

**Hudson Square Business Improvement District
Request for Proposals (RFP):
Street Surface Preparation, Pavement Markings, and Installation Services**
Little Sixth Avenue Plaza | Hudson Square, New York, NY

Summary

The Hudson Square Business Improvement District (HSBID) invites qualified, New York State-certified Minority- and Women-Owned Business Enterprise (MWBE) contractors to submit proposals for street surface preparation, pavement markings, and installation services associated with the creation of Little Sixth Avenue Plaza.

This scope includes pavement marking removal and application, surface cleaning and priming, and the assembly and installation of custom furnishings and decking procured under a separate contract. The selected contractor will be responsible for preparing the plaza surface in accordance with NYCDOT and manufacturer specifications, and coordinating the safe and efficient installation of plaza elements. Installation is anticipated for spring 2026.

While cost competitiveness is a key consideration, HSBID will select the proposal that best meets the project's specifications, schedule, and MWBE participation requirements.

About Hudson Square

Since 2009, HSBID has overseen the transformation of Manhattan's former Printing District into a vibrant, creative, and forward-thinking neighborhood. HSBID's mission is to propel, support, and celebrate the neighborhood through programs that enhance the pedestrian environment, promote sustainability, and improve quality of life.

Further information regarding HSBID's programs can be found at:
www.hudsonsquarebid.org

Project Background

HSBID, in partnership with the NYC Department of Transportation (NYCDOT) through the agency's Plaza Program, is developing Little Sixth Avenue Plaza between Spring and Dominick Streets, adjacent to Spring Street Park.

Building on the success of HSBID's \$6 million renovation of Spring Street Park in 2018, the plaza will transform a portion of roadway into approximately 4,000 square feet of new open space – a welcoming, flexible public space designed to reflect Hudson Square's creative and sustainable identity.

Final design approvals are expected in early 2026, with installation and opening planned for spring 2026.

Scope of Work

The contractor will perform the following tasks as necessary to prepare the plaza area for installation and ensure compliance with applicable NYCDOT and manufacturer specifications. Work will include but is not limited to:

A. Surface Marking Removal

- Remove existing thermoplastic and painted pavement markings using high-pressure water blasting with vacuum recovery, in accordance with NYSDOT Specification 627.02 (Water Blasting for Surface Preparation & Marking Removal).
- Approximate scope includes removal of crosswalk markings at both ends of the block (totaling ~1,000 square feet) and removal of a small striped no-parking buffer area (~200 square feet) near the southern end of the block.
- Protect surrounding asphalt, utilities, and any remaining curb markings during removal operations.

B. Priming of Road Surface

- Clean and prepare approximately 4,000 square feet of asphalt surface for application of primer and subsequent asphalt mural installation by artist team.
- Apply primer product as specified by HSBID and/or the selected mural artist, consistent with manufacturer instructions and NYSDOT Section 727 requirements.
- Ensure full coverage and uniform adhesion for subsequent paint application.

C. Pavement Markings

- Install double solid white thermoplastic lines (approximately 30 feet in length) delineating the plaza boundary at the north and south ends of the block.
- Additional minor striping may include crosswalk edges or short no-parking zones as directed.
- All work must comply with NYSDOT Section 727: Extruded Thermoplastic ReflectORIZED Pavement Markings and the NYCDOT Typical Pavement Markings & Geometry Manual (2024).
- All materials, equipment, and workmanship shall meet MUTCD standards.

D. Installation and Assembly

- Coordinate with HSBID and selected furnishing vendor for delivery and installation of plaza furnishings, planters, and decking.
- Estimated furnishings include approximately twelve (12) movable seating units with umbrellas and six (6) movable planters, depending on final design.
- Curbside decking installation may include an estimated 20-foot-long by 6.5-foot-wide modular deck section, depending on final design.
- Provide on-site labor, traffic control, and safety equipment as necessary for installation of heavy or modular items.
- Furnish and install granite blocks and/or flexible delineators along plaza edges, as directed by HSBID and NYCDOT.

E. General Requirements

- Maintain safe pedestrian and vehicle access adjacent to work zones at all times.
- Provide all necessary traffic control devices, signage, and flagging in accordance with MUTCD and NYCDOT requirements.
- Ensure all work areas are clean and free of debris upon completion.

Required Qualifications

- Firm must be a New York State-certified Minority- and Women-Owned Business Enterprise (MWBE).
- Firm must have demonstrated experience performing asphalt surface preparation, priming, and thermoplastic marking installation in accordance with NYCDOT and NYSDOT specifications.

- Firm must have experience installing streetscape amenities such as benches, decking, umbrellas and planters in a dense, urban environment.

Itemized Pricing

Proposers must provide a detailed itemized cost proposal that includes unit prices, quantities, and total cost estimates for each major component of the work, including:

- Surface marking removal (square footage)
- Priming of asphalt surface (square footage)
- Thermoplastic striping (linear feet)
- Installation of furnishings, planters, and decking (each)
- Installation of granite blocks and/or delineators (each or linear feet)
- Traffic control and site protection

Please provide all costs as both unit prices and total estimated cost, including labor, materials, equipment, and mobilization. Approximate quantities are provided for estimating purposes only and are subject to adjustment based on final design and field conditions.

Schedule

RFP issued	November 10, 2025
Questions due	November 24, 2025
Responses to questions posted	December 1, 2025
Proposals due	December 12, 2025
Contractor selection	February 2026
Installation and completion	May 2026

Note: Schedule subject to adjustment based on coordination with NYCDOT and artist team.

Submission Requirements

- Company name, contact information, and MWBE certification documentation.
- Project references for comparable work (minimum three projects within the last five years).
- Itemized fee proposal (as described above).
- Work plan and schedule, including staffing and equipment plan.
- Proof of insurance coverage meeting requirements below.

Selection Criteria

In evaluating proposals, HSBID will consider the following factors:

- MWBE certification and compliance
- Relevant experience with similar scopes of work
- Cost competitiveness and completeness of bid
- Ability to meet schedule and coordinate with multiple project partners
- Quality of references and demonstrated reliability

Key Terms and Insurance Requirements

This section highlights key insurance and indemnification requirements applicable to the selected vendor. A full contract will be executed following selection.

- Insurance: The selected contractor must maintain insurance coverage meeting the requirements of the City of New York and HSBID, including general liability, automobile liability, and workers' compensation, naming the Hudson Square Business Improvement

District, the City of New York, and the NYC Department of Transportation as additional insureds.

- Indemnification: The selected contractor shall agree to indemnify, defend, and hold harmless HSBID, the City of New York, and their respective officers, employees, and agents from and against any and all claims, damages, liabilities, and expenses arising from or connected with the performance of work under this contract.

Note: This section is provided for informational purposes and does not represent the full set of terms and conditions that will appear in the final contract.

Submission Instructions

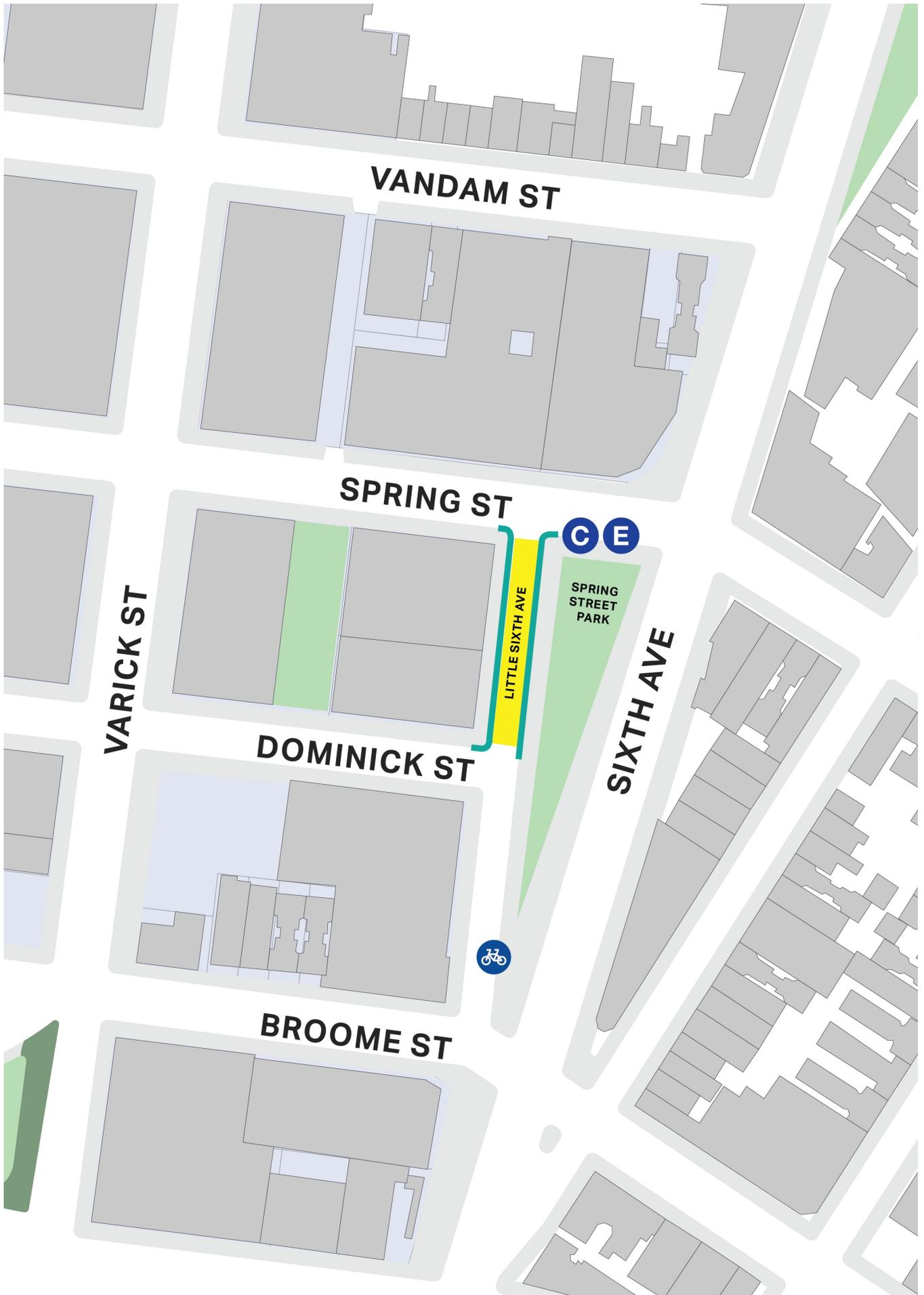
All proposals must be submitted electronically to RFP@HudsonSquareBID.org with the subject line:

“Street Surface Preparation and Installation RFP – Little Sixth Avenue Plaza.”

Questions should be submitted to the same address by the stated deadline. Responses will be posted publicly on the HSBID website.

Exhibits

- Exhibit A: Site context
 - Exhibit A-1: Context map
 - Exhibit A-2: Existing conditions photos
- Exhibit B: Conceptual design rendering
- Exhibit C: NYSDOT and NYCDOT pavement marking and removal specifications
 - Exhibit C-1: Water blasting for surface preparation and marking removal
 - Exhibit C-2: Extruded thermoplastic reflectorized pavement markings
 - Exhibit C-3: Preformed thermoplastic reflectorized pavement letters and symbols
 - Exhibit C-4: NYCDOT typical pavement markings and geometry manual



VANDAM ST

SPRING ST

VARICK ST

DOMINICK ST

BROOME ST

LITTLE SIXTH AVE

SIXTH AVE

SPRING STREET PARK

C E





North end of block, looking south



Mid-block, looking south



South end of block, looking north



Note: Image courtesy of Metropolitan Urban Design (MUD) Workshop, prepared for NY Forward grant submission. Provided for illustrative purposes only; final design subject to approval. The conceptual rendering conveys the overall design intent and quality standard for the Little Sixth Avenue Plaza. Furnishings and decking shown are representative of the type of amenities envisioned to meet the project's goals. Equivalent products or systems of comparable design quality, durability, and functionality will be considered.

Water Blasting for Surface Preparation & Marking Removal

DESCRIPTION. This work shall consist of cleaning and preparing Portland cement and bituminous pavement surfaces for the application of pavement marking materials utilizing a combination of grinding and water blasting – both with vacuum recovery of debris. Examples of pavement markings requiring this item include, but are not limited to, paint, MMA, polyurea, thermoplastic and epoxy marking materials.

CONSTRUCTION DETAILS.

General. The work required to clean and prepare pavement surfaces shall be performed in accordance with these specifications, the contract documents and to the satisfaction of the Engineer. Water blasting with vacuum recovery shall be used for all applications of pre-treatment. Grinding with vacuum recovery may be used prior to the water blasting to improve removal efficiency of old markings in a manner that minimizes damage to the pavement surface.

Before any work is begun, a schedule of operations shall be submitted for the approval of the Engineer. When the work is conducted under traffic, the Contractor shall supply all necessary flags, markers, signs, and other devices to maintain and protect traffic.

Whenever grinding and water-blasting are performed, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist. Any debris not picked up by vacuum recovery that remains on the roadway, including broken parts from cleaning equipment, shall be removed, and disposed of in a manner satisfactory to the Engineer.

Limits of Work. Cleaning and surface preparation work shall be confined to the surface area specified for the application of pavement marking materials; or the surface area of existing pavement markings that is specified for removal on the plans, or as directed by the Engineer.

Surface preparation work includes cleaning for lines or cleaning for letters and symbols or cleaning for color surface treatment. Lines will be meant to include broken line; dotted line; channelizing line; barrier lines; stop lines; crosswalk line and crossbars.

When lines are cleaned, the area of preparation will be the width of the new pavement marking, or existing line, plus 1 inch on each side. When letters and symbols are cleaned the area of preparation will be sufficiently large to accommodate the new marking, or to remove the existing marking.

Cleaning Concrete Pavements. On new Portland cement concrete pavements, cleaning operations shall not begin until a minimum of 30 days after the placement of concrete. All new concrete pavements shall be cleaned by water blasting. When water blasting is performed, pavement markings shall be applied no sooner than 24 hours after water blasting has been completed.

The extent of the blasting work shall be to clean and prepare the concrete surface such that:

- A. There is no visible evidence of curing compound on the peaks of the textured concrete surface.
- B. There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface.
- C. All remaining curing compound is intact; all loose and flaking material is removed.
- D. The peaks of the textured pavement surface are rounded in profile and free of sharp edges and irregularities.

Cleaning Existing Pavement Markings. Existing pavement markings shall be cleaned for the purpose of:

- A. Preparing the pavement surface for the application of new pavement markings in the same location as the existing markings.
- B. To remove existing markings that are in good condition which, if allowed to remain, will interfere with or otherwise conflict with newly applied marking patterns.

Water Blasting for Surface Preparation & Marking Removal

It is not intended that all deteriorated existing pavement markings be removed. Example: If a new marking is applied to an unmarked “gap” in a broken line and the existing broken line pattern is worn or deteriorated, as determined by the Engineer, to the extent that it is not misleading or confusing to the motorist, the existing markings do not require removal.

Pavement markings shall be cleaned to the extent that 95% to 100% of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

The determination of acceptable removal will be made by judgment of the Engineer and will be guided by the Department's pictorial standards of acceptable marking removal. Pictorial standards are available from the NYSDOT Materials Bureau.

Replacement of Pavement Markings. The Contractor shall not remove existing pavement markings and leave the highway unmarked overnight.

Disposal of Waste Collected by Vacuum Recovery and Debris Removal. Water blasting equipment used shall recover a minimum of 95% of water applied – leaving no standing water. Vacuumed water shall be filtered for re-use. Any wastewater and collected solid waste shall be disposed of in accordance with all federal, state, and local requirements. Pavement markings shall be installed within 24 to 72 hours of water blasting or as directed by the Engineer. Pavement shall be completely dry prior to PSM installation – time varying with temperature and humidity as needed.

OPERATOR REQUIREMENTS. Operators of water blasting and grinding equipment shall have current certification of having successfully completed equipment manufacture’s training for each type, make, and model of equipment used. A copy of such certification shall be provided to the Engineer when requested. Such operators shall take care to remove old and/or conflicting markings and to clean the surface thoroughly while preventing damage to the pavement. The Engineer may disallow any operator to use water blasting and grinding equipment if the operator is deemed to lack the skill and judgment required to adequately prepare the pavement for markings or to prevent unnecessary pavement damage.

METHOD OF MEASUREMENT. Surface cleaning and preparation of pavement surfaces will be measured in Square Feet. No payment will be made for cleaning the number of feet of unmarked gaps between broken or dotted line segments.

Multiplier Factor for Payment of Removal of Pavement Marking Lines	
Line Width	12" (Item 7)
4"	1.0x
6"	1.0x
8"	1.0x
10"	1.0x
12"	1.0x
16"	2.0x
24"	2.0x

Payment for letters and symbols will be based on a square footage price, which is defined in the contract and the Payment Factor Table included in this specification.

Water Blasting for Surface Preparation & Marking Removal

BASIS OF PAYMENT. The contract unit price shall include the cost of mobilization, furnishing all labor, materials, and equipment to satisfactorily complete the work – including the cost of work zone traffic control as needed. The Engineer shall determine if separate payment is justified for removal of conflicting lines/letters/symbols/color in addition to payment for surface preparation of new lines/letters/symbols/color to be installed. No payment will be made under this item for the removal of pavement markings required under the *Defective Thermoplastic Pavement Markings* section of the *Extruded Thermoplastic Reflectorized Pavement Markings* specification; *Defective Preformed Thermoplastic Pavement Markings* section of the *Preformed Thermoplastic Reflectorized Pavement Letters & Symbols* specification; *Defective Results* section of the *Color Surface Treatment for Pavements (CST)* specification; and *Defective Results* section of the *Resin Bonded Aggregate Surfacing for Walking Areas* specification.

Payment will be made under:

Item	Pay Unit
Water Blasting for Surface Preparation & Marking Removal	Square Feet*

*See following page for table to be used in determining area of letters and symbols

Water Blasting for Surface Preparation & Marking Removal

Area of Letters and Symbols for Surface Preparation & Marking Removal (via Waterblasting)

Type	Item	SF	
Symbols		Turn Arrow	15.50
		Through (straight) Arrow	12.50
		Combo Arrow	25.50
		Combo Arrow (left/right)	27.00
		Lane Reduction Arrow	42.00
		Bicycle Facility Arrow	4.50
		Wrong Way Arrow	24.40
		HOV Lane	13.50
		Sharks Teeth 12" x 18"	0.75
		Sharks Teeth 24" x 36"	3.00
		Speed Hump Marking	12.10
		Bike Symbol 40" x 72"	20.00
		Bike Symbol 24" x 48"	8.00
		Ped Symbol 72"	18.00
8" Letters & Numbers		A	5.50
		B	7.10
		C	4.80
		D	6.10
		E	5.90
		F	4.70
		G	5.80
		H	6.00
		I	2.60
		J	3.70
		K	5.70
		L	3.80
		M	7.40
		N	7.10
		O	6.00
		P	5.30
		Q	6.30
		R	6.30
		S	5.70
		T	3.80
		U	5.60
		V	4.80
		W	7.30
		X	4.80
		Y	3.90
		Z	5.10
		1	2.60
		2	5.80
	3	5.80	
	4	5.10	
	5	6.10	
	6	6.20	
	7	3.80	
	8	6.70	
	9	6.20	
	0	6.00	
	10' School	94.00	

Notes

- 1 Letters and symbols shown to the left will be paid in accordance to the number of "Units" they represent.
- 2 For preformed thermoplastic, "1 Unit" is based on average list price from four leading preformed thermoplastic pavement marking manufacturers for the same turn arrow symbol.
- 3 For extruded thermoplastic, "1 Unit" for bid determination is derived from FHWA-approved turn arrow symbol which is 15.50 SF.
- 4 N.A. = Not Applicable because this option is not used by NYCDOT.
- 5 Symbols / letters / numbers not shown may be added to the contract using the same methodology presented above for payment.
- 6 See NYCDOT Typical Drawings in Exhibit A of this contract for typically utilized symbols and letter configurations.
- 7 The factors listed in this table are fixed for the duration of the contract unless modified by change order.

Extruded Thermoplastic Reflectorized Pavement Markings

DESCRIPTION. Under this work, the Contractor shall furnish and apply extruded thermoplastic reflectorized pavement markings at the location and in accordance with patterns indicated on the plans or as ordered by the Engineer, and in conformance with the MUTCD and these specifications.

The thermoplastic pavement marking compound shall be extruded in a molten state onto the pavement surface. Following surface application of glass beads and upon cooling to normal pavement temperatures, the resultant marking shall be an adherent reflectorized stripe, letter or symbol of the specified thickness and width that is capable of resisting deformation by traffic.

MATERIALS.

Extruded Thermoplastic. Extruded thermoplastic shall be capable of application on new and existing asphalt and Portland cement concrete surfaces meet the requirements of AASHTO M249 and shall:

- Not contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the US Occupational Safety and Health Administration (OSHA) as a carcinogen.
- Conform to current Federal, State and Local air pollution regulations, including those for the control (emission) of volatile organic compounds (VOC).
- Be in suitable, well-sealed packaging that is original and unopened. Shipping documents and packaging shall have identification numbers or batch dates for confirmation of when products were manufactured, brand name, name of manufacturer, lot or batch number, temperature range for storage, expiration date, the quantity contained and Include Material Safety Data Sheets. This information shall be made available for inspection at any time.
- Be stored in accordance with the manufacturer's instructions and manufacturers' requirements for shelf life and storage conditions.
- Be clearly labeled and in a dry and clean condition prior to use.
- Provide a surface friction of a minimum of 45 BPN (ASTM E303) with retroreflective beads installed.
- Be installed at a thickness minimum of 90 Mils (3/32 inch) and no more than 125 Mils (1/8 inch).
- Be colored yellow or white in conformance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) as specified on provided Work Orders or Plans.
- Formulated for application at temperatures between 400°F and 450 °F.
- Show no significant breakdown or deterioration at 450°F.

Extruded Thermoplastic Reflectorized Pavement Markings

- Be free from all dirt and foreign objects.
- Comply with the following requirements:

TABLE 727-01-1 THERMOPLASTIC PROPERTIES		
Component	% by Weight	
	White	Yellow
Binder Content	20.0 min	20.0 min.
TiO ₂ Pigment Content	10.0 min	Not Applicable
Glass Beads Content	30-40	30-40
Inert Fillers	*43 max	*
* Amount and type of yellow pigment, calcium carbonate and inert fillers at the option of the manufacturer, providing the other composition requirements are met and the yellow pigment is lead chromate free.		

Physical Properties of Extruded Thermoplastic.

A. Color. (ASTM D1535) When viewed under North Standard Daylight:

White: approximate visual color match to Munsell Book Notation N 9.5/0.

Yellow: approximate visual color match to Munsell Book Notation 10YR8/14.

B. Yellowness Index. (ASTM D1925 at 2° Observer angle and C Illuminate)

White thermoplastic: 0.12 maximum

C. Softening Point. (ASTM E28) Softening point: 194°F minimum.

D. Specific Gravity. Between 1.8 and 2.2 as determined by a water displacement method at 77°F.

E. Field Drying Time. At 70°F, and thickness between 1/8 inch and 3/16 inch: completely solid and showing no damaging effect from traffic after 10 minutes.

Glass Beads. Glass beads applied to the surface of thermoplastic pavement markings shall meet the requirements of AASHTO M247-11 and NYSDOT Standard Specifications Section 727-05.

Thermoplastic Primer. All Portland cement pavement surfaces shall be primed. The primer shall be either a one-component or a two-component, cold or hot applied material of the type recommended by the manufacturer of the thermoplastic pavement marking material. At least five working days prior to the start of thermoplastic application, the Contractor shall provide the Engineer with the manufacturer's written instructions for primer application. The application of the primer shall be performed in accordance with the manufacturer's written recommendations which shall include the method of application, the application rate, and the drying time.

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APPROVED THERMOPLASTIC MATERIALS. Extruded Thermoplastic Pavement Marking Materials appearing on NYSDOT's Approved List under Section 727-01 with a Manufacturer's certification that the product meets the requirements of this specification (e.g., binder 20.0 % by weight minimum rather than NYSDOT's 17% minimum), or a product approved equal as determined by the Engineer, are deemed acceptable for use. For NYSDOT's most updated approved materials list, please see: <https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/alme/pav.html>.

CONSTRUCTION DETAILS.

General. All pavement markings and patterns shall be placed as shown on the Contract or Work Order documents and in accordance with the MUTCD.

Before any pavement marking work is begun, a schedule of operations shall be submitted for approval by the Engineer or his/her authorized representative. At least five (5) days prior to starting striping, the Contractor shall provide the Engineer with the extruded thermoplastic manufacturer's written instructions for use. These instructions shall include, but not be limited to, recommended material mixing ratios and application temperatures.

Inspectors have the right to shut down work if any required documentation, safety requirements or performance requirements are not met.

Material Temperatures. Extruded thermoplastic shall be applied at a temperature between 400°F and 450 °F per manufacturer requirements as measured at the extrusion shoe(s). No extruded thermoplastic shall be placed until a temperature within this range is attained and maintained at the extrusion shoe(s).

Work Zone Traffic Control. When pavement markings are applied under traffic, the Contractor shall provide all necessary flags, markers, signs, etc. in accordance with the MUTCD to maintain and protect traffic, and to protect marking operations and the markings until thoroughly set. The application of pavement markings shall be done in the general direction of traffic. Installation against the direction of traffic flow shall not be allowed.

Misplaced and tracked material. The Contractor shall be responsible for removing, to the satisfaction of the Engineer, all tracking marks, spilled preformed thermoplastic, and preformed thermoplastic markings applied in unauthorized areas.

Atmospheric Conditions. Thermoplastic pavement markings shall only be applied during conditions of dry weather and on substantially dry pavement surfaces. At the time of installation, the pavement surface temperature shall be a minimum of 55°F and the ambient temperatures shall be a minimum of 50°F and rising.

Surface Preparation. The Contractor shall clean the pavement and existing durable markings to the satisfaction of the Engineer. At the time of application, all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease, and similar foreign materials. A high-volume air blower shall be used to clear dust and debris from the surface for all applications to be

Extruded Thermoplastic Reflectorized Pavement Markings

included in the unit cost for this item - except where water blasting for surface preparation is specifically called out on the Work Order as a payment item.

Extruded Thermoplastic Bond Strength. Bonding between extruded thermoplastic and the pavement shall be randomly tested using a lift-off tester according to ASTM 4796 and D7234.

Thermoplastic Application Equipment. Thermoplastic application equipment shall be approved by the Engineer prior to the start of work.

Thermoplastic material shall be applied to the pavement surface by the extrusion method, wherein one side of the shaping die is the pavement, and the other three sides are contained by, or are part of, suitable equipment for maintaining the temperature and controlling the flow of material.

Thermoplastic material may be applied to the pavement surface by the ribbon method, where ambient air temperature is a minimum of 65° F and rising as well as surface temperature is at a minimum of 55° F and rising. All thermoplastic ribbon applications shall be approved by the Engineer prior to the start of work.

For heating the thermoplastic composition, the application equipment shall include a melting kettle(s) of such capacity as to allow for continuous marking operations. The melting kettle(s) may be mounted on a separate “supply” vehicle or included as part of the mobile application equipment. The kettle(s) shall be capable of heating the thermoplastic composition temperatures between 400 °F and 450 °F. The heating mechanism shall be by means of a thermostatically controlled heat transfer medium. Heating of the composition by direct flame will not be allowed. Material temperature gauges shall be visible at both ends of the kettle(s) and at the extrusion shoe(s).

Application equipment shall be constructed to provide continuous mixing and agitation of the material. Conveying parts of the equipment between the main material reservoir and the extrusion shoe(s) shall be so constructed as to prevent accumulation and clogging. All parts of the equipment which come into contact with the material shall be so constructed so as to be easily accessible and exposable for cleaning and maintenance. The equipment shall be constructed so that all mixing and conveying parts up to and including the extrusion shoe(s), maintain the material at the required plastic temperature.

The application equipment shall be so constructed as to insure continuous uniformity in the dimensions of the stripe. The applicator shall provide a means for cleanly cutting off stripe ends squarely and shall provide a method of applying “skip” lines. The equipment shall be capable of applying varying widths of traffic markings.

The applicator shall be equipped with a drop-on type bead dispenser capable of uniformly dispensing reflective glass spheres at controlled rates of flow. The bead dispenser shall be automatically operated in such a manner that it will only dispense beads while the composition is being applied.

Application equipment shall be mobile and maneuverable to the extent that straight lines can be followed, and normal curves can be made in a true arc. Applicators shall be equipped and constructed in such a manner as to satisfy the requirements of the:

Extruded Thermoplastic Reflectorized Pavement Markings

- 1. Mobile Application Equipment.** The mobile applicator shall be defined as a truck mounted, self-contained pavement marking machine that applies thermoplastic by the extrusion method. The unit shall be equipped to apply the thermoplastic material at the widths and thicknesses specified herein. The mobile unit shall be capable of operating continuously and of installing a minimum of 12,000 feet of longitudinal markings in an 8-hour day.

The mobile unit shall be equipped with a melting kettle(s) or materials storage reservoir(s) of such capacity as to allow for continuous marking operations.

The mobile unit shall be equipped with an extrusion shoe(s) and shall be capable of marking edge line and centerline stripes. The extrusion shoe(s) shall be closed, heat jacketed or suitably insulated unit; shall hold the molten thermoplastic at a temperature greater than 400°F; and shall be capable of extruding a line between 4 to 12 inches in width; and at a thickness of no less than 90 Mils (3/32 inch) and no more than 125 Mils (1/8 inch), and of generally uniform cross section. Material temperature gauges shall be affixed or incorporated in the extrusion shoe in such a manner as to be visible, and capable of monitoring the composition temperature throughout the marking operation.

The mobile unit shall be equipped with an electronic and programmable line pattern control system, or mechanical control system, so as to be capable of applying skip or solid lines in any sequence, and through any extrusion shoe in any cycle length.

- 2. Portable Application Equipment.** The portable applicator shall be defined as hand operated equipment, specifically designed for placing thermoplastic installations such as crosswalks; stop bars; legends; arrows; and short lengths of lane, edge, and centerlines. The portable applicator shall be capable of applying thermoplastic pavement markings by the extrusion method. It is intended that the portable applicator will be loaded with hot thermoplastic composition from the melting kettle(s). The portable applicator shall be equipped with all the necessary components, including a materials storage reservoir, bead dispenser, extrusion shoe, and heating accessories, so as to be capable of holding the molten thermoplastic at temperatures greater than 400°F, of extruding a line of from 4 to 12 inches in width, and in thickness of no less than 90 Mils (3/32 inch) and no more than 125 Mils (1/8 inch) and of generally uniform cross-section. Material temperature gauges shall be affixed or incorporated in the extrusion shoe in such a manner as to be visible, and capable of monitoring the composition temperature throughout the marking operation.

Application of Thermoplastic Reflectorized Pavement Markings. All special markings, cross walks, stop bars, legends, arrows, and similar patterns shall be placed with a portable applicator. Unless otherwise specified in the contract documents all center line, skip line, edge line and other longitudinal type markings may be applied with either a portable or a mobile applicator.

When the surface preparation work has been completed, if applicable, the bituminous and/or concrete pavement surface shall be primed and with a primer in accordance with the manufacturer's written instructions. Primer shall not be required on new bituminous pavement surfaces that are completed within the same calendar year as the thermoplastic marking application. The primer shall be spray applied onto the pavement surface and allowed to dry according to the

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manufacturer's written instructions. Pavement surfaces that are primed and not striped with thermoplastic within the required drying time or within the same workday shall be re-primed.

After the primer has dried, the thermoplastic shall be applied at composition temperatures no lower than 400°F at the point of deposition. Immediately after installation of the thermoplastic, drop-on reflective glass spheres shall be mechanically applied such that the spheres are held by and embedded in the surface of the molten composition.

Defective Thermoplastic Pavement Markings. Thermoplastic reflectorized pavement markings, which after application and setting are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient glass bead coverage or inadequate glass bead retention.

Repair Method. Prepare the surface of the defective thermoplastic marking or the surface so the application surface shall be free of oil, dirt, dust, grease, and similar foreign materials. Repair shall be made by removing and replacing the marking or by melting the surface and evenly reapplying glass beads with a shaker.

2. Uncured or discolored thermoplastic and/or insufficient bond to pavement surface or existing durable marking.

Repair Method. The defective thermoplastic marking shall be completely removed and cleaned to the underlying pavement surface and re-applied in accordance with the requirements of this specification.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired, or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective thermoplastic reflectorized pavement markings shall be performed at the Contractor's expense.

Personal Protective Equipment. Follow all exposure, respiratory and personal protective equipment controls, handling and safety precautions and spill and disposal procedures as identified by safety data sheets (SDS), labels and other manufacturer's recommendations for the products used.

WORK ZONE TRAFFIC CONTROL (WZTC). The Contractor is responsible for ensuring appropriate WZTC in compliance with the MUTCD appropriate for the dry time of the selected material applied. The Contractor is responsible to ensure adequate WZTC to prevent those walking, skating, bicycling, and driving from coming into contact with applied material that is still capable of being tracked. The Contractor shall be liable for such tracking and property damage should it occur.

Extruded Thermoplastic Reflectorized Pavement Markings

METHOD OF MEASUREMENT. Pavement striping will be measured by linear foot along the centerline of the pavement stripe and will be based on a 4-inch-wide stripe. Measurement for striping with a plan width other than basic 4 inch or 12 inch as shown on the plans or as directed by the Engineer will be made by the following method:

Multiplier Factor for Payment of Thermoplastic Pavement Markings		
Line Width	4" (Item 1)	12" (Item 2)
4"	1.0x	n/a
6"	1.5x	n/a
8"	2.0x	n/a
12"	n/a	1.0x
16"	n/a	1.3x
24"	n/a	2.0x

Line types following Item 1 will include, but are not limited to: 4", 6" & 8" solid lines (white or yellow), double solid lines (white or yellow), lane lines (white or yellow), short broken lines (white or yellow), short, dotted lines (white or yellow), double short, dotted line (yellow), railroad X (white), & bicycling facility chevron (white). Refer to drawings TSC-1, TRR-1, and TAR-1 of the typical drawings.

Line types following Item 2 will include but are not limited to: crosswalk lines (white), stop bar lines (white), 12", 16" & 24" solid lines (white or yellow). Refer to drawings TSC-1, TRR-1, and TAR-1 of the typical drawings.

Payment for extruded letters and symbols will be based on a unit price, which is defined in the contract and the **Payment Factor Table** included in this specification.

BASIS OF PAYMENT. The accepted quantities of markings will be paid for at the contract unit price, which shall include the cost of furnishing all labor, materials, and equipment to satisfactorily complete the work. The cost for maintaining and protecting traffic during the marking operations shall be included in the price bid. The cost of removal of concrete curing compounds and existing pavement markings will be paid under the Water Blasting for Surface Preparation & Marking Removal item and is not included in this item.

Payment will be made under:

Item	Pay Unit
4" Wide Extruded Thermoplastic Reflectorized Pavement Marking Line	Feet
12" Wide Extruded Thermoplastic Reflectorized Pavement Marking Line	Feet
Extruded Thermoplastic Reflectorized Letters and Symbols	Unit*

Extruded Thermoplastic Reflectorized Pavement Markings

*See table on following page for table to be used in determining payment factor for extruded thermoplastic reflectorized letters and symbols.

**Payment Factors for Installation of
Extruded Thermoplastic Pavement Markings**

Type	Item	Extruded		
		SF	Units	
Symbols		Turn Arrow	15.50	1.00
		Through (straight) Arrow	12.50	0.81
		Combo Arrow	25.50	1.65
		Combo Arrow (left/right)	27.00	1.74
		Lane Reduction Arrow	42.00	2.71
		Bicycle Facility Arrow	4.50	0.29
		Wrong Way Arrow	24.40	1.57
		HOV Lane	13.50	0.87
		Sharks Teeth 12" x 18"	0.75	0.05
		Sharks Teeth 24" x 36"	3.00	0.19
		Speed Hump Marking	12.10	0.78
		Bike Symbol 40" x 72"	N.A.	N.A.
		Bike Symbol 24" x 48"	N.A.	N.A.
		Ped Symbol 72"	N.A.	N.A.
8' Letters & Numbers		A	5.50	0.35
		B	7.10	0.46
		C	4.80	0.31
		D	6.10	0.39
		E	5.90	0.38
		F	4.70	0.30
		G	5.80	0.37
		H	6.00	0.39
		I	2.60	0.17
		J	3.70	0.24
		K	5.70	0.37
		L	3.80	0.25
		M	7.40	0.48
		N	7.10	0.46
		O	6.00	0.39
		P	5.30	0.34
		Q	6.30	0.41
		R	6.30	0.41
		S	5.70	0.37
		T	3.80	0.25
		U	5.60	0.36
		V	4.80	0.31
		W	7.30	0.47
		X	4.80	0.31
		Y	3.90	0.25
		Z	5.10	0.33
		1	2.60	0.17
	2	5.80	0.37	
	3	5.80	0.37	
	4	5.10	0.33	
	5	6.10	0.39	
	6	6.20	0.40	
	7	3.80	0.25	
	8	6.70	0.43	
	9	6.20	0.40	
	0	6.00	0.39	
	10' School	94.00	6.06	

Notes

- Letters and symbols shown to the left will be paid in accordance to the number of "Units" they represent.
- For extruded thermoplastic, "1 Unit" for bid determination is derived from FHWA-approved turn arrow symbol which is 15.50 SF.
- N.A. = Not Applicable because this option is not used by NYCDOT.
- Symbols / letters / numbers not shown may be added to the contract using the same methodology presented above for payment.
- See NYCDOT Typical Drawings in Exhibit A of this contract for typically utilized symbols and letter configurations.
- The factors listed in this table are fixed for the duration of the contract unless modified by change order.

Preformed Thermoplastic Reflectorized Pavement Letters & Symbols

DESCRIPTION. Under this work, the Contractor shall furnish and apply preformed thermoplastic pavement markings at the location and in accordance with patterns indicated on the plans or as ordered by the Engineer, and in conformance with the MUTCD and these specifications.

MATERIALS.

Preformed Thermoplastic. Preformed thermoplastic shall be capable of application on new and existing asphalt and Portland cement concrete surfaces, meet the requirements of AASHTO M249 and shall:

- Not contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the US Occupational Safety and Health Administration (OSHA) as a carcinogen.
- Conform to current Federal, State and Local air pollution regulations, including those for the control (emission) of volatile organic compounds (VOC).
- Be packaged in suitable, well-sealed in their original unopened containers. Shipping documents and containers shall have identification numbers or batch dates for confirmation of when products were manufactured, brand name, name of manufacturer, lot or batch number, temperature range for storage, expiration date, the quantity contained and Include Material Safety Data Sheets. This information shall be made available for inspection at any time.
- Be stored in accordance with the manufacturer's instructions and manufacturers' requirements for shelf life and storage conditions.
- Be clearly labeled and in a dry and clean condition prior to use.
- Shall provide an installed surface friction level of 45 British Pendulum Number (BPN) minimum
- Be colored white in conformance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) and/or as specified on provided Work Orders or Plans.
- Provide a surface bond to pavement throughout the installation meeting or exceeding 200 PSI per ASTM 4796
- Thickness shall be specified at 125 Mils.

Green Preformed Thermoplastic with friction aggregate shall include only calcined bauxite, corundum, or alternate equal anti-skid aggregate approved by the Engineer can be used for intersection treatment.

- Aggregate used shall have a minimum hardness value of 8.0 per Mohs Hardness Scale or alternative aggregate to be approved by the Engineer and be uniformly applied – providing a surface friction value >60 BPN (ASTM E303) over the entire surface.

Glass Beads. White retro reflective glass beads shall be intermixed in the preformed thermoplastic. Glass beads are additionally applied during installation when the surface is liquefied to the surface of the marking. Glass beads applied to the surface of pre-formed thermoplastic pavement markings shall meet the requirements of NYSDOT Standard Specifications Section 727-05.

APPROVED PREFORMED THERMOPLASTIC MATERIALS. Products appearing on the list below with a Manufacturer's certification that the product meets the requirements of this specification, or a Product approved equal as determined by the Engineer, are deemed acceptable for use:

PreMark® by Ennis-Flint
115 Todd Court, Thomasville, NC 27360
336-475-6600 www.ennisflint.com

Preformed Thermoplastic ReflectORIZED Pavement Letters & Symbols

Swarco Industries Inc.
P.O. Box 89, Columbia, TN 38402
800-216-8781 www.swarco.com

Ozark Materials, LLC
591 Glendale Av, Greenville, AL 36037
334-213-2995 www.ozarkmaterials.net

Crown USA, Inc
35 Industrial Park Drive
Woodbury, GA 30293
706-553-7500 www.crownusa.com

Preform, LLC
3845 Deer Park Blvd
Elkton, FL 32033
888-826-5161 www.preform.us

GENTEM Inc.
35 Fraser Ct. Unit 2
Barrie, Ontario L4N 5J5
888-919-8842 www.gentem.ca

APPROVED GREEN PREFORMED THERMOPLASTIC MATERIALS. Products appearing on the list below with a Manufacturer's certification that the product meets the requirements of this specification, or a Product approved equal as determined by the Engineer, are deemed acceptable for use:

Preform, LLC
3845 Deer Park Blvd
Elkton, FL 32033
888-826-5161 www.preform.us

"Tuffline" Green Hot-applied Thermoplastic*
Crown USA, Inc
35 Industrial Park Drive
Woodbury, GA 30293
706-553-7500 www.crownusa.com

*This material has been deemed a functional equivalent for green preformed. This product with a Manufacturer's certification that the product meets the requirements of this specification are deemed acceptable for use.

CONSTRUCTION DETAILS.

General. All pavement markings and patterns shall be placed as shown on the Contract or Work Order documents and in accordance with the MUTCD.

Before any pavement marking work is begun, a schedule of operations shall be submitted for approval by the Engineer or his/her authorized representative. At least five (5) days prior to starting striping, the Contractor shall provide the Engineer with the preformed thermoplastic manufacturer's written instructions

Preformed Thermoplastic Reflectorized Pavement Letters & Symbols

for use. These instructions shall include, but not be limited to, material mixing ratios and application temperatures.

When pavement markings are applied under traffic, the Contractor shall provide all necessary flags, markers, signs, etc. in accordance with the MUTCD to maintain and protect traffic, and to protect marking operations and the markings until thoroughly set.

The application of pavement markings shall be done in the general direction of traffic. Installation against the direction of traffic flow shall not be allowed.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, all tracking marks, spilled preformed thermoplastic, and preformed thermoplastic markings applied in unauthorized areas.

Atmospheric Conditions. Preformed thermoplastic pavement markings shall only be applied during conditions of dry weather and on substantially dry pavement surfaces. At the time of installation, the pavement surface temperature shall be at or above manufacturer recommendations.

Surface Preparation. The Contractor shall clean the pavement and existing durable markings to the satisfaction of the Engineer. At the time of application, all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease, and similar foreign materials. A high-volume air blower shall be used to clear dust and debris from the surface for all applications to be included in the unit cost for this item - except where water blasting for surface preparation is specifically called out on the Work Order as a payment item.

Preformed Thermoplastic Application Equipment. A heat torch for placement of markings and/or drying of pavement shall be the type recommended by the manufacturer of the preformed material. All application equipment shall be approved by the Engineer prior to the start of work.

Application of Preformed thermoplastic Reflectorized Pavement Markings. Preformed thermoplastic reflectorized pavement markings shall be placed at the width and pattern designated by the Contract Documents. Marking operations shall not begin until applicable surface preparation work is completed and approved by the Engineer, and the atmospheric conditions and pavement surface temperature are acceptable to the Engineer. If required by manufacturer, a heat torch shall be used to remove moisture and/or heat pavement surface to temperature indicated by manufacturer.

Thermoplastic Primer. All Portland cement pavement surfaces shall be primed. The primer shall be either a one-component or a two-component, cold or hot applied material of the type recommended by the manufacturer of the thermoplastic pavement marking material. At least five working days prior to the start of thermoplastic application, the Contractor shall provide the Engineer with the manufacturer's written instructions for primer application. The application of the primer shall be performed in accordance with the manufacturer's written recommendations which shall include the method of application, the application rate, and the drying time.

Defective Preformed Thermoplastic Pavement Markings. Preformed thermoplastic reflectorized pavement markings, which after application and setting are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient glass bead coverage or inadequate glass bead retention.
Repair Method. Prepare the surface of the defective preformed thermoplastic marking or the surface so the application surface shall be free of oil, dirt, dust, grease, and similar foreign materials. Repair

Preformed Thermoplastic Reflectorized Pavement Letters & Symbols

shall be made by removing and replacing the marking or by melting the surface and evenly reapplying glass beads with a shaker.

2. Uncured or discolored thermoplastic and/or insufficient bond (to pavement surface or existing durable marking).

Repair Method. The defective preformed thermoplastic marking shall be completely removed and cleaned to the underlying pavement surface and re-applied in accordance with the requirements of this specification.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired, or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective preformed thermoplastic reflectorized pavement markings shall be performed at the Contractor's expense.

Personal Protective Equipment. Follow all exposure, respiratory and personal protective equipment controls, handling and safety precautions and spill and disposal procedures as identified by the safety data sheets (MSDS), labels and other manufacturer's recommendations for the products used.

Temporary Traffic Control (TTC). The Contractor is responsible for ensuring appropriate TTC in compliance with the MUTCD appropriate for the dry time of the selected material applied. The Contractor is responsible to ensure adequate TTC to prevent those walking, skating, bicycling, and driving from coming into contact with applied material that is still capable of being tracked. The Contractor shall be liable for such tracking, property damage, and injury should it occur.

METHOD OF MEASUREMENT. Payment for preformed letters and symbols will be based on a unit price, which is defined in the contract and the *Payment Factor Table* included in this specification.

BASIS OF PAYMENT. The accepted quantities of markings will be paid for at the contract unit price, which shall include the cost of furnishing all labor, materials, and equipment to satisfactorily complete the work. The cost for TTC during the marking operations shall be included in the price bid. The cost of removal of concrete curing compounds and existing pavement markings will be paid under the Water Blasting for Surface Preparation & Marking Removal item and is not included in this item.

Payment will be made under:

Item	Pay Unit
Preformed Thermoplastic Reflectorized Pavement Letters & Symbols	Unit*

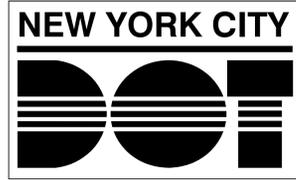
*See following page for table to be used in determining payment factor for preformed thermoplastic letters and symbols.

Payment Factors for Installation of Preformed Thermoplastic Pavement Markings

Type	Item	Preformed Units	
Symbols		Turn Arrow	1.00
		Through (straight) Arrow	0.86
		Combo Arrow	1.81
		Combo Arrow (left/right)	1.88
		Lane Reduction Arrow	2.58
		Bicycle Facility Arrow	0.38
		Wrong Way Arrow	1.01
		HOV Lane	0.47
		Sharks Teeth 12" x 18"	0.06
		Sharks Teeth 24" x 36"	0.12
		Speed Hump Markings	0.45
		Bike Symbol 40" x 72"	0.97
		Bike Symbol 40" x 72"	0.91
		Bike Symbol 24" x 48"	0.60
		Ped Symbol 72"	0.84
		Green Bike Bar 12" x 12"	0.02
	8' Letters & Numbers	A	0.41
B		0.41	
C		0.41	
D		0.41	
E		0.41	
F		0.41	
G		0.41	
H		0.41	
I		0.41	
J		0.41	
K		0.41	
L		0.41	
M		0.41	
N		0.41	
O		0.41	
P		0.41	
Q		0.41	
R		0.41	
S		0.41	
T		0.41	
U		0.41	
V		0.41	
W		0.41	
X		0.41	
Y		0.41	
Z		0.41	
1		0.41	
2		0.41	
3		0.41	
4		0.41	
5		0.41	
6	0.41		
7	0.41		
8	0.41		
9	0.41		
0	0.41		
10' School	N.A.		

Notes

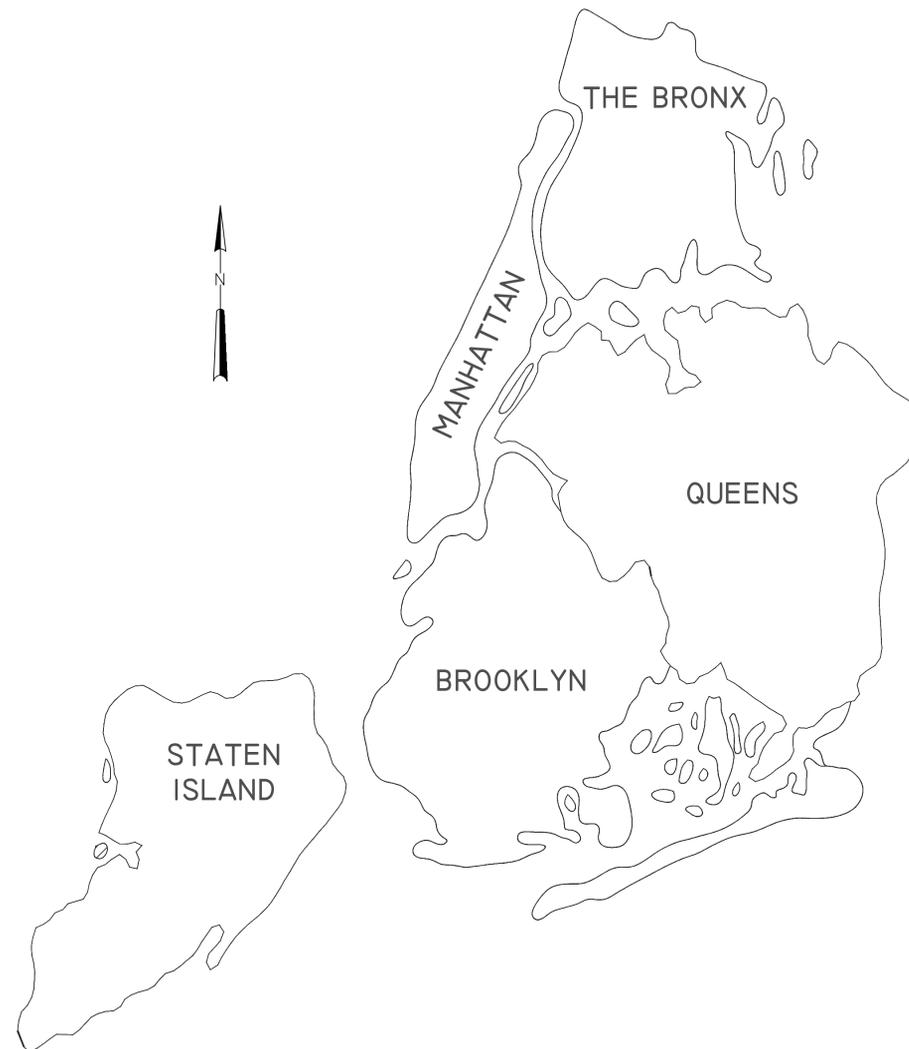
1. Letters and symbols shown to the left will be paid in accordance to the number of "Units" they represent.
2. For preformed thermoplastic, "1 Unit" is based on average list price from four leading preformed thermoplastic pavement marking manufacturers for the same turn arrow symbol.
3. N.A. = Not applicable because this option is not used by NYCDOT.
4. Symbols / letters / numbers not shown may be added to the contract using the same methodology presented above for payment.
5. See NYCDOT Typical Drawings in Exhibit A of this contract for typically utilized symbols and letter configurations.
6. The factors listed in this table are fixed for the duration of the contract unless modified by change order.



NEW YORK CITY DEPARTMENT OF TRANSPORTATION TRANSPORTATION PLANNING & MANAGEMENT

TYPICAL PAVEMENT MARKINGS & GEOMETRY

CITY OF NEW YORK CITY, ALL COUNTIES
MAY 2024 UPDATE



Roger K. Weld, P.E.,
Chief Engineer, Transportation Planning & Management Division
New York City Department of Transportation

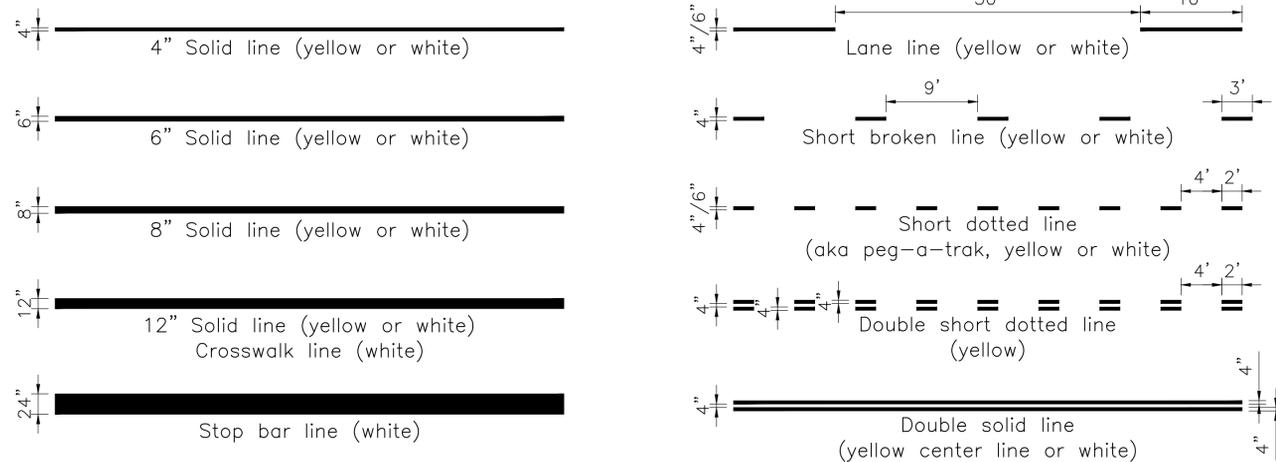
SHEET	DWG	NAME
01	TYPX-1	INDEX OF SHEETS & GENERAL NOTES
02	TSC-1	STRIPING & CROSS HATCHING
03	TAR-1	ARROWS & SYMBOLS
04	TWM-1	WORD MESSAGES
05	TEL-1	EDGE LINES FOR PARKWAYS & HIGHWAYS
06	TCW-1	CROSSWALKS & STOP BARS
07	TBUS-1	BUS LANES
08	TBL-1	BIKE ROUTES
09	TBL-2	BIKE LANES & BUFFERED BIKE LANES
10	TBX-1	BIKE BOXES FOR BIKE LANES
11	PBL-1	ONE-WAY PROTECTED BIKE LANES (PBLs): GENERAL
12	PBL-2	ONE-WAY PROTECTED BIKE LANES (PBLs): TURN TREATMENTS
13	TBP-1	BIKE PATHS & CROSSINGS
14	TBAP-1	BIKE ROUTES & BIKE LANES ALONG ANGLE PARKING
15	TPK-1	ANGLE PARKING
16	TRS-1	RUMBLE STRIPS
17	TSB-1	SPEED BUMP MARKINGS
18	TSR-1	SPEED REDUCERS FOR BIKE LANES AT SPEED BUMPS
19	TRR-1	HIGHWAY-RAIL GRADE CROSSINGS
20	TRF-2	PLANTED PEDESTRIAN ISLAND
21	BBI-1	BUS BOARDING ISLAND
22	TCC-1	WORK ZONE TRAFFIC CONTROL PAVEMENT MARKINGS INSTALLATIONS

LEGEND:

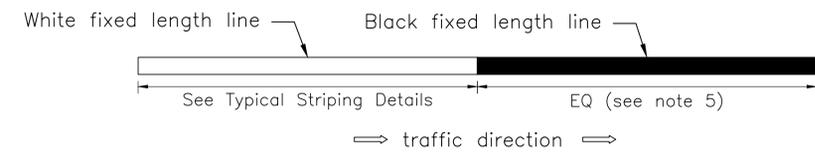
	WALKING AREA COLOR		FLEXIBLE DELINEATORS
	BUS LANE (PAINT)		QUICK KURB
	BUS LANE (PAVEMENT)		MARTELLO BOLLARDS
	BUS BOARDER		TRAFFIC SIGNAL
	BIKE LANE		DETECTABLE WARNING STRIP
	PLANTINGS		RUBBER SPEED BUMP



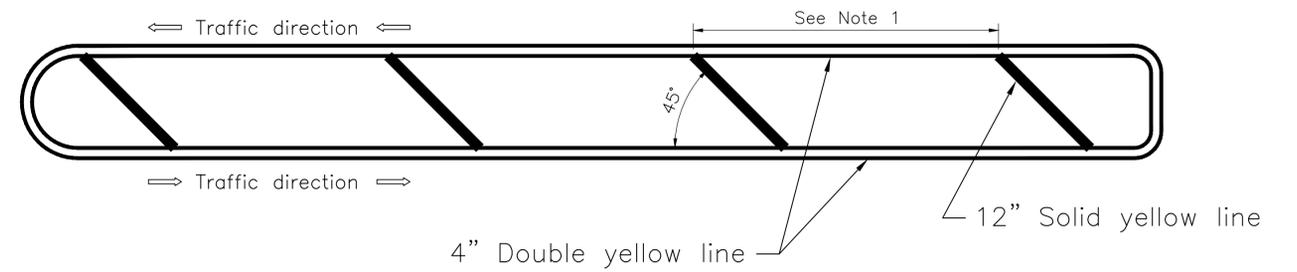
Typical Striping Details



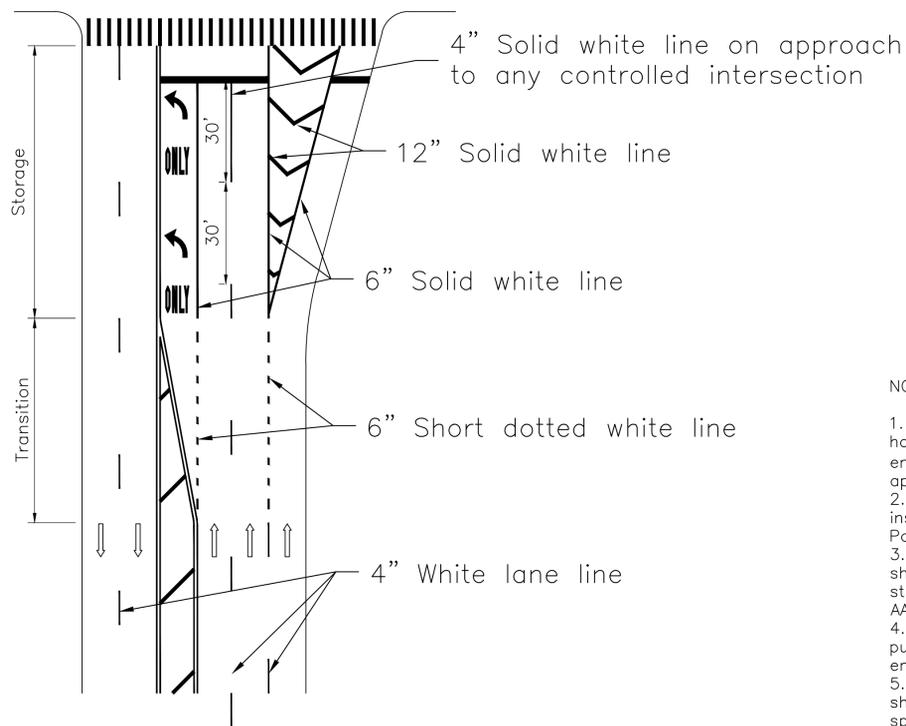
Contrast Striping



Typical Flush Median Striping



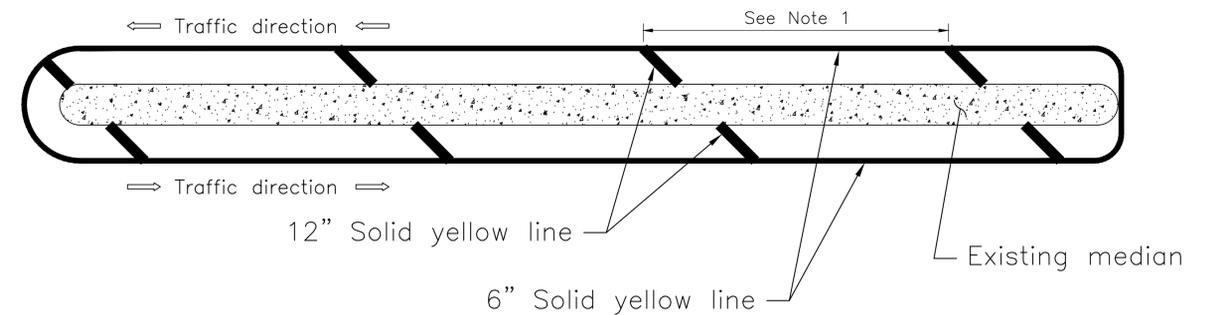
Typical Striping Layout



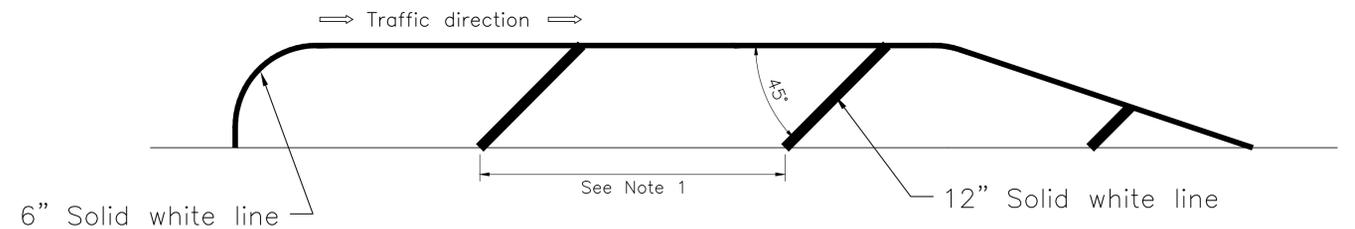
NOTES:

1. On local streets, the spacing between cross hatch lines shall be specified based on engineering judgement. Spacing of 30' is appropriate for most applications.
2. On all highways, gores and striping shall be installed as per NYS DOT drawing number 685-01 Pavement Marking Details sheets 3-5 of 9.
3. The actual length of gores and cross hatching shall be designed by an engineer based on actual street layout and traffic conditions according to AASHTO requirements.
4. Tapers and returns shown for illustrative purposes only and shall be designed based on engineering judgement.
5. For contrast striping, white fixed length line shall be installed with the length and spacing as specified on this sheet and a black fixed length line of equal length shall be installed in the gap following each.

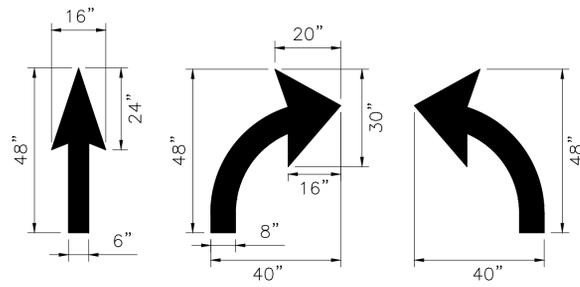
Typical Extended Median Striping



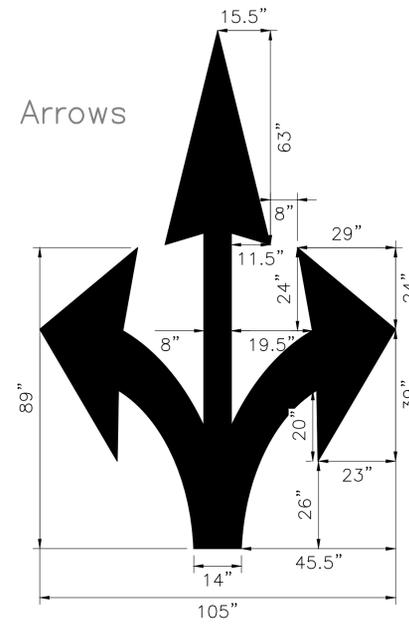
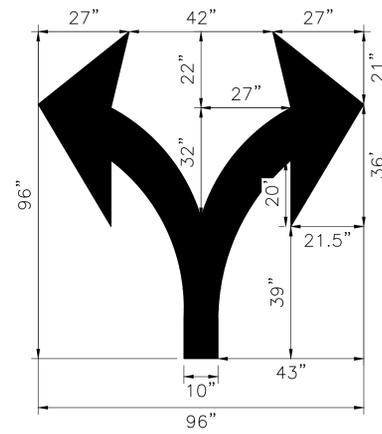
Typical Curbside Channelization Striping



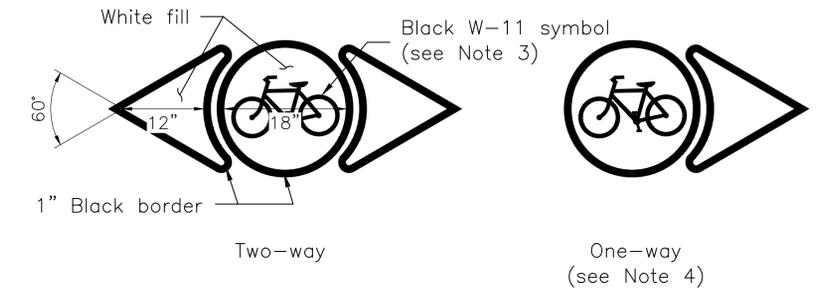
Bicycling Facility Arrows



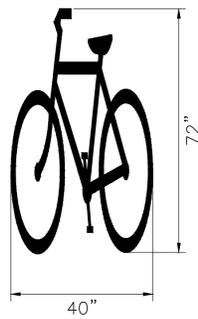
Combination Arrows



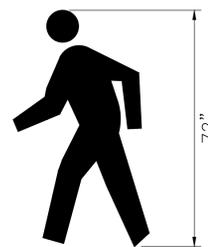
Bicycling Facility Stamp for Use in Pedestrian Areas



Bicycling Facility Symbols



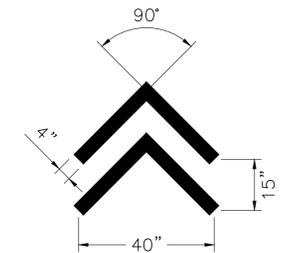
Walking Facility Symbols



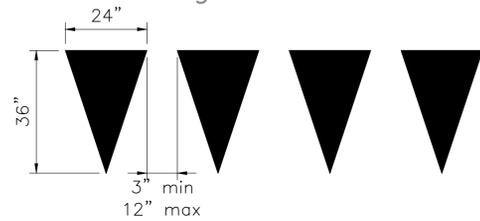
Mini Bicycling and Walking Facility Symbols



Bicycling Facility Chevron



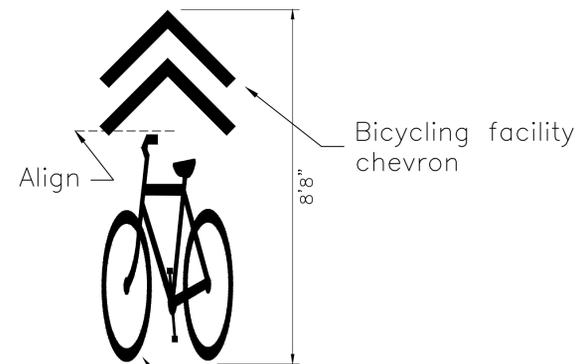
Large Yield Line



Small Yield Line



Shared Lane Marking "Sharrow"

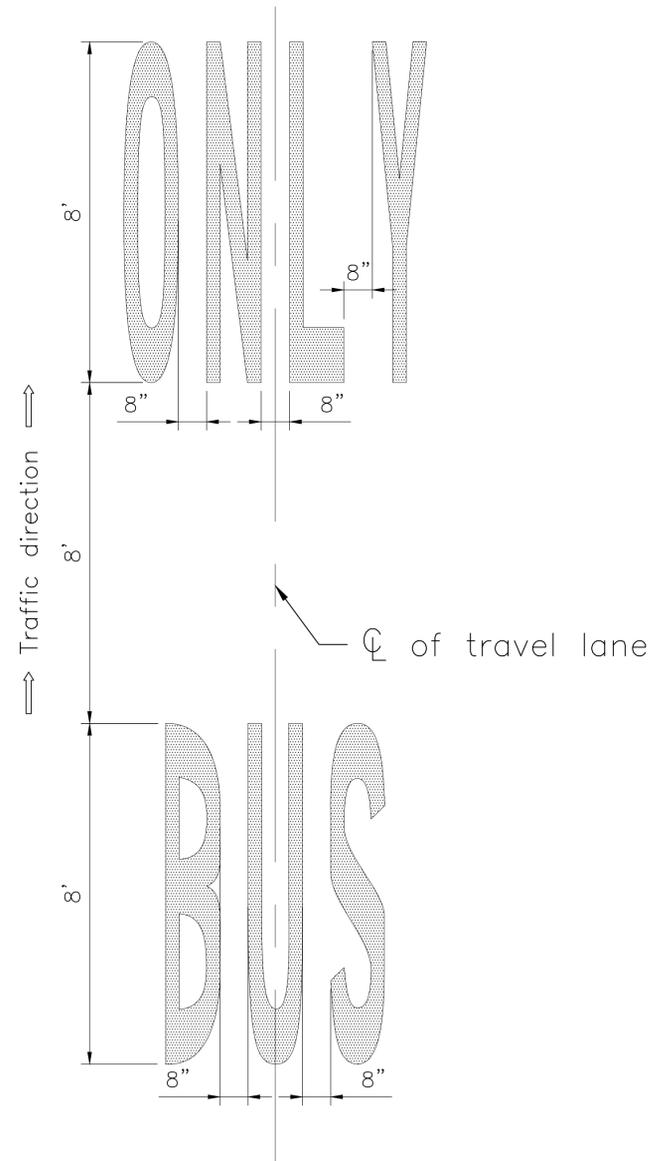


Bicycling facility symbol

NOTES:

- All symbols shall conform to the shapes specified in the MUTCD 2004 Standard Highway Signs and Markings (SHSM) Book, Pavement Markings chapter.
- Preferential Lane Symbols and the following arrows shall be installed as per NYS DOT drawing number 685-01 Pavement Marking Details sheet 8: Turning, Turning/Straight, Straight, Lane Reduction, Diverge, and Ramp Arrows.
- Stamp icon shall utilize the W11-1 "bikes" shape as shown in the SHSM, and for similar shared facility applications may use alternative shapes in the W11 series as noted on plans, i.e. W11-7 "equestrian" and W11-11 "golf cart."
- One of the two pointers of the Bicycle Stamp may be removed to indicate the intended direction of bicycle traffic.

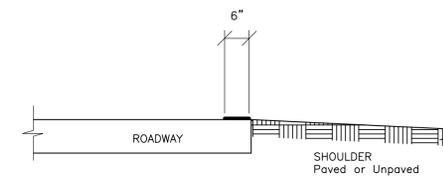
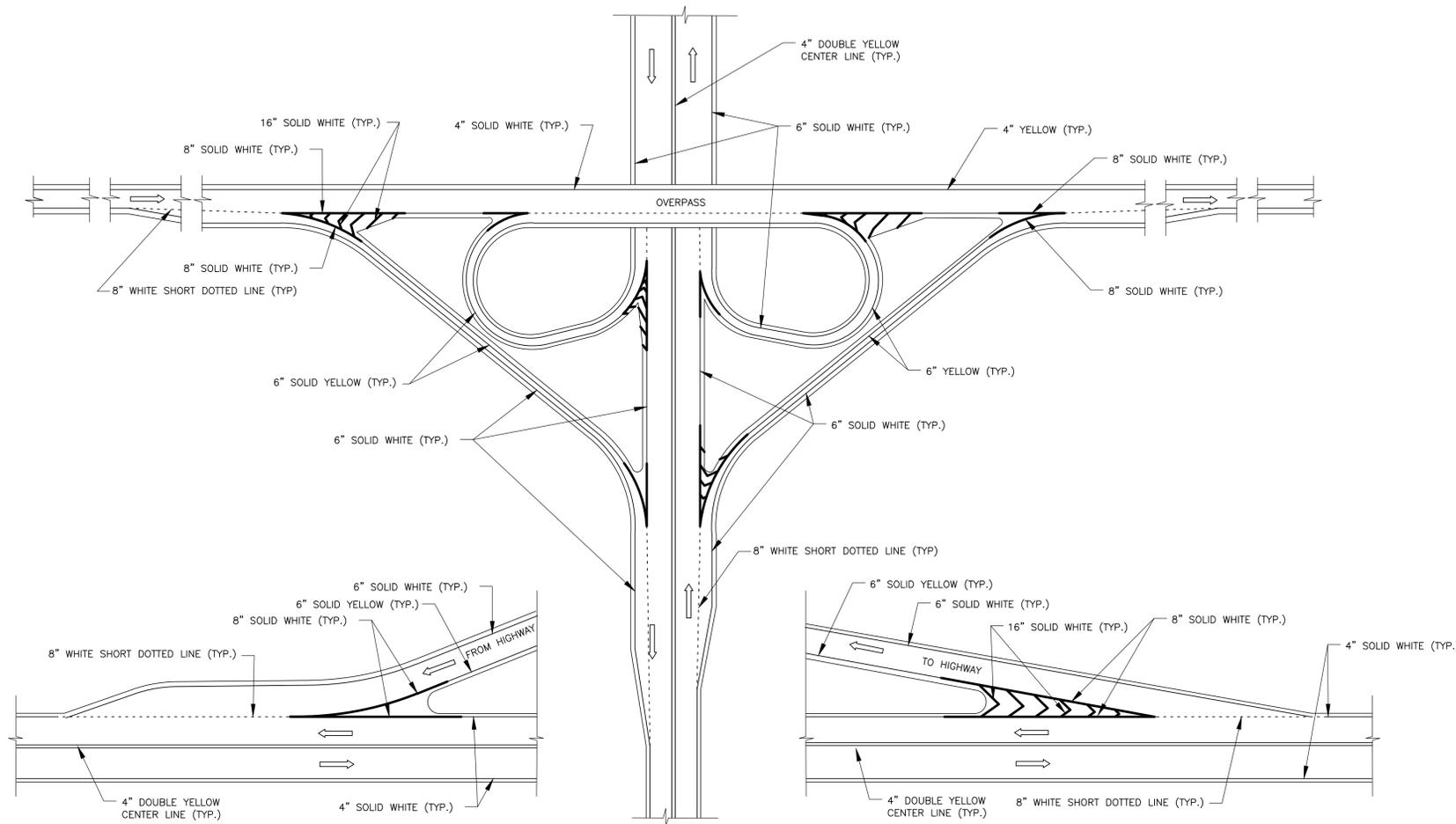
Typical Word Message
(BUS ONLY shown)



NOTES:

1. All messages shall consist of preformed letter shapes as specified in the MUTCD 2004 Standard Highway Signs and Markings (SHSM) Book, Pavement Markings chapter.
2. All messages shall be of an 8' text height, unless otherwise specified. Text height of 4' is typical of messages in bike lanes.
3. All messages consisting of two words or more shall have 8' between words and be laid out such that the first word is closest to an approaching vehicle. Spacing of 4' between words is typical of messages in bike lanes.
4. Spacing between each letter shall be equal for any word. Letter spacing shall be 8" unless otherwise specified or as limited by lane width. All messages shall fit within a single lane and not overlap any striping, unless otherwise specified. Letter spacing of 4" is typical of messages in bike lanes.
5. All messages shall be aligned on center with travel lane, unless otherwise specified.
6. All letters shall be solid white, unless otherwise specified.
7. This drawing replaces TWM-2 and TWM-3.



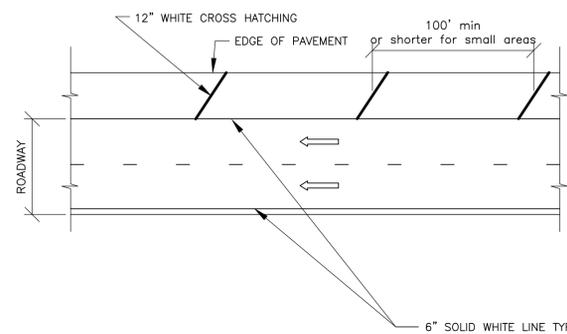


EDGE LINE DETAIL

HIGHWAY EXIT GORE

CLOVER LEAF INTERCHANGE

HIGHWAY ENTRANCE GORE



CROSS HATCHING ADJACENT TO EDGE LINE

NOTES:

1. This drawing replaces DWGS.: MC-89A; MG-443; MG-444.
2. The actual length of the gores and cross sections shall be designed by an engineer based on actual street layout and traffic conditions according to AASHTO requirements.
3. For city streets see typical drawing TSC-1.



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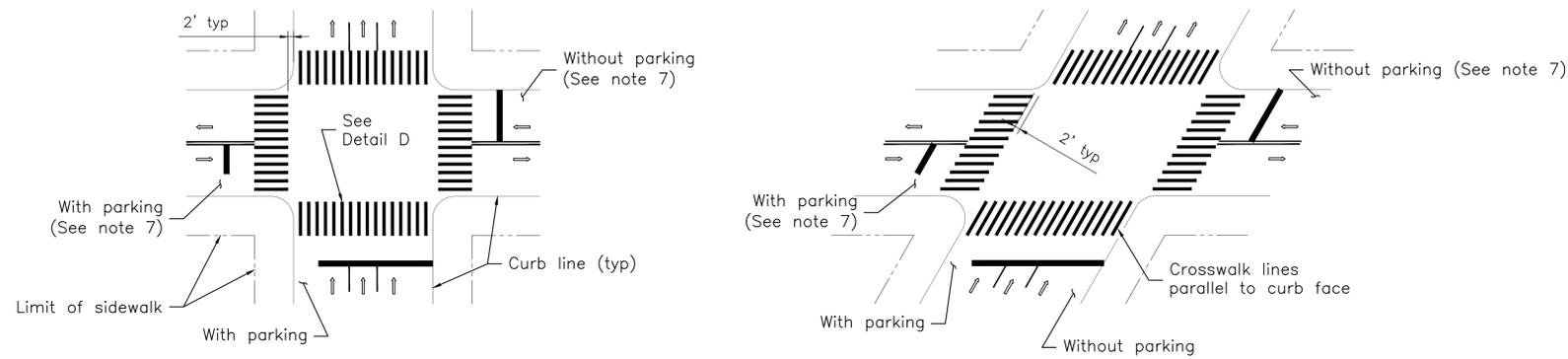
TYPICAL PAVEMENT MARKINGS
 EDGE LINES FOR PARKWAYS & HIGHWAYS



Drawn by D. NELSON
 Checked by S. BARKHO & F. AZER
 Borough ALL
 Scale NOT TO SCALE
 Effective Date 12/01/2015

SHEET 05 OF 22
 DRAWING
 NO. TEL-1

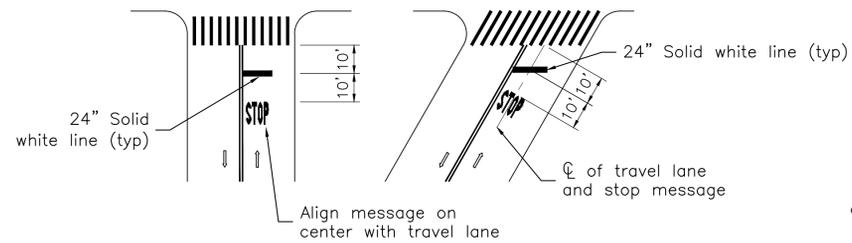
Typical Crosswalks & Stop Bars



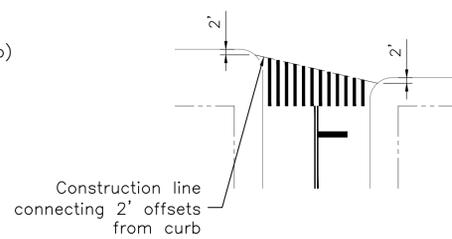
NOTES:

1. The front of crosswalk shall be set back 2' from the curb line unless otherwise specified by the engineer or for accessibility (see note 2).
2. At corners with apex pedestrian ramps, the landing area must fall within the crosswalks, in some cases requiring widening of the crosswalk(s) or marking an extension at the corner.
3. Crosswalks shall be installed at any signalized, stop-controlled, or yield-controlled leg of an intersection, unless otherwise specified.
4. Stop bars shall be installed in any signalized or stop controlled travel lane entering the intersection.
5. All stop bars shall be 10' offset from the back of the crosswalk, parallel to the back of crosswalk, unless otherwise specified.
6. Stop bars may be staggered or setback to accommodate large vehicle turns.
7. Presence or absence of curbside parking shown for illustrative purposes only. Stop bars should extend to curb on streets without curbside parking. Stop bars should extend to parking lane stripe on streets with striped curbside parking. Stop bars should extend to 8' from curb, or as determined by engineer, on streets with unstriped curbside parking.
8. Unless otherwise specified by the engineer on a plan or order, the back of crosswalk shall extend to whichever is greatest of the following: full width of sidewalk, the full extent of the corresponding curb ramp's landing area, or a minimum width of 8'.

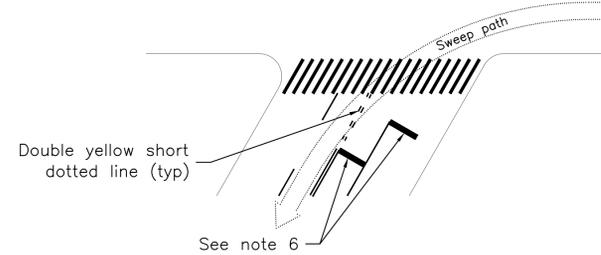
Detail A: Typical Stop Bar & Stop Message Placement



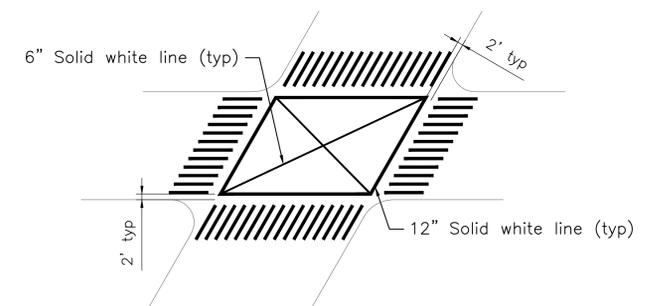
Detail C: Trapezoidal Crosswalks at Offset Curblines



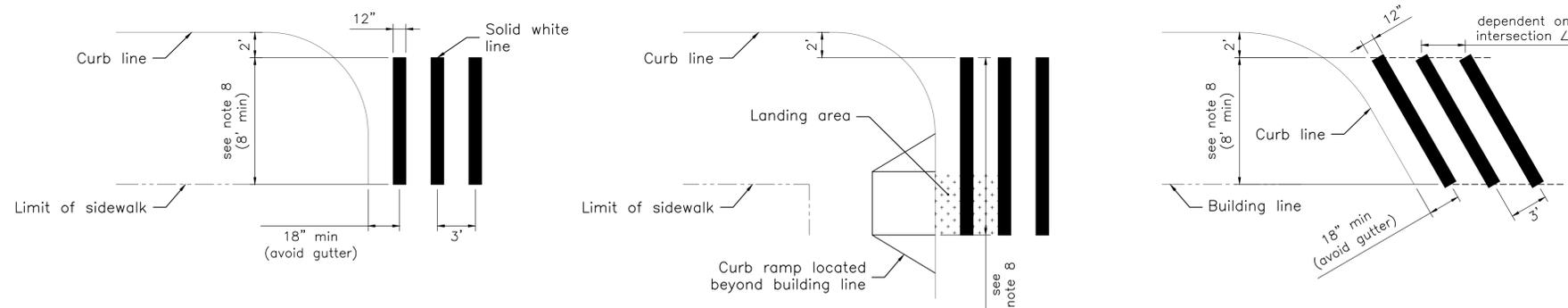
Detail B: Optional Staggered Stop Bar for Constrained Turns



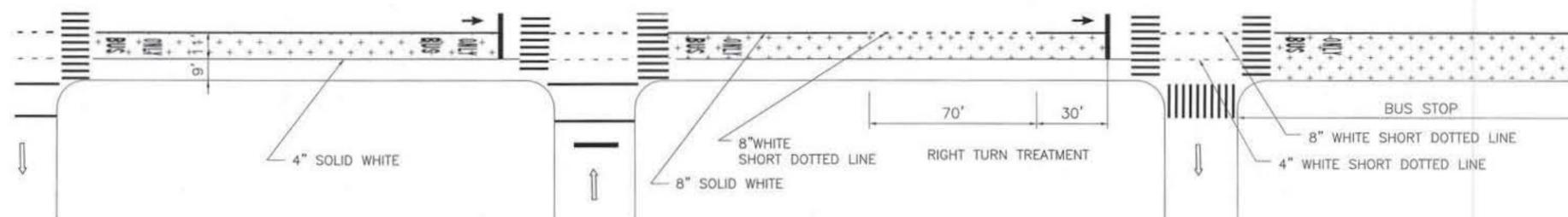
Detail E: Do Not Block Intersection Markings



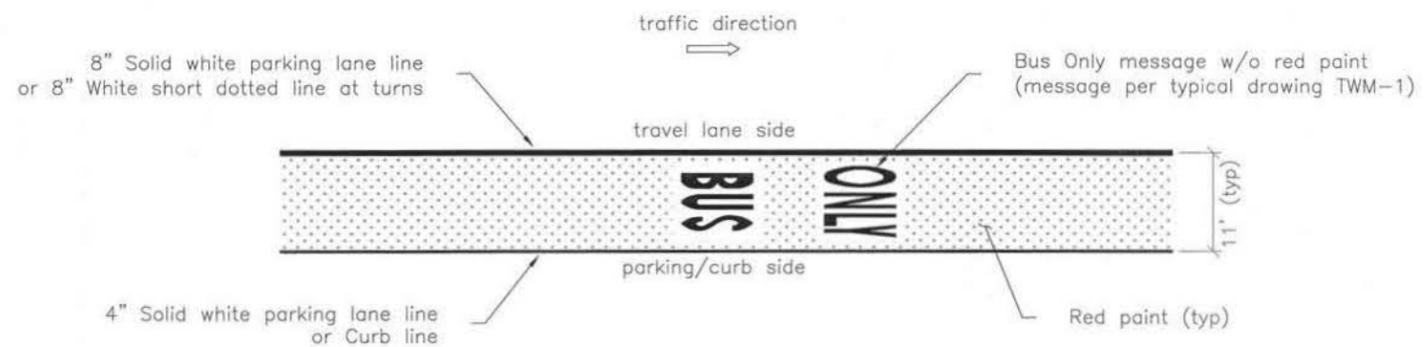
Detail D: Crosswalk Stripe Spacing and Length



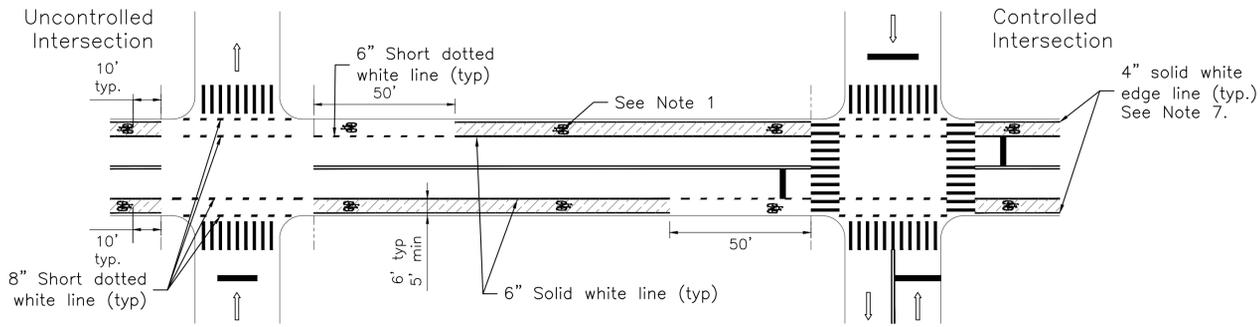
TYPICAL BUS LANE



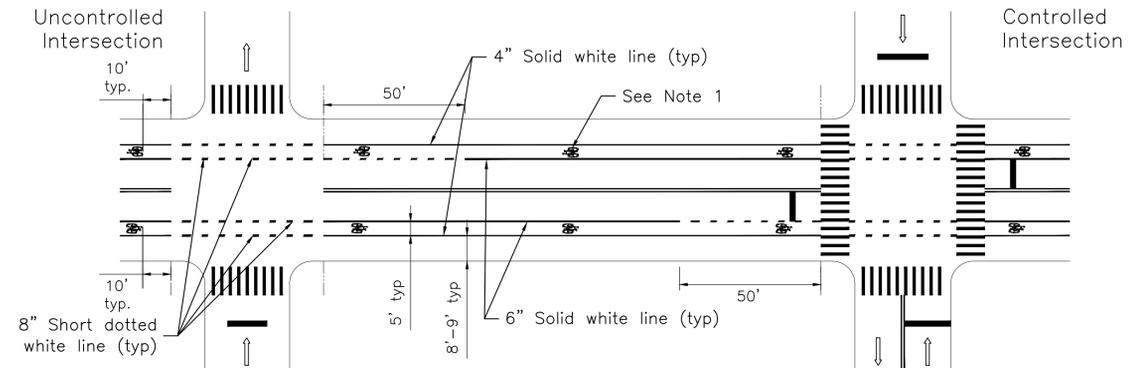
BUS LANE DETAIL



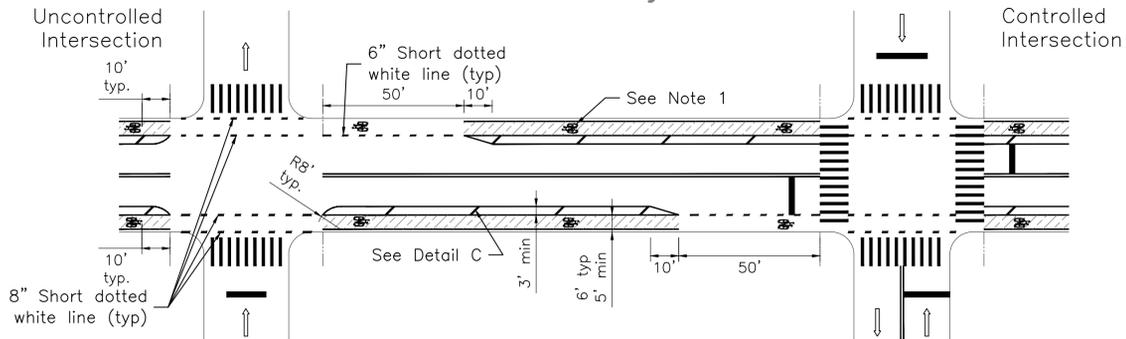
Typical Bike Lanes Adjacent to Curb



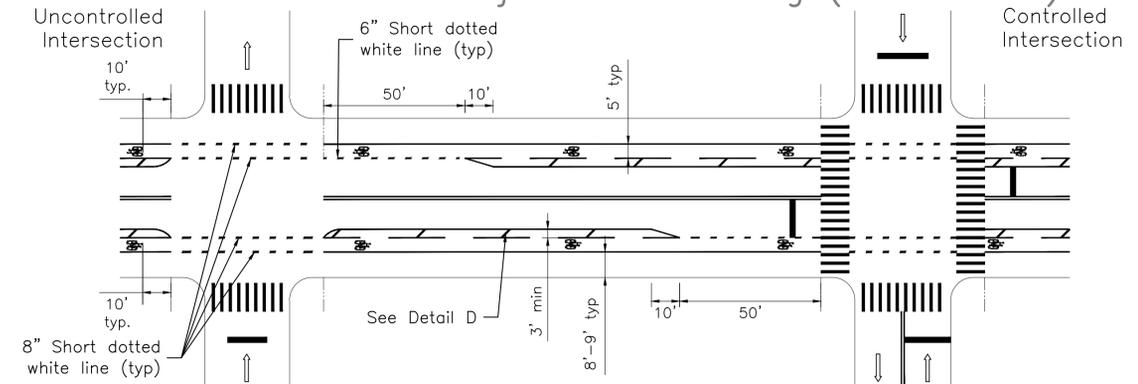
Typical Bike Lanes Adjacent to Parking



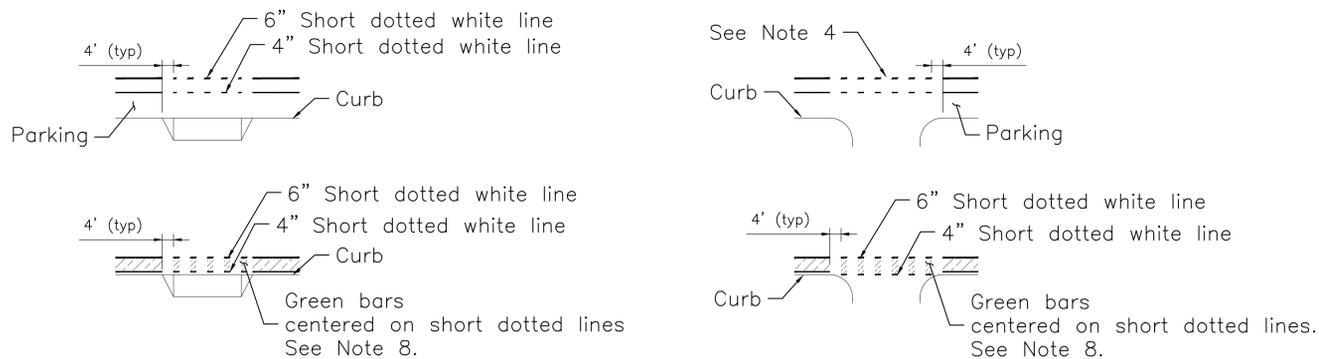
Buffered Bike Lanes Adjacent to Curb



Buffered Bike Lanes Adjacent to Parking (See Note 8)



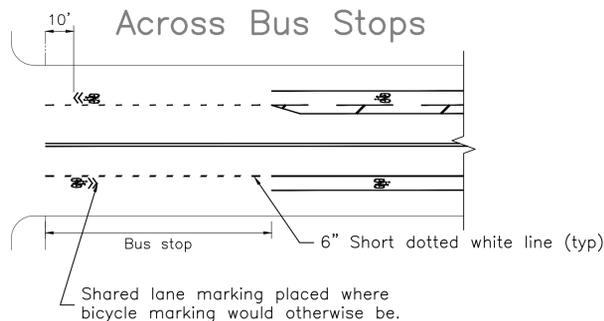
Detail A: Treatments Across Driveways and Alleys



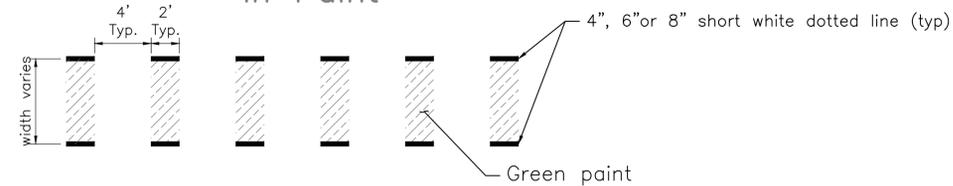
At driveways with frequent ingress/egress, break bike lane with short dotted line across curb cut, including flares. Where an edge line is present, it may remain solid.

At alleyways, break bike lane lines with short dotted line across alley, including curb returns.

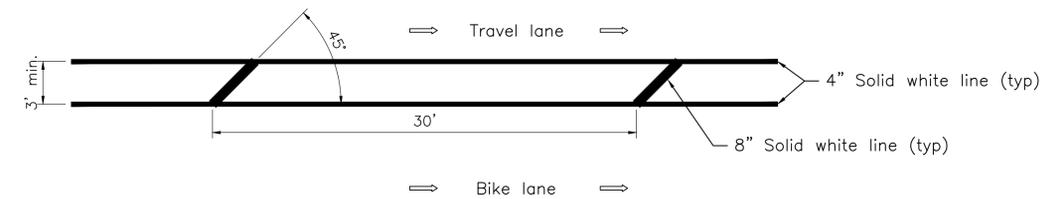
Detail B: Treatments Across Bus Stops



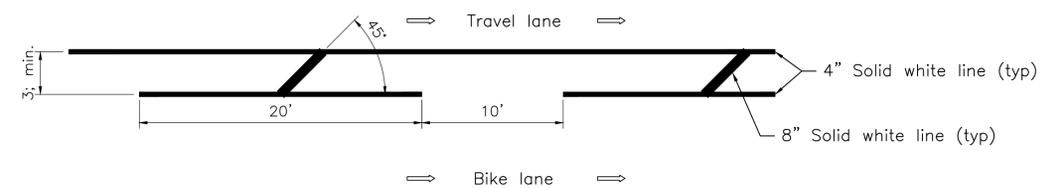
Detail E: Full Width Green Bars in Paint



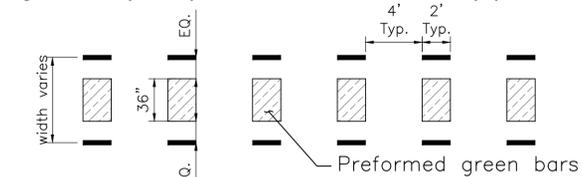
Detail C: Bike Lane Buffer (Parking Prohibited)



Detail D: Bike Lane Buffer (Parking Permitted)



Detail F: 36" Preformed Bars Layout (Requires NYCDOT approval)



Where bike lane is >6' in width, two preformed green bars may be placed adjacent to each other.

NOTES:

- Bicycle symbols shall be installed at each end of each block with additional symbols at least every 200'. For typical blocks of 450' or less, a single midblock symbol is typical.
- Bicycle symbols, sharrows, and chevrons shall be installed as per typical drawing TAR-1.
- Some design features that are not annotated or dimensioned are provided for illustrative purposes.
- For a typical driveway or alley 10'-24' wide, green bars shall be used when possible for curbside bike lanes.
- Green bars are to be placed based on engineering judgement and current NYCDOT policy.
- In most cases, a wider parking lane should be considered as a design alternative to providing a bike lane buffer.
- 4" edge line placed 1' off the curb must be installed where a green curbside bike lane is at least 5' wide. Where the curb is adjacent to the left edge of the bike lane in the direction of travel, the edgeline shall be yellow.
- Green bars shall be centered on short dotted line markings and fill the full space between lines where feasible. Otherwise 24" x 36" preformed bars may be installed centered within bike lane as approved by NYCDOT. See Details E and F.



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TYPICAL PAVEMENT MARKINGS

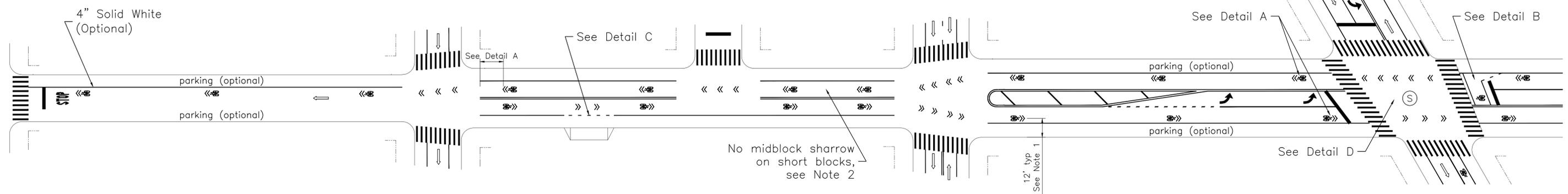
BIKE LANES & BUFFERED BIKE LANES



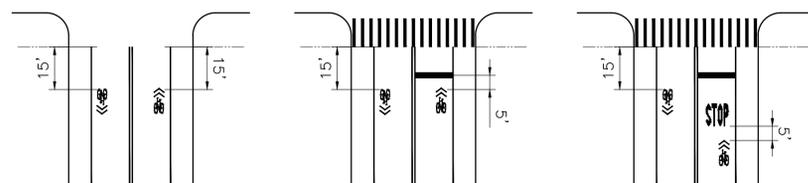
Drawn by A. SULESKI & D. CAIAZZO
Checked by M. SINGH
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Effective Date 05/21/24

SHEET 08 OF 22
DRAWING
NO. TBL-1

Typical Bike Routes

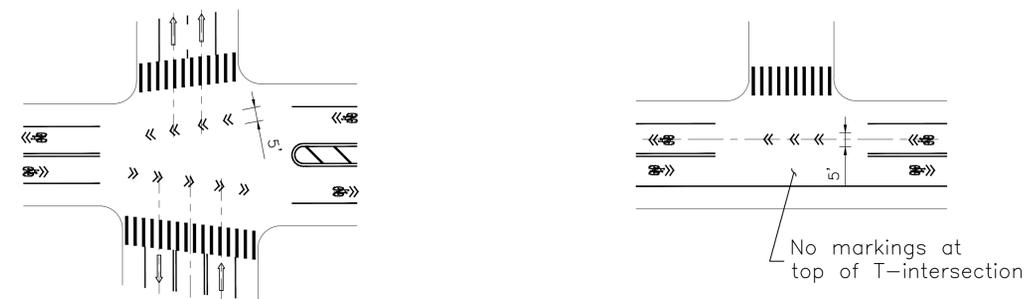


Detail A: Longitudinal Placement at Approaches

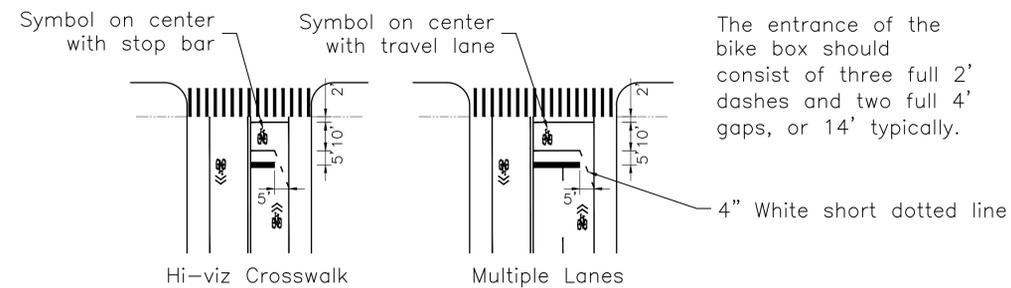


Sharrows should be placed 15' from the crosswalk or property line. Where a STOP message or other marking would obstruct the normal placement of the sharrow, the sharrow should be placed 5' from that marking.

Detail D: Bike Route Intersection Markings

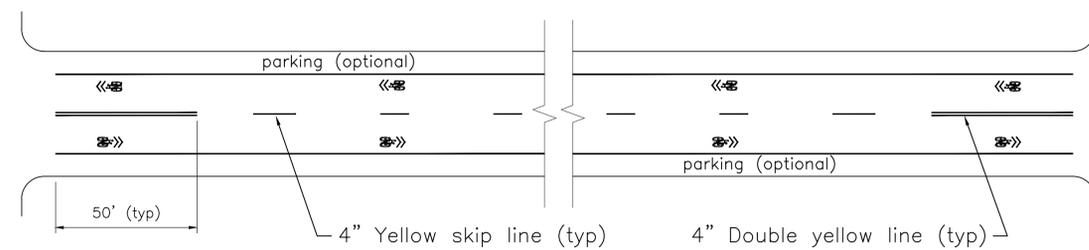


Detail B: Bike Boxes along Bike Routes (See Note 5)



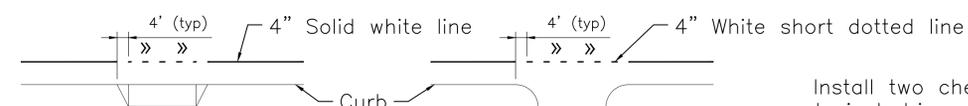
The entrance of the bike box should consist of three full 2' dashes and two full 4' gaps, or 14' typically.

Typical Passing Permitted Shared Lanes



Treatment shall only be installed on blocks at least 30' in width

Detail C: Treatments across Driveways & Alleys



At driveways with frequent ingress/egress, break parking lane line with short dotted line across curb cut, including flares.

At alleyways, break parking lane line with short dotted line across alley, including curb returns.

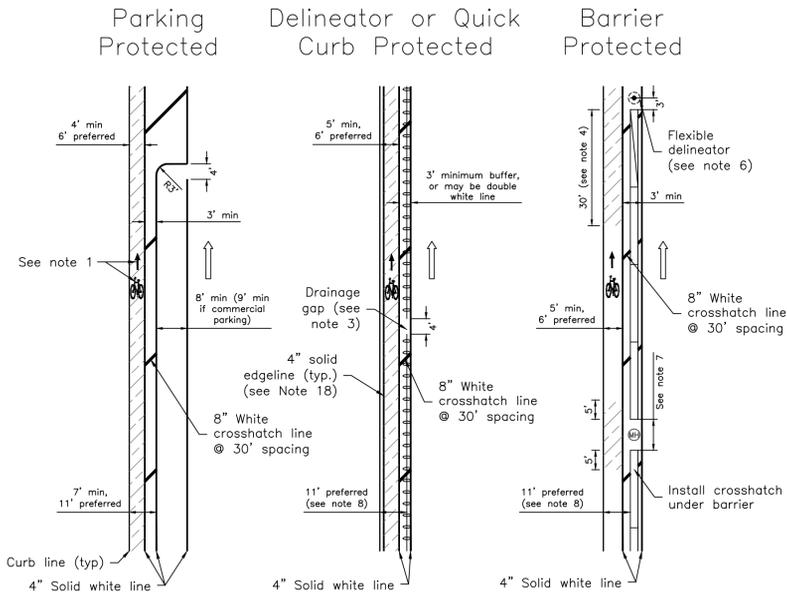
Install two chevrons for a typical driveway or alley 10'-24' wide. More chevrons may be installed for wider driveways.

NOTES:

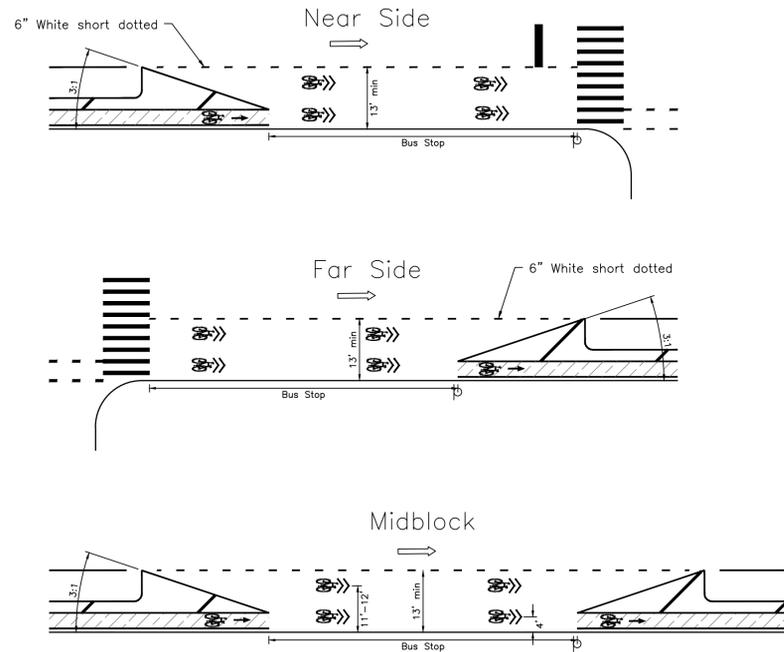
1. Sharrows should be 12' offset from the curb where there is curbside parking lane. In most other cases sharrows should be 4' offset from the curb or lane line.
2. In addition to the sharrows placed at the ends of the block in accordance with Detail A, a sharrow shall be placed at least every 100'.
3. Bike symbols, sharrows, and chevron shall be installed as per typical drawing TAR-1.
4. Some design features not annotated or dimensioned are provided for illustrative purposes.
5. Where possible, bike boxes installed across more than 2 travel lanes should be avoided, and a two stage queue box should be considered instead.



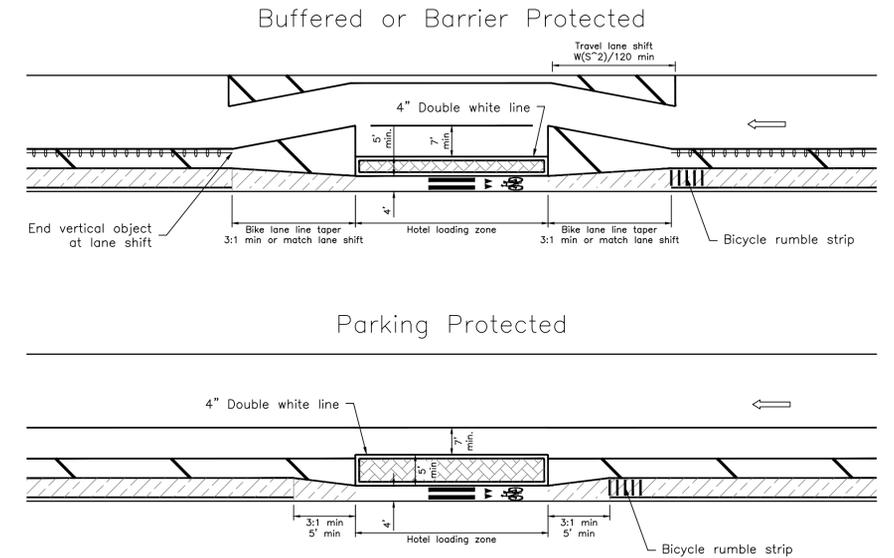
Minimum Widths & PBL Types



Bus Stop Treatments (see note 9)



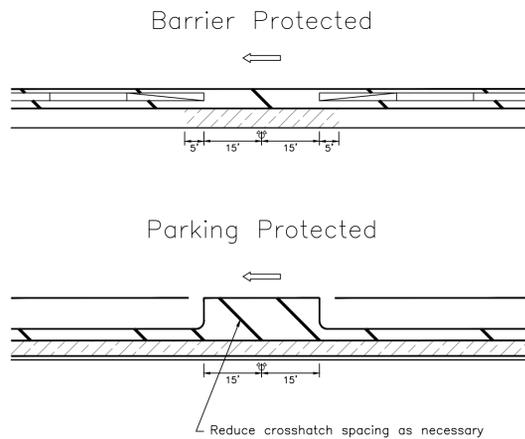
Hotel Loading Zones (see note 14)



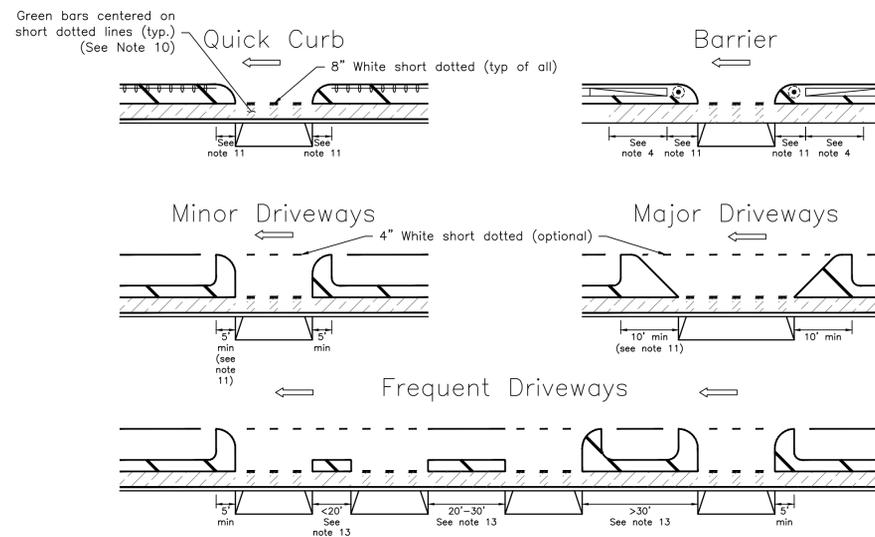
Notes:

- Bike symbols should be placed no greater than 200' +/- apart with at least one placed midblock and one at start and end of the block. Directional arrows shall be added to bike symbol in a protected bike lane, except when combined with a bike stop bar or yield teeth.
- A 4' gap should be left between channelized areas and floating parking lines. 3' fillets should be used in the inside corners of floating parking lanes and no fillets should be used on the outside corners.
- Quick curb used to protect a bike lane shall have a minimum width 4' gap every 100' +/- to facilitate drainage.
- Green paint is not required in a barrier protected bike lane, except in breaks in the barrier and an additional 30' at the start and end of a block.
- For taper lengths, L shall be determined using $L=(W*S^2)/60$ for design speeds below 45mph. W=Width and S=Speed. Caution should be used in employing these typical in higher speed contexts.
- At either end of the block, the barrier shall terminate with end sections of concrete barrier and shall have a flexible delineator offset 3' on center from each end section.
- For manholes, vaults, valve boxes, etc. that would be obstructed by barrier, a break may be provided wide enough for accessing the utility and no greater than 15'. End sections are not required unless on a sharp horizontal curve or as otherwise determined necessary based on engineering judgement. For barrier breaks greater than 10', add green paint extending 5' past either end of the break.
- For protected bike lanes without a maintenance plan, 11' of clearance is needed between curb and any vertical element to allow for street sweeping.
- Only bus stop treatments for 13' or wider between travel lane and curb line are detailed on this sheet. Where width permits, a bus boarding island should be considered per typical drawing BBI-1. For narrower than 13', consider relocation of the bus stop or ramping cyclists onto sidewalk around the bus stop, which may be supplemented with a sidewalk extension along the bus stop.
- Green bars shall be centered on short dotted line markings and fill the full space between lines where feasible. Otherwise 24"x36" preformed bars may be installed centered within bike lane as approved by NYCDOT. See Details E and F on TBL-1.
- The limit of vertical elements and/or the length of the buffers within the floating parking on either side of driveways shall be based on turn analysis for ingress and egress of the design vehicle.
- Driveways should be considered major driveways if they serve a large parking facility, are frequently used, or are used by large trucks.
- In areas with a large number of driveways, engineering judgement may be used to install the floating parking without buffers between driveways closer than 30' apart.
- In a hotel loading zone treatment, the crosswalk between the painted pedestrian space and the sidewalk should be positioned as close as possible to the hotel door and be at least 8' wide. Crosswalk bars may be placed closer together than the typical 3' to fit at least 2 bars within the space.
- Bike lane should taper at a rate not be greater than 3:1 to shift for a pre-existing curb extension.
- Rumble strips may be used on approach to traffic controls, crosswalks, and obstacles based on engineering judgement.
- For dimensioning of bus stop treatments, "bus stop" denotes the location of the bus stop pole and the typical distance to the end of the no standing regulation.
- 4" solid edgeline placed 1' off the curb must be installed where a green curbside bike lane is at least 5' wide. Where the curb is adjacent to the left edge of the bike lane in the direction of travel, the edge line shall be yellow.

Hydrant Treatments



Driveway Treatments



LEGEND:

	WALKING AREA COLOR		FLEXIBLE DELINEATORS
	BIKE LANE		QUICK CURB
	DETECTABLE WARNING STRIP		BARRIER MIDDLE SECTION
	RUBBER SPEED BUMP		BARRIER END SECTION
			TRAFFIC SIGNAL



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TYPICAL PAVEMENT MARKINGS & GEOMETRY

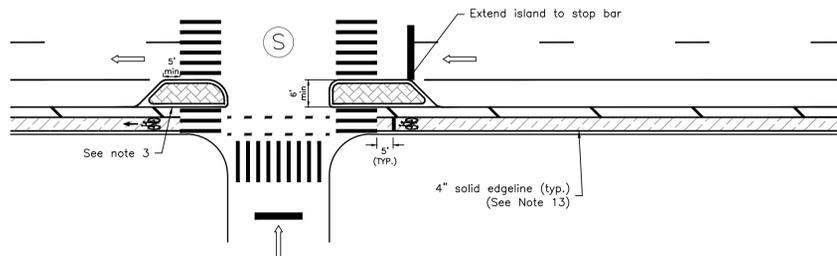
One-way Protected Bike Lanes (PBLs): General



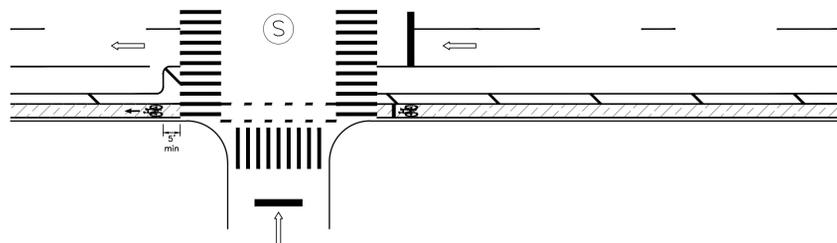
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SHEET 11 OF 22
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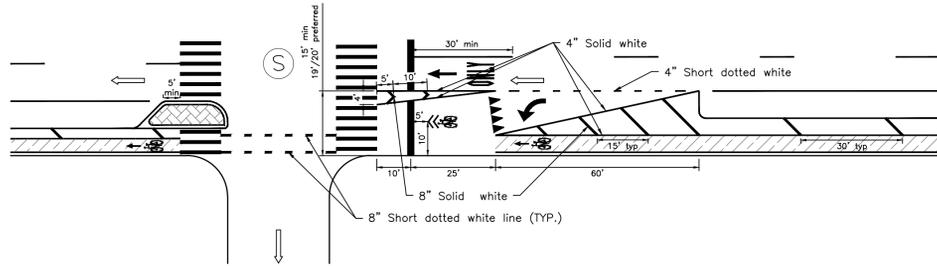
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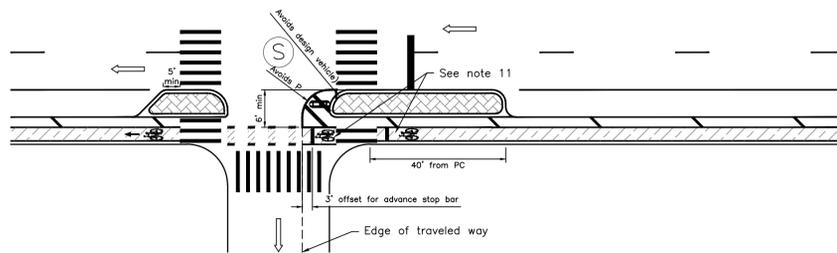
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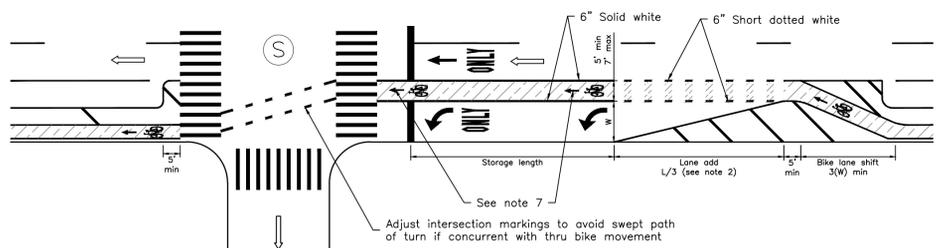
Mixing Zone



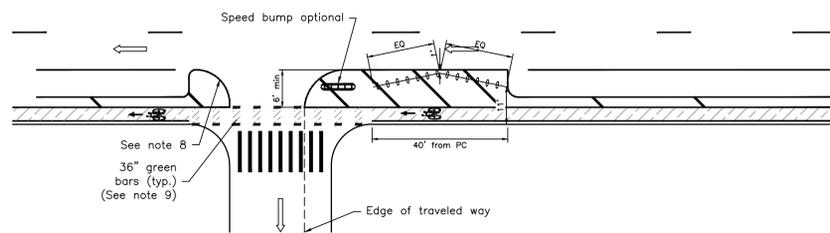
Offset Crossing (Simple Radius)



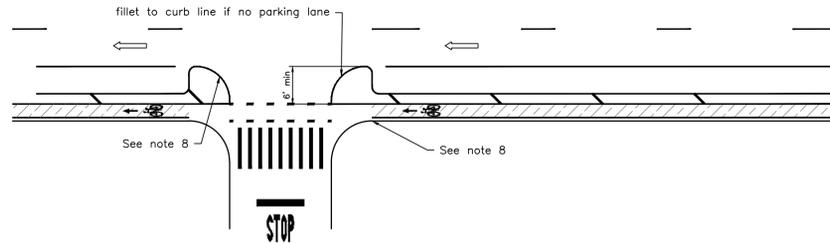
Pocket Lane



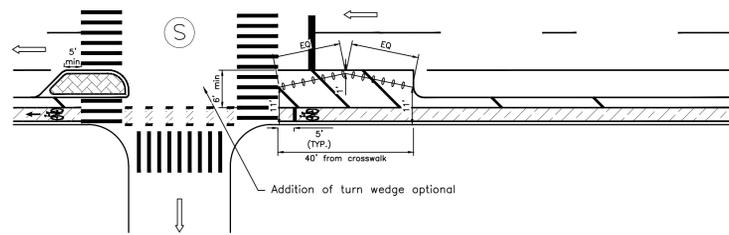
Uncontrolled Approach w/ Turn Conflict



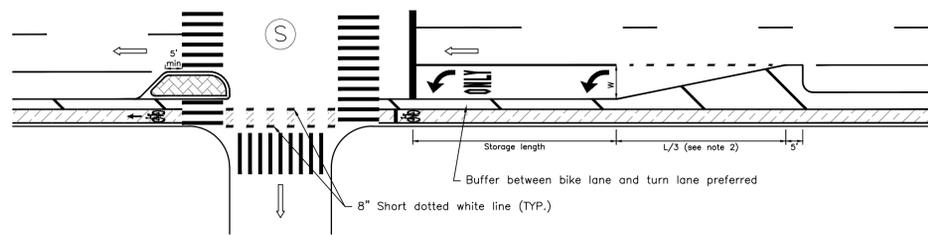
Uncontrolled Approach w/o Turn Conflict



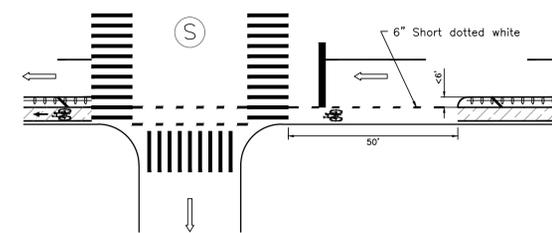
Constrained Offset (see note 10)



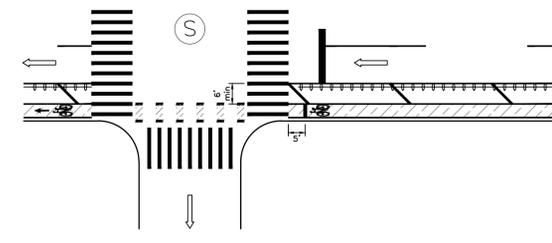
Separated Phase



Barrier Protected w/ Narrow Buffer



Barrier Protected w/ Wide Buffer



- Notes:
- At stop controlled approaches, channelization or painted ped area should be provided at minimum such that a driver and cyclist traveling in the same direction would have a clear sightline to each other from the locations of the relative stop bars.
 - For taper lengths, the length (L) shall be determined using $L = (W \cdot S^2) / 60$ for design speeds below 45mph. W=Width and S=Speed. Caution should be used in employing these typicals in higher speed contexts.
 - Far side islands should be installed wherever feasible. If infeasible, than at least 5' of channelization should be installed in the parking lane.
 - Where there is insufficient width to maintain a 7' wide painted pedestrian island, the island may be widened so that the island may be carried through the buffer to the bike lane.
 - Offset crossing are best as treatments for turns with volumes of 120 vehicles/hour or less.
 - Omit turn wedges and advance queuing position if there is a bus stop or rush hour regulation along the corresponding curb of the receiving leg of the cross street.
 - Bike symbols at stop bar and start of pocket lane, plus at least one midblock symbol per additional 50'. Lane assignment arrows may be used as appropriate.
 - The ends of the buffer may be shifted and/or filleted as necessary to avoid swept path of the design vehicle. For some turn treatments in parking protected bike lanes, where there is no swept path conflict, the buffer should align with the cross street curb lines. For some turn treatments in bike lanes not protected by parking, where there is no swept path conflict, the buffer should align with the PC/PT of the existing corner return.
 - Green bars shall be centered on short dotted line markings and fill the full space between lines where feasible. Otherwise 24"x36" preformed bars may be installed centered within the bike lane as approved by NYCDOT. See Details E and F on TBL-1.
 - Constrained offset design may be used when the swept path does not allow for a painted pedestrian island of minimum width to extend to the edge of crosswalk.
 - If a turn wedge is provided and a cyclist may safely queue in the space adjacent to it during phases nonconcurrent with the cyclists' through phase(s), an advanced queuing position may be marked with a bike symbol and stop bar in the intersection.
 - All painted pedestrian spaces shall have flexible delineators in accordance with latest DOT policy.
 - 4" edge line placed 1' off the curb must be installed where a green curbside bike lane is at least 5' wide. Where the curb is adjacent to the left edge of the bike lane in the direction of travel, the edgeline shall be yellow.

LEGEND:			
	WALKING AREA COLOR		FLEXIBLE DELINEATORS
	BIKE LANE		QUICK CURB
	DETECTABLE WARNING STRIP		BARRIER MIDDLE SECTION
	RUBBER SPEED BUMP		BARRIER END SECTION
			TRAFFIC SIGNAL



CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING AND MANAGEMENT (TP&M)
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TYPICAL PAVEMENT MARKINGS & GEOMETRY

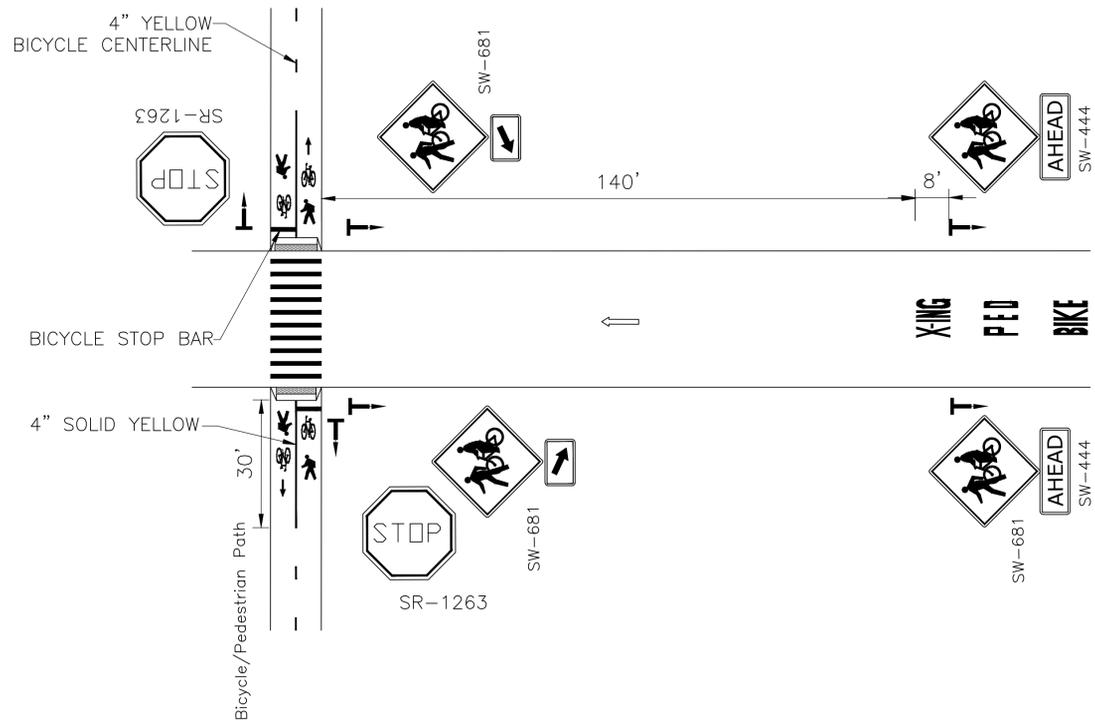
One-way Protected Bike Lanes (PBLs): Turn Treatments



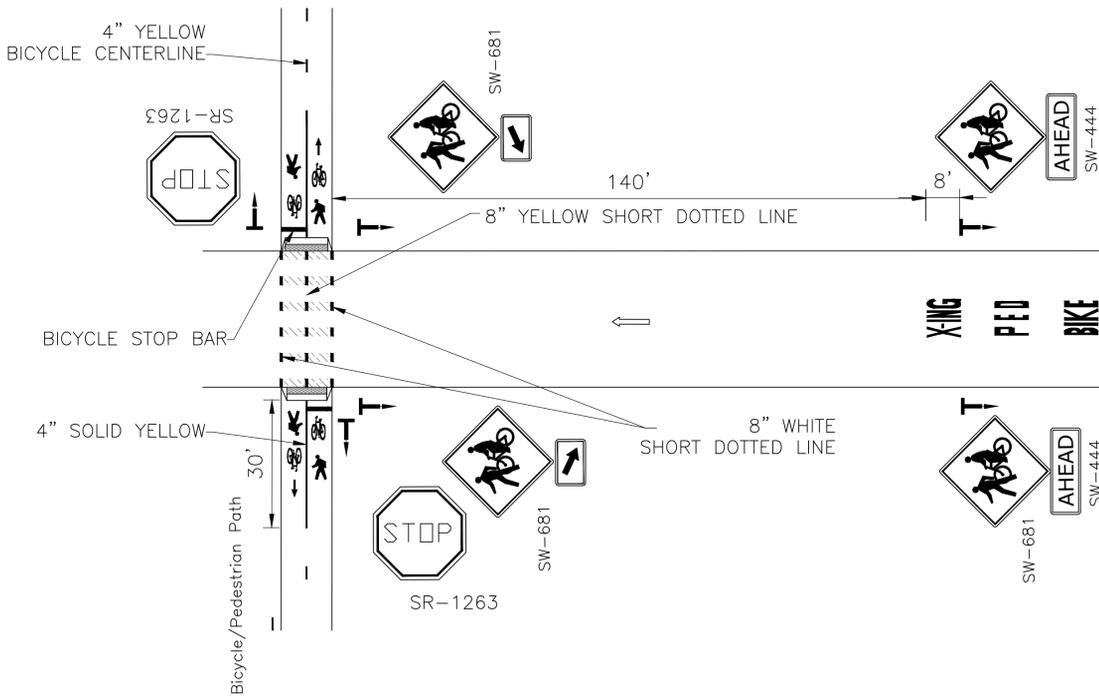
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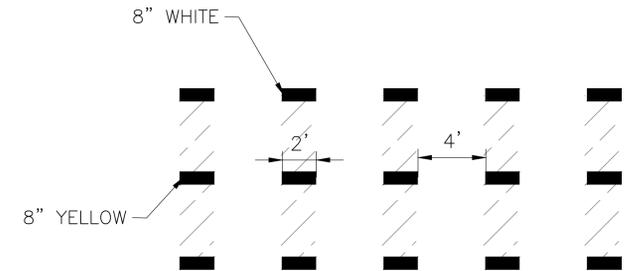
UNCONTROLLED SHARED BICYCLE / PEDESTRIAN PATH WITH ENHANCED CROSSING APPROVED



UNCONTROLLED SHARED BICYCLE / PEDESTRIAN PATH WITHOUT ENHANCED CROSSING APPROVED

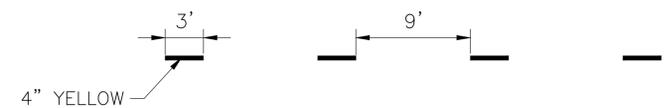


CROSSING MARKINGS IN INTERSECTION DETAILS

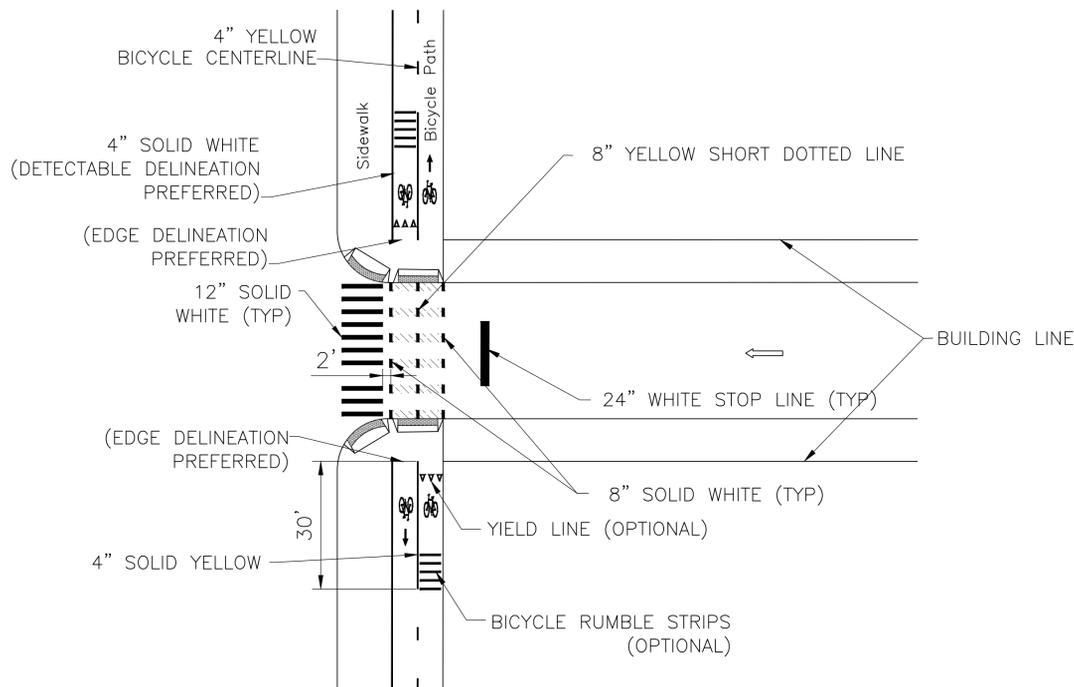


For crosswalk detail see typical drawing TCW-1

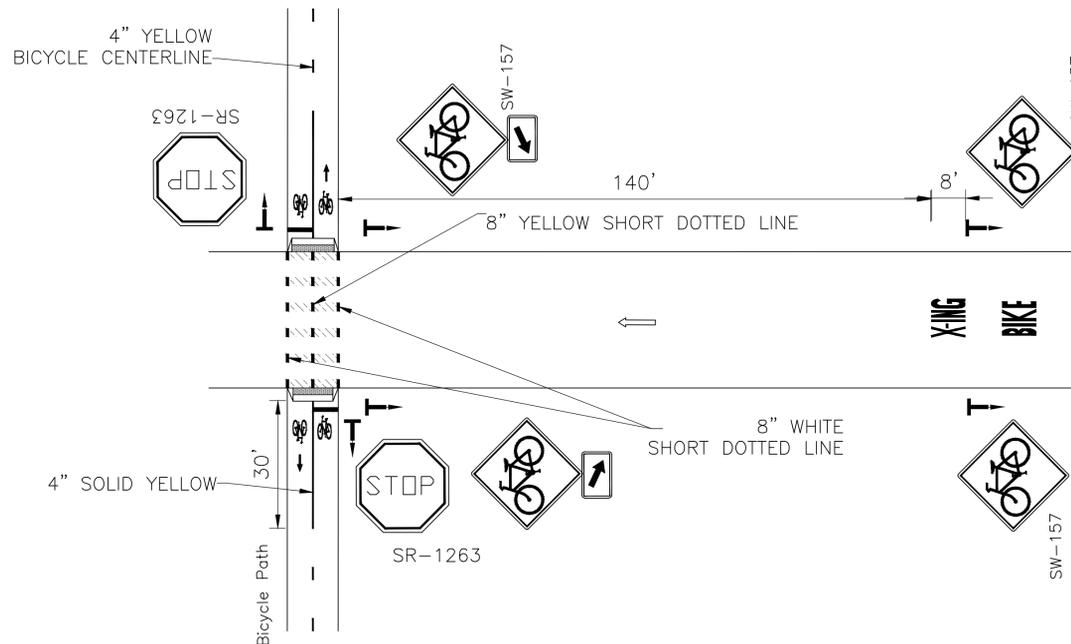
BIKE CENTERLINE ON PATH DETAIL



STOP CONTROLLED OR SIGNALIZED BIKE PATH ADJACENT TO CROSSWALK



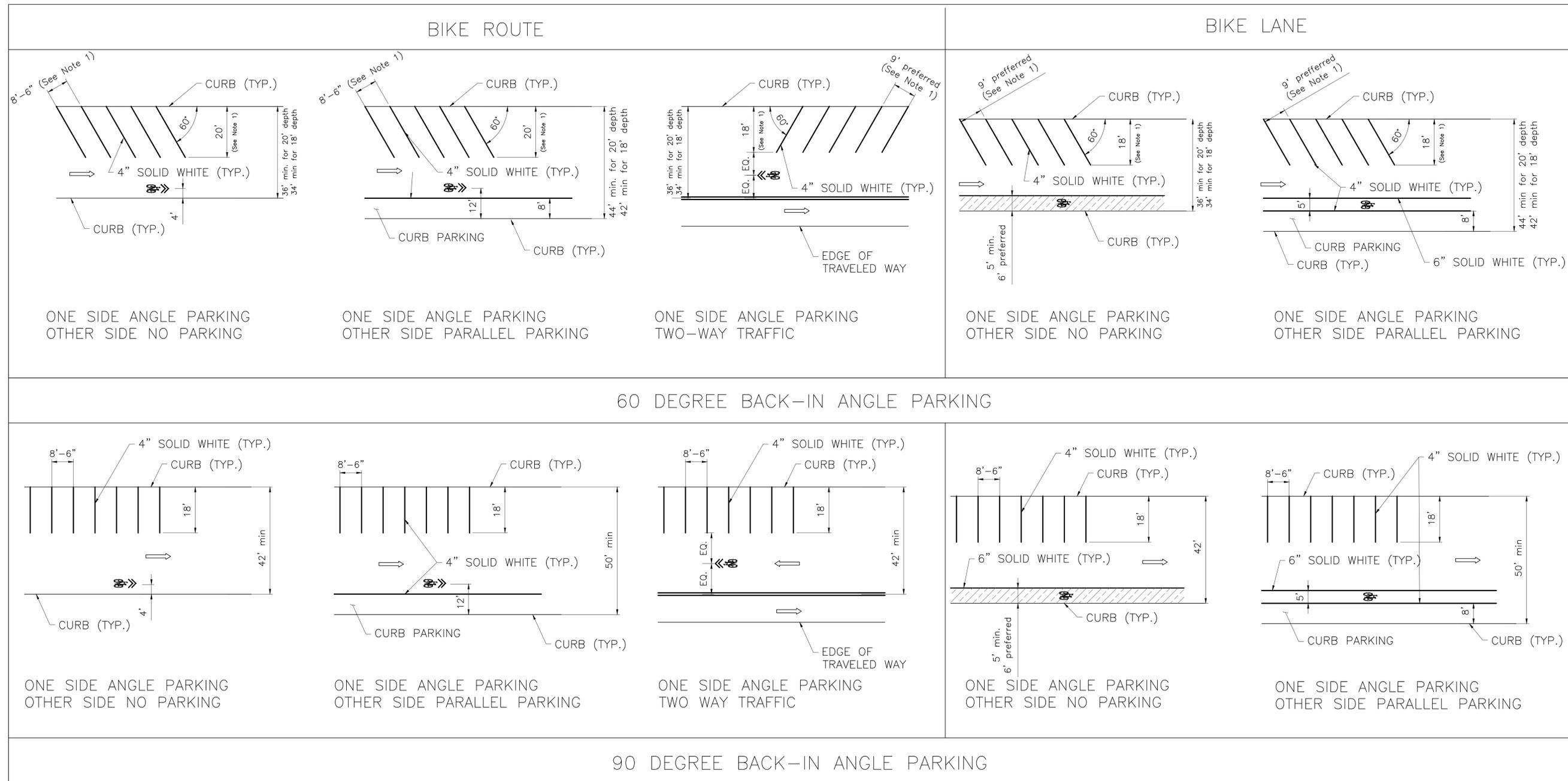
BICYCLE PATH CROSSING ON UNCONTROLLED CROSS STREET



NOTES:

- Other configurations of bike and pedestrian markings, signs, and messages not shown on this sheet may be needed based on site specific contexts.
- Bicycle centerlines should be solid on tight curves, for 30' on approach to an intersection, or anywhere where bike passing should be discouraged.





- NOTES:
1. For 60° parking, if the parking stall width is increased from 8'-6" to 9', the minimum required parking stall depth shall be 18' instead of 20'.
 2. The preferred placement is shown whereby the bike lane or sharrows are opposite angled parking. However, the engineer may consider bike lanes and sharrows immediately abutting angled parking, but only for configurations that are both back-in and angled at 60°. An offset or buffer should be provided between the parking stalls and the bike lane. The most likely application of such being on two-way streets.



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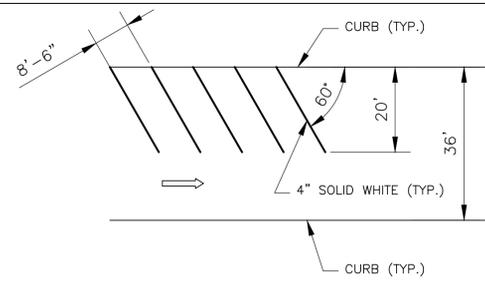
TYPICAL PAVEMENT MARKINGS
 BIKE ROUTES & BIKE LANES ALONG ANGLE PARKING



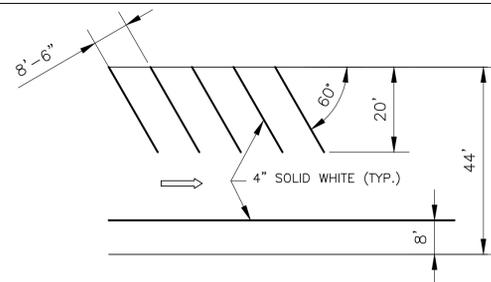
Drawn by A. SULESKI & D. CAIAZZO
 Checked by M. SINGH
 Borough ALL
 Scale NOT TO SCALE
 Effective Date 05/21/2024

SHEET 14 OF 22
 DRAWING
 NO. TBAP-1

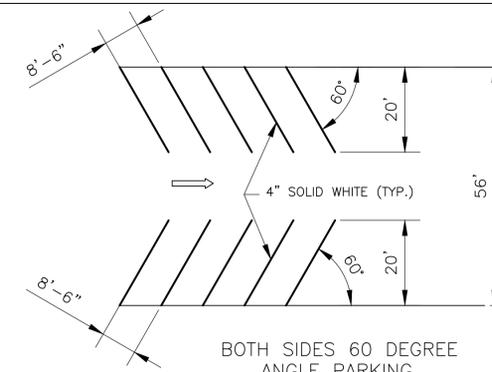
ONE WAY
TRAFFIC



ONE SIDE 60 DEGREE ANGLE PARKING

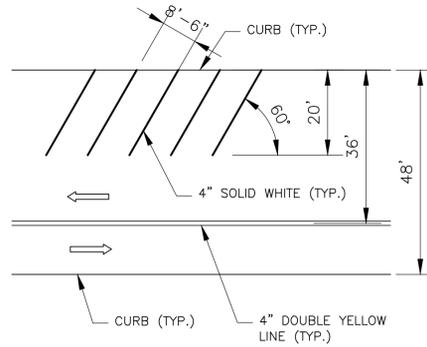


ONE SIDE 60 DEGREE ANGLE PARKING
OTHER SIDE PARALLEL PARKING

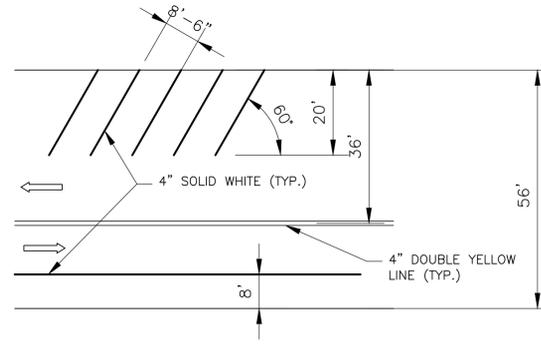


BOTH SIDES 60 DEGREE
ANGLE PARKING

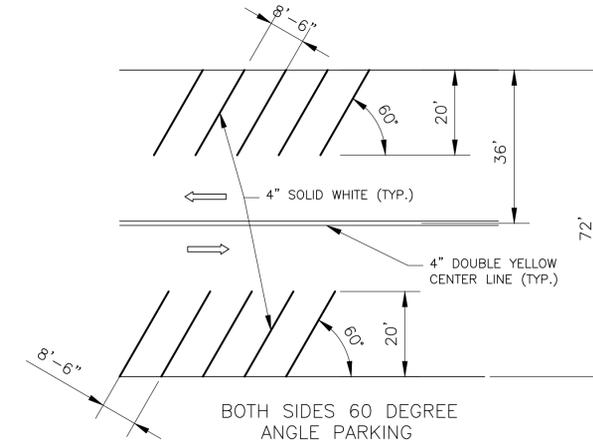
TWO WAY
TRAFFIC



ONE SIDE 60 DEGREE ANGLE PARKING

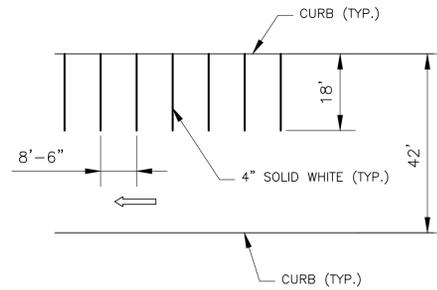


ONE SIDE 60 DEGREE ANGLE PARKING
OTHER SIDE PARALLEL PARKING

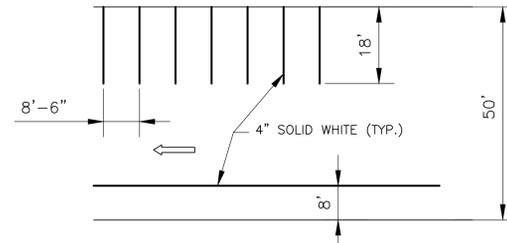


BOTH SIDES 60 DEGREE
ANGLE PARKING

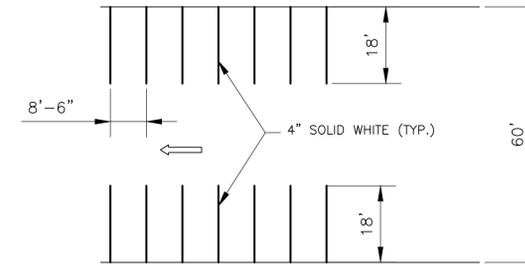
ONE WAY
TRAFFIC



ONE SIDE 90 DEGREE ANGLE PARKING

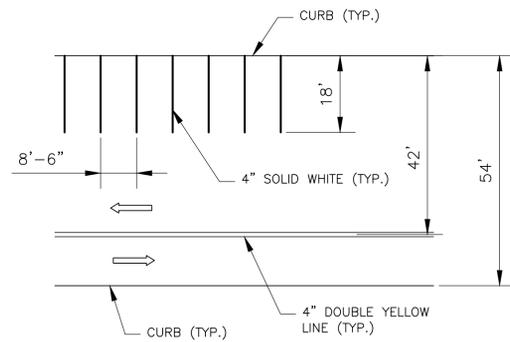


ONE SIDE 90 DEGREE ANGLE PARKING
OTHER SIDE PARALLEL PARKING

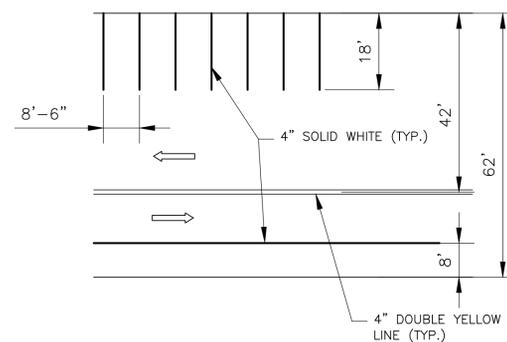


BOTH SIDES 90 DEGREE
ANGLE PARKING

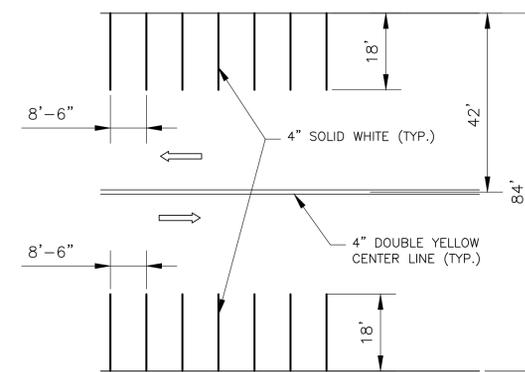
TWO WAY
TRAFFIC



ONE SIDE 90 DEGREE ANGLE PARKING



ONE SIDE 90 DEGREE ANGLE PARKING
OTHER SIDE PARALLEL PARKING



BOTH SIDES 90 DEGREE
ANGLE PARKING

NOTES:

- For 60° parking, if the parking stall width is increased from 8'-6" to 9', the minimum required parking stall depth shall be 18' instead of 20'.



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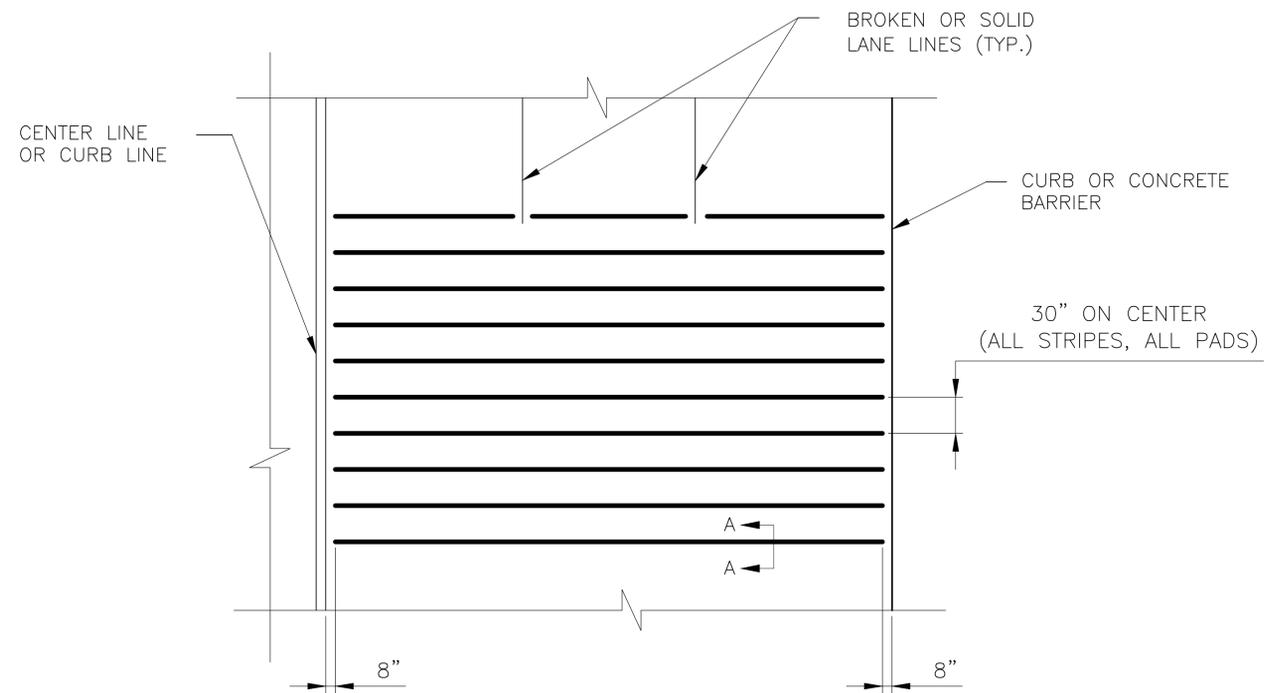
TYPICAL PAVEMENT MARKINGS
ANGLE PARKING



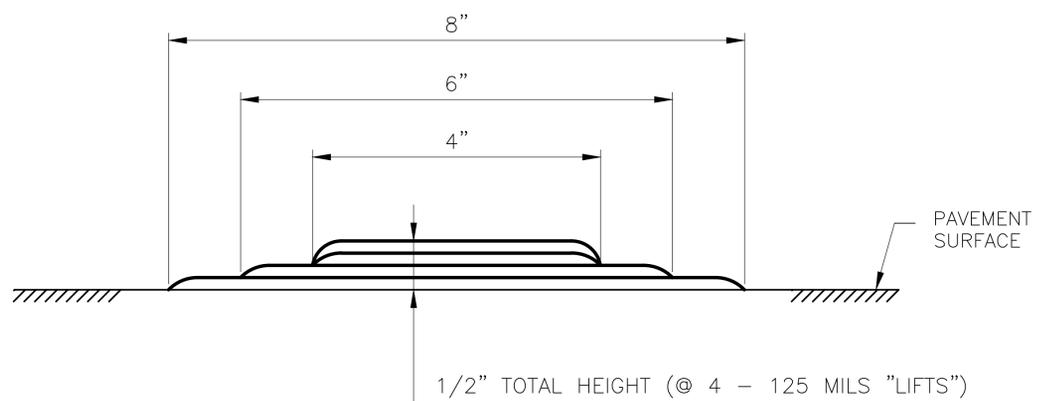
Drawn by D. AMIN
Checked by S. BARKHO & F. AZER
Borough ALL
Scale NOT TO SCALE
Effective Date 12/01/2015

SHEET 15 OF 22
DRAWING
no. TPK-1

TYPICAL RUMBLE STRIP

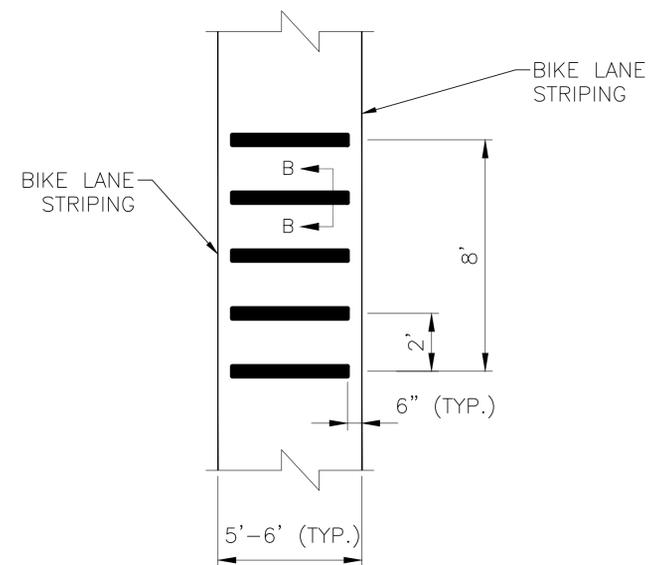


PLAN VIEW
RUMBLE STRIP
(ONE LOCATION)

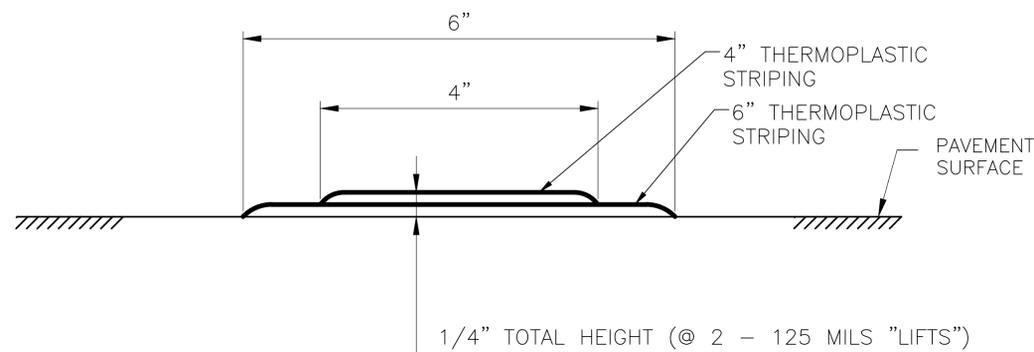


CROSS SECTION DETAIL A-A:
SINGLE TYPICAL STRIPE

TYPICAL BICYCLE RUMBLE STRIP



PLAN VIEW
RUMBLE STRIP
(ONE LOCATION)



CROSS SECTION DETAIL B-B:
SINGLE TYPICAL STRIPE



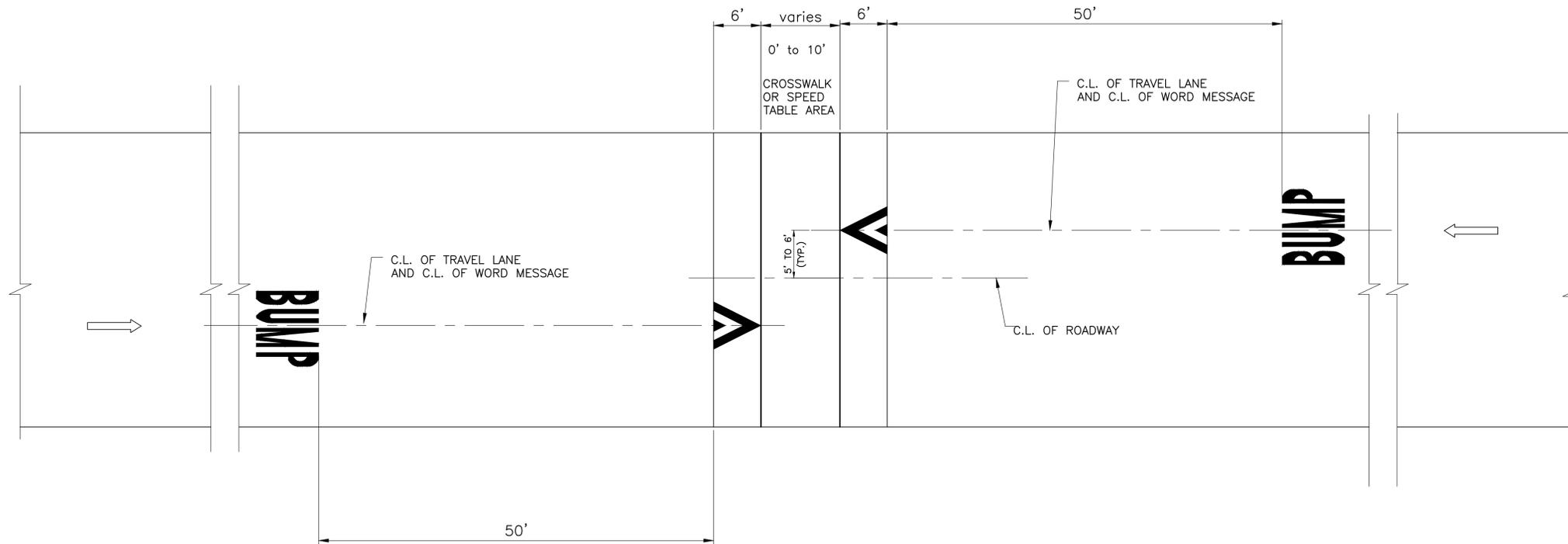
CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING AND MANAGEMENT (TP&M)
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TYPICAL PAVEMENT MARKINGS RUMBLE STRIPS

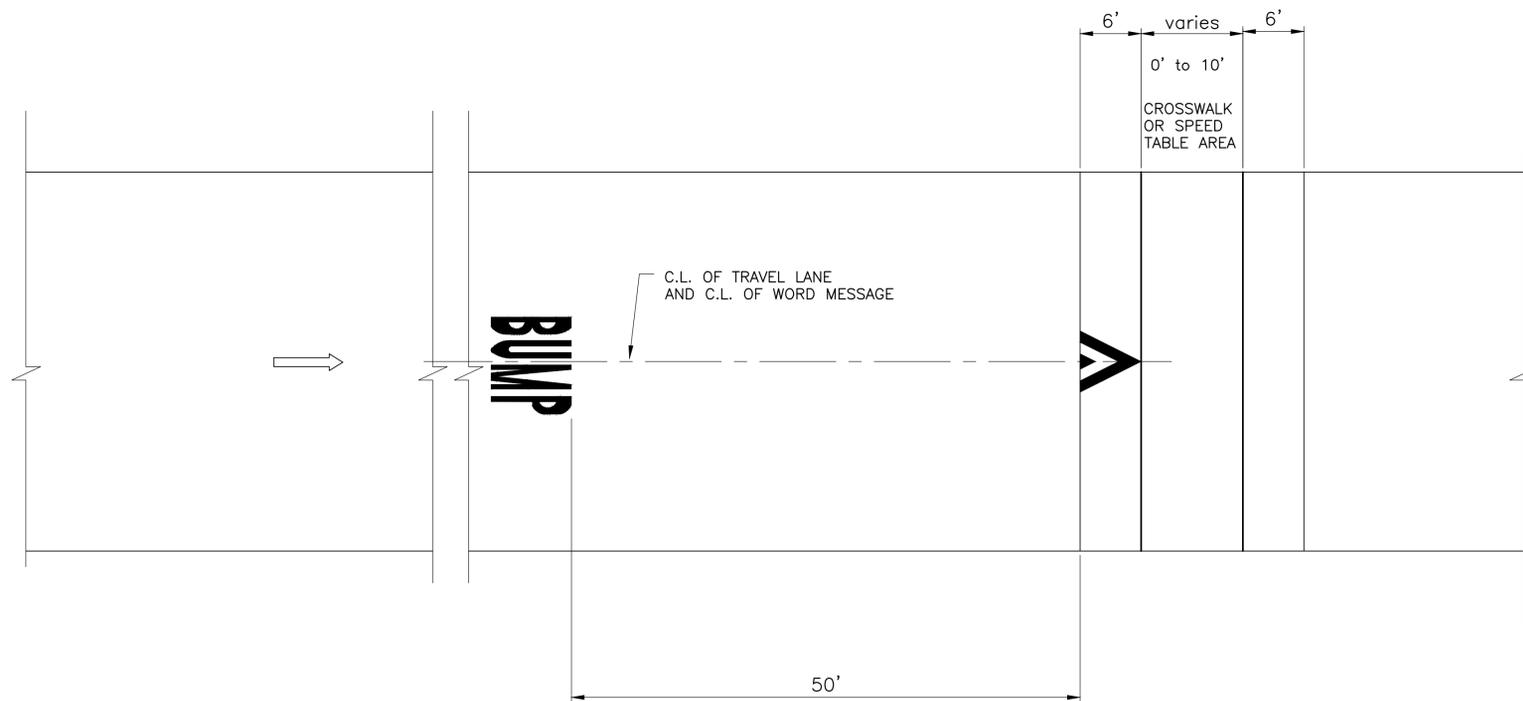


Drawn by K. KUSMICK
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Borough ALL
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Effective Date 12/04/2020

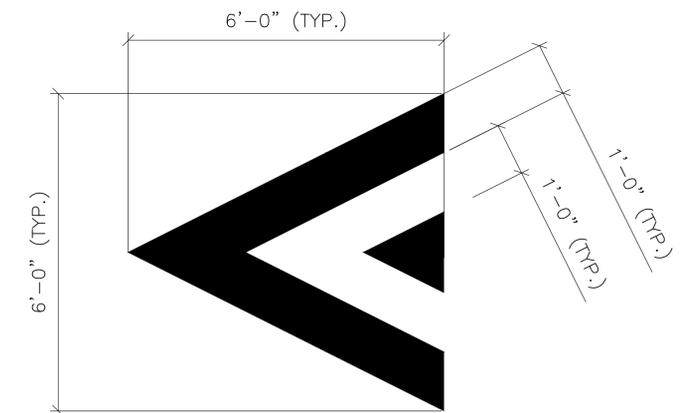
SHEET 16 OF 22
DRAWING
NO. TRS-1



SPEED BUMP SYMBOL AND WORD MESSAGE INSTALLATION FOR TWO-WAY STREETS



SPEED BUMP SYMBOL AND WORD MESSAGE INSTALLATION FOR ONE-WAY STREETS



"BUMP" SYMBOL LAYOUT

NOTES:

1. On multilane roadways one bump symbol and one word message shall be installed for each travel lane.
2. For bump message detail see typical drawing TWM-1.
3. For streets with bike lanes see typical drawing TSR-1.



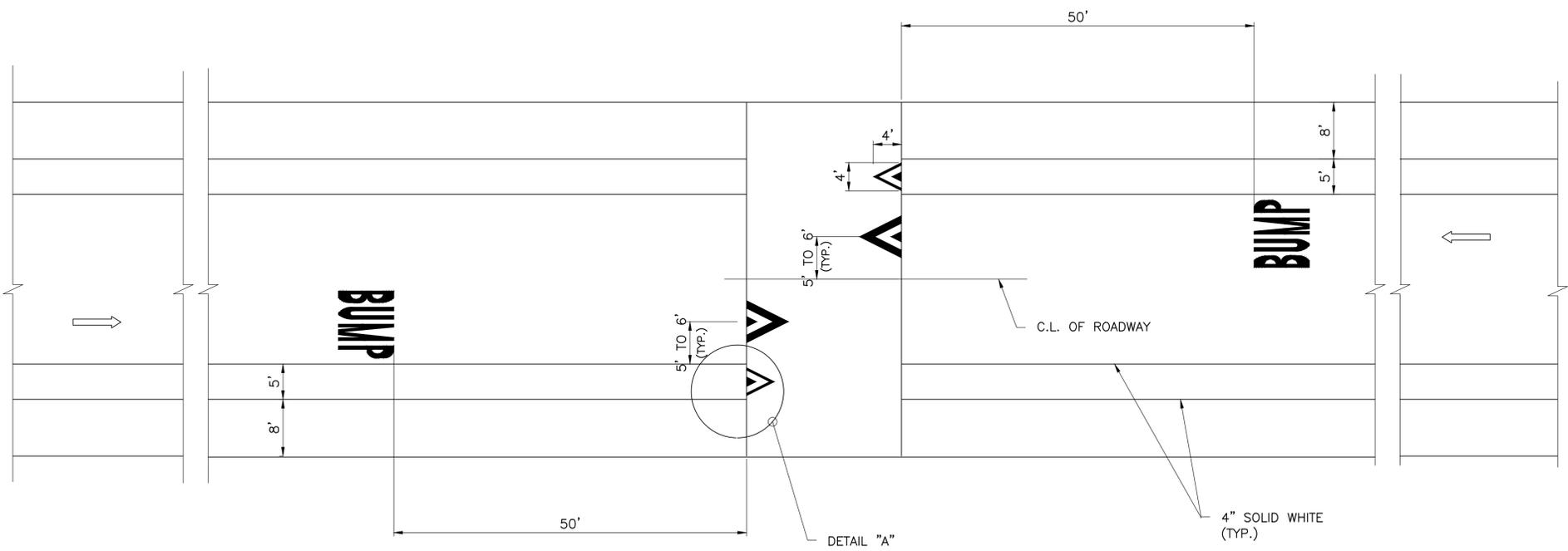
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TYPICAL PAVEMENT MARKINGS
 SPEED BUMP MARKINGS

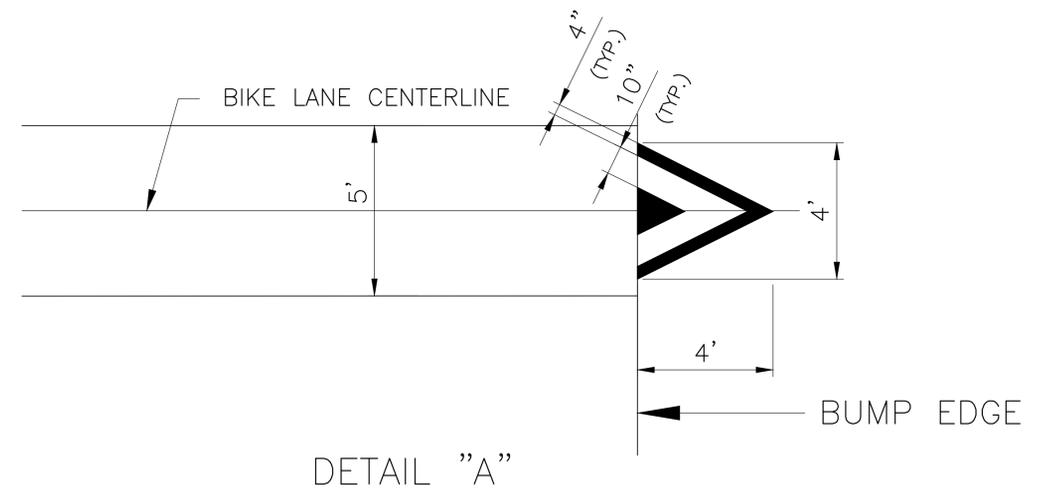


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 Checked by S. BARKHO & F. AZER
 Borough ALL
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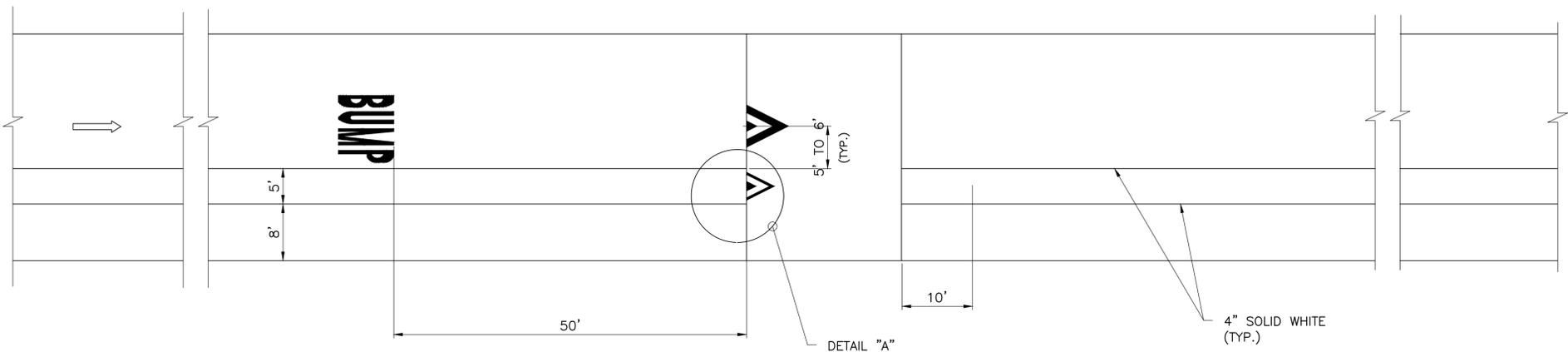
SHEET 17 OF 22
 DRAWING
 NO. TSB-1



INSTALLATION FOR TWO-WAY STREETS



DETAIL "A"



INSTALLATION FOR ONE-WAY STREETS

- NOTES:
1. For speed bump markings installation see typical drawing TSB-1.



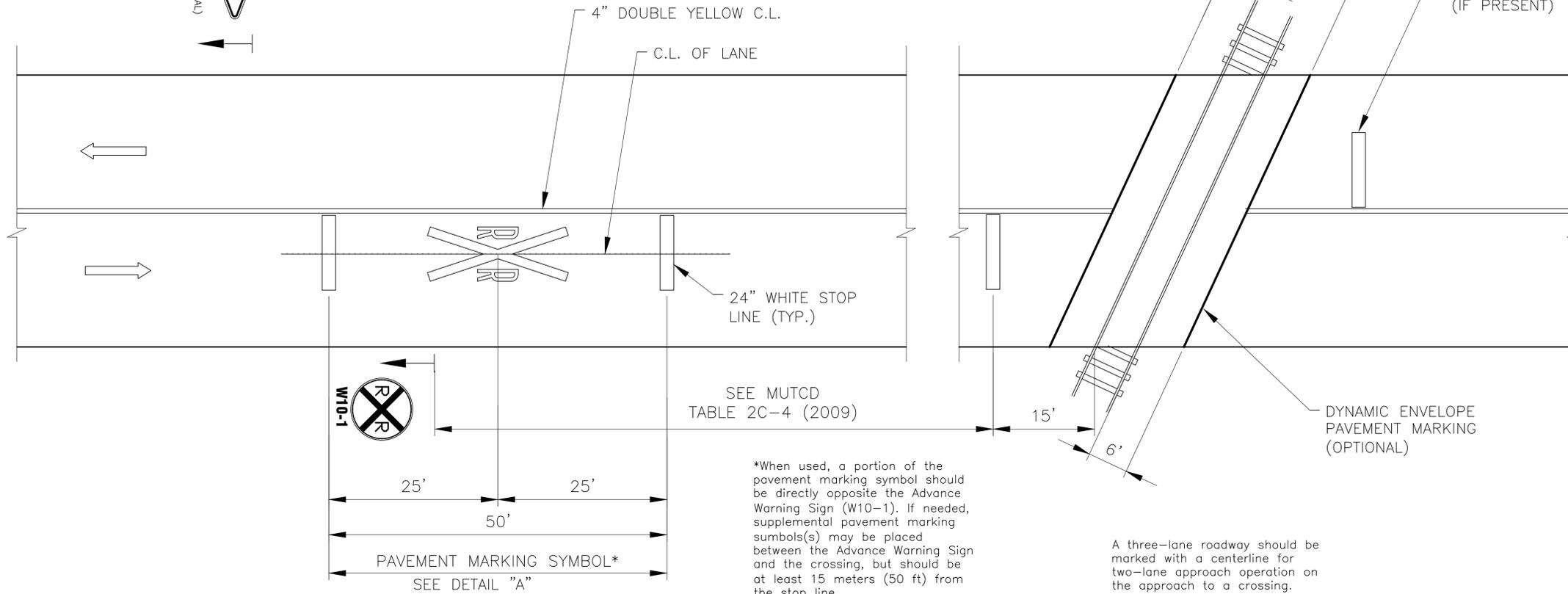
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TYPICAL PAVEMENT MARKINGS
 SPEED REDUCERS FOR BIKE LANES AT SPEED BUMPS



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 Checked by _____ S. BARKHO & F. AZER
 Borough _____ ALL
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 Effective Date _____ 12/04/2020

SHEET 18 OF 22
 DRAWING
 NO. TSR-1

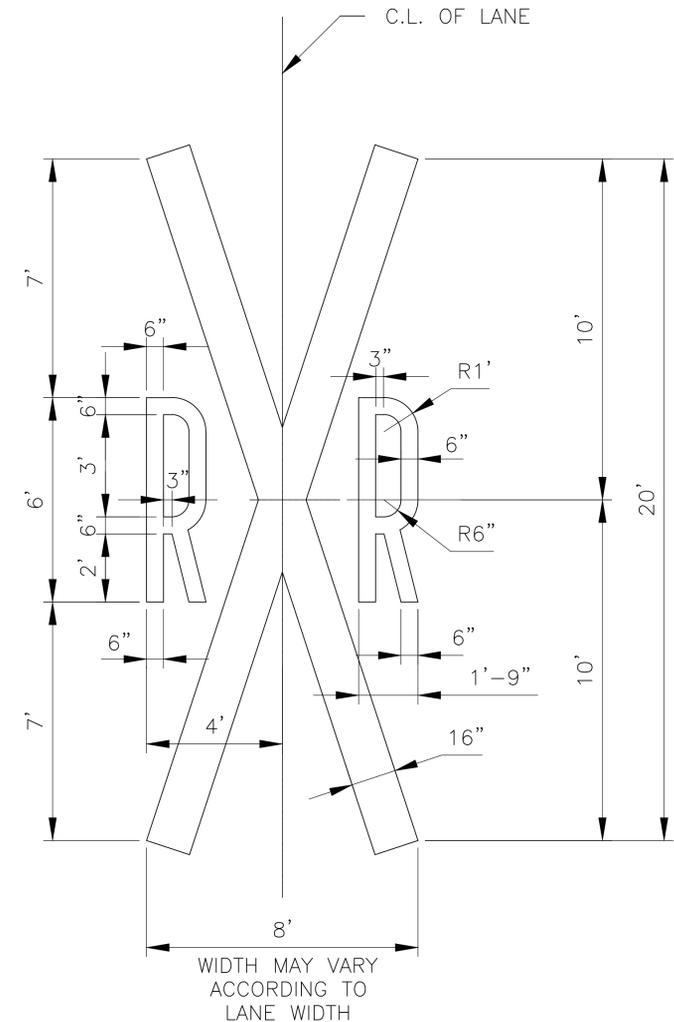


SEE MUTCD TABLE 2C-4 (2009)

*When used, a portion of the pavement marking symbol should be directly opposite the Advance Warning Sign (W10-1). If needed, supplemental pavement marking symbols(s) may be placed between the Advance Warning Sign and the crossing, but should be at least 15 meters (50 ft) from the stop line.

A three-lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing.

On multi-lane roads, the transverse bands should extend across all approach lanes, and individual RXR symbols should be used in each approach lane.



WIDTH MAY VARY ACCORDING TO LANE WIDTH

DETAIL "A"
3/16"=1'-0"

NOTES:

1. The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.
2. Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2005 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 180 feet for the appropriate sign.
3. Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2005 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second², minus the sign legibility distance of 180 feet.
4. Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second², minus the sign legibility distance of 250 feet.
5. No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.
6. The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.



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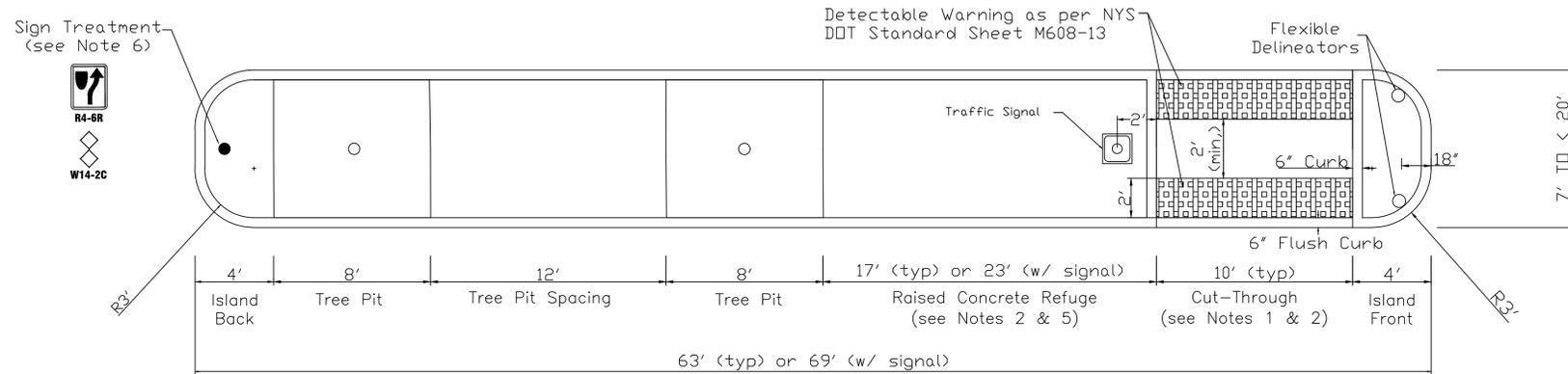
TYPICAL PAVEMENT MARKINGS
HIGHWAY-RAIL GRADE CROSSINGS



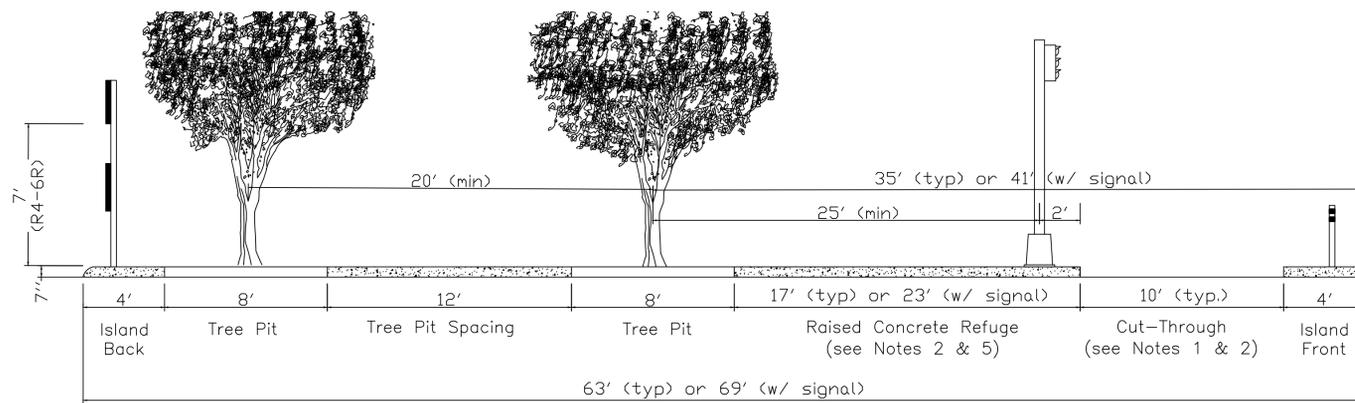
Drawn by _____ M.F.
Checked by S. BARKHO & F. AZER
Borough ALL
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Effective Date 12/01/2015

SHEET 19 OF 22
DRAWING
NO. TRR-1

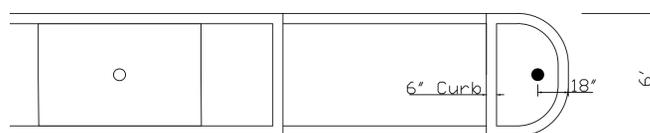
Typical 7' to <20' Width Island (Plan)



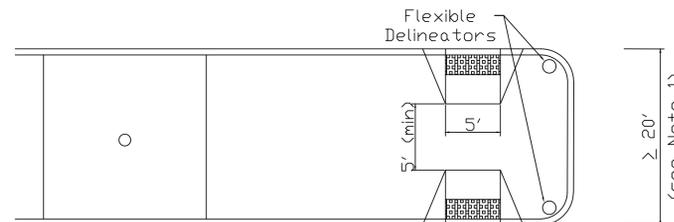
Typical 7' to <20' Width Island (Side Elevation)



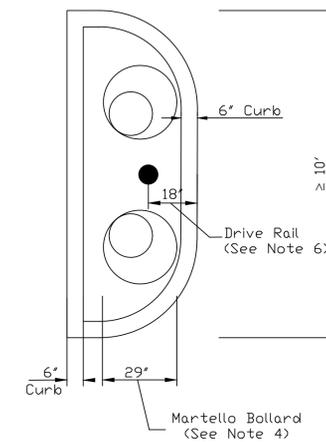
Detail 4: 6' Width Island Plan w/o Detectable Warning Mat



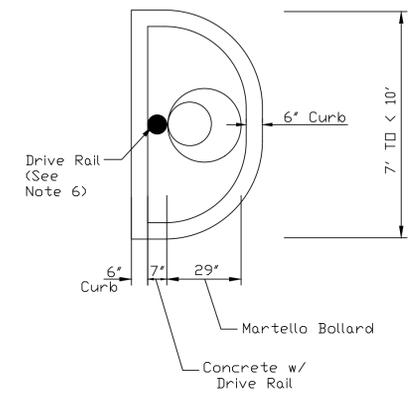
Detail 5: ≥20' Width Island Plan w/ Ped Ramps (see Note 1)



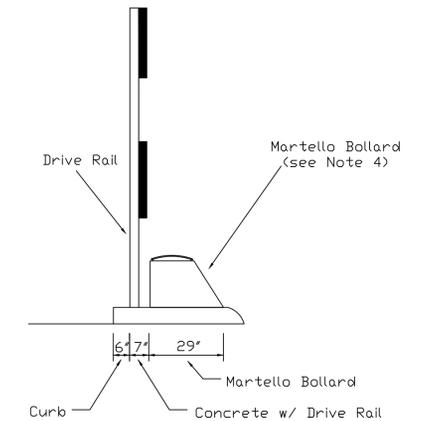
Detail 1: ≥10' Island Front w/ Double Bollards



Detail 2: 7' to <10' Island Front w/ Single Bollard (Plan)



Detail 3: 7' to <10' Island Front w/ Single Bollard (Elevation)



NOTES:

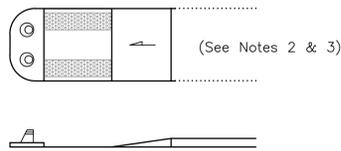
- For islands 20' and wider, instead of a cut-through, pedestrian ramps with 1:12 max. grade and 5' min. landing area shall be used (as per NYS DOT Standard Sheet M808-13). For islands 16' to <20', pedestrian ramps can be considered if and only if the curb height is lowered to accommodate the 1:12 required ramp grade while maintain the 5' min landing area.
- Cut-through and raised concrete refuge widths shall be based on width of sidewalk approaching the island according to the following table:

Sidewalk width	12'	13'	≥14'
Cut-through	8' min	9'	10' max
Raised cnrt refuge w/o signal	19' max	18'	17' min
Raised cnrt refuge w/ signal	25' max	24'	23' min

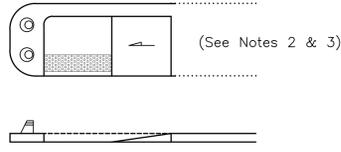
- Engineering judgement shall be used to determine the size of raised refuge and cut-through for islands with special conditions.
- Based on engineering judgement, Martello Bollard(s) with approved reflective elements may be included where left-hand turn movement is made towards the island in the receiving leg of an intersection, or otherwise determined to be necessary based on traffic conditions and analyses.
- Any tree (measured from center) must be at least 25' from any signal head or street light. A tree can not be included if it obstructs the sight line to a pole mounted traffic signal face.
- Signs are subject to engineering judgement. Signs should be used where it is not readily apparent that traffic is required to keep to the right.
- A vertical reflective element shall be provided at the front and back of each island. Examples of vertical reflective elements include Martello Bollards, flexible delineators, and signs. Flexible delineators shall be installed at locations where no Martello Bollards or signs are provided. However, at trailing ends, without approaching traffic, a vertical reflective element is not required.
- No island should be less than 6'. A 6' minimum island should only be considered in locations where no alternatives exist to provide necessary horizontal geometry. For 6' islands, detectable warning surface shall not be installed.



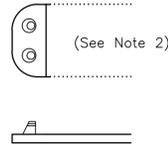
Island End With Cut-Thru



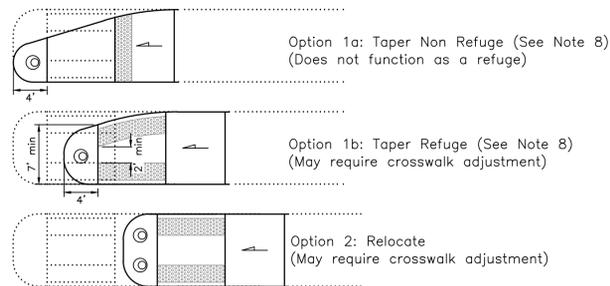
Island End With Parallel Ramp



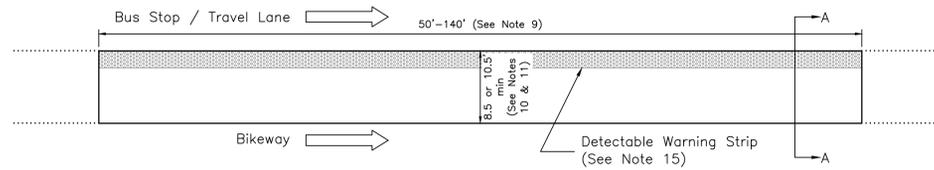
Island End Without Ramp



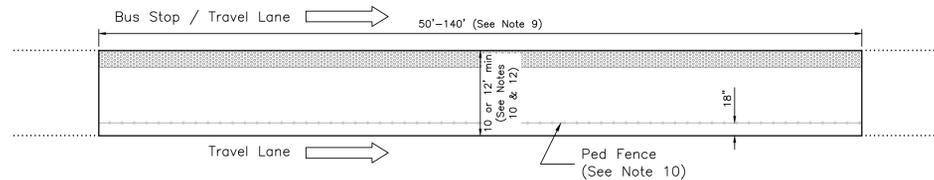
Island End Modification Options for Turning Vehicle Swept Path



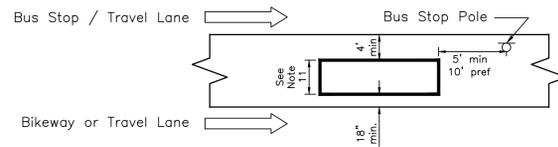
Middle Section w/o Fence



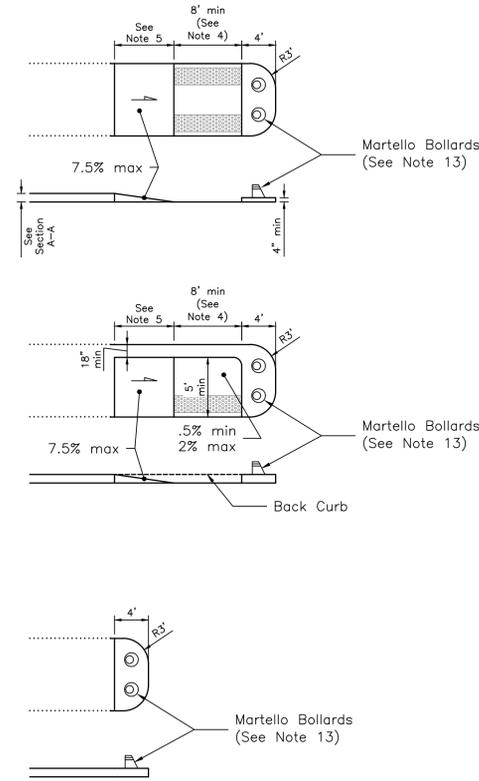
Middle Section w/ Fence



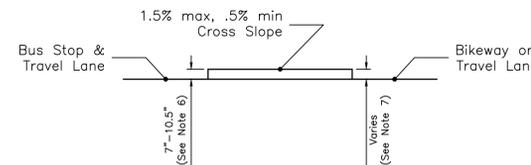
Bus Shelter Placement



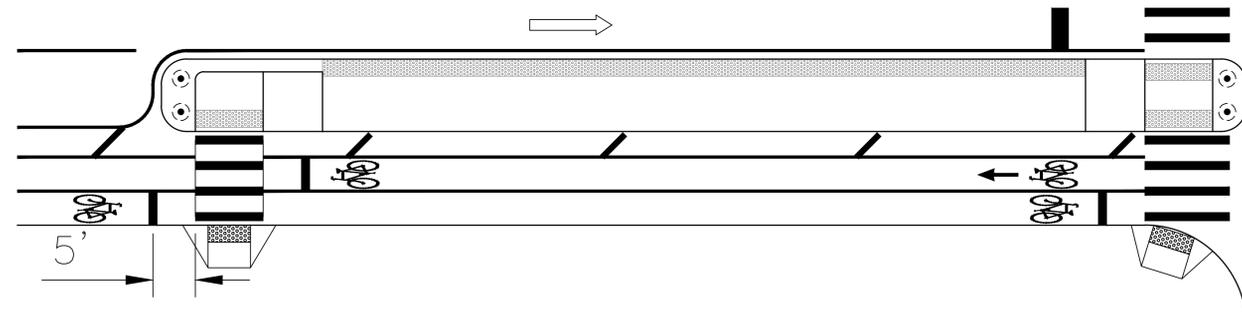
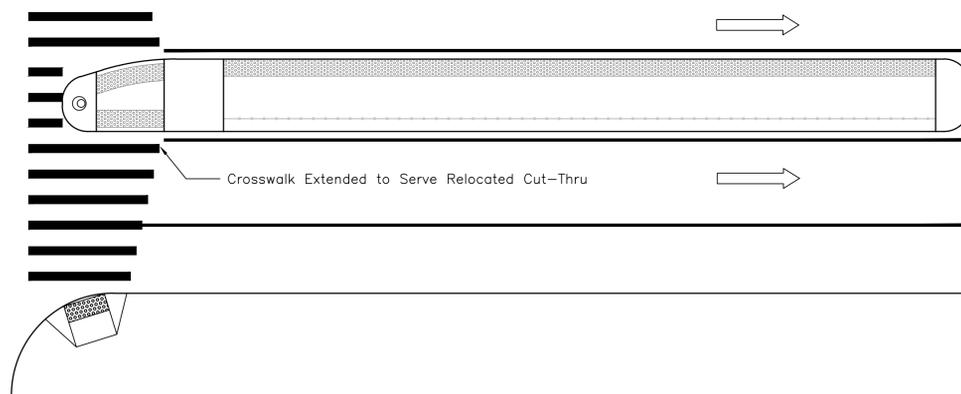
Island End Dimensions



Section A-A (Scale 1:5)

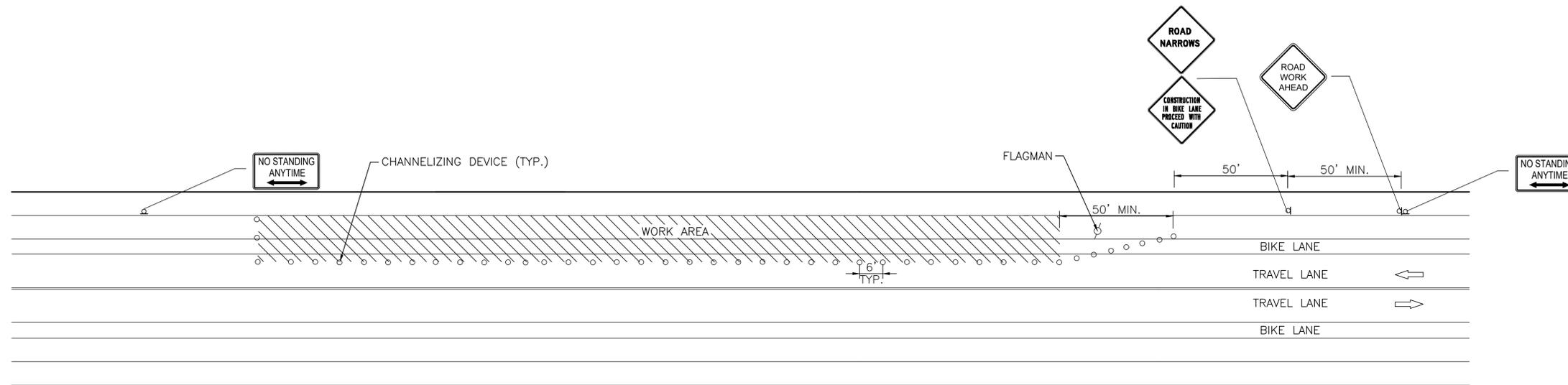


Example Islands w/ Markings

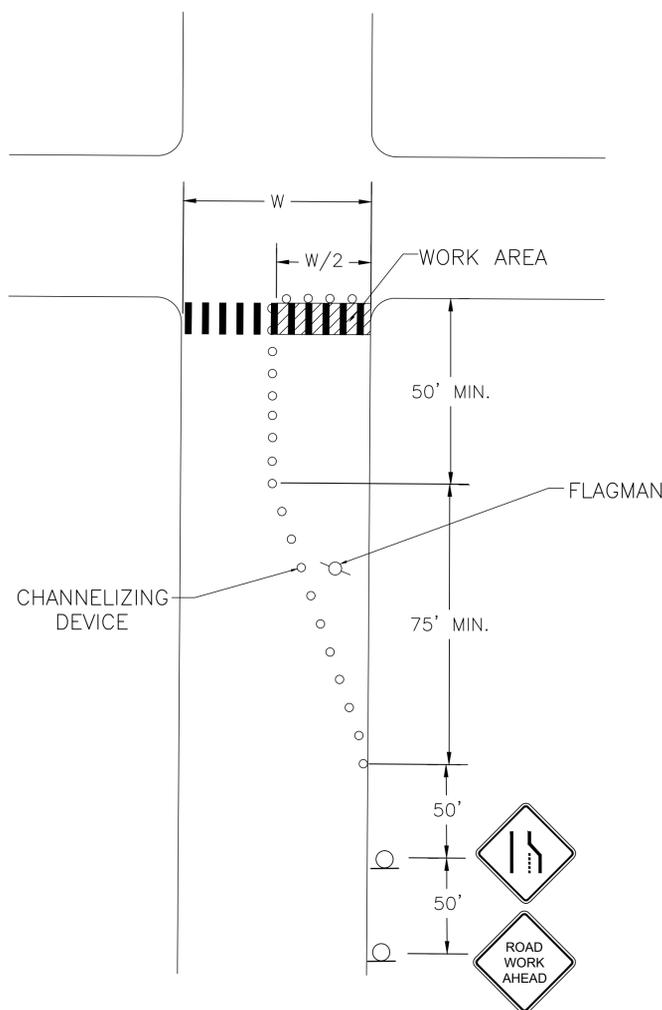


Notes:

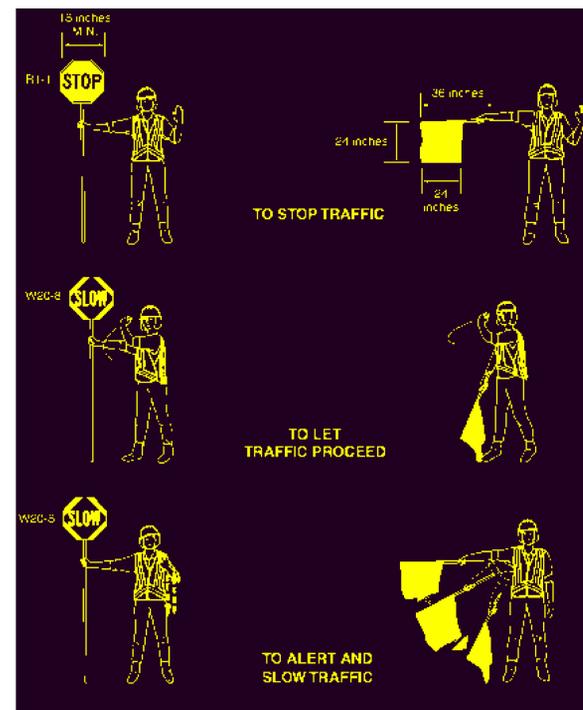
- Islands may be wider and/or longer, as determined by engineering judgement for the context.
- At least one end of the island shall have a ramp and it is desirable that both have ramps. For islands with middle sections longer than 70', both ends should have ramps. If a single ramp is used it should be at the end which is closest to the nearest crosswalk.
- For particularly wide islands or in other atypical contexts, perpendicular curb ramps may be considered in lieu of cut-thrus and parallel ramps.
- Width of cut-thru or ramps should be 8' min and as wide as the crosswalk desirably. However, 5' minimum is permitted where a smaller cut-thru or ramp would avoid a constraint that would otherwise hinder constructability. For cut-thrus or ramps wider than 10', pipe bollards or other design features should be present to deter motor vehicle use.
- Length of the ramp shall be based on 7.5% max slope for design and layout (8.33% max for work acceptance).
- The curb height against the bus stop shall be 7" min, with 10.5" preferred.
- The curb height opposite the bus stop may be variable in height to maintain an ADA-compliant cross slope of 1.5% max for design and layout (2% max for work acceptance) and positive drainage across the island of .5% min.
- Where the bus island would otherwise obstruct permitted vehicle turns, the end section may be tapered and/or filleted to avoid the swept path of the vehicle (Options 1a or 1b). Option 1a should be considered first, and if infeasible or if the island needs to function as a pedestrian refuge for signal timing, then Option 1b should be considered. In cases where Options 1a and 1b are insufficient or infeasible, the island may be moved away from the intersection (Option 2).
- Minimum middle section lengths are as follows:
 - Standard bus (40' design vehicle)
50' infrequent, 90' frequent
 - Express bus (45' design vehicle)
50' infrequent, 95' frequent
 - Articulated bus (62' design vehicle)
70' infrequent, 140' frequent
- Minimum island widths with no bus shelter are as follows:
 - Standard and articulated buses
8.5' adjacent to bike lane, 10' adjacent to travel lane
 - Express bus
10.5' adjacent to bike lane, 12' adjacent to travel lane
- Bus shelter depth is 3' 8" for types A and B and 5' 2" for types C, D, and SBS double shelters - requiring 9' 2" or 10' 8" minimum island width respectively.
- Pedestrian fence should be used when the side of the island opposite the bus stop is adjacent to a vehicular travel lane. However since this requires an additional 18", engineering judgment should be used when available width is constrained.
- Bollards may be installed per NYC DOT policy and engineering judgement where warranted to protect people on the island from turning or merging vehicles.
- Refer to drawing TRF-2 for placement of flexible delineators. Where a bike lane approaches the bus boarding island, a flexible delineator may be installed on the corner of the island to increase visibility of the curb.
- A 2' wide detectable warning strip should be placed along the full length of the edge of the middle section wherever the curb height is greater than 7".



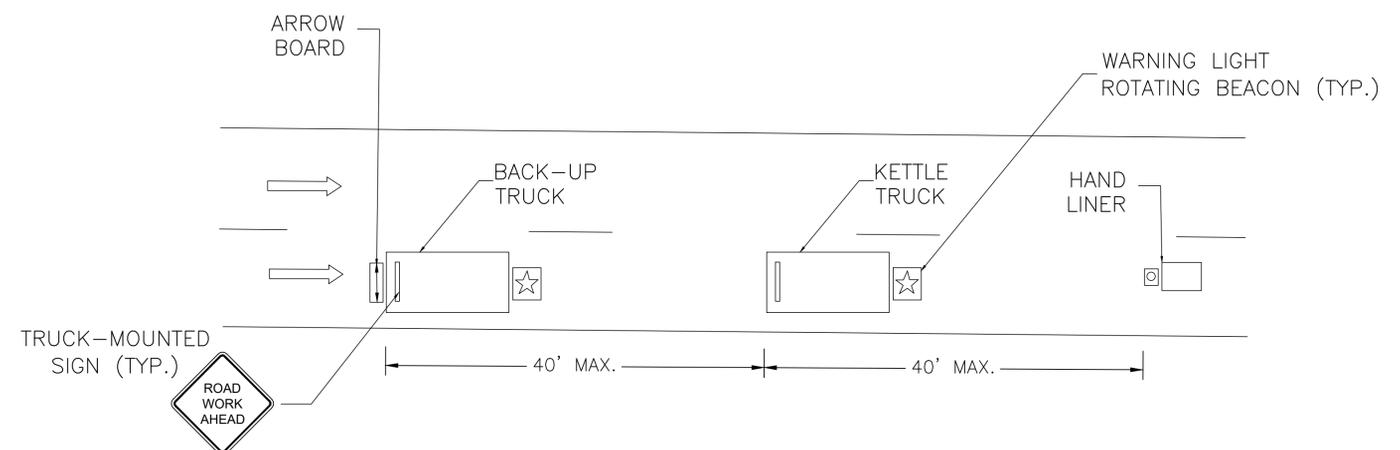
TYPICAL CONSTRUCTION OF BIKE LANE
N.T.S.



TYPICAL CONSTRUCTION OF CROSSWALKS
N.T.S.



USE OF HAND-SIGNALING
DEVICES BY FLAGGERS



MOBILE OPERATIONS FOR PAVEMENT MARKING INSTALLATION
N.T.S.

NOTES:

1. ALL WARNING SIGNS SHALL BE 30" X 30" IN SIZE; PARKING SIGNS SHALL BE 12" X 18" IN SIZE.
2. REFER TO NYCDOT STANDARD PAVEMENT MARKING SHEETS TBL-2 AND TCW-1 FOR TYPICAL PAVEMENT MARKING DETAILS.



CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING AND MANAGEMENT (TP&M)
28-11 Queens Plaza North L.I.C., N.Y. 11101

TYPICAL PAVEMENT MARKINGS & GEOMETRY
WORK ZONE TRAFFIC CONTROL PAVEMENT MARKINGS INSTALLATIONS



Drawn by R. EGAN
Checked by S. BARKHO
Borough ALL
Scale NOT TO SCALE
Effective Date 12/04/2020

SHEET 22 OF 22
DRAWING
no. TCC-1