



City Mobility Planning

Houston

Northwest Sub-regional Study



This Page Intentionally Left Blank

City Mobility Planning

Northwest Sub-regional Study
January, 2015

Prepared for:
City of Houston



Prepared by:
Kimley-Horn and Associates, Inc.



Kimley-Horn
and Associates, Inc.



City Mobility Planning

Northwest Sub-regional Study Special Thanks to:

The residents and stakeholders within the study area that attended meetings and provided feedback throughout the process.

Stakeholder Advisory Committee

Anibeth Turcios, Greater Northside Management District
Bakayak Nelson, Harris Co. Public Health & Environmental Services
Carra Moroni, COH - Health and Human Services
Craig Powers, Oak Forest Homeowners Association
David Gao, H-GAC
Davis Graves, HPB
Debbie Khymer, Ridgepoint
Council Member Ed Gonzalez, District H
Eileen Egan, Near Northwest Management District

Hans-Michael Ruthe, H-GAC
Heng Weng, H-GAC
Janice Maaskant, Harris Co. Public Infrastructure Department
Jim Mackey, White Oak Bayou Association
Jim Webb, The Goodman Corporation
Jose Trevino
Larry Badon, Houston METRO
Laura Tromp, COH - Council Member Ed Gonzalez' Office
Loyd Smith, Harris Co. Public Infrastructure Department
Marco Montes, Harris Co. Precinct 4

Nancy Wilcox, White Oak Bayou Association
Paul Dugal, COH - Parking Management
Rachael Die, COH - Parks & Recreation Department
Ralph Deleon, COH - Economic Development, Mayor Office
Rebecca Reyna, Greater Northside Management District
Rob Block, Avenue CDC
Stacy Slawinski, Harris Co., Public Infrastructure Department
Tom Gall, Bike Houston
Virginia Duke, Lindale Park Civic Club

City Staff

Khang M. Nguyen - Project Manager, Public Works & Engineering Department
Amar Mohite - Co-Project Manager, Planning & Development Department
Jeffrey Weatherford - Deputy Director, Public Works & Engineering Department
Anita Hollmann - Senior Transportation Planner

Table of Contents

I. Introduction.....	7	V. Changing Mobility Considerations.....	39	VIII. Next Steps.....	131
1.1 The Study Area.....	9	5.1 Addressing the Shift in How Transportation is Viewed	39	8.1 The Purpose of this Study.....	131
1.2 Study Area Objectives and Tools	11	5.2 Complete Streets and Houston	40	8.2 Outcomes of this Study.....	132
II. Northwest Existing Conditions	15	5.3 Health in the Community	42	X. Appendix A: Data Collection.....	136
2.1 2013 Major Thoroughfare and Freeway Plan.....	16	5.4 Street Connectivity Considerations	44	X. Appendix B: Thoroughfare Types	148
2.2 Existing Transit Routes	18	5.5 Bicycle User and Facility	50	X. Appendix C: Transit Analysis	152
2.3 Existing Bicycle Facilities.....	20	5.6 Sidewalk Design Considerations	56	X. Appendix D: Travel Demand Results	158
2.4 Existing Travel Conditions by Period of Day	22	5.7 Transit Corridor Selection	58		
		5.8 Intersection Design Considerations	60		
		5.9 Integration of Modal Types	64		
III. Community Involvement	27	VI. A Balanced Approach	67		
3.1 Public Meeting #1:.....	28	6.1 Defining the Priority Elements	68		
3.2 Stakeholder Meeting #1:	28	6.2 Corridor Sheets	73		
3.3 Stakeholder Meeting #2:.....	29				
3.4 Public Meeting #2.....	30	VII. Outcomes.....	107		
IV. Defining Future Mobility Conditions....	33	7.1 2035 Major Thoroughfare and Freeway Plan.....	108		
4.1 Travel Demand Forecasting	33	7.2 Intersection Analysis.....	110		
		7.3 Bike Vision Map.....	124		
		7.4 Transit and Pedestrian Vision Map.....	126		
		7.5 Multi-Modal Classification Map.....	128		

This Page Intentionally Left Blank

I. Introduction

In 2009 the City of Houston adopted the City Mobility Plan or **CMP Phase I**, which proposed a new process for developing mobility solutions. These solutions focused on enhancing the capitalized investment made in transportation infrastructure projects by identifying multi-modal system improvements that could be made at the time of corridor development or redevelopment (i.e. CIP, Rebuild Houston, TIP, etc.). The idea was that as the City invested in certain utility improvements – such as sewer or storm water upgrades – a systematic approach could also be made to increase the general capacity or number of users in a corridor via multi-modal considerations.

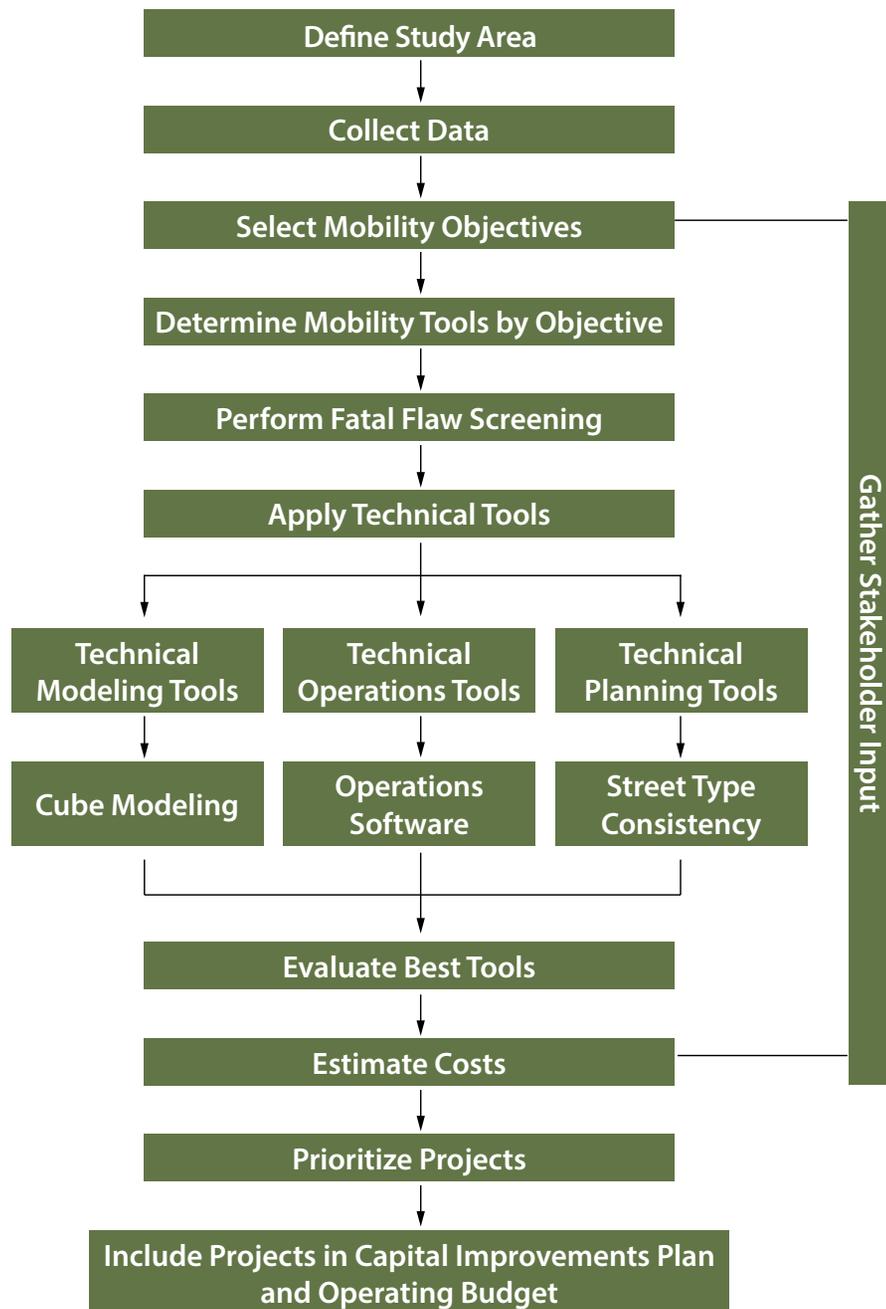
One of the outcomes of the CMP Phase 1 was a series of technical memorandums, one of which – Technical Memorandum 3: Functional Street Classification – highlighted and further illustrated corridor considerations as they pertained to bicycle, pedestrian, freight and transit considerations. The corridor considerations were eventually adopted into Appendix 2 of the City's Infrastructure Design Manual. Similarly, this also resulted in the Model Verification and Validation process as highlighted in Technical Memorandum 4, which today is used as one of the many analytical tools for sub-regional corridor evaluations.

The City wants to move the greatest number of people and goods in the most efficient manner along its corridors. CMP Phase II focuses on sub-regional studies located throughout the City in which multi-modal classifications can be further evaluated. Although not exhaustive, **Figure 1.1** represents those studies which have either been completed or are pending completion in the near future.

In short, the purpose of **CMP Phase II** and the sub-regional studies is to take a deeper assessment of the corridor network to ensure those recommendations developed during Phase 1 of the CMP process are appropriate at not only the regional level, but the neighborhood level as well. The project team worked extensively with sub-regional stakeholders such as local agencies, management entities and other interest groups to ensure concerns and related visions for development within the area were fully understood before recommendations were formulated. The result is an intricate set of recommendations that look at both the individual corridor (See **Chapter VI. A Balanced Approach**), as well as the greater transportation network, as it pertains to individual systems such as bicycle and transit networks (See **Chapter VII. Outcomes**).



FIGURE 1.1: CMP II: SUBREGIONAL PLANS



The flow chart on the left specifies the process that was undertaken to identify specific mobility projects within the Northwest Study Area. The process starts with defining the Study Area and moves to data collection. Once those steps are complete, the process continues to selecting mobility objectives and mobility tools. This is followed by performing a fatal flaw screening of the selected objectives and tools. Public and stakeholder input is gathered throughout all of these steps. Once the fatal flaw screening is complete, we will use technical modeling tools, technical operations tools, and technical planning tools to develop a series of mobility options. These tools provide an opportunity to evaluate the mobility needs in the sub-area and provide additional analysis that can be used to prioritize preliminary intersection projects with respect to cost and benefit. The direct output from this process is a prioritized list of intersection improvement projects and a vision of the major thoroughfares for the sub-area that can be integrated into the Capital Improvements Plan (CIP) and operating budget.

The overall project development process does not stop once funding is programmed; rather a new process for design and construction of the corridor improvements takes control of the specifics for each project. That information is beyond the scope of this planning study, however, guidelines are established later in this document that demonstrate appropriate points of stakeholder involvement in that design process.

FIGURE 1.2

1.1 The Study Area

The boundary of the Northwest Study Area borders the historical Heights neighborhood to its south and is bounded on the east by Interstate Highway 45, on the west by U.S. Highway 290, on the north by Beltway 8, and on the south by Interstate Highway 610 (West Loop).

The Northwest Study Area represents one of the first sub-regional study areas that is more “suburban” in nature resulting in a thoroughfare and street network that is less grid-like and more separated than in an urban context. As expected, primary commercial uses are situated along many of these primary corridors, and residential developments are tucked away in largely disconnected residential cul-de-sacs (see section [5.5 Street Connectivity Considerations](#) for more information). The Study Area is also home to many industrial and manufacturing uses that are dispersed throughout various neighborhoods. This pattern of development presents a unique



transportation consideration where the movement of goods is constantly in conflict with the movement of people.

Given the lower residential density of the Study Area, many of the proposed thoroughfares have yet to be constructed resulting in a relatively disconnected network.

The Study Area is further complicated by the jurisdictional boundaries where the northern portion is located in Harris County and in the Houston’s extraterritorial jurisdiction (ETJ), while the southern portion is located within the City’s corporate limits. As a result, any recommendations resulting from this Study must consider implementation processes and considerations of not only the city of Houston, but Harris County as well.

Provided recommendations resulting from this study are intended to represent a provided vision of what the greater transportation system and related corridors could look like. Recommendations are not representative of what can be built today. Harris County restrictions of today include:

- Sidewalks are currently not encouraged along Major Thoroughfares, but are considered a priority in residential subdivisions and schools.
- Shared-use paths (defined in Section 5.5 Bicycle User and Facility) are currently not built within the County due to restricted right-of-way. Where appropriate the County encourages partnership with other agencies to build such facilities adjacent to the road right-of-way so ensure safe street crossings.
- Bike lanes are currently not constructed along roads within the County.

1.2 Study Area Objectives and Tools

A number of mobility objectives resulted from the 2009 City Mobility Plan (CMP) which provide the foundation for the assumptions and related tools used for the purpose of this study. [CMP Goals and Objectives](#) include:

- Increased access to transit facilities
- Increased access to pedestrian facilities
- Increased access to bicycle facilities
- Improved connectivity of the system
- Better accommodations for the movement of freight
- Cost efficiency
- Minimized travel times
- Reliable commuting options
- Reduction in congestion
- Minimized conflict points within the network
- Safe and secure environment for pedestrians and bicyclists
- Neighborhood traffic
- Air quality conformity to State standard
- Improved ability to maintain infrastructure
- Maintain a system that is energy efficient
- Improved corridor aesthetics
- Enhanced pedestrian amenities
- Pedestrian-scaled streets
- Facilitation of all modes of travel
- Accommodate the movement of freight (Truck and Rail)

The public outreach portion of the process identified several goals from various stakeholders:

- Enhance safety
 - » At intersections
 - » For pedestrians and bicyclists
- Increase multi-modal alternatives
- Improve and increase connections to destinations

Associated tools that related to the defined goals and objectives have been sorted into three categories below:

- Technical Modeling Solutions – those that can be analyzed using the Regional Travel Demand Model,
- Technical Operations Solutions – those that can be analyzed using traffic analysis software such as SYNCHRO, and
- Technical Planning Solutions – those that are not represented well within either modeling platform whose results are often qualitative in nature.

Where appropriate, potential solutions may be geared for motorized, non-motorized, or alternative transport options such as mass transit. As list of these tool types can be seen in [Figure 1.4](#)

City Mobility Planning Toolbox

Motorized Tools



Traffic calming slows or reduces automobile traffic, improving the safety for pedestrians and cyclists. Techniques include speed humps, textured paving, curb extension, pedestrian crossing islands, traffic circles, and reduced turning radii.



Intersection design controls traffic movement where two or more streets cross. Improvements include left-turn bays, right-turn slip lanes, flared lanes to increase intersection capacity, reduced turning radii to increase intersection awareness, and protected bicycle turn spaces.



Signal timing is coordinating the sequence and timing of traffic signal phases. Signal timing can increase the efficiency of the street by allowing for the greatest number of vehicles to cross the intersection in the shortest time.



Access management techniques help increase the mobility and safety of a particular corridor by consolidating driveways and controlling access to adjacent land uses by influencing access location, design, spacing and operation.



Medians are traffic islands installed to prevent or ensure certain turning movements at intersections. They also provide a separation between opposing traffic lanes. Medians eliminate cut-through traffic, change driving patterns, beautify streets with greenery, and increase pedestrian safety for crossing streets.

Non-Motorized Tools



Sidewalks are important to the pedestrian traveler. Wider sidewalks in commercial areas facilitate a mix of uses. The addition of streetscaping can promote pedestrian use.



Bike lanes are located on the edge of a street or between the travel lanes and parking lanes. Typically, they are 5-6 feet wide and allow cyclist to have a protected space on the street.



Streetscaping refers to the use of planted areas and other beautifying techniques along corridors that can attract pedestrians and make pedestrian and bicycle use more pleasant.



Pedestrian crossings connect neighborhoods and can be at intersections or mid-block. Signal timing and pedestrian "islands" can improve safety for walkers.



Sharrows are special lane markings for roads too narrow to accommodate a separate bike lane. These markings alert drivers to the likelihood of encountering bicyclists.

Alternative Transport Tools



Rapid transit comes in two forms: Light Rail Transit (LRT) and Bus Rapid Transit (BRT). Bus Rapid Transit has the unique ability to function in either an exclusive right-of-way (ROW) or in mixed traffic. However, the most common application assumes an exclusive ROW for operational efficiency and safety.



Commuter rail service connects the large master planned communities around the region, the surrounding towns, and even nearby cities, with the urban core.



Road space rationing or reallocation reserves parking and other road uses for preferred modes such as carpools, vanpools, energy-efficient vehicles, and public transit vehicles.



Travel demand management refers to a set of strategies to reduce the use of city roadways to decrease congestion and the infrastructural burden of intense use, especially by single-occupancy vehicles.



Park and ride lots encourage transit usage for people who are not within walking distance of a transit station. These lots typically adjoin suburban bus and rail stations to reduce the number of cars in the urban core.

FIGURE 1.4

This Page Intentionally Left Blank

This Page Intentionally Left Blank

II. Northwest Existing Conditions

The Mobility Plan for the Northwest Study Area is intended to develop mobility solutions for those living, working, and traveling through the area. To better understand the mobility issues, both quantitative and qualitative data were utilized. Examples of quantitative data include an evaluation of area demographics, vehicular traffic counts, transit ridership, right-of-way evaluations, and other corridor-specific plans. Qualitative data, acquired directly through public and stakeholder feedback, was further evaluated. Examples include locations of desired bike facilities, concerns regarding safety at intersection crossings, as well as locations of perceived congestion by the public.

For more information regarding analysis not highlighted directly in this chapter, see [Appendix A: Data Collection](#).



PHOTO PROVIDED COURTESY CITY OF HOUSTON

2.1 2013 Major Thoroughfare and Freeway Plan

The City of Houston's Major Thoroughfare and Freeway Plan (MTFP) identifies all major corridors within the City of Houston and its surrounding extraterritorial jurisdiction (ETJ). Freeways and Major Thoroughfares represent those roadways which adhere to the movement of large volumes of traffic (regardless of mode) over long distances. Collectors and Local Streets form the network that provides access to residential properties, private developments, and other neighborhood amenities such as parks, schools, or grocery stores. Based on these definitions, Freeways and Major Thoroughfares are designed to optimize mobility, while Collectors and Local Streets provide the greatest potential for increased access. The MTFP maintains the provided hierarchical classification for Major Thoroughfares and associated Collector Streets.

The Northwest Study Area consists of mostly Major Thoroughfares with a few Major Collectors designated on the MTFP. The prevalent issue in this region is a lack of street continuation and connectivity of existing roadways where:

- Many of the Major Thoroughfares are not yet built and hence provide for a noted gap within the existing system of roadways. Future congestion of the network depends greatly on when and where these gaps are completed.

- The White Oak Bayou presents a challenge to street connectivity especially where it intersects with major and local roadways. Due to cost associated with bridge construction, variances for roadway continuation across certain portions of these bayous are often granted.
- Given presence of industrial and manufacturing facilities within the Study Area, freight traffic movement is prevalent within this context, but more evident along corridors such as Fairbanks North Houston, Fall Brook Drive, Breen and Bingle/ North Houston Rosslyn Road.

The City of Houston's current MTFP identifies (as shown in [Figure 2.1](#)) the Major Thoroughfares and Major Collectors within the Study Area that have sufficient width (solid lines), need to be widened (double dashed line), or need to be acquired (dashed line). Most of the thoroughfares are of sufficient width, but portions of the following corridors need more right-of-way.



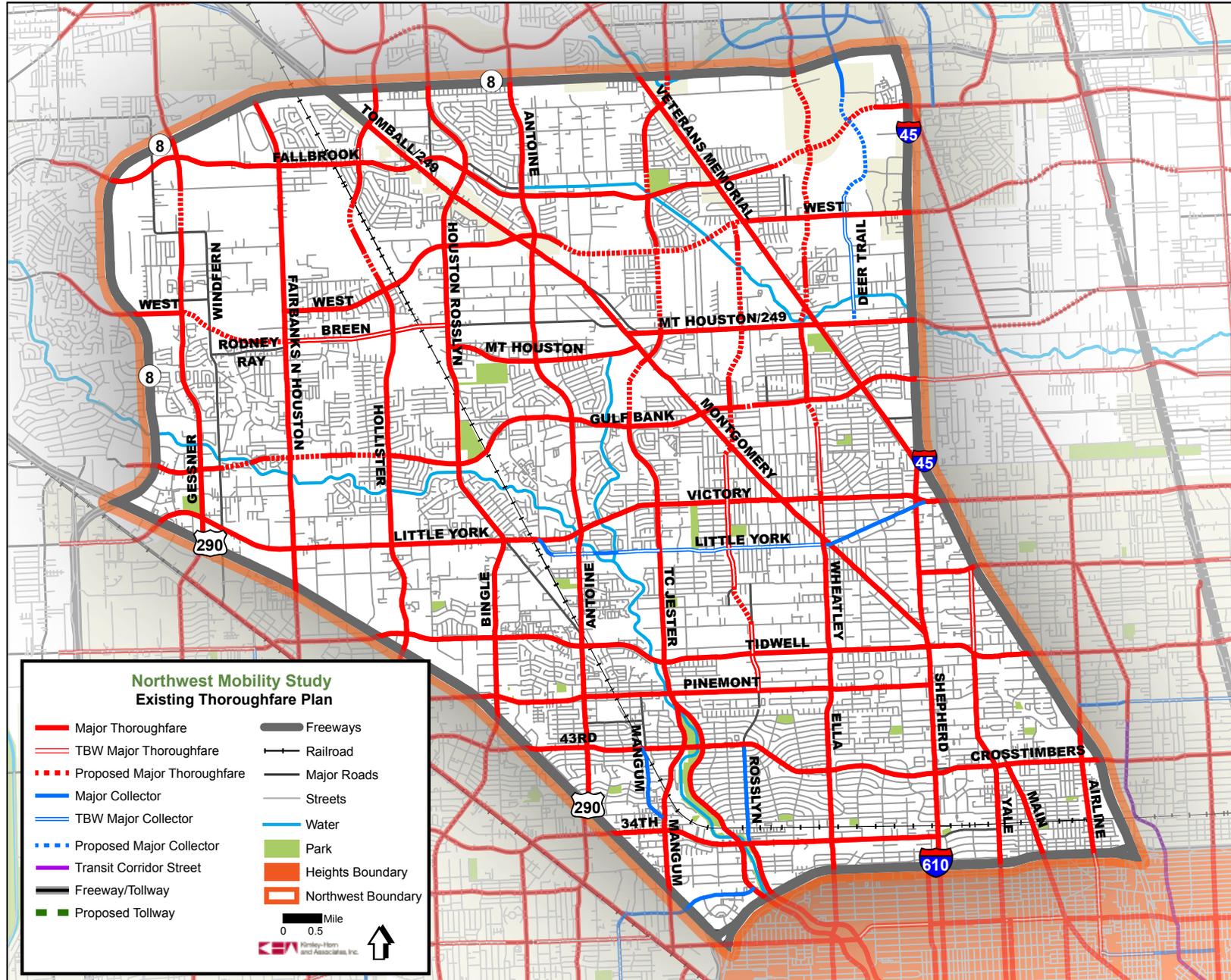


FIGURE 2.1

2.2 Existing Transit Routes

The Metropolitan Transit Authority of Harris County (METRO) is the transit service provider for the City of Houston. Currently, 14 transit routes with bus stops exist within the Northwest Study Area, as shown by [Figure 2.2](#). Routes within the Northwest Area facilitate the movement of passengers mostly within the city limits of Houston, or along the freeways.

Many neighborhoods within the Study Area are not served by a transit route, and the location of Park and Ride facilities are spaced far apart in this expansive area. The METRO Park and Ride facilities are located in two areas: Veterans Memorial Dr. at Shepherd Drive and Tomball Parkway at Seton Lake Drive. A third Park and Ride location - Pinemont Drive at Federal Plaza Drive - closed in January of 2014 due to the expansion of the U.S. 290

corridor. Rider traffic is anticipated to be diverted to the Northwest Transit Center near the 610 Loop at Little York Drive and West Montgomery Drive or the West Little York Park and Ride which lies just west of the study area south of U.S. 290.

METRO is also undergoing a transit system reimagining project that takes a fresh look at the METRO bus network. Although the study is pending completion, the overarching goal is to improve and expand upon existing transit service by consolidating routes and increasing frequency. As such, all recommendations emerging from this Study Area analysis is fully vetted by participating METRO Stakeholder committee members.



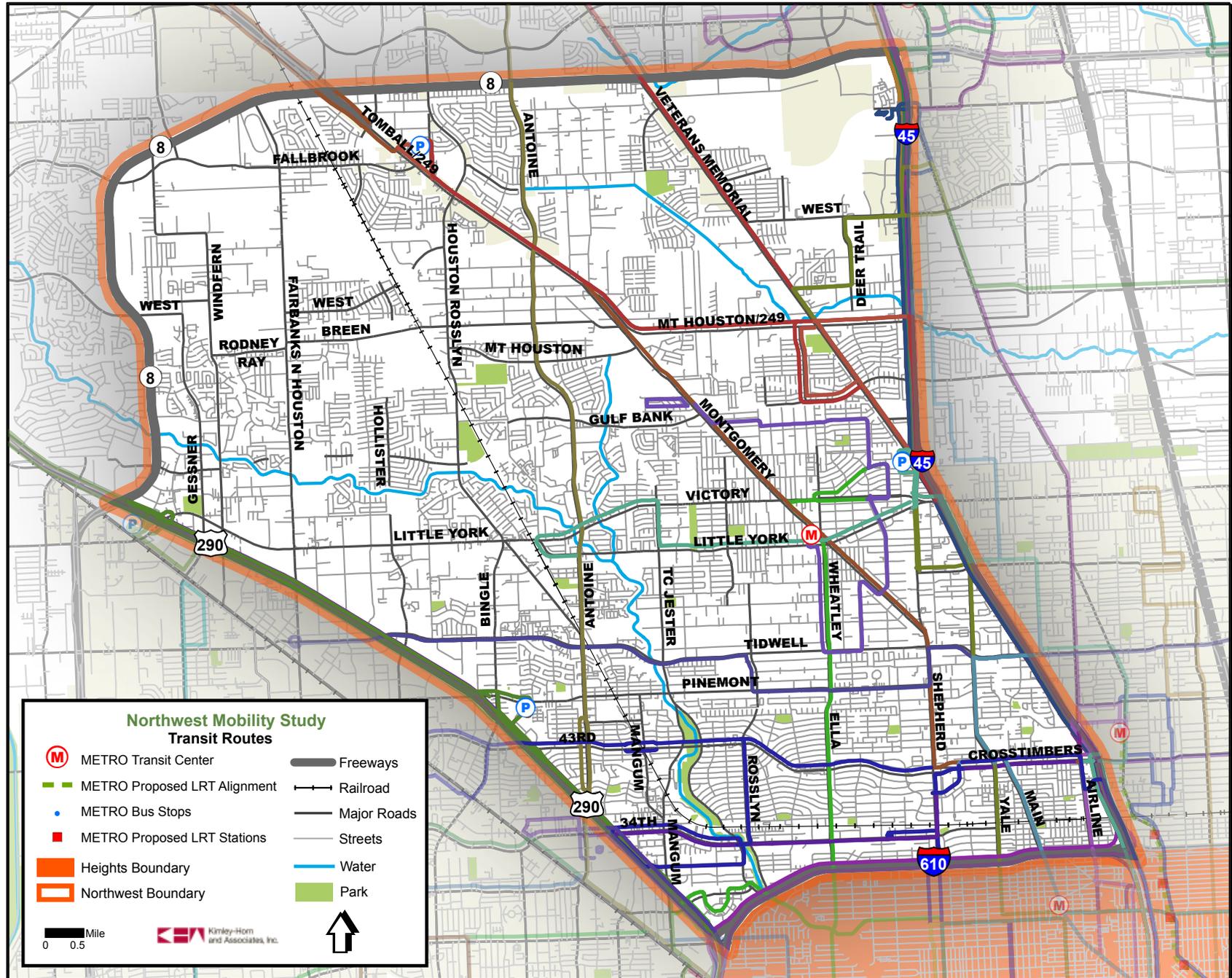


FIGURE 2.2

2.3 Existing Bicycle Facilities

There are a limited number of existing bicycle facilities in the Northwest Study Area, and are mainly located within the City Limits. Bicycle facilities for the City of Houston are divided into four types: bike lane, shared lane (also known as a sharrow), shared-use path, and signed bike route. The existing facilities are identified in [Figure 2.3](#). Three of these four types are found in the Study Area - the Northwest does not have any designated shared lanes. A shared-use path exists on Antoine Drive from the White Oak Bayou shared-use trail to Pinemont Drive.

Most facilities within this area have developed as a way to bring cyclists to the White Oak Bayou Trail. Bike lanes and bike routes transition across the major east/west corridors where the corridor's street designs change. The on-street network is lacking north of Pinemont Drive. The expansion of the White Oak Bayou Trail will call for additional bicycle facilities to enable the movement of bikers from the neighborhoods to the trail.

Initial analysis of the network indicates a need to develop and expand the existing bicycle network. Specific attention should be given to:

- Movement of cyclists to the northern portion of the study area where on-street bike facilities are less likely do to corridor constraints and related speeds associated with regional roadways.
- Interstate crossings under surrounding Freeways between the Heights, Northside and the Greater Heights or Northwest neighborhoods.
- Key connection points - or trail heads - from on-street to off-street bike facility networks.



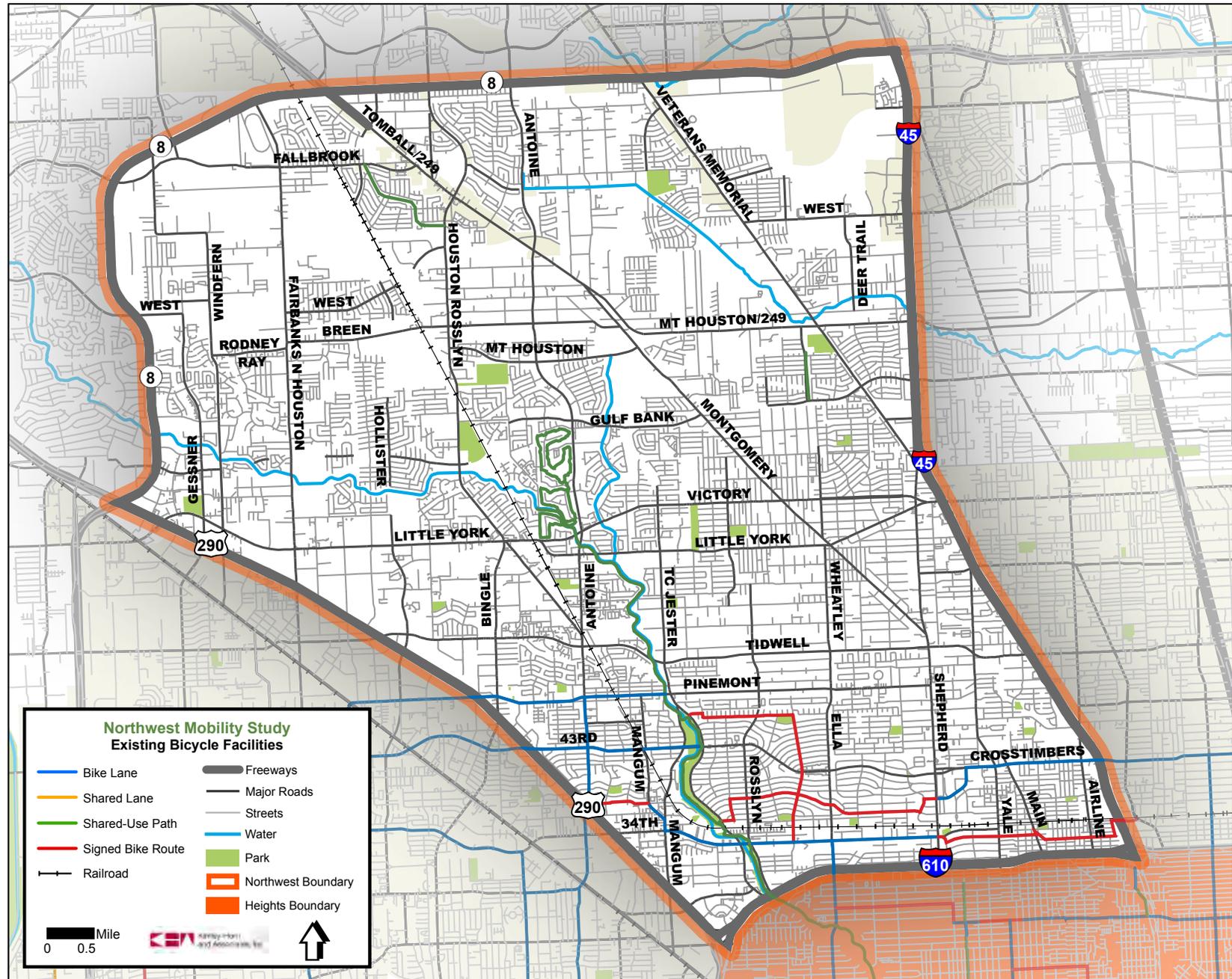


FIGURE 2.3

2.4 Existing Travel Conditions by Period of Day

Intersection Congestion

Intersection traffic counts and signal data are limited for this study area. Forty-one intersections were analyzed using SYNCHRO traffic analysis software. Available information was divided into two periods for study: AM peak period and PM peak period, when corridors are most heavily utilized by commuting traffic. Figures 2.5 and 2.6 depict level of service (LOS) at each intersection. LOS is a qualitative measure that gauges congestion on a grading scale similar to scholastic grading: LOS A represents free flowing traffic conditions with little or no delays and LOS F represents severe congestion, characterized by long queues and delays.

Certain intersections adjacent to highways are TxDOT property, and as such not within the scope of this study. Future coordination with TxDOT is essential to fully understand the best treatment options available to the City, and as approved by TxDOT. Similarly, where intersections are within a certain proximity of roadway, highway, or light-rail construction, intersection congestion was not evaluated. Current traffic patterns do not reflect (what will be) normal traffic patterns once construction is complete. Traffic patterns are expected to normalize one year after construction is complete.

Intersections with a rating of LOS E or LOS F, and thus representing maximum failure include:

- Victory at Little York: AM = LOS F; PM = LOS F
- Victory at Shepherd: AM = LOS F; PM = No Failure
- Little York at Houston Rosslyn: AM = LOS E; LOS E
- Tidwell at Shepherd: AM = LOS F; PM = LOS F
- 34th and Mangum: AM = No Failure; PM = LOS E
- 34th at Shepherd: AM = LOS F; PM = No Failure

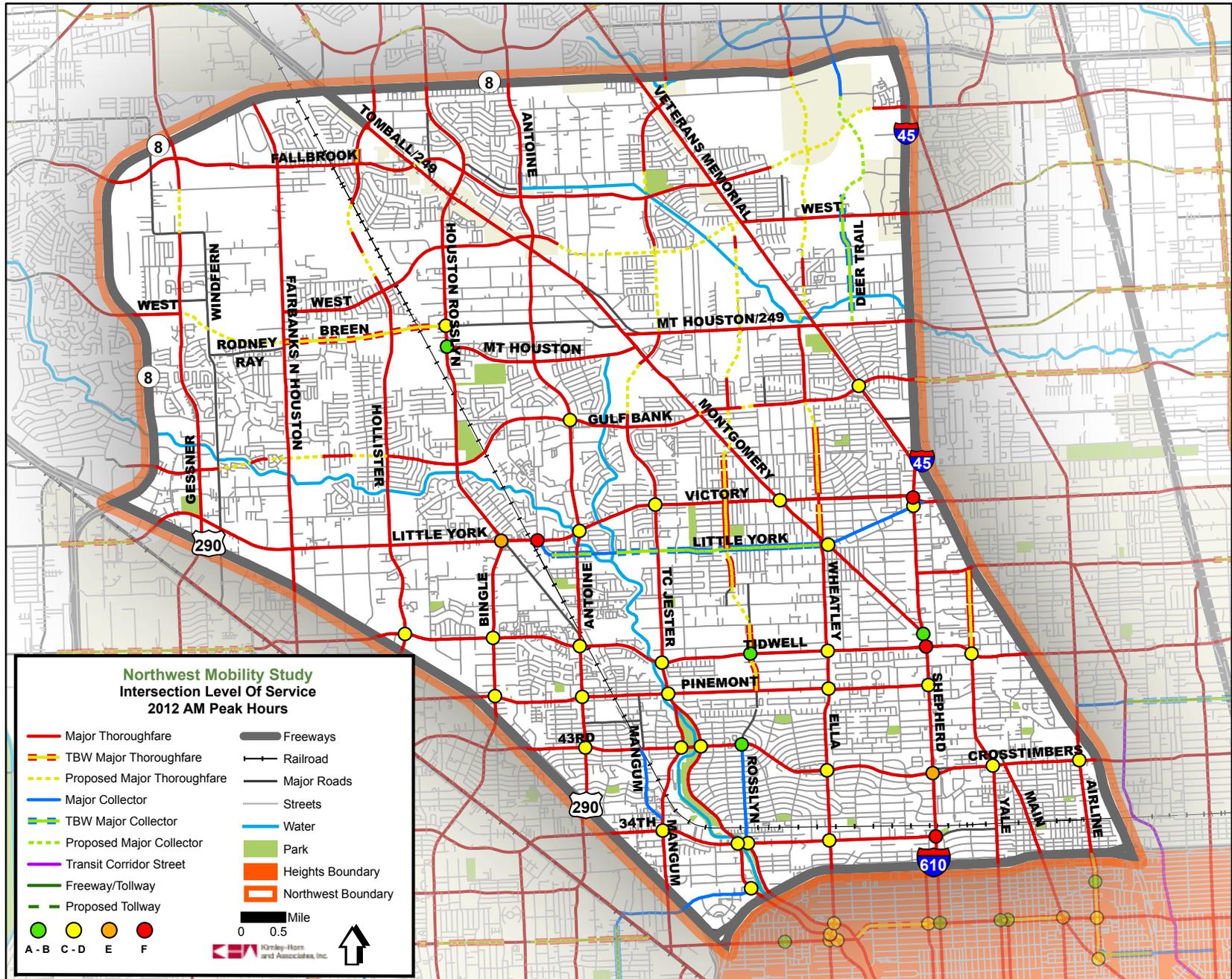


FIGURE 2.4

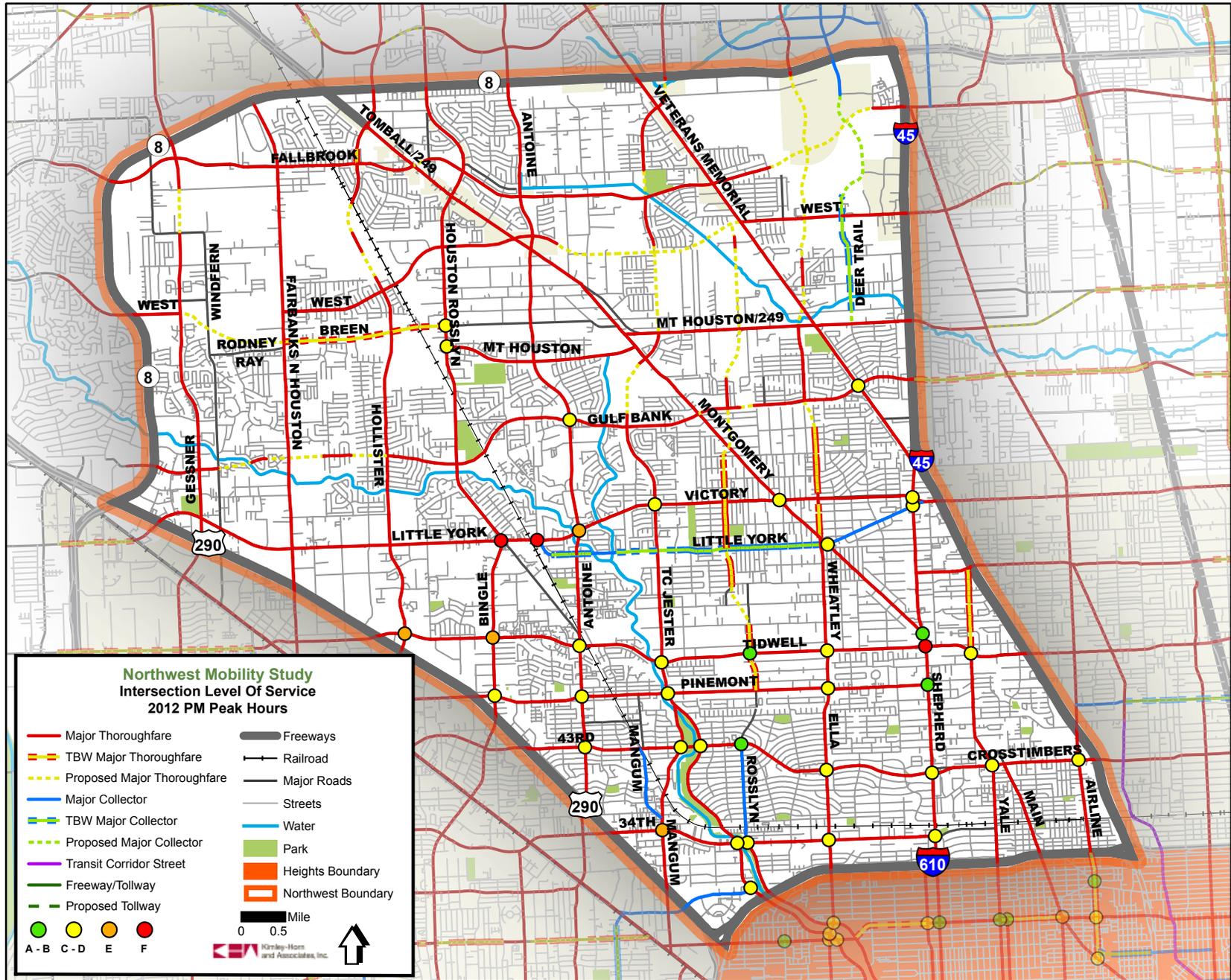


FIGURE 2.5

This Page Intentionally Left Blank

This Page Intentionally Left Blank

III. Community Involvement

Ongoing community and stakeholder involvement throughout the planning process was essential in developing a plan that balanced the general desires of the community with the mobility needs of the greater region. Community involvement was divided into two public and two stakeholder meetings. The first set of public and stakeholder meetings were held at the beginning of the study to better understand the mobility goals and preferences of the citizens and stakeholders. Follow up meetings were held before the finalization of recommendations to ensure the consultant team properly reflected ideas and concerns generated by the public and stakeholder committee alike.

In addition to the in-person meeting opportunities, the study also maintained an on-line platform where all interested parties could learn about the project, download related presentation material, and provide interactive comments in a blog-like format. Additionally, the public was able to provide comments on maps and preliminary corridor cross sections. Blog comments and discussions were also used interactively by citizens and stakeholders. The website for this study is <http://houston-northwest.org>.



3.1 Public Meeting #1:

Public Meeting #1 was held March 26, 2013. The purpose was to gather public insight on transportation related issues and opportunities within the Study Area. The meeting began with a presentation of the existing conditions as previously defined in this Report. The public was then provided the opportunity to ask questions in an open forum, and discuss ideas regarding improved modal options within their community. At the close of the meeting, participants were encouraged to document concerns, and potential ideas on a series of maps printed and made available for public review. All comments were evaluated by the project team, and summarized for review and consideration at stakeholder meetings.

3.2 Stakeholder Meeting #1:

The first stakeholder meeting was held on May 15, 2013, where participants were presented findings from the existing conditions analysis. In addition, public concerns and associated solutions as expressed during Public Meeting #1 were discussed.

Specifically, stakeholders were asked to provide direction to the project team regarding public input on several key issues including:

- Future road widening and connectivity
- Pedestrian elements
- Transit service improvements
- Intersection improvements
- Railroad Crossings

Utilizing this information, stakeholders worked with the project team to develop “big idea”



PHOTO PROVIDED COURTESY CITY OF HOUSTON



PHOTO PROVIDED COURTESY CITY OF HOUSTON

solutions that could ultimately be tested or modeled. For more information regarding modeling results, see [Chapter IV. Defining Future Mobility Conditions](#).

3.3 Stakeholder Meeting #2:

The second stakeholder meeting was held on August 19, 2013. Preliminary recommendations for road, pedestrian, bike, transit and intersection improvements were presented for review. Where appropriate, recommendations were improved upon by stakeholders to ensure issues raised during Public Meeting #1 and the first stakeholder meeting were being effectively considered.

A total of four big ideas, as presented during the first stakeholder meeting, were modeled and associated results presented. At the close of the meeting, scenarios 1 and 3 were deemed appropriate for further consideration. .

General consensus from Stakeholder Meeting #2 indicated that preliminary recommendations were on-par with public and stakeholder input, but several corridors required additional consideration. Stakeholders requested that local streets be evaluated as a potential multi-modal corridors, and not limit potential improvement to just Major Thoroughfares.



PHOTO PROVIDED COURTESY CITY OF HOUSTON



PHOTO PROVIDED COURTESY CITY OF HOUSTON

3.4 Public Meeting #2

Public Meeting #2 was held on April 1, 2014 at the Moody Park Community Center. The Project Team provided a brief summary the project team's efforts between Public Meeting #1 and Public Meeting #2. To provide a more transparent understanding of the directional changes currently ensuing within Houston's greater multi-modal conversation, changing mobility considerations were highlighted ([Chapter V: Changing Mobility Considerations](#)). The summary outlined certain adopted changes, such as the Mayor's Complete Streets Executive Order, as well as other ongoing policy considerations. Key Factors for each corridor - including transit, the pedestrian, bike, on-street parking and the vehicle - were evaluated per corridor ([Chapter VI: A Balanced Approach](#)) and within individual modal system ([Chapter VII: Outcomes](#)). Individual corridor sheets, as well as outcome boards, were displayed at the public meeting where participants were given the opportunity to provide feedback regarding recommendations.

3.5 Public Comment Period

The close of Public Meeting #2 signified the start of a 30-day public comment period on draft recommendations resulting from this study. Handwritten comments were submitted at the close of Public Meeting #2. Other avenues for public submission included the study's official e-mail address, as well as an interactive website which provided spatial representation of final system maps. Moreover, the website maintained an interactive blog where the public was encouraged to ask questions. All questions posted were answered by staff in a timely manner. Finally, all comments received were cataloged. Responses for each comment are provided by City Staff.

This Page Intentionally Left Blank

This Page Intentionally Left Blank

IV. Defining Future Mobility Conditions

4.1 Travel Demand Forecasting

The City of Houston and the Houston-Galveston Area Council (H-GAC), through an inter-local agreement, conducted the travel demand forecasting within the Study Area. The Travel Demand Model (the model) is a useful tool for comparing alternative transportation scenarios. The model assists in understanding the manner in which future population and employment will cause traffic to grow. The intent is to better understand the dynamics of a complex network of streets and to test what-if scenarios of different transportation solutions.

The City, H-GAC, and the project team worked together to update the 2035 demographic forecasts. The updates included existing building permits, development trends, and traffic studies.

Forecast Results - The Scenarios

The study team created four initial scenarios for the Northwest sub-area. These scenarios were designed to test big ideas from local stakeholders, professional staff, and the consultant team. The different scenarios include:

- Scenario 1 (Base Build-Out)
- Scenario 2 (Couplets)
- Scenario 3 (Capacity Projects)
- Scenario 4 (High Frequency Transit)
- Scenario 5 (Recommendations)

The scenarios were analyzed individually to allow for a comparison between different concepts. Ultimately, a combined scenario (Scenario 5) represents final recommendations the project team feels are realistic for implementation. The provided descriptions below demonstrate what modifications were made within each Scenario.

To view final 2035 projection numbers associated with each Scenario, see [Appendix E: Travel Demand Model Results](#).

Scenario 1 (Base Build-Out)

The Base Model scenario assumes the full development of all Major Thoroughfares and Major Collectors as identified in the 2013 MTFP. The effects of such recommendations on traffic volumes and congestion levels were evaluated in this scenario. The map of this scenario is found in [Figure 4.1](#).

Scenario 2 (Couplets)

This scenario was created specifically for the Heights-Northside Sub-regional Study, which was done in conjunction with this study. It is included in this Report for reference purposes only. The map of this scenario is shown in [Figure 4.2](#).

Scenario 3 (Capacity Projects)

Scenario 3 combines road expansion (as designated by the MTFP) and street reduction projects. The intent was to create a network that safely and reasonably supported a variety of mobility uses. This model is a more financially feasible option than the Base Model Scenario. The map of this scenario is found in [Figure 4.3](#).

Scenario 4 (High Frequency Transit)

Scenario 4: This high frequency transit scenario included transit routes which factored in public input, population growth, job growth, activity centers, and connectivity to other destinations (such as downtown or the Galleria). The increase in service was modeled by doubling the service frequency during the peak hours. Non-peak hour headways were also increased slightly. Ultimately, however, METRO is responsible for the frequency and stop locations of all City bus routes. The map of this scenario is found in [Figure 4.4](#).

Scenario 5 (Recommendations)

These four scenarios were analyzed separately and compared to the 2035 Base Model as provided by H-GAC (with the new 2035 demographics previously discussed). Scenario results were then taken to stakeholders for feedback. The provided input and the project team's analysis were combined to create Scenario 5. The result is a network of corridors that acknowledges the need for the expansion as well as the reduction of certain corridors (Scenario 3), increased High Frequency Transit Options (Scenario 4), and the completion of key east-west and north-south corridors as depicted on the Major Thoroughfare and Freeway Plan (Scenario 1). The map is found in [Figure 4.5](#).

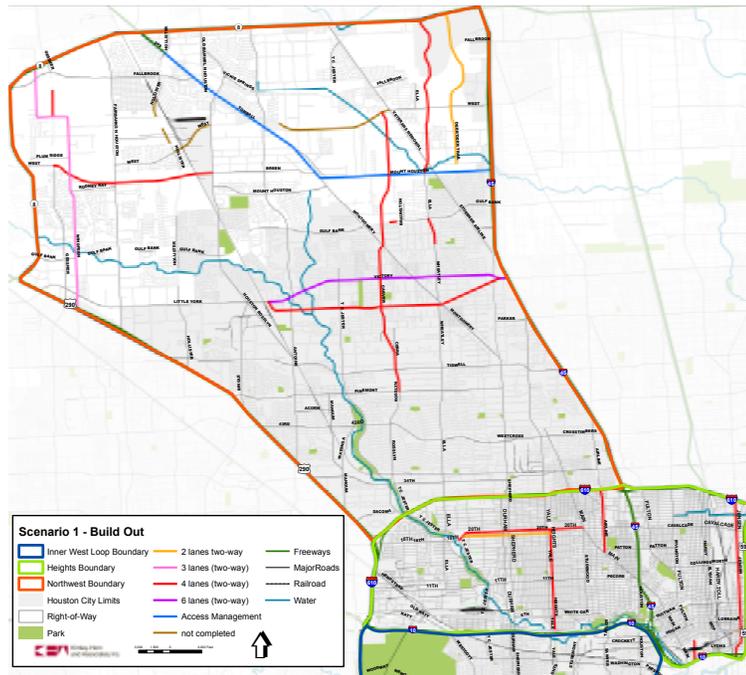


FIGURE 4.1 SCENARIO 1: BASE BUILD-OUT

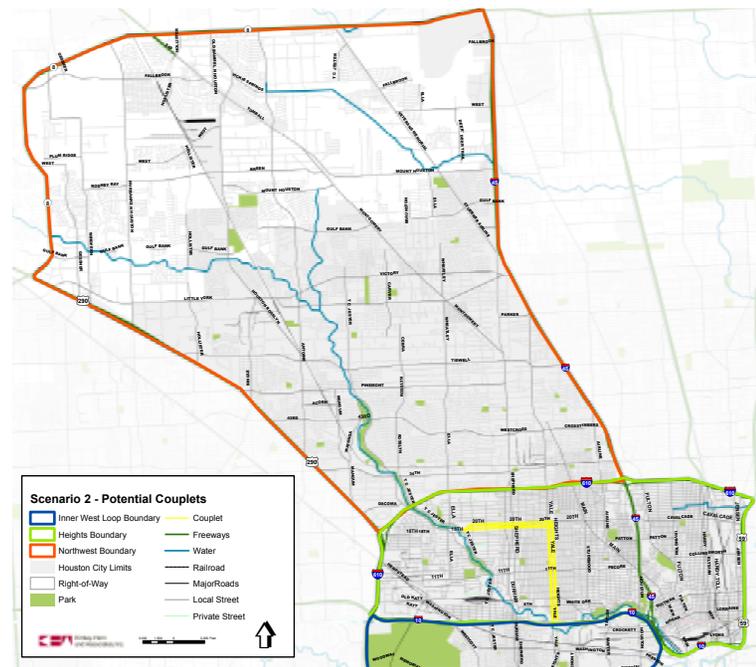


FIGURE 4.2 SCENARIO 2: COUPLETS

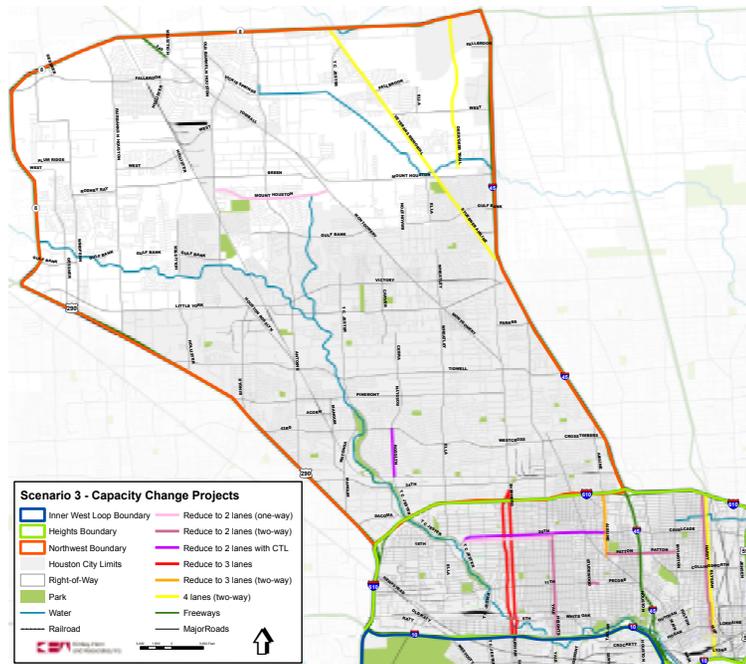


FIGURE 4.3 SCENARIO 3: CAPACITY PROJECTS

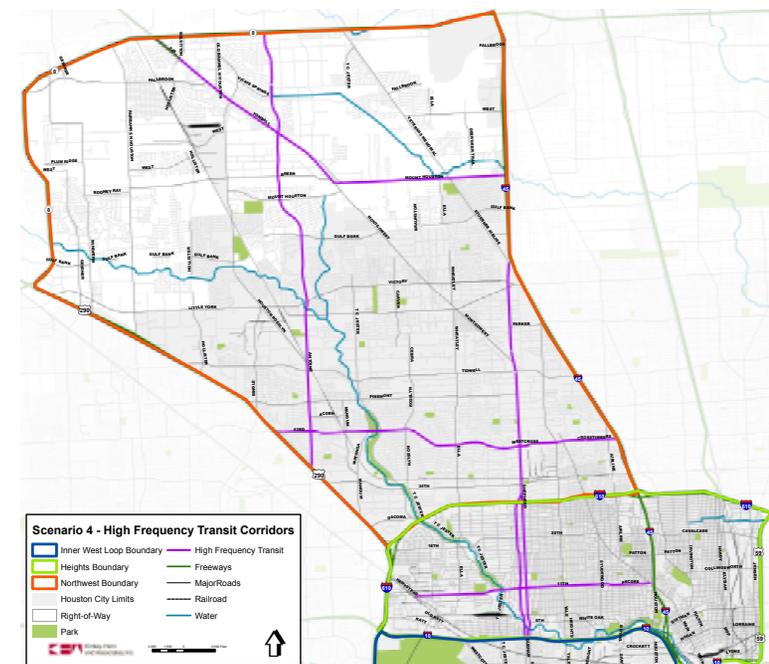


FIGURE 4.4 SCENARIO 4: HIGH FREQUENCY TRANSIT

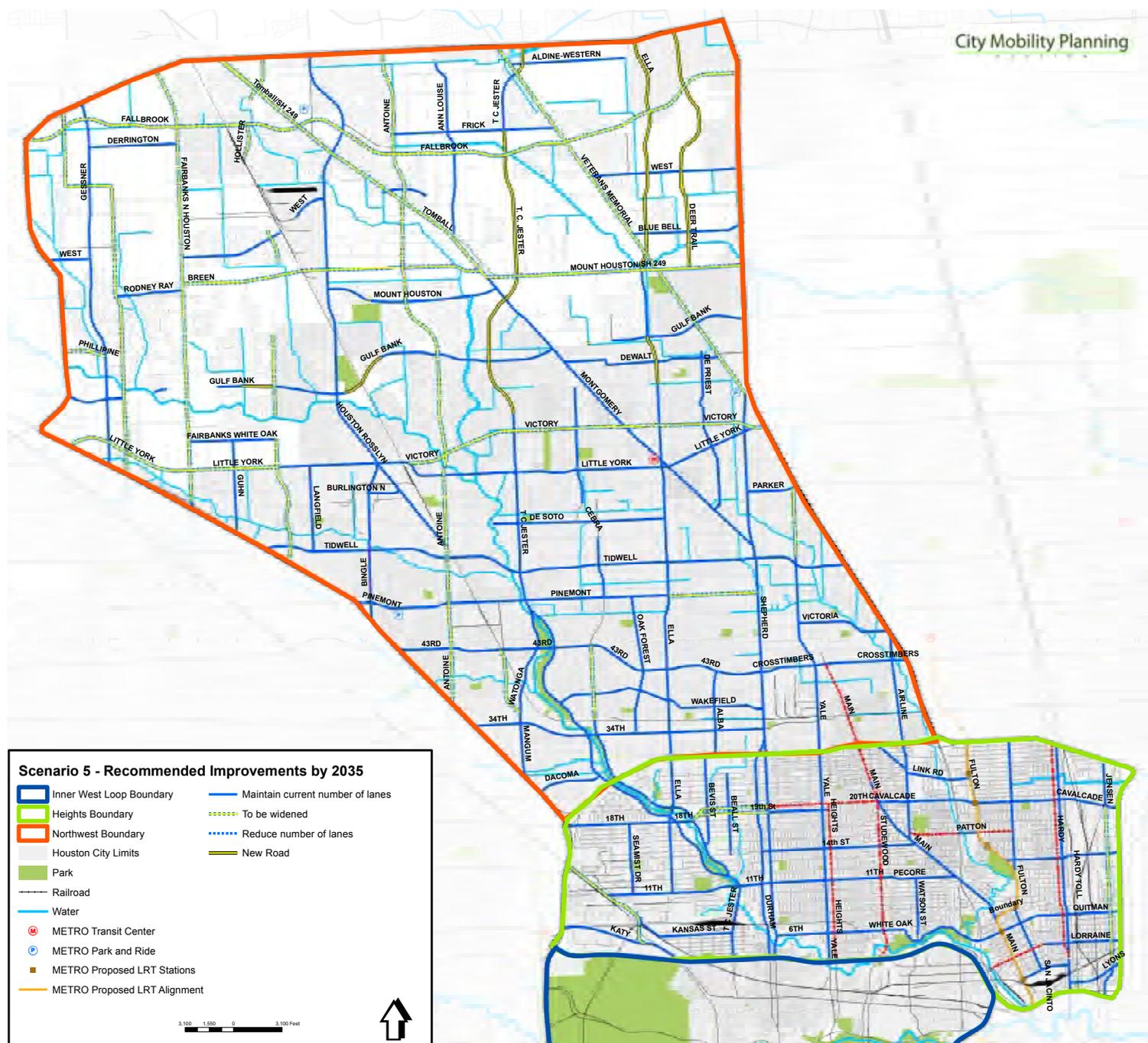


FIGURE 4.5 SCENARIO 5: RECOMMENDATIONS

This Page Intentionally Left Blank

This Page Intentionally Left Blank

V. Changing Mobility Considerations

5.1 Addressing the Shift in How Transportation is Viewed

During Phase I of the City Mobility Planning initiative, the City of Houston contemplated the concept of providing multi-modal transportation options within a corridor. That conversation led to the development of alternative design standards located within [Appendix 2 of Chapter 10](#) of the [Infrastructure Design Manual](#). These alternative cross-sections provide for a myriad of design configurations that promote multi-modal concepts in partnership with the automobile.

The City recognizes that automobile travel will continue to be a vital component of transportation within the region. This is especially true in areas with large job and population clusters of activity. The Northwest study area is no exception and is expected to see an increase in automobile traffic, especially as the area continues to attract new residential and commercial development. However, there is a need to shift the current approach of designing a roadway for the maximum capacity of *vehicles* to the maximum movement of *people* before a corridor reaches system failure; this allows a corridor to be utilized to its fullest potential within a restricted right-of-way. Incorporating alternative

modes of transportation into the system design before network failure, extends the capacity of the existing system by encouraging modal change of the user. By providing users with safe, alternative modal options, the burden of limited space along street corridors to be widened for automobile travel only can be balanced by alternative facility types which can accommodate more people in a smaller space (i.e. Bus transit or bicycle facilities).

The following subsection of this chapter represents various topics being contemplated across the United States and, within recent years, in the City of Houston. Although exact policies on how to best target specified topics are still under consideration by the City of Houston, the provided concepts are highlighted as a platform for future conversations and related evaluation of complete system mobility.



PHOTO PROVIDED COURTESY CITY OF HOUSTON

5.2 Complete Streets and Houston

What is a Complete Street?

The motivation for designing Complete Streets is felt by many major cities for different reasons. In some communities, traffic has become an unmanageable challenge and right-of-way is limited. In other areas, health-conscious communities have learned that using other modes of transportation benefits their social and physical health. Regardless of the motivating factor, creating corridors for more than just the automobile is a shift in policy that is gaining momentum in the United States.

Tying into the Existing Culture of Houston

Houston is known for its innovation and market driven approach to development. With this notion in mind, Mayor Annise Parker issued an Executive Order to develop a Houston Complete Streets and Transportation Plan. This initiative promotes the use of Complete Streets throughout the City of Houston. In her press release on October 10, 2013, Mayor Parker stated, “Houston is a city that embraces its diversity. This Complete Streets policy applies the same approach to our mobility system by meeting the diverse needs of all Houstonians while also creating more accessible and attractive connections to residential areas, parks, businesses, restaurants, schools and employment centers.” Houston’s can-do attitude to meet not only its transportation, but communities needs, is well suited for a new era of Complete Streets which promotes increased flexibility in street design more apt to suit Houston’s diverse market.

The development and implementation of the Complete Streets policy will be a new way of thinking for many officials and residents within Houston. When it comes to streets, Houston has relied on increasing roadway capacity (i.e. street widening) for vehicles to meet the needs of an ever-growing population. However, we “all hate Houston Traffic” is a well-known slogan in Houston and is representative of the cultural change taking place. Given complete streets is more apt to the movement of people, and not just vehicles, the community at large seems amenable to this new policy change. However, what this policy means for a car-focused community is still not greatly understood by the community

at large. As such, tying into the community’s market driven approach regarding the economic, social and health benefits associated with a more diverse transportation system needs to be better advertised.

Elements of Design

Complete Streets has many design characteristics that is inclusive of the entire right-of-way including the travelway (or street), streetside and context. Within the travelway, a Complete Street provides for modal use deemed appropriate for the corridor. Travelway considerations include lane width of travel lanes, transit facilities accommodations, on-street bicycle facilities, on-street parking, medians and pedestrian crossings. Design elements for the streetside include off-street bicycle facilities, pedestrian travelways, landscaping (such as grass buffers or tree wells), and frontage zones.

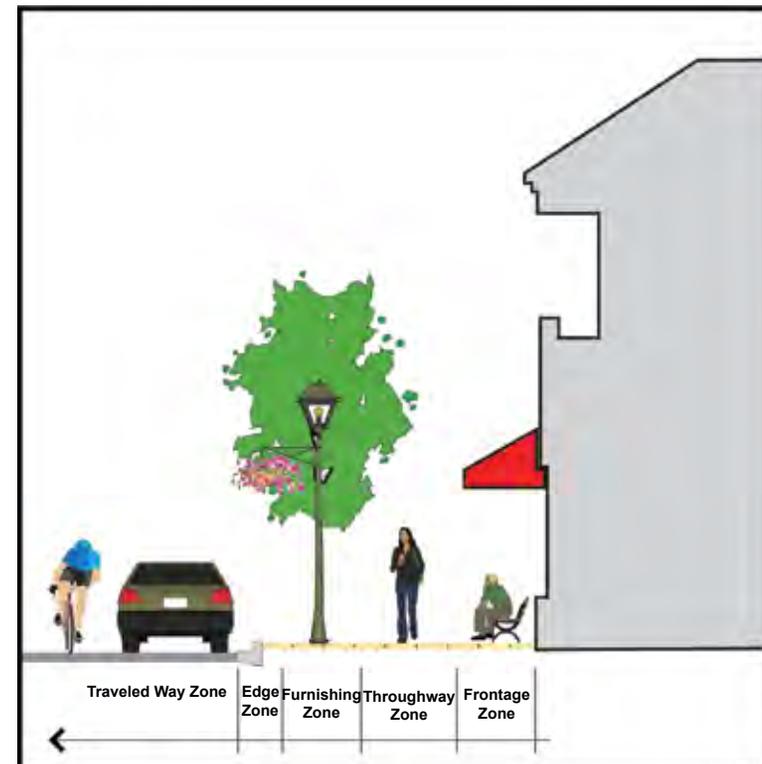


FIGURE 5.1 SOURCE: DALLAS COMPLETE STREETS MANUAL

Purpose of Complete Streets

The Purpose of Complete Streets Design

Complete Streets are intended to provide safe and accessible streets for users of all ages and abilities. In major cities and metropolitan areas, Complete Street policies are being designed to guide the future development and redevelopment of major corridors. Houston's Complete Streets Executive order states, "The Complete Street concept takes the following variables into account when providing services:

- People being served at their residence or property by other right-of-way users;
- People of all ages and abilities, including children, older adults and persons with disabilities;
- The function of the road (e.g. local collector and thoroughfare) and the level of vehicular, pedestrian, and bicycle traffic;
- Multi-Modal Classification Street Types"

Enhanced Efficiency of All Modes

The street network of a community/city/region defines how a city is built. How streets are developed, where they are placed and how they connect to the greater transportation network influence how traffic and development interact at both the regional and local level. A well-connected network increases route options for system users. Where conflict points occur - including but not limited to traffic accidents, congestion at specific intersections, or construction - connected networks allow users to utilize existing systems for alternative route options without relatively high cost to the user. Similarly, well connected networks reduce traffic stress placed on a single corridor. How this is achieved is not limited to the roadway, but can be achieved by increasing provided connectivity and accessibility to alternative mobility networks such as off-street trails or strategically placed on-street bicycle facilities. Similarly, transit networks need to be well-connected to other lines, stations, and destination centers which utilize the placement of existing streets. Moreover, transit accessibility of vehicles, pedestrians and bicyclists plays a large role in the success of the transit system, and as such represent a vital component

in system connectivity. In short, Complete Streets represents the multi-modal approach to each individual mode, as well as the connection of each mode within the greater transportation system.

Implementing Complete Streets

Many techniques which currently promote the concept of Complete Streets predate the City's Complete Street Executive Order. For instance, [Chapter 10 Appendix 2](#) of the [Infrastructure Design Manual](#) maintains current multi-modal (MMC) design considerations. Similarly, the sub-regional mobility studies - of which this report is a part of - systematically evaluate and identify multi-modal network improvements including enhanced connectivity between various modes.

The Complete Streets Executive Order, however, takes the notion of a multi-modal approach to transportation planning a step further emphasizing the importance of final system design and moreover, implementation. As such, the City is in the process of developing its first Complete Street and Transportation Plan (HCSTP) to be completed in 2015. Although the development of the Plan is still in its infancy stages, it is anticipated to provide a framework or blueprint for the City's adoption of future transportation and mobility related policies as the concept of what a Complete Street is within the City of Houston continues to mature.



PHOTO PROVIDED COURTESY CITY OF HOUSTON

5.3 Health in the Community

The Houston Mobility Plan and related sub-regional studies focus on encouraging multi-modal corridor design throughout the Houston area. By doing so, each study area has the potential to grow and redevelop into an environment that is friendly for both auto and non-automobile users. This process can be split into near and long-term redevelopment strategies from sidewalk repair (near-term), to multi-modal street reconstruction (long-term). Developing walkable and livable communities produces an additional outcome not traditionally stated within Houston's subregional studies, but is a direct result of an active transportation network : healthier communities.

Health and Transportation

Can the way we travel to and from destinations impact our health? This is a question that is being raised across the nation as communities seek ways to increase health and decrease risk factors that lead to obesity, asthma, and other chronic diseases resulting from unhealthy food choices and inactivity. Findings from an international survey show that the United States has some of the highest rates of car usage and the lowest rates of walking, biking, and public transportation compared to other industrialized countries. These factors were also found to directly correlate with obesity rates and related lack of physical activity.¹ Overall population health reflects these trends, where over two-thirds of Houston adults and almost one-third of children are overweight or obese, and thus at increased risk for a range of health conditions such as heart disease and diabetes.²

According to the US Surgeon General report on physical activity and health, "30 minutes

of moderate physical activity, 5 days a week, even when performed in short sessions of activity, is enough to provide health benefits such as reduction in obesity levels, coronary heart disease and hypertension."³ Therefore, a simple shift away from driving and toward a more active commute – such as walking, walking to transit or bike riding – provides an opportunity for increased physical activity which may result in a decrease in certain risk factors often associated with limited exercise.⁴

In a study published in the American Journal of Preventative Medicine, key indicators recommended for increased physical activity include building and enhancing sidewalks, providing efficient bicycle lanes, and promoting more efficient transit service.⁵ Similar evidence also indicates that individuals living in areas with a more complete, walkable network are more likely to walk to nearby amenities and transit stations. These individuals walk an average of 35-45 additional minutes per day than individuals living in less walkable environments.⁶

The desire for increased opportunities for physical activity through walking, biking and transit is also evident from Northwest public comments collected during the study. Whether expressed desires were for recreational, commute, or utilitarian purposes, one underlying concept remains the same: these are all active forms of transportation or travel.

Improvements to the built environment through the integration of complete streets at the neighborhood level can improve access to healthy food and encourage physical activity. The Harris County Food System report, published in October of 2013, highlights the need of better access to healthier food options. The study found the location of food stores and their accessibility via public transportation greatly impacts a family's access to healthy foods. For families or individuals without a car, public transportation – including safe sidewalks and bike routes - is necessary for accessing food, services, and recreation. Study findings indicate that over half (54%) of residents in one Harris County community

*Houston & Harris County Statistics*²

Inefficient Physical Activity

- Adults 53%
- Children 77%

Obese or Overweight

- Adults 63 %
- Children 34%

traveled over six miles to a grocery store, while two-thirds residents in a second community traveled over one mile to a grocery store, with an additional 20% traveling over six miles. The report identified issues that impact community health that could lead to childhood obesity, and also provided policy recommendations that would make healthy choices easier for community residents, including improvements to the built environment.

This paradigm shift in transportation as it relates to health, is fitting for the purposes of the Northwest Sub-regional Mobility Study, as well as similar sub-regional studies, and reinforces the benefits of the Complete Streets policy. In short, a well-functioning transportation network not only moves people, but also provides healthy and safe transportation options that benefit all users of the network.

Example Initiatives Include:

- Community Transformation Initiative (CTI): Aimed at enhancing community livability through enhancing connectivity, walkability, increasing access, etc. for all area residents.
- Healthy Living Matters (HLM): mission is to mobilize policy action to curb childhood obesity in Harris County which includes measures such as active living. Report: http://www.healthylivingmatters.net/why_does_healthy_living_matter/reports



PHOTO PROVIDED COURTESY KHA

¹ Pucher, J. and C. Lefevre. 1996. *The Urban Transport Crisis in Europe and North America*. London: Macmillan Press Ltd.

² Institute for Health Policy at The University of Texas School of Public Health, Houston Health Survey, 2010

³ US Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Promotion; 1996, Available at <http://www.cdc.gov/nccdphp/sgr/sgr.htm>, accessed 14 August 2008.

⁴ Transit and Health: Mode of Transport, Employer-Sponsored Public Transit Pass Programs, and Physical Activity. *Journal of Public Health Policy* (2009) 30, S73-S94.

⁵ Brennan-Ramirez, Laura K. et al. (2006). "Indicators of Activity-Friendly Communities: An Evidence-Based Consensus Process." *American Journal of Preventive Medicine*, Volume 31, Issue 6

5.4 Street Connectivity Consideration

Traffic congestion within suburbs is a well-known concern across the United States, and Houston is no different. As suburbs continue to emerge as not only bedroom communities, but a place for commerce, employment, and residential recreational activities, the blending of regional peak hour traffic with local commuter trips is inevitable. As such, concerns expressed by the general public and stakeholders regarding congestion within the Northwest study area is not a surprise as residents seek ways to keep those aspects of the suburban network for which they love, but increase the system's usability to reduce traffic congestion.

Connectivity and the way it is perceived in the suburban context is a conversation taking place across the United States, and it is one evident within the Northwest study area. As expressed during the first public meeting and subsequent stakeholder meetings, the suburbs are a direct result of market demand, and as such should not be developed to mimic the urban context. However, the following aspects concerning enhanced connectivity within the Northwest network as collected during the first public meeting include:¹

Expressed Benefits to keep within the Northwest suburban context:

- Refuge from urban living
- Less cut-through traffic
- Less hard scape/more natural features
- Larger lot sizes
- Exclusivity
- Security

Expressed Connectivity to enhance Northwest suburban context:

- Alternative modes of transportation (i.e. via walking, bike and transit)
- Use of natural features, trails, and bayous
- Connections to schools, libraries, and other neighborhood amenities
- Access to shopping and local entertainment
- Access to key transit/bus stops

Market Trends

Expressed desires for enhanced connectivity via alternative modes are not new. In fact, they relay many of the design considerations characteristic of historic suburbs that were more inclined to mimic the natural environment.² As cars became more predominate, the pedestrian network was ultimately preserved by a system of off-street trails that linked communities together with a series of parks or open space; the provided configuration is commonly referred to as the Radburn Model.³



FIGURE 5.2 SOURCE: MARTIN, M.D. RETURNING TO RADBURN

Newer suburban subdivisions, however, do not emphasize the need for strong alternative transportation networks - such as sidewalks or offstreet tails - often citing ever-increasing land values, construction costs, and the perception of decreased security due to such amenities as noted concerns.

The result of these development practices has ultimately led to the “Loop and Lollipop”

1. For full set of public comments, see Appendix XX

2. Grammenos, F., Pogharian, S. and Tasker-Brown (2001). Residential Street Pattern Design Working Paper #389. Research funded by Canada Mortgage and Housing Corporation.

3. Birch, Eugenie L., Radburn and the American Planning movement. University of Pennsylvania. Department of City and Regional Planning.

pattern most prevalent with today's suburban development. Within the Northwest study area development trends align this general change in development practices over time where older suburbs, located closer to the 610 Loop, are characteristics of an elongated street grids (i.e. Fragmented and Wrapped Parallel). More recent developed suburban developments, more commonly positioned closer to Beltway 8, maintain a more "Loop and Lollipop" street configuration with limited connectivity. (i.e. Loops and Lollipops).

Street Patterns

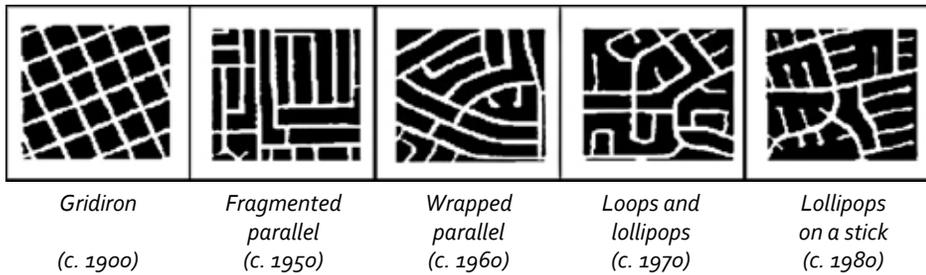


FIGURE 5.3 SOURCE: GRAMMENOS, F. (2002). RESIDENTIAL STREET PATTERN DESIGN

Making it Work

The general public is aware of the premises of the suburbs and, as stated earlier, desire to maintain those traits that make the suburbs a desirable place to live. Similarly, the City of Houston recognizes that the design trends identified above occurred over an extended period of time. This resulted in varying degrees of existing networks including streets, sidewalks, parks, and other infrastructure that make up a system of neighborhoods, and, as such, cannot just be moved or drastically changed overnight for the sake of increased connectivity.

So what is the solution? To put it simply, many communities are working with what they've got. In other words, communities are seeking ways to improve the suburban network that already exist by making slight modifications for improved connectivity. Hence, the tools explored within this chapter have been explored specifically for the City of Houston and are intended to identify ways in which existing networks can be tweaked to increase connectivity between communities, associated neighborhood amenities and the greater transportation network as a whole. General considerations include:

Connect Pedestrian Attractors/Neighborhood Amenities

Pedestrian attractors/neighborhood amenities are best defined within the provided context as destinations that generate foot traffic from nearby residential communities to areas of activity whether for recreational or utilitarian purposes. The City of Houston does not currently maintain a standard methodology for measuring such attractors, but examples of typical residential attractors within residential neighborhoods include parks, libraries, schools and health related facilities.

Look Beyond the Street

Although multi-modal street treatments are an essential part of this study, it is important to note that the intended purpose is not to design streets, but rather move people. In areas like the county, where pedestrian movement along primary corridors can be restricted due to safety concerns, neighborhood connectivity may best be achieved off the beaten path. The City of Houston has several natural resources which can be used to develop this off-street path. In fact, in November of 2012, the Bayou Greenways 2020 project, which works for the creation of greenways and trails along Houston's bayous, received \$100 million of public funds to create such a network.

The Northwest Study Area is comprised of three primary bayous: White Oak, Little White Oak, and Halls Bayous. As part of the City's and County's storm water management plan, these naturally occurring corridors have been largely preserved throughout the City of Houston and the greater ETJ. As organizations, such as Houston Parks Board – Parks by You and the City develop these bayous for trail use, communities should identify multiple access points from existing neighborhoods to these constructed amenities resulting in a more robust and connected network.

Fill in the Gaps

Gaps within the local street network are expected given the suburban nature of this area. However, understanding why gaps might exist will help communities and the City alike better understand what changes, if any, might result in a more usable network. Potential gap connectors include:

Local Street Extensions/Stubs: Within the City of Houston, developers are required to provide internal block lengths of at least 1,400 feet for local subdivision streets. If a local street terminates without means of a turnaround (i.e. a street stub) future developers are required to extend this connection to preserve internal connectivity within the local street network. Depending on the circumstances, variances are granted ⁴ eliminating local connectivity for car traffic. With a simple reconfiguration, the local network can be maintained for pedestrian and bike traffic only. The result is a street network which works to eliminate unwanted vehicular through traffic without inhibiting the movement of people. Potential examples of connections include local area connections to grocery stores, boutiques or off-street trails between neighborhoods.

Excess Development Reserve: Where parcels of land are too small, and an additional house is not feasible, a reserve may be established within a provided subdivision. These parcels can be located at the edge of provided developments, offering great connectors from one development to the next, or alternative access to bayous, parks or other neighborhood amenities. ⁵

Utility Easements: Easements provide access to various piping, electrical wiring, etc. throughout the City and County alike. These easements (like bayous) typically transcend multiple neighborhoods providing a strong network of essential utility lines of various types. Where appropriate, these easements may be utilized as an alternative transportation network not appropriately suited for the automobile. Examples include the recently adopted Centerpoint Utility Easement Corridor agreement currently allotted within Harris County.



Source: Pending. Image provide from study conducted in Germany.



Source: Standard Highway Sign Designs (SHSD) for Texas, 2012 Edition. Texas Department of Transportation (TxDOT).

4. For more information regarding street extensions, visit the City Code of Ordinances, Chapter 42, Sec. 42-135.

5. For more information regarding Reserves, visit the City Code of Ordinances, Chapter 42, Sec. 42-190 - Sec. 42-193.

Publicly Owned Property: Provided properties in and around the City of Houston and Harris County are difficult to develop or restricted from development due to concerns such as flooding. In circumstances where appropriate, potential to extend alternative transportation options should be explored around certain facilities, such as detention ponds, which serve a greater purpose of flood mitigation, but may also serve as an added amenity to the community.



Figure 5.4 Source: Image acquired via Google Maps. Representative of Example B within "Exploring the Possibility" section of this Chapter.

Future Developments: 23% of the Northwest Study Area is comprised of undeveloped land, and an additional 6% is owned or used by a public entity (See Appendix A). As these connections are considered throughout existing developments, new developments should warrant easy retrofits to existing networks as previously defined. Put simply, the market has shown evidence of demand where, as reported in the 2002 survey conducted by the National Association of Realtors and the National Association of Home Builders, "Trails ranked the second most important amenity..." within residential communities.



Figure 5.5 Source: Image acquired via Google Maps. Representative of Example B within "Exploring the Possibility" section of this Chapter.

Exploring the Possibility

The Northwest study area is comprised of a variety of community types with an array of connectivity considerations. As such, further study is warranted to fully understand the best method for increasing local connectivity between communities as well as to the greater transportation network. Based on general understandings as previously defined, the provided example explores possible connectivity options along White Oak Bayou. The White Oak Bayou transcends the back side of residential, industrial, and some commercial properties just east of the North Houston Rosslyn corridor to local school facilities west of Beltway 8. Midblock crossings should be avoided and direct paths to intersections or overpasses should be explored where appropriate.

The concepts previously presented are not identified for implementation by a single entity, community, or developer. Instead, these provided concepts only serve as examples and a starting point of discussion as the City of Houston and County continue to mature and attract more and more residents within their respective boundaries.

The example below represents properties both within the City of Houston and Harris County. A consideration of amenities within a half and quarter mile of the White Oak Bayou are highlighted on the next page for consideration.

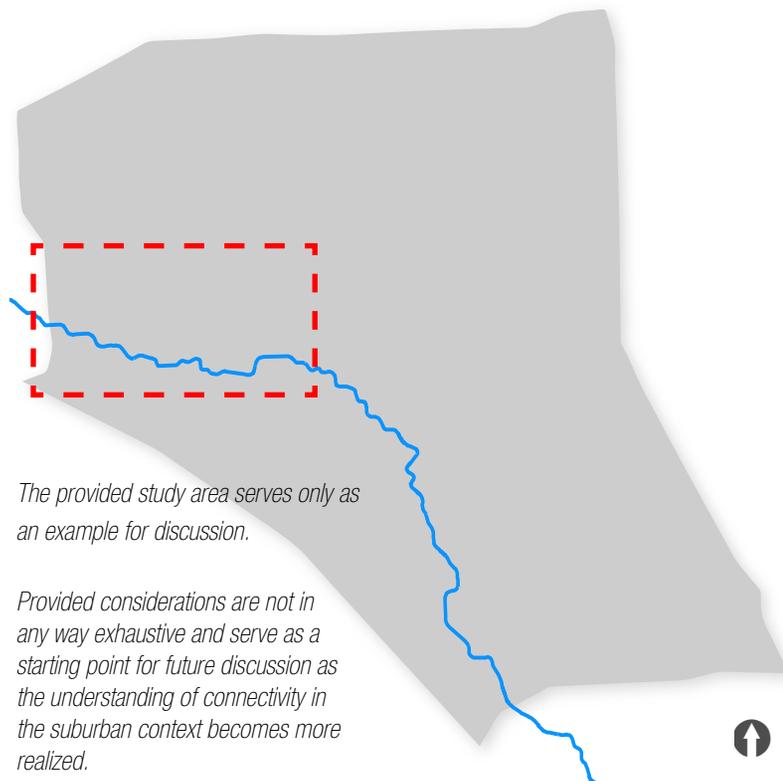


FIGURE 5.6

FIGURE 5.7

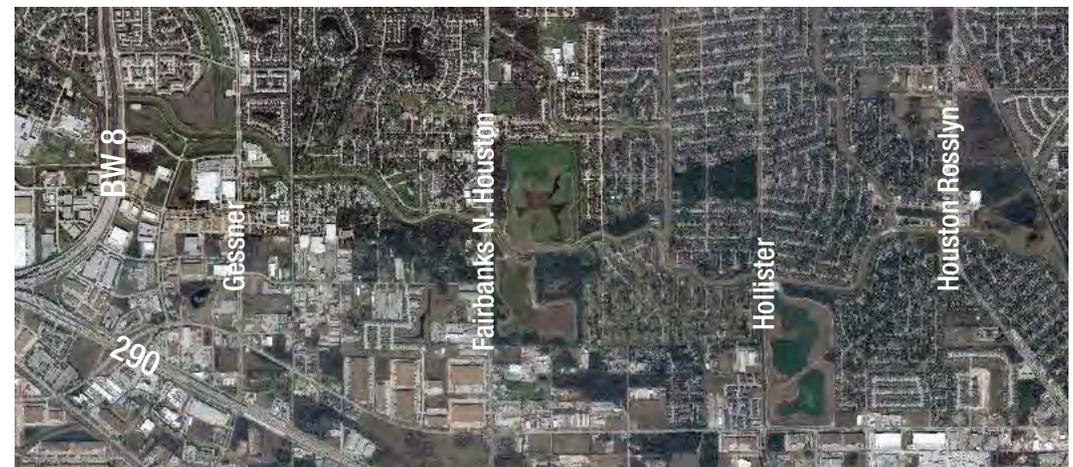


FIGURE 5.8

Connectivity Opportunities:

A: Enhance Connections to Existing Trail Networks

- Key Amenities:
 - » Existing pedestrian bridge
 - » Existing Jersey Village Trails
- Benefit:
 - » Link school locations to neighborhoods east of Beltway 8 and use connection to existing trail system
- Obstacle:
 - » Overpass at Beltway 8

B: Utilize Publicly Owned Property

- Key Amenities:
 - » Existing east-west local corridor
 - » Note: Provided configuration upholds evidence of pedestrian footpaths from this provided corridor
- Benefit:
 - » Key access point for neighborhood pedestrian or bikeway users. Provides alternative network opportunity to parks, associated library, adjacent neighborhoods and health facilities
- Obstacle:
 - » Understanding of future use
 - » Agency coordination

C: Excess Development Reserve:

- Key Amenities:
 - » White Oak Bayou
 - » Neighborhood schools
- Benefit:
 - » Key access point for neighborhood pedestrian or bikeway users. Provides alternative network opportunity to parks, associated library, adjacent neighborhoods and health facilities
- Obstacle:
 - » Understanding of future use

D: Reestablish the Street Grid for Alternative Modes (Street Stubs):

- See next page (example F)

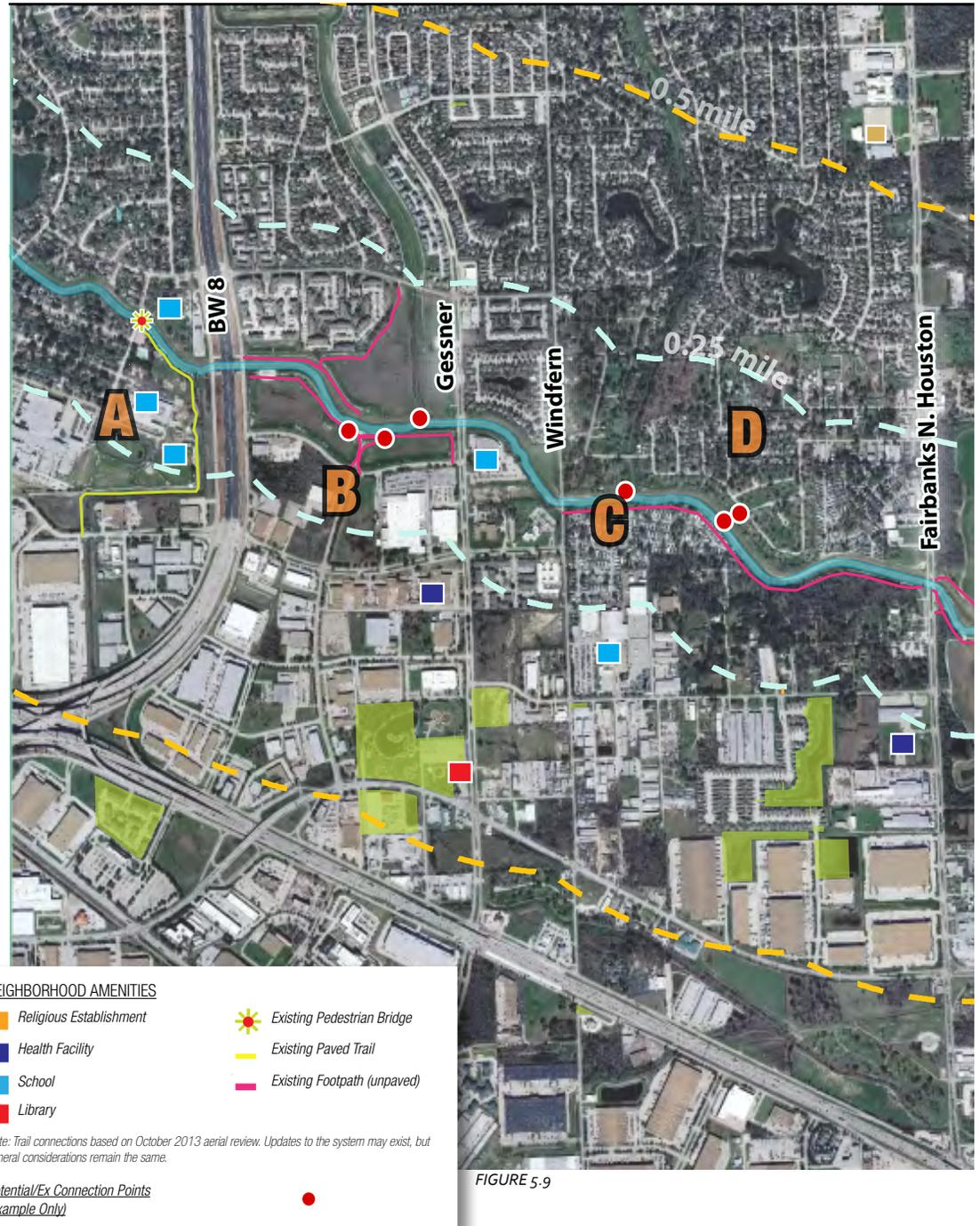


FIGURE 5.9



NEIGHBORHOOD AMENITIES

- Religious Establishment
- Health Facility
- School
- Library
- ✦ Existing Pedestrian Bridge
- Existing Paved Trail
- Existing Footpath (unpaved)

Note: Trail connections based on October 2013 aerial review. Updates to the system may exist, but general considerations remain the same.

Potential/Ex Connection Points (Example Only)



FIGURE 5.10

Connectivity Opportunities:

E: Promote Local Neighborhood Connections

- Key Amenities:
 - » Existing pedestrian bridge
 - » Existing trail development
- Benefit:
 - » Key access point for neighborhood pedestrian or bikeway users. Provides alternative network opportunity to parks, associated library, adjacent neighborhoods and health facilities
- Obstacle:
 - » Adjacent subdivision coordination

F: Reestablish the Street Grid for Alternative Modes (Street Stubs)

- Key Amenities:
 - » Existing access to residential neighborhood preserved
 - » Existing street stub
- Benefit:
 - » Used street stubs are potential extension of alternative modes of transportation not specific to the motor vehicle
- Obstacle:
 - » Community buy in

G: Promote use of undeveloped or vacant parcels

- Key Amenities:
 - » Access to neighboring church and health care facilities
- Benefit:
 - » Potential increase in future development for enhanced community interaction
- Obstacle:
 - » Coordination

5.5 Bicycle User and Facility

Houston is seeing a shift in how we view the bicycle user as part of the overall transportation system. Just as street design considerations do not take a “one-size fits all” approach to vehicular movement, bicycle movement varies as well. For example, what type of facility is most appropriate for a child traveling to school on a bike versus a working professional traveling to work? How might this consideration vary if the user is enjoying a leisurely bike ride (i.e. recreational user) versus someone who might be on a daily commute where speed and time play a major factor in route consideration?

User Types

Like other topics explored, the recognition of bicycle user types and variations in bicycle facility considerations is taking place across the United States. In accordance with the American Association of State Highway and Transportation Officials (AASHTO)¹, bicycle users are best defined by level of biking experience and comfort on a specified roadway categorized in the table below.

AASHTO Bicycle User Types

Type	Type A Advanced/Experienced	Type B Basic Adult	Type C Children
			
Values	<ul style="list-style-type: none"> • Convenience • Speed • Direct access to destination 	<ul style="list-style-type: none"> • Comfortable experience • Low stress 	<ul style="list-style-type: none"> • Lower complexity decision environment
Comfortable Riding on...	<ul style="list-style-type: none"> • Safety on all street types • High traffic • High speeds 	<ul style="list-style-type: none"> • Designated facilities 	<ul style="list-style-type: none"> • Residential streets • Busier streets with well-defined bike travel areas • Off-street bike paths
Confident “claiming” a narrow lane?	Probably	No	No
Understand of traffic principals	Yes	Yes	No

FIGURE 5.11

Facility Types

The City of Houston does not currently maintain a formal process for evaluating what streets should be included in the Master Bike Plan. Similarly, the user types of the system - as previously defined - are also not systematically evaluated by facility type within the greater transportation network. Instead the City evaluates facility type on a case-by-case basis. The City recognizes that bike facility types most appropriate for a given corridor may vary, and as such, the current Master Bike Plan should be improved upon to consider all users of the system. Although not currently available, an update to the Master Bike Plan is expected in 2015 and is anticipated to provide a general framework to system design and future update of the resulting network map. The following classifications summarize the facility types currently endorsed by the City of Houston's Master Bike Plan:

Bike Lanes

- A bike lane is the portion of the roadway adjacent to the travel lane that is designed by striping, signing, and pavement marking for the preferential or exclusive use of the cyclist.
- There is no parking allowed in this lane unless otherwise indicated.

Signed-Shared Roadway

- A signed-shared roadway is designated for bicycle or motor vehicle use. The shared lane is not for simultaneous use of both vehicles. Motor vehicles traveling at a greater speed than cyclist can pass cyclist as any other slow moving vehicle using the adjacent lane.
- There are special pavement markings and signs along this lane to remind both cyclist and motorist to share the road.
- These roadways typically have lower travel speeds and traffic volumes, and also provide convenient routes to destinations.
- Shared-use lanes should not be used on roadways with speed limits below 40 mph.

Signed Bike Routes

- A signed bike route is a roadway that has been designated by signing a corridor as a preferred route for bicycle use.
- Parking may be allowed on this route and cyclist will ride to the left and around parked cars.
- Ideally these routes would still have favorable conditions for bicycling, such as low vehicle volumes, low travel speeds, or wide shoulders.
- Route signs should be placed at locations where the bike route turns at an intersection and where bike routes cross one another.
- With proper wayfinding, bike routes assist with guiding cyclist to more dominate roadways with safer pedestrian and bike crossings.

Trails/Shared-Use Paths

- A bikeway that is physically separated from motorized vehicular traffic by an open space or barrier, and can be located:
 - Within a highway right-of-way
 - Within an independent right-of-way, such as a retired railroad corridor
 - Along bayous and drainage easements
- Also known as "Hike and Bike Trails"
- Off-street shared-use paths attract a mix of users with a wider range of skill levels and riding speeds.
- The use of a centerline stripe is recommended on pathways with high use to designate two directions of travel.
- Shared-use paths, or sidepaths, may be located adjacent to roadways when sufficient right-of-way is present to provide additional separation from motorists. These sidepaths should follow the same design criteria as shared-use paths in

independent rights-of-way.

Other definitions, however, may prove relevant to the City as it continues to grow and mature its understanding of the bikeway user. Additional facility types for consideration include:

Bicycle Boulevard

- Bicycle boulevards are designed to give priority to bicycle traffic.
- Local roads with low volumes and speeds that provide an alternative to, but running parallel with major roads.
- Offer convenient access to land use destinations.
- Signs and pavement markings are used as way finding for bicyclists.

Cycle Track

- Bicycle highways intended for commuting traffic.
- Protected cycle tracks are recommended on major arterials with high travel speeds, high traffic volumes and multiple lanes, and offer protection for less confident riders.
- Two-way cycle tracks may be considered when there is not enough room to accommodate one-way cycle tracks on both sides of the street. Two-way cycle tracks may be considered to optimize the ROW in an existing street configuration where a single element is removed, such as a row of on-street parking.
- Advance timing of signalization is recommended for cycle track facilities at signalized intersections and is a recommended best practice to reduce potential conflicts with turning vehicles.

Buffered Bike Lanes

- Buffered bike lanes are beneficial for streets with high travel speeds, high travel volumes, or high truck traffic.
- These facilities may be accomplished by reconfiguration existing roadways that under capacity and have more travel lanes than needed. Buffers should be delineated by two solid white lines at least 2 feet apart; if wider than 3 feet, diagonal hatching

should also be marked.

Other treatments for consideration pertain to increasing awareness of the user and motor vehicle alike and are not focused necessarily on one bicycle facility type. Instead, provided recommendations – where appropriate – are for universal consideration.

Highlighted Conflict Points – Bike Facility Caution

- Colored pavement for bicycle use, typically green in color, may be used to increase the visibility of facilities in potential areas of conflict with motor vehicles. Colored pavement is commonly applied at intersections or driveways, in areas where motor vehicles are likely to cross over a bike lane into an adjacent turn lane or property.

Yield to Bike Signage

- “Yield to Bikes” signage should be used to reinforce bicycles’ right-of way at colored bike lane areas.

Bike Facility Design/Considerations

The appropriate design for a corridor considers certain factors such as daily traffic volume, travel speed, and related context as it pertains to area attractors and neighborhood context. However, regardless of what is desired, a corridor only maintains a certain number of feet in which it must accommodate vehicular, bike and pedestrian traffic as discussed in previous section of this Report. As such, the following questions should be considered when determining the development of a bicycle facility:

- Is the roadway a new construction?
- Is the roadway being repurposed?
- Is the roadway being reconstructed?

In short, a simple set of variables to select the most appropriate bicycle facility does not always encapsulate the complexity of Houston's streets as they pertain to facility feasibility.

1. New Construction

New roadway construction projects can typically follow the City's standard cross-sections as found in the [COH Mobility Plan Street Paving Design Requirements](#), which include options for bicycle facilities based on the multi-modal classification of the corridor.

2. Repurpose

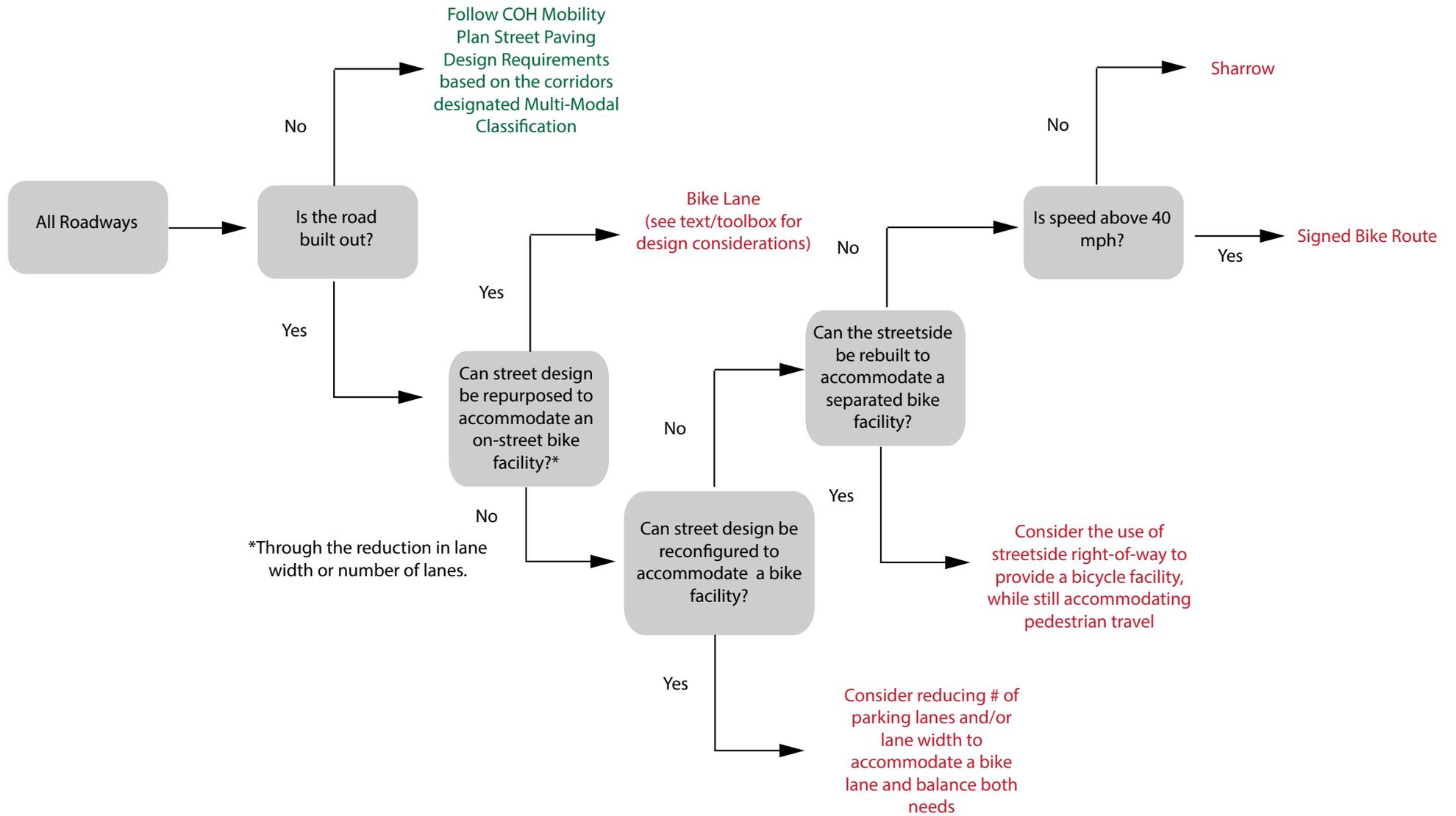
Repurpose projects typically require modifications to existing cross section where additional amenities - such as a bike lane - may be added to the roadway without removing a lane of traffic. This type of modification may occur where lanes are wider than needed.

3. Reconfiguration

When the width of the travel way cannot be widened along a corridor, the City should evaluate whether a roadway's existing lanes can be reconfigured to provide the necessary space for a bicycle facility. Reconfiguration of a travel way may include reducing the total number of lanes when traffic volumes demonstrate an excess of roadway capacity. Another scenario would be to reduce median width to maintain vehicle travel lanes and also introduce a bike facility within the existing roadway width. On-street parking may be a high priority on some corridors and should be evaluated during roadway reconfiguration. It may be necessary to balance both parking and bicycle travel needs using an atypical cross-section. Occasionally, a wide existing streetside zone (the portion of the right-of-way dedicated to pedestrian facilities and amenities) may be repurposed to include both bicycle and pedestrian facilities separated from the roadway. These facilities would include physically buffered bike lanes or raised cycle tracks.

The following flow chart is intended to guide the facility selection process and ensure that a preferred facility is an appropriate choice for a specific corridor. This tool will not automatically provide the best solution for a roadway, but is intended to demonstrate why certain desired bike facilities might not always make sense on the ground. Given the complexities of many roadways, the City should use planning and engineering judgment in order to develop a cross-section that addresses all road users.

FIGURE 5.12 FACILITY SELECTION PROCESS



Houston Bike Related Policies

The paradigm shift in the way Houston views bikes can also be seen in the recent policies embraced by the City which include:

Complete Streets Policy

The Complete Street Executive Order directs City efforts to achieve complete streets. A complete street is defined as a “public roadway that takes into account all users” including people on bikes. Of the objectives listed within the order, multi-modal classifications are defined – of which, bikes are considered within the modal choice for consideration. Finally, the Complete Streets Executive Order directs the development of a “Houston Complete Streets and Transportation Plan” of which one of the Plan Components must, at a minimum, include the Bikeway/Pedestrian Plan as currently maintained by the City of Houston.

Safe Passing Ordinance

Chapter 45 Article 2 of the City Codes of Ordinances was adopted by the City in April of 2013. The Ordinance requires motorists to pass or trail a cyclist, pedestrians and other non-vehicular or “vulnerable road users” at a safe distance. Although safe distance is a term defined to take into consideration “road, traffic and weather conditions at the time, in any event, not less than 3’ laterally while passing a vulnerable road user in a passenger car or light truck and not less than 6’ laterally if the operator’s vehicle is a truck (other than a light truck) or a commercial vehicle as defined by the Transportation Code.” The code further requires motorists to be mindful of vulnerable users during turning movements as well as prohibits the use of harassment or intimidation of vulnerable users at any time.

Houston Bike Education

As the City of Houston continues to evolve in its adoption of bikes into its everyday culture, the need to educate automobile users and bicyclists becomes increasingly important. The City, and other bike advocate organizations, continuously work to educate all roadway users on the importance of proper roadway etiquette. That is to say, both cars and bikes are considered “traffic” while utilizing public roadways. Therefore, all roadway users must abide by laws that dictate what is legal for each user type. How to function on the roadway can vary slightly between a motorized and non-motorized vehicle. As such, it is necessary to not only educate users about their responsibilities, but also the responsibilities of others (i.e. What are automobiles supposed to do when they see a bike, and visa-versa?)



PHOTO PROVIDED COURTESY CITY OF HOUSTON

5.6 Sidewalk Design Considerations

Pedestrians as a Priority

Returning focus to pedestrian amenities is a growing trend around the Nation due to the many benefits of active transportation are being publicly endorsed by health officials.

Such benefits include:

- Improve physical and social health
- Reduce personal transportation costs
- Reduce carbon footprint

Existing Policy

The City of Houston requires that any new or reconstructed sidewalk be built to a 5 foot wide minimum standard. A 6 foot minimum standard is required for any sidewalks located along a transit corridor. Sidewalk improvements above the minimum standard are recommended based on a variety of factors. These factors include land use and context, traffic volumes, and transit availability along a corridor.

Design Considerations

When designing a sidewalk, the pedestrian zone should be taken into consideration and varies based on the context and intended user of the corridor. The pedestrian zone is defined as the streetside area between the edge of the curb and the property line of the bordering parcel. This provided zone can be broken into four subcategories: 1) edge zone, 2) furnishing zone, 3) throughway, and 4) frontage zone.

Edge Zone

The edge zone is comprised of the area between the curb and the furnishing zone. This zone creates a space between the recognized sidewalk area and automobiles. On corridors where on-street parking is permitted, this zone allows for door swing space. It also provides an area for pedestrians to transition between the walkway and their automobile without creating issues for other users.

Furnishing Zone

The furnishing zone provides an area for functional and artistic features within the pedestrian zone. It is also used for public services, landscaping, utilities, and as a buffer between pedestrians and the corridor. The functional features within this zone include public services, bicycle racks, utilities, fire hydrants, utility poles, sign poles, traffic signal cabinets and utility cabinets. Additional features that are functional, but also enhance the appeal of this zone are trees, shrubs and planters, landscaping, vendor space, street furniture, and decorative artwork.

The furnishing zone provides many benefits. It increases the tangible and the perceived safety of pedestrians by identifying the division between the street and pedestrian realm. When properly implemented and maintained, a furnishing zone can increase the lure, walkability and safety to pedestrians along a corridor.

Pedestrian Throughway Zone

The pedestrian throughway is the basic function of the pedestrian zone. It is located between the furnishing and the frontage zone. The throughway is the section of the sidewalk where pedestrians travel. It is critical to keep this zone clear of obstructions (including the condition of the pavement) to allow for safe pedestrian movement. This design element should also account for handicapped and disabled users. Movement of wheelchairs within the throughway zone is a critical design element.

Frontage Zone

The frontage zone is dependent on the context of uses or location of buildings along the corridor. It can serve as a buffer between the building front (if there is not a setback) and the walkable area. It can also serve as an advertisement area for storefronts. Stationary items can be placed within this area with proper licensing agreements.



PHOTO PROVIDED COURTESY KHA

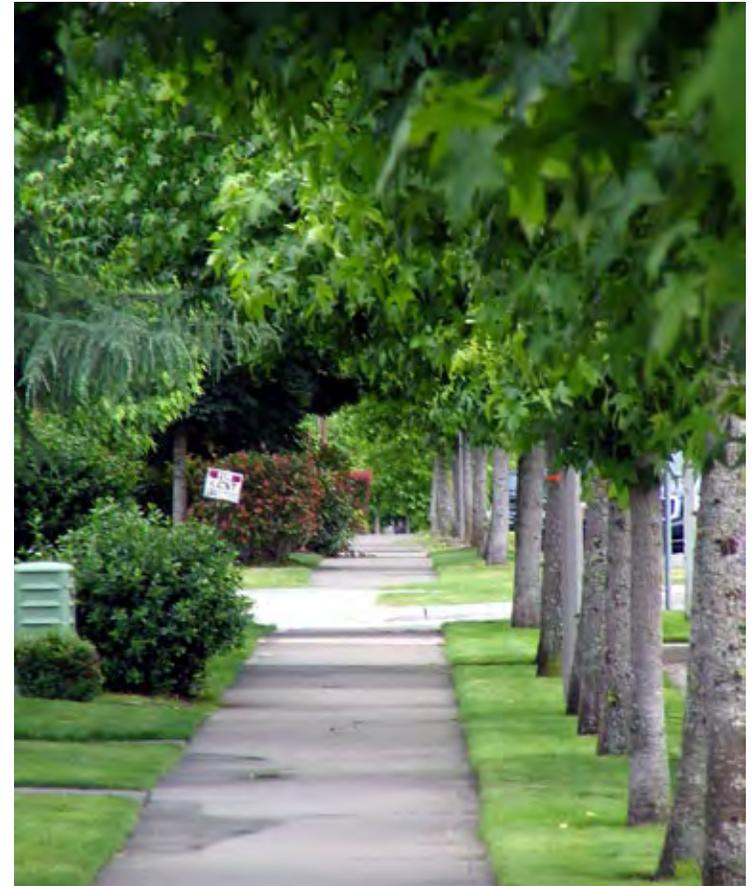


PHOTO PROVIDED COURTESY KHA

5.7 Transit Corridor Considerations

Public Transit for the Public

The perception of bus and light rail as transportation for low-income communities is changing as more young professionals utilize mass transportation. Benefits include:

- Reduce expenses associated with personal automobile
- Reduce time spent in traffic
- Spend commuting time working via personal devices
- Environmentally friendly
- Benefits to personal health

Another user base are persons that emigrated from countries where public transportation is socially acceptable and widely used. As more people understand the benefits associated with public transportation, utilization is expected to increase.

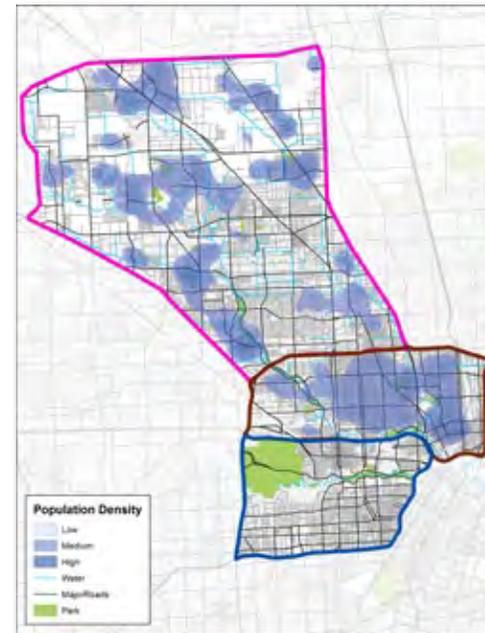
Increasing the Availability

As congestion continues to increase, transportation funding is an urgent concern within the country and region. Therefore, more efficient transportation alternatives have become increasingly attractive. Improving transportation capacity has evolved from simply moving vehicles to moving people. This shift in focus has given transportation planners more flexibility in identifying new technologies to increase the capacity of a corridor or a transportation network. Transit service is an efficient method of moving people, but it is not an appropriate solution along every corridor. To identify the specific corridors and areas of Houston where transit can be most successful in capturing riders, the following factors were analyzed and ranked in the Northwest study area:

- Residential Density
- Lane Use
- Network Density

- Existing Transit Ridership
- Projected Transit Ridership

Each factor detailed below helps to determine which corridors in the study area can best accommodate transit service, primarily from a ridership perspective. Larger scales of the maps are provided in [Appendix C: Transit Analysis](#).

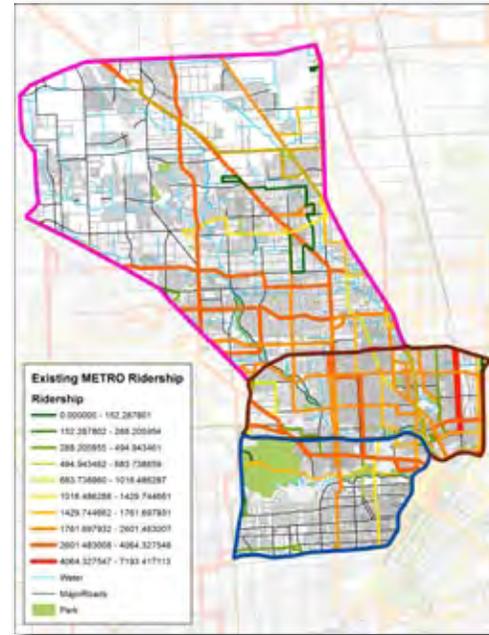


Residential Density:

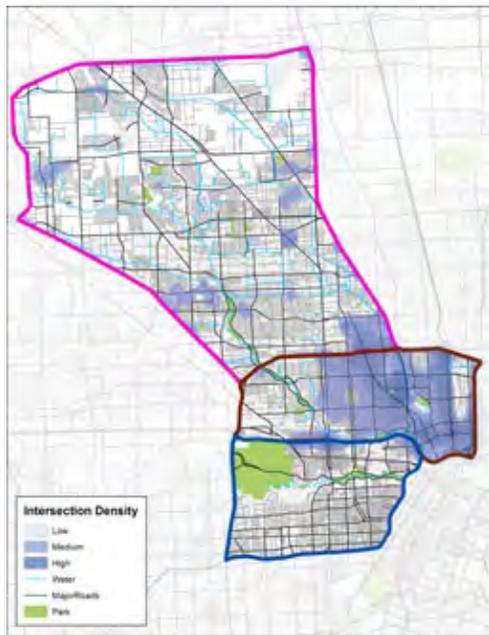
Residential density is an important factor for determining transit potential. People who reside in high density areas are more likely to use transit. The corridors that are within or in proximity to medium and high density locations were considered for transit locations.



Land Use: Identifying corridors that contain a higher amount of commercial, retail and employment activity is important for transit selection. Destinations for transit riders are shopping centers, grocery stores and employment centers.



Existing Transit Ridership: Examining existing transit patterns is an effective tool to determine potential transit corridors. Some of these routes may already be functioning as a significant transit corridors but can be enhanced with improved infrastructure, shorter headways or enhanced buses to increase ridership.



Network Density: The density of the street network affects a person's ability to walk or bike to their destination. Less dense areas usually result in a more automobile oriented network. Both Heights and the Northside maintain a high network density. Northside, however, has the highest network density in the study area.



Projected Transit Ridership: H-GAC currently incorporates transit routes into its 2035 travel demand model. This data is helpful to see where the transit demand is based on future demographic and traffic patterns/congestion.

Complete Streets is not about moving vehicles only. As you can see from these maps, other forms of transportation have a large impact on the road network. Focusing on moving people (whether it be via automobile, public transit, bicycle, or pedestrian zones) is what is important.

5.8 Intersection Design Considerations

Changing Priorities

A strong multi-modal design results in the safe passage of automobile and non-automobile users through the network. Creating safe realms for these users extends to all parts of the corridor, with increased importance at intersections and other types of crossings where differing modal types overlap. All mode types should feel safe, comfortable, and experience a minimal amount of delay when passing through an intersection. However, enhancing conditions for one mode may negatively impact others. Previous intersection design focused on the quick and efficient movement of automobiles, but as other modes gain popularity (transit/bicycles) this attitude can potentially hinder the efficient flow of the overall network.

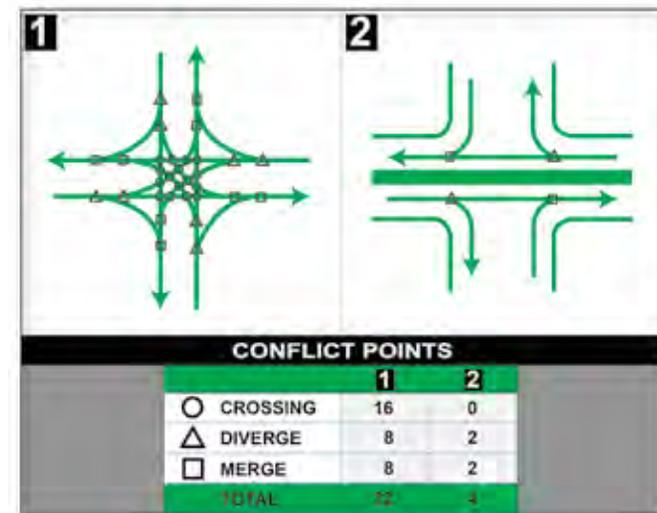
Modes for consideration within the scope of intersection design include automobile, pedestrian, bicycle, and bus transit. Although other alternative modes of transportation may exist, the provided represent the most commonly used forms of traffic within the City of Houston and serve as a baseline for discussion of alternative design options.

Multi-Modal Intersection Design

The following section explains the fundamentals of multi-modal intersection design and describes the concepts of how automobiles, bicycles, pedestrians and transit vehicles can be accommodated in the design of an intersection.

At any given time, multi-directional movement is occurring at all intersections. Conflict occurs where users of the network collide. As provided in [Figure 5.13](#), an intersection maintains a number of known conflict points. To reduce known conflict, certain design tools are available for consideration. For instance, the design of an intersection that accommodates vehicular turning movements where pedestrian and bicycle traffic are expected, may include certain design consideration that help demarcate how each mode type should transition through an intersection. Such treatments include a pedestrian only

phase within a signal cycle that preempts vehicular movement by a few seconds. This provided phase helps reduce potential collision between vehicular right-hand-turning movements and a pedestrian utilizing a crosswalk. Additionally, colored pavement or striping is often used at intersections for bicycles clearing demarcating the placement of bike vs. vehicular movement understood by both the bicyclist and motorist alike. Such design considerations help define how traffic (whether motorized or non motorized) are expected to behave.



Other design tool examples for consideration include:

- Pedestrian signals
- Continued markings for bicycles at intersections
- Additional signage
- Designated crosswalks
- Proper bus stop placement
- Advanced stop lines
- Intersection median barriers
- Right-turn-on-red restrictions

Due to limited right-of-way, not all modes of transportation can be accommodated in a one-size-fits-all design for all intersections. The amount of traffic, speed of the roadway and the safety of the user must be addressed on a project basis. However, individual intersections should be evaluated not in silo, but in conjunction with the greater transportation network to ensure a consistent flow of all mode types within respective networks and greater transportation system. Modes with higher priority will typically take precedence in the design features of the corridor, but should not reduce the actual safety of other modes. If this should occur, priority of the modal needs on the corridor should be reevaluated.

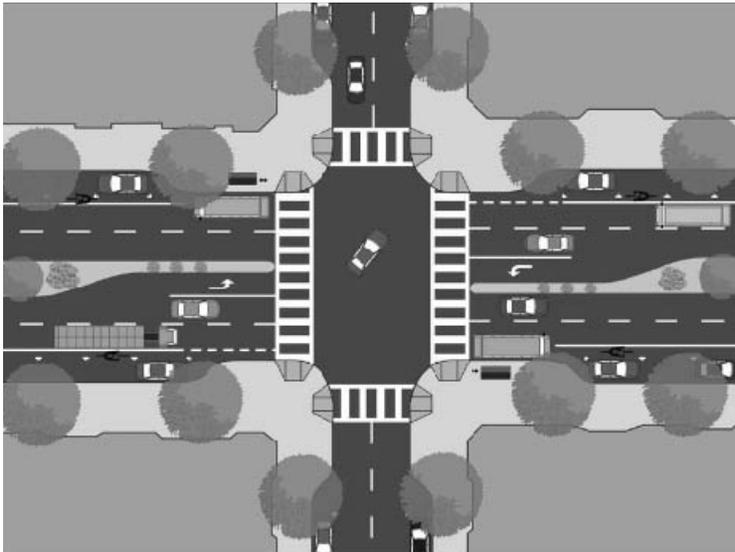


FIGURE 5.14 SOURCE: DIGITAL MEDIA PRODUCTIONS

Pedestrians

Pedestrian traffic represents the most basic form of transportation that is free of cost for the user. Intersections, or crossings in general, pose a particular challenge to pedestrian safety. Crosswalks serve two main purposes: 1) guiding pedestrians to locations where they will be visible when crossing the street, and 2) alerting drivers of pedestrian movements. At intersections, several elements affect pedestrians:

- Visibility at curbs
- ADA accessibility
- Crosswalks
- Pedestrian signals
- Pedestrian crossing refuges
- Traffic control types

Several different tools can be used as visual indicators of pedestrian movements, including items such as:

- Pavers can be a different color of brick or material on the ground to indicate the path the pedestrian will be following.
- Raised crossings are also a physical technique that makes a defined pedestrian realm at an intersection or crossing.
- In-street YIELD TO PEDESTRIAN signs is a way of alerting drivers of possible activity before arriving at the intersection.
- Pedestrian signalization helps demarcate when a pedestrian is crossing an intersection or, if timed correctly can grant priority of crossing to the pedestrian.



PHOTO COURTESY OF KHA



PHOTO COURTESY OF KHA

Transit

Proper **bus stop placement** is an important element in the design of intersections (See [Figure 5.15](#)). Bus stops should be located at the far-side stop of an intersection reducing wait times of drivers attempting to make right-hand turns which can become blocked at near-side stop configurations. Far-side stop configurations also help eliminate potential conflict points between vehicles as motorists attempt to jump lanes to gain access around buses for right-hand turning movements. **Mid-block stops** are least desirable and result in the highest use of curb space hindering both through and right-hand turn movements.

Other important factors to consider include trade-offs between transit vehicles and other modes of transportation. Automobiles, bicyclists and pedestrians can potentially converge at the same intersection, and the interaction of these users is defined by the intersection design. Transit vehicles are usually large and their movements can dominate the area. Planning for the turning radius of the vehicle can assist in making their movements safe and efficient.

Where it is possible, **transit-only lanes** at intersections provide transit vehicles a dedicated space to bypass traffic, and can typically be shared with bicyclist.

Transit priority treatments provide an early green signal, or hold a green signal, for transit vehicles to cross an intersection with minimal delay. Use of this method should be evaluated based on how it will affect the overall network system.

Bike

How to create a safe environment for a bicyclist can range based on confidence and skill level. Complete separation of a facility is recommended along high speed corridors where the user might



PHOTO COURTESY OF KHA

have some experience (Class B User), but prefers the comfort and increased safety associated with a buffered path. Separated bike paths are recommended where the user is highly inexperienced (Class C User). Such examples include sections of corridors along a safe-route to school program or corridors leading to popular park or community center destinations.

Intersections where Class B and C users are anticipated should be designed with the same concepts in mind. Green paving

or striping can help guide

novice users through an intersection. For more advanced users (Class A Users), simple treatments such as Bicycle Boxes allow bicycle traffic to be placed in front of vehicular traffic. When the signal turns green, bicycle traffic may then preempt vehicular movement for all through, right and left hand turns reducing unnecessary conflict points with the automobile.

Associated design features for bicycle crossings include designated crossings, signage, designated holding patterns, stop bars, right-turn protection, and signalization.



PHOTO COURTESY OF KHA

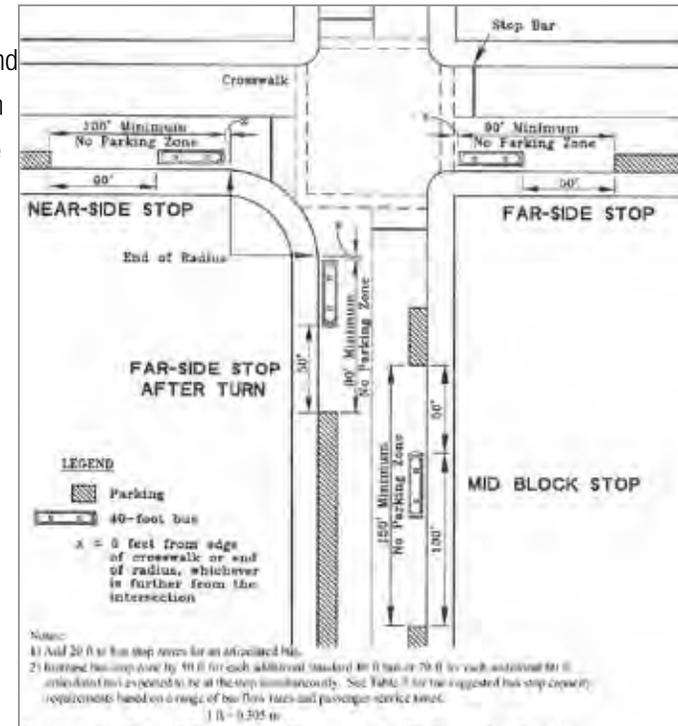


FIGURE 5.15 SOURCE: ITE MANUAL

Chart

Figure 5.16 is a chart that identifies pedestrian and bicycle features at signalized intersections that can be used to create safe and functional intersections.

Shorter and more visible crosswalks	<ul style="list-style-type: none"> • Crosswalks on all approaches; • Longitudinal markings (possible use of colored and/or textured paving); • Reduced overall street widths by reducing the number of travel and turn lanes, or narrowing travel lanes; • Curb extensions with pedestrian push buttons on extensions; and • Median refuges on wide streets (greater than 60 feet) with median push buttons.
Priority for pedestrians, bicyclist, and accessibility	<ul style="list-style-type: none"> • Shorter cycle lengths, meeting minimum pedestrian clearances (also improves transit travel times); • Longer pedestrian clearance times (based on 3.5 feet/sec. to set flashing (clearance) time and 3.0 feet/sec for total crossing time); • Reduced conflicts between pedestrians and turning vehicles achieved with: <ul style="list-style-type: none"> ○ Pedestrian lead phases; ○ Scramble phases in very high pedestrian volume locations; ○ Restricted right turns on red when pedestrians are present during specified hours; and ○ Allowing right turns during cross-street left turn phases reduces the number of right turn conflicts during pedestrian crossing phase.
Low speed channelized right turn lanes	<ul style="list-style-type: none"> • Adequate sized islands for pedestrian refuge; • Raised pedestrian crossing/speed table within channelized right turn lane; and • Signal control of channelized right turn in high pedestrian volumes locations.
Improved pedestrian information	<ul style="list-style-type: none"> • Pedestrian countdown timers; and • “Look Before Crossing” markings or signs.
Bicycle features	<ul style="list-style-type: none"> • Bicycle lanes striped up to crosswalk (using “skip lines” if vehicular right turns are allowed); • Bicycle detectors on high volumes routes, or bicyclist-accessible push buttons; • Adequate clearance interval for bicyclist; • Colored paving in bicycle/vehicle lanes in high-conflict areas; and • “Bike Boxes” (painted rectangle along right hand curb or behind crosswalk) to indicate potential high-conflict area between bicycles continuing through an intersection and right turning vehicles, and to allow bicyclist to proceed through intersection or turn in advance of vehicles.
High-priority transit thoroughfare elements	<ul style="list-style-type: none"> • Adaptive Transit Signal Priority (TSP) when transit detected; • Extended green phase on bus route (rapid transit signal priority); • Truncated green phase for cross street; • Re-order phasing to provide transit priority (transit priority not to be given in two successive cycles to avoid severe traffic impacts); • Other bus priority signal phasing (sequencing) • Queue jump lanes and associated signal phasing; and • Curb extension bus stops, bus bulbs.
Accessibility and space for pedestrians	<ul style="list-style-type: none"> • Properly placed pedestrian actuation buttons, with audible locator tones; • Detectable warnings; • Two curb ramps per corner depending on radius of curb return and presence of curb extensions; • Clear pedestrian paths (and shoulder clearances) ensuring utilities and appurtenances are located outside pedestrian paths; • Vertical and overhang clearance of street furnishings for the visually impaired; • Properly placed signal poles and cabinets: <ul style="list-style-type: none"> ○ Behind sidewalks (in landscaping or in building niches); ○ In planting strips (furnishing zone); and ○ In sidewalk, at least three feet from curb ramps.
Traffic operations for safe speeds and pedestrian convenience	<ul style="list-style-type: none"> • Target speeds between 25-35 mph; • Signal progression at target speeds; and • Fewer very long/very short cycle lengths.
Higher priority on aesthetics	<ul style="list-style-type: none"> • Textured and colored material within the streetside; • Colored material within crosswalks, but avoid coarse textures which provide rough surfaces for the disabled; • Attractive decorative signal hardware, or specialized hardware; and • Attention to landscaping and integration with green street stormwater management techniques.

FIGURE 5.16

5.9 Integration of Modal Types

The following examples are generalized conceptual illustrations of different intersection configurations, along with an existing aerial photo.



FIGURE 5.18: 43RD AT ELLA EXISTING AERIAL PHOTO



FIGURE 5.19: TIDWELL/W MONTGOMERY/SHEPHERD EXISTING AERIAL PHOTO

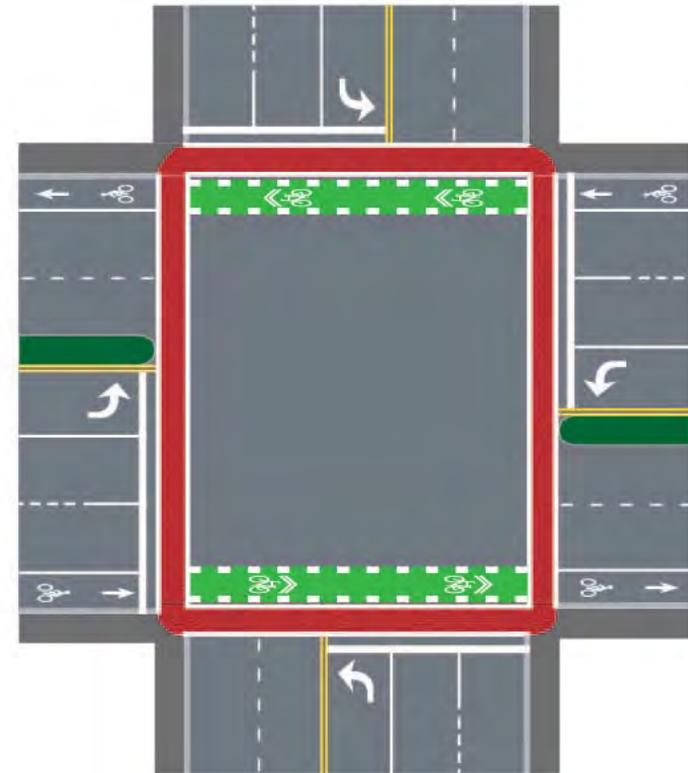


FIGURE 5.17: INTERSECTION REDESIGN CONCEPT



FIGURE 5.18: FAIRBANKS N HOUSTON AT BREEN EXISTING AERIAL PHOTO

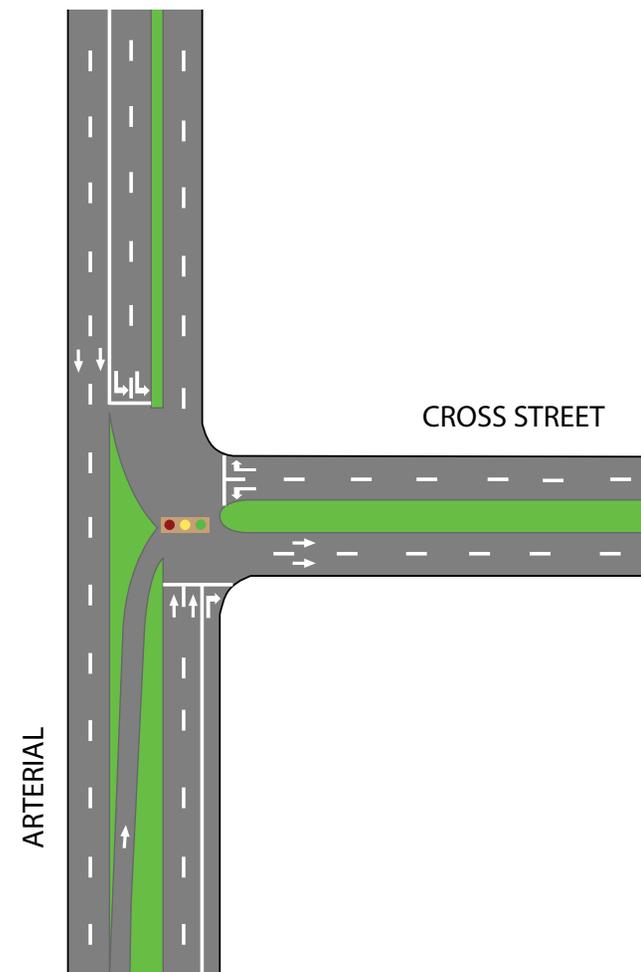


FIGURE 5.19: MODIFIED FLORIDA T INTERSECTION CONCEPT

This Page Intentionally Left Blank

VI. A Balanced Approach

Considering All Users of the System

The following pages highlight a shift in the manner in which transportation can be viewed by promoting alternative transportation options, prioritizing improvements for specific corridors and locations, and examining the opportunities for connections to transportation options outside of the City's current right-of-way.

There are multiple components to planning for infrastructure needs within the Study Area. Those include but are not limited to:

- Understanding the needs of the community;
- Developing a plan that responds to development trends;
- Examining the travel demand model results;
- Prioritizing corridors for specific users;
- Correcting gaps within the transportation network; and
- Creating/Revising policies as appropriate.

Each of these elements are considered the in corridor vision design provided in subsequent pages of the report based on the MTFP functional classification of the roadway and associated priority elements as defined in Section 6.1. It is important to note, however, that the provided potential cross-sections are examples of what roadways might look like when the provided elements like bike, pedestrian, etc., are considered in addition to the automobile. Provided examples represent proposed future visions are not final designs for implementation given there has not been an examination of the engineering specifics for each of these solutions.

The ideas presented, therefore, will be refined through further analysis at the intersection, corridor, and the system-wide level before moving into final design and construction.

The process for developing those more detailed plans is discussed within this document and will follow the City of Houston's Capital Improvement Plan process for infrastructure programs.

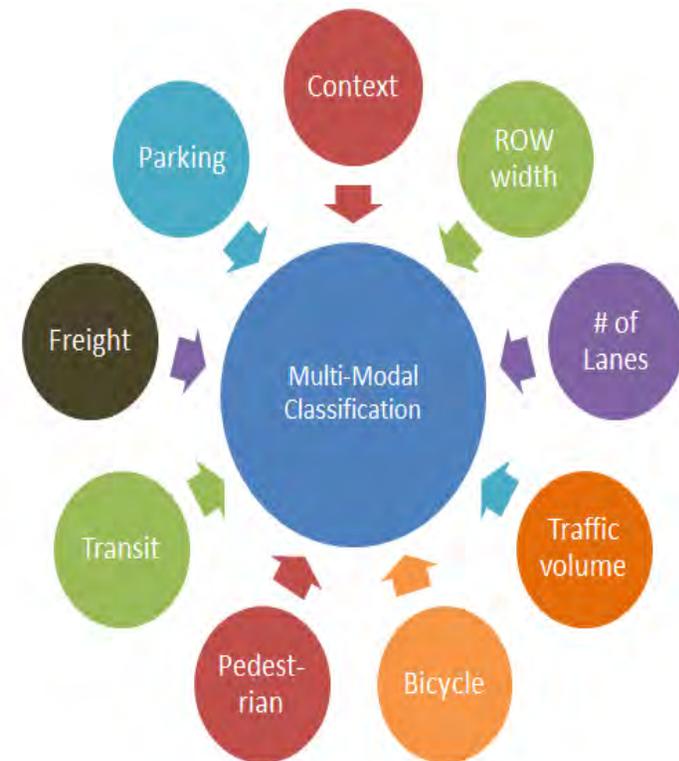


FIGURE 6.1

6.1 Defining the Priority Elements

The creation of a multi-modal street network requires balancing competing considerations throughout the entire transportation system, and does not encourage placing all modes on all roadways. By examining a corridor's priority elements as defined to the right, each potential user of the system is evaluated and further balanced against the need of other user types. The result is a future vision of the corridor that highlights the needs and associated wants within the existing and future transportation network. For a better understanding of these modes and related considerations, see [Chapter V. Changing Mobility Considerations](#).

Recognizing the benefits of a balanced approach, the Northwest Mobility Study examined the needs for each mode independently. Gaps and potential improvements to each network were identified as defined in [Chapter VII. Outcomes](#). Final outcome maps were then overlaid and compared to ensure a complete and complementary transportation network inclusive of all modes. Resulting priority elements were then evaluated within each corridor's limited right-of-way and potential design concepts were developed based on defined elements.

The table on the next page provides a summary of each of the corridors that are currently classified under the existing MTFP. The table identifies what elements were prioritized per corridor; related Corridor Sheets depict potential design examples.

Automobiles

The automobile is considered a priority on all Houston streets. As such, an associated icon is not required to identify this element as a priority. Instead, defined priority elements are intended to call attention to other modes that may be incorporated within a corridor in addition to the automobile.

Priority Elements

Bicycle

Bicycle facilities increase the reach of transit services, promote non-motorized transportation options, and can be used for recreation and commuting alternatives. They can be located in the roadway as a shared traffic facility or separated from traffic as an on-street buffered facility.



Additionally, facilities may be provided in the pedestrian realm, where appropriate, providing for the complete removal of the facility from vehicular traffic.

Parking

The provision of adequate vehicular capacity continues to be paramount to providing access and mobility within the study area. Where appropriate, parking may serve as a pedestrian buffer or as traffic calming treatment. Permanent parking is appropriate in certain context such as commercial retail areas upon approval of the PWE. Only peak-hour parking is displayed in corridor design examples to best demonstrate the potential use of the corridor at full capacity.



Transit

Increased access to transit will help promote ridership and offset some of the right-of-way constraints while increasing the carrying capacity of the roadway. High-frequency Transit which promotes fewer stops at greater distances, as well as local transit service were evaluated.



Pedestrian Realm

Where transit is a priority, the pedestrian network is considered an essential, complementary component where the sidewalk is encouraged to be greater than the current City standard of five feet. Pedestrians facilities are also prioritized for certain commercial/retail establishments and associated community amenities such as schools, parks or libraries or regional trail networks.



Proposed MMC

Resulting multi-modal classification recommended based the functional classification of the roadway (MTFP) and elements as defined above. Provided classification are in line with facility types defined in Phase 1 of the CMP Process.

STREET NAME	FROM	TO	EXISTING FUNCTIONAL CLASS	MEDIAN/ CTL/ UNDIVIDED	MTFP ROW	NUM LANES	EXIST VOLUME RANGE	2035 VOLUME RANGES	MTFP IMPROVEMENTS	UPDATED FUNCTIONAL CLASS	PROPOSED MMC	BIKE FACILITY	PARKING	TRANSIT	PED REALM
FALLBROOK DR	BELTWAY 8	SH 249	T-4-100	MEDIAN	100'	4	5,000-11,000	12,000-38,000	P-4-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X- local	X
FALLBROOK DR	SH 249	VETERANS MEMORIAL	T-4-100	MEDIAN	100'	4	11,000-16,000	23,000-29,000	P-4-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
FALLBROOK DR	VETERANS MEMORIAL	I-45	T-4-100	MEDIAN	100'	4	2,000-12,500	9,000-18,500	P-4-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
WEST RD	BELTWAY 8	GESSNER	T-4-100	MEDIAN	100'	4	17,000-18,000	24,500-35,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-feeder	
WEST RD	GESSNER	FAIRBANKS N HOUSTON	MISSING CONNECTION	N/A	N/A	N/A	N/A	N/A	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-feeder	
WEST RD	FAIRBANKS N HOUSTON	HOLLISTER ST	T-4-100	MEDIAN	100'	4	200-1,000	500-7,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-feeder	
WEST RD	HOLLISTER	VETERANS MEMORIAL	T-4-100	N/A	N/A	N/A	N/A	N/A	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-feeder	
WEST RD	VETERANS MEMORIAL	I-45	T-4-100	MEDIAN	100'	4	10,500-17,000	24,000-33,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-feeder	
BREEN DR	FAIRBANKS N HOUSTON	N. HOUSTON ROSSLYN	T-4-100	UNDIVIDED	60'-100'	2	9,000-16,000	18,000-35,500	T-4-100	MAJOR THOROUGHFARE	INDUSTRIAL BOULEVARD				X
BREEN DR	N. HOUSTON ROSSLYN	SH 249	LOCAL STREET	UNDIVIDED	N/A	2	12,000-18,000	18,000-35,000	T-4-100	MAJOR THOROUGHFARE	INDUSTRIAL BOULEVARD				X
SH 249	BELTWAY 8	W MOUNT HOUSTON RD	T-6-120-180	CTL	170-180'	6	27,000-43,000	58,500-81,000	P-6-180	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD	X		X - Express	X
SH249	W MONTGOMERY RD	I-45	T-6-120-180	CTL	120'	6	20,000-32,000	44,500-65,000	P-6-180	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD	X		X- Local	X
W MOUNT HOUSTON RD	N HOUSTON ROSSLYN	W MONTGOMERY RD	T-4-100	MEDIAN	100'	4	2,000-3,000	6,000-8,500	MJ-2-100	MAJOR COLLECTOR	SUBURBAN STREET	X			
W GULF BANK RD	BELTWAY 8	WINDFERN RD	T-4-100	MEDIAN	100'	4	17,000-19,000	32,500-37,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	WINDFERN	WOOD BLUFF BLVD	MISSING CONNECTION	N/A	N/A	N/A	N/A	30,000-40,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	WOOD BLUFF BLVD	SHADY VALE LN	T-4-100	MEDIAN	100'	4	18,000	31,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	SHADY VALE LN	HOLLISTER RD	MISSING CONNECTION	N/A	N/A	N/A	N/A	31,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	HOLLISTER	NORTH HOUSTON ROSSLYN	T-4-100	MEDIAN	100'	4	18,000	39,000-39,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	N HOUSTON ROSSLYN	SUMMER LYNN PL	MISSING CONNECTION	N/A	N/A	N/A	N/A	31,000-35,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	SUMMER LYNN PL	SH 249/ W MONTGOMERY	T-4-100	MEDIAN	100'	4	5,500	32,000-48,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	SH 249/W MONTGOMER	ELLA BLVD	MISSING CONNECTION	N/A	N/A	N/A	N/A	21,000-30,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W GULF BANK RD	ELLA BLVD	I-45	T-4-100	MEDIAN	100'	4	10,000-20,000	35,000-39,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W LITTLE YORK RD	US 290	FAIRBANKS N HOUSTON	T-4-100	UNDIVIDED	100'	4	22,000	22,500-34,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W LITTLE YORK RD	FAIRBANKS N HOUSTON	VICTORY DR @ ALABONSON RD	P-6-100	MEDIAN	100'	4	25,000	25,500-45,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
W LITTLE YORK RD (Collector)	VICTORY DR @ ALABONSON RD	back to Victory DR	C-4-70	UNDIVIDED	60'	4	6,000-11,000	10,000-31,000	MJ-4-70	MAJOR COLLECTOR	SUBURBAN AVENUE			X-local	X
VICTORY DR	LITTLE YORK RD @ ALABONSON RD	LITTLE YORK RD	P-6-100	MEDIAN	100'	4	32,000	32,500-48,000	P-4-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD	X			X
W LITTLE YORK RD	VICTORY DR	I-45	P-6-100	MEDIAN	130'	6	6,000-11,000	10,000-31,000	P-6-130'	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD	X (partial)			
W TIDWELL RD	US 290	TC JESTER BLVD	T-4-90/100 (Varies)	MEDIAN	100'	4	16,000	16,000-42,000	T-4-90/100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X - Express	X

COUPLET: A COUPLET IS A ONE-WAY PAIRING OF TWO CORRIDORS.
 TRANSIT: TRANSIT RECOMMENDATIONS ARE INTENDED TO SUPPORT METRO'S SYSTEM REIMAGINING.

*Note: Table arranged geographically by location of street. For best use, compare to Chapter VII. Outcome System Maps. Associated Corridor Sheets are alphabetized.

STREET NAME	FROM	TO	EXISTING FUNCTIONAL CLASS	MEDIAN/ CTL/ UNDIVIDED	MTFP ROW	NUM LANES	EXIST VOLUME RANGE	2035 VOLUME RANGES	MTFP IMPROVEMENTS	UPDATED FUNCTIONAL CLASS	PROPOSED MMC	BIKE FACILITY	PARKING	TRANSIT	PED REALM
W TIDWELL RD (ADDED)	TC JESTER BLVD	SHEPHERD DR	T-4-80	MEDIAN	80'	4	16,000	16,000-42,000	T-4-80	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X -GAP (partial)		X-Express	X
W TIDWELL RD	SHEPHERD DR	I-45	T-4-80	MEDIAN	80'	4	22,000	28,000-41,500	T-6-100/130	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X		X - Express	X
PINEMONT DR	US 290	TC JESTER BLVD	T-4-80	MEDIAN	80'	4	12,900-19,000	24,000-31,000	T-4-80	MAJOR THOROUGHFARE	URBAN BOULEVARD	X			
PINEMONT DR	TC JESTER BLVD	ELLA BLVD	T-4-80	CTL	80'	4	16,700	21,500-27,000	T-4-80	MAJOR THOROUGHFARE	URBAN BOULEVARD	X-GAP			
PINEMONT DR	ELLA BLVD	SHEPHERD DR	T-4-80	UNDIVIDED	80'	2	19,700	22,000	T-4-80	MAJOR THOROUGHFARE	URBAN BOULEVARD	X -GAP			
W 43RD ST	US 290	ELLA BLVD	T-4-varies (80-100)	MEDIAN	80-100'	4	11,800-15,300	18,000-32,000	T-4-90/100	MAJOR THOROUGHFARE	URBAN BOULEVARD	X		X - Express	X
W 43RD ST	ELLA BLVD	SHEPHERD DR	T-4-60/70	CTL	60'-70'	4	11,800	17,000-32,000	T-4-70	MAJOR THOROUGHFARE	URBAN BOULEVARD	X*		X - Express	X
W CROSSTIMBERS ST	SHEPHERD DR	I-45	T-4-80	MEDIAN	80'	4	16,400-18,300	25,000-42,000	T-4-90	MAJOR THOROUGHFARE	URBAN BOULEVARD	X		X - Express	X
W 34TH ST	US 290	SHEPHERD DR	T-4-80	MEDIAN	70-80'	4	13,000-18,000	14,200-33,000	T-4-80	MAJOR THOROUGHFARE	URBAN BOULEVARD	X (partial)		X-Local	X
WINDFERN RD	BELTWAY 8	US 290	LOCAL STREET	UNDIVIDED	60'	2	9,000	10,000-16,000	MN-2-60/70	MINOR COLLECTOR	SUBURBAN STREET	X			X
GESSNER RD	BELTWAY 8	US 290	T-4-100	MEDIAN	100'	4	8,500-23,500	18,000-30,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD				X
FAIRBANKS N HOUSTON RD	BELTWAY 8	US 290	T-4-100	MEDIAN	100'	4	35,200-37,000	36,000-49,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD	X		X-Local	X
HOLLISTER RD	BELTWAY 8	FALLBROOK DR	T-4-100	MEDIAN	100'	4	31,350	32,000-42,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD				
HOLLISTER RD	FALLBROOK DR	WEST RD	MISSING CONNECTION	N/A	N/A	N/A	N/A	N/A	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD				
HOLLISTER RD	WEST RD	W LITTLE YORK RD	T-4-100	UNDIVIDED	100'	2	12,000-15,500	23,000-32,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
HOLLISTER RD	W LITTLE YORK RD	US 290	T-6-100	MEDIAN	100'	4	17,000-19,000	33,000-48,000	T-6-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
N HOUSTON ROSSLYN RD	BELTWAY 8	W LITTLE YORK RD	P-6-100	MEDIAN	100'	6	30,000-38,000	32,200-42,000	P-6-100	PRINCIPAL THOROUGHFARE	INDUSTRIAL BOULEVARD				X
N HOUSTON ROSSLYN	W LITTLE YORK RD	ANTOINE DR	LOCAL STREET	UNDIVIDED	60'	2	6,000-12,000	9,000-16,000	MN-2-60	MINOR COLLECTOR	INDUSTRIAL STREET				X
BINGLE RD	W LITTLE YORK RD	US 290	P-6-100	MEDIAN	100'	6	32,400	33,000-58,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X-Local	X
ANTOINE DR	BELTWAY 8	SH 249	T-4-100	MEDIAN	100'	4	14,000-22,000	28,500-47,000	T-6-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X		X - Express	X
ANTOINE DR	SH 249	W GULF BANK	T-4-100	MEDIAN	100'	4	14,000-22,000	28,500-47,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X		X - Express	X
ANTOINE DR	W GULF BANK	N. HOUSTON ROSSLYN	T-4-120	MEDIAN	100'	4	22,000-26,000	28,500-47,000	T-4-120	MAJOR THOROUGHFARE	URBAN BOULEVARD	X		X - Express	X
ANTOINE DR	N. HOUSTON ROSSLYN	US 290	T-4-120	MEDIAN	100'	4	22,000-26,000	28,500-47,000	T-6-120	MAJOR THOROUGHFARE	URBAN BOULEVARD	X		X - Express	X
E TC JESTER BLVD	I-610	JUDIWAY ST	T-4-120	MEDIAN	100'	4	9,000-15,000	11,500-27,500	T-4-120	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X			
W TC JESTER BLVD	I-610	JUDIWAY ST	T-4-100/110	MEDIAN	90-100'	4	10,000-23,500	20,500-40,000	T-4-100/110	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X			
TC JESTER BLVD	JUDIWAY ST	BELTWAY 8	T-4-100	MEDIAN	90-100'	2-4	9,800-23,500	20,500-40,000	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X			
MANGUM RD	US 290	WATONGA BLVD	T-4-100	MEDIAN	100'	4	18,600	32,000-44,000	T-4-100	MAJOR THOROUGHFARE	URBAN BOULEVARD	X			X
MANGUM RD	WATONGA BLVD	ANTOINE DR	C-4-60	UNDIVIDED	60'	3	3,000-5,500	13,500-14,500	MN-2-60	MINOR COLLECTOR	URBAN STREET	X			X
WATONGA BLVD	MANGUM RD	T C JESTER BLVD	T-4-100	MEDIAN	100'	4	8,000-9,000	31,000	T-4-100	MAJOR THOROUGHFARE	URBAN BOULEVARD				X

COUPLET: A COUPLET IS A ONE-WAY PAIRING OF TWO CORRIDORS.
 TRANSIT: TRANSIT RECOMMENDATIONS ARE INTENDED TO SUPPORT METRO'S SYSTEM REIMAGINING.

*Note: Table arranged geographically by location of street. For best use, compare to Chapter VII. Outcome System Maps. Associated Corridor Sheets are alphabetized.

STREET NAME	FROM	TO	EXISTING FUNCTIONAL CLASS	MEDIAN/ CTL/ UNDIVIDED	MTFP ROW	NUM LANES	EXIST VOLUME RANGE	2035 VOLUME RANGES	MTFP IMPROVEMENTS	UPDATED FUNCTIONAL CLASS	PROPOSED MMC	BIKE FACILITY	PARKING	TRANSIT	PED REALM
ROSSLYN RD	JUDIWAY ST	43rd	C-4-80	UNDIVIDED	80'	2	11,500-17,700	12,000	MJ-2-80	MAJOR COLLECTOR	SUBURBAN AVENUE	X			X
ROSSLYN RD	43rd	CANDLE LIGHT PLACE	LOCAL STREET	UNDIVIDED	NA	2	N/A	N/A	MN-2- 80	MINOR COLLECTOR	SUBURBAN AVENUE	X			X
ROSSLYN RD (Cebra St/Carver)	PINEMONT DR	WEST RD	N/A	N/A	N/A	N/A	N/A	N/A	MJ-4-80	MAJOR COLLECTOR	SUBURBAN AVENUE	X (Partial)			X
ELLA BLVD	I-610	W LITTLE YORK RD	T-4-80	MEDIAN	80'	4	21,400-28,000	27,000-41,500	T-4-80	MAJOR THOROUGHFARE	URBAN BOULEVARD			X - Local	X
WHEATLEY/ELLA BLVD	W LITTLE YORK RD	W GULF BANK	T-4-80	MEDIAN	Varies	4	15,000-17,500	32,000-37,500	T-4-80 (Varies)	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X -GAP (partial)		X - Local	X
ELLA BLVD	W GULF BANK	BELTWAY 8	T-4-100	MEDIAN	100'	4	15,000-17,500	32,000-37,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X (partial)			
N SHEPHERD DR	VETERANS MEMORIAL DR	W MONTGOMERY RD	P-6-200/210	MEDIAN	150'-200'	6	30,000-35,000	47,000-61,500	VETERANS TO LITTLE YORK P-6-210 LITTLE YORK TO MONTGOMERY P-6-200	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X - Express	X
N SHEPHERD DR	W MONTGOMERY RD	I-610	P-6-100	MEDIAN/CTL	100'	6	3,000-26,500	35,000-59,000	P-6-120	PRINCIPAL THOROUGHFARE	URBAN BOULEVARD			X - Express	X
YALE ST	I-610	W TIDWELL RD	T-4-70-80	MEDIAN	70-80'	4	12,800-15,500	26,500-35,500	T-4-80	MAJOR THOROUGHFARE	URBAN AVENUE			X-local	X
YALE ST	W TIDWELL RD	I-45	T-4-80	UNDIVIDED	60'-80'	2	6,500-11,000	20,500-27,500	T-4-70/80	MAJOR THOROUGHFARE	URBAN AVENUE			X-local (partial)	X
N MAIN ST	I-610	W CROSSTIMBERS RD	T-4-70	UNDIVIDED	70'	4	5,000-10,500	17,000-26,000	MJ-4-70	MAJOR COLLECTOR	URBAN AVENUE	X*	X	X-Express	X
AIRLINE DR	I-610	I-45	T-4-80	MEDIAN	80'	4	15,900-16,700	21,000-37,500	T-4-80	MAJOR THOROUGHFARE	INDUSTRIAL BOULEVARD			X-Express	X
VETERANS MEMORIAL DR	BELTWAY 8	SH 249	T-4-100	CTL	100'	4	18,000-28,000	35,000-49,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X - Express	X
VETERANS MEMORIAL DR	SH 249	I-45	P-6-100	MEDIAN	100'	4	18,900	29,000-48,500	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			X - Express	X
W MONTGOMERY RD	W GULF BANK	W TIDWELL RD	T-4-80	MEDIAN	80'	4	13,000-21,000	13,000-44,000	NORTH OF JORENT DR T-4-100 SOUTH OF JORENT DR T-4-80	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Express	X
W MONTGOMERY RD	SH 249	W GULF BANK	T-4-80	CTL	90	2	15,900-16,700	21,000-37,500	T-4-80	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X-Express	X
DEER TRAIL/GREENS CROSSING	SH 249	BELTWAY 8	C-4-Varies	N/A	N/A	4	N/A	N/A	MJ-4-Varies	MAJOR COLLECTOR	INDUSTRIAL AVENUE	X (partial)			

COUPLET: A COUPLET IS A ONE-WAY PAIRING OF TWO CORRIDORS.
 TRANSIT: TRANSIT RECOMMENDATIONS ARE INTENDED TO SUPPORT METRO'S SYSTEM REIMAGINING.

*Note: Table arranged geographically by location of street. For best use, compare to Chapter VII. Outcome System Maps. Associated Corridor Sheets are alphabetized.

Additional Consideration: Minor Collectors

The following chart details existing collector streets within the Northwest area that are not currently designated on the Major Thoroughfare and Freeway Plan (MTFP) the City.

Collector Streets act as connections to and between arterials to help facilitate the movement of automobiles. These streets are more accommodating of other modes of transportation such as bicycles. In order to develop a more connected network, the streets in the following table have been proposed for an adjustment in the MTFP.

STREET NAME	FROM	TO	EXISTING FUNCTIONAL CLASS	MEDIAN/ CTL/ UNDIVIDED	MTFP ROW	NUM LANES	EXIST VOLUME RANGE	2035 VOLUME RANGES	MTFP IMPROVEMENTS	UPDATED FUNCTIONAL CLASS	PROPOSED MMC	BIKE FACILITY	PARKING	TRANSIT	PED REALM
DERRINGTON	GESSNER	FAIRBANKS N HOUSTON	LOCAL STREET	UNDIVIDED	XX	2	N/A	800-1,500	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
LANGFIELD	TIDWELL	WHITEOAK TRAIL	LOCAL STREET	UNDIVIDED	50'	2	N/A	8,700	2 LANES	MINOR COLLECTOR	SUBURBAN STREET	X			
BURLINGTON	LANGFIELD	N HOUSTON ROSSLYN	LOCAL STREET	UNDIVIDED	60'	2	N/A	7,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
RODNEY RAY	WINDFERN	FAIRBANKS N HOUSTON	LOCAL STREET	MEDIAN	100'	4	N/A	6,500-8,000	4 LANES	MINOR COLLECTOR	SUBURBAN STREET				
PHILLIPINE	BELTWAY 8	WINDFERN	LOCAL STREET	UNDIVIDED	80'	2	N/A	9,000-11,000	4 LANES	MINOR COLLECTOR	SUBURBAN STREET				
FAIRBANKS WHITE OAK RD	FAIRBANKS N HOUSTON	HOLLISTER	LOCAL STREET	UNDIVIDED	65'	2	N/A	7,500	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
GUHN RD	FAIRBANKS WHITE OAK RD	US 290	LOCAL STREET	UNDIVIDED	65'	2 TO 4	N/A	4,000-6,500	4 LANES	MINOR COLLECTOR	SUBURBAN STREET				
ANN LOUISE RD	OLD FOLTIN RD	BELTWAY 8	LOCAL STREET	UNDIVIDED	60'	2	N/A	1,000-14,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
OLD FOLTINO RD	ANN LOUISE RD	249	LOCAL STREET	UNDIVIDED		2	N/A	7,000	4 LANES	MINOR COLLECTOR	SUBURBAN STREET				
FRICK RD	ANTOINE	VETERANS MEMORIAL	LOCAL STREET	UNDIVIDED	55'	2	N/A	3,000-9,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
ALDINE WESTERN RD	VETERANS MEMORIAL	ELLA BLVD	LOCAL STREET	UNDIVIDED	65'	2	N/A	11,000-12,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
BLUE BELL RD	VETERANS MEMORIAL	I-45	LOCAL STREET	UNDIVIDED	65'	2	N/A	6,000-13,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
DE WALT ST	MONTGOMERY	IH 45	LOCAL STREET	UNDIVIDED	60'	2	N/A	8,500-11,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
DE PRIEST ST	DE WALT	MONTGOMERY	LOCAL STREET	UNDIVIDED	60'	2	N/A	3,000-7,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
DE SOTO	ANTOINE	ELLA BLVD	LOCAL STREET	UNDIVIDED	60'	2	N/A	3,000-5,500	2 LANES	MINOR COLLECTOR	SUBURBAN STREET	X -GAP			
WAKEFIELD	TC JESTER	YALE	LOCAL STREET	UNDIVIDED	50'	2	N/A	7,000-12,500	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
ALBA RD	43RD	I-610	LOCAL STREET	UNDIVIDED	60'	2	N/A	9,500-15,500	2 LANES	MINOR COLLECTOR	SUBURBAN STREET	X			
OAK FOREST	34TH	PINEMONT	LOCAL STREET	UNDIVIDED	60'	2	N/A	6,000-15,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				
VICTORIA DR	YALE	I-45	LOCAL STREET	UNDIVIDED	60'	2	N/A	3,000	2 LANES	MINOR COLLECTOR	SUBURBAN STREET				

6.2 Corridor Sheets

The purpose of this study is to recommend a network of modal facilities to efficiently move people within the Study Area. As such, the network is first evaluated at a system level to best understand where congestion might occur and why. Priority elements (pedestrian, parking, transit, pedestrian, and bicycle facilities) are evaluated at a more intimate level, where individual corridor examples are assessed to determine “what works” within a given scenario. Variables analyzed include existing right-of-way, traffic counts, and current modal uses as well as future projected volumes and anticipated development patterns. Public comment and associated interests such as area context were considered and balanced within each recommendation. .

The corridor sheets that follow below provide the information for each corridor:

- Priority Elements identified by associated icon
- Existing conditions
- Identified needs
- Future vision

Corridor sheets are arranged alphabetically and complement information provided in summary tables highlighted in [Section 6.1: Highlighting Priority Elements](#). Summary tables are arranged by a corridor’s geographic location and may be directly compared to the final system maps presented in [Chapter VII. Outcomes](#).

Note: Provided corridor sheets define the proposed vision of the corridor and demonstrate how identified priority elements might be configured within a corridor. Corridor sheets serve as examples only. Final design is determined during the construction phase and deemed appropriate by a licensed Professional Engineer; detailed corridor design of this type is not appropriate at this high level of planning.

Priority Elements



Note: Although freight is not identified as a priority element, MMC designations of Industrial Boulevard/Avenue/Street recommendation were considered based on area context. Examples for consideration include North Houston Rosslyn Road and Airline Drive.

Regional freight mobility has been considered for the greater region of Houston and cross referenced for the purpose of this report. For more information, see H-GAC’s Regional Goods Movement Study, Intermodal Connectors Inventory and Assessment, June 2013.

W 34th Street

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-80
Existing Counts Range	13,000-18,000	Future Volume Range	14,200-33,000
Right-of-Way	70'-80'	Proposed MMC	Urban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

W. 34th Street is a 4-lane, divided **Major Thoroughfare** that provides east-west connectivity from US-290 to Shepherd. Currently, two different cross sections define the built corridor:

- US-290 to Mangum Road: 4-lane thoroughfare with a median and 70' of right-of-way.
- Mangum Road to Shepherd Drive: 4-lane thoroughfare with a median and an 80' right-of-way; bike lanes flank both sides of the roadway.

Commercial and office uses are the most prominent land use from US 290 to Mangum Road. From Mangum Road to TC Jester there is an increase in multi-family use. East of TC Jester, land use is primarily single-family residential.

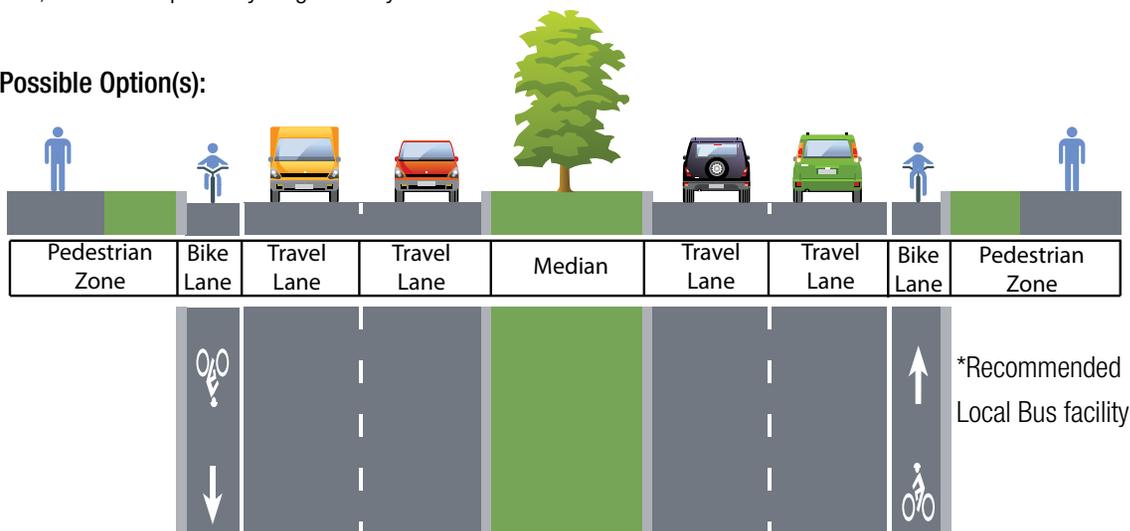
Identified Needs

System modeling results indicate traffic along W. 34th Street will remain significant into 2035 (see **Chapter IV. Defining Future Mobility Conditions**). Waltrip High School is located near the intersection of Ella Blvd and W. 34 Street, and attributes to morning and afternoon traffic during the beginning and close of school-day hours. Bicycle facilities along the corridor are narrow, and according to public comment feel unsafe given the speed at which traffic travels along the roadway. Sidewalks are evident along the corridor, but are inconsistent. Designated crosswalks along the corridor are located at intersections, but are not user friendly.

Future Vision

W. 34th Street traffic congestion is affected by the existing network's limited north-south connectivity. As provided in Chapter IV of this Report certain connections, such as the extension of Ella Blvd north of Little York Road, are anticipated to alleviate some congestion along the corridor. However, projected volumes still indicate a vehicular capacity need along the corridor. As such, it is recommended that W. 34th Street remain classified as a 4-lane **Major Thoroughfare**. Similarly, given the system's provided grid, land use and associated context, the corridor is further recommended to be classified as an **Urban Boulevard** in preservation of the median for access management. Wider bike lanes are also recommended for increased connectivity and safe access to destinations such as the local high school and off-street bike facilities near the intersection of TC Jester. Where appropriate, it is recommended the median be reduced to provide a safe biking facility. Sidewalk improvements will also be necessary and should be a priority near the school and METRO bus stops. A local bus facility is recommended along W. 34th Street to accommodate large multi-family and commercial properties along the corridor.

Possible Option(s):



W 43rd Street

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-70; T-4-90/100
Existing Counts Range	11,800-15,300	Future Volume Range	17,000-32,000
Right-of-Way	60'-100'	Proposed MMC	Urban Blvd
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median/CTL

Existing Condition

W 43rd Street is a **Major Thoroughfare** that provides the first continuous east-west corridor north of IH 610 with access across US 290 and IH 45. Its existing cross sections include:

- US-290 to TJ Jester: 4-lane 100' right-of-way road with a median and bike lanes and sidewalks separated by a small planting strip flanking both sides of the corridor in 100' right-of-way. Land use is predominately single-family residential with short lot faces.

- TC Jester to Ella Blvd: 4-lane 80'-90' right-of-way road with a median but no bike lanes. From Oak Forest Drive to Ella Blvd, a center turn lane functions in place of the raised median. The land uses along the corridor also transition to a mix of retail-commercial properties with short-faced parking lots, institutional facilities and multi-family housing.

- Ella Blvd to Shepherd: 4-lane 60' right-of-way road with no median and sidewalks flanking both sides of the road; land use is single-family residential properties with lot faces fronting the street.

Identified Needs

Two elementary schools and one junior high directly abut W. 43rd Street between E. TC. Jester Blvd and Main Street, just west of Ella Blvd. Traffic speeds along the corridor, especially near school facilities, was expressed as a concern by the public. Residents expressed a desire for traffic calming treatments such as speed bumps, raised-midblock crossings for pedestrians, and pedestrian beacons during peak pickup and drop-off hours. A below-grade crossing at the TC Jester bridge for the multi-use trail was another idea expressed by residents. Intersections in need of improved pedestrian crossings included Oak Forest Drive and Ella Boulevard.

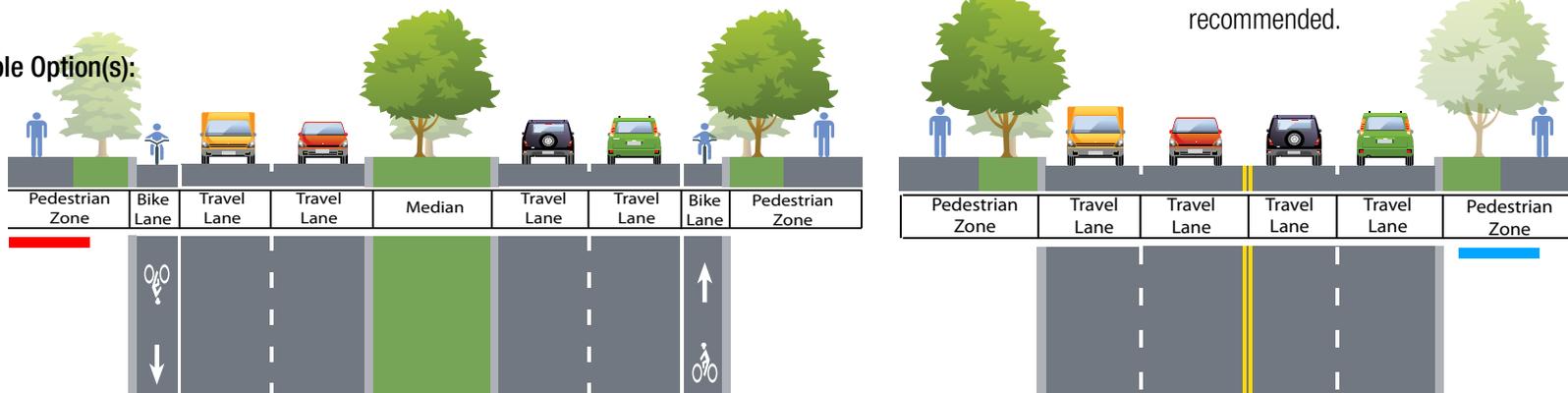
Future Vision

Due to projected traffic volumes, length and provided east-west connectivity provided by the corridor, it is recommended W. 43rd Street remain a 4-lane **Major Thoroughfare**. As the corridor develops, it is recommended to develop as an **Urban Blvd** characteristic of short block faces and median for continued access management of vehicular traffic. Multi-modal considerations are restricted by a limited right-of-way:

- US 290 to Ella: 90 - 100' right-of-way is recommended allowing for a more robust pedestrian realm and expanded on-street bicycle facility appropriate for a high-speed corridor. Where medians are present, pedestrian refuges should be installed especially near schools.

- Ella to Shepherd: 70' right-of-way with a bike facility extended east of TC Jester for increased connectivity to bike facilities on Crosstimbers. The provided facility is intended to connect bicycle traffic to neighborhood amenities, schools and the White Oak Bayou Trail. A High Frequency Transit facility is also recommended.

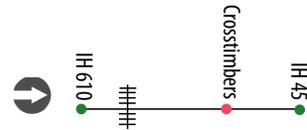
Possible Option(s):



*Recommended High Frequency Transit & Bike Facility. Bike Route may be warranted where right-of-way is constricted between Ella and Shepherd. However, further evaluation for desired level of safety should be evaluated.

Airline Drive

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-80
Existing Counts Range	15,900-16,700	Future Volume Range	21,000-37,500
Right-of-Way	80'	Proposed MMC	Industrial Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Airline Drive is a 4-lane divided **Major Thoroughfare** with an 80' right-of-way from IH 610 to IH 45. Commercial and industrial uses line the northern section of the corridor which attracts larger truck traffic. South of the railroad tracks, the corridor is abutted by residential use. Although it is only a small segment in the study area, Airline Drive is a major corridor for moving traffic north-south from just south of the Outer Loop of Beltway 8 to the Inner Loop area.

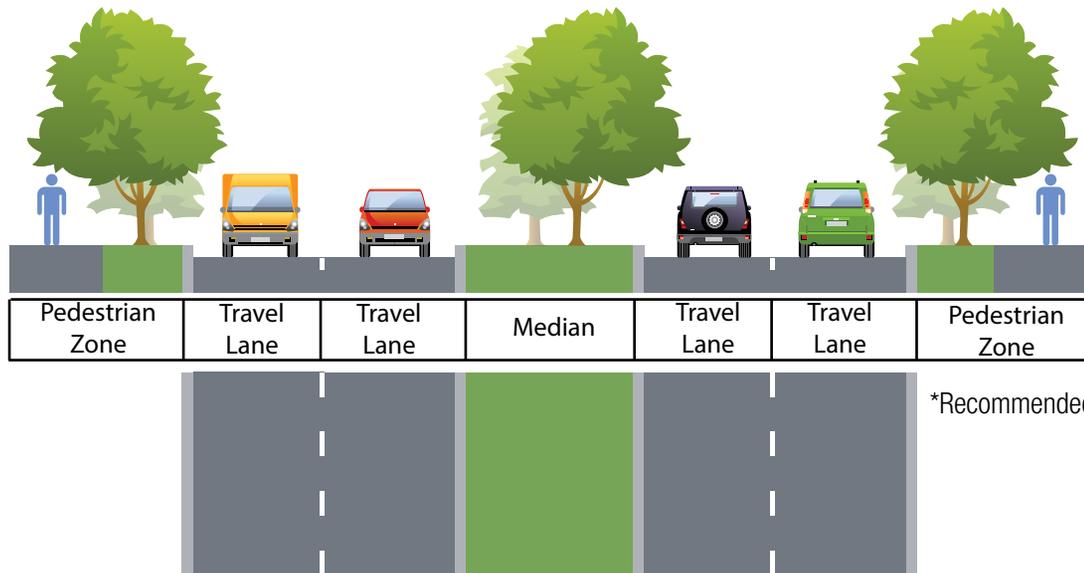
Identified Needs

Due to its industrial nature, public input placed a high priority on providing transit access to the area. Enhancement of pedestrian facilities would be necessary in order to create a way for transit riders to safely travel from bus stops to their final destination. The public also indicated a desire for bicycle facilities along the corridor.

Future Vision

The majority of Airline Drive within the study area are industrial. As such, it is recommended the corridor be classified as an **Industrial Boulevard**. The corridor should maintain existing medians and redevelop to add a median in the segments of the corridor where not currently present. Due to the projected volumes for the corridor, reducing lanes to accommodate an on-street bicycle facility is not recommended, thus attention should be focused on enhancing the pedestrian realm. The corridor is recommended to remain a **Major Thoroughfare** with an 80' right-of-way. Due to the industrial facilities located on the corridor, a High Frequency Transit facility is recommended for providing access for the public along the local and regional network.

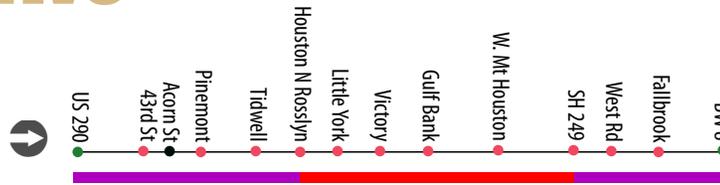
Possible Option(s):



*Recommended High Frequency Transit

Antoine Drive

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100; T-6-120
Existing Counts Range	14,000-26,000	Future Volume Range	28,500-47,000
Right-of-Way	100'	Proposed MMC	Urban/Suburban Blvd
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Antoine Drive provides north-south connectivity from US 290 to Beltway 8 as a divided, 4-lane **Major Thoroughfare**.

Variations in the existing cross section include:

- US 290 to Houston N. Rosslyn: 4-lane thoroughfare with 120' right-of-way and bike lanes flanking both sides of the corridor. Along Scarborough High School segment, the corridor has on-street parking; a stripped bike lane is provided directly adjacent to parking. Commercial use is much more prevalent North of Acron Street to Pinemont.
- Houston N. Rosslyn to Little York: 4-lane thoroughfare with 100' right-of-way and buffered pedestrian realm. Share-the-road signage, or Sharrows, are evident from Pinemont to Little York.
- Little York to Breen: 4-lane thoroughfare with 100' right-of-way and buffered pedestrian realm. The provided context is largely single-family residential and no bike lanes.
- Breen to BW 8: Industrial with some commercial and residential with relatively wide setbacks from the corridor.

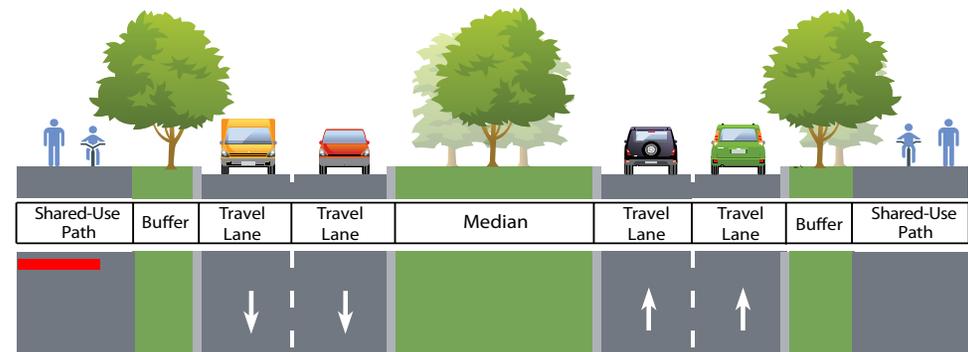
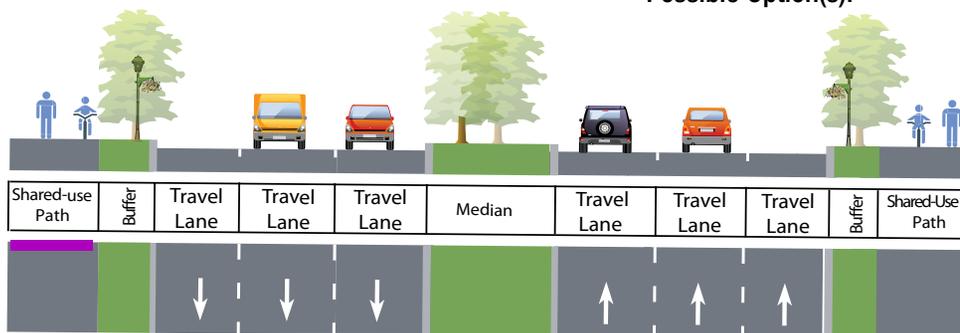
Identified Needs

Travel demand results indicate a need to maintain if not expand the current 4-lane designation of the corridor to 6-lanes. However, in line with the Near Northwest Livable Centers Study and associated Antoine Corridor Concept Plan, expansion of the roadway does not adhere to the greater vision of the corridor for some portions of the roadway. Moreover, as demonstrated through recent capital investments, as supported by area plans, a 4-lane corridor is more sensitive to the area context. Several intersections were identified as needing mitigation improvements to enhance the flow of traffic. SH 249/Antoine Drive and West Road/Antoine Drive were identified as problem intersections, and increased signage may be needed to better accommodate traffic movement through these intersections. Better access to White Oak Bayou at Antoine Drive was also identified. Finally, sidewalks are non-existent at railroad crossings.

Future Vision

While there is a future demand for increased capacity along the corridor, the study recommends that Antoine north of N. Houston Rosslyn to SH 249 be classified as a 4-lane **Major Thoroughfare**. To accommodate projected traffic volumes and increased access to regional highways, 6-lanes are recommended from US 290 to Houston N. Rosslyn and north of SH 249 to BW 8. Similarly, given the density of land use and relative grid-connection of the local street network, Antoine Drive is recommended an **Urban Boulevard** south of Gulf Bank in preservation of the median and desired context. North of Gulf Bank, the corridor is recommended as a **Suburban Boulevard**. A **shared-use path**, which is a separated off-street bicycle facility, is recommended along Antoine given provided traffic volumes. As a regional connector, High Frequency Transit, is also recommended.

Possible Option(s):

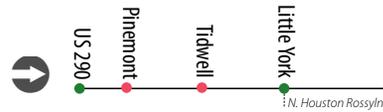


NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

*Recommended High Frequency Transit

Bingle Road

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	6	MTFP Designation	P-6-100
Existing Counts Range	32,400	Future Volume Range	33,000-58,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Bingle Road is a 6-lane, divided **Principal Thoroughfare** with an 100' right of way. The corridor provides north-south connection from US-290 to Little York. At Little York, the corridor transitions into N. Houston Rosslyn. The Bingle-N. Houston Rosslyn pairing provides one of only two completely built north-south corridors within the study area, and is considered a vital regional connector for vehicular traffic. Bingle Road is defined by commercial and retail uses, promoting both regional and localized traffic movement.

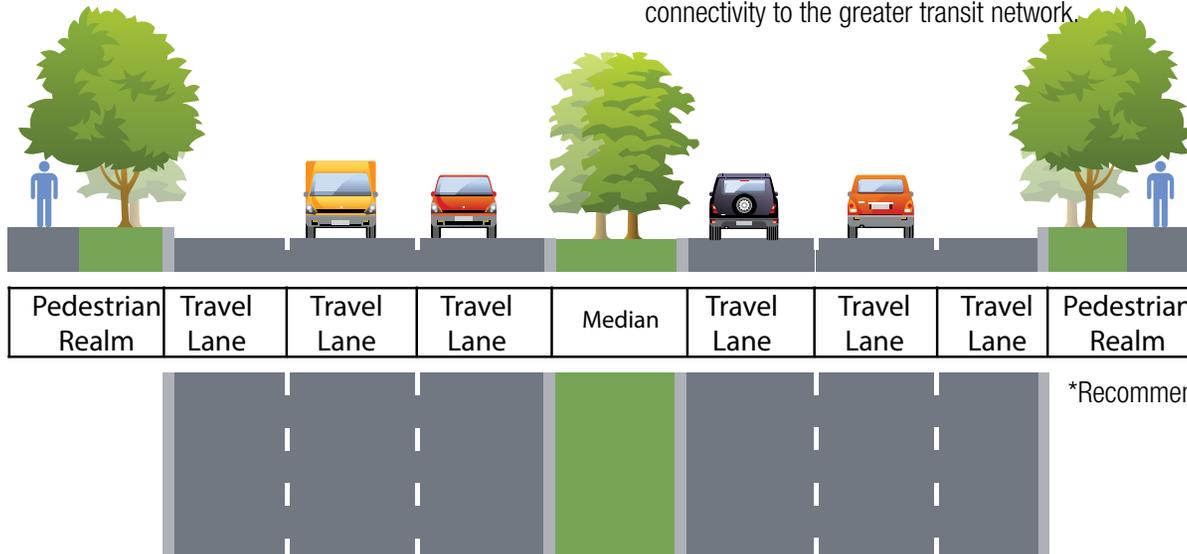
Identified Needs

Public comments indicated that heavy truck traffic is common along this corridor. The intersection of Breen Drive and Bingle Road, as it transitions into N. Houston Rosslyn, could potentially use mitigation to enhance turning movements at the traffic light. Some portions of Bingle Road have large gaps within the existing sidewalk network. Similar to other places within the study area, sidewalks at railroad crossings are nonexistent. Transit is also not accommodated on the existing facility, which is considered a significant gap given the existing retail-commercial use along the corridor. Similarly, as a regional connector, transit would greatly benefit the corridor in terms of increased capacity of the corridor, and increased connectivity to the greater transit network.

Future Vision

Due to existing and projected vehicular traffic volumes anticipated along the corridor, it is recommended that Bingle Road remain a 6-Lane **Principal Thoroughfare** with 100' of right-of-way. Given the area context with longer commercial and residential setbacks, the corridor is also recommended as a **Suburban Boulevard** in preservation of the median and continued access management of vehicular turning movements. Prioritized modal improvements include completing sidewalk gaps and enhancing existing pedestrian facilities. Given the proximity of this corridor to Antoine Drive, it is recommended that local transit be accommodated and incorporated where needed to access other High Frequency Routes.

Possible Option(s):



*Recommended Local Bus Facility

Breen Drive

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2	MTFP Designation	T-4-100
Existing Counts Range	9,000-18,000	Future Volume Range	18,000-35,500
Right-of-Way	60'-100'	Proposed MMC	Industrial Blvd.
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Median

Existing Condition

Breen Drive is currently built as a 2-lane road with open ditches and no pedestrian amenities. Breen Drive is classified on the MTFP as a 4-lane **Major Thoroughfare** to be widened from Fairbanks N. Houston Road to N. Houston Rosslyn Road within a 100' right-of-way. West of Fairbanks N. Houston the MTFP designation is proposed to be extended to what is today West Road which maintains the same MTFP designation. For portions of the corridor currently classified on the MTFP, use is largely industrial. East of N. Houston Rosslyn Road, however, the corridor is not designated on the MTFP and currently operates as a 2-lane street that is more suburban to rural in nature with a provided mix of land uses.

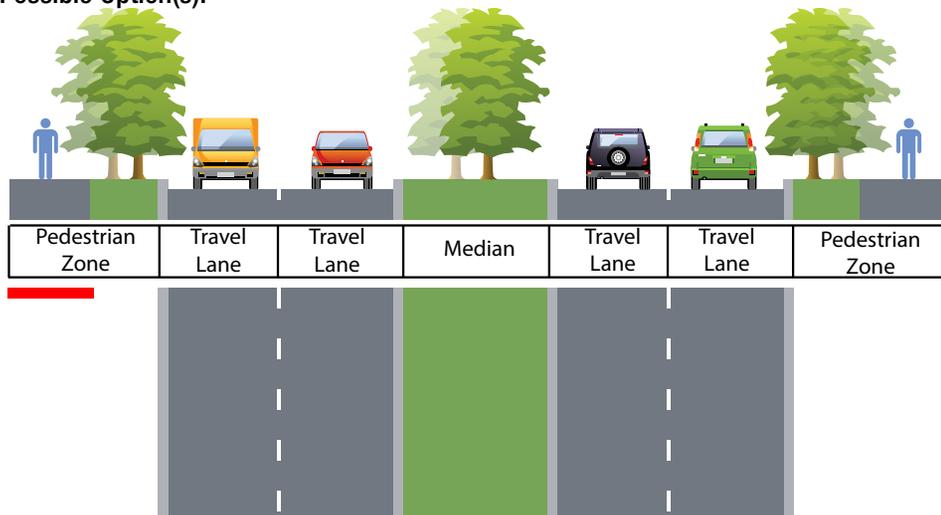
Identified Needs

Stakeholders and the public alike noted the absence of sidewalks as a concern. The project team introduced the concept of a 3-lane or 4-lane cross section with sidewalks which was well received by the public.

Future Vision

Given the existing industrial use along the corridor, and anticipated traffic volumes, it is recommended Breen be built as a 4-lane **Major Thoroughfare** as currently designated on the MTFP. For continued system efficiency, the portion of the corridor currently classified as a local road, is also recommended to 4-lane **Major Thoroughfare** to SH 249. An esplanade, or raised median is also recommended for the portion of the corridor currently on the MTFP for increased access management of larger industrial vehicles. Given the existing and anticipated context, the length of the corridor is recommended to be classified an **Industrial Blvd** in preservation of the proposed median. Construction of sidewalks is recommended as there are presently none. A bicycle facility is currently not recommended for this corridor given anticipated heavy traffic volumes. Finally, the intersection of Breen Drive and SH 249 can benefit a redesign to streamline traffic movements.

Possible Option(s):



NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

W. Crosstimbers Street

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-90
Existing Counts Range	16,400-18,300	Future Volume Range	25,000-42,000
Right-of-Way	80'	Proposed MMC	Urban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

W. Crosstimbers Street is currently a 4-lane divided **Major Thoroughfare** with an 80' right-of-way. It is also one of the few existing corridors within the study area with a designated bike lane. Crosstimbers is an east-west continuation of 43rd Street. Residences are the prominent development type along this small portion of the corridor.

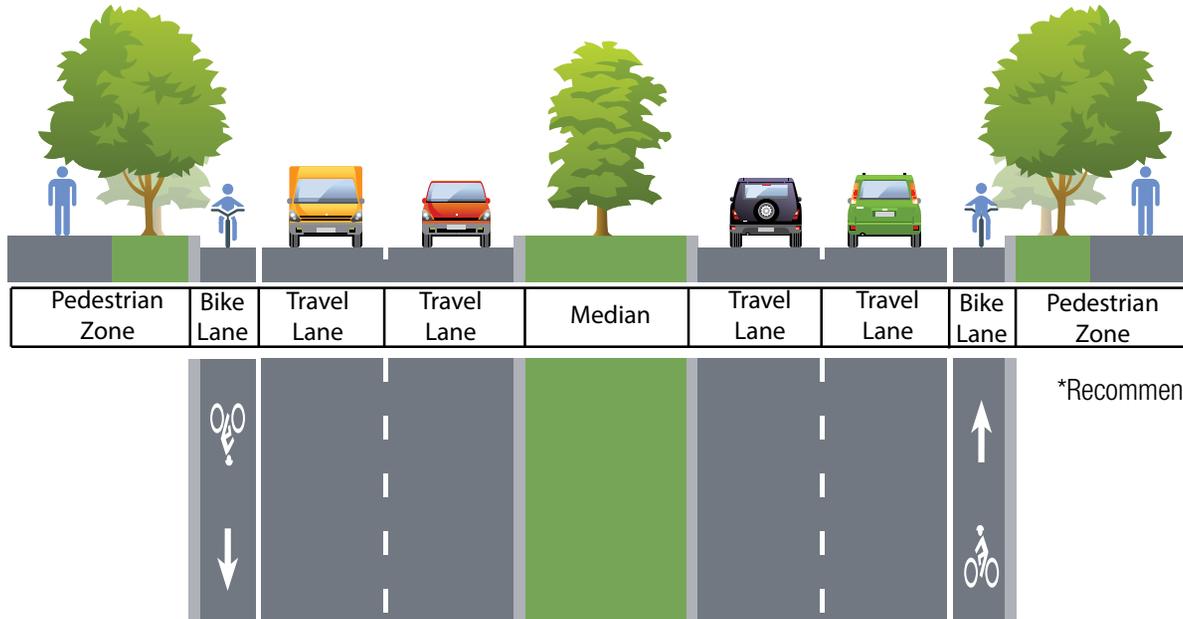
Identified Needs

Resident and stakeholders identified the preservation of the bike lane as a priority.

Future Vision

For consistency of the corridor and the continuation of 43rd Street as a primary east-west connector, it is recommended that W. Crosstimbers Street remain a **Major Thoroughfare** on the MTFP with an **Urban Boulevard** multi-modal classification. Similarly, the corridor is recommended to be expanded from an 80' to a 90' right-of-way providing additional space for a more robust bicycle lane and pedestrian zone. As a continuation of W. 43rd Street, a High Frequency Transit route is recommended along the corridor. With this addition, special attention should be given to enhancing the pedestrian realm.

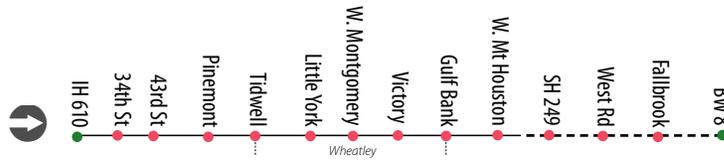
Possible Option(s):



*Recommended High Frequency Transit

Ella Boulevard

Priority Elements



Existing Condition

Ella Boulevard is a north-south corridor that extends from IH 610 to Beltway 8 as a 4-lane, divided **Major Thoroughfare**. The corridor transitions a name change to Wheatley from Tidwell to Gulf Bank. Variations include:

- Ella to W. Little York: This portion of the corridor is currently built as a 4-lane Major Thoroughfare with an 80' right-of-way as classified. Use along the corridor is primarily residential. Undeveloped parcels are also evident with commercial use located primarily at major intersections.
- W Little York to Veterans Memorial: Portions between W. Little York to W. Montgomery Road, and Dewalt Street to W. Gulf Bank are presently not built; however, the classification remains consistent with the above. Segments between W. Little York and Gulf Bank are currently on the City's CIP for consideration in 2014-2015.
- W. Montgomery Road to Beltway 8: This portion of the corridor is also classified as a 4-lane divided Major Thoroughfare, but is expanded to maintain a 100' right-of-way. North of SH 249 the corridor is largely proposed, and hence not built. Current land use is characterized as agricultural with a residential subdivision near W. Montgomery Road.

Identified Needs

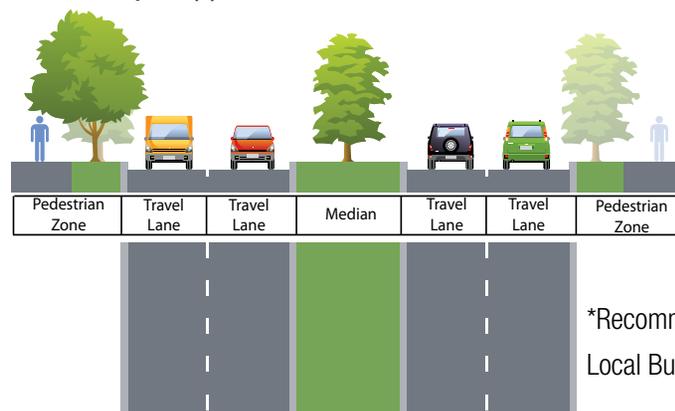
Intersection congestion is noted by the public as the most prevalent issues along the corridor including those intersecting Major Thoroughfares and IH 610. Improving pedestrian facilities by enhancing sidewalks, adding speed bumps to slow traffic, and focusing on pedestrian access at intersections were points highlighted during the public input process.

Future Vision

Ella Boulevard is recommended to remain as a 4-lane **Major Thoroughfare** with an 80' and 100' right-of-way where currently designated. Although projected traffic provide some volumes greater than 40,000 vehicular trips, affected segments about IH 610 and Beltway 8, and do not reflect the nature of traffic along the extended corridor. In preservation of the median and increased access management, the corridor is recommended as boulevard section: south of W Little York Ella is recommended as an **Urban Blvd** and north of W Little York Ella is recommended as a **Suburban Blvd**. Ella is a regional connector and not appropriate for on-street bicycle facilities along some portions of the roadway. However, on-street facilities are recommended along the more urbanized section of the corridor, and an off-street bike path may be accommodated north of Dewalt Street to Mount Houston providing added amenities to a more residential context. Should Ella Boulevard be extended north of SH 249, connections to the off-street trail network along Halls Bayou, including continuous access across the bayou for both on-street and off-street users, should be prioritized. As a regional connector the corridor is also recommended as a High Frequency Transit facility, and sidewalks should be expanded and designed as such.

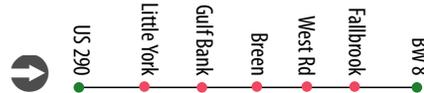
EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-80; T-4-100
Existing Counts Range	21,400-28,000	Future Volume Range	27,000-41,500
Right-of-Way	80'	Proposed MMC	Suburban/Urban Blvd
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Possible Option(s):



Fairbanks N Houston

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-6-100
Existing Counts Range	35,200-37,000	Future Volume Range	36,000-49,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Fairbanks N. Houston is a 4-lane divided **Major Thoroughfare**, and is one of the only existing corridor that provides existing connections built from US 290 to Beltway 8. Sidewalks are nonexistent along the length of the corridor, and bicycle facilities do not exist. Between Beltway 8 and Fallbrook the corridor provides access to a relatively large commercial land use. North of Breen, the corridor is mainly flanked by industrial, agricultural and undeveloped parcels. A more residential land use is evident south of Breen to Gulf Bank.

Identified Needs

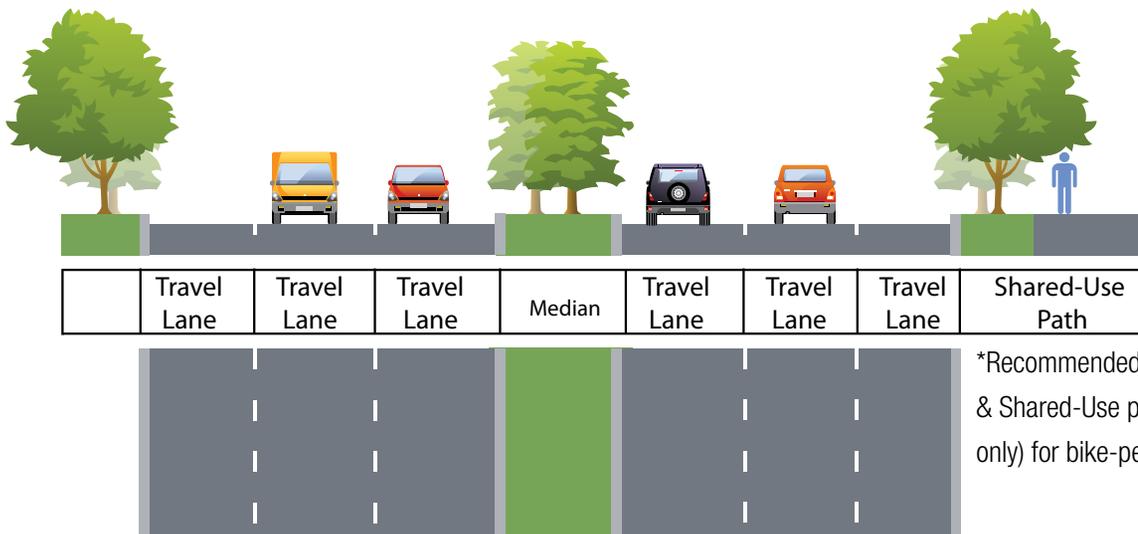
In the near-term, north-south vehicular traffic will continue to depend heavily on Fairbanks N. Houston given the segment of Hollister Road, south of Fallbrook Drive, is pending development and not yet built. As provided by future traffic volume results, even with the build out of certain segments of Hollister, vehicular traffic along this corridor is still anticipated to increase. To alleviate congestions, Harris County has installed a fiber optic traffic signal communication system along the corridor providing for more efficient coordination of signal timings between intersections. As a result, traffic flows have improved for near-term congestion concerns.

Future Vision

Provided traffic volumes indicate Fairbanks N. Houston will continue to grow in importance for the movement of vehicular traffic north-south through the study area. As result, it is recommended the corridor be reclassified as 6-lane **Principal Arterial** within the currently designated 100' right-of-way. For continued access management and preservation of the median, the corridor is further recommended as a **Suburban Blvd**.

Finally, it is recommended that special attention be given to developing a viable pedestrian realm along the corridor to help improve and provide a higher range of mobility options for users within the local transportation network. Given the limited right-of-way, it is recommended that a **shared-use path**, which is a separated off-street bicycle facility, be designed along one side of the corridor to ensure a safe and robust facility for all users. Working with Harris County will be necessary for this corridor improvement, as well in conjunction with METRO to ensure a viable local bus facility options.

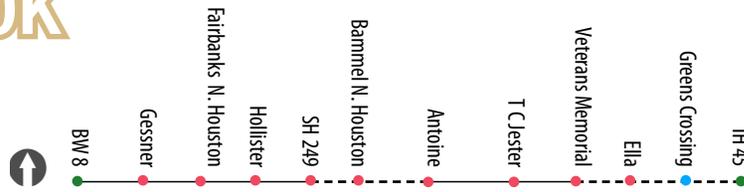
Possible Option(s):



*Recommended Local Bus Facility & Shared-Use path (one-side only) for bike-ped movement.

Fallbrook

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-4-100
Existing Counts Range	2,000-16,000	Future Volume Range	12,000-38,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Fallbrook Drive is an 4-lane east-west **Major Thoroughfare** with an existing median in a 100' right-of-way. Segments are currently not built and include: SH 249 to Old Bammel N Houston Rd, and Sweetbrook Dr. to IH 45.

The corridor serves a primarily single-family residential homes which directly abut the corridor. A small pocket of commercial-retail exists along the corridor's northwest segment near Beltway 8, and multi-family developments along the segment between SH 249 and Houston Rossyln. The portion of the corridor from Bammel N. Houston Road to Sweetbrook Drive has sidewalks on both directions of travel, but the remainder of the corridor does not.

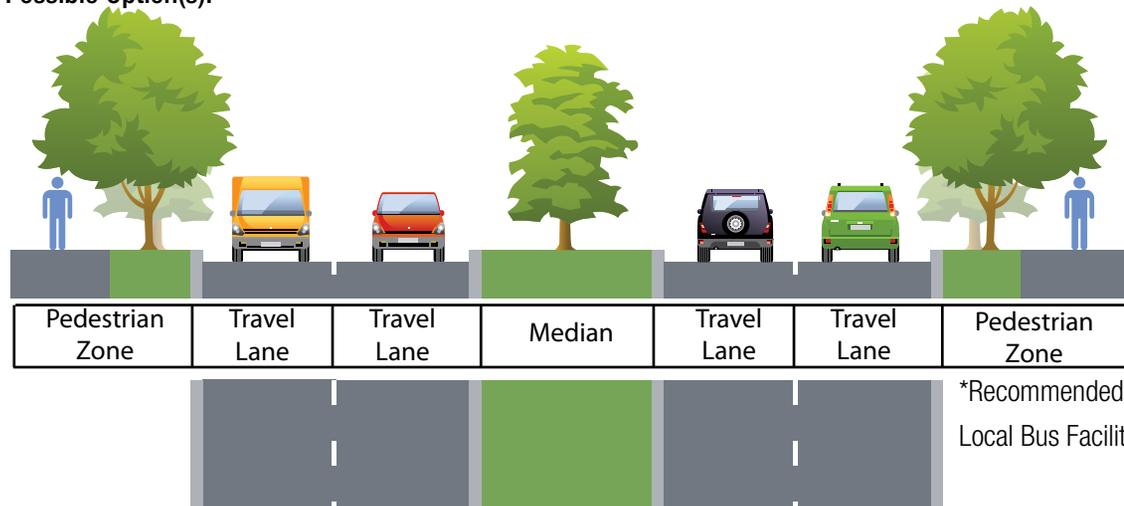
Identified Needs

This corridor is seen as a priority corridor to be completed for both vehicular and pedestrian traffic from Beltway 8 to IH 45 by 2035. This connection is projected to gain over 10,000 vehicles on average for daily travel.

Future Vision

Based on projected traffic volumes, it is recommended Fallbrook Drive be reclassified as a 4-lane **Principal Thoroughfare** given the importance of the corridor for regional vehicular movement. Although future model volumes only indicate the need for a 4-lane cross section, the corridor provides an alternative to the Beltway and may warranted a 6-lane expansion depending on the inventory of development. Given current traffic volumes, the Beltway is only expected to increase making Fallbrook an attractive parallel alternative for vehicular movement. If the corridor were expanded to 6 lanes, it is anticipated the corridor would reach capacity due to latent demand. Similarly, in preservation of the right-of-way Fallbrook's future design would be most suitable as a **Suburban Boulevard**. It is important to the corridor that pedestrian accommodations be provided to ensure safe movement along an otherwise busy roadway. A local bus facility is recommended for this corridor.

Possible Option(s):



Gessner Road

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100
Existing Counts Range	8,500-23,500	Future Volume Range	18,000-30,500
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Gessner Road is a 4-lane divided **Major Thoroughfare** from Beltway 8 to US-290. Variations include:

- US-290 to Gulf Bank: the corridor maintains 100' right-of-way with sidewalks while the rest of Gessner to the north only has sidewalks on the west side.
- Gulf Bank to West Road/Breen: the corridor maintains a 100' right-of-way and primarily serves residential uses and some retail-commercial.
- West Road/Breen to Beltway 8: This segment of corridor has not been constructed.

Identified Needs

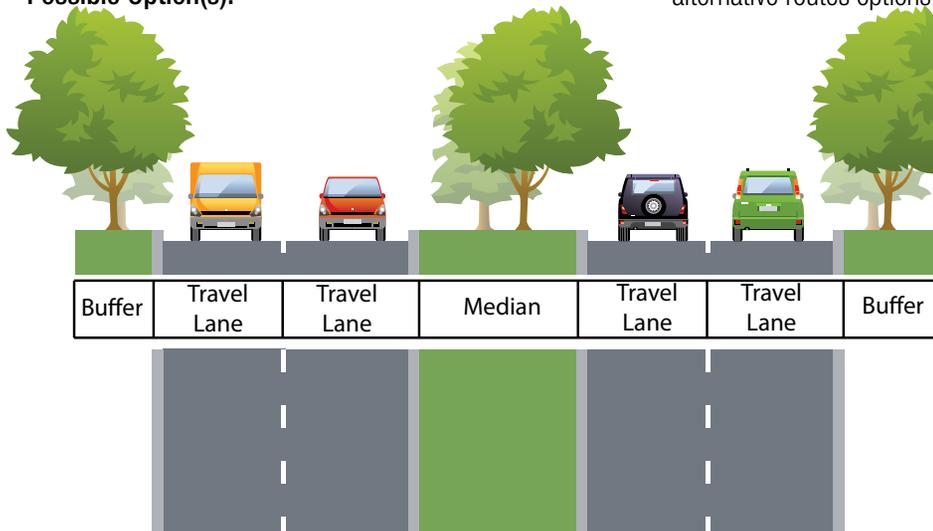
Based on provided modeling results, the completion of Gessner Road is an essential connection needed to accommodate projected traffic volumes within the greater study area. The corridor runs in parallel with Fairbanks N. Houston Road which is recommended to be expanded as a 6-lane Principal Arterial and anticipated to carry primary loads of regional vehicular traffic as is Beltway 8. However, as indicated within the existing conditions of the report, the study area is greatly limited by the gaps within an incomplete network. Although right-of-way has been reserved on the MTFP, north-south completion of this corridor is essential to alleviate more localized traffic movement providing alternative routes options for all users.

Future Vision

Based on projected traffic volumes, it is recommended Gessner Road maintain its current classification as a 4-lane **Major Thoroughfare** with 100' of right-of-way. It is further recommended the completion of Gessner Road to Beltway 8 be prioritized as an essential connection for the community. In preservation of the median, and increased access management, it is further recommended the corridor be designated a **Suburban Boulevard**.

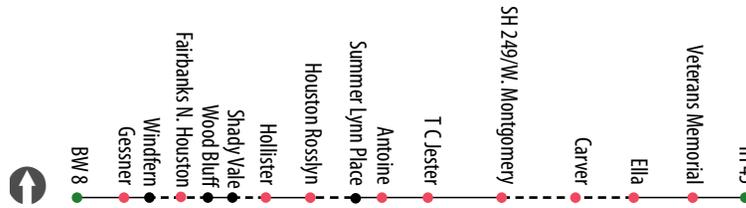
Although a High Frequency Transit facility is not currently recommended for this corridor, future study may be warranted. If properly implemented, public transit would provide a great asset to the corridor to assist in alleviating congestion, and moving people to their destinations.

Possible Option(s):



W Gulf Bank Road

Priority Elements



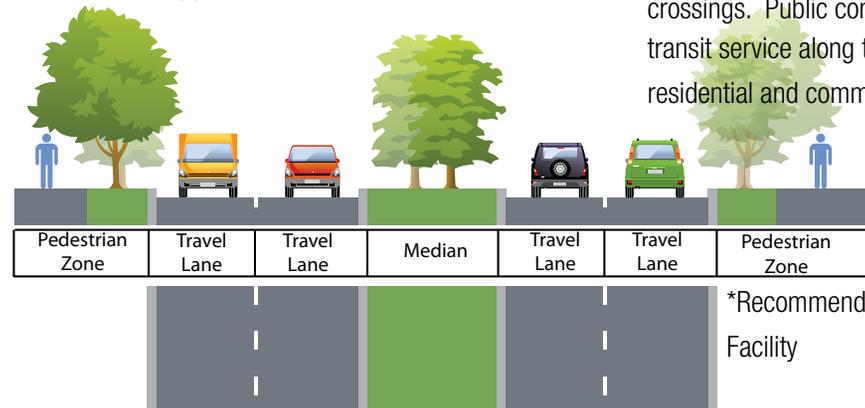
EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100
Existing Counts Range	5,500 -20,000	Future Volume Range	32,000-39,500
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

W. Gulf Bank Road is 4-lane **Major Thoroughfare** with 100' right of way and is designated east-west corridor from Beltway 8 to IH 45 on the MTFP. Although ample right-of-way has been preserved along the length of the corridor, several segment have not been built and include: local road Windfern to Wood Bluff Blvd, Shady Vale to Hollister and SH 249 to Ella Blvd. Where segments are built, sidewalks or other pedestrian amenities are not apparent., except for portion of the corridor with residential land uses.

Landuse from Beltway 8 to SH 249/W. Montgomery consist of largely undeveloped parcels with a mix of single and multi-family residential uses east of Antoine Drive. East of SH 249/W. Montgomery consists single-family.

Possible Option(s):



Identified Needs

Given the limited east-west connectivity within the study area, the completion of W. Gulf Bank in its entirety is essential for improved vehicular circulation of the greater network. As the corridor is developed, a need for a more robust pedestrian realm is also desired for increased safety of the user to other potential modes, such as transit. Challenges, however, are significant and include parcels owned by the Harris County Flood Control District, as well as cost associated with construction of bridge(s) across the White Oak Bayou.

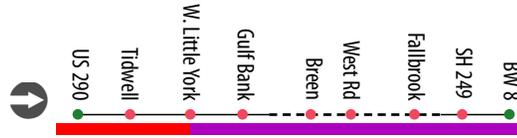
Where current segments exist north of Antoine Drive, public comment indicates a need for improved crosswalks, and enhanced signalization for pedestrians, especially near the schools. The intersection of W Gulf Bank and Antoine Drive was identified for improved pedestrian crossings. Public comment also indicated a lack of public transit service along the corridor especially in more dense residential and commercial use areas.

Future Vision

It is recommended that W. Gulf Bank Road maintain its current classification as 4-lane **Major Thoroughfare** and 100' right-of-way. Many of the segments pending development are inhibited by flooding, often resulting in additional cost associated with corridor development. As such, complete build-out of the network is not anticipated by 2035. Instead, it is recommended that those connections needed to expanded local connectivity be prioritized creating more alternative route options for the immediate user. Similarly, as the corridor develops, the median is recommended to remain providing access management and preservation of the esplanade. Given the context of existing segments built, the corridor is anticipated to maintain its current low density character. As such is recommended to be classified as a **Suburban Boulevard**. As provided in the project team's transit analysis detailed in **Chapter 5.7 Changing Transit Considerations**, a local bus service is also recommended and should be incorporated for the length of the corridor. All segments of the corridor, at a minimum, should maintain a wide sidewalk within the pedestrian realm to accommodate all users, especially those associated with transit. .

Hollister Street

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2-4	MTFP Designation	T-4-100; T-6-100
Existing Counts Range	12,000-31,500	Future Volume Range	23,000-48,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median/Undivided	Median/CTL/Undivided	Median

Existing Condition

Hollister Street is a north-south corridor classified on the MTFP as a 4-lane **Major Thoroughfare** with 100' right-of-way from Beltway 8 to US-290. Much of the corridor between Gulf Bank and Fallbrook Drive is not built.

Variations in the portions existing include:

- US 290 to W. Little York: 4-lane divided street with a sidewalk and buffered planting strip flanking both sides of the corridor. Smaller commercial developments, such as gas stations, are located at intersections. Aside from a few multi-family developments, the corridor along this section resembles a business park, with long setbacks, large lots and a significantly wide median.
- Little York to Beltway 8: The majority of the corridor is not built. Where currently segments do exist, the roadway is narrow with no sidewalk, and open ditches flank both sides of the road.

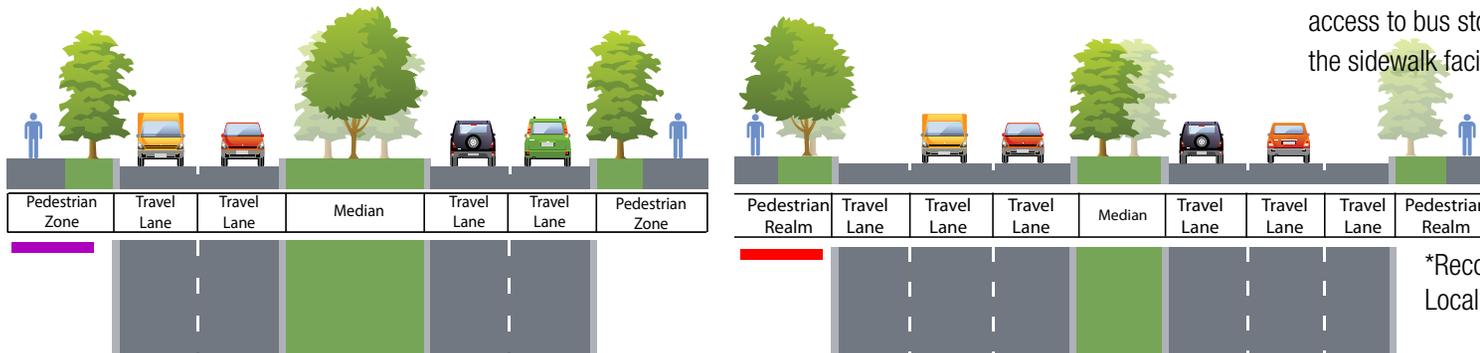
Identified Needs

There is strong public support for the completion of Hollister Street north of W. Little York to the corridor's full carrying capacity. However, the majority of Hollister Street is located in the City's ETJ and coordination with Harris County will be needed to ensure timely implementation. Additionally, the physical construction of the corridor is also challenged by needed bridge crossings at White Oak Bayou as well as the railroad and sand pits between West Road and Fallbrook Drive. Sidewalks are intermittent along existing section of Hollister Street, and within certain subdivisions, are nonexistent. However, demand for such facilities is evident from footpaths seen along these stretches of corridor directly adjacent to the road. Residents also expressed a desire for bicycle connections to the White Oak Bayou Trail.

Future Vision

Hollister Street is recommended to remain classified as a **Major Thoroughfare**. Based on the understanding of the project team, completion of Hollister Street is set for 2035 as a 4-lane corridor with 100' right-of-way. However, where provided traffic loads between W Little York and US-290 exceed daily traffic flows of 40,000, the corridor is recommended to be expanded to a 6-lane facility (T-6-100). Given the provided barriers associated with constructing a bridge across the railroad, the segment of Hollister north of West Road to Fallbrook Drive, is not anticipated to be built by 2035. However, the connection of this corridor is vital for the longevity of the greater transportation system, and as such is not recommended for removal. Once built, Hollister may serve in conjunction with, or an alternative to, bicycle facilities on Fair Banks N. Houston. As such, it is recommended that any future bridge construction be designed to accommodate safe pedestrian and bicycle traffic. To safely accommodate local access to bus stops and related connectivity, gaps within the sidewalk facilities should also be completed.

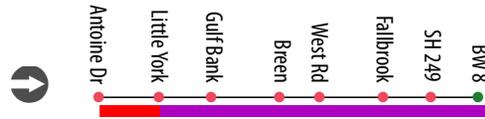
Possible Option(s):



NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

N Houston Rosslyn Road

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2; 6	MTFP Designation	C-2-60; P-6-100
Existing Counts Range	6,000-12,000; 30,000-38,000	Future Volume Range	9,000-16,000; 32,000-42,000
Right-of-Way	100'	Proposed MMC	Industrial Blvd/Street
Median/CTL/Undivided	Median/ Undivided	Median/CTL/Undivided	Median/Undivided

Existing Condition

N. Houston Rosslyn Road is a 6-lane divided **Principal Thoroughfare** that operates in conjunction with Bingle Road from W. Little York to Beltway 8. The portion of N. Houston Rosslyn Road from W. Little York Road to Antoine Drive is currently not on the MTFP and is best classified as a **Local Street**. Land use along the corridor is primarily industrial with undeveloped and agricultural parcels directly abutting the corridor.

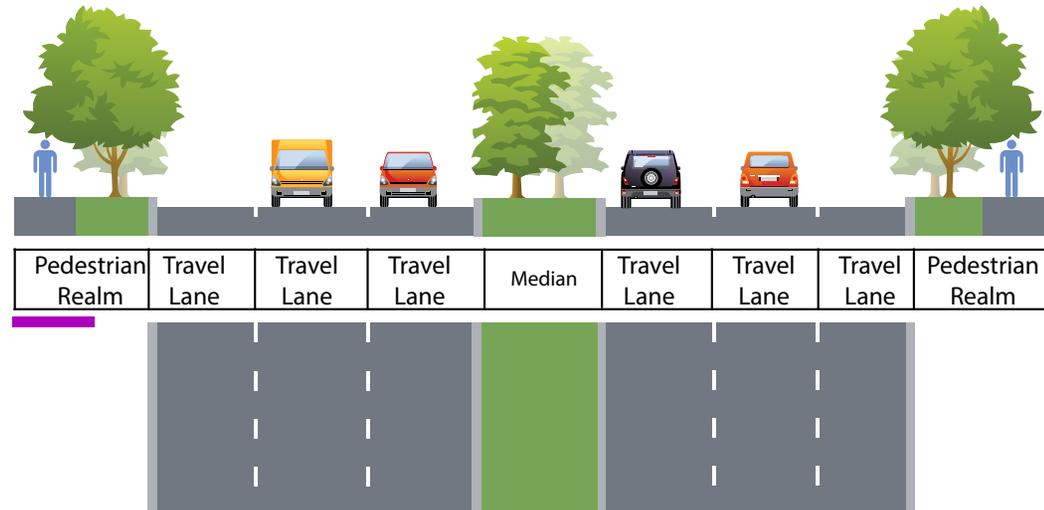
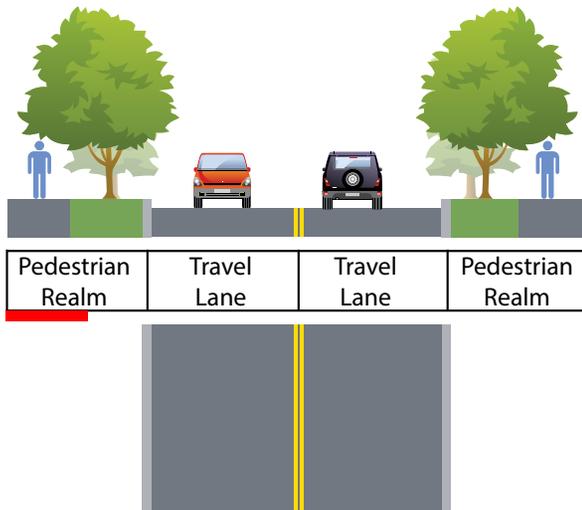
Identified Needs

The portion of N. Houston Rosslyn Road from Antoine Drive to W. Little York is not on the MTFP, but maintains the same land use type as the portion currently classified. As a predominately industrial corridor, larger lane widths and turning radii are needed to accommodate larger freight-trucking movements. Public comment for this corridor reinforced the need of the corridor to maintain a well-developed sidewalk network. Although transit is considered a priority for the corridor, the public expressed a desire for future use and development of the pedestrian realm.

Future Vision

It is recommended Houston N. Rosslyn Road maintain its current 6-lane **Principal Thoroughfare** designation from W. Little York to Beltway 8 given anticipated traffic loads of 30,000 or more in consistent functionality with Bingle Road. Similarly, based on network analysis, the small segment of corridor connecting to Antoine Drive demonstrates a significant load of existing and projected traffic volumes. As such, it is recommended that this segment be added to the MTFP as a **Minor Collector**. In preservation of the median, it is further recommended to be classified as an **Industrial Boulevard** north of W. Little York. For consistency in relation to the corridor's land use south of W. Little York, the corridor is recommended as an **Industrial Street**.

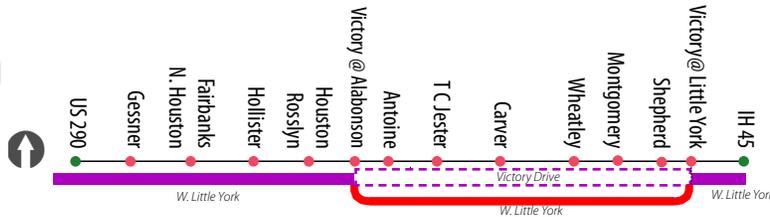
Possible Option(s):



NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

W Little York Road

Priority Elements



Existing Condition

W. Little York Road operates in conjunction with Victory Drive providing east-west connectivity from US 290 to IH 45. Where the corridor transitions to Victory Drive for enhanced regional traffic movement, W. Little York Drive provides an offset transition in parallel to the larger corridor for more localized traffic accessibility to various neighborhood amenities. Existing classifications include:

- US 290 to Fairbanks N. Houston: 4-lane **Major Thoroughfare** within a 100' right-of-way and a center turn lane from Gessner to Fairbanks N. Houston. Existing land use is a mix of industrial, commercial and undeveloped uses.
- Fairbanks N. Houston to IH 45: 6-lane **Principal Thoroughfare** divided by a median and operating in conjunction with Victory Drive. Existing land use is a mix of industrial, commercial and undeveloped parcels.
- Victory at Alabonson Road to Victory Drive at W. Little York: 4-lane undivided **Major Collector** with a 70' right-of-way. Land use along this portion of the corridor is mainly single-family residential and some multi-family parcel development. Five schools directly abut or are within the near vicinity of this portion of the corridor.

Identified Needs

The W. Little York and N. Shepherd Park and Rides are located west of US 290 and N. Shepherd Drive, respectively along the regional portions of W. Little York Road. The Acres Home Transit Center is located at the at the intersection of Wheatley/Montgomery/W Little York. Given the regional transit capacity filtering to these locations, a more localized service allows for increased access to area amenities.

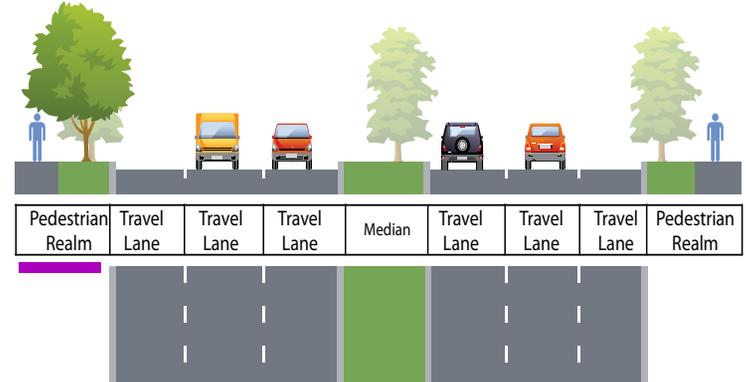
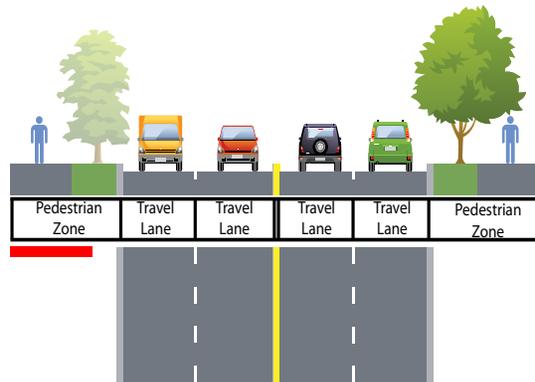
Public comment indicated that pedestrian facilities are limited and are in need of general enhancement. Heavy truck traffic was also noted as a concern along the corridor, and considered a safety concern.

Future Vision

Due to project traffic volumes, W. Little York Road, in conjunction with Victory Drive, is recommended to be classified as a 6-lane **Principal Thoroughfare** for the entirety of the corridor not currently classified as a Major Collector. For increased access management and preservation of the median where it currently exists, the provided segments are also recommended to be designated as a **Suburban Boulevard**. The portion classified as a **Major Collector** is recommended to remain as 4-lanes, and proposed as a **Suburban Avenue** given size of lots and setbacks associated with land use directly abutting the roadway. The addition of a bicycle facility along the segment designated as Major Collector is not proposed due to constrained right-of-way; however, the corridor east of Victory is proposed as bike facility in conjunction with Victory Drive recommendations.

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-6-100; C-4-70
Existing Counts Range	22,000-32,000	Future Volume Range	22,500-48,000
Right-of-Way	60'-100'	Proposed MMC	Suburban Avenue/Blvd
Median/CTL/Undivided	Median/Undivided	Median/CTL/Undivided	Median

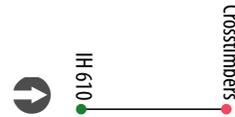
Possible Option(s):



*Recommended Local Bus Facility. A bicycle facility is recommended on Victory Drive, however, a gap along the corridor is noted from Victory at W. Little York Drive to IH 45. (See Chapter VII. Outcomes for more information).

N Main Street

Priority Elements



Existing Condition

N. Main Street is a 4-lane undivided **Major Thoroughfare** with 70' of right-of-way from Crosstimbers Street to IH 610. Sidewalks flank both sides of the corridor and a pedestrian buffer is evident along some portion of the roadway. Locally, the corridor is known as "Church Row" and is seen as the community's entrance to its economic hub.

Identified Needs

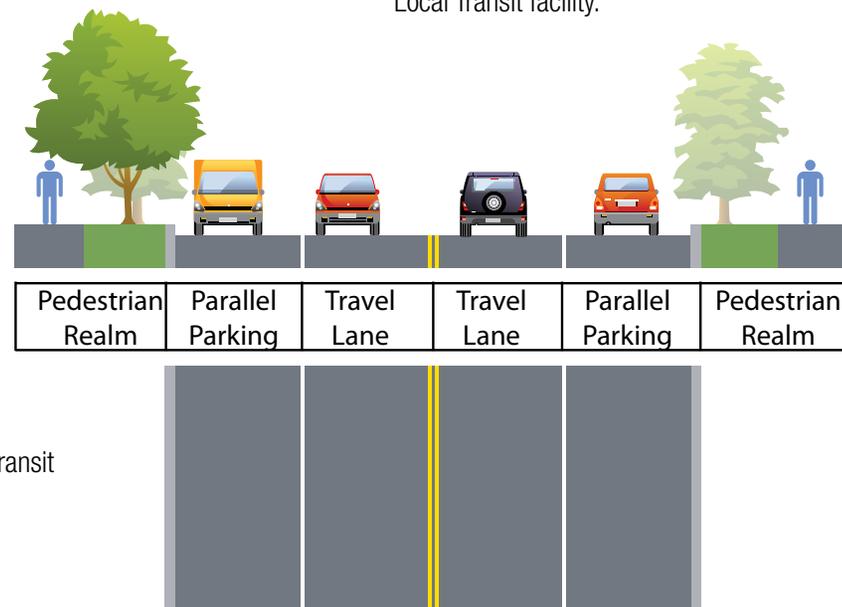
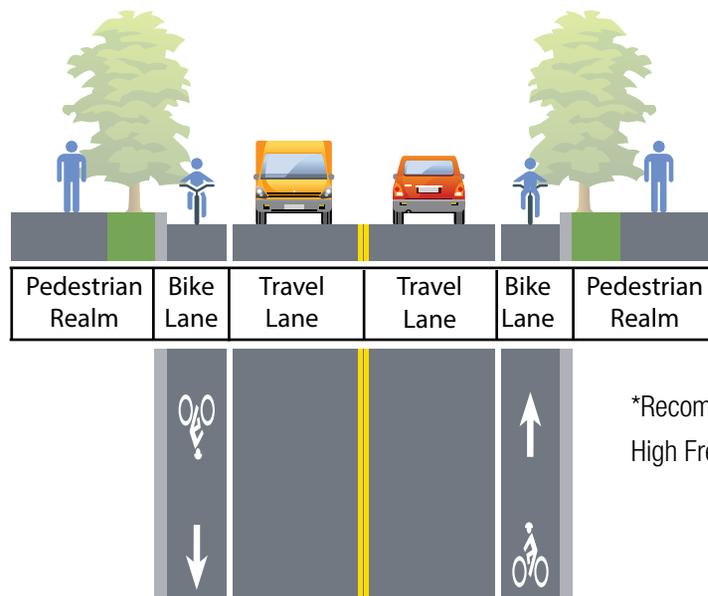
Area residents see this corridor as a gateway into the neighborhood. The intersection of Crosstimbers and North Main is described as the area's current and future economic hub. As such, residents would like to ensure that all users can get to this specific node - pedestrian and bicyclist, alike. Sidewalks are present on both sides of the corridor, but are not in favorable condition. Presently, no bicycle facility exists along the corridor, but the addition of one would provide a link within the areas fragmented bicycle network.

Future Vision

The multi-modal classification suitable to North Main Street is a **Urban Avenue**. Given the provided volumes expected for the future, the corridor does reserve some flexibility in design. To allow for maximum flexibility it is recommended that the MTFP be downgraded to a **Major Collector**, but maintain 4-lanes of potential through movement. In the interim, the two inner lanes may be reserved for automobile traffic; parking and bike facilities may be explored within the remaining pavement. However, this corridor provides direct access to the Heights Transit Center, and as such should be reserved as a High Frequency Transit and/or Local Transit facility.

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	C-4-70
Existing Counts Range	5,000-10,500	Future Volume Range	17,000-26,000
Right-of-Way	70'	Proposed MMC	Urban Avenue
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Undivided

Possible Option(s):



Mangum Rd & Watonga Blvd

Priority Elements



Existing Condition

Mangum Road and Watonga Boulevard are contiguous corridors that together form a continuous 4-lane, divided **Major Thoroughfare** with a 100' right-of-way from US 290 to TC Jester. At the Mangum-Watonga junction, regionally traffic utilizes Watonga Blvd north to TC Jester. Similarly, Mangum Road transitions to a 4-lane **Major Collector** with a 60' right-of-way. Although classified as 4-lanes, a portion of the collector from the Watonga-Mangum junction to Lamonte Lane is currently built as a 2-lane corridor with a continuous center-turn lane. Sidewalks are provide along both segments of corridor variation. Transit is not available on Mangum Road or Watonga Boulevard.

Identified Needs

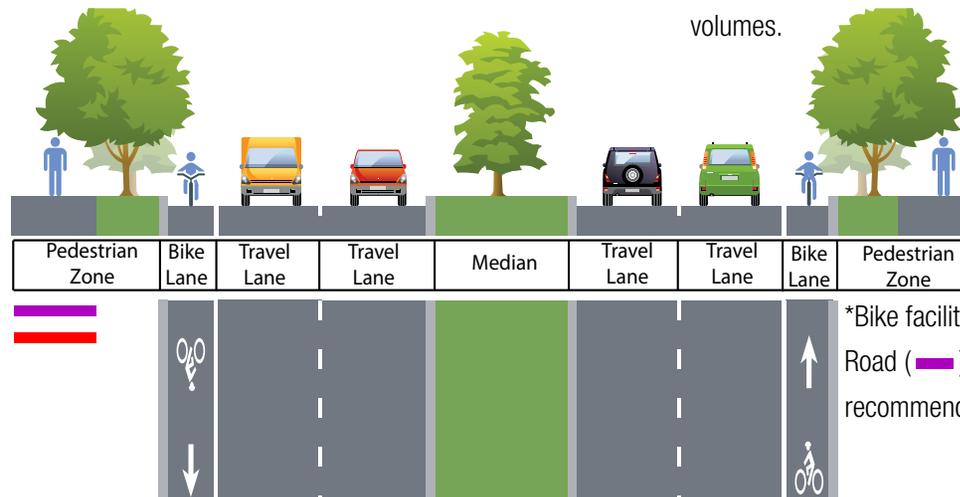
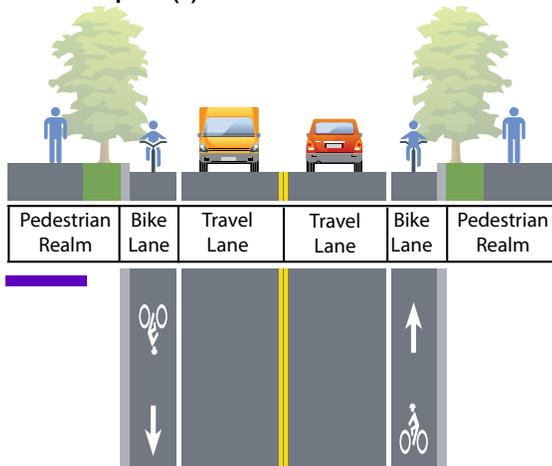
The intersection of W. 43rd and Watonga Boulevard was noted by the public as a dangerous intersection and where a safer design of the left turn lane was requested. Another need assessed through public input was the general enhancement of pedestrian facilities up to the intersection at TC Jester for enhanced accessibility of the White Oak Bayou Trail connection.

Future Vision

Where Mangum Road and Watonga Blvd form a continuous corridor, projected traffic volumes justify the current **Major Thoroughfare** designation on the MTFP. The multi-modal classification of **Urban Boulevard** is recommended for this same strip of corridor in preservation of the median and increased access management. For the more localized section of Mangum Road to W. 43rd Street, the corridor is recommended as a **Minor Collector** and as an **Urban Street** given the lower traffic volumes associated with a more dense, residential street. Given the residential nature of both segments of corridor, an enhanced pedestrian realm should be prioritized for the corridor. A bike facility along Mangum Road is recommended given the more residential nature of the corridor as well as reduced traffic speeds and lower traffic volumes.

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	3-4	MTFP Designation	C-2-60; T-4-100
Existing Counts Range	3,000-18,600	Future Volume Range	31,000-44,000
Right-of-Way	60'-100'	Proposed MMC	Urban Blvd/Street
Median/CTL/Undivided	Median/Und	Median/CTL/Undivided	Median/Und

Possible Option(s):

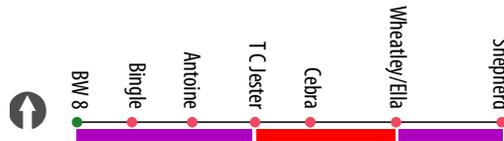


*Bike facility recommended along Mangum Road (purple bar); a bike facility is not currently recommended along Watonga Blvd (red bar).

NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

Pinemont Drive

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2-4	MTFP Designation	T-4-80
Existing Counts Range	12,900-19,700	Future Volume Range	22,000
Right-of-Way	80'	Proposed MMC	Urban Boulevard
Median/CTL/Undivided	Med/CTL/Und	Median/CTL/Undivided	Med/CTL/Und

Existing Condition

Pinemont Drive is a **Major Thoroughfare** with an 80' right-of-way that connects US 290 to Shepherd Drive within the Northwest area. Although the right-of-way remains consistent, the corridor transitions between three different cross sections and are currently built as:

- US 290 to TC Jester: 4-lane corridor divided by a raised median with bike lanes flanking both sides of the corridor. Land use is developed along the portion west of Antoine consisting of multi-family, commercial and some public-institutional parcels. The remainder of the corridor up to TC Jester is primarily single family residential.
- TC Jester to Ella: 4-lane corridor with a continuous center turn lane; bike lanes are not provided. Land use along this corridor maintains some single-family residential.
- Ella to Shepherd: 2-lane undivided corridor with an open ditch flanking the northern edge of the corridor and a sidewalk along the southern edge. Land use is a mix of undeveloped and single-family residential.

Pinemont has a connection to the White Oak Bayou Trail near its intersection with TC Jester.

Identified Needs

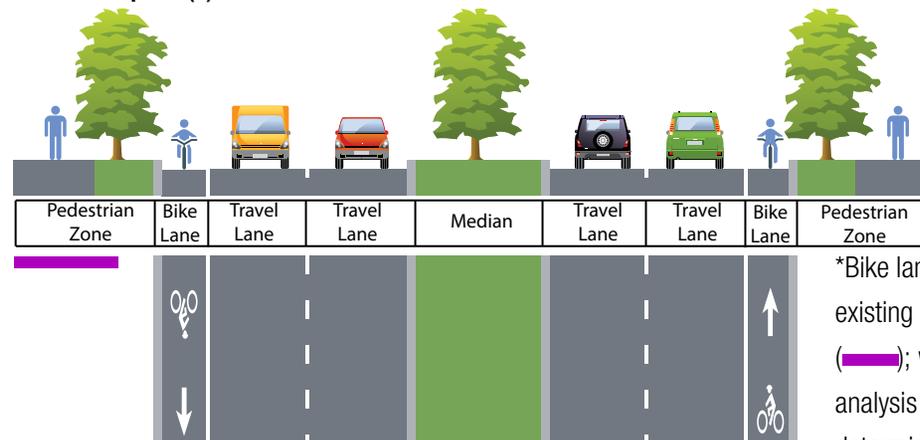
Projected traffic volumes indicate a 4-lane configuration of the corridor for all segments of vehicular travel. Provided projections represent the lower range of vehicular traffic and as such increased flexibility of design should be considered for multi-modal improvements. An existing bicycle lane is apparent from US 290 to TC Jester; however, due to proximity of the highway, safe facilities across US 290 corridor should be coordinated. Due to limited right-of-way, a separated bike lane may not be possible for segments of the corridor east of TC Jester, however is considered essential as the area continues to attract residential-focused developments.

Public input also indicated several congested intersections at Antoine, TC Jester, and Ella/Wheatley.

Future Vision

Pinemont Drive is recommended to remain a 4-lane **Major Thoroughfare** as indicated by projected modeling results. Given the diversity and density of development west of TC Jester, the corridor is further recommended as an **Urban Boulevard** in preservation of the median for increased access management as undeveloped parcels continue to mature east of TC Jester. The existing bike lane is recommended to remain on segments west of TC Jester. A bike facility is recommended east of TC Jester but right-of-way is limited between TC Jester and Wheatly/Ella Blvd. Intersection improvements are detailed in **Chapter VII. Outcomes.**

Possible Option(s):



*Bike lane recommended to remain along existing portions where right-of-way is available (purple bar); where right-of-way is limited, further analysis of the most proper facility type should be determined during pre-engineering (red bar).

NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

Rossllyn Road

Priority Elements



Existing Condition

Rossllyn Rd is classified on the MTFP as a 4-lane undivided **Major Collector** with an 80' right-of-way from Judiway Street to W. 43rd Street. Currently the corridor is built as a 2-lane undivided road flanked on either side by open ditch. A sidewalk directly abuts the corridor along the western edge of the corridor, but the eastern edge is separated from traffic by the existing ditch. North of W. 43rd Street, the corridor is not classified on the MTFP and terminates into a residential neighborhood north of Candlelight Place Drive.

North of Pinemont Dr., Rossllyn Road is classified as a **Major Thoroughfare**. Land use along the corridor is low-density residential with a number of undeveloped parcels. North of SH 249, the corridor is proposed to extend across Halls Bayou and intersect the proposed extension of West Road. Undeveloped parcels appear more evident, as do industrial uses and multi-family developments.

Possible Option(s):

Identified Needs

Rossllyn Road is a continuation of E. TC Jester Boulevard. North of W. 34th Street, vehicular capacity is reduced as the corridor transitions from a 4-lane boulevard to a 2-lane residential collector. Special attention should be provided to accommodate left and right-hand turns at W. 34th and 43rd Street.

North of 43rd Street, the corridor is classified as a **Local Road**, and terminates north of Candlelight Place Drive where an approximate 100' length of corridor was abandoned. North of Pinemont Drive, the MTFP alignment is in tact and classified as a 2-lane **Major Thoroughfare** with a 70' right-of-way way and a 4-lane **Major Thoroughfare** 100' right-of-way south and north of W. Gulf Bank Road, respectively. Constant name changes along the corridor cause unnecessary confusion, and is more approximately identifiable as a single corridor within the greater network given much of the corridor is pending development.

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2	New MTFP Designation	C-2-80; C-4-80
Existing Counts Range	11,500-17,700	Future Volume Range	12,000
Right-of-Way	80'	Proposed MMC	Suburban Avenue
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Undivided

Future Vision

Projected traffic volumes indicate that some portions of the corridor may not warrant 4-lanes of traffic while others segments do. Given the provided corridor serves mainly low-density residential land uses, it is recommended to be classified as a **Suburban Avenue**. Similarly, for increased flexibility and added multi-modal capacity of vehicular lanes, the following variations along the corridor are recommended including:

- Judiway to 43rd St: 2-lane **Major Collector** with an 80' right of way. Bike facilities should be maintained for increased residential access. Appropriate facility type should be explored where right-of-way is available.
- 43rd St to Candle Light Place: 2-lane **Minor Collector** given lack of continued vehicular connectivity. Potential easement consideration for bike and pedestrian traffic should be considered for the 100' length of abandoned roadway.

North of Pinemont Dr., the corridor provides an alternative north-south connection between Ella and T.C. Jester which are both projected to carry significant future traffic volumes. To accommodate such traffic, recommendation includes:

- Pinemont to W. Gulf Bank: 4-Lane **Major Collector** with a 80' right-of-way as currently designated.
- W. Gulf Bank to West Rd: 4-lane **Major Collector** with 80' right-of-way

State Highway 249

Priority Elements



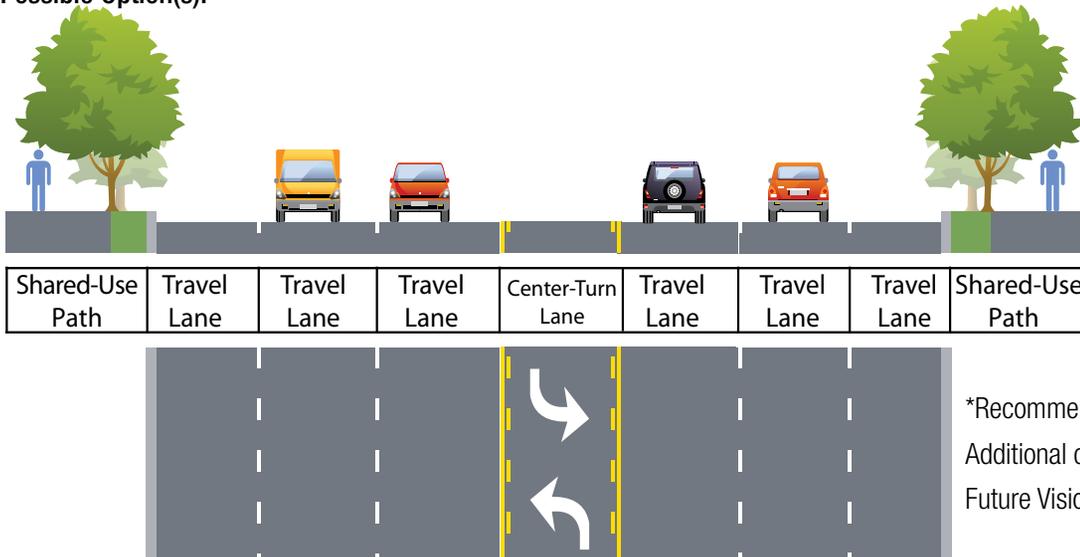
EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	6	MTFP Designation	P-6-180
Existing Counts Range	20,000-43,000	Future Volume Range	44,500-81,000
Right-of-Way	120'-180'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	CTL	Median/CTL/Undivided	CTL

Existing Condition

State Highway 249 is a 6-lane **Principal Thoroughfare** with a center turn lane and 120'-180' of right-of-way connecting Beltway 8/Tomball Pkwy to SH 249/W Mt Houston Rd. The corridor acts as a vehicular highway and provides a connection to Breen Drive and Montgomery Drive for regional east-west and north-south connectivity, respectively.

Land use consists of commercial, industrial and some multi-family residential, as well as some undeveloped parcels.

Possible Option(s):



Identified Needs

Public comment, along with visual surveys conducted by the project team, showed there is a need for pedestrian facilities along the corridor. There are many man-made paths identifying a need for pedestrians and bicycle access between residences, businesses, and bus stops. Crossing SH 249 at intersections is difficult due to heavy through traffic, coupled with the non-pedestrian friendly design. Several intersections need to have further review of possible pedestrian enhancements including intersections with West Road, Antoine Drive and W. Mt Houston.

Future Vision

State Highway 249 focuses on the movement of automobiles through the study area, and as such is recommended to remain a 6-Lane **Principal Thoroughfare**. The corridor is further recommended to be classified as a **Suburban Blvd.**

Given the exponential traffic demands anticipated along the corridor, it is recommended that a corridor level analysis, such as an access management or bus rapid transit study, be conducted. The intent of such analysis is to determine if certain corridor amenities such as High Frequency Transit and/or a raised median barrier with calculated access points, could potentially manage traffic flow in a way that would reduce congestion along the roadway.

It is recommended that a shared-use path or other separated bike facility, be explored with any other additional studies conducted along this corridor.

*Recommended High Frequency and Local Transit. Additional corridor level analysis recommended; See Future Vision for more information.

N Shepherd Drive

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	6	MTPF Designation	P-6-120; P-6-200/210
Existing Counts Range	3,000-35,000	Future Volume Range	35,000-61,500
Right-of-Way	100'-200'	Proposed MMC	Urban/Suburban Blvd
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median/CTL

Existing Condition

N. Shepherd Drive is 6-lanes divided **Principal Thoroughfare**. Shepherd Drive functions as a two-way corridor from IH 45 to just north of IH 610, where it splits into the Shepherd Drive/Durham Drive couplet. Variations along the two-way portion transition north and south of Montgomery Road and include:

North of Montgomery Road: 200' to 210' right-of-way with a wide, planted esplanade. Sidewalks and retail-commercial development with relatively wide setbacks flank both sides of the roadway.

South of Montgomery: 100' right-of-way with a raised, narrow concrete median; sidewalks flank both sides of the roadway.

Identified Needs

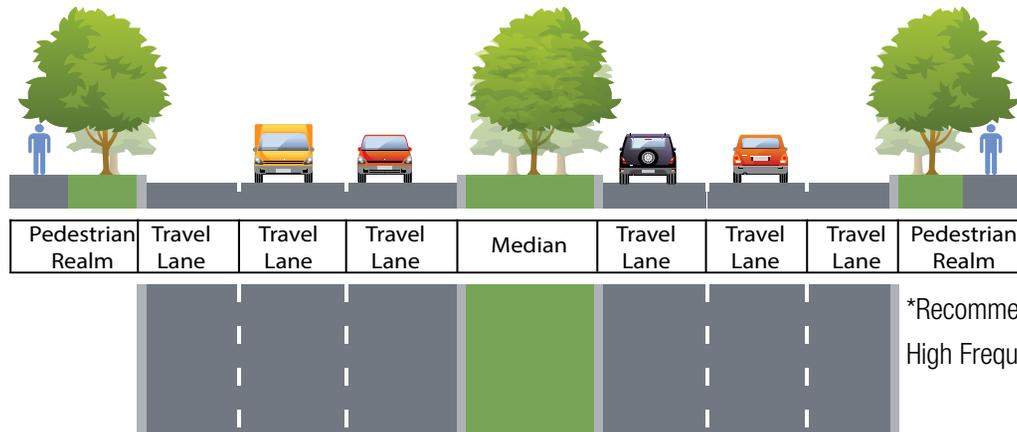
Model projections indicate traffic volumes greater than 35,000 vehicles with projections near 50,000 vehicles along some portions of the corridor characteristic of a 6-lane facility.

Wait time and related congestion at intersections was a concern expressed by the public. Specific intersections at Shepherd Drive include Tidwell Road, 43rd Street and 34th Street. Additionally, the IH 45 northbound access ramp was noted as a primary congestion point. Finally, the N. Shepherd Trail, which is a slip street near the 34th Street intersection was identified as confusing for retail shoppers.

Future Vision

Given existing and future vehicular traffic volumes anticipated on this corridor, it is recommended the corridor remain a 6-lane **Principal Thoroughfare**. Although traffic volumes warrant the potential expansion of the corridor to 8-lanes, the added capacity is anticipated to only attract more cars - or latent demand - to the corridor and is not the preferred approach of the project team given the surrounding context and opportunity to develop a neighborhood activity center. For continued access management appropriate for the provided context, the corridor is recommended as an **Urban Boulevard** south of Montgomery Road and **Suburban Boulevard** to its north. A controlled center turn lane is also recommended for some portions of the roadway. Where repurposing of the roadway is needed, the widening of the pedestrian realm as a shared, or more robust sidewalk, should be explored given the number of smaller commercial-retail that would benefit from a more localized multi-modal centric network. Concentrating a High Frequency Transit facility along this corridor is essential given it's the high demand for transit users. Specifically, the option for Bus Rapid Transit should be further explored for this corridor.

Possible Option(s):



*Recommended High Frequency Transit

TC Jester Boulevard

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100/110/120
Existing Counts Range	9,000-23,500	Future Volume Range	19,000-40,000
Right-of-Way	90'-100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

TC Jester Boulevard transitions into the Northwest study area south of IH 610 as two separate corridors and is currently built to Victory Drive. Variation along designated portions of the corridor as classified by the MTFP include:

- East TC Jester Blvd: 4-lane **Major Thoroughfare** with 120' right of way. E TC Jester Blvd turns into Rosslyn Road just north of W 34th Street.
- West TC Jester Blvd: 4-lane divided **Major Thoroughfare** with 100'-120' of ROW. This portion of the corridor continues as TC Jester through the remainder of the study area after Judiway Street.
- TC Jester: 4-lane **Major Thoroughfare** that maintains 90', 100', 110', 120' right-of-way intermittently along portions of the corridor.

The corridor is home to residential development with a few nodes of commercial properties. The White Oak Bayou Trail follows on the west side of TC Jester Blvd up to its northern limit at Victory Drive.

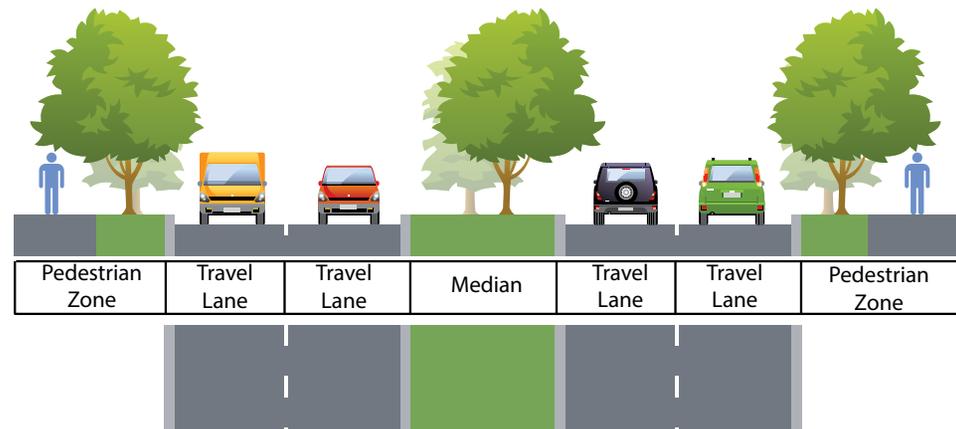
Identified Needs

TC Jester is identified as a proposed corridor to Beltway 8 which, when constructed, would provide an essential north-south connection within the study area. Additionally, TC Jester represents the closest north-south corridor to IH 610 and US-290. Specific pedestrian amenities, such as a bikeway bridge connector from Highland Park to the White Oak Bayou Trail, were also suggested by the public.

Future Vision

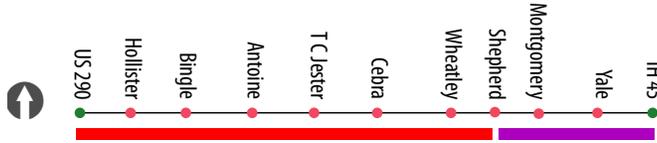
TC Jester is recommended to remain a 4-lane **Major Thoroughfare** with current right-of-way designations as previously listed. The multi-modal classification for TC Jester Blvd would best be suited as a **Suburban Boulevard** in preservation of the median and park-like context. A bicycle facility is recommended for portions of the corridor located inside the City of Houston's Corporate limits. Although a buffered bike or shared-use facility would greatly improve multi-modal access within the study area, further evaluation is required to determine the most appropriate that promotes the highest degree of safety for users of the system.

Possible Option(s):



W Tidwell Road

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-80; T-4-90/100; T-6-100/130
Existing Counts Range	16,000-22,000	Future Volume Range	16,000-42,000
Right-of-Way	80'-100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

W. Tidwell Road is a 4-lane divided **Major Thoroughfare** with 80'-100' of right-of-way that provides east-west connectivity from US 290 to IH 45. The White Oak Bayou Trail crosses W. Tidwell Road directly west of TC Jester Blvd. Sidewalks are fairly consistent throughout the corridor, but pedestrian facilities across bridges are lacking. Presently, no bicycle facility exists along the corridor. Transit exists along the corridor with the exception of Wheatley Street to Shepherd Drive where existing transit is routed to Pinemont.

Land use along the corridor is mainly residential and commercial with most of the commercial-retail properties east of Shepherd Drive. Heavy multi-family use is evident west of Antoine Drive to Bingle Road.

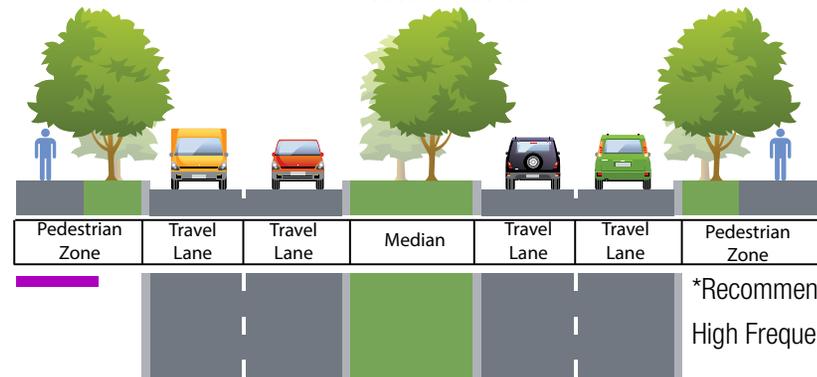
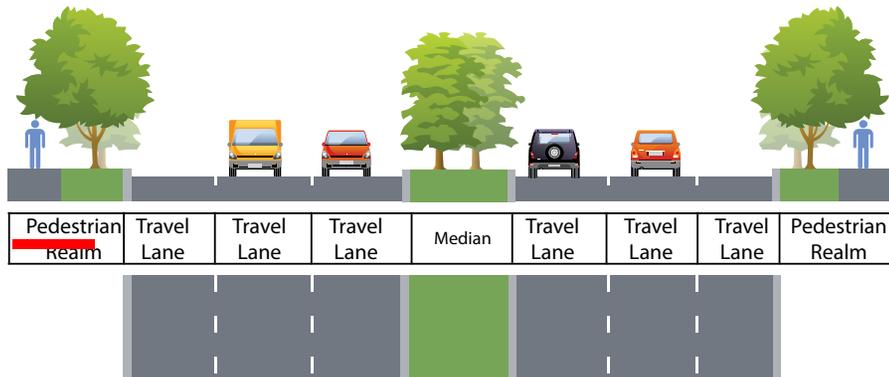
Identified Needs

Portions of W. Tidwell Road are projected to maintain volumes over 40,000 trips. However, these segments directly abut and provide access to regional highways, and are not characteristic along the length of the corridor. Comments from the public identified most intersections along the corridor as in need of safety and efficiency improvements. Specific intersections of concern those directly adjacent to US 290. In addition to these improvements, connecting sidewalk gaps through the undeveloped segments of the corridor is important to residents and stakeholders. The project team also noted the need for safe connections to the White Oak Bayou Trail and sidewalks across area bridges.

Future Vision

The 4-lane divided **Major Thoroughfare** designation of Tidwell Road is efficient for the current and projected use of the corridor, west of Shepherd. East of Shepherd to IH 45, 6-lanes are needed to meet the future traffic demands. In preservation of the median for continued access management, the corridor is recommended **Suburban Boulevard**. A High Frequency Transit route, given the continuous east-west connection through the study area and access to the Northline Station along METRO's Redline Light Rail, is recommended. As demonstrated on the final system maps provided in the next chapter, bike facilities are also recommended for a portion of the corridor providing needed connections to Ella/Weatley facilities. Due to right-of-way constraints safe bike facilities between TC Jester and Ella/Wheatly may prove challenging, and should be explored for the best design option should bikes be accommodated.

Possible Option(s):

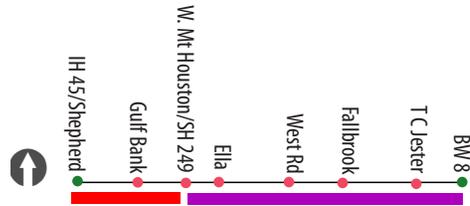


*Recommended High Frequency Transit

NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

Veterans Memorial Drive

Priority Elements

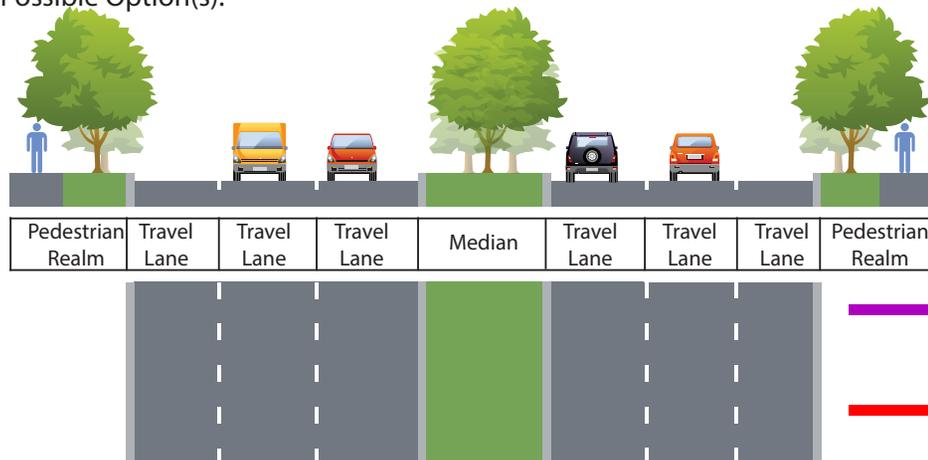


EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4-6	MTFP Designation	P-6-100
Existing Counts Range	18,000-28,000	Future Volume Range	29,000-49,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median/CTL

Existing Condition

Veterans Memorial Drive is classified on the MTFP as a 6-lane **Principle Thoroughfare** from IH 45 to SH 249 and a 4-Lane **Major Thoroughfare** SH 249/W. Mount Houston to Beltway 8. The corridor, however, is currently built as 4-lanes for its entirety from IH 45 to Beltway 8. South of SH 249, the corridor is divided by a median. North of SH 249 the corridor is undivided left turn lanes for added turning capacity where appropriate. From US 249 to BW 8, the corridor has open ditches flanking both sides of the roadway. Veterans Memorial Drive primarily consists of residential development and in many ways is a residential connector. Regional mobility is evident between IH 45 and BW 8.

Possible Option(s):



NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

Identified Needs

Traffic issues are present along the corridor and are apparent at certain intersections including IH 45, W Gulf Bank and SH 249. Specific mitigation tactics include a reassessment of signal timings as well as potential widening of problem intersections for added turning lane capacity where appropriate. The N. Shepherd Park and Ride is located at the terminus of Veterans Memorial and N. Shepherd Drive providing regional transit access to area residents which should be accommodated within the greater network. Creating a connected pedestrian zone along Veterans Memorial Drive is necessary as the corridor continues to develop.

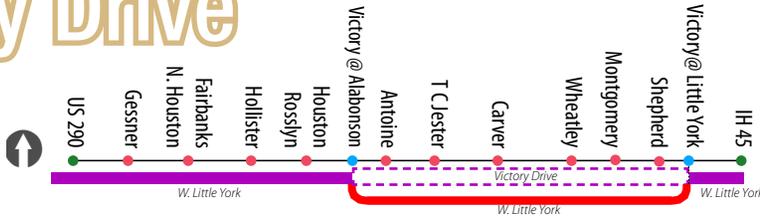
Future Vision

Veterans Memorial serves commuting traffic traveling to and from downtown, other destinations and other neighborhoods. Future traffic projections indicate multiple segments along the corridor from IH 45 to Beltway 8 greatly surpass anticipated traffic volumes of 33,000 or more. As such, Veterans Memorial Drive is recommended to be reclassified and widened to a 6-lane **Principal Thoroughfare** for its entirety. The provided recommendation is intended to increase the corridor's overall carrying capacity characteristic of projected volumes for the corridor. With the high number of commuters it is further recommended as a **Suburban Boulevard** for increased access management and preservation of the median.

Given the importance of the corridor for local movement of the pedestrian user to Transit, special attention should be given to the best use and design of the pedestrian realm.

Victory Drive

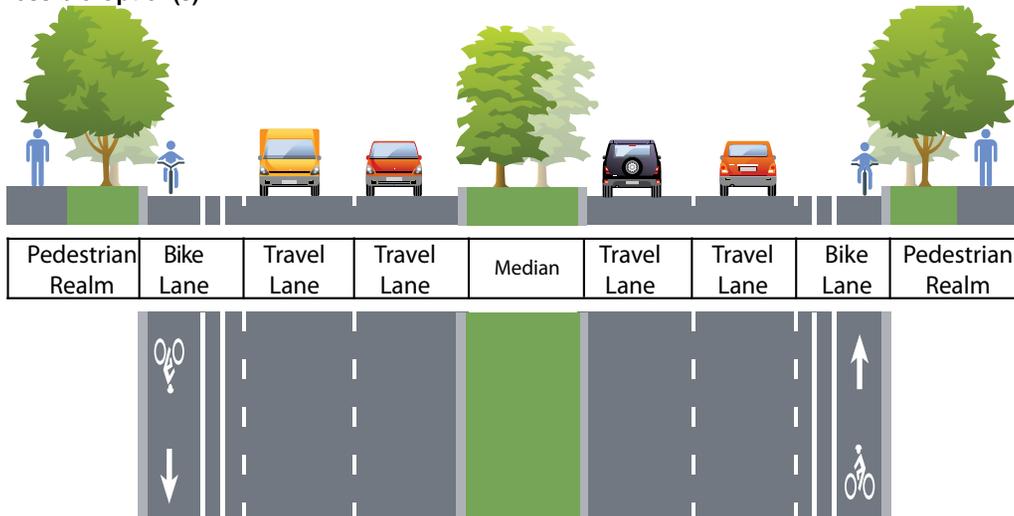
Priority Elements



Existing Condition

Victory Drive is classified as a divided 6-lane **Principal Thoroughfare** with 100' right-of-way on the MTFP. The corridor provides east-west connectivity in conjunction with W. Little York Road as a continuous 6-lane Principal Thoroughfare classification from US 290 to IH 45. Currently, Victory Drive is built as 4-lanes with a divided median, sidewalks and a planting strip along most portions of the roadway. Land use that fronts Victory Drive is predominately low-density residential with undeveloped parcels. Victory Drive crosses White Oak Bayou, and has the potential for a trail connection with future improvements proposed with the Bayou Greenways. Bicycle facilities are not present along the corridor.

Possible Option(s):



NOTE: COLORED BAR(S) INTENDED TO CORRESPOND WITH CORRIDOR KEY AT THE TOP OF THE PAGE.

Identified Needs

Intersection delays and associated congestion were identified as a major issue along the corridor. Truck traffic as the primary concern where community residents noted the corridor as more residential in use and not appropriate for larger freight movements. Connections to the White Oak Bayou trail from Victory Drive are needed to facilitate the movement of pedestrians to this trail.

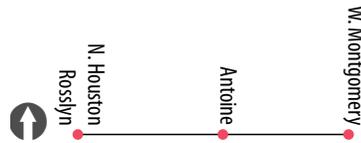
Future Vision

Victory Drive and W. Little York Road - between Victory at Alabonson and Victory at W. Little York - currently maintain four existing lanes of traffic, and as such provide eight lanes of combined east-west vehicular capacity. Based on this understanding, it is recommended Victory Drive be classified as a 4-lane **Major Thoroughfare** within this provided segment. To assist with continued access management, it is recommended the provided esplanade be preserved and corridor classified as a **Suburban Boulevard**. The provided boulevard classification is also intended to reflect the residential nature of the corridor with building setbacks located further from the road. A bike facility is also recommended along this segment and is intended to provide needed connections to the White Oak Bayou trail system as well as access across IH 45. To ensure ample safety of the user, the proper bicycle facility type is best determined during the design and engineering phase of corridor improvements. Given the associated context, special attention should be provided at intersections for increased capacity of turning movements as

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-4-100
Existing Counts Range	32,000	Future Volume Range	32,500-48,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

W. Mount Houston

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	C-2-100
Existing Counts Range	2,000-3,000	Future Volume Range	6,000-8,500
Right-of-Way	100'	Proposed MMC	Suburban Street
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Undivided

Existing Condition

W. Mount Houston Road is a 4-lane divided **Major Thoroughfare** with a 100' right-of-way. The provided segment is relatively short providing connectivity between N. Houston Rosslyn and W. Montgomery Road. Historically seen as a major east-west connector, the functionality of the corridor is no longer accurate; Breen Drive, in conjunction with SH 249 is seen as the primary regional connector just north of W. Mount Houston. As a result, this portion of West Mount Houston currently carries loads more appropriately seen along residential streets.

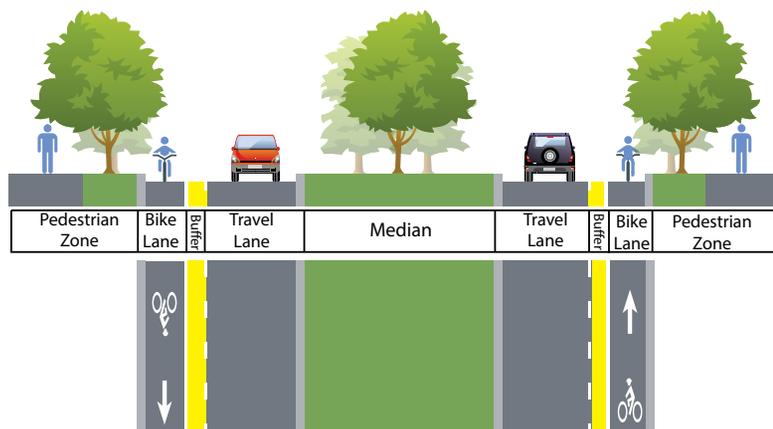
Identified Needs

The corridor has the potential to accommodate safe and effective movement of bicycles along the corridor given the refocus of regional vehicular traffic from W. Mount Houston to Breen Road. The placement of the facility is intended to serve as a connector to local schools near the intersection of W. Mount Houston and W. Montgomery Road. Similarly, the provided corridor enhances access to Vogel Creek and Antoine Street, both of which are identified as essential gap connectors as depicted in **Chapter VII. Outcomes**. Sidewalks are also in need of repair.

Future Vision

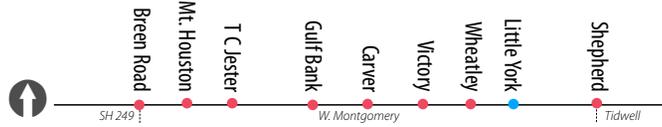
Projected traffic volumes indicate 4-lanes of traffic are not warranted. As such, it is recommended W. Mount Houston west of SH 249 be downgraded on the MTFP from a Major Thoroughfare to a **Major Collector** with just 2-lanes for vehicular traffic. The remaining outside travel lanes are further recommended to be repurpose to accommodate buffered bike lanes. The multi-modal classification of this portion of the corridor could then be assigned as a **Suburban Street** with a historical median for the length of the corridor.

Possible Option(s):



W. Montgomery Rd

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2-4	MTFP Designation	T-4-80; T-4-100
Existing Counts Range	13,000-21,000	Future Volume Range	13,000-44,000
Right-of-Way	80'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median

Existing Condition

West Montgomery Road is classified as a 4-lane **Major Thoroughfare** with 80' and 100' right-of-way north and south of TC Jester, respectively. The corridor functions in conjunction with SH 249 and Tidwell Road for continued northwest- southeast connectivity through the study area. Currently, the corridor is built out as follows:

- SH 249 to Breen Road: 2-lanes undivided with a turn lane; sidewalks are not currently built along this segment of the corridor.
- Breen Road to Shepherd/Tidwell: 4-lanes divided by a median; sidewalks exist along portions of the corridor.

A mix of uses including some commercial, industrial, Public-institutional and undeveloped parcels are evident along the corridor. The corridor traverses through the Acres Home Subdivision.

Identified Needs

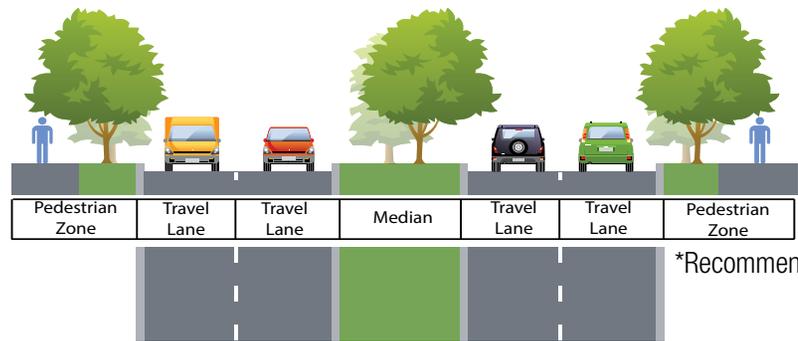
- West Montgomery Road serves as a primary transit corridor with connections to:
- Seton Lake Park and Ride north of W. Montgomery Road near SH 249 and Fallbrook Drive.
 - Acres Homes Transit Center near the intersection of W. Montgomery Road and W. Little York Road
 - Northline Light Rail Station Stop just south of Tidwell Road.

To accommodate future traffic volumes, the transition between W. Montgomery Road and SH 249 should be revisited as development matures within the study area. The intent is to alleviate confusion between a vehicular users attempting to travel east-west on SH 249 or northwest-southeast to Montgomery Road.

Future Vision

Given future vehicular traffic demands, it is recommended that W. Montgomery Road be built out in its entirety as a 4-lane divided **Major Thoroughfare** as reflected in recent construction projects along some parts of the corridor. The corridor is recommended as **Suburban Boulevard**, given provided context and in preservation of the median for continued and increased access management of vehicular traffic. Finally, the corridor is recommended as a High Frequency Transit facility. As such, sidewalks should be designed with a wider pedestrian realm appropriate for increased transit access. Due to safety concerns, a bicycle facility along this corridor is not recommended due to limited right-of-way and high projected vehicular traffic volumes.

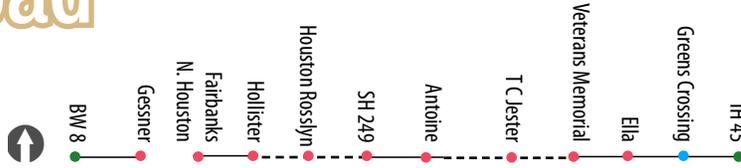
Possible Option(s):



*Recommended High Frequency Transit Route

West Road

Priority Elements



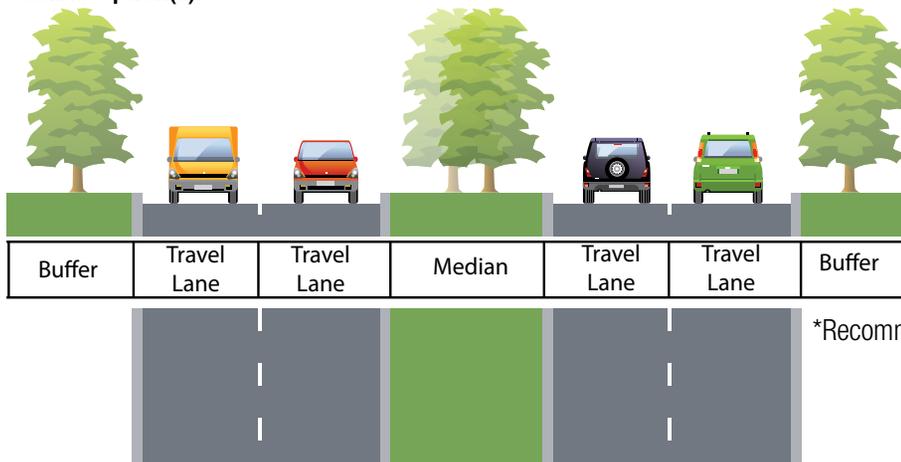
EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100
Existing Counts Range	18,000	Future Volume Range	33,000
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

West Road is classified as a 4-lane **Major Thoroughfare** with 100' right-of-way on the MTFP. Although the right-of-way is sufficient in width, many portions of the corridor have yet to be built resulting in an extremely discontinuous corridor from Beltway 8 to IH 45. Currently, four segments of West Rd are operational today, the longest of which is from IH 45 to Veterans Memorial. Sidewalks are not present along any section of the corridor, and bike facilities are not accommodated.

Land use along existing portions of the corridor include commercial parcels closest to IH 45, and some undeveloped and a few residential parcels as the corridor transitions to Veterans Memorial.

Possible Option(s):



Identified Needs

The public voiced concern regarding the completion of West Road in preservation of the more suburban to rural nature of some of the parcels along the corridor. Although the preservation of the right-of-way is seen as a need by the project team, the near-term completion of the corridor is challenged by railroads, Halls Bayou and right-of-way acquisitions through existing developments.

The expansion of the pedestrian realm is seen as a more near-term solution for proper accommodation of all users of the corridor. Although existing corridor segments lack sidewalks, evidence of pedestrian use are evident given the footpaths that can be seen on both sides of the thoroughfare.

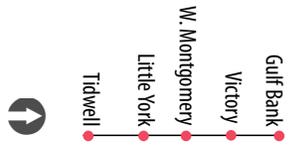
Future Vision

Completing all missing connections of West Road by 2035 is not recommended. However, given anticipated traffic volumes, the portion of West Road from N Houston Rosslyn Road to Tomball Parkway will likely be expanded to 4-lanes by 2035. With the segmented nature of the street, a bicycle facility would not be beneficial to this corridor. Adding dual left turn lanes at Gessner, Fairbanks N Houston, and N. Houston Rosslyn would assist in the movement of traffic along the corridor. With these concepts and designs, the multi-modal classification for West Road could potentially be a **Suburban Boulevard**. A local bus facility, namely a feeder bus facility which is intended to transition passengers to a more regional service, is recommended for the length of the corridor. Given the provided facility is in the county, justification for additional sidewalks is not currently warranted. However, as populations continue to increase along the corridor, the potential option for sidewalks should be further explored at the discretion of Harris County.

*Recommended Local Bus Facility

Wheatley (Ella Blvd)

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-80
Existing Counts Range	15,000-17,500	Future Volume Range	32,000-37,500
Right-of-Way	100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Wheatley is a continuation of Ella Boulevard. Portions of the corridor do not currently exist. Portions of Wheatley from Tidwell to Gulf Bank, the corridor is proposed to be improved as a 4-lane roadway with a median. It is classified as a **Major Thoroughfare** on the City of Houston's MTFP.

Identified Needs

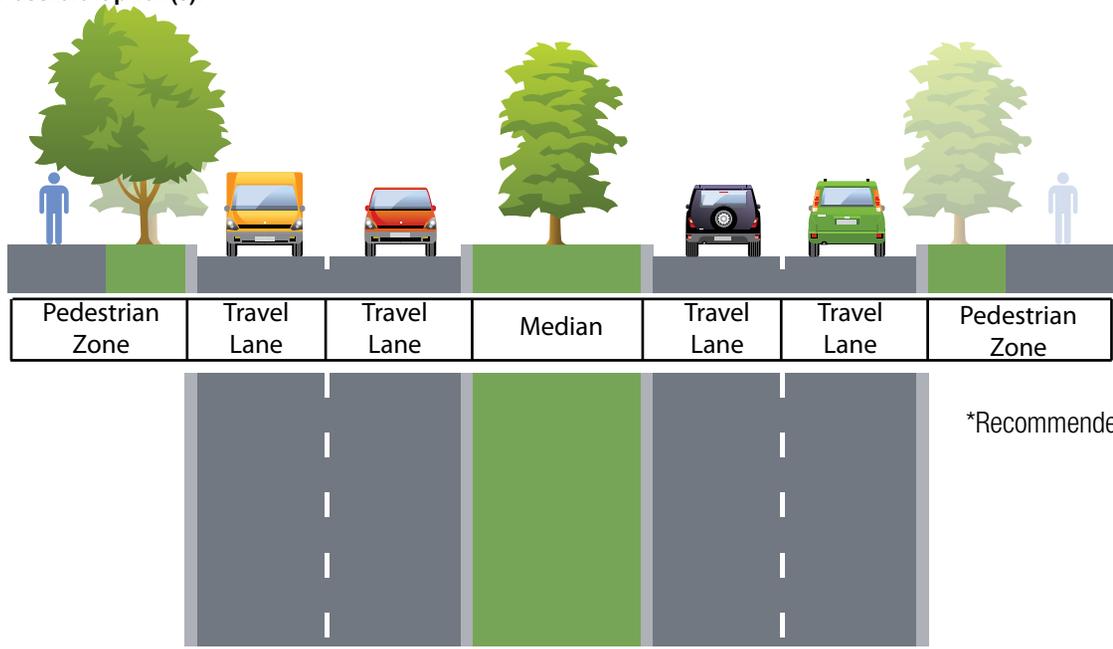
The extension of the corridor to the north of SH 249 to Beltway 8 was identified as a potential need for the corridor. This would assist in creating a connected network within the Northwest Study Area.

Future Vision

The corridor will retain the classification of Major Thoroughfare, and can potentially gain the multi-modal classification of **Suburban Boulevard**. As a continuation of Ella Blvd, a Local Bus Route route is also recommended for Wheatley.

See Ella Boulevard project page for more information.

Possible Option(s):



*Recommended Local Bus Route

Windfern Road

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2	MTFP Designation	C-2-60/70
Existing Counts Range	9,000	Future Volume Range	10,000-16,000
Right-of-Way	60'	Proposed MMC	Suburban Street
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Undivided

Existing Condition

Windfern Road is currently 2-lane **Local Street** with a 60' right-of-way. Windfern is a north-south corridor that meanders from Beltway 8 and US 290. Volumes along this corridor are relatively low except for where the corridor intersects with US 290.

South of Gulf Bank Road, land use is a mix of undeveloped, industrial, and agricultural uses. Multi-family and single family residential uses are prominent north of Gulf Bank Road.

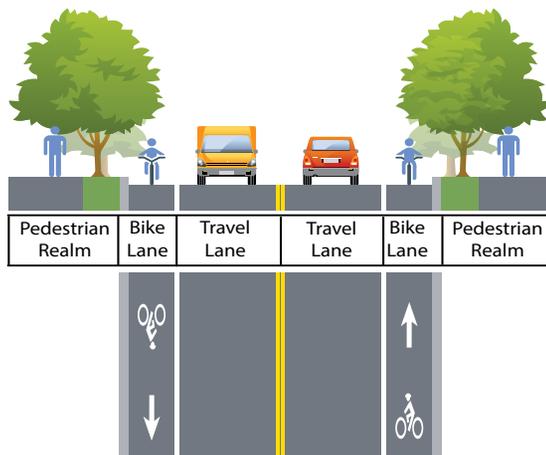
Identified Needs

Fairbanks N. Houston and Gessner Road are recommended as primary north-south facilities. As such, Windfern Road provides an alternative for local traffic connectivity and circulation in the study area. As a slower-speed corridor, the facility offers a safe and alternative route for bicycle users not accustomed to interacting with high volumes of vehicular traffic as seen on Fairbanks N. Houston.

Future Vision

Windfern Road is recommended to be added to the MTFP as a **Minor Collector** in preservation of a 60' right-of-way characteristic of lower traffic volumes and increased alternative for local multi-modal route options. It is further recommended as a **Suburban Street** characteristic of larger lots with ample setbacks and relatively low densities. Given the lower traffic projected along the length of the corridor, a bicycle lane is recommended for increased north-south connectivity within the study area and greater bicycle network. Special attention should be given to creating a safe and friendly pedestrian realm to enhance internal and localized multi-modal use along the corridor.

Possible Option(s):



Yale Street

Priority Elements



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2-4	MTFP Designation	T-4-70/80
Existing Counts Range	6,500-15,500	Future Volume Range	20,500-35,500
Right-of-Way	60'-80'	Proposed MMC	Urban Avenue
Median/CTL/Undivided	Median/Und	Median/CTL/Undivided	Median/Und

Existing Condition

Yale Street is classified as a 4-lane **Major Thoroughfare** with an 80' and 70' right-of-way north and south of W. Crosstimbers Street, respectively. The corridor provides north-south connectivity through the study area from IH 45 and continue to IH 610 providing continued connection into the Height neighborhood. Existing corridor sections include:

- IH 45 to W. Hamilton St: 2-lanes undivided with sidewalk along some portions of the corridor and open ditches along certain vacant parcels. Land use is relatively undeveloped.
- W. Hamilton St to IH 610 is a 4-lane divided corridor, with medians and turn lanes. Sidewalk gaps are common along the corridor.

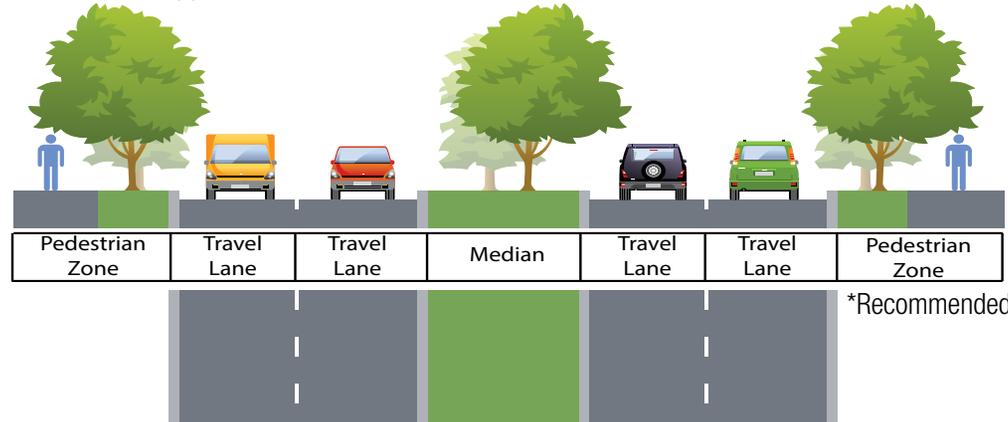
Identified Needs

Residents indicated that they view Yale Street as an auto-oriented corridor and feel unsafe to use or cross as a pedestrian or bicyclist. However, due to the location of the High School, making a safe and friendly pedestrian zone should be a priority of any future redevelopment. If developed correctly, students may utilize the pedestrian zone for safe access to and from school.

Future Vision

Yale Street is recommended to remain a 4-lane **Major Thoroughfare** on the MTFP classified as an **Urban Avenue** given the relative density and uses along the corridor. Additional focus should be placed on creating a pedestrian realm that is safe and friendly to accommodate local student traffic, and potential retail/commercial traffic.

Possible Option(s):



*Recommended Local Transit Route

This Page Intentionally Left Blank

This Page Intentionally Left Blank

VII. Outcomes

The previous chapter explored design examples and related key factors for consideration at a micro level. However, how these recommendations translate to the greater system is more evident at the macro level where various systems interact. As such, this chapter of the Report represents the system improvement recommendations for the Northwest Study Area as it pertains to the subregional network. The resulting “network maps” represent a plan that identifies system gaps and highlights potential modifications for improvements both on the MTFP and MMC classifications. The resulting networks depicted work to connect the different facilities to enhance the efficient movement of people throughout the Study Area, achieving the purpose of this study.

The following maps show a comprehensive look at the Northwest Study Area based on the recommendations found within this document.

- 2035 Major Thoroughfare and Freeway Plan
- Bike Vision Map
- Intersection Analysis
- Transit and Pedestrian Vision Map
- Multi-Modal Classification Map

7.1 2035 Major Thoroughfare and Freeway Plan

As explained in the Existing Conditions section of this report, the Major Thoroughfare and Freeway Plan (MTFP) is the City of Houston's guiding document for future corridors. Based on the provided function classification, the MTFP provides the City with essential data regarding the future capacity need of the corridor. Without this roadmap, identifying projects, funding needs, and priorities would be difficult.

The Northwest area faces connectivity challenges as proposed corridors transition between City of Houston and Harris County jurisdiction. The MTFP looks beyond these boundaries and focuses on the regional network. It also looks at ways to adjust the existing corridors to better suit the communities needs.

The recommendation for the Northwest is to focus on creating fully connected corridors. Providing for effective through movements of vehicles increases the efficient movement of people. An updated Major Thoroughfare and Freeway Plan is envisioned, as seen in the adjoining map. Public comments, workshop results, and the analysis from the Project Team of the traffic demand model, intersections, and planned road improvements were all factors in this development.

For a full list of detailed recommendations in table form, please visit the detailed corridor sheets and associated matrix provided in [Chapter VI. A Balanced Approach](#) of this Report.

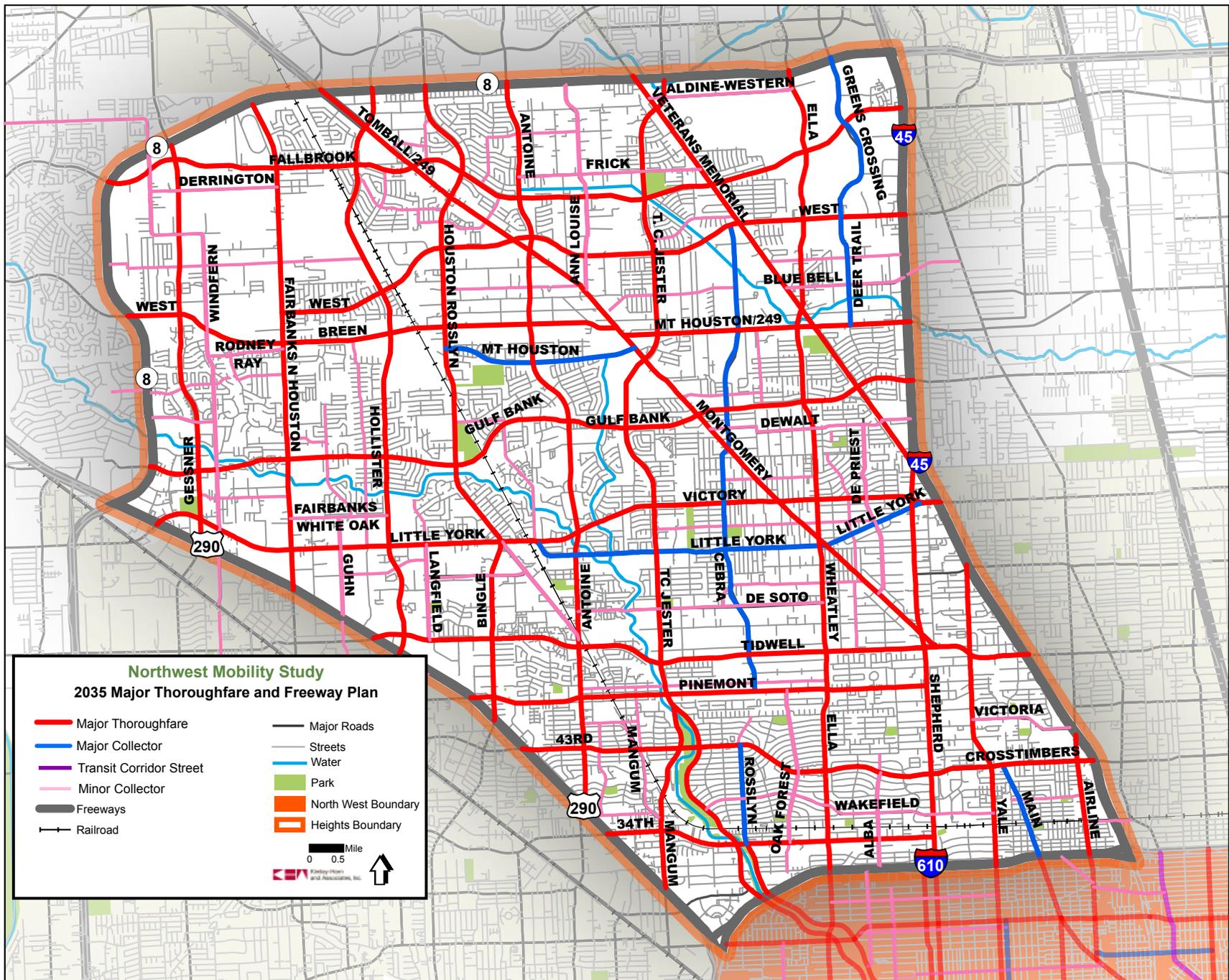


FIGURE 7.1

7.2 Intersection Analysis

Development of Future Intersection Conditions

The traditional traffic engineering approach for growing traffic volumes across a network of streets is to simply start from a point in time at which intersection-specific information is collected, and then grow the volumes at a consistent growth rate over the planning horizon. The largest challenge to this approach - within a study area of this larger size - is that over time redevelopment and traffic patterns shift. This causes the steady rate of growth to be over/under estimated for more localized conditions. This study attempts to estimate the future operating conditions at the intersections by using the existing traffic counts as a baseline, and growing them based upon the growth witnessed in the travel demand model.

Intersection data for the portions of Northwest in Harris County (outside of the City of Houston's jurisdiction) were not available at the time of this study. Consequently, count-based recommendations are not provided for those intersections. Additionally, analysis of the intersections with the bounding Interstates and State Highways was not included in the scope of this study due to ongoing major reconstruction projects along US 290 and IH 610. As such, this study acknowledges that intersections with the freeways are typically congested and in need of mitigation, but projections for these intersections will be altered greatly once reconstruction is completed. This is due to many factors, including that traffic patterns typically normalize one-year after construction is finished.

Analyzing Future Conditions

The general level of congestion within the larger corridors suggests that overall intersection level of service will be manageable, but could be improved in 2035. The following maps illustrates the intersection congestion levels for the AM peak in 2035. The Northwest area is quite large and has a largely suburban make-up. The area is also missing many through connections, with roads not continuing across the study area. This is a major factor contributing to poor intersection level of service (LOS). Future AM peak period has twenty-five major signalized intersections rating an LOS of F and an additional seven with an LOS of E. The remaining intersections are ranked A-D. The PM peak period show a similar result with twenty-three intersections with an LOS of F and four with an LOS of E.

Mitigating the Near Term Conditions

Specific projects have been identified for the near term at intersections to help mitigate congestion that exists today. These planning-level concepts are provided with specific recommendations and their improvements will help with congestion levels during peak hours and throughout the day as well.

Mitigating the Long Term Conditions

The mitigation opportunities for the 2035 scenario will be affected by many improvements other than intersection enhancements. Connecting roads, and the adjustment of the number of lanes by corridor, will impact the movement of vehicles at intersections. Signal timing improvements are recommended following road and intersection design changes. Specific intersection improvements can be found in this section.

Intersection Improvement Recommendations

The following set of tables and associated system maps indicate the intersections with recommended near- and long-term mitigation improvements. The project team identified improvements based on several variables which include growth rates, existing traffic counts, projected traffic volumes, land use, and the MTFP. The labeled intersection corresponds to the ID number on the following tables.

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
1	34th @ Ella	Modify Eastbound and Westbound left-turn phases to permissive/protected phase on 34th St	Add Northbound and Southbound Right-Turn Bay on Ella Add additional Northbound Left-Turn Bay to make dual left-turns on Ella Add Eastbound Right-Turn Bay on 34th Street Modify North and Southbound Left-Turn phases to Protected phases on Ella
2	34th @ Mangum/Watonga	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Southbound Thru lane on Watonga Add additional Northbound Thru lane on Mangum Add Eastbound and Westbound Right-Turn Bay on 34th Street
3	34th @ Shepherd	Optimize Offsets Optimize Splits Modify East and Westbound left-turn phases to permissive/protected phases on 34th St Modify Southbound and Northbound left-turn phases to protected phases on Shepherd	Add additional Northbound Left-Turn Bay to make dual left-turns on Shepherd Add Southbound Right-Turn Bay on Shepherd Add additional Eastbound Right-Turn Bay to make dual right-turns on 34th Street Modify Southbound Left-Turn phase to Protected phase on Shepherd
4	34th @ E TC Jester	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Southbound Right-Turn Bay on E. TC Jester Add Eastbound Right-Turn Bay on 34th Street
5	34th @ W TC Jester	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Northbound and Southbound Right-Turn Bay on W. TC Jester Add Eastbound Right-Turn Bay on 34th Street
6	43rd @ Antoine	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Northbound and Southbound Left-Turn Bay to make dual leftturns on Antoine Modify North and Southbound Left-Turn phases to Protected phases on Antoine

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
7	43rd @ Ella	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Northbound and Southbound Right-Turn Bay on Ella Add Eastbound and Westbound Right-Turn Bay on 43rd Street
8	43rd/Crosstimbers @ Shepherd	Optimize Offsets Optimize Splits	Add additional Northbound and Southbound Thru lanes on Shepherd OR Add Northbound and Southbound Right-Turn Bay on Shepherd Add additional Westbound Left-Turn Bay to make dual left-turns on Crosstimbers
9	43rd @ TC Jester	Optimize Offsets Optimize Splits Modify Northbound and Southbound left-turn phases to permissive/protected phases at this intersection Remove the small island in the middle of the intersection	Add Eastbound and Westbound Right-Turn Bay on 43rd Street
10	Crosstimbers @ Airline	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	
11	Little York @ Alabonson/Victory	Optimize Offsets Optimize Splits	Possible roundabout configuration
12	Gulf Bank @ Antoine	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	
13	Pinemont @ Antoine	Optimize Offsets Optimize Splits Modify Eastbound and Westbound left-turn phases to permissive/protected phases on Pinemont	Add additional Northbound and Southbound Left-Turn Bay to make dual leftturns on Antoine Add Westbound Right-Turn Bay on Pinemont

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
14	Tidwell @ Antoine	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Northbound and Southbound Left-Turn Bay to make dual left-turns on Antoine Modify Eastbound, Westbound, Northbound and Southbound Left-Turn phases to Protected phases at this intersection
15	Victory @ Antoine	Optimize Offsets Optimize Splits Increase the Southbound left-turn bay length to provide minimum 200 ft on Antoine	Add Westbound Right-Turn Bay on Victory Add Southbound and Northbound Right-Turn Bay on Antoine Add additional Westbound and Eastbound Left-Turn Bay to make dual left-turns on Victory
16	Little York @ Bingle/N Houston Rosslyn	Optimize Offsets Optimize Splits	Add Northbound and Southbound Right-Turn Lane Extend Northbound and Southbound Left-Turn Bay by additional 50-100' Add an additional Westbound Thru Lane for the Westbound approach Add additional Eastbound Left-Turn Bay to make dual left-turns on W. Little York
17	Pinemont @ Bingle	Optimize Offsets Optimize Splits Modify Eastbound and Westbound left-turn phases to permissive/protected phases on Pinemont	Add additional Southbound Left-Turn Bay to make dual left-turns on Bingle Add additional Eastbound and Westbound Left-Turn Bay to make dual left-turns on Pinemont Add Westbound Right-Turn Bay on Pinemont Add Northbound Right-Turn Bay on Bingle Modify East and Westbound Left-Turn phases to Protected phases on Pinemont
18	Tidwell @ Bingle	Optimize Offsets Optimize Splits Modify Eastbound and Westbound left-turn phases to permissive/protected phases on Tidwell	Add Westbound and Eastbound Right-Turn Bay on Tidwell Add Northbound and Southbound Right-Turn Bay on Bingle Add additional Eastbound and Westbound Left-Turn Bay to make dual left-turns on Tidwell Modify East and Westbound Left-Turn phases to Protected phases on Tidwell

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
19	Breen @ N Houston Rosslyn	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Southbound and Northbound thru lanes on N. Houston Rosslyn Add Southbound and Northbound right-turn bay on N. Houston Rosslyn
20	Crosstimbers @ Yale	Optimize Offsets Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	
21	Dacoma @ TC Jester	Optimize Offsets Optimize Splits Modify Northbound left-turn phase to permissive/protected phases on W. TC Jester	
22	Pinemont @ Ella	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound Left-turn phases to Permissive/Protected phases at this intersection	
23	Gulf Bank @ Stuebner Airline/Veterans Memorial	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Eastbound Right-Turn Bay on W. Gulf Bank
24	Tidwell @ Hollister	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Northbound and Southbound Thru lanes on Hollister Add Westbound and Eastbound Right-Turn Bay on Tidwell Add additional Northbound and Southbound Left-Turn Bay to make dual left-turns on Hollister Add Southbound Right-Turn Bay on Hollister Modify North and Southbound Left-Turn phases to Protected phases on Hollister
25	Little York @ Montgomery	Optimize Offsets Add additional Eastbound left-turn bay to make dual left-turns on W. Little York Modify Northbound and Southbound left-turn phases to permissive/protected on W. Montgomery	

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
26	Little York @ Shepherd	Optimize Offsets and Splits Modify the Eastbound approach lane configuration from 2 thru lanes and 1 left-turn lane to 1 thru lane and 2 left-turn lanes make dual left-turns on W. Little York	
27	Victory @ Montgomery	Optimize Offsets Optimize Splits	Add additional Southbound Left-Turn Bay to make dual left-turns on W. Montgomery Add Westbound Right-Turn Lane Modify Eastbound, Westbound, Northbound and Southbound Left-Turn phases to Protected phases at this intersection
28	Montgomery @ Shepherd		Optimize Splits
29	Pinemont @ Shepherd		Add additional Northbound Left-Turn Bay to make dual left-turns on Shepherd Add Southbound Right-Turn Bay on Shepherd
30	Pinemont @ TC Jester	Optimize Offsets Optimize Splits Modify Eastbound and Westbound left-turn phases to permissive/protected phases on Pinemont	Add Eastbound Right-Turn Bay on Pinemont
31	Tidwell @ Shepherd	Optimize Offsets Optimize Splits Modify Eastbound and Westbound left-turn phases to permissive/protected phases on Tidwell	Add Westbound and Eastbound Right-Turn Bay on Tidwell Add additional Eastbound Left-Turn Bay to make dual left-turns on Tidwell Add additional Northbound and Southbound Left-Turn Bay to make dual left-turns on Shepherd Modify East and Westbound Left-Turn phases to Protected phases on Tidwell
32	Victory @ Shepherd	Optimize Offsets Optimize Splits Add Southbound right-turn bay on Shepherd	Add additional Northbound Left-Turn Bay to make dual left-turns on Shepherd Add additional Eastbound Left-Turn Bay to make dual left-turns on Victory

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation
33	Tidwell @ TC Jester	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add additional Westbound Left-Turn Bay to make dual left-turns on Tidwell Add additional Northbound Left-Turn Bay to make dual left-turns on TC Jester Add Eastbound and Westbound Right-Turn Bay on Tidwell Modify Eastbound, Westbound, Northbound and Southbound Left-Turn phases to Protected phases at this intersection
34	Victory @ TC Jester	Optimize Offsets Optimize Splits Add Eastbound right-turn bay on Victory	
35	Tidwell @ Ella/Wheatley	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	
36	Tidwell @ Yale	Optimize Offsets Optimize Splits Modify Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Eastbound Right-Turn Bay on Tidwell Add additional Northbound Left-Turn Bay to make dual left-turns on Yale Modify Eastbound, Westbound, Northbound and Southbound Left-Turn phases to Protected phases at this intersection

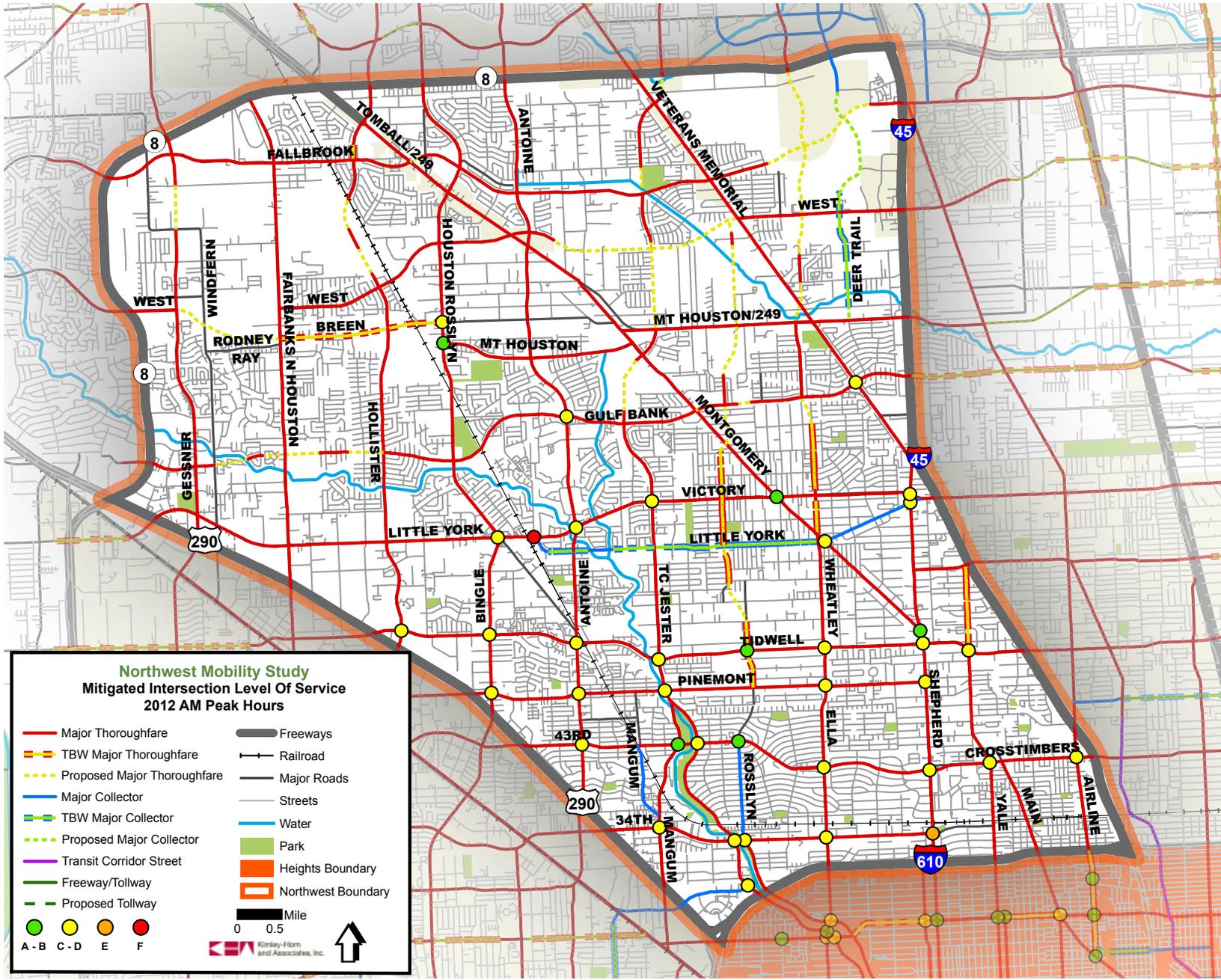


FIGURE 7.3

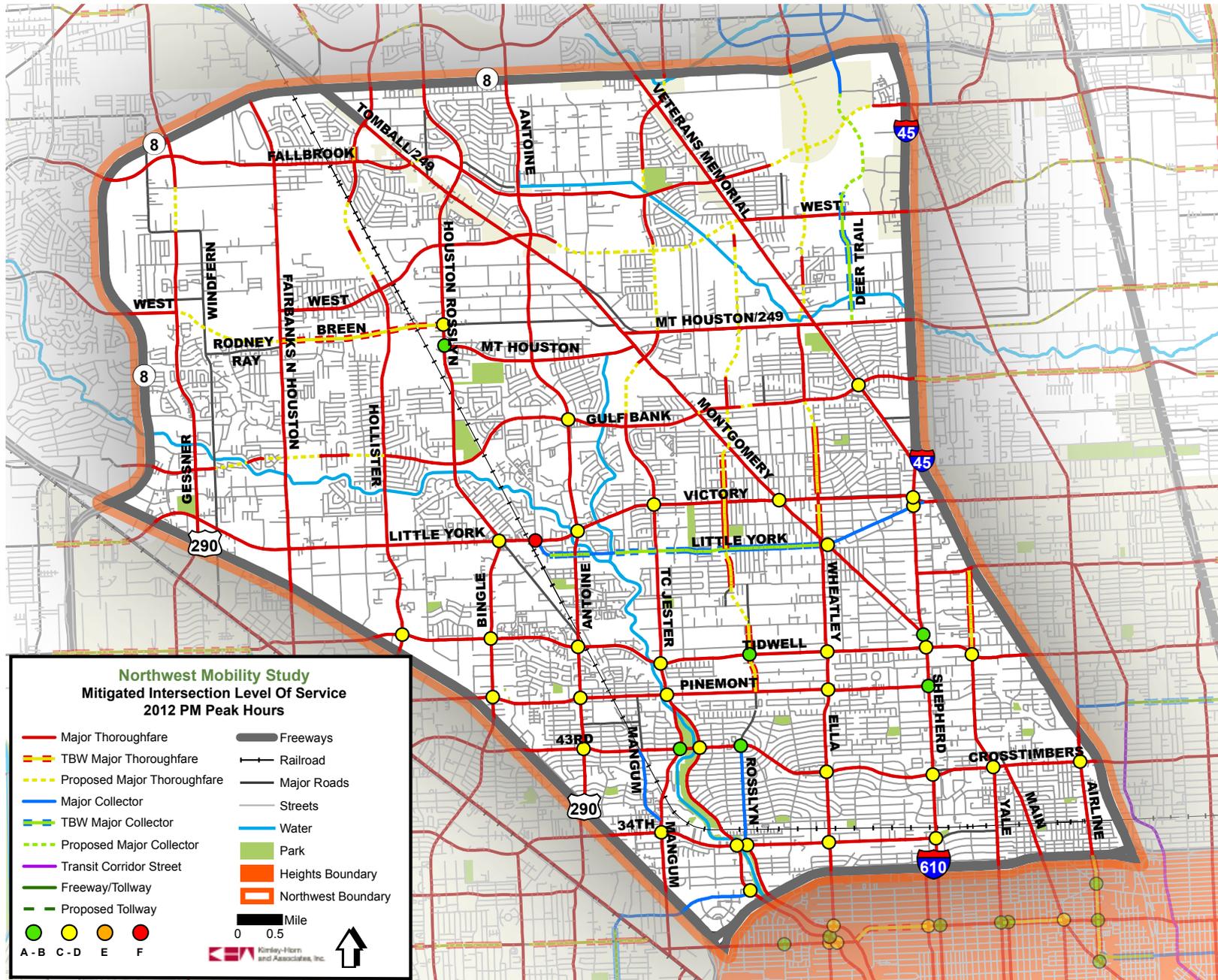


FIGURE 7.4

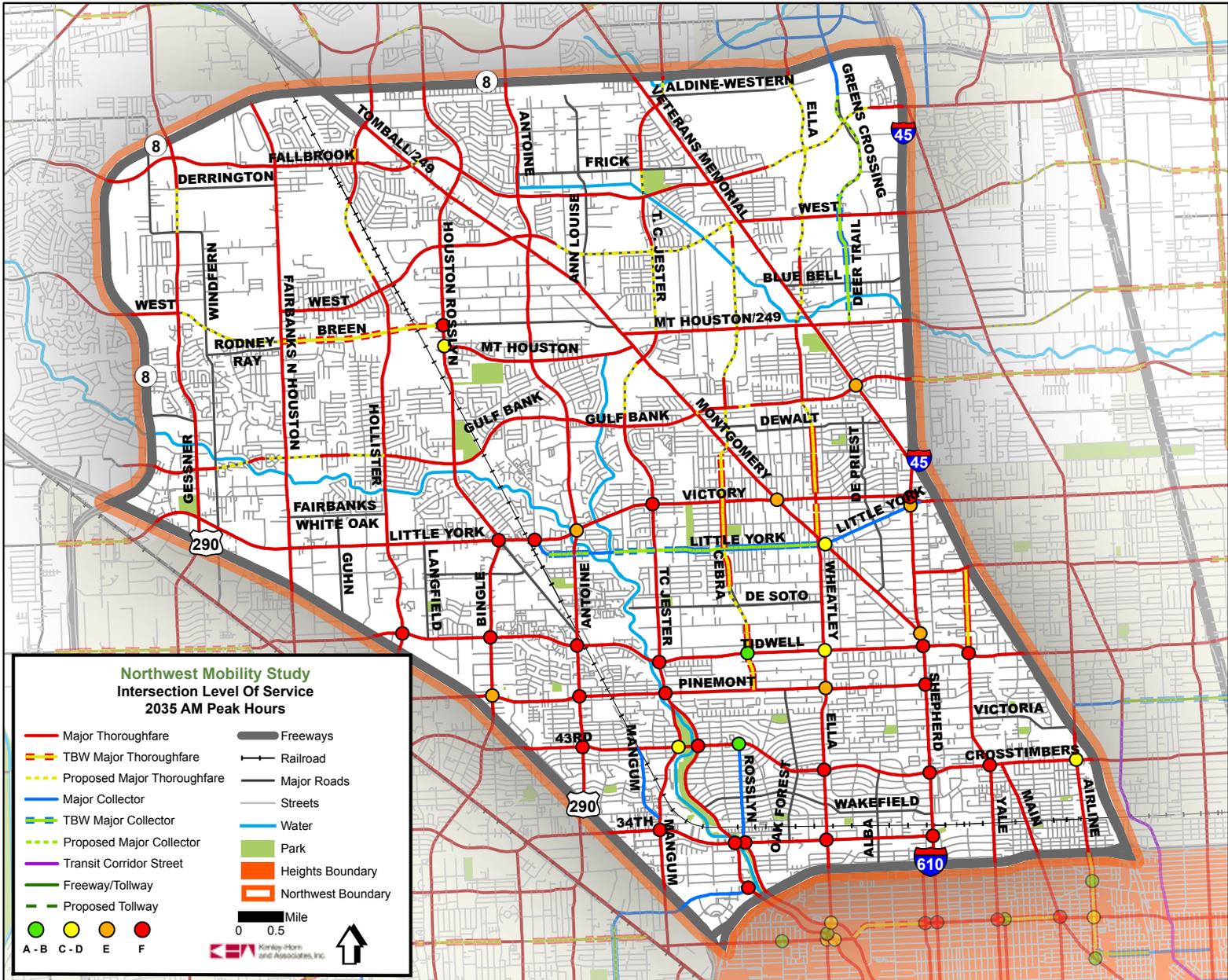


FIGURE 7.5

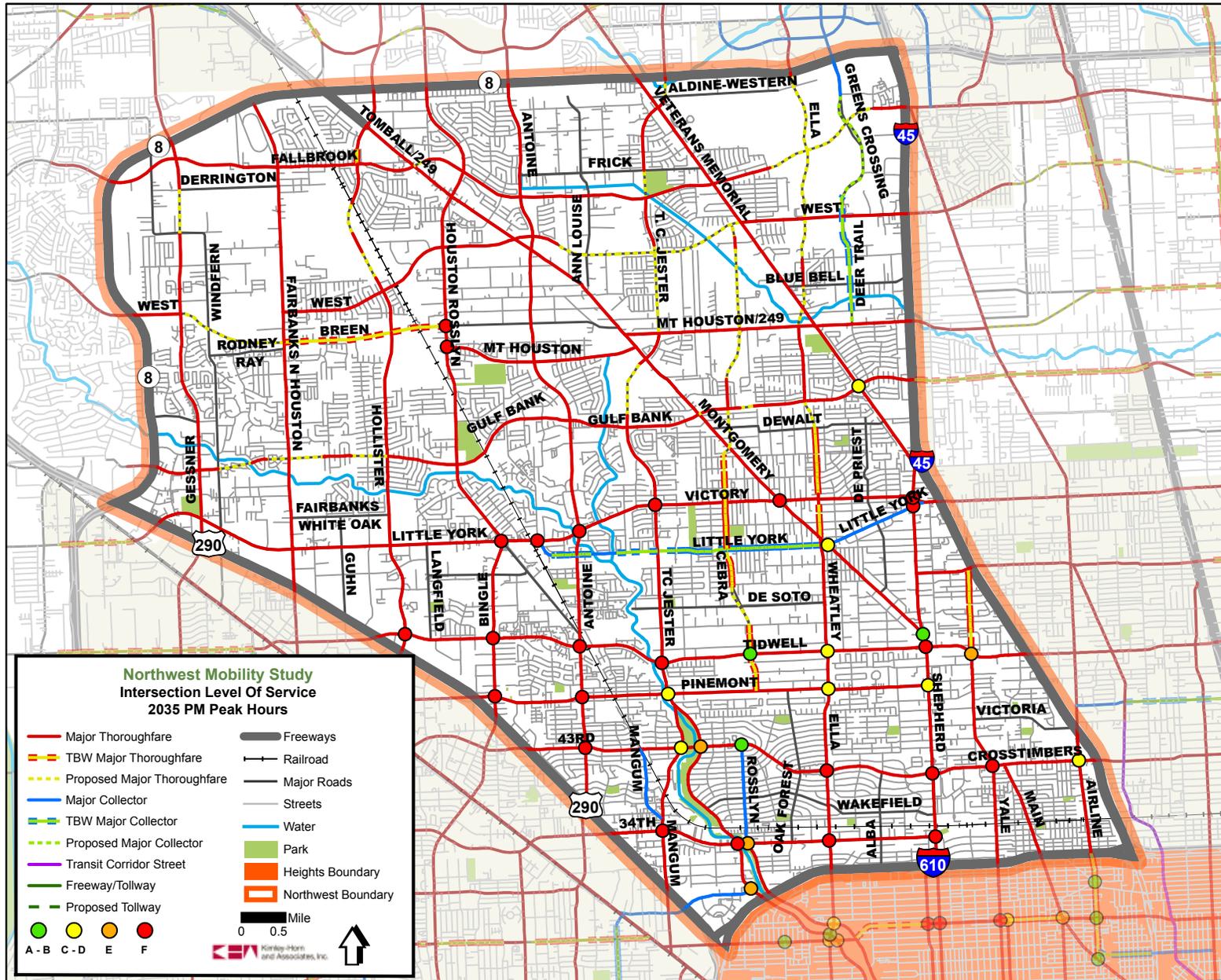


FIGURE 7.6

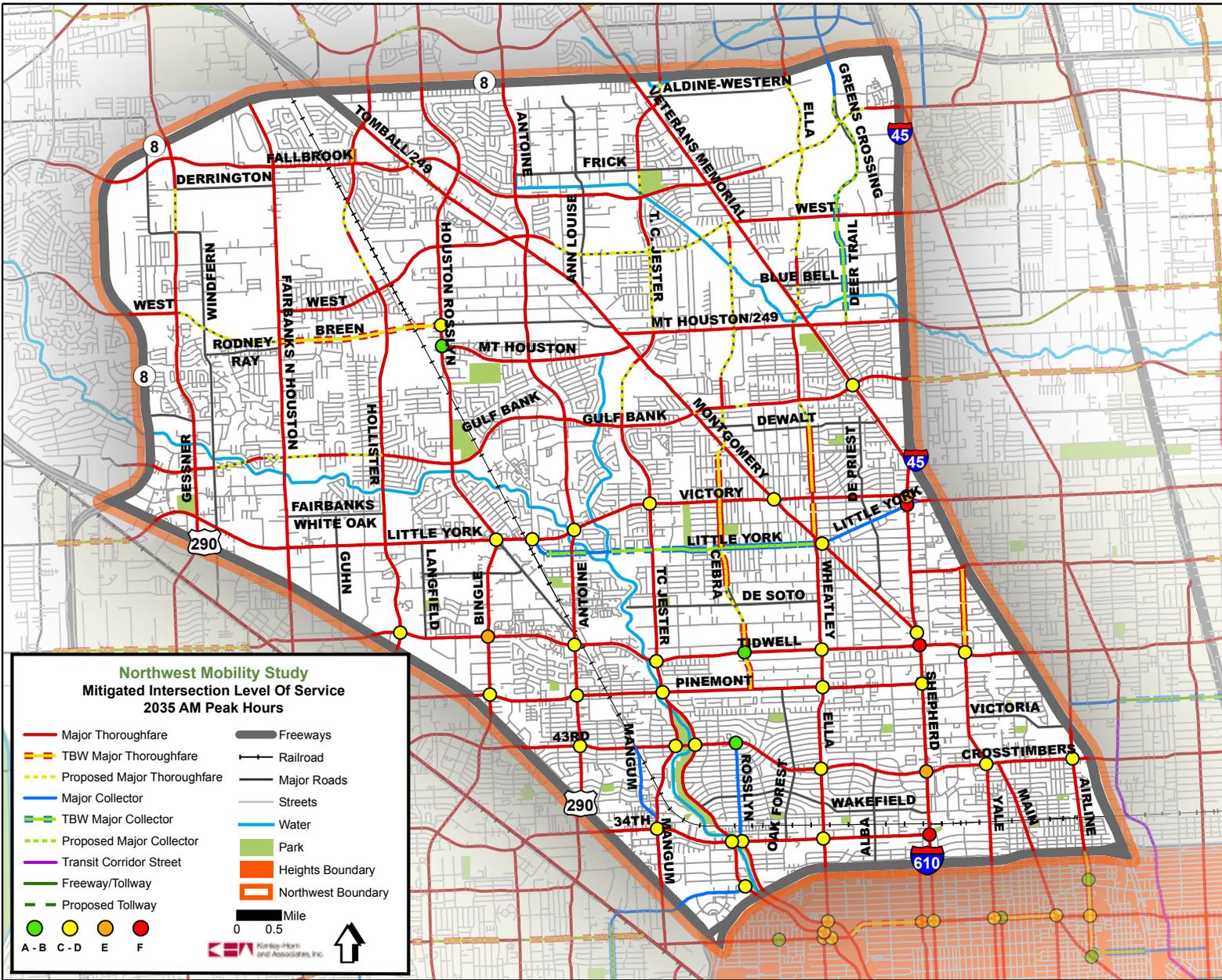


FIGURE 7.7

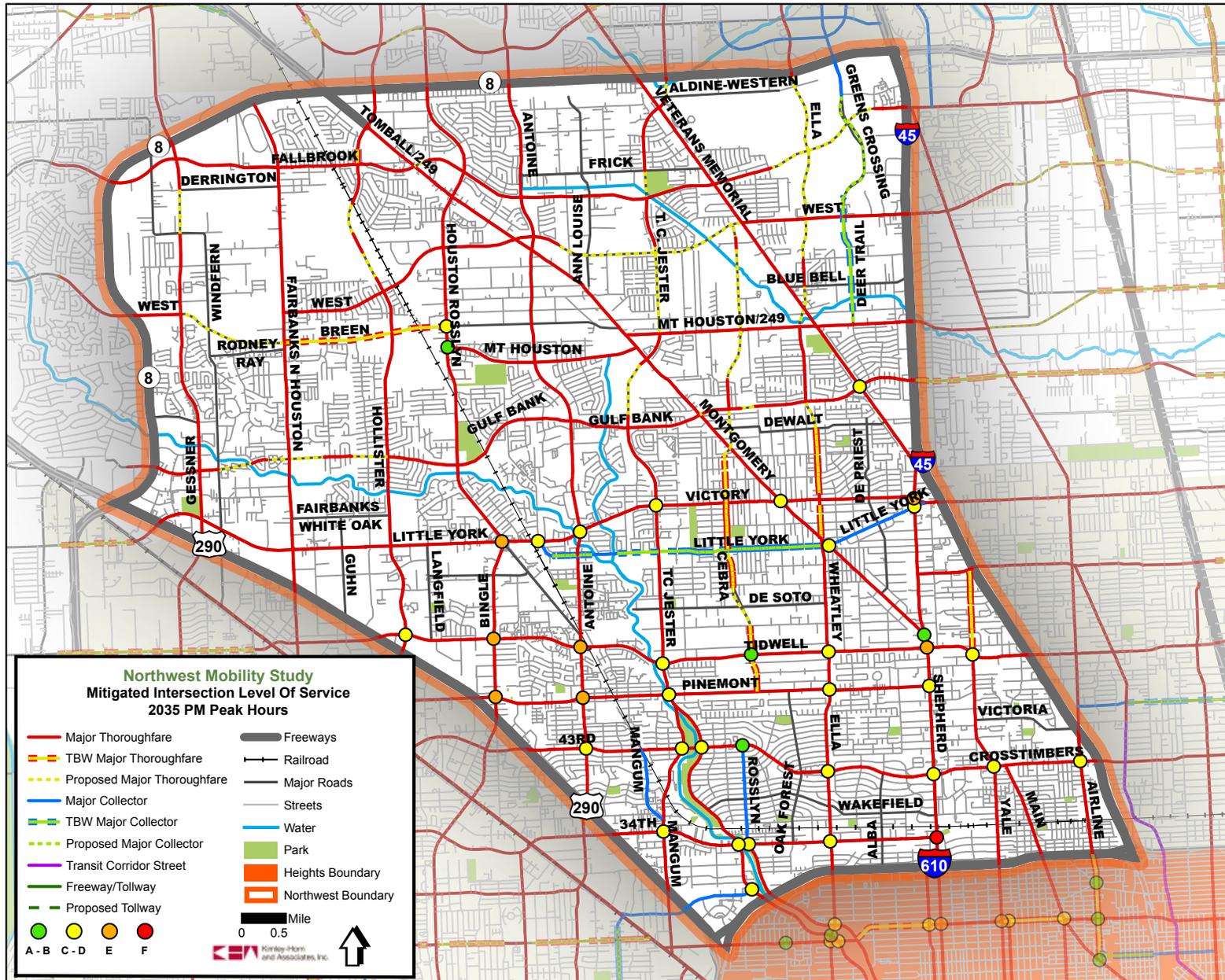


FIGURE 7.8

7.3 Bike Vision Map

The current bicycle network within the Northwest Study Area is limited, but room for expansion is evident. Planning for future facilities as streets redevelop, in addition to working with existing corridor design to create viable bicycle facilities, is essential in creating a well-connected network. **Trail heads** - or key access points from on-street to off-street biking facilities - are identified on the following system map for bike facilities; however, this list is in no way exhaustive and instead meant to start discussion concerning where and when such transition points are warranted.

In general, the Northwest Study Area maintains a more dense composition of development and existing street networks south of Gulf Bank Rd than the north. As such, there is a greater opportunity to promote on-street bike facilities in this southern half of the Study Area. However, off-street facility potential is greatest as defined in more detail below.

The Northwest area is also home to several bayous, including the larger White Oak and Halls Bayous. These are great assets in developing the off-street bicycle network in the

Northwest area. The success of other bayou trail projects will encourage the construction of some form of off-street facility. The expansion of this network for recreational and commuter purposes is essential in spurring the multi-modal nature of the area as population and employment numbers begin to increase.

Finally, based on the Project Teams evaluation, and various discussions with the County, identified gaps within the on-street network highlight those critical corridors that represent essential commuting considerations within the Northwest study area's bikeway network.

Although the exact design is not yet understood, the corridors highlight the need for this additional consideration where the primary consideration for future design - as seen by the County and City alike - is the safety of the user where separated multi-use paths or the like may be most appropriate along high capacity/high speed corridors. However, until a more detailed understanding of the engineering considerations involved in such an endeavor, the highlighted critical corridors provide a baseline for future discussion.

For a more detailed discussion addressing street connectivity issues within this Study Area see section [5.4 Street Connectivity Considerations](#) in Chapter V of this Report.



PHOTO PROVIDED COURTESY CITY OF HOUSTON

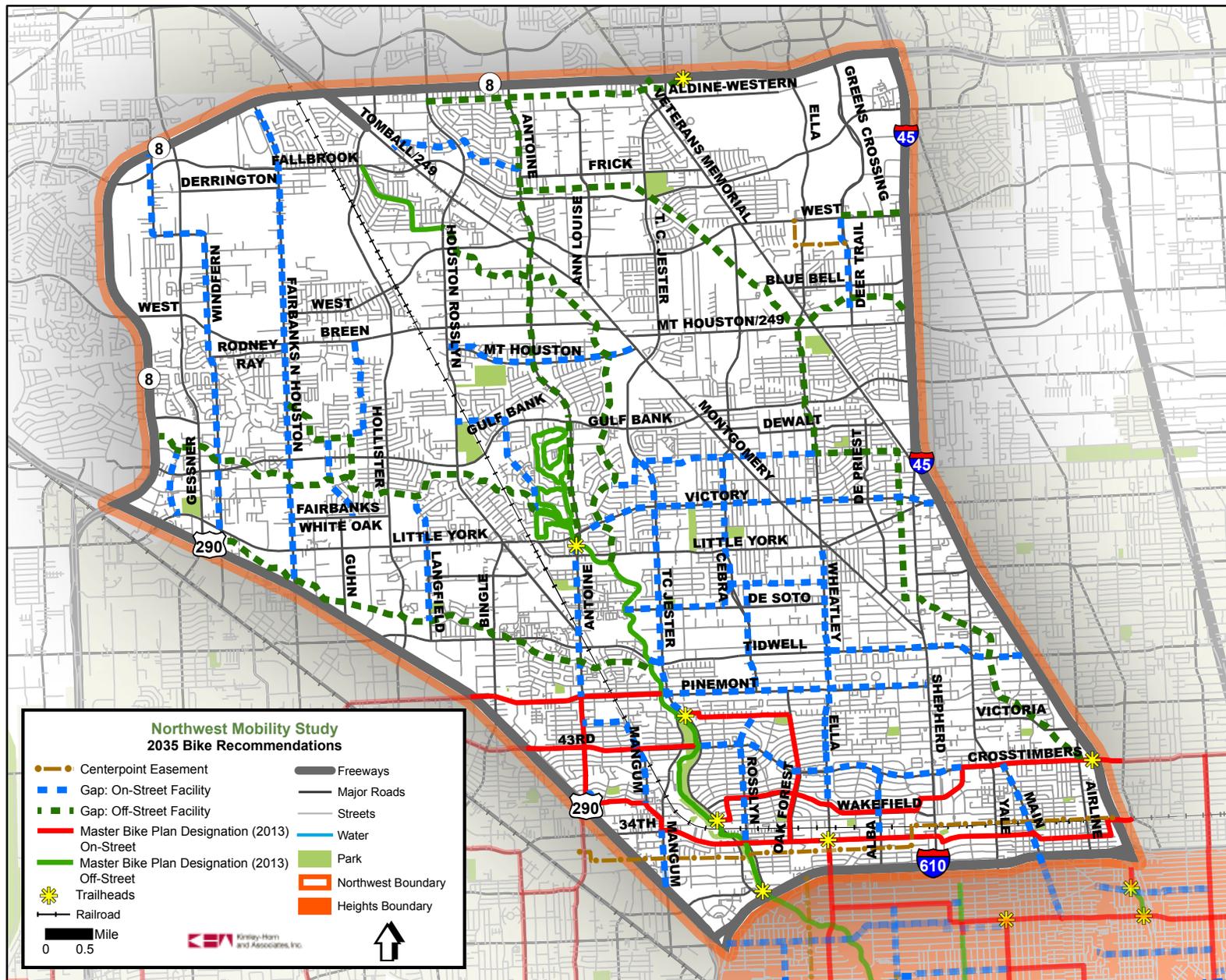


FIGURE 7.9

7.4 Transit and Pedestrian Vision Map

The transit network within the Northside area is extensive, as seen in [Chapter II. Existing Conditions](#). As detailed in [Chapter V, Section 5.6 Transit Corridor Considerations](#), the project team evaluated the existing network based on defined transit needs. The resulting map identifies those areas in need of transit facilities. In compilation with Scenario 5 results, two transit types are depicted in final system recommendations including: Local Bus facilities and Bus Rapid Transit (BRT), or routes that facilitate the movement of larger numbers of persons across greater distances with less stops. METRO's light rail line, which came on line in December of 2013, is also depicted. See [Figure 7.10](#) for more information.

Several High Frequency Routes are recommended located mostly along high capacity corridors with regional significance. Projections indicate the most popular routes will continue to be those that provide access to and from Houston's downtown. .

- **Feeder routes:** While the High Frequency Routes provide superior transit service along with heavy transit demand, feeder routes connect larger residential communities to these frequent routes. These routes may also connect local destinations, thus providing an effective transit network in the overall area.

With the expansion of the transit network (including the opening of the light-rail line) enhancements to pedestrian facilities within the Study Area are priority for the study area. Specifically, it is recommended that wider sidewalks be provided on corridors with transit. Wider sidewalks enhance safety of the pedestrian realm which encourages increased access to transit. For more information regarding the pedestrian realm and proper facility types see [Chapter VI. A Balanced Approach](#).



BUS RAPID TRANSIT (BRT)



LOCAL BUS

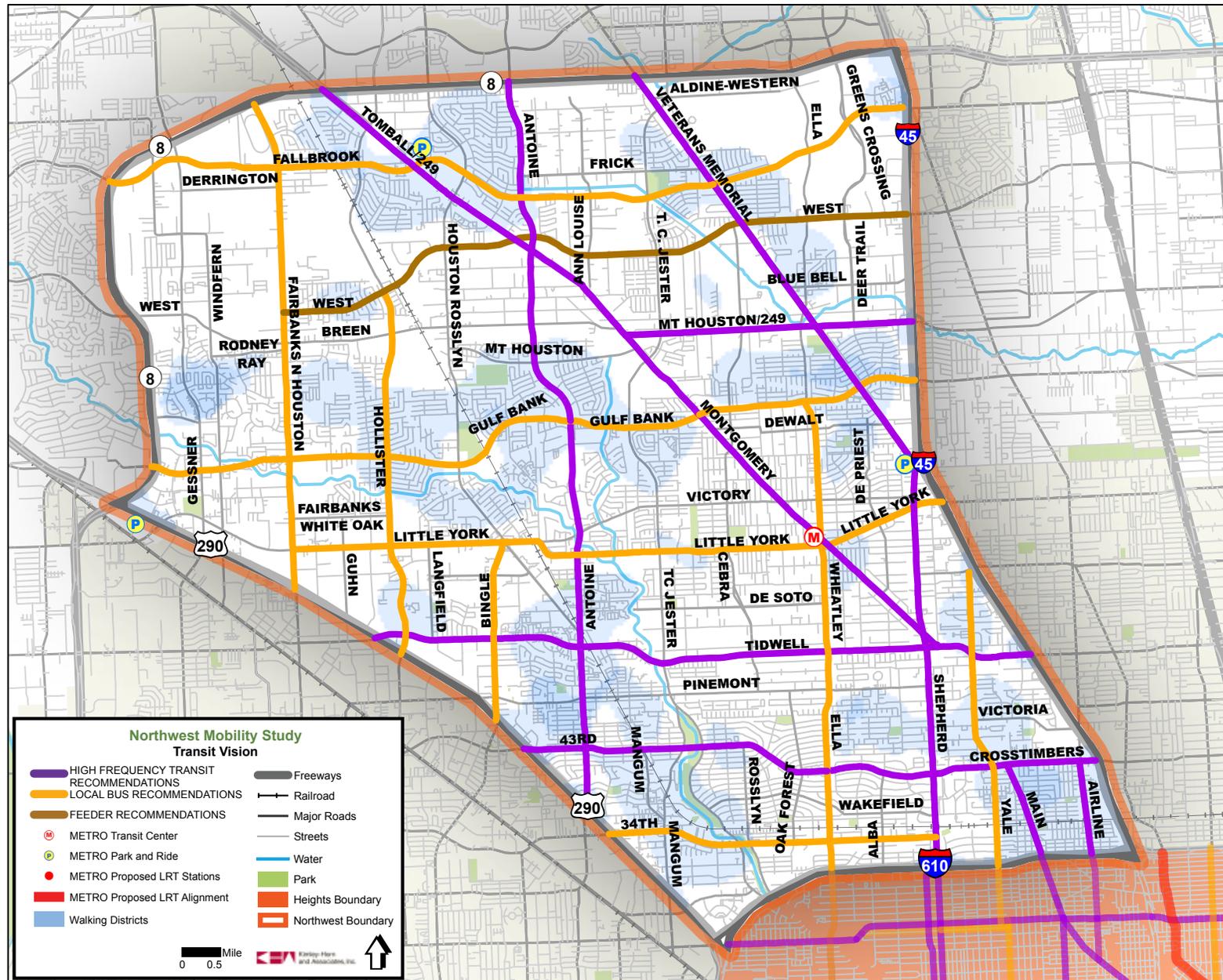


FIGURE 7.10

7.5 Multi-Modal Classification Map

The Multi-Modal Classification Map depicts a public street type classification system that takes into account the functional classification system and land use context, inclusive of right-of-way width, number of lanes, and traffic volume. The MMC can be found in Chapter 10 of the Design Manual for Street Paving Design Requirements.

The multi-modal classification identifies the options for widths of the road based on the modal uses. Corridor classifications were identified in conjunction with the City of Houston's Public Works and Engineering Department (PWE) and Planning and Development Department (PDD). Individual corridor evaluation is summarized in [Chapter VI, Section 6.2 Corridor Sheets](#). The MMC Map shown in [Figure 7.11](#) is representative of the 2035 MTFP network, and as such includes all existing as well as planned roads projected to be built by 2035.

Based on the evaluation of the MMC designations provided in Chapter 10, Appendix 2 of the City of Houston Infrastructure Design Manual, it is recommended that provided right-of-way designations as currently defined be reevaluated. Specific attention should be given to how a Boulevard and Avenue are defined where provided ROW designations of 100' or 80' do not necessarily reflect older corridors characteristic of Houston streets.

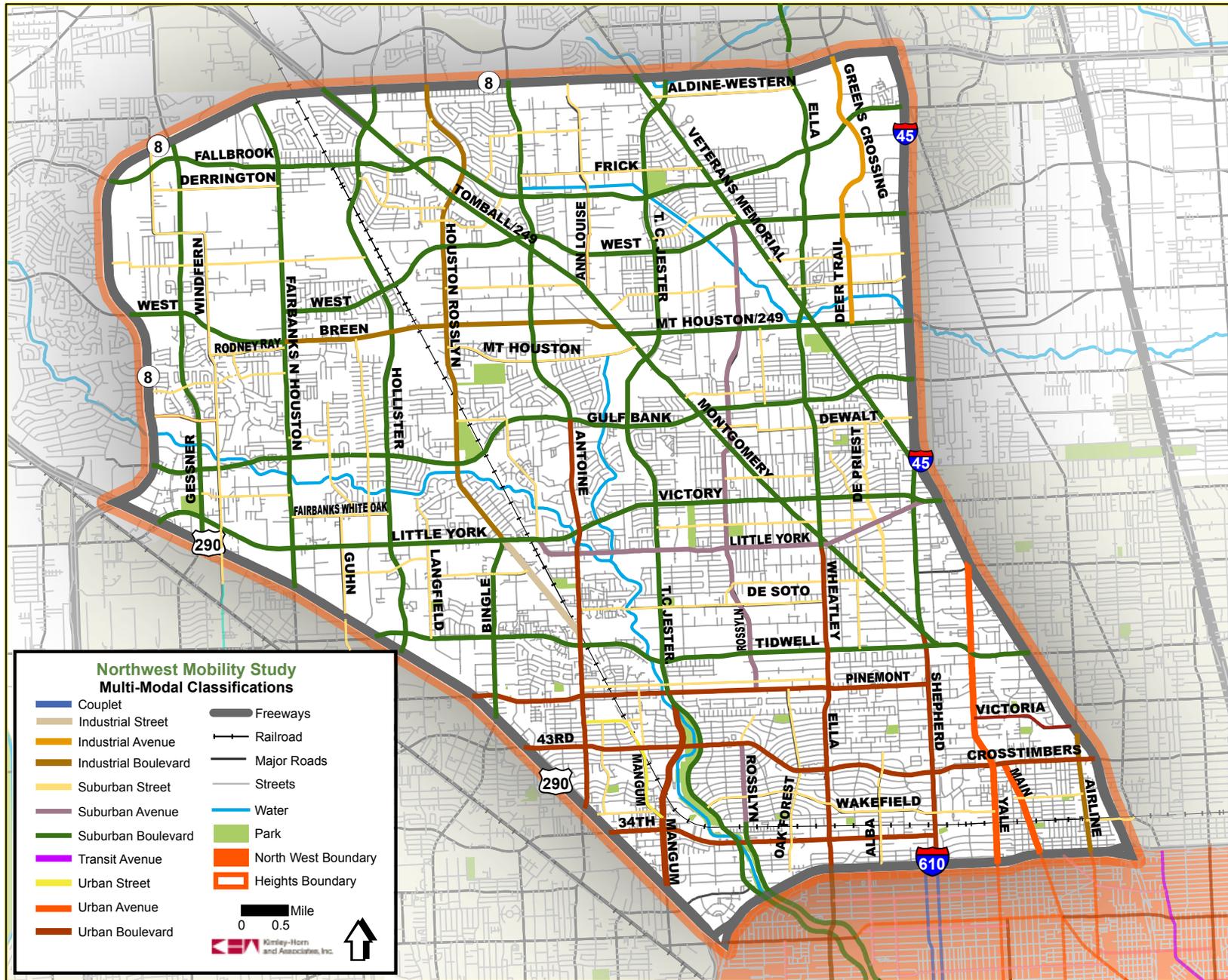


FIGURE 7.11

This Page Intentionally Left Blank

VIII. Next Steps

8.1 The Purpose of this Study

The City of Houston has undertaken this planning level study to identify near- and long-term transportation system needs within the Northwest study area. This study sets a vision for future transportation facilities within the study area through an examination of multiple transportation modes and project concepts. This study examined project concepts that can ultimately be fed into the City's Capital Improvement Program process as described in more detail within subsequent sections of this chapter, CIP Manual Summary.

Additionally, this study promotes several concepts that are policy oriented. These items can be addressed through the annual review process that several City documents undergo, which is described in subsequent parts of this Chapter.

Finally, these recommendations are not intended to be static. The intent of this study, and other mobility studies in which the City is a partner, is to develop a set of projects and policy recommendations that can be used in determining sub-regional priorities. These priorities can be further examined within the broader citywide capital programming and pre-engineering process.

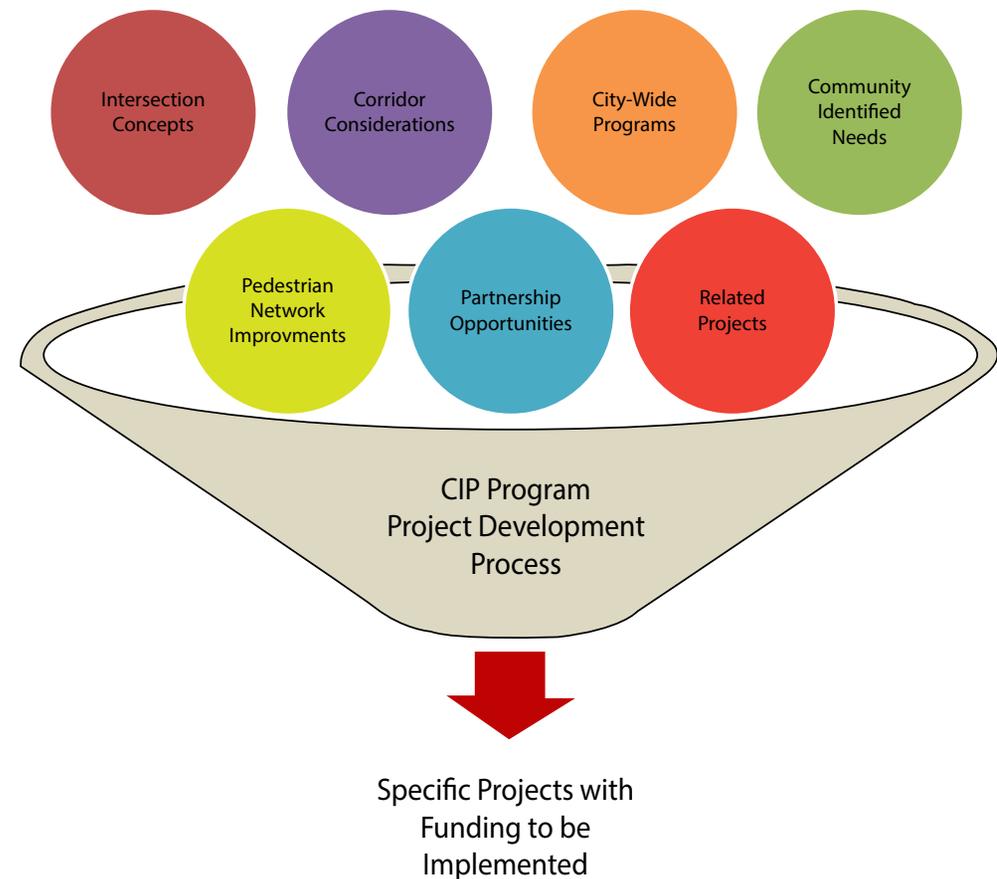


FIGURE 8.1

8.2 Outcomes of this Study

The specific project concepts identified for both the short and long-term will be analyzed through the lens of several different departments within the City which include, but are not limited to:

- Planning and Development Department can use the recommendations to ensure that right-of-way is preserved where appropriate. The Department is responsible for defining the multi-modal classification process via the MTFP.
- The Department of Public Works and Engineering will work through their annual engineering process to develop further details regarding the solutions discussed in this report for specific intersections.
- The Department of Public Works and Engineering will be responsible for analyzing the broader projects within the scope of their annual projects review process that is highlighted within the CIP Process Manual for Infrastructure Programs.

Each of these items are discussed in more detail in the following sections.

CIP Process Manual Summary

The single largest program that will be used for the implementation of the Inner West Loop Study will be the Rebuild Houston Initiative. All City departments and divisions play a role in defining projects for consideration for the Rebuild Houston process. Given the link between the street infrastructure concepts presented within this Report, Rebuild Houston provides a viable, long-term funding source for identified improvements. The process for Capital Improvement Projects (CIP) can be broken into two phases:

- Programming Phase, projects to be constructed within the next five years
- Planning Phase, projects estimated to occur within the next six to ten years.

Many of the projects identified through this study fall under the Planning Phase which involves several additional steps before funding is programmed. It is at this stage, however, where projects and related elements are first prioritized, that includes incorporating multi-modal concepts resulting from this and other mobility studies.

The following graphic provides an overview of the Planning Phase, however it is recommended that the most recent version of the Capital Improvement Plan Process Manual be examined for pertinent changes throughout the life of this document and the project concepts. The graphics shown are representative of graphics found in Version 3.0 of the above referenced manual.

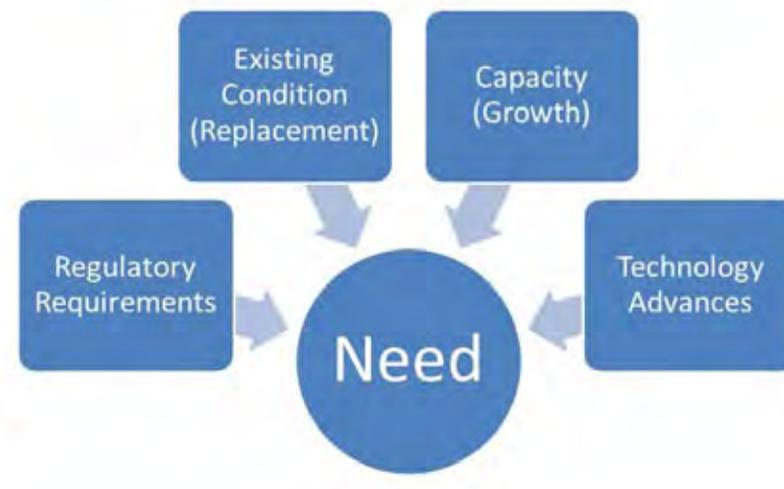


FIGURE 8.2

The planning phase of the CIP process is arranged in four distinct steps (Figure 8.3). Need identification is the first step of the planning phase and starts with a comprehensive assessment of existing conditions. A need is determined every time that the existing infrastructure does not meet the Level of Service (LOS) defined in the City of Houston Infrastructure Design Manual (IDM). Potential infrastructure improvements result in:

- Replacement – where existing condition of the infrastructure no longer meets the standard LOS and is beyond routine maintenance, or
- Growth – where demand growth results in existing conditions congestion or higher capacity.

Where need is determined, multi-modal considerations, as determined by these mobility studies efforts, should be used to evaluate a roadway’s project infrastructure such as sidewalks, neighborhood traffic management and commuter bicycle infrastructure. These identified elements may then be prioritized and further evaluated in the third step of the planning process where solutions, including potential roadway designs, are considered.

Project that reach the top of the prioritization list become candidate needs and moved into solution development. In this step, pre-engineering is performed to identify and develop candidate projects for inclusion in future CIPs. Candidate projects identified and developed during the planning phase are not automatically added to the CIP.

Final incorporation of candidate projects and related design considerations are determined in the Programming Phase of the CIP process.

The project needs are then developed further through the process including: pre-engineering, project coordination and review, coordination with other entities, additional engineering, and programming the project within the CIP and including funding for the construction of the project.

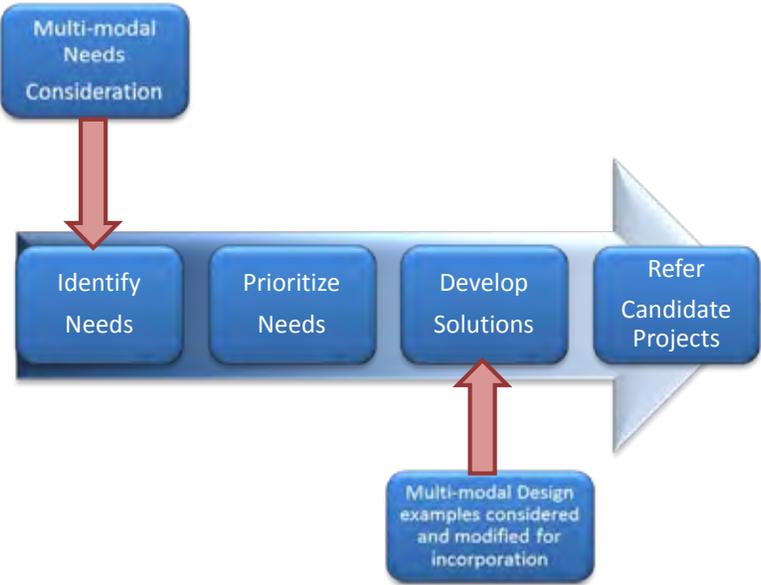


FIGURE 8.3

Potential Policy Updates

During the planning process, discussions with City staff led to the realization that there may be a need to update some of the existing City Policies related to street definitions and the application of the Alternative Cross-Sections that are defined in Chapter 10, Appendix 2 of the Infrastructure Design Manual. Most notably several gaps within the options that were identified through this process include a need to:

- Create additional cross section alternatives for 60 and 70-foot corridors that act as Urban Avenues;
- Create Transit Corridor Definitions that do not rely on exclusive lane treatments;
- Define cross sections for Urban Streets that reflect a 50 and 60-foot right-of-way pattern for streets that currently act as Collectors but are not defined on the MTFP as such; and
- Consider use of “Target Speed” instead of “Design Speed”.

Additional public outreach will likely be warranted during the pre-engineering and final engineering phases of a specific project development process. These outreach activities and the level of detail covered should be governed by the complexity of the project. For example, a sidewalk project with an identified gap in the network requires a smaller sphere of additional outreach, likely only with affected property owners. Meanwhile, a corridor study to implement one of the corridor concepts identified above, should have a detailed public involvement process, as defined previously in this Report.

Updates to MTFP

The Major Thoroughfare and Freeway Plan (MTFP) is another major policy that will be used by the City’s Planning and Development Department to further the multi-modal transportation concepts that were developed during this planning effort. By ensuring that

roadways within the Study Area are appropriately classified and designated within the MTFP, Planning staff at the City have the ability to secure right-of-way, coordinate projects, and explore non-motorized connections within other planning and design activities where vehicular considerations allow. This tool also allows the staff to communicate the long-term vision of a corridor as redevelopment continues within the Study Area.

Additionally, there is a need to examine related policies to further define the proposed multi-modal classification system. Revisions to the main body of policies that define the application of the MTFP have proven difficult given the use of the definitions contained within the MTFP throughout sections of the Local Development Code. As such, it is recommended that a sub-classification system be established within the existing MTFP ordinance so that as sub-regions are analyzed more thoroughly the multi-modal classification system can be utilized without adversely impacting the remaining elements of the code.

Coordination with Other Entities

One of the most critical components to moving concepts and associated recommendations discussed in this document forward is coordination. It is recommended that preliminary or planning level activities be coordinated through the Planning and Development Department to ensure a consistent approach to system-level planning. Implementation of general-level planning concepts and projects, however, are more appropriately executed by Public Works and Engineering where segments of the greater system are evaluated on a project-by-project basis. To ensure consistency, it is recommended that the Planning and Development Department work with Public Works to ensure that the intent of the system-level planning is appropriately translated to on-the-ground project implementation.

Another important component of the coordination efforts includes the integration of concepts and plans being developed by agencies other than the City of Houston. Examples include those projects under design by either a Management District, a TIRZ, or a Private Sector entity.

Ensuring that the plans and projects developed by these outside partners are in line with the ideas presented by this report will help to ensure connectivity within the overall transportation system. Additionally, these coordination efforts will help to promote alternative modes of transportation within an area of the City that is currently experiencing a high rate of densification with expectations that this higher rate of density will continue throughout the planning horizon.

Project Phasing

Given the pre-engineering level of detail associated with this effort, defining project phasing and costing beyond concepts of near- and long-term is difficult. The City of Houston, through the Rebuild Houston Initiative, is in the process of developing and refining the city-wide project prioritization process which will be used to determine corridor-based projects throughout the City - corridors evaluated as part of this Study, will enter this process.

In addition, the Department of Public Works and Engineering (PWE) has established criteria by which the intersections signal upgrades are prioritized, and funded for improvement. As outlined in the 2012 Capital Improvements Plan Process Manual, intersection improvements include upgrading equipment and associated hardware and software to support traffic signal timing and coordination. In some cases reconfiguration of turning lanes or lane configuration can improve area-wide flow. Need for improvements to signalized intersections is driven by two factors, replacement of prior technologies or non-functioning equipment and intersection performance. Intersections with equipment that are not capable of being coordinated area-wide are considered a need. In the future these intersections will also be evaluated for capacity. Need for new signalized intersections will be analyzed separately by the Manual on Unified Traffic Control Devices (MUTCD) signal warrant process.

The long-term project list can be examined over the next twenty years to determine phasing that is appropriate given verified needs. As part of this study, the following were

identified as critical improvement corridors. Conceptual improvements presented in this report will be analyzed to move beyond the planning stages and into preliminary and final engineering. The final step for any of these projects will be securing funding through either a Capital Improvements Plan (CIP), a coordinated project with one of the Management Districts or TIRZs within the study area, or an outside funding source such as a Private Sector Partner or State and Federal funding opportunities.

- State Highway 249
- Montgomery
- Fairbanks North Houston
- Hollister

Some of these corridors are already under consideration for improvements, such as State Highway 249. Still more are just entering the beginning stages of the project development process and will be discussed again as further information is available.

These critical corridors were identified due to their impact on:

- Overall grid connectivity
- Capacity
- Intersection level of service
- Ability to accommodate additional modal uses
- Little York
- Antoine
- TC Jester
- Gulf Bank

As opportunities arise for coordination between projects, including projects such as utility replacements (which already require the street to be reconstructed), the projects identified for near and long-term improvements will be re-examined as appropriate.