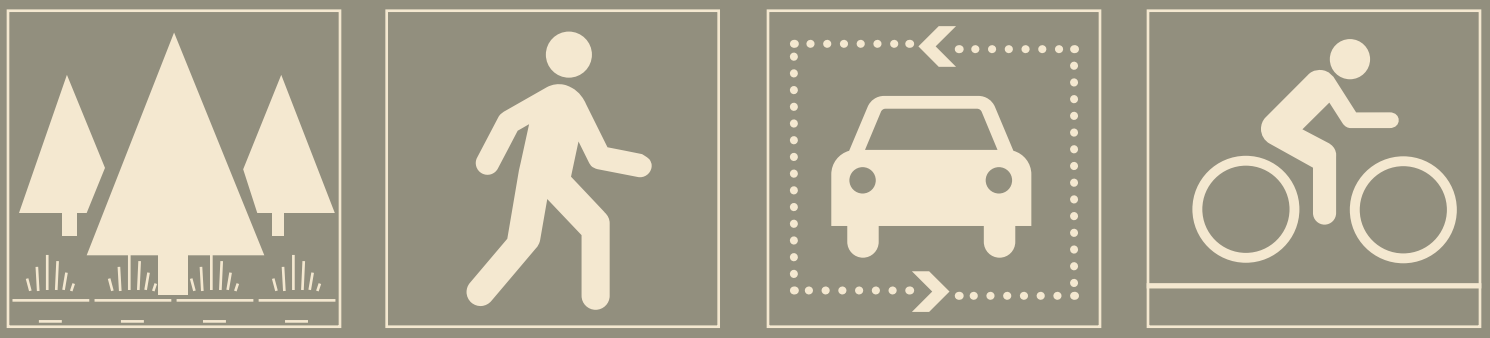
Streetscape Design Standards



Memorial City Redevelopment Authority

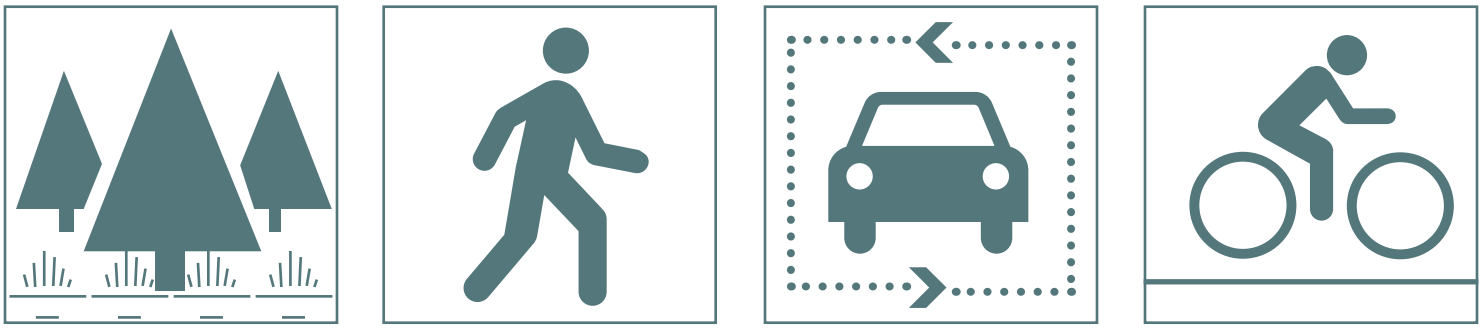
In Partnership with Memorial Management District + Spring Branch Management District

2015

*DISCLAIMER: The standards serve only as a guide and contain no regulatory authority. All regulatory authority resides within the City of Houston Public Works and Engineering Department.

SWA GROUP

Streetscape Design Standards



Memorial City Redevelopment Authority

In Partnership with Memorial Management District + Spring Branch Management District

EDITION: FEBRUARY 2015

CONTENTS

SBMD - Spring Branch Management District
MMD - Memorial Management District

*NOTE: In a few instances, the referenced document is included by a web link and not a hard paper copy.

1 Introduction

EDITION: FEBRUARY 2015

Image Source: City Center Houston

The responsibility for guiding public improvements at TIRZ 17 is only exceeded by the Board's sense of accomplishment we share during the design, construction and commissioning phases of our projects. Addressing flooding, mobility, pedestrian safety, street beautification - to name a few of our recent and current projects - go a long way in improving the quality of life within the TIRZ and surrounding community. These Streetscape Standards will aid the Board in delivering exemplary projects that are needed, economical and aesthetic and are achieved in collaboration with our two partners, the Memorial Management District and the Spring Branch Management District.

Ann Thomas Givens, Chair,
TIRZ 17 Redevelopment Authority

OVERVIEW

The Streetscape Design Standards is a document produced by and for the benefit of the TIRZ 17 Redevelopment Authority (MCRDA) as a tool to assist its Board of Directors, staff and design consultants in guiding the implementation of its CIP projects. This document is the product of a collaboration between TIRZ 17 Redevelopment Authority and the two Management District having overlapping boundaries with the TIRZ #17 – the Memorial Management District (MMD) and the Spring Branch Management District (SBMD). This collaboration reflects an important, strategic partnership between these three entities where the MCRDA provides leadership in building certain public improvements that, once completed, are maintained under agreement by MMD and SBMD within their respective boundaries. This document relies heavily on many sources. Foremost are the ordinances and reports by the City of Houston's concerning Houston's street and the important work done by Scenic Houston as documented in its Streetscape Resource Guide, 2013. Please see the appendices for a complete list of reference documents.

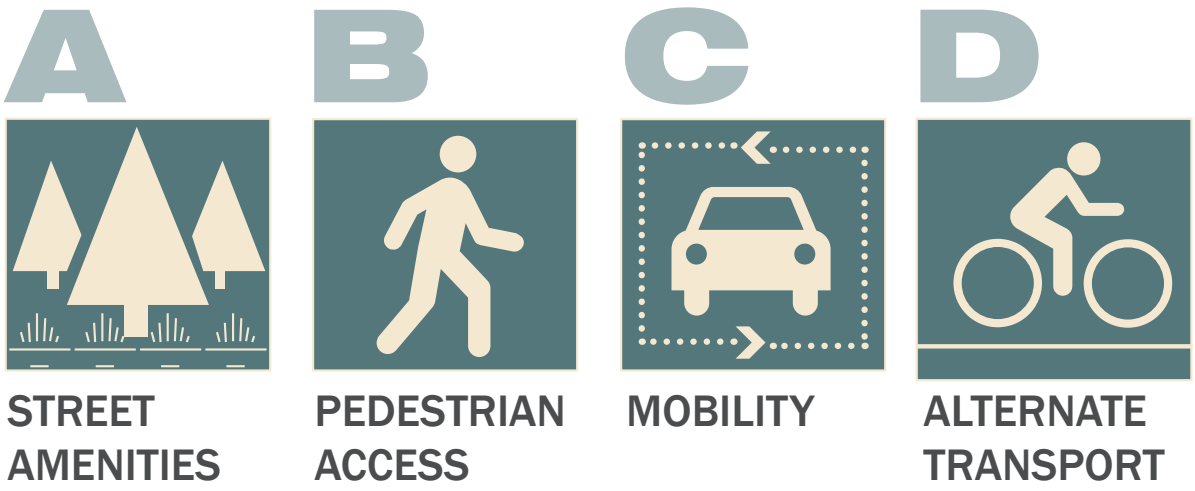
The Streetscape Design Standards is a supplement to the Memorial Management District Area Guidelines (2003) and should be used in conjunction with this document. Where the Memorial City District Management Area Guidelines (2003) is concerned with both public and private properties, this Streetscape Design Guidelines is concerned solely with the public realm, that being the area and activities occurring within the street right-of-way and controlled by the public.

The Streetscape Design Standards address two aspects of the public realm. First are those certain public improvements that have been and are proposed to be constructed by the MCRDA through its CIP program in the public realm. These public improvements represent a range of what may be referred to as "amenities". These are in contrast to the hard infrastructure that MCRDA is also responsible for constructing, namely street paving, drainage, sewer and water. The amenities include but are not limited to landscaping, decorative paving, lighting and irrigation. The second aspect considers amenities in terms of how the public realm is used by the general public. This is best represented by Mayor Parker's Executive Order on Complete Streets (2013) whose purpose is to insure that street use and activity considers all modes of mobility - private vehicles, bicycles, public transport and pedestrians – including the appurtenances that are necessary and appropriate to promote these activities.

PURPOSE

The **Streetscape Design Standards** serve **four** major purposes:

1. Simplify the design decision-making process and create economies of scale by creating a standard kit of parts from which amenity selections will be made for MCRDA projects and which will be maintained by MMD and SBMD following construction;
2. Produce a consistent and unified streetscape aesthetic that supports and promotes the distinctive identities of the MMD and the SBMD;
3. Build upon and coordinate with existing standards, ordinances and important initiatives; and,
4. Recognize the variability in MCRDA's street network and create a flexible design response.



*DISCLAIMER: The standards serve only as a guide and contain no regulatory authority. All regulatory authority resides within the City of Houston Public Works and Engineering Department.

METHODOLOGY

The Streetscape Design Standards has been developed through a three-level process in order to create a clear structure and order. Throughout, flexibility is key to this methodology so that updates to the document can be easily made as and when warranted by changing conditions and, as appropriate, at any of the three levels described below:

LAYER ONE

The first level considers and illustrates MCRDA's general urban context. This includes the local, primary street network and its characteristics. These streets are - or in the future could be - included in MCRDA's CIP for improvements. Contextual and character factors include street classification, right-of ways, bikeway framework, street type, METRO bus routes (including the "Re-Imagined Plan"), sidewalk condition, esplanade and medians locations, vegetation and abutting land uses. An inventory of MCRS's thirty major streets is also summarized for each street's attributes, both quantitatively and qualitatively. This is provided in chart form for easy reference. (See pages 28 – 29).

LAYER TWO

The second level considers and illustrates the street cross sections for MCRD's streets by type of street using the City of Houston's classifications (boulevards, avenues, street). The purpose here is two-fold: first, to identify the constituent elements (travel lanes, sidewalks, planting areas, etc) that together comprise the overall street right-of-way and the amount of space occupied by each element; and, second to consider opportunities to adjust the allocation of the right-of-way for certain elements (including amenities) in the street section so as to promote the Complete Street objective (promote all modes of mobility and appurtenances thereto, while maintaining vehicular capacity). In addition to the reallocation of space in the right-of-way, there is consideration for expanding the overall street section by obtaining public access easements from abutting private property owners. (See pages 32 - 43).

LAYER THREE

The third level addresses the standard kit of parts that constitute the types of amenity improvements comprising the streetscape and that would constructed as part MCRDA's CIP program. Building on the two levels described above, this last level associates the amenity item by street type and specific MCRDA street and provides detailed information on the amenity element(s). These include but are not limited to two broad categories: softscape, in the form of general landscaping; and, hardscape, in the form paving (sidewalk and median), pedestrian lighting and bus stops. (See pages 46 – 77).

* Except for the Spring Branch Management District, where a similar guidelines or standards document does not exist at the time of this document's preparation.

HOW TO USE THIS GUIDE

The Streetscape Design Standards can be used for a number of purposes ranging from a general reference for an overview of MCRDA street network and existing conditions to a detailed reference for amenities and their design for specific streets. Sections 1 and 2 provide the general overview. Sections 3 and 4 comprise the largest part of the document and where the standards for all amenities are to be found. The document is organized to help the reader easily navigate the information and locate the particular information of interest.

GENERAL REFERENCE - EXAMPLE A: The reader is interested in understanding the existing streetscape character of any primary street in MCRDA's area, including the existing street ROW width, the number of vehicular lanes and whether there are overhead power lines that would dictate selection of street trees.

1. The reader would consult the chart on page 28 in Section 2.
2. The diagram on page 20 shows the street's location in the MCRDA area. Other diagrams on the accompanying pages in this section show the relationships of this street to other streets in MCRDA.

GENERAL REFERENCE - EXAMPLE B: The reader is interested in understanding the types of amenities that are included in these standards.

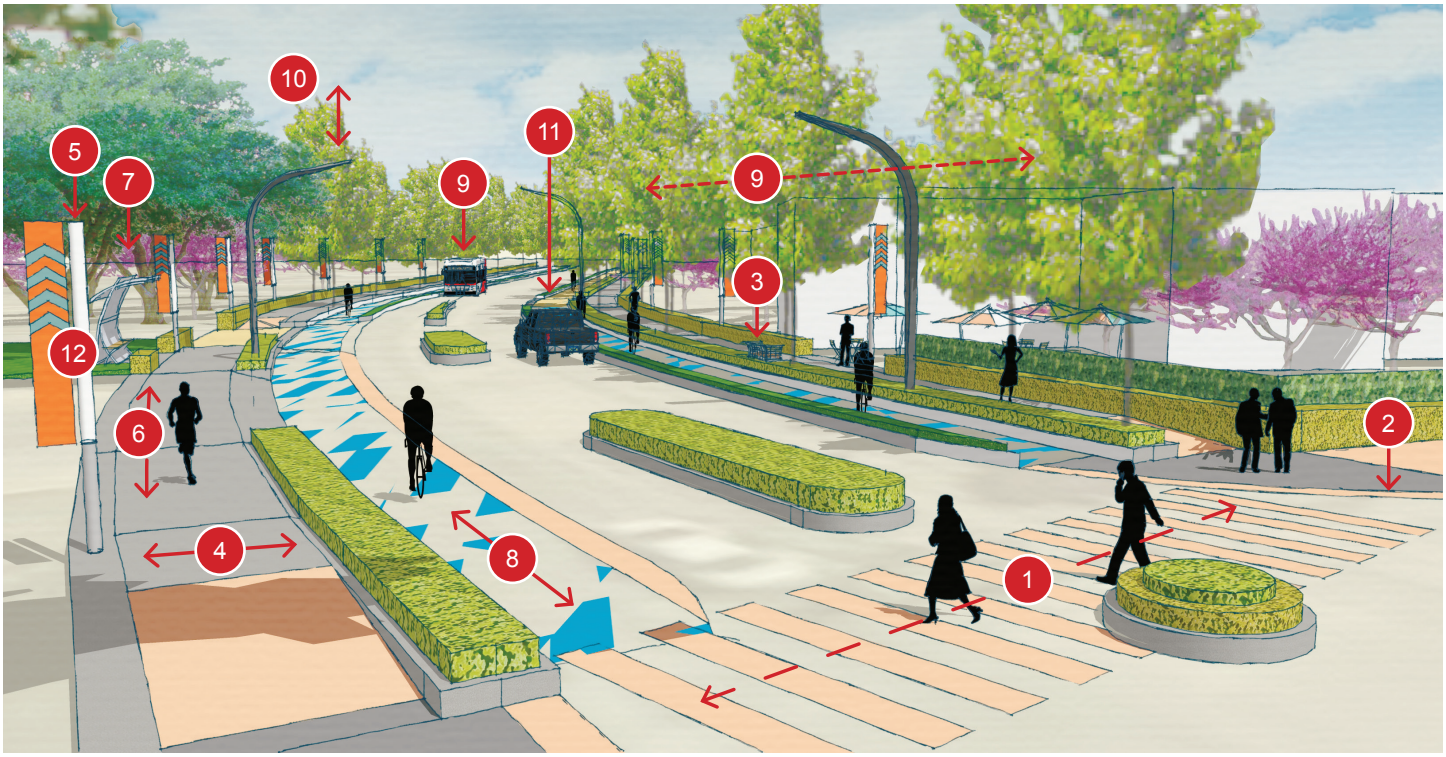
1. The reader would refer to the amenities contained in Section 4, which are organized by "softscape " and "hardscape". Pages 46-48 provides a convenient chart listing all the amenities with page references to more detail on the amenity(s) of interest.
2. Page 49-50 depicts the typical location of the amenity on the street and its relationship to other amenities. Section 4 makes references to "standard" and "non-standard" amenities. Standard amenities comprise those amenities that are candidate improvements by the MCRDA. These improvements do not include certain "non-standard" improvements constructed by MMD and SBMD and that can be found on MCRDA's streets. Examples of non-standard improvements include entry monuments and signage, banner poles, and other items typically utilized by management districts in their district identity programs.
3. Where non-standard amenities exist on MCRDA's streets, they are referenced in the Memorial Management District Area Guidelines (2003) or, for SBMD, are referenced in the appendix of this document.

DESIGN DETAIL REFERENCE – EXAMPLE A: The reader is interested in understanding the street section options for a specific MCRDA street and what types of amenities such as trees and shrubs that might be included, were that street to be improved under the MCRDA's CIP. Additionally, the reader is interested in understanding the specific types of planting material that are available for that street.

1. The reader would first refer to Section 3 and the Streetscape Opportunities Chart on page 33. The chart identifies and describes the street of interest and also indicates a page reference (also in Section 3) for the street type and street section options.
2. The reader would then refer to Section 4 and the Specifications Chart on pages 46-48 and consult the chart to locate the "Softscape" column for the particular street of interest.
3. A page reference directs the reader in Section 4 to the "Softcape" options. Here, tree and shrub species and sizes are identified. The information is also specific as to which materials are designated for MMD and which for SBMD.

STREETSCAPE PRIORITIES

1. ENSURE SAFETY WITH MARKED ROADWAY CROSSINGS AND SAFE PEDESTRIAN CROSSING HAVENS.
2. INCREASE ACCESSIBILITY WITH WIDE PEDESTRIAN RAMPS.
3. PROVIDE INVITING PEDESTRIAN SPACES.
4. WIDE SIDEWALKS PROMOTE PEDESTRIAN USE + ENHANCE PEDESTRIAN SAFETY.
5. PEDESTRIAN LIGHTING ACTIVATES THE STREET AND DEFINES A 'SENSE OF PLACE' AT NIGHT.
6. RELOCATING UTILITIES UNDERGROUND REDUCES VERTICAL OBSTRUCTIONS AND VISUAL CLUTTER.
7. SHADED BUS STATIONS ALLOW FOR THE USE OF AND IMPROVE THE TRANSIT EXPERIENCE.
8. CONTINUOUS SEPARATED BICYCLE LANES PROVIDE SAFE + CONVENIENT ACCESS FOR CYCLISTS AND REDUCE AUTOMOBILE TRIPS.
9. CONTINUOUS ROWS OF STREET TREES BEAUTIFY THE STREET, PROVIDE SHADE THAT REDUCE HEAT ISLAND EFFECT, AND ABSORB CARBON DIOXIDE.
10. WELL DESIGNED STREET LIGHTING PUTS LIGHT WHERE IT IS NEEDED AND REDUCES ENERGY WASTE AND LIGHT POLLUTION.
11. AUTOMOBILES OCCUPY TRAVEL LANES AND TURN LANES FOR OPTIMAL CAPACITY AND SAFETY.
12. APPROPRIATE ABOVE GROUND SIGNAGE, UTILITIES, ETC ARE ORGANIZED TO AVOID CLUTTER.



The accompanying illustration "Streetscape Priorities" depicts a prototypical streetscape in the MCRDA area and notes key planning and design considerations supporting the streetscape amenities that are being promoted in these Streetscape Design Standards including traffic volume and movement, safety and security elements, comfort strategies, visibility, legibility and multi-modal activities.

*A list of relevant guidelines used for this compilation can be located in the Appendices.

2

Street System + Streetscape Context

EDITION: FEBRUARY 2015

URBAN CONTEXT - TIRZ + MANAGEMENT DISTRICTS

Existing City of Houston TIRZs and management districts are illustrated below. TIRZ (Tax Increment Reinvestment Zones) are special zones created by the City to attract new investment to an area. TIRZ 17 was created in 1999 over the Memorial City area.

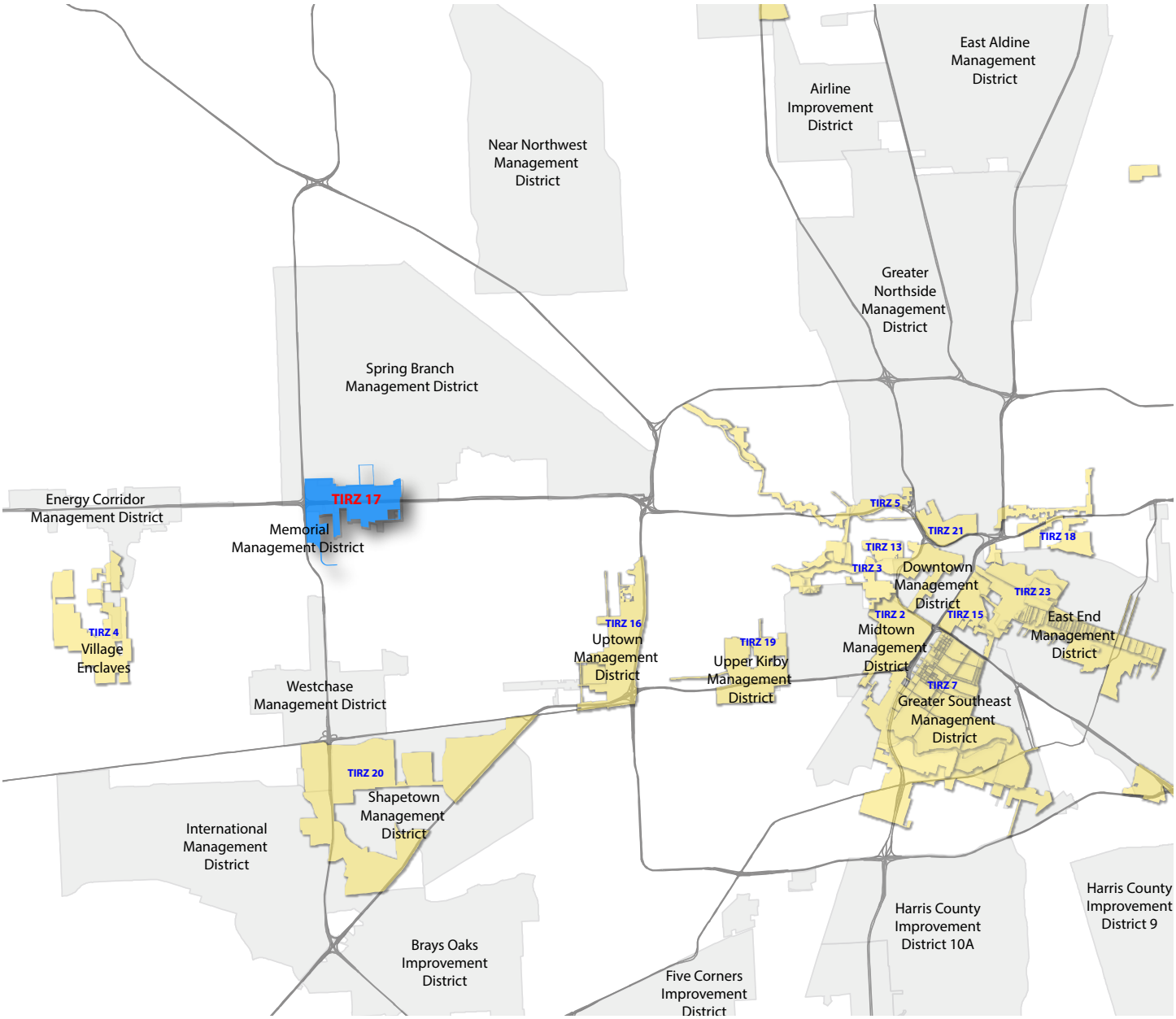


Image Source: City of Houston

Close-in major activity centers in Houston are depicted below.

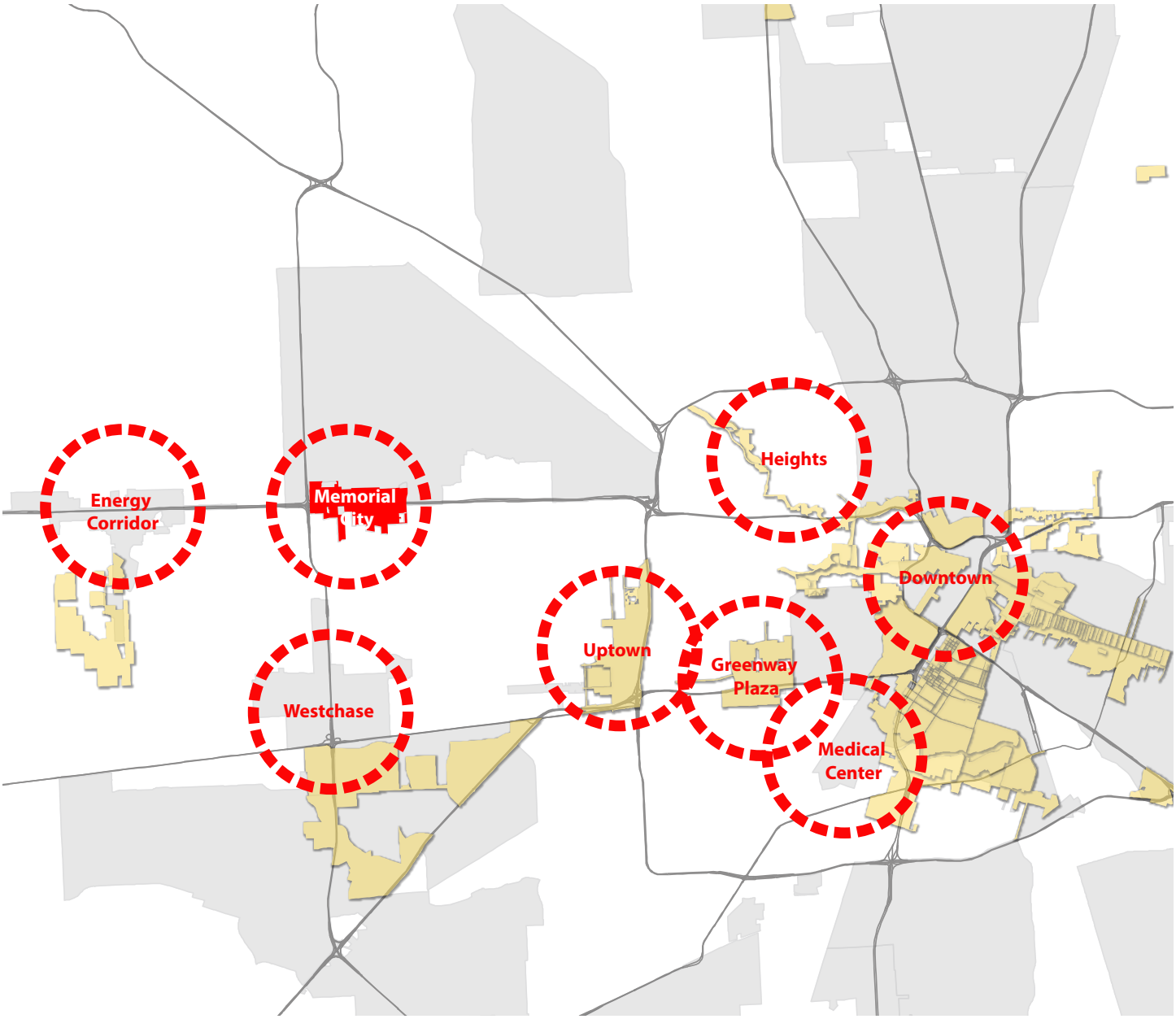


Image Source: City of Houston

SITE AERIAL

Image Source: City of Houston/ HGAC

TIRZ 17 BOUNDARIES

The illustration below shows TIRZ 17 and its relationship to MMD and SBMD.

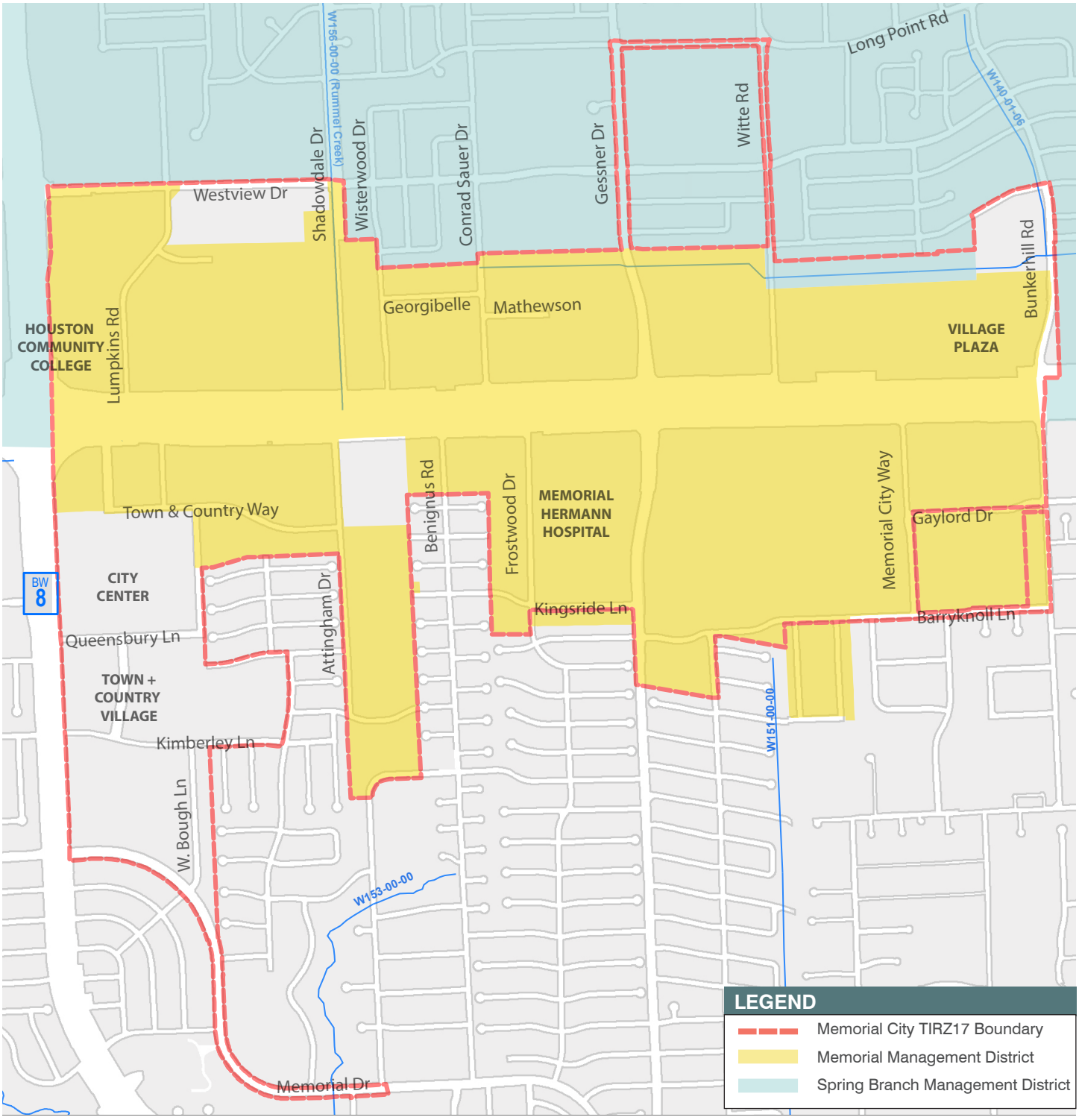


Image Source: City of Houston/ TIRZ

MAJOR THOROUGHFARES + COLLECTOR STREETS

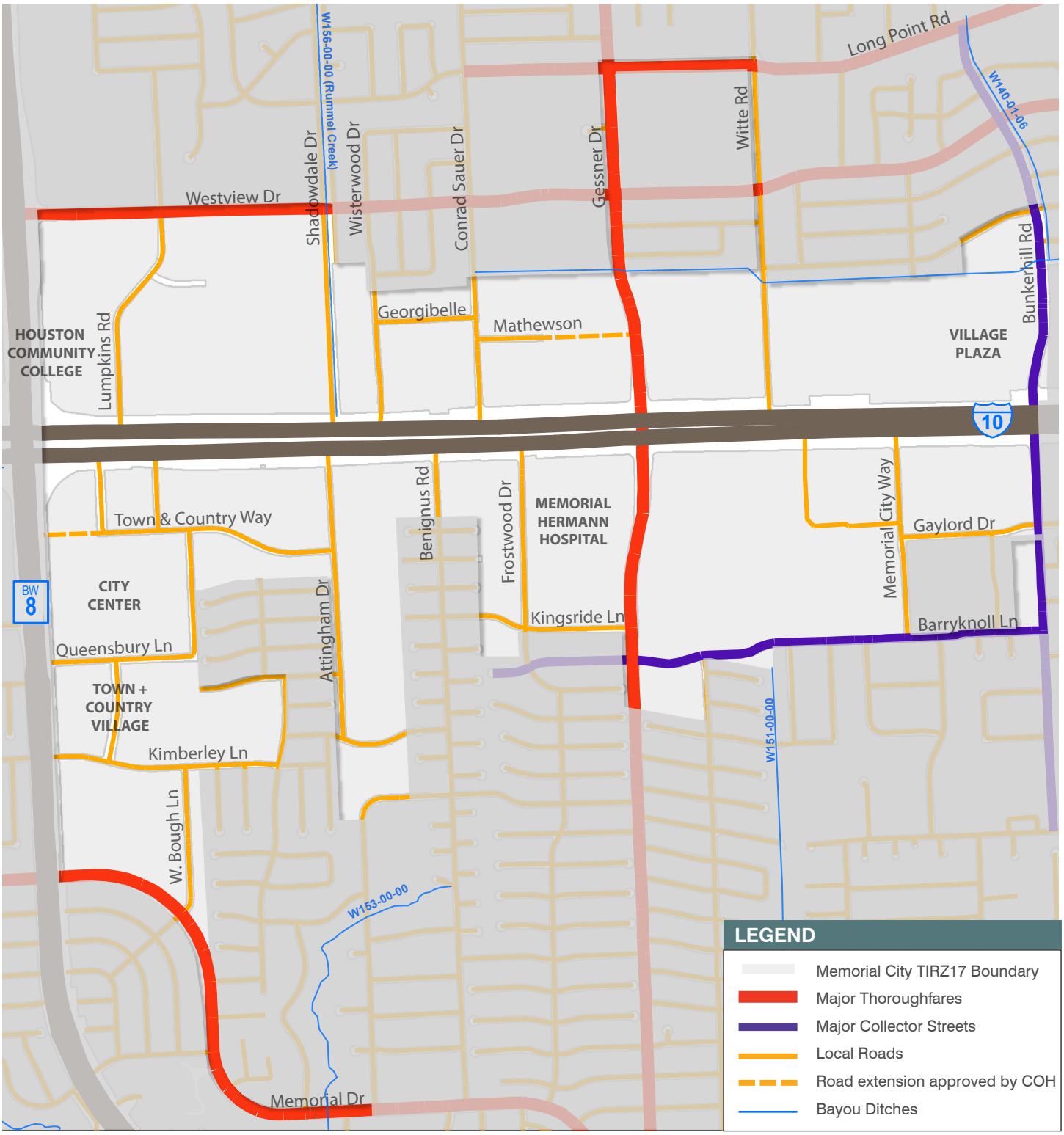


Figure 1_ Source: City of Houston

RIGHT OF WAY WIDTHS

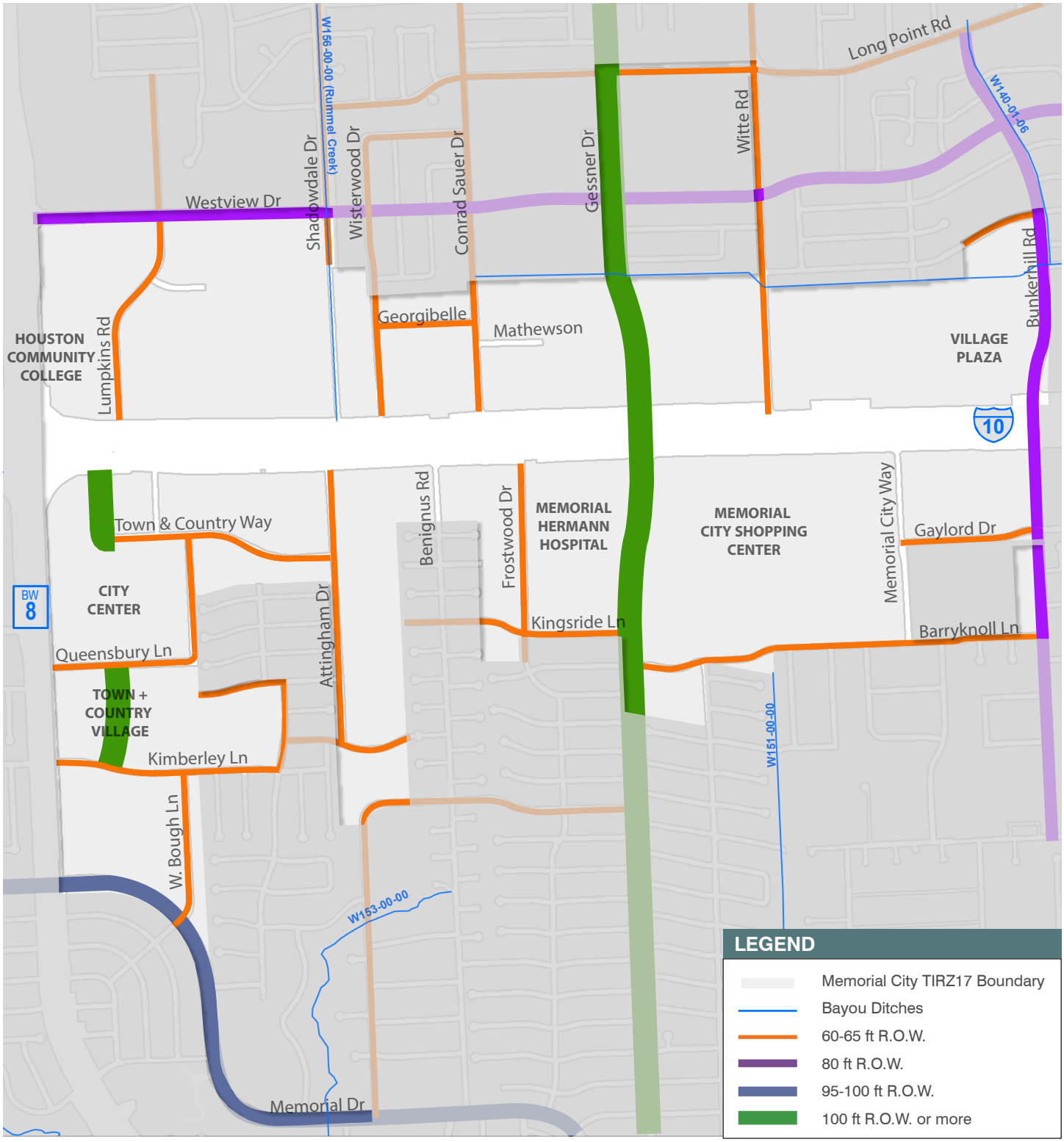


Figure 2_Source: City of Houston

EXISTING METRO BUS ROUTES

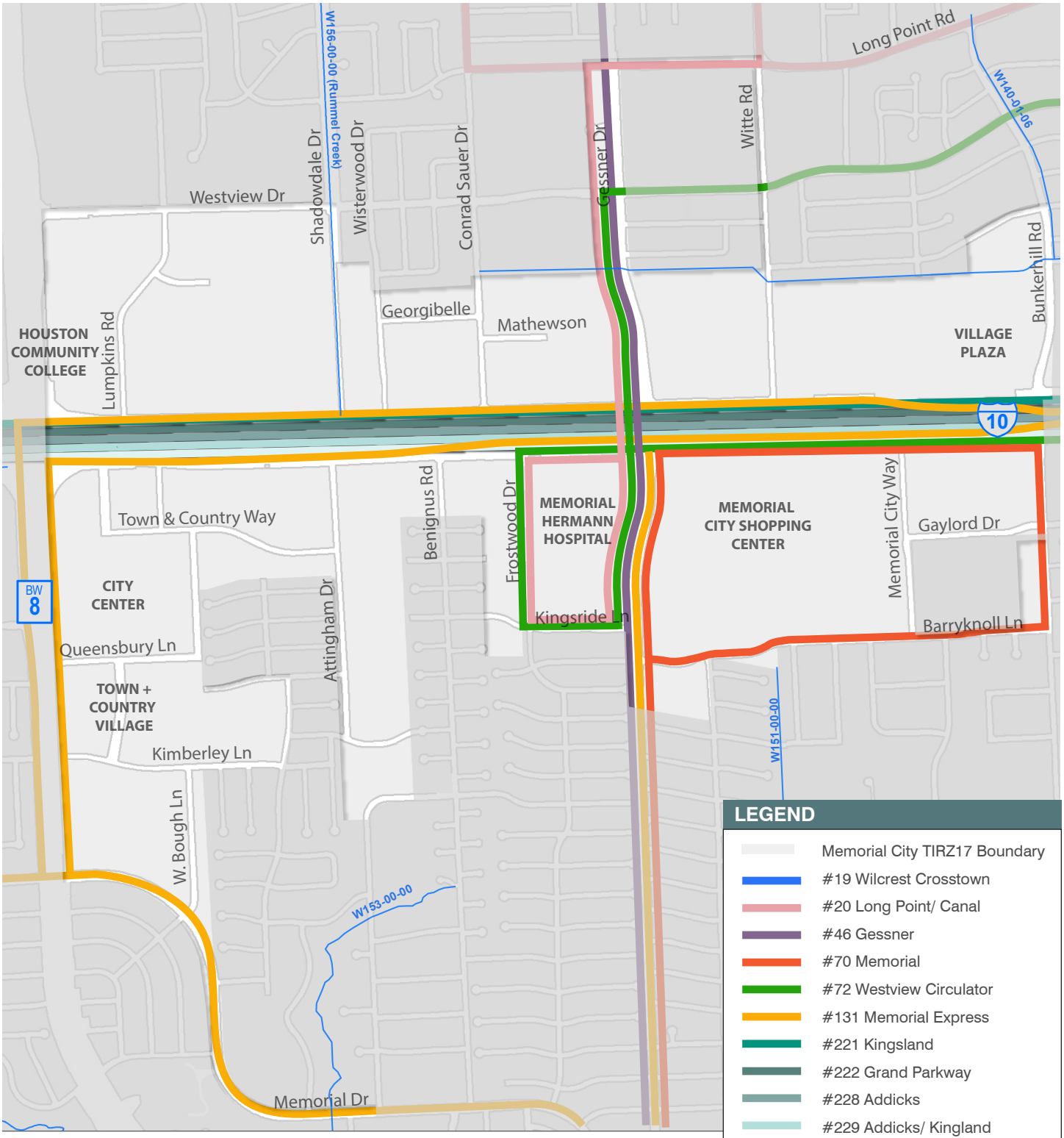


Figure 3_ Source: HGAC

REIMAGINED HOUSTON - PROPOSED BUS ROUTES

The 'Reimagined Houston' proposed bus routes have been a tool in assessing which streets require a bus lane, a bus sign and/or a bus shelter. For the purposes of this report, "red" and "blue" lines shall be considered for bus shelters. All other lines shall consist of flag signs.

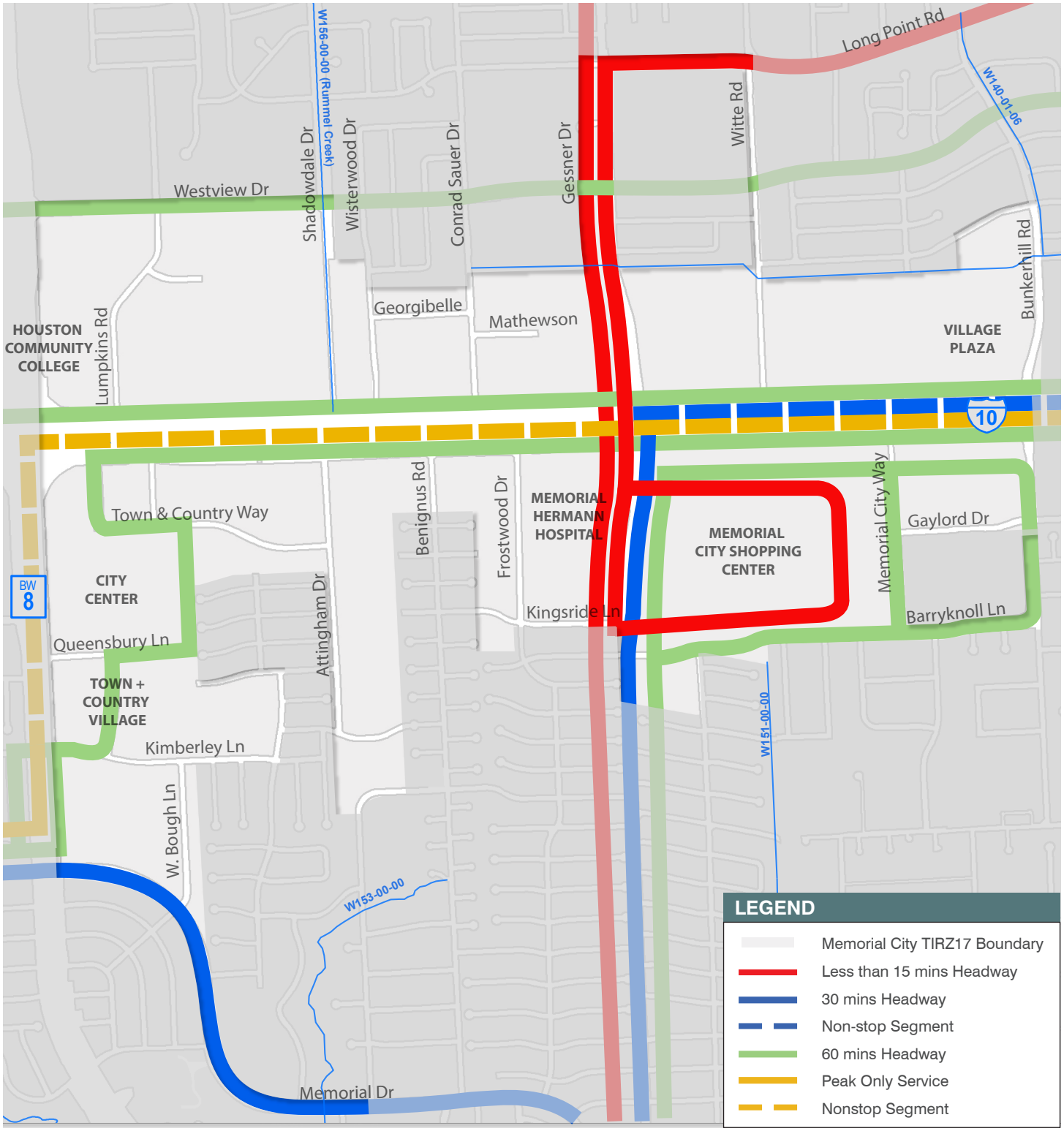


Figure 4_Source: METRO

BIKEWAY PLAN

NOTE: A local bikeway plan is being developed through a separate project and will be included in this document once it has been compiled.

SIDEWALK CONDITIONS

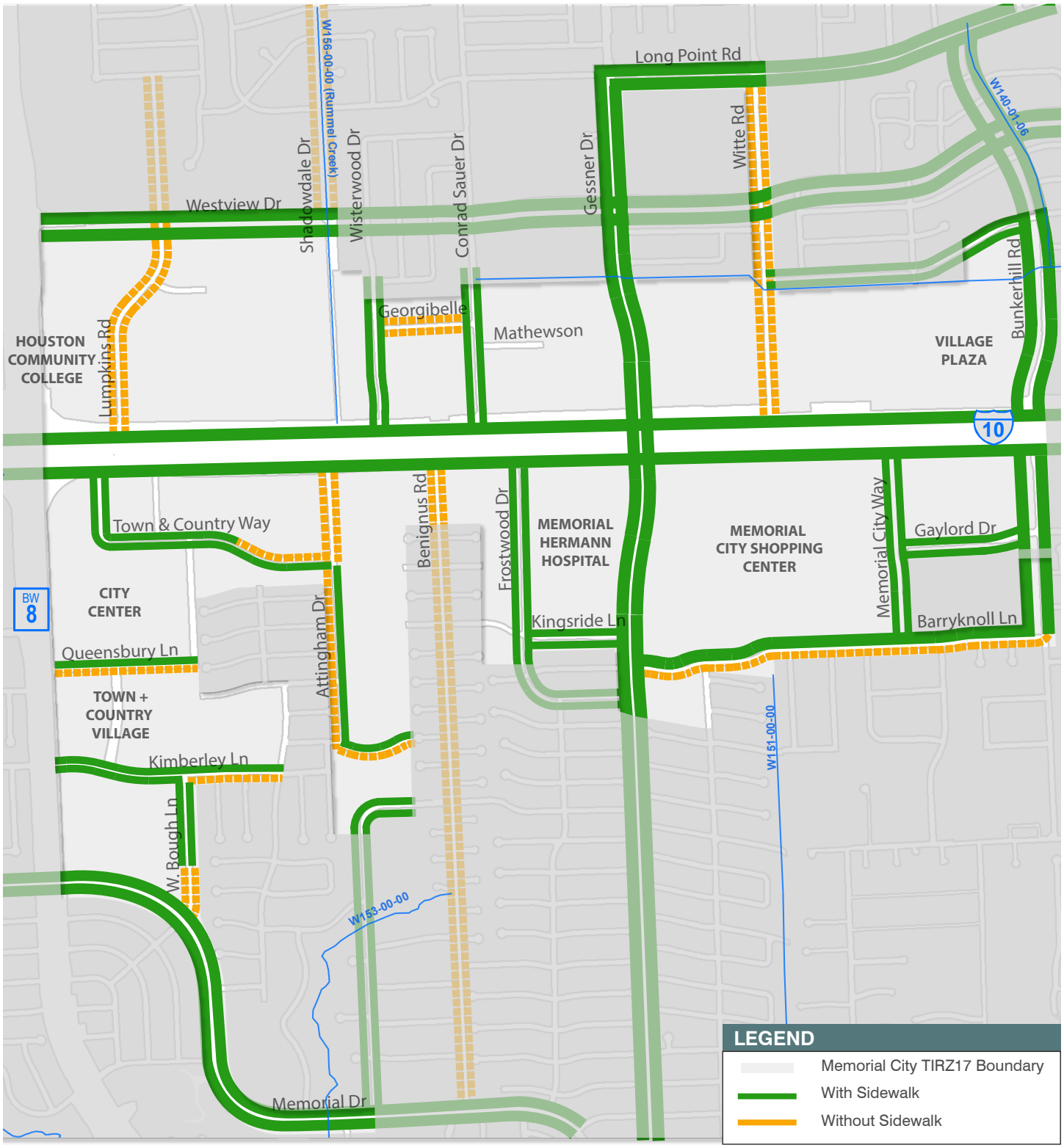


Figure 5_Source: SWA Group

ESPLANADE + MEDIANS

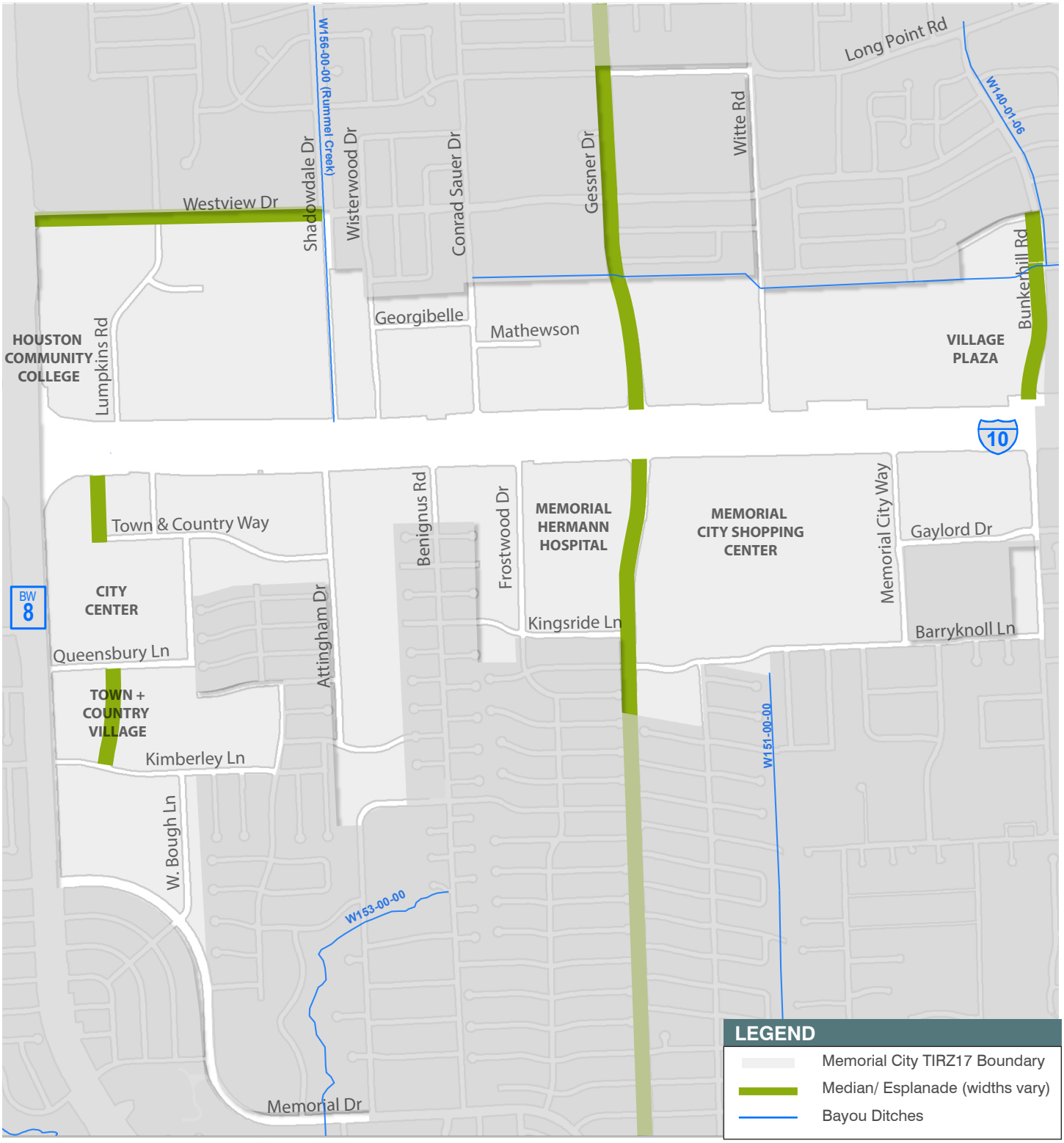


Figure 6_Source: SBMD + MMD

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STREET INVENTORY

The accompanying chart provides a detailed inventory of the 30 primary streets in the MCRA area. The information shows the existing conditions as of the 2014 Edition of these Streetscape Design Standards. It is intended as a baseline for the all sections of the report. As the MCRA continues to make improvements on these streets, this baseline can be expected to change and be up-dated periodically to capture these changes. For example: where sidewalks are now unavailable, new sidewalks may be constructed; where trees are absent, new trees may be planted and a consistent tree type established; bus stops, whether flag signs or bus shelter, may be added for new or enhanced METRO routes; bike lanes may be established to build a local network connected to regional bikeways networks; and, on-street parking may be added or eliminated as may be warranted by the particular street improvement project.

PEDESTRIAN REALM

The pedestrian realm is defined by pedestrian accessibility, ease of comfort, walkability, and aesthetic appeal. Sidewalks and street vegetation are tools used to achieve these important goals.

Name	ROW Width	Number of Lanes	Lane Width	Median Trees	Sidewalks	Open Ditch	Street Trees
Gessner Dr	100' (180)	6	11'	Yes - Magnolia + Crepe Myrtle	Yes	No	Yes - Bald Cypress + Japanese Blueberry
Memorial Dr	100'	4	11'	No	Yes	Yes	No
Westview Dr	80'	4	12'	Yes - Crepe-Myrtle + Red Oak	One Side	No	Yes - Live Oaks + Cider Oak + Red Oak
Long Point Rd	60'	4	12'	No	Yes	No	No

Name	ROW Width	Lane No.	Lane Width	Median	Sidewalks	Open Ditch	Street Trees
Town and Country Blvd*	100'	4	12'	Yes - Cypress + Live Oaks	Yes	No	Yes - Live Oak + Crepe Myrtle + Red Oak + Sycamore
Bunker Hill Rd	80'	3	14'	Turn Lane - Wax Myrtle + Live Oak + Date Palm	Yes	No	Yes - Live Oaks + Red Oak
Lumpkin Rd	60'	2	11'	No	No	Yes	Yes - Live Oaks
Shadowdale Dr	60'	4	11'	No	One Side	Yes	Yes - Red Oak + Live Oak + Red Bud + Bald Cypress + Water Oak + Hackberry
Wisterwood Dr	60'	2	11'	No	No	No	No
Conrad Sauer Dr	60'	4	11'	No	Yes	No	No
Witte Rd	60'	2	11'	No	No	Yes	No
Georgibelle Dr	60'	2	11'	No	Yes	Yes	No
Pine Lake Dr	65'	2	11'	No	Yes	No	No
Town and Country Way	60'	4	11'	No	One Side	No	Yes - Live Oak + Crepe Myrtle + Red Oak + Ash
Town and Country Street	60'	2	11'	No	One Side	No	Yes - Live Oak
Town and Country Ln	60'	4	11'	No	Yes	No	Yes - Drake Elm + Magnolia + Live Oak + Red Oak
Gaylord Dr	60'	2	11'	Turn Lane	Yes	No	Yes - Live Oak + Palm + Crepe Myrtle
Barryknoll Ln	60'	4	11'	No	One Side	No	Yes - Live Oak + Holly
Kingsride Ln	60'-70'	4 to 5	11'	No	Yes	No	No
Queensbury Ln	60'	2	11'	No	One Side	No	Yes - Live Oak
Vindon Dr	60'	2	11'	No	One Side	No	Yes - Red Oak + Live Oak
Kimberley Ln	60'	2	11'	No	Yes	No	Yes - Post Oak + Magnolia + Live Oak
Perthshire Rd	60'	2	11'	No	Yes	No	No
W. Bough Ln	60'	2	11'	No	No	Yes	Yes - Live Oak + Crepe Myrtle + Pear + Chinese Pistache + Pine + Hackberry
Attingham Dr	65'	2	11'	No	One Side	No	Yes - Live Oak + Red Oak
Benignus Rd	60'	2	11'	No	No	Yes	Yes - As + Pecan + Water Oak + Magnolia
Frostwood Dr	60'	4	11'	No	One Side	No	Yes - Live Oaks
Plantation Rd	60'	2 to 4	11'	No	Yes	No	No
Mathewson Ln	60'	2	12'	No	No	No	No
Memorial City Way	55'- 65'	4	11'	No	Yes	No	Yes - Live Oak + Holly + Water Oak

Source: SWA Group

*Note: Town and Country Boulevard has a 100' R.O.W. however it is classified as an urban street rather than a boulevard because of the nature of its speed and capacity.

BIKE

It is important to recognize potential on and off-street bike networks in order to provide the public with alternative means of transportation and leisure activities.

TRANSIT

Transit, in this case recognizes improved bus routes/ lanes that utilizes METRO's "Reimagined Houston" proposal as a baseline to identify which streets have bus lanes/ stops.

PARKING

On-street parking is considered for low-traffic, low-speed streets that have high foot traffic.

VEGETATION

Vegetation includes softscape materials such as street trees and median landscaping, essential to a fully functional and an aesthetic quality of the street.

STREET CONDITIONS

Street conditions consider the street right-of-way, capacity, hardscape materials (paving) and the overall quality of the street.

Powerline	Bus stops	CIP	MTHF Plan	E/P Bike lanes	Bayou Greenways + Channels	On street Parking	Site Character
Yes	Yes	Yes	Yes	None	Ditch W140_00_	No	Commercial/Residential
Yes	Yes	No	Yes	None	Ditch W153_00_	No	Residential/ Parking
Yes	Yes	No	Yes	Proposed on Existing	Ditch W156_00_	No	Ditch/Industrial
Yes	No	No	Yes	In Need	No	No	Parking

Powerline	Bus stops	CIP	MTHF Plan	E/P Bike lanes	Bayou greenways	On street Parking	Site character
No	No	No	No	None	No	No	Commercial/Residential
Yes	No	Yes	No	None	Ditch W140_00_	No	Commercial/Residential
Yes	Yes	Yes	No	None	No	No	Commercial/Civic
Yes	No	No	No	Existing	Ditch W156_00_	Yes	Residential
No	No	No	No	None	No	Yes	Industrial
Yes	No	No	No	None	No	No	Commercial/Civic/Industrial
Yes	Yes	Yes	No	None	Ditch W140_00_	No	Residential/Industrial
Yes	No	No	No	None	No	No	Industrial
Yes	No	No	No	None	No	Yes	Residential
Yes	No	No	No	None	No	Yes	Commercial
Yes	No	No	No	None	No	Yes	Commercial/Residential
No	No	No	No	None	No	No	Commercial
Yes	No	No	No	None	No	No	Commercial/Residential
Yes	Yes	Yes	No	None	No	No	Residential/Parking
No	Yes	No	No	None	No	No	Residential
No	No	Yes	No	None	No	Yes	Commercial
No	No	No	No	None	No	Yes	Residential/Civic
Yes	No	Yes	No	Proposed	No	Yes	Commercial/Residential
No	No	No	No	None	No	Yes	Residential/Civic
Yes	No	No	No	None	No	No	Commercial
No	No	No	No	None	No	Yes	Residential/Civic
No	No	No	No	None	No	No	Commercial
No	Yes	No	No	None	No	No	Commercial
No	No	No	No	None	No	No	Commercial/Residential
Yes	No	No	No	None	No	No	Industrial
Yes	No	No	No	None	No	No	Commercial

** CIP projects are inclusive of current, completed and proposed (on Rebuild Houston lists for 2015-2024) projects.
*** E/P Bike Lanes refer to either existing on-street bike lane (E) or a local bikeway plan that is being developed through a separate project (P).

3 Streetscape Opportunities

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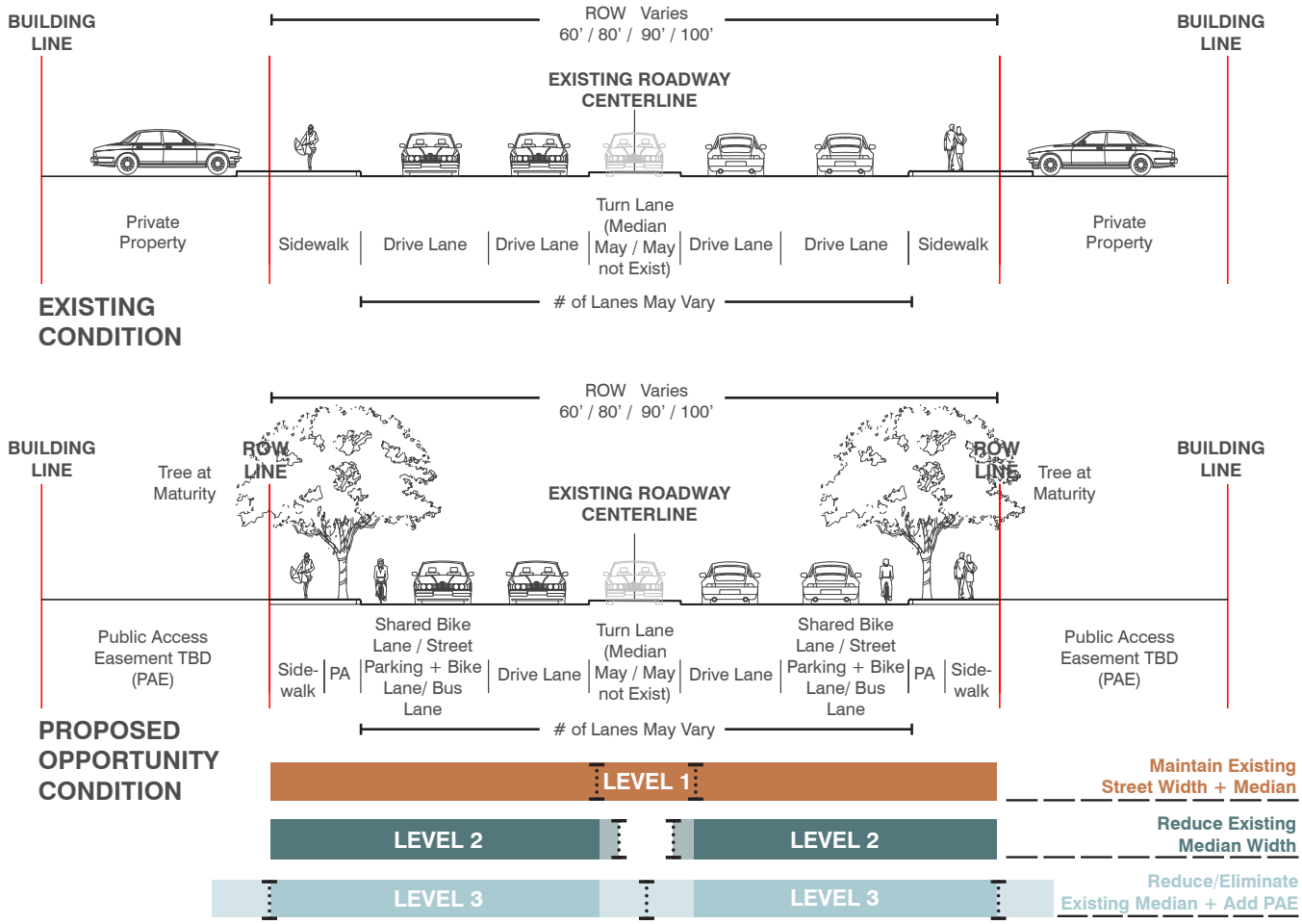
STREETSCAPE OPPORTUNITIES

This section considers and illustrates the street cross sections for MCRD's streets by type of street using the City of Houston's classifications (boulevards, avenues, street). The purpose here is two-fold: first, to identify the constituent elements (travel lanes, sidewalks, etc) that together comprise the overall street right-of-way and the amount of space occupied by each element; and, second to consider opportunities to adjust the allocation of the right-of-way for certain elements (including amenities) in the street section so as to promote the 'Complete Streets' objective. In addition to the reallocation of space in the right-of-way, there is consideration for expanding the overall street section by obtaining public access easements by abutting property owners.



STREETSCAPE OPPORTUNITIES

LEVEL 1: Minimum revision of the street section; utilization of the existing ROW dimension to accommodate and enhance public realm amenities.

LEVEL 2: Moderate revisions to existing street components; partial or complete conversion of median space for public realm amenities such as sidewalks, sidewalk planting, bus shelters, and street furniture.

LEVEL 3: In addition to the existing ROW Level 3 considers the utilization of both median space as well as a public access easement (up to 5 feet on either side) in order to accommodate public realm amenities that are not otherwise possible within the existing ROW.

The accompanying chart on page 33 builds on information presented in the previous section. Of particular importance and note are the following three items.

STREETSCAPE OPPORTUNITIES CHART

NOTES:

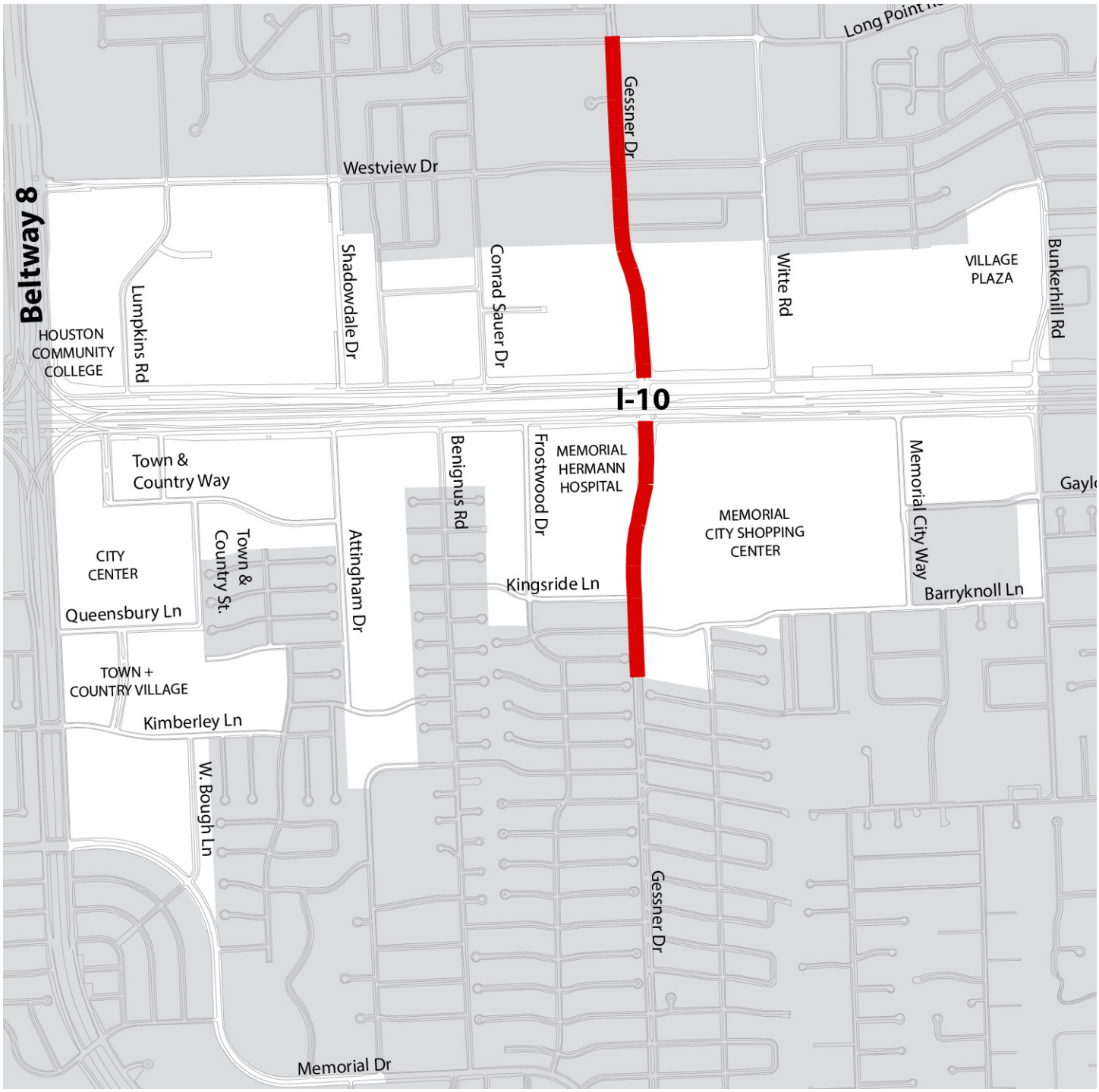
1. **Levels 1 – 3 :** The three levels refer to the extent to which the street ROW might be modified in order to accommodate more space for public realm amenities including but not limited to wider sidewalks, more planting area and/or dedicated bike lanes. (Continued on p.33)
2. **ROW + Easements :** This column shows the assumed maximum widened street section that might be possible to accommodate new and / or enhanced public realm amenities.
3. **Illustration of Levels :** On page 32, additional space cited in Notes 1) and 2) above is depicted in this illustration. If there is an existing median, it might be reduced in width or eliminated altogether and the space recovered and used for the appropriate public realm amenities. In combination with a reduction of the median or as a stand-alone option, the additional space for amenities might be obtained through the granting of a public access easement by abutting property owner(s).

TYPE		SPEED	STREETS	MULTI-MODAL CLASSIFICATION EXAMPLE	ROW + EASEMENTS	STREET CLASSIFICATION					PAGE REFER.
						Major Thoroughfare	Thoroughfare	Major Collector	Collector	Local Street	
A	Boulevard	45 MPH	Gessner	Level 1	100’	✓					p.34-35
				Level 2	100’						
				Level 3	110’						
		45 MPH	Memorial	Level 1	100’	✓	✓				p.36-37
				Level 2	100’						
				Level 3	110’						
B	Avenue	35-45 MPH	Westview Bunkerhill	Level 1	80’		✓	✓	✓		p.38-39
				Level 2	80’						
				Level 3	90’						
C	Street	35-40 MPH	Conrad Sauer, Witte Queensbury Town+Country Kimberley Kingsride Gaylord Frostwood Long Point Wisterwood Memorial City Way Lumpkin Georgibelle Pine Lake Vindon Perthshire W. Bough Attingham Benignus Mathewson	Level 1	60’			✓	✓	✓	p.40-41
				Level 3	70’						
D	Street next to Ditch	35 MPH	Shadowdale	Level 1	60’					✓	p.42-43
				Level 3	60’						

*Note: Number of lanes include left turn lanes. Where median space is lacking, Level 2 may not be an option.

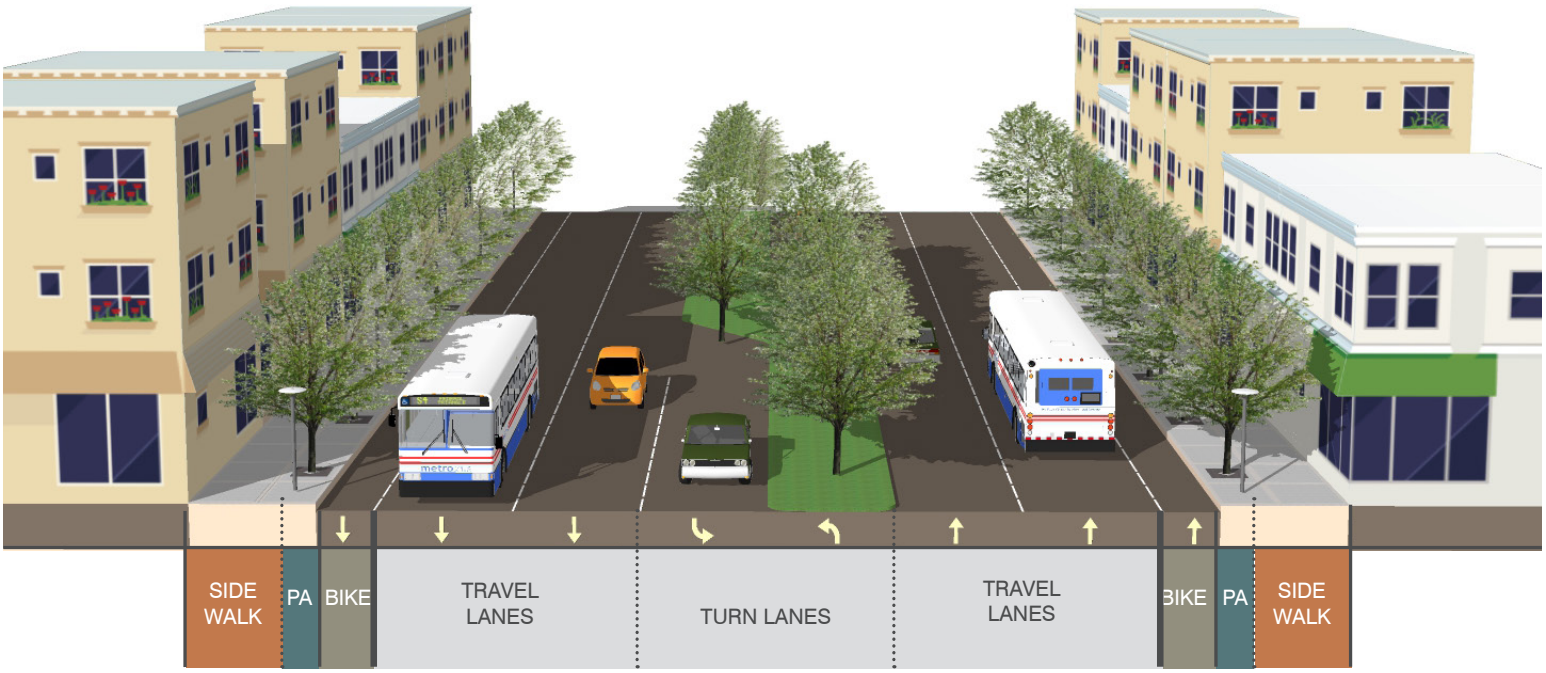
To the far right of the chart are page references to the specific Street Types where pertinent details are provided for each level (1 – 3) including configurations of the modified, widened street sections. The Street Types (pages 34 – 43) follow immediately behind the Street Opportunities Chart.

STREET TYPE - A URBAN BOULEVARD



LOCATION MAP

TYPE A - Gessner



FOR ILLUSTRATIVE PURPOSES ONLY

TYPE A	Levels	Sidewalks	Planting (PA) / Rain Garden	Bus Sign/ Bus Shelter	Bike Lane	Parking	Bus Lane	Drive Lanes	Median / Turn Lane (T L)
100 ft ROW	1	6 X 2 =12	4 X 2 = 8	Bus Shelter	Shared with Bus Lane	None	12 X 2 = 24	11 X 4 =44	12 Median T L
100 ft ROW	1	6 X 2 =12	10 X 2 =20	Bus Shelter	5 X 2 =10	None	12 X 2 = 24	11 X 2 =22	12 T L
100 ft ROW	2	6 X 2 =12	4.5 X 2 = 9	Bus Shelter	Shared with Bus Lane	None	12 X 2 = 24	11 X 4 =44	11 Median T L
110 ft ROW[1] / Easement	3	8 X 2 = 16	6 X 2 = 12	Bus Shelter	5 X 2 =10	None	12 X 2 = 24	12 X 4 =48 (with T L)	None

NOTES:

1. If additional R.O.W. is unavailable, added width may be achieved by dedication of public access easements.
2. The equations "A x B = C", are representational, where A is the element in horizontal feet, B is the number of elements – i.e., both sides of the street – and C is the total horizontal feet.
3. Indicated widths will need to be field-verified in the design phase for each street as the dimensions may vary.
4. Where 'None' is indicated for Median / Turn Lanes in either Levels 2 or 3, this indicates that this space has been eliminated and its space allocated to uses of new or enhanced amenities.

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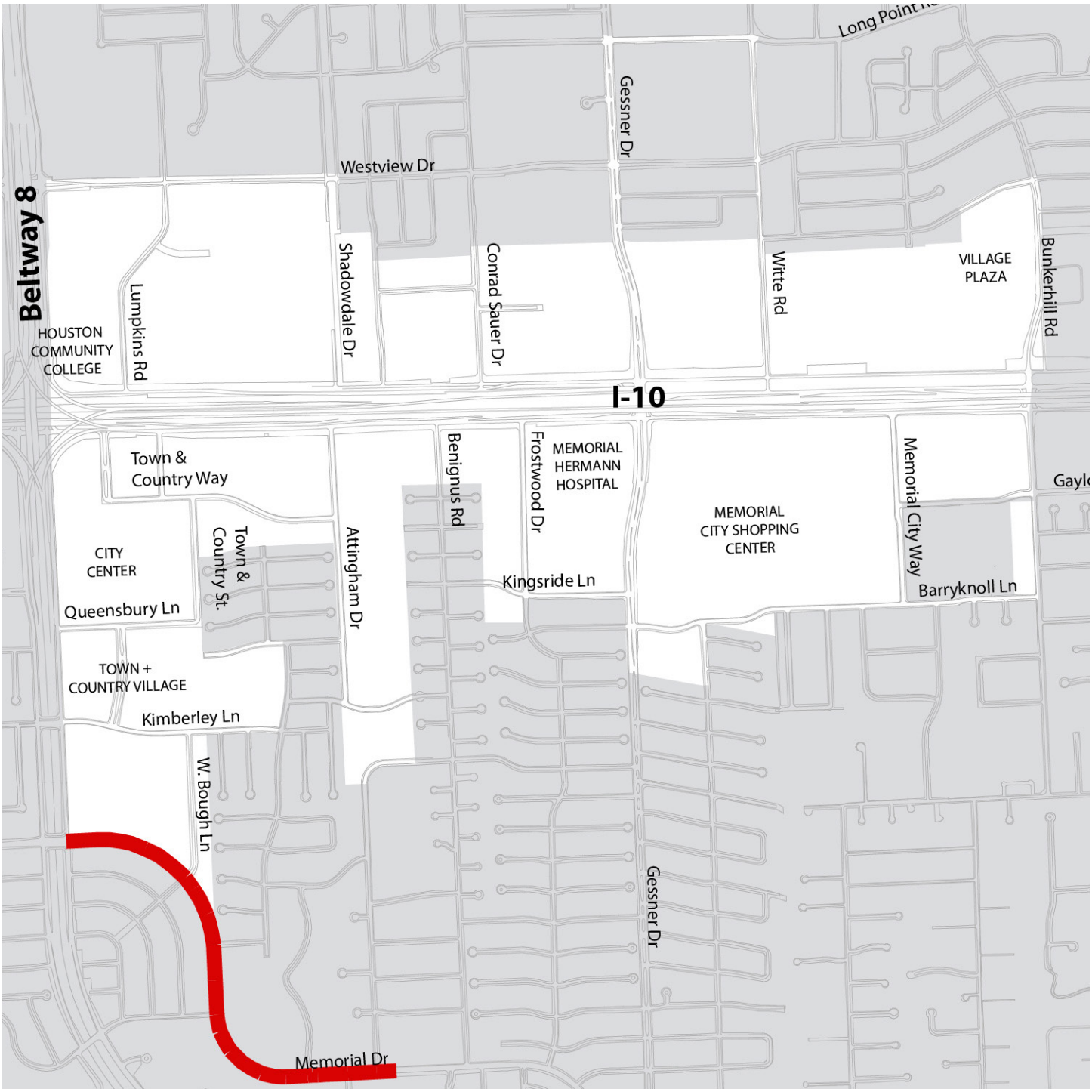
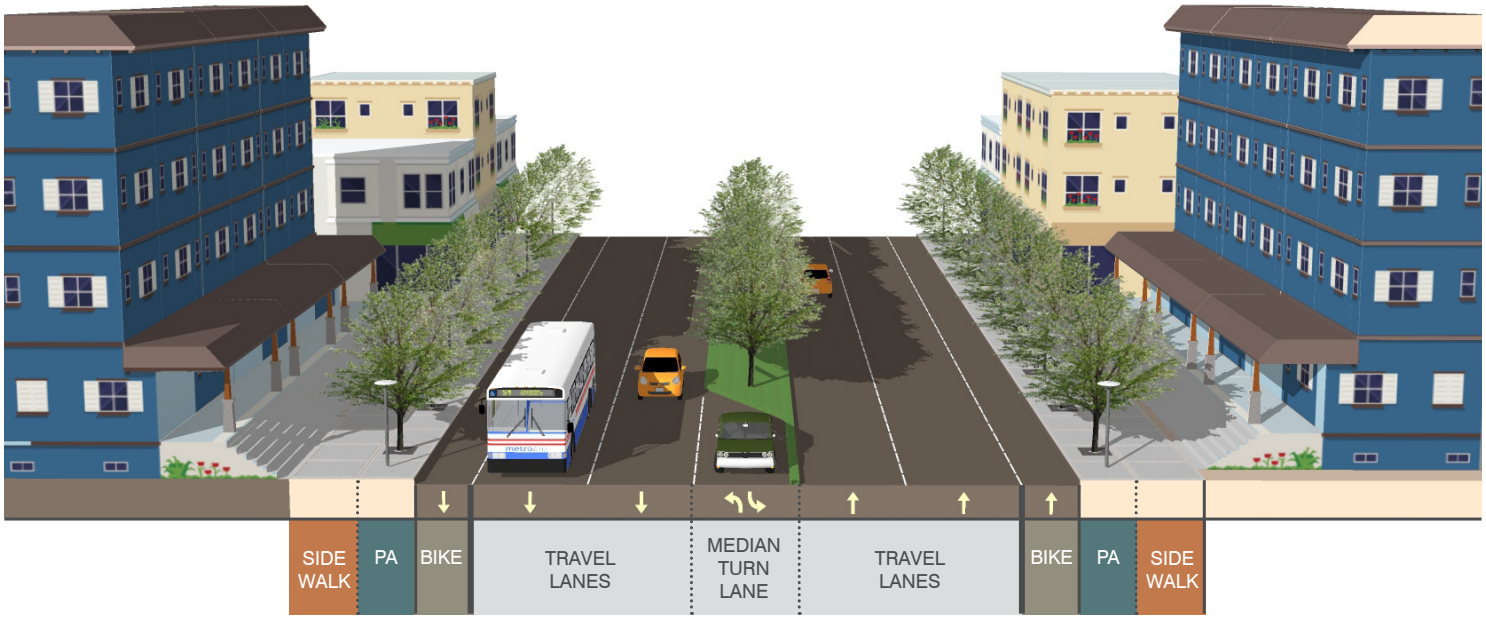
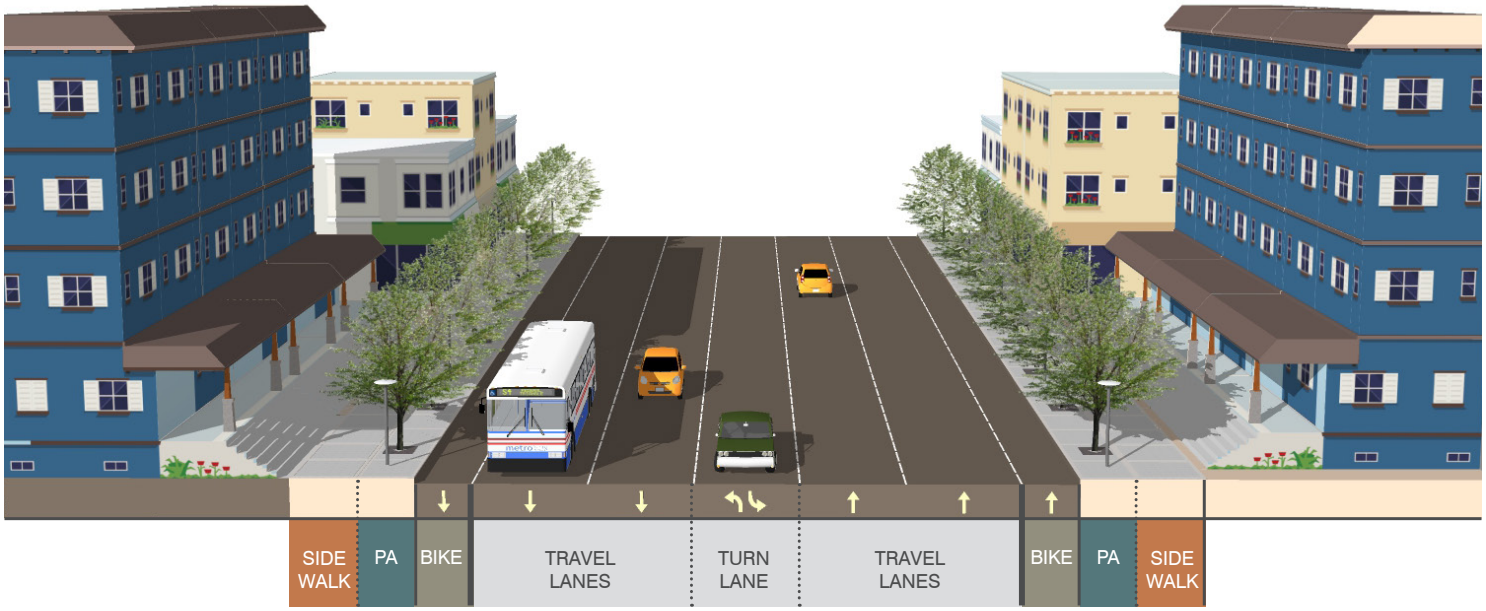
STREET TYPE - A SUBURBAN BOULEVARD



LOCATION MAP

TYPE A - Memorial Dr





FOR ILLUSTRATIVE PURPOSES ONLY

TYPE A	Levels	Sidewalks	Planting (PA) / Rain Garden	Bus Sign/ Bus Shelter	Bike Lane	Parking	Bus Lane	Drive Lanes	Median / Turn Lane (T L)
100 ft ROW	1	6 X 2 =12	10 X 2 =20	Bus Shelter	5 X 2 =10	None	12 X 2 = 24	11 X 2 =22	12 T L
110 ft ROW(1) / Easement	3	9 X 2 = 18	11 X 2 =22	Bus Shelter	5 X 2=10	None	12 X 2 = 24	12 X 2 =24	12 T L

NOTES:

1. If additional R.O.W. is unavailable, added width may be achieved by dedication of public access easements.
2. The equations "A x B = C", are representational, where A is the element in horizontal feet, B is the number of elements – i.e., both sides of the street – and C is the total horizontal feet.
3. Indicated widths will need to be field-verified in the design phase for each street as the dimensions may vary.
4. Where 'None' is indicated for Median / Turn Lanes in either Levels 2 or 3, this indicates that this space has been eliminated and its space allocated to uses of new or enhanced amenities.

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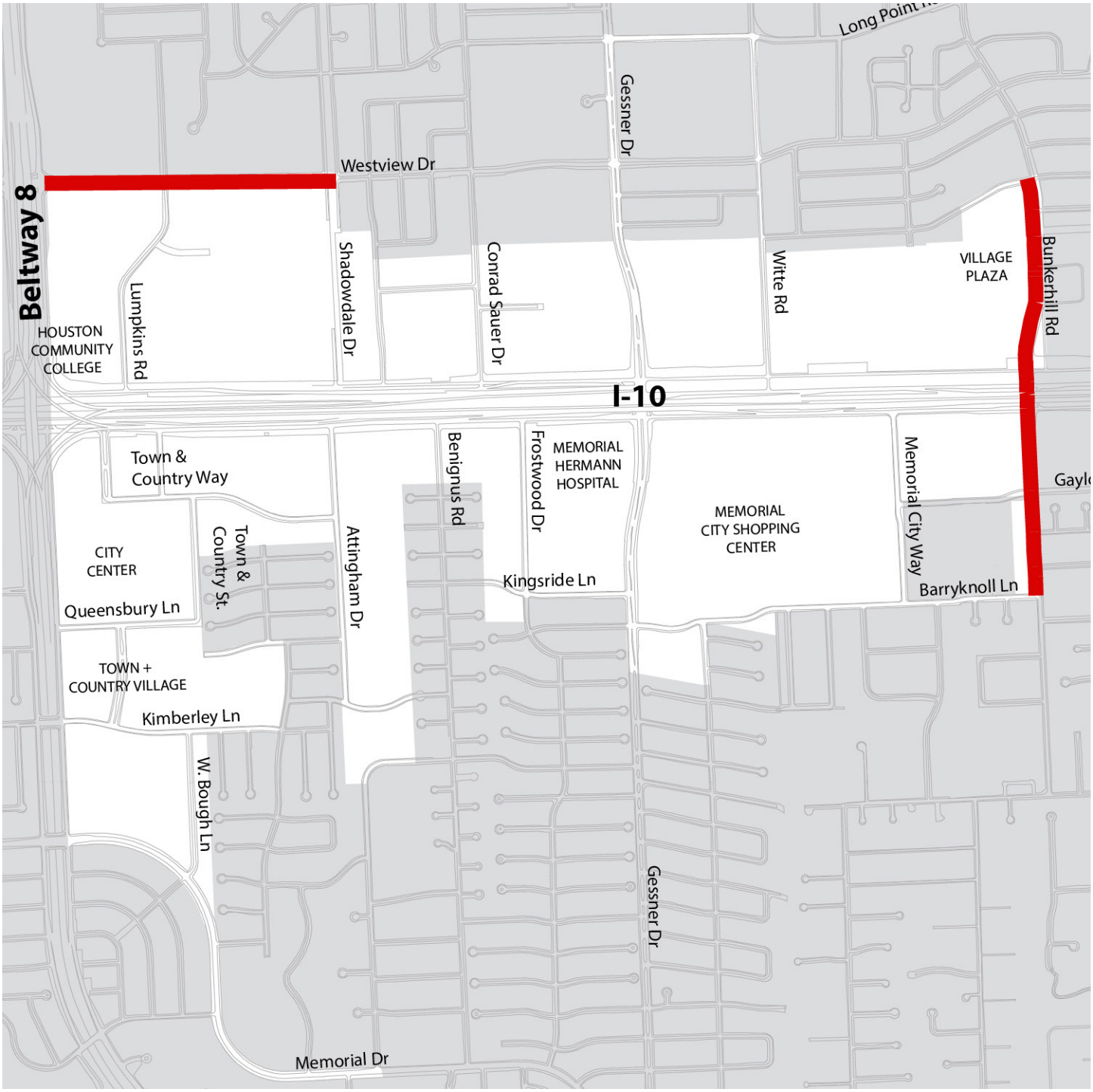
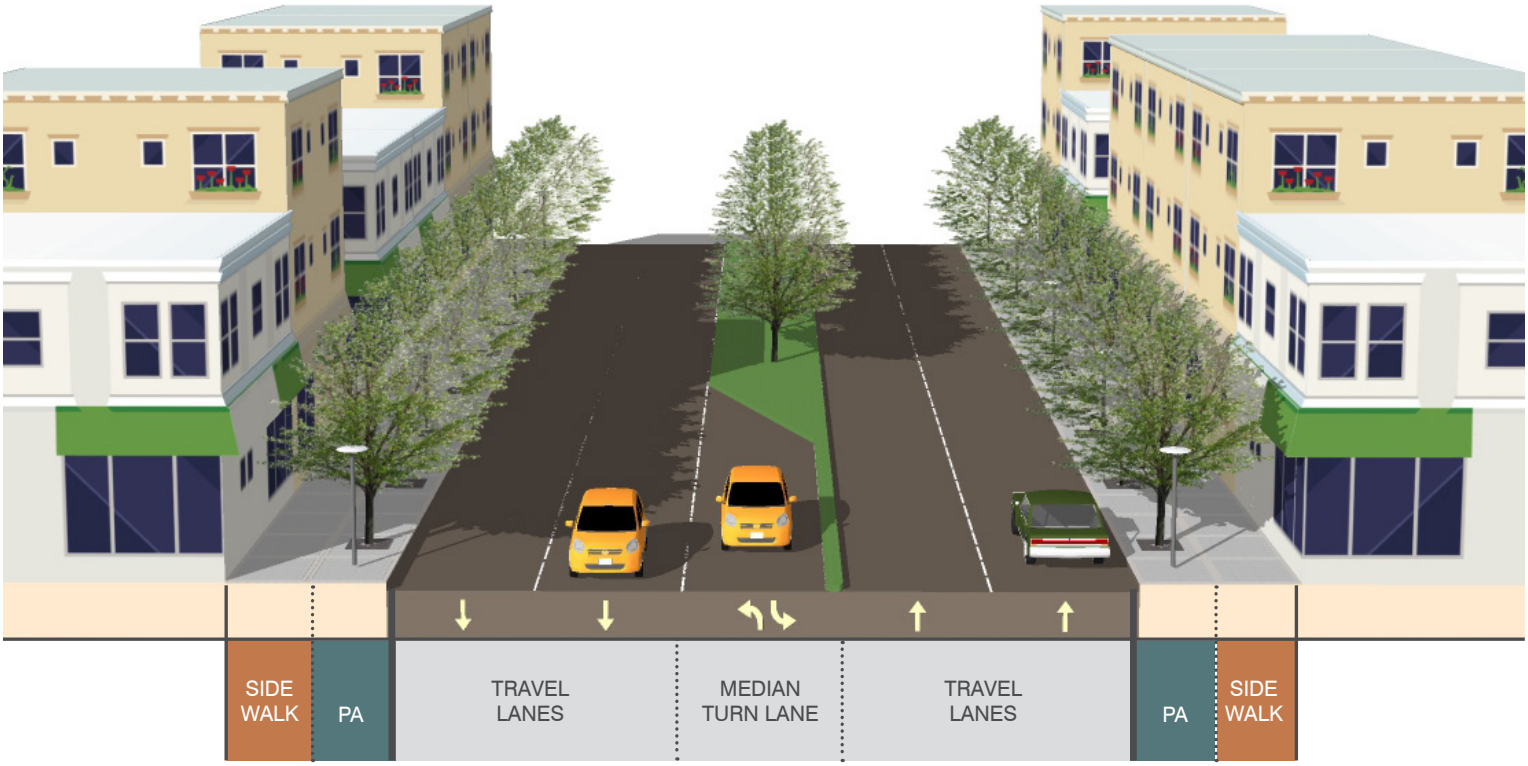
STREET TYPE - B URBAN AVENUE



LOCATION MAP

TYPE B - Bunkerhill Rd + Westview Dr



FOR ILLUSTRATIVE PURPOSES ONLY

TYPE B	** Levels	Sidewalks	Planting (PA) / Rain Garden	Bus Sign/ Bus Shelter	Bike Lane	Parking	Bus Lane	Drive Lanes	Median / Turn Lane (T L)
80 ft ROW	1 -Op. X	6 X 2 =12	4.5 X 2 = 9	Bus Sign	Shared with Bus Lane	None	12 X 2 = 24	11 X 2 = 22	13 Median T L
	1 -Op. Y	6 X 2 =12	4.5 X 2 = 9	N / A	Shared with Drive Lane	None	None	(12 X 2= 24) + (11 X 2= 22)	13 Median T L
	1 -Op. Z	8 X 2 =16	11 X 2 = 22	N / A	Shared with Drive Lane	None	None	14 X 2 = 28	14 T L
80 ft ROW	2 -Op. X	6 X 2 =12	5 X 2 = 10	Bus Sign	Shared with Bus Lane	None	13 X 2 = 26	11 X 2 = 22	10 Median T L
	2 -Op. Y	6 X 2 =12	5 X 2 = 10	N / A	Shared with Drive Lane	None	None	(13 X 2= 26) + (11 X 2= 22)	10 Median T L
	2 -Op. Z	8 X 2 =16	10 X 2 = 20	N / A	5 X 2 = 10	None	None	11 X 2 = 22	12 T L
90 ft ROW(1) / Easement	3 -Op. X	7 X 2 =14	5 X 2 = 10	Bus Sign	5 X 2 = 10	None	12 X 2 = 24	11 X 2 = 22	10 Median T L
	3 -Op. Y	8 X 2 = 16	5 X 2 = 10	N / A	5 X 2 = 10	None	None	11 X 4= 44	10 Median T L
	3 -Op. Z	10 X 2 =20	13 X 2 = 26	N / A	5 X 2 = 10	None	None	11 X 2 = 22	12 T L

NOTES:

****Op. X** refers specifically to Westview Drive which is a part of the re-imagined Houston METRO system hence the street is inclusive of a dedicated bus lane.

****Op. Y** refers specifically to Bunkerhill Rd, which does not have a dedicated bus route.

****Op. Z** refers specifically to Bunkerhill Rd, which does not have a dedicated bus route and, at areas, contain three lanes.

1. If additional R.O.W. is unavailable, added width may be achieved by dedication of public access easements.
2. The equations "A x B = C", are representational, where A is the element in horizontal feet, B is the number of elements – i.e., both sides of the street – and C is the total horizontal feet.
3. Indicated widths will need to be field-verified in the design phase for each street as the dimensions may vary.
4. Where 'None' is indicated for Median / Turn Lanes in either Levels 2 or 3, this indicates that this space has been eliminated and its space allocated to uses of new or enhanced amenities.

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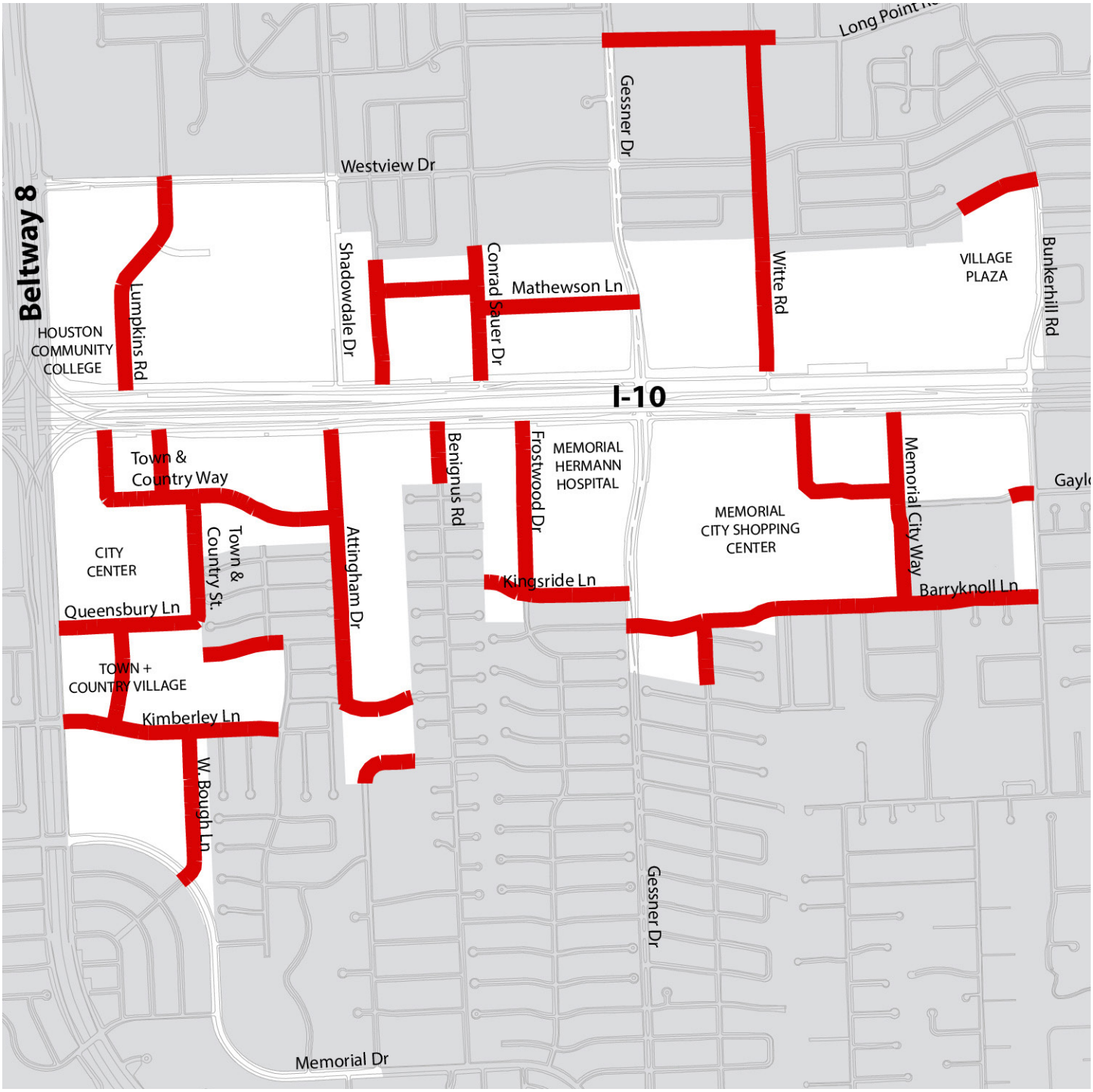
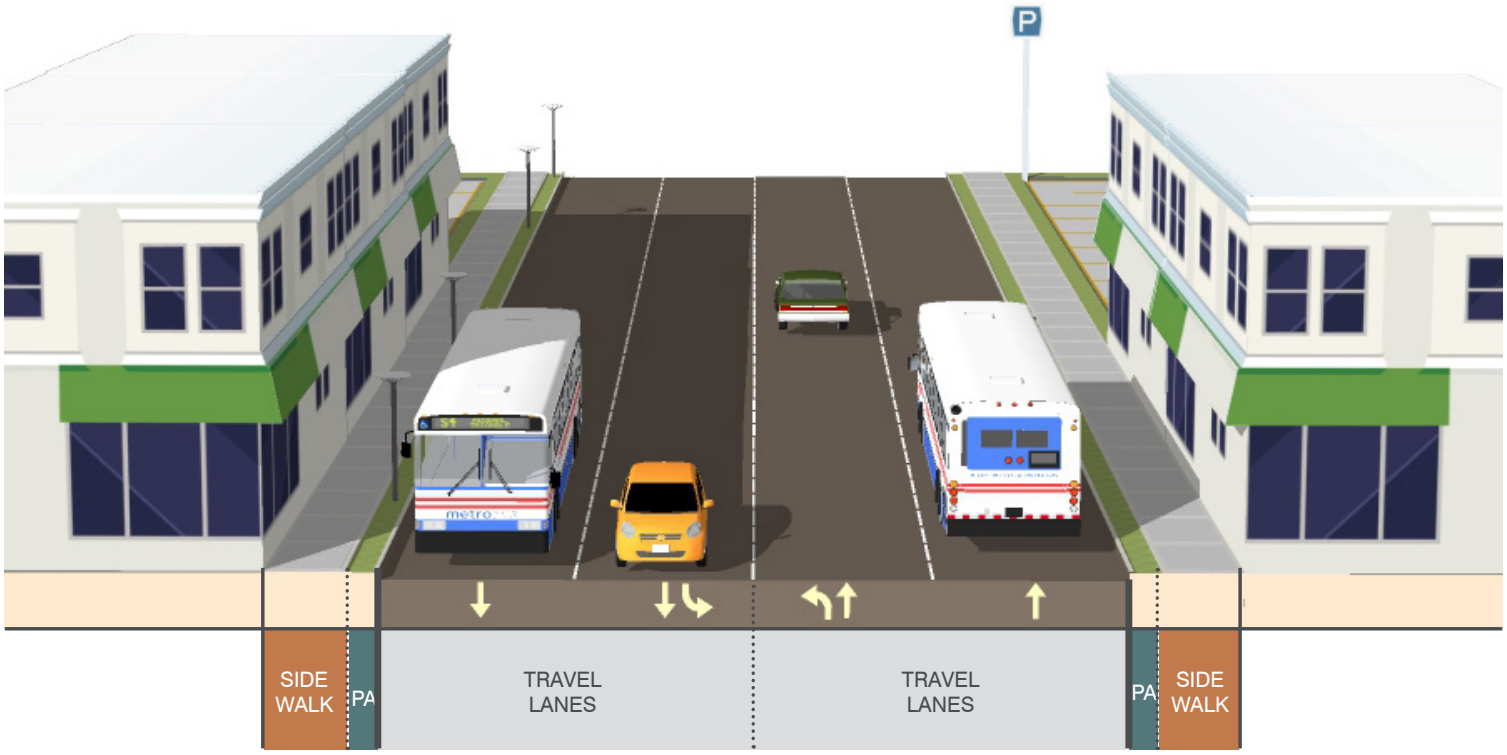
STREET TYPE - C URBAN STREET



LOCATION MAP

TYPE C - Conrad Sauer, Witte, Queensbury, Town + Country Blvd*, Town + Country Way, Town + Country Ln, Town + Country St, Kimberley, Kingsride, Frostwood, Longpoint, Wisterwood, Mathewson, Memorial City Way



FOR ILLUSTRATIVE PURPOSES ONLY

TYPE C	** Levels	Sidewalks	Planting (PA) / Rain Garden	Bus Sign/ Bus Shelter	Bike Lane	Parking	Bus Lane	Drive Lanes	Median / Turn Lane (T L)
60 ft ROW	1 -Op. X	5 X 2 = 10	2 X 2 = 4	Bus Shelter	Shared with Bus Lane	None	12 X 2 = 24	11 x 2 = 22	None
	1 -Op. Y	5 X 2 = 10	2 X 2 = 4	N / A	Shared with Drive Lane	None	None	(12 X 2= 24) + (11 X 2= 22)	None
	1 -Op. Z	5 X 2 = 10	4 X 2 = 8	N / A	Shared with Drive Lane	9 X 2 = 18	None	12 x 2 = 24	None
	1 -Op. Z '	6 X 2 = 12	10 x 2 = 20	N / A	Shared with Drive Lane	None	None	14 x 2 = 28	None
70 ft ROW(1) / Easement	3 -Op. X	6 X 2 = 12	5 X 2 = 10	Bus Shelter	Shared with Bus Lane	None	13 X 2 = 26	11 x 2 = 22	None
	3 -Op. Y	6 X 2 = 12	5 X 2 = 10	N / A	Shared with Drive Lane	None	None	(13 X 2= 26) + (11 X 2= 22)	None
	3 -Op. Z	6 X 2 = 12	6 X 2 = 12	N / A	Shared with Drive Lane	9 X 2 = 18	None	14 x 2 = 28	None
	3 -Op. Z '	9 X 2 = 18	12 X 2 = 24	N / A	Shared with Drive Lane	None	None	14 x 2 = 28	None
TYPE C-1*	**Levels**	**Sidewalks**	**Planting (PA) / Rain Garden**	**Bus Sign/ Bus Shelter**	**Bike Lane**	**Parking**	**Bus Lane**	**Drive Lanes**	**Median / Turn Lane (T L)**
100 ft ROW	1	6 X 2 = 12	5 X 2 = 10	Bus Sign	Shared with Bus Lane	None	14 X 2 = 28	11 x 2 = 22	28 Median T L
	2	7 X 2 = 14	6 X 2 = 12	Bus Sign	Shared with Bus Lane	None	14 X 2 = 28	11 x 2 = 22	24 Median T L
110 ft ROW(1) / Easement	3	9 X 2 = 18	8 X 2 = 16	Bus Sign	5 X 2 = 10	None	12 X 2 = 24	11 X 2 = 22	20 Median T L

NOTES:

*Note: Town and Country Boulevard has a 100' R.O.W. However the street shall be classified as an urban street due to the nature of its speed and capacity.

Op. X refers to urban streets with an option for a dedicated bus route.
Op. Y refers to urban streets without the option for a dedicated bus route.
Op. Z refers to urban streets without the option for a dedicated bus route, but is inclusive of on-street parking.
Op. Z' refers to urban streets without the option for a dedicated bus route on a two-lane, two-way street.

1. If additional R.O.W. is unavailable, added width may be achieved by dedication of public access easements.
2. The equations "A x B = C", are representational, where A is the element in horizontal feet, B is the number of elements – i.e., both sides of the street – and C is the total horizontal feet.
3. Indicated widths will need to be field-verified in the design phase for each street as the dimensions may vary.
4. Where 'None' is indicated for Median / Turn Lanes in either Levels 2 or 3, this indicates that this space has been eliminated and its space allocated to uses of new or enhanced amenities.

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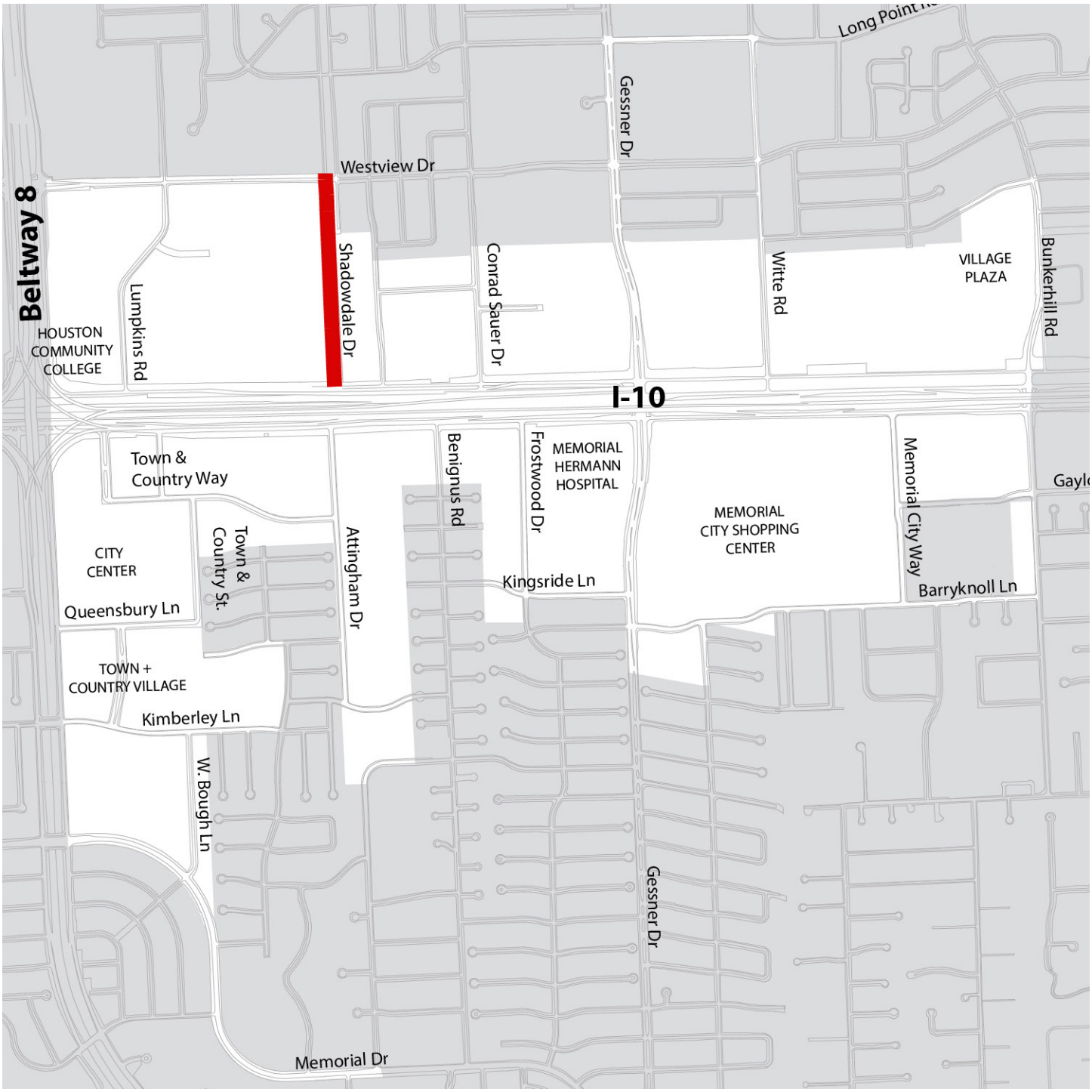
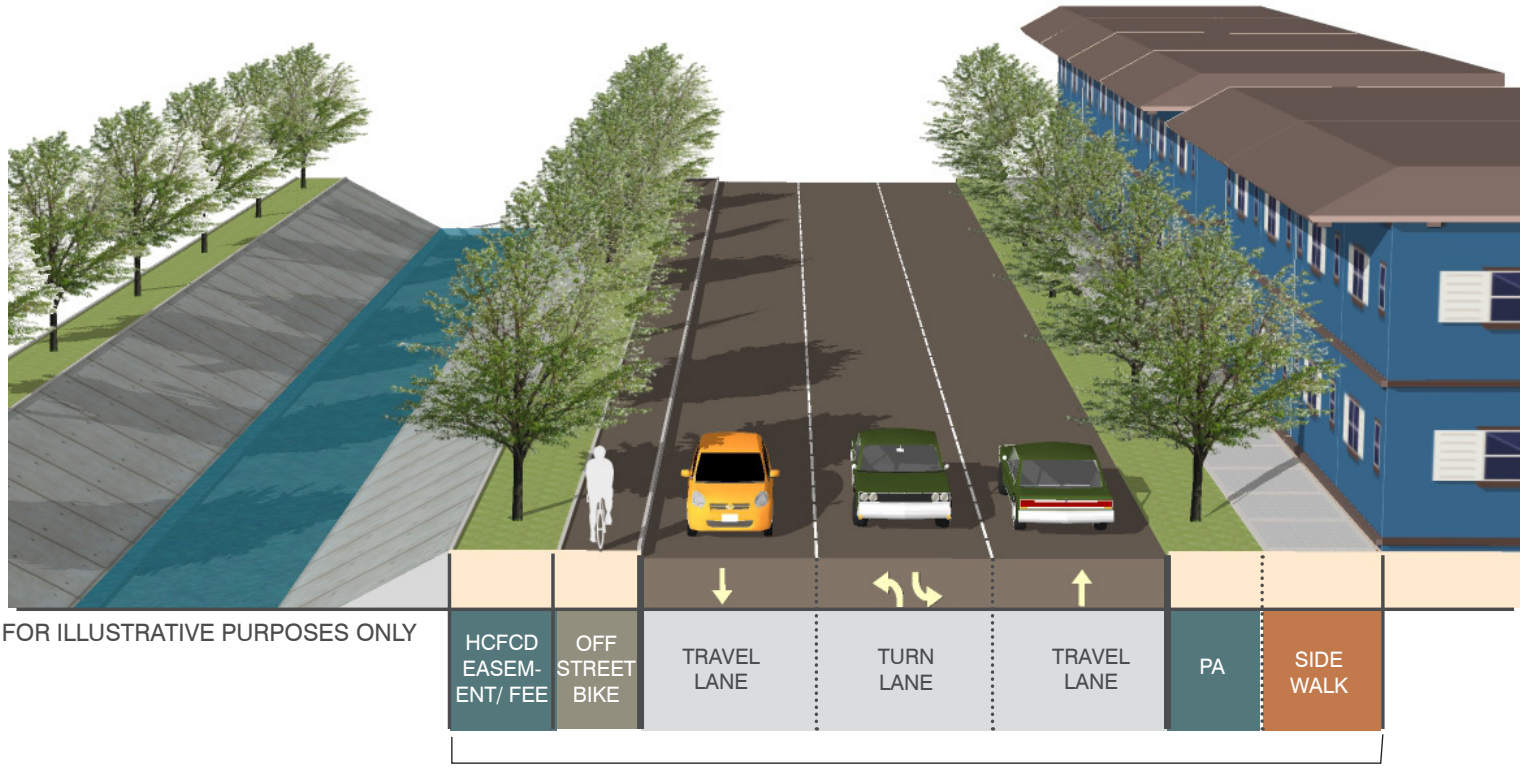
STREET TYPE - D SPECIAL CONDITION



LOCATION MAP

TYPE D - Shadowdale Dr



FOR ILLUSTRATIVE PURPOSES ONLY

Suburban Street ROW may include Off-street Bike + HCFCD Buffer to accommodate a 60 ft ROW.

TYPE D	** Levels	Sidewalks	Planting (PA) / Rain Garden	Bus Sign/ Bus Shelter	Bike Lane	Parking	Bus Lane	Drive Lanes	Median / Turn Lane (T L)
110' ft ROW*	1 -Op. X	5 X 1 = 5	7 X 2 = 14	N / A	5 X 1 = 5 + Shared Bike Lane	None	None	(14 x 1) + (11 X 1) = 25	11 T L
(60 FT Roadway)	1 -Op. Y	6 X 1 = 6	7.5 X 2 = 15	N / A	5 X 1 = 5 + Shared Bike Lane	9 X 1 = 9	None	(14 x 1) + (11 X 1) = 25	None
110' ft ROW*	3 -Op. X	8 X 1 = 8	8 X 2 = 16	N / A	5 X 1 = 5 + Shared Bike Lane	None	None	(14 x 1) + (11 X 1) = 25	11 T L
(65 FT Roadway)(1)	3 -Op. Y	8 X 1 = 8	9 X 2 = 18	N / A	5 X 1 = 5 + Shared Bike Lane	9 X 1 = 9	None	(14 x 1) + (11 X 1) = 25	None

NOTES:

* Shadowdale St. has an atypical condition of existing streets in TIRZ17, where the drainage ditch takes up the west side of the street structure, thereby leaving 60ft for the R.O.W. The 60 ft ROW may include some Off-street bike trails and HCFCD easement. The remaining dimension accounts for the ditch itself.

**Op. X refers to suburban streets without an option for a dedicated bus route.
**Op. Y refers to suburban streets without the option for a dedicated bus route, but is inclusive of on-street parking.

1. If additional R.O.W. is unavailable, added width may be achieved by dedication of public access easements.
2. The equations "A x B = C", are representational, where A is the element in horizontal feet, B is the number of elements – i.e., both sides of the street – and C is the total horizontal feet.
3. Indicated widths will need to be field-verified in the design phase for each street as the dimensions may vary.
4. Where 'None' is indicated for Median / Turn Lanes in either Levels 2 or 3, this indicates that this space has been eliminated and its space allocated to uses of new or enhanced amenities.

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4 Streetscape Specifications

STANDARD

SOFTSCAPE

Tree/ Plant Species	[MMD/SBMD]
Tree Well	[MMD]
Tree Grate	[MMD]
Storm Water Mitigation	[MMD]
Irrigation	[MMD/SBMD]

HARDSCAPE

Sidewalk Paving	[MMD]
Median Paving	[MMD/SBMD]
Paving at Intersections	[SBMD]
Street Parking	[MMD]
Roadway Lighting	[MMD]
Pedestrian Lighting	[MMD]
Infrastructure	[MMD/SBMD]
Street Furniture	[MMD]

NON-STANDARD

SOFTSCAPE	(See Standards for Softscape)

HARDSCAPE

Signage	[SBMD]

*NOTE: “STANDARD” refers to amenities that are funded and constructed by the MCRDA and maintained under agreement between the MCRDA, the MMD and the SBMD. “Non-Standard” refers to amenities that are not typically funded nor constructed by the MCRDA. “Non-standard” amenities might be paid for by the management districts as “betterments” as part of a MCRDA project under a special agreement and maintained under agreement between the MCRDA and the MMD and the SBMD.

EDITION: FEBRUARY 2015

SPECIFICATIONS CHART

TYPE		SPEED	STREETS	SOFTSCAPE							PAVING						
					App D1			App. D1		App.D7	p.13	p.13	p.14	p.13	p.14		
							p.55		p.55	p.59						p.63	
				p.56	p.58	p.54		p.54		p.59					p.62		p.61
				MMD	MMD	MMD	SBMD	MMD	SBMD						MMD	SBMD	
				Tree Well/ Grate	Swales/ Stormwater Raingarden	Street Tree		Shrubs		Irrigation	Cross walks	Roadway Pavement	Curbs	Drive Lanes	Median Paving		Sidewalk Paving
A	Boulevard	45 MPH	Gessner	O	O	✓	✓	O	O	O	✓	✓	✓	✓	O	O	✓
		45 MPH	Memorial	O	O	✓	N/A[1]	O	N/A[1]	O	✓	✓	✓	✓	O	N/A[1]	✓
B	Avenue	35-45 MPH	Westview Bunkerhill	O	O	✓	✓	O	O	O	✓	✓	✓	✓	O	O	✓
C	Street	35-40 MPH	Conrad Sauer Witte Queensbury Town+Country Kimberley Kingsride Gaylord Forestwood Long Point Wisterwood Memorial City Way Lumpkin Shadowdale Georgibelle Pine Lake Vindon Perthshire W. Bough Attingham Benignus Mathewson	O	O	✓	✓	O	O	O	✓	✓	✓	✓	O	O	✓
D	Street next to Ditch	35 MPH	Shadowdale	O	O	✓	✓	O	O	O	✓	✓	✓	✓	O	O	✓

** Shadowdale St. has an atypical roadway and pedestrian lighting structure due to a parallel drainage ditch.

✓ Required Amenities
O Optional Amenities
N/A[1] Streets are not located in the Spring Branch District
N/A[2] Roads where street parking is not applicable

Refer to Guidelines +
Coordinate with Civil Engineer

LIGHTING					PARKING	INFRASTRUCTURE					STREET FURNITURE					
p.17	p.18		p.20	p.20			p.6					p.24	p.24	p.25	p.26	p.26-30
		p.67									p.70					
p.66	p.67				p.65	p.68					p.69					
	MMD	SBMD			MMD	MMD					MMD					
Roadway Lighting	Pedestrian Lighting		Light Bollards	Accent/ Special Lighting	Street Parking Treatment	Electric Poles	Hydrants	Junction, Electric Pullboxes	Telephone/ Cable-boxes	Drainage	Bus Shelters/ Bus Sign	Benches	Trash Receptacle	Bike Racks	Drinking Fountains	MISC.
✓	○	○	○	○	N/A[2]	○	✓	✓	✓	✓	○	○	○	○	○	○
✓	○	N/A[1]	○	○	○	○	✓	✓	✓	✓	○	○	○	○	○	○
✓	○	○	○	○	○	○	✓	✓	✓	✓	○	○	○	○	○	○
✓	○	○	○	○	○	○	✓	✓	✓	✓	○	○	○	○	○	○
✓**	○**	○	○	○	○	○	✓	✓	✓	✓	○	○	○	○	○	○

Reference 'Memorial Management District Area Guidelines' (2003)

Reference 'Streetscape Design Guidelines' Supplement for Spring Branch Management District (SBMD) Standards. Standards are referenced in this supplement.

Reference 'Streetscape Design Guidelines' (Supplement to 'MMD Area Guidelines')

SPECIFICATIONS CHART ... CONTINUED

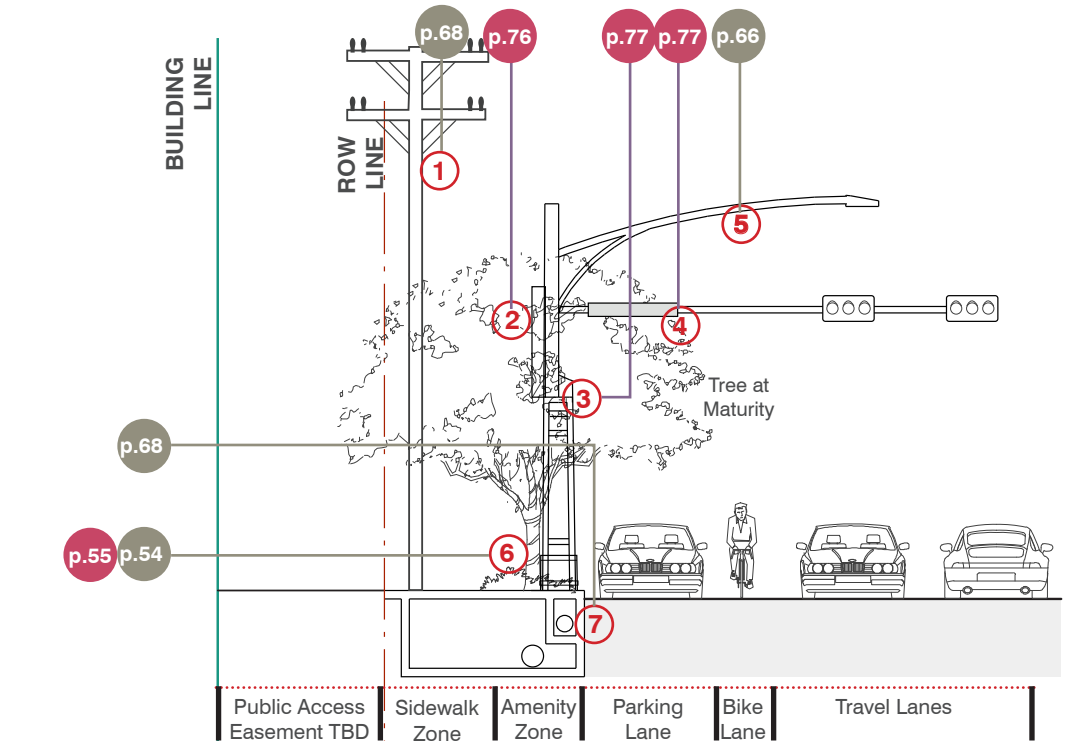
Information may be used to coordinate efforts between TIRZ and Management District.

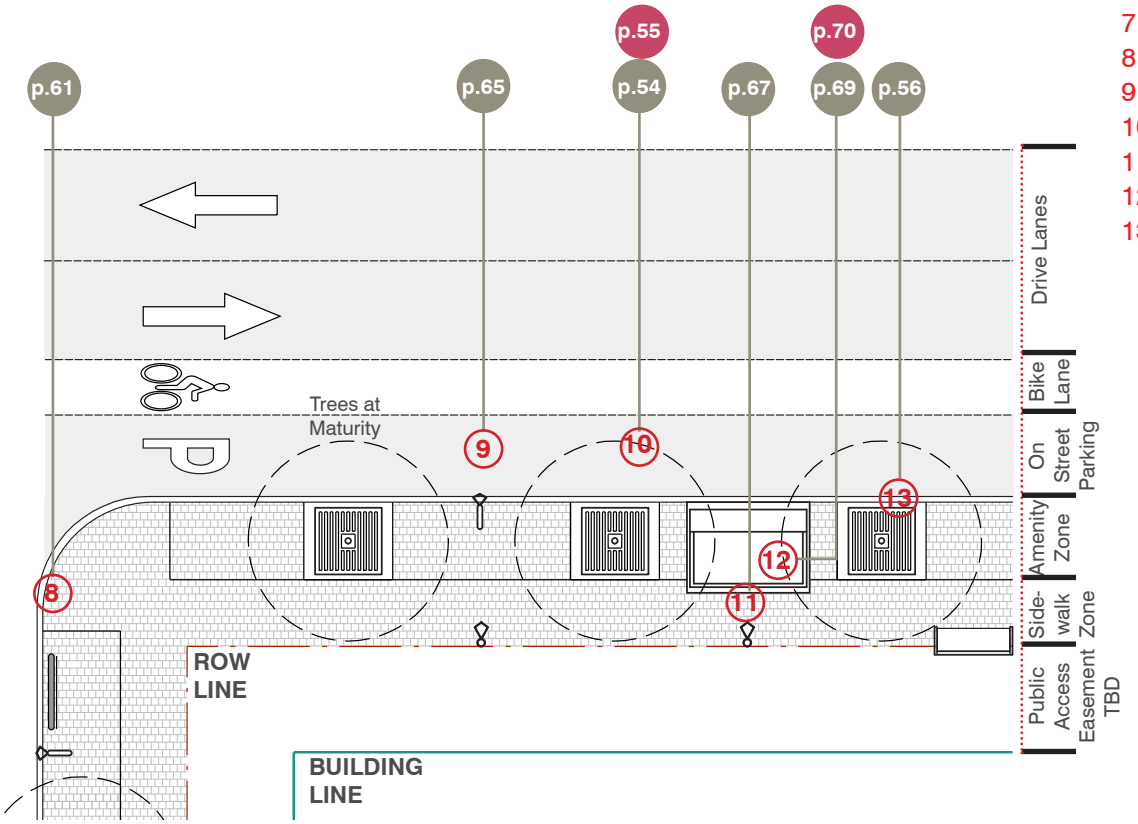
TYPE		SPEED	STREETS	STREET FURNITURE CONT...			SIGNAGE											
				p.25	p.26	p.26-30	p.47	p.45		p.57		p.58	p.52		p.56		p.51	
									p.76		p.73	p.72		p.76		p.77		p.77
										p.73		p.72						
							MMD	MMD	SBMD	MMD	SBMD		MMD	SBMD	MMD	SBMD	MMD	SBMD
				Bike Racks	Drinking Fountains	MISC.	Pylons	Banners		Regulatory Signs		Traffic Signal Shield	Pedestrian Directional Signage		Street Identification		Entry Monuments	
A	Boulevard	45 MPH	Gessner	O	O	O	O	O	O	✓	✓	O	O	O	✓	✓	O	O
		45 MPH	Memorial	O	O	O	O	O		✓	N/A[1]	O	O		✓		O	
B	Avenue	35-45 MPH	Westview Bunkerhill	O	O	O	O	O	O	✓	✓	O	O	O	✓	✓	O	O
C	Street	35-40 MPH	Conrad Sauer Witte Queensbury Town+Country Kimberley Kingsride Gaylord Forestwood Long Point Wisterwood Memorial City Way Lumpkin Shadowdale Georgibelle Pine Lake Vindon Perthshire W. Bough Attingham Benignus Mathewson	O	O	O	O	O	O	✓	✓	O	O	O	✓	✓	O	O
D	Street next to Ditch	35 MPH	Shadowdale	O	O	O	O	O	O	✓	✓	O	O	O	✓	✓	O	O

** Shadowdale St. has an atypical roadway and pedestrian lighting structure due to a parallel drainage ditch

✓ Required Amenities
O Optional Amenities
N/A[1] Streets are not located in the Spring Branch District

SWA SPECIFICATIONS DIAGRAM





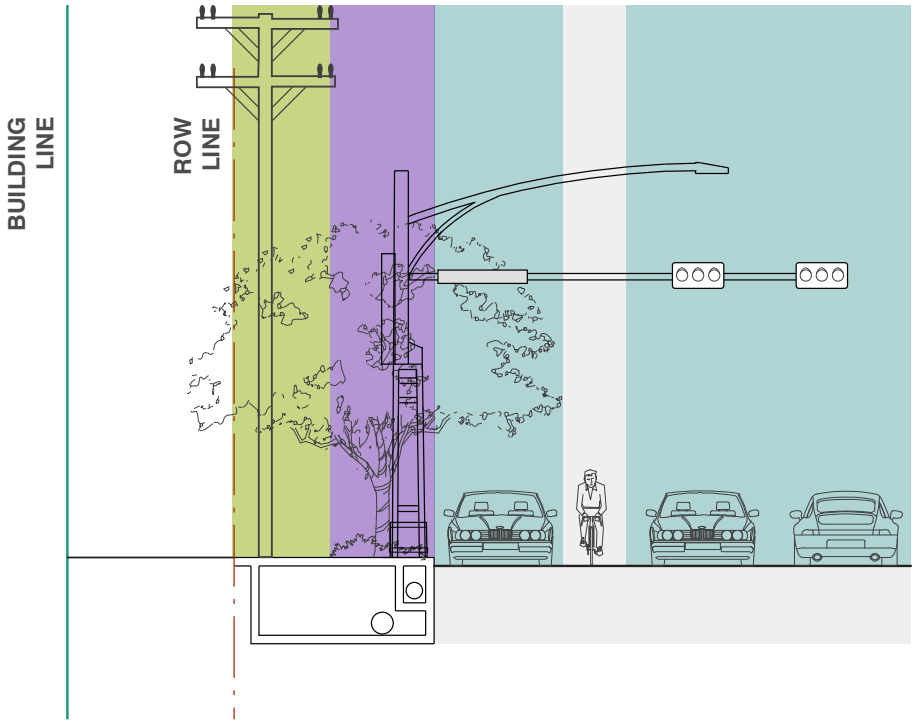
LEGEND

p.# Reference 'Streetscape Design Guidelines' (Supplement to 'MC Area Guidelines')

p.# Reference 'Streetscape Design Guidelines' Supplement for Spring Branch Management District Standards (Note: Spring Branch standards existing at the time of this document's preparation are illustrated in this supplement).

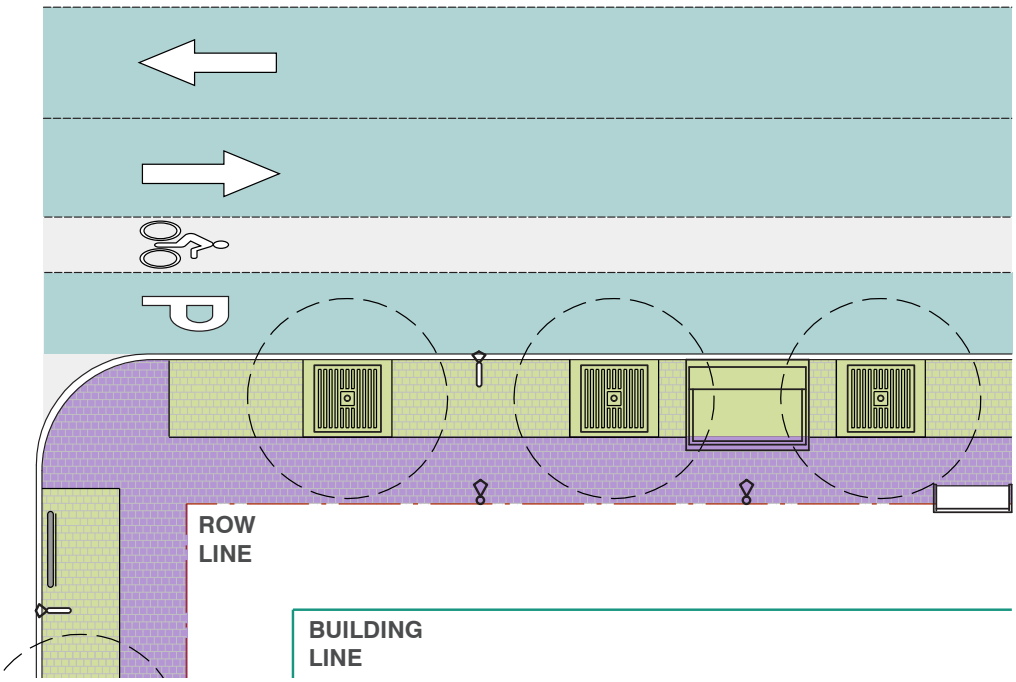
1. Electric Poles/ Power Lines
2. Banners
3. Entry Monuments/ Pylons
4. Street Identification
5. Roadway Lighting
6. Shrub/Groundcover
7. Buried Powerlines
8. Sidewalk Paving
9. On-Street Parking Lane
10. Street/ Median Trees
11. Pedestrian Lighting
12. Bus Shelter/ Bus Stop
13. Tree Grate/ Tree Well

SWA SPECIFICATIONS DIAGRAM - ZONES



LEGEND

- Vehicular Zone (Drive Lanes + On-Street Parking)
- Bike Lane
- Amenity Zone
- Sidewalk Zone



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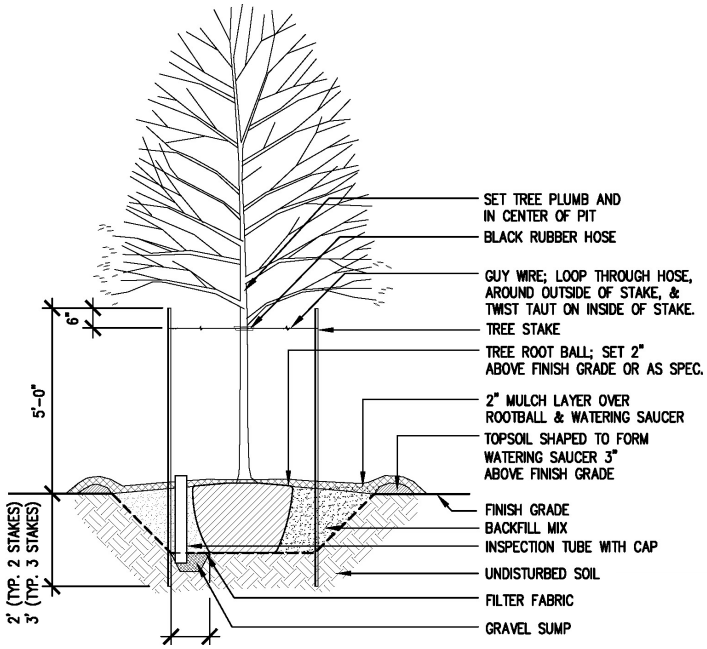
4a Streetscape Specifications

Standard

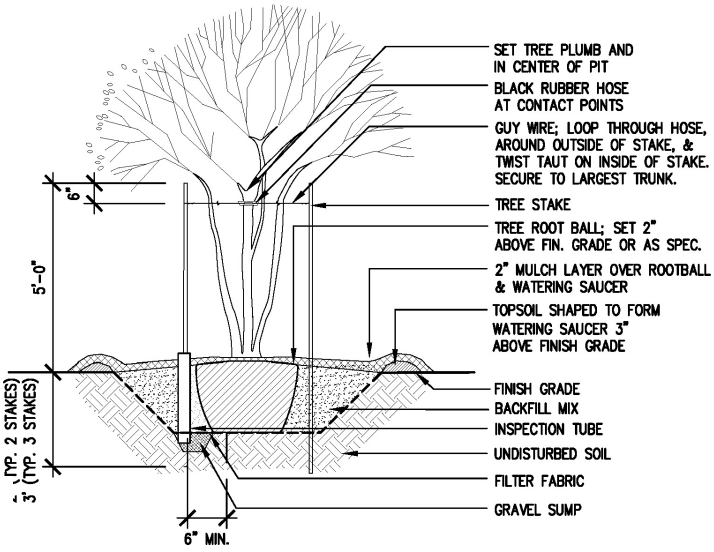
MEMORIAL TREE + PLANT LIST

	Tree	Shrubs/ Plants	Groundcover/ Grass
	Magnolia - *Magnolia grandiflora*	Mexican Feather Grass - *Nassella tenuissima*	Asian Jasmine - *Trachelospermum asiaticum*
	Crepe Myrtle - *Lagerstroemia*	Nearly Wild Rose - *Nassella tenuissima*	Dwarf Mondo - *Ophiopogon japonicus*
	Red Oak - *Quercus rubra*	Society Garlic - *Tulbaghia violacea*	Star Jasmine - *Trachelospermum jasminoides*
	Wax Myrtle - *Morella cerifera*	Giant Liriope - *Liriope muscari*	Fox Tail Fern - *Asparagus aethiopicus*
	Live Oak - *Quercus virginiana*	Lantana	Tangerine Bulbine - *Bulbine frutescens*
	Medjool Palm - *Phoenix dactylifera*		
	Bald Cypress - *Taxodium distichum*	Society Garlic - *Tulbaghia violacea*	Bermuda Grass
	Japanese Blueberry - *Elaeocarpus decipiens*	Gold Lantana - *Lantana Camara*	
	Live Oak - *Quercus virginiana*	African Iris - *Dietes vegeta*	
	Red Oak - *Quercus rubra*	Yaupon Holly - *Ilex Vomitoria*	
	Cedar Oak - *Cedrus*	Stiff Bottlebrush - *Callistemon Rigidus*	
	Red Bud - *Cercis canadensis*	Giant Liriope - *Liriope muscari*	
	Water Oak - *Quercus nigra*		
	Hackberry - *Celtis occidentalis*		
	Ash - *Fraxinus*		
	Sycamore - *Platanus occidentalis*		
	Drake Elm - *Ulmus parvifolia*		
	Holly - *Ilex*		
	Chinese Pistache - *Pistacia chinensis*		
	Pine - Pinus		
	Pecan - *Carya illinoinensis*		

*Note: Refer to the 'Memorial Management District Area Guidelines' (2003) for extended list and imagery of tree and plants. New tree plantings shall be 65 GAL unless planting area is restricted, in which case instance it shall be 45 GAL. Refer below for standard planting tree installation and page 55 for the placement of tree in the ROW. In instances where overhead power lines exist, refer to page 68.



STANDARD PLANTING TREE - SINGLE TRUNK



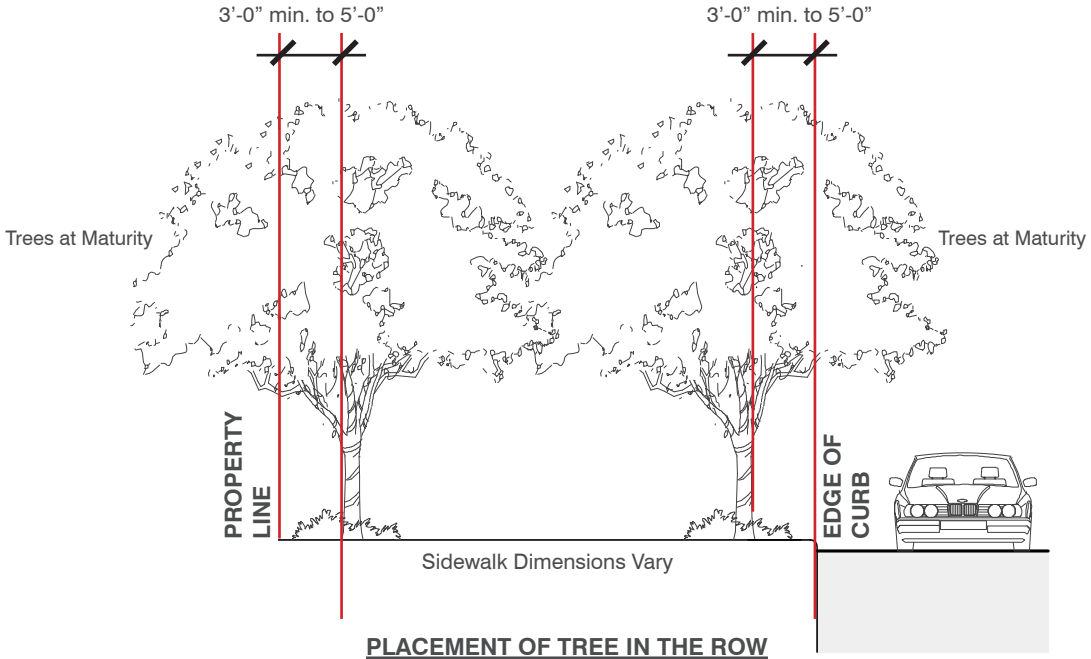
STANDARD PLANTING TREE - MULTI TRUNK

SPRING BRANCH TREE + PLANT LIST

	Tree	Shrubs/ Plants	Groundcover
MEDIANS / ESPLANADES	Live Oak - *Quercus virginiana*	Cassian Grass	Bermuda Grass - *Cynodon dactylon*
	Crepe Myrtle - *Lagerstroemia*	Nearly Wild Rose - *Nassella tenuissima*	
		Daylily - *Hemerocallis*	
		Giant Liriope - *Liriope muscari*	
		New Gold Lantana	
STREET VEGETATION	Live Oak - *Quercus virginiana*	Hameln Grass - *Pennisetum alopecuroides*	Bermuda Grass - *Cynodon dactylon*
	Crepe Myrtle - *Lagerstroemia*	Nearly Wild Rose - *Nassella tenuissima*	
	Wax Myrtle - *Morella cerifera*	Daylily - *Hemerocallis*	
	Bald Cypress - *Taxodium distichum*	Giant Liriope - *Liriope muscari*	
	Nuttall Oak - *Quercus nuttallii*	Society Garlic - *Tulbaghia violacea*	
		New Gold Lantana	

*Note: New tree plantings shall be no smaller than 65 GAL. Refer to page 54 for standard planting tree installation.

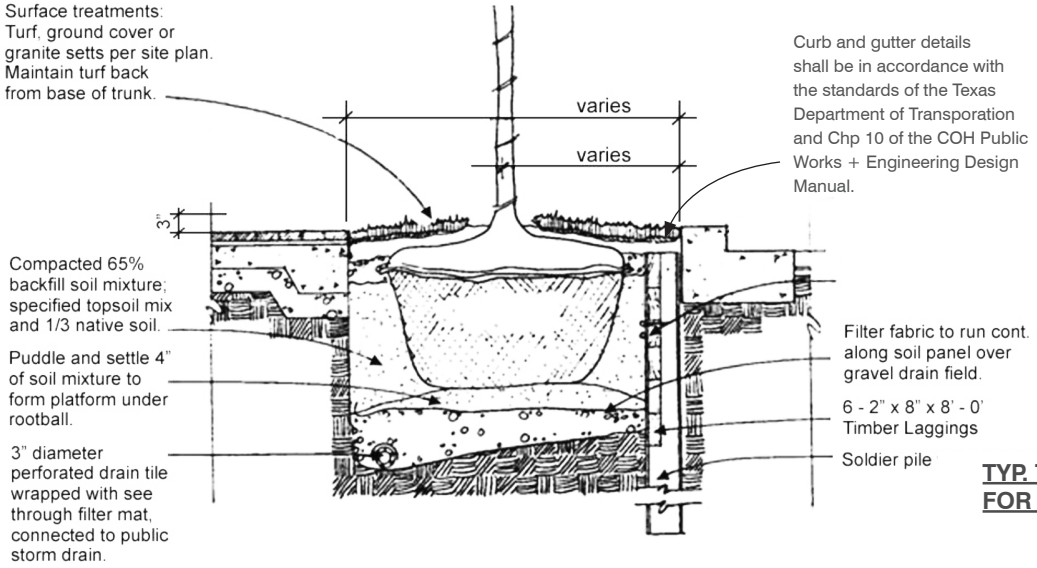
Image Source: Spring Branch Management District



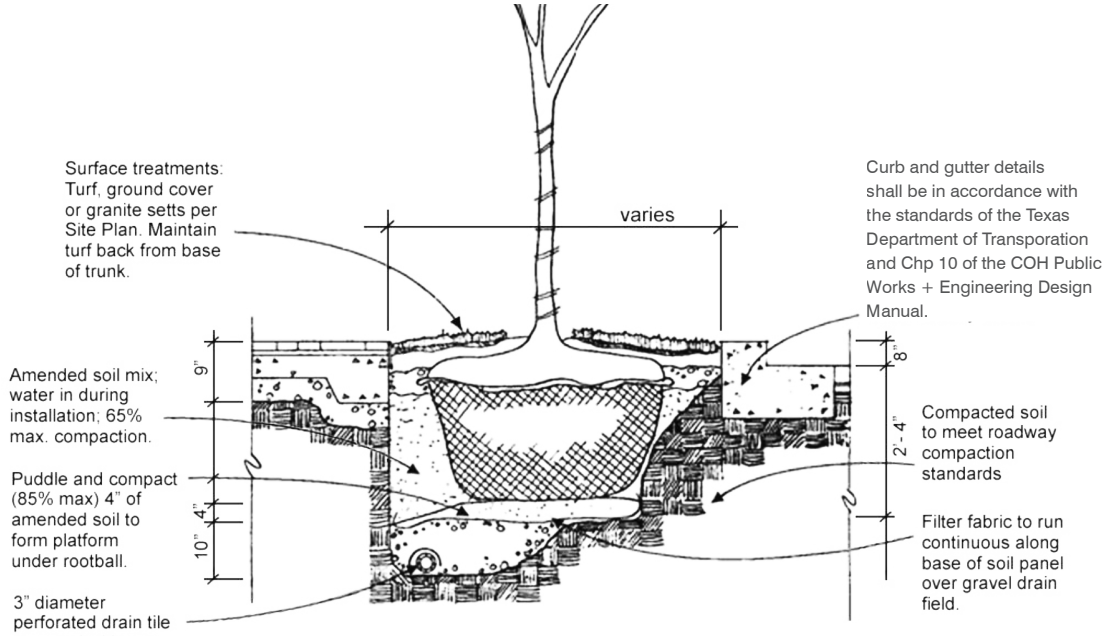
PLACEMENT OF TREE IN THE ROW

TREE WELL

Tree wells may be planted with turf, groundcover or local shrubs. Tree types and shrubs shall be in accordance to the standard Memorial MD or Spring Branch MD tree/ plant list (pgs. 54-55). In general, turf does not perform well under trees with dense canopy or in high foot traffic areas. In the event that a grate is used in covering the surface of the tree pit, the minimum size of the tree well may be as large as the grate itself.



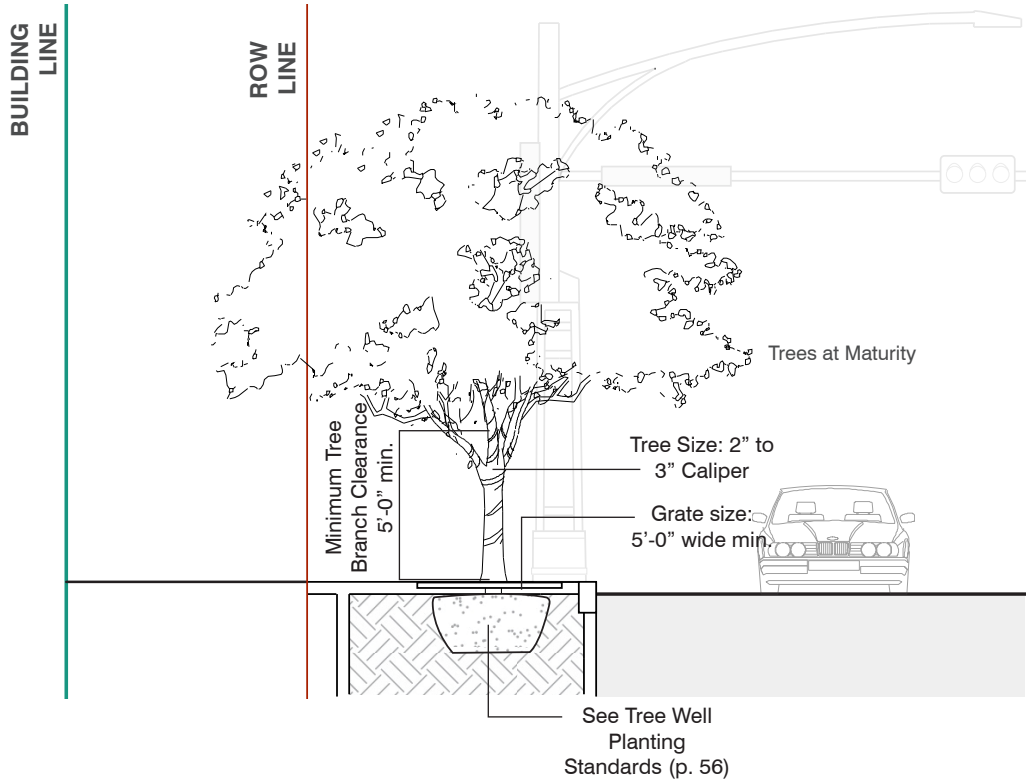
TYP. TREE WELL PLANTING DETAILS FOR TREES IN PAVEMENT CUT-OUTS



TYP. TREE WELL PLANTING DETAILS FOR TREES IN LAWN PANELS

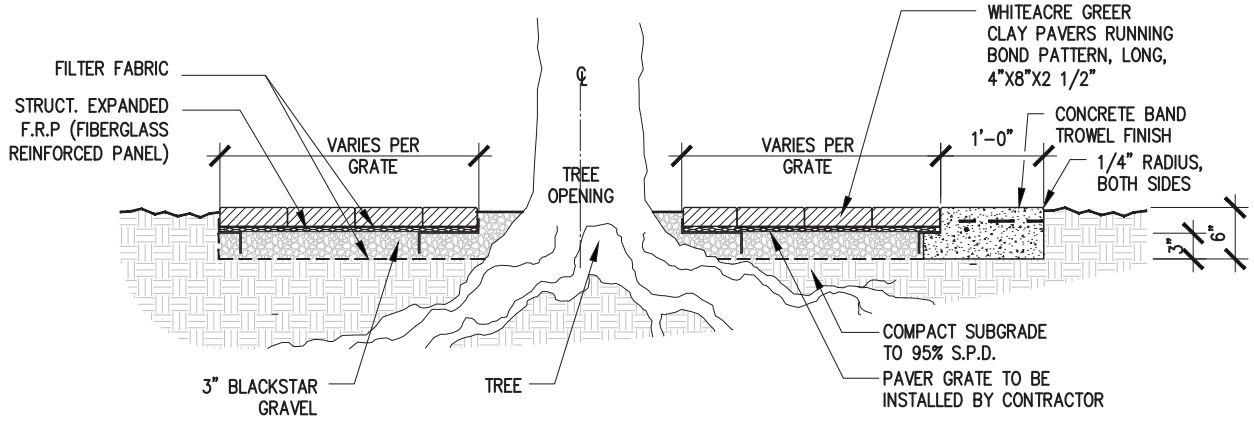
TREE GRATE

Tree grates may be utilized in urban conditions particularly where sidewalks are narrow particularly where an accessible route cannot be otherwise obtained. Tree grates generally offer a larger spread for pedestrian walkability. Grates shall comply with ADA standards (1/2" max. openings) and may be heel-proof (1/4" to 5/8" opening max.) if necessary. Standard frames (or equivalent) shall be used. Consult contractor for product specificification.



PLANTING GRATE

Planting grates are an alternative to a tree grate. They greatly reduce weeds, open up tight pedestrian walk areas, and minimize root up-lifting of pavers. See Tree Well Planting Standards (p. 56)



BIO-SWALES/ STORM WATER DRAINAGE RAIN GARDENS

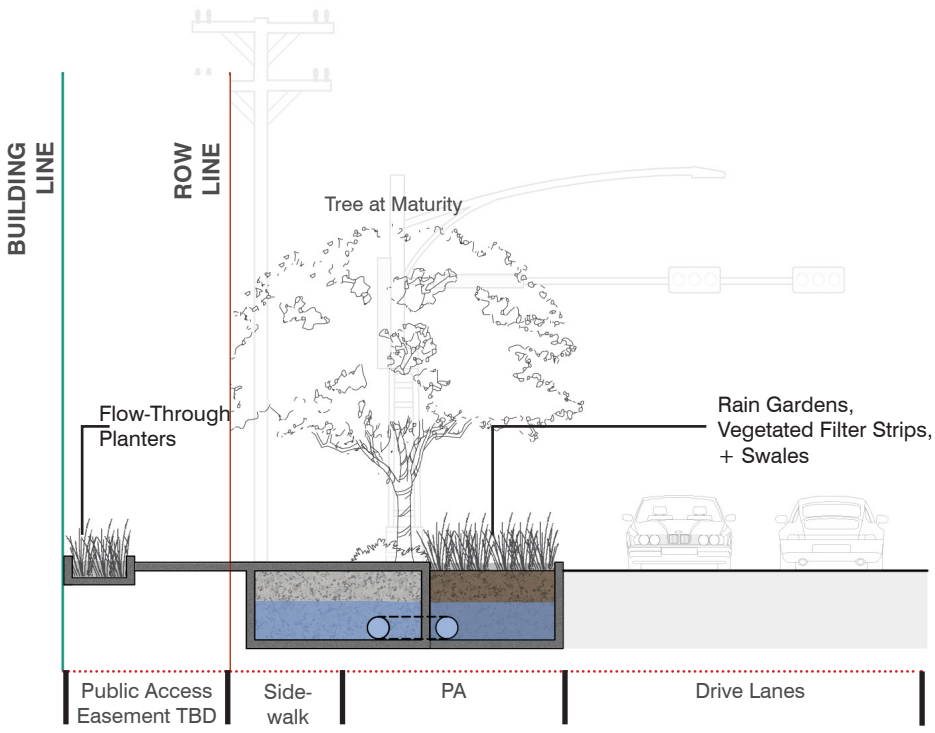
Low impact development approaches may be implemented in the public ROW particularly to reduce storm water run-off, reduce piping and excavation needed to manage storm water, hence cutting project costs, preserving trees and vegetation and providing aesthetic appeal to the District. According to the Clean Water Services, flow-through planters, rain gardens, vegetated filter strip and swales are appropriate for the public ROW. Refer to Appendix 'C' for Clean Water Services 'Low Impact Development Approaches' Handbook for detailed drawings and extended definitions fo each type of LIDA system.

Rain Garden: landscaped reservoirs that collect and filter storm water run-off; they typically require less piping and are smaller than swales that are shallow in nature and may be constructed with or without a wall.

Flow Through Planter: structural landscaped reservoirs that collect storm water and filter out pollutants. These are appropriate where soils do not drain well. They typically line edges of building facades or where there are unstable slope.

Swale: narrow, gently sloped landcaped depression that collects storm water run-off. Densely planted swales filter storm water as it flows the length of the swale discharges to a sewer or discharge point.

Vegetated Filter Strip: gently sloped areas designed to receive sheet flows from adjacent impervious surfaces; typically are vegetated with groundcover and grass.

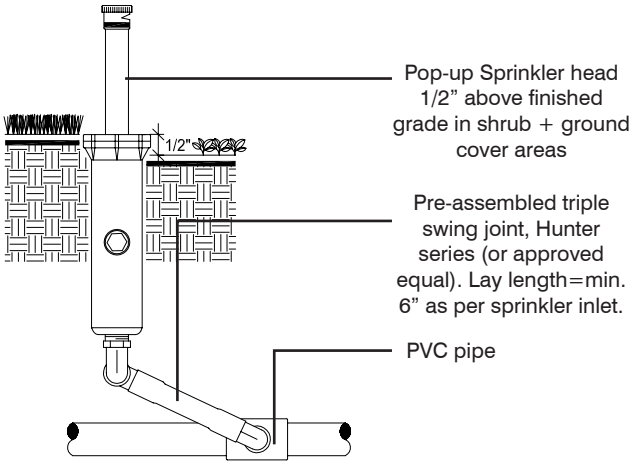


Reference Appendix 'C' for Clean Water Services 'Low Impact Development Approaches' Handbook.

POP UP SYSTEM

MANUFACTURER: Hunter Industries

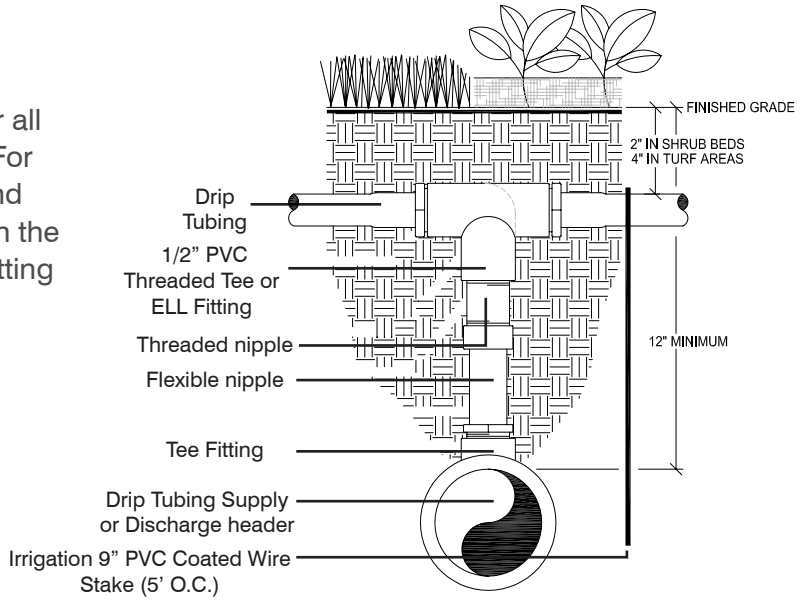
NOTES: Sprinkler heads shall be 6” from paving edge in ground cover areas. Sprinkler heads shall be 12” from the face of building walls or windows. Sprinkler heads shall be 4” from paving edge in turf areas.



DRIPLINE CONNECTION

MANUFACTURER: Hunter Industries

NOTES: Drip tubing connection required for all connections between drip tubing + PVC headers. For connections at end runs of tubing, 90’ ELL fitting and one adapter fitting shall be used. For connections in the middle of runs of tubing, tee fitting + two adapter fitting shall be used.

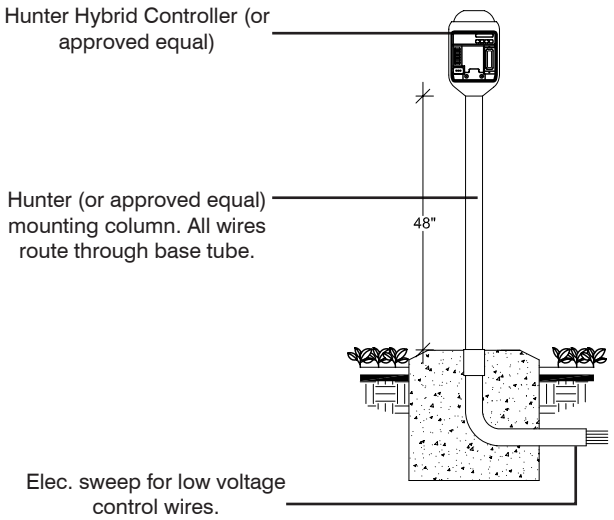


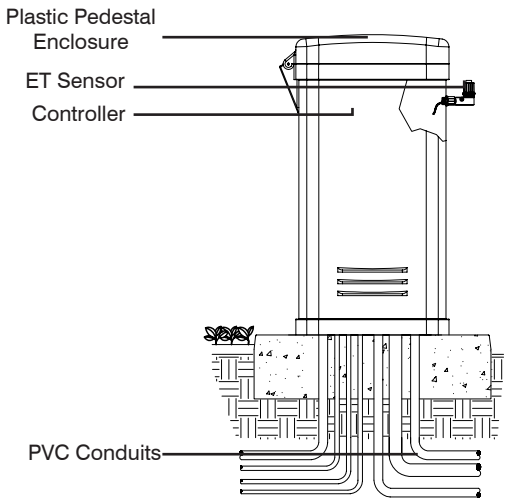
Reference Appendix ‘C’ for construction details + Irrigation product specifications (size, brand, etc).

CONTROLLERS

TYPES: **1.** Controller with Enclosure; **2.** Solar Powered Controller

NOTES: **1.** Rectangular pull box for low voltage control wire splices shall be provided at the base of the controller. **2.** All remote control valves used with solar-powered controller shall have the solenoids replaced with appropriate DC latching solenoids; Verify final location of controller with the District or County prior to installation.





Reference Appendix 'C' for construction details + Irrigation product specifications (size, brand, etc).

SIDEWALK PAVING

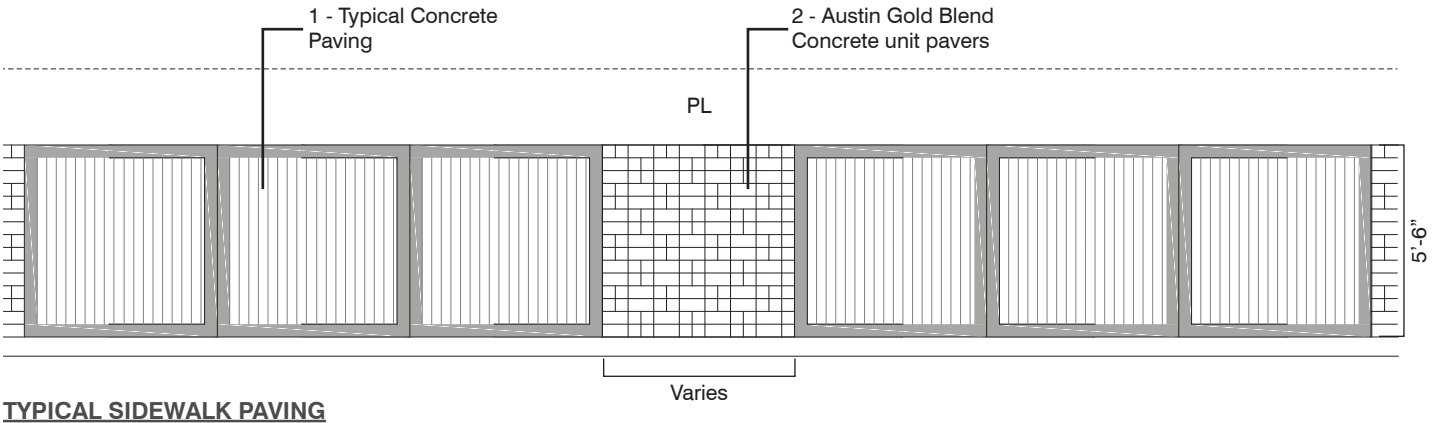
Standard sidewalk paving considers three modules of typical concrete paving and one module of “Austin Gold Blend” concrete unit pavers. Dimensions of each segment may vary.

Austin Gold Blend
Concrete unit pavers

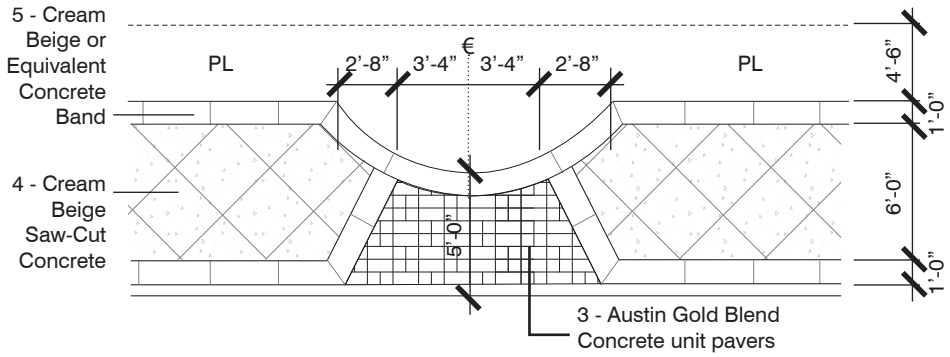
MATERIALS: 1. Typical Concrete Paving; 2. Austin Gold Blend by PAVESTONE or approved equal broom finish.
SIZE: 1. Varies; **2.** 4X4 & 4X8

LIDA OPTION: Low impact development approaches shall be considered in addressing storm water mitigation. Refer to Appendix ‘C’ for Clean Water Services ‘Low Impact Development Approaches’ Handbook for detailed drawings and extended definitions for permeable pavement.

Porous pavement: water permeable structural hardscape that infiltrates rain water, slows down storm water run-off flows and reduces temperature. The two types of porous pavement include pervious concrete/asphalt, and permeable pavers. Pervious concrete/asphalt are poured in while permeable pavers typically are solid pre-cast conrete, cobbles, brick or stone, set to allow water to seep in between.



TYPICAL SIDEWALK PAVING




Typical Sidewalk Paving

SPECIAL PAVING CONDITION ON GESSNER

Reference Appendix ‘C’: Typical sidewalk construction details and Clean Water Services’ ‘Low Impact Development Approaches’ Handbook for permeable paver methodology + components.

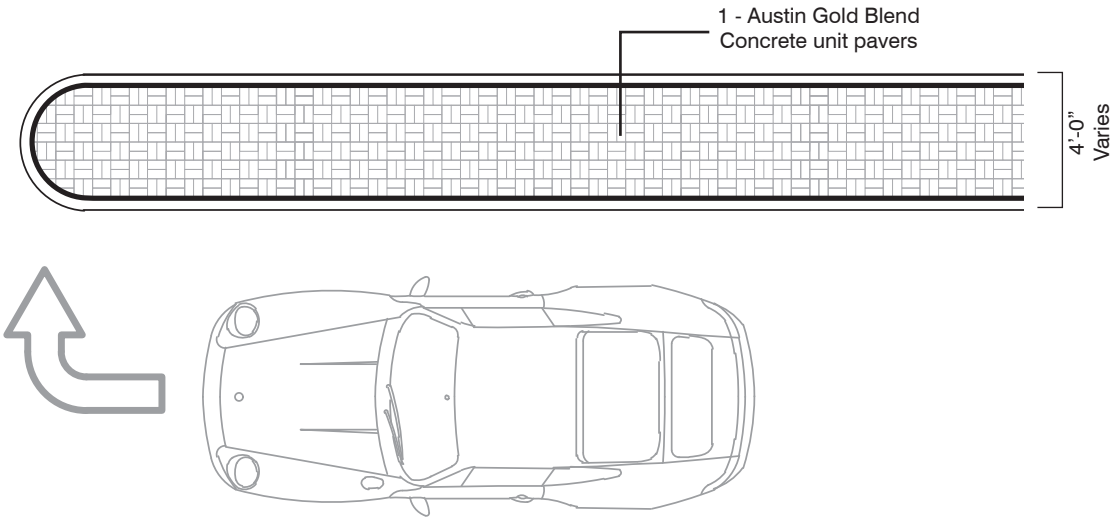
MEDIAN PAVING

Paving in Memorial MD usually run along the length of the median, except where there may be planted esplanades. Dimensions of medians vary.

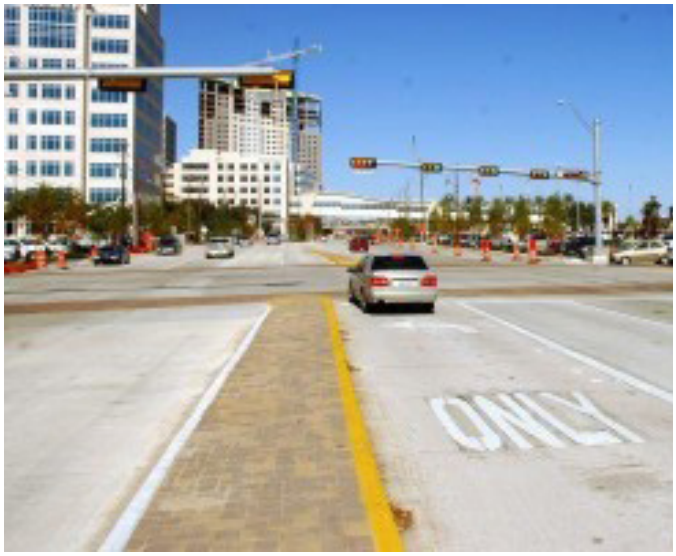
MATERIALS: 1. Landscape pavers- Concrete unit pavers by PAVESTONE; Plaza pavers- Austin Gold Blend or approved equal broom finish.

SIZE: 1. 4X4 & 4X8

Austin Gold Blend
Concrete unit pavers



MEDIAN TURN LANE



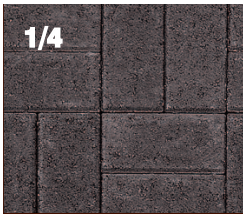
Reference Appendix 'C' for construction details.

MEDIAN PAVING

Median paving in Spring Branch MD are usually capped at the ends of each segments. Dimensions of medians vary.

MATERIALS: 1. Charcoal 'Holland Stone' concrete unit paver on concrete subslab by PAVESTONE; **2.** Buff 'Holland Stone' concrete unit paver on concrete subslab by PAVESTONE; **3.** Tan 'Holland Stone' concrete unit paver on concrete subslab by PAVESTONE; **4.** Charcoal 'City Stone V' concrete unit paver on concrete subslab by PAVESTONE.

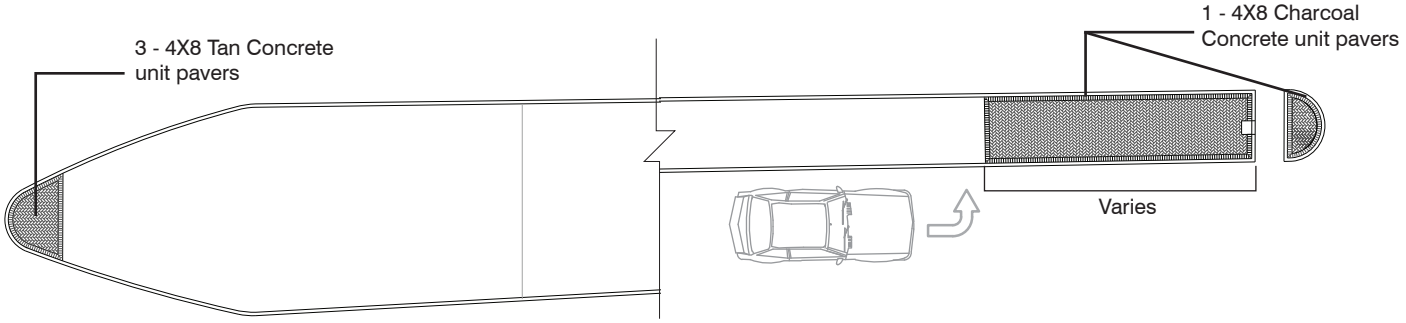
SIZE: **1.** 4X8 Solider Course
2. 4X8 Herringbone Pattern
3. 4X8 Herringbone Pattern
4. 8X8 Stacked Solider Course



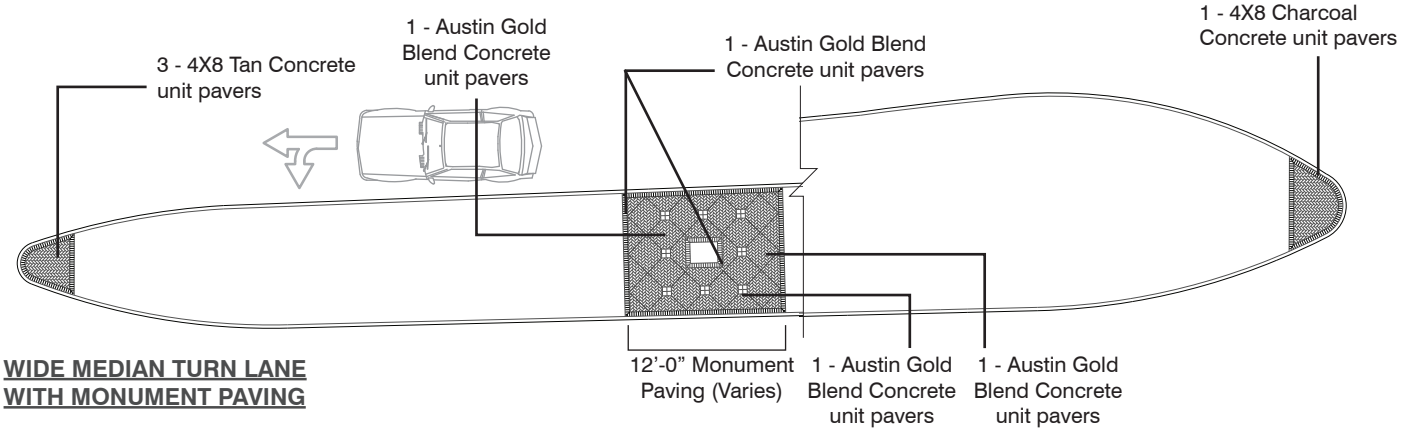
Charcoal Concrete unit paver

Buff Concrete unit paver

Tan Concrete unit paver



NARROW MEDIAN TURN LANE



WIDE MEDIAN TURN LANE WITH MONUMENT PAVING

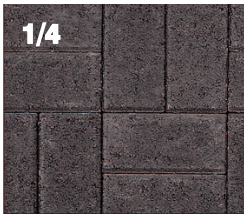
Reference Appendix 'C' for detailed construction of Tanner median improvements.

PAVING AT INTERSECTIONS

Intersections shall be designed in a safe and functional manner and reflect the identity of their respective District. The following is a typical site application at the intersection of Long Point and Wirt.

MATERIALS: 1. Charcoal (by PAVESTONE) Concrete Unit paver on concrete subslab; **2.** Buff (by PAVESTONE) Concrete Unit paver on concrete subslab; **3.** Tan (by PAVESTONE) Concrete Unit paver on concrete subslab; **4.** Charcoal (by PAVESTONE) Concrete Unit paver on concrete subslab; **5.** Grey Concrete

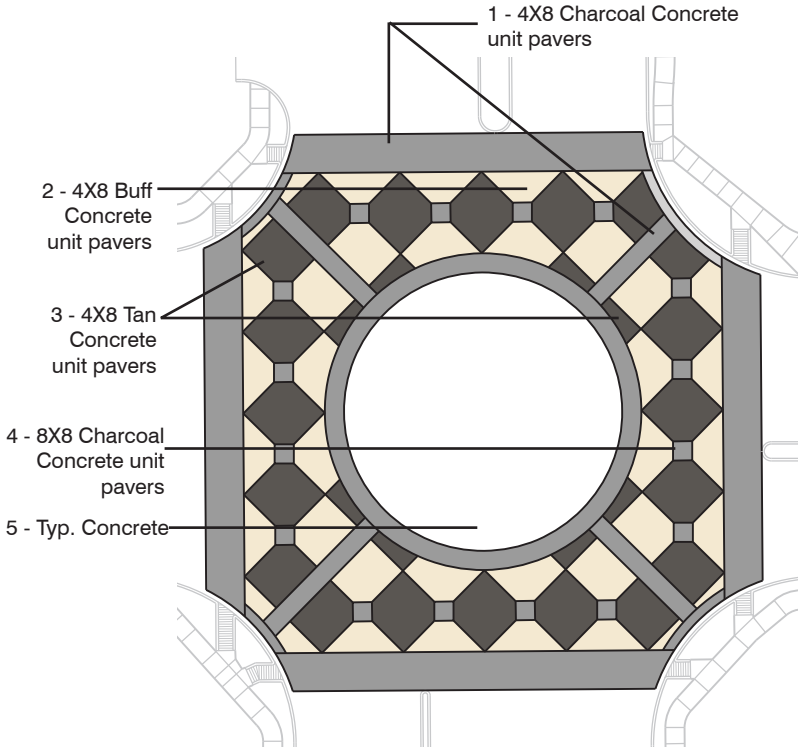
SIZE: 1. 4X8 Herringbone Pattern; **2.** 4X8 Herringbone Pattern; **3.** 4X8 Solider Course; **4.** 8X8 Stacked Solider Course; **5.** RE: CIVIL



Charcoal Concrete unit paver

Buff Concrete unit paver

Tan Concrete unit paver



PAVING COLOR PATTERNS

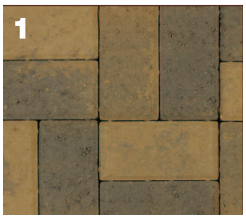
- Tan
- Buff
- Charcoal

Reference Appendix 'C' for detailed construction of Long Point + Wirt Intersections as well as detailed drawings of Tanner median improvements.
Render Source: Kudella + Weinheimer.

ON-STREET PARKING PAVING PATTERN

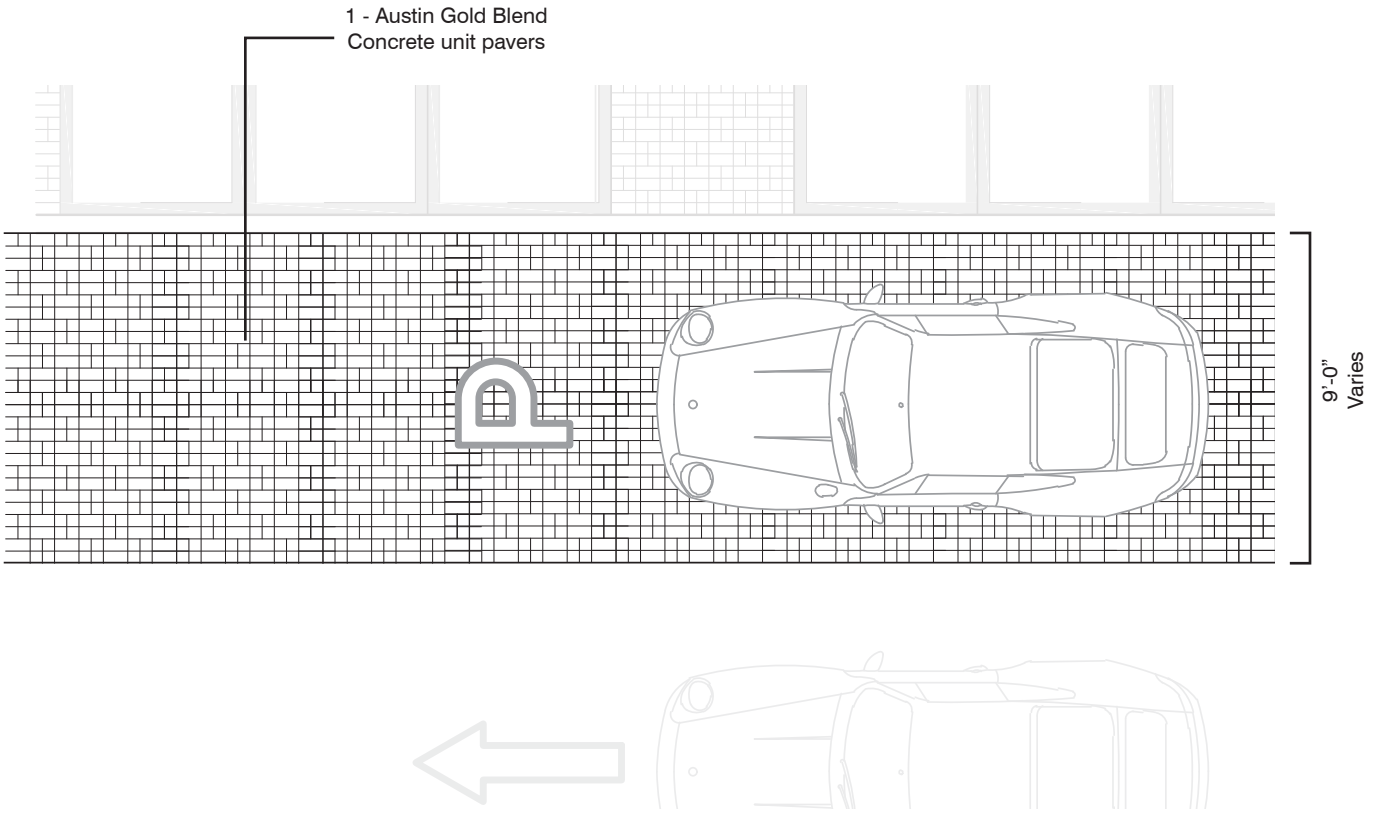
In special cases, such as areas of high pedestrian activity, on-street parking may be paved with special paving.

*** Otherwise, construction of new on-street parking pavement shall be in accordance with the standards of the Texas Department of Transporation and Chp 10 of the COH Public Works + Engineering Design Manual.



Austin Gold Blend
Concrete unit pavers

MATERIALS: 1. Austin Gold Blend by PAVESTONE or approved equal broom finish.
SIZE: 1. 4X4 & 4X8



***Reference Texas Department of Transporation and Chp 10 of the COH Public Works + Engineering Design Manual for standard concrete paving stipulations. Image Source: PAVESTONE

ROADWAY LIGHTING

LED options that are approved by CenterPoint and the City of Houston may be available to be utilized in the street right- of-way in the future.

MATERIALS: Shall be determined when a city standard is developed.
MODEL: Current pilot projects consider **CREE** XSP LED Series. Options are shown below.
SIZE: Shall be determined when a city standard is developed or refer below.

XSP SERIES
LED STREET LIGHT

XSP1™ LED STREET LIGHT
Standard Module:
3500 Lumens 53 Watts at 4000K
3850 Lumens 53 Watts at 5700K

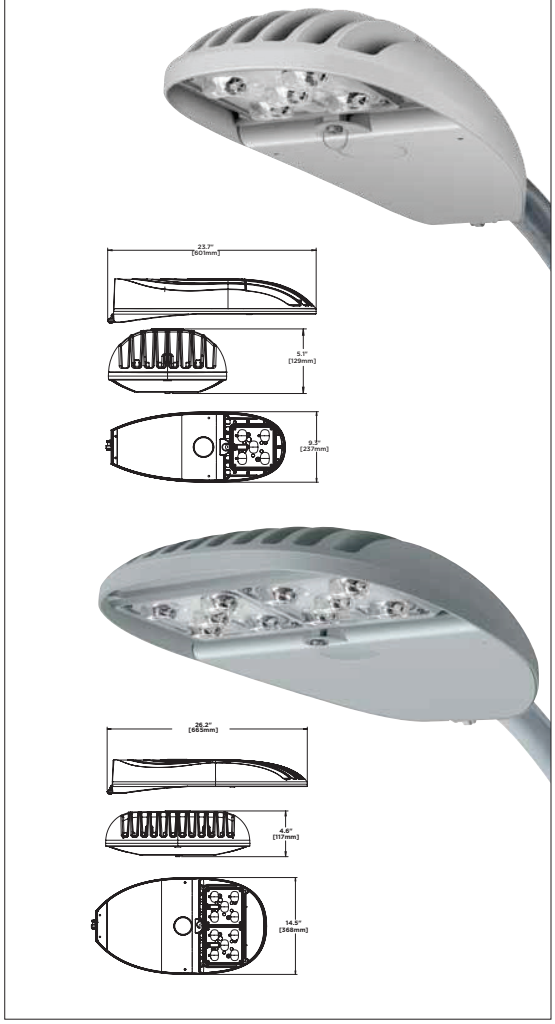
High Efficacy Module:
4806 Lumens 53 Watts at 4000K
5340 Lumens 53 Watts at 5700K

Dimensions: L 23.7" x W 9.3" x H 5.1"

XSP2™ LED STREET LIGHT
Standard Module:
7000 Lumens 101 Watts at 4000K
7700 Lumens 101 Watts at 5700K

High Efficacy Module:
9612 Lumens 101 Watts at 4000K
10680 Lumens 101 Watts at 5700K

Dimensions: L 26.2" x W 14.5" x H 4.6"



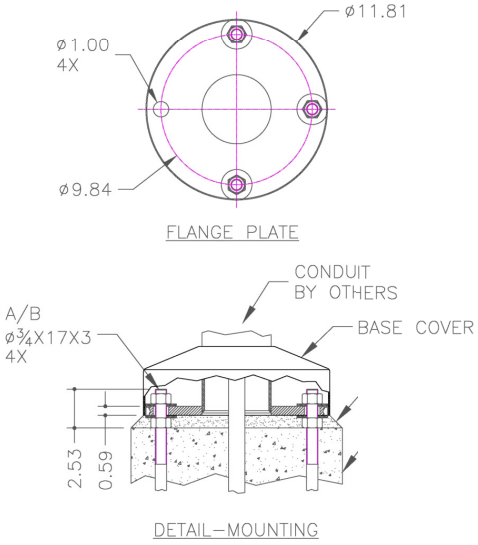
Reference Appendix 'C' for City of Houston Ordinance for LED lights.

PEDESTRIAN LIGHTING

LED options are available to be utilized in the street right- of-way.

MODEL: HESS LED Module 360L - Symmetric distribution; 270L - Asymmetric distribution
COLOR TEMPERATURE: WW - 3000K; NW - 4000K; CW - 5000K
VOLT: UNV; 120 - 277V
MOUNTING: A - Single Post Mount; **B** - Twin Para Bracket
POLE: 10S - 10' Stepped; 12S - 12' Stepped; X-Other (specify)
POLE MAT: A - Aluminum; **S** - Steel
FINISH: SG - Silver Grey; **BL -** Black; **CC -** Custom Color

Mounting Detail



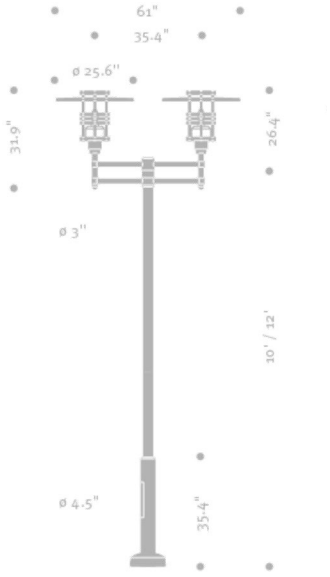
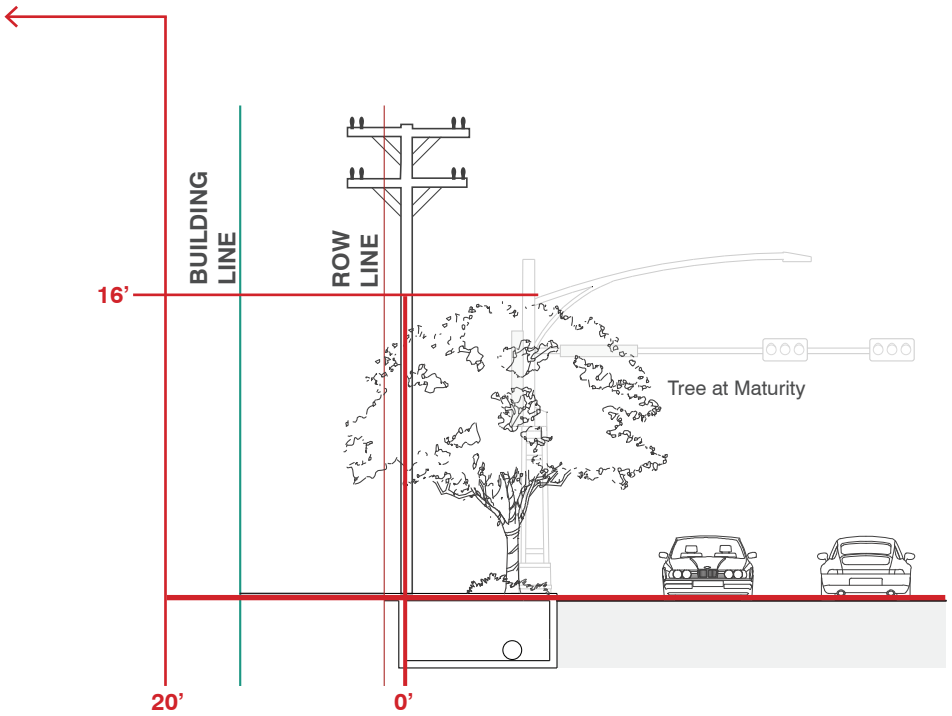


Image Source: HESS America
Reference Electrical drawings on specified projects.

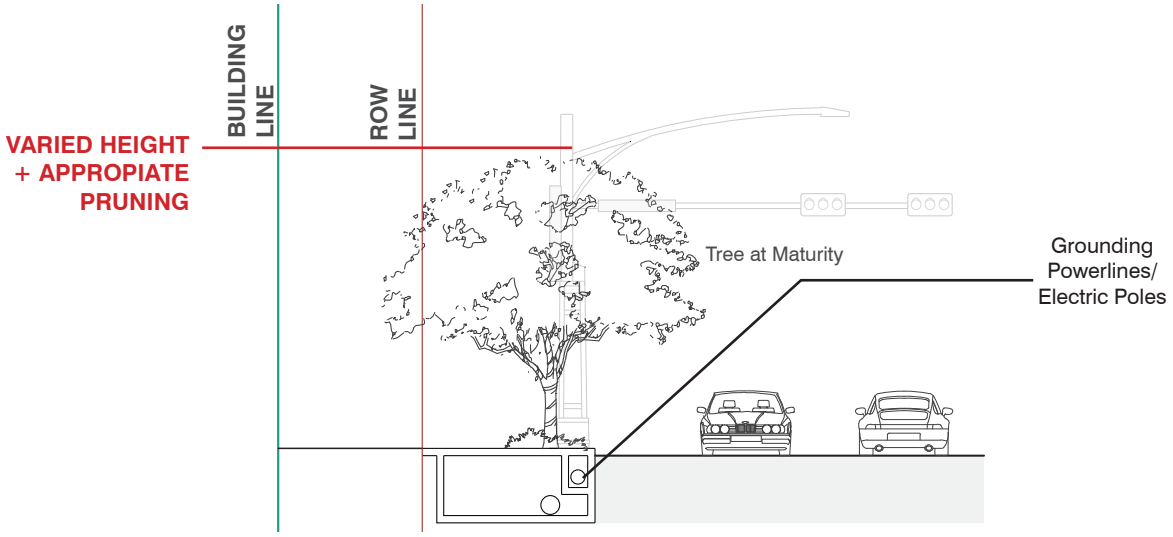
OVER HEAD ELECTRIC POLES/ POWER LINES

In the event of a powerline or an overhead electric pole, improvements shall consider the appropriate tree height and type. Trees in the street ROW shall not exceed the height of 16'-0." For criteria outside the ROW refer to CenterPoint's "Tree Trimming Practices." Tree type shall match the District's approved tree/plant palette.



RELOCATING POWER LINES

Appropriate trimming and pruning practices should be maintained in order to have visual clearance for pedestrians and traffic signals. Placing powerlines underground may be a safer alternative that should be considered as the preferred alternative whenever possible. Height of trees, in this case, may vary.

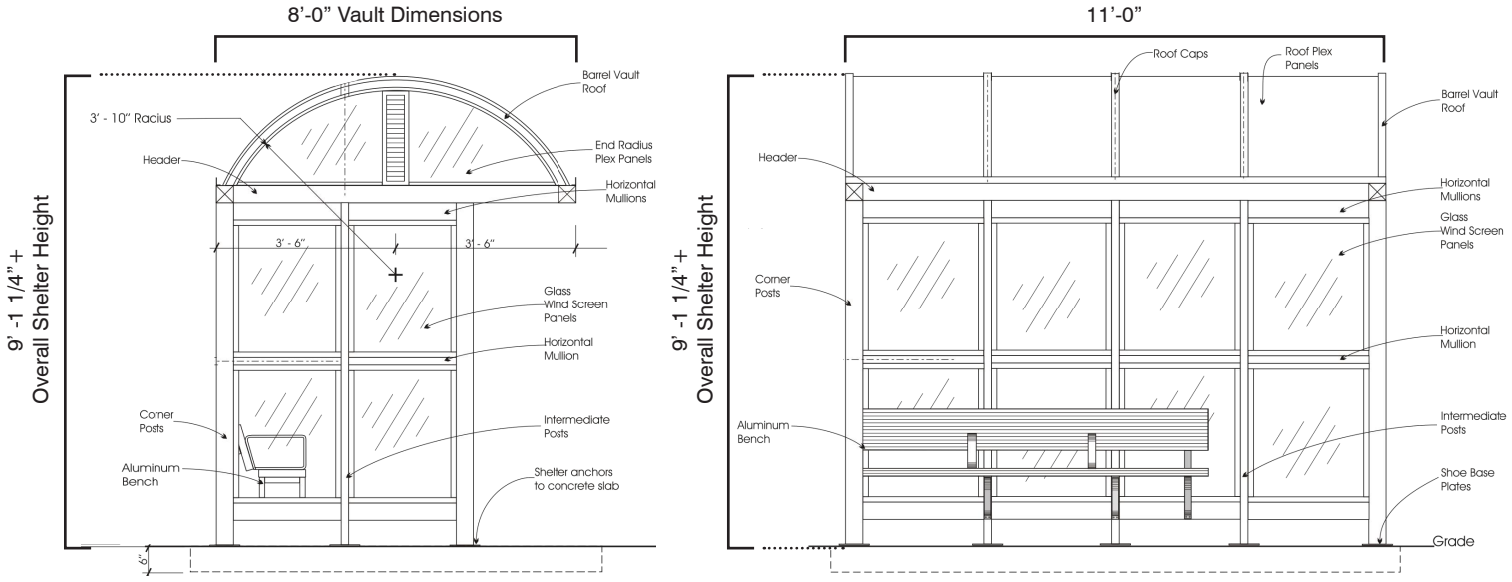


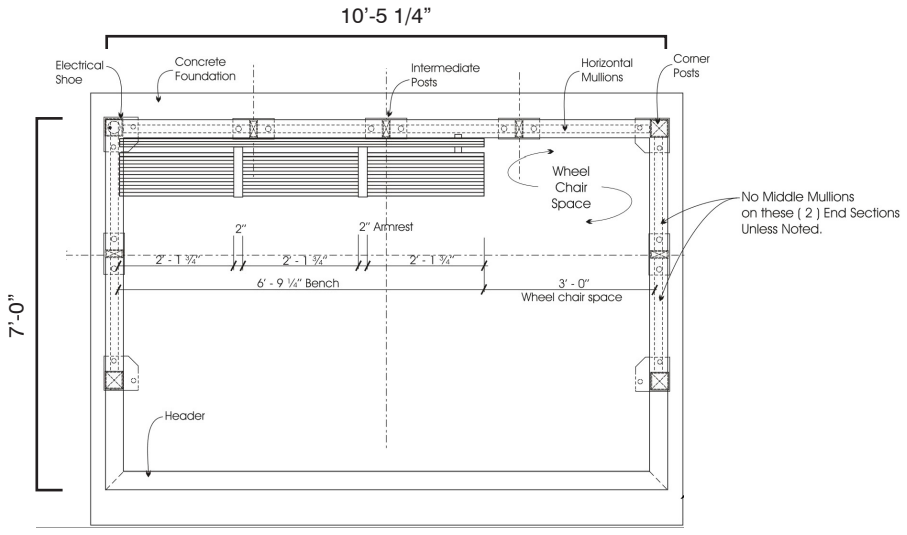
Reference Appendix 'C' for extensive CenterPoint guide to appropriate tree height and low-growing trees. Match tree types with standard Memorial or Spring Branch tree/ plant list (page 54-55).

BUS SHELTER

Bus shelters shall be constructed where possible. Refer to Chapter 3 of this document for street-appropriate right-of-way dimensions and whether streets are part of the mobility/ major thoroughfare plan.

MATERIALS: Refer to Appendix C for improvements. Match metallic matthews paint color: Champagne grey metallic, MP16771.
SIZE: Refer to Appendix C for detailed component size.



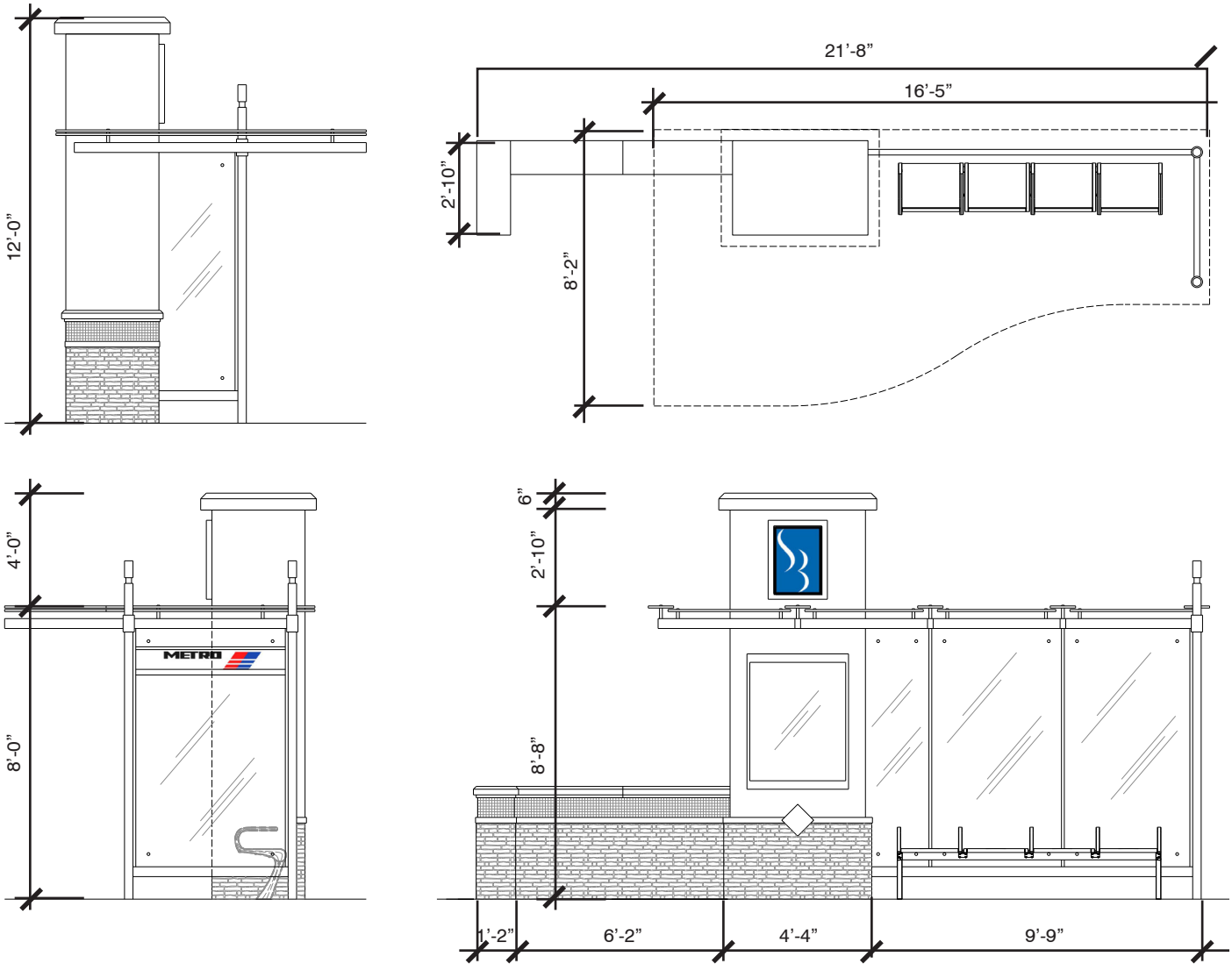


Reference Appendix 'C' for modified Midtown bus shelter details.

BUS SHELTER

Bus shelters shall be constructed where possible. Refer to Chapter 3 of this document for street-appropriate right-of-way dimensions and whether streets are part of the mobility/ major thoroughfare plan.

MATERIALS: Refer to Appendix C for Spring Branch materials.
SIZE: Refer below and Appendix C for detailed construction.



Reference Appendix 'C' for modified Spring Branch bus shelter details.

BUS SHELTER CONTINUED...

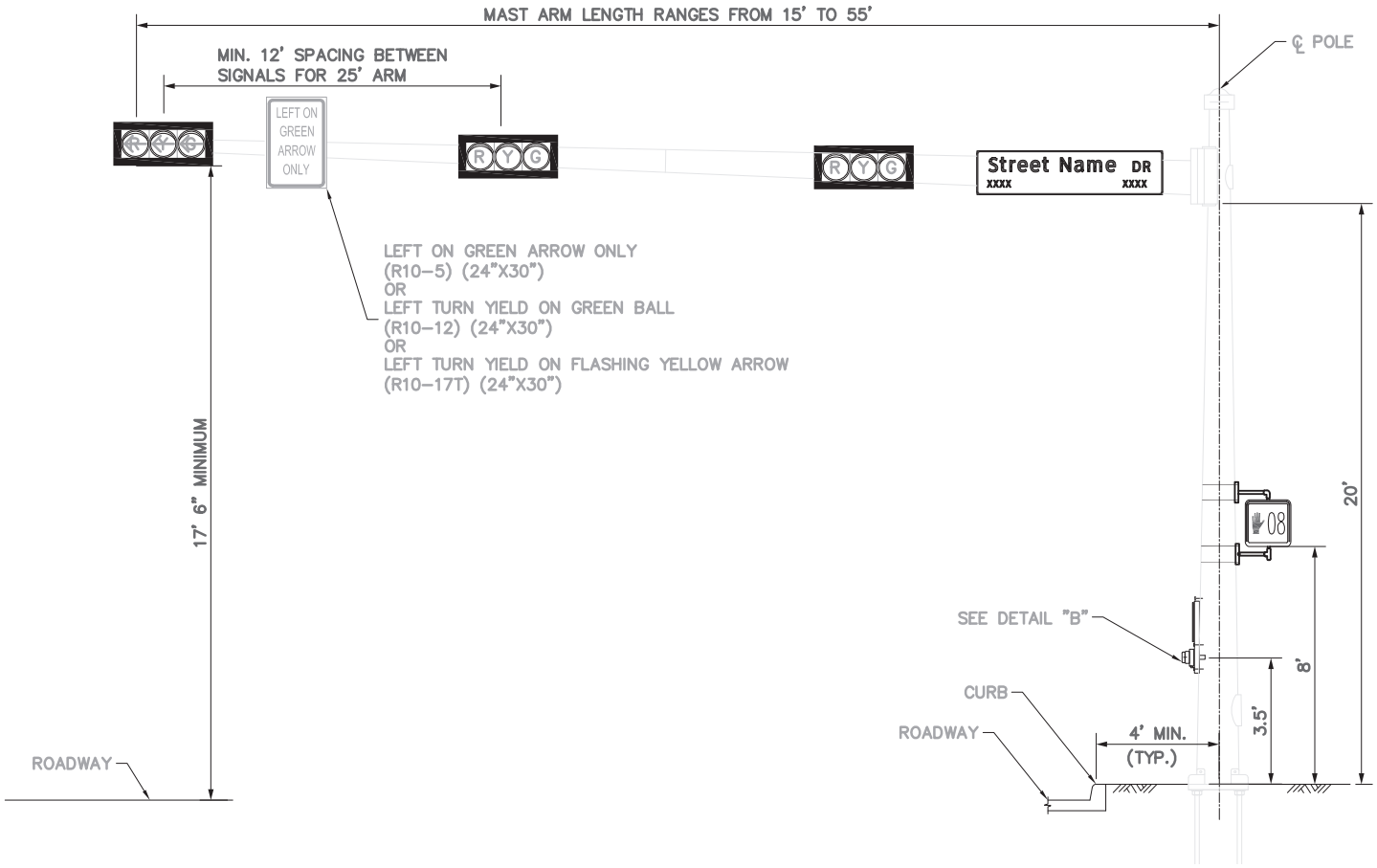
Render Source: Kudella + Weinheimer.

BUS STOP SIGNS

Where bus shelters are not indicated by passenger volume, bus signs will be provided in accordance with METRO and Texas Department of Transportation.

TRAFFIC LIGHT MAST

Typical traffic lights must be provided by the contractor that shall be in accordance with the COH Department of Public Works (Traffic and Transportation Division - Drawing illustrated below).



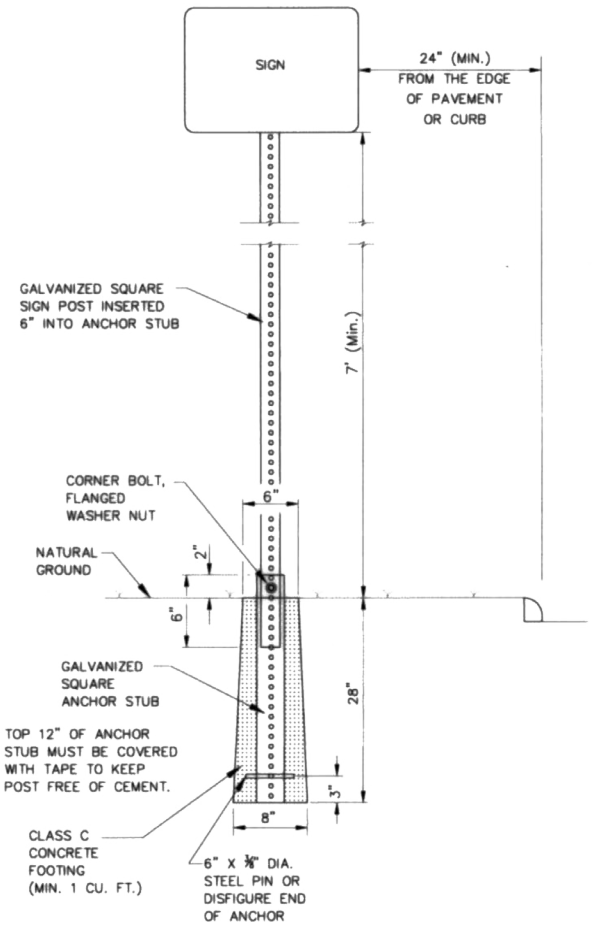
Reference Appendix 'C' for extensive traffic signal details.

REGULATORY SIGNS

Typical regulatory signage must be provided by the contractor that shall be in accordance with the COH Department of Public Works (Traffic and Transportation Division).

MATERIALS: All regulatory signs including stop signs, yield signs, etc shall be fabricated from 0.125 aluminum with diamond grade reflective vinyl text in colors mandated by the Texas Manual of Uniform Traffic Control Devices. Poles for signs shall be 2- 1/2" diameter steel painted to match Pantone 4484. Rear face of sign panels and all mounting hardware to poles shall be painted to match Pantone 4485.

NOTES: Street signage/ fixtures in general ought to be aligned along the back of curb in an organized manner with trees and utility poles. It is encouraged to allocate multiple signs per pole as to reduce clutter in the ROW. In addition, although minimum dimensions are provided below (City of Houston- Department of Public Works- Drawing illustrated below) for location of regulatory signs in the ROW, location may be dependent on types of signage as well as the audience to whom the signs are implemented for.



Reference Appendix 'C' for extensive traffic signal details.

TABLE A	
GALVANIZED SQUARE SIGN POST (PERFORATED)	1-3/4" x 1-3/4" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED)	2-1/2" X 2-1/2" (14 GAUGE)

Consolidate signs to avoid clutter in the public ROW.

4b Streetscape Specifications

Spring Branch Signage

Non - Standard

Note: Identity features are the responsibility of the Spring Branch Management District. This section is provided as a convenience for reference only.

EDITION: FEBRUARY 2015

IDENTITY SIGNS

ENTRY MONUMENTS

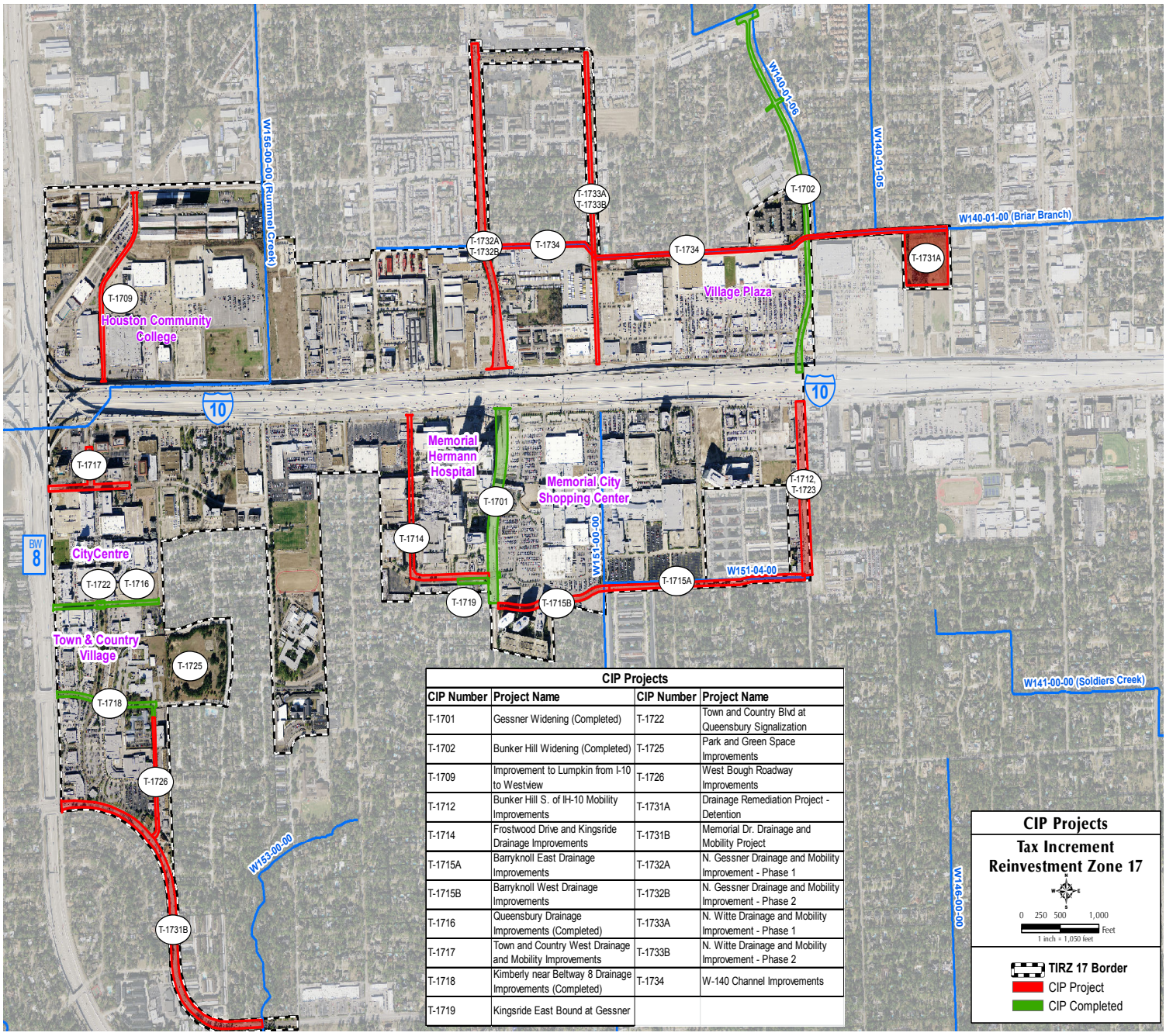
STREET IDENTIFICATION SIGNS

Appendix - A

Mobility Guidelines

EDITION: FEBRUARY 2015

CAPITAL IMPROVEMENT PROJECTS



CIP Projects			
CIP Number	Project Name	CIP Number	Project Name
T-1701	Gessner Widening (Completed)	T-1722	Town and Country Blvd at Queensbury Signalization
T-1702	Bunker Hill Widening (Completed)	T-1725	Park and Green Space Improvements
T-1709	Improvement to Lumpkin from I-10 to Westview	T-1726	West Bough Roadway Improvements
T-1712	Bunker Hill S. of IH-10 Mobility Improvements	T-1731A	Drainage Remediation Project - Detention
T-1714	Frostwood Drive and Kingsride Drainage Improvements	T-1731B	Memorial Dr. Drainage and Mobility Project
T-1715A	Barryknoll East Drainage Improvements	T-1732A	N. Gessner Drainage and Mobility Improvement - Phase 1
T-1715B	Barryknoll West Drainage Improvements	T-1732B	N. Gessner Drainage and Mobility Improvement - Phase 2
T-1716	Queensbury Drainage Improvements (Completed)	T-1733A	N. Witte Drainage and Mobility Improvement - Phase 1
T-1717	Town and Country West Drainage and Mobility Improvements	T-1733B	N. Witte Drainage and Mobility Improvement - Phase 2
T-1718	Kimberly near Beltway 8 Drainage Improvements (Completed)	T-1734	W-140 Channel Improvements
T-1719	Kingsride East Bound at Gessner		

Image Source: TIRZ 17

MAJOR THOROUGHFARE + FREEWAY PLAN / RE-IMAGINING HOUSTON TRANSIT PLAN

*** Link to the Major Thoroughfare + Freeway Plan**

http://www.houstontx.gov/planning/mobility/MTFPMap/MTFP_Map_2013.pdf

*** Link to Re-Imagining Houston Transit Plan**

http://www.transitsystemreimagining.com/

Appendix - B

Character Guidelines

EDITION: FEBRUARY 2015

LINKS TO CHARACTER GUIDELINES

*** Link to the Scenic Houston 'Streetscape Resource Guide'**

http://www.scenichouston.org/wp-content/uploads/Streetscape-Rescource-Guide-final-2013.pdf

*** Link to City Mobility Planning - Inner West Loop Sub-area Study**

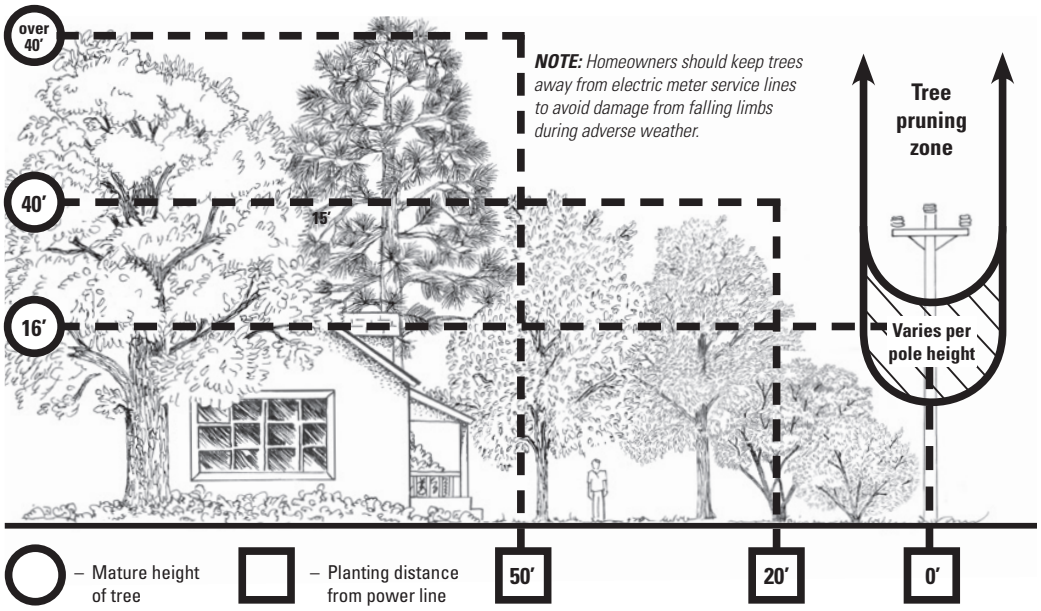
http://www.houstontx.gov/planning/mobility/CMP/IWL/Houston_IWL_Report.pdf

*** Link to Adopt-an-Esplanade Program Application**

http://www.houstontx.gov/parks/pdfs/adoptanesplanade.pdf

Recommended list of low-growing trees suitable for planting near power distribution lines

Common Name	Scientific Name	Mature Tree Height
Texas Redbud	*Cercis canadensis var. texensis*	20 ft.
Fringe Tree	*Chionanthus virginicus*	30 ft.
Texas Hawthorn	*Cratagus texana*	20 ft.
Yaupon Holly	*Ilex vomitoria*	15 - 25 ft.
Dwarf Crape Myrtle	*Lagerstroemia spp. (dwarf varieties)*	20 ft.
Southern Waxmyrtle	*Myrica cerifera*	10 - 20 ft.
Texas Pistache	*Pistacia texana*	10 ft.
Mexican Plum	*Prunus mexicana*	20 ft.
Little Gem Magnolia	*Magnolia grandiflora 'Little Gem'*	15 - 20 ft.
Pygmy Date Palm	*Phoenix roebelenii*	8 ft.
Mediterranean Fan Palm	*Chamarops humilis*	15 ft.



***Link to Additional Information to CenterPoint's "Tree Trimming Brochure"**

http://www.centerpointenergy.com/staticfiles/CNP/Common/SiteAssets/doc/tree%20trimming%20brochure,%20T&D.pdf

iv

Appendix - C

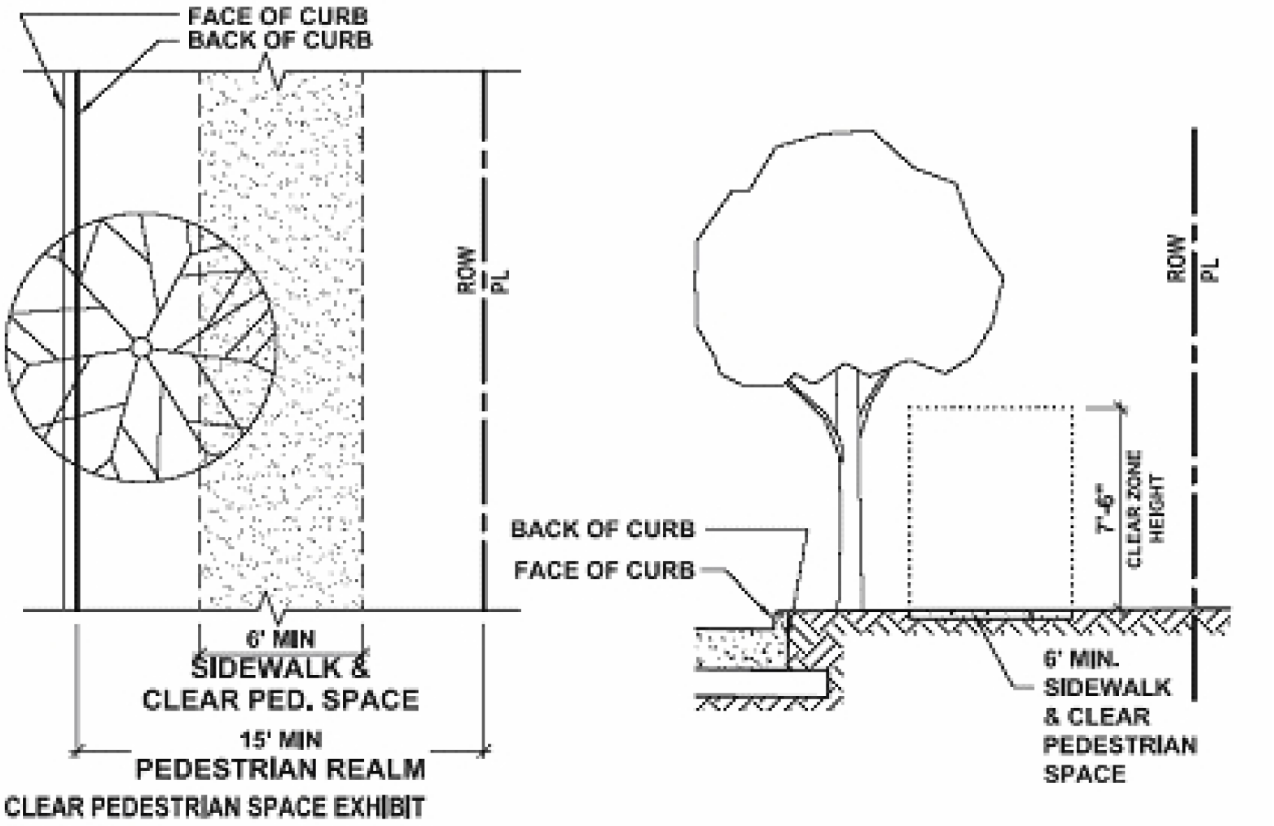
Regulatory Guidelines

EDITION: FEBRUARY 2015

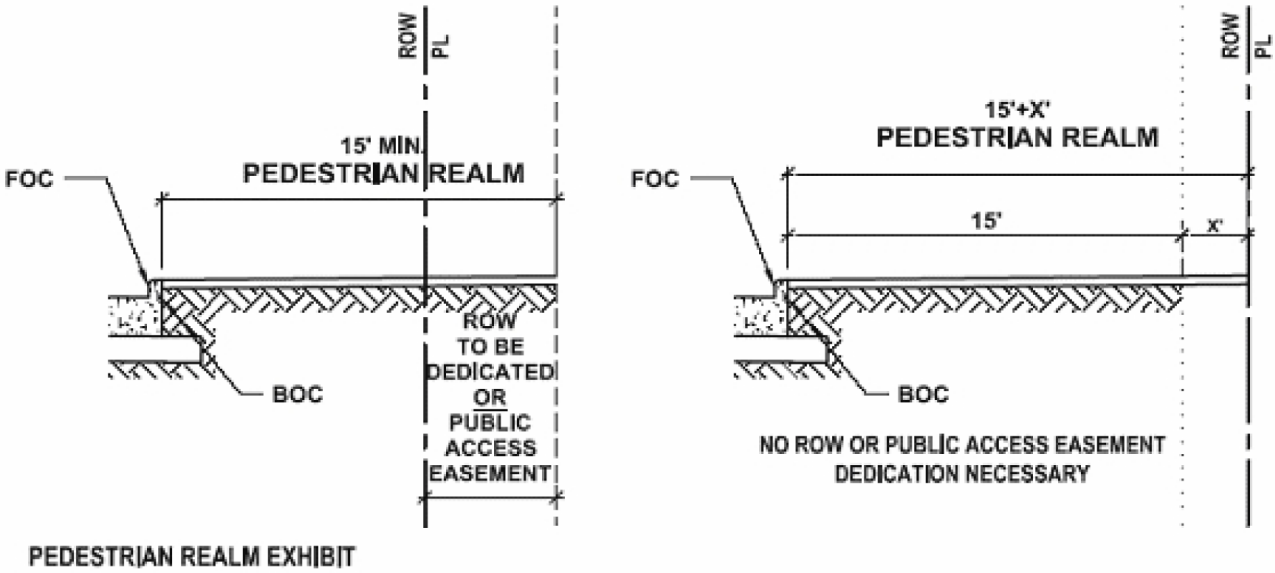
COMPLETE STREETS ORDINANCE

***Complete Streets Ordinance- Executive Order Link**

http://www.houstontx.gov/planning/docs_pdfs/Exec_Order_Complete_Streets.pdf

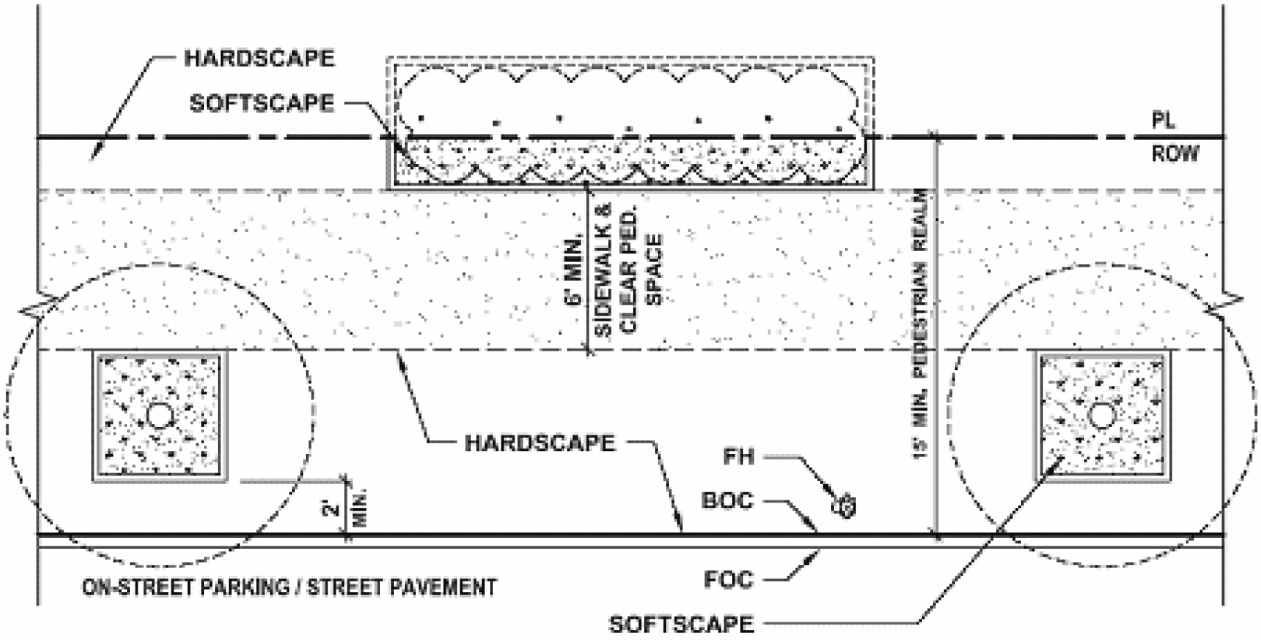


CoH Code of Ordinances. Ch. 42: Transit Corridor, Pedestrian Clear Space



CoH Code of Ordinances. Ch. 42: Transit Corridor, Pedestrian Realm

CITY OF HOUSTON - CODE OF ORDINANCES



CoH Code of Ordinances. Ch. 42: Transit Corridor, Pedestrian Realm Softscape

***Link to Additional Information**

https://library.municode.com/index.aspx?clientId=10123

City of Houston, Texas, Ordinance No. 2014-546

AN ORDINANCE APPROVING THE LED STREET LIGHT INSTALLATION AND TARIFF AGREEMENT WITH CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC WITHIN THE CITY OF HOUSTON, TEXAS; MAINTAINING IN EFFECT THE CURRENT RATES THAT SHALL CONSTITUTE THE CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC STREETLIGHT RATES TO BE OBSERVED WITHIN THE CITY OF HOUSTON, TEXAS, UNTIL CHANGED UNDER THE UTILITIES CODE; PROVIDING AN INSTALLATION SCHEDULE; MAKING FINDINGS AND CONTAINING OTHER PROVISIONS RELATING TO THE FOREGOING SUBJECT; PROVIDING FOR SEVERABILITY; AND DECLARING AN EMERGENCY.

* * * * *

WHEREAS, Centerpoint Energy Houston Electric, LLC ("CenterPoint Electric") has agreed to install light-emitting diode ("LED") luminaires in the City's street lights according to an agreed-upon schedule using luminaires that are commercially available and satisfactory to both parties; and

WHEREAS, converting the City's street lights to the use of LED luminaires supports energy efficiency, provides better quality outdoor lighting, increases public safety and health, results in an estimated savings of over $28 million for the City, and reduces the City's greenhouse gas emissions by an estimated 5%; and

WHEREAS, the initial rates for the streetlights with LED luminaires shall be the current effective rates as of the date of this ordinance for streetlights with mercury vapor, high pressure sodium vapor, and metal halide luminaires, if approved by the Texas Public Utility Commission; and

WHEREAS, in the event that the Texas Public Utility Commission approves initial rates for the LED street lights that are different from the rates agreed to by the City or CenterPoint, either party may terminate the agreement; and

WHEREAS, CenterPoint may seek to recover used and useful capital and reasonable and necessary expenses associated with LED street light installation through a distribution capital recovery factor (DCRF) application or other rate proceeding; and

WHEREAS, the City agrees not to oppose legislation that extends to 2023 the expiration of a provision in the Texas Utilities Code authorizing utilities to seek periodic adjustment in its rates based on changes in its capital, such as a DCRF; and

WHEREAS, a deployment plan for installing the street lights within five years from the date of commencement of the Project, with consideration for variable factors such as workforce availability and vendor production, is the most expeditious schedule for replacing the luminaires in the City's more than 165,000 street lights; and

CoH Code of Ordinances. LED Street Lighting Stipulations

WHEREAS, the City Council finds that the public interest will be served by the adoption of an ordinance approving the LED Street Light Installation and Tariff Agreement that maintains in effect the current rates for street lights until changed under the Texas Utilities Code; **NOW, THEREFORE,**

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HOUSTON, TEXAS:

Section 1. That the facts and findings contained in the preamble of this Ordinance are determined to be true and correct and are hereby adopted as part of this Ordinance.

Section 2. That the City Council hereby approves the LED Street Light Installation and Tariff Agreement ("Agreement") which shall be adopted as part of this Ordinance and is attached hereto and incorporated herein by reference.

Section 3. That the Mayor or her designee is hereby authorized to execute all documents related to the Agreement on behalf of the City; that the City Secretary or her designee is hereby authorized to attest to all such signatures and to affix the seal of the City to all such documents; and that the City Attorney is hereby authorized to take all action necessary to enforce all legal obligations under said Agreement without further authorization from Council.

Section 4. If any provision, section, subsection, sentence, clause or phrase of this ordinance, or the application of same to any person or set of circumstances is for any reason held to be invalid, the validity of the remaining portions of this ordinance or their application to other persons or sets of circumstances shall not be affected thereby, it being the intent of the City Council in adopting this ordinance that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality, voidness or invalidity of any other portion hereof, and all provisions of this ordinance are declared to be severable for that purpose.

Section 5. The City Council officially finds, determines, recites and declares that a sufficient written notice of the date, hour, place and subject of this meeting of the City Council was posted at a place convenient to the public at the City Hall of the City for the time required by law preceding this meeting, as required by the Open Meetings Law, Chapter 551, Texas Government Code; and that this meeting has been open to the public as required by law at all times during which this ordinance and the subject matter thereof has been discussed, considered and formally acted upon. The City Council further ratifies, approves and confirms such written notice and the contents and posting thereof.

Section 6. That there exists a public emergency requiring that this Ordinance be passed finally on the date of its introduction as requested in writing by the Mayor; therefore, this Ordinance shall be passed finally on such date and shall take effect immediately upon its passage and approval by the Mayor; however, in the event that the Mayor fails to sign this Ordinance within five days after its passage and adoption, it shall take effect in accordance with Article VI, Section 6, Houston City Charter.

PASSED AND ADOPTED this 4th day of June, 2014.

APPROVED this ___ day of _____, 2014.

_____
Mayor of the City of Houston

Pursuant to Article VI, Section 6, Houston City Charter, the effective date of the foregoing Ordinance is JUN 10 2014.

_____
City Secretary

CoH Code of Ordinances. LED Street Lighting Stipulations

LED STREET LIGHT INSTALLATION AND TARIFF AGREEMENT

This LED Street Light Installation and Tariff Agreement is entered into by and between CenterPoint Energy Houston Electric, LLC ("CenterPoint" or the "Company") and the City of Houston, Texas ("City") (collectively, the "Signatories").

1. CenterPoint will procure and install LED luminaires and new photoelectric relays for all street lights within the City for which replacements satisfactory to the City and CenterPoint are commercially available (hereinafter the "Project"). A current list of satisfactory and commercially available LED luminaire replacements for existing mercury vapor, high pressure sodium, and metal halide street lights is attached as Exhibit "A."

2. The Project shall commence within three months of the date of final approval of the initial rates described in paragraph 4 below and subject to paragraph 3 below, shall be complete no later than five years after commencement. The deployment plan for the Project will be designed to proceed no slower than replacing approximately 20% of the existing street lights in year 1, 25% in both years 2 and 3, and 15% in both years 4 and 5. After commencement of the Project, all new streetlights installations within the City will consist of LED luminaires satisfactory to the City and CenterPoint that are commercially available, unless otherwise agreed to in writing by CenterPoint and the City or unless the Project is terminated in accordance with paragraph 8.

3. The City acknowledges that the Company's ability to commence and complete the Project on the timeline set forth in paragraph 2 above is dependent upon factors such as workforce availability and vendor production constraints which could affect the commencement and completion dates. The Company will notify the City upon the occurrence of any event that will affect the commencement and completion dates.

4. Within 15 days of the approvals in paragraph 10, CenterPoint will submit initial rates for the Project for approval by the City and may also submit those rates for approval by all of its other original jurisdiction regulators. The Signatories agree that the initial rates for the Project shall be those reflected on the attached Exhibit B and agree to support those initial rates if they are challenged in proceedings before the Public Utility Commission of Texas (PUC). In the event that the PUC approves initial rates that are different from those set forth on Exhibit B, either CenterPoint or the City may terminate this Agreement. The Signatories acknowledge that the initial rates set forth in Exhibit B may be changed in subsequent rate proceedings. Any such change in the initial rates shall not be grounds for the termination of this Agreement.

5. The City acknowledges that CenterPoint may request recovery of the capital (including a reasonable return) and expenses associated with the Project through either a distribution capital recovery factor application under Public Utility Commission of Texas Substantive Rule 25.243 or other rate proceeding. The City agrees that the Project is prudent, reasonable and necessary and acknowledges that CenterPoint may request recovery by CenterPoint of all used and useful capital (including a reasonable return) and the reasonable and necessary expenses associated with the Project.

6. During the 2015 session of the Texas Legislature, the City agrees not to oppose legislation extending to January 1, 2023 the expiration date of the periodic rate adjustment currently set forth in Texas Utilities Code section 36.210.

7. During the Project period, CenterPoint will work in good faith with vendors to identify satisfactory LED replacement luminaires for those street light luminaires within the City that are not currently part of the Project. As the Company and the City agree on additional LED replacement luminaires, the Company will seek regulatory approval of rates for those street lights not currently part of the Project, if different than the rates described in paragraph 4 above, and following regulatory approval, if needed, will add those street lights to the Project.

8. CenterPoint shall have the right to terminate the Project upon thirty days written notice to City if (a) CenterPoint's rates for distribution service are reduced below the levels in place as of the date of this LED Street Light Installation and Tariff Agreement as a result of a proceeding in which the City participates in a manner adverse to CenterPoint; or (b) the periodic rate adjustment currently set forth in Texas Utilities Code section 36.210 is not extended until at least January 1, 2023 or replaced by a substantially equivalent capital cost recovery mechanism.

9. The Signatories agree that this LED Street Light Installation and Tariff Agreement may be executed in multiple counterparts.

10. This agreement is subject to approval by the board of directors of CenterPoint Energy, Inc. and the City Council of the City.

11. Subject to the condition in paragraph 8, this agreement is effective on the date of the countersignature by the City Controller.

CoH Code of Ordinances. LED Street Lighting Stipulations

Exhibit A

- All non-decorative 70-100 watt high pressure sodium, metal halide, and mercury vapor lights will be replaced with a cobra 45 watt LED or equivalent
- All non-decorative 150 watt high pressure sodium and 175 watt mercury vapor and metal halide lights will be replaced with a cobra 95 watt LED or equivalent
- All non-decorative 250 watt high pressure sodium and metal halide lights will be replaced with a cobra 115 watt LED or equivalent
- All non-decorative 400 watt metal halide and mercury vapor lights will be replaced with a cobra 180 watt LED or equivalent

Exhibit B

Lamp Type Initial Lumen	Watt (Bulb Only)	Schedule A*	Schedule B*	Schedule C*	Schedule D*	Schedule E*	Monthly KWH
Mercury Vapor							
58,000 Lumen	1,000	$8.82	$22.97	$14.01	$23.28	$16.75	365
22,600 Lumen	400	$5.15	$17.75	$11.50	$19.75	$13.14	150
7,800 Lumen	175	$3.64	N.A.	N.A.	$15.89	$10.40	69
4,200 Lumen	100	$3.54	$16.91	N.A.	$13.70	N.A.	41
High Pressure Sodium Vapor							
50,000 Lumen (Set Back)	400	$14.22	N.A.	N.A.	$24.16	$21.30	160
50,000 Lumen	400	$7.93	$20.65	$14.01	$23.28	$15.50	160
28,000 Lumen (Set Back)	250	$14.45	N.A.	N.A.	$24.16	$21.30	106
28,000 Lumen	250	$5.15	$17.75	$11.66	$19.75	$13.15	106
15,000 Lumen	150	$3.64	$16.20	$10.77	$15.89	$10.40	58
9,500 Lumen	100	$3.64	$16.20	N.A.	$12.92	$8.88	38
6,000 Lumen	70	$3.58	$16.13	N.A.	$12.46	N.A.	29
Metal Halide							
32,200 Lumen	400	$9.49	N.A.	N.A	$23.94	$18.56	159
19,475 Lumen	250	$10.34	N.A.	N.A.	$26.43	$18.35	96
12,900 Lumen	175	$11.01	N.A.	N.A.	$23.52	$17.09	70
7,900 Lumen	100	$11.69	N.A.	N.A.	$23.29	$19.68	40
Light Emitting Diode (LED)[1]							
4,800 Lumen	60	N.A.	N.A.	N.A.	$17.31	N.A.	17
LED Alternative For 400W Mercury Vapor							
15,100 Lumen	180	$5.15	$17.75	$11.50	$19.75	$13.14	64
LED Alternative For 175W Mercury Vapor							
7,900 Lumen	95	$3.64	N.A.	N.A.	$15.89	$10.40	32
LED Alternative For 100W Mercury Vapor							
4,800 Lumen	45	$3.54	$16.91	N.A.	$13.70	N.A.	17
LED Alternative For 250W High Pressure Sodium							
15,100 Lumen	180	$5.15	$17.75	$11.66	$19.75	$13.15	64

2nd LED Alternative For 250W High Pressure Sodium							
10,850 Lumen	115	$5.15	$17.75	$11.66	$19.75	$13.15	38
LED Alternative For 150W High Pressure Sodium							
7,900 Lumen	95	$3.64	$16.20	$10.77	$15.89	$10.40	32
LED Alternative For 100W High Pressure Sodium							
4,800 Lumen	45	$3.64	$16.20	N.A.	$12.92	$8.88	17
LED Alternative For 70W High Pressure Sodium							
4,800 Lumen	45	$3.58	$16.13	N.A.	$12.46	N.A.	17
LED Alternative For 400W Metal Halide							
15,100 Lumen	180	$9.49	N.A.	N.A.	$23.94	$18.56	64
LED Alternative For 250W Metal Halide							
15,100 Lumen	180	$10.34	N.A.	N.A.	$26.43	$18.35	64
2nd LED Alternative For 250W Metal Halide							
10,850 Lumen	115	$10.34	N.A.	N.A.	$26.43	$18.35	38
LED Alternative For 175W Metal Halide							
7,900 Lumen	95	$11.01	N.A.	N.A.	$23.52	$17.09	32
LED Alternative For 100W Metal Halide							
4,800 Lumen	45	$11.69	N.A.	N.A.	$23.29	$19.68	17

[1]The initial rate levels shown in this Rate Schedule for LED luminaires are subject to change, perhaps significantly, in the next Cost of Service rate filing.

* DESCRIPTION OF LIGHTING CONFIGURATIONS

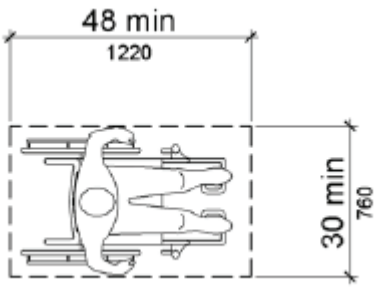
Schedule A -one or more lamps/luminaires mounted on existing distribution poles and served by overhead conductors.

Schedule B -single lamp/luminaire mounted on ornamental standard and served by overhead conductors. Limited to existing installations.

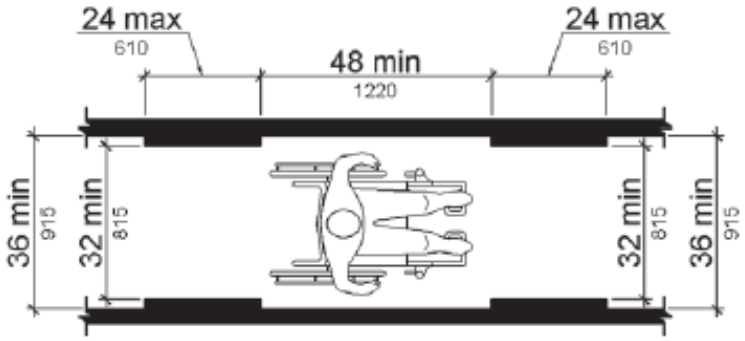
Schedule C -twin lamps/luminaires mounted on ornamental standard and served by overhead conductors. Limited to existing installations.

Schedule D -single lamp/luminaire mounted on ornamental standard and served by underground conductors, or decorative residential streetlights.

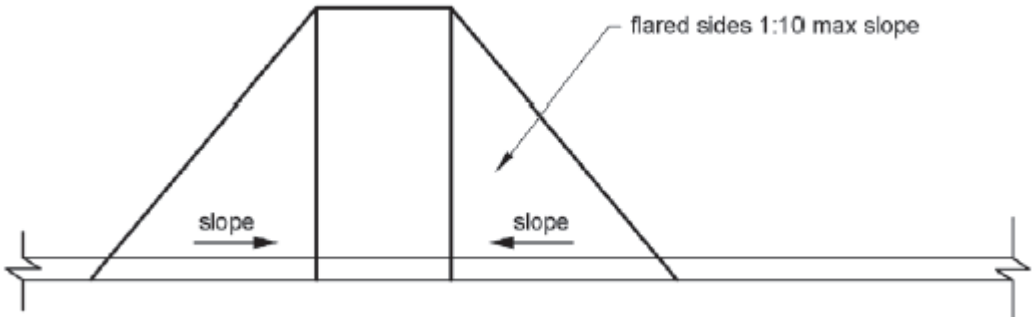
Schedule E -twin lamps/luminaires mounted on ornamental standard and served by underground conductors.



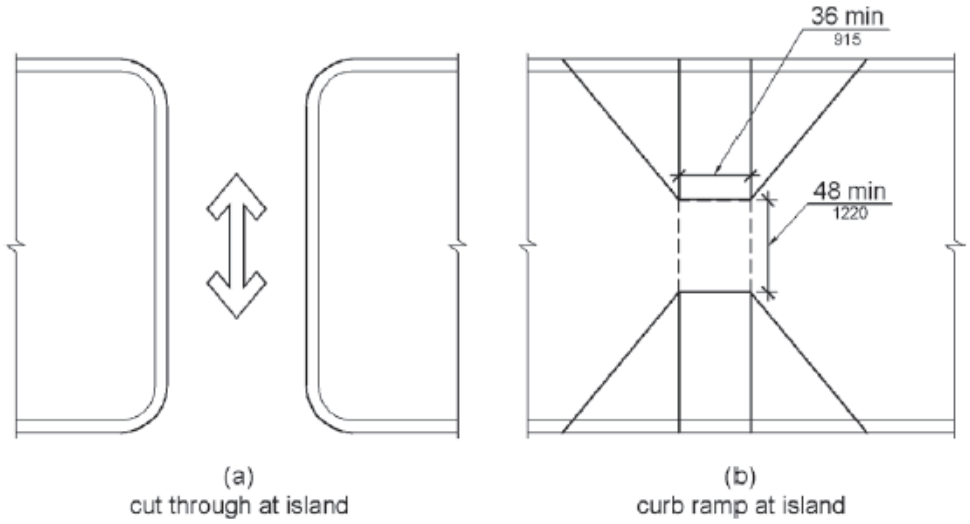
TX ADA. 305.3: Clear Floor or Ground Space



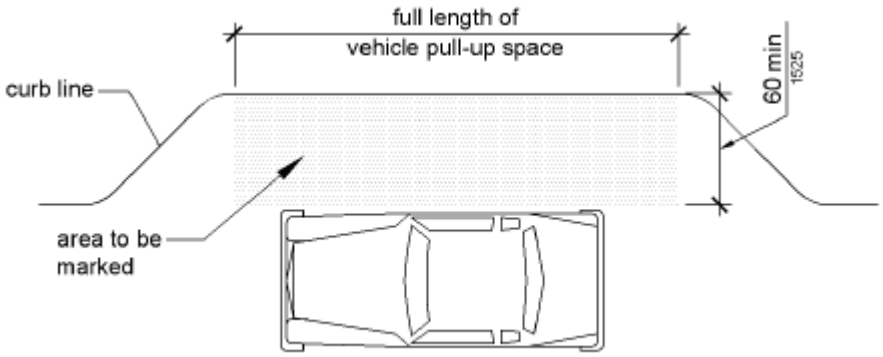
TX ADA. 403.5.1: Clear Width



TX ADA. 406.3: Sides of Curb Ramps



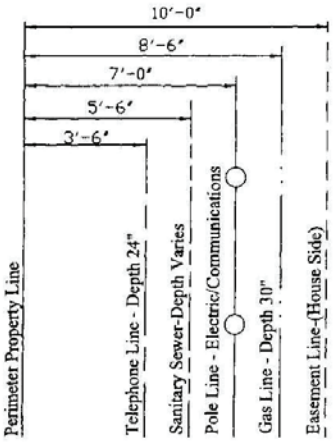
TX ADA. 406.7: Crossings at Islands



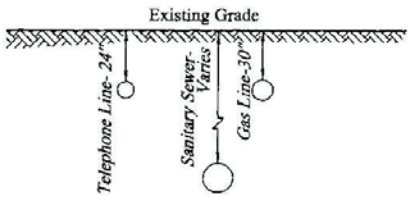
TX ADA. 503.3: Passenger Loading Zone Access Aisle

***Link to Additional Information**

http://www.tdlr.texas.gov/ab/abtas.htm



PERIMETER EASEMENT



TYPICAL INSTALLATION DEPTHS

CoH Infrastructure Design Manual. Ch. 6: Utilities in Easements

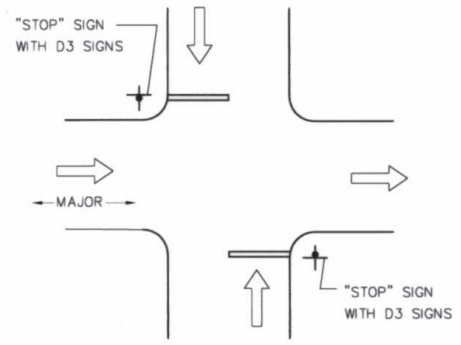
CITY MOBILITY PLAN (CMP)					MAJOR THOROUGHFARE AND FREEWAY PLAN (MTFP)				
MULTI MODAL CLASSIFICATION					EXISTING CLASSIFICATION				
	Proposed ROW	Number of Lanes	Avg Daily Traffic Vol (vpd)	Design Speed (mph)	PRINCIPAL THOROUGHFARE >5 miles >30,000 vpd **Design Speed 45 mph** Ex ROW: 60' - 400'	THOROUGHFARE >3 miles >20,000 vpd **Design Speed 45 mph** Ex ROW: 50' - 210'	MAJOR COLLECTOR 1 - 2 miles >5,000 vpd **Design Speed 45 mph** Ex ROW: 50' - 150'	COLLECTOR 1 - 2 miles >5,000 vpd **Design Speed 45 mph** Ex ROW: 50' - 150'	LOCAL STREET <1 mile <5,000 vpd **Design Speed 35 mph** Min 50'
BOULEVARD									
Urban	100'-140'	4-8	15,000-50,000	**45**					
Suburban	100'-120'	2-6	500-50,000	**45**					
Transit	120'	4-6	1,500-30,000	**45**					
Industrial	100'-120'	4-6	15,000-50,000	**45**					
AVENUE									
Urban	80'-100'	2-4	1,500-30,000	**45**					
Suburban	80'-100'	2-4	1,000-20,000	**45**					
Transit	100'	2	1,500-15,000	**45**					
Industrial	80'-100'	3-5	5,000-35,000	**45**					
COUPLET	60'-100'	2-5	1,000-25,000	**45**					
STREET									
Urban	60'	2	1,000-10,000	**35**					
Suburban	60'	2	500-5,000	**35**					
LOCAL STREET									
Residential Main	60'-70'	2	≥1,500	**35**					
Residential High Density	55'-60'	2	350-750	**35**					
Residential Std Density	50'-65'	1+	250-350	**35**					

Indicates Shared Classification

CoH Infrastructure Design Manual. Ch. 10: Multi-Modal Classification

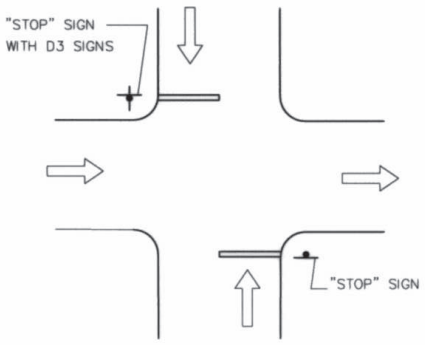
***Link to Additional Information including Multi-modal Classifications, Curb + Gutter Details, + standard concrete paving stipulations.**

http://edocs.publicworks.houstontx.gov/documents/design_manuals/idm.pdf

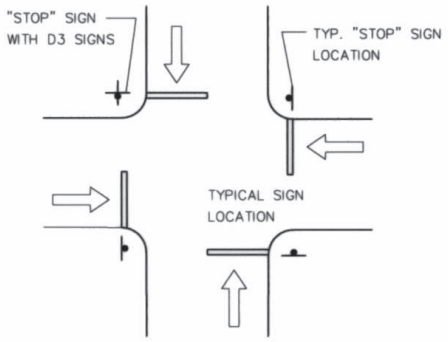


TWO–WAY STOP
AND ONE–WAY OPERATION
ON MAJOR/LOCAL INTERSECTION

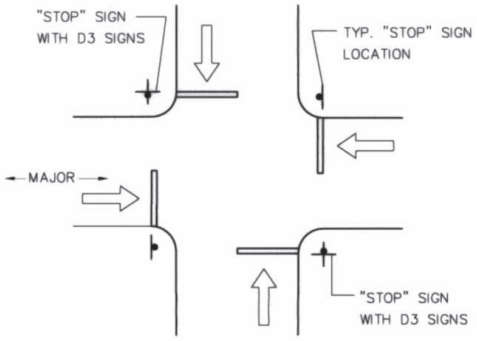
TYPICAL SIGN PLACEMENT



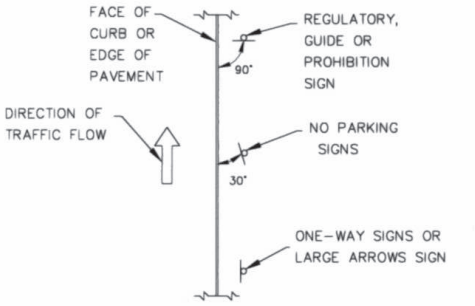
TWO–WAY STOP
AND ONE–WAY OPERATION
ON LOCAL/LOCAL INTERSECTION



FOUR–WAY STOP CONTROL
ON LOCAL/LOCAL INTERSECTION

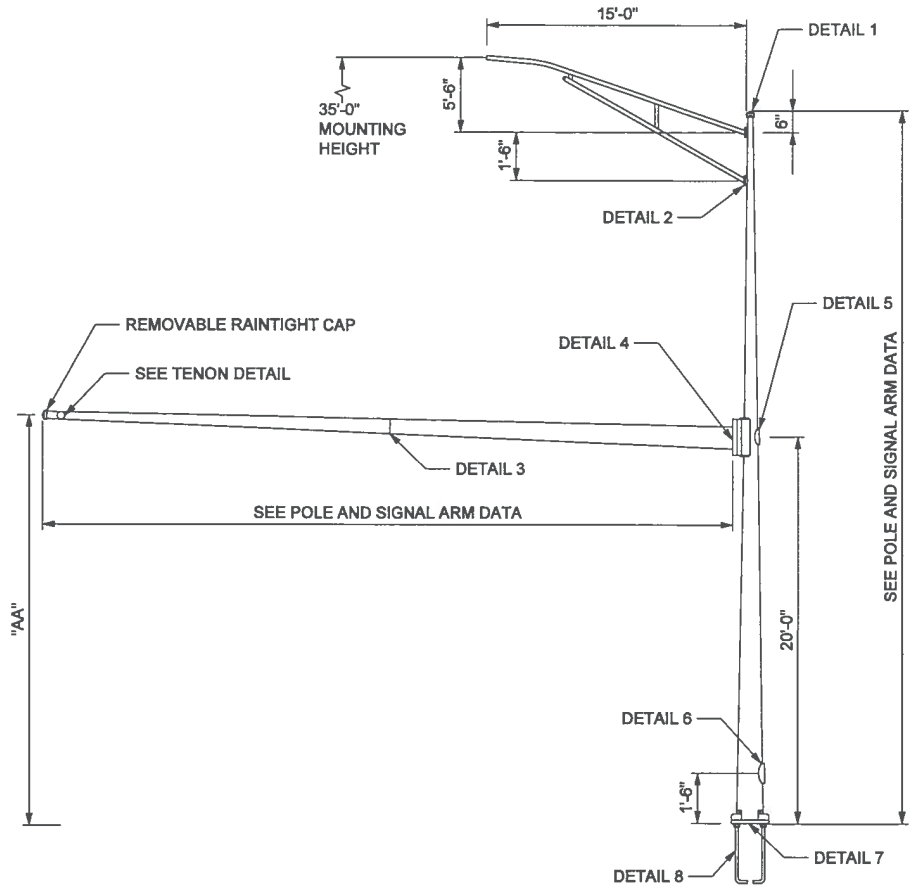


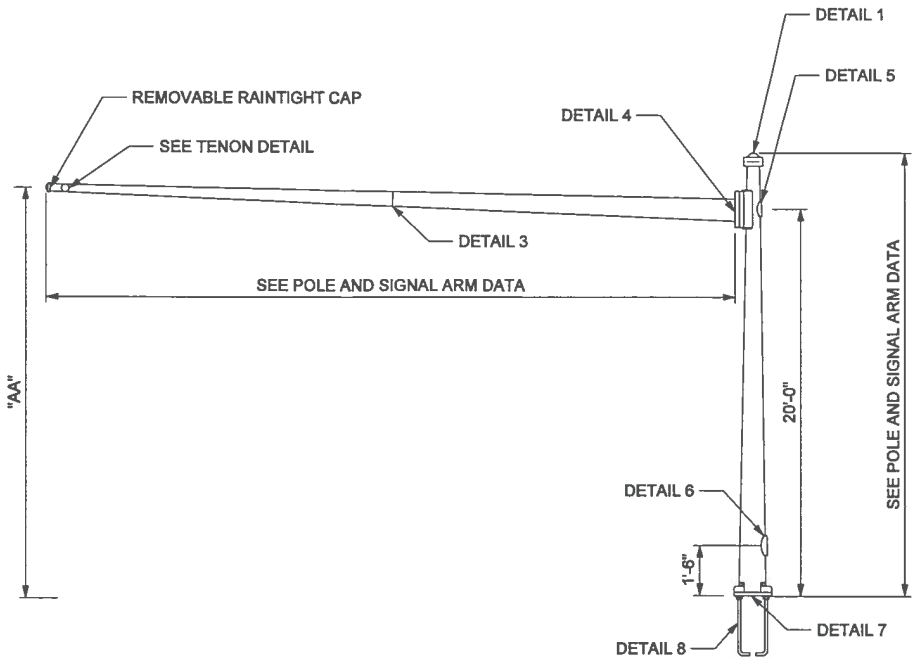
FOUR–WAY STOP CONTROL
ON MAJOR/LOCAL INTERSECTION



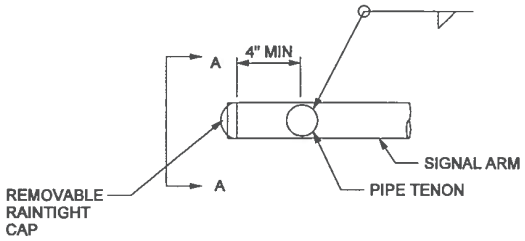
MAST ARM INSTALLATION
REFER TO TRAFFIC SIGNAL DETAILS
FOR ADDITIONAL INFORMATION.

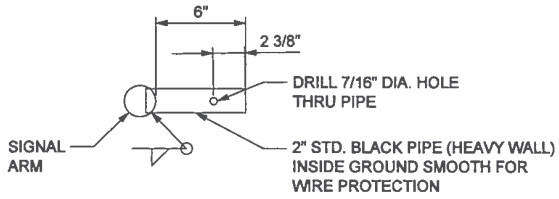
Typical Sign Placement





Pole Dimensions





SECTION A-A

MATERIAL DATA					
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFT - 3 GAUGE	A595 GR.A	55	MAST ARM CONN. BOLTS	A325*	
POLE SHAFT - 0.375"	A572 GR.55	55	LUM. ARM CONN. BOLTS	SAE GR.5	36
MAST ARM SHAFT	A595 GR.A	55	ANCHOR BOLTS	F1554 GR.55	55
LUMINAIRE ARM SHAFT	2" SCH.80 PIPE		GALVANIZING	A123 & A153	
ARM ATTACHMENT PLATE	A36	36			
BASEPLATE	A36	36			
*LUBRICATE IN FIELD IF NECESSARY IN LIEU OF THE REQUIREMENTS IN A325.					

DESIGNATION KEY			POLE TUBE						POLE BASE			
POLE SERIES	POLE TYPE	SIGNAL ARM SPAN (FT)	BASE DIA. (IN)	TOP DIA. (IN) WITH LUM ARM	TOP DIA. (IN) WITHOUT LUM ARM	LENGTH (FT) WITH LUM ARM	LENGTH (FT) WITHOUT LUM ARM	GAUGE OR THK. (IN)	SQUARE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE / SLOT "Z" (IN)
HOU	1	25	13.00	8.80	10.00	30.00	21.50	3	19.00	18.00	2.25	2.50
		30										
		35										
HOU	2	40	13.00	8.80	10.00	30.00	21.50	0.375				
		45										
		50										
		55										

DESIGNATION KEY			ANCHOR BOLT				SIGNAL ARM TUBE				
POLE SERIES	POLE TYPE	SIGNAL ARM SPAN (FT)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	SPAN (FT)	TIP HEIGHT "AA" (FT)
HOU	1	25	2.25	89.00	7.00	12.00	8.00	3.50	7	25.00	20.2
		30					9.00	4.80	7	30.00	20.3
		35					10.00	5.10	7	35.00	20.3
HOU	2	40					10.50	4.90	7	40.00	20.3
		45					10.14	3.84	3	45.00	20.4
		50					11.00	4.00	3	50.00	20.4
		55					11.50	4.16	DET 3	55.00	20.5

Pole + Mast Arm Data

***Link to Additional Information**

https://library.municode.com/index.aspx?clientId=10123

2.3 Selecting LIDAs to Match Site Conditions

LIDA facilities can be constructed on and adjacent to buildings, and integrated into site landscaping and hardscape such as parking lots and along streets. LIDA facilities can be used singly to manage rainfall and runoff from a drainage area, or constructed in a series of multiple facilities. The site analysis helps identify the types of LIDAs best suited to the site. Owners and designers may use Table 1 as a quick reference to match each LIDA with common stormwater management objectives and site constraints to select the most appropriate facilities.

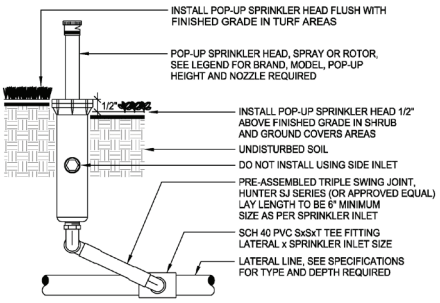
Table 1: LIDA Selection for Site Conditions

	Green Roof	Porous Pavement	Flow-through Planter	Infiltration Planter/ Rain Garden	Vegetated Filter Strip	LIDA Swale
Reduce imperviousness	✓	✓				
Infiltrate		✓		✓	✓	✓
Detention/ flow control		✓		✓		
Provide Habitat			✓	✓	✓	✓
Near Vegetated Corridor			✓	✓	✓	✓
Private property	✓	✓	✓	✓	✓	✓
Private street		✓	✓	✓	✓	✓
Public Street/ROW*			✓		✓	✓
On or next to building	✓		✓			
Parking lot		✓	✓	✓	✓	✓
Landscaped area			✓	✓	✓	✓
Steep slope	✓		✓			
Soils with low infiltration rate	✓	✓	✓		✓	✓
High GW table	✓		✓		✓	✓
Contaminated soils	✓		✓			

* Check with local juristiction about use in ROW

***Link to Additional Information to Definitions + Detailed Illustrations of LIDA types**

https://www.cleanwaterservices.org/PermitCenter/NewsAndResources/LIDAHandbook.aspx

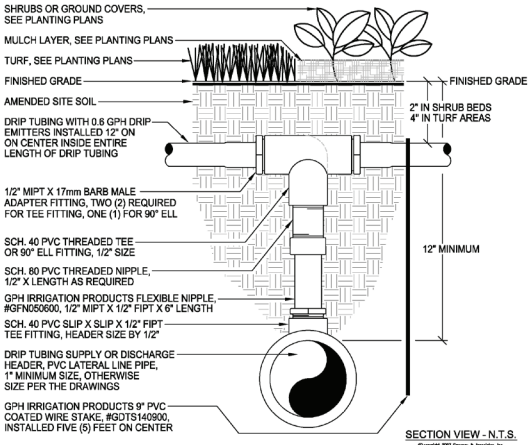


NOTE:
INSTALL SPRINKLER HEADS 6" FROM PAVING EDGE IN SHRUB AND GROUND COVER AREAS.
INSTALL SPRINKLER HEADS 12" FROM THE FACE OF BUILDING WALLS OR WINDOWS.
INSTALL SPRINKLER HEADS 4" FROM PAVING EDGE IN TURF AREAS.

INSTALL SPRINKLER HEADS PLUMB. ADJUST SPRAYS OR NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

SECTION VIEW - N.T.S.

A - POP-UP SPRINKLER



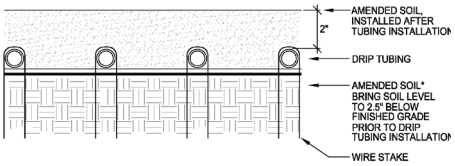
SECTION VIEW - N.T.S.

NOTE:
DRIP TUBING CONNECTION REQUIRED FOR ALL CONNECTIONS BETWEEN DRIP TUBING AND PVC HEADERS.

FOR CONNECTIONS AT END RUNS OF TUBING, USE A 90° ELL FITTING AND ONE ADAPTER FITTING FOR CONNECTION.

FOR CONNECTIONS IN THE MIDDLE OF RUNS OF TUBING, USE A TEE FITTING AND TWO ADAPTER FITTINGS FOR THE CONNECTION.

B - DRIPLINE CONNECTION TO PVC



* AS PER LANDSCAPE DRAWINGS

RECOMMENDED INSTALLATION:

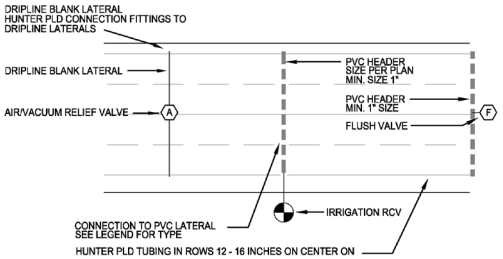
TO INSURE EVEN PARALLEL AND LEVEL TUBING ROWS IT IS RECOMMENDED THAT THE SOIL LEVEL IN THE PLANTER AREAS BE BROUGHT TO 1 1/2" BELOW FINISHED GRADE AND PROPERLY COMPACTED AS PER THE LANDSCAPED DRAWINGS PRIOR TO THE INSTALLATION OF THE TUBING.

INSTALL TUBING AS INDICATED ON THESE DRAWINGS AND SECURE TO GRADE USING WIRE HOOP STAKES AT 5 FEET ON CENTER SPACING.

BACKFILL FINAL 2" OF SOIL OVER THE TUBING AFTER INSTALLATION OF THE TUBING

SECTION VIEW - N.T.S

C -DRIPLINE LAYOUT

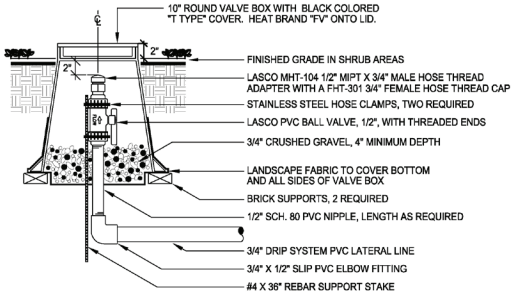


HUNTER PLD TUBING IN ROWS 12 - 16 INCHES ON CENTER ON LEVEL GROUND.

INSTALL DRIP FLUSH VALVE PER DETAIL AT THE END OF EACH TUBING SECTION PER PLAN.
INSTALL AIR RELIEF VALVES PER DETAIL, AT HIGH POINTS OF EACH TUBING SECTION PER PLAN.
RUN AIR/VACUUM RELIEF BLANK TUBING LATERAL ALONG HIGH POINT OF MOUND OR BERM.
ATTACH ALL IN-LINE DRIP TUBING TO BLANK LATERAL.
MORE THAN TWO RELIEF VALVES MAY NEED TO BE INSTALLED PER SECTION

SECTION VIEW - N.T.S.

D - DRIPLINE LAYOUT

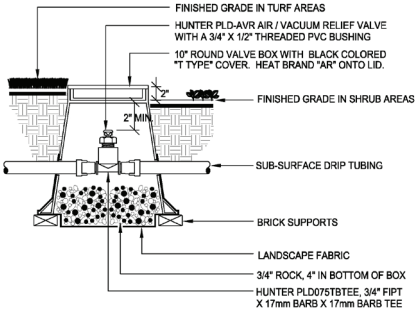


NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

USE AN APPROVED, NON-HARDENING, TEFLON ASSEMBLY PASTE ON ALL THREADED FITTINGS.

SECTION VIEW - N.T.S

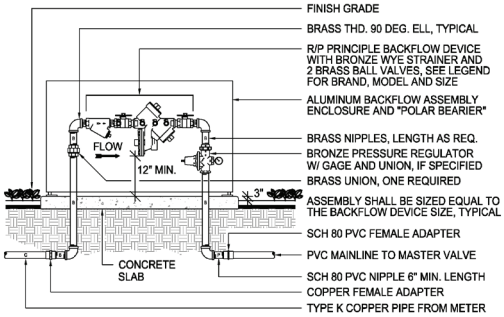
E - DRIP MANUAL FLUSH VALVE



NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

SECTION VIEW - N.T.S

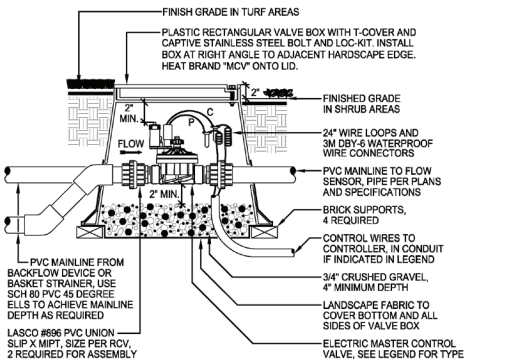
F -DRIP AIR RELIEF VALVE



NOTE:
CONCRETE SLAB SHALL BE MINIMUM 4" THICK, 18" WIDE AND EXTEND AT LEAST 8" PAST THE BACKFLOW ASSEMBLY PIPING. IF BACKFLOW ENCLOSURE IS SPECIFIED, THE CONCRETE SLAB SHALL BE THE SIZE REQUIRED BY THE MANUFACTURER.

SECTION VIEW - N.T.S

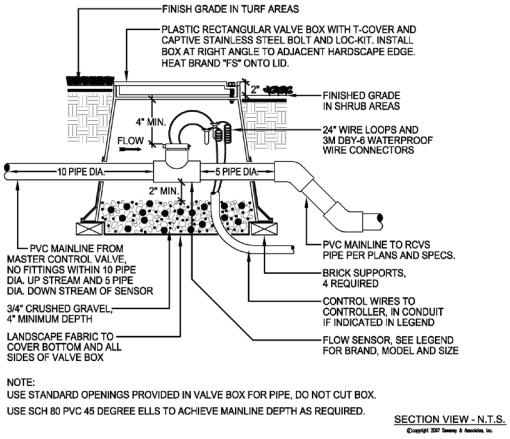
G - R/P TYPE BACKFLOW



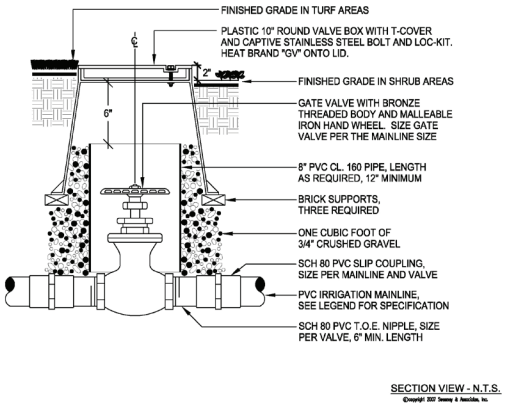
NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

SECTION VIEW - N.T.S.

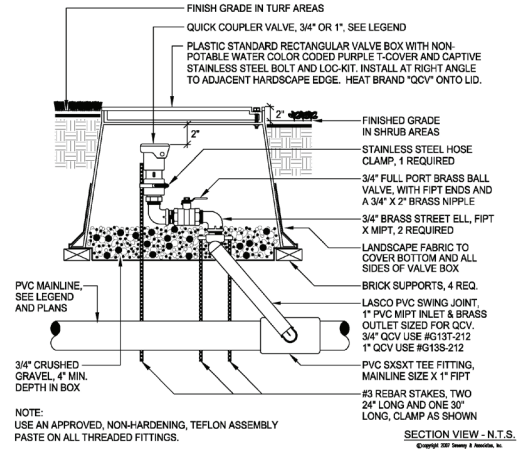
H - MASTER CONTROL VALVE



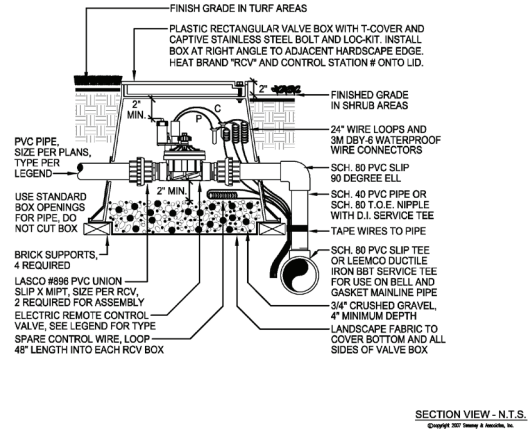
I -FLOW SENSOR



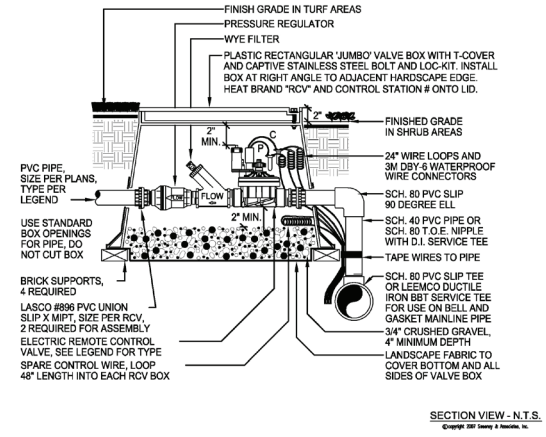
J -ISOLATION VALVE



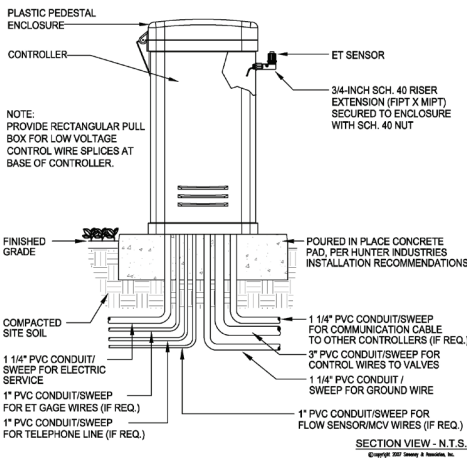
K -QUICK COUPLER VALVE



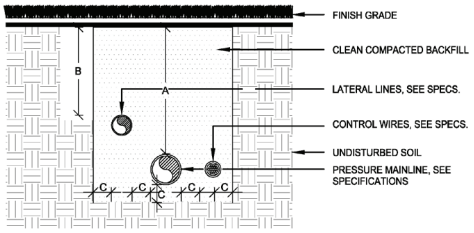
L - REMOTE CONTROL VALVE



M -DRIP RCV ASSEMBLY



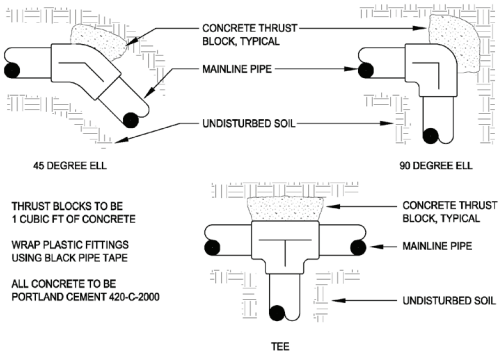
N - CONTROLLER WITH ENCL.



DIMENSION	A	B	C
1/2" TO 2-1/2" IN SIZE	18"	12"	4"
3" TO 6" IN SIZE	24"		4"

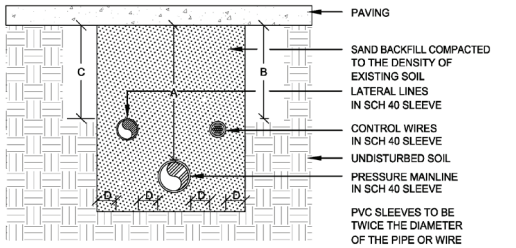
SECTION VIEW - N.T.S

O -PIPE INSTALLATION



PLAN VIEW - N.T.S.

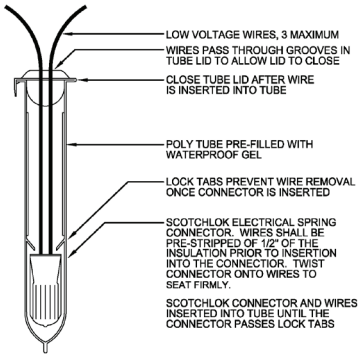
P -PIPE INSTALLATION



DIMENSION	A	B	C	D
1 1/2" TO 6" IN SIZE	36"	24"	24"	4"

SECTION VIEW - N.T.S.

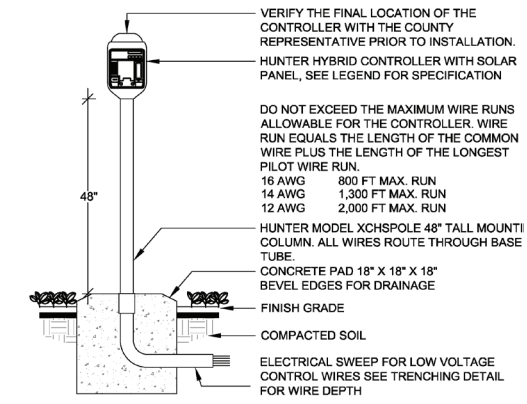
Q -PIPE UNDER HARDSCAPE



NOTE:
WIRE CONNECTOR SHALL BE A 3M DBY-6 DIRECT BURY SPLICE KIT.
KIT SHALL INCLUDE A SCOTCHLOK Y SPRING CONNECTOR, A POLYPROPYLENE TUBE AND A WATERPROOF SEALING GEL. TUBE SHALL BE SUPPLIED PREFILLED WITH GEL.
DIRECT BURY SPLICE KIT SHALL BE USED TO ELECTRICALLY CONNECT 2 - 3 #14 OR 2 #12 PRE-STRIPPED COPPER WIRES. LARGER WIRES OR GREATER QUANTITIES OF WIRES SHALL REQUIRE A LARGER APPROVED WIRE CONNECTION.

SECTION VIEW - N.T.S

R - WIRE CONNECTORS

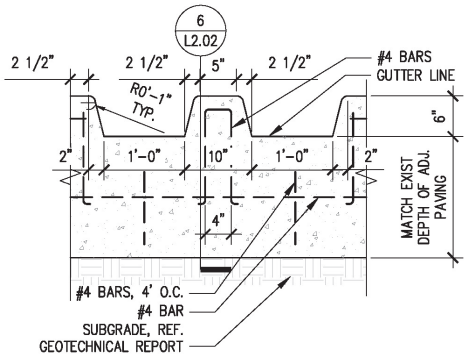


NOTE:
ALL REMOTE CONTROL VALVES USED WITH THE SOLAR-POWERED CONTROLLER SHALL HAVE THE SOLENOIDS REPLACED WITH THE APPROPRIATE DC LATCHING SOLENOIDS. REFER TO IRRIGATION LEGEND FOR TYPE.

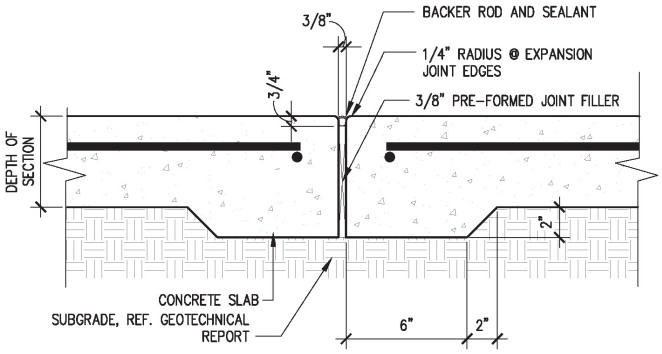
SECTION VIEW - N

S - SOLAR-POWERED CONTROLLER

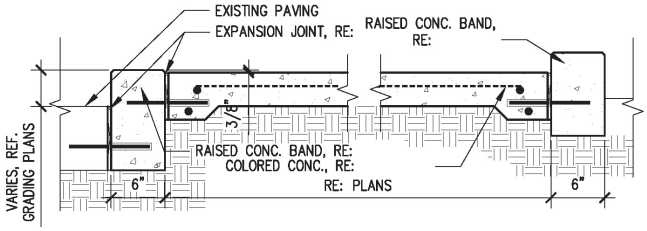
TYPICAL PAVING CONSTRUCTION DETAILS



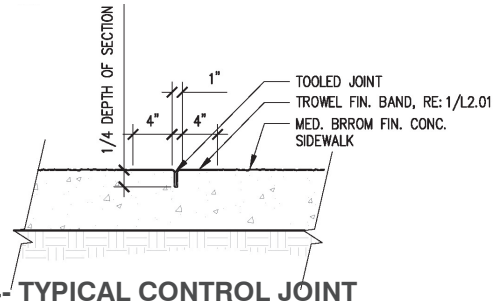
1 - SAW TOOTH CURB DETAIL



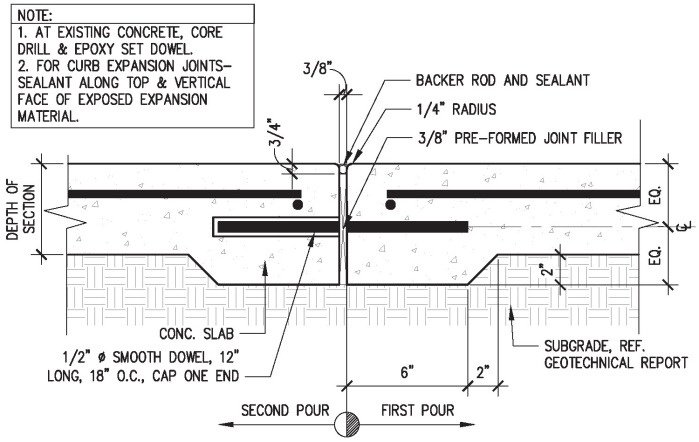
2 - ISOLATION JOINT - SECTION



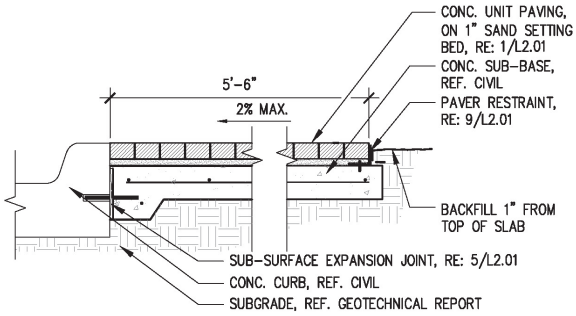
3 - ACCESSIBLE RAMP - SECTION



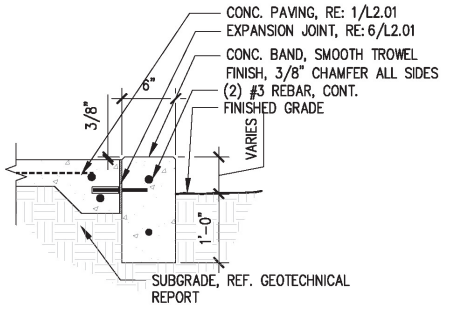
4- TYPICAL CONTROL JOINT



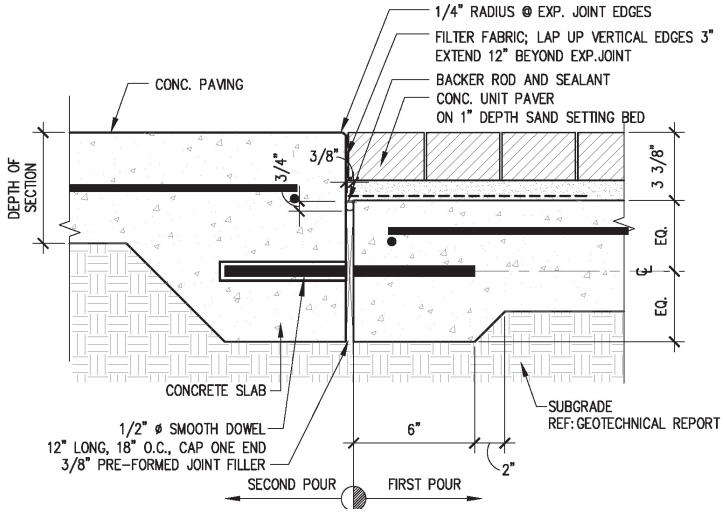
5 - TYPICAL EXPANSION JOINT - SECTION



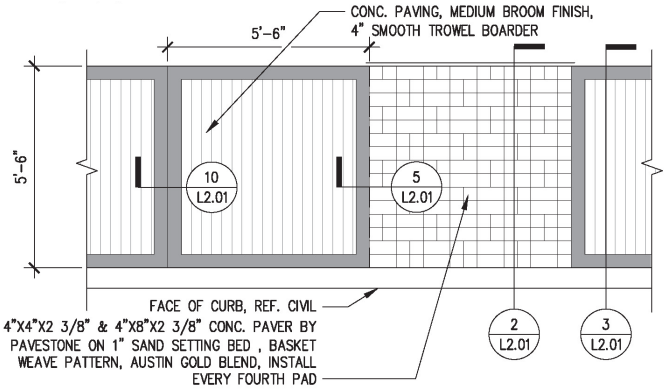
6- TYPICAL CONCRETE PAVING - SECTION



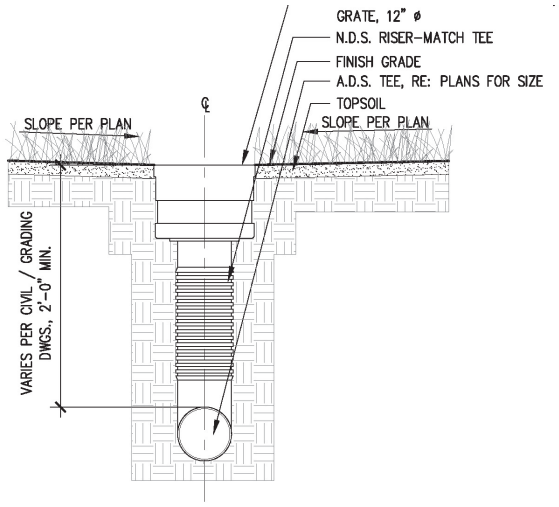
7 - RAISED CONCRETE BAND



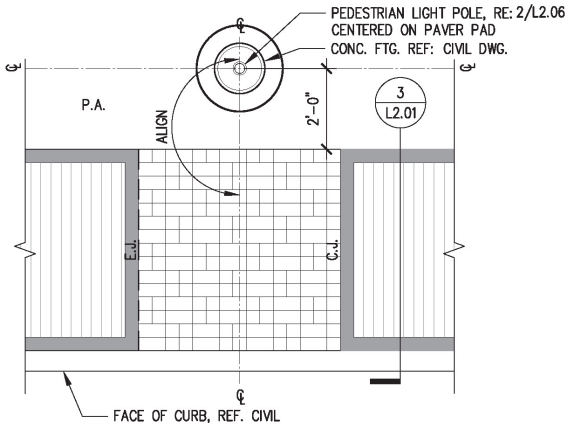
8 - SUBSURFACE EXPANSION JOINT - SECTION



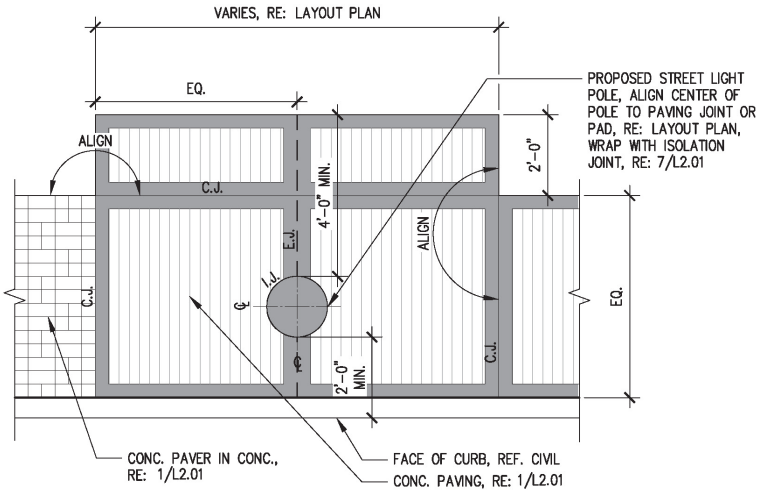
9 - TYPICAL CONCRETE PAVING



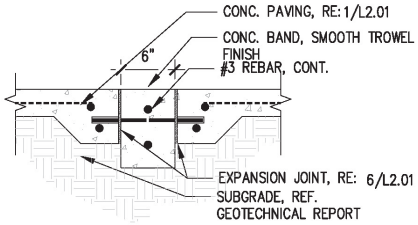
10 - AREA DRAIN IN PLANTER



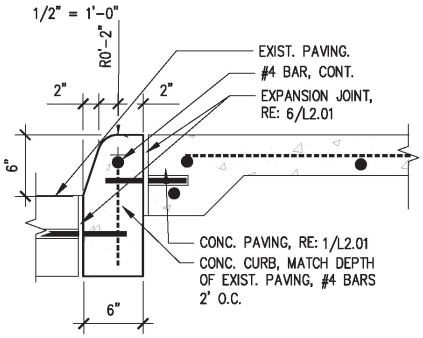
11 - PEDESTRIAN LIGHT POLE



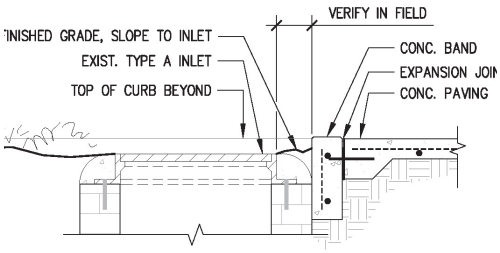
12 - LIGHTPOLE IN CONCRETE PAVING



13 - FLUSH CONC. BAND

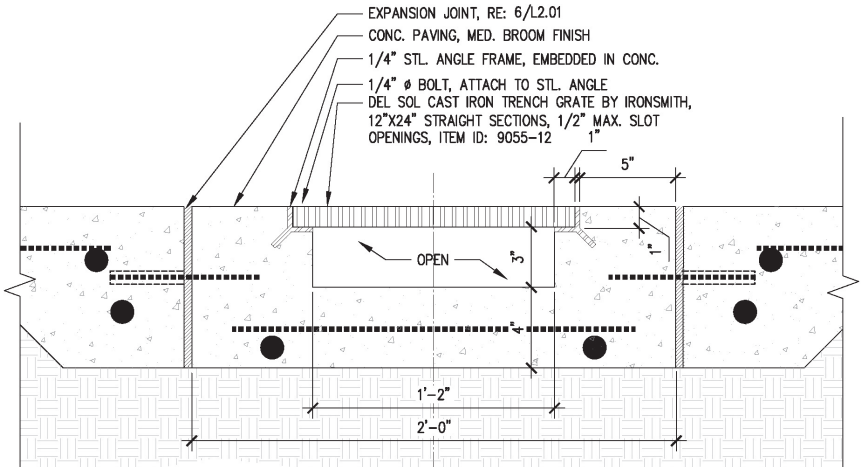


14 - CONC. CURB - SECTION

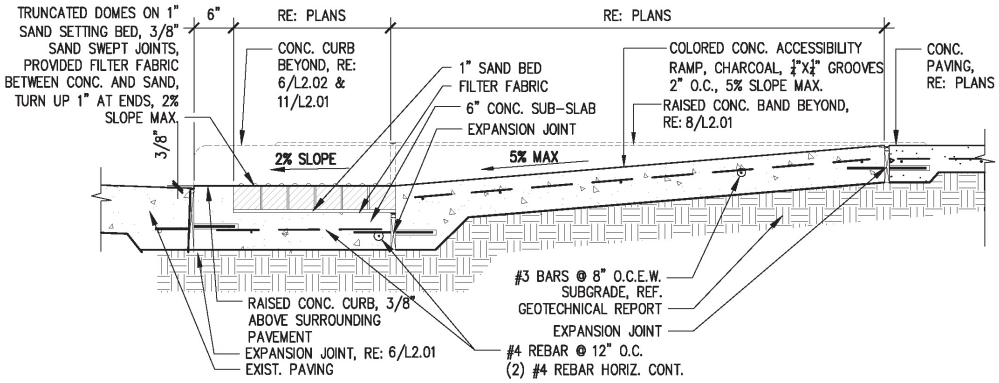


15 - CONC. BAND AT INLET

TYPICAL PAVING CONSTRUCTION DETAILS



16 - STEEL GRATE AT CONC. CHANNEL



17 - ACCESSIBLE RAMP - SECTION

MATERIAL & FURNISHING SCHEDULE

PAVING MATERIALS

SYMBOL	DESCRIPTION	MATERIAL	SUPPLIER	SIZE	COLOR	FINISH	REMARK	DETAIL
P1	TYPICAL CONC. PAVING	CONC.	--	VARIES	NATURAL	MED. BROOM	4' SMOOTH TROWEL BOARDER	1/L2.01
P2	PAVERS IN CONC.	CONC. PAVER	PAVESTONE	4X4 & 4X8	AUSTIN GOLD BLEND	--	BASKET WEAVE PATTERN	2/L2.01
P3	COLORED CONC.	CONC.	--	VARIES	CHARCOAL	GROOVED 2" O.C.	ADA COMPLIANT	
P4	DETECTABLE PAVER	CONC. PAVER	PAVESTONE	4X8	CHARCOAL	--	ADA COMPLIANT, STACKED	

SITE FURNISHINGS

SYMBOL	DESCRIPTION	MATERIAL	SUPPLIER	SIZE	COLOR	FINISH	REMARK	DETAIL
F1	BACKLESS BENCH	STEEL	LANDSCAPE FORMS	22 1/4"X16"X92"	TBD	POWDER COATED	SURFACE MOUNTED NO ARMS	2/L2.05
F2	TRASH RECEPACLE	STEEL	LANDSCAPE FORMS	27"X23"X47"	TBD	POWDER COATED	SURFACE MOUNTED	4/L2.05
F3	BICYCLE RACK	STEEL	LANDSCAPE FORMS	5'X43"X21 1/2"	TBD	POWDER COATED	SURFACE MOUNTED	1/L2.05

18 - MATERIAL AND FURNISHING SCHEDULE

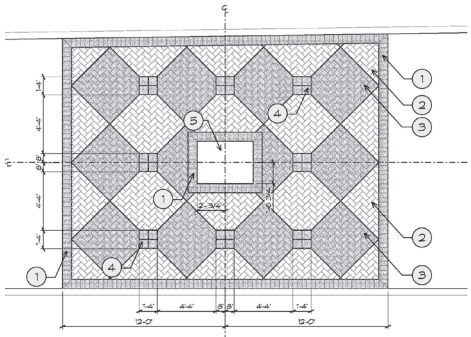
MEDIAN PAVING DETAILS

GENERAL NOTES

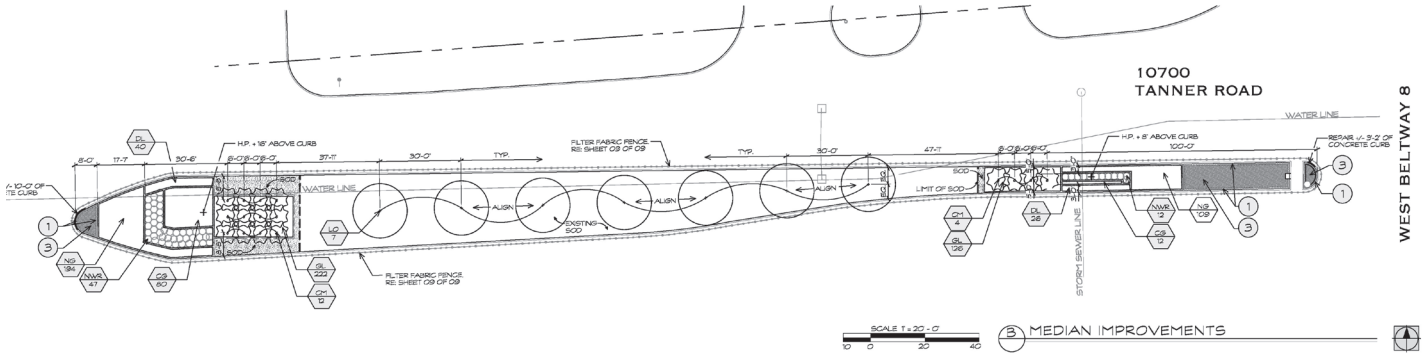
1. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF AS DIRECTED BY THE ARCHITECT AND/OR THE APPROVED HARRIS COUNTY REPRESENTATIVE.
2. THE CONTRACTORS SHALL BE FULLY RESPONSIBLE FOR ANY ADJUSTMENTS OR REPAIRS WHICH MAY BE REQUIRED TO REMEDY ANY DEFECTS.
3. CONTRACTOR TO STAKE THE LIMITS OF THE PAVER PLAZA AND MONUMENT SIGN FOR LANDSCAPE ARCHITECTS REVIEW AND APPROVAL BEFORE CONSTRUCTION
4. . LANDSCAPE CONTRACTOR TO RE-SOD ALL AREAS DISTURBED DURING CONSTRUCTION.
5. NO DRAINAGE PROPOSED IN THIS PLAN SET. HOWEVER, CONTRACTOR TO INSTALL MATERIAL IN SUCH A WAY TO PROMOTE POSITIVE DRAINAGE.

CALL BEFORE YOU DIG!!!

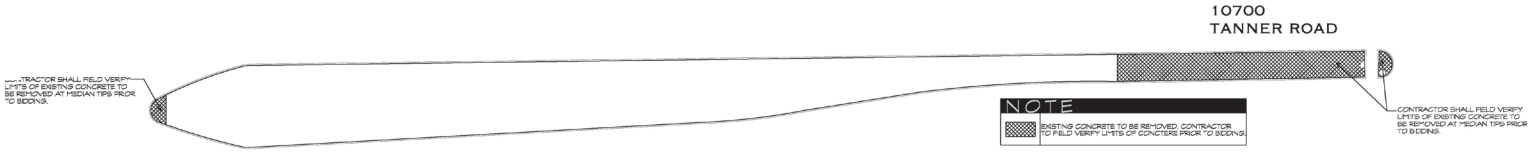
14. CONTRACTOR SHALL NOTIFY HARRIS COUNTY, HARRIS COUNTY PUBLIC INFRASTRUCTURE DEPARTMENT, OFFICE OF THE COUNTY ENGINNER, 48 HOURS BEFORE STARTING WORK ON THIS PROJECT. TELEPHONE NO. 713-755-5370
15. ANY UTILITIES PRESENTED ON THESE DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR TO NOTIFY TEXAS ONE CALL (IN HOUSTON) 713-223-4567 AND LONESTAR ONE CALL AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH HARRIS COUNTY, DEPARTMENT OF PUBLIC INFRASTRUCTURE'S STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST TO THE DISTRICT.
17. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE COUNTY ENGINEER, HARRIS COUNTY PUBLIC INFRASTRUCTURE DEPARTMENT VIA 713-755-5370 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
18. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OF BETTER.
19. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT.
20. TREE BRANCHES SHALL BE TRIMMED AND MAINTAINED TO A MINIMUM OF 24 INCHES FROM INSIDE OF CURB TO A HEIGHT OF 15 FEET FROM TOP OF CURB.
21. ALL SHRUBS TO BE MAINTAINED TO 30" IN HEIGHT.



5 MONUMENT SIGN PLAZA
SCALE: 1/4" = 1'-0"

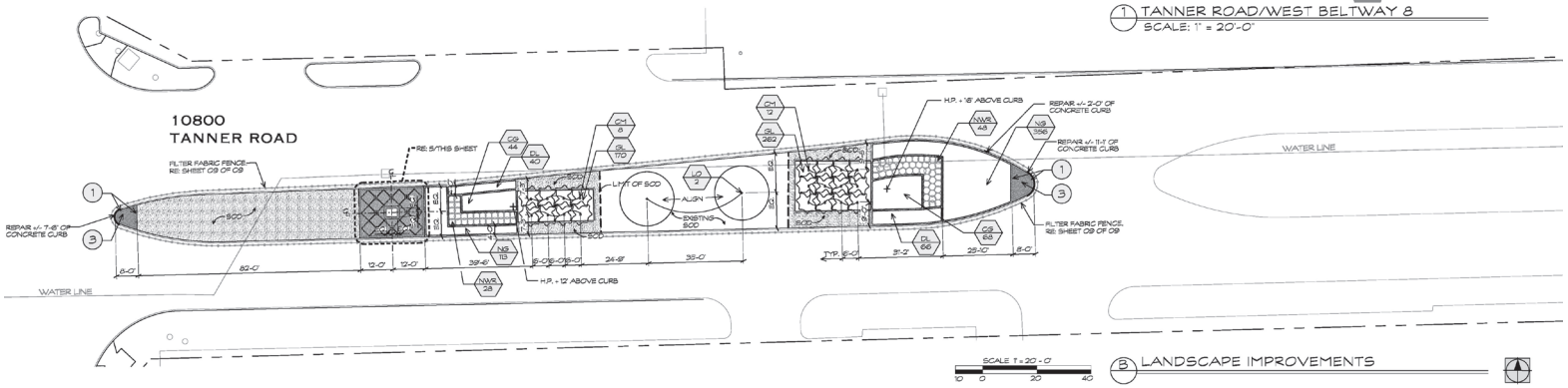


SCALE 1" = 20'-0"
3 MEDIAN IMPROVEMENTS



SCALE 1" = 20'-0"
A MEDIAN DEMOLITION

1 TANNER ROAD/WEST BELTWAY 8
SCALE: 1" = 20'-0"



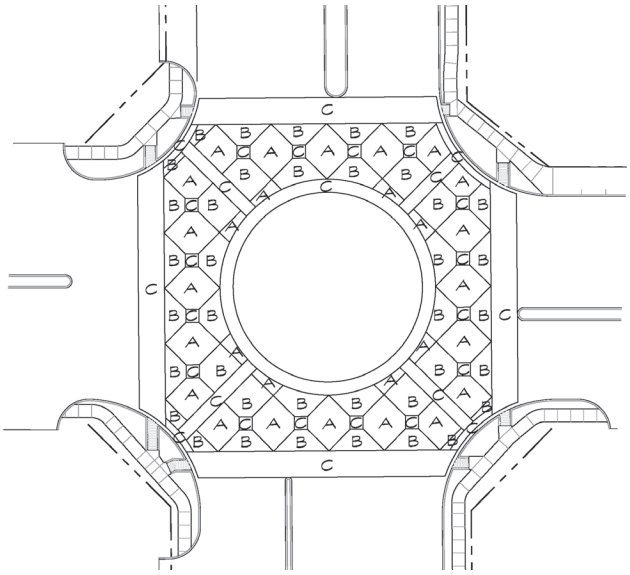
SCALE 1" = 20'-0"
3 LANDSCAPE IMPROVEMENTS

SCALE 1" = 20'-0"
A MEDIAN DEMOLITION

1 TANNER ROAD/BRITTMOORE ROAD
SCALE: 1" = 20'-0"

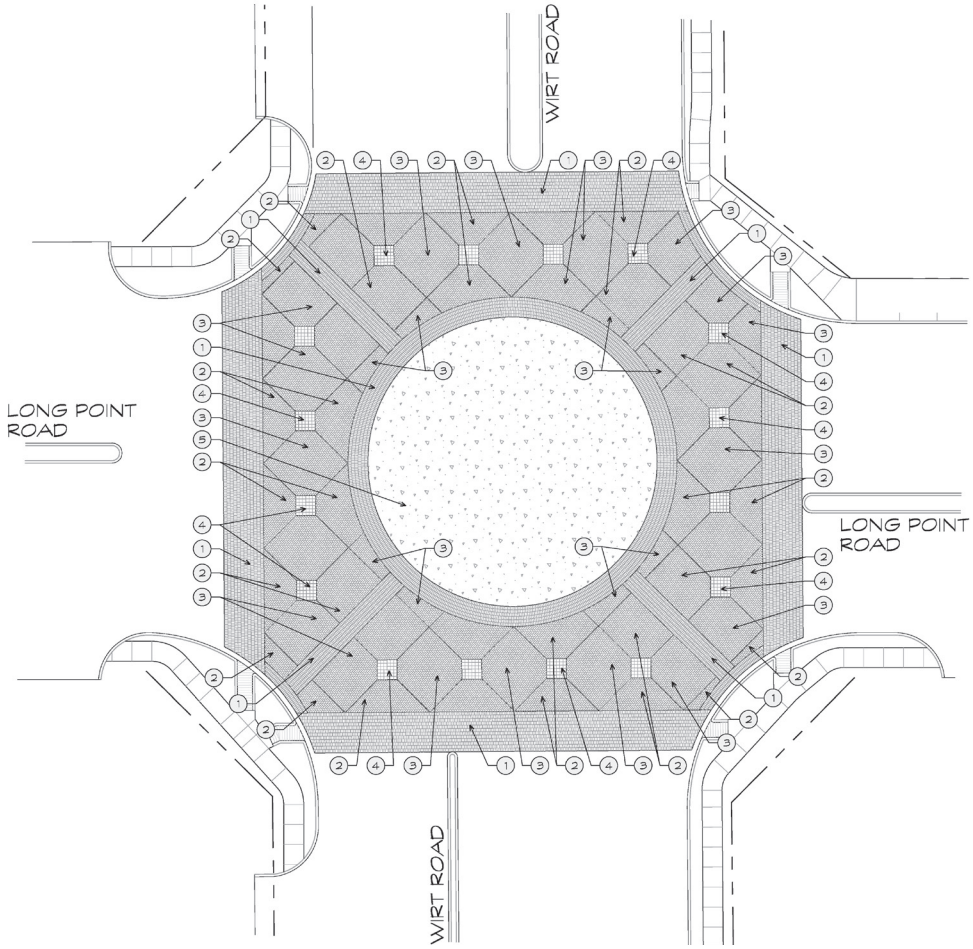
Source: Kudela + Weinheimer

INTERSECTION DETAILS



LEGEND	
1	CONCRETE UNIT PAVER ON CONCRETE SUBSLAB, SET ON 1" SAND LEVELING BED, PAVER COLOR TO BE,(C) COLOR TO BE CHARCOAL, SEE BELOW BY PAVESTONE, PAVER TO BE 4" x 8" 80mm, IN HERRINGBONE PATTERN, RE: 2/L1.01
2	CONCRETE UNIT PAVER ON CONCRETE SUBSLAB, SET ON 1" SAND LEVELING BED, PAVER COLOR TO BE,(B) COLOR TO BE BUFF, SEE BELOW BY PAVESTONE, PAVER TO BE 4" x 8" 80mm, IN HERRINGBONE PATTERN, RE: 2/L1.01
3	CONCRETE UNIT PAVER ON CONCRETE SUBSLAB, SET ON 1" SAND LEVELING BED, PAVER COLOR TO BE, (A) COLOR TO BE TAN, SEE BELOW BY PAVESTONE, PAVER TO BE 4" x 8" 80mm, IN SOLIDER COURSE PATTERN, SEE BELOW, RE: 2/L1.01
4	CONCRETE UNIT PAVER ON CONCRETE SUBSLAB, SET ON 1" SAND LEVELING BED, PAVER COLOR TO BE,(C) COLOR TO BE CHARCOAL, SEE BELOW BY PAVESTONE, PAVER TO BE 8" x 8" 80mm, IN STACKED SOLIDER COURSE PATTERN, SEE BELOW, RE: 2/L1.01
5	GREY CONCRETE, RE: CIVIL DRAWINGS

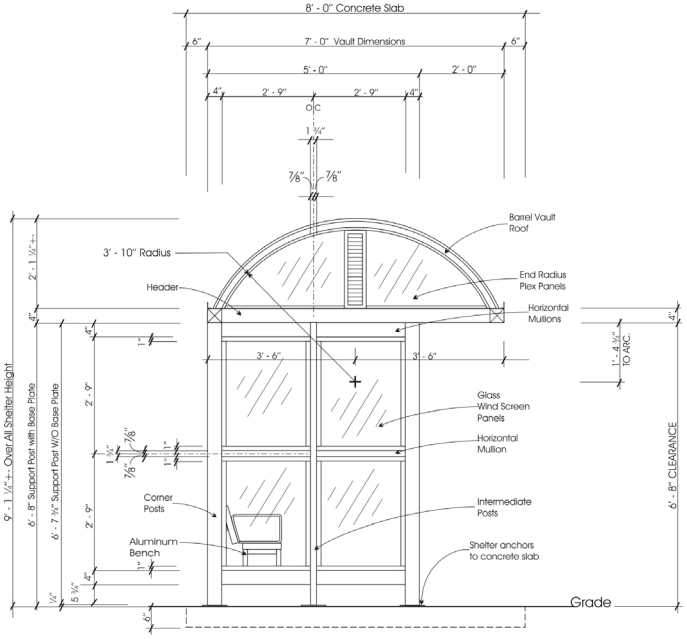
1 - PAVER COLOR CHART



2 - LONGPOINT WIRT INTERSECTION

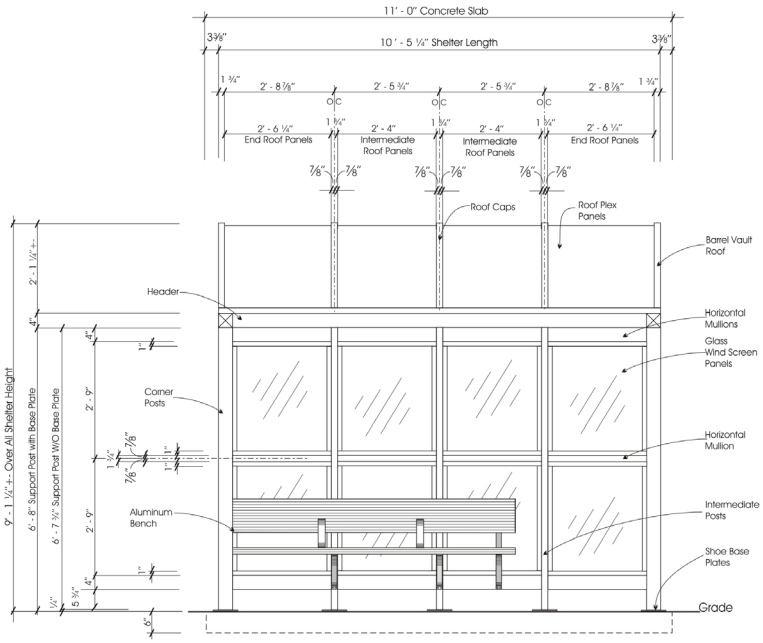
Source: Kudela + Weinheimer

BUS SHELTER DETAILS

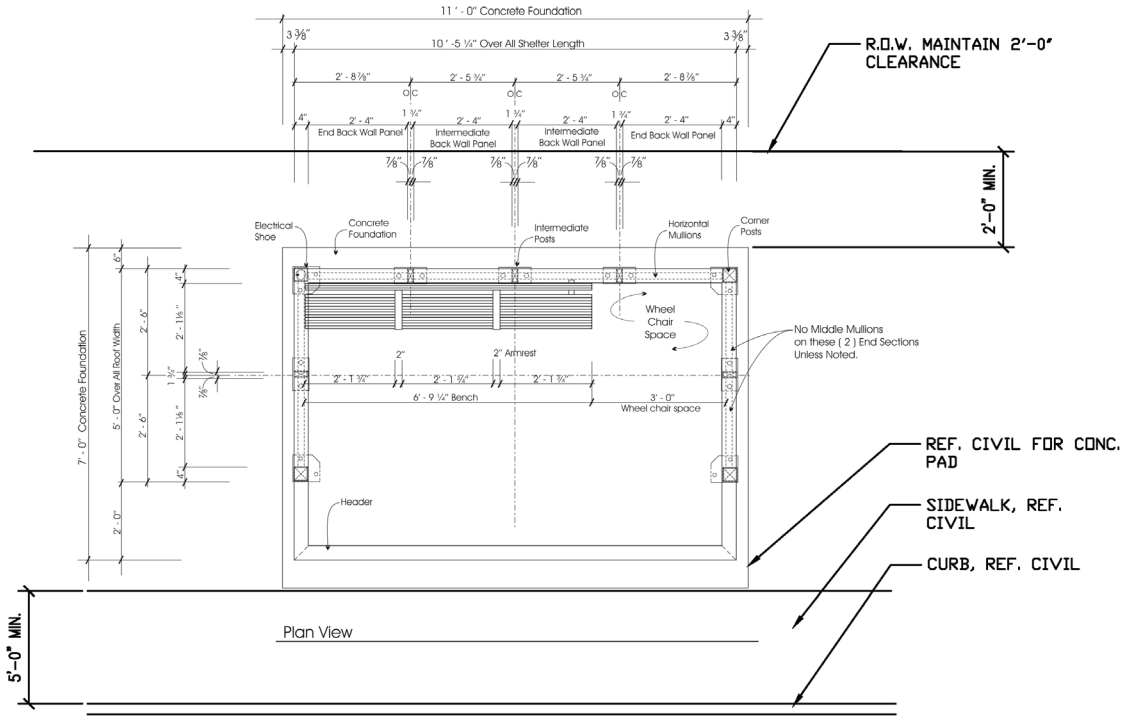


End Elevation A

Note: Opposite Elevation has (2) Full Length Glass Panes. See End Elevation B.

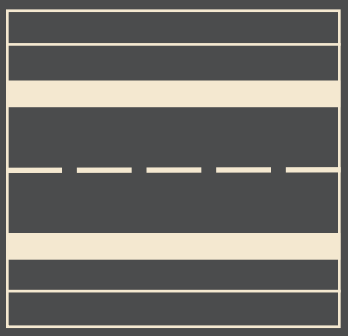


Front Elevation



Plan View






SWA GROUP