



ONE WAY

AYARD
FPB
ESTABLISHED 1911

116 WEST HOUSTON STREET NYC

116

SIT SLEEP SOWO

114

Planted Raised Median Design Guidelines

June 1, 2015



VISION ZERO



Street Design

Outreach

Enforcement

Legislation

Campaigns



VISION ZERO Great Streets

Rethink and redesign major corridors to prevent serious crashes, improve mobility, increase accessibility and enhance neighborhood vitality and environmental health

4th Avenue, Atlantic Avenue, Grand Concourse, and Queens Boulevard have been identified for improvements



Existing Condition, 4th Avenue



Proposed 4th Avenue Treatment (rendering)



Flatbush Avenue Extension, Brooklyn



Broadway Malls, Manhattan

Benefits

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

Calms traffic by narrowing roadway

Planted medians increase the traffic-calming effect afforded by MEDIANS

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

Greens and beautifies the streetscape if it incorporates trees and/or plantings.

Improves environmental quality and can incorporate stormwater source controls

If designed for walking access, can provide additional pedestrian capacity

Can provide space for a SIDEWALK and/or SEPARATED BIKE PATH, particularly as part of a boulevard treatment



Application

Street Design Manual



New York City
Department of Transportation

2013
Second Edition

GEOMETRY: SIDEWALKS & RAISED MEDIANS

2.2.3 Raised Median

Raised Median

Usage: Wide

A raised area separating different lanes, traffic directions, or roadways within a street. The raised median can be either curb height (6-7 inches) or, where appropriate, 12-24 inches high. The width as well as design of raised medians can vary widely. They can range from narrow raised concrete islands to tree-lined promenades to intensively landscaped boulevard medians. In contrast to PEDESTRIAN SAFETY ISLAND (2.2.4), raised medians extend for most or all of the street block.

LANDSCAPE: ROADWAY PLANTINGS

6.2.1 Raised Median

Raised Median

A RAISED MEDIAN (2.2.3) that provides an opportunity for planting. Medians can be 6-7 inches high (at curb height) or 12-24 inches high to provide additional growing medium as well as increased protection. Medians allow for various types of plantings due to their different sizes and lengths. Trees are typical; however, careful consideration must be given to the sight lines of drivers, cyclists, and pedestrians. DPR generally maintains existing median plantings, pursuant to the Greenstreets agreement between DPR and DOT.

RAISED MEDIAN

Curb Height

A median that is raised 6-7 inches above the roadbed and provides adequate width to allow for plantings. RAISED MEDIAN (CURB HEIGHT) are utilized throughout the city. Trees and other ornamental plantings add to the traffic-calming effect provided by medians.

Benefits

See benefits for RAISED MEDIAN (6.2.1)

Considerations

See considerations for RAISED MEDIAN (6.2.1)

Consider underground utility constraints as excavation beneath the roadbed will be necessary to provide adequate soil volume and positive drainage

If the roadway can be regraded to a double crown, consider using the median to capture and detain stormwater; See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Design

See design guidance for RAISED MEDIANS (6.2.1)

Consider the use of a suspended pavement system and CONNECTED TREE BEDS (6.1.1b)

Plantings must not protrude into the roadway; select plants that will grow densely within the planting bed

Plants

See Roadway Planting Recommendations (Table 6B)



Planted curb-height median: 253rd Street and 86th Avenue, Queens (Credit: DPR)



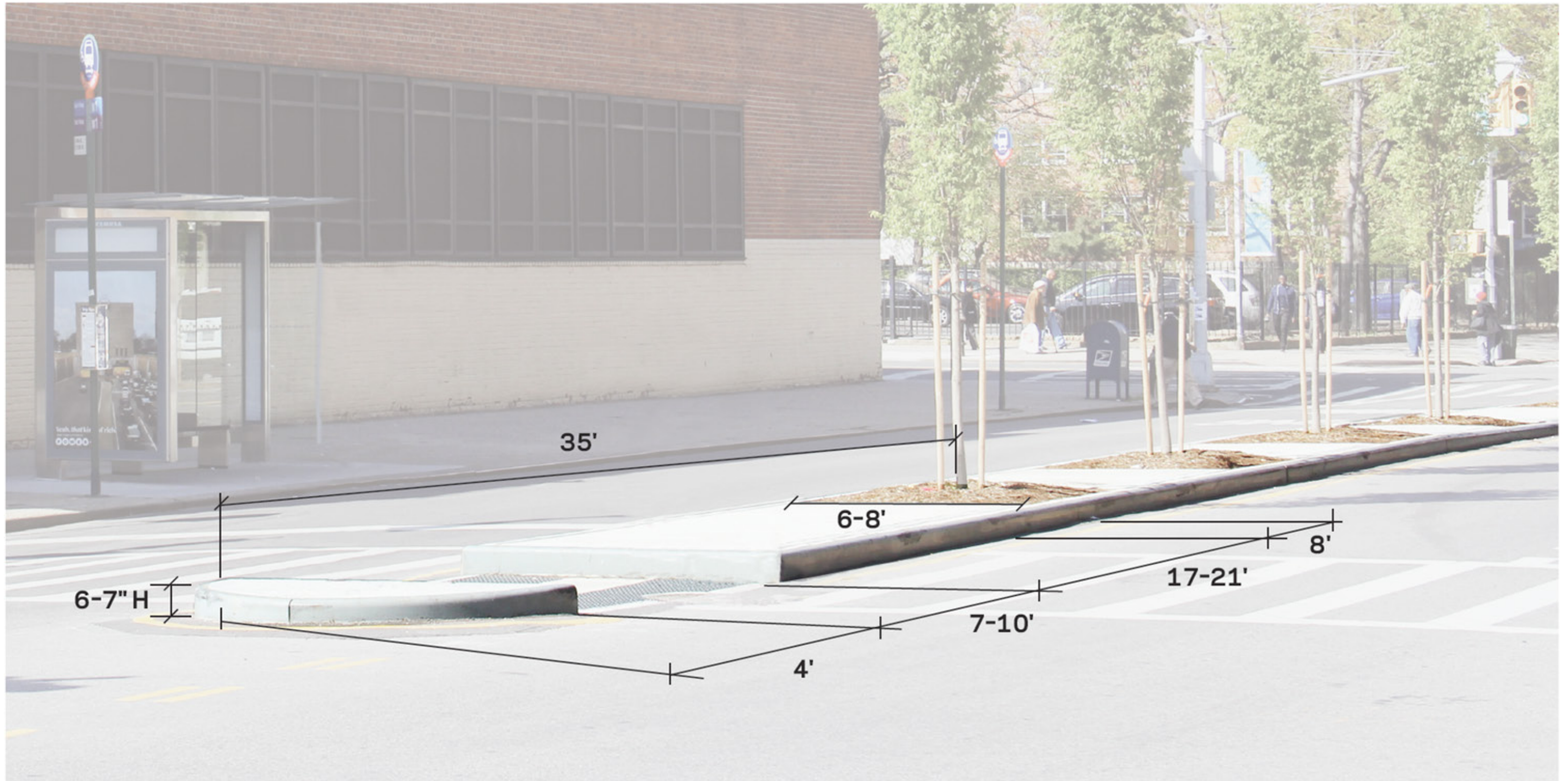
Curb-height median with plantings set back from the curb to allow for easier maintenance: Merrick Boulevard, Queens (Credit: DPR)

Curb Height

Appropriate for all streets where subsurface conditions allow sufficient excavation for adequate soil depth.

DOT's preferred treatment.











Credit: Landscape Architecture Magazine (April 2015 Edition)



Credit: Landscape Architecture Magazine (April 2015 Edition)

RAISED MEDIAN

12-24 Inches

A median, typically constructed of concrete or stone, 12-24 inches above the roadbed that provides above-ground soil volume for plantings. Generally employed where underground constraints prevent planting at grade and/or along high-speed roadways.



Raising medians to over 12 inches helps accommodate tree roots: West Houston Street, Manhattan (Credit: DPR)



Planted raised median: Canal Street, Manhattan (Credit: DPR)

Benefits

See benefits for RAISED MEDIAN (6.2.1)

Considerations

See GENERAL GUIDELINES (6.0.1)

See considerations for RAISED MEDIAN (6.2.1)

Higher medians can encourage higher motor vehicle speeds; therefore, design the median to the minimum height necessary to accommodate appropriate soil depth

Consider visibility in relation to the overall height of mature plantings and the raised median (12 - 24 inches)

Existing trees at potential raised-median sites should be preserved if possible; consider installing the median around the trees to prevent excavation and change of soil grade

Design

See design guidance for RAISED MEDIAN (6.2.1)

Planting beds should be sufficiently wide and deep to provide adequate soil volume for plants: 6 feet minimum soil width (wall to wall) and 24 inches minimum soil depth

Always excavate through the entire roadbed so the bottom of the planting bed is open and will allow positive drainage

The roots of plants will be primarily above ground, and are thus more sensitive to freeze-thaw cycles in the winter. Carefully select species which are cold hardy to at least Zone 6A. For added insulation, provide adequate mulch (2 - 3 inches) at the time of planting and replenish as necessary

For perimeter plantings, choose plants that will not protrude beyond the edge of the raised wall; plants that cascade over the edge of the wall may be acceptable

Plants

See Roadway Planting Recommendations (Table 6B)

12-24 Inches

Appropriate where subsurface conditions make sufficient excavation for adequate soil depth infeasible, or traffic concerns make a raised median wall desirable.





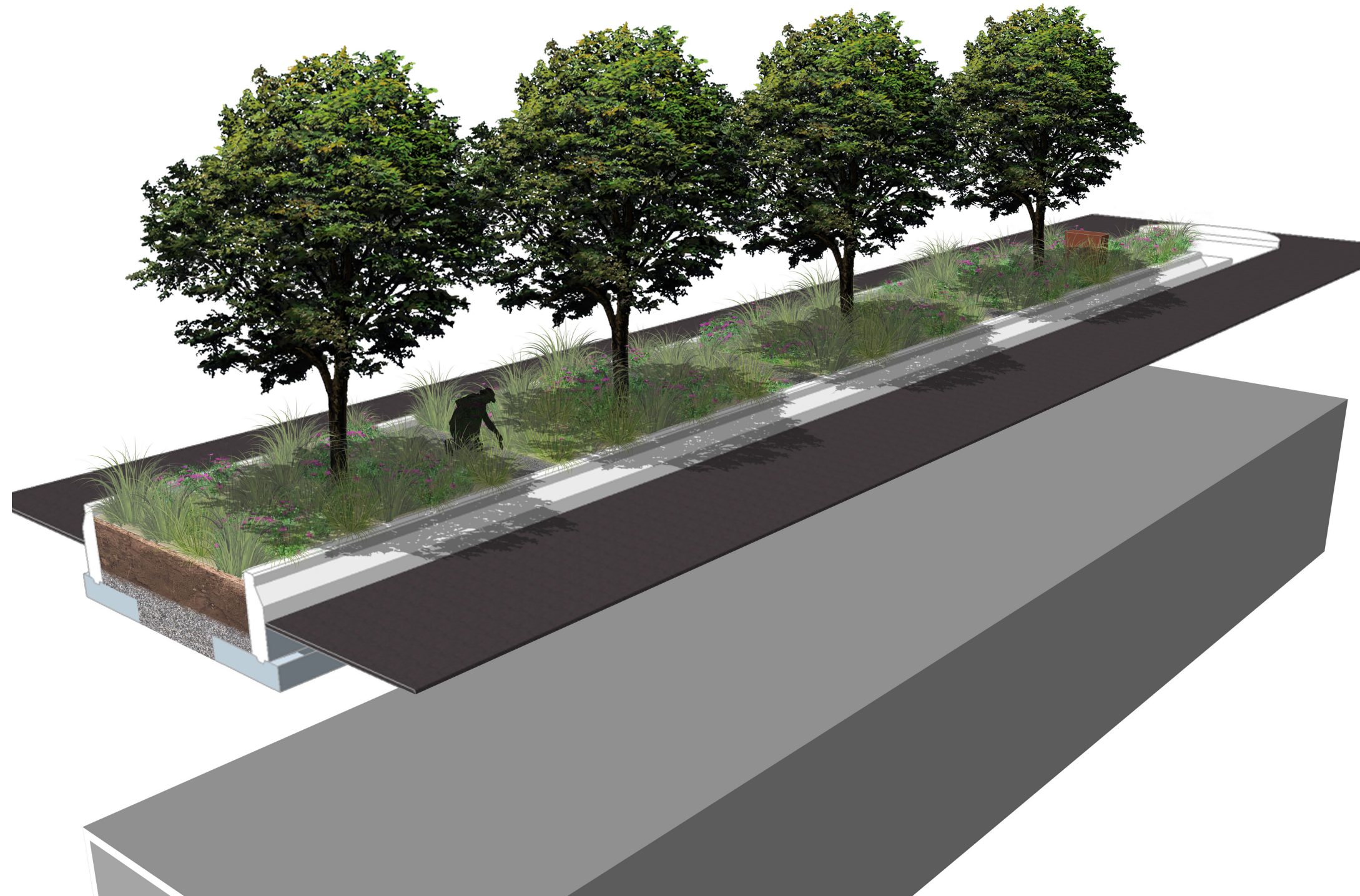








Design



Plantings

As per the SDM section 6.0.1 (General Guidelines), plantings should be selected to match existing site conditions and anticipated site use to achieve an aesthetically pleasing, functional, and long-lived landscape.

Soil

As per SDM section 6.0.1, soils are crucial to plant health and project implementation. Soil volume should be maximized and plants selected to grow well in the available soil volume.

Drainage

As per SDM section 6.2.1b, Positive drainage must be established by always excavating through the entire roadbed and any impermeable layers.

Subsurface Constraints

The presence of train tunnels or utility lines underneath the planned median affect drainage and planting considerations.

Intersection/ Setbacks

As per SDM section 6.0.1, intersection design and planting setbacks must follow MUTCD, AASHTO, NYSDOT, DPR and DOT design standards. Trees and other plantings must not block sight lines at intersections

Irrigation

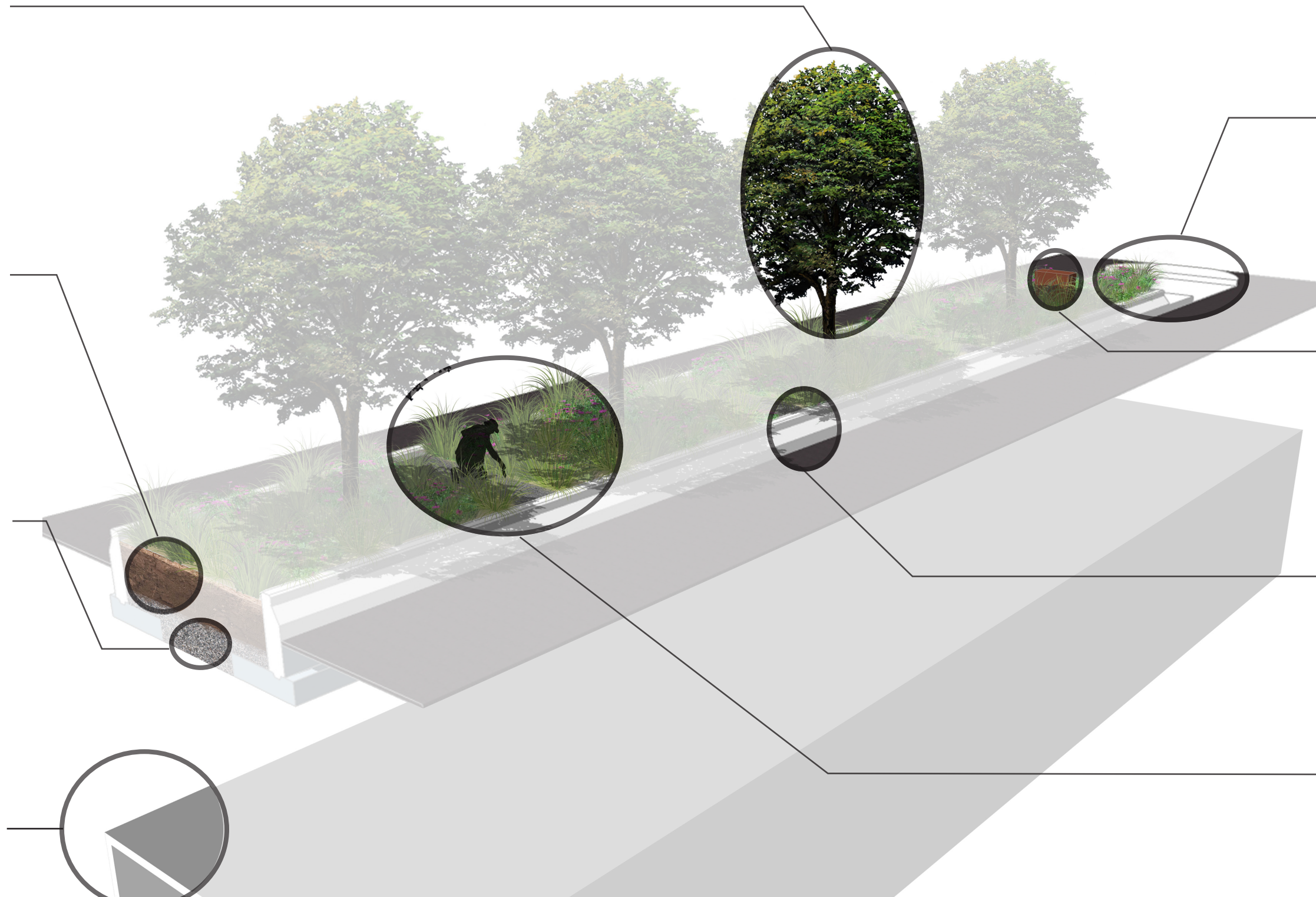
Irrigation is a critical factor in design and plant selection. Any water source will require an RPZ, water meter and appropriate equipment.

Median Structure

As per SDM section 2.2.3, a raised median will be 12-24" in height and extend for most or all of the street block. The typical design will be a reinforced concrete wall.

Maintenance

Maintenance requirements should be a major design consideration. As per SDM section 6.0.1, site design and species selection should correspond to the anticipated level of maintenance.

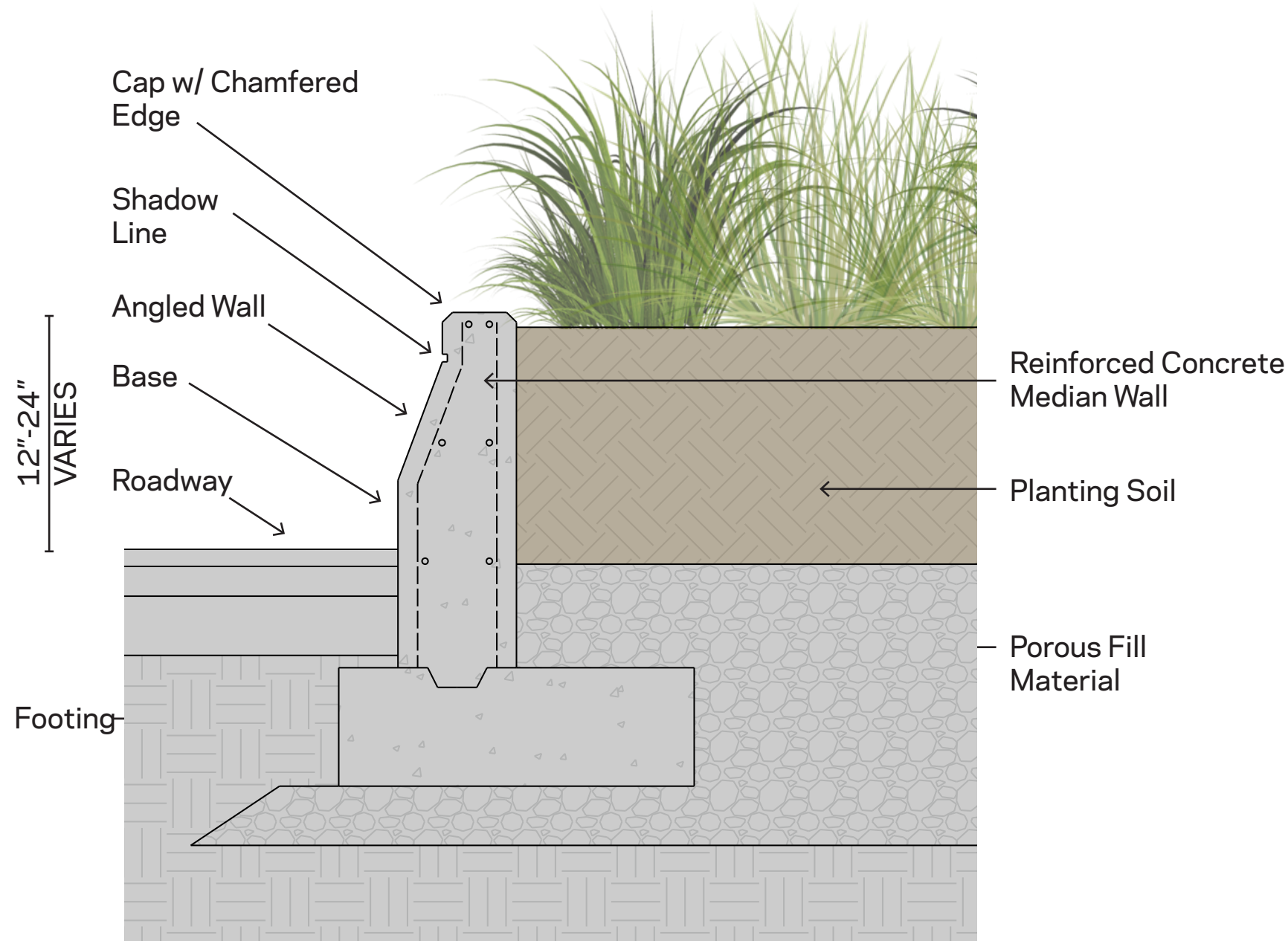
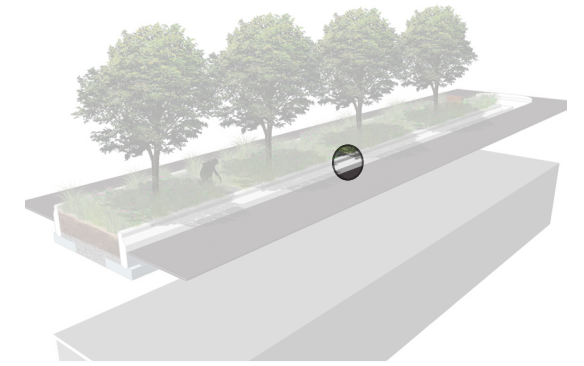


Median Dimensions: Height

Raised Medians should be designed to the minimum height necessary to accommodate adequate soil volume for the proposed plantings. 24" maximum above roadbed.

Soil Volume Required:

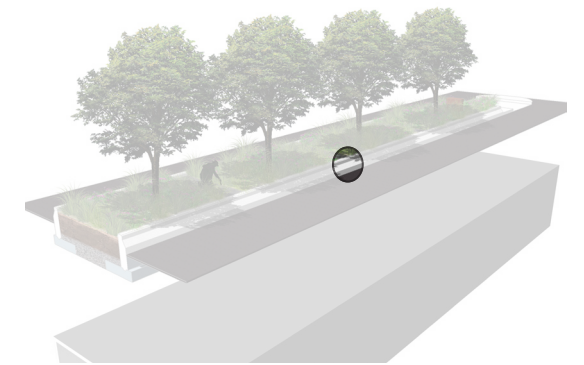
24" minimum depth required for trees; 36" preferred. Preference for 150 ft³ of soil volume per tree minimum, can be reduced for multiple trees in a shared soil volume condition. Shared soil volume between tree pits is preferred to individual tree pits.



Jackson Avenue, Queens

Construction Considerations

Constructability should be considered in the design of the median structure. Using pre-cast sections may save time. Self-consolidating concrete and steel formwork can also be used to reduce pock marks and improve the overall finish of the median wall.



Smooth finish
from steel
formwork

East Houston Street Median - Inspection Sample



East Houston Street Median - Inspection Sample



Self-consolidating concrete
(Source: Nicolia ready-Mix)



Steel formwork
(Source: Metal Forms Corporation)

Subsurface Considerations

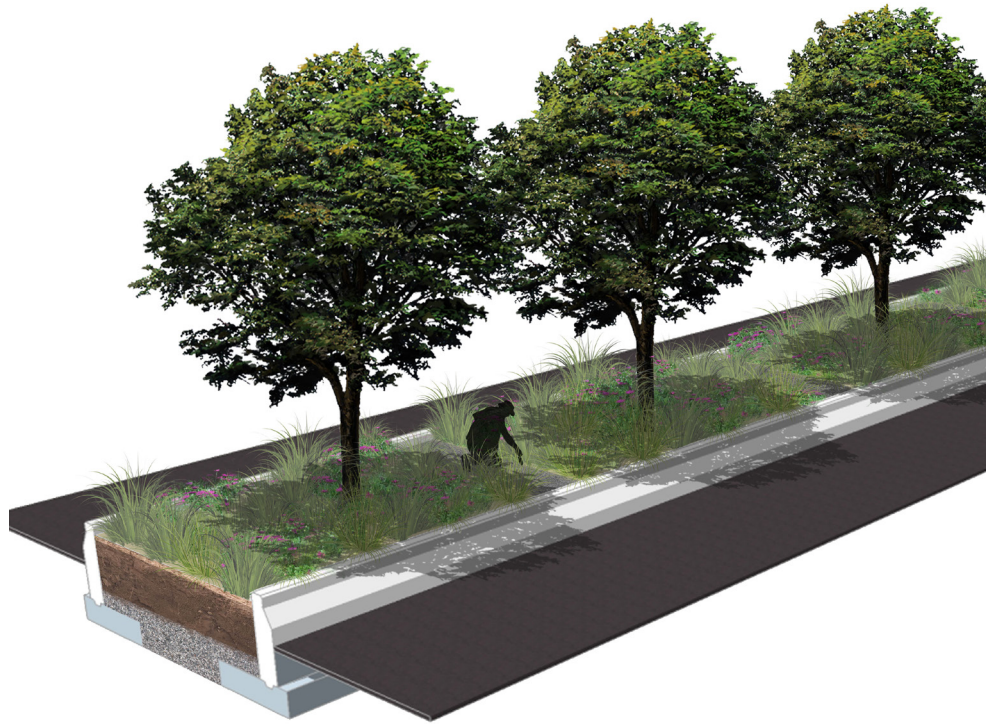
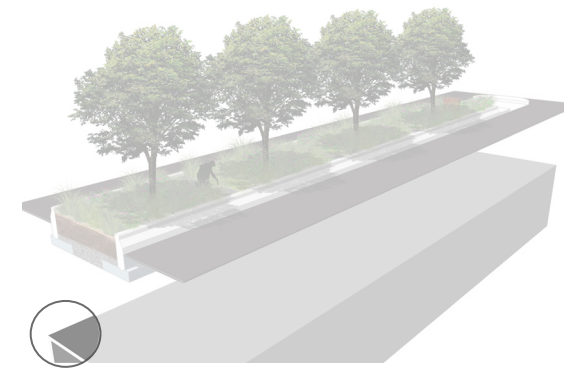
Typical driving force behind raised medians. Subsurface constraints limit the amount of soil volume.

NYCTA Tunnel Clearance

NYCTA requires a minimum of 10' horizontal clearance from subway structures for trees. 10' of vertical clearance is also required for tree plantings (or as low as 5' with an acceptable root barrier). Should the cover requirements not be feasible, the median must provide a "bathtub" for drainage of a minimum 2' depth.

Utility Clearances

The majority of utilities may run under or pass through a raised median. DEP typically requires 6' horizontal clearance from a tree trunk to a water/sewer main and 30' clear of plantings or structure on either side of a manhole.



Unconstrained

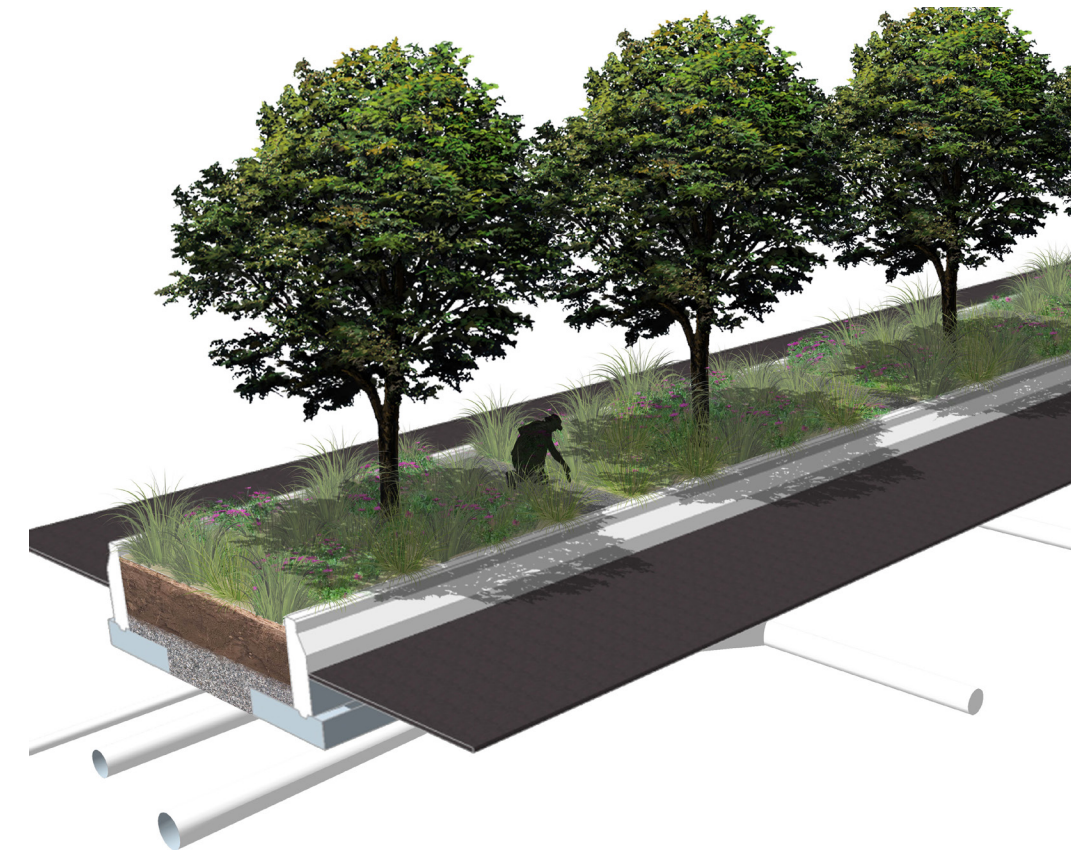
Typically reserved for locations along high speed roadways or where additional height is desirable (e.g. enhance safety, deter jay-walking, provide additional protection to plants, etc.)



Subway/Vault Structures

Additional planting considerations apply to provide for long-term plant vitality

- Raise the vent structures to median height
- Raise the median around or next to the vents



Utility Conflicts

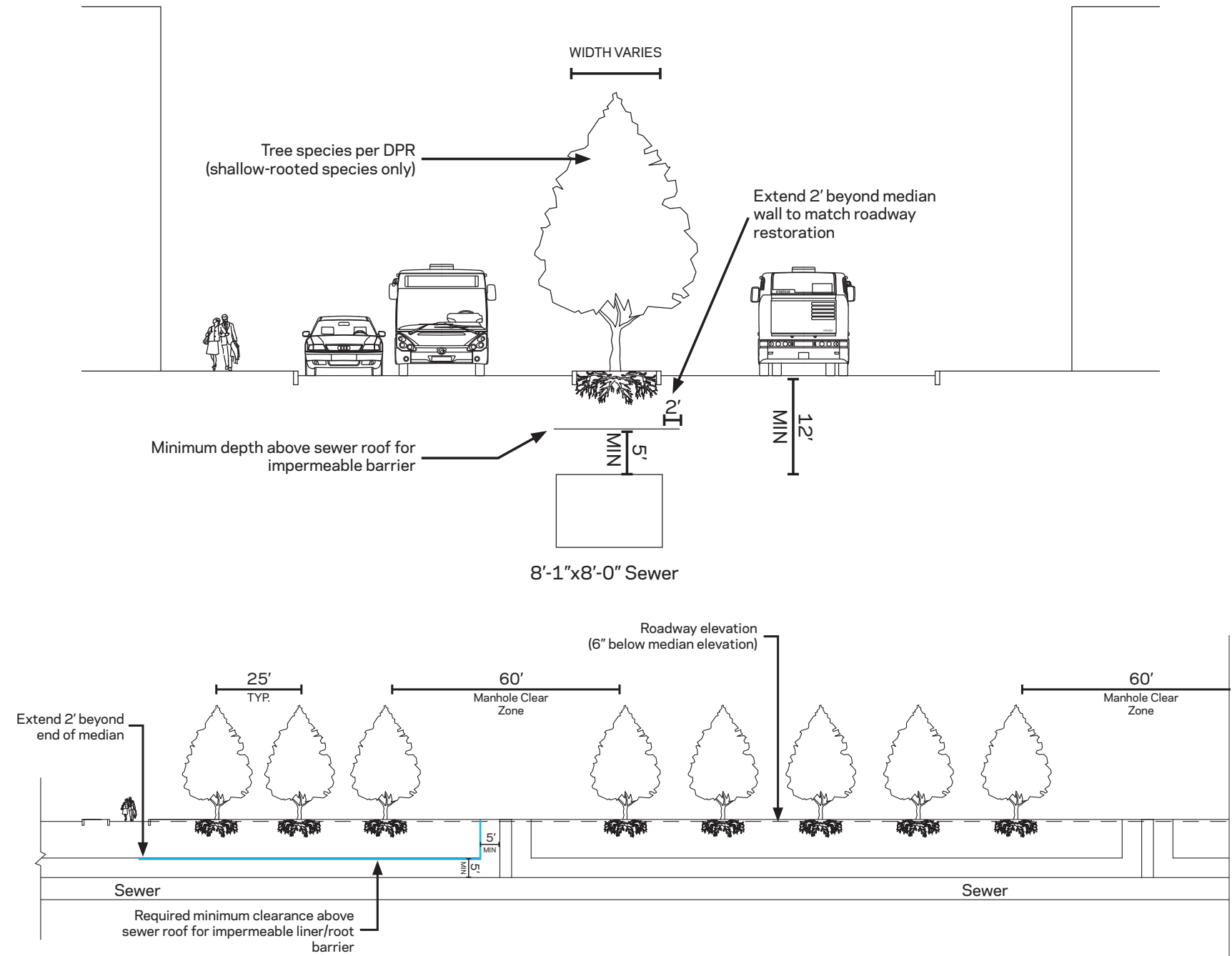
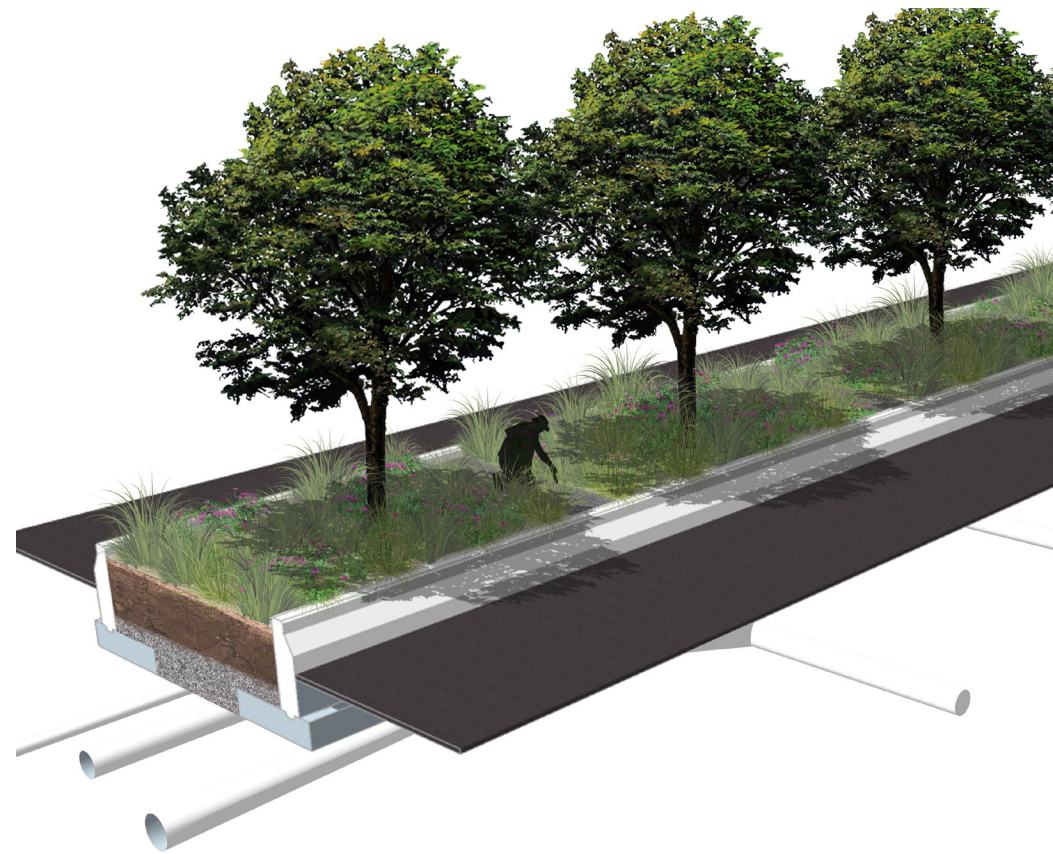
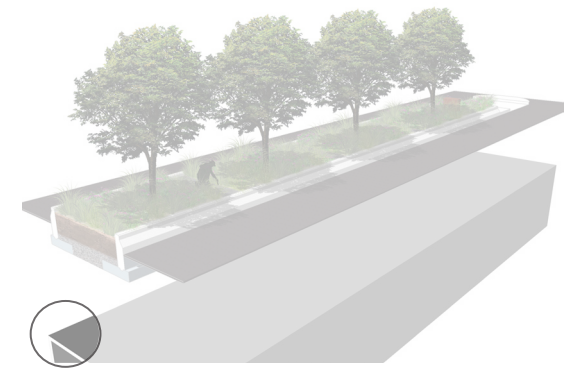
Utilities must be sleeved depending on type and access provided where appropriate

DEP Requirements

- A low median (6"-7")
- Adequate space and protection between the sewer and vegetation roots while still allowing maintenance and construction access
- 30' clear spacing on either side of a manhole.

DEP Allowances for Trees

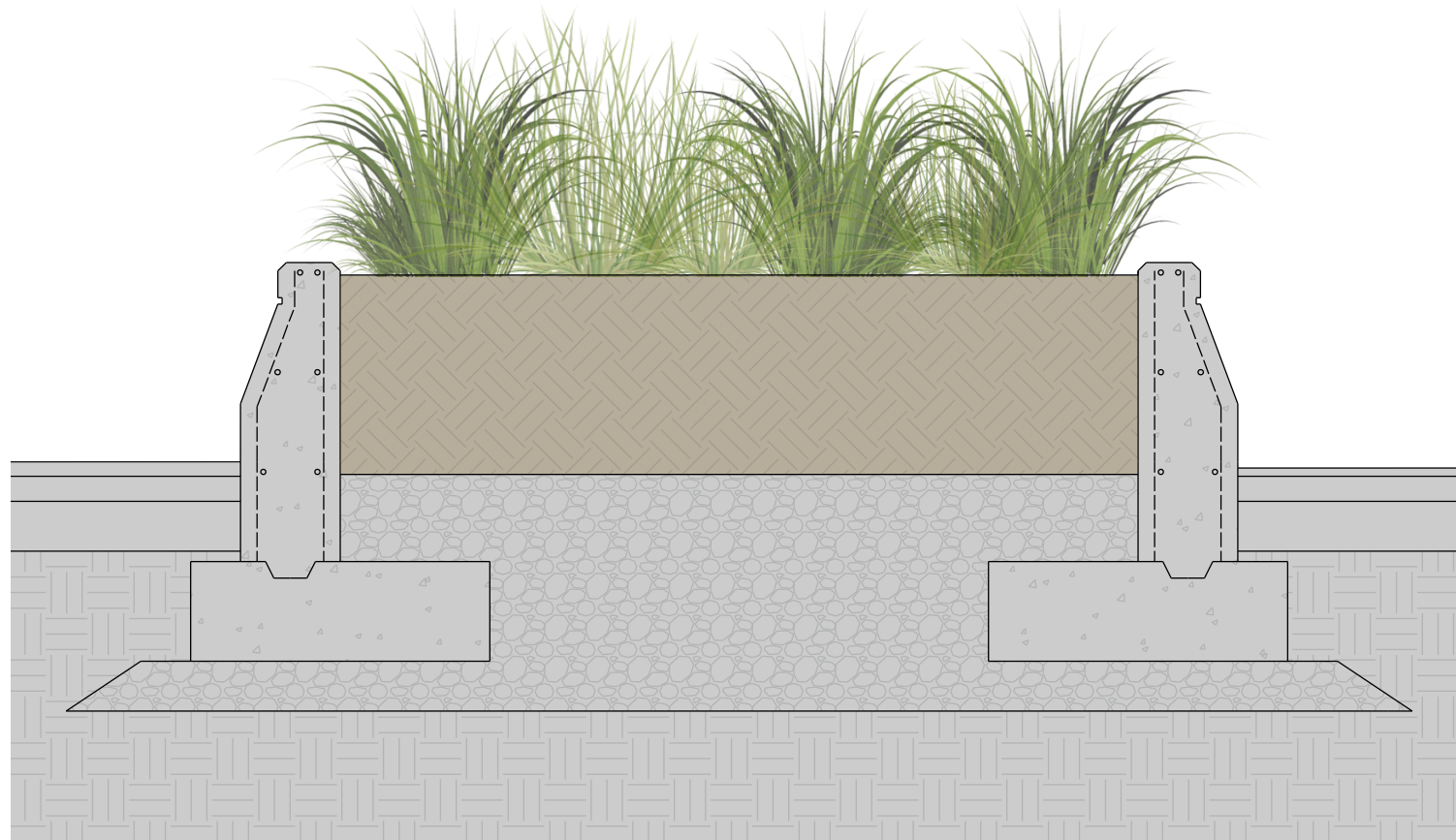
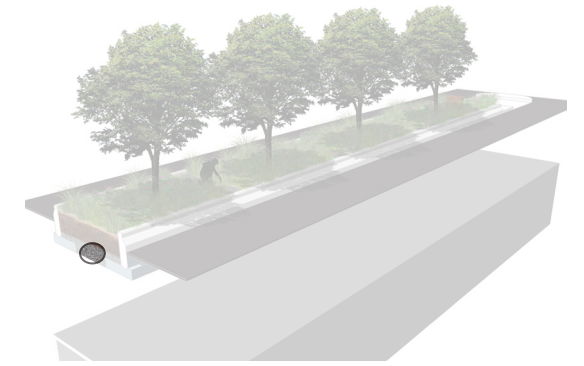
- 6' horizontal clearance from sewer/water line.
- Moveable planters (doweling is fine) outside of the manhole clearance zone.
- Under the condition where the sewer is 12' or more from the surface, a 6-7" high median with trees is acceptable provided: the distance between the bottom of the tree well and top of the sewer is no less than 5'; an impermeable liner exists; the impermeable liner extends a minimum of 1' beyond the mature root ball.



Drainage Considerations

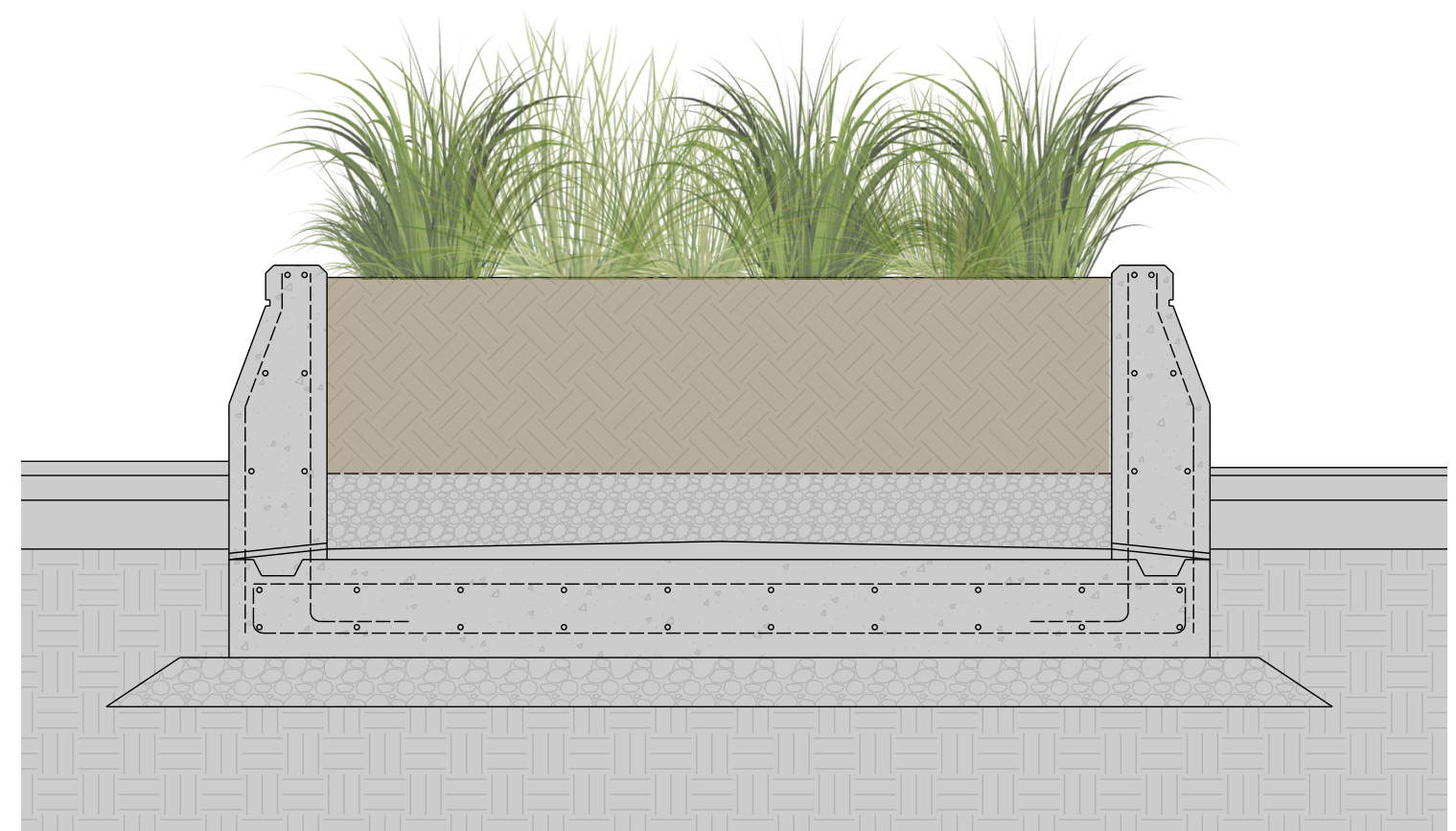
Excavation through the existing roadbed and establishment of positive drainage is mandatory. If water cannot escape the root zone, the plants will drown. The structure/foundation may also be compromised over time.

Additional drainage structures or treatments may be necessary depending on site conditions (e.g. waterproofing, perforated pipe, etc.)



Open Structure

An open footing allows water to drain through the broken stone base into the subgrade. Appropriate when train tunnels and non-sleeved utilities are not present, or are more than 10' below the base.



Enclosed Structure

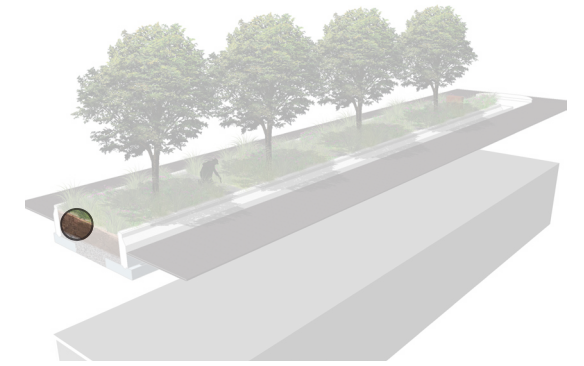
A footing underneath the broken stone base that prevents drainage into the subgrade directly below the median. Weep holes direct water to drain outward. Appropriate above train tunnels when 10' clearance cannot be established.

Soil Considerations

The planting bed consists of a minimum of 24" (36" preferred) of soil over an aggregate base for drainage, with at least 3" of mulch. Providing adequate soil volume is critical to tree and plant vitality.

Soil Mix

The soil mix should be high quality planting soil. Given limited growing conditions, the soil should allow for high water holding capacity and have a slightly acidic pH (5.7-6.5) to maximize nutrient availability. Where necessary the soil should contain a perlite or an expanded shale to minimize overall weight.



Aggregate Base

For drainage purposes



Soil



Mulch

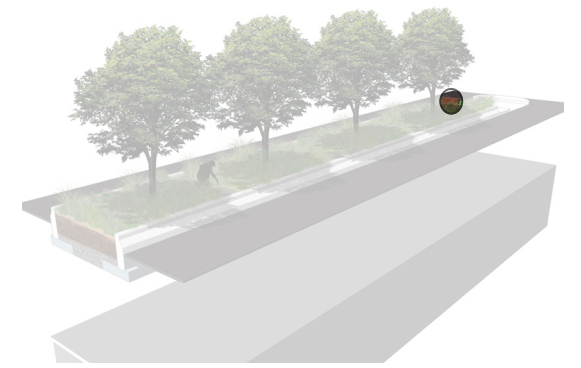
3" minimum; do not apply directly around tree trunks or large woody shrubs as this will cause rot.

Irrigation

- A water source should be provided on the median when possible. Otherwise, a water truck will be required.
- The watering method used will impact plant selection and maintenance.
- The "Hose-Bib Connection" and "Full Irrigation System" require an RPZ and associated equipment (enclosure, water meter, etc.)

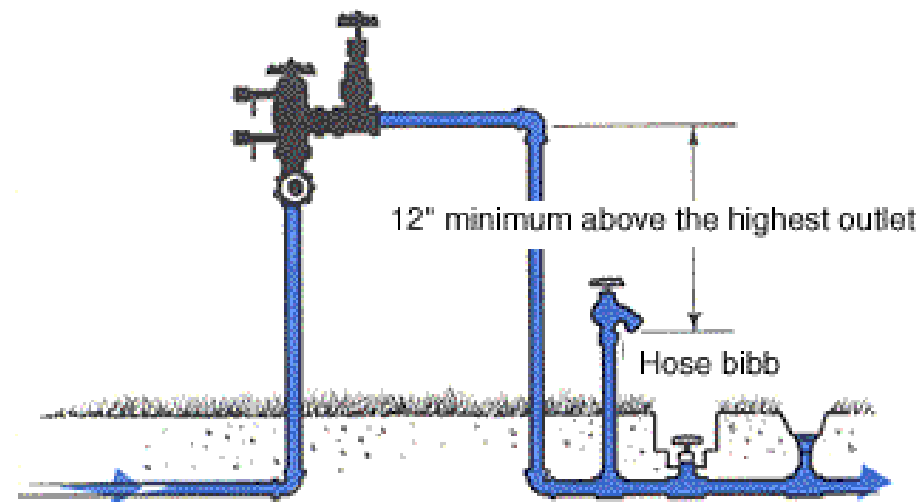
RPZ Considerations

The RPZ and water meter must be located where it can be accessed regularly for maintenance. Typical locations are near the intersection with plantings used for screening (see intersection design section).



Water Truck

No water source provided
Consider appropriate safety measures (back-up truck, etc.)



Hose-Bib Connection

Enclosure color can be customized

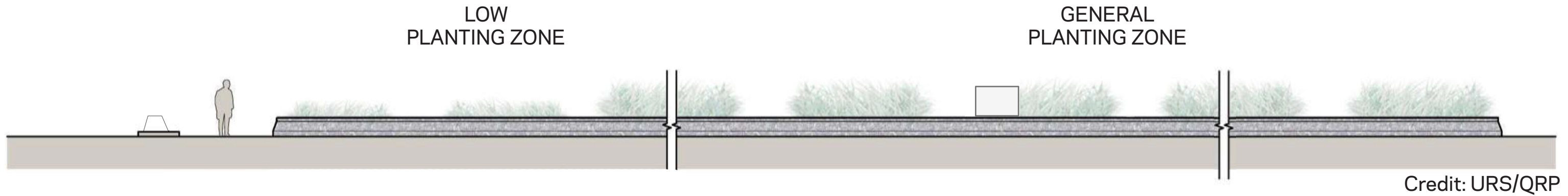
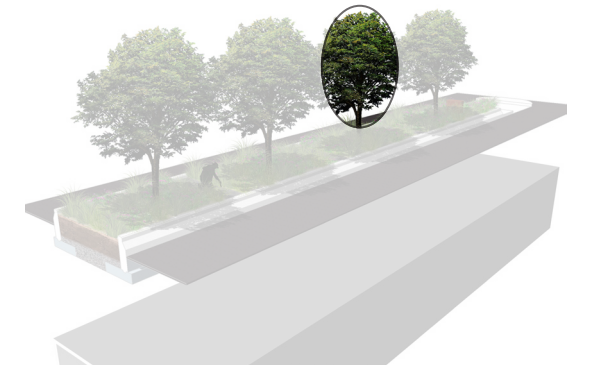


Full Irrigation System

- Pop-up sprinklers
- Drip irrigation - only applicable with high-capacity maintenance partner

Planting Zones

In order to preserve sight distances, the planted area closest to the intersection should contain only low-growing plants and groundcovers. There must be a minimum of 35' between the median tip and the first tree. The remainder of the median may contain plants of varying heights.



Flatbush Avenue Extension, Brooklyn



Adams Street, Brooklyn

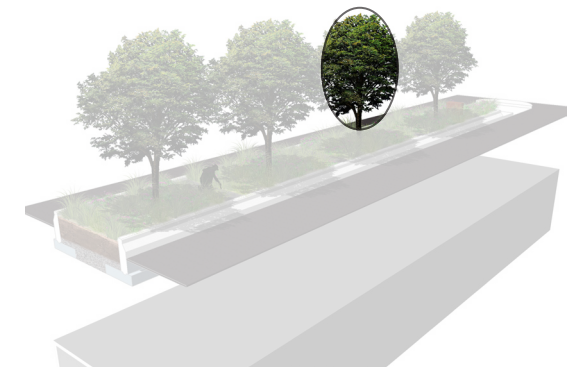
Planting Considerations

Plantings will be selected based on the following characteristics:

- Soil Volume
- Soil Properties
- Median Width and Height
- Type of Irrigation
- Level of Maintenance
- Planting Context/Biodiversity
- Environmental Tolerances

All plantings will be selected in coordination with the maintenance partner and reviewed by DPR.

All trees must be reviewed and approved by DPR.



Canal Street, Manhattan

Low Maintenance

- Drought tolerant (water truck only)
- Hardy plants with very good environmental tolerances (salt, wind, etc.)
- Low frequency of maintenance visits*
- Most limited plant palette



Jackson Avenue, Queens

Average Maintenance

- Drought tolerant (water source provided and/or water truck)
- Hardy plants with good environmental tolerances (salt, wind, etc.)
- Average frequency of maintenance visits*
- Wider range of plants available



Adams Street, Brooklyn

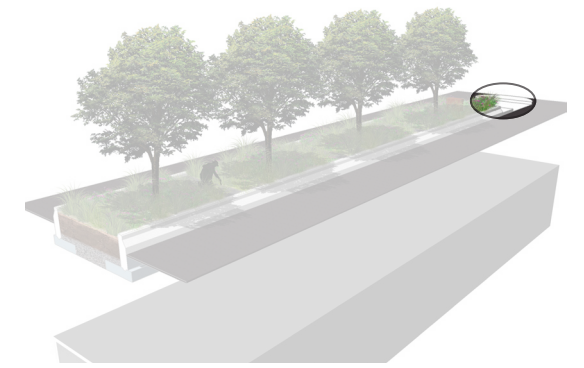
High Maintenance

- High-demand plants (irrigation system provided)
- Good environmental tolerances
- Highest frequency of maintenance visits*
- Widest range of available plants

*Note: see maintenance considerations section for information on maintenance activities

Median Dimensions: Width

The preferred minimum median width is 7' with 5' of planting. Narrower widths may be used on a case-by-case basis, but are typically discouraged. Wider medians allow for greater flexibility in use and plant selection. In all cases, adequate soil volume must be provided and plants selected to fit the site conditions.



Park Avenue South, Manhattan

Narrow Median (4'-7' Wide)

Planting restrictions apply



West Houston Street, Manhattan

Typical Median (7'-16' Wide)

5' minimum planting width



Pike Street, Manhattan

Wide Median (>16' Wide)

Typically referred to as Pedestrian Malls

Intersection Design

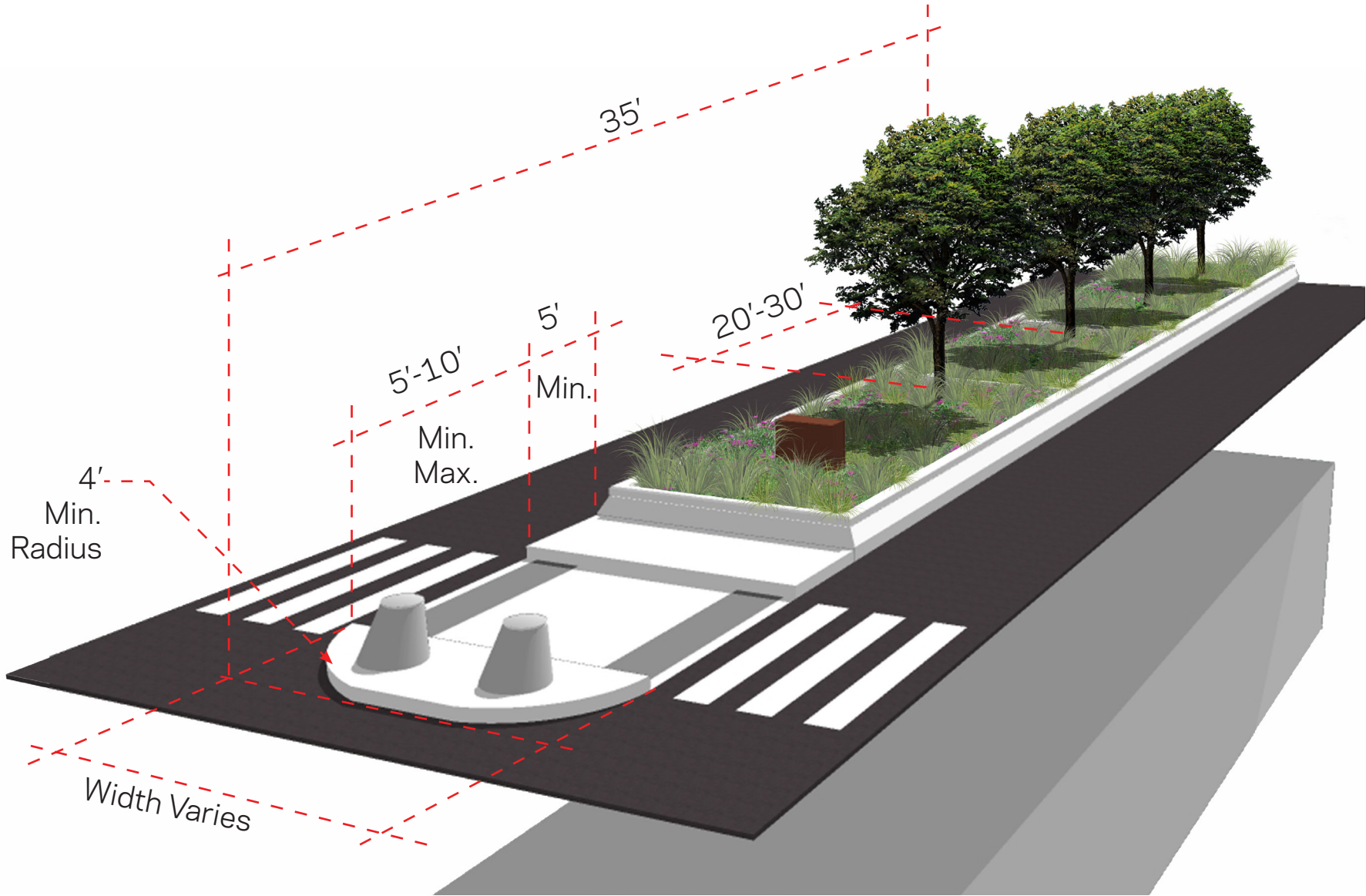
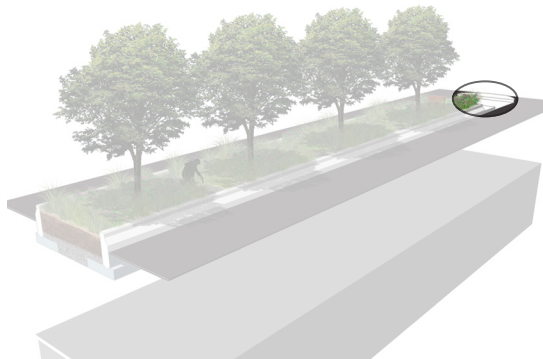
The median tip must meet ADA requirements and all DOT standards. This area should provide a refuge for pedestrians crossing the street and be oriented to accommodate the direction of pedestrian flow.

Setbacks/Clearances

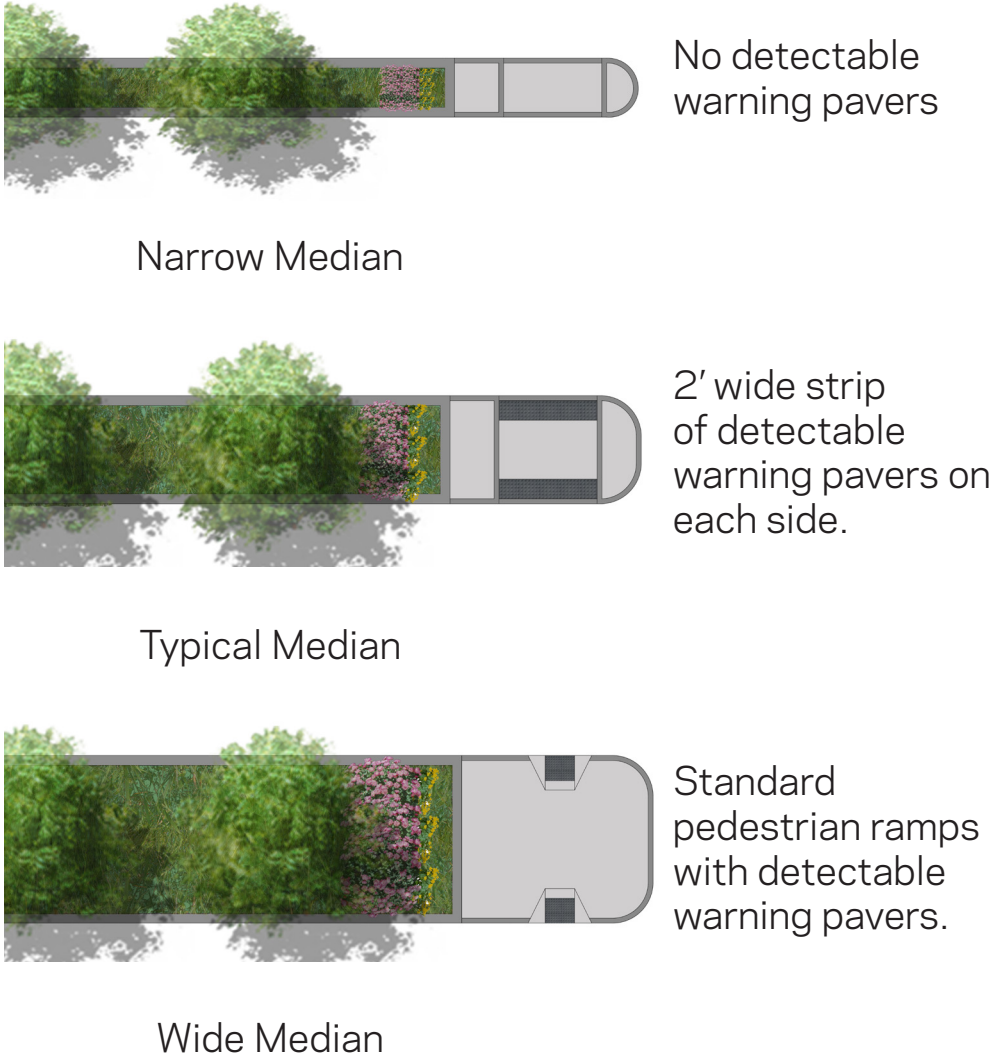
Intersection setbacks protect drivers and pedestrians by ensuring a sufficient range of vision at intersections. A 5' minimum clearance from the end of the crosswalk to the beginning of the median should be maintained.

Planting

Consideration should be given to a more diverse plant palette at the intersection as this is where pedestrians will interact with the median.



Intersection Setbacks

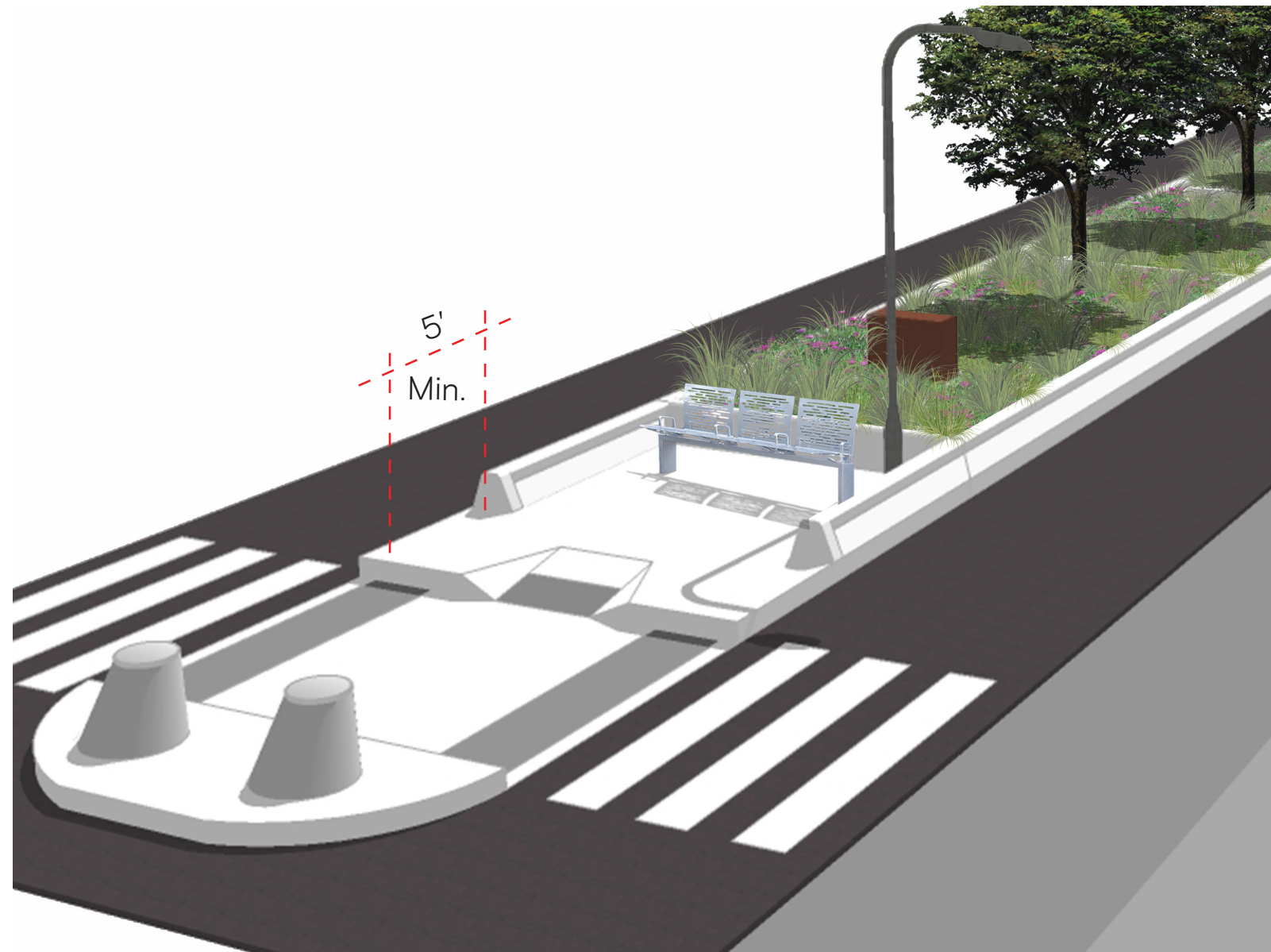
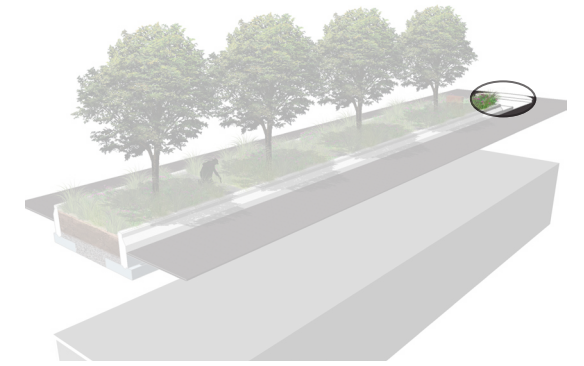


Median Tip Design

Furnishing Considerations

Furnishings are typically located at the intersection and may include benches, bike racks, wayfinding, etc. A 5' minimum clearance is required from the end of the crosswalk to the beginning of any furnishing.

Furnishings should only be located where needed. Locations near major pedestrian generators (e.g. subways, cultural buildings, major retail, etc.) or where the intersection design creates a space should be considered. ADA access must be provided.



Bench, light pole and RPZ equipment at an intersection along Flatbush Avenue



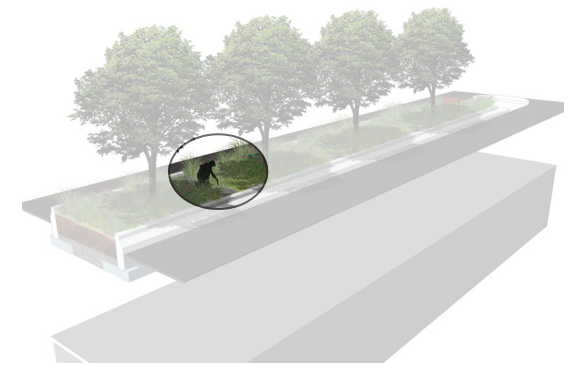
Flatbush Avenue Extension, Brooklyn

Maintenance Considerations

Landscape maintenance will be facilitated from either perpendicular paths at appropriate intervals (~20-30'), or from a central path down the length of the median, if width permits. An additional buffer space (18") between the plantings and median wall is preferred, where possible, to enhance access for maintenance workers.

Maintenance Activities

As per SDM section 6.0.1, maintenance should include an appropriate level of watering, weeding, pruning, cultivating, and waste removal. Repair of minor washouts, mulching, soil replacement, plant replacement and other horticultural operations may also be necessary.



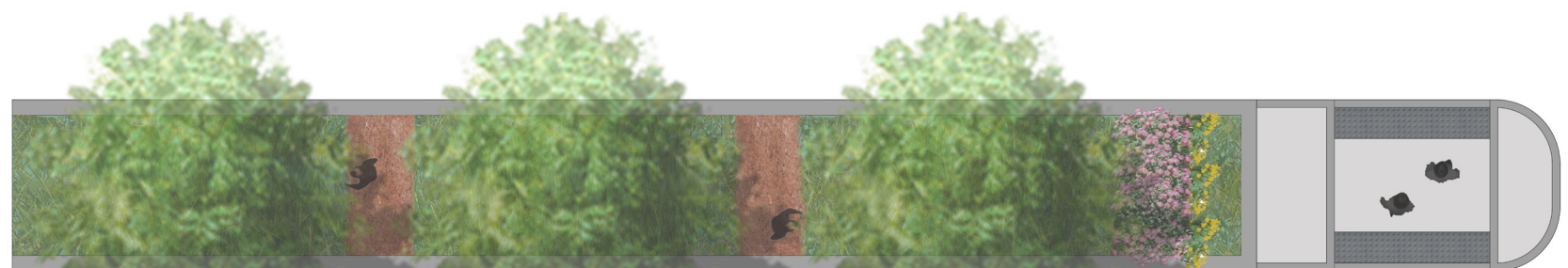
Adams Street, Brooklyn*



Broadway, Manhattan*



Center Maintenance Path



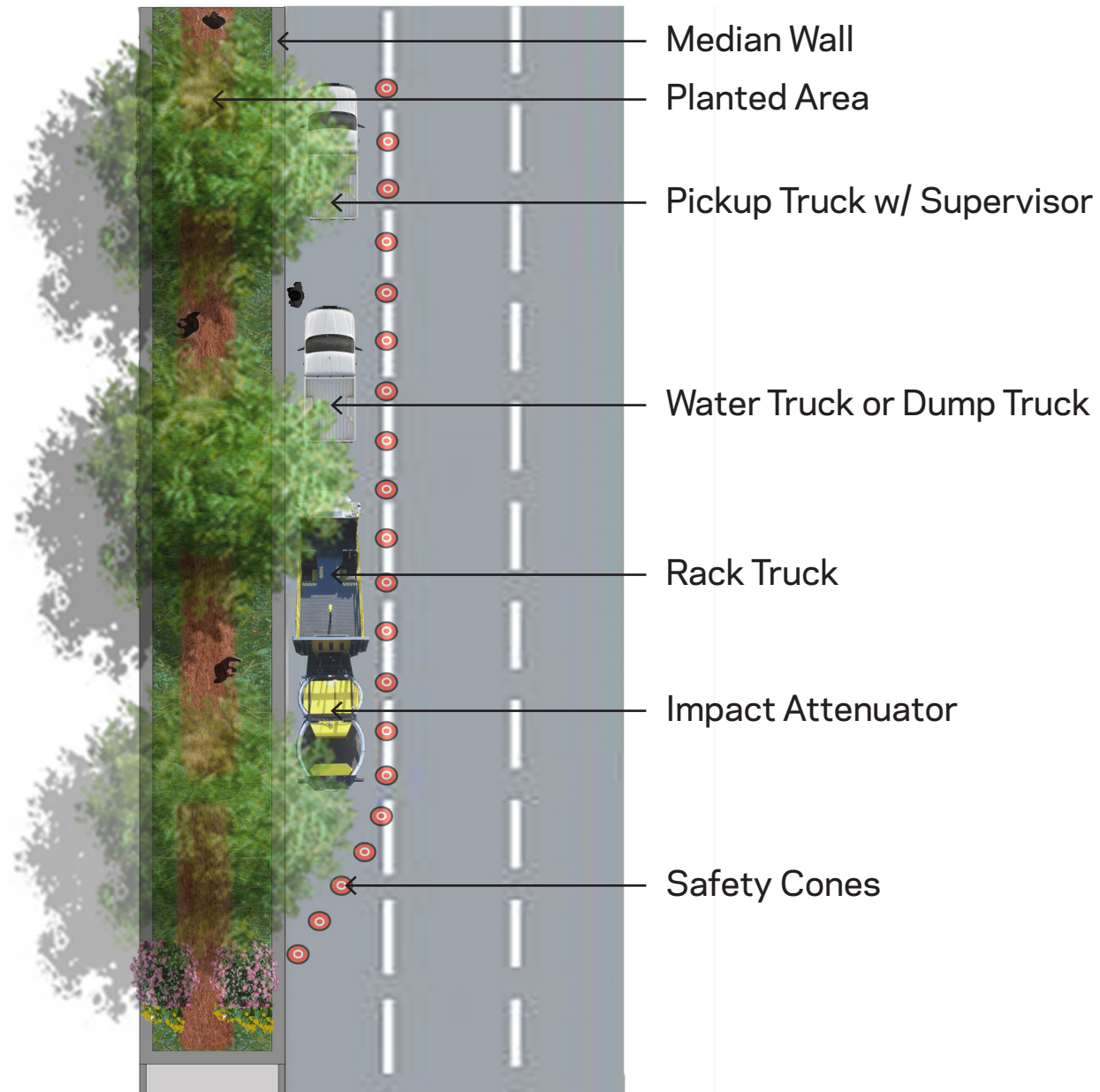
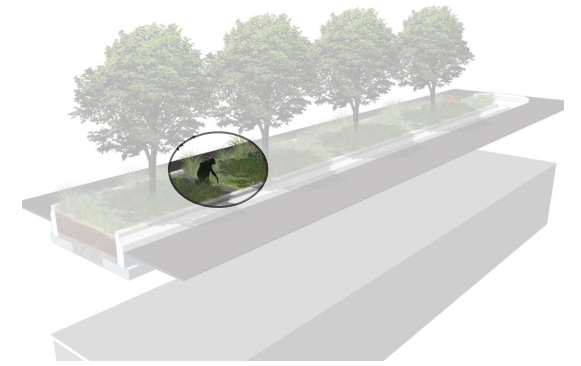
Intermediate Maintenance Paths

*Note: photographs shown are for illustrative purposes only and do not show all appropriate safety equipment

Maintenance Safety and Operations

To ensure the safety of landscape maintenance workers, it is recommended to deploy an impact attenuator behind any maintenance vehicles parked in temporarily blocked traffic lanes. The vehicles and crew deployed will vary based on the maintenance provider, planting complexity and irrigation method.

*Alternative methods for equipment location and median access are being explored.



Typical Safety Work Zone*



Van Ness Avenue, San Francisco



Example Rack Truck w/ Attenuator



Planted Raised Median Design Guidelines

June 1, 2015

