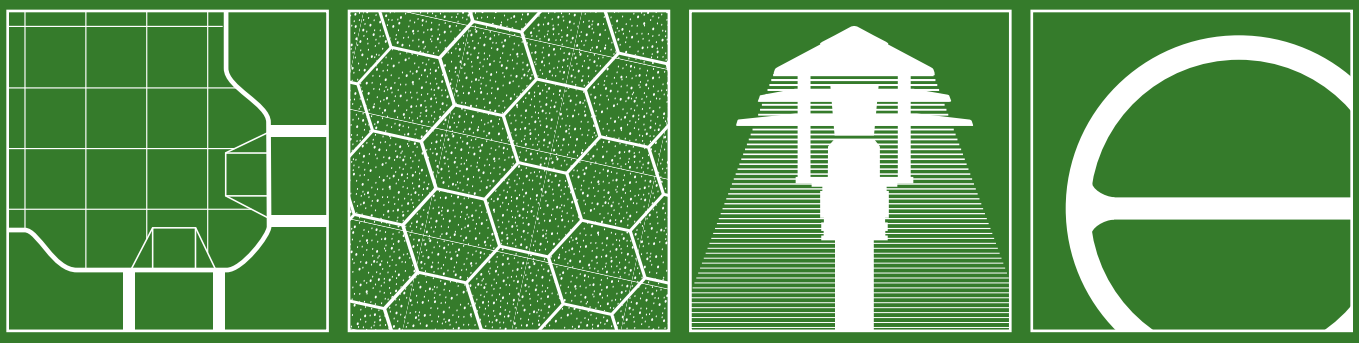
Street Design Manual



New York City
Department of Transportation

2009

www.nyc.gov/dot

Copyright

Copyright © 2009 New York City Department of Transportation

ISBN–13: 978–0–615–29096–6
ISBN–10: 0–615–29096–5
1. REFERENCE/General.
2. TRANSPORTATION/General.

Printed in the United States by Vanguard Direct.
Printed on Roland Recycled stock: Forest Stewardship Council (FSC) certified, 30% post-consumer and FSC mixed paper, manufactured using biogas energy and certified EcoLogo. Tabs printed on Wausau Paper Royal Complements: 30% post-consumer recycled fiber, Green Seal® certified.

Set with Galaxie Polaris.

All photos are courtesy of New York City Department of Transportation unless otherwise noted.

The most current version of the Manual is available for download at **www.nyc.gov/streetdesignmanual**. Print copies may be purchased through New York City CityStore (**www.nyc.gov/citystore**).

Updates and addenda to the Street Design Manual will be posted on the Street Design Manual website at **www.nyc.gov/streetdesignmanual**. Readers may register on the website to receive updates by email.

Madison Square, Manhattan

PARKS
BRONX SCIENCE

Letter from the Mayor

Dear Friends,

The streets of New York are often seen as permanent fixtures of city life, and in some ways, they are. But our streets are also dynamic, and their character and uses can change as the City continually evolves and reinvents itself.

City government uses different designs for different types of streets, from bus-priority corridors and truck routes to commercial main streets and residential neighborhood blocks. In a city as large and richly varied as ours, one size does not fit all. In recent years, we have been working especially hard to tailor the streets to best fit the needs of individual neighborhoods and communities.

The New York City *Street Design Manual* is the culmination of the greater attention and creativity our Administration is bringing to its streetscape. It further expands our catalogue of street design features and allows for a new set of pre-approved materials, beyond the basic asphalt and concrete. It streamlines the process of designing and delivering street projects, and builds design excellence into each and every one of them. The manual also makes it easier for members of the public to better understand our goals for all the various types of street design elements and materials.

This Design Manual was created by our innovative Department of Transportation in cooperation with eight other City agencies. It will ensure that private developers, utility companies and city agencies all work from a single framework and playbook. Most importantly, the Manual will not only create more attractive, functional and coherently designed streets that will improve our quality of life, but it will also allow projects to be completed more quickly and less expensively.

Better service at a better price—that's effective government, and this manual is helping us bring it to life.

Sincerely,

Mayor Michael R. Bloomberg

Adams Street, Brooklyn

BROUWERS
BROUWERS

Table of Contents

Letter from the Mayor 5
Foreword from the Commissioner 11
Acknowledgments. 13

Introduction 15

Purpose & Background 17
Street Design Policy. 20

1 Using the Manual 25

1.1 Applicability 26
1.2 Organization 27
1.3 The Planning Process. 28
1.4 Design Checklist 38
1.5 Integration into Project Development 40

Stone Street, Manhattan

2 Geometry 43

2.0 Introduction 45

2.1 Roadways & Lanes 48
2.1.1 Mixed Roadway 49
2.1.2 Bike Lanes & Paths 50
2.1.3 Bus Lanes & Busways 56
2.1.4 Shared Street 59

2.2 Sidewalks & Medians 61
2.2.1 Sidewalk 62
2.2.2 Curb Extension 65
2.2.3 Median 72

2.3 Traffic Calming 75
2.3.1 Raised Speed Reducers 76
2.3.2 Gateway 78
2.3.3 Traffic Diverters 79
2.3.4 Chicane 85
2.3.5 Neighborhood Traffic Circle 86
2.3.6 Roundabout 88
2.3.7 Raised Crossing 90
2.3.8 Raised Intersection 91

2.4 Street Trees & Plantings 92
2.4.1 Tree Pits 93
2.4.2 Greenstreet/Planted Area 98
2.4.3 Street Swale 99

3 Materials 101

3.0 Introduction 104

3.1 Roadways 107
3.1.1 Asphaltic Concrete 108
3.1.2 Concrete 112
3.1.3 Granite Block 113
3.1.4 Interlocking Permeable Concrete or Asphalt Pavers 115

3.2 Crosswalks 116
3.2.1 Granite Pavers 117
3.2.2 Thermoplastic Imprinting 118

3.3 Sidewalks 119
3.3.1 Concrete 120
3.3.2 Mastic Asphalt 127
3.3.3 Hexagonal Asphalt Pavers 128
3.3.4 Bluestone Flags 129
3.3.5 Granite Slabs 130
3.3.6 Rubber Pavers 131

3.4 Sidewalk Furnishing Zones 132
3.4.1 Granite Block 133
3.4.2 Square Asphalt and Concrete Pavers 136
3.4.3 Concrete with Exposed Glass Aggregate 137

3.5 Curbs 138
3.5.1 Concrete 139
3.5.2 Granite 142

3.6 Plazas 143
3.6.1 Imprinted Asphalt 144
3.6.2 Hexagonal Concrete Pavers 145
3.6.3 Decorative Gravel 146

4 Lighting 149

4.0 Introduction 151

4.1 Street Lighting 154
4.1.1 Cobra Head 155
4.1.2 Stad 157
4.1.3 Fulton 159
4.1.4 Alliance 160
4.1.5 Helm 161
4.1.6 Flatbush Avenue 163
4.1.7 TBTA 164
4.1.8 Type M 166
4.1.9 Type F 167
4.1.10 Bishops Crook 168
4.1.11 Type L 169
4.1.12 City Light 170
4.1.13 LED Type A 171
4.1.14 LED Type E 172

4.2 Pedestrian Lighting 173
4.2.1 Cobra Head 174
4.2.2 Stad 175
4.2.3 Fulton 176
4.2.4 Flushing Meadows Park 177
4.2.5 Type B 178
4.2.6 World's Fair 179
4.2.7 TBTA 180
4.2.8 Round Top Head 181
4.2.9 LED Post Top 182
4.2.10 LED Type A 183
4.2.11 LED Type E 184

4.3 Traffic Signal Poles 185
4.3.1 Type M–2 Traffic Signal Pole 186
4.3.2 Alliance Traffic Signal Pole 188

5 Furniture 189

5.0 Introduction 190

5.1 Bike Racks 191

5.2 Bus Stop Shelters 192

5.3 Bike Shelters 193

5.4 Newsstands 194

5.5 Automatic Public Toilets (APT) 195

5.6 Lightpole Banners 196

5.7 Benches 197

5.8 Waste Receptacles 198

Glossary 199

Appendices 209

A Design Review Cover Sheet 210
B Agency Roles on the City's Streets 216
C Legal & Design Guidance References 219
D NYC DOT Design Review Process 223

Index 225

Foreword from the Commissioner

The streets of New York are changing. Today, New Yorkers can enjoy dozens of new public plazas in places formerly occupied by speeding traffic; safely negotiate school zones, senior districts and the areas around transit stations in more friendly streetscapes; and ride along protected bicycle lanes.

This *Street Design Manual* formally establishes and standardizes all of these new elements. It also continues the spirit of the Bloomberg administration by laying out dozens of new ideas—approaches for innovative street designs that we will test in New York in the months and years ahead.

The *Street Design Manual* is a detailed guide to the city transportation policies that NYC DOT established in *Sustainable Streets*, the department's strategic plan, and *World Class Streets*, which describes our programs to improve the city's public realm.

For decades, the city restricted itself to a narrow approach to our streets. That has not only created a less interesting and attractive streetscape than New York deserves, but it also led to a riot of design exceptions as developers, business districts, and city project managers have sought to go beyond a bare–bones, utilitarian approach.

By simultaneously broadening our design horizons, establishing clear guidelines, and adopting a new palette of materials, we will create world–class city streets and a more predictable process for all of the public and private entities who carry out work related to our public rights of way. I believe this effort will represent a significant contribution to renewed growth and to the goal of a greater, greener New York that Mayor Bloomberg set forth in *PlaNYC 2030*.

The streetscape design guidance on the pages that follow distills the city's historic design precedents, our building traditions, and our visions for today's streets and the streets of the future into a common–sense vocabulary. It gives designers, planners, and residents the tools to create a more durable, safe, and attractive streetscape. It also contributes to environmental health, with street features that reduce stormwater runoff and add greenery.

The *Street Design Manual* is the result of two years of hard, focused work. I could not be more pleased with the result. The talented and energetic staff at DOT who brought the project to fruition are the best in the business. The level of cooperation between city agencies and the generosity of my fellow commissioners and their staffs in sharing expertise, reviewing priorities, and moving the effort to completion was unprecedented. I am extremely grateful for all of their support.

Janette Sadik–Khan
Commissioner

Grand Army Plaza, Brooklyn

Acknowledgments

The completion of this project would not have been possible without the participation of numerous city agencies. Each individual named here played a role, from the development of the original concept to writing and reviewing. The Streetscape Task Force will continue working to enhance New York City streets.

Janette Sadik–Khan, COMMISSIONER, DOT

Lori Ardito, **FIRST DEPUTY COMMISSIONER, DOT**

With Special Thanks to:
Adrian Benepe, **COMMISSIONER, DPR**
Amanda Burden, **DIRECTOR, DCP**
David Burney, **COMMISSIONER, DDC**
Emily Lloyd, **FORMER COMMISSIONER, DEP**

NYC DOT *Street Design Manual* Team
Wendy Feuer
Michael Flynn
Ed Janoff
Margaret Newman
Bruce Schaller
Andy Wiley–Schwartz

NYC DOT Special Contributors
Patricia Browne
Emily Colasacco
John Dulac
Joseph Jarrin
Jon Orcutt
Susan Pondish

Streetscape Task Force and Other Contributors
John Albin, **DOT**
Orly Amir, **DOT**
Lynette Baptist, **DOT**
Joe Barr, **DOT**
Eric Beaton, **DOT**
Josh Benson, **DOT**
Simon Bertrang **OCPD**
Maurice Bruet, **DOT**
Joseph Cannisi, **DOT**
Kerry Carnahan, **DDC**
Tom Cocola, **DOT**
Philip Damashek, **DOT**
Skye Duncan, **DCP**
Anthony Fiore, **DEP**
Margaret Forgione, **DOT**
Jennifer Lex Furioli, **SBS**
Neil Gagliardi, **DOT**
Steve Galgano, **DOT**
Kathryn Garcia, **DEP**
Anita Garrison, **DOT**
Kanda Gordon, **DOB**
Meredith Griffin, **DC**
Bram Gunther, **DPR**
Bruce Hendler, **DDC**
Claudia Herasme, **DCP**
Leon Heyward, **DOT**
Christopher Hrones, **DOT**
Terra Ishee, **DOT**
Adriana Jacykewycz, **DPR**
David Jehn, **DOT**
Michael Johnson, **DOT**
Laurie Kerr, **OLTPS**
Jared Knowles, **LPC**
Aaron Koch, **OLTPS**
Anne Koenig, **DOT**
Joshua Kraus, **DOT**
Ziv Lavi, **DCP**
Steve Levine, **OMB**
Rozella Logan, **DOT**
Chris Lucas, **DOT**
Tim Lynch, **DDC**
Patricia Lyons, **DOT**
Tom Maguire, **DOT**
Vincent Maniscalco, **DOT**
Mike Marsico, **DOT**
John Martin, **DOT**
Wanda Matos, **DOT**
Robert Mayer, **OMB**
Maura McCarthy, **DOT**
Charles McKinney, **DPR**
John McLaughlin, **DEP**
Connie Moran, **DOT**
John Murray, **OMB**
Paul Nelson, **SBS**
Yun Poy "Dino" Ng, **DDC**
Signe Nielsen, **DC**
Ted Oberman, **DOT**
Flavia Orlandi, **OMB**
Galileo Orlando, **DOT**
Joseph Palmieri, **DOT**
Ghanshyam Patel, **DOT**
Robert Piccolo, **MOPD**
Michael Primeggia, **DOT**
Marguerite Riskalla, **DOT**
Matthew Roe, **DOT**
Gale Rothstein, **EDC**
Scott Roveto, **DOT**
Charles Rudesill, **DPR**
Ryan Russo, **DOT**
Ali Sadriyoun, **DOT**
Luis Sanchez, **DOT**
Jeff Shumaker, **DCP**
Jackie Snyder, **DC**
Gerard Soffian, **DOT**
Michael Soliman, **DOT**
Joe Sopiak, **DDC**
Patricia Stareck, **DOT**
David Stein, **DOT**
Matt Stephens, **DPR**
Carter Strickland, **OLTPS**
Jeff Sugarman, **DCP**
Sandy Tomas, **EDC**
Randy Wade, **DOT**
Jeremy Waldrup, **SBS**
Thomas Wargo, **DCP**
Alex Washburn, **DCP**
Steve Weber, **DOT**
Matthew Wells, **DPR**
Keith Wen, **DOB**
Josh Wojcik, **DOT**
Brianna Wolf, **OLTPS**

Technical Readers
Michael Ronkin
Gary Toth

Editor and Indexer
Chelsea Mauldin
Carol Inskip

Graphic Design
Pure+Applied

Carlton Avenue, Brooklyn

Agency Acronyms

DC
New York City Design Commission

DCA
New York City Department of Consumer Affairs

DCAS
New York City Department of Citywide Administrative Services

DCP
New York City Department of City Planning

DDC
New York City Department of Design and Construction

DEC
New York State Department of Environmental Conservation

DEP
New York City Department of Environmental Protection

DOB
New York City Department of Buildings

DOHMH
New York City Department of Health and Mental Hygiene

DoITT
New York City Department of Information Technology and Telecommunications

DOT / **NYC DOT**
New York City Department of Transportation

DPR
New York City Department of Parks and Recreation

DSNY
New York City Department of Sanitation

EDC
New York City Economic Development Corporation

FDNY
New York City Fire Department

FHWA
The Federal Highway Administration

LPC
New York City Landmarks Preservation Commission

MOPD
Mayor's Office for People with Disabilities

MTA
Metropolitan Transportation Authority

NYCT
New York City Transit, an MTA agency

NYPD
New York City Police Department

NYS DOT
New York State Department of Transportation

OCPD
Mayor's Office of Capital Project Development

OLTPS
Mayor's Office of Long–Term Planning and Sustainability

OMB
Mayor's Office of Management and Budget

SAPO
The Street Activity Permit Office within the New York City Office of Citywide Event Coordination and Management

SBS
New York City Department of Small Business Services

US DOT
U S Department of Transportation

Introduction

Purpose & Background 17

Street Design Policy 20

Public Parking
PARK HERE
ENTER
We accept
Wooster St

Purpose and Background

This manual builds on the experience of innovation in street design, materials, and lighting that has developed around the world. It is designed to be a flexible document that will change and grow, incorporating new treatments as appropriate after testing.

The *Street Design Manual* provides policies and design guidelines to city agencies, design professionals, private developers, and community groups for the improvement of streets and sidewalks throughout the five boroughs. It is intended to serve as a comprehensive resource for promoting higher quality street designs and more efficient project implementation by streamlining the design and review processes.

The *Street Design Manual* is the product of an inter–agency task force headed by the Department of Transportation (DOT), and joined by the Departments of Design and Construction (DDC), City Planning (DCP), Environmental Protection (DEP), Parks and Recreation (DPR), Buildings (DOB), the Economic Development Corporation (EDC), the Landmarks Preservation Commission (LPC), the Design Commission (DC), and the Mayor's Office. The task force was initially convened in the fall of 2007 to make a practical assessment of problems, needs, and opportunities in a broad range of street conditions. Over the course of a year, agency representatives visited sites throughout the city, reviewed existing conditions, and assessed the performance of street materials, as well as lighting and geometric treatments. The group evaluated potential new materials and treatments that required further study and considered sustainability issues and stormwater impacts. This effort led to a decision to expand the responsibilities of the task force to create a manual that would provide design direction for streets.

The *Street Design Manual* is intended to supplement rather than replace existing engineering and environmental standards and requirements, including but not limited to the *Manual on Uniform Traffic Control Devices* (MUTCD) and *AASHTO Policy on Geometric Design of Highways and Streets* ("Green Book"). In a city with as many varied and complex conditions as New York, designs must be tailored for the particular needs and opportunities created by the local context, uses, and dimensions of streets. Therefore, the *Street Design Manual* leaves ample room for choice, and all designs remain subject to case–by–case NYC DOT approval based on established engineering standards and professional judgment, with the safety of all street users being of paramount importance.

Grand Street, Manhattan

While there were clear benefits to accommodating automobile movement through the city, the negative effects became increasingly evident over the last forty years.

Urban streets have always fulfilled multiple functions. Early in the twentieth century, they served not only as transportation routes but as the front yards and public squares of cities. Horse–drawn carriages, people on foot or horseback, and, later, bicycles and streetcars shared the streets with pushcart vendors, outdoor markets, children playing, and neighbors socializing. As vibrant as it was, this diverse set of uses and users of the street created a variety of problems for safety, sanitation, and mobility. Reformers of the day effected changes in street design and zoning, stormwater management, sanitary sewers, and traffic controls to improve safety and sanitation and to promote mobility and economic growth.

Over time, street design focused primarily on motor vehicle movement, and the emerging discipline of traffic engineering worked to safely integrate cars and trucks into pre–existing urban forms. While there were clear benefits to accommodating automobile movement through the city, the negative effects became increasingly evident over the last forty years. The focus on autos resulted in unsustainable land development patterns, fewer transportation choices, increased noise, pollution, and greenhouse gases, as well as a decline in social, civic, physical, and economic activity on streets.

Lower East Side, Manhattan (1910)

9th Avenue, Manhattan after "complete street" improvements

Practitioners (and the public) have learned that investment in high–quality street infrastructure can yield benefits well beyond simple mobility.

Engineering, planning and urban design best practices over the last ten years have emphasized a more balanced idea of street design, giving equal weight to transportation, community, and environmental goals. Practitioners (and the public) have learned that investment in high–quality street infrastructure can yield benefits well beyond simple mobility: public health, improved physical environment, and (particularly relevant in lean fiscal times) economic benefits in the potential for increased residential and commercial property values and retail activity.

The *Street Design Manual* builds on the experience of innovation in street design, materials, and lighting that has developed in New York City and around the world. It is designed to be a flexible document that will change and grow, incorporating new treatments as appropriate after testing. The use and continued development of the *Street Design Manual* will assure that New York City remains a leading innovator in the public realm as it becomes a greater, greener city.

Street Design Policy

Planning and designing streets in accord with the goals and principles of this section will contribute to a consistent level of quality and functionality for New York City's streets. This policy, along with the project's planning framework (see Chapter 1), should be used to resolve conflicting priorities for limited street space.

Goals

At over a quarter of the city's land area, streets are a critical part of New York City's infrastructure. They provide the bulk of its public space and have wide–ranging impacts on both its environmental health and the quality of life of its neighborhoods.

Accordingly, it is the policy of NYC DOT that the following goals and principles be adhered to when designing city streets.

Overall goals are:

1 **Design for Safety: Move people and goods safely.**

2 **Design for Access and Mobility: Accommodate all street users, giving priority to the most energy– and space–efficient modes.**

3 **Design for Context: Respond to neighborhood character.**

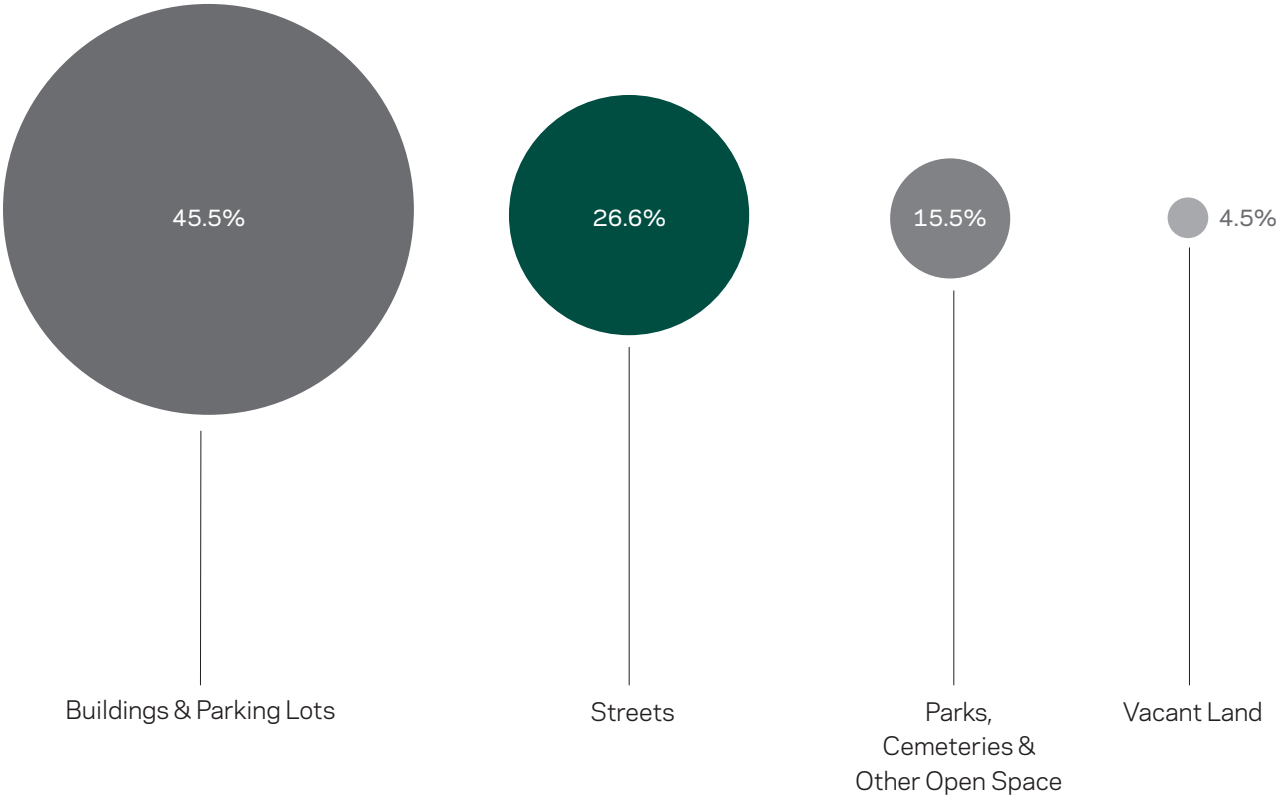
4 **Design for Livability: Create a vibrant public realm with high–quality public spaces.**

5 **Design for Sustainability: Contribute to a healthier and more sustainable environment.**

6 **Design for Visual Excellence: Create coherent and harmonious streetscapes.**

7 **Design for Cost–Effectiveness: Provide the greatest possible value to the public.**

Percent of New York City Land Area by Use
Streets make up over a quarter of the city's land area. (Source: PlaNYC Sustainable Stormwater Management Plan, 2008)



Principles

1

Design for Safety

The city's efforts to enhance street safety through engineering, education and enforcement have helped contribute to the lowest number of pedestrian fatalities and serious injuries since the city began keeping such statistics in 1910. Designing safe streets will continue to be the first priority for NYC DOT.

- **Prioritize safety** for all street users, particularly more vulnerable groups (children, the elderly, those with disabilities) and more vulnerable modes (walking, bicycling).
- **Design streets serving primarily local trips for slower speeds** to reduce crashes and injuries and discourage cut–through traffic.
- **Research, test, and evaluate innovative new safety treatments**, particularly those successfully adopted in other cities.

2

Design for Access and Mobility

With a growing population and limited right–of–way, street designs should provide efficient ways to move people and goods and improve the economic vitality of the city.

- **Prioritize walking, bicycling, and transit** by providing safe, accessible, convenient, and comfortable facilities for these modes, particularly on designated routes and at critical network connections.
- **Accommodate truck traffic and deliveries** while minimizing their negative impacts on neighborhoods.
- **Strive to meet accessibility standards.**
- **Accommodate emergency vehicle access**.

3

Design for Context

Streets help define the character of neighborhoods. Their design should refer to the surrounding context, including the history, land uses, and nearby landmarks.

- **Preserve the unique character** of neighborhoods.
- **Support connections to adjacent land uses** by providing gathering spaces and pedestrian access to and from major destinations.
- **Design local streets to be green, traffic–calmed environments** that encourage walking, bicycling, and recreational activities.
- **Design through–streets to balance the accommodation of traffic** with safety and community needs.

4

Design for Livability

Beyond their use for moving people and goods, streets comprise an extensive network of public open spaces that can facilitate social, civic, and economic interactions.

- **Expand usable public open space** by reallocating underutilized roadway space to create pedestrian plazas, expanded sidewalks, corner and mid–block curb extensions, and opportunities for green planted areas.
- **Design streets to encourage physical activity** for all ages and populations by making walking, bicycling, and transit attractive and convenient.
- **Include public seating** when there is an appropriate maintenance partner.

5

Design for Sustainability

Streets present an extraordinary opportunity to improve the environmental health of the city.

- **Collaborate across agencies in testing new materials** so that our streets are constructed in an environmentally sound way.
- **Minimize impermeable surfaces and maximize vegetation** on streets. Street designs should use stormwater source controls and other best management practices (BMPs) wherever possible.
- **Reduce the heat absorption of streets** by maximizing tree canopy cover and utilizing paving materials with high Solar Reflectance Index (SRI) values when possible.

6

Design for Visual Excellence

Great cities are defined by the visual quality of their streets. New York City's streets should be designed to the highest aesthetic standards possible, maintaining consistency in their character in order to achieve a coherent and harmonious streetscape.

- **Improve the coherence of streets** by using consistent materials.
- **Consider long term maintenance.** Materials should be selected that are readily maintained and durable over an extended period of time.

7

Design for Cost–Effectiveness

Reconstruction of city streets requires substantial financial resources. The list of worthwhile projects competing for a limited pool of funding is extensive. It is therefore important to ensure that street designs are cost–effective.

- **Consider full lifecycle costs and benefits** when developing street designs. Besides their initial capital outlays, the measurable long–term economic, environmental, safety, health, and other benefits of well–designed, well–managed streets should be taken into consideration.
- **Design streets to meet the city's future needs**. Streets are reconstructed very infrequently. Consideration of future conditions and needs should be part of the planning process.
- **Implement a clear and consistent design review process** to streamline project review.

1 Using the Manual

1.1 Applicability 26

1.2 Organization 27

1.3 The Planning Process 28

1.4 Design Checklist 38

1.5 Integration into Project Development 40

Applicability

The *Street Design Manual* should be used by agency staff, design professionals, community groups, and other entities involved in the planning and design of streets in New York City. The policies and guidelines in the *Street Design Manual* should be the foundation of designs for all projects that significantly impact public and private streets in New York City. NYC DOT will review projects for consistency with the manual.

Examples of applicable projects include capital and non–capital projects, such as street reconstructions and resurfacings; operational and traffic control treatments; street work associated with new or renovated buildings; and other public or private construction projects that include roadways, sidewalks, and plazas.

The guidance presented in the *Street Design Manual* does not supersede any existing federal, state or city laws, rules, and regulations. All projects remain subject to relevant statutes, such as the Zoning Resolution of the City of New York, City Environmental Quality Review (CEQR), and appropriate reviews and approvals of oversight agencies such as the New York City Design Commission (DC), Landmarks Preservation Commission (LPC), and Office of Management and Budget (OMB).

The manual provides assistance in four major areas:

Canal Street, Manhattan

Organization

The *Street Design Manual* is structured with five chapters and four appendices. Chapters 2 through 5 contain the bulk of the manual's design guidance.

Chapter 1: Using the Manual
Guidelines for incorporating the manual into the design process.

Chapter 2: Geometry
A "toolbox" of geometric street treatments to enhance safety, mobility, and sustainability.

Chapter 3: Materials
Specific materials with recommendations for use and references to appropriate specifications.

Chapter 4: Lighting
Street and pedestrian lights that meet energy–efficiency, technical, and visual quality criteria.

Chapter 5: Furniture
Freestanding elements that are part of NYC DOT's coordinated street furniture franchise and site furnishings used by other agencies.

Glossary
Definitions of frequently used terms and abbreviations.

Appendix A: Design Cover Sheet
A project summary to accompany submission of project designs to NYC DOT and other agencies for review.

Appendix B: Guide to Jurisdictions
Agency responsibilities for particular street operations and infrastructure.

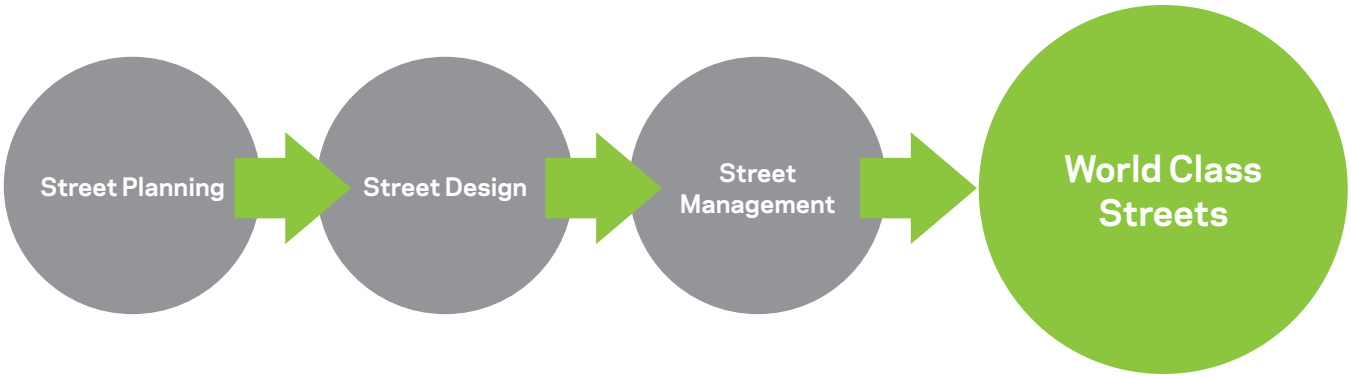
Appendix C: Citations
Reference to laws, regulations, and reference sources.

Appendix D: DOT Design Review Process
A summary of NYC DOT's streamlined design review process.

A Note on Sustainability Opportunities
Many of the design treatments in this manual include a section entitled "Sustainability Opportunities," offering ways to reduce the street's environmental impact. For more detailed design guidance on sustainable street infrastructure, including stormwater source controls (BMPs), readers are directed to DDC's *High Performance Infrastructure Guidelines*, the *Sustainable Urban Sites Handbook*, and resources listed in Appendix C.

The Planning Process

The *Street Design Manual* is primarily focused on providing guidance for the design of streets. However, the planning framework that establishes the context and priorities for each design, and the ongoing management and operation of streets once built, are also critical steps to create world–class streets (see below). This section provides a brief overview of the larger planning framework of which street design, and the *Street Design Manual*, should be a part. Appendix C includes a number of useful resources for more details on best planning practices for streets.



Street Planning

- Community priorities
- Land uses & types of users
- Demand & usage patterns, major trip generators
- Safety–related needs
- Local vs. through traffic
- Bus routes, bicycle routes, truck routes, critical connections
- Access management (driveways)
- Existing environmental & public space conditions

Street Design

- Target & design speeds
- Alignments & widths
- Horizontal & vertical geometric elements
- One–way or two–way operation
- Public spaces
- Roadway, sidewalk & lighting materials
- Grading & drainage
- Utilities
- Materials
- Lighting
- Furniture
- Trees, vegetation & stormwater controls
- Public art

Street Management

- Speed limit
- Traffic controls
- One–way or two–way operation
- Part–time or full–time access controls
- Curbside regulation
- Maintenance/cleaning
- Public space programming
- Short–term operational improvements utilizing temporary materials
- Enforcement

Planning

Every street is not only inseparable from its surrounding community and land uses, but it's also a part of the larger transportation network of the city and region. Streets should be designed with an understanding of their role in both the local and larger planning context. The planning of street projects should begin with the setting of clearly–defined goals. Projects should seek to address not only pre–existing issues that have been identified by the community or the city, but also policy objectives or other needs of the city and stakeholders that the project can meet as well. Appropriate stakeholders should be involved in projects from project conception to implementation.

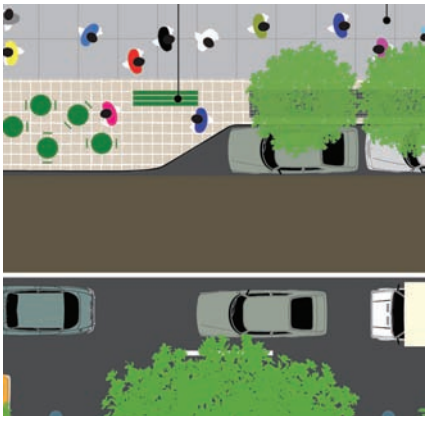
Design

The design guidance of the *Street Design Manual* provides options for street designs in the form of "toolboxes" of geometric, material, lighting, and furnishing treatments (Chapters 2–5), but in most cases it does not prescribe which specific treatments must be used and in which combination. It also does not dictate which treatment should receive priority when there is a conflict between design alternatives. Rather, it gives users the flexibility to determine which overall design is most appropriate and practical in light of the goals and priorities established through the planning process and the overall policies of the manual (found in the Introduction). The Design Checklist in the next section can be a particularly helpful tool for this decision–making process.

Management

Well–functioning, high–quality streets are not just a product of their planning and design: the way a street is operated and managed once built is just as important as its design. For example, curbside regulations and traffic controls (signs, signals, and markings) are a central factor in determining how streets operate and the quality of the public realm. Likewise, access to a street can be limited to pedestrian traffic on certain days or for certain hours, and vehicular traffic can be limited to transit and/or commercial vehicles some or all of the time. Finally, maintenance of street materials, furnishings, and plantings is critical to the long–term success of street designs.

Land use, which varies widely in New York City, is one important planning criterion for street design



To assist designers, engineers, and other users in visualizing the "big picture"—how the manual's individual design treatments can be combined to respond to varying planning contexts—five generalized "street typologies" are described below, followed by two illustrative examples of how various elements from the manual can be combined.

Street Typologies

Most jurisdictions in the United States categorize their streets into "functional classifications" based on vehicular access and mobility needs. Some states and cities go beyond such classifications to categorize streets into broader "typologies" that respond not only to the context of the vehicular network, but also to other networks (such as transit and bicycle), land uses, and environmental factors. Such categorizations are intended to provide a simplified planning framework to expedite the street design process.

Due to the complexity and limited right–of–way of its street network, New York City does not currently assign streets into such typologies. However, the five generalized street typologies that follow show that the design of a street can be considered in a comprehensive way. Some, like a Boulevard treatment, have been used widely in New York City and around the world; other innovative designs such as a slow street have been used successfully elsewhere, but have not yet been adopted in New York City.

Most streets are and will continue to be variations of the prevalent General Street design — one or more roadways open to mixed traffic with sidewalks and curbs. This type of street provides great flexibility, allowing for streets of varying designs and operating characteristics through such parameters as design speed; one–way versus two–way operation; number and width of moving and parking lanes; use of medians, curb extensions, and other geometric features; provision of exclusive or preferential facilities for buses and bicyclists; and street material and furniture selections.

Fordham Road, The Bronx

General Street

With a mixed roadway, curbs, and sidewalks, General Streets are the most prevalent street design and can be tailored to serve both local and through street contexts.

Although this design frequently emphasizes motor vehicle access and movement, the street may also include dedicated facilities for buses and/or bicyclists. Unlike a shared street, vehicles and pedestrians are typically separated rather than cooperatively sharing the street space.

Typical Treatments

- Mixed Roadway
- Sidewalks
- Individual Tree Pits
- Standard roadway, sidewalk and curb materials

Other Common Treatments

- Curb Extensions
- Median
- Bike Lane/Bike Path
- Greenstreet/Planted Area
- Tinted concrete and/or exposed aggregate sidewalk
- Granite Curb
- Unit paver furnishing zone

Grand Concourse, Bronx

Boulevard

A wide street with multiple roadways and medians and an emphasis on greening and design quality.

The term "boulevard" has often referred to wide streets that act as grand promenades between important destinations. They typically have two or more roadways separated by medians, with the inner roadway(s) intended for through traffic and the outer for local traffic, and an exceptional level of landscaping, public open space, and visual quality. The medians sometimes include pedestrian and bicycle paths.

In New York City, not all streets designed as boulevards are named "Boulevard" (for example Ocean Parkway in Brooklyn), and vice versa.

Typical Treatments

- Mixed Roadways
- Sidewalks
- Medians
- Individual Tree Pits/Connected Tree Pits
- Standard roadway, sidewalk and curb materials
- Unit paver sidewalk or furnishing zone

Other Common Treatments

- Curb Extension
- Bike Lane/Bike Path
- Bus Lane/Busway
- Greenstreet/Vegetated Area
- Shared Street (in service roadways)
- Distinctive crosswalk materials
- Tinted concrete and/or exposed aggregate sidewalk
- Granite curb

Tokyo, Japan (Credit: Rob Ketcherside)

Slow Street

A local street which makes extensive use of traffic–calming measures to discourage vehicular through–traffic, reduce vehicle speeds, and green and beautify the streetscape, creating a comfortable environment for bicycling and walking.

Sometimes called "bicycle boulevards" or "Home Zones", Slow Streets are especially well–suited to local residential streets and streets adjacent to schools.

Typical Treatments

- Mixed Roadway
- Sidewalks
- Reduced Speed Limit
- Gateways and Curb Extensions
- Traffic Diverters
- Neighborhood Traffic Circles
- Individual Tree Pits/Connected Tree Pits
- Greenstreets/Planted Areas
- Unit Paver Roadway
- Standard Sidewalk and Curb Materials

Other Common Treatments

- Shared Street
- Raised Intersections
- Street Swales
- Distinctive Crosswalk Materials
- Unit Paver Sidewalk
- Granite Curb

Fulton Mall, Brooklyn

Transit Street

A street for exclusive or near–exclusive surface transit (bus) use or where transit operations are given priority.

Transit streets are streets where private vehicles have limited or no access, and bus use is prioritized. Delivery access may be allowed at all times or in off–hours, and bicyclists are sometimes allowed to share the bus lanes.

Transit streets often emphasize urban design and transit–supportiveness by including outdoor seating, landscaping, attractive street materials, and well–designed bus queuing areas and off–board fare collection. These measures help create an appealing street environment in the presence of high numbers of buses.

Typical Treatments

- Mixed Roadway (vehicle access completely or mostly limited to buses)
- Bus Lane/Busway
- Sidewalks
- Individual Tree Pits/Connected Tree Pits
- Concrete or Unit Paver Roadway
- Tinted Concrete and/or Exposed Aggregate Sidewalk
- Standard Curb Materials

Other Common Treatments

- Curb Extensions
- Gateways
- Medians
- Greenstreets/Planted Areas
- Unit Paver Sidewalk or Furnishing Zone

Stone Street, Manhattan

Pedestrian–Only Street
A street exclusively for pedestrian use.

Pedestrian streets usually involve the full–time restriction of vehicle access to a street, however delivery access may be allowed in off–hours. Bicyclists can either be allowed to ride through or be required to dismount and walk. The design can be as simple as a typical General Street without vehicle access or can be more intensively designed with attractive street materials, furniture, landscaping, and plaza treatments.

Typical Treatments

- Individual Tree Pits
- Unit paver roadway
- Imprinted asphalt roadway
- Standard sidewalk and curb materials

Other Common Treatments

- Sidewalks
- Gateways
- Raised Intersections
- Connected Tree Pits
- Greenstreets/Planted Areas
- Unit paver sidewalk
- Granite curb

Sample Streets

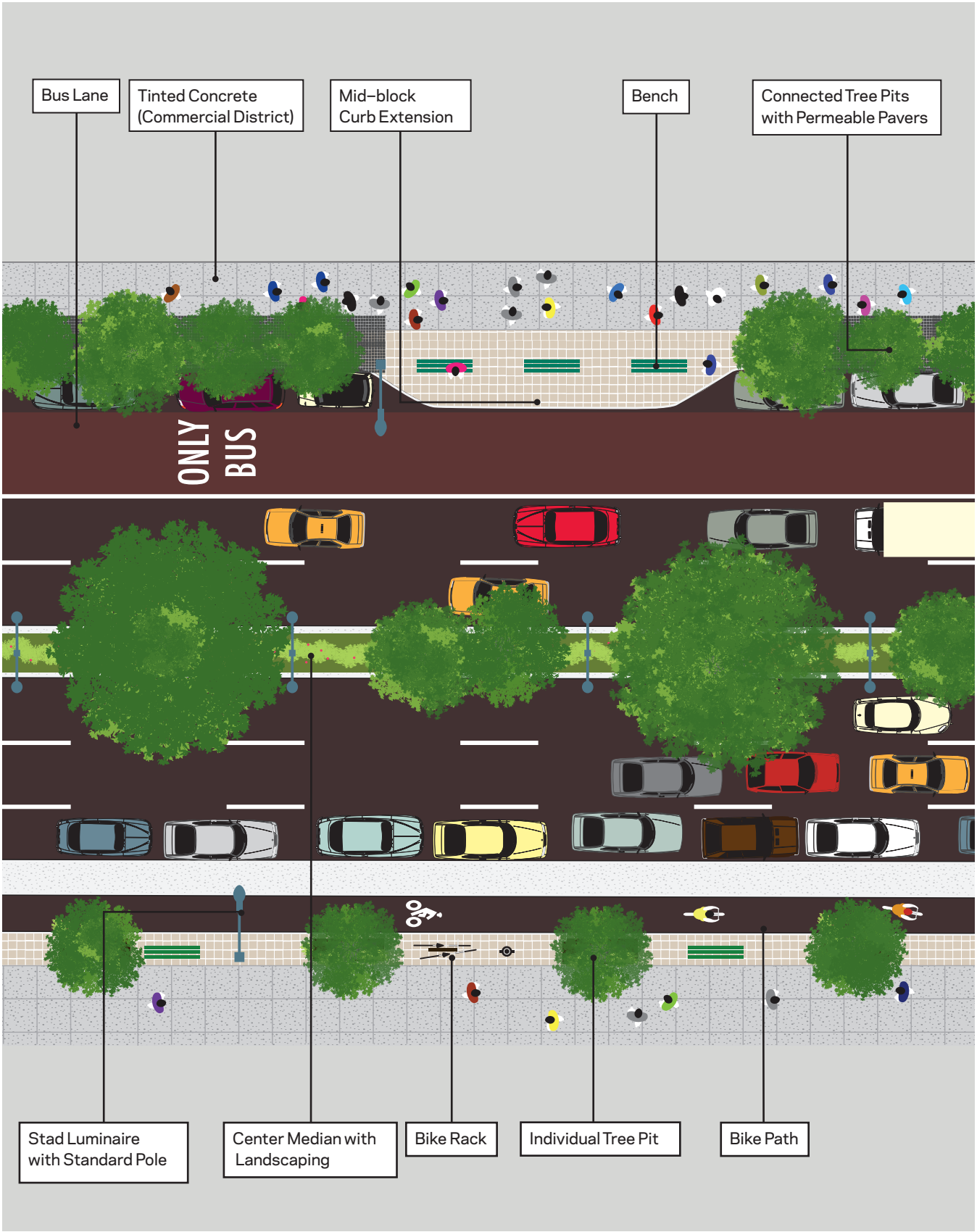
The two diagrams on pages 34–37 illustrate how different combinations of elements from the manual can be tailored to accommodate varied street uses and contexts. Like many New York City streets, these examples do not reflect any one of the previously described typologies, but rather contain elements of them all.

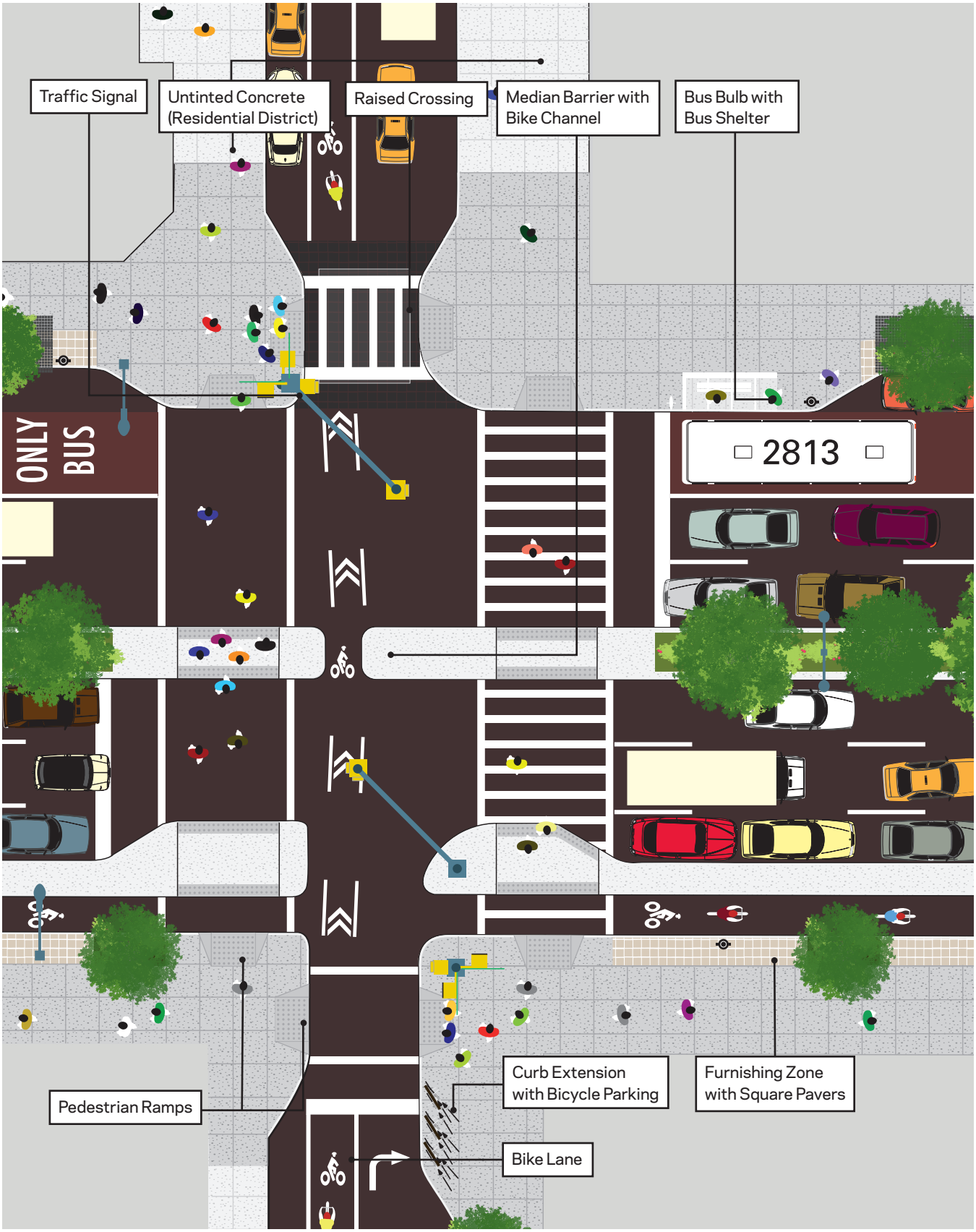
Figure 1 depicts treatments that are often appropriate on multi–lane through–streets and/or retail corridors. Figure 2 depicts treatments that are often appropriate on local streets and/or residential streets.

The images are illustrative rather than literal depictions of street designs and are not intended to be used as design guidance.

Sample Streets

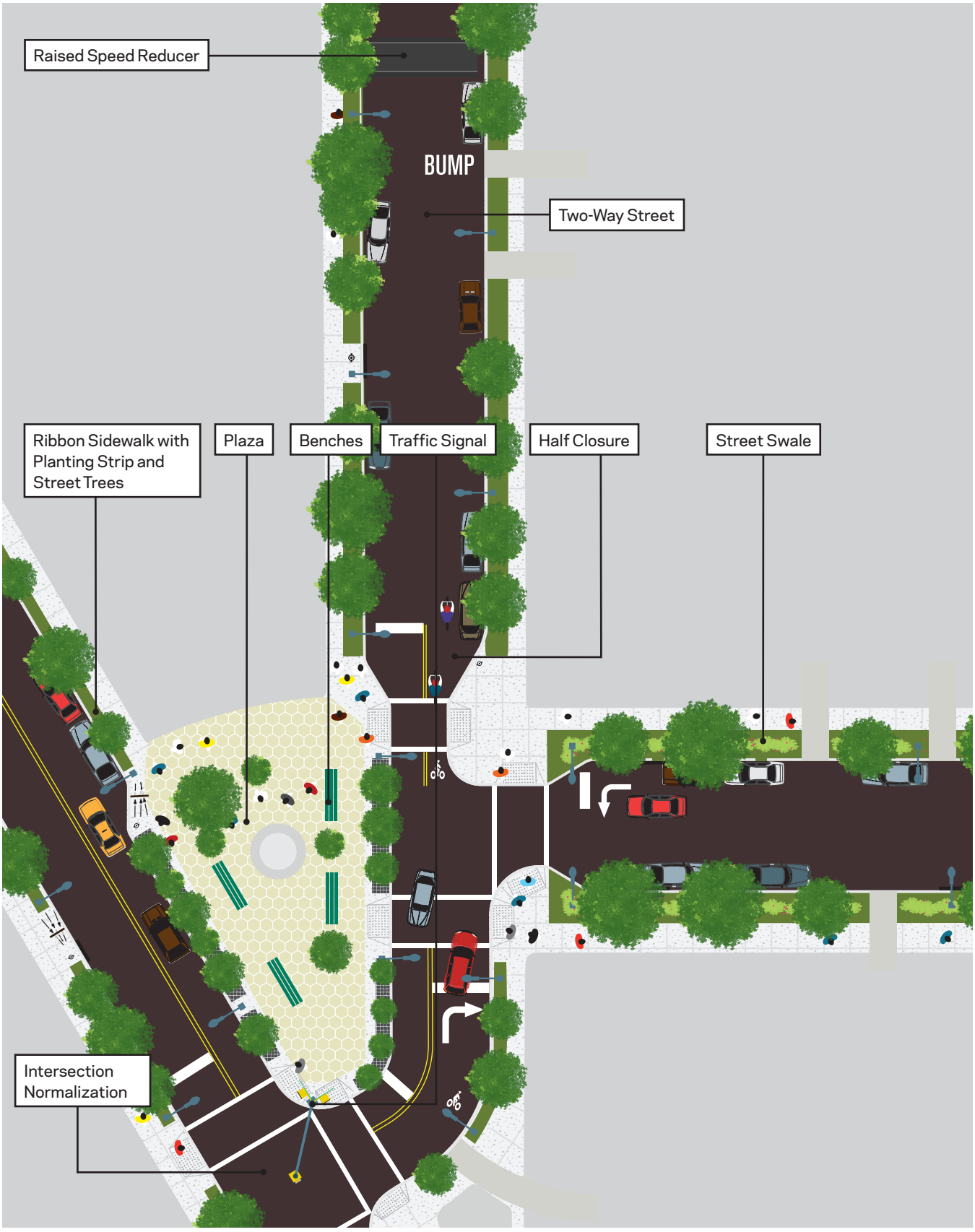
Figure 1 Treatments Appropriate to Major Through–Streets




Traffic Signal
Untinted Concrete (Residential District)
Raised Crossing
Median Barrier with Bike Channel
Bus Bulb with Bus Shelter
ONLY BUS
2813
Pedestrian Ramps
Curb Extension with Bicycle Parking
Furnishing Zone with Square Pavers
Bike Lane

Sample Streets

Figure 2 Treatments Appropriate to Local Streets



Mid–Block Narrowing with Raised Speed Reducer
BUMP
Street Swale
Raised Intersection
Ribbon Sidewalk with Street Swale
Plain Concrete (Residential District)

Design Checklist

To define context, set project goals, and give appropriate consideration to the full range of factors that should inform the street's design, refer to this checklist of key design criteria. Note that the checklist follows the format of the Design Review Cover Sheet (Appendix A). Projects submitted to NYC DOT for approval will be reviewed with respect to these topic areas.

Use the checklist in conjunction with the questions in the next section, Integration into Project Development.

Fulton Street, Manhattan

Fulton Mall, Brooklyn

Street Context

☐ **History & Character**
Describe for the specific project area

☐ **Land Use**
Predominant land uses and densities within the project area (e.g., light residential, dense commercial), any historic districts or special zoning districts, proximity to transit

☐ **Network Role**
The role of the street in the neighborhood, city, and regional transportation system

☐ **Major Sites**
Identify major sites, destinations, and trip generators within or proximate to the project area, including prominent landmarks, commercial, cultural and civic institutions, and public spaces

☐ **Street Width**
Available space and how its allocation will be prioritized

Street Operations

☐ **Walking**
Pedestrian safety, volumes, comfort and convenience of movement, accident history, important walking connections, and quality of the walking environment

☐ **Bicycling**
Bicycle volumes, comfort and convenience of movement, existing or proposed bike routes and other important bicyclist connections, accident history, and bicycle parking

☐ **Motor Vehicles**
Motor vehicle volumes, access, accident history, important motor vehicle connections, appropriateness of motor vehicle traffic to street scale (e.g., local versus through traffic), and ways to reduce the negative impacts of motor vehicle traffic

☐ **Transit**
Bus routes and operations, subway or other transit station access, and supportiveness of transit usage and users

☐ **Trucks/Freight**
Truck routes, safety, volumes, access, mobility, and ways to reduce the negative impacts of truck traffic

☐ **Access**
Access or mobility needs of the disabled, elderly, and children, ADA compliance, and any school or senior safety zones within the project area

☐ **Curbside Conditions**
Curbside demand and usage patterns within the project area, allocation of space for through movement, meter parking, non–metered parking, loading, deliveries, and pedestrian space

☐ **Public Space**
Public space, pedestrian seating, quality of public realm

☐ **Drainage**
Stormwater flow patterns, catch basins, and sewer connections

☐ **Street Cuts**
Frequency of utility "cuts" into the roadway within the project area, potential improvement or consolidation of utility infrastructure

Greening

☐ **Street Trees**
Tree coverage within the project area

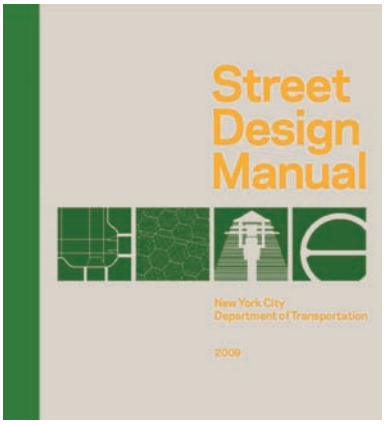
☐ **Greenstreets & Vegetation**
Existing Greenstreets within the project area and opportunity sites for Greenstreets or other planted areas

☐ **Stormwater Control**
Stormwater runoff conditions, permeability of underlying soil, stormwater source controls

☐ **Flooding**
Flooding conditions within the project area

☐ **Maintenance Partner(s)**
Potential and/or committed maintenance partners (e.g., BIDs, DPR) and level of commitment (e.g., watering, weeding, pruning, litter removal, replacements)

☐ **Permits**
Wetlands or coastline areas within 100 feet of the project area; requirements for New York State Department of Environmental Conservation or the Army Corps of Engineers permits



***Street Design Manual* Usage**

☐ **Materials, Lighting & Furniture**
Paving materials, lighting poles, fixtures and levels, and street furniture

☐ **Application**
Ways in which proposed design will follow the guidelines of the *Street Design Manual* in regards to overall policies and principles, street geometry, materials, lighting, and other street elements

☐ **Major Deviations**
Extent and reasons why a potential design may deviate from the guidelines, policies, and principles of the manual

☐ **Pilot Treatments**
Any pilot geometric, material or lighting treatments from the *Street Design Manual* that could be proposed in a potential design

Integration into Project Development

Use by Project Managers, Designers, Engineers, Planners

To make the *Street Design Manual* an integral part of the full project planning and design process, key questions are identified below (Q) for different stages of the process, with references to sections of the *Street Design Manual* (A) that can help answer them.

Identify Project Goals

Q. What are the primary objectives of the project?

Are there other secondary objectives that could or should be addressed at the same time?

Has the community been involved in setting the project goals?

A. The Street Design Policy (Introduction) should inform the project goals.

Refer to the Design Checklist in the previous section for key considerations in setting primary and secondary project goals.

Q. Who are other stakeholder agencies and entities?

A. Refer to Appendix B, Jurisdictions on the City's Streets, for a partial list of relevant agencies and entities who may have a stake in the project and may need to be consulted.

Government and community stakeholders should be brought in before the development of a design and involved through to implementation.

Assess Project Extent and Limits

Q. What is the extent of construction: sidewalk and furnishing replacement only, roadway resurfacing, surface construction, or full–depth reconstruction?

A. Refer to the manual for guidelines on the types of treatments that are most likely to be feasible given the extent of construction work.

Q. Are there any current or potential maintenance partners? (Many enhanced geometric, material, and lighting treatments require a maintenance partner. Examples of treatments may include optional paving materials, landscaped areas, and non–standard lighting fixtures.)

A. Refer to Chapters 2–5 (Geometry, Materials, Lighting, and Furniture) for treatments that require a maintenance partner. When applicable, be sure that a suitable maintenance partner is identified and involved in the design process.

Refer to Appendix B, Jurisdictions on the City's Streets, for a partial list of relevant agencies and entities who may have a stake in the project or who could assist in securing maintenance.

Develop Proposed Design

Q. What is the desired role and characteristics of the affected street(s)?

Who uses the street(s) and how; how should it function?

A. Use Appendix A, the Street Design Cover Sheet, as a tool for defining the existing and desired future characteristics of the street(s) and for overall design considerations.

Q. Based on the project goals and scope identified, which design treatments best achieve the project goals and realize the desired uses of the street(s)?

Of those, which are most feasible given operational, budget, and maintenance constraints?

A. Use Chapters 2–5 (Geometry, Materials, Lighting, and Furniture) to identify appropriate treatments for the goals, scop, and budget of the project and for general design guidance on when and how to use those treatments. For detailed geometric design guidance, refer to established design guidance sources including those listed in Appendix C.

Refer to the Street Design Policy (Introduction) to set priorities and resolve competing priorities for budget and/or spatial concerns.

Refer to Appendix C, Legal and Design Guidance References, for a partial list of relevant legal rules and regulations.

Q. Which agencies and other stakeholders (e.g., maintenance) need to be involved in the design?

Will use of any pilot materials or geometry be proposed? If so, be sure to partner with the relevant agency or agencies in designing such pilot designs.

A. Refer to Appendix B, Jurisdictions on the City's Streets, for a partial list of relevant agencies and entities who may need to be consulted on the design and maintenance of particular elements.

Submit Proposed Design for Applicable Reviews

Q. Which agency review is mandatory?

Which is advisory or optional?

A. Refer to Appendix B, Jurisdictions on the City's Streets, for a partial list of relevant agencies who should or must review the proposed design.

NYC DOT has developed an expedited review process (see Appendix D for an overview). Review of projects that include NYC DOT funding will be coordinated through DOT's Office of Capital Program Management (CPM). All other projects affecting streets will be coordinated through the appropriate Borough Commissioner's office.

Attach the Street Design Cover Sheet (Appendix A), along with any submitted drawings of the proposed design for NYC DOT or other agency reviews.

Q. Does the design adhere to the policies, principles and design guidance of the manual?

Where it doesn't, how has it been justified?

A. The proposed design will be reviewed by NYC DOT for consistency with the Street Design Policy (Introduction) and the design guidance of Chapters 2–5 (Geometry, Materials, Lighting, and Furniture). Justification will be expected for discrepancies, and discrepancies may not be approved.

Use by Community Boards, Elected Officials, Community Groups, and the Public

While the *Street Design Manual* gives planning and design guidance for government agencies and their consultants, it is also intended to be a resource for the general public. The manual can assist neighborhood groups and elected officials in planning more effectively for their communities.

145th Street, Queens

Identify Project Goals

Q. What are the overall goals and priorities of the city in designing its streets?

What are the goals of the community for the project? How can the manual help realize them?

A. Refer to the Street Design Policy (Introduction) for an overview of general policies and priorities for designing streets.

Refer to the Street Design Checklist (previous section) for key considerations in setting project goals.

Maintenance Partners

Q. What are the appropriate ranges of design treatments that may be considered for particular New York City streets or neighborhoods?

Which treatments require a maintenance partner from the community?

What is the maintenance capacity of the community?

What is required of maintenance partners?

A. Refer to Chapters 2–5 (Geometry, Materials, Lighting, and Furniture) to understand the different design treatments that can be used, for general guidance on when and how they should be used, and for any requirements for maintenance partners from the community.

Timeline

Q. How can the quality of projects and speed of delivery be improved?

How can time–consuming design changes late in the development process be avoided?

A. Use of the manual early on and throughout the project development process can help the public and government interact more efficiently and effectively, potentially speeding approvals and implementation.

Regulating Agencies and Laws

Q. What agencies have jurisdiction over a particular project and how will they be involved in the planning, discussion and evaluation of the project?

A. Refer to Appendix B for clarification on which agencies have responsibility or jurisdiction over different elements of the street design, such as approvals, permits and maintenance.

Q. What laws, regulations, and design guidance sources should the public be made aware to become familiar with the street design process?

A. Refer to Appendix C for a reference on laws, regulations, and design guidance sources that are frequently relevant in designing streets.

2 Geometry

2.0 Introduction 45
2.1 Roadways & Lanes 48
2.1.1 Mixed Roadway 49
2.1.2 Bike Lanes & Paths 50
2.1.a Bike Lane 51
b Bike Path 52
2.1.3 Bus Lanes & Busways 56
a Bus Lane 57
b Busway 58
2.1.4 Shared Street 59

2.2 Sidewalks & Medians 61
2.2.1 Sidewalk 62
a Full Sidewalk 63
b Ribbon Sidewalk 64
2.2.2 Curb Extension 65
a Curb Extension with Greenstreet/Plantings 68
b Curb Extension with Community Facilities 69
c Bus Bulb 70
d Mid–Block Narrowing 71
2.2.3 Median 72
2.2.4 Median Safety Island 74

2.3 Traffic Calming 75
2.3.1 Raised Speed Reducers 76
a Speed Cushion 77
2.3.2 Gateway 78
2.3.3 Traffic Diverters 79
a Median Barrier 80
b Forced Turn 81
c Diagonal Diverter 82
d Half Closure 83
e Full Closure 84
2.3.4 Chicane 85
2.3.5 Neighborhood Traffic Circle 86
2.3.6 Roundabout 88
2.3.7 Raised Crossing 90
2.3.8 Raised Intersection 91

2.4 Street Trees & Plantings 92
2.4.1 Tree Pits 93
a Individual Tree Pit 95
b Connected Tree Pits 96
c Stormwater–Capturing Tree Pits 97
2.4.2 Greenstreet/Planted Area 98
2.4.3 Street Swale 99

		Usage		
Section	Geometric Treatment	Wide	Limited	Pilot
2.1	**Roadway & Lanes**			
2.1.1	Mixed Roadway	●		
2.1.2	Bike Lanes & Paths			
2.1.2a	Bike Lane	●		
2.1.2b	Bike Path		●	
2.1.3	Bus Lanes & Busways			
2.1.3a	Bus Lane		●	
2.1.3b	Busway			●
2.1.4	Shared Street			●
2.2	**Sidewalks & Medians**			
2.2.1	Sidewalk			
2.2.1a	Full Sidewalk	●		
2.2.1b	Ribbon Sidewalk	●		
2.2.2	Curb Extension			
2.2.2a	Curb Extension with Greenstreet/Plantings	●		
2.2.2b	Curb Extension with Community Facilities	●		
2.2.2c	Bus Bulb	●		
2.2.2d	Mid–Block Narrowing	●		
2.2.3	Median	●		
2.2.4	Median Safety Island	●		
2.3	**Traffic Calming**			
2.3.1	Raised Speed Reducers		●	
2.3.1a	Speed Cushion			●
2.3.2	Gateway		●	
2.3.3	Traffic Diverters			
2.3.3a	Median Barrier		●	
2.3.3b	Forced Turn		●	
2.3.3c	Diagonal Diverter			●
2.3.3d	Half Closure			●
2.3.3e	Full Closure			●
2.3.4	Chicane			●
2.3.5	Neighborhood Traffic Circle			●
2.3.6	Roundabout			●
2.3.7	Raised Crossing		●	
2.3.8	Raised Intersection			●
2.4	**Street Trees & Plantings**			
2.4.1	Tree Pits			
2.4.1a	Individual Tree Pit	●		
2.4.1b	Connected Tree Pits		●	
2.4.1c	Stormwater–Capturing Tree Pit			●
2.4.2	Greenstreet/Planted Area		●	
2.4.3	Street Swale			●

Introduction

About this Chapter

The geometric design of streets is integral to how motorists, bicyclists, pedestrians, and other street users behave on them. Geometry also affects streets' economic, community, and environmental impacts.

This chapter establishes general guidelines for the geometric design of streets as well as a "toolbox" of geometric treatments that may be used to enhance safety, mobility, and sustainability.

The recommendations of this chapter supplement rather than replace existing sources of detailed engineering guidance and do not supersede any existing federal, state or city laws, rules, and regulations. All projects remain subject to relevant statutes, such as the Zoning Resolution of the City of New York, City Environmental Quality Review (CEQR) and appropriate reviews and approvals of oversight agencies.

Guidance Sources

Guidance on the geometric design and operations of streets and roadways is contained in such sources as *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004), the *Manual of Uniform Traffic Control Devices* (FHWA, 2003), and *Urban Street Geometric Design Handbook* (ITE, 2008).

Other resources include the *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (AASHTO, 2004), *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities* (ITE, 2006), and NYC DOT's own *School Safety Engineering Project: General Mitigation Measures Final Report* (2004). For additional references, see Appendix C.

Applicability and Exceptions

All new projects that significantly impact public and private streets should follow these guidelines. NYC DOT approval will be based on site—specific conditions and cost—effective engineering standards and judgment, with the safety of all street users being of paramount importance.

Usage Categories

Geometric treatments are divided into three categories: wide application, limited application, or pilot projects.

Wide

Geometric treatments of this type are in wide use throughout New York City. They constitute the basic set of elements that are typically found on city streets. Designs should incorporate them wherever appropriate. These treatments generally require less intensive review than limited or pilot treatments.

Limited

Geometric treatments of this type are currently in limited use in New York City. While the designs are well–established, their application is contingent on site–specific conditions. These treatments will require more in–depth review of appropriateness and feasibility.

Pilot

Geometric treatments of this type are currently in, at most, limited use in New York City, but have been employed successfully in other U.S. and international cites. Appropriate design criteria are still under development for application in New York City. Proposals for pilot usage of these treatments are encouraged and will be evaluated on a case–by–case basis.

General Guidelines

The following guidelines expand on the general policies and principles outlined in Chapter 1, with more detailed information specific to geometric street design.

Vehicle Target Speed

Streets should be designed with target speeds (see Glossary) and speed limits appropriate to their surrounding uses and desired role in the vehicular network. New York State Vehicle & Traffic Law (VTL) Section 1642(a)(26)(a) currently allows speed limits below 25 mph, and as low as 15 mph, in New York City if used in conjunction with traffic calming measures. Slower target speeds and speed limits should be considered on local streets, residential streets, alleys; on streets adjacent to schools, and senior or disabled pedestrian trip generators; and waterfronts, parks, or other significant pedestrian destinations.

Roadway Width, Curb Radii & Crossing Distance

To minimize pedestrian crossing distances and reduce impermeable, heat–absorbing asphalt coverage, the paved roadway of all streets should be designed to be the minimum width —and have the minimum number of lanes—that safely and cost–effectively allow for the desired operations of motor vehicles, buses, and bicyclists. Roadway reconstructions should be designed for traffic volumes expected in the actual build year. Additional consideration should be given to recent trends in traffic and mode choice —as documented in NYC DOT's *Sustainable Streets Index* — and their implication for traffic volumes in future years (e.g., five years after the build year). Excess width should be reallocated to provide walking, transit, and bicycling facilities, public open space, green cover, and/or stormwater source control measures. If financial limitations preclude final implementation of street retrofits (e.g., curbing, streetscaping, etc.), the reallocation of space should still proceed with temporary or least costly approaches such as restriping.

To further reduce pedestrian crossing distances and slow turning vehicles, all roadway corners should be designed with the smallest possible radius that still accommodates the design vehicle and emergency vehicles.

Pedestrian crossing distances should be minimized in all locations utilizing the above methods and other treatments, such as curb extensions (neckdowns) and medians. Sidewalk narrowings and roadway widenings should be avoided.

Design Vehicles & Emergency Access

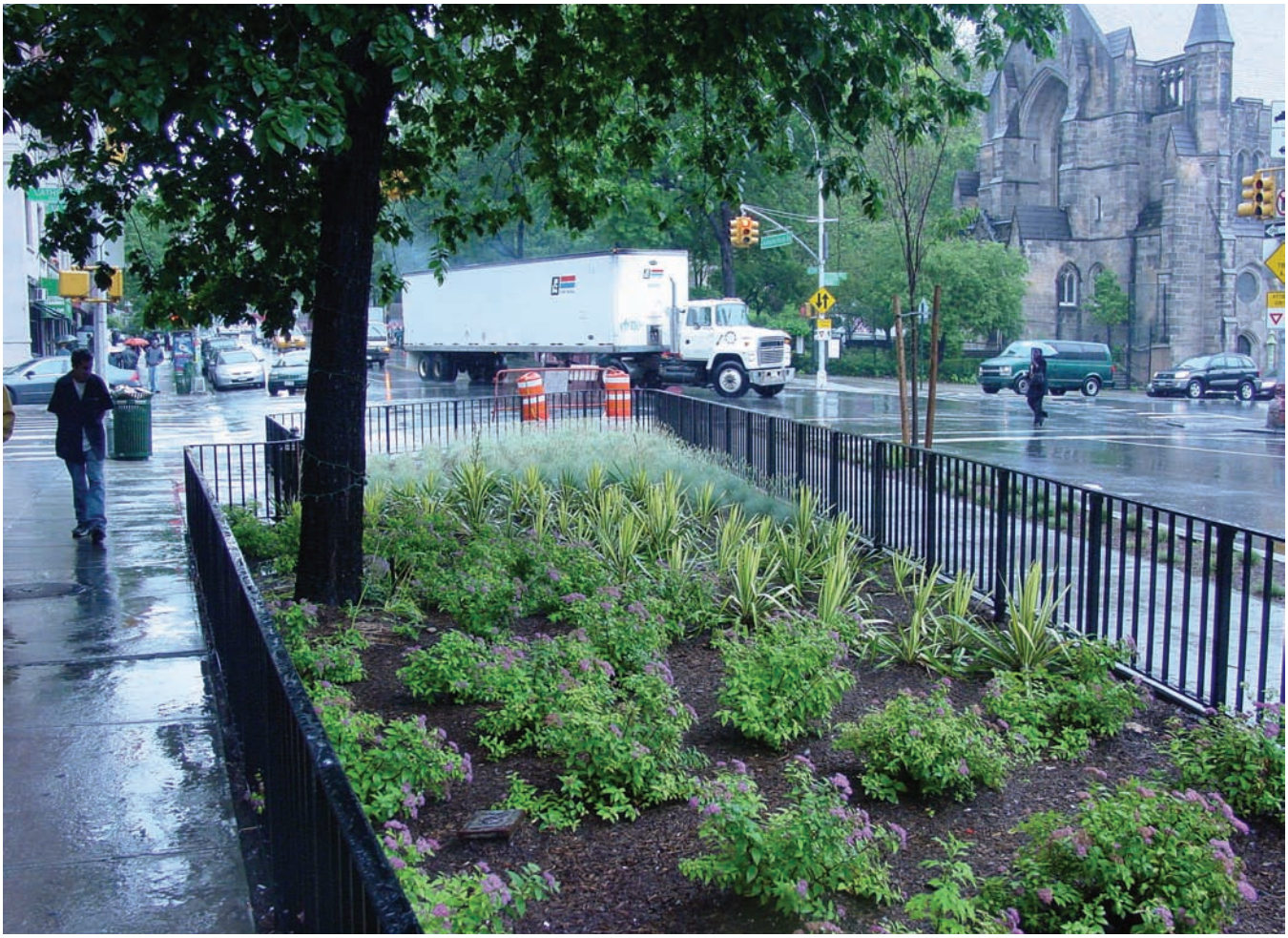
The design vehicles (see Glossary) used for geometric street designs, typically a single unit truck, should be appropriate to the predominant intended uses of the given street and should not include commercial vehicles larger than the allowed New York City maximum length. In addition, all street designs must consider FDNY, other emergency vehicle, and sanitation vehicle access needs (street cleaning and snow clearing).

Complex Intersections

Multi–leg or skewed angle intersections should be redesigned (to the extent possible) to simplify operations and reduce or separate conflicts. This can include the removal of intersection legs and slip lanes that are unimportant to the traffic network, creation of right–angled intersection alignments, and simplified traffic patterns. Resulting pedestrian space should be consolidated into its most usable form to create new public open space and shorter, more direct crossings. The use of slip lanes should generally be avoided.

Accessibility

Projects should meet all applicable federal, state, and/or local accessibility standards for public rights–of–way, including minimum clear sidewalk widths, inclusion of ADA–compliant pedestrian ramps, and provision of accessible waiting and boarding areas at transit stops.



Greenstreet with stormwater-capturing design: Amsterdam Avenue, Manhattan (Credit: NYC DPR)

Detail of stormwater-capturing design during rain event (Credit: NYC DPR)

Vegetation, BMPs & Drainage

All modifications to street geometry should consider and avoid unintended changes in the direction and disposition of stormwater runoff. Designs for planted areas, stormwater source controls, and BMPs within the public right–of–way are still evolving and being tested.

Because these treatments may ultimately revert to city agencies for ongoing maintenance, the appropriate agencies (e.g., NYC DOT, NYC DPR, and/or NYC DEP) should be consulted early in the design process so that all such treatments are technically viable and maintainable. Street construction, infrastructure replacement, tree planting, and Greenstreets construction should be coordinated to avoid damage to underlying infrastructure and minimize costs.

Roadways & Lanes

Mixed Roadway

USAGE: WIDE

That portion of a street designed, improved or ordinarily used for vehicular travel, exclusive of the shoulder and slope.

This predominant roadway design generally emphasizes motor vehicle access and flow, but it can be augmented with dedicated facilities for other modes (such as BUS or BIKE LANES or PATHS). The design leaves significant flexibility to calm traffic and enhance the public realm. However, unlike a SHARED STREET, vehicles and pedestrians are typically separated, rather than cooperatively sharing the roadway space.

Low–traffic, local roadway: Argyle Road, Brooklyn

Benefits

Can be designed to provide basic accommodation for all transportation modes

Provides intra–city network for vehicular through and local access

Application

Streets that are not SHARED STREETS (2.1.4) or pedestrian–only streets

On relatively narrow (e.g., two or fewer moving lanes), low vehicle volume and/or high pedestrian volume streets and alleys, instead consider SHARED STREET or pedestrian–only street treatments

Design

Provide SIDEWALKS (2.2.1) on both sides of all roadways, except in certain historic districts as per Landmarks Preservation Commission (LPC)

Roadways must meet technical requirements as per relevant standard specifications and regulations

Minimize roadway width and maximize sidewalk (and planting strip, if applicable) width maximized to the greatest extent possible

Exclusive or preferential facilities for buses and/or bicycles should be used as per those treatments' criteria or when deemed appropriate by NYC DOT

Provisions of street trees should be maximized

Include planted areas and stormwater source controls within the roadway wherever possible, when a maintenance partner is identified

Grade roadways to direct stormwater towards any stormwater source controls (such as in a MEDIAN (2.2.3) or CURB EXTENSION (2.2.2))

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Maximize trees and other green cover

Utilize stormwater source controls wherever feasible

Increase SRI value of paved surfaces to reduce urban heat island impact

Utilize recycled content in paving materials

Coordinate streetscape/utility work to minimize street cuts

High–traffic roadway with median: Delancey Street, Manhattan

Bike Lanes & Paths

USAGE: WIDE

A dedicated on–street lane or path for bicycles (see Glossary).

Bikeways are typically designed as BIKE LANES within the roadway delineated with markings (2.1.2a, also known as Class 2 bike lanes) or as BIKE PATHS physically separated from traffic for most of their length (2.1.2b, also known as Class 1 bike lanes). Another typical design is the shared lane (Class 3 bike lane) described in Table 1. The shared lane is not covered by the Manual.

Buffered bike lane: 9th Street, Brooklyn

One–way, parking–separated bike path on a crosstown street: Grand Street, Manhattan

Benefits

Provides dedicated space for bicyclists, enhancing safety, comfort, and mobility

Cumulative with other bikeways, provides a comprehensive network of recommended routes for bicyclists, thereby encouraging bicycling

Application

NYC Bicycle Master Plan routes

Streets not on the Master Plan when identified by NYC DOT as priority routes

Consider on streets with high current or anticipated bicycle volumes

Design

See Table 1 (following 2.1.2b) for a listing of typical bikeway designs and their respective spatial requirements, ideal applications, and advantages and disadvantages

Create connectivity with adjoining bikeways, bike parking, and bicycle destinations

Sustainability Opportunities

Utilize permeable paving and/or paving with a high SRI value within BIKE LANE or BIKE PATH

Utilize recycled content in paving materials

Bike Lanes & Paths:

Bike Lane

USAGE: WIDE

A portion of a roadway that has been designated by striping, signs, and pavement markings for the preferential or exclusive use of bicyclists. Also known as a Class 2 bike lane.

Physical separation of bike lanes is desirable, but is not always possible due to physical or operational constraints.

Green, buffered bike lane: Broadway, Manhattan

Bike lane: 164th Street, Queens

Benefits

See benefits of BIKE LANES & PATHS (2.1.2)

Addition of on–roadway bike lanes that narrows or replaces motor vehicle lanes can calm traffic

Considerations

Without physical separation, vehicles can block bike lanes, making enforcement of violations more critical

Application

See application guidance for BIKE LANES & PATHS

Consideration should be given to use of BIKE PATH (2.1.2b) rather than, or in addition to, BIKE LANE whenever possible

Design

See design guidance for BIKE LANES & PATHS

BIKE LANES should be buffered when possible, typically with 3 feet of channelization

At intersections with complex traffic patterns—or when bike lanes located immediately adjacent to the curb—bike lanes can be given visual emphasis through the use of green–colored pavement

Sustainability Opportunities

See sustainability opportunities for BIKE LANES & PATHS

Bike Lanes & Paths:

Bike Path

USAGE: LIMITED

A path intended for the use of bicycles that is physically separated from motorized vehicle traffic by an open space or barrier and either within the highway right–of–way or within an independent right–of–way. Also known as a Class 1 bike lane.

Physical separation of bikeways can sometimes be preferable on wide or busy streets, on major bike routes, or along long, uninterrupted stretches. Separation can take the form of a painted buffer demarcating the bike lane behind a "floating" parking lane, a narrow curb or median, or a wider median with landscaping.

An alternative form of separation is grade–separation, where the bike path is located at sidewalk grade or in between sidewalk and roadway grade.

Wide, one–way, median–separated bike path on a busy avenue: 9th Avenue, Manhattan

Parking–separated bike path showing mixing zone at intersection: Grand Street, Manhattan

Benefits

See benefits of BIKE LANES & PATHS (2.1.2)

Offers greatest bicyclist separation from motor vehicle traffic on mid–block sections

Reduces risk of "dooring" (vehicle occupants opening their door into the path of an oncoming bicyclist)

Reduces or eliminates blocking of the bike lane by motor vehicles and the swerving of bicyclists into mixed traffic

Considerations

Design consideration must be given to emergency vehicle access to adjacent buildings and to snow–clearing and street–sweeping needs

Application

Where a BIKE LANE is appropriate and the street is an important bicycle network connection, or has high motor vehicle volumes or speeds or multiple moving lanes, or is along a park, waterfront, or other open space where cross streets and driveways are infrequent

Consider wherever a BIKE LANE is appropriate

2.1.2b Separated Bike Path

Two–way bike path separated with landscaped median: Canal Street, Manhattan

Two–way bike path located outside the sidewalk: Columbia Street, Brooklyn

Design

See design guidance for BIKE LANES & PATHS (2.1.2)

Care must be given to the design of bike paths at intersections and driveways to maintain visibility of the bicyclist to motorists (and vice–versa) and to reduce the risk of turning conflicts with motor vehicles

In some circumstances (e.g., long paths along open space or waterfront) paths can be designed for shared–use by bicyclists, pedestrians, skaters, wheelchair users, and other non–motorized users ("a shared–use path") rather than as a separate bike path and SIDEWALK (2.2.1)

If designed as a shared–use path, provide adequate space appropriate to anticipated volumes of low–speed users (pedestrians) and higher–speed users (bicyclists) so as to provide safe and comfortable accommodation of both and minimize conflicts between the two

Design MEDIANS that separate bike paths according to the MEDIAN section (2.2.3)

Sustainability Opportunities

See sustainability opportunities for BIKE LANES & PATHS

If a separated bike path uses medians, see Sustainability Opportunities for MEDIANS

Table 1

Guide to New York City On–Street Bicycle Facilities

	Class 1: Bike Path (2.1.2b)	
	Signal Protected Path *9th Avenue, 31st to 16th Streets, Manhattan*	**Protected Path with Mixing Zones** *Grand Street, Manhattan*
Space Required	**14 feet**	**8 feet**
Parking Loss	**High** 5 – 6 parking spaces/ turn bay (usually every other block)	**High** 4 – 5 parking spaces/ mixing zone (usually every other block)
Ideal Application	**Commercial Avenues** • Wide one–way multilane street • Excess road space • High–speed vehicular traffic • High potential for motor vehicle intrusion into standard lane	**Commercial Cross–Streets** • One or two lane street • Excess road space • Low–speed vehicular traffic for safe mixing zone • High potential for motor vehicle intrusion into standard lane
Advantages	• Full protection for cyclists • Major enhancement to pedestrian safety and comfort	• Protection for cyclists midblock • Mixing zone to manage turning conflict • Simpler implementation than Signal Protected Path • Signal timing unchanged
Disadvantages	• Space needs • Parking impacts • Signal timing and loading activity increase delays • Cyclist mobility • Complex review and implementation • Turn restrictions may be needed at complex intersections to maintain acceptable operations	• Parking impacts • Cyclist mobility • Unproven (Pilot) • Complex review and implementation • Challenging to regulate floating parking

Class 2: Bike Lane (2.1.2a)		Class 3: Bike Route (Not Included in Manual)	
Buffered Lane *DeKalb Avenue, Brooklyn*	**Standard Lane** *20th & 21st Streets, Manhattan*	**Shared Lane** *48th Street, Queens*	**Signed Route**
8 feet	**5 feet**	**None** A wide (13–foot) travel lane is preferred	**None** A wide (13–foot) travel lane is preferred
Medium – Low Parking typically preserved unless space unavailable. Strict curb regulations sometimes needed	**Medium – Low** Parking typically preserved unless space unavailable. Strict curb regulations sometimes needed	**Low** Parking is typically preserved	**None**
Residential Avenues o Wide multilane street o Excess road space o Low potential for intrusion into bicycle lane	**Residential Cross–Streets** o One or two lane street o Excess road space o Low potential for intrusion into bicycle lane	**Narrow Streets** o One or two lane street o No excess road space o Connected to other bicycle facilities	**Limited Use** o Interim treatment o Connected to other bicycle facilities o Indicates a preferred bicycle route o Preserves curbside access
o Dedicated cycling space o Buffer zone enhances comfort for cyclists o Preserves curbside access o Simple implementation	o Dedicated roadway space for cycling o Preserves curbside access o Simple implementation	o Clear easy to follow bicycle route o Heightens driver awareness of cyclists o Preserves curbside access o Simple implementation	o Indicates a preferred bicycle route o Preserves curbside access o Simple implementation.
o Vehicular intrusion remains possible o Width tempts motorists to intrude o Perceived as less safe than protected paths	o Vehicular intrusion remains possible o Cyclists have minimal separation from traffic o Perceived as less safe than protected paths	o Does not provide dedicated roadway space for cycling o Cyclists not separated from traffic	o Does not provide dedicated roadway space for cycling o Cyclists not separated from traffic o Sign placement critical, can be challenging

Bus Lanes & Busways

USAGE: LIMITED

A dedicated on–street facility for buses.

BUS LANES are delineated within the roadway with markings (2.1.3a) while BUSWAYS are physically separated from traffic for most of their length (2.1.3b). Both facility types can either be designed to run along the median of the street or along the outside (curbside or interior to a parking lane) of the street.

Red, curb–aligned, on–street busway with "soft separation" from traffic: 34th Street, Manhattan

Benefits

Improves bus speeds and reliability by separating buses from potential congestion in mixed traffic and reducing or eliminating their need to merge in and out of traffic at bus stops

Provides means for emergency vehicles to bypass traffic

Considerations

If curbside, may result in loss of curbside parking

Application

Streets with high bus volumes or Bus Rapid Transit (BRT) and moderate to high traffic congestion

Consider on all streets with high bus volumes or BRT and adequate space, regardless of congestion

Avoid on streets where the roadway geometry prevents the safe operation of a BUS LANE OR BUSWAY in conjunction with other necessary uses of the roadway

Design

BUS LANES & BUSWAYS can be located immediately adjacent to the curb (curb bus lane or busway), adjacent to the righthand parking lane (interior bus lane), or in the middle of a road with boarding island stations (median bus lane or busway)

All BUS LANE & BUSWAY types can be one or two lanes per direction based on bus volume, operating characteristics, and road width; one lane per direction is a more common treatment

A median BUS LANE or BUSWAY should be considered on two–way streets when sufficient right–of–way is available to accommodate the bus facility and the associated boarding islands, and the operation of the busway (including pedestrian movements) can be safely managed

For median bus lane or busway designs, boarding platforms must be included for bus passengers at bus stops; these islands can also function as MEDIAN SAFETY ISLANDS (2.2.4)

For median bus lane or busway designs, left turns across the bus facility should either be prohibited or provided a protected signal phase

Use an interior bus lane when parking needs to be maintained; stops can be made at the curb or at BUS BULBS (2.2.2c)

Use a curb–aligned bus lane or busway when right–of–way may be constrained or a median facility cannot be operated safely and where parking impacts can be managed

For curb–aligned designs, curbside deliveries can be accommodated with, lay–bys, and reserved commercial loading around the corner, e.g., delivery windows, delivery

All BUS LANE & BUSWAY designs can accommodate one or two directions of bus traffic. Special care must be paid to the signalization and design of intersections so as to not introduce turning conflicts

Consider queue–jump lanes for buses where buses need to merge with mixed traffic, where the roadway width reduces (such as at the end of a bus lane, a roadway choke point, or a bridge or tunnel approach), and at turn priority locations

For improved roadway longevity, a concrete roadway should be considered for BUS LANES & BUSWAYS when conditions permit

Sustainability Opportunities

Utilize paving with a high SRI value within bus lane or busway unless red–colored pavement is to be used as per 2.1.3a

Utilize recycled content in paving materials

Bus Lanes & Busways:

Bus Lane

USAGE: LIMITED

A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of buses.

Physical separation of bus lanes is often inadvisable due to physical or operational constraints. Painted lanes, overhead signs, and soft barriers can minimize intrusion of other vehicles. Where land use and street width permit, full or partial physical separation can help enforce the lanes (see 2.1.3b).

Curb–aligned double bus lane: Madison Avenue, Manhattan

Red, curb–aligned, bus lane: East Fordham Road, The Bronx

Bus queue–jump lane: West 207th Street, Manhattan

Benefits

See benefits of BUS LANES & BUSWAYS (2.1.3)

Considerations

See considerations for BUS LANES & BUSWAYS

Application

See application guidance for BUS LANES & BUSWAYS

Design

See design guidance for BUS LANES & BUSWAYS

Red–colored pavement can be considered for bus lanes that operate twelve or more hours per day

At intersections, the allowance or prohibition of turns from the bus lane should be clear, such as ending the red paint where cars can enter to make right turns

Sustainability Opportunities

See sustainability opportunities for BUS LANES & BUSWAYS

Bus Lanes & Busways:
Busway

USAGE: PILOT

A physically separated lane reserved for bus traffic.

Busways are similar to BUS LANES (2.1.3a) in most respects, however full or partial physical separation (typically through a narrow curb or wider MEDIAN (2.2.3)) further improves bus speeds by minimizing blocking of the bus lane by other vehicles.

Curb–aligned busway: Paris, France (Note: For illustrative purposes only)

Benefits

See benefits of BUS LANES & BUSWAYS (2.1.3)

Reduces or eliminates blocking of BUS LANE

Considerations

Design consideration must be given to emergency vehicle access, deliveries and pick–up/drop–off to adjacent buildings, and to snow–clearing and street–sweeping needs

Application

See application guidance for BUS LANES & BUSWAYS

Consider where a BUS LANE is appropriate and the street is a high–volume bus route and has adequate right–of–way to accommodate a busway

Consider wherever a BUS LANE is appropriate

Design

See design guidance for BUS LANES & BUSWAYS

Busways should be designed to allow emergency vehicles to bypass traffic

On routes with multiple tiers of bus service, passing needs (e.g., express buses) should be accommodated

If a median busway design is not separated with a wide median, then the median must widen to provide boarding platforms for bus passengers at bus stops, which must meet ADA standards

Turns across busways need to be controlled for safety; bus–only signals may be needed

MEDIANS used to separate busway should be designed according to the MEDIAN section

Sustainability Opportunities

Utilize paving with a high SRI value within busway, for example concrete

For median–separated busway, see Sustainability Opportunities for MEDIANS

A short section of separated busway through a busy intersection: Willis Avenue, The Bronx

Separated median busway: Paris, France (Note: for illustrative purposes only)

Shared Street

USAGE: PILOT

Often referred to as a "pedestrian-priority street," a shared street is a low-speed, typically curbless roadway designed as a single surface shared among pedestrians, bicyclists, and low-speed motor vehicles.

Typically employed on local-access streets, vehicles are slowed to very low speeds through a reduced speed limit, traffic calming, signage, and use of distinctive materials, furnishings, and other visual cues in the roadway that encourage drivers to travel with increased caution. Street users generally negotiate right of way cooperatively rather than relying on traffic controls, allowing pedestrians to dominate the street. The entire street thus effectively functions as a public space. Different forms of shared streets can be used in different contexts.

Shared street: Mainz, Germany
(Note: for illustrative purposes only)

Shared street in a commercial area: Brighton, UK (Credit: Gehl Architects)
(Note: for illustrative purposes only)

Benefits

Allows freer pedestrian movement within walking–oriented areas and to and from surrounding land uses and destinations

Reduces sidewalk crowding on narrow streets

Maintains bicycle, local vehicle, and delivery access while creating an exceptionally pedestrian–oriented street that accommodates recreational and social activities

Allows active land uses to spread into the surrounding street network, fostering a vibrant public realm

Comfortable, attractive environment encourages "staying" activities such as relaxing, shopping, eating, and socializing

Integrated design can incorporate art, street furniture, landscaping, and other innovative and attractive design elements

Encourages partnerships with the community in beautification, maintenance and programming of street space

Considerations

Accommodation of and navigation by the visually impaired should be given particular attention

May impact street drainage or require catch basin relocation

May require loss of on-street parking

Any community facilities integrated into the design (such as street furniture or public art) will typically necessitate the presence of a maintenance partner and a permit or revocable consent from the city

Application

Consider on narrower streets (at most two moving lanes), or outer roadways of boulevard–type streets, with little or no through–traffic, and which are not major vehicular or bicyclist through–routes or designated truck routes

Consider on streets adjacent to major pedestrian destinations such as retail, waterfront, park, plaza, civic, cultural or transit hub land uses, where vehicle volumes are low and pedestrian desire lines are diffuse (i.e., pedestrians would like to cross the street in many places)

Consider on local residential streets whose design priority is to allow safe use of street space for recreational activities and green space, in partnership with residents or neighborhood groups

Consider on narrow, alley-type streets

Depending on the specific land uses, width, vehicle and pedestrian volumes and other access and operational characteristics of the street, a shared street may not be appropriate, in which case consideration should be given to a standard MIXED ROADWAY with alternative design options such as traditional traffic calming and/or a mid-block crossing

Consider as an alternative a fully pedestrianized street when pedestrian volumes are high, vehicle volumes are low and vehicle access is not required during daytime hours

Design

Sidewalks and curbs should not be used, but accessible path(s) must be provided as per ADA guidelines

In the absence of curbs, special attention should be given to providing adequate drainage

Vehicle–free, accessible routes must be provided for the visually impaired

Design should utilize whatever horizontal, vertical, and material treatments are necessary to encourage vehicle speeds that are low (15 mph or lower) throughout, whether or not pedestrians are present

Use GATEWAY (2.3.2) or similar treatments and proper signage at entries to discourage through-traffic, indicate the change in street environment, and slow entering vehicles

Institute a reduced speed limit (New York State VTL Section 1642(a)(26)(a) currently allows as low as 15mph) along with the physical traffic calming of the shared street

Attractive street materials, furnishings and other objects within the street can be used to alert drivers and emphasize the pedestrian orientation of the space, subject to permits, maintenance agreements, or revocable consents as required

Pedestrian–priority zone: Fordham Plaza, The Bronx

Shared intersection: Seven Dials, London (Credit: Aaron Naparstek/streetsblog.org)
(Note: For illustrative purposes only)

Maximize street trees

Include planted areas and stormwater source controls within the roadway wherever possible

Staggered sections of parking or loading zones can be used as a design option to constrict wider streets

To maintain the streetscape elements required for creating a low–speed environment and fostering a vibrant public space, careful attention must be paid to proper programming and management of the space, with the participation of an active maintenance partner where appropriate

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Maximize trees and other green cover

Utilize stormwater source controls wherever feasible

Increase SRI value of paved surfaces to reduce urban heat island impact

Utilize recycled content in paving materials

Coordinate streetscape/utility work to minimize street cuts

Sidewalks & Medians

Sidewalk

USAGE: WIDE

That portion of a street, whether paved or unpaved, between the curb lines or the lateral lines of a roadway and the adjacent property lines intended for the use of pedestrians. Where it is not clear which section is intended for the use of pedestrians, the sidewalk will be deemed to be that portion of the street between the building line and the curb.

In denser areas a FULL SIDEWALK (2.2.1a) reaching all the way to the curb is used, while in less built–up areas a RIBBON SIDEWALK (2.2.1b), with a vegetated or grass planting strip between the sidewalk and the roadway, can often be used.

Sidewalk with standard paving treatment: 11th Avenue, Manhattan

Benefits

Facilitates relatively speedy and unobstructed pedestrian movement, free of vehicle conflicts except at intersections and driveways

Can provide space for "staying" activities such as relaxing, shopping, eating, and socializing, with adequate width

Application

Streets that are not SHARED STREETS (2.1.4) or pedestrian–only, except in certain historic districts as per LPC

Ribbon sidewalks are appropriate in R1–R6 zoning districts; full sidewalks are used elsewhere

Design

Sidewalks should always be provided on both sides of the street roadway

A park's internal path located near a roadway does not substitute for a sidewalk

Sidewalks (and planting strip, if applicable) should be as wide as possible appropriate to foot traffic and available street width

Sidewalks must conform to ADA requirements for minimum clear path width and provision of spaces where wheelchair users can pass one another or turn around; beyond the ADA minimum, provide an unobstructed clear path of 8 feet or one–half the sidewalk width (whichever is greater)

Sidewalk cross–slope can be 2% maximum, for a width of at least 5 feet

Sidewalks must meet load–bearing, friction, and other requirements as per relevant standard specifications and regulations

ADA–compliant pedestrian ramps must be provided at all pedestrian crossings; separate ramps should be used aligned with each crosswalk; color of detectable warning strip should contrast with surrounding pavement: dark gray in areas of light pavement and white in areas of dark pavement

The area within 18 inches of the curb should be kept free of all obstructions

New York City Mayor's Executive Order No.22 of 1995 (the "Clear Corner Policy") states that to the maximum extent possible, structures and objects should not be placed in the corner and the corner quadrant

For recommended clearances between obstructions, see Revocable Consent Rules (RCNY Title 34, Chapter 7), Section 7–06(c)(5)), NYC DOT Highway Rules (RCNY Title 34, Chapter 2, Section 2–10) and DCA's rules regarding newsstands (RCNY Title 6, Chapter 2, Subchapter G)

Maximize street trees

Include planted areas and stormwater source controls within sidewalks wherever possible when a maintenance partner is identified

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Maximize trees and other green cover whenever clearance allows

Utilize stormwater source controls wherever feasible

Increase SRI value of sidewalk materials to reduce urban heat island impact

Utilize recycled content in paving materials

Coordinate streetscape/utility work to minimize street cuts

Sidewalk:

Full Sidewalk

USAGE: WIDE

A full sidewalk accommodates both pedestrian traffic and a range of street furnishings and fixtures.

The area of the sidewalk closest to the curb, where light poles, signs, fire hydrants, telephone booths, newspaper boxes, etc., are typically located, is referred to as the "furnishing zone" (see section 3.4).

Sidewalk: Seventh Avenue, Brooklyn (Credit: NYC DCP)

Sidewalk corner quadrant with pedestrian ramps: West 110th Street, Manhattan

Benefits

See benefits of SIDEWALK (2.2.1)

Provides increased space for pedestrian movement and improved curbside access as compared to a RIBBON SIDEWALK (2.2.1b)

Application

See application guidance for SIDEWALK

Design

See design guidance for SIDEWALK

Sustainability Opportunities

See sustainability opportunities for SIDEWALK

Sidewalk:

Ribbon Sidewalk

USAGE: WIDE

A sidewalk that is separated from the roadway by a continuous, unpaved planting strip.

Most existing ribbon sidewalks in the city have a lawn planting strip, more sustainable landscaping options should be utilized whenever possible. Alternatively, planting strips can be designed as pilot STREET SWALES (2.4.3) to help collect stormwater runoff.

Ribbon sidewalk with lawn planting strip: Rockaway Beach Boulevard, Queens

Benefits

See benefits of SIDEWALK (2.2.1)

Provides greater space for tree roots than a FULL SIDEWALK (2.2.1a) with INDIVIDUAL TREE PITS (2.4.1a), improving long–term tree health

Provides a modest improvement in stormwater detention from the sidewalk and/or roadway as compared to a FULL SIDEWALK

Provides a more attractive streetscape in areas of low– to moderate–density residential land use

Application

Areas within zoning districts R1 through R6

Consider wherever pedestrian volumes can be accommodated and curbside activity is low

Design

See design guidance for SIDEWALK

Ribbon sidewalks should be at least 5 feet wide or as required to match the existing ribbon width in the immediate neighborhood; they should be wider along arterials and collector roads

Planting strips adjacent to ribbon sidewalks must be planted with groundcover vegetation for erosion control if a STREET SWALE is not used; herbaceous plant material, preferably native or adapted species, should be used rather than grass wherever possible, as turf absorbs water from tree roots, has little benefit to habitat, and requires the use of pesticides, herbicides, fungicides, and lawnmowers that can potentially damage tree roots

Where there are fire hydrants in the planting strip adjacent to a ribbon sidewalk, a 5–foot–by–5–foot slab of 6–inch–thick concrete on 6–inch, crushed–stone base extending from the curb to the sidewalk is required. Similar considerations apply to other elements, such as lampposts and signal posts

Sustainability Opportunities

See sustainability opportunities for SIDEWALK

Utilize STREET SWALE within planting strip rather than groundcover vegetation alone to better manage stormwater

Ribbon sidewalk with street swale planting strip: Seattle, Washington (Credit: Abby Hall)

Curb Extension

USAGE: WIDE

An expansion of the curb line into the lane of the roadway adjacent to the curb (typically a parking lane) for a portion of a block either at a corner or mid–block.

Also known as neckdowns, curb extensions can enhance pedestrian safety by reducing crossing distances, can relieve sidewalk crowding, and can provide space for functional elements such as seating, plantings, and furniture. In addition, two curb extensions can be located on either side of a street to create a MID–BLOCK NARROWING (2.2.3) or at an intersection to create a GATEWAY (2.3.2).

Curb extension: Fifth Avenue, Brooklyn

Benefits

Calms traffic by physically and visually narrowing the roadway

At a corner, slows turning vehicles and emphasizes the right of way of crossing pedestrians

Shortens crossing distance, reducing pedestrian exposure and minimum required signal time for crossing

Improves the ability of crossing pedestrians and drivers to see each other

Makes the crosswalk more apparent to drivers, encouraging them to stop in advance of the crosswalk and reducing illegal parking within crosswalk

Reinforces lane discipline through intersection, preventing vehicle passing maneuvers in parking lane

Provides additional pedestrian space and reduces crowding, particularly for queuing at crossings and bus stops or when located at a subway entrance or other protrusion

Creates space that may be used to locate street furniture, bike parking, bus stop, public seating, street vendors, etc., potentially reducing sidewalk clutter

Keeps fire hydrant zone clear when located in front of a hydrant

Defines the ends of angle parking

Can discourage truck turns onto streets with No Truck regulations (See RCNY Title 34, Chapter 4, Section 4–13)

Considerations

May impact street drainage or require catch basin relocation

May impact underground utilities

May require loss of curbside parking

May complicate delivery access and garbage removal

May impact snow plows and street sweepers

Curb Extension: Seventh Avenue, Manhattan

A curb extension "blockbuster" with Greenstreet: Amsterdam Avenue, Manhattan

Lay–bys for curbside loading between curb extensions: Greenwich Street, Manhattan

Application

Only applicable within a curbside parking lane

Corners with marked pedestrian crosswalks in retail districts, directly adjacent to schools, at intersections with demonstrated pedestrian safety issues, on wide streets, or in areas of high foot traffic

At school crosswalks

At mid–block crossings (see MID–BLOCK NARROWING 2.2.2d)

Intersections where a two–way road transitions to oncoming one–way operation so as to block wrong–way traffic from proceeding straight onto the one–way portion (a "blockbuster")

Next to subway entrances or other sidewalk pinch points so as to increase pedestrian walking or queuing space

In front of fire hydrants so as to keep clear of parked vehicles

Consider at all corners and pedestrian crossings

Consider elongated curb extensions for some or most of a block (i.e., a widened sidewalk with lay–by areas) in areas where a full sidewalk widening would be desirable but some loading, drop–off, or parking access must be maintained

Cannot be used where curbside travel (including bus, bicycle, or general traffic) lane exists, such as those created through peak–period parking restrictions

Feasibility of curb extensions is evaluated based on engineer review of design vehicle turning movements and vehicle turning volumes

Design

Curb extension width is typically two feet less than the width of the parking lane, but the curb extension can also extend to the bicycle lane when one is striped. Minimum curb extension length is typically equal to the full width of the crosswalk, however it can be longer when appropriate or necessary

A fire truck turning zone with a 50–foot outside radius should be maintained clear of physical obstructions (signs, planters, non–flexible bollards, trees)

When a curb extension conflicts with design vehicle turning movements, the curb extension should be reduced in size rather than eliminated wherever possible

At crossings that may have low pedestrian visibility, curb extension should be long enough to "daylight" the crossing, i.e., provide open sight–lines to the pedestrian crossing for approaching motorists; the additional curb extension space can be used to provide plantings or community facilities such as bicycle parking as long as visibility is not hindered

The design and placement of street furniture, trees, and plantings on a curb extension must not impede pedestrian flow, obstruct clear path, or interfere with "daylighting" the intersection, emergency operations, or sight lines

Curb extension must be designed so as to maintain drainage of stormwater from the gutter and not cause ponding; depending on site–specific grading conditions this might include properly locating catch basins or utilizing design treatments that channel water through, around, or in between curb extension and the curbline

When space permits, more functional curb extension designs, such as those with GREENSTREET/PLANTED AREAS (2.2.2d) or COMMUNITY FACILITIES (2.2.2b) such as seating or bicycle parking should be used whenever possible

Vertical elements should be used to alert drivers and snow plow operators to presence of the curb extension

To reduce the cost and implementation time of curb extension, trench drains can be considered instead of catch–basin relocation if a maintenance partner exists to clean the trench drain

When curb extension is used at a fire hydrant, the length of the curb extension should be equal to or greater than the No Parking zone (typically 15 feet in either direction) and the hydrant should be moved onto the curb extension

Paving on curb extension should match that of the surrounding sidewalks

Sustainability Opportunities

Locate trees and/or plantings within curb extension when appropriate

Maximize permeable surface of curb extension, e.g., with vegetation, permeable paving or both

Design any planted areas within curb extension so as to capture stormwater according to current standards

Curb Extension:

Curb Extension with Greenstreet/ Plantings

USAGE: WIDE

A CURB EXTENSION that is planted rather than paved (typically as a NYC DPR Greenstreet), for example as a landscaped bioswale.

Curb extension with planted area: Mulry Square, Manhattan

Landscaped curb extension: Christopher Street, Manhattan

Curb extension with a planted swale that captures stormwater from the gutter: Beach 19th Street, Queens

Benefits

Provides safety and traffic calming benefits as described in CURB EXTENSION (2.2.2)

Vegetation helps to mitigate air pollution and capture carbon dioxide from the air, improving environmental health and public health

Green cover reduces the urban heat island effect and decreases energy costs related to air temperatures

Landscaping provides visual improvement to the city streetscape

Can be designed to provide stormwater detention from sidewalk and street

Considerations

Landscaping or stormwater source controls require a partner for ongoing maintenance

If outfitted to capture stormwater, careful consideration must be given to design, overflow control, and plant species

Application

See application guidance for CURB EXTENSION

Areas without sidewalk crowding where NYC DPR will maintain a Greenstreet or a committed partner other than NYC DPR will maintain the vegetated area

Design

See design guidance for CURB EXTENSION

Pedestrian crossings must remain paved

If curb extension is designed to capture stormwater, catch basins should be located on the downhill side of the curb extension rather than the uphill side

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Guards or wickets are permitted around planted areas where their use does not impede pedestrian traffic

Sustainability Opportunities

See sustainability opportunities for CURB EXTENSION

Design planted areas within curb extension to capture stormwater according to current standards

Curb Extension:

Curb Extension with Community Facilities

USAGE: WIDE

A CURB EXTENSION that provides space for community facilities such as bicycle parking, seating, and other street furniture.

In areas with inadequate sidewalk width to accommodate needed functional sidewalk elements for the community, the extra space provided by a curb extension can be used for bike parking, seating, public art, gardens, plantings, or trees, alone or in combination.

Similarly, all paved curb extensions can also provide space for consolidating basic sidewalk furnishings such as trash cans, newspaper racks, newsstands, and light or signal poles, where foot traffic permits.

Curb extension with trees and bike parking: 46th Street, Queens

Benefits

Provides safety and traffic calming benefits as described in CURB EXTENSION (2.2.2)

Provides space for functional sidewalk elements outside of the sidewalk clear path, freeing sidewalk space for movement

Improves the public realm and creates useful public space, particularly in areas where public open space is in short supply

Allows limited street space to serve multiple functions, thereby increasing the performance of street infrastructure

Considerations

Permits, revocable consents, and/or maintenance agreements may be required for certain elements

Bike racks must be standard NYC DOT design unless a permit is obtained from NYC DOT

Application

See application guidance for CURB EXTENSION

Areas without sidewalk crowding where demand exists for the community facilities and a committed partner is willing to maintain any elements that require maintenance, such as seating; a maintenance partner is not needed for a NYC DOT bike rack

Design

See design guidance for CURB EXTENSION

Sustainability Opportunities

See sustainability opportunities for CURB EXTENSION

Curb extension with bike parking: North 7th Street, Brooklyn

Curb Extension:
Bus Bulb

USAGE: WIDE

A CURB EXTENSION at a bus stop that avoids the need for buses to pull in and out of the moving lane to stop.

Bus bulbs may also be designed to better support bus passengers through the inclusion of higher curbs, bus stop shelters, seating, pre–boarding payment equipment, and other bus–supportive facilities.

Bus loading at a bus bulb "island": Broadway, Manhattan

Bus bulb: San Francisco, California

A bus bulb under an "El" (elevated subway): Jerome Avenue, The Bronx

Benefits

Provides safety and traffic calming benefits as described in CURB EXTENSION (2.2.2)

Speeds bus movement on streets with traffic congestion by eliminating the need for buses to maneuver in and out of the moving lane

Speeds bus movement by reducing the likelihood of bus stops being blocked by stopped vehicles

Discourages non–bus encroachment into bus–only lanes

Can allow faster bus passenger boarding

Can provide comfort and convenience to bus riders through dedicated waiting space and inclusion of bus–related amenities

When utilized at a bus stop under an elevated train line, where the bus does not pull over to the sidewalk, provides a safer space for passengers to wait, as many currently stand in the roadway

Allows additional on–street parking as compared to a standard bus stop

Application

See application guidance for CURB EXTENSION

At bus stops along bus routes where it has been determined by NYC DOT and MTA NYCT that bus bulbs would enhance bus service

Design

For detailed design guidance, see *Select Bus Service Station Design Guidelines* (NYC DOT & MTA NYCT, 2009)

See additional design guidance for CURB EXTENSION

Bus bulbs should be long enough to encompass the front and rear doors of the buses that will be using it, and should extend the length of the bus stop whenever possible

Design BUS BULBS with care to accommodate accessibility needs, taking into account the full range of buses that might be using the stop

Sustainability Opportunities

See sustainability opportunities for CURB EXTENSION

Curb Extension:
Mid–Block Narrowing

USAGE: WIDE

Two CURB EXTENSIONS that create a pinch point.

A mid–block narrowing (also referred to as a "choker") physically or visually constricts the roadway, thereby slowing vehicular traffic or alerting drivers to the presence of a mid–block crossing. The curb extensions themselves can be of any variety, for example with plantings or other functional elements. A mid–block narrowing is equivalent to a GATEWAY (2.3.2) located mid–block.

Mid–block narrowing (Note: use of walls is not recommended by this manual): West 94th Street, Manhattan

Mid–block crossing with Curb Extensions: West 125th Street, Manhattan

Benefits

Provides safety and traffic calming benefits as described in CURB EXTENSION (2.2.2)

Calms mid–block traffic speeds, particularly if vertical elements (e.g., bollards, trees, bicycle parking etc) are included in CURB EXTENSIONS

Improves drivers' awareness of presence of crosswalk at mid–block crossing

Provides space for greening, community facilities, bicycle parking, and/or stormwater source control measures

Application

See application guidance for CURB EXTENSION

Local streets with demonstrated speeding issues and/or a mid–block crossing

At mid–block crossings on two–way streets, it is generally preferable to include a MEDIAN (2.2.3) or MEDIAN SAFETY ISLAND (2.2.4) rather than or in addition to a mid–block narrowing, when space allows

Design

See design guidance for CURB EXTENSION

Reduce lane width at mid–block narrowing to impact vehicle speeds; on low–traffic residential streets mid–block narrowing can be combined with other design treatments including RAISED CROSSINGS (2.3.7), RAISED SPEED REDUCERS (2.3.1), or vertical elements for maximum effectiveness

Sustainability Opportunities

See sustainability opportunities for CURB EXTENSION

Locate trees and/or plantings within curb extensions of mid–block narrowing when appropriate

Design any planted areas within CHICANE (2.3.4) curb extensions so as to capture stormwater according to current standards

Median

USAGE: WIDE

An area separating different lanes, traffic directions, or roadways within a street. For the purpose of this Manual, a MEDIAN is raised rather than flush or painted.

The width as well as design of medians can vary widely. They can range from narrow raised concrete islands to tree–lined promenades to intensively landscaped boulevard medians.

In contrast to MEDIAN SAFETY ISLANDS (2.2.4), medians extend for most or all of the street block.

Median with landscaping and sidewalk: Carlton Avenue, Brooklyn

Benefits

Reduces risk of left–turn and vehicle head–on collisions

Calms traffic by narrowing roadway

Enhances pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross road in stages

If designed for walking access, can provide additional pedestrian capacity

Greens and beautifies the streetscape with trees and/or plantings

Improves environmental quality and can incorporate stormwater source controls

Can provide space for a SIDEWALK (2.2.1) and/or SEPARATED BIKE PATH (2.1.2b), particularly as part of a boulevard treatment

Considerations

May impact underground utilities

Design must account for impact of median on emergency vehicle movement and access

Landscaping or stormwater source controls require a partner for ongoing maintenance

Changes in traffic circulation resulting from addition of median should be understood so as to not force drivers to travel on inappropriate routes or make U–turns

If continuous, median may prevent left turns into driveways on opposite side of street

Application

Two–way streets with three or more roadway travel lanes in total

Consider on all two–way multilane streets

On streets of limited width, it may be preferable in some situations to include other treatments (e.g., expanded sidewalks or dedicated transit or bicycle facilities) rather than a median if there is not adequate room for all treatments and travel lanes

2.2.3 Median

Median on a local residential street: Glenwood Road, Brooklyn

Design

Medians should be wide enough to provide refuge to pedestrians at crossings: 5 feet minimum, 6 feet or greater preferred; when planted, 6 feet minimum

Medians should extend beyond the crosswalk at intersections wherever possible, while accommodating vehicle turning movements; the "nose" of the median should not infringe on the crosswalk width at intersections and should include bollards to protect pedestrians from wayward vehicles

Provide a path across the median at crossings, flush with the roadway and as at least as wide as the crosswalk

Provide a large pedestrian storage area at crossings to permit groups of pedestrians to safely wait to cross

Medians must provide tactile cues for pedestrians with visual impairments to indicate the border between the pedestrian refuge area and the motorized travel lanes

Include street trees or plantings wherever safe and feasible, using structural soil where appropriate

Use unpaved and permeable surfaces wherever possible with medians

Include planted areas and stormwater source controls within medians wherever possible when a maintenance partner is identified

Medians must be designed so as to maintain drainage of stormwater and not cause ponding

Grade roadways to direct stormwater towards medians if the medians include sufficient stormwater source controls

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains; also consider visibility for motorists, cyclists, and pedestrians

Sustainability Opportunities

Locate trees and/or plantings within median

Maximize permeable surface of median, e.g., with vegetation, permeable paving, or both

Design any planted areas within median so as to capture stormwater according to current standards

Median Safety Island

USAGE: WIDE

A raised area located at crosswalks that serves as pedestrian refuge separating traffic lanes or directions, particularly on wide roadways. Also known as a "median refuge island" and "green refuge island." Used at pedestrian crossings when a full MEDIAN is not feasible.

A median safety island confers most of the same benefits as full MEDIANS at pedestrian crossings. Full MEDIANS should be used rather than median safety islands wherever possible.

Median safety island: Vanderbilt Avenue, Brooklyn

Median safety island with landscaping and tree: Empire Boulevard, Brooklyn

Benefits

Enhances pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross road in stages

Calms traffic, especially left turns and through–movements, by narrowing roadway at intersection

Reduces risk of vehicle left–turn and head–on collisions at intersection

Can green and beautify the streetscape with trees and/or vegetation, potentially including stormwater source controls

Trees increase the visibility of the island, thereby usually improving safety

Considerations

May impact underground utilities

Landscaping or stormwater source controls require a partner for ongoing maintenance

Application

See application guidance for MEDIAN (2.2.3)

Design

See design guidance for MEDIAN

Typical island accommodates two street trees and, where appropriate, bell bollards

Sustainability Opportunities

See sustainability opportunities for MEDIAN

Traffic Calming

Raised Speed Reducers

USAGE: WIDE

A raised area of a roadway that deflects both the wheels and frame of a traversing vehicle with the purpose of reducing vehicle speeds.

The two basic types of raised speed reducers are speed humps and speed tables. Both are typically raised 3 to 4 inches above the level of the roadway, and both have a proven speed–reducing track record in New York City. While a speed hump is relatively short in length (e.g., 13 feet long), a speed table is longer (e.g., 22 to 30 feet long), with a flat section in the middle, sometimes including a RAISED PEDESTRIAN CROSSING (2.3.7). SPEED CUSHIONS (2.3.1a) are a variation of speed humps designed to allow easier emergency vehicle, bus, or truck passage.

Benefits

Compels drivers to travel at speeds no higher than the street's design speed

A speed table can be used to provide a raised mid–block crossing in conjunction with a stop control

Considerations

Impacts emergency vehicle movement

Snow plows must be given advance warning

May generate additional noise

Application

Must be requested by a community, with approval based on a NYC DOT field study of the location using speed survey, geometric, and street operations criteria

Avoid on streets that: are designated as a "local" or "through" truck route; are on an MTA bus route, tour bus route, or route of any other bus operator; are on an emergency vehicle response or snow emergency route; have a Fire Department house located on the block; have more than one moving lane per direction; or are wider than 44 feet

The location can be investigated by NYC DOT for a "Reduced School Speed Zone" if a speed reducer is not feasible but the street has an 85th percentile speed of 25 mph or higher and is near an eligible school

Design

Space raised speed reducers to maintain desired operating speeds

Appropriate warning signs and roadway markings should accompany raised speed reducers

Locate raised speed reducers in the middle of the roadway, with the gutters kept clear for proper road drainage

Use signage or other methods alert operators of snow–clearing vehicles to the presence of raised speed reducers

While raised speed reducers (humps, tables, cushions) are an effective method to retrofit existing streets to reduce motor vehicle speeds in lieu of street reconstruction, all newly reconstructed streets should be comprehensively designed to achieve desired speeds, e.g., using appropriate roadway width and alignment, horizontal deflection, traffic controls, trees, and other traffic calming treatments

Sustainability Opportunities

Utilize recycled content in paving materials

Speed hump: Bolton Avenue, The Bronx

Raised Speed Reducers:
Speed Cushion

USAGE: PILOT

Narrow speed humps that reduce traffic speeds without causing vertical displacement of vehicles with wide wheel bases (trucks, buses, and emergency vehicles).

Wide vehicles can travel over speed cushions at moderate speed after aligning properly, making them potentially appropriate for use on streets with low- to moderate-frequency emergency, truck, or bus routes.

Speed cushions are typically made from modular, temporary materials.

Speed cushions showing impact on typical vehicles: Vancouver, Canada (Credit: Richard Drdul) (Note: for illustrative purposes only)

Speed cushions showing ease of bus passage: Vancouver, Canada (Credit: Richard Drdul) (Note: for illustrative purposes only)

Benefits

See benefits of RAISED SPEED REDUCERS (2.3.1)

Reduces motor vehicle speeds without hampering bus service or most commercial vehicles

Quieter than speed humps on commercial routes

Can be easily removed, relocated, or repositioned

Available as an off–the–shelf product

Considerations

Snow plows must be given advance warning

Application

See application guidance for RAISED SPEED REDUCERS

Streets that qualify for RAISED SPEED REDUCERS, except for the presence of a truck, bus or emergency vehicle route

Consider on non–arterial roadways with speeding concerns

Avoid on arterial roadways

Design

See design guidance for RAISED SPEED REDUCERS

Spacing and dimensions of speed cushions are typically similar to those of other RAISED SPEED REDUCERS

Sustainability Opportunities

See sustainability opportunities for RAISED SPEED REDUCERS

Gateway

USAGE: LIMITED

A combination of traffic–calming and visual measures used at the entrance to a low–speed street to slow entering vehicles and discourage through–traffic.

Useful at all roadway transitions to slower–speed environments, gateways are especially suited to entrances to residential side streets and SHARED STREETS. The design elements of a gateway can include CURB EXTENSIONS (2.2.2), a RAISED CROSSING (2.3.7) or driveway treatment, a MEDIAN (2.2.3), landscaping or trees, and community facilities such as seating and public art.

Gateway to residential street including Greenstreets: Mulry Square, Manhattan

Benefits

- Decreases vehicular speeds and discourages through–traffic without blocking or prohibiting vehicular access
- Demarcates transitions to low–speed, SHARED STREET (2.1.4). or pedestrian–oriented areas
- Provides pedestrians with priority movement across the treated leg of the intersection

Considerations

- May impact street drainage or require catch basin relocation
- May impact underground utilities
- May require loss of curbside parking in some cases
- Community facilities typically necessitate the presence of a maintenance partner
- Many community facilities and sidewalk items require a permit or revocable consent from the city
- If gateway includes a RAISED CROSSING (2.3.7), snow plows must be given advance warning

Application

- Entrances to SHARED STREETS
- Consider at entrances to streets with low vehicle volumes or speeds from streets with high vehicle volumes or speeds

Design

- Include at a minimum CURB EXTENSIONS (2.2.2) to narrow the roadway; preferably, vertical deflection should also be created using a RAISED CROSSING or ramped driveway treatment; if the street is two–way, a MEDIAN (2.2.3) or MEDIAN SAFETY ISLAND (2.2.4) can be included, space permitting
- Other design elements can "narrow" a street visually, including plantings, public art, bicycle parking, and community facilities such as seating
- If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

- If gateway includes CURB EXTENSIONS, see sustainability opportunities for CURB EXTENSIONS

Gateway at transition from local residential street: Prospect Place, Brooklyn

Traffic Diverters

USAGE: LIMITED

A family of traffic calming treatments that can be used to slow, redirect or block motor vehicle traffic, primarily at intersections.

In areas where a goal is to reduce motor vehicle through–traffic, it may be desirable to create physical barriers that make it impractical or impossible to use local streets for anything other than local access trips.

Forced turn at two–way to one–way transition: West 24th Street, Manhattan

Benefits

Reduces or eliminates short–cut and cut–through traffic

When applied consistently to an area, reduces traffic speeds

Can green and beautify the streetscape with trees and/or vegetation, improving environmental quality and potentially incorporating stormwater source controls

Considerations

May impact street drainage or require catch basin relocation

May impact underground utilities

Emergency vehicle access needs must be accommodated

Landscaping or stormwater source controls require a partner for ongoing maintenance

If outfitted to capture stormwater, careful consideration must be given to design, overflow control, and plant species

Application

Consider on local streets with speeding or cut–through/short–cutting issues

Design

Design traffic diversion devices to impact motor vehicle movement but not bicycle movement; utilize bike channels or similar design strategies to allow passage by bicyclists

Include planted areas and stormwater source controls within traffic diverters wherever possible when a maintenance partner is identified

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

Locate trees and/or plantings within diverter when appropriate

Maximize permeable surface of diverter, e.g., with vegetation, permeable paving, or both

Design any planted areas within diverter so as to capture stormwater according to current standards

Traffic Diverters:

Median Barrier

USAGE: LIMITED

An elevated MEDIAN or MEDIAN SAFETY ISLAND extended through an intersection to prevent left turns and through–movements to and from the intersecting street.

Pedestrian access can be maintained with pedestrian refuges and bicycle access with gaps in the median. As with typical MEDIANS, trees or plantings can be included within the median barrier.

Median barrier: Canal Street, Manhattan

Median barrier: Cooper Square, Manhattan

Benefits

See benefits for TRAFFIC DIVERTERS (2.3.3)

Enhances safety at intersection by reducing potential vehicle movements and conflicts, particularly left turns

Reduces risk of vehicle head–on collisions

Reduces risk of motorists running a red light or stop sign when approaching from side street

Calms traffic on side street by requiring turn and on major street by narrowing roadway

Enhances pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross the road in stages

Application

See application guidance for TRAFFIC DIVERTERS

One–way or two–way local streets at their intersections with two–way collector or arterial roadways

Design

See design guidance for TRAFFIC DIVERTERS

See additional design guidance for MEDIAN (2.2.3)

Sustainability Opportunities

See sustainability opportunities for TRAFFIC DIVERTERS and MEDIAN

Traffic Diverters:

Forced Turn

USAGE: LIMITED

An island or sidewalk extension at the approach to an intersection that prevents left or right turns and through–movements from the intersecting street.

Like other traffic islands and sidewalk extensions, a forced turn can include plantings or other design features.

Forced turn: Riverside, California (Credit: Ryan Snyder)

Forced turn with bike channel: Berkeley, California (Credit: Jessica Roberts)
(Note: for illustrative purposes only)

Benefits

See benefits for TRAFFIC DIVERTERS (2.3.3)

Enhances safety at intersection by reducing potential vehicle movements and conflicts, particularly left turns

Reduces risk of motorists running a red light or stop sign when approaching from side street

Enhances pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross road in stages

Application

See application guidance for TRAFFIC DIVERTERS

Two–way local streets at their intersections with one–way streets or with two–way streets on which a MEDIAN BARRIER (2.3.3a) is not possible

Design

See design guidance for TRAFFIC DIVERTERS

Sustainability Opportunities

See sustainability opportunities for TRAFFIC DIVERTERS

Traffic Diverters:
Diagonal Diverter

USAGE: PILOT

A barrier or median placed diagonally across an intersection that blocks vehicular through–movements and up to half of their turning movements.

Implementation of a diagonal diverter results in two separate, L–shaped roadways for motor vehicles. Bicycle and walking access can be maintained through the diverter with gaps or ramps, and emergency vehicle access can be maintained with a gap and removable bollards or a mountable curb.

Diagonal diverter: Vancouver, Canada (Credit: Richard Drdul)
(Note: for illustrative purposes only)

Diagonal diverter with landscaping: Berkeley, CA (Credit: Jessica Roberts)

Benefits

See benefits for TRAFFIC DIVERTERS (2.3.3)

Strongly discourages motor vehicle through–traffic on side streets

Slows traffic by forcing turns

Greatly enhances safety at intersection by eliminating turning conflicts between motor vehicles

Reduces the risk of motorists running red lights or stop signs

Application

See application guidance for TRAFFIC DIVERTERS

Intersections of two one–way or two–way local streets on which short–cutting traffic is a severe problem

Design

See design guidance for TRAFFIC DIVERTERS

Sustainability Opportunities

See sustainability opportunities for TRAFFIC DIVERTERS

Traffic Diverters:

Half Closure

USAGE: PILOT

A physical barrier at an intersection to prohibit traffic in one direction on an otherwise two–way street, while permitting entry or exit in the other direction.

Also referred to as a partial closure or one–way closure, half closures realize many of the benefits of a FULL CLOSURE (2.3.3e) without fully converting a street to a cul–de–sac. Bicycle access can be maintained through the use of a dedicated bicycle channel or other design element.

Half closure with landscaping and bike access: Portland, Oregon (Credit: Ryan Snyder)

Half closure: Vancouver, Canada (Credit: Richard Drdul)
(Note: for illustrative purposes only)

Benefits

See benefits for TRAFFIC DIVERTERS (2.3.3)

Enhances safety at intersection by reducing potential vehicular movements and conflicts

Calms traffic on affected block by creating a partial cul–de–sac

Enhances pedestrian safety and accessibility by shortening crossing at closure

Larger closures can create a sizeable public space with community facilities

Application

See application guidance for TRAFFIC DIVERTERS

Two–way local streets on which short–cutting traffic is a severe problem but for which a FULL CLOSURE (2.3.3e) (cul–de–sac) is not feasible or desirable

Design

See design guidance for TRAFFIC DIVERTERS

Sustainability Opportunities

See sustainability opportunities for TRAFFIC DIVERTERS

Traffic Diverters:

Full Closure

USAGE: PILOT

A physical barrier at an intersection to fully close a street segment to motor vehicle access at one end.

The barrier can be a fence or bollards, a basic sidewalk, or a more elaborate landscaped space or plaza. The affected street segment becomes a cul–de–sac for motor vehicles, while bicycle access can be maintained through the use of a dedicated bicycle channel or other design element. Emergency vehicle access can be maintained by using mountable curbs and a clear path.

Full closure with Greenstreet and turnaround: Jewel Avenue, Queens

Full closure with landscaping and bike channel: Berkeley, California (Credit: Ryan Snyder)

Benefits

See benefits for TRAFFIC DIVERTERS (2.3.3)

Completely eliminates motor vehicle through–traffic on side street

Enhances safety at intersection by reducing potential vehicular movements and conflicts

Calms traffic on closed block by creating a cul–de–sac

Enhances pedestrian safety and accessibility by eliminating crossing at closure

Larger closures can create a sizeable public space with community facilities such as seating, plantings, etc.

Considerations

Closure of a publicly mapped street to vehicular access for over 180 days is subject to §19–107 of the Administrative Code of the City of New York

Application

See application guidance for TRAFFIC DIVERTERS

One–way or two–way local streets on which short–cutting traffic is a severe problem and for which conversion to a cul–de–sac is feasible and desirable

Design

See design guidance for TRAFFIC DIVERTERS

Depending on the length of the block, a turnaround usable by emergency vehicles may be necessary at the closed end of the block

Sustainability Opportunities

See sustainability opportunities for TRAFFIC DIVERTERS

Chicane

USAGE: PILOT

The creation of a "slalom" effect along a relatively narrow, low-volume road through the use of staggered CURB EXTENSIONS or a serpentine roadway alignment.

Chicanes discourage or make it impossible for drivers to drive in a straight line, which can reduce vehicular speeds.

Chicane: Vancouver, Canada (Credit: Richard Drdul) (Note: For illustrative purposes only)

Benefits

Forces drivers to drive more slowly and with greater awareness, particularly at mid–block locations

Can green and beautify the streetscape with trees and/or vegetation, improving environmental quality and potentially incorporating stormwater source controls

Considerations

May impact street drainage or require catch basin relocation

May impact underground utilities

May require loss of curbside parking

Landscaping or stormwater source controls require a partner for ongoing maintenance

If outfitted to capture stormwater, careful consideration must be given to design, overflow control, and plant species

May impact snow plows and street sweepers

Application

Consider on narrower, low-volume, local streets (maximum of two moving lanes) with demonstrated speeding issues

Avoid on bus routes, truck routes, and major bicycle routes

Design

The simplest and most basic approach to create a chicane is to alternate on–street parking (parallel or angled) from one side to the other; in this case, CURB EXTENSIONS (2.2.2) at the beginning and end of each grouping of parking

If utilizing CURB EXTENSIONS, see CURB EXTENSION section for general design considerations

Use vertical elements to alert drivers and snow plow operators to presence of chicanes

Sustainability Opportunities

Locate trees and/or plantings within chicane curb extensions when appropriate

Maximize permeable surface of chicane curb extensions, e.g., with vegetation, permeable paving, or both

Design any planted areas within chicane curb extensions to capture stormwater according to current standards

Chicane at entry to residential neighborhood: San Francisco, California (Credit: SF MTA)

Neighborhood Traffic Circle

USAGE: PILOT

A round traffic island in the center of a traditional intersection.

Primarily applicable to lower–traffic intersections, neighborhood traffic circles can provide many of the advantages of full ROUNDABOUTS, (2.3.6) but using much less space.

Neighborhood traffic circle with tree: West Palm Beach, Florida (Credit: Ian Lockwood and Timothy Stillings)

Neighborhood traffic circle with landscaping: Berkeley, California (Credit: John Allen)

Benefits

Reduces speeds and accident rates, particularly when applied consistently to an area

Can green and beautify the streetscape with trees and/or vegetation, improving environmental quality

Inclusion of plantings or art within the island creates an attractive focal point for the neighborhood

Considerations

May impact underground utilities

Landscaping requires a partner for ongoing maintenance

Application

Consider at existing stop–controlled intersections, particularly all–way stops

Consider at intersections of streets with low target speeds (25 mph or below) or low vehicle volumes

ROUNDABOUT (2.3.6) should be used instead at high–volume or large intersections

2.3.5 Neighborhood Traffic Circle

Neighborhood traffic circle with landscaping: Vancouver, Canada (Credit: Richard Drdul)
(Note: for illustrative purposes only)

Design

Design speeds for movement around the circle should be 10 to 15 mph; exit speeds should be limited to 15 mph through the circle's design wherever possible

Use signs within the center island and reflective paint on the curb to improve center island visibility, reflective

Include street tree(s) wherever possible; include planted areas when a maintenance partner is identified

A protective apron of concrete or textured pavement may be provided around the circle to accommodate wide–turning vehicles; where extreme geometric constraints exist and truck volumes are low, trucks may be accommodated by use of a fully mountable roundabout island

Use small curb radii where right turns are made

Install "Keep Right" or similar signs directing drivers to proceed to the right around the circle through the intersection

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Locate trees and/or plantings within neighborhood traffic circle island

Maximize permeable surface of neighborhood traffic circle island, e.g., with vegetation, permeable paving, or both

Design any planted areas within neighborhood traffic circle island so as to capture stormwater according to current standards

Roundabout

USAGE: PILOT

An intersection with circular, one–way (counter–clockwise) traffic around a central circle in which entering traffic yields to traffic already in the roundabout.

Roundabouts can vary in size (diameter) and number of lanes and can be designed as unsignalized or signalized intersections. Roundabouts are distinguished from "old–style" traffic circles/rotaries by their rules for yielding and key design features such as horizontal deflection at entries.

Recently installed roundabout in downtown neighborhood: Asheville, North Carolina (Credit: Anthony Butzek)

Benefits

- Reduces top vehicular speeds at signalized intersections, reducing the severity of accidents
- Eliminates left turns, a primary cause of accidents
- Enhances pedestrian safety when used at appropriate intersections
- Allows simultaneous movement of crossing vehicular streams, often processing vehicular traffic more efficiently than signalization
- When used in place of a stop– or signal–controlled intersection, may reduce vehicle emissions and travel times by reducing start–and–stop driving
- Reduces need to widen streets approaching intersection to store vehicles under signalized operation
- Can green and beautify the streetscape with trees and/or plantings, improving environmental quality and potentially incorporating stormwater source controls
- Inclusion of public open space, vegetation or art within the roundabout island creates an attractive focal point for the neighborhood

Considerations

- May require increased spatial footprint for intersection, but not approaches
- May impact street drainage or require catch basin relocation
- May impact underground utilities
- May require loss of curbside parking
- Landscaping or stormwater source controls require a partner for ongoing maintenance
- If outfitted to capture stormwater, careful consideration must be given to design, overflow control, and plant species

Application

- Intersections with 1) no more than 80–90% of volume on the main facility and 2) having either existing all–way stop control, at least three approaches, high vehicle turning volumes or percentages, or speeding issues
- Consider at locations with heavy vehicle turning movements, low pedestrian crossing compliance, poor safety records, or where signalization has led or may lead to operational issues for pedestrians or bicyclists

Roundabout with public art and landscaping in residential neighborhood: Delft, Netherlands (Note: for illustrative purposes only)

As a gateway treatment for low–speed (25 mph speed limit or less) or SHARED STREETS (2.1.4)

Design

Deflection should be created for entering vehicles to reinforce yielding behavior; at two–way legs of the intersection, use splitter islands to provide deflection as well as to allow pedestrians to cross in two segments

Limit entry and exit speeds through deflection and/or raised crossings

Curves should accommodate the design vehicle; use an apron of textured paving around the central island to slow motor vehicle movements while accommodating larger vehicles such as trucks

To improve center island visibility, use reflective signs within the center island and reflective paint on the curb

Include street tree(s) wherever possible; include planted areas and stormwater source controls when a maintenance partner is identified

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Locate trees and/or plantings within Roundabout islands

Maximize permeable surface of roundabout islands, e.g., with vegetation, permeable paving, or both

Design any planted areas within roundabout islands so as to capture stormwater according to current standards

Raised Crossing

USAGE: LIMITED

A marked pedestrian crosswalk at an intersection or a mid–block location constructed at a higher elevation than the adjacent roadway.

A raised crossing is essentially a speed table, with the full width of the crosswalk contained within the flat portion of the table, usually 10– to 15–feet wide. It combines the benefits of a RAISED SPEED REDUCER (2.3.1) with enhanced visibility for the pedestrian crossing.

Raised crossing at a Gateway to side street: Paris, France
(Note: for illustrative purposes only)

Benefits

Compels drivers to travel at speeds no higher than the street's design speed

Improves drivers' awareness of presence of pedestrian crossing, particularly at mid–block crossing locations

Used at street GATEWAYS (2.3.2), can alert drivers that they are entering a slower–speed, pedestrian–oriented street environment

Allows convenient pedestrian circulation between high foot traffic destinations on opposite sides of a street

Considerations

May impact street drainage or require catch basin relocation

Application

Existing stop–controlled crosswalks or other locations where demand exists for a stop–controlled pedestrian crossing that also meet the criteria for RAISED SPEED REDUCERS (2.3.1)

Consider at areas of particularly high pedestrian crossing demand on narrower streets (maximum of two moving lanes), such as locations with pedestrian generators (e.g., major commercial or cultural destinations, transit entrances, parks) on opposite sides of the street

Consider as a more robust option for mid–block crossings

Consider on the outer roadways of multi–lane boulevards at crossings

Avoid on arterial roadways

Design

Appropriate warning signs and roadway markings should accompany raised crossing

Use signage or other methods to alert snow–clearing vehicle operators to the presence of raised crossing

Use enhanced, high–visibility street materials to further draw attention to raised crossing

Sustainability Opportunities

See sustainability opportunities for RAISED SPEED REDUCERS

Utilize recycled content in paving materials

Raised Crossing: London, UK
(Note: For illustrative purposes only)

Raised Intersection

USAGE: PILOT

An entire intersection raised above the level of the surrounding roadways.

The intersection is typically raised to sidewalk height.

Raised Intersection: Cambridge, Massachusetts

Benefits

Vertical deflection at entry to intersection encourages reduced vehicle speeds

Improves drivers' awareness of presence of crossings

Visually turns intersection into a pedestrian–oriented zone

Considerations

May impact street drainage or require catch basin relocation

Snow plows must be given advance warning

Application

Stop–controlled intersections with a high volume of pedestrian crossings and low target vehicle speeds (e.g., 25 mph or below)

Stop–controlled intersections with a history of pedestrian accidents or speeding issues

Stop–controlled intersections where enhancing pedestrian movement is a major goal, such as transit stops or commercial areas

Avoid on truck routes and at other locations where RAISED SPEED REDUCERS (2.3.1) are not appropriate

Design

Slope of entrance ramps for motorized traffic can be steep or shallow, depending on target speeds

Use enhanced, high–visibility street materials to further draw attention to raised intersection

Sustainability Opportunities

Minimize impervious paved areas and utilize permeable paving wherever possible

Maximize trees and other green cover

Utilize stormwater source controls wherever feasible

Increase SRI value of paved surfaces to reduce urban heat island impact

Utilize recycled content in paving materials

Coordinate streetscape/utility work to minimize street cuts

Raised intersection: London, UK
(Note: for illustrative purposes only)

Raised intersection: Cologne, Germany
(Credit: Aaron Naparstek)
(Note: for illustrative purposes only)

Street Trees & Plantings

Tree Pits

USAGE: WIDE

Excavated pits that allow for the planting of street trees within the public right–of–way.

Tree pits are used extensively all over the city and should be used wherever sidewalks exist if subsurface conditions allow. INDIVIDUAL TREE PITS (2.4.1a) are currently the only required design, however CONNECTED TREE PITS (2.4.1b) should be used wherever possible to provide improved tree health, and STORMWATER–CAPTURING TREE PITS (2.4.1c)—those that take water from the roadway—can be considered for pilot projects.

Street trees planted in individual tree pits: Avenue S, Brooklyn

Benefits

Vertical elements, such as trees, make streets appear narrower to drivers, causing them to drive slower

Street trees help to mitigate air pollution and capture carbon dioxide from the air, improving environmental and public health

Green cover reduces the urban heat island effect and decreases energy costs related to air temperatures

Street trees provide natural stormwater management

Street trees dampen street noise, providing health and psychological benefits

Street trees provide urban wildlife habitat opportunities

Trees make streets more attractive

Considerations

May impact underground utilities

NYC DPR contractors will maintain tree pits (individual or connected) for two years after planting, after which each individual property owner is responsible for maintaining the tree pit(s), while NYC DPR retains responsibility for and jurisdiction over the tree itself

For NYC DOT projects, any street trees included beyond NYC DOT's approved funding must be funded by NYC DPR or another entity

Tree placement near subsurface steam lines may transmit too much heat to tree roots, compromising tree health

Application

All areas with FULL SIDEWALKS (2.2.1a)

CONNECTED TREE PITS (2.4.1b) should be utilized as an alternative to INDIVIDUAL TREE PITS (2.4.1a) wherever feasible

RIBBON SIDEWALK (2.2.1b) should be used as an alternative to a FULL SIDEWALK in areas of low– to moderate–land use density as per its application guidance, in which case street trees do not require tree pits

Design

Meet minimum size and design requirements of NYC DPR's *Tree Planting Standards* (see Appendix C) contingent upon accommodation of pedestrian capacity and subsurface constraints

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

The New York City Zoning Resolution requires that one tree be provided for every 25 feet of curb frontage for new developments and major alterations

Maximize exposed soil to allow more water and air to get to the roots of the tree; use paving or other surface treatments over the tree pit in high pedestrian traffic areas

Tree pit guards or wickets enclosing the perimeter of the tree pit are permitted where their use does not impede pedestrian traffic and should not impede stormwater flow into the tree pit

Do not use tree pit grates that are flush with the sidewalk to cover tree pits

Vertical tree guards that enclose the tree trunk are not permitted

Stagger street tree species along a block to avoid species blight

Design tree pits to discourage the encroachment of pets

Design sidewalks to direct stormwater into tree pits wherever advisable

Sustainability Opportunities

Maximize size of tree pit while adequately accommodating pedestrian movement and curbside access needs

Utilize no paving or use permeable paving over tree pit

Use CONNECTED TREE PITS instead of INDIVIDUAL TREE PITS to increase root space and stormwater intake

Consider the pilot use of STORMWATER–CAPTURING TREE PIT (2.4.1c)

Tree Pits:

Individual Tree Pit

USAGE: WIDE

A tree pit within the sidewalk, disconnected from other tree pits, where a street tree is planted.

While this is currently the predominant design around the city, other designs that give tree roots more space and air (such as CONNECTED TREE PITS) can improve tree health and longevity.

Individual tree pits in a median (deep irrigation bags are secured to tree bases): Page Avenue, Staten Island (Credit: NYC DPR)

Individual tree pit with tree guard: Prospect Avenue, Brooklyn

Benefits

See benefits of TREE PITS (2.4.1)

Considerations

See considerations for TREE PITS

Application

See application guidance for TREE PITS

Use CONNECTED TREE PITS (2.4.1b) rather than INDIVIDUAL TREE PITS wherever possible

Design

See design guidance for TREE PITS

NYC DPR standard tree pit size is 5 feet by 10 feet

Sustainability Opportunities

See sustainability opportunities for TREE PITS

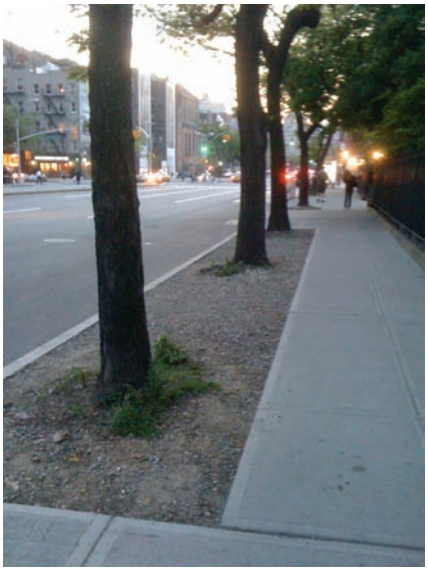
Tree Pits:
Connected Tree Pits

USAGE: LIMITED

A series of tree pits connected with a continuous trench in order to provide increased root space and stormwater detention.

The trench of connected tree pits should be left uncovered (and, optionally, landscaped) to improve tree root health. However, in areas of heavy pedestrian volumes and limited sidewalk space, the trench can be bridged by sidewalk slabs supported either by structural soil or a subsurface frame system.

Connected tree pits with permeable paver–covered trench: Columbia Street, Brooklyn



Connected tree pits with uncovered trench: West Houston Street, Manhattan

Benefits

See benefits of TREE PITS (2.4.1)

Provides greater space for tree roots than INDIVIDUAL TREE PITS (2.4.1a), improving tree health and longevity

In areas where a RIBBON SIDEWALK (2.2.1b) is inappropriate, connected tree pits provide many of the same benefits

Additional soil provides increased stormwater detention capacity over INDIVIDUAL TREE PITS

Considerations

See considerations for TREE PITS

Application

See application guidance for TREE PITS

Whenever possible in lieu of INDIVIDUAL TREE PITS

Consider RIBBON SIDEWALK as an alternative in areas of low–to–moderate land use density as per its application guidance and zoning requirements

Design

See design guidance for TREE PITS

Where sidewalk coverage is necessary (areas of high foot traffic, limited sidewalk space, or frequent curbside access), the sidewalk slab or permeable pavers can be bridged over the tree pit trench using structural soil or a subsurface frame system to increase soil volume

Sustainability Opportunities

See sustainability opportunities for TREE PITS

Tree Pits:

Stormwater–Capturing Tree Pit(s)

USAGE: PILOT

An INDIVIDUAL TREE PIT or CONNECTED TREE PITS designed to capture stormwater from the adjacent roadway.

If designed well, stormwater–capturing tree pits could benefit tree health by increasing the amount of water the tree receives and reducing the need for manual watering. The design of the pit is crucial to tree health; stormwater should be filtered through an appropriate soil mixture.

Stormwater–capturing tree pit with plantings: San Francisco (Credit: San Francisco Planning Department)

Stormwater–capturing tree pit with plantings: Wellington, NZ (Credit: NYC DCP) (Note: for illustrative purposes only

Benefits

See benefits of TREE PITS (2.4.1)

May improve tree health and reduce sidewalk heaving by providing increased water to tree

Adopting effective stormwater–capturing tree pit designs on a wide–scale basis could reduce stormwater volumes entering the sewer system during storms

Considerations

See considerations for TREE PITS

Careful consideration must be given to design and overflow control

Application

See application guidance for TREE PITS

Pilot implementations can be pursued in partnership with NYC DPR or another maintenance partner

Use connected stormwater–capturing tree pits as an alternative to individual stormwater–capturing tree pits wherever feasible

Use RIBBON SIDEWALK (2.2.1b) and STREET SWALE (2.4.3) instead of STORMWATER–CAPTURING TREE PITS in areas of low–to–moderate land use density as per their application guidance

Design

See design guidance for TREE PITS

Special care must be given to the siting of stormwater–capturing tree pits; if superior sub–drainage doesn't exist and overflow drains are not used, tree plantings may fail

Stormwater–capturing CONNECTED TREE PITS (2.4.1b) should be used wherever feasible instead of INDIVIDUAL TREE PITS (2.4.1a)

Sustainability Opportunities

See sustainability opportunities for TREE PITS

Greenstreet/ Planted Area

USAGE: LIMITED

A planted area within the public right–of–way maintained by NYC DPR (through an agreement between NYC DOT and NYC DPR) or another entity such as a business or neighborhood group (through a concession or maintenance agreement).

Greenstreets and other planted areas not only provide beauty but also enhance green cover and can help manage stormwater. They can range in size and shape from small ribbons in medians or along sidewalks to traffic triangles to large stormwater–collection swales.

Large Greenstreet: First Avenue, Manhattan

Benefits

Vegetation helps to mitigate air pollution and capture carbon dioxide from the air, improving environmental and public health

Green cover reduces the urban heat island effect and decreases energy costs related to air temperatures

Landscaping beautifies neighborhood streets

Stormwater capture reduces need for regular watering, reducing maintenance costs

Can incorporate community facilities such as seating or other furnishings to encourage social and recreational activities, depending on its size and maintenance partner

Considerations

May impact street drainage or require catch basin relocation

May impact underground utilities

Landscaping or stormwater source controls require a partner for ongoing maintenance

If designed to capture stormwater, careful consideration must be given to design, overflow control, and plant species

Application

Wherever NYC DPR has made a greenstreet project a priority and there is adequate space to accommodate one

Consider a greenstreet wherever NYC DPR is willing to maintain the space and either (1) existing underutilized sidewalk space exists, (2) existing underutilized roadway space (e.g., channelized areas) exists that can be converted, or (3) reclaimable excess street right–of–way exists beyond the edge of the constructed street

Consider a non–greenstreet planted area wherever the above criteria are met and a committed partner other than NYC DPR is willing to maintain the planted area

Design

Design details should be determined on a site–specific basis in consultation with NYC DPR, NYC DOT, or other relevant agencies.

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Guards or wickets are permitted around planted areas where their use does not impede pedestrian traffic

Sustainability Opportunities

Design greenstreet/planted area so as to capture stormwater according to current standards

Greenstreet with stormwater–capturing design: Furmanville Avenue, Queens (Credit: NYC DPR)

Landscaped areas incorporating public seating maintained by a private partner: Greenwich Street, Manhattan

Street Swale

USAGE: PILOT

A vegetated depression running alongside the road into which stormwater is directed.

The function of a street swale is both to detain stormwater—allowing it to infiltrate the soil—and to convey any overflow into the sewer system. As long as plant species are chosen that can tolerate periodic flooding and salt, street swales can also beautify the street. They typically require a maintenance entity to clean and occasionally unclog the swale and drains.

Street swale: Church Street at 35th Street and 14th Avenue, Brooklyn

Street swale: Eugene, Oregon

Street swale: Church Street at 35th Street and 14th Avenue, Brooklyn

Benefits

Provides superior stormwater detention from sidewalk and street

Permits greening of the streetscape

Beautifies neighborhood streets, if well–maintained

Considerations

May impact street drainage or require catch basin relocation

May impact underground utilities

Street swales require an ongoing partner for such maintenance activities as vegetation replacement, debris and garbage removal, and clearing of sediment and debris from any drainage structures

Careful consideration must be given to design, overflow control, and plant species

Application

Consider in areas of lower–density land use where a RIBBON SIDEWALK (2.2.1b) would be appropriate in partnership with NYC DPR or another maintenance partner

Consider along parks and open space

Avoid in areas of high foot traffic or curbside activity

Design

Special care must be given to the siting of street swale based on subsurface conditions and infiltration rates

Should be at least 10 feet from building foundations

Should be between 5– and 10–feet wide with a 2–foot flat bottom where possible

Longitudinal slope should not be greater than 5%

To help sustain plant health, plants used in a street swale must be comprised of species that require low maintenance and can tolerate salt, frequent inundation, and periods of drought

If work includes tree planting, consider the location of utility infrastructure, including NYC DEP sewers and water mains

Sustainability Opportunities

Maximize size of swale while adequately accommodating pedestrian movement and curbside access needs, through flush or cut curbs and other design elements

3 Materials

3.0	**Introduction**	**104**
3.1	**Roadways**	**107**
3.1.1	Asphaltic Concrete	108
a	Imprinted Asphalt	109
b	High Albedo Asphalt	110
c	Porous Asphalt	111
3.1.2	Concrete	112
3.1.3	Granite Block	113
a	Modular Cobblestones	114
3.1.4	Interlocking Permeable Concrete or Asphalt Pavers	115
3.2	**Crosswalks**	**116**
3.2.1	Granite Pavers	117
3.2.2	Thermoplastic Imprinting	118
3.3	**Sidewalks**	**119**
3.3.1	Untinted Concrete	120
a	Tinted Concrete	121
b	Tinted Concrete with Exposed Light–Colored Aggregate	122
c	Tinted Concrete with Silicon Carbide Treatment	123
d	Sand–Colored Concrete with Exposed Aggregate	124
e	Porous Concrete	125
f	London Pavers	126
3.3.2	Mastic Asphalt	127
3.3.3	Hexagonal Asphalt Pavers	128
3.3.4	Bluestone Flags	129
3.3.5	Granite Slabs	130
3.3.6	Rubber Pavers	131
3.4	**Sidewalk Furnishing Zones**	**132**
3.4.1	Granite Block	133
b	Concrete Cobbles	134
c	Modular Cobblestones	135
3.4.2	Square Asphalt or Concrete Pavers	136
3.4.3	Concrete with Exposed Glass Aggregate	137
3.5	**Curbs**	**138**
3.5.1	Untinted Concrete	139
a	Tinted Concrete	140
b	Integral Concrete Curb and Gutter	141
3.5.2	Granite	142
3.6	**Plazas**	**143**
3.6.1	Imprinted Asphalt	144
3.6.2	Hexagonal Concrete Pavers	145
3.6.3	Decorative Gravel	146
a	Resin–Bound Gravel	147

Section	Material	Standard	Optional	Historic	Pilot
3.1	**Roadway**				
3.1.1	Asphaltic Concrete	●			
3.1.1a	Imprinted Asphalt		●		
3.1.1b	High Albedo Asphalt				●
3.1.1c	Porous Asphalt				●
3.1.2	Concrete	●			
3.1.3	Granite Block		●	●	
3.1.3b	Modular Cobblestones		●		
3.1.4	Permeable Asphalt or Concrete Pavers				●
3.2	**Crosswalk**				
Same as Roadway					
3.1.1	Asphaltic Concrete	●			
3.1.1a	Imprinted Asphalt		●		
3.1.1b	High Albedo Asphalt				●
3.1.1c	Porous Asphalt				●
3.1.2	Concrete	●			
3.1.3	Granite Block		●	●	
3.1.3b	Modular Cobblestones		●		
3.1.4	Permeable Asphalt or Concrete Pavers				●
3.2.1	Granite Pavers		●		
3.2.2	Thermoplastic Imprinting		●		
3.3	**Sidewalks**				
3.3.1	Untinted Concrete	●			
3.3.1a	Tinted Concrete	●		●	
3.3.1b	Tinted Concrete with Exposed Light–Colored Aggregate		●		
3.3.1c	Tinted Concrete with Silicon Carbide Treatment		●		
3.3.1d	Sand–Colored Concrete with Exposed Aggregate		●		
3.3.1e	Porous Concrete				●
3.3.1f	London Pavers		●		
3.3.2	Mastic Asphalt				●
3.3.3	Hexagonal Asphalt Pavers		●		
3.3.4	Bluestone Flags			●	
3.3.5	Granite Slabs			●	
3.3.6	Rubber Pavers				●
3.4	**Sidewalk Furnishing Zones**				
Same as Sidewalk					
3.3.1	Untinted Concrete	●			
3.3.1a	Tinted Concrete	●		●	
3.3.1b	Tinted Concrete with Exposed Light–Colored Aggregate		●		
3.3.1c	Tinted Concrete with Silicon Carbide Treatment		●		

Section	Material	Standard	Optional	Historic	Pilot
3.3.1d	Sand–Colored Concrete with Exposed Aggregate		●		
3.3.1e	Porous Concrete				●
3.3.1f	London Pavers		●		
3.3.2	Mastic Asphalt				●
3.3.3	Hexagonal Asphalt Pavers		●		
3.3.4	Bluestone Flags			●	
3.3.5	Granite Slabs			●	
3.3.6	Rubber Pavers				●
3.4.1a	Concrete Cobbles		●		
3.4.1b	Modular Cobblestones		●		
3.4.2	Square Asphalt Pavers		●		
3.4.3	Concrete with Exposed Glass Aggregate		●		
3.5	**Curbs**				
3.5.1	Concrete	●			
3.5.1a	Tinted Concrete	●			
3.5.1b	Granite		●	●	
3.5.2	Integral Concrete Curb and Gutter		●		
3.6	**Plazas**				
Same as Sidewalk Furnishing Zones					
3.3.1	Untinted Concrete	●			
3.3.1a	Tinted Concrete	●		●	
3.3.1b	Tinted Concrete with Exposed Light–Colored Aggregate		●		
3.3.1c	Tinted Concrete with Silicon Carbide Treatment		●		
3.3.1d	Sand–Colored Concrete with Exposed Aggregate		●		
3.3.1e	Porous Concrete				●
3.3.1f	London Pavers		●		
3.3.2	Mastic Asphalt				●
3.3.3	Hexagonal Asphalt Pavers		●		
3.3.4	Bluestone Flags			●	
3.3.5	Granite Slabs			●	
3.3.6	Rubber Pavers				●
3.4.1a	Concrete Cobbles		●		
3.4.1b	Modular Cobblestones		●		
3.4.2	Square Asphalt Pavers		●		
3.4.3	Concrete with Exposed Glass Aggregate		●		
3.6.1	Imprinted Asphalt		●		
3.6.2	Hexagonal Concrete Pavers		●		
3.6.3	Decorative Gravel		●		
3.6.3a	Resin–Bound Gravel		●		

Introduction

About this Chapter
This chapter identifies attractive and practical materials for use at recommended locations.

Usage Categories
The materials have been divided into four categories: wide use or "standard" application, limited use or "optional" application, "historic" landmark application, and "pilot" application.

Projects utilizing the standard materials in the identified contexts will generally only require a permit from NYC DOT. Optional materials will receive expedited review but will generally require a maintenance agreement. Paving materials not included in this manual may be proposed but are discouraged and will require full design and engineering review from the Design Commission and NYC DOT and will require a maintenance agreement.

Standard
Material is required in specified context(s) unless a distinctive treatment is approved by NYC DOT and the Design Commission.

Optional
Material is permitted for use in specified context(s), pending city review. Optional materials require approval from the Design Commission before being installed.

Historic
Material is subject to the requirements of the New York City Landmarks Preservation Commission.

Pilot Usage
Materials with sustainable properties that will be tested prior to classification in future editions of this manual either as standard or optional.

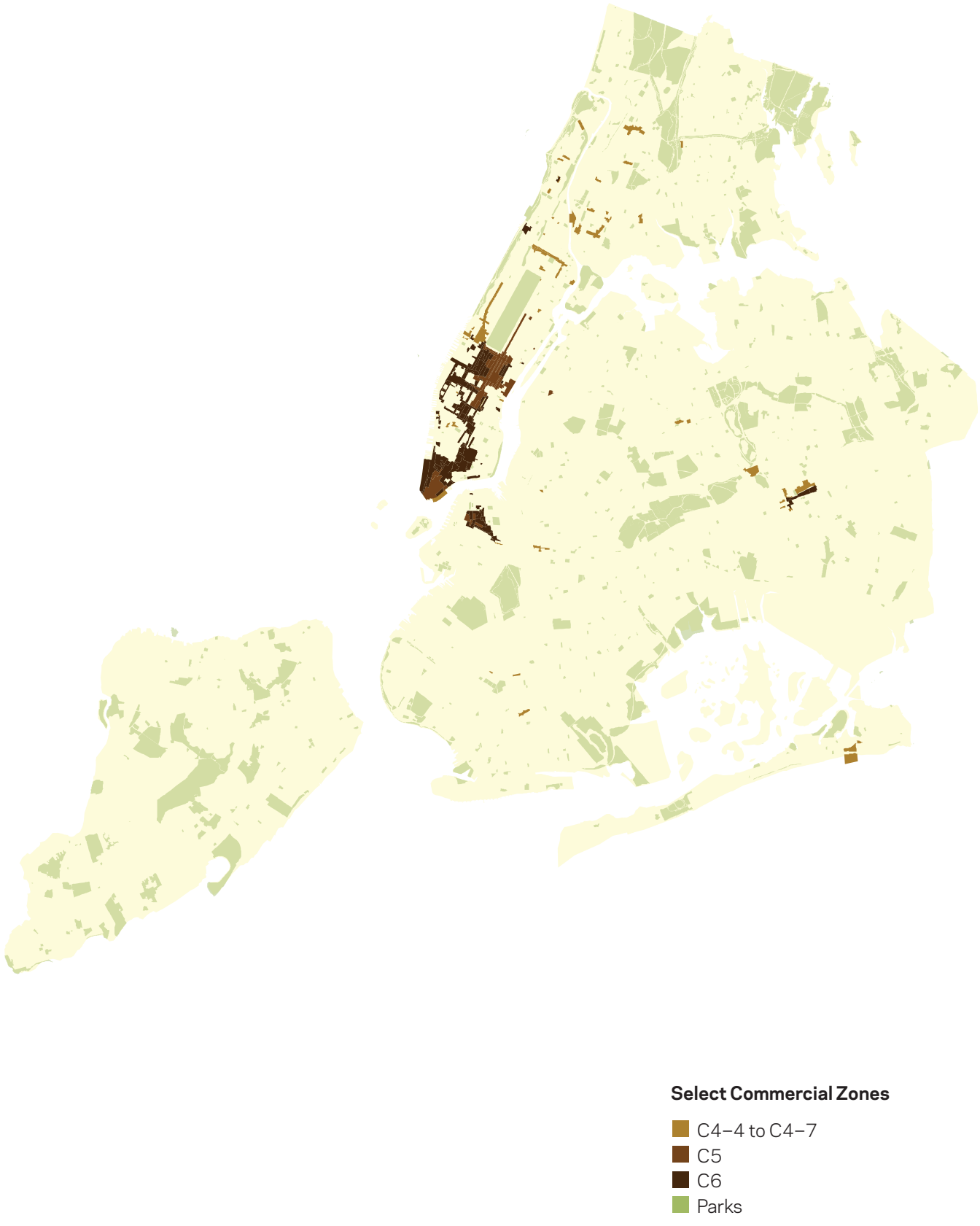
New Sidewalk Standards for Commercial Districts
Pending regulatory change, sidewalks abutting properties in certain commercial districts shall be constructed of Tinted Concrete (3.3.1a). The affected sidewalks will be in commercial districts C4–4 through C4–7, C5 and C6, as defined in the Zoning Resolution of the City of New York (see map on opposite page). As such, any sidewalk installation or replacement constituting 50% or more of the total square footage of the sidewalk abutting a property located in the aforementioned commercial districts will be required to use the new sidewalk standard.

Specification Sources
The recommendations in this chapter supplement rather than replace existing engineering standards. Readers are directed to the sources noted below, those listed in Appendix C, and any applicable resources.

Detailed information on the specifications for standard materials is contained in the NYC DOT/DDC *Standard Highway Specifications*. Typical construction details are provided in the NYC DOT *Standard Details of Construction*. Information regarding standard procedures and approval requirements is provided in the *Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components*.

The design guidance described here does not supersede any existing federal, state or local laws, rules, and regulations. All projects remain subject to relevant statutes, such as the Zoning Resolution of the City of New York, City Environmental Quality Review (CEQR) and appropriate reviews and approvals of oversight agencies.

Map of Commercial Districts with New Sidewalk Standard
(Credit: NYC Department of City Planning)



Applicability and Exceptions

All new projects that significantly impact public and private streets should follow these guidelines. NYC DOT approval will be based on site specific conditions and cost–effective engineering standards and judgment, with the safety of all street users being of paramount importance.

Sidewalk Reviews and Approvals

Installation of sidewalk associated with new building construction is coordinated by the Department of Buildings through the Builder's Pavement Plan. For other installations of new sidewalk, property owners or constructing entities must file a Sidewalk, Curb & Roadway Application (SCARA) with NYC DOT. All treatments in "optional" or "pilot" usage categories also require the filing of a Distinctive Sidewalk Application and receiving of approval from the Design Commission before being installed. For more information on sidewalk permits, reviews, and approvals, download the *Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components* at nyc.gov/streetdesignmanual. For further information, please contact the NYC DOT Bureau of Permit Management & Construction Control. For contact information visit nyc.gov/dot or call 311.

The Design Commission reviews distinctive sidewalks for their aesthetic impact on the streetscape. A sidewalk is considered distinctive if it deviates from that neighborhood's standard, which in most cases is Department of Transportation grey concrete with a 5–by–5–foot scoring pattern, but can include cobble or granite block in areas where the historic fabric remains intact. Designs for distinctive sidewalks in front of existing buildings are submitted through the NYC DOT. Designs for distinctive sidewalks that are part of new construction projects are submitted through the Department of Buildings. For more information, please visit the Design Commission's website at nyc.gov or call 311.

Maintenance Agreements

Each treatment in this chapter has a statement indicating whether or not the material requires a maintenance agreement before being installed. This agreement requires that the adjacent property owner, installing entity, or some other entity will generally be responsible for maintaining that material and providing appropriate insurance. For sidewalks and curbing, the constructing entity must file a Distinctive Sidewalk Improvement Maintenance Agreement with the NYC DOT Bureau of Permit Management & Construction Control. For other materials requiring maintenance agreements—such as roadbeds, furnishing zones and plazas—proposals should first be reviewed with the appropriate NYC DOT Borough Commissioner. Contact information for NYC DOT Borough Commissioners can be found at nyc.gov/dot or by calling 311.

Roadways

Roadways represent the paved central portion of the street that allow access to and movement through an area (see Glossary). Most roadways are designed for vehicular use.

Asphaltic Concrete

USAGE: STANDARD

Mixture of asphalt binder and stone aggregate, usually laid on a concrete base and compacted by a roller to form a solid road surface.

Typical black asphalt roadway: Delancey Street at Forsyth Street, Manhattan

Benefits

Provides smooth, durable, and frictionally excellent road surface

Material is widely available and cost effective

Impervious quality channels water to the curb on crowned roadways

Dark color hides dirt and stains, creates background for high–contrast markings

Easy to maintain and patch

Can be pigmented or imprinted for varied purposes

Asphalt can be recycled

Considerations

Prone to rutting and shoving under high volumes of heavy vehicles

Application

Asphalt is standard for roadbeds in all neighborhoods unless otherwise specified

Material is preferred road surface for cyclists

This material is generally maintained by NYC DOT

Design

Minimum 3–inch–thick wearing course, typically

Roadway should be crowned to drain stormwater from the road surface

May require concrete base

Specification source: NYC DOT Standard Specifications sections 2.05, 3.01, 4.01, 4.02

Detail source: NYC DOT Standard Details drawing H–1034 and related

Sustainability Opportunities

High recycled asphalt (RAP) content

Asphalt with high SRI values

Porous asphalt

Imprinted Asphalt

USAGE: OPTIONAL

Machine–heated asphalt, imprinted with a pattern template and colored with protective coating.

Imprinted asphalt pedestrian plaza in the roadway: 185th Street at Amsterdam Avenue, Manhattan

Taranto, Italy
(Credit: Integrated Paving Concepts®)

Benefits

See benefits of ASPHALTIC CONCRETE (3.1.1)

Visually defines pedestrian or non–vehicle areas

Can be installed on existing asphalt that is in good condition

Preserves asphalt roadway for vehicle use if necessary

More cost–effective than unit pavers

Easier to maintain than unit pavers

Considerations

See considerations for ASPHALTIC CONCRETE

Pattern and colored coating may deteriorate if exposed to regular vehicle traffic

Application

Appropriate for roadways or parts of roadways with no regular vehicular traffic, such as restricted–use streets, pedestrian streets, or plazas

Can be used for areas of the roadbed that are not intended for regular vehicle travel, such as textured aprons or medians

Use of this material generally requires a maintenance agreement

Design

See design guidance for ASPHALTIC CONCRETE

Can be installed on existing asphalt that is in good condition

Various patterns and colors available

Specification source: NYC DOT Standard Specifications section 6.45B

Sustainability Opportunities

See sustainability opportunities for ASPHALTIC CONCRETE

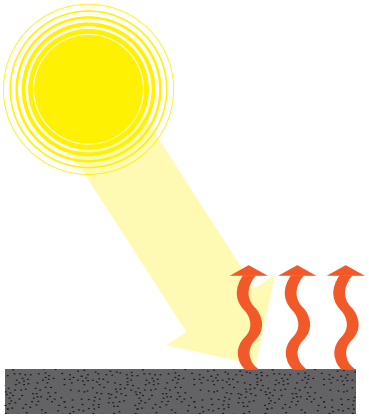
High SRI value coloring

High Albedo Asphalt

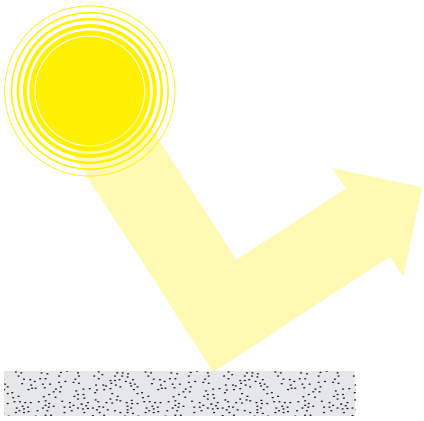
USAGE: PILOT

Asphalt roadway comprised of light–colored aggregate and/or binder producing high Solar Reflectance Index (SRI) values.

Highway showing left side paved with high–albedo asphalt and the right side paved with conventional asphalt: Interstate 10, West Texas (Credit: The Citizen Scientist, April 16, 2004)



Conventional Asphalt



High Albedo Asphalt

By reflecting sunlight, lighter–colored paving reduces the urban heat island effect

Benefits

See benefits of ASPHALTIC CONCRETE (3.1.1)

Reflects more of the sun's rays and absorbs less heat than traditional black asphalt pavement, mitigating the urban heat island effect

Considerations

See considerations for ASPHALTIC CONCRETE

Light–colored natural aggregates are considerably more expensive than dark because of limited local availability

Application

Streets with high sun exposure, ideally in an urban setting sheltered from wind, where impacts on surrounding air quality can be effectively measured.

Should be piloted on streets with low vehicle traffic

Should not be piloted where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

See design guidance for ASPHALTIC CONCRETE

Aggregate: light in color

Asphaltic cement: white or light–colored binder if available

Other options: white chippings in hot–rolled asphalt

Sustainability Opportunities

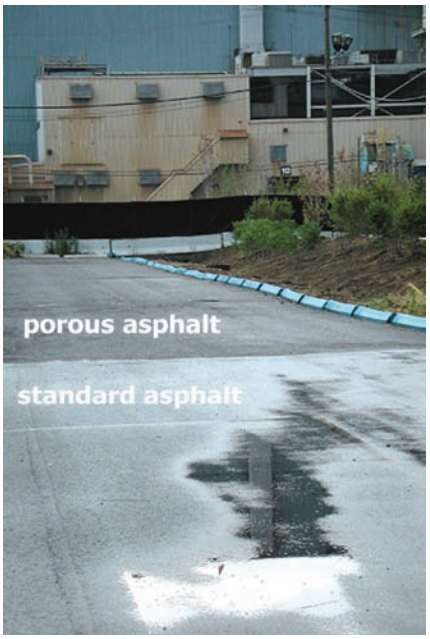
See sustainability opportunities for ASPHALTIC CONCRETE

Porous Asphalt

USAGE: PILOT

Standard asphaltic concrete mixed without fine particles and with low binder content, leaving space for water to drain through to an open–graded stone bed.

Voids in between stones allow water to pass through (note: for demonstration purposes, this example shows a clear resin, not asphalt, to bind the aggregate particles)



Conventional asphalt causes rainwater to pool while porous asphalt allows it to permeate the ground below

Benefits

See benefits of ASPHALTIC CONCRETE (3.1.1)

Exhibits similar structural properties as conventional asphalt

Allows stormwater to drain through, reducing runoff into the sewer system

Reduces likelihood of ponding and slick or icy road conditions

May be less prone to cracking in winter than conventional pavement

Considerations

See considerations for ASPHALTIC CONCRETE

Not appropriate for use where there is water–sensitive subsurface infrastructure

Not effective at greater than 5% slope

Only certain soil types are appropriate as subbases for infiltration

Porosity can covey harmful chemicals into the soil

May require routine vacuuming of surface to maintain porosity

Application

On a level street above the high water table with low vehicle traffic

Must have adequate subsurface conditions to detain stormwater

Avoid where there is potential for soil contamination

Can be used to pave an entire roadway or just the parking lane or gutter strip

Should not be piloted where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

See design guidance for ASPHALTIC CONCRETE

Aggregate should be no smaller than 600 µm, or the No. 30 sieve

Asphaltic cement should be 5.75–6.0% bituminous asphalt content by weight

Requires 18– to 36–inch stone infiltration bed with detention system and/or overflow controls and even distribution of stormwater

Bottom of infiltration bed should be at least 3 feet above high water table and 2 feet above bedrock

Sustainability Opportunities

See sustainability opportunities for ASPHALTIC CONCRETE

Concrete

USAGE: STANDARD

Mixture comprised of cement(s), aggregate(s), water, and other chemical admixtures, poured over metal reinforcement bars, smoothed, and then allowed to harden, forming a solid road surface.

Typical concrete roadbed: West Side Highway, Manhattan

Typical concrete bus pad: Manhattan Ave at 114th Street, Manhattan

Benefits

Provides durable and frictionally excellent road surface

This material is widely available and cost effective

Impervious quality channels water to the curb on crowned roadways

Resists rutting and shoving that can occur with asphalt

Compared to asphalt, reduces impact of vehicle travel vibrations on sub–surface features and neighboring structures

Considerations

Difficult to replace or patch in sections where utility cuts or defects occur

Application

Should be used wherever engineering criteria dictates, such as bridges, vaulted roadways, or bus pads

Should not be used where frequent utility cuts are likely

Will be evaluated on a case–by–case basis based on engineer review of roadway structure

This material is generally maintained by NYC DOT

Design

Must have joints to allow for expansion no more than 20 feet apart

May require metal reinforcement bars as specified by NYC DOT

Specification source: NYC DOT Standard Specifications sections 3.05, 4.05

Detail source: NYC DOT Standard Details drawing H–1050

Detail source (bus pad): NYC DOT Standard Details drawings H–1005, H–1005 A

Sustainability Opportunities

Supplementary cementitious materials (SCM)

Granite Block

USAGE: OPTIONAL/HISTORIC

Historic smooth–finish granite block unit pavers often referred to as "cobblestones," commonly used throughout New York City in the 19th Century.

Typical cobblestone roadway: Jay Street at Hudson Street, Manhattan

Cobblestone pedestrian street: Stone Street, Manhattan

Benefits

Reinforces historic character

Calms vehicle traffic

Visually delineates separation of street uses or modal priorities

Cobblestones are relatively easy to remove and reset, especially for utility access

Considerations

Stones can become loose over time and will require regular maintenance

May generate significant noise from vehicle tires

Uneven surface can hinder pedestrian, cyclist, and disabled persons' mobility

Provision should be made for a smooth cycling surface if it's part of a planned bike route

Can be slippery when wet

Application

Should be used wherever there is existing cobblestone in areas where the historic fabric remains intact

May be used to provide visual delineation to separate bike lanes from vehicle lanes or vehicle lanes from pedestrian areas (see 3.4.1)

Can be used to designate areas of the roadbed not intended for regular vehicle travel, such as pedestrian streets or textured gutters, aprons, or medians

Use of this material is subject to the LPC when used in historic districts with existing cobblestones

This material is generally maintained by NYC DOT when used in historic districts

Use of this material outside of historic districts generally requires a maintenance agreement

Design

Can be sand–set for easier installation and greater permeability, or mortar–set for stronger structural properties

May require concrete base

Specification source: NYC DOT Standard Specifications sections 2.06, 6.04

Sustainability Opportunities

Salvaged cobbles

Permeable installation

Modular Cobblestone

USAGE: OPTIONAL

A pre–assembled grid of smooth saw–cut finish granite cobbles fastened to a sturdy backing and installed as modular tiles.

Modular cobblestone pedestrian street: Broad Street at Wall Street, Manhattan

Modular cobblestone installation: Broad Street at Wall Street, Manhattan (Credit: Eurocobble®)

Benefits

See benefits of GRANITE PAVERS (3.1.3)

Easier to install and maintain than traditional cobblestone

Smooth, saw–finish stones do not hinder pedestrian or cyclist mobility

Considerations

See considerations for GRANITE PAVERS

Exact lifecycle of product is unknown

Application

Roadways with no regular vehicular traffic such as restricted–use streets, pedestrian streets, or plazas

Can be used for areas of the roadbed that are not intended for regular vehicle travel, such as textured aprons or medians

Should not be used where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

Requires concrete base

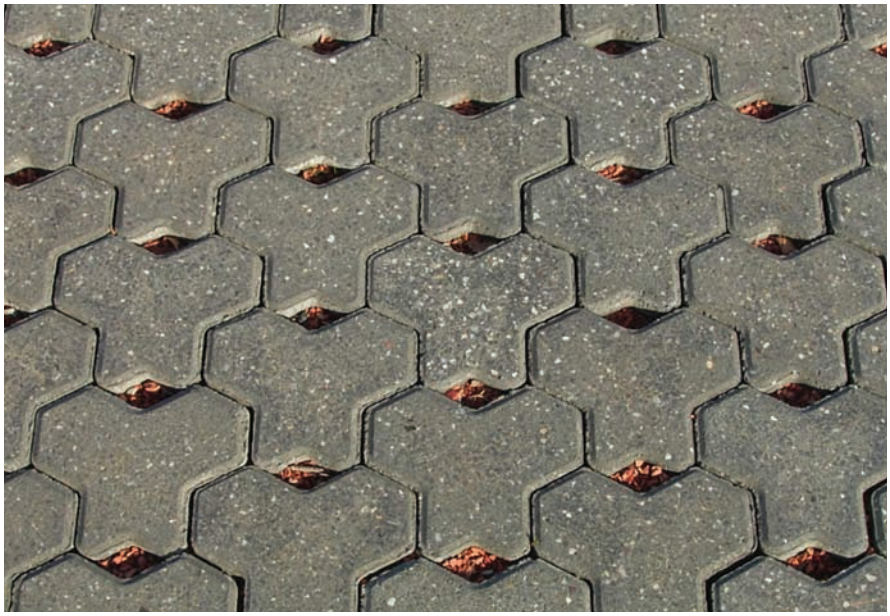
Various colors and styles available

Specification source: NYC DOT Standard Specifications section 6.06MC

Interlocking Permeable Concrete or Asphalt Pavers

USAGE: PILOT

Interlocking unit pavers with voids between them to allow rainwater to pass through.



Voids between pavers allow rainwater to trickle through: Bicentennial Park, Sydney, Australia (Credit: Water Sensitive Urban Design)

Permeable paving treatment used in a parking lot: Sutherland Shire, Sydney, Australia (Credit: Water Sensitive Urban Design)

Benefits

Similar structural properties to conventional unit pavers

Allows stormwater to drain through, reducing runoff into the sewer system

Reduces likelihood of ponding and slick or icy road conditions

Considerations

Not appropriate for use where there is water–sensitive subsurface infrastructure

Not effective at greater than 5% slope

Only certain soil types are appropriate as subbases for infiltration

Permeability can convey harmful chemicals into the soil

Unit pavers can become loose over time and will require regular maintenance

Vegetative growth in voids will occur

May require routine vacuuming of surface to maintain permeability

Application

On a level street above the high water table with low vehicle traffic and few heavy vehicles

Must have adequate subsurface conditions to detain stormwater

Can be used to pave an entire roadway or just the parking lane or gutter strip

Avoid where there is potential for soil contamination

Use of this material generally requires a maintenance agreement

Design

Hard joint sand should be used where vehicles will drive over the pavers

Requires 18– to 36–inch stone infiltration bed with detention system and/or overflow controls, and even distribution of stormwater

Bottom of infiltration bed should be at least 3 feet above high water table and 2 feet above bedrock

Sustainability Opportunities

Supplementary cementitious materials (SCM)

High recycled asphalt (RAP) content

Crosswalks

Crosswalks are delineated areas of the roadbed that indicate where pedestrians are expected to cross and alert drivers to that possibility (see Glossary). In certain instances, crosswalks may have patterns or be constructed from materials that further increase their visibility or add character to a neighborhood. This section is intended to include only surface materials approved for creating distinctive crosswalks. It does not include guidance on using standard thermoplastic markings to designate crosswalks for traffic control purposes. For this information, please refer to the Federal Manual on Uniform Traffic Control Devices.

In addition to the materials listed in this section, all materials listed in the Roadways section may be used in crosswalks as well, according to the application guidance provided.

Granite Pavers

USAGE: OPTIONAL

Stone unit paver known for durability and associated with high–quality traditional streets.

Example of square granite pavers in a crosswalk: 48th Avenue at Center Boulevard, Queens

Long granite pavers set in poured concrete: West Side Highway, Manhattan

Benefits

Visually enhances crosswalk

Considerations

Due to the possibility of pavers cracking or becoming uneven, and asphalt shoving at the borders, application requires attentive maintenance

Application

Crosswalks on historic streets or where distinction is desired and there are low volumes of heavy vehicle traffic

Should not be used where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

Crosswalks generally should comply with MUTCD standards

Paver size: minimum 4 inches for shortest dimension, maximum 30 inches for longest dimension, minimum 5–inches thickness for vehicular roadbed

Pavers that have a ratio of length to width greater than 2:1 should only be used when set in poured concrete because of the likelihood of breakage under heavy–vehicle traffic

Granite must have a textured surface that provides sufficient slip resistance to meet a minimum 0.60 coefficient of friction when wet

Specification source: NYC DOT Standard Specifications section 6.04

Sustainability Opportunities

Salvaged pavers

Thermoplastic Imprinting

USAGE: OPTIONAL

Thermoplastics applied into grooves created by heating and imprinting the asphalt.

Decorative thermoplastic imprinting: Ocean City, NJ (Credit: Integrated Paving Concepts)

Close–up of thermoplastic imprinting: Seattle, WA (Credit: Integrated Paving Concepts)

Benefits

Visually enhances crosswalk

Preserves existing asphalt surface

Because the thermoplastics are imprinted below the level of the road surface, the application will not begin to wear until about ¼ inch of the asphalt has been worn away, resulting in a longer lifespan than typical thermoplastic crosswalks markings

Considerations

As in any other application, thermoplastics will wear the most at the points of greatest abrasion from vehicle tires and may need to be touched–up or re–applied within 5 to 10 years

Application

Thermoplastic imprinting can be used on any crosswalk on an asphalt roadbed

Avoid where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement.

Design

Crosswalks generally should comply with MUTCD standards

Color and pattern can be customized

Specification source: NYC DOT Standard Specifications section 6.45 A

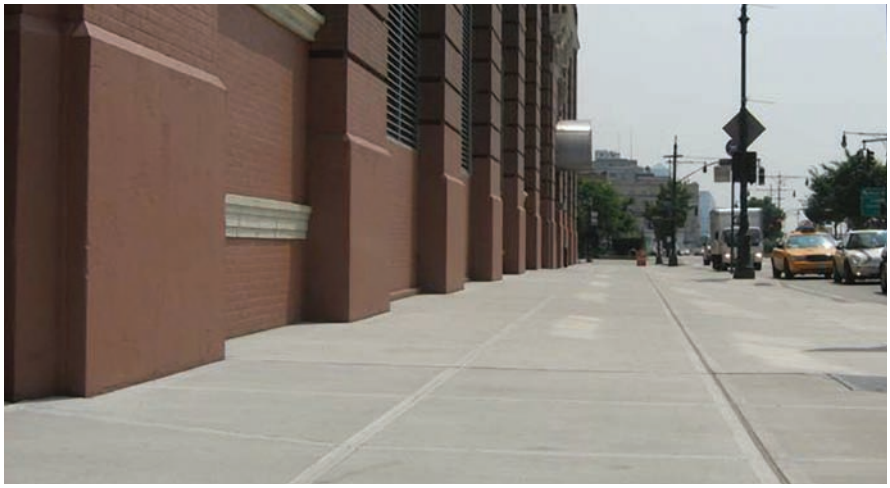
Sidewalks

Sidewalks are paths for pedestrians alongside a road (see Glossary). The primary function of a sidewalk is to provide pedestrian movement and access to buildings and lots, parks, and other destinations. However, sidewalks also function as a site for loading and unloading vehicles, as public meeting and gathering spaces, as a place for outdoor dining, a venue for commerce or expression, and sometimes as an opportunity to beautify the streetscape with natural vegetation. Sidewalks require pedestrian ramps with detectable warning strips at all crossings, as described in the ADA Standards for Accessible Design.

Untinted Concrete

USAGE: STANDARD

Mixture comprised of cement(s), aggregate(s), water, and other chemical admixtures, smoothed and then allowed to harden, forming a solid sidewalk surface.



Typical concrete sidewalk: West Street at 16th Street, Manhattan

Concrete ribbon sidewalk: Rockaway Beach Boulevard, Queens

Benefits

Provides durable and frictionally excellent sidewalk surface

This material is widely available and cost effective

Considerations

Difficult to patch in sections where utility cuts or defects occur

Application

Appropriate for sidewalks on all non–commercial and non–historic streets and select commercial streets unless otherwise specified

Other options should be evaluated where frequent utility cuts are likely

Adjacent property owners are generally responsible for maintaining this material

Design

Flag size: 5 feet by 5 feet

Joint: "tooled joint" or simulated saw–cut joint scoring patterns

Typically requires 6–inch gravel base

May require metal reinforcement bars as specified by NYC DOT

Specification source: NYC DOT Standard Specifications sections 2.02, 2.15, 2.22, 3.05, 4.13

Detail source: NYC DOT Standard Details drawing# H–1045

Sustainability Opportunities

Supplementary cementitious materials (SCM)

Tinted Concrete

USAGE: STANDARD*/HISTORIC

Same mixture as untinted concrete, but with a pigment. Also used in historic districts to simulate historic pavers that cannot be replaced in kind, as per LPC guidelines.

** Pending regulatory change, this material may be standard only for commercial districts C4–4 through C4–7, C5 and C6, as defined in the Zoning Resolution of the City of New York.*

Typical tinted concrete sidewalk with simulated saw–cut joint scoring: Broadway at Exchange Place, Manhattan

Bluestone pavers shown in the foreground, with tinted concrete to simulate the historic pavers shown in the background: Hudson Street at Christopher Street, Manhattan

Benefits

See benefits of UNTINTED CONCRETE (3.3.1)

Dark tinting visually enhances sidewalk and emphasizes urban character in areas with greatest commercial and retail density

Reinforces historic character (if applicable)

Scored joints provide cleaner look, simulating individually hewn blocks of stone.

Considerations

See considerations for UNTINTED CONCRETE

Application

Standard in commercial districts C4–4 through C4–7, C5 and C6, as defined in the Zoning Resolution of the City of New York

Required in historic districts when bluestone or granite is being replaced, as per LPC guidelines

Adjacent property owners are generally responsible for maintaining this material

Design in Commercial Districts

Flag size: 5 feet by 5 feet

Pigmenting: 3% Light Grey Portland Cement

Joint: simulated saw–cut joint scoring

Typically requires 6–inch gravel base

May require metal reinforcement bars as specified by NYC DOT

Specification source: NYC DOT Standard Specifications section 4.13

Design In Historic Districts

Flag size and pigmenting to match existing pavers as per LPC guidelines

Joint: "tooled joint" scoring

Typically requires 6–inch gravel base

May require metal reinforcement bars as specified by NYC DOT

Specifications and standard details available in the LPC guidelines

Sustainability Opportunities

See sustainability opportunities for UNTINTED CONCRETE

Tinted Concrete with Exposed Light–Colored Aggregate

USAGE: OPTIONAL

Same mixture as tinted concrete, but with addition of exposed light–colored pebble–sized aggregate. Joints are scored to simulate saw–cutting.

Tinted concrete sidewalk with light–colored exposed aggregate (note: this example does not include the required "simulated saw–cut joint" scoring pattern): 42nd Street at Grand Central Terminal, Manhattan

Benefits

See benefits of TINTED CONCRETE (3.3.1a)

Exposed aggregate creates a texture and more natural appearance

Exposed aggregate camouflages dirt and gum

Considerations

See considerations for TINTED CONCRETE

Application

This material is recommended for commercial areas with high foot traffic

Because this is an optional sidewalk treatment, it is best used when applied to entire blocks, rather than to the sidewalks of individual small properties which would create a "patchwork" effect

Adjacent property owners are generally responsible for maintaining this material

Design

See design guidance for TINTED CONCRETE

Aggregate: pebble–sized, light in color

Aggregate specification source: NYC DOT Standard Specifications section 4.13 E, item numbers 4.13 EAGG (for four–inch sidewalk), 4.13 EBGG (for seven–inch sidewalk)

Sustainability Opportunities

See sustainability opportunities for TINTED CONCRETE

Tinted Concrete with Silicon Carbide Treatment

USAGE: OPTIONAL

Same mixture as tinted concrete, but treated with silicon carbide to add sparkle.

Tinted concrete sidewalk with silicon carbide treatment, shown with non–standard flag size: San Francisco, CA (Credit: Flickr user "Caribb")

Benefits

See benefits of TINTED CONCRETE (3.3.1a)

Sparkle adds distinction and visual enhancement to tinted concrete

Increases slip resistance of surface

Considerations

See considerations for TINTED CONCRETE

Application

This material is appropriate for sidewalks in commercial districts

Because this is an optional sidewalk treatment, it is best used when applied to entire blocks, rather than to the sidewalks of individual small properties which would create a "patchwork" effect

Adjacent property owners are generally responsible for maintaining this material

Design

See design guidance for TINTED CONCRETE

Silicon carbide specification source: NYC DOT Standard Specifications section 4.13

Sustainability Opportunities

See sustainability opportunities for TINTED CONCRETE

Sand–Colored Concrete with Exposed Aggregate

USAGE: OPTIONAL

Same mixture as tinted concrete, but sand–colored, and with multi–colored pebble–sized exposed aggregate.

Sand–colored concrete sidewalk with exposed aggregate: Prospect Park West, Brooklyn

Benefits

See benefits of TINTED CONCRETE WITH EXPOSED LIGHT–COLORED AGGREGATE (3.3.1b)

Sand color reinforces natural character of open spaces

Considerations

See considerations for TINTED CONCRETE WITH EXPOSED LIGHT–COLORED AGGREGATE

Application

This material is appropriate for sidewalks adjacent to waterfronts and open spaces

Because this is an optional sidewalk treatment, it is best used when applied to entire blocks, rather than to the sidewalks of individual small properties which would create a "patchwork" effect

Adjacent property owners are generally responsible for maintaining this material

Design

See design guidance for TINTED CONCRETE WITH EXPOSED LIGHT–COLORED AGGREGATE

Pigmenting: sand–colored

Aggregate: pebble–sized, mixed–color river rock

Specification source: NYC DOT Standard Specifications section 4.13 ESA (for four–inch sidewalks), 4.13 ESB (for seven–inch sidewalks)

Sustainability Opportunities

See sustainability opportunities for TINTED CONCRETE WITH EXPOSED LIGHT–COLORED AGGREGATE

Porous Concrete

USAGE: PILOT

Concrete mixture using minimal cementitious materials to coat the aggregate, and using little or no sand, leaving substantial void content through which water can drain.

Porous concrete lets water permeate down to the subsurface soil

Benefits

See benefits of UNTINTED CONCRETE (3.3.1)

Allows stormwater to drain through to soil, reducing runoff into the sewer system

May reduce likelihood of ponding and slick or icy sidewalk conditions

May be less prone to cracking in winter than conventional concrete

Considerations

See considerations for UNTINTED CONCRETE

Not appropriate for use where there is water–sensitive subsurface infrastructure

Not effective at greater than 5% slope

Only certain soil types are appropriate as subbases for infiltration

Porosity can convey harmful chemicals into the soil

May require routine vacuuming of surface to maintain porosity

Application

On a level street above the high water table with low pedestrian traffic and no vehicular encroachment

Must have adequate subsurface conditions to detain stormwater

Can be used to pave an entire sidewalk, or just over the trench of CONNECTED TREE PITS (2.4.1b)

Avoid where there is potential for soil contamination

Should not be used where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

See design guidance for UNTINTED CONCRETE

Requires 18– to 36–inch stone infiltration bed with detention system and/or overflow controls, and even distribution of stormwater

Bottom of infiltration bed should be at least 3 feet above high water table and 2 feet above bedrock

Sustainability Opportunities

See sustainability opportunities for UNTINTED CONCRETE

London Pavers

USAGE: OPTIONAL

Large precast concrete pavers laid in a staggered pattern.

London pavers: Brooklyn Bridge Pedestrian Access Ramp, Manhattan

Benefits

See benefits of UNTINTED CONCRETE (3.3.1)

Reinforces civic character of area

Less expensive than stone paver alternatives

Considerations

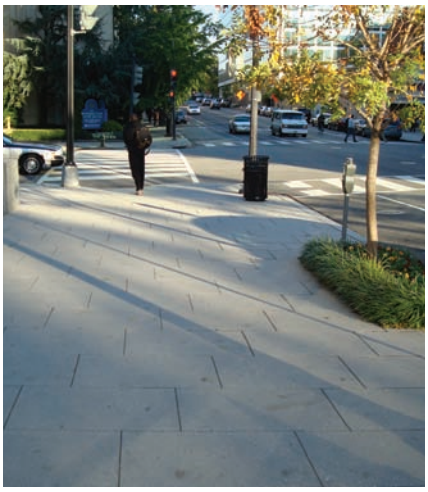
Unit pavers can become loose over time and will require regular maintenance

Application

For sidewalks fronting on city, state or federally–owned buildings and other civic structures such as bridges, courthouses, libraries, and memorials

Because this is an optional sidewalk treatment, it is best used when applied to entire blocks, rather than to the sidewalks of individual small properties which would create a "patchwork" effect

Use of this material generally requires a maintenance agreement



London pavers (note: this example shows a non–standard size): Washington, DC

Design

Paver size: 18 inches by 36 inches

Requires concrete base

Specification source: NYC DOT Standard Specifications section 6.06 LP

Sustainability Opportunities

See sustainability opportunities for UNTINTED CONCRETE

Mastic Asphalt

USAGE: PILOT

Asphalt with high binder content, spread onto a concrete or compacted gravel base.

Paris, France

Paris, France

Benefits

Provides durable and frictionally excellent sidewalk surface

Easier and less expensive to install and replace than concrete

Can be patched in sections

Can be hand–spread without the use of rollers

Can be transported solid and re–melted on site

Considerations

Initial skid resistance is lower until binder film is worn away from surface

Application

Appropriate for areas without existing sidewalks, but not in historic or commercial districts

Use of this material generally requires a maintenance agreement

Design

May require concrete base

Mastic asphalt or stone mastic asphalt (SMA) must have 6–10% binder content

Large coated chippings can be used to increase slip resistance

Sustainability Opportunities

High recycled asphalt (RAP) content

High albedo asphalt

Hexagonal Asphalt Pavers

USAGE: OPTIONAL

Asphalt pre–cast into hexagonally–shaped pavers.

Hexagonal asphalt paver sidewalk: Columbus Avenue at West 66th Street, Manhattan

Benefits

Widely–used paver for New York City public spaces conveys park–like character

Interlocking hexagonal shape fits tightly together and resists shifting and buckling

This material is widely available and cost effective

Dark color hides dirt and stains

Hexagonal pavers are relatively easy to reset or replace, especially for utility access

Asphalt pavers can be recycled

Considerations

Unit pavers can become loose over time and will require regular maintenance

Application

Hexagonal asphalt pavers are appropriate for sidewalks adjacent to parks or plazas.

Use of this material generally requires a maintenance agreement

Design

Paver size: 8 inches between parallel sides

Can be sand–set for easier installation or mortar–set for stronger structural properties

Specification source: NYC DOT Standard Specifications sections 3.04, 6.60

Sustainability Opportunities

High recycled asphalt (RAP) content

Bluestone Flags

USAGE: HISTORIC

Historic stone unit paver with subtle variations in color, grain, and surface.

Bluestone flag sidewalk: Perry Street at Bleecker Street, Manhattan

Benefits

Reinforces historic character

Adds distinction and visual enhancement to sidewalk

Stone conveys connection to natural environment

Considerations

Vulnerable to breakage when driven over by vehicles

Due to the possibility of pavers cracking or becoming uneven, application requires attentive maintenance.

Application

This material is standard in historic districts or other areas with existing bluestone pavers where historic fabric remains intact, as per the LPC guidelines.

Adjacent property owners are generally responsible for maintaining this material in Landmark districts

Design

Bluestone: 2¼–inch thick New York State bluestone, to match size and color of existing flags

Finish: Natural cleft, with variation in smoothness not exceeding ⅛ inch

Joints: Hand–tight

Specification sources: LPC guidelines, NYC DOT Standard Specifications section 6.07

Sustainability Opportunities

Salvaged bluestone

Granite Slabs

USAGE: HISTORIC

Historic stone paver, with varieties of color, texture and veining. Can be cut to extremely large sizes to span underground vaults.

Granite slab sidewalk: Hudson Street at Dominick Street, Manhattan

Benefits

Reinforces historic character

Adds distinction and visual enhancement to sidewalk

Stone conveys connection to natural environment

Considerations

Not intended to support heavy vehicles when spanning underground vaults

Difficult to repair or patch in sections

Application

This material is standard in historic districts or other areas with existing granite pavers where historic fabric remains intact, as per the LPC guidelines

Adjacent property owners are generally responsible for maintaining this material in Landmark districts

Design

Granite: to match size and color of existing flags, 3–inch minimum thickness

Slip resistance: minimum 0.60 coefficient of friction wet

Specification sources: LPC guidelines, NYC DOT Standard Specifications section 6.04

Sustainability Opportunities

Salvaged granite slabs

Rubber Pavers

USAGE: PILOT

Interlocking sidewalk pavers made of recycled rubber or a rubber/plastic mix.

Rubber sidewalk pavers (credit: Rubbersidewalks®)

Benefits

Easy to install and replace

Pavers can be shaped to avoid trees or other objects

Thinner than traditional sidewalk, allowing more room for roots to grow

Permeability of the joints allows stormwater to filter through to tree roots

Permeability helps to reduce the formation of the condensation commonly seen under traditional concrete flags which promotes the aggressive root growth that tends to cause fracturing and upheaval

Considerations

Semi–permeability generates some stormwater runoff

Unit pavers can become uneven over time and will require regular maintenance

Application

Appropriate for piloting on sidewalks or plazas with low pedestrian traffic where tree roots may cause the fracturing and upheaval of sidewalk paving.

Use of this material generally requires a maintenance agreement

Design

Recycled rubber must be free of high–risk chemicals or otherwise sealed to prevent contamination of soil

Paver size: 2 feet by 2.5 feet

Various colors available

Sustainability Opportunities

Recycled rubber

High SRI value coloring

Sidewalk Furnishing Zones

The furnishing zone is the area of the sidewalk immediately adjacent to the curb where street trees, signs, above–ground utilities, and street furniture are typically located (see Glossary). Furnishing zones provide a physical buffer and a visual transition between the vehicles in the roadbed and the pedestrians on the sidewalk, while also affording a clear area for organizing the various elements of street furniture that might otherwise appear cluttered. This area is generally 5 feet wide, or as wide as the tree pits along the blockface. Eight feet, or one half of the sidewalk width, whichever is greater, must be maintained for unobstructed pedestrian passage. The furnishing zone of any sidewalk with a clear path of less than 8 feet should be built out of the same material as the adjacent sidewalk.

Furnishing zones are most appropriate on streets with at least moderate levels of both pedestrian and vehicle traffic—usually commercial shopping streets. Furnishing zones are best used when applied to entire blocks or a series of blocks comprising a corridor, rather than to sidewalks in front of individual small properties which would create a "patchwork" effect. In addition to the materials listed in this section, all materials listed in the Sidewalks section may be used in furnishing zones as well, according to the application guidance provided.

Granite Block

USAGE: OPTIONAL

Historic smooth–finish granite block unit pavers often referred to as "cobblestones," commonly used throughout New York City in the 19th Century.

Cobblestones used in a furnishing zone: Battery Park City, Manhattan

Benefits

Visually delineates separation of street uses

Stones convey connection to natural environment

Cobblestones are relatively easy to remove and reset, especially for utility access

Considerations

Stones can become loose over time and will require regular maintenance

Can be slippery when wet

Uneven surface can hinder pedestrian and disabled persons' mobility

Application

Can be used on streets where pedestrians will not typically be forced to walk in the furnishing zone

Use of this material generally requires a maintenance agreement

Design

Should be sand–set for easier installation and greater permeability wherever impermeable installation generates stormwater runoff

Can be mortar set for stronger structural properties

The area within 18 inches of the curb should be kept free of obstructions

Specification source: NYC DOT Standard Specifications sections 2.06, 6.06

Sustainability Opportunities

Salvaged cobbles

Permeable installation

Concrete Cobbles

USAGE: OPTIONAL

Precast concrete cobbles designed to simulate granite block pavers.

Concrete cobble (Credit: Cobble Systems®)

Benefits

See benefits of GRANITE PAVERS (3.4.1)

Less expensive than natural stone alternatives

Considerations

See considerations for GRANITE PAVERS

Application

See application guidance for GRANITE PAVERS

Use of this material generally requires a maintenance agreement

Design

See design guidance for GRANITE PAVERS

Specification source: NYC DOT Standard Specifications section 6.06

Sustainability Opportunities

See sustainability opportunities for GRANITE PAVERS

Modular Cobblestones

USAGE: OPTIONAL

A pre–assembled grid of smooth saw–cut finish granite cobbles fastened to a sturdy backing and installed as modular tiles.

Modular cobblestone pedestrian street: Broad Street at Wall Street, Manhattan

Benefits

Easier to install and maintain than traditional cobblestone

Smooth, saw–finish stones do not hinder pedestrian or cyclist mobility

Considerations

Exact lifecycle of product is unknown

Impermeability generates stormwater runoff

Application

This material is appropriate for furnishing zones in high–traffic areas

Consider permeable paving options adjacent to trees and planted areas

Use of this material generally requires a maintenance agreement

Design

Requires concrete base

Various colors and styles available

Specification source: NYC DOT Standard Specifications section 6.06 A

Square Asphalt or Concrete Pavers

USAGE: OPTIONAL

Precast square–shaped asphalt pavers.

Square asphalt pavers in a furnishing zone: Willoughby Street at Duffield Street, Brooklyn

Benefits

This material is widely available and cost effective

Relatively easy to reset or replace, especially for utility access

Asphalt pavers can be recycled

Considerations

Unit pavers can become loose over time and will require regular maintenance

Application

Can be used on streets where pedestrians will not typically be forced to walk in the furnishing zone

Use of this material generally requires a maintenance agreement

Design

Paver size: 8 inches by 8 inches

Should be sand–set for easier installation and greater permeability wherever impermeable installation generates stormwater runoff

Can be mortar set for stronger structural properties

The area within 18 inches of the curb should be kept free of obstructions

Specification source: NYC DOT Standard Specifications section 6.6 A

Sustainability Opportunities

High recycled asphalt (RAP) content

High SRI value coloring

Concrete with Exposed Glass Aggregate

USAGE: OPTIONAL

Select surface aggregates (such as colored glass or decorative pebbles) embedded and fully adhered to concrete, either poured and cast–in–place as traditional concrete sidewalk, or as precast unit pavers.

Poured, cast–in–place concrete with exposed glass aggregate: Brooklyn Plaza, Brooklyn

Benefits

Decorative glass adds distinction and visual enhancement to concrete

Increases slip resistance of surface

As precast pavers, relatively easy to reset or replace, especially for utility access

Considerations

Unit pavers can become loose over time and will require regular maintenance

Application

The material, when poured and cast–in–place, is appropriate for all furnishing zones and plazas

When installed as precast pavers, it can be used on streets where pedestrians will not typically be forced to walk in the furnishing zone

When cast–in–place, should not be used where frequent utility cuts are likely

Use of this material generally requires a maintenance agreement

Design

Slip resistance: minimum 0.60 coefficient of friction wet

Joint: simulated saw–cut joint scoring

Pavers should be sand–set for easier installation and greater permeability wherever impermeable installation generates stormwater runoff

Pavers can be mortar set for stronger structural properties

The area within 18 inches of the curb should be kept free of obstructions

When used as pavers, paver size: 8 inches by 8 inches

When poured, may require metal reinforcement bars as specified by NYC DOT

Unlimited color and aggregate mix options available

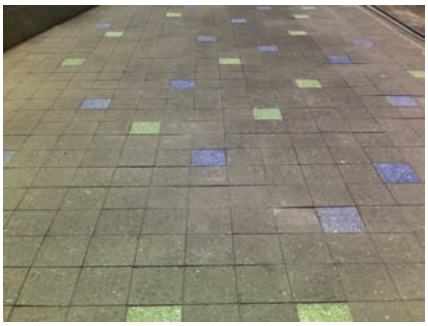
Specification source: NYC DOT Standard Specifications sections 4.13 EG, item numbers 4.13 EGA (for four–inch sidewalks), 4.13 EGB (for seven–inch sidewalks), 6.47 EGA8 (for pavers)

Sustainability Opportunities

Supplementary cementitious materials (SCM)

High SRI value coloring

Recycled glass or reclaimed aggregates



Concrete pavers with exposed blue and green glass aggregate (shown interspersed with black asphalt pavers): Hudson River Park, Manhattan

Curbs

A curb is a step where the roadbed meets the sidewalk or other raised pathway (see Glossary). Curbs serve three functions: a visual and physical limit to the vehicular roadbed; a gutter to convey rainwater and detritus from the roadbed and sidewalks to the catch basins at the ends of the street; and aesthetically, curbs add a finished edge to sidewalks and roadbeds. Sidewalks require pedestrian ramps with detectable warning strips at all crossings as described in the ADA Standards for Accessible Design.

Untinted Concrete

USAGE: STANDARD

Mixture comprised of cement(s), aggregate(s), water, and other chemical admixtures, smoothed and then allowed to harden, forming a solid curb.

Typical concrete curb: Beach 73rd Street, Queens

Typical untinted concrete curb with steel facing: West 114th Street and Morningside Avenue, Manhattan

Benefits

This material is widely available and cost effective

Can easily be cast on site to fit curved sidewalk profiles

Cast–in–place curbs are more resistant to displacement than stone alternatives

Considerations

Vulnerable to breakage if repeatedly mounted by heavy vehicles

Application

This material is standard for any street with untinted concrete sidewalks

This material is generally maintained by NYC DOT

Design

Size: 6 inches wide on top, 8 inches wide on bottom, 18 inches deep

Expansion joints of curb should line up with expansion joints of sidewalk

Steel facing should be used on streets where repeated mounting by heavy vehicles may cause damage.

May require metal reinforcement bars as specified by NYC DOT

Specification source: NYC DOT Standard Specifications section 4.08, 3.05

Steel–faced specification source: NYC DOT Standard Specifications section 2.13, 3.05, 4.09

Detail source: NYC DOT Standard Details drawing# H–1044

Steel–faced detail source: NYC DOT Standard Details drawing# H–1010

Sustainability Opportunities

Supplementary cementitious materials (SCM)

Salvaged or recycled steel facing

Tinted Concrete

USAGE: STANDARD

Same mixture as untinted concrete, but with a pigmented admixture to produce a color equivalent to the standards of the LPC.

Typical tinted concrete curb with steel facing: Beaver Street at Hanover Street, Manhattan

Benefits

See benefits of UNTINTED CONCRETE (3.5.1)

Considerations

See considerations for UNTINTED CONCRETE

Application

This material is standard for any street with tinted concrete sidewalks.

This material is generally maintained by NYC DOT

Design

See design guidance for UNTINTED CONCRETE

Pigmenting: 3% Light Grey Portland Cement

Pigmenting specification source: NYC DOT Standard Specifications section 2.19

Sustainability Opportunities

See sustainability opportunities for UNTINTED CONCRETE

Integral Concrete Curb and Gutter

USAGE: OPTIONAL

Concrete curb and gutter precast as single pieces and laid in sections.

Precast concrete curb and gutter sections laid end–to–end. Photo shows optional sidewalk extension in background: Miami Beach, FL

Benefits

Easier to install and maintain than cast–in–place alternatives

Can be removed and replaced as needed

Considerations

See considerations for UNTINTED CONCRETE (3.5.1)

Application

Appropriate for residential areas with low volumes of heavy vehicles

Use of this material may require a maintenance agreement

Design

Specification source: NYC DOT Standard Specifications section 4.08 CG

Sustainability Opportunities

See sustainability opportunities for UNTINTED CONCRETE

Use of porous concrete where possible

Granite

USAGE: OPTIONAL/HISTORIC

Granite cut to long sections and laid as curbing. Saw–finishing, achieved by cutting the granite with a stone saw and polishing out saw marks, provides a smooth, clean look. Split finishing, typically achieved by hand–chiseling, exposes the natural cleft of the stone, giving a rough–hewn texture.

Split–finish granite curb shown with concrete sidewalk: Houston Street at LaGuardia Place, Manhattan

Saw–finish granite curb shown with historic bluestone sidewalk: Madison Avenue at East 51st Street, Manhattan

Benefits

Reinforces historic character (if applicable)

Adds distinction and visual enhancement to sidewalk

Stone conveys connection to natural environment

Extremely durable and low–maintenance, resists cracking and discoloration

Can be removed and replaced as needed

Considerations

Difficult to patch and must therefore be replaced by section if severely damaged

Much higher material cost than concrete

Application

This material is appropriate for all streets, especially commercial districts, including use in combination with concrete sidewalk

Granite curb should be used in historic districts or areas with existing granite curb where the historic fabric remains intact

This material is generally maintained by NYC DOT

Design

Size: 5 inches to 8 inches wide on top, 3 inches of minimum width on bottom, 16 inches deep

Must have lip with batter and rounded edge

Slip resistance at top of curb: minimum 0.60 coefficient of friction when wet

Specification source: NYC DOT Standard Specifications section 2.12, 4.07

Saw–finish curb detail source: NYC DOT Standard Detail drawing# H–1056

Split–finish curb detail source: NYC DOT Standard Detail drawing# H–1056A

Sustainability Opportunities

Salvaged granite curb

Plazas

A plaza is a public space in the city that provides a place for people to enjoy the public realm (see Glossary). Unlike a sidewalk, a plaza is a destination rather than a space to pass through.

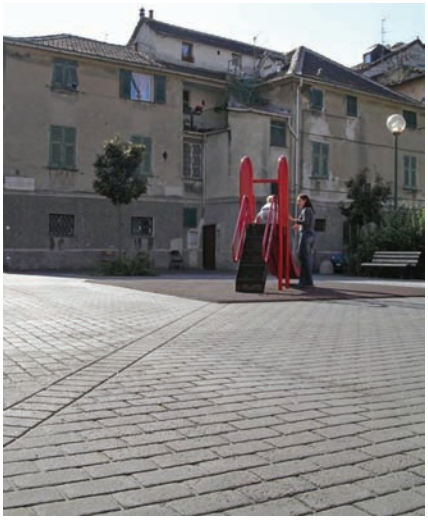
In addition to the materials listed in this section, all materials listed in the Sidewalks section and the Sidewalk Furnishing Zones section may be used in plazas as well, according to the application guidance provided.

Imprinted Asphalt

USAGE: OPTIONAL

Machine–heated asphalt, imprinted with pattern templates and colored with protective coating.

Imprinted asphalt in a plaza: Drumgoole Plaza (Gold Street at Frankfort Street), Manhattan



Imprinted asphalt in a plaza: Genova, Italy (Credit: Integrated Paving Concepts®)

Benefits

Visually defines pedestrian or non–vehicle areas

Can be installed on existing asphalt that is in good condition

More cost–effective than unit pavers

Easier to maintain than unit pavers

Application

Appropriate for plazas where traditional unit pavers are desired, but asphalt road surface must be preserved, or where cost or maintenance considerations prohibit unit pavers

Use of this material generally requires a maintenance agreement

Design

Can be installed on existing asphalt that is in good condition

Various patterns and colors available

Specification source: NYC DOT Standard Specifications section 6.45B

Sustainability Opportunities

High recycled asphalt (RAP) content

High SRI value coloring

Hexagonal Concrete Pavers

USAGE: OPTIONAL

Concrete precast into hexagonally shaped pavers.

Hexagonal concrete pavers in a privately owned plaza: White Street at Broadway, Manhattan

Benefits

Interlocking hexagonal shapes fit tightly together and resist shifting and buckling

Hexagonal pavers are relatively easy to reset or replace, especially for utility access

Considerations

Unit pavers can become loose over time and will require regular maintenance

Application

This material is appropriate for all plazas

Use of this material generally requires a maintenance agreement

Design

Paver size: 16 inches between parallel sides

Specification source: NYC DOT Standard Specifications 6.47 ER

Sustainability Opportunities

Supplementary cementitious materials (SCM)

Decorative Gravel

USAGE: OPTIONAL

Small size decorative gravel or aggregate spread on top of a sturdy earthen or cementitious base.

Decorative gravel seating area: Bryant Park, Manhattan

Benefits

Adds visual enhancement

Stones convey connection to natural environment

Highly slip–resistant

Considerations

Can be difficult to remove litter from gravel

Snow cannot be plowed or shoveled from surface

Gravel must be replenished every few years

Impermeable installation generates stormwater runoff

Application

Decorative gravel can be used in low pedestrian traffic areas interior to public spaces

Use of this material generally requires a maintenance agreement

Design

Surface must be level and include a flush border of edging material to contain the gravel

Should be sited at the interior of plazas, not in pedestrian pathways

Various colors and aggregate styles available

Specification source: NYC DOT Standard Specifications section 6.04DG

Sustainability Opportunities

Permeable installation

Reclaimed gravel

Resin–Bound Gravel

USAGE: OPTIONAL

Colored gravel that is scattered across an existing solid surface and epoxied by means of a transparent or colored resin.

Resin–bound gravel treatment applied to existing asphalt roadway to create a temporary pedestrian plaza: 9th Avenue at West 14th Street, Manhattan

Benefits

See benefits of DECORATIVE GRAVEL (3.6.3)

Extremely slip resistant

More cost–effective than loose gravel

Easier to maintain than loose gravel

Considerations

Difficult to replace or patch in sections where utility cuts or defects occur

Impermeability generates stormwater runoff

Application

Resin–bound gravel can be used in temporary plazas and pedestrian spaces built on top of the existing roadbed (to be replaced with permanent materials at a later date), or where decorative gravel is desired but asphalt road surface must be preserved

This material is not recommended for long–term applications, especially where there are sub–surface utilities because of difficulty patching

Use of this material generally requires a maintenance agreement

Design

Various colors available

Specification source: NYC DOT Standard Specifications section 6.04RG

Sustainability Opportunities

Reclaimed gravel

4 Lighting

4.0 Introduction 151

4.1 Street Lighting 154
4.1.1 Cobra Head 155
4.1.2 Stad 157
4.1.3 Fulton 159
4.1.4 Alliance 160
4.1.5 Helm 161
4.1.6 Flatbush Avenue 163
4.1.7 TBTA 164
4.1.8 Type M 166
4.1.9 Type F 167
4.1.10 Bishops Crook 168
4.1.11 Blank Page 169
4.1.12 City Light 170
4.1.12 Blank Page 171
4.1.13 LED Type E 172

4.2 Pedestrian Lighting 173
4.2.1 Cobra Head 174
4.2.2 Stad 175
4.2.3 Fulton 176
4.2.4 Flushing Meadows 177
4.2.5 Type B 178
4.2.6 World's Fair 179
4.2.7 TBTA 180
4.2.8 Round Top Head 181
4.2.9 LED Post Top 182
4.2.11 Blank Page 183
4.2.12 Blank Page 184

4.3 Traffic Signal Poles 185
4.3.1 Type M–2 Traffic Signal Pole 186
4.3.2 Alliance Traffic Signal Pole 188

4.1 DOT–ApprovedStreet–Lighting Combinations

Luminaires	Standard Poles			Optional Poles					Historic Poles		
	Davit	Octagonal	Round	Flatbush	Alliance	TBTA	WM	Fulton	Type M	Type F	Bishops Crook
Cobra Head	●	●	●				●				
Stad	●	●	●	●		●	●				
Fulton								●			
Alliance					●						
Helm	●	●	●	●		●	●				
Teardrop				●		●			●	●	●
Shielded Teardrop						●					

● This combination of an optional pole with the Teardrop or Shielded Teardrop luminaire creates a historic light

4.2 DOT–Approved Pedestrian–Lighting Combinations

Luminaires	Standard Poles			Optional Poles			Historic Poles	
	Davit	Octagonal	Round	TBTA	Fulton	Flushing Meadows	Type B	World's Fair
Cobra Head	●	●	●					
Stad	●	●	●	●				
Fulton					●			
Flushing Meadows						●		
Helm	●	●	●	●				
Teardrop				●				
Shielded Teardrop				●				
Type B							●	
World's Fair								●

● This combination of an optional pole with the Teardrop or Shielded Teardrop luminaire creates a historic light

Introduction

About this Chapter

This chapter outlines options for both new and replacement street lighting for use on New York City streets. Included are those fixtures that meet NYC DOT engineering standards, as well as technical requirements for safety and energy efficiency and for use in a variety of contexts.

Selection Criteria

Fixture types (luminaires) are categorized as Standard, Optional, Historic, and Pilot fixture types for both Street Lights and Pedestrian Lights (see detailed descriptions of these usage categories below). Only the fixtures that are described in the Standard category will be provided and maintained by NYC DOT. All other fixtures must be separately funded; and under certain conditions, will be maintained by NYC DOT. Where energy consumption and quantity of fixtures exceeds NYC DOT "Standard," a separate maintenance agreement will be required.

o Luminaires & Poles

The selection of lighting includes the specification of both a pole and luminaire. The desired aesthetic and engineering outcomes can be achieved by combining luminaires with different poles. Acceptable combinations are described in this chapter.

o Energy Guidelines

To comply with current citywide energy guidelines, most of the fixtures are available with 150W (watt) and 100W high pressure sodium (HPS) lamps. Energy costs that exceed the 150W standard and 100W standard must be separately funded. NYC DOT engineers will determine where the use of 150W or 100W is appropriate for the particular application.

o Engineering Review

In all cases, the suitability of the fixture type for particular street and lighting conditions must be approved by NYC DOT engineers.

Usage Categories

Standard

These luminaire and pole types will be provided and maintained by NYC DOT. The current standard luminaires for New York City streets are the 100W and 150W Cobra Head (for street lighting) and the 70W and 100W Cobra Head (for pedestrian lighting). For street lighting and pedestrian lighting, the standard pole types are the Davit, Round, and Octagonal poles. The M–2 Traffic Signal Pole is standard for use at all traffic signal locations.

Optional

These luminaires and poles require additional funding for the initial cost of the fixtures. In an effort to reduce carbon emissions citywide, the additional energy costs above the 150W (for street lighting) or 70W and 100W (for pedestrian lighting) standards will also require additional funding for all projects authorized after December 31, 2008.

Historic

Historic fixtures are intended for use in Landmark districts that are designated by the New York City Landmark Preservation Commission (LPC) or for neighborhoods that have substantial historic fabric intact. They will require special approval by NYC DOT and the Design Commission (DC) for use in other areas.

Most historic poles are currently used with only one luminaire, the 250W or 150W teardrop. Until alternate historic luminaires of lower wattage are available that meet NYC DOT technical requirements, this is the only option available.

Pilot

These luminaires are not yet approved for use in New York City. Many of them are currently or soon to be tested. They will require NYC DOT approval prior to specification for any project.

Specifications

For design criteria, technical information, finishes, and color specification, refer to *Bureau of Traffic Division of Streetlighting* Specifications. The latest edition is available from the NYC Department of Transportation.

Cutoff

Outdoor luminaires may be categorized according to the four classifications established by the IESNA of full cutoff, cutoff, semi–cutoff, and non–cutoff to distinguish the range in quantity of upward light and light above a horizontal plane emitted by a light source.

- **Full cutoff**: Full cutoff fixtures do not emit any upward light (at or above 90 degrees) and up to 10% of their light at or above 80 degrees. They create the narrowest spread of light.
- **Cutoff**: Cutoff fixtures emit up to 2.5% of their light upward (at or above 90 degrees) and up to 10% of their light at or above 80 degrees. They create a slightly wider spread of light.
- **Semi Cutoff**: Semi–cutoff fixtures emit up to 5% of their light upward (at or above 90 degrees), and up to 20% of their light at or above 80 degrees. They create a wider spread of light.
- **Non Cutoff**: Non–cutoff fixtures emit light in all directions. They create the widest spread of light.

Spacing/Typical

X:Y: The spacing of streetlights is dependant on several factors, including the height of the pole, street width, the amount of light the fixture provides, and the lighting levels necessary for the particular street classification. The information provided in this chapter is intended as a guideline to indicate that additional poles and/or fixtures may be required in the selection of certain luminaires.

The spacing between poles is described as a ratio in comparison to the Standard luminaire and pole (SLP), which is currently the Cobra Head luminaire on a round, octagonal, or davit pole. A ratio of 1:1 indicates that an equal number of poles and luminaires would be required for replacement. A ratio of ½:1 indicates twice as many luminaires and poles would be required to achieve similar lighting levels as the SLP.

Lighting Levels

Lighting levels are based on the guidelines established by the IESNA. All lighting designs must be reviewed and approved by NYC DOT engineers.

Notes and Symbols

HPS	High Pressure Sodium
LED	Light Emitting Diode
HDG	Hot Dipped Galvanized Steel
SLP	Standard Luminaire and Pole (cobra head on round, octagonal, or davit pole)
IESNA	Illuminating Engineering Society of North America
IES Type	Pattern of light distribution defined by the Illuminating Engineering Society.
W	Watts
$	Costs: Shown for each luminaire as a "$" symbol, representing relative costs compared to the Standard Luminaire and Pole (SLP). Because actual costs are subject to change, a scale of one to five $ symbols is used rather than specific monetary amounts.

Street Lighting

Cobra Head

USAGE: STANDARD

The Cobra Head luminaire was originally introduced by the Westinghouse and General Electric companies in 1957 to accompany an aluminum post designed in 1958 by Donald Deskey and first installed in 1963. Additional poles were later introduced to support the Cobra Head luminaire: the Octagonal, Round, and Davit. The 100W and 150W Cobra Head luminaire are the current standard for New York City streets.

Applications

Streets or highways

Single or twin mounting

Lamping/Optics

100W HPS, 150W HPS

Medium Semi–Cutoff, IES Type 1 (100W HPS)

IES Type II (150W HPS)

Material/Color

H.D.G. Steel/silver (street)

Aluminum/silver (highway)

Cost Compared to SLP

Cobra Head is the SLP

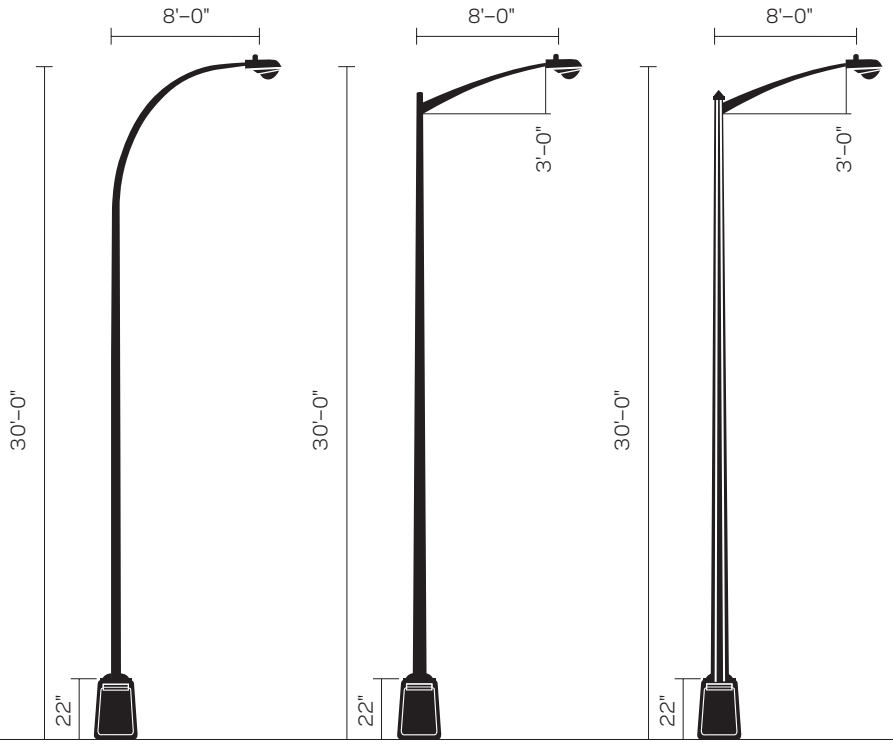
Spacing/Typical

1: 1

Cobra Head luminaire and octagonal pole: Pearl Street, Manhattan

Cobra Head with Standard Poles

Poles shown here are the standard poles provided, tested, and maintained by NYC DOT.



Stad

USAGE: OPTIONAL

The Stad luminaire was introduced on the Robert F. Kennedy Bridge (formerly the Triboro Bridge). The design of the luminaire provides a contemporary option to the standard Cobra Head at an additional cost.

Applications

Commercial districts

Single or twin mounting

Lamping/Optics

100W HPS or 150W HPS

Cutoff or Semi–Cutoff, IES Type II or III

Material/Color

Aluminum/silver, black and green

Cost Compared to SLP

$$$$

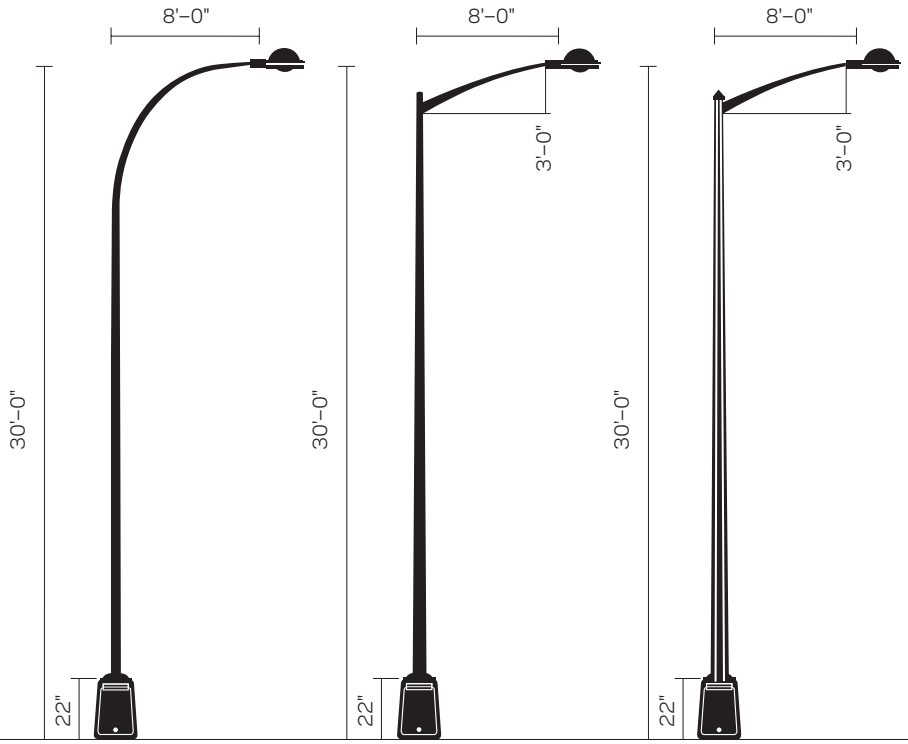
Spacing/Typical

1: 1

Stad luminaire TBTA pole: Robert F. Kennedy Bridge, Manhattan

Stad with Standard Poles

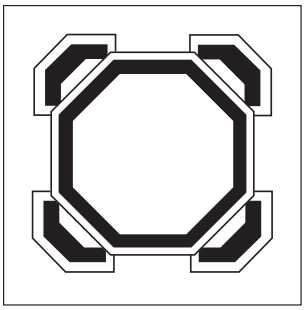
Standard poles are provided and maintained by NYC DOT.



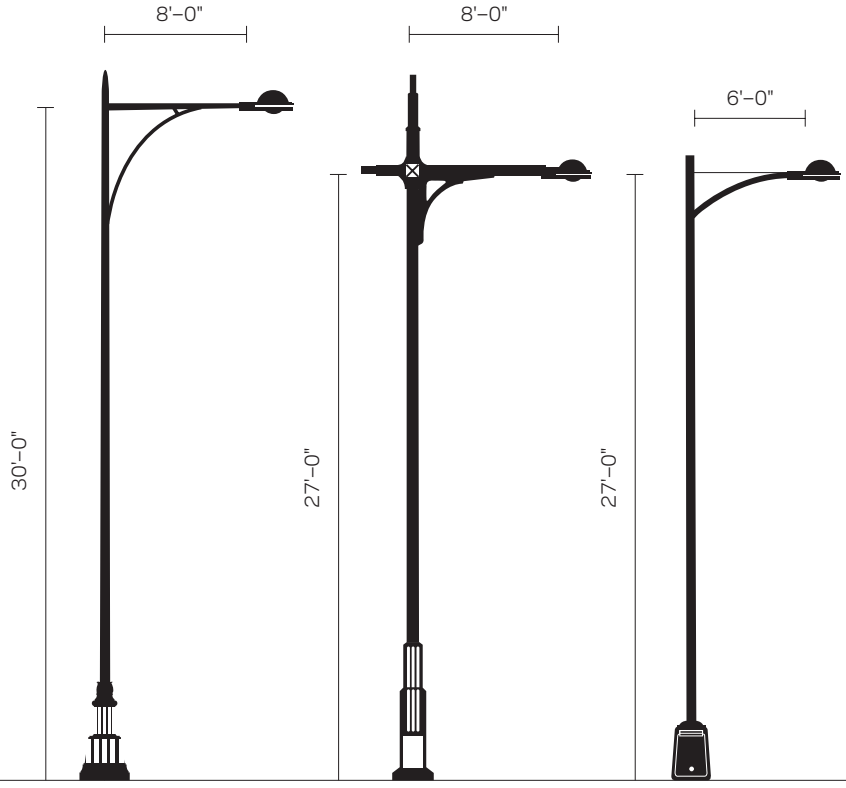
Davit Round Octagonal

Stad with Optional Poles

Optional poles require additional funding.



Plan view, WM only



Flatbush Avenue TBTA WM Pole

Fulton

USAGE: OPTIONAL

The Fulton luminaire was selected for installation on the Fulton Street Mall in fall 2008. The design of the luminaire provides a contemporary option to the standard Cobra Head at an additional cost.

Applications

Commercial districts

Roadway width of 36 feet or less

Lamping/Optics

100W HPS or 150W HPS

Cutoff, IES Type II or III

Material/Color

Aluminum/silver

Cost Compared to Standard Light

$$$$

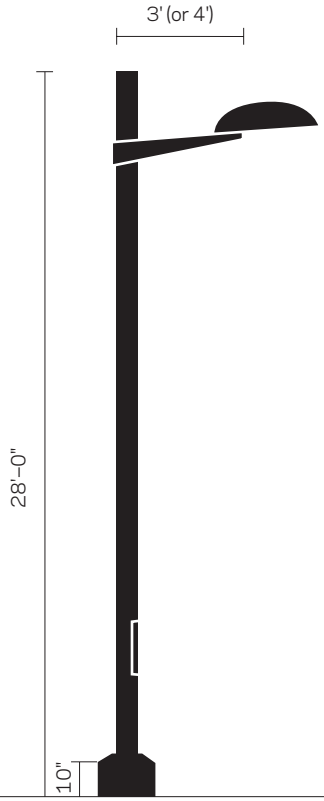
Spacing/Typical

¾: 1

Fulton luminaire and pole (Credit: Hess America)

Fulton luminaire and pole (Credit: Hess America)

Fulton Luminaire and Pole
No standard NYC DOT pole options.



Fulton Head

Alliance

USAGE: OPTIONAL

The Alliance luminaire was originally introduced in the Lower Manhattan historic financial district by the Downtown Alliance business improvement district. The design of the luminaire provides a contemporary option to the standard Cobra Head at an additional cost.

Applications

Commercial districts

Roadways with width of 36 ft or more

Lamping/Optics

100W HPS, 150W HPS

Cutoff, or semi–cutoff, IES Type II or III

Material/Color

Steel/silver and black

Cost Compared to SLP

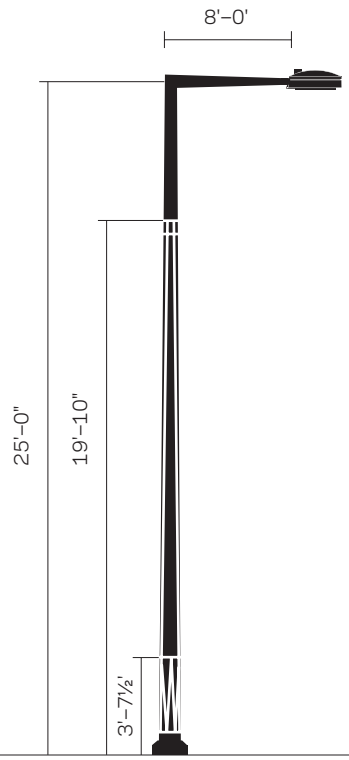
$$$$$

Spacing/Typical

⅔: 1

Alliance luminaire and pole: Murray Street, Manhattan

Alliance Luminaire and Pole
No standard NYC DOT pole options.



Alliance

Helm

USAGE: OPTIONAL

The Helm luminaire was piloted by NYC DOT on Queens Boulevard in 2008. The design of the luminaire provides a contemporary option in place of the standard Cobra Head at an additional cost.

Applications

Commercial districts

Lamping/Optics

100W HPS or 150W HPS

Curved sag glass optics

Cuttoff, or semi–cutoff, IES Type II or III

Material/Color

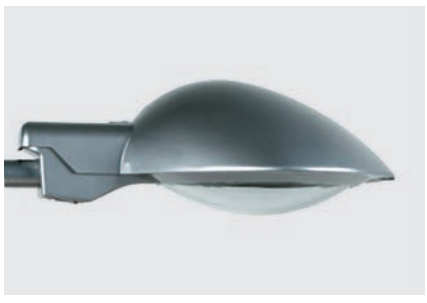
Aluminum/silver, black, brown and green

Cost Compared to SLP

$$$$$

Spacing/Typical

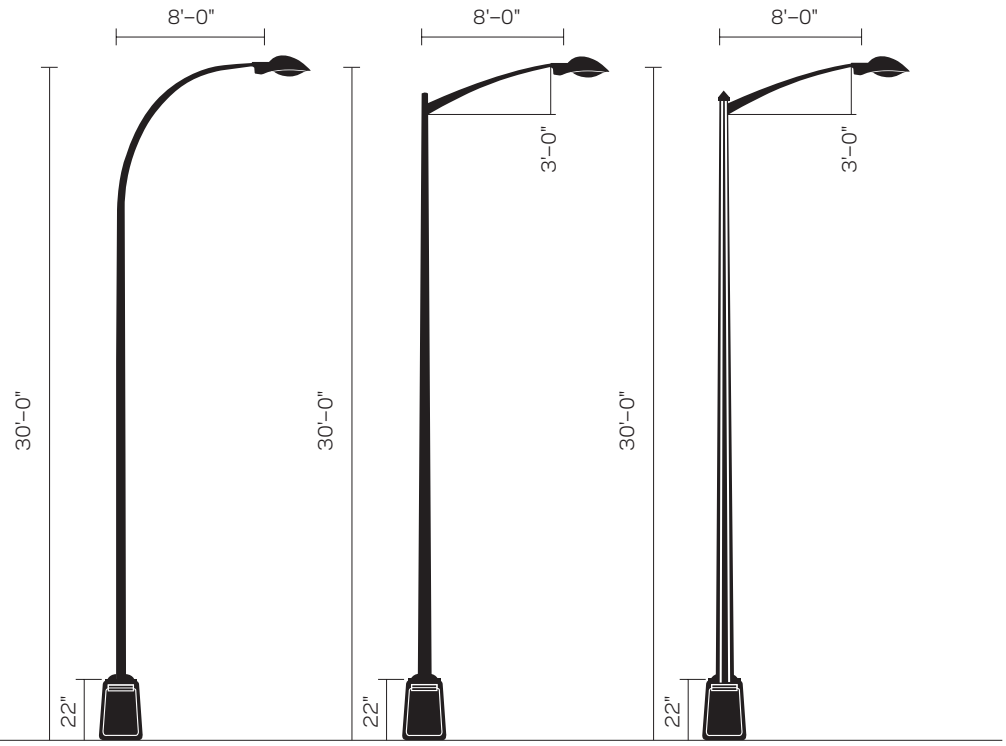
⅔: 1



Helm luminaire and WM pole: 39th Street, Queens

Helm with Standard Poles

Standard poles are provided and maintained by NYC DOT.



Davit Round Octagonal

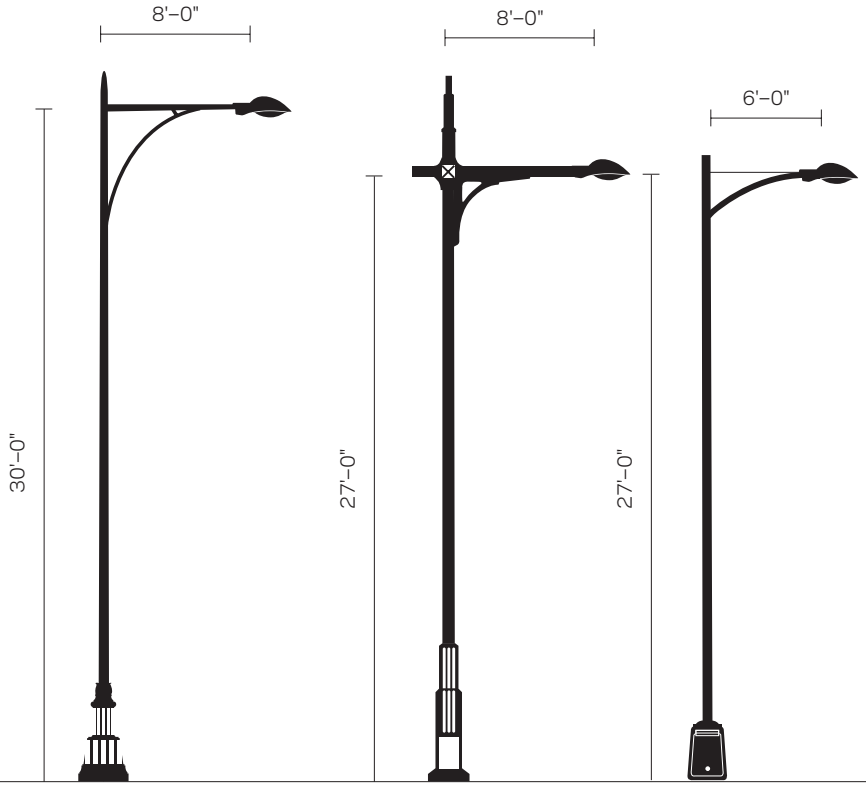
Helm with Optional Poles

Optional poles require additional funding.

Arms

Type 1 for WM Pole

Type 2 for WM Pole



Flatbush Avenue TBTA WM Pole

Flatbush Avenue

USAGE: OPTIONAL

The Flatbush Avenue pole was installed in 1988 by the Economic Development Corporation on Flatbush Avenue in Brooklyn. The Flatbush Avenue pole can support both historic and optional luminaires.

Applications

Commercial and residential streets

Streets with roadway width of 36 feet or more

Single or twin mounting (center medians)

Lamping/Optics

Teardrop: Non–Cutoff, IES Type III or V (250W HPS)

Shielded Teardrop: Cutoff, IES Type III or V (250W HPS)

Stad or Helm: Cutoff or Semi–Cutoff, IES Type II or III (150W HPS)

Material/Color

Fabricated steel pole/black, brown, and green

Cost Compared to SLP

$$

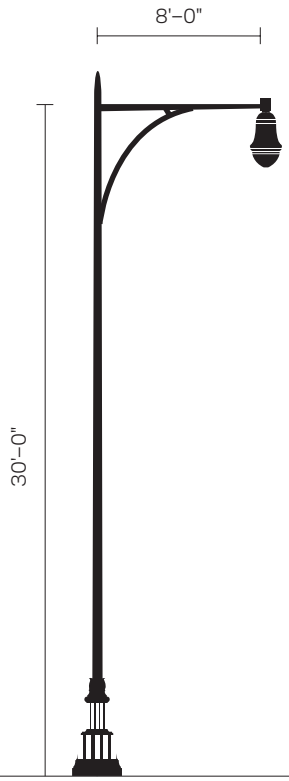
Spacing/Typical

Teardrop or Shield Teardrop: ⅔: 1

Stad: 1:1

Historic Teardrop luminaire and Flatbush pole: 49th Street, Queens

Historic Luminaire with Flatbush Avenue Pole



TBTA

USAGE: OPTIONAL

The TBTA (Triboro Bridge Tunnel Authority) was introduced in the 1950s and '60s for mid–twentieth–century bridge construction projects such as the Robert F. Kennedy Bridge (formerly the Triboro Bridge). The TBTA replaced wooden lamp posts which lit parkways during the 1920s and '30s. Today, the TBTA can support both historic and optional luminaires.

Applications

Commercial and residential streets

Single or twin mounting

Streets with roadway width of 36 feet or more

Lamping/Optics

Teardrop: Non–Cutoff, IES Type III or V (250W HPS)

Shielded Teardrop: Cutoff, IES Type III or V (250W HPS)

Stad: Cutoff or Semi–Cutoff, IES Type II or III (150W HPS)

Material/Color

Fabricated steel pole/black, brown and green

Cost Compared to SLP

$$$$$

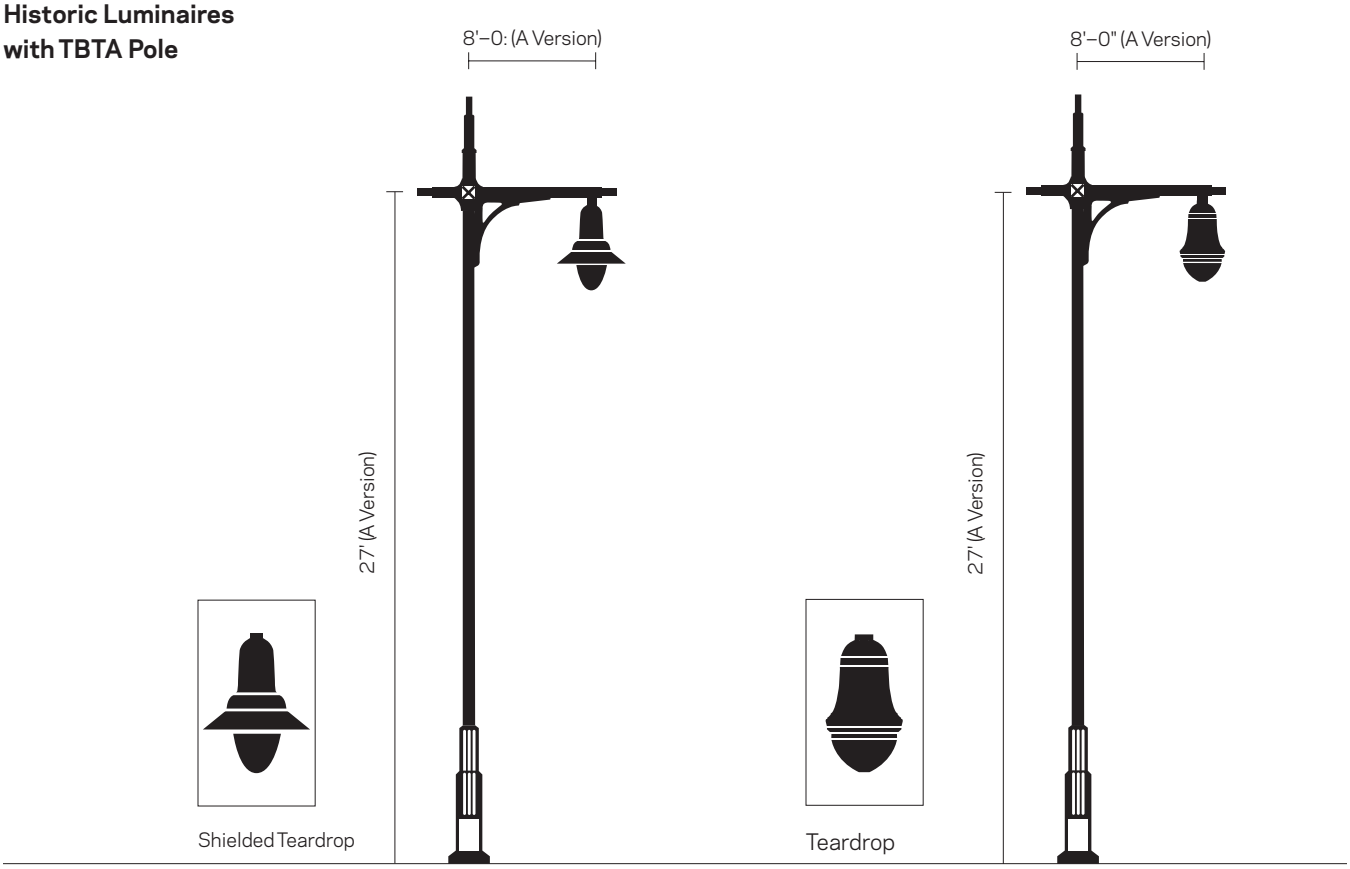
Spacing/Typical

Teardrop or Shielded Teardrop: ⅔: 1

Stad: 1: 1

Historic Shielded Teardrop luminaire and TBTA Pole: 40th Street, Manhattan

Historic Luminaires with TBTA Pole



Type M

USAGE: HISTORIC

The Type M pole, originally known as the Mast–Arm post, was introduced in 1908 for wide streets at corners on Broadway north of Columbus Circle and on Seventh Avenue north of Central Park. Bracket versions of the Mast–Arm were also attached to the facades of buildings. The reproduction of the Mast–Arm was introduced in the late twentieth century as the Type M pole.

Applications

Selected historic districts

Streets with roadway width of 36 feet or more

Single or twin mounting

Lamping/Optics

Non Cutoff, IES Type III or V

Teardrop luminaire, 250W HPS

Material/Color

Ductile iron pole/black, brown and green

Cost Compared to SLP

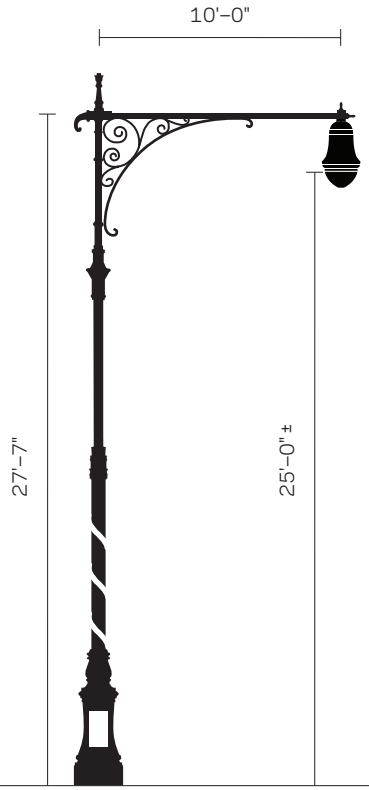
$$$$$

Spacing/Typical

⅔: 1

Historic Teardrop luminaire and Type M pole: West 11th Street, Manhattan

Historic Luminaire with Type M Pole



Type F

USAGE: HISTORIC

The Type F pole, originally known as the Reverse Scroll Bracket, was developed in 1913 and installed on narrow streets downtown on Seventh Avenue. Bracket versions of the Reverse Scroll were also attached to the facades of buildings. The reproduction of the Reverse Scroll was introduced in the late twentieth century as the Type F pole.

Applications

Selected historic districts

Streets with roadway width of 36 feet or less

Single or twin mounting

Lamping/Optics

Non–Cutoff, IES Type III or V

Teardrop luminaire, 250W HPS

Material/Color

Ductile iron pole/black, brown, and green

Cost Compared to SLP

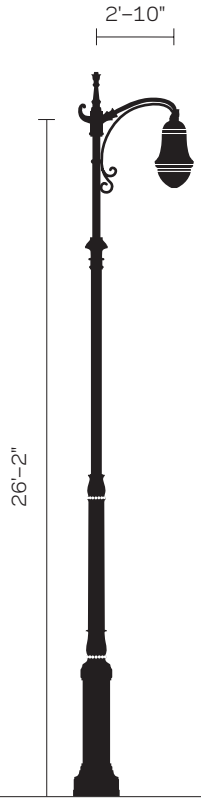
$$$$$

Spacing/Typical

½: 1

Historic Teardrop luminaire and Type F pole: East 8th Street, Manhattan

Historic Luminaire with Type F Pole



Bishops Crook

USAGE: HISTORIC

The Bishops Crook was the first of a number of decorative street lights to be introduced as early as 1900 on narrow city streets. Bracket versions of the Bishops Crook were also attached to the facades of buildings. The reproduction of the Bishops Crook was introduced in 1980 at Madison Avenue and 50th Street outside the Helmsley Palace Hotel, which is known today as the New York Palace Hotel.

Applications

Selected historical districts

Streets with roadway width of 36 feet or less

Lamping/Optics

Non–Cutoff, IES Type III or V

Teardrop luminaire, 250W HPS

Material/Color

Ductile Iron pole/black, brown and green

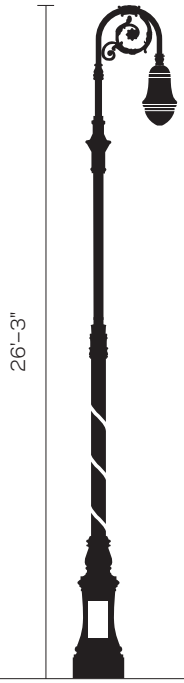
Cost Compared to SLP

$$$$$

Spacing/Typical

½: 1

Historic Teardrop luminaire and Bishops Crook pole: Nassau Street, Manhattan



This Page Intentionally Left Blank

NYC DOT is no longer planning to pilot the Type L design

City Light

USAGE: PILOT

The City Light is not yet available for use, but is included in the Street Design Manual because it is currently being tested. An international design competition to develop a new standard streetlight for New York City was held in 2004. The City Light design was selected as the winning entry. NYC DOT, the Office for Visual Interaction, and NYC DDC are working together to develop the proposed design into a luminaire for use on the city streets.

Applications

Commercial or Residential districts
TBD

Lamping/Optics

LED

Material/Color

TBD

Cost Compared to SLP

TBD

Spacing/Typical

TBD

City Light pilot rendering

City Light pilot rendering

This Page Intentionally Left Blank

NYC DOT is no longer planning to pilot the LED Type A design

LED Type E

USAGE: PILOT

The LED Type E luminaire is a rectangular design housing modular light bars. NYC DOT plans to pilot the luminaire in select locations.

Applications

Commercial or Residential districts TBD

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

LED, full cutoff

Material/Color

TBD

Cost Compared to SLP

TBD

Spacing/Typical

TBD

LED Type E street light (Credit: Ruud Lighting)

LED Type E street light (Credit: Ruud Lighting)

Pedestrian Lighting

Cobra Head

USAGE: STANDARD

The Cobra Head luminaire was originally introduced by the Westinghouse and General Electric companies in 1957 to accompany an aluminum post designed in 1958 by Donald Deskey and first installed in 1963. Additional poles were later introduced to support the Cobra Head luminaire: the Octagonal, Round, and Davit. The 70W and 100W Cobra Head luminaires are the current standard for New York City pedestrian lighting.

Applications

Parks, esplanades, pedestrian bridges, walkways, ramps, under elevated trains and bikeways

Single mounting

Lamping/Optics

70W HPS, 100W HPS

Medium Semi–Cutoff, IES Type II

Material/Color

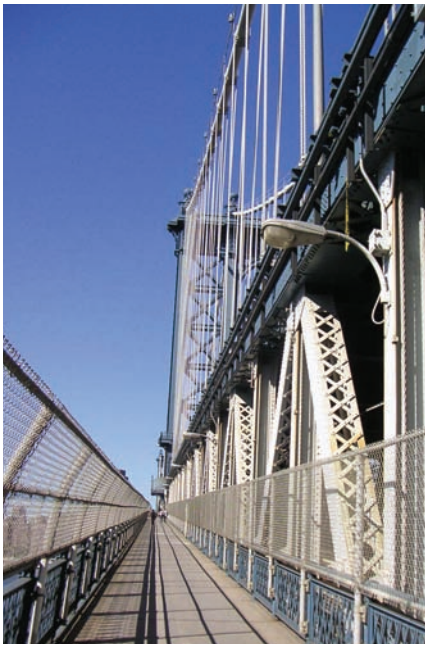
H.D.G. Steel/silver

Cost Compared to SLP

Cobra Head is the SLP

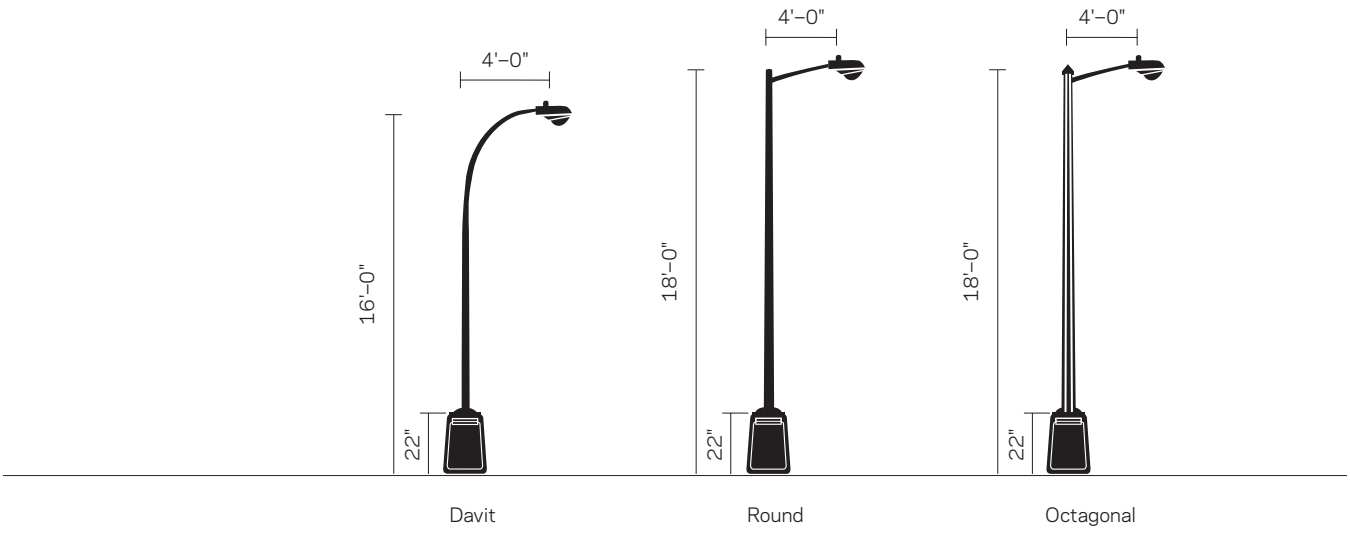
Spacing/typical

1:1



Cobra Head luminaire: Manhattan Bridge, Manhattan

Cobra Head with Standard Poles



Stad

USAGE: OPTIONAL

The Stad luminaire was introduced on the Robert F. Kennedy Bridge in 2008. The design of the luminaire provides a contemporary option to the standard Cobra Head at an additional cost.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

70W HPS or 150W HPS

Sag or flat lens optics

Cutoff or Semi–Cutoff, IES Type II or III

Material/Color

Aluminum/silver, black and green

Cost Compared to SLP

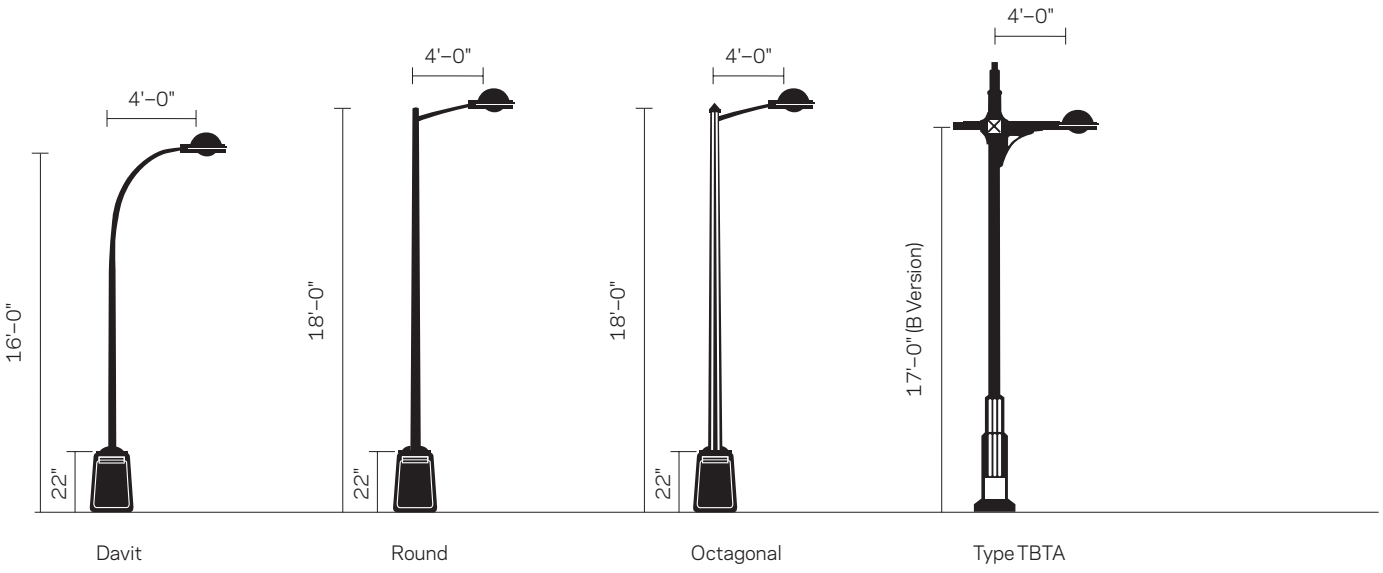
$$$$

Spacing/Typical

1: 1

Stad luminaire TBTA pole: Robert F. Kennedy Bridge, Manhattan

Stad with Standard Poles



Fulton

USAGE: OPTIONAL

The Fulton luminaire was selected for installation on the Fulton Street Mall in fall 2008. The design of the luminaire provides a contemporary option in place of the standard Cobra Head at an additional cost.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

70W HPS, 100W HPS

Cutoff, IES Type II or III

Material/Color

Aluminum/silver and black

Cost Compared to SLP

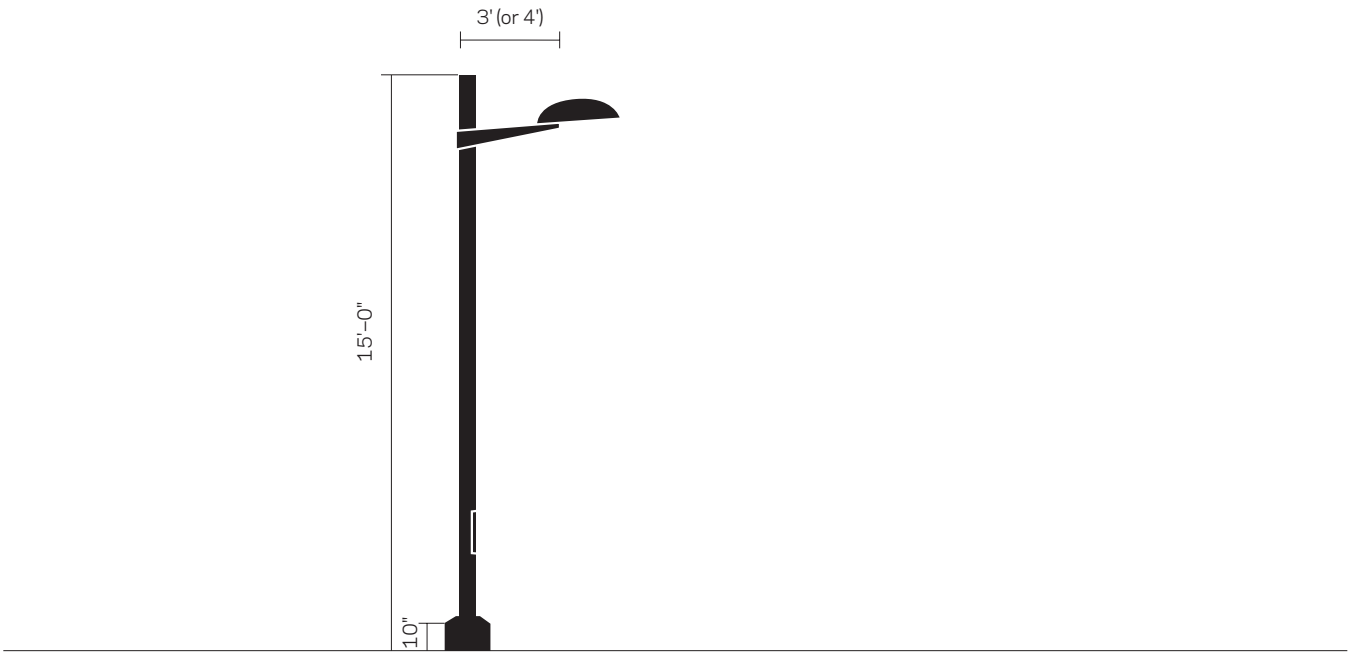
$$$$

Spacing/Typical

¾: 1

Fulton luminaire and pole (Credit: Hess America)

Fulton Luminaire and Pole
No standard NYC DOT pole options.



Fulton Head

Flushing Meadows

USAGE: OPTIONAL

The Flushing Meadows pole and luminaire was first installed in 2004 by the NYC Parks and Recreation Department in Canarsie Park in Brooklyn, NY. The pole is now installed in many city parks, plazas, and along walkways and bikeways.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

70W HPS, 100W or 150W HPS

Cutoff, IES Type III or V

Flushing Meadows Head

Material/Color

Fabricated steel/black, brown, green, and silver

Cost Compared to SLP

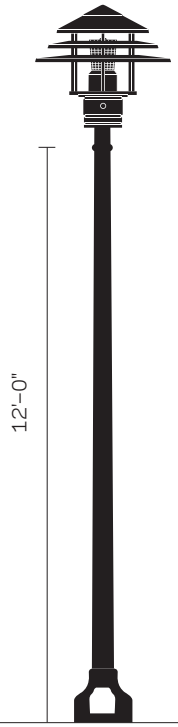
$$

Spacing/Typical

$^{2}/_{3}$: 1

Flushing Meadows luminaire and pole: 46th Street, Queens

Flushing Meadows Pole & Luminaire



Type B

USAGE: HISTORIC

The Type B luminaire and pole was one of two street lights designed in the early 1900s for tungsten incandescent lamps. The Type B pole was first introduced in 1911 by designer Henry Bacon for the Central Park Mall and later installed in other city parks. The reproduction of the Type B pole was introduced in the late twentieth century. The pole is now installed in many city parks, in plazas, and along walkways and bikeways.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

150W HPS, 100W HPS

Non–Cutoff, IES Type V

Type "Riverside Park" luminaire

Material/Color

Ductile iron pole/black, brown, or green

Cost Compared to SLP

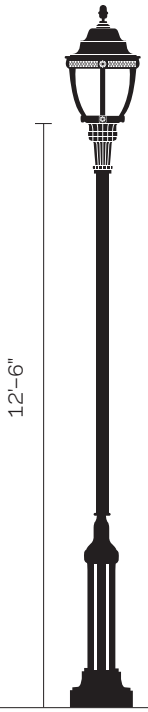
$$

Spacing/Typical

⅔: 1

Type B luminaire and pole: Battery Place, Manhattan

Type B Luminaire & Pole



World's Fair

USAGE: HISTORIC

The World's Fair luminaire and pole was first installed in 1964 during the World's Fair held at Flushing Meadows Park in Queens. The pole is now installed in many city parks, in plazas, and along walkways and bikeways.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

100W HPS & 150W HPS

Non–Cutoff, IES Type V

Type 2085 luminaire

Material/Color

Steel/black, brown, or green

Cost Compared to SLP

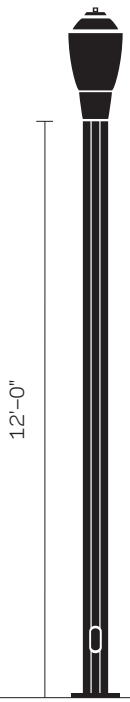
$

Spacing/Typical

⅔: 1

World's Fair luminaire and pole: Battery Park, Manhattan

World's Fair Luminaire and Pole



TBTA

USAGE: OPTIONAL

The TBTA (Triboro Bridge Tunnel Authority) pole was originally introduced in the 1950s and '60s for mid–twentieth–century bridge construction projects such as the Robert F. Kennedy Bridge (formerly known as the Triboro Bridge). The TBTA replaced wooden lamp posts which lit parkways during the 1920s and '30s. The pole was recently installed as pedestrian lighting along the Hudson River Park Greenway and can support both historic and optional luminaires. Historic luminaires render the lights historic.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

Teardrop: Non–Cutoff, IES Type III or V (100W HPS or 150W HPS)

Shielded Teardrop: Cutoff, IES Type III or V (100W HPS or 150W HPS)

Material/Color

Fabricated steel/black, brown, or green

Cost Compared to SLP

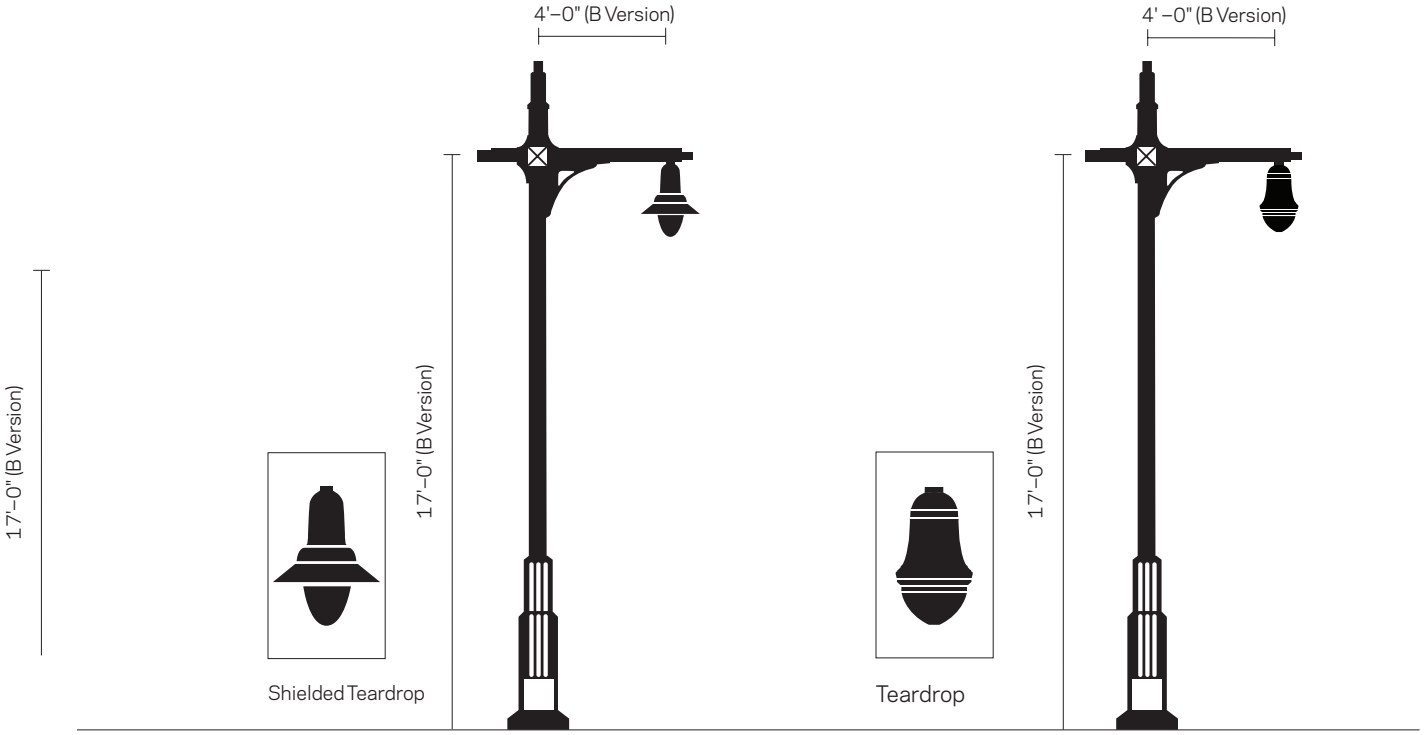
$$$$$

Spacing/Typical

For Teardrop or Shielded Teardrop: ⅔: 1

Historic Shielded Teardrop luminaire and TBTA pole: Hudson River Parkway, Manhattan

Historic Luminaires with TBTA Pole



Round Top Head

USAGE: PILOT

The Round Top Head was installed on the piers in Gantry State Park in Long Island City, Queens. The luminaire is suitable for wet locations. NYC DOT plans to pilot the luminaire by FY 2010 in additional locations throughout New York City.

Round Top Head luminaire and pole: Gantry Park Plaza, Queens

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

Cutoff, Type V (150 W HPS)

Material/Color

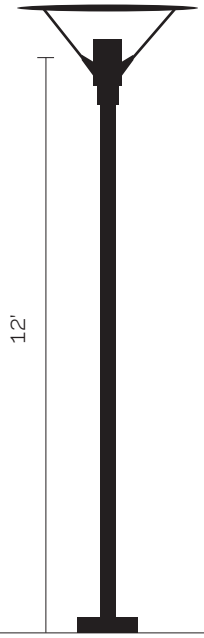
Aluminum/silver

Cost Compared to SLP

$$$$

Spacing/Typical

½:1



LED Post Top

USAGE: PILOT

Beginning in 2008, NYC DOT has installed the LED Post Top luminaire at select locations in Central Park on a pilot basis. It is a more energy–efficient, white–light replacement for the Type B Luminaire.

Applications

Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamping/Optics

Available up to 80W maximum

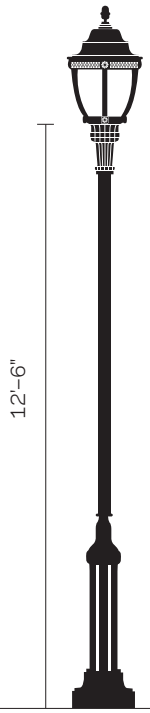
Optional electrical control available for hi/lo dimming; high in energy savings

Material/Color

Hard mount tops made of spun aluminum with polyester powder coat finish

LED Post Top luminaire and Type B Pole, Central Park, Manhattan

LED Post Top
The luminaire can be supported by an aluminum or steel decorative pole.



This Page Intentionally Left Blank

NYC DOT is no longer planning to pilot the LED Type A design

This Page Intentionally Left Blank

NYC DOT is no longer planning to pilot the LED Type E luminaire

Traffic Signal Poles

Type M–2 Traffic Signal Pole

USAGE: STANDARD

Originally approved and first installed in 1953, the M–2 Traffic Signal Pole is standard for use at all traffic signal locations. It can be combined with any standard arm or bracket with the standard Cobra Head or an optional luminaire, or with any arm or bracket in the historic section to provide a consistent streetscape.

Applications

Intersections

Single or double mounting

Lamping/Optics

Standard: Cobra Head luminaire, 100W HPS or 150W HPS

Optional: Stad luminaire, 100W HPS or 150W HPS; Helm luminaire, 100W HPS or 150W HPS

Historic: Teardrop luminaire, 250W HPS

Material/Color

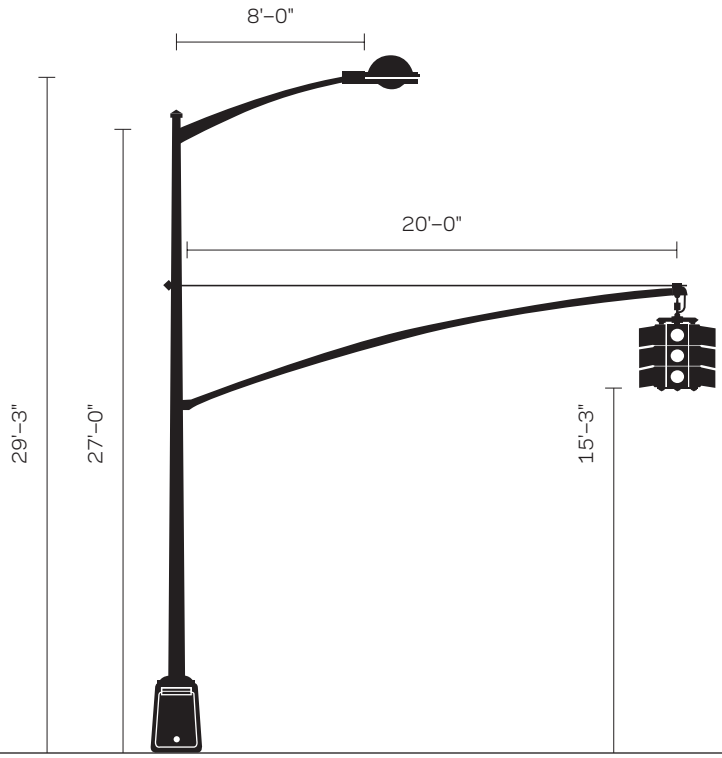
H.D.G. Steel/silver, green and brown

Type M–2 Traffic Signal Pole with standard luminaire: Murray Street, Manhattan

Type M–2 Traffic Signal Pole with historic luminaire: Warren Street, Manhattan

Type M–2 Traffic Signal Pole with historic luminaire: West 113th Street, Manhattan

Type M–2 Traffic Signal Pole with standard luminaire: Lafayette Street, Manhattan



Alliance Traffic Signal Pole

USAGE: OPTIONAL

The Alliance luminaire was originally introduced in the Lower Manhattan historic financial district by the Downtown Alliance business improvement district. The luminaire and optional traffic signal pole can be used as an alternative contemporary option in place of the standard M–2 Traffic Signal Pole but at an additional cost.

Applications

Intersections

Lamping/Optics

See Alliance luminaire, 100W HPS or 150W HPS

Material/Color

H.D.G. steel/silver and black

Alliance Traffic Signal Pole and luminaire: Murray Street, Manhattan

5 Furniture

5.0 Introduction 190
5.1 Bike Racks 191
5.2 Bus Stop Shelters 192
5.3 Bike Shelters 193
5.4 Newsstands 194
5.5 Automatic Public Toilets 195
5.6 Lightpole Banners 196
5.7 Benches 197
5.8 Waste Receptacles 198

Introduction

About This Chapter

New York City's streets, sidewalks, and public spaces are populated with a variety of elements installed on their surfaces, ranging from bus stop shelters to trash cans. Some of these items perform utilitarian functions, while others offer information or amenities to street users.

Chapter 5 includes examples and descriptions of such common street furniture as bicycle racks and bus stop shelters. It does not include an exhaustive catalog of all elements that are placed on city streets.

Bike Racks

Bike racks provide on–street parking for cyclists. Constructed of cast–metal, the NYC DOT standard bike rack was the product of an international competition.

Conceptual rendering from Beetlelab

Conceptual rendering from Beetlelab

Site Specifications

Clear path: With few exceptions, bike racks must allow a minimum clear path of 8 feet in width

Clearance from the curb: All bike racks must be a minimum of 18 inches from the curb

Other Minimum Distances

15 feet	fire hydrants, bus stops, taxi stand or hotel loading zones, franchise structures, subway entrances
10 feet	corner quadrants, driveways, building entrances (building, line installations only)
5 feet	standpipes, above–ground structures (e.g., signs, meters, lights, mailboxes, planters, phones), building entrances (curb installations only)
3 feet	tree pit edges, grates, utility covers

For More Information

To request a bike rack, please call 311 or visit nyc.gov/dot and fill out an online request form

Bus Stop Shelters

Bus stop shelters are part of the coordinated street furniture franchise that was awarded to Cemusa, Inc., in 2006. The award–winning, stainless steel and glass design provides seating and protection from the elements for bus users. Cemusa will be replacing all bus shelters with this new design.

York Avenue at 69th Street, Manhattan (Credit: Jennifer Yao)

Site Specifications

Shelters are configured in four sizes: regular, narrow, short, and double

Clear path: With few exceptions, shelters must allow a minimum clear path of 7 feet in width

Clearance from curb: All shelters must allow a straight unobstructed path of a minimum of 3 feet between the shelter and the curb

Other Minimum Distances:

10 feet	fire hydrants, standpipes
5 feet	tree trunks, canopies
5 feet	tree pits, cellar doors
3 feet	streetlights, traffic signal poles
2 feet	ventilation, street signs

For More Information

To learn more about the Coordinated Street Furniture Franchise, call 311, visit nyc.gov/dot, or email streetfurniture@dot.nyc.gov

Bike Shelters

Bicycle parking shelters contain stainless steel bike racks for eight bikes. The design closely resembles the bus shelter, using the same high–quality materials. The ad panels are used to display the annual NYC Cycling Map and public service campaigns.

Jackson Avenue at 50th Avenue, Queens (Credit: Cemusa, Inc.)

Site Specifications

See specifications for BUS STOP SHELTERS (5.2)

For More Information

To learn more about the Coordinated Street Furniture Franchise, call 311, visit nyc.gov/dot, or email streetfurniture@dot.nyc.gov

Newsstands

Newsstands are part of the coordinated street furniture franchise. They are fabricated from stainless steel and glass. The product displays can be customized by each operator from a standard kit of parts. All existing newsstands that were licensed by DCA as of July 13, 2006, will receive a replacement newsstand at no cost to the licensee.

6th Avenue at 39th Street, Manhattan (Credit: Jennifer Yao)

Site Specifications

Newsstands are available in nine sizes, including widths of 4, 5, and 6 feet and lengths of 8, 10, and 12 feet

Clear path: Newsstands must allow a minimum clear path of 9 feet, 6 inches in width

Clearance from curb: All newsstands must allow a straight unobstructed path of a minimum of 18 inches between the newsstand and the curb

For complete siting criteria, please refer to DCA rules at: www.nyc.gov/html/dca/html/licenses/024.shtml

For More Information

To learn more about the Coordinated Street Furniture Franchise, call 311, visit nyc.gov/dot or email streetfurniture@dot.nyc.gov

Automatic Public Toilets (APT)

In response to the lack of public restrooms in New York City, Cemusa, the coordinated street furniture franchisee, will install twenty automatic public toilets (APTs). These state–of–the–art facilities offer comfort, hygiene, accessibility, and security to the public, with a modern design. Engineered to self–sanitize after each use, the APTs will afford the people of New York a safe and valuable convenience.

Madison Avenue at 23rd Street, Manhattan (Credit: Cemusa, Inc.)

Site Specifications

Sites for APTs will be determined by NYC DOT

The footprint of the APTs spans 6 feet, 7 inches by 12 feet and requires an additional 5 feet of unobstructed space, both above and below ground, on all sides

Clear path: Automatic Public Toilets must allow a minimum clear path of 8 feet in width

Clearance from curb: All APTs must allow a straight unobstructed path of a minimum of 1.5 feet between the APT and the curb

Other Minimum Distances:

10 feet	fire hydrants, standpipes
5 feet	tree trunks, canopies
3 feet	streetlights, traffic signal poles
2 feet	ventilation, street signs, cellar doors.

Permissible Locations:

a. On wide streets, only in commercial, manufacturing, or mixed use districts

b. On sidewalks or plazas adjacent to property owned or leased by a government agency or public authority, or under the jurisdiction of the EDC

c. On traffic islands or public places bounded on all sides by mapped streets under the jurisdiction of NYC DOT

d. On or adjacent to parks property or playgrounds, subject to the approval of the Department of Parks and Recreation

e. Close proximity to water, sewer, and electrical connections

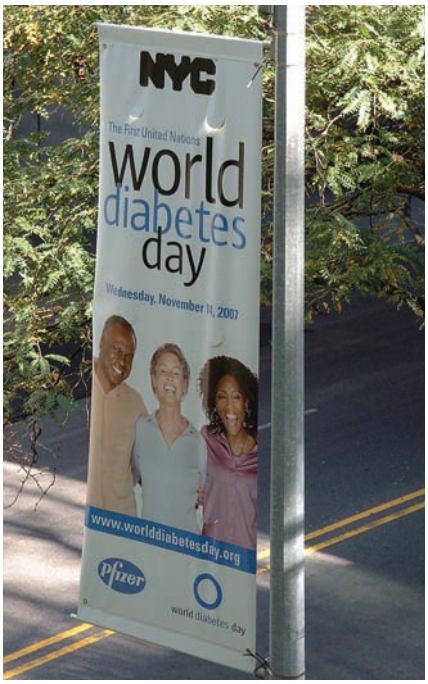
For More Information:

To learn more about the Coordinated Street Furniture Franchise, call 311, visit nyc.gov/dot, or email streetfurniture@dot.nyc.gov

Lightpole Banners

NYC DOT may issue permits for the display of banners promoting cultural exhibits or events and public or historical events which foster tourism and/or enhance the image of the city.

Jay Street, Manhattan (Credit: Tanya Codispodi, Tribeca Film Festival)



East 42nd Street at First Avenue, Manhattan (Credit: Elizabeth Blake)

Design Specifications

Horizontal banners are not permitted

Vertical banners shall be not more than 3–feet wide and not more than 8 feet in length

All banners must have six air slits

Double banners (two banners on the same pole) are only permitted if they collectively do not exceed 24 square feet

Banners shall contain no advertisements

The trade name or logo of the sponsor of the event (if applicable) shall occupy no more than 10% of the lower portion of the banner

For complete regulations regarding banner permits, please refer to Rules of the City of New York, Title 34, Chapter 2, section 2–14(b) and on the web at: www.nyc.gov/html/dot/html/permits/banners.shtml

For More Information:

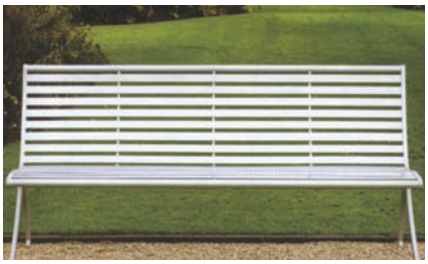
Please contact: the Banner Unit
NYC Department of Transportation
40 Worth Street, Room 1215
New York, NY 10013
T: (212) 788–2109
F: (212) 676–1445

Benches

Benches are best situated in areas with heavy pedestrian traffic, especially retail shopping corridors, transit stops, plazas, or near cultural institutions.

Currently there is no NYC DOT standard design for benches in the right–of–way. The Department of Parks and Recreation utilizes several styles of benches in park areas. These may be used in plazas and on streets. However a revocable consent or a maintenance agreement is generally required.

Hoof Bench (circa 1870) for historic districts (Credit: NYC DPR)



Parc Vue bench for use in contemporary settings (Credit: NYC DPR)

1964 World's Fair Bench for general use (Credit: NYC DPR)

1939 World's Fair Bench for general use (Credit: NYC DPR)

Site Specifications

Benches may be installed on the street subject to a revocable consent or maintenance agreement from the NYC DOT

No bench shall be greater than 6 feet in length

Benches greater than 4 feet in length shall be designed to discourage people from reclining

Benches adjacent and parallel to the building shall be installed no more than 6 inches from the building face and, if multiple benches are installed, they shall be at least 3 feet apart

A bench which is not anchored to the sidewalk shall be placed against the building face during hours that the benefited property is open to the public and shall be stored inside the building when the building is closed

For complete regulations regarding revocable consents, please refer to Rules of the City of New York, Title 34, Chapter 7 and on the web at: www.nyc.gov/html/dot/html/permits/revconif.shtml

Waste Receptacles

Among its other responsibilities, the Department of Sanitation services over 25,000 waste receptacles that are placed on thoroughfares citywide. Waste receptacles are concentrated in commercial areas, where they may be emptied as frequently as five times a day. They may also be placed in predominantly residential zones and serviced on residential refuse routes, along with household trash, two or three times a week.

Two examples of custom waste receptacles that conform to DSNY Sponsor–a–Basket guidelines (Credit: Victor Stanley, Inc.®)

Sponsor–a–Basket Program

Sponsoring organizations may purchase and place custom waste receptacles with the approval of the Department of Sanitation. The waste receptacle design must meet DSNY specifications. Sponsored waste receptacles may bear the name or logo of the sponsoring organization, but cannot include advertising of any kind. Locations must be submitted for approval along with the Sponsor–a–Basket Letter of Intent.

For More Information:

For more information regarding DSNY's rules, please refer to the Rules of the City of New York, Title 16 and on the web at: www.nyc.gov/html/dsny/html/rules_reg/digest.shtml

To sponsor a waste receptacle, please call 311.

Standard wire mesh public waste receptacle (Credit: Colin Robertson)

Glossary

Common Terms

A

AASHTO (American Association of State Highway Transportation Officials)

A nonprofit, nonpartisan association representing highway and transportation departments in the fifty states, the District of Columbia, and Puerto Rico, representing all five transportation modes—air, highways, public transportation, rail, and water. AASHTO publishes numerous design guidance publications, including *A Policy on Geometric Design of Highways and Streets* ("Green Book"). www.transportation.org/?siteid=37&pageid=310

ADA (Americans with Disabilities Act)

The Americans with Disabilities Act gives civil rights protections to individuals with disabilities, similar to those rights provided to individuals on the basis of race, color, sex, national origin, age, and religion. It guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications. www.ada.gov/

ADT (Average Daily Traffic)

The average number of vehicles to pass a certain point or use a certain roadway per day. Sometimes referred to as VPD (Vehicles Per Day), this is the calculation of the total traffic volume during a given time (in whole days) divided by the number of days in that period. (AASHTO: *A Policy on Geometric Design of Highways and Streets*)

Albedo (Pavement Albedo)

Albedo is the ability of a surface material to reflect incident solar (short wave) radiation. It is expressed on a scale of 0 to 1 where a value of 0.0 indicates that a surface absorbs all solar radiation and an albedo value of 1.0 represents total reflectivity. Light–colored surfaces generally have higher albedos than dark–colored surfaces. Pavements with lower albedo absorb more sunlight and get hotter. Pavements with higher albedo absorb less sunlight and are therefore cooler, mitigating the urban heat island effect www.epa.gov/heatisland/resources/faq.html#7. Conventional asphalt has an albedo in the range 0.04 to 0.12, while concrete has an albedo of around 0.5. (*High Performance Infrastructure Guidelines*) Reflectance is also measured using Solar Reflectance Index (SRI) values.

Arterial Street

The part of the roadway system serving as the principal network of through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the cities. (*Institute of Traffic Engineers Traffic Engineering Handbook)*

B

Bicycle

Every two– or three–wheeled device upon which a person or persons may ride, propelled by human power through a belt, a chain, or gears, with such wheels in a tandem or tricycle, except that it shall not include such a device having solid tires and intended for use only on a sidewalk by pre–teenage children. (New York State Vehicle and Traffic Law, Title 1, Article 1, §102 and Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Bicycle Facilities
A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically designated for bicycle use. (AASHTO: *A Policy on Geometric Design of Highways and Streets*)

Bicycle Lane/Bike Lane
A portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicycles. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 102–a)

Bicycle Path/Bike Path
A path physically separated from motorized vehicle traffic by an open space or barrier and either within the highway right–of–way or within an independent right–of–way and which is intended for the use of bicycles. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 102–b)

Bicycle Route/Bike Route
A bikeway designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways. (AASHTO *Guide for the Development of Bicycle Facilities*) In New York City, bike routes are set forth in the New York City Cycling Map and come in three main categories: Bicycle Path, Class 1 (bridge, park or separated on–street path); Bicycle Lane, Class 2 (on–street striped route); and Bicycle Route, Class 3 (on–street signed route).

BID (Business Improvement District)
A not–for–profit corporation made up of property owners and commercial tenants who are dedicated to promoting business development and improving an area's quality of life. BIDs deliver supplemental services such as sanitation and maintenance, public safety and visitor services, marketing and promotional programs, capital improvements, and beautification for the area—all funded by a special assessment paid by property owners within the district. www.ci.nyc.ny.us/html/sbs/html/neighborhood/bid.shtml

Bikeway
A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. (AASHTO: *Guide for the Development of Bicycle Facilities*)

Bioswale
A depressed, planted area designed to convey, capture, and filter stormwater runoff and increase rainwater infiltration. These systems are linear. The term "street swale" is used throughout this Manual. (*Florida Field Guide to Low Impact Development*: http://buildgreen.ufl.edu/Fact_sheet_Bioswales_Vegetated_Swales.pdf)

BMP (Best Management Practices)
Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage, or leaks, sludge or waste disposal, or drainage from raw material storage. www.epa.gov/npdes/pubs/cgp_appendixa.pdf

BRT (Bus Rapid Transit)
A flexible, high performance rapid transit mode that combines a variety of physical, operating, and system elements into a permanently integrated system with a quality image and unique identity. (Levinson et al., *Bus Rapid Transit: Implementation Guidelines*, TCRP Report 90–Volume II)

BRT (Bus Rapid Transit) Route
A road designed to improve the speed, reliability, and overall attractiveness of bus service, and that carries bus lines designated as "Select Bus Service" by MTA NYCT/MTA Bus and/or other services identified as BRT. This also includes roads that are designated for BRT service in the future, through the BRT Master Plan or other planning documents.

Bus
Every motor vehicle having a seating capacity of more than fifteen adults, in addition to the operator, and used for the transportation of persons, and every charter bus, interstate bus, intrastate bus, school bus, and sight–seeing bus, regardless of seating capacity. (Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Bus Route
A street that carries one or more regularly scheduled local, commuter, or intercity bus lines running on a published schedule.

Busway
A physically separated lane reserved for bus traffic.

C

Capital Project

A. A project that provides for the construction, reconstruction, acquisition, or installation of a physical public betterment or improvement that would be classified as a capital asset under generally accepted accounting principles for municipalities, or any preliminary studies and surveys relative thereto, or any underwriting or other costs incurred in connection with the financing thereof;
B.The acquisition of property of a permanent nature, including wharf property;
C. The acquisition of any furnishings, machinery, apparatus, or equipment for any public betterment or improvement when such betterment or improvement is first constructed or acquired;
D. Any public betterment involving either a physical improvement or the acquisition of real property for a physical improvement consisting in, including, or affecting (1) streets and parks, (2) bridges and tunnels, (3) receiving basins, inlets, and sewers, including intercepting sewers, plants or structures for the treatment, disposal or filtration of sewage, including grit chambers, sewer tunnels, and all necessary accessories thereof, or (4) the fencing of vacant lots and the filling of sunken lots;
E. Any other project allowed to be financed by the local finance law, with the approval of the mayor and the comptroller;
F. Any combination of the above. (New York City Charter § 210.1)

Cast-in-Place

Term describing a paving material, such as concrete, that is poured into place on-site and set to harden

CEQR (City Environmental Quality Review)

A process by which agencies of the City of New York review proposed discretionary actions to identify the effects those actions may have on the environment. CEQR is New York City's process for implementing SEQRA (New York State Environmental Quality Review Act), which requires that state and local governmental agencies assess environmental effects of discretionary actions before undertaking, funding, or approving such actions, unless they fall within certain statutory or regulatory exemptions from the requirements for review. **www.nyc.gov/html/oec/html/ceqr/ceqrfaq.shtml**

Channelization

The separation or regulation of conflicting traffic movements into definite paths of travel by traffic islands or pavement marking to facilitate the orderly movements of both vehicles and pedestrians. (AASHTO: *A Policy on Geometric Design of Highways and Streets*)

Clear Path

A straight unobstructed path for pedestrian circulation on the sidewalk. (Rules of the City of New York, Title 34, Chapter 7, § 7–06(c)(3)). (See also definition of clear path in DCA's rules and in the ADA.)

Coefficient of Friction

A value between 0 and 1 representing the ratio of the force of resistance between the horizontal motion of a body or object and a surface to the force pushing the body or object down on that surface. Surfaces with lower values, such as ice, are more slippery, while surfaces with higher values, such as concrete, are less slippery.

Collector Street

The collector street system provides both land access and traffic circulation within residential, commercial, and industrial areas. It differs from the arterial system in that facilities on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Conversely, the collector street also collects traffic from local streets in residential neighborhoods and channels it into the arterial system. In the central business district, and in other areas of like development and traffic density, the collector system may include the street grid, which forms a logical entity for traffic circulation. (FHWA: *Functional Classification Guidelines*)

Commercial District

A commercial district, designated by the letter C (C1–2, C3, C4–7, for example), is a zoning district in which commercial uses are allowed and residential uses may also be permitted, as described in the Zoning Resolution of the City of New York. **www.nyc.gov/html/dcp/html/subcats/zoning.shtml**

Community Facilities

As used in this manual, community facilities are elements of the streetscape that serve useful functions to street users beyond infrastructure and vehicular operations. Examples include street furniture (e.g., bike racks and newsstands), public and café seating, public art, and plantings. Their use is generally authorized through permits, revocable consents, and/or maintenance agreements.

Concession
A grant made by an agency for the private use of city–owned property for which the city receives compensation other than in the form of a fee to cover administrative costs, except that concessions shall not include franchises, revocable consents, and leases. (NYC Charter, Section 362(a); Rules of the City of New York, Title 12)

Controlled–Access Highway
Every highway, street, or roadway in respect to which owners or occupants of abutting lands and other persons have no legal right of access to or from the same except at such points only and in such manner as may be determined by the public authority having jurisdiction over such highway, street, or roadway.
(New York State Vehicle and Traffic Law, Title 1, Article 1, § 109)

Crosswalk
A. That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway between the curbs or, in the absence of curbs, between the edges of the traversable roadway;
B. Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 110)

CSO (Combined Sewer Overflow)
A discharge of excess wastewater from a combined sewer system (sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe) directly into nearby streams, rivers, or other water bodies during periods of heavy rainfall or snowmelt when the wastewater volume exceeds the capacity of the sewer system or treatment plant.
cfpub.epa.gov/npdes/home.cfm?program_id=5

Cutoff
Outdoor luminaires may be categorized according to the four classifications established by the IESNA of full cutoff, cutoff, semi–cutoff, and non–cutoff to distinguish the range in quantity of upward light and light above a horizontal plane emitted by a light source.

Cut–Through Traffic
Traffic using minor roadways, usually residential streets, as shortcuts to avoid congestion on major streets. (*U.S. Traffic Calming Manual*, American Planning Association, 2009)

Curb
A vertical or sloping member along the edge of a roadway clearly defining the pavement edge.
(New York State Vehicle and Traffic Law, Title 1, Article 1, § 111)

D

Design Speed
A selected speed used to determine the various geometric design features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use, and the functional classification of highway.
(AASHTO: *A Policy on Geometric Design of Highways and Streets*)

Design Vehicle
Selected vehicles, with representative weight, dimensions, and operating characteristics, which are used to establish highway design controls for accommodating vehicles of designated classes. (AASHTO: *A Policy on Geometric Design of Highways and Streets*)

Driver
Every person who operates or drives or is in actual physical control of a vehicle. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 113)

Driveway
Every entrance or exit authorized pursuant to applicable law and used by vehicular traffic to or from lands or buildings abutting a highway. (Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

F

Flag (sidewalk)
A flat slab of stone used as a paving material. (*American Heritage® Dictionary of the English Language*, Fourth Edition)

Franchise
A grant by an agency of a right to occupy or use the inalienable property of the city (usually, streets or sidewalks) to provide a public service. (NYC Charter, Section 362(b))

Furnishing Zone
A multi–purpose area of the roadside. It serves as a buffer between the pedestrian travel way and the vehicular area of the thoroughfare within the curbs, and it provides space for roadside appurtenances such as street trees, planting strips, street furniture, utility poles, sidewalk cafés, sign poles, signal and electrical cabinets, phone booths, fire hydrants, bicycle racks, and bus stop shelters. (Institute of Transportation Engineers, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practice*)

G

Gateway
A combination of traffic–calming and visual measures used at the entrance to a low speed street to slow entering vehicles and discourage through–traffic.

Green Book
See *A Policy on Geometric Design of Highways and Streets*.

Green Infrastructure
An adaptable term used to describe an array of products, technologies, and practices that use natural systems—or engineered systems that mimic natural processes—to enhance overall environmental quality and provide utility services. As a general principal, green infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff. When used as components of a stormwater management system, green infrastructure practices such as green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits. **cfpub.epa.gov/npdes/greeninfrastructure/information.cfm#glossary**

Greenstreet
Paved traffic islands and medians converted into green spaces filled with shade trees, flowering trees, shrubs, and/or groundcover, pursuant to a program established in 1996 and as further referred to in a Master Agreement between NYC DOT and NYC DPR.

H

Highway
The entire width between the boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 118)

High Water Table
The highest level of the groundwater in a given area, taking into account seasonal and periodic storm event fluctuations.

Historic District
Any area which (1) contains improvements that have a special character or special historical or aesthetic interest or value; and represent one or more periods or styles of architecture typical of one or more eras in the history of they city; and cause such area, by reason of such factors, to constitute a distinct section of the city; and (2) has not been designated as a historic district pursuant to Title 25 of the Administration Code of the City of New York. (Administrative Code of the City of New York, Title 25, Chapter 3, Section 25–302(h))

Horizontal Deflection
The horizontal (sideways) movement of moving vehicles compelled through physical and/or visual changes to the roadway alignment, for example a bend in the road.

HPS (High Pressure Sodium)
A type of lamp which uses sodium gas to produce light. It is one of the most efficient sources of light.

I

IESNA
The Illuminating Engineering Society of North America is a professional organization of lighting engineers with a commitment to sharing their knowledge and expertise. IESNA has established recommended guidelines regarding levels of illumination for street and pedestrian lighting.

Intersection
The area contained within the grid created by extending the curblines of two or more streets at the point at which they cross each other. (Rules of the City of New York, Title 34, Chapter 2, § 2–01)

L

LED
A light emitting diode converts electricity to light through the movement of electrons. It does not have a filament and is more efficient than incandescent bulbs. It consumes less energy, is more compact, and lasts longer than traditional light sources.

Limited Use Street
A legally mapped street to be temporarily closed to motor vehicles by the Department of Transportation, in accordance with lawfully authorized signs or other traffic control devices. (Rules of the City of New York, Title 34, Chapter 4, §4–12(r)(4))

Local Street
The local street system comprises all facilities not on one of the higher systems. It serves primarily to provide direct access to abutting land and access to the higher order systems. It offers the lowest level of mobility and usually contains no bus routes. Service to through traffic movement usually is deliberately discouraged. (FHWA: *Functional Classification Guidelines*)

Local Traffic
Vehicular traffic whose trip origin and/or destination are in the immediate area of a given street.

LOS (Level of Service)
A methodology for measuring traffic flow based on traveler delay and congestion, defined in the *Highway Capacity Manual* (HCM). Grades from A to F are used, from free flow to traffic jam conditions. Historically used primarily for motor vehicle traffic, LOS methodologies have also been devised for pedestrian, bicyclist, and transit operations.

Low Impact Development (LID)
A comprehensive stormwater management and site–design technique. Within the LID framework, the goal of any construction project is to design a hydrologically functional site that mimics predevelopment conditions. This is achieved by using design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large–scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost–effective landscape features located on–site. LID is a versatile approach that can be applied to new development, urban retrofits, and revitalization projects. This design approach incorporates strategic planning with micro–management techniques to achieve environmental protection goals while still allowing for development or infrastructure rehabilitation to occur. **cfpub.epa.gov/npdes/greeninfrastructure/information.cfm#glossary**

M

Motor Vehicle
Every vehicle operated or driven upon a public highway which is propelled by any power other than muscular power, except as otherwise provided in § 125 of the Vehicle and Traffic Law. (Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

MUTCD (Manual on Uniform Traffic Control Devices)
Defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. **mutcd.fhwa.dot.gov/**

O

Operating Speed
The speed at which drivers are observed operating their vehicles during free–flow conditions. The 85th percentile of the distribution of observed speeds is the most frequently used measure of the operating speed associated with a particular location or geometric feature. (AASHTO: A Policy on Geometric Design of Highways and Streets)

P

Park
Parking
The standing of a vehicle, whether occupied or not, otherwise than temporarily for the purpose of and while actually engaged in loading or unloading property or passengers. (Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Peak Hour(s)
The hour or hours of greatest vehicular traffic volumes on a given street or intersection, usually defined for weekday AM, MD (mid–day) and PM, and Saturday MD, peak periods. The peak hours, rather than entire day, are typically analyzed in a traffic analysis.

Pedestrian
Any person afoot or in a wheelchair. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 130)

Plaza
An area designated for use by pedestrians, which may vary in size and shape; which may abut a sidewalk and is located fully within the bed of a roadway; may be at the same level as the roadway or raised above the level of the roadway; may be physically separated from the roadway by curbing, bollards, or other separators; may be treated with special markings and materials; and may contain benches, tables, or other facilities for pedestrian use.

A Policy on Geometric Design of Highways and Streets
Often referred to as the "Green Book," this document is published by AASHTO and contains "design practices in universal use as the standard for highway geometric design." **bookstore.transportation.org/item_details.aspx?ID=109**

Private Road
Every way or place in private ownership and used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 133)

Public Highway
Any highway, road, street, avenue, alley, public place, public driveway, or any other public way. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 134)

R

Rain Garden
A planted depression that captures and absorbs rainwater that would otherwise flow into a storm drain. (*Florida Field Guide to Low Impact Development*: http://buildgreen.ufl.edu/Fact_sheet_Bioretention_Basins_Rain_Gardens.pdf)

Restricted Use Street
A legally mapped street to be permanently closed to motor vehicles by the Department of Transportation, and open to use by pedestrians. (Rules of the City of New York, Title 34, Chapter 4, §4–12(r)(4))

Revocable Consent
A grant by the city of a right, revocable at will…to an owner of real property or, with the consent of the owner, to a tenant of real property to use adjacent inalienable property (usually, streets or sidewalks) for such purposes as may be permitted by rules of NYC DOT or NYC DoITT. (For full definition see NYC Charter, Section 362(c)(2); Rules of the City of New York, Title 34, Chapter 7, Section 7–01)

Right of Way
The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian approaching under such circumstances of direction, speed, and proximity as to give rise to danger of collision unless one grants precedence to the other. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 139)

Right–of–Way
A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes. (AASHTO: *Guide for the Development of Bicycle Facilities*)

Road
An open way for the passage of vehicles, persons, or animals on land. (FHWA)

Roadbed
The graded portion of a highway within top and side slopes, prepared as a foundation for the pavement structure and shoulder. (FHWA)

Roadway
That portion of a street designed, improved, or ordinarily used for vehicular travel, exclusive of the shoulder and slope. (Rules of the City of New York, Title 34, Chapter 2, §2–01)

S

Shared Use Path
A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right–of–way or within an independent right–of–way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non–motorized users. (AASHTO *Guide for the Development of Bicycle Facilities*)

Scoring (concrete)
Marking the surface of concrete for visual or textural effect. "Tooled joint" scoring refers to concrete sidewalk flag joints finished with a hand-trowelled border. "Simulated saw-cut joint" scoring refers to concrete sidewalk flag joints finished using a spacer to simulate the appearance of joints cut with a masonry saw.

Sidewalk
That portion of a street, whether paved or unpaved, between the curb lines or the lateral lines of a roadway and the adjacent property lines intended for the use of pedestrians. Where it is not clear which section is intended for the use of pedestrians, the sidewalk will be deemed to be that portion of the street between the building line and the curb. (Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Simulated Saw-Cut Joint
See scoring (concrete)

Solar Reflectance Index (SRI)
SRI is a value that incorporates both solar reflectance and emittance in a single value to represent a material's temperature in the sun. SRI quantifies how hot a surface would get relative to standard black and standard white surfaces. It is calculated using equations based on previously measured values of solar reflectance and emittance as laid out in the American Society for Testing and Materials Standard E 1980. It is expressed as a fraction (0.0 to 1.0) or percentage (0% to 100%). (United States Environmental Protection Agency: www.epa.gov/heatisld/resources/glossary.htm)

Source Control
Action to prevent pollution where it originates. www.stormwaterauthority.org/glossary.aspx

Source Reduction
The technique of stopping and/or reducing pollutants at their point of generation so that they do not come into contact with stormwater.
www.cabmphandbooks.com/Documents/Development/Section_7.pdf

Stand
Standing
The stopping of a vehicle, whether occupied or not, otherwise than temporarily for the purpose of and while actually engaged in receiving or discharging passengers.
(New York State Vehicle and Traffic Law, Title 1, Article 1, § 145 and Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Stop
Stopping
Any halting even momentarily of a vehicle, whether occupied or not.
(Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Street
A street, avenue, road, alley, lane, highway, boulevard, concourse, parkway, driveway, culvert, sidewalk, crosswalk, boardwalk, and viaduct, and every class of public road, square and place, except marginal streets.
(New York City Charter § 210.7)

Street Tree
A tree growing in the public right–of–way.
www.nycgovparks.org/sub_your_park/trees_greenstreets/faq.html

Supplementary Cementitious Materials (SCM)
Industrial by–products such as coal fly ash, granulated blast furnace slag, and silica fume that are used as a partial replacement for portland cement in concrete. (Green In Practice 107—Supplementary Cementitious Materials, Portland Cement Association). SCM's are pre–consumer recycled materials that would otherwise have been disposed of in landfills, providing cost savings to concrete manufacturers and reducing environmental impact caused by averting disposal (*High Performance Infrastructure Guidelines*).

Swale
See Bioswale

T

Target Speed
The speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multimodal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a safe environment for pedestrians and bicyclists. The target speed is usually the posted speed limit. (ITE *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*)

Through Traffic
Vehicular traffic whose trip origin and destination are not in the immediate area of a given street.

Traffic
Pedestrians, ridden or herded animals, vehicles, bicycles, and other conveyances either singly or together while using any highway for purposes of travel. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 152)

Tooled Joint
See scoring (concrete)

Traffic Calming
The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non–motorized street users. As opposed to traffic control devices that are regulatory and require enforcement, traffic calming measures are intended to be self–enforcing. (ITE: *Traffic Calming: State of the Practice*, 1999)

Traffic Control Device
All signs, signals, markings, and devices placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning or guiding traffic.
(New York State Vehicle and Traffic Law, Title 1, Article 1, § 153)

Transitway
Any roadway or series of roadways designated for the exclusive use of buses or taxis or such other designated high occupancy vehicles as may be permitted, during certain hours of the day, with access to such roadway(s) limited to one block thereof to other vehicles for the purpose of delivery of goods or services or the picking up or dropping off of passengers.
(Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Truck
Except as otherwise specified in the Rules of the City of New York, Title 34, Chapter 4, § 4–01(b,) a truck is defined as any vehicle or combination of vehicles designed for the transportation of property, which has either of the following characteristics two axles, and six tires; or three or more axles. (Rules of the City of New York, Title 34, Chapter 4, § 4–13(a))

Truck Route
See Rules of the City of New York, Title 34, Chapter 4, § 4–13.

U

Unit Paver
Paving materials that are precast, such as hexagonal asphalt pavers, or individually hewn, such as granite blocks, such that each paver is a single unit that can be remove or replaced.

Urban Heat Island
Many urban and suburban areas experience elevated temperatures compared to their outlying rural surroundings; this difference in temperature is what constitutes an urban heat island. The annual mean air temperature of a city with one million or more people can be 1.8 to 5.4 degrees F (1 to 3 degrees C) warmer than its surroundings, and on a clear, calm night, this temperature difference can be as much as 22 degrees F (12 degrees C). Even smaller cities and towns will produce heat islands, though the effect often decreases as city size decreases. (US EPA: *Reducing Urban Heat Islands: Compendium of Strategies*)

V

Vehicle
Every device in, upon, or by which any person or property is or may be transported or drawn upon a highway, except devices moved by human power or used exclusively upon stationary rails or tracks. (New York State Vehicle and Traffic Law, Title 1, Article 1, § 159 and Rules of the City of New York, Title 34, Chapter 4, § 4–01(b))

Vertical Deflection
The vertical (upward) displacement of moving vehicles by way of a raising of the roadbed surface, for example with a hump, table, or other raised element.

Appendices

A Design Review Cover Sheet 210
B Agency Roles on the City's Streets 216
C Legal & Design Guidance References 219
D DOT Design Review Process 223

Design Review Cover Sheet

Introduction

The following cover sheet can be attached to all street designs submitted to NYC DOT for review or approval*. The description of the history, scope, context, overall project goals, and the major recommendations provided by the submitter via this form allows NYC DOT or other reviewing agencies to provide a more expeditious evaluation, potentially reducing review time and minimizing requests for revisions late in the project development process.

This version included as part of the *Street Design Manual* is provided for reference only—readers should use the digital version available for download on NYC DOT's website at: **nyc.gov/streetdesignmanual**.

***Note:** DDC projects should be submitted to NYC DOT Office of Capital Program Management for review coordination. All other projects should be submitted to the appropriate NYC DOT Borough Commissioner office for review coordination.

A. PROJECT INFO

1. Project Name

2. Project/Budget ID(s) (if applicable)

3. Design Completion (%)

4. Lead Agency/Entity

5. Contact(s)

6. Partner Agencies/Entities

7. Project Location

Borough

Community District

Council District

Assembly District

Senate District

Congressional District

8. Project Area (precise street limits and scope)

9. Project History & Impetus

10. Project Goals

11. Project Budget

12. Funding Sources

13. Project Scope

14. Dates Started/Anticipated to Start:

Planning

Preliminary Design

Final Design

Construction

B. CONTEXT

1. History & Character:
Describe the history and character of the project area and how the proposed design responds to these.

2. Land Use:
Describe the predominant land uses and densities within the project area, including any historic districts or special zoning districts, and the compatibility of the proposed design with these.

3. Major Sites:
Major Sites: Describe any major sites, destinations, and trip generators within or proximate to the project area, including prominent landmarks, commercial, cultural and civic institutions, and public spaces, and how the proposed design can support these sites.

C. OPERATIONS

1. Walking:
Describe existing walking conditions within the project area, desired future conditions, and how the proposed design addresses walking conditions, including pedestrian safety, volumes, comfort and convenience of movement, important walking connections, and quality of the walking environment.

2. Bicycling:
Describe existing bicycling conditions within the project area, desired future conditions, and how the proposed design addresses bicycling conditions, including bicyclist safety, volumes, comfort and convenience of movement, existing or proposed bike routes and other important bicycling connections, and bicycle parking.

C. OPERATIONS

3. Motor Vehicles:
Describe existing motor vehicle conditions within the project area, desired future conditions, and how the proposed design addresses motor vehicle conditions, including motor vehicle safety, volumes, access, important motor vehicle connections, appropriateness of motor vehicle traffic to the particular street (e.g., local versus through traffic) and reducing the negative impacts of motor vehicle traffic.

4. Transit:
Describe existing transit conditions within the project area, desired anticipated future conditions, and how the proposed design addresses transit conditions, including bus routes and operations, subway or other transit station access, and supportiveness of transit usage and users.

5. Trucks/Freight:
Describe existing truck conditions within the project area, desired future conditions, and how the proposed design addresses truck conditions, including truck routes, safety, volumes, access, mobility and reducing the negative impacts of truck traffic.

6. Access:
Describe how the proposed design addresses the needs of those with increased access or mobility requirements such as the disabled, elderly, and children, including ADA compliance and any school or senior safety zones within the project area, if applicable.

7. Curbside Conditions:
Describe existing curbside demand and usage patterns within the project area, desired future conditions, and how the proposed design addresses curbside conditions, including allocation of space for parking, loading, and drop–off, and pedestrian space.

8. Public Space:
Describe existing public space conditions within the project area and how the proposed design affects public space, including any proposed new public space and any new pedestrian seating or other enhancements to the public realm.

C. OPERATIONS

9. Drainage:
Describe potential disturbance to existing stormwater flow patterns or existing catch basins, and/or the need for new sewer connections.

10. Street Cuts:
Describe observed frequency of utility "cuts" into the roadway within the project area and how the proposed design addresses street cut conditions, including improvement or consolidation of utility infrastructure.

D. GREENING

1. Street Trees:
Describe existing street tree coverage within the project area and how street trees are included in the proposed design.

2. Greenstreets & Plantings:
Describe any existing Greenstreets and Greenstreet opportunities within the project area and any Greenstreets or other planted areas that are included in the proposed design.

3. Stormwater Control:
Describe stormwater runoff conditions including the infiltration ability of underlying soil within the project area and what, if any, stormwater source controls are included in the proposed design.

4. Flooding:
Describe any flooding conditions within the project area and how the proposed design addresses flooding.

D. GREENING

5. Maintenance Partner(s):
Describe any potential and/or committed maintenance partners (e.g., DPR) and level of commitment (e.g., watering, weeding, pruning, litter removal, replacements).

6. Permits:
Describe whether any wetlands or coastline areas are within 100 feet of the project area and whether permits from the New York State Department of Environmental Conservation or the Army Corps of Engineers are necessary.

E. STREET DESIGN MANUAL

1. Materials, Lighting & Furniture:
Describe existing and proposed street materials, lighting and furniture, including paving materials; lighting poles, fixtures and levels; and street furniture.

2. Application:
Describe how the proposed design follows the guidelines of the *New York City Street Design Manual* in regards to overall policies and principles, street geometry, materials, lighting, and street furniture.

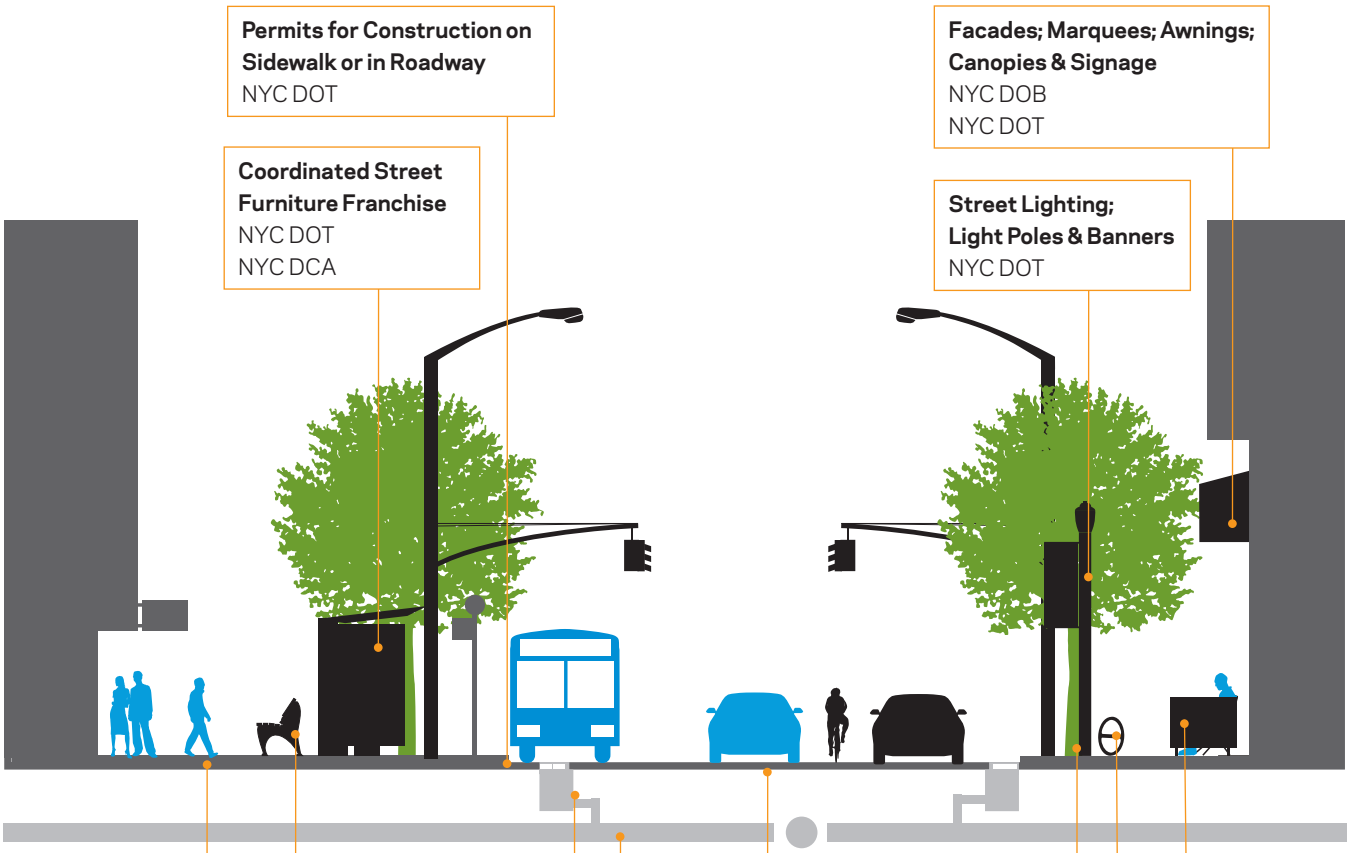
3. Major Deviations from Guidelines:
Where the design deviates from the guidelines or policies and principles of the Manual, provide explanation.

4. Pilot Treatments:
Describe any pilot treatments being proposed, whether geometric or material treatments.

Agency Roles on the City's Streets

This diagram summarizes the roles and responsibilities of city agencies and other entities related to the most visible aspects of the City's streets. It does not include all agencies with street–related roles and is not intended to be a literal representation of appropriate street furniture locations.

An expanded listing follows.



Agency Roles on the City's Streets

The following are agencies, authorities, and other organizations that are frequently involved in the design of streets in New York City. This list is provided as a reference tool, for informational purposes only and is not an exhaustive list.

Street Planning, Design & Construction

Street Capital Projects

NYC DOT (initiation, scoping, conceptual design) www.nyc.gov/dot

NYC DEP (initiation, scoping) www.nyc.gov/dep

NYC EDC (initiation, scoping, conceptual design, final design, agency alignment & construction) www.nycedc.com

NYC DDC (conceptual design, final design, agency alignment & construction) www.nyc.gov/ddc

NYC DPR (parks, Greenstreets) www.nyc.gov/parks

NYS DOT (state highways within New York City) www.nysdot.gov

Other city, state, and federal agencies and authorities for individual, typically site–specific projects

Comprehensive Street Planning

NYC DOT (for most public streets) www.nyc.gov/dot

NYC DCP (zoning, private streets, transportation studies) www.nyc.gov/dcp

NYS DOT (for state and federal routes) www.nysdot.gov

Design of Stormwater Best Management Practices/ Source Controls

NYC DEP www.nyc.gov/dep

NYC DPR www.nyc.gov/parks

NYC DOT www.nyc.gov/dot

Greenstreets

NYC DPR www.nyc.gov/parks

NYC DOT www.nyc.gov/dot

Land Acquisition

NYC DCAS www.nyc.gov/dcas

NYC DDC www.nyc.gov/ddc

NYC SBS www.nyc.gov/sbs

NYC Law Department www.nyc.gov/law

NYC DCP (ULURP) www.nyc.gov/dcp

Non–Capital Street Projects

NYC DOT (design and implementation) www.nyc.gov/dot

People with Disabilities

Mayor's Office for People with Disabilities www.nyc.gov/html/mopd/

Street Tree & Tree Pit Design Standards

NYC DPR www.nyc.gov/parks

Reviews, Approvals & Permits

Coastal Erosion Permits

NYS DEC www.dec.ny.gov

Construction on Sidewalk or in Roadway, Permits

NYC DOT www.nyc.gov/dot

Curb Cut, Existing Cellar Door, Marquee & Awning Permits

NYC DOB www.nyc.gov/html/dob

Environmental Review (CEQR/SEQRA/NEPA)

Lead agency and involved agencies vary by project

Emergency Vehicle Access Review

FDNY www.nyc.gov/fdny

Historic District Review

NYC LPC www.nyc.gov/landmarks

Light Pole Banner Permits

NYC DOT www.nyc.gov/dot

Newsracks

NYC DOT www.nyc.gov/dot

Review of Works of Art and Structures (as defined in Chapter 37, § 854 of the NYC Charter)

NYC DC www.nyc.gov/html/artcom

Revocable Consents

NYC DOT www.nyc.gov/dot

NYC DCA
(sidewalk cafés)
www.nyc.gov/consumers

NYC DoITT
(telecommunications)
www.nyc.gov/doitt

Sewers, Catch Basins & Drainage Approval

NYC DEP
www.nyc.gov/dep

Sidewalk Shed Permits

NYC DOB
www.nyc.gov/html/dob

Sidewalk Work Permits

NYC DOB
(Builder's Pavement Plan)
www.nyc.gov/html/dob

NYC DOT
www.nyc.gov/dot

Special Event/Street Fair Permits

CECM www.nyc.gov/html/cecm/

NYPD www.nyc.gov/nypd

Street Tree Permits (including Tree Guards)

NYC DPR
www.nyc.gov/parks

Street Vendor Permits

NYC DCA
www.nyc.gov/consumers

NYC DOHMH
www.nyc.gov/health

Vaults & Canopies: Permits

NYC DOT
www.nyc.gov/dot

Water Quality Permits/Approvals

NYS DEC
www.dec.ny.gov

NYC DEP
www.nyc.gov/dep

Wetlands Permits

United States Army Corps of Engineers www.usace.army.mil

NYS DEC
www.dec.ny.gov

Operation & Maintenance

Coordinated Street Furniture Franchise (bus stop shelters, newsstands, automatic public toilets, bike shelters)

NYC DOT
www.nyc.gov/dot

NYC DCA
www.nyc.gov/consumers

Greenstreets Maintenance

NYC DPR
www.nyc.gov/parks

Roadway Maintenance and Repair

NYC DOT
www.nyc.gov/dot

Roadway & Retaining Wall Inspection

NYC DOT
www.nyc.gov/dot

NYC DDC
www.nyc.gov/ddc

Sidewalk Maintenance and Repair

Property Owners

NYC DOT
(in certain zoning districts or through prior notice) www.nyc.gov/dot

Street Cleaning, Snow Removal & Litter Removal

DSNY
www.nyc.gov/sanitation

NYC DOT
www.nyc.gov/dot

NYC DPR
www.nyc.gov/parks

BIDs
(Business Improvement Districts)
www.nyc.gov/html/sbs/html/neighborhood/bid.shtml

Street Operations (Street Lighting, Traffic Controls, etc.)

NYC DOT
www.nyc.gov/dot

Supplementary Maintenance & Services, Street Furniture

NYC SBS
www.nyc.gov/html/sbs

BIDs
(Business Improvement Districts)
www.nyc.gov/html/sbs/html/neighborhood/bid.shtml

Tree Pit Maintenance

NYC DPR
(first two years from planting)
www.nyc.gov/parks

Property owners
(after two years from planting)

Transit (Bus) Operations

MTA NYCT
www.mta.info/nyct

Utilities

NYC DEP
www.nyc.gov/dep

Private Utilities

Empire City Subway
www.empirecitysubway.com

Enforcement

Enforcement of Traffic Rules (including parking regulations)

NYPD
www.nyc.gov/nypd

Stoop Line Enforcement

NYC DCA
www.nyc.gov/consumers

Legal & Design Guidance References

The following are laws, rules, regulations, and design guidance documents that may be relevant to the design of streets. This list is provided as a reference tool, for informational purposes only, and is not an exhaustive list. All public and private actions must comply with all applicable laws, rules, and regulations, not solely those listed below.

Federal Laws and Regulations

Code of Federal Regulations (CFR)
www.gpoaccess.gov/cfr/

Manual on Uniform Traffic Control Devices (MUTCD)
www.mutcd.fhwa.dot.gov/

United States Code (USC)
uscode.house.gov

Americans with Disabilities Act (ADA)
www.ada.gov/stdspdf.htm

Clean Air Act (CAA)
www.epa.gov/air/caa/

Clean Water Act (CWA)
www.epa.gov/oecaagct/lcwa.html

National Environmental Policy Act (NEPA)
www.epa.gov/Compliance/nepa/

State Laws and Regulations

New York State Code of Rules and Regulations
www.dos.state.ny.us/info/nycrr.htm

New York State Department of Environmental Conservation (Title 6)
www.dos.state.ny.us/info/nycrr.htm

New York State Environmental Quality Review Act (SEQRA)
www.dec.ny.gov/public/357.html

New York State Department of Transportation (Title 17)
www.dos.state.ny.us/info/nycrr.htm

New York State Environmental Conservation Law (ECL)
public.leginfo.state.ny.us/

New York State Highway Law
public.leginfo.state.ny.us/

New York State Transportation Law
public.leginfo.state.ny.us/

New York State Vehicle and Traffic Law (VTL)
public.leginfo.state.ny.us/

Local Laws and Regulations

New York City Charter (2004) (www.nyc.gov/html/charter/)

City Planning (Chapter 8)

Department of Buildings (Chapter 26)

Department of Citywide Administrative Services (Chapter 35)

Department of Consumer Affairs (Chapter 64)

Department of Design and Construction (Chapter 55)

Department of Environmental Protection (Chapter 57)

Department of Health (Chapter 22)

Department of Parks and Recreation (Chapter 21)

Department of Sanitation (Chapter 31)

Department of Small Business Services (Chapter 56)

Department of Transportation (Chapter 71)

Fire Department (Chapter 19)

Franchises, Revocable Consents and Concessions (Chapter 14)

Landmarks Preservation Commission (Chapter 74)

Police Department (Chapter 18)

Public Design Commission/Art Commission (Chapter 37)

Administrative Code of the City of New York
24.97.137.100/nyc/AdCode/entered.htm

Budget; Capital Projects (Title 5)
NYC Traffic Rules

Construction and Maintenance (Title 27)

Consumer Affairs (Title 20)

Contracts, Purchases and Franchises (Title 6)

Environmental Protection and Utilities (Title 24)

Local Laws and Regulations (cont.)

Fire Prevention and Control (Title 15)

Health (Title 17)

Housing and Buildings (Title 26)

Land Use (Title 25)

Parks (Title18)

Police (Title 14)

Sanitation (Title 16)

Transportation (Title 19)

Rules of the City of New York
24.97.137.100/nyc/rcny/entered.htm

City Planning (Title 62)

Community Assistance Unit (Tile 50)

Department of Buildings (Title 1)

Department of Citywide Administrative Services (Title 55)

Department of Environmental Protection (Title 15)
Rules Governing the Construction of Private Sewers
Rules Governing the Use of the Water Supply

Department of Consumer Affairs (Title 6)

Department of Health (Title 24)

Department of Parks and Recreation (Title 56)

Department of Sanitation (Title 16)

Department of Small Business Services (Title 66)

Department of Transportation (Title 34)
NYC Traffic Rules (Chapter 4)
NYC Highway Rules (Chapter 2)
Revocable Consents (Chapter 7)

Fire Department (Title 3)

Franchise and Concession Review Committee (Title 12)

Landmarks Preservation Commission (Title 63)

Police Department (Title 38)

Public Design Commission/Art Commission (Title 57)

Zoning Resolution of the City of New York
www.nyc.gov/html/dcp/html/subcats/zoning.shtml

City Environmental Quality Review
www.nyc.gov/html/oec/html/ceqr/ceqr.shtml

CEQR Technical Manual
www.nyc.gov/html/oec/html/ceqr/ceqrpub.shtml

New York City Charter (Chapter 8)

Rules of the City of New York (Title 43 and 62)

National Design Guidance Sources

AASHTO
www.transportation.org/

A Policy on Geometric Design of Highways and Streets (AASHTO: 2004; **www.bookstore.transportation.org/item_details.aspx?ID=110**)

A Guide for Achieving Flexibility in Highway Design (AASHTO: 2004; **bookstore.transportation.org/item_details.aspx?ID=103**)

Guide for the Planning, Design, and Operation of Pedestrian Facilities (AASHTO: 2004; **bookstore.transportation.org/item_details.aspx?id=119**)

Guide for the Development of Bicycle Facilities (AASHTO: 1999; **bookstore.transportation.org/item_details.aspx?ID=104**)
Note: A new version of this publication is expected to be released in early 2009

American Planning Association (APA)

U.S. Traffic Calming Manual (American Planning Association & American Society of Civil Engineers: 2009)

FHWA
www.fhwa.dot.gov/

BIKESAFE: Bicycle Countermeasure Selection System (FHWA: 2006; **www.bicyclinginfo.org/bikesafe/**)

PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System (FHWA: 2004; **www.walkinginfo.org/pedsafe/**)

Pedestrian Facilities Users Guide (FHWA: 2002; **www.trb.org/news/blurb_detail.asp?id=1545**)

Designing Sidewalks and Trails for Access (FHWA: 2001; **www.fhwa.dot.gov/environment/sidewalks/**)

Flexibility in Highway Design (FHWA: 1997; **www.fhwa.dot.gov/environment/flex/**)

Public Involvement Techniques for Transportation Decision–Making (FHWA/FTA: 1996; www.fhwa.dot.gov/reports/pittd/contents.htm)

ITE www.ite.org/

Urban Street Geometric Design Handbook (ITE: 2008; www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=TB–018)

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practice (ITE: 2006; www.ite.org/css/)

Traffic Calming: State of the Practice (ITE & FHWA: 1999; www.ite.org/traffic/tcstate.asp#tcsop)

The Design and Safety of Pedestrian Facilities (ITE: 1998; www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP–026A)

MUTCD
mutcd.fhwa.dot.gov/

U.S. Access Board
www.access–board.gov/

Accessible Public Rights–of–Way: Planning and Designing for Alterations (U.S. Access Board: 2007; www.access–board.gov/prowac/alterations/guide.htm)

ADA and ABA Accessibility Guidelines (U.S. Access Board: 2004; www.access–board.gov/ada–aba/)

The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (U.S. Access Board: 2002; www.access–board.gov/adaag/html/adaag.htm)

Accessible Rights–of–Way: A Design Guide (U.S. Access Board: 1999; www.access–board.gov/prowac/guide/PROWGuide.htm)

Local Design Guidance Sources

NYC DCP
www.nyc.gov/planning

New York City Bicycle Master Plan (NYC DCP & NYC DOT: 1997; www.nyc.gov/html/dcp/html/bike/mp.shtml)

NYC DDC
www.nyc.gov/ddc

Active Design Guidelines: Promoting Physical Activity and Health in Design (NYC DDC, DOHMH, DOT, DCP & OMB: Estimated publication 2009)

High Performance Infrastructure Guidelines: Best Practices for the Public Right–of–Way (NYC DDC & Design Trust for Public Space: 2005)

Sustainable Urban Sites Design Manual (DDC: 2009; www.nyc.gov/html/ddc/html/desogm/reports.shtml)

NYC DOT
www.nyc.gov/dot

Standard Specifications (NYC DOT: 1986; www.nyc.gov/html/dot/html/about/dotlibrary.shtml#spec)

Standard Details of Construction (NYC DOT: 1999; www.nyc.gov/html/dot/html/about/dotlibrary.shtml#spec)

Street Lighting Specifications and Standard Drawings (NYC DOT: 1992; www.nyc.gov/html/dot/html/about/dotlibrary.shtml#spec)

Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components www.nyc.gov/html/dot/html/permits/stpermit.shtml#instructions

Specifications for Furnishing All Labor and Material Necessary and Required for the Installation, Removal or Relocation of Street Lighting Equipment in the City of New York (NYC DOT: 1992; www.nyc.gov/html/dot/html/about/dotlibrary.shtml#spec)

Specifications for Furnishing All Labor and Material Necessary and Required for the Installation or Removal of Electrical Traffic Signal Equipment to Control Traffic in the City of New York (NYC DOT: 1995; www.nyc.gov/html/dot/html/about/dotlibrary.shtml#spec)

School Safety Engineering Project: General Mitigation Measures Final Report (NYC DOT: 2004; www.nyc.gov/html/dot/downloads/pdf/schoolsafetymitigation.pdf)

NYC DPR
www.nyc.gov/parks

Tree Planting Standards (NYC DPR: 2008; www.nycgovparks.org/sub_permits_and_applications/images_and_pdfs/TreePlantingStandards.pdf)

Park Design for the 21st Century: High Performance Landscape Guidelines (NYC DPR & the Design Trust for Public Space: Estimated publication July 2009)

Stormwater Source Control / Best Management Practices (BMP) Design Guidance Sources

PlaNYC Sustainable Stormwater Management Plan (NYC: 2008; **www.nyc.gov/html/planyc2030/html/stormwater/stormwater.shtml**)

State of New York Stormwater Management Design Manual (New York State Department of Environmental Conservation: 2008; **www.dec.ny.gov/chemical/29072.html**)

City of Chicago Stormwater Management Ordinance Manual (Chicago Department of Water Management: 2008)

City of Portland Stormwater Management Manual (Portland Bureau of Environmental Services: 2008; **www.portlandonline.com/bes/index.cfm?c=47952**)

City of Philadelphia Stormwater Management Guidance Manual (Philadelphia Water Department Office of Watersheds: 2008; **www.phillyriverinfo.org/Programs/SubprogramMain.aspx?Id=StormwaterManual**)

Street Planning Resources

Downtown Brooklyn Traffic Calming Study (NYC DOT: 2004; **www.nyc.gov/html/dot/html/motorist/dntnbklyntraf.shtml**)

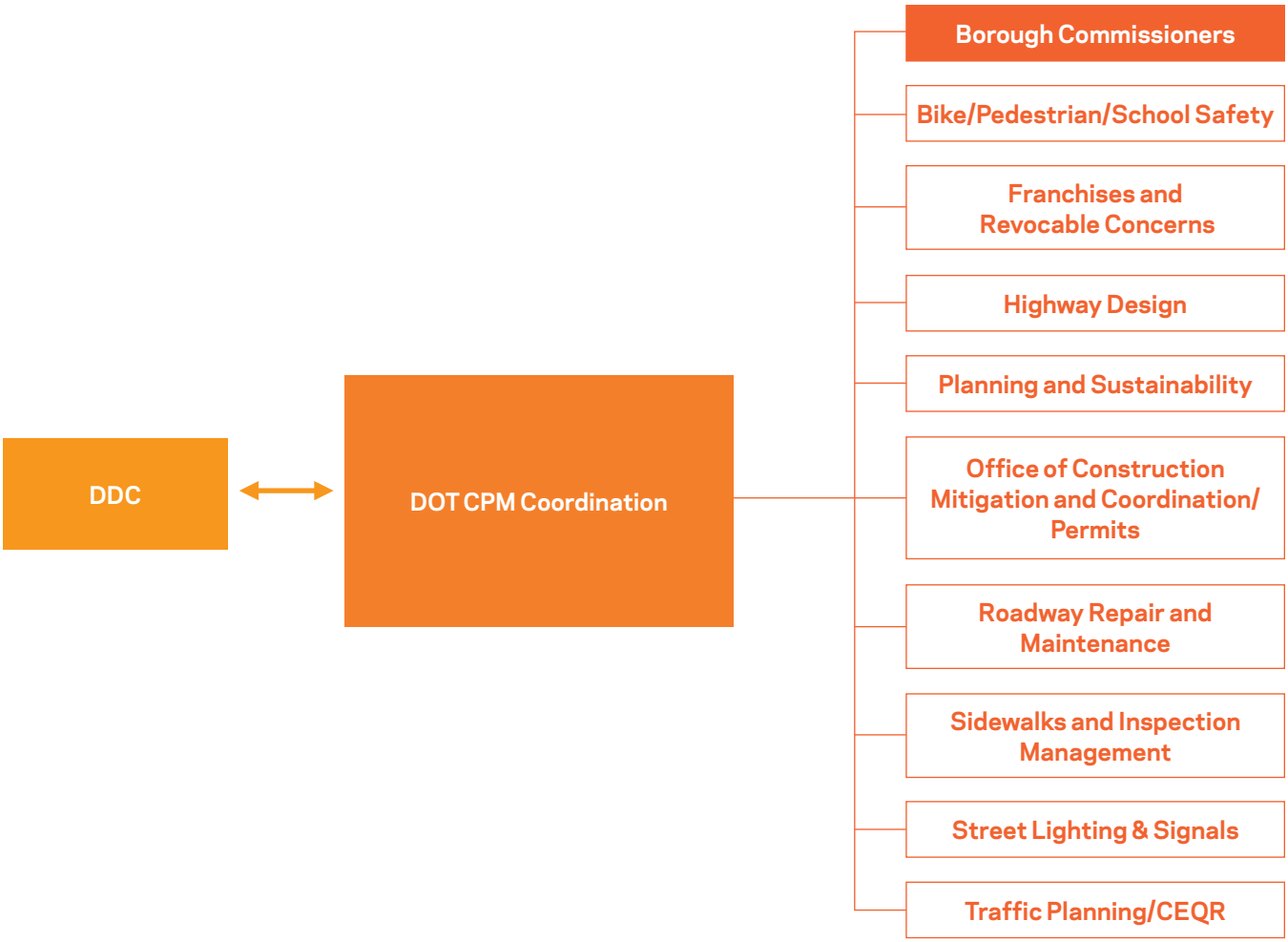
Project Development & Design Guide (Massachusetts Highway Department: 2006; **www.mhd.state.ma.us/default.asp?pgid=content/designGuide&sid=about**)

San Francisco Better Streets Plan–Draft for Public Review (City and County of San Francisco: June 2008; **www.sfbetterstreets.org**)

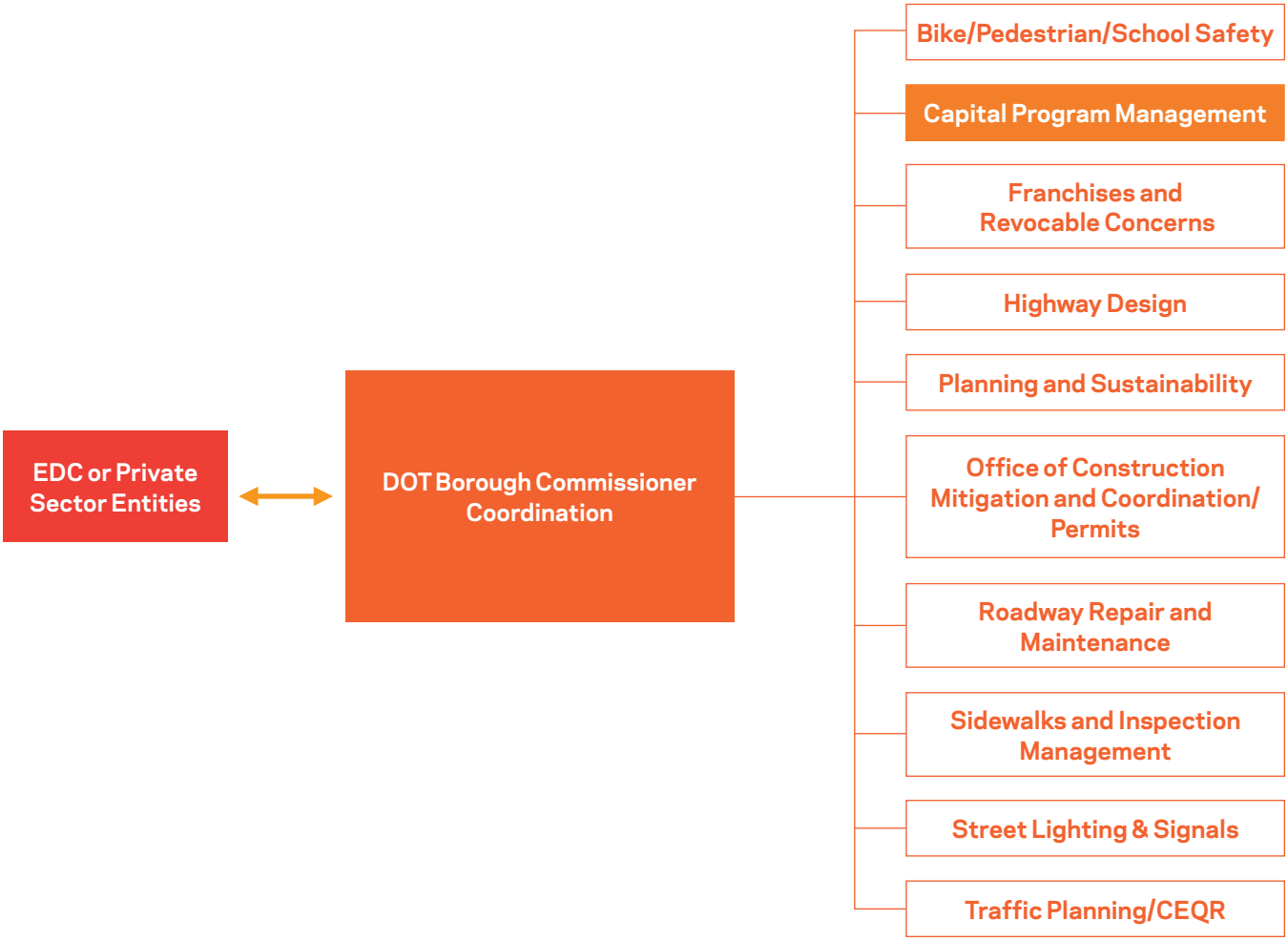
Smart Transportation Guidebook: Planning and Designing Highways and Streets that Support Sustainable and Livable Communities (New Jersey DOT/Pennsylvania DOT: 2008; **www.smart–transportation.com/guidebook.html**)

DOT Design Review Process: DDC Infrastructure Capital Projects

The following two pages illustrate NYC DOT's design review process for internally generated street projects that flow through DDC and for externally generated projects that are initiated by EDC or other entities. In both conditions, one office will coordinate DOT's review and comments. In this way, the review period for proposed designs will be expedited and responses coordinated. The chart does not include review by the Office of Management and Budget, the Public Design Commission or the Landmarks Preservation Commission.



DOT Design Review Process: EDC and Private Sector Streetscape Projects



Index

A

Accessibility, 22, 39
- buses, 70
- medians and, 73
- in shared streets, 59, 60
- on sidewalks, 62

Albedo. *See* Solar Reflectance Index values

Alliance luminaires and poles, 160

Alliance traffic signal pole, 188

Asphalt
- applications, 109, 110, 111, 127, 128, 136, 144
- composition, 109, 111
- high albedo, 110
- imprinted, 109, 144
- maintenance, 109, 110, 111, 127, 128, 136
- mastic, 127
- pavers, 115, 128, 136
- pilot project applications, 110, 111
- porous, 111
- thermoplastic imprinting on, 118

Asphaltic concrete, 108

Automated public toilets, 195

Automobiles. *See* Motor Vehicles

B

Benches, 197

Bicycle boulevards, 32

Bike lanes/paths, 3, 16, 31, 50–55
- buffered, 50, 51, 52, 55
- "dooring" and, 52
- emergency vehicle access and, 52
- geometric treatment and design, 50–55
- grade-separated, 52
- intersections and, 53
- markings for, 51
- median-separated, 52, 53
- one-way, 50
- parking loss and, 54–55
- parking-separated, 50, 52
- protected with mixing zones, 54
- right-of-way and, 52
- safety issues, 52
- shared use, 53, 55
- signal protected, 54
- signed route, 55
- space requirements, 54–55
- standard, 55
- traffic calming and, 51
- visual emphasis for, 51

Bikes and bicycling
- parking/racks, 38, 69, 191, 193
- road surfaces preferred, 108
- shelters, 193
- street design and, 22, 23, 38

Bioswales. *See* Street swales

Bishops Crook light poles, 168

Bluestone applications, 129
- flags, 129
- maintenance, 129

Bluestone sidewalk, 129

Bollards, 82, 84

Boulevards, 31, 59, 72, 90

Builder's Pavement Plan, 106

Bus lanes/busways, 31, 56–58
- boarding islands and, 56
- bulbs, 70
- curb-aligned, 56, 57, 58
- delivery accommodations and, 56, 58
- double, 57
- geometric treatment and design, 56–58
- interior, 56
- intersection design and, 56, 57
- location, 56
- marking designations, 57
- median, 56, 58
- minimization of vehicle intrusion in, 57, 58
- off-board fare collection, 32
- parking loss and, 56
- passenger shelters, 70
- queue-jump, 56, 57
- queuing areas, 32
- red-colored, 56, 57
- rights-of-way and, 56
- separated, 58

Bus stop shelters, 192

C

Chicanes, 71, 85

City Environmental Quality Review, 26, 45, 104

City Light light poles, 170

Clear Corner Policy, 62

Cobblestone roadways, 113, 114

Cobblestones, 113, 133
applications, 114, 134, 135
concrete, 134
maintenance, 135
modular, 114, 135

Cobra head luminaires, 155, 174

Concrete
applications, 108, 112, 115, 120, 121, 122, 123, 134, 137, 145
cobble, 134
color, 108
composition, 108, 112, 122, 139
curbs, 141
with exposed aggregate, 122, 137
hexagonal pavers, 145
maintenance, 108, 115, 120, 121, 122, 123, 137
permeable, 115
porous, 125
sand-colored with exposed aggregate, 124
sidewalks, 120–125
with silicon carbide treatment, 123
tinted, 121–123, 122, 123, 140
untinted, 120, 139

Coordinated Street Furniture Franchise, 192, 195

Crosswalks
materials, 116–118
street design, 116–118
thermoplastic imprinting, 118

Cul-de-sacs, 83, 84

Curb extensions, 31, 32, 46, 65–71
"blockbuster," 66
bus bulb, 70
chicane, 71
choker, 71
with community facilities, 69
corner, 23
curbside loading between, 66
design for, 67
emergency access and, 67
furnishings and, 69
with Greenstreet plantings, 68–71
landscaped, 68
locations, 66
maintenance and, 68, 69
mid-block narrowing, 23, 71
planted swales and, 68
stormwater management and, 67, 68
traffic calming and, 69
width, 67

Curb(s)
concrete, 139, 140
extensions, 65–71
granite, 142
integral concrete with gutter, 141
materials for, 137–142
mountable, 82
radii, 46, 87
steel-faced, 139

Cut-off. *See* Lighting

D

Davit light poles, 156, 158, 162, 174, 175

Decorative gravel, 146

Design and review process, 17, 24, 26, 223–224

Design Commission, 17, 26, 106

Diagonal traffic diverters, 82

Drainage, 39, 47, 67, 73

E

Emergency access, 46
bus lanes/busways and, 56, 58
curb extensions and, 67
in full closures, 84
medians and, 72
speed reducers and, 76–77

F

Flatbush Avenue light poles, 158, 162, 163

Flooding, 39

Flushing Meadows luminaires and poles, 177

Forced turn diverters, 81

Freight. *See* Trucks

Full closure diverters, 84

Full sidewalk, 62, 63

Fulton luminaires and poles, 159, 176

Furnishing zones, 132
applications, 132
locations, 132
sidewalk, 63, 132–137

Furniture, 27, 32, 190–198
curb extensions and, 69

G

Gateways, 32, 33, 60, 78, 90
as transitions, 78

General streets, 31

Geometric treatment and design, 27, 43–99
accessibility and, 46
applicability, 45
design vehicles and, 46
emergency access and, 46
function of, 45
guidance sources, 45
intersections and, 46
limited usage, 45, 52–53, 56–58, 78, 80, 81, 90, 98
mixed roadways, 49
pedestrian street, 33
pilot project usage, 45, 58, 77, 82, 83, 84, 85, 86, 91, 99
plantings and, 47, 93–97
roundabouts and neighborhood traffic circles, 86–89
slow streets, 32
transit street, 32
wide usage, 45, 49, 50, 51, 62–74, 76, 93

Goals
policy, 21–24
project, 40

Granite
applications, 113, 117, 130, 133, 142
maintenance, 113, 130, 133

Granite block roadbed, 113

Granite block sidewalk, 133

Granite curbs, 142

Granite pavers, 117

Granite slab sidewalk, 130

Gravel
applications, 146, 147
decorative, 146
resin-bound, 147

Greenstreets, 31, 32, 33, 39, 47, 98

H

Half closure diverters, 83

Handicapped access. *See* Accessibility

Heat island effect, 93, 98, 110

Helm luminaires, 161–162

Hexagonal asphalt pavers, 128

Hexagonal concrete pavers, 145

High albedo asphalt, 110

Historic districts, 121
granite curbs, 142
roadways, 113
sidewalks, 62, 129

I

Imprinted asphalt, 109, 144

Integral concrete curb and gutter, 141

Interlocking permeable pavers, 115

Intersections
bike lanes/paths and, 53
complex, 46
"daylighting" of, 67
multi-leg, 46
raised, 32, 33, 91
redesign, 46
safety at, 81, 82, 83
skewed angle, 46
slip lanes, 46
stop-controlled, 91

L

Land use, 29, 38
contexts, 31
shared streets and, 59–60
street design and, 38

LED Post Top luminaires, 182

LED Type A luminaires, 171, 183

LED Type E luminaires, 172, 184

Lighting, 27, 150–188
cutoff optics, 157, 159, 160
flat glass optics, 161
historic usage, 163, 164, 165, 166, 167
medium semi-cutoff, 157
non-cutoff optics, 164
optional usage, 157, 160, 161–162, 175, 176
pedestrian, 174–184
pilot project usage, 181, 182, 183
semi-cutoff optics, 165
standard usage, 155, 159, 174
street, 155–172
street design, 155–172
teardrop optics, 164
traffic signal poles, 185–188

Lightpole banners, 196

London pavers, 126

Luminaires. *See* Lighting

M

Maintenance agreements
materials, 122, 123, 124, 125, 126, 128, 129, 130, 131, 133, 134, 135, 136, 137, 141, 144, 145, 146, 147
planting, 39

Mastic asphalt, 127

Materials, 27, 102–147
consistency of, 24
historic usage, 113, 129, 130, 142
land use contexts and, 31
maintenance, 24
optional usage, 114, 117, 118, 122, 124, 126, 128, 133, 134, 136, 142, 144, 146, 147
pilot project usage, 115, 125, 127, 131
standards for commercial districts, 104
standard usage, 104, 108, 120, 121, 139, 140

Median barriers, 80

Median safety islands, 56, 71, 72, 74, 78, 80

Medians, 31, 72–74
bike lanes/paths and, 53
emergency access and, 72
handicapped access and, 73

Mixed roadways, 49

Modular cobble, 135

Motor vehicles. *See* Vehicles

N

Neckdowns. *See* Curb extensions

Neighborhood traffic circles, 86-87, 88

Newsstands, 194

New York City Bicycle Master Plan, 50

New York State Vehicle & Traffic Laws, 46

O

Octagonal light poles, 156, 158, 162, 174, 175

P

Parking
alternate side, 85
bicycle, 22, 38, 69, 191, 193
losses, 54, 55, 56

Pavers
applications, 117, 126, 128, 131, 136, 145
asphalt, 115, 136
concrete, 145
granite, 117
hexagonal asphalt, 128
historic, 121
London, 126
rubber, 131

Pedestrian
access, 23
crossings, 46, 59, 65–69, 72, 74, 90, 91, 116–118
median safety islands and, 74
plazas, 23
safety, 38, 74, 83, 84
separation from traffic, 49
shared streets, 59–60
volume, 49

Pedestrian lighting, 174–184

Pedestrian streets, 33, 49, 109, 113

Permits, 39, 99, 104, 106, 196, 197
wetland, 39

Planning process, 28–37
land use and, 29

Plantings, 23, 93–97
with chicanes, 85
curb extensions and, 68, 69
diverters, 80
geometric treatment and design, 47
Greenstreets, 98
habitat opportunities and, 93
maintenance and, 93
maximization of, 23
medians and, 72, 73, 74
mid-block narrowings, 71
pollution and, 98
roundabouts and neighborhood traffic circles, 86–89
sidewalk, 62, 64
stormwater management and, 93
street noise and, 93
strips, 64
tree pits, 93–97

Plazas, 23, 143, 144–147

Poles, lighting. *See also* Lighting
davit, 155, 156, 158, 162, 174, 175
Flatbush Avenue, 162, 163
Flushing Meadows, 177
octagonal, 155, 156, 158, 162, 174, 175
round, 155, 156, 158, 162, 174, 175
TBTA, 164–165, 175, 180
traffic signal, 186–188
WM, 162, 175

Pollution, 18
plantings and, 98
tree pits and, 93

Porous asphalt, 111

Porous concrete, 125

Public spaces, 23, 46
expansion of, 23
seating in, 23
shared streets and, 59–60
street design and, 39

R

Raised crossing, 90

Raised intersection, 91

Raised speed reducers, 76

Resin-bound gravel, 147

Restriping, 46

Revocable consents, 59, 62, 69, 78, 197, 202

Ribbon sidewalk, 62, 64, 120

Roadways and lanes, 107.
See also Street(s)
cobblestone, 113, 114
curbless, 59–60
geometric treatment and design, 46, 47
grading, 49, 73
high albedo asphalt, 110

Roadways and lanes (Continued)
materials for, 107–115
mixed traffic, 31, 32, 49
permeable, 11, 115
serpentine, 85
shared, 31, 32, 44, 49, 53, 55, 59, 60, 62, 78, 89
width considerations, 46

Roundabouts, 86, 88-89

Round light poles, 156, 158, 162, 174, 175

Round top head light poles, 181

Rubber pavers, 131

S

Safety, 21, 22, 46
bike lanes/paths and, 52
pedestrian, 38
for vulnerable groups, 22

Sand-colored concrete, 124

Shared streets, 31, 32, 49, 59–60, 78

Shielded teardrop luminaires, 165, 180

Sidewalks, 32, 36, 62–71, 119
accessibility, 62
Clear Corner Policy and, 62
cross-slope, 62
curb extensions, 65–69
distinctive, 106
geometric treatment and design, 62–74
historic, 121, 129, 130
load-bearing requirements, 62
maintenance and, 62, 106
paving materials, 120–131
pedestrian ramps, 62, 63
plantings and, 62, 64, 93–99
ribbon, 62, 64
stormwater management and, 49, 62, 68, 98, 99, 125
tinted concrete, 121–123
utility infrastructure and, 62

Sidewalks, furnishing zones, 63, 132–137

Slow streets, 32

Snow clearing
bike lanes/paths and, 52
chicanes and, 85
curb extensions, 65
raised crossings and, 90
raised intersections, 91
raised speed reducers and, 76

Solar Reflectance Index values, 23, 110

Speed
bumps, 76
cushions, 76–77, 77
humps, 76, 77
mid-block narrowing and, 71
raised speed reducers, 71, 76–77
reduction, 32, 60, 76–77, 78, 85, 88, 91
roundabouts and neighborhood traffic circles, 86–89
school zones, 76
tables, 76
target, 46, 91

Square asphalt pavers, 136

Stad luminaires, 157, 175

Stormwater management, 18, 23, 27, 39, 46
with chicanes, 85
curb extensions and, 67, 68
drainage swales and, 64
geometric treatment and design, 47
materials and, 111
medians and, 73
plantings and, 93
roadway, 49
shared streets and, 59, 60
sidewalks and, 32, 62
street, 85
swales, 64
tree pits and, 93, 97

Street design, 28, 29
access and mobility, 21, 22, 39
application, 39
balanced ideas of, 19
bicycling and, 38
context, 21, 23
cost-effectiveness, 21, 24
crosswalks, 116–118, 117–118
curbs, 139–142
curbside conditions and, 39
divergence, 39
drainage, 39
flooding, 39
furniture, 39, 133–137
goals, 20–24

Street Design (Continued)
greening and, 23, 39
history, 18, 38
land use and, 29, 38
lighting, 39
livability, 21, 23
local streets, 36–37
maintenance partners and, 39
major sites, 38
materials and, 39, 104–147
network role, 38
operations, 38–39
pedestrian lighting, 174–184
permits (*See* Permits)
pilot treatments, 39
plantings, 93–97, 93–99
plazas, 144–147
policies, 20–24
principles, 22–24
project development in, 40–42
property values and, 19
public space, 39
retail activity and, 19
roadway materials, 107–115
roadways and lanes, 49–59, 107–115
safety, 21, 22, 46
sidewalks, 62–64, 62–71, 106, 120–131
stormwater management and, 23, 39
street context, 38
street cuts, 39
street lighting, 155–172
sustainability, 21, 23
target speed, 46
through streets, 34–35
traffic calming, 76–91
traffic signal poles, 185
transit, 38
trees, 39 (*See also* Tree Pits)
trucks/freight, 38
trucks/freight and, 38
vehicles, 38
visual excellence, 21, 24
walking, 38
width, 38

Street(s)
bicycle boulevards, 32
boulevard, 31
cuts, 39
context, 38
history, 18
local, 23, 36–37
management, 28, 29
neighborhood character and, 23
operations, 38–39
pedestrian, 33, 49, 109, 113
planning, 28, 29
reconstruction, 24, 26
resurfacing, 26
sample, 33–37
shared, 31, 32, 49, 59–60, 78
slow, 32
through, 23, 34–35
transit, 32
typologies, 30–33
visual quality of, 24
width, 38

Street swales, 32, 64, 68, 99

Street sweeping
bike lanes/paths and, 52
chicanes and, 85
and curb extensions, 65

T

TBTA light poles, 158, 164, 165, 175, 180

Teardrop luminaires, 165, 180

Thermoplastic imprinted asphalt, 118

Tinted concrete, 121, 122, 123

Tinted concrete curbs, 140

Toilets, automatic public, 195

Traffic
circles (*See* Roundabouts *and* Neighborhood traffic circles)
engineering, 18
negative effects of, 18
truck, 22

Traffic calming, 32, 46, 75–91
bike lanes and, 51
chicane, 85
curb extensions and, 69
diagonal diverter, 82
forced turns, 81
full closure, 84
gateways, 78
geometric treatment and design, 76–91
half closure barriers, 83
medians and, 72, 80
mid-block narrowing and, 71

Traffic Calming (Continued)
raised crossings, 90
raised intersection, 91
raised speed reducers, 76–77
roundabouts and neighborhood traffic circles, 86–87
shared streets and, 59–60
speed cushions, 77
traffic diverters, 79–84

Traffic diverters, 79–84

Traffic signal poles, 186–188. *See also* Lighting

Transit, 22, 38
streets, 32

Tree pits, 93–97
connected, 34, 95, 96
individual, 93, 95
stormwater-capturing, 93, 97

Trucks, 38, 46
accommodation for, 22

Type B light poles, 178

Type F light poles, 167

Type L light poles, 169

Type M light poles, 166

Type M-2 Traffic Signal Pole, 186–187

U

Untinted concrete, 120

Untinted concrete curbs, 139

V

Vehicles, 31, 38, 46, 49
Bicycles (*See* Bikes and Bicycling)
emergency, 22, 46 (*See also* Emergency access)
separation from pedestrians, 49
shared streets and, 59–60

W

Walking, 22, 23, 32, 38, 46, 59, 66, 72, 82

Waste receptacles, 198

WM light poles, 158, 162, 175

World's Fair luminaires and poles, 179

Z

Zoning, 26, 104–105, 121