
0.00	0.00	0.00

TAR for Other Tree Sizes ($) - FOR DECISION MAKING ONLY
($ values for each tree size will populate when tree cost is entered in restitution calculator tab)
[for design removals]

Replacement Tree Size and Associated Trunk Area of Tree Size (in^2)						
1-gallon	2-gallon	10-gallon	2" b&b	3" b&b	4" b&b	5" b&b
0.126	0.283	0.786	3.143	7.071	12.571	19.643

TREE #	SPECIES	TREE STATUS					DBH (inches) (populates if Design Removal)	TAR of Caliper (in^2)**	TOTAL BASAL AREA (in^2)	CTLA CONDITION RATING	SPECIES RATING	LOCATION FACTOR			NYC Trunk Area Replacement (TAR) (in^2)*		
		Tree Remains	Condition Removal	Design Removal (restitution required)	Stump Removal	Trans-plant						Site Rating	Placement Rating	Location Rating	Design Removals (Required TAR)**	Condition Removals (Exempt TAR)	Tree Remains or Transplant (Preservation TAR)
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TREE #	SPECIES	TREE STATUS					DBH (inches) (populates if Design Removal)	TAR of Caliper (in^2)**	TOTAL BASAL AREA (in^2)	CTLA CONDITION RATING	SPECIES RATING	LOCATION FACTOR			NYC Trunk Area Replacement (TAR) (in^2)*		
		Tree Remains	Condition Removal	Design Removal (restitution required)	Stump Removal	Trans-plant						Site Rating	Placement Rating	Location Rating	Design Removals (Required TAR)**	Condition Removals (Exempt TAR)	Tree Remains or Transplant (Preservation TAR)
2491																	
2492																	
2493																	
2494																	
2495																	
2496																	
2497																	
2498																	
2499																	
2500																	
Total							0.0	0.0	0.0						0.00	0.00	0.00

Replacement Tree Size and Associated Trunk Area of Tree Size (in^2)						
1-gallon	2-gallon	10-gallon	2" b&b	3" b&b	4" b&b	5" b&b
0.126	0.283	0.786	3.143	7.071	12.571	19.643
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

VALUATION

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
ALDER, EUROPEAN	ALGL	Good	95.00%		Good	Y
AMERICAN SYCAMORE	PLOC	Moderate	100.00%		Good	M
AMUR CORKTREE	PHAM	Unknown	85.00%		Good	OM
APPLE	MAPU	Moderate	85.00%		Moderate	Y
ARBORVITAE, AMERICAN	THOC	Unknown	90.00%		Moderate	M
ARBORVITAE, ORIENTAL	THOR	Unknown	90.00%		Moderate	OM
ARBORVITAE, WESTERN	THPL	Unknown	100.00%		Poor	Y
ASH, BLACK	FRNI	Good	90.00%		Poor	M
ASH, BLUE	FRQU	Good	95.00%		Poor	OM
ASH, CAROLINA	FRCA	Good	80.00%		Unknown	Y
ASH, EUROPEAN	FREX	Moderate	95.00%		Unknown	M
ASH, FLOWERING	FROR	Unknown	90.00%		Unknown	OM
ASH, GREEN	FRPE	Good	90.00%			
ASH, GREEN -MARS SEED	FRPEMS	Good	90.00%		ISA_CONDITION	
ASH, GREEN -SUMMIT	FRPES	Good	90.00%		95-100	Excellent
ASH, OTHER	FR	Moderate	90.00%		80-94	Good
ASH, RAYWOOD	FROXRA	Unknown			60-79	Fair
ASH, SINGLE LEAVED	FREXHE	Unknown	85.00%		45-59	Poor
ASH, WHITE	FRAM	Moderate	95.00%		0-44	Very Poor
ASH, WHITE -AUT APPLA	FRAMAA	Moderate	95.00%		0.00	Dead
ASH, WHITE -AUT PURPL	FRAMAP	Moderate	95.00%			
ASPEN, BIGTOOTH	POGR	Moderate	90.00%		PRUNING UNITS	
ASPEN, QUAKING	POTR1	Moderate	90.00%		0"	0
ATLANTIC WHITE CEDAR	CHTH	Unknown	90.00%		0" - 6"	0.75
BALDCYPRESS	TADI	Good	100.00%		6" - 12"	1.00
BAYBERRY, EVERGREEN	MYHE	Good	85.00%		12" - 18"	1.25
BAYBERRY, SOUTHERN	MYCE	Good	85.00%		18" -24"	1.50
BEECH, AMERICAN	FAGR	Poor	100.00%		24" - 30"	2.00
BEECH, EUROPEAN	FASY	Poor	100.00%		30" - 36"	2.50
BEECH, OTHER	FA	Poor	100.00%		36" - 42"	3.00
BIRCH, EUROPEAN	BEPE	Unknown	85.00%		42" - 48"	3.50
BIRCH, GRAY	BEPO	Moderate	80.00%		Over 48"	4.00
BIRCH, OTHER	BE	Poor	90.00%			
BIRCH, PAPER	BEPA	Poor	90.00%		Removal UNITS	
BIRCH, RIVER	BENI	Moderate	95.00%		0"	0
BIRCH, SWEET	BELE	Moderate	95.00%		0" - 6"	0.75
BIRCH, WEEPING	BEPEGR	Unknown	90.00%		6" - 12"	1.00
BIRCH, YELLOW	BEAL	Moderate	95.00%		12" - 18"	1.25
BLACK LOCUST	ROPS	Good	90.00%		18" - 24"	1.50
BLACKGUM	NYSY	Good	95.00%		24" - 30"	2.00
BOXELDER	ACNE	Good	90.00%		30" - 36"	2.50
BUCKEYE, OHIO	AEGL	Poor	90.00%		36" - 42"	3.50
BUCKEYE, RED	AEPA	Moderate	90.00%		42" - 48"	4.50
BUCKEYE, YELLOW	AEOC	Poor	100.00%		Over 48"	5.50
BUTTERNUT	JUCI	Unknown	95.00%			
BUTTONWOOD, SILVER	COSE	Unknown			Tree Growth Regulato	
CATALPA, NORTHERN	CASP	Good	100.00%		0"	0
CATALPA, SOUTHERN	CABI	Good	100.00%		0" - 6"	0.75
CEDAR, ATLAS	CEAT	Unknown	100.00%		6" - 12"	1.00

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
CEDAR, DEODAR	CEDE	Good	95.00%		12" - 18"	1.25
CHERRY, BLACK	PRSE1	Moderate	95.00%		18" -24"	1.50
CHERRY, CORNELIAN	COMA	Unknown	85.00%		24" - 30"	2.00
CHERRY, HIGAN -PENDLA	PRSU	Unknown	80.00%		30" - 36"	2.50
CHERRY, KWANZAN	PRSE2	Unknown	85.00%		36" - 42"	3.00
CHERRY, MAZZARD	PRAV	Unknown	95.00%		42" - 48"	3.50
CHERRY, OTHER	PR	Moderate	85.00%		Over 48"	4.00
CHERRY, PIN	PRPE1	Unknown	85.00%			
CHERRY, SARGENT	PRSA	Unknown	90.00%			
CHESTNUT, AMERICAN	CADE	Unknown	100.00%		Decompact UNITS	
CHESTNUT, CHINESE	CAMO	Unknown	95.00%		0"	0
CHINESE PARASOL TREE	FISI	Unknown	90.00%		0" - 6"	0.75
CHINKAPIN, ALLEGHENY	CAPU	Poor	85.00%		6" - 12"	1.00
CHOKECHERRY, AMUR	PRMA	Unknown	90.00%		12" - 18"	1.25
CHOKECHERRY, COMMON	PRVI	Unknown	85.00%		18" - 24"	1.50
CHOKECHERRY, SHUBERT	PRVISH	Unknown	100.00%		24" - 30"	2.00
CITRUS SP	CISP	Unknown			30" - 36"	2.50
COMMON CRAPEMYRTLE	LAIN	Unknown	80.00%		36" - 42"	3.00
COTONEASTER SPECIES	CO3	Unknown	90.00%		42" - 48"	3.50
COTTONWOOD, BLACK	POTR2	Poor	90.00%		Over 48"	4.00
COTTONWOOD, EASTERN	PODE	Moderate	90.00%			
COTTONWOOD, SWAMP	POHE	Unknown	90.00%			
CRABAPPLE	MA2	Moderate	85.00%			
CRABAPPLE -HARV. GOLD	MAHA	Moderate	85.00%			
CRABAPPLE -IND.SUMMER	MAIS	Moderate	85.00%			
CRANBERRY, AMERICAN	VITR	Unknown	85.00%			
CUCUMBER TREE	MAAC	Moderate	95.00%			
CYPRESS, LEYLAND	CULE	Unknown	95.00%			
DAWN REDWOOD	MEGL	Unknown	100.00%			
DOGWOOD, FLOWERING	COFL	Moderate	85.00%			
DOGWOOD, KOUSA	COKO	Unknown	90.00%			
DOGWOOD, OTHER	CO1	Poor	85.00%			
DOGWOOD, ROUGHLEAF	CODR	Unknown	85.00%			
DOUGLAS FIR	PZME	Moderate	100.00%			
EASTERN HOP HORNBEAM	OSVI	Moderate	85.00%			
EASTERN REDCEDAR	JUVI	Good	90.00%			
EASTERN WAHOO	EUAT	Moderate	90.00%			
ELM, AMER. PRINCETON	ULAMPR	Good	95.00%			
ELM, AMERICAN	ULAM	Good	95.00%			
ELM, BRANDON	ULAMBR	Good				
ELM, CEDAR	ULCR	Unknown	95.00%			
ELM, CHINESE	ULPA	Unknown	95.00%			
ELM, CHINESE ATHENA	ULPAAT	Unknown	95.00%			
ELM, ENGLISH	ULPR	Unknown	95.00%			
ELM, OTHER	UL	Good	95.00%			
ELM, ROCK	ULTH	Unknown	95.00%			
ELM, SEPTEMBER (RED)	ULSE	Unknown	95.00%			
ELM, SIBERIAN	ULPU	Good	90.00%			
ELM, SLIPPERY	ULRU	Good	95.00%			

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
ELM, WINGED	ULAL	Good	90.00%			
ELM,AMER. DELAWARE#2	ULAMDE2	Good	95.00%			
ELM,CHIN CENTRAL PAR	ULPACPS	Unknown	95.00%			
ELM,CHINESE ALLEE	ULPAAL	Unknown	95.00%			
ELM,SMOOTHLEAF HOMES	ULCAHO	Good	95.00%			
EUR. SMOKE TREE	COCO1	Unknown	85.00%			
FIR, BALSAM	ABBA	Good	100.00%			
FIR, FRASER	ABFR	Unknown	95.00%			
FIR, OTHER	AB	Moderate	95.00%			
FIR, WHITE	ABCO	Moderate	95.00%			
FRINGE TREE	CHVI	Moderate	90.00%			
GINKGO	GIBI	Good	100.00%			
GINKGO (FEMALE)	GIBI(F)	Good	100.00%			
GOLDEN -CHAIN TREE	LAWA	Unknown	85.00%			
GOLDENRAIN TREE	KOPA	Unknown	85.00%			
GOLDENRAIN TREE, S	KOEL	Unknown	85.00%			
HACKBERRY	CEOC	Good	95.00%			
HARDY RUBBER TREE	EUUL	Unknown	95.00%			
HAWTHORN, COCKSPUR	CRCR	Good	80.00%			
HAWTHORN, DOWNY	CRMO1	Unknown	80.00%			
HAWTHORN, ENGLISH	CRMO2	Unknown	80.00%			
HAWTHORN, GREEN	CRVI	Unknown	80.00%			
HAWTHORN, OTHER	CR	Good	80.00%			
HAWTHORN, PARSLEY	CRMA	Unknown	80.00%			
HAWTHORN, WASHINGTON	CRPH	Good	80.00%			
HAZEL SPECIES	CO2	Good	90.00%			
HEMLOCK, EASTERN	TSCA	Poor	100.00%			
HICKORY, BITTERNUT	CACO	Poor	95.00%			
HICKORY, BLACK	CATE	Unknown				
HICKORY, MOCKERNUT	CATO	Moderate	100.00%			
HICKORY, OTHER	CA1	Poor	95.00%			
HICKORY, PIGNUT	CAGL	Moderate	95.00%			
HICKORY, SCRUB	CAFL	Unknown				
HICKORY, SHAGBARK	CAOV	Poor	100.00%			
HICKORY, SHELLBARK	CALA	Unknown	100.00%			
HICKORY, WATER	CAAQ	Good	100.00%			
HOLLY SPECIES	ILSP	Good	90.00%			
HOLLY, AMERICAN	ILOP	Good	95.00%			
HOLLY, DAHOON	ILCA	Good	90.00%			
HONEYLOCUST	GLTR	Good	95.00%			
HORNBEAM, AMERICAN	CACA	Unknown	90.00%			
HORNBEAM, EUROPEAN	CABE	Unknown	90.00%			
HORSECHESTNUT	AEHI	Good	95.00%			
HORSECHESTNUT, RED	AECA	Good	90.00%			
JAPANESE CEDAR	CRJA	Unknown	95.00%			
JAPANESE PAGODA TREE	SOJA	Unknown	95.00%			
JAPANESE TREE LILAC	SYRE	Unknown	85.00%			
KATSURA TREE	CEJA	Poor	95.00%			
KENTUCKY COFFEETREE	GYDI	Good	100.00%			

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
LARCH, COMMON	LADE	Unknown	100.00%			
LAURELCHERRY, CAROLI	PRCA	Unknown	80.00%			
LINDEN, AMERICAN	TIAM	Poor	95.00%			
LINDEN, LITTLE LEAF	TICO	Poor	95.00%			
LINDEN, LITTLELEAF G	TICOGR	Poor	95.00%			
LINDEN, OTHER	TI	Moderate	95.00%			
LINDEN, SILVER	TITO	Poor	95.00%			
LONDON PLANETREE	PLAC	Moderate	100.00%			
MAACKIA, AMUR	MAAM	Unknown	90.00%			
MAGNOLIA, CHINESE	MADE	Unknown	95.00%			
MAGNOLIA, OTHER	MA1	Unknown	95.00%			
MAGNOLIA, SOUTHERN	MAGR	Moderate	95.00%			
MAGNOLIA, STAR	MAST	Unknown	95.00%			
MAGNOLIA, UMBRELLA	MATR	Unknown	95.00%			
MAPLE, AMUR	ACGI	Unknown	85.00%			
MAPLE, ARMSTRONG	ACRUAR	Moderate	95.00%			
MAPLE, BLACK	ACNI	Unknown	95.00%			
MAPLE, HEDGE	ACCA	Unknown	85.00%			
MAPLE, JAPANESE	ACPA	Unknown	85.00%			
MAPLE, NORWAY	ACPL	Moderate	90.00%			
MAPLE, NORWAY -CLEVLD	ACPLCL	Moderate	90.00%			
MAPLE, NORWAY -COLUMN	ACPLCO	Moderate	90.00%			
MAPLE, NORWAY -CR KNG	ACPLCR	Moderate	90.00%			
MAPLE, NORWAY -EMQUEN	ACPLEM	Moderate	90.00%			
MAPLE, NORWAY -SCHWED	ACPLSC	Moderate	90.00%			
MAPLE, NORWAY -SUPRFM	ACPLSU	Moderate	90.00%			
MAPLE, OTHER	AC	Moderate	90.00%			
MAPLE, PAPERBARK	ACGR	Unknown	90.00%			
MAPLE, RED	ACRU	Moderate	90.00%			
MAPLE, RED -AUT FLAME	ACRUAU	Moderate	90.00%			
MAPLE, RED -BOWHALL	ACRUBO	Moderate	90.00%			
MAPLE, RED -OCT GLORY	ACRUOC	Moderate	90.00%			
MAPLE, RED -RED SUNST	ACRURE	Moderate	90.00%			
MAPLE, SILVER	ACSA1	Moderate	90.00%			
MAPLE, STRIPED	ACPE	Unknown	90.00%			
MAPLE, SUGAR	ACSA2	Poor	100.00%			
MAPLE, SUGAR -COLUMNR	ACSA2CO	Poor	100.00%			
MAPLE, SUGAR -GRN MTN	ACSA2GR	Poor	100.00%			
MAPLE, SYCAMORE	ACPS	Unknown	95.00%			
MAPLE, TRIDENT	ACBU	Unknown	85.00%			
MASO - MAGNOLIA, SAUCER	MASO	Unknown	85.00%			
MAYHAW	CROP	Unknown	80.00%			
MIMOSA	ALJU	Unknown	80.00%			
MONKEY PUZZLE TREE	ARAR	Unknown	95.00%			
MOUNTAIN -ASH, AMER.	SOAM	Unknown	80.00%			
MOUNTAIN -ASH, EURO.	SOAU	Unknown	85.00%			
MOUNTAINASH,KOREAN	SOAL	Unknown	90.00%			
MULBERRY, PAPER	BRPA	Unknown	85.00%			
MULBERRY, RED	MORU	Good	90.00%			

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
MULBERRY, WHITE	MOAL	Moderate	95.00%			
OAK, BASTARD	QUAU	Unknown				
OAK, BLACK	QUVE	Moderate	95.00%			
OAK, BLACKJACK	QUMA2	Good	90.00%			
OAK, BLUEJACK	QUIN	Good				
OAK, BUR	QUMA1	Good	100.00%			
OAK, CHESTNUT	QUPR	Moderate	100.00%			
OAK, CHINKAPIN	QUMU	Good	90.00%			
OAK, ENGLISH	QURO	Unknown	100.00%			
OAK, LAUREL	QULA2	Moderate	95.00%			
OAK, LIVE	QUVI	Good	100.00%			
OAK, MYRTLE	QUMY	Unknown	85.00%			
OAK, NORTHERN PIN	QUEL	Unknown	95.00%			
OAK, NORTHERN RED	QURU	Moderate	100.00%			
OAK, OTHER	QU	Moderate	90.00%			
OAK, OVERCUP	QULY	Good	95.00%			
OAK, PIN	QUPA	Moderate	95.00%			
OAK, POST	QUST	Good	95.00%			
OAK, SAWTOOTH	QUAC	Unknown	100.00%			
OAK, SCARLET	QUCO	Poor	100.00%			
OAK, SHINGLE	QUIM	Good	90.00%			
OAK, SHUMARD	QUSH	Good	95.00%			
OAK, SOUTHERN RED	QUFA	Moderate	100.00%			
OAK, SWAMP CHESTNUT	QUMI	Good	100.00%			
OAK, SWAMP WHITE	QUBI	Good	100.00%			
OAK, TURKEY	QULA1	Good	95.00%			
OAK, TURKEY, EURO	QUCE	Good	95.00%			
OAK, WATER	QUNI	Good	100.00%			
OAK, WHITE	QUAL	Good	100.00%			
OAK, WILLOW	QUPH	Moderate	100.00%			
OLIVE, AUTUMN	ELUM	Unknown	80.00%			
OLIVE, RUSSIAN	ELAN	Unknown	80.00%			
OSAGE -ORANGE	MAPO	Unknown	100.00%			
PAWPAW	ASTR	Good	85.00%			
PEAR, CALLERY	PYCA	Moderate	85.00%			
PEAR, CALLERY -ARISTO	PYCAAR	Moderate	85.00%			
PEAR, COMMON	PYCO	Moderate	85.00%			
PECAN	CAIL	Unknown	100.00%			
PERSIMMON, COMMON	DIVI	Good	95.00%			
PERSIMMON, JAPANESE	DIKA	Good	85.00%			
PINE, AUSTRALIAN	CAEQ	Unknown				
PINE, AUSTRIAN	PINI	Good	100.00%			
PINE, EASTERN WHITE	PIST	Unknown	95.00%			
PINE, JACK	PIBA	Good	90.00%			
PINE, JAPANESE BLACK	PITH	Unknown	95.00%			
PINE, LOBLOLLY	PITA	Moderate	90.00%			
PINE, LONGLEAF	PIPA	Moderate	100.00%			
PINE, NORFOLK ISLAND	AREX	Unknown				
PINE, OTHER	PI2	Moderate	95.00%			

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
PINE, PITCH	PIRI	Good	90.00%			
PINE, POND	PISE	Good	95.00%			
PINE, RED	PIRE	Good	95.00%			
PINE, SAND	PICL	Unknown	90.00%			
PINE, SCOTCH	PISY	Good	95.00%			
PINE, SHORTLEAF	PIEC	Moderate	90.00%			
PINE, SLASH	PIEL	Good	95.00%			
PINE, SPRUCE	PIGL2	Good	95.00%			
PINE, VIRGINIA	PIVI	Poor	95.00%			
PLUM, AMERICAN	PRAM	Moderate	80.00%			
PLUM, CHICKASAW	PRAN	Unknown	85.00%			
PLUM, FLOWERING	PRTR	Unknown				
PLUM, OTHER	PR2	Moderate	85.00%			
PLUM, PURPLELEAF	PRCE	Unknown	80.00%			
PODOCARPUS, BROAD LF	PONA	Unknown	90.00%			
PODOCARPUS, YEW	POMA	Unknown	90.00%			
POPLAR, BALSAM	POBA	Unknown	90.00%			
POPLAR, GRAY	POCA	Unknown	80.00%			
POPLAR, LOMBARDY	PONI	Moderate	90.00%			
POPLAR, LOMBARDY	PONIIT	Moderate	90.00%			
POPLAR, OTHER	PO	Good	90.00%			
POPLAR, WHITE	POAL	Unknown	90.00%			
PRIVET SPECIES	LISP	Unknown	80.00%			
PRIVET, CHINESE	LILU	Unknown	80.00%			
REDBUD, EASTERN	CECA	Moderate	80.00%			
REDWOOD, COAST	SESE	Good	100.00%			
REDWOOD, GIANT	SEGI	Moderate	100.00%			
ROSE -OF -SHARON	HISY	Unknown	85.00%			
ROYAL PAULOWNIA	PATO	Good	95.00%			
SASSAFRAS	SAAL	Good	95.00%			
SERVICEBERRY, DOWNY	AMAR	Moderate	95.00%			
SERVICEBERRY, OTHER	AM	Good	90.00%			
SHRUB	SHRUB	Unknown	90.00%			
SILVERBELL	HADI	Moderate	90.00%			
SMOOTH SUMAC	RHGL	Moderate	80.00%			
SNOWBELL, JAPANESE	STJA	Unknown	85.00%			
SOURWOOD	OXAR	Poor	90.00%			
SOUTHERN REDCEDAR	JUSI	Unknown	90.00%			
SPRUCE, BLACK	PIMA	Good	90.00%			
SPRUCE, COLORAD BLUE	PIPUGL	Moderate	95.00%			
SPRUCE, COLORADO	PIPU	Moderate	100.00%			
SPRUCE, NORWAY	PIAB	Moderate	95.00%			
SPRUCE, OTHER	PI1	Moderate	95.00%			
SPRUCE, WHITE	PIGL1	Moderate	95.00%			
STAGHORN SUMAC	RHTY	Good	80.00%			
STUMP	STUMP	0	0.00%			
SUGARBERRY	CELA	Good	90.00%			
SWEETBAY	MAVI	Good	85.00%			
SWEETGUM	LIST	Poor	100.00%			

dSpecies						
Description	**Value**	**Tolerance**	**Species Rating**		**Tolerance**	**Age Class**
TAMARACK	LALA	Moderate	95.00%			
TREE OF HEAVEN	AIAL	Good	90.00%			
TULIP TREE	LITU	Moderate	95.00%			
TURKISH HAZELNUT	COCO2	Unknown	90.00%			
UNKNOWN	Unknown	0	0.00%			
UNKNOWN DEAD TREES	UNKDEAD	0	0.00%			
UNKNOWN LIVE TREES	UNK	0	0.00%			
UNKNOWN SHAFT	UNKSHFT	0	0.00%			
UNKNOWN STUMP	UNKSTMP	0	0.00%			
WALNUT, BLACK	JUNI	Poor	95.00%			
WALNUT, ENGLISH	JURE	Poor	95.00%			
WILLOW SPECIES	SA	Good	90.00%			
WILLOW, BLACK	SANI	Good	90.00%			
WILLOW, CORKSCREW	SAMA	Unknown	80.00%			
WILLOW, LAUREL	SAPE	Unknown	80.00%			
WILLOW, WEEPING	SABA	Moderate	90.00%			
WITCH HAZEL	HAVI	Moderate	90.00%			
WOODED AREA	WOODS	0	0.00%			
YELLOWOOD	CLLU	Poor	90.00%			
YEW	TA	Unknown	95.00%			
ZELKOVA	ZE	Unknown	100.00%			
ZELKOVA, JAPANESE	ZESE	Unknown	100.00%			

			ListBox Links (DO NOT Modify)				
Ft/Inch			AgeClass	Condition	Pruning	BudCondition	
0.5			Y	0	X	0	
0.75			M	1		1	
1			OM	2		2	
0.75			N/A	3		3	
1				4		4	
1.25							
1							
1.25							
1.5							
1							
1.25							
1.5							
r UNITS							

How to score condition:

Problems: None apparent (4); minor (3); major (2); extreme (1).

Scoring Criteria:

Roots: Anchorage; collar/flare soundness; mechanical injury; girdling/kinked; compaction / waterlogged; toxic gasses / chemical symptoms; presence of insects/disease; mushrooms.

Trunk: sound bark/wood; cavities; mechanical injury; cracks; swollen/sunken areas; insects/disease; conks.

Scaffold branches: strong attachments; smaller diameter than trunk at attachment; vertical branch distribution; free of included bark; free of decay/cavities; well pruned; well-proportioned / proper taper; wound closure; deadwood or fire injury; insects/diseases.

Small Branches and twigs: vigor of current shoots; well distributed in canopy; buds (color, shape, size); insects/diseases; weak or dead twigs.

Foliage and buds: size of foliage/buds; coloration of foliate; nutrient status; herbicide / chemical / pollution injury; wilted or dead leaves; dry buds; insects / diseases.

How to score Site Rating:

The more suited a tree is to its growing environment, and the more conducive the area is to tree growth, the higher the site rating.

High (100% to 90%)
- The site is in a park or landscaped area with ample belowground and overhead growing space;
- The site is in the street but there is adequate growing space;
- The species is tolerant of the site's difficult growing conditions;
- The site is physically limiting, but the tree's stature is appropriate for the site;
- The tree has minor conflicts with existing site infrastructure that can be remedied by mild or moderate corrective pruning;
- The site contains few targets and the tree is of a structurally sound species.

Medium (90% to 70%)
- Site has physical space constraints for tree;
- Species is only moderately tolerant of the site's difficult growing conditions;
- Tree has moderate conflicts with existing infrastructure;
- Site has a lesser degree of the suggested criteria in the High rating type.

Low (70% to 20%)
- Species is intolerant of the site's difficult growing conditions;
- Tree's stature is inappropriate for site infrastructure;
- Tree has major conflicts with existing site infrastructure that cannot be remedied without elimination of the infrastructure or drastic reduction or elimination of the tree;
- The site contains many targets and the tree is a structurally weak

How to score Placement Rating:

The placement rating is an assessment of a tree's placement in its surrounding landscape, both in terms of its positioning and its contextual relationships.

High (100% to 90%)
- The tree is a native species in or adjacent to a natural area or large park;
- The tree is a historic specimen or part of a grove, or is an original planting in historic landscape;
- The tree is the only, or one of a few, in the area;
- The tree is extremely complimentary to or prominent within an adjacent view, land use, structure, or natural landscape element;
- The tree is very important within a group of other plantings, such as an allée or along an even-aged block, and its loss would be of high impact to that planting group;
- The tree provides exceptional services based on its location (i.e. shade in a playground or sitting area, property value in front of a building, stormwater absorption in or near a wetland, etc.).

Medium (90% to 70%)
- The tree is one of a group of plantings and its individual loss would have minimal visual or environmental impact on the entire group;
- Tree has a lesser degree of the suggested criteria in the High rating type.

Low (70% to 20%, 20% for invasives)
- The tree is an *invasive* species in or adjacent to a natural area or large park;
- The tree currently or has the potential to block a view integral to the importance of the site, or otherwise impede a design.

NYC Tree Valuation Tree Costs:

(3-inch caliper replacement tree planting cost)*

Annual Year	Tree Cost
2009	$1,200
2010	$1,900
2011	$1,550
2012	$1,700
2013	$1,450
2014	$1,450
2015	$1,400
2016	$1,650
2017	$1,800
2018	$2,000

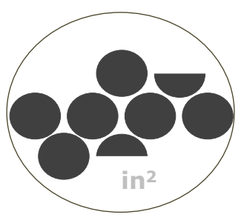
*** This value should be used for:**
1. Third parties paying into the Tree Fund in accordance with the NYC street tree planting zoning requirements for new buildings;
2. Calculating the monetary restitution required when Parks is to plant the replacement trees for permitted tree removals on non-Parks projects;
3. Calculating monetary restitution for illegal tree removals and vandalism.

** This is calculated by the Director of Street Tree Planting early each annual year from a user cost survey based on average tree cost of each fiscal year's capital street tree planting contracts.

NYC Valuation Method vs. Caliper

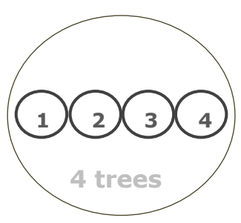
The NYC method is the total basal area of a tree reduced for species, condition, and location factors. The result, in square inches of wood, is the Trunk Area Replacement (TAR), which cannot be less than the wood of caliper replacement (caliper TAR, below).

1. Trunk Area Replacement— the total *area* of wood of the tree(s) valuation(s) required for replacement according to NYC Valuation Method. The total area required can be replaced in different tree sizes.



2. Caliper TAR—the *area* of wood of the number of 3-inch trees that span the total caliper of tree(s) removed.

3. Caliper Replacement—the *number* of 3-inch trees that span the total caliper of tree(s) removed.



NYC Tree Removal Laws

Caliper Law (1980)*
- Applies to the replacement of Parks-owned trees removed for construction
- Established caliper replacement as a **minimum** replacement standard

Arborcide Law (1996)**
- Destruction of a Parks-owned tree can result in criminal or civil penalties
- Parks seeks maximum replacement value for trees destroyed (formerly basal area, now NYC TAR if able to be estimated)

Restitution Law (Local Law 3 of 2010)***
- Requires Parks to set a "fee" for tree replacement and to promulgate rules for valuation that "substantially comply" with ISA guidelines, but that are no lower than caliper. NYC Valuation method is the result.
- Applies to all city agencies, including Parks, as well as all private entities seeking permits to remove Parks-owned trees.

* NYC Administrative Code section 18-107
** NYC Charter § 533(a) (9) (ii)

TIVR Instructions

Overview

TIVR is an excel spreadsheet tool with multiple tabs for assessing, valuing, and prescribing management actions for trees under the jurisdiction of NYC Parks. This includes trees within the City right-of-way, on developed parkland, and/or in natural areas. It should be used at the beginning of any project, typically in the tree inventory phase, but also in the preparation of multi-tree Tree Damage Reports. It is designed for use by NYC Parks divisions, including Forestry and Parks' Capital, as well as other agency and private consulting arborists.

Tab Order	Tab Name	User Can Input	Auto-Calculating	Tab User*		Description
				Parks' Forestry	Consultant	
1	Read Me	n/a	n/a	✓	✓	Directions for using the TIVR tool for all users.
2	Summary		●	✓		Total project inventory, restitution, and valuation details.
3	Inventory	●		✓	✓	Input form for up to 2,500 trees and/or stumps.
4	Project Notes	●		✓	✓	Text box for recording inventory personnel, details and/or dates.
5	Valuation		●	✓		Tree-by-tree and total project required, exempt, and preservation TAR.
6	Restitution	●	●	✓		Calculator to determine size, location, and costs for replanting project TAR.
7	Tree Protection Schedule	●				Displays critical root zones (CRZ) and sets tree management actions for contract.
8	TPS – for CAD		●			Non-shaded TPS for linking and inserting into CAD drawing.
9	Arborist Summary Report		●			Displays tree inventory specifications, CRZ, and tree care activities.
10	Unit Estimates		●			Displays unit quantities for tree and stump removal and tree care activities.
11	References	n/a	n/a	✓	✓	Notes tree assessment guidelines, replacement diagrams, and tree costs.

**Parks Capital division uses all tabs*

For more detailed descriptions of the TIVR tool and each tab, see directions at right.

Detailed Instructions for Use

The user must begin every project with a re-named, blank master TIVR file. When updating a previously inventoried project, only copy and paste by choosing the paste 'values only'. This will prevent override of the format and formulas. The blank TIVR files and documents are available in the Tree Preservation/NYC Tree Valuation Calculators section of the Forestry, Horticulture & Natural Resources intranet page.

2. Summary Tab

This tab pulls key information from each tab and displays it in one place. It is a locked sheet and the cells are populated from information on other tabs of the spreadsheet. It summarizes the tree inventory, restitution plan and cost, all tree valuations, and the Unit Estimates (for Parks Capital contracts). The restitution summary shows the total NYC Required Trunk Area Replacement (TAR) as well as the equivalent TAR for caliper replacement for the project. By law, the restitution for permitted non-condition tree removals can never fall below the caliper replacement on any project (see References tab for further explanation).

3. Inventory Tab

This is the basic input tab for a multi-tree inventory, where Project Name and Number are recorded (in the yellow shaded area at top), as well as the inventory and assessment variables for every tree. The species, DBH, condition, site and placement ratings, as well as the status, must be noted in order for the valuation to be calculated in the next tab. Please note the following:

- **Number of rows**. The TIVR file contains **2,500** formatted rows for trees. *Do not delete rows of the inventory—even if trees or stumps are removed--as other formulas on other tabs will break if this is done.*
- **Locked rows**. Rows cannot be deleted. Every tree or stump must be accounted for and properly designated a status. If a tree or stump is removed, add this information to the notes field.
- **Tree Numbers.** Each tree or stump is automatically assigned a number in the TIVR. There are also two additional columns (Plan # and ForMS Tree Point #) for relating the TIVR inventory number to other tree numbering systems relevant to the project if required.
- **Individual tree data**. Enter each tree, one at a time, in sequence across the columns including tree characteristics (species, size and height, age class); condition scores (shaded subtotal and total cells will auto-calculate); site and placement ratings specific to each tree[1]; tree status (tree remains, removal type, transplant), and/or pruning type for each tree (if appropriate); and comments.
- **Calculate the diameter of a multi-stemmed tree.** The tool to the right of the inventory table allows for up to 5 stems per tree and will calculate the proper diameter to be entered in Column E for a multi-stemmed tree.
- **Automatic formatting**. When a tree is marked for removal due to poor condition or design, the row for that tree will gray out.

(continued above right)

[1]For invasive species in or adjacent to a natural area, including but not limited to parks designed as "Forever Wild," **Placement Rating** score shall be as low as 20% as per the NYC Tree Valuation Protocol. A higher or lower placement rating may be given for other factors

- **To change the status of a tree**. If you need to change a tree status from 'remove' to 'remain', or within a removal category, you must delete the cell value with the delete button (rather than choosing the blank option from the cell drop down). *If you do not do this, the valuation tab will not calculate.*

The information you enter into the Field Inventory tab is the basis for higher level calculations on all other tabs, including and ESPECIALLY the Valuation tab, which determines required project Restitution.

4. Project Notes

This tab is available with a free form text box for entering information about the inventory, such as who conducted it and when. Other information that may be necessary to note is assumptions, methods, or special calculations that are specific to the project inventory.

5. Valuation

There is no data entry required in this tab. This sheet uses the information from the inventory listing to auto calculate a number of fields relating to tree valuation for each tree, including CTLA condition rating, species rating, and location rating. The valuation for each tree is noted as either Required TAR (for s design removal), Exempt TAR (for a condition removal) or Preservation TAR (for a trees to remain or transplant). The total valuation (NYC Trunk Area Replacement TAR) for each category is summarized at the top of the sheet for ease of access as well as on the project Summary tab.

Additionally, on the far right of this tab there is a TAR replacement cost calculated for every tree, with cost in 7 different sized replacement trees automatically shown. In order to populate these cells to see replacement costs for tree sizes other than 3" dbh, a price for that size must be entered into the appropriate Planting Cost cell on the Restitution tab and then the cost for that tree size will be reflected here as well.

6. Restitution Calculator

This tab converts the project restitution—i.e. the Required TAR, in square inches of wood, derived from the total of all design removals specified—into actual numbers of trees. Condition removals (Exempt TAR) do NOT require restitution. The restitution calculator is used to determine the restitution implementation plan, both in terms of tree quantities, size, cost, and location (on site or off site). **The tool helps to optimize fulfillment of the restitution requirements through costing out different replacement tree size scenarios.**

Reminders:

- The total restitution for the project is shown in the shaded green cell at the top of the chart.
- The calculator defaults to a cost (to the public for a street tree) and number of 3" trees that would fulfill the project restitution. However, users should input the actual costs (if known) for the appropriate tree sizes of the entity that will be planting the trees. The calculator accommodates different project planting costs for on site AND off site trees.

(continued above right)

- The tool automatically rounds up the number of trees required to a whole number.
- Complete directions for how to use the calculator are on the tab next to the input grid.

7. Tree Protection Schedule

This tab carries over the tree #, species, diameter, removal and transplant determinations and preparatory pruning prescriptions, and calculates the critical root zone (CRZ). Tree Protection mitigations, as well as soil de-compaction, fertilization and tree growth regulator can be specified here (in the white cells). If a tree has been designated a removal in the inventory tab, any mitigation cells are grayed out here.

8. TPS – for CAD

This tab replicates the Tree Protection Schedule without shading so that it can be linked to CAD drawings. This file remains unlocked so as to facilitate the CAD link. However, any changes to the sheet's structure will break the formula it pulls from.

9. Arborist Summary Report

This tab summarizes the disposition of each tree inventoried in terms of condition, tolerance to construction with prescriptions for removal, transplanting, and pruning specifications. The ISA Critical Root Zone is the preferred disturbance distance for construction impacts to tree roots and soil and is shaded in gold. The red column in this tab indicates the absolute minimum distance and is called the Structural Critical Root Zone. All information on this tab auto-calculates from the **Inventory** tab and is used by Parks Capital arborists and landscape architects.

10. Contract Unit Estimates

This tab auto-calculates from information on other tabs and displays the total quantities of tree protection and removal reason types, as well as the units for each category of work are shown at the top of the worksheet.

- Any changes to tree status or prescriptive pruning must be made in the **Inventory** tab according to the directions (i.e. use the delete button to eliminate a value in a cell).
- Any changes to de-compact tree, fertilize and tree growth regulator must be edited in the **Tree Protection Schedule** tab.

11. References

This tab is for reference only. It contains background information for using and understanding the TIVR excel tool, including:

- Directions on how to assess and score **Condition**;
- Directions on how to score a **Site Rating**;
- Directions on how to score a **Placement Rating**;
- Historical public 3-inch dbh street tree replacement costs (2009 to 2018);
- Diagram and explanation of the NYC Valuation method vs. caliper method;
- Summary of the three NYC tree removal laws.

(end)

Prepared By:
Date:

Field Inventory

PROJ NAME	
PROJ #	

TREE # (required)	PLAN #	ForMS Tree Point #	SPECIES	DBH (inches) at 4.5 feet from ground	OTHER TREE DIMENSIONS (optional): TOTAL TREE HEIGHT (ft.)	CROWN HEIGHT (ft.)	CROWN DIAMETER (ft.)	AGE CLASS: Y-<20% M-20-80% OM->80% of Life Expectancy	CONDITION: ROOTS Structure (1-4)	Health (1-4)	Subtotal (2-8)	TRUNK Structure (1-4)	Health (1-4)	Subtotal (2-8)	SCAFFOLD BRANCHES Structure (1-4)	Health (1-4)	Subtotal (2-8)	SMALL BRANCHES (1-4)	FOLIAGE & BUDS (1-4)	SUBTOTAL (8-32)	SITE RATING: rate: 10%-100% VH-90%-100% H-80%-89% Ave-70%-79% L-60%-69% VL-10%-59%	PLACEMENT RATING: rate: 10%-100%	STATUS (to change, delete cell contents, DO NOT select blank from drop down): TREE REMAINS	REMOVAL (condition)	REMOVAL (design)	REMOVAL (stump only)	TRANSPLANT	PRUNING ANSI A-300: Cleaning	Raising	Reducing	Restoring	Structural	Thinning	Limb Tying	COMMENTS
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38											0			0			0			0															
39											0			0			0			0															

CONDITION RATINGS: 4 - No Apparent Problems 3 - Minor Problems 2 - Major Problems 1 - Extreme Problems

ENTER INVENTORY/PROJECT NOTES HERE (text field):

This space is available for notes on survey or resurvey dates, personnel, or any other issues that arise or should be noted in the course of the inventory.

- Note 1
- Note 2
- Note 3
- etc.

APPENDIX J

CONSTRUCTION MANAGEMENT CHECKLIST

Construction Management Checklist currently in development