Street Design Manual

New York City
Department of Transportation

2009
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
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Stone Street, Manhattan
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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
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.

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<td>DCA</td>
<td>New York City Department of Consumer Affairs</td>
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<td>DCAS</td>
<td>New York City Department of Citywide Administrative Services</td>
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<td>DCP</td>
<td>New York City Department of City Planning</td>
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<td>New York City Department of Design and Construction</td>
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<td>New York State Department of Environmental Conservation</td>
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<td>New York City Department of Environmental Protection</td>
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<td>DOB</td>
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<td>DOHMH</td>
<td>New York City Department of Health and Mental Hygiene</td>
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<td>New York City Department of Information Technology and Telecommunications</td>
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<td>DOT / NYC DOT</td>
<td>New York City Department of Transportation</td>
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<td>New York City Department of Parks and Recreation</td>
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<td>New York City Department of Sanitation</td>
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<td>EDC</td>
<td>New York City Economic Development Corporation</td>
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<td>FDNY</td>
<td>New York City Fire Department</td>
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<td>FHWA</td>
<td>The Federal Highway Administration</td>
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<td>LPC</td>
<td>New York City Landmarks Preservation Commission</td>
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<td>MOPD</td>
<td>Mayor’s Office for People with Disabilities</td>
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<td>MTA</td>
<td>Metropolitan Transportation Authority</td>
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<td>NYCT</td>
<td>New York City Transit, an MTA agency</td>
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<td>NYPD</td>
<td>New York City Police Department</td>
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<td>NYS DOT</td>
<td>New York State Department of Transportation</td>
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<td>OCPD</td>
<td>Mayor’s Office of Capital Project Development</td>
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<td>OLTPS</td>
<td>Mayor’s Office of Long–Term Planning and Sustainability</td>
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<td>OMB</td>
<td>Mayor’s Office of Management and Budget</td>
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<tr>
<td>SAPO</td>
<td>The Street Activity Permit Office within the New York City Office of Citywide Event Coordination and Management</td>
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<td>SBS</td>
<td>New York City Department of Small Business Services</td>
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Introduction

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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.
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.
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.
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)
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.
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.

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

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1.1 Applicability

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:
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.
Using the Manual 1.3 The Planning Process

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

<table>
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<tr>
<th>Low Density Residential</th>
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<th>Medium Density Residential</th>
<th>High Density Residential Mixed Use Commercial Overlay</th>
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<tr>
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<td>Sunnyside, Staten Island</td>
<td>Park Slope, Brooklyn</td>
<td>Jackson Heights, Queens</td>
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</table>
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.
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

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
1.3 The Planning Process

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
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
1.3 The Planning Process

Pedestrian Ramps

Untinted Concrete (Residential District)

Raised Crossing

Median Barrier with Bike Channel

Bus Bulb with Bus Shelter

Traffic Signal

Bike Lane

Curb Extension with Bicycle Parking

Furnishing Zone with Square Pavers

ONLY BUS

(Residential District)
Sample Streets

Figure 2: Treatments Appropriate to Local Streets

- Raised Speed Reducer
- Ribbon Sidewalk with Planting Strip and Street Trees
- Plaza
- Benches
- Traffic Signal
- Half Closure
- Street Swale
- Two-Way Street
- Intersection
- Normalization
1.3 The Planning Process

- Mid-Block Narrowing with Raised Speed Reducer
- Street Swale
- Raised Intersection
- Ribbon Sidewalk with Street Swale
- Plain Concrete (Residential District)
1.4 Design Checklist

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.

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

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**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

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**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.

<table>
<thead>
<tr>
<th>Identify Project Goals</th>
<th>Assess Project Extent and Limits</th>
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</thead>
<tbody>
<tr>
<td>Q. What are the primary objectives of the project?</td>
<td>Q. What is the extent of construction: sidewalk and furnishing replacement only, roadway resurfacing, surface construction, or full-depth reconstruction?</td>
</tr>
<tr>
<td>Are there other secondary objectives that could or should be addressed at the same time?</td>
<td>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.</td>
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<tr>
<td>Has the community been involved in setting the project goals?</td>
<td>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.)</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Q. Who are other stakeholder agencies and entities?</td>
<td></td>
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</table>
1.5 Integration into Project Development

**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, scope, 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.

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. 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?

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.

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

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.
1.5 Integration into Project Development

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.

**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?

**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

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<td>2.3.5</td>
<td>Neighborhood Traffic Circle</td>
<td>●</td>
</tr>
<tr>
<td>2.3.6</td>
<td>Roundabout</td>
<td>●</td>
</tr>
<tr>
<td>2.3.7</td>
<td>Raised Crossing</td>
<td>●</td>
</tr>
<tr>
<td>2.3.8</td>
<td>Raised Intersection</td>
<td>●</td>
</tr>
<tr>
<td>2.4</td>
<td>Street Trees &amp; Plantings</td>
<td></td>
</tr>
<tr>
<td>2.4.1</td>
<td>Tree Pits</td>
<td></td>
</tr>
<tr>
<td>2.4.1a</td>
<td>Individual Tree Pit</td>
<td>●</td>
</tr>
<tr>
<td>2.4.1b</td>
<td>Connected Tree Pits</td>
<td>●</td>
</tr>
<tr>
<td>2.4.1c</td>
<td>Stormwater–Capturing Tree Pit</td>
<td>●</td>
</tr>
<tr>
<td>2.4.2</td>
<td>Greenstreet/Planted Area</td>
<td>●</td>
</tr>
<tr>
<td>2.4.3</td>
<td>Street Swale</td>
<td>●</td>
</tr>
</tbody>
</table>
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.
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.

### 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

### 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
2.1.2 Bike Lanes & Paths

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.

**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.

**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
**2.1.2b Bike Path**

**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.

---

**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
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

<table>
<thead>
<tr>
<th>Class 1: Bike Path (2.1.2b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Protected Path</td>
</tr>
<tr>
<td>9th Avenue, 31st to 16th Streets, Manhattan</td>
</tr>
<tr>
<td>Protected Path with Mixing Zones</td>
</tr>
<tr>
<td>Grand Street, Manhattan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Space Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parking Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
<tr>
<td>5 – 6 parking spaces/turn bay (usually every other block)</td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td>4 – 5 parking spaces/mixing zone (usually every other block)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ideal Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Avenues</td>
</tr>
<tr>
<td>Wide one-way multilane street</td>
</tr>
<tr>
<td>Excess road space</td>
</tr>
<tr>
<td>High-speed vehicular traffic</td>
</tr>
<tr>
<td>High potential for motor vehicle intrusion into standard lane</td>
</tr>
<tr>
<td>Commercial Cross-Streets</td>
</tr>
<tr>
<td>One or two lane street</td>
</tr>
<tr>
<td>Excess road space</td>
</tr>
<tr>
<td>Low-speed vehicular traffic for safe mixing zone</td>
</tr>
<tr>
<td>High potential for motor vehicle intrusion into standard lane</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full protection for cyclists</td>
</tr>
<tr>
<td>Major enhancement to pedestrian safety and comfort</td>
</tr>
<tr>
<td>Protection for cyclists midblock</td>
</tr>
<tr>
<td>Mixing zone to manage turning conflict</td>
</tr>
<tr>
<td>Simpler implementation than Signal Protected Path</td>
</tr>
<tr>
<td>Signal timing unchanged</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space needs</td>
</tr>
<tr>
<td>Parking impacts</td>
</tr>
<tr>
<td>Cyclist mobility</td>
</tr>
<tr>
<td>Unproven (Pilot)</td>
</tr>
<tr>
<td>Complex review and implementation</td>
</tr>
<tr>
<td>Challenging to regulate floating parking</td>
</tr>
<tr>
<td>Turn restrictions may be needed at complex intersections to maintain acceptable operations</td>
</tr>
</tbody>
</table>
### 2.1.2 Bikeway: Table 1

<table>
<thead>
<tr>
<th>Buffered Lane</th>
<th>Standard Lane</th>
<th>Shared Lane</th>
<th>Signed Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeKalb Avenue, Brooklyn</td>
<td>20th &amp; 21st Streets, Manhattan</td>
<td>48th Street, Queens</td>
<td>None</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>8 feet</td>
<td>5 feet</td>
<td>None</td>
</tr>
<tr>
<td><strong>Medium – Low</strong></td>
<td>Parking typically preserved unless space unavailable. Strict curb regulations sometimes needed</td>
<td>Parking typically preserved unless space unavailable. Strict curb regulations sometimes needed</td>
<td>Parking is typically preserved</td>
</tr>
<tr>
<td><strong>Residential Avenues</strong></td>
<td>One or two lane street</td>
<td>One or two lane street</td>
<td>Limited Use</td>
</tr>
<tr>
<td>- Wide multilane street</td>
<td>- Excess road space</td>
<td>- No excess road space</td>
<td>- Interim treatment</td>
</tr>
<tr>
<td>- Low potential for intrusion into bicycle lane</td>
<td>- Low potential for intrusion into bicycle lane</td>
<td>- Connected to other bicycle facilities</td>
<td>- Connected to other bicycle facilities</td>
</tr>
<tr>
<td>- Preserves curbside access</td>
<td>- Preserves curbside access</td>
<td>- Indicates a preferred bicycle route</td>
<td>- Preserves curbside access</td>
</tr>
<tr>
<td>- Simple implementation</td>
<td>- Simple implementation</td>
<td>- Preserves curbside access</td>
<td>- Simple implementation</td>
</tr>
<tr>
<td><strong>Residential Cross–Streets</strong></td>
<td>- Clear easy to follow bicycle route</td>
<td>- Does not provide dedicated roadway space for cycling</td>
<td>- Does not provide dedicated roadway space for cycling</td>
</tr>
<tr>
<td>- Dedicated roadway space for cycling</td>
<td>- Heightens driver awareness of cyclists</td>
<td>- Does not provide dedicated roadway space for cycling</td>
<td>- Cyclists not separated from traffic</td>
</tr>
<tr>
<td>- Preserves curbside access</td>
<td>- Preserves curbside access</td>
<td>- Cyclists not separated from traffic</td>
<td>- Sign placement critical, can be challenging</td>
</tr>
<tr>
<td>- Simple implementation</td>
<td>- Simple implementation</td>
<td>- Simple implementation</td>
<td></td>
</tr>
</tbody>
</table>
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.

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 LANE & BUSWAY 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 on 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 LANE & 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

Red, curb–aligned, on–street busway with “soft separation” from traffic, 34th Street, Manhattan
**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).

### 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

---

*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*
2.1.3b Busway

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.

**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
**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.

**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
2.1.4 Shared Street

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 15 mph) 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.

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
2.2.1 Sidewalk

**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.

### 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

Ribbons 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 1.8 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
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).

**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**
2.2.1b Ribbon 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.

**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
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).

**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 RCNYTitle 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
2.2.2 Curb Extension

**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.
**2.2.2a Curb Extension with Greenstreet/Plantings**

**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.

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**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

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*Curb extension with planted area: Mulry Square, Manhattan*
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.

**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: 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.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides safety and traffic calming benefits as described in Curb Extension (2.2.2)</td>
<td>See application guidance for Curb Extension</td>
</tr>
<tr>
<td>Speeds bus movement on streets with traffic congestion by eliminating the need for buses to maneuver in and out of the moving lane</td>
<td>At bus stops along bus routes where it has been determined by NYC DOT and MTA NYCT that bus bulbs would enhance bus service</td>
</tr>
<tr>
<td>Speeds bus movement by reducing the likelihood of bus stops being blocked by stopped vehicles</td>
<td>Design</td>
</tr>
<tr>
<td>Discourages non-bus encroachment into bus-only lanes</td>
<td>For detailed design guidance, see Select Bus Service Station Design Guidelines (NYC DOT &amp; MTA NYCT, 2009)</td>
</tr>
<tr>
<td>Can allow faster bus passenger boarding</td>
<td>See additional design guidance for Curb Extension</td>
</tr>
<tr>
<td>Can provide comfort and convenience to bus riders through dedicated waiting space and inclusion of bus-related amenities</td>
<td>Design BUS BULBS with care to accommodate accessibility needs, taking into account the full range of buses that might be using the stop</td>
</tr>
<tr>
<td>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</td>
<td>Sustainability Opportunities</td>
</tr>
<tr>
<td>Allows additional on-street parking as compared to a standard bus stop</td>
<td>See sustainability opportunities for Curb Extension</td>
</tr>
</tbody>
</table>

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*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*
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.

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.

**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

**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.

### Benefits

- **Reduces risk of left-turn and vehicle head-on collisions**
- **Calm 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**

Median with landscaping and sidewalk: Carlton Avenue, Brooklyn
2.2.3 Median

**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.

**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
2.3.1 Raised Speed Reducers

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

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

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

Speed hump: Bolton Avenue, The Bronx
2.3.1a 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.

**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
2.3.2 Gateway

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](image)

**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 Diversers

**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.

**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

*Forced turn at two-way to one-way transition: West 24th Street, Manhattan*
2.3.3a Median Barrier

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.

**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

Calm 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.

**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

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

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

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)](image)

![Half closure: Vancouver, Canada (Credit: Richard Drdul)](image)  
(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.

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.

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

**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
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.

**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

**Recently installed roundabout in downtown neighborhood: Asheville, North Carolina  
(Credit: Anthony Butzek)**
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.
2.3.7 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.

**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 Intersection

**Usage: Pilot**

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

The intersection is typically raised to sidewalk height.

**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
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.

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**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

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**Considerations**

- Street trees provide urban wildlife habitat opportunities
- Trees make streets more attractive
- 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).
**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.

**Benefits**

See benefits of TREE PITS (2.4.1)

**Considerations**

See considerations for TREE PITS

**Application**

See application guidance for TREE PITS

**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

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

**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

**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

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

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
2.4.2 Greenstreet/Planted Area

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.

**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.
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.

### 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

### 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

### 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

### 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

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### MATERIALS

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Same as Sidewalk Furnishing Zones

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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.

**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

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

**USAGE: OPTIONAL**

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

**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.

**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.

**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
- 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**

**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 convey harmful chemicals into the soil
- May require routine vacuuming of surface to maintain porosity

**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

**Application**
- On a level street above the high water table with low vehicle traffic
- Conventional asphalt causes rainwater to pool while porous asphalt allows it to permeate the ground below

**Sustainability Opportunities**
- See sustainability opportunities for ASPHALTIC CONCRETE

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)
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.

**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.

**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.

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

Modular cobblestone pedestrian street: Broad Street at Wall Street, Manhattan
Interlocking Permeable Concrete or Asphalt Pavers

**Usage**: Pilot

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

**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

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

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

**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


**Sustainability Opportunities**

Salvaged pavers

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
Thermoplastic Imprinting

**Usage: Optional**

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

**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.
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.

#### 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.

**Benefits**

See benefits of UNINTERTED 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 UNINTERTED 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

**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

**Sustainability Opportunities**

See sustainability opportunities for UNINTERTED 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.

**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.

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.

**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.

**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 1.8– 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.

**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

**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.

**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.

**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.

**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: 2 ¼–inch thick New York State bluestone, to match size and color of existing flags
- Finish: Natural cleft, with variation in smoothness not exceeding ¼ inch
- Joints: Hand–tight
- Specification sources: LPC guidelines, NYC DOT Standard Specifications section 6.07

**Sustainability Opportunities**
- Salvaged bluestone

Bluestone flag sidewalk: Perry Street at Bleecker Street, Manhattan
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.

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**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

**Sustainability Opportunities**
- Salvaged granite slabs
Rubber Pavers

**USAGE: PILOT**

Interlocking sidewalk pavers made of recycled rubber or a rubber/plastic mix.

**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

Rubber sidewalk pavers (credit: Rubbersidewalks®)
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.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Use of this material generally requires a maintenance agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visually delineates separation of street uses</td>
<td></td>
</tr>
<tr>
<td>Stones convey connection to natural environment</td>
<td></td>
</tr>
<tr>
<td>Cobblestones are relatively easy to remove and reset, especially for utility access</td>
<td></td>
</tr>
</tbody>
</table>

**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

**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.

**Benefits**
- See benefits of GRANITE PAVERS (3.4.1)
- Less expensive than natural stone alternatives

**Considerations**
- See considerations for GRANITE PAVERS

**Application**
- 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.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier to install and maintain than traditional cobblestone</td>
<td>This material is appropriate for furnishing zones in high-traffic areas</td>
</tr>
<tr>
<td>Smooth, saw-finish stones do not hinder pedestrian or cyclist mobility</td>
<td>Consider permeable paving options adjacent to trees and planted areas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Use of this material generally requires a maintenance agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact lifecycle of product is unknown</td>
<td></td>
</tr>
<tr>
<td>Impermeability generates stormwater runoff</td>
<td></td>
</tr>
</tbody>
</table>

**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.

**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.

**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
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

MATERIALS: CURBS

Usage: STANDARD

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

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

Typical concrete curb: Beach 73rd Street, Queens

Typical untinted concrete curb with steel facing: West 114th Street and Morningside Avenue, Manhattan
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.

**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.

**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

Precast concrete curb and gutter sections laid end-to-end. Photo shows optional sidewalk extension in background: Miami Beach, FL.
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.

**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.

**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.

**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.

**Design**

- Paver size: 16 inches between parallel sides.
- Specification source: NYC DOT Standard Specifications 6.47 ER.

**Sustainability Opportunities**

- Supplementary cementitious materials (SCM).

**Application**

This material is appropriate for all plazas.

**Use of this material generally requires a maintenance agreement.**

Hexagonal concrete pavers in a privately owned plaza: White Street at Broadway, Manhattan.
### Decorative Gravel

**Usage: Optional**

Small size decorative gravel or aggregate spread on top of a sturdy earthen or cementitious base.

#### 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

#### 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.

**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

**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

**This material is not recommended for long-term applications, especially where there are sub-surface utilities because of difficulty patching**
4 Lighting

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### 4.1 DOT–Approved Street–Lighting Combinations

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<th>Optional Poles</th>
<th>Historic Poles</th>
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<tbody>
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<td>Davit</td>
<td>Octagonal</td>
<td>Round</td>
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<tr>
<td>Cobra Head</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Stad</td>
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<td>Fulton</td>
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<td>Alliance</td>
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<td>Helm</td>
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<td>●</td>
</tr>
<tr>
<td>Teardrop</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Shielded Teardrop</td>
<td>●</td>
<td>●</td>
<td>●</td>
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</tbody>
</table>

● This combination of an optional pole with the Teardrop or Shielded Teardrop luminaire creates a historic light.

### 4.2 DOT–Approved Pedestrian–Lighting Combinations

<table>
<thead>
<tr>
<th>Luminaires</th>
<th>Standard Poles</th>
<th>Optional Poles</th>
<th>Historic Poles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Davit</td>
<td>Octagonal</td>
<td>Round</td>
</tr>
<tr>
<td>Cobra Head</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Stad</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fulton</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Flushing Meadows</td>
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<td>Helm</td>
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<td>Teardrop</td>
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<td>Shielded Teardrop</td>
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<tr>
<td>Type B</td>
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<tr>
<td>World’s Fair</td>
<td>●</td>
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</table>

● This combination of an optional pole with the Teardrop or Shielded Teardrop luminaire creates a historic light.
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.

- **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.

- **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.

- **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 luminaires 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.
4.0 Introduction

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPS</td>
<td>High Pressure Sodium</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>HDG</td>
<td>Hot Dipped Galvanized Steel</td>
</tr>
<tr>
<td>SLP</td>
<td>Standard Luminaire and Pole (cobra head on round, octagonal, or davit pole)</td>
</tr>
<tr>
<td>IESNA</td>
<td>Illuminating Engineering Society of North America</td>
</tr>
<tr>
<td>IESType</td>
<td>Pattern of light distribution defined by the Illuminating Engineering Society</td>
</tr>
<tr>
<td>W</td>
<td>Watts</td>
</tr>
<tr>
<td>$</td>
<td>Costs: Shown for each luminaire as a “$” 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.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Applications</th>
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<tbody>
<tr>
<td>Streets or highways</td>
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<tr>
<td>Single or twin mounting</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Lamping/Optics</th>
</tr>
</thead>
<tbody>
<tr>
<td>100W HPS, 150W HPS</td>
</tr>
<tr>
<td>Medium Semi-Cutoff, IES Type 1 (100W HPS)</td>
</tr>
<tr>
<td>IES Type II (150W HPS)</td>
</tr>
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<table>
<thead>
<tr>
<th>Material/Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.D.G. Steel/silver (street)</td>
</tr>
<tr>
<td>Aluminum/silver (highway)</td>
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<table>
<thead>
<tr>
<th>Cost Compared to SLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobra Head is the SLP</td>
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</table>

<table>
<thead>
<tr>
<th>Spacing/Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1</td>
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</table>

*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.

<table>
<thead>
<tr>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial districts</td>
</tr>
<tr>
<td>Single or twin mounting</td>
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<table>
<thead>
<tr>
<th>Lamping/Optics</th>
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</thead>
<tbody>
<tr>
<td>100W HPS or 150W HPS</td>
</tr>
<tr>
<td>Cutoff or Semi-Cutoff, IES Type II or III</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Material/Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum/silver, black and green</td>
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</table>

<table>
<thead>
<tr>
<th>Cost Compared to SLP</th>
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<td>$$$$$</td>
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<thead>
<tr>
<th>Spacing/Typical</th>
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</table>

Stad luminaire TBTA pole: Robert F. Kennedy Bridge, Manhattan
4.1.2 Stad

**Stad with Standard Poles**
Standard poles are provided and maintained by NYC DOT.

**Stad with Optional Poles**
Optional poles require additional funding.
**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.

### Fulton Luminaire and Pole

No standard NYC DOT pole options.

### 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 Head**

3' (or 4')

28'-0"

10'
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.

<table>
<thead>
<tr>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial districts</td>
</tr>
<tr>
<td>Roadways with width of 36 ft or more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lamping/Optics</th>
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</thead>
<tbody>
<tr>
<td>100W HPS, 150W HPS</td>
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<tr>
<td>Cutoff, or semi–cutoff, IES Type II or III</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Material/Color</th>
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<tbody>
<tr>
<td>Steel/silver and black</td>
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<table>
<thead>
<tr>
<th>Cost Compared to SLP</th>
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<td>$$$$$$</td>
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<table>
<thead>
<tr>
<th>Spacing/Typical</th>
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<td>$3:1</td>
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</table>

**Alliance Luminaire and Pole**

No standard NYC DOT pole options.
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
- Cutoff, or semi-cutoff, IES Type II or III

**Material/Color**
- Aluminum/silver, black, brown and green

**Cost Compared to SLP**
- $$$$$

**Spacing/Typical**
- ½: 1

Helm luminaire and WM pole: 39th Street, Queens
4.1.5 Helm

Helm with Standard Poles
Standard poles are provided and maintained by NYC DOT.

Helm with Optional Poles
Optional poles require additional funding.

Arms
Type 1 for WM Pole
Type 2 for 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: 3/4: 1
- Stad: 1:1

Historic Luminaire with Flatbush Avenue Pole

Historic Teardrop luminaire and Flatbush pole: 49th Street, Queens
4.1.7 TBTA

**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: 7⁄8: 1
- Stad: 1: 1
Historic Luminaires with TBTA Pole

- **8'–0" (A Version)**
- **27' (A Version)**

- **Shielded Teardrop**
- **Teardrop**
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
- ¾: 1

---

![Historic Teardrop luminaire and Type M pole: West 11th Street, Manhattan](image-url)
Lighting: Street Lighting

**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**
- $\frac{1}{2}$: 1

---

**Historic Luminaire with Type F Pole**

Historic teardrop luminaire and Type F pole: East 8th Street, Manhattan
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.

<table>
<thead>
<tr>
<th>Applications</th>
<th>Streets with roadway width of 36 feet or less</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamping/Optics</td>
<td>Non-Cutoff, IES Type III or V</td>
</tr>
<tr>
<td>Material/Color</td>
<td>Ductile Iron pole/black, brown and green</td>
</tr>
<tr>
<td>Cost Compared to SLP</td>
<td>$$$$$</td>
</tr>
<tr>
<td>Spacing/Typical</td>
<td>½: 1</td>
</tr>
</tbody>
</table>

Historic Teardrop luminaire and Bishops Crook pole: Nassau Street, Manhattan
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 undergoing engineering review. It is anticipated that the prototype of the light will be available for testing on city streets beginning Fall 2010. 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.

<table>
<thead>
<tr>
<th>Applications</th>
<th>Commercial or Residential districts</th>
<th>TBD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lamping/Optics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Material/Color</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost Compared to SLP</strong></td>
<td></td>
<td>TBD</td>
</tr>
<tr>
<td>TBD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spacing/Typical</strong></td>
<td></td>
<td>TBD</td>
</tr>
</tbody>
</table>
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)
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 with Standard Poles**

---

![Cobra Head luminaire: Manhattan Bridge, Manhattan](image)

---

![Davit](image)

![Round](image)

![Octagonal](image)
**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 with Standard Poles**

- **Davit Round Octagonal Type TBTA**
  - Stad luminaire TBTA pole: Robert F. Kennedy Bridge, Manhattan
  - Davit
  - Round
  - Octagonal
  - Type TBTA
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.

<table>
<thead>
<tr>
<th>Applications</th>
<th>Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamping/Optics</td>
<td>70W HPS, 100W HPS Cutoff, IES Type II or III</td>
</tr>
<tr>
<td>Material/Color</td>
<td>Aluminum/silver and black</td>
</tr>
<tr>
<td>Cost Compared to SLP</td>
<td>$$$$$</td>
</tr>
<tr>
<td>Spacing/Typical</td>
<td>3/4: 1</td>
</tr>
</tbody>
</table>

**Fulton Luminaire and Pole**

No standard NYC DOT pole options.
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 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**

\( \frac{3}{4} : 1 \)
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 |

| Material/Color       |  
|----------------------|-----------------|
| Steel/black, brown, or green   |

| Cost Compared to SLP |  
|----------------------|-----------------|
| $                   |

| Spacing/Typical     |  
|---------------------|-----------------|
| 3⁄8: 1              |

World’s Fair Luminaire and Pole

World’s Fair luminaire and pole: Battery Park, Manhattan
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.

### Lighting: Pedestrian Lighting

#### 4.2.7 TBTA

**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: $\frac{3}{4}:1$

---

**Historic Luminaires with TBTA Pole**

- **Shielded Teardrop**
  - 4’-0” (B Version)
- **Teardrop**
  - 4’-0” (B Version)

Historic Shielded Teardrop luminaire and TBTA pole: Hudson River Parkway, Manhattan
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.

**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.

<table>
<thead>
<tr>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lamping/Optics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available up to 80W maximum</td>
</tr>
<tr>
<td>Optional electrical control available for hi/lo dimming; high in energy savings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material/Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard mount tops made of spun aluminum with polyester powder coat finish</td>
</tr>
</tbody>
</table>

LED Post Top

The luminaire can be supported by an aluminum or steel decorative pole.
NYC DOT is no longer planning to pilot the LED Type A design
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
4.3.1 Type M–2 Traffic Signal Pole

Type M–2 Traffic Signal Pole with standard luminaire: Lafayette Street, Manhattan

Type M–2 Traffic Signal Pole with historic luminaire: West 113th 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

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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.

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.

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

Jackson Avenue at 50th Avenue, Queens (Credit: Cemusa, Inc.)
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.

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.

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.

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.

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.

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.

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:


To sponsor a waste receptacle, please call 311.
Glossary
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*)

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**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.

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**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)

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**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)

**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

**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

**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.
**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.  

**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.  

**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.
GLOSSARY

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 4, 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 cafes, 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.
**Common Terms**

**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, evapotranspire, 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](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 the 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]

**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/]

**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)

**Park**
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)

**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_Bioretenion_Basins_Rain_Gardens.pdf](http://buildgreen.ufl.edu/Fact_sheet_Bioretenion_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)

**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)

**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](http://www.epa.gov/heatisld/resources/glossary.htm))

**Source Control**
Action to prevent pollution where it originates. [www.stormwaterauthority.org/glossary.aspx](http://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.


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

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.
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)

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

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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. DESIGN REVIEW COVER SHEET

## A. PROJECT INFO

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<td><strong>Project Name</strong></td>
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<td>2.</td>
<td><strong>Project/Budget ID(s) (if applicable)</strong></td>
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<td><strong>Design Completion (%)</strong></td>
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## 7. PROJECT LOCATION

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## 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)
B. Agency Roles on the City’s Streets

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

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.

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(www.nyc.gov/html/charter/) |
| **Manual on Uniform Traffic Control Devices (MUTCD)**  
www.mutcd.fhwa.dot.gov/ | City Planning (Chapter 8) |
| **United States Code (USC)**  
uscode.house.gov | Department of Buildings (Chapter 26) |
| Americans with Disabilities Act (ADA)  
www.ada.gov/stdspdf.htm | Department of Citywide Administrative Services (Chapter 35) |
| Clean Air Act (CAA)  
www.epa.gov/air/caa/ | Department of Consumer Affairs (Chapter 64) |
| Clean Water Act (CWA)  
www.epa.gov/oecaagct/lcwa.html | Department of Design and Construction (Chapter 55) |
| National Environmental Policy Act (NEPA)  
www.epa.gov/Compliance/nepa/ | Department of Environmental Protection (Chapter 57) |
| **State Laws and Regulations** | Department of Health (Chapter 22) |
| **New York State Code of Rules and Regulations**  
www.dos.state.ny.us/info/nycrr.htm | Department of Parks and Recreation (Chapter 21) |
| New York State Department of Environmental Conservation (Title 6)  
www.dos.state.ny.us/info/nycrr.htm | Department of Sanitation (Chapter 31) |
| New York State Environmental Quality Review Act (SEQRA)  
www.dec.ny.gov/public/357.html | Department of Small Business Services (Chapter 56) |
| New York State Department of Transportation (Title 17)  
www.dos.state.ny.us/info/nycrr.htm | Department of Transportation (Chapter 71) |
| **New York State Environmental Conservation Law (ECL)**  
public.leginfo.state.ny.us/ | Fire Department (Chapter 19) |
| New York State Highway Law  
public.leginfo.state.ny.us/ | Franchises, Revocable Consents and Concessions (Chapter 14) |
| New York State Transportation Law  
public.leginfo.state.ny.us/ | Landmarks Preservation Commission (Chapter 74) |
| New York State Vehicle and Traffic Law (VTL)  
public.leginfo.state.ny.us/ | Police Department (Chapter 18) |
| **Administrative Code of the City of New York**  
24.97.137.100/nyc/AdCode/entered.htm | Public Design Commission/Art Commission (Chapter 37) |
| **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)** | |
C. Legal & Design Guidance References

Local Laws and Regulations (cont.)

Fire Prevention and Control (Title 15)
Health (Title 17)
Housing and Buildings (Title 26)
Land Use (Title 25)
Parks (Title 18)
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 (Title 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

City Environmental Quality Review

CEQR Technical Manual

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

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/)


Pedestrian Facilities Users Guide

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/)

ITE www.ite.org/

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#tcsp)


MUTCD mutcd.fhwa.dot.gov/

U.S. Access Board www.access-board.gov/


Local Design Guidance Sources

NYC DCP
www.nyc.gov/planning

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)

NYC DOT
www.nyc.gov/dot


NYC DPR
www.nyc.gov/parks
Tree Planting Standards (NYC DPR: 2008; www.nycgovparks.org/sub_permits_and_applications/images_and_pdfes/TreePlantingStandards.pdf)
Stormwater Source Control / Best Management Practices (BMP) Design Guidance Sources


City of Chicago Stormwater Management Ordinance Manual (Chicago Department of Water Management: 2008)


Street Planning Resources


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)
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.
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