
City Mobility Planning
Houston
Northwest Sub-regional Study

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City Mobility Planning

Northwest Sub-regional Study
January, 2014

Prepared for:
City of Houston

Prepared by:
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GUNDA CORPORATION
Engineers, Planners & Managers

CJ Hensch & Associates, Inc.

City Mobility Planning

Northwest Sub-regional Study
Special Thanks to:

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

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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. 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. As such, 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 the bicycle and transit networks (See Chapter VII. Outcomes).

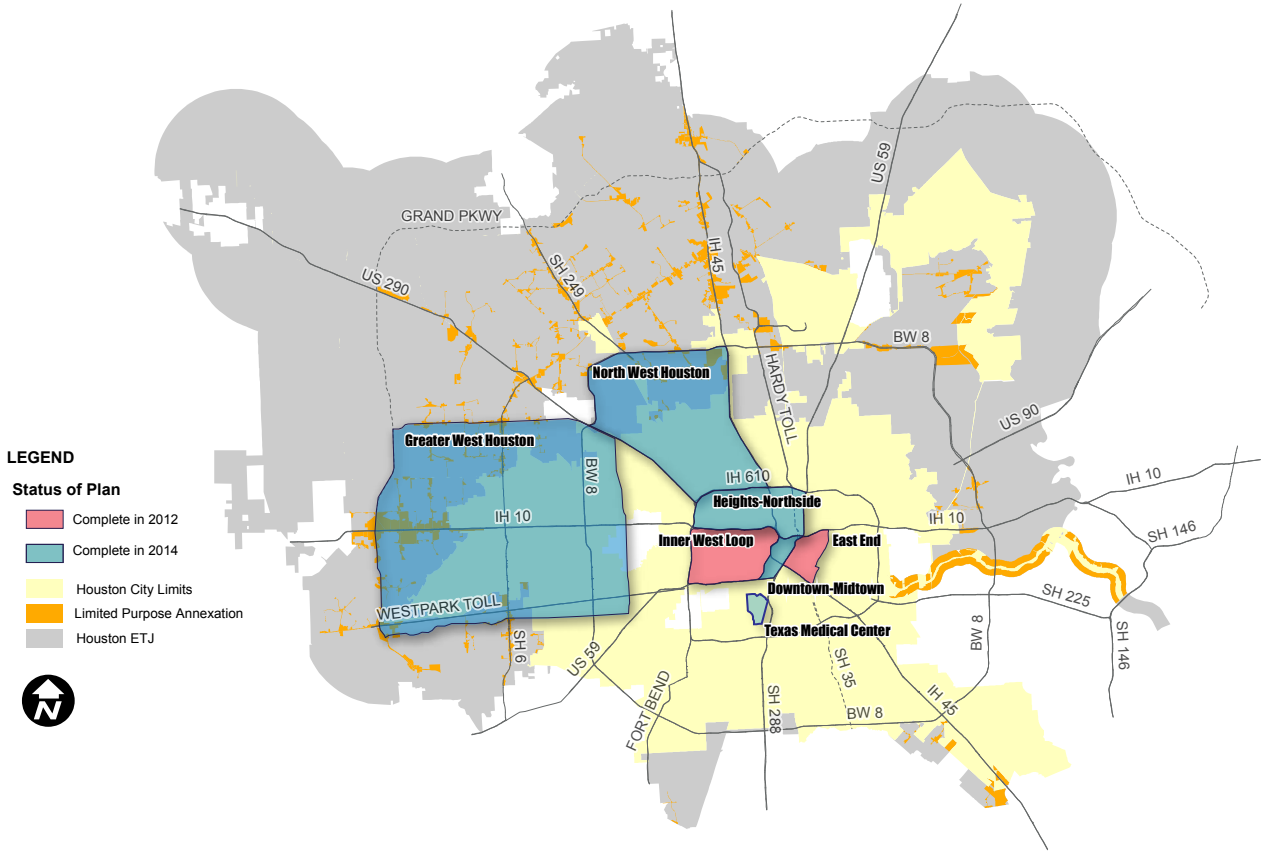


FIGURE 1.1: CMP II: SUBREGIONAL PLANS

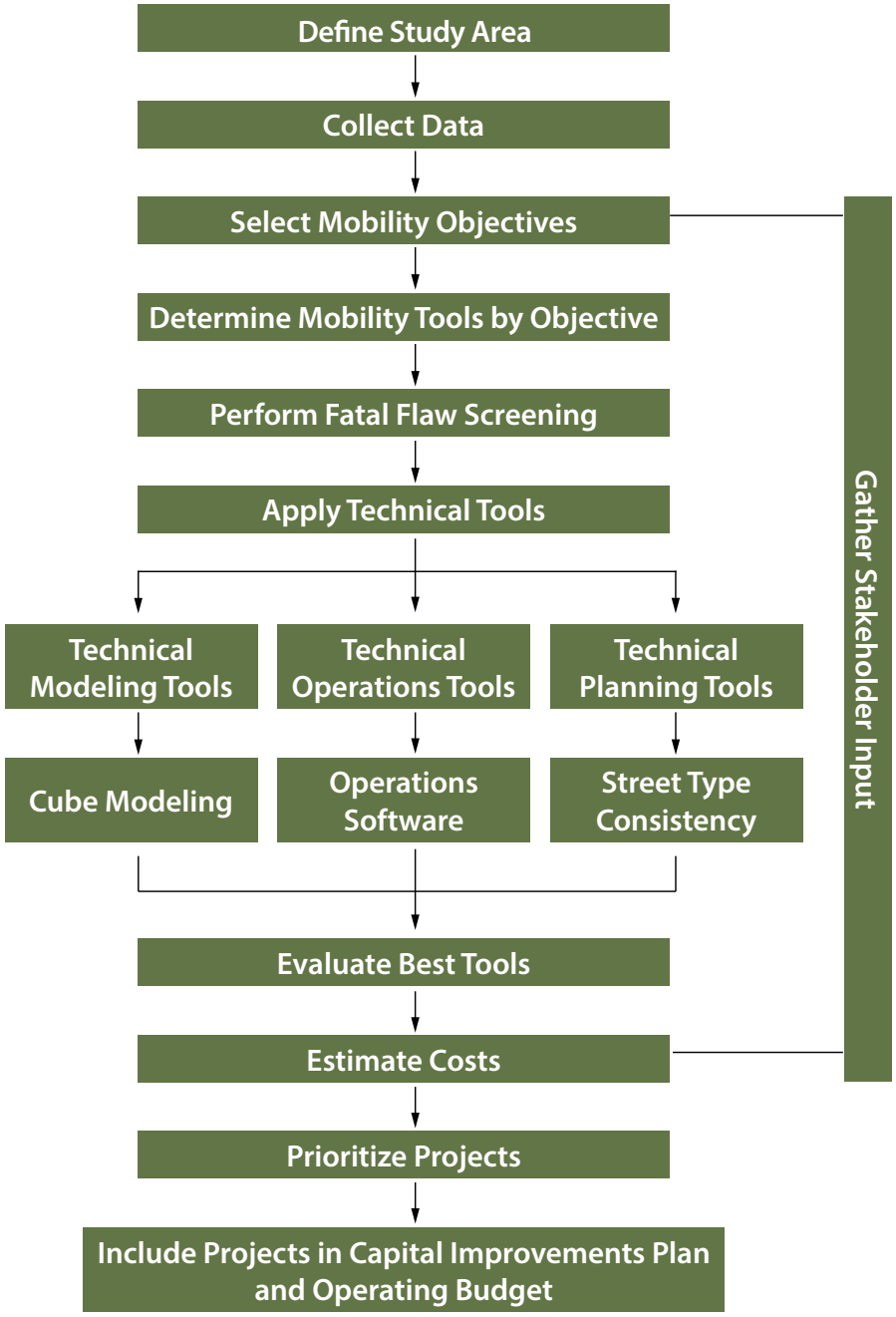


FIGURE 1.2

The flow chart on the left specifies the process that was undertaken to identify specific mobility projects within the Nothwest 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 and operating budget.

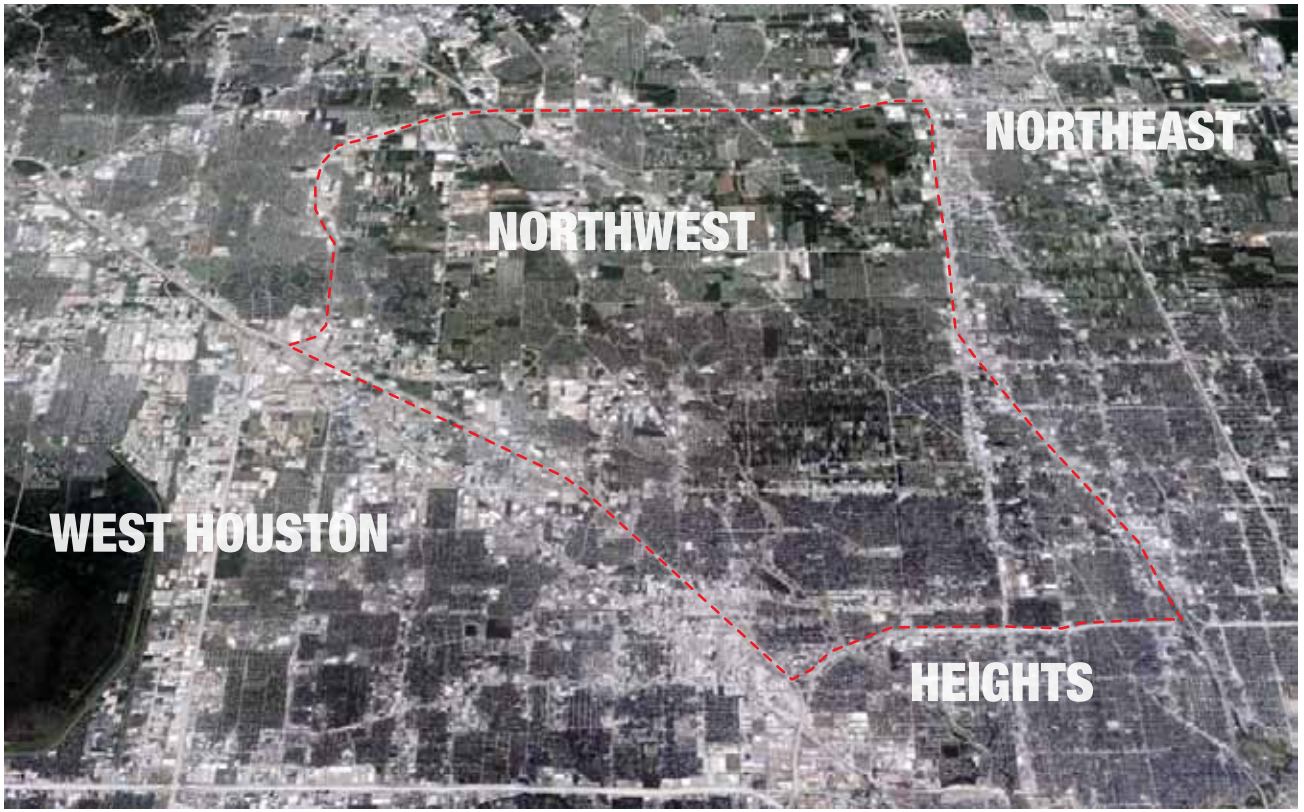
The overall project development process does not stop once funding is programmed; rather a new process for design and construction of the corridor improvements takes control of the specifics for each project. That information is beyond the scope of this planning study, however, guidelines are established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

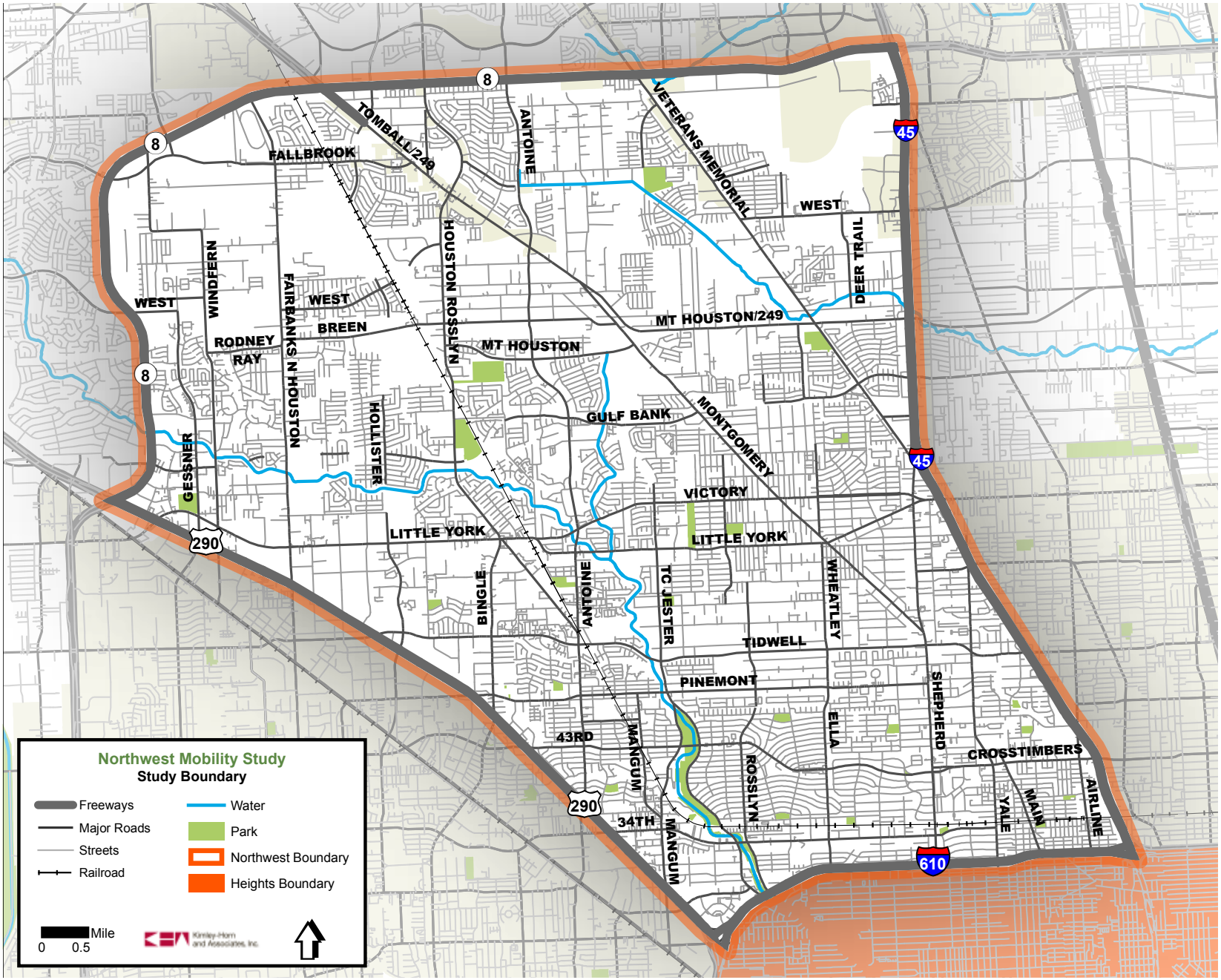
1.1 The Study Area

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 and present a unique transportation consideration where the movement of goods is constantly in conflict with the movement of people as congestion continues to increase.

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 city of 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.

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MANGUM
ROSSLYN
CROSSTIMBERS
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Northwest Mobility Study
Study Boundary
Freeways
Major Roads
Streets
Railroad
Water
Park
Northwest Boundary
Heights Boundary
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FIGURE 1.3

1.2 Study Area Objectives and Tools

A number of mobility objectives resulted from the 2009 City Mobility Plan (CMP). Not all of the objectives generated from the 2009 CMP will relate to the needs of the Northwest Study Area; therefore, one of the first tasks of this planning process is to determine which ones are applicable. 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 for this plan identified several goals from various stakeholders:

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

By addressing the goals mentioned above, the choice regarding the appropriate tools for the Study Area becomes clearer. Not all mobility tools will be needed or appropriate to solve the mobility issues in the Northwest Study Area and the list of relevant tools will be refined through the planning process.

The tools selected and utilized will be sorted into three separate categories:

- 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.

Examples of potential tools used as a means for consideration in this analysis are presented on the following page in Figure 1.4. Although this list is not exhaustive, it provides insight into the types of modes and solutions considered for this study as previously defined in other City of Houston Mobility studies of this nature.

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 accomodate 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

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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. The first step in this process is to identify the existing conditions of the Northwest Study Area. Quantitative data gathered includes, but is not limited to: demographics, turning movement counts, traffic counts, transit ridership, right-of-way, and other corridor-specific plans. We also analyze qualitative data acquired through public and stakeholder feedback. This information is paired with the existing conditions data to help design mobility alternatives and solutions to fit the needs of the community.

The existing conditions found in this chapter analyze the current state of the Study Area, while also consulting any existing future plans for development in the region (i.e. the Major Thoroughfare and Freeway Plan, a long-range planning document). Examination of the street, bicycle, pedestrian, and transit networks and other travel conditions are in this section.

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 intersections 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.

PHOTO PROVIDED COURTESY CITY OF HOUSTON

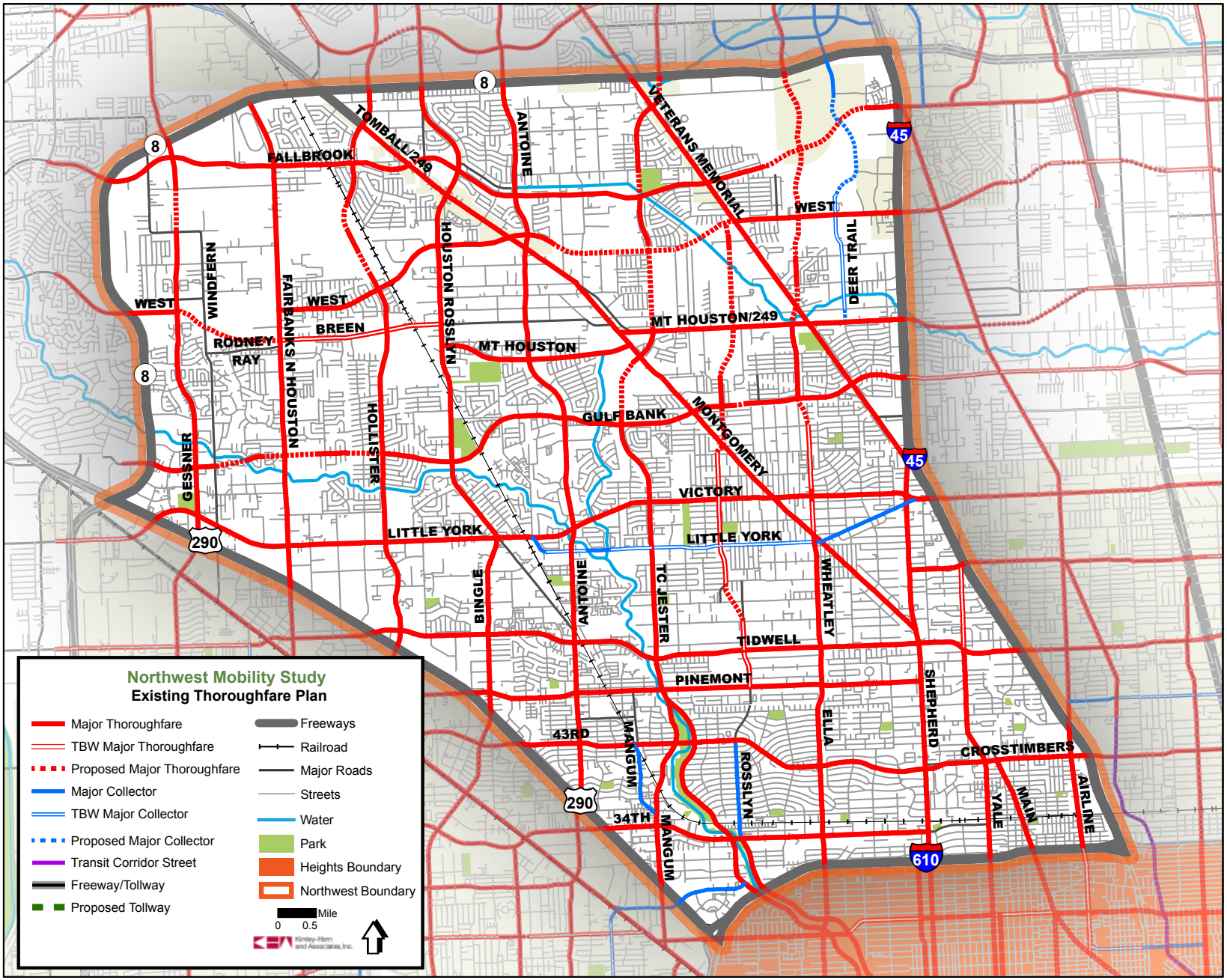
Northwest Mobility Study
Existing Thoroughfare Plan
Major Thoroughfare
TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
Freeways
Railroad
Major Roads
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FIGURE 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 over aching 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.

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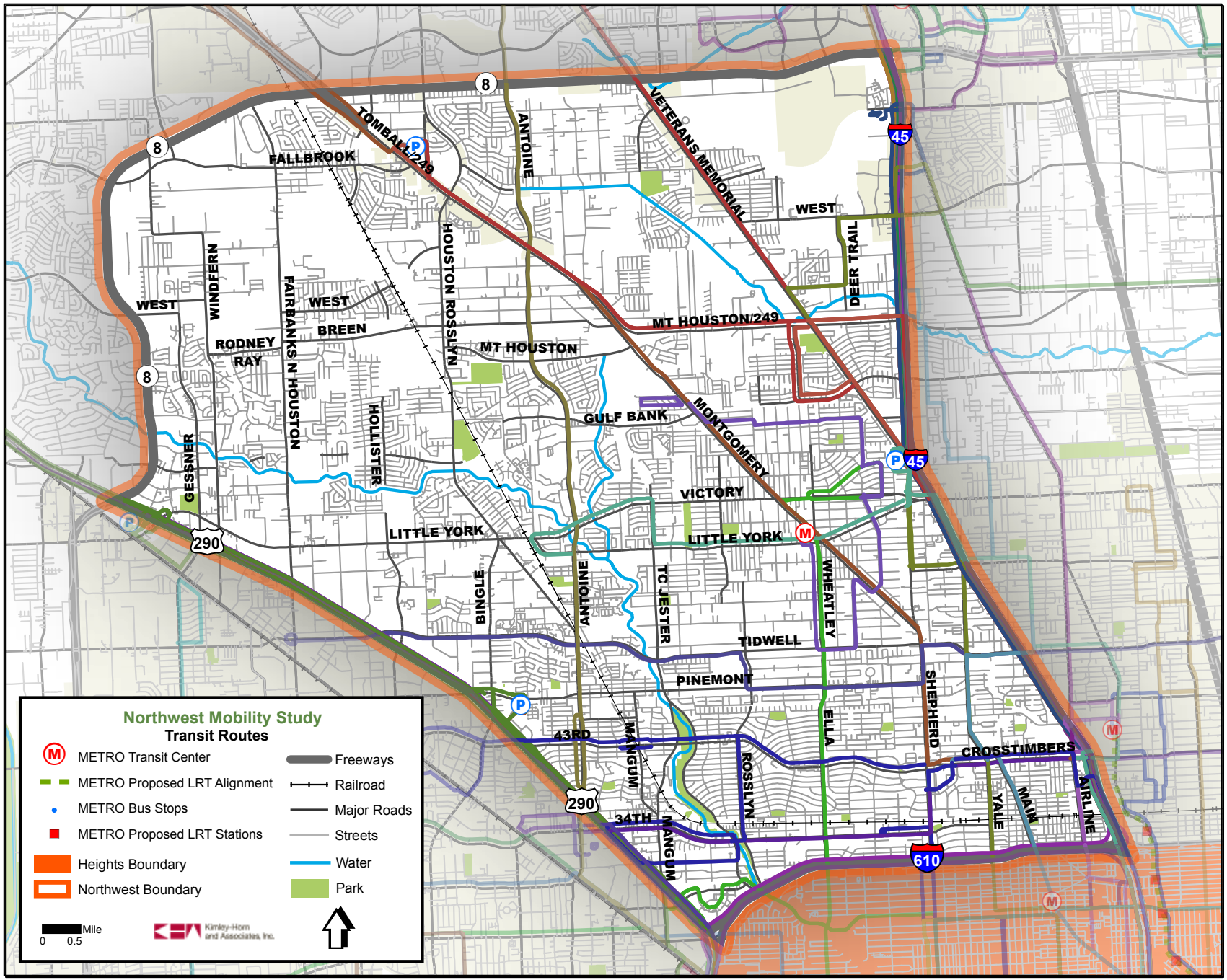
Northwest Mobility Study
Transit Routes
METRO Transit Center
METRO Proposed LRT Alignment
METRO Bus Stops
METRO Proposed LRT Stations
Heights Boundary
Northwest Boundary
Freeways
Railroad
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FIGURE 2.2

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.

PHOTO PROVIDED COURTESY CITY OF HOUSTON

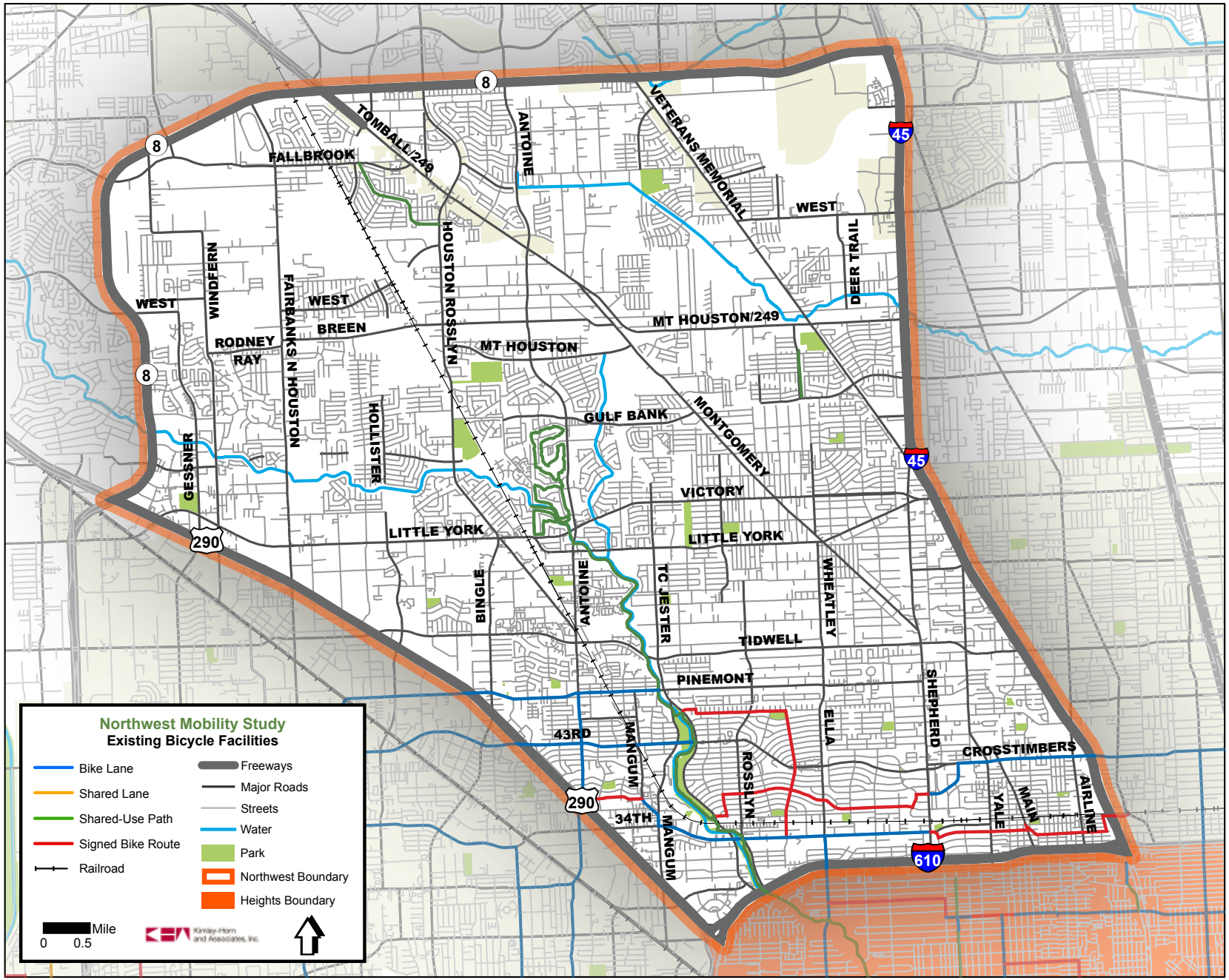
Northwest Mobility Study
Existing Bicycle Facilities
Bike Lane
Shared Lane
Shared-Use Path
Signed Bike Route
Railroad
Freeways
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FIGURE 2.3

2.4 Existing Travel Conditions by Period of Day

Intersection Congestion

Data for this study area was collected for major intersections within the Houston city limits. Traffic counts for 41 intersections were analyzed using SYNCHRO traffic analysis software. The information was divided into two periods for study: AM peak period and PM peak period, which represent when corridors are most heavily utilized by commuting traffic. Figures 2.4 and 2.5 show the level of service (LOS) at each intersection analyzed with available AM peak period and PM peak period data. LOS is a measurement scale that gauges congestion on a grading similar to scholastic grading: A is a good rating with little or no congestion and F is a poor rating with high levels of congestion.

Where provided intersections are TxDOT property, future coordination with TxDOT is essential to fully understand the best treatment options available to the City of Houston (as approved by TxDOT). Similarly, where intersections are within a certain proximity of roadway, highway, or light-rail construction, intersection congestion was not evaluated because 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 E or F, and thus representing intersections with 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

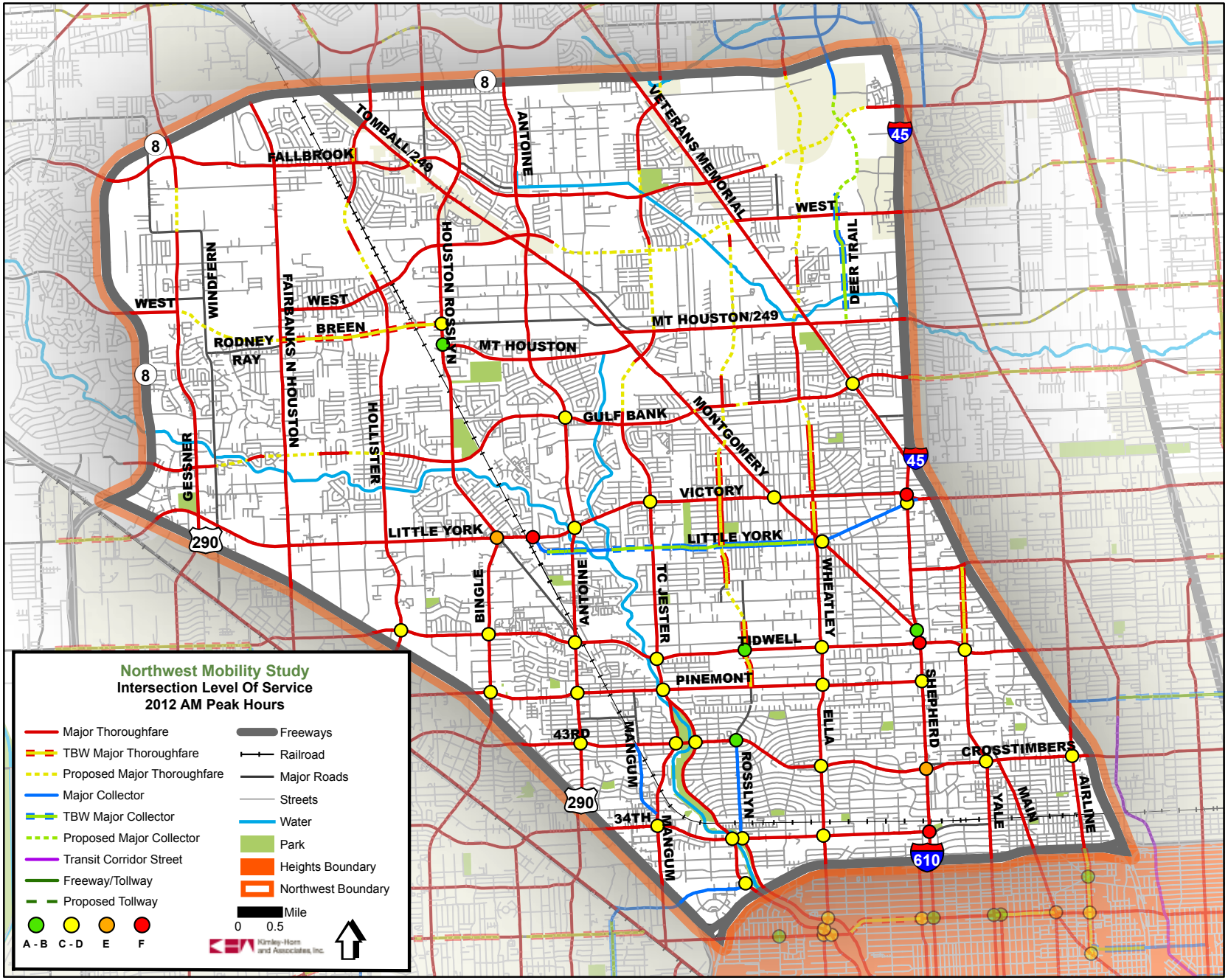
Northwest Mobility Study
Intersection Level Of Service
2012 AM Peak Hours
Major Thoroughfare
TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
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FIGURE 2.4

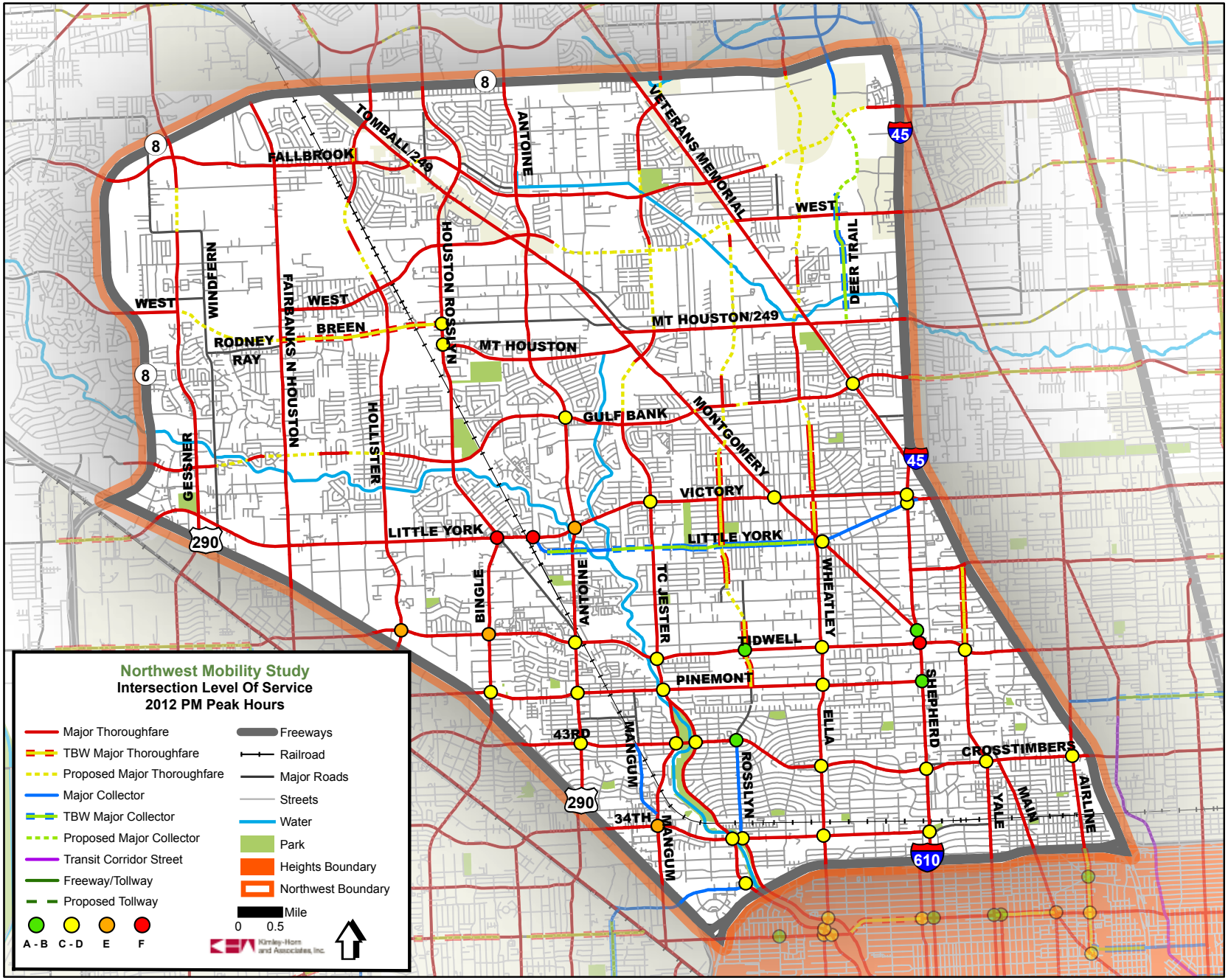
Northwest Mobility Study
Intersection Level Of Service
2012 PM Peak Hours
Major Thoroughfare
TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
A - B
C - D
E
F
Freeways
Railroad
Major Roads
Streets
Water
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FIGURE 2.5

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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 meetings and two stakeholder meetings. The first 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. Alternative 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 released information such as maps and pictures. Blog comments and discussions were also used interactively by citizens and stakeholders. The website for this study is http://houston-northwest.org.

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3.1 Public Meeting #1:

The first public meeting for Northwest was held on March 27, 2013 to gather public insight on issues and opportunities within the Study Area. The meeting began with a presentation of the existing conditions within the community based on data from the City of Houston, the Houston-Galveston Area Council, and TXDOT. During this meeting, the public was able to view boards representing the data presented, as well as additional information. After the presentation, the public commented on aerials to provide detailed information on current conditions. This information was consolidated by the Consultant team.

3.2 Stakeholder Meeting #1:

The first stakeholder meeting was held on May 15, 2013, where stakeholders were able to review the feedback provided by the public during the March meeting. In addition to reviewing this material, stakeholders were given the opportunity to make comments on additional issues and opportunities within the Study Area.

In the previous public meeting, several key issues were made apparent through consistency between comments. Due to the prominence of certain topics, stakeholders were asked to comment on the following issues specifically:

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

PHOTO PROVIDED COURTESY CITY OF HOUSTON

PHOTO PROVIDED COURTESY CITY OF HOUSTON

From these questions and the open discussion allotted during this time, stakeholders worked with facilitators to develop “big idea” solutions to the issues found within the Study Area. These ideas were incorporated into the development of the Mobility Plan for the Northwest area.

3.3 Stakeholder Meeting #2:

The second stakeholder meeting was held on August 19, 2013. At this session, stakeholders viewed the preliminary recommendations of the study area in regards to road, pedestrian, bike, transit and intersection improvements. Feedback from this meeting was used to gauge how in-line the recommendations were with the public feedback gathered from the first public meeting, stakeholder meeting, the two steering committee meetings and data collected from the project website.

Stakeholders were presented with a summary of all feedback, bike plan recommendations and five model scenarios with background on how each scenario was developed. They afterwards broke into sub-committees to review the preliminary recommended improvements and provided comments.

Feedback from this meeting indicated initial recommendations by the consultant team were in-line with public desire. Expanding and connecting the network in the Northwest area is a priority for stakeholders. Growing the bike network was also presented as a priority for the community.

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PHOTO PROVIDED COURTESY CITY OF HOUSTON

3.4 Public Meeting #2 (Planned)

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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's forecasters, and the Consultant Team work together to update the 2035 demographic forecasts. This change was based on 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.

Scenario 1 (Base Build-Out)

The Base Model scenario runs the model as if all Major Thoroughfares and Major Collectors were built-out 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 on page 35.

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 only for reference purposes. The map of this scenario is shown in Figure 4.2 on page 35.

Scenario 3 (Capacity Projects)

Scenario 3 combines road expansion (as designated by the MTFP) with street reductions projects as well. The intention 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 on page 35.

Scenario 4 (High Frequency Transit)

Scenario 4: This high frequency transit scenario developed routes that were determined from a variety of factors including public comment, population growth, job growth, activity centers, and connectivity to other destinations (such as downtown or the Galleria). The increase in service was modeled by increasing headways to twice as often during the peak hours. Non-peak hour headways were also increased slightly. Houston METRO is of course in charge of all bus routes, timing and stop locations. The map of this scenario is found in Figure 4.4 on page 35.

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 the stakeholders to provide feedback. Their input and the project team's analysis were combined to create Scenario 5. This scenario is the list of recommendations within the Study Area. The map is found in Figure 4.5 on page 36.

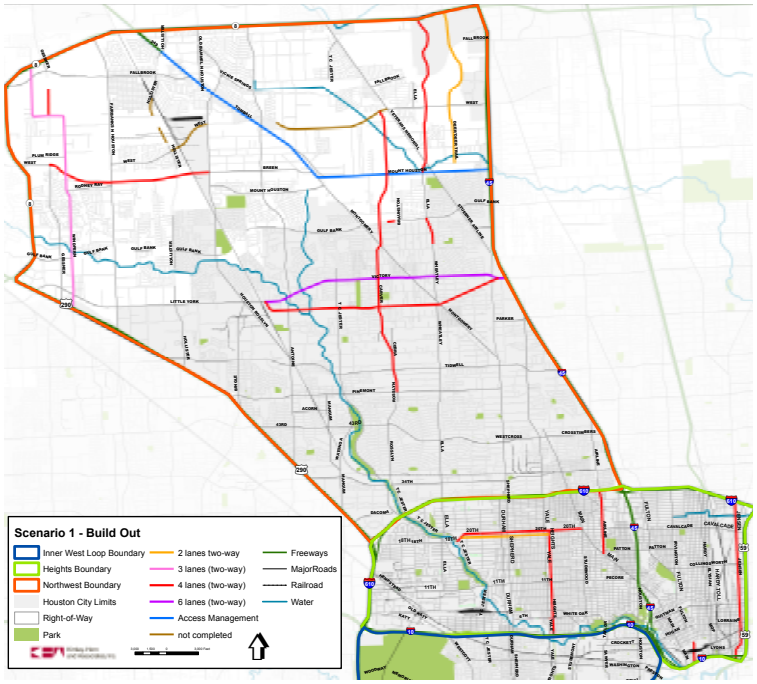

FIGURE 4.1 SCENARIO 1: BASE BUILD-OUT

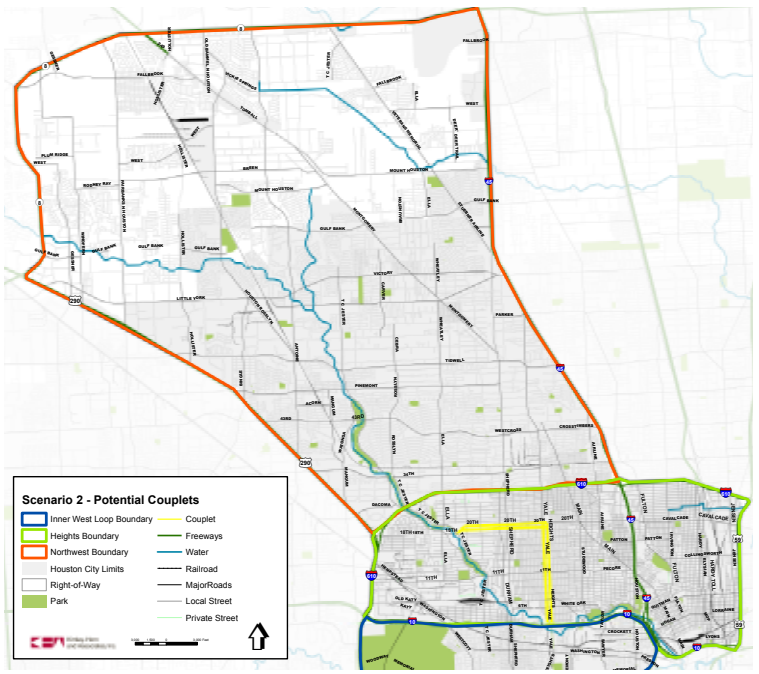

FIGURE 4.2 SCENARIO 2: COUPLETS

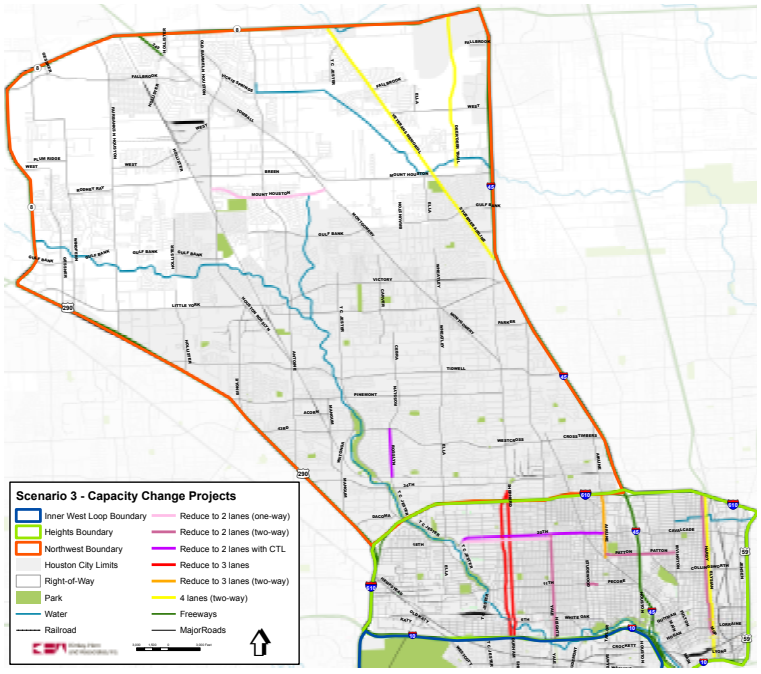

FIGURE 4.3 SCENARIO 3: CAPACITY PROJECTS

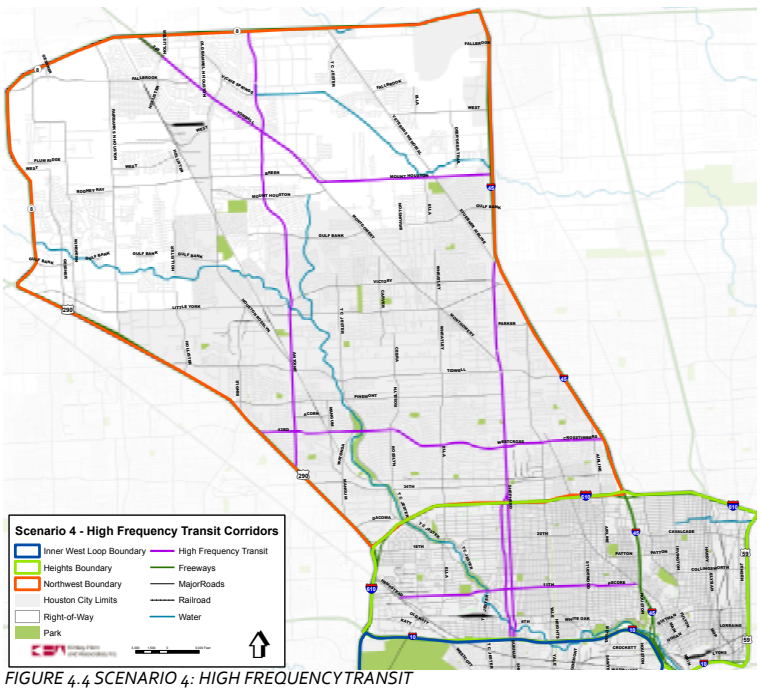

FIGURE 4.4 SCENARIO 4: HIGH FREQUENCY TRANSIT

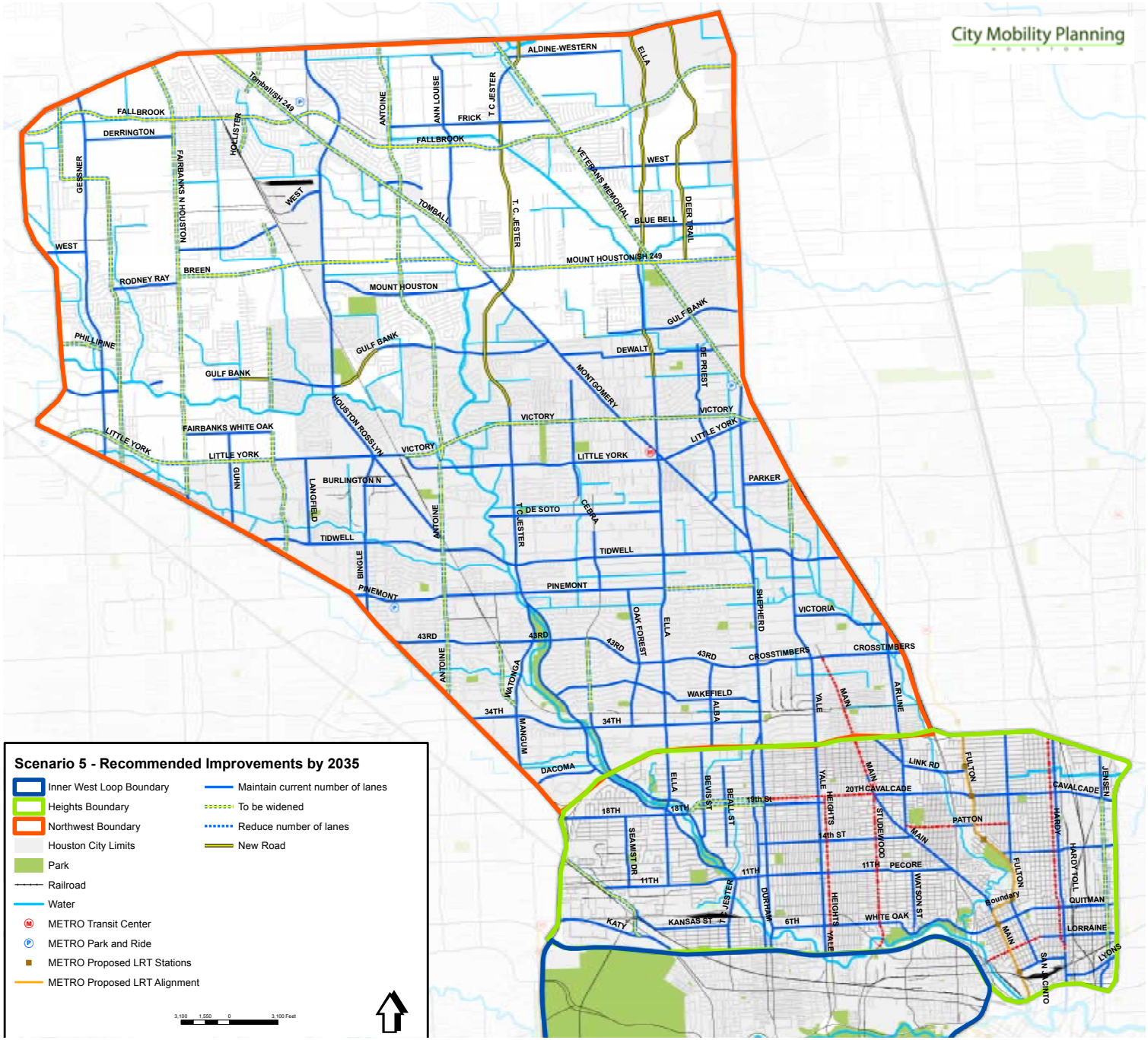

FIGURE 4.5 SCENARIO 5: RECOMMENDATIONS

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V. Changing Mobility Considerations

5.1 Addressing the Shift in How Transportation is Viewed

During Phase One of the City Mobility Planning initiative, the City of Houston contemplated the concept of providing multi-modal transportation options within a corridor planning exercise. That conversation led to the development of the alternative design standards that are located within Appendix 2 of Chapter 10 of the Infrastructure Design Manual. These alternative cross-sections provide for a myriad of design configurations, providing options within the transportation network other than an automobile.

As the City of Houston continues to grow in population, the Northwest Study Area is only expected to grow in popularity. However, as highlighted within the existing conditions chapter of this Report, there are still opportunities within the network to explore new options of how to best move people in a safe and effective manner. Incorporating alternative modes of transportation into the system design before network failure can potentially decrease the likelihood of failure. By providing users with more modal options, the burden on automobiles and streets can be lessened.

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 clusters of jobs and population. The Northwest is projected to see an increase in automobile traffic throughout various corridors, especially as more people try to access the regional highway network that surrounds the Study Area. 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 before it reaches maximum capacity; this can be achieved by evaluating a corridor for all modes of transport. As a result, the following represent the change in mobility considerations that are taking place across the United States, and as seen in recent years, in the City of Houston. Although exact policies within the City have not been developed for all considerations discussed, these concepts should be continuously considered when evaluating complete system mobility. The most recent change in Houston includes the concept of Complete Streets which is discussed in more detail here.

PHOTO PROVIDED COURTESY CITY OF HOUSTON

5.2 Complete Streets and Houston

What is a Complete Street?

The push 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, a health-conscious community has 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 policy shift that is gaining momentum in the United States.

Tying into the Existing Culture of Houston

Houston is known for its innovation and willingness to let the community grow and develop by allowing the market to influence development. With this notion, Mayor Annise Parker issued Executive Order 1-15 regarding 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 attitude towards moving with the changing times and needs of its communities is well suited for moving into a new era with Complete Streets.

However, moving to implement a 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 the roadway capacity for vehicles to manage the growing population. The Complete Streets policy is focused on the movement of people along corridors, not just vehicles. Transitioning to this approach will require education and training on Complete Streets for it to be embraced, even for a community that is willing to adapt to new trends in many areas of development.

Elements of Design

Complete Streets have many design characteristics and plans for the travelway, streetside and context. Within the travelway, a Complete Street will provide for the modal uses deemed appropriate for the corridor. This includes the designs and widths of travel lanes, special transit facilities, on-street bicycle facilities, on-street parking, medians, and pedestrian crossings. Design elements for the streetside include off-street bicycle facilities, pedestrian travelway, landscaping (such as buffers or tree wells), and frontage zones.

The interaction of different modes (automobiles, transit vehicles, bicycles, pedestrians, and light-rail) can be a complex challenge. Some modes are compatible with one another within the right-of-way, while others need specific guidelines to create a safe and harmonious corridor for the different users.

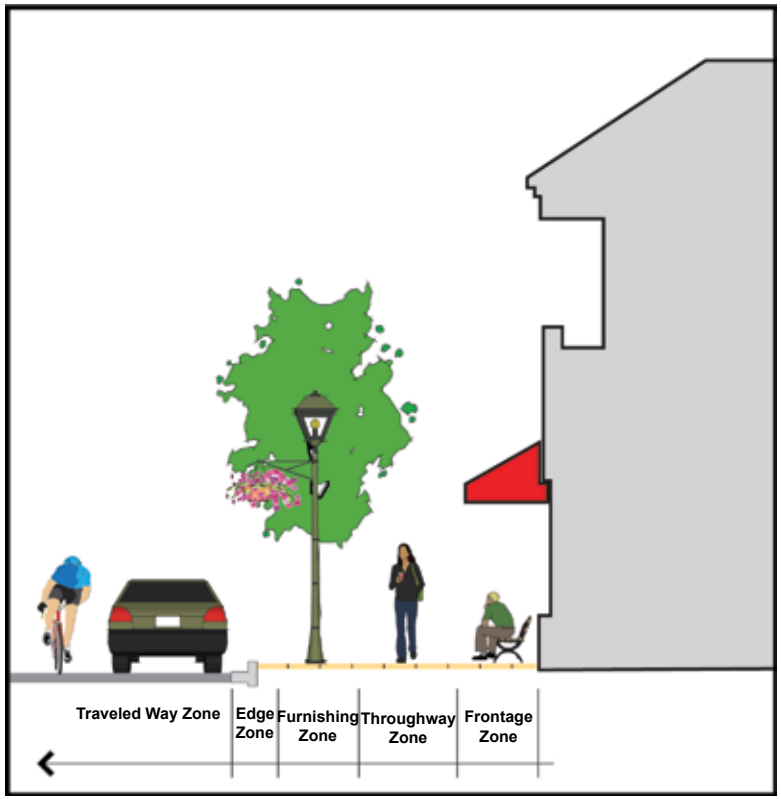


FIGURE 5.1 SOURCE: DALLAS COMPLETE STREETS MANUAL

Purpose of Complete Streets

The Purpose of Complete Streets Design

Complete Streets intend to provide a safe and accessible street 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. An Executive Order initiated by Houston's Mayor in October of 2013, states within the definition of Complete Streets, "The Complete Street concept takes the following variables into account when providing services [corridor attributes]:

- 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; and
- Providing other options of transportation for different incomes."

Enhanced Efficiency of All Modes

The street network of a community/city/region defines its structure and has the largest impact on the types of traffic challenges they face. A well-connected network can provide for many routes, reducing congestion levels on a single thoroughfare. Connectivity is an important factor in creating an efficient transportation network. A well-connected network provides several inlets/outlets for users to travel to their destination. This helps to reduce heavy loading on a particular corridor and does not apply singularly to automobile networks. Transit networks need to be well-connected to other lines, stations, and destination centers. This also relates to bike networks, but they have the advantage of using on- and off-street facilities to create their network.

Implementing Complete Streets

Many techniques are being employed in Houston. For instance, Chapter 10 Appendix 2 of the Infrastructure Design Manual maintains current MMC design considerations. Also, the many sub-regional plans each promote Complete Street policies. However, all planning needs to be combined with a change in policy matched with changes in the Engineering Design Manual.

The City is also embracing on its first ever Complete Street Transportation Plan. 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 such policies as the concept continues to mature within the City of Houston.

PHOTO PROVIDED COURTESY CITY OF HOUSTON

5.3 Health in the Community

The Houston Mobility Plan and related sub-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 livable environments also produces an additional outcome not traditionally stated as a goal at the onset of mobility plans: A healthier community.

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 alarming statistics related to obesity, asthma, and other chronic diseases associated with 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, thus at increased risk for a range of health conditions such as heart disease and diabetes.[2]

Houston & Harris County Statistics [2]

Inefficient Physical Activity

- *Adults 53%*
- *Children 77%*

Obese of Overweight

- *Adults 63 %*
- *Children 34%*

According to the US Surgeon General report on physical activity and health, "30 minutes of moderate physical activity, 5 day 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 – could provide an opportunity for physical activity and decrease the risk of chronic disease for otherwise sedentary individuals.[4]

In a study published in the American Journal of Preventative Medicine, key indicators found to increase 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 walkability and bikability is also evident within public comments received for the purposes of this Report within the Northwest study area. Whether these desires are for recreational, commute, or utilitarian purposes, one underlying concept remains the same: these forms of travel are active.

Improvements to the built environment and integration of complete streets at the neighborhood level can improve access to healthy food in addition to physical activity. In a study that highlighted the need for better access to healthy choices called the Harris County Food System report (October 2013), the location of food stores and their accessibility via public transportation was found to greatly impact a family's access to healthy food and healthy choices. 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 traveled over 6 miles to a grocery store, while two-thirds of residents in a second community traveled over 1 mile to a grocery store, with an additional

20% traveling over 6 miles. The report identified issues that impact community health and can 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 Mobility Study, as well as similar sub-regional studies especially in regard to the implementation of the new Complete Streets policy. A well-functioning transportation network not only moves people, but also provides healthy and safe

transportation options that benefit all users of the network.

PHOTO PROVIDED COURTESY KHA

Example Initiative 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/wp-content/uploads/2012/07/HLM-Assessment-Report-Final.pdf

[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 provide a more workable network for the local experience.

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 demands, and as such should not be developed to mimic the urban context. However, the following aspects concerning enhanced connectivity within this network have been expressed.[1]

Expressed Benefits to Keep:

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

Expressed Connectivity to Enhance:

- 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
- Key transit/bus stops

Market Trends

These expressed desires for enhanced connectivity via alternative modes are not new. In fact, they relay many of the design considerations of more 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, 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 a strong alternative network often citing the ever-increasing land values, construction costs, and the perception of decreased security as noted concerns.

The result of these development practices has ultimately led to the "Loop and Lollipop" pattern most prevalent with today's suburban development. Within the Northwest

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.

Study Area development trends align with historic national trends where older suburbs, characteristics of elongated street grids, are located closer to the 610 Loop (i.e. Fragmented and Wrapped Parallel). However, more recent "Loop and Lollipop" suburban communities are more commonly positioned closer to Beltway 8 (i.e. Loops and Lollipops), where virgin land is more abundant.

Making it Work

Street Patterns

Gridiron	*Fragmented parallel*	*Wrapped parallel*	*Loops and lollipops*	*Lollipops on a stick*
(c. 1900)	*(c. 1950)*	*(c. 1960)*	*(c. 1970)*	*(c. 1980)*

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

The general public is aware of the premises of the suburbs and, as stated earlier, desires to maintain those traits because they 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 of streets, sidewalks, parks, and other infrastructure that make up a system of neighborhoods that cannot 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 have. In other words, communities are seeking ways to improve the suburban networks that already exist. The tools explored below are unique to the City of Houston and are intended to explore ways to enhance alternative networks which not only link communities and related neighborhood amenities to each other, but also to the greater area network. 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 Past 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 is restricted due to safety concerns, neighborhood connectivity is best achieved off the beaten path. The City of Houston has several natural resources (the bayous) which can be used to develop this off-street path. The Houston trail system is gaining popularity as it continues to mature.

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 key transition points from existing neighborhoods onto these newly constructed amenities.

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 to 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 other commercial establishments.

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 development, 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 provided 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.

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

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

Publicly Owned Property: Provided properties in and around the City of Houston and Harris County alike maintain access to properties that may have limited use due to regional concerns such as flooding. In circumstances where appropriate, potential opportunities arise where alternative transportation access may be more suitable then the automobile. Within the Northwest Study Area, it is appropriate to construct paths over man-made footpaths that have been created over the years, connecting popular points of interest.

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.

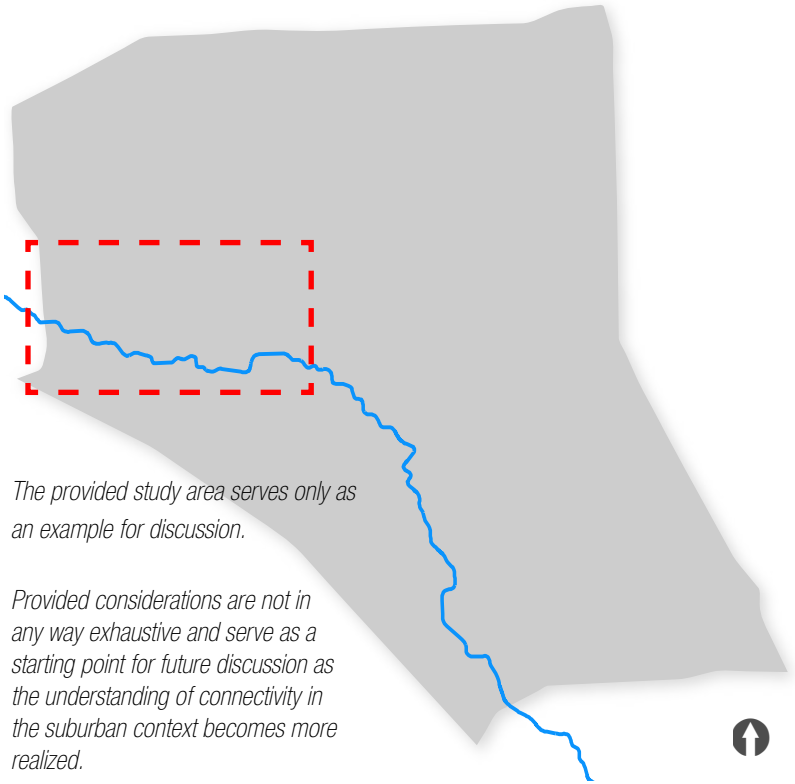
4. For more information regarding street extensions, visit the City Code of Ordinances, Chapter 42, Sec. 42-135.
5. For more information regarding Reserves, visit the City Code of Ordinances, Chapter 42, Sec. 42-190 - Sec. 42-193.

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 and 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.



The provided study area serves only as an example for discussion.

Provided considerations are not in any way exhaustive and serve as a starting point for future discussion as the understanding of connectivity in the suburban context becomes more realized.

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)

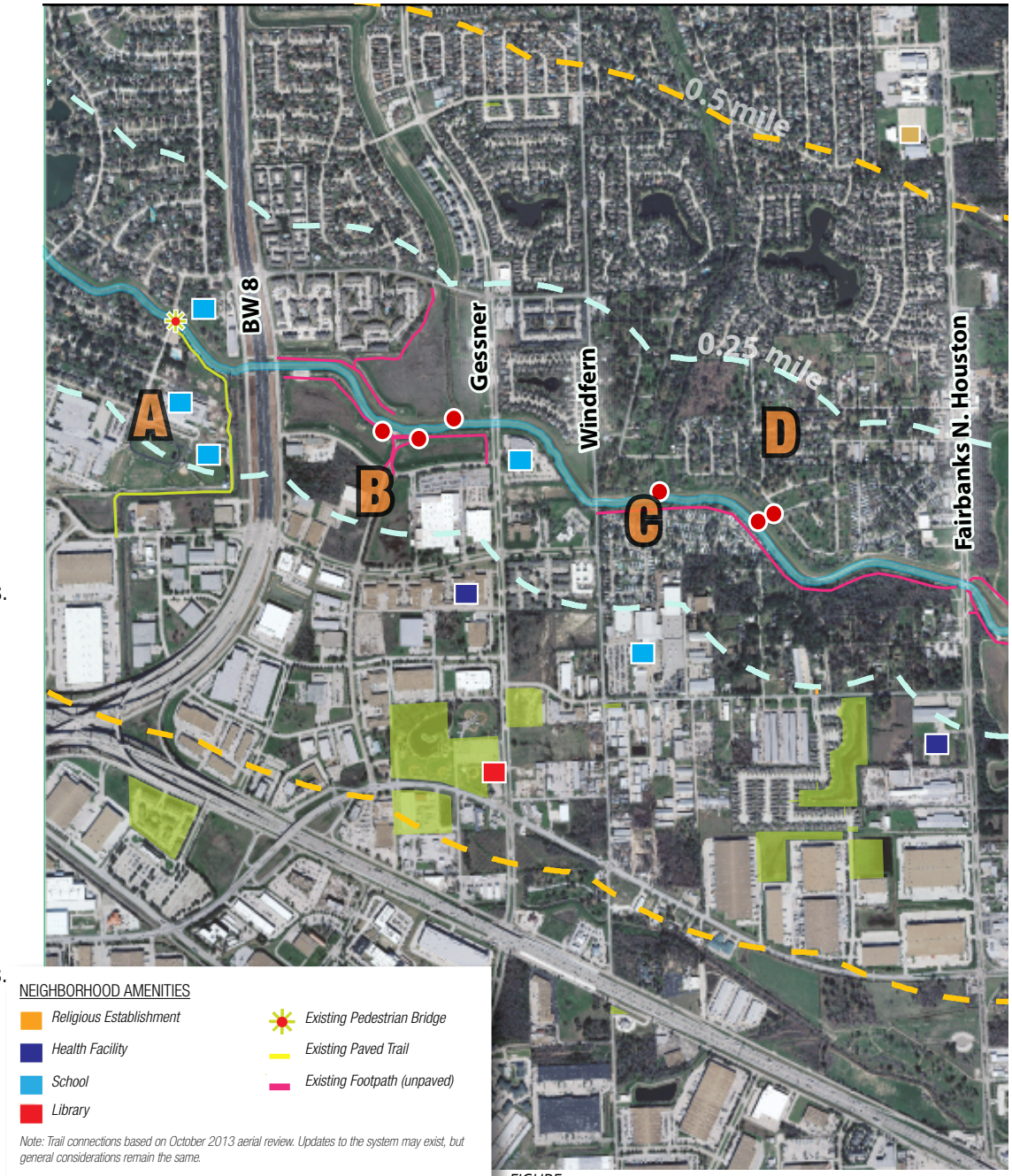


FIGURE 5.9

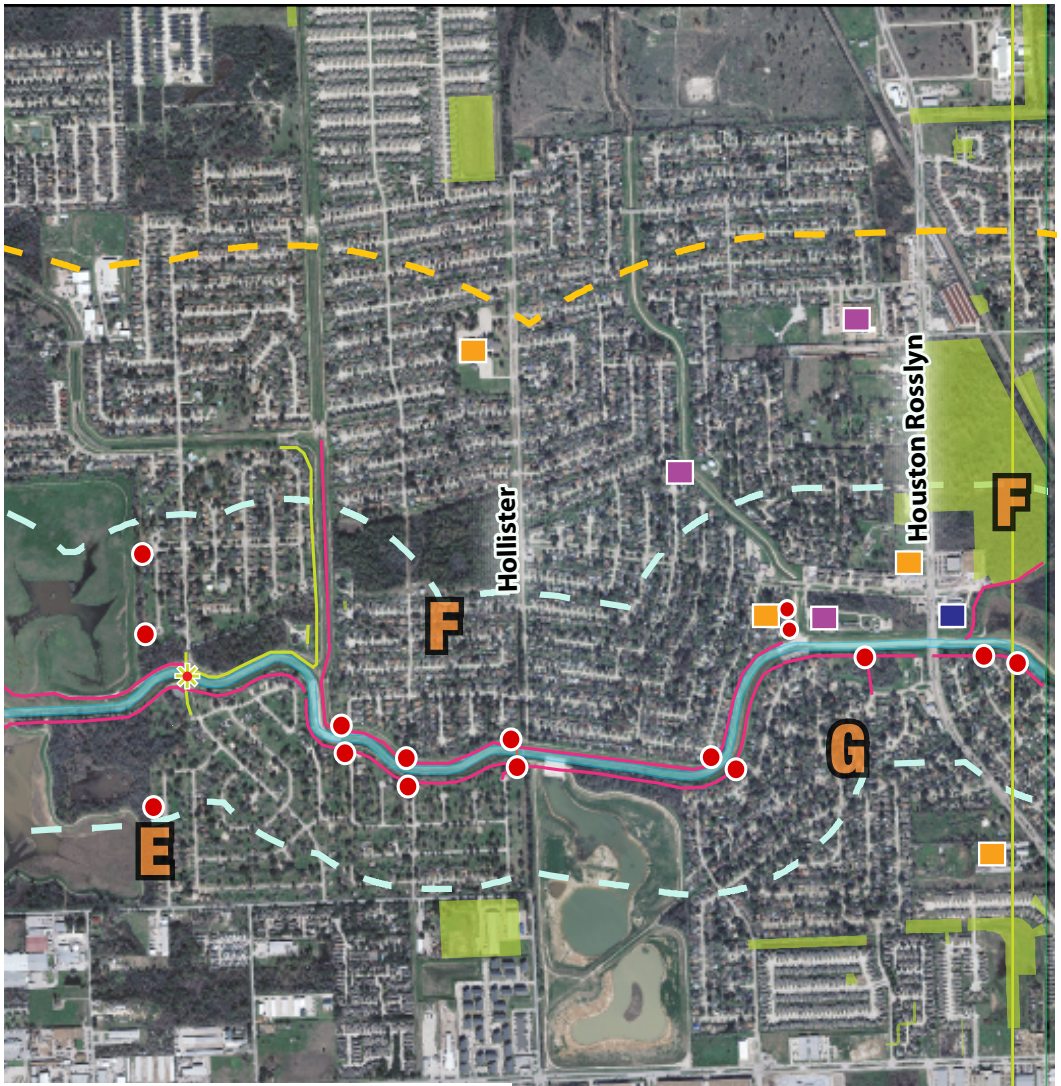


FIGURE 5.10

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 heath 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 our 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 are a prevalent choice 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 as:

AASHTO Bicycle User Types

Type	**Type A** Advanced/Experienced	**Type B** Basic Adult	**Type C** Children
			
Values	• Convenience • Speed direct access to destination	• Comfortable experience • Low stress	• Lower complexity decision environment
Comfortable Riding on...	• Comfort riding on all street types • High Traffic • High Speeds	• Designated facilities	• Residential streets • Busier streets with well-defined bike travel areas • Off-street bike paths
Confident "claiming" a narrow lane?	Probably	No	No
Knowledge of traffic principals	Yes	Yes	No

FIGURE 5.11

Facility Types

The City of Houston currently does not maintain a formal process to evaluate what corridors are most appropriate for the user type as defined on the previous page. The City instead evaluates facility type on a case-by-case basis as appropriate for the City and community alike. As such, the City recognizes that bike facility types most appropriate for a given corridor vary and maintain the following classifications as adopted by the City of Houston 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 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 offering an alternative for, but running parallel to, 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. Conventional bike lanes without protection on these types of roadways can be stressful for less confident riders.
- Two-way cycle tracks may be considered when there is not enough room for one-way cycle tracks on both sides of the street or when extra right-of-way is available only on one side. Two-way cycle tracks may be considered to optimize the ROW (such as when you remove 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 on streets with higher travel speeds, higher travel volumes, or high truck traffic.
- These facilities may be accomplished as retrofits or the reconfiguration of existing roadways with 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, the 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 that bicycles have the 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, there has been a shift in the way streets are evaluated in terms based on the time a bike facility is recommended where the following are considered:

- 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

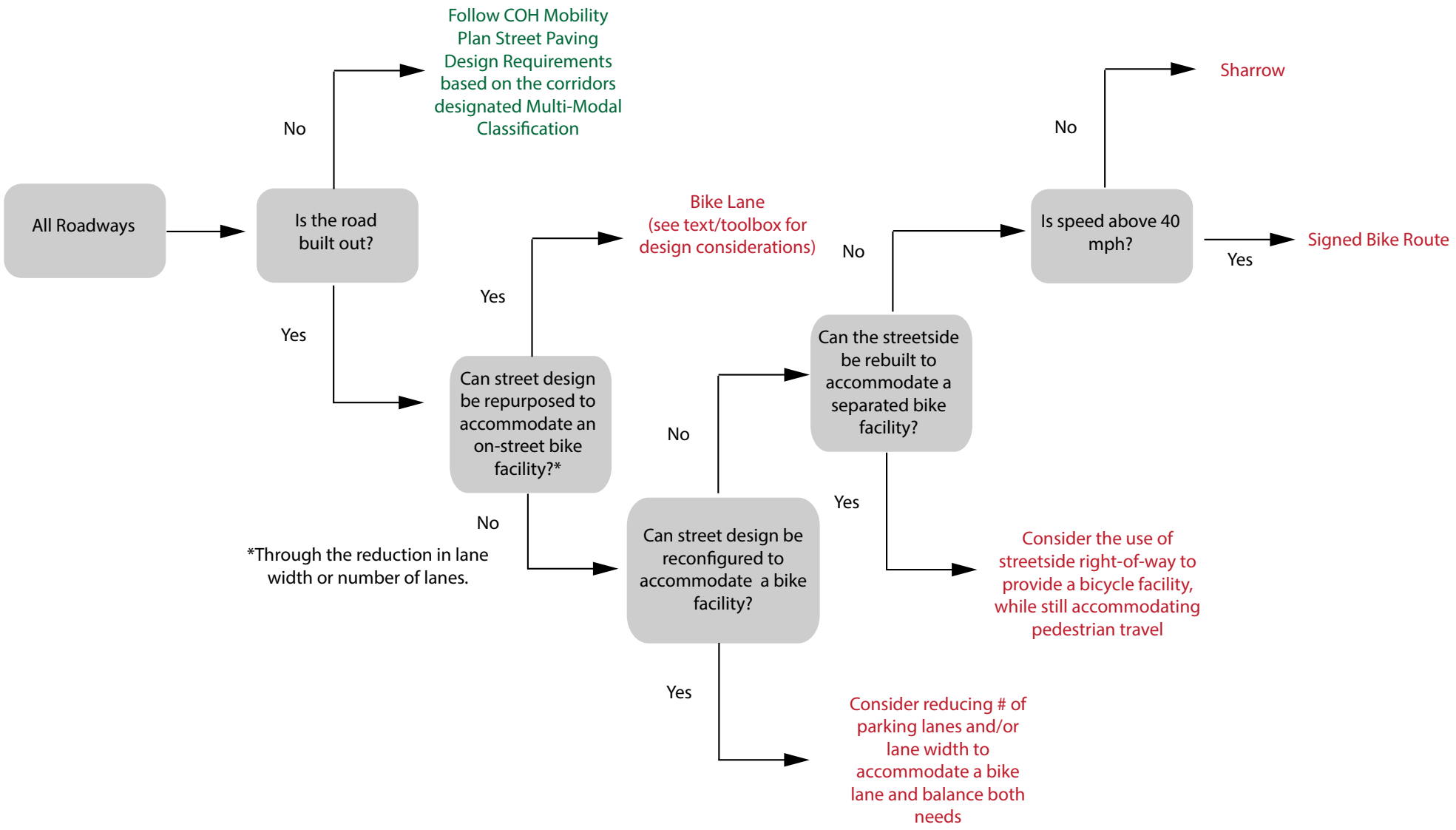
Repurpose projects typically require modifications to existing standard design cross-sections, as currently endorsed by the City, in order to meet the various transportation needs within limited right-of-way. Most repurpose projects to accommodate bicycle facilities on existing streets will be difficult to implement without special design and context considerations for each individual corridor. However, the ideal facility type may not always be able to be implemented due to various constraints.

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 the 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, the establishment of a complete street types based upon multi-modal Classifications is 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 drivers to pass or trail a cyclist, pedestrians and other non-vehicular or "vulnerable road users" at a safe distance. Although safe distance is a termed 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 diminishes the use of harassment or intimidation of vulnerable users at any time.

Houston Bike Education

As the City of Houston continues to mature adoption of bikes into its everyday culture, the need to educate not only automobile users, but bicyclists themselves becomes increasingly important. The City, and other bike advocate organizations, continuously work to educate all roadway users of the importance of proper roadway etiquette. That is to say, both cars and bikes are considered "traffic" while utilizing public roadways. As such, 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, so there is a need to educate all users about not only their responsibilities, but the responsibilities of additional users (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

Returning to Pedestrians as a Priority

Returning focus to pedestrian amenities is a trend around the nation as the many benefits of active transportation are being publicly endorsed by health and other officials. Such benefits include:

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

Existing Policy

Within the City of Houston any new or reconstructed sidewalk must 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. This will vary based on the context of the corridor. The pedestrian zone is the streetside area between the edge of the curb and the property line of the bordering parcel. Pedestrian amenities can encourage growth in a walkable environment within the appropriate context type. The pedestrian zone can be broken into 4 subcategories: 1) edge zone, 2) furnishing zone, 3) throughway, and 4) frontage zone.

Edge Zone

The edge zone comprises 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.

PHOTO PROVIDED COURTESY KHA

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, vendors, 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.

Throughway Zone

The 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 pedestrians' safe movements. This design element should also account for the handicapped and disabled. 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

Public transportation within the United States became increasingly polarized to a specific demographic over the past few decades. Only recently has a shift away from this stereotypical user base occurred. Bus and light-rail are no longer seen as options designed specifically for low-income communities. The benefits of using public transportation as opposed to a personal automobile are enticing a new demographic of users, not defined by their income. Younger generations are turning to public transportation for many reasons including:

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

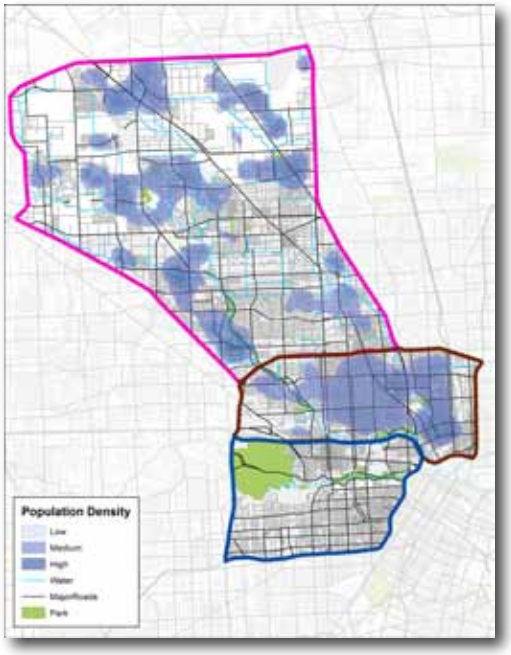
Another user base is found in persons, now residing in Houston, who immigrated from countries where public transportation is socially acceptable and widely used. As more people understand the benefits associated with public transportation, utilization will increase.

Increasing the Availability

Congestion will continually increase, making transportation funding an urgent concern within the country and region. Therefore more efficient transportation alternatives are increasingly more 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 does not work in every situation and along every corridor. To identify the specific corridors and areas of Houston that transit can be the most successful in capturing riders, the following factors were analyzed and ranked in the Northwest:

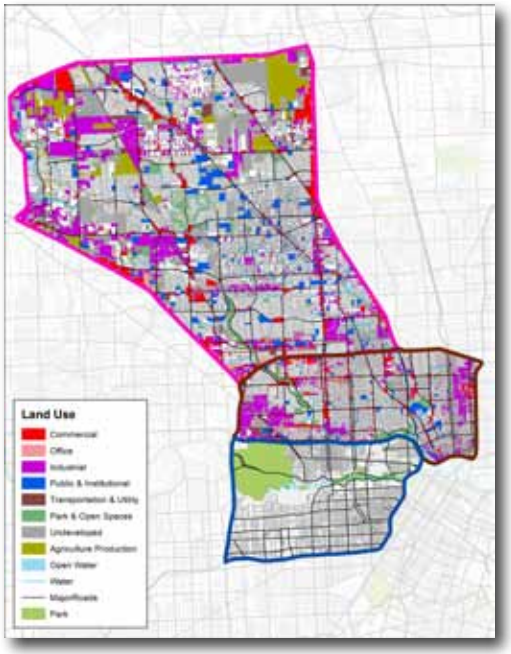
- Residential Density
- Lane Use
- Network Density
- Existing Transit Ridership
- Projected Transit Ridership

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.



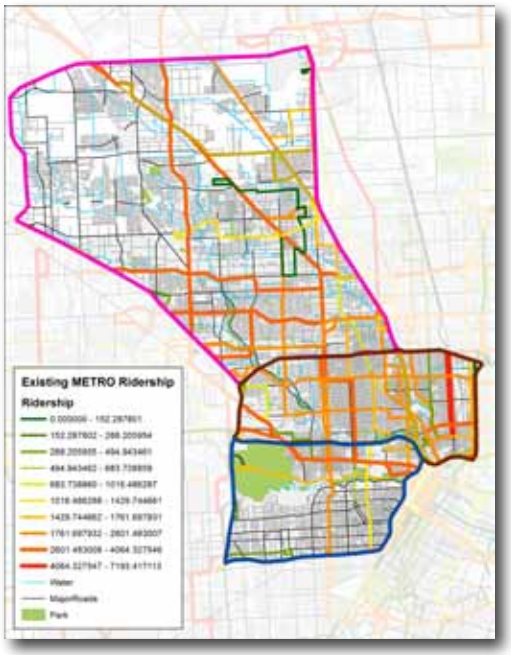
Residential Density:

Residential density is an important factor for determining transit potential. The higher density an area is the more likely people will use transit. The corridors that are within or in proximity to the medium and high density locations were considered for transit locations.



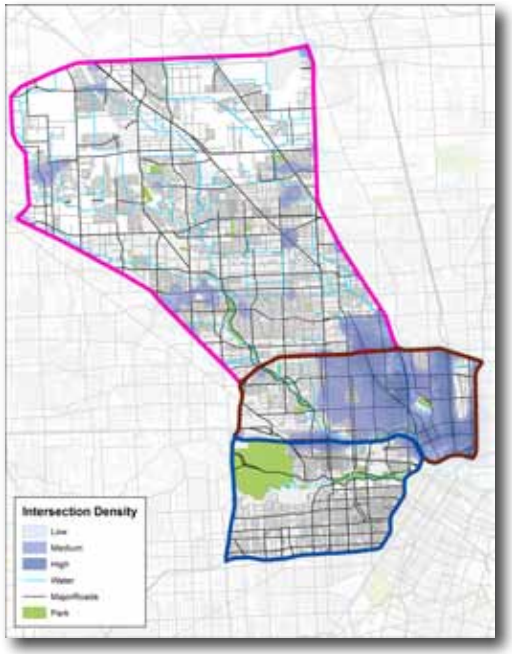
Land Use:

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.



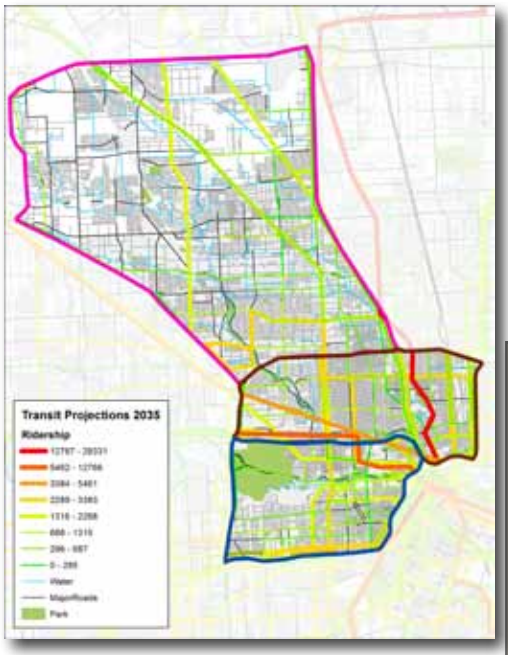
Existing Transit Ridership:

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 the ability for people to walk or bike to their destination. The less dense an area is in regards to network, the more automobile oriented it may be. As expected, the Northwest has relatively low Network Density.



Projected Transit Ridership:

H-GAC currently incorporates transit routes in 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, transit vehicle, bicycle, or pedestrian) is important.

5.8 Intersection Design Considerations

Changing Priorities

A strong component of a multi-modal plan is designing corridors for safe passage of automobile and non-automobile users. Creating safe realms for these users extends to all parts of the corridor, with increased importance at intersections and other types of crossings. 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, bus transit, and bicycle traffic. Although other alternative modes of transportation may exist, the provided represent the most commonly understood forms of traffic within the City of Houston and hence serve as a baseline for discussion for alternative design options for intersections.

Multi-Modal Intersection Design

The following section discusses 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. Example innovative intersection improvements and specific location applications are provided to give the designers a potential framework for creating multi-modal intersections. All modes of transportation are found on the corridors within the City of Houston, including: automobile, transit, light-rail, bicycles, and pedestrians. Accommodating multiple modal types on a corridor requires an understanding of how these modes interact.

At all intersections, multi-directional movement is occurring. Planning for these movements to transpire safely requires specific design effort. For instance, the turning movements of automobiles in relation to pedestrians (or transit vehicles next to bicyclist) are a critical design feature in creating a safe environment. Intersections create many points where collisions can occur. (See Figure 5.13.)

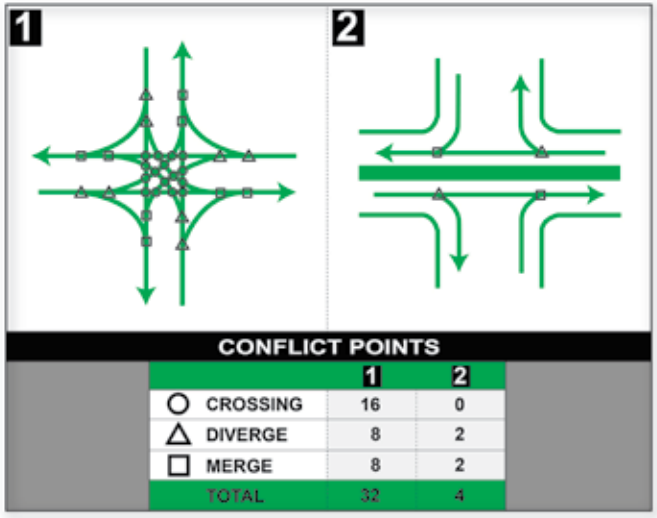


FIGURE 5.13

Basic design attributes include a variety of planning concepts. The following acknowledge only a few of the design elements listed within Figure 5.16.

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

Prioritization of these types of attributes at a particular intersection must be completed with an in-depth look at the activity occurring there. 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.

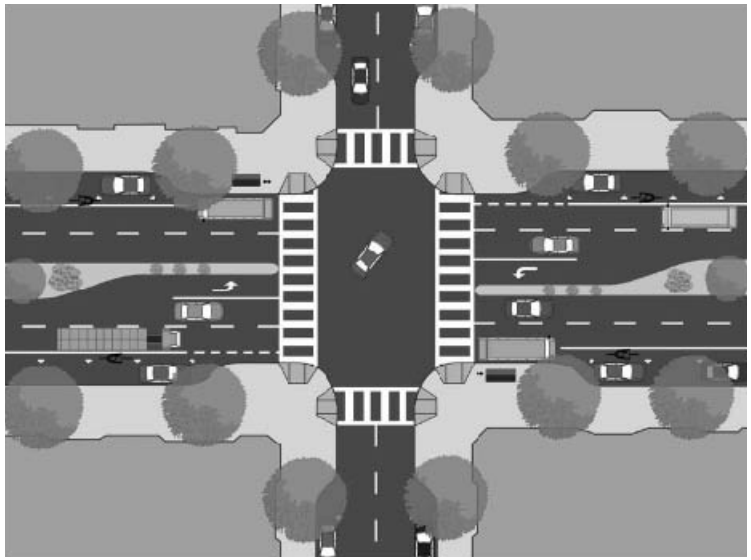


FIGURE 5.14 SOURCE: DIGITAL MEDIA PRODUCTIONS

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:.

PHOTO COURTESY OF KHA

- 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 of showing the 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.

PHOTO COURTESY OF KHA

- Pedestrian signalization includes several types of indicative tools or measures. For instance, at signalized intersections, there can be a gap time before cars are allowed to move that allows pedestrians the right-of-way. A signal phase singularly defined for pedestrian movement can be used at intersections with high pedestrian activity.

Transit

Design for transit function at intersections also requires additional study. Transit vehicles need to maintain an efficient schedule and move safely through an area. Transit vehicles require additional planning due to their size and frequent stops. This also requires planning for the safety of the passengers waiting, as well as boarding or alighting from the transit vehicle. Focus on transit design at intersections is influenced by its interaction with other modes of transportation.

Proper **bus stop placement** is an important element in the design of intersections (See Figure 5.15).**Mid-block stops** are the least desirable because they require the most amount of curb side space. Locating bus stops at the near- or far-side of intersections is recommended. Far-side placement is recommended for signalized intersections. There are several advantages to this placement, for instance, buses are allowed to take advantage of gaps in traffic flow. This eliminates the need for buses to be at the front of the queue line at an intersection for a near-side stop. It also minimizes the conflicts between buses and right turning vehicles.

Other important factors to consider include the 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.

PHOTO COURTESY OF KHA

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.

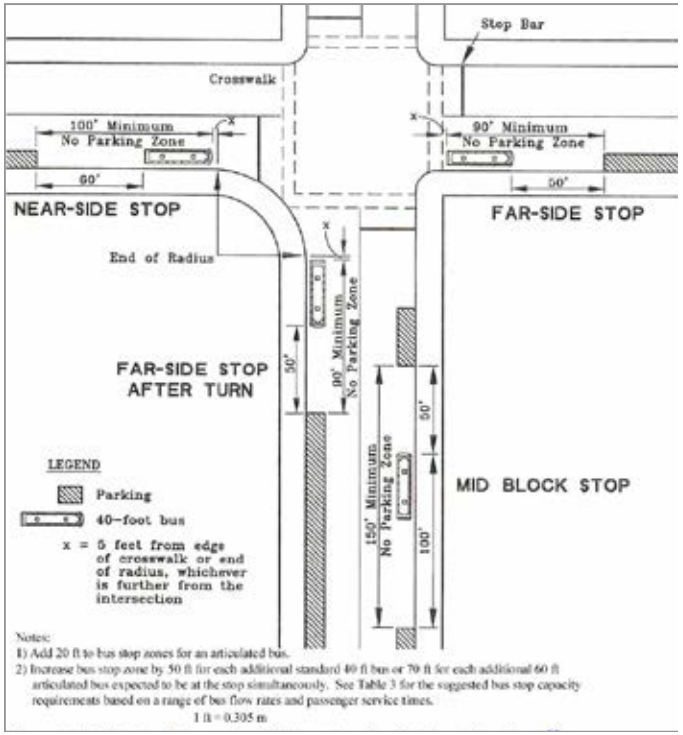


FIGURE 5.15 SOURCE: ITE MANUAL

Bike

Creating a safe environment is important for bicyclist since they typically range in their skill level and confidence. When designing bicycle facilities at an intersection or other crossing, recognizing the different skill levels assists in the creation of a path that is easy to follow.

A direct and safe path through intersections is affected by factors like the number of driveways, ramps, and other mode users.

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

Bike crossing markings through an intersection reinforce that priority is given to bicyclist over turning vehicles. They also facilitate in providing a safe path for bicyclist to make left-turns.

PHOTO COURTESY OF KHA

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	• 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	• 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:
	  ○ 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	• 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	• Pedestrian countdown timers; and • “Look Before Crossing” markings or signs.
Bicycle features	• 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	• 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	• 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:
	  ○ 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	• Target speeds between 25-35 mph; • Signal progression at target speeds; and • Fewer very long/very short cycle lengths.
Higher priority on aesthetics	• 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

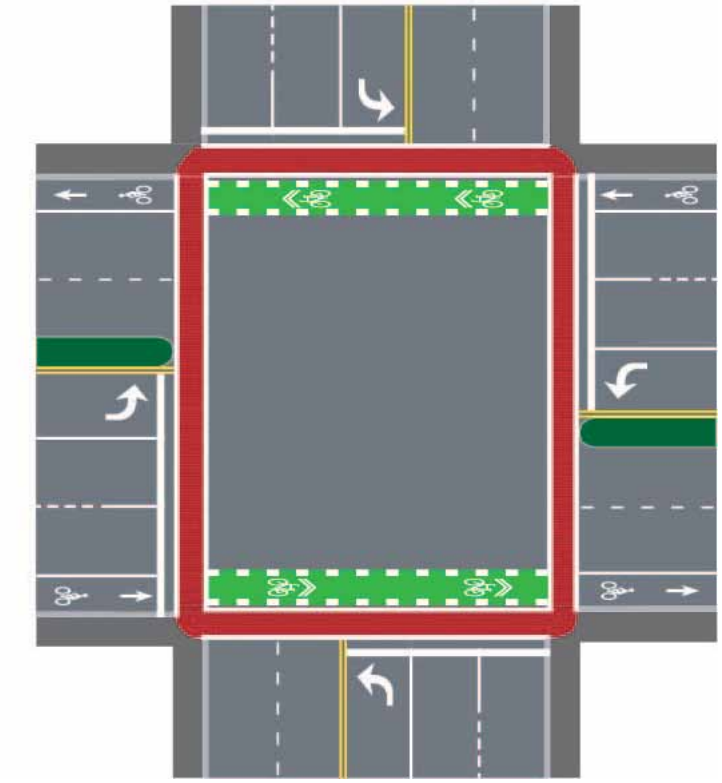


FIGURE 5.17: INTERSECTION REDESIGN CONCEPT

FIGURE 5.18: FAIRBANKS N HOUSTON AT BREEN EXISTING AERIAL PHOTO

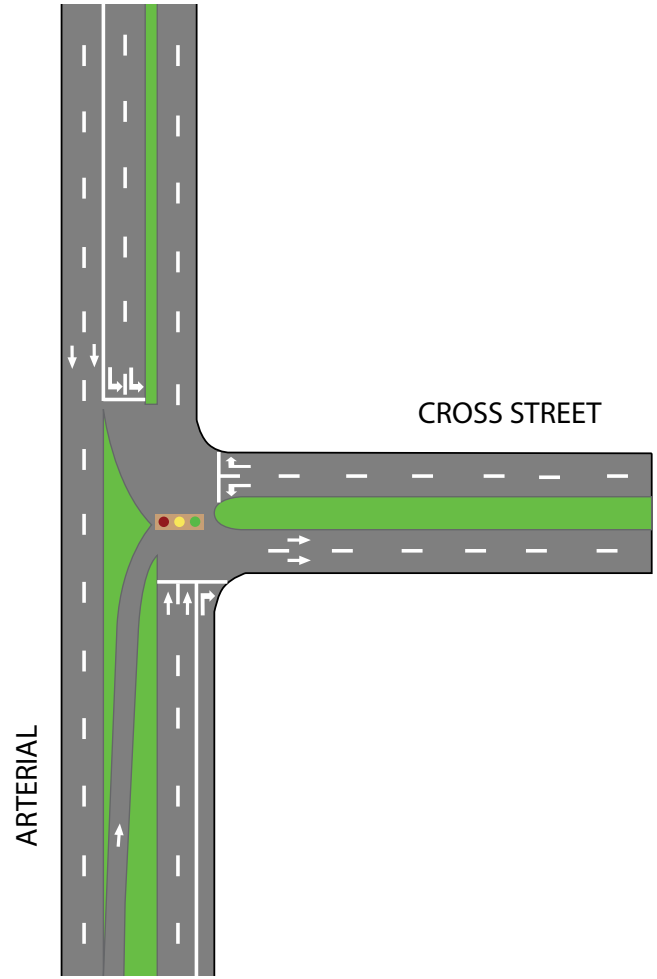


FIGURE 5.19: MODIFIED FLORIDA T INTERSECTION CONCEPT

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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 in corridor designs provided in subsequent pages of the Report. It is important to note however, that the provided potential cross sections are examples of what roadways might look like when the provided elements (bike, pedestrian, etc) are considered in addition to the automobile. Provided examples 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.

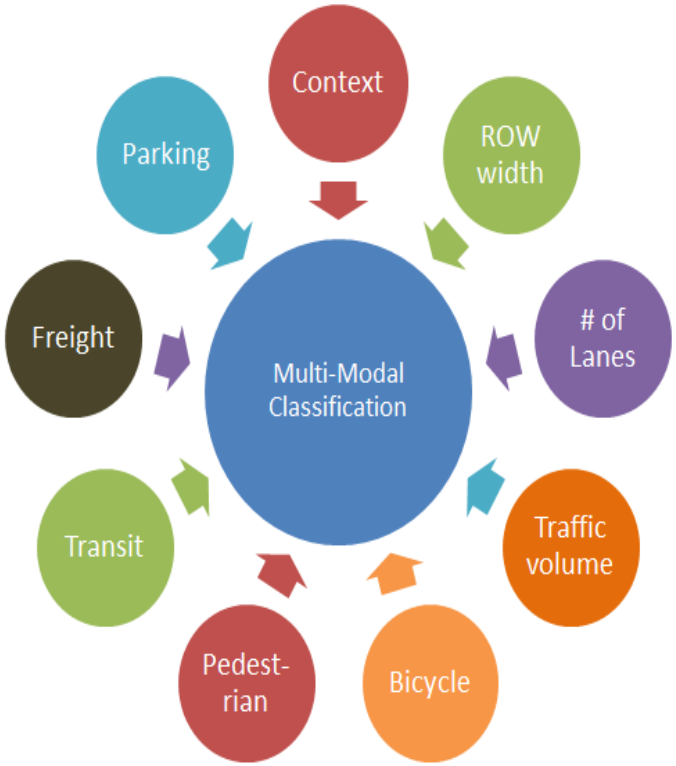

FIGURE 6.1

6.1 Defining the Priority Elements

The creation of a Multi-Modal Street network requires a balance of competing considerations throughout the entire network, rather than focusing on implementing all modes within a single corridor. Oftentimes, those streets that serve a heavy vehicular focus are not the best candidate for high-quality bicycle facilities given the limited ROW and higher vehicle volumes/speeds. Similarly, transit vehicles are often desired in context with bicycle facilities; however, providing complementary and intersecting routes often increases the reach of transit. Quality and continuous sidewalk facilities are critical throughout this densely developed area. It is important that the allocation of space needs is in balance with the needs of the cycling community given the limited ROW.

Recognizing the need for this balanced approach, the Northwest Mobility Study examined the needs for each mode independently. Then overlaid those needs on one-another to identify gaps within the system, overlapping complementary concepts, and overlapping conflicts given the limited ROW. These concepts were then examined within the design concepts currently available within the Infrastructure Design Manual to arrive at the proposed Multi-Modal Street Classifications highlighted on the pages that follow.

The priority elements defined for each corridor provide a guideline for the design of the corridors. The element that has priority on the corridor will be included in the design, and other elements will be included based on available right-of-way and funding opportunities.

The table on the next page provides a summary of each corridor that is currently classified under the existing MTFP. The table highlights several elements that were examined from the recommendations. A summary of those elements and how they were examined follows:

Priority Elements

Parking

The continued provision of adequate vehicular capacity continues to be paramount to providing access and mobility within the study area. Permanent parking is ideal only in cases where currently exist. Non-peak hour parking is not displayed.

Transit

Promoting transit use will help to off-set some of the ROW constraints by increasing the person carrying capacity of the corridor.

Pedestrian

Promoting park-once areas, access to transit, and local trip options through pedestrian facilities helps to curb peak-hour traffic and provides connectivity within the transportation network.

Bicycle

Increases the reach of transit services, promotes non-motorized transportation options, can be used for recreation and commuting alternatives.

ADA Access

Highlights corridors where additional attention to ramps and street crossings that are in compliance with the American with Disabilities Act.

Automobiles

Are a priority on every corridor in Houston. The priority elements call attention to additional modes that should be promoted on a particular corridor.

Existing MTFP Classification - examines the current functional use designation and the ROW.

Proposed MMC - resulting proposed sub-classification based on all of the above inputs, and the facility types that were defined in Phase 1 of the City Mobility Planning 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	X
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	X
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	X
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	X
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	X
BREEN DR	FAIRBANKS N HOUSTON	SH 249	T-4-100	UNDIVIDED	60'-100'	2	9,000-18,000	18,000-35,500	T-4-100	MAJOR THOROUGHFARE	SUBURBAN 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 - 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- 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	C-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	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	W MONTGOMERY RD	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				
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				
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	C-4-70	MAJOR COLLECTOR	SUBURBAN AVENUE	X- GAP (partial)		X-local	X

X: THIS INDICATES A CORRIDOR WITH LIMITED RIGHT-OF-WAY, SO THE SUGGESTED BICYCLE FACILITY IS A BIKE ROUTE.*
PARTIAL: THIS INDICATES THAT ONLY A PORTION OF THE CORRIDOR CONTAINS THE FACILITY

*Note: Table arranged geographically by location of street and not alphabetically.
For best use, compare to Chapter 7 System Maps. Corridor Sheets are alphabetical

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
VICTORY DR	LITTLE YORK RD @ ALABONSON RD	LITTLE YORK RD	P-6-100	MEDIAN	100'	4	32,000	32,500-48,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD				
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				
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
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	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			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	SUBURBAN BOULEVARD	X			
PINEMONT DR	TC JESTER BLVD	ELLA BLVD	T-4-80	UNDIVIDED	80'	4	16,700	21,500-27,000	T-4-80	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X-GAP			
PINEMONT DR	ELLA BLVD	SHEPHERD DR	T-4-80	UNDIVIDED	80'	2	19,700	22,000	T-4-80	MAJOR THOROUGHFARE	SUBURBAN 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	SUBURBAN 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	SUBURBAN AVENUE	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	SUBURBAN 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	SUBURBAN BOULEVARD	X (partial)		X-Local	X
WINDFERN RD	BELTWAY 8	US 290	LOCAL STREET	UNDIVIDED	60'	2	9,000	10,000-16,000	C-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	4,000-49,000	P-6-100	PRINCIPAL THOROUGHFARE	SUBURBAN BOULEVARD			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				
N HOUSTON ROSSLYN	W LITTLE YORK RD	ANTOINE DR	LOCAL STREET	UNDIVIDED	60'	2	6,000-12,000	9,000-16,000	C-2-60	MINOR COLLECTOR	INDUSTRIAL STREET				
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	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	US 290	T-4-120	MEDIAN	100'	4	22,000-26,000	28,500-47,000	T-6-120	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD	X -GAP		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			

X: THIS INDICATES A CORRIDOR WITH LIMITED RIGHT-OF-WAY, SO THE SUGGESTED BICYCLE FACILITY IS A BIKE ROUTE.*
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W TC JESTER BLVD	I-610	JUDIWAY ST	T-4-100/110	MEDIAN	90-100'	4	10,000-23,500	20,500-54,000	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	20,500-54,000	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	SUBURBAN BOULEVARD	X			X
MANGUM RD	WATONGA BLVD	ANTOINE DR	C-4-60	UNDIVIDED	60'	3	3,000-5,500	13,500-14,500	C-3-60	MINOR COLLECTOR	SUBURBAN 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	SUBURBAN BOULEVARD				X
ROSSLYN RD	43RD	JUDIWAY ST	C-4-80	UNDIVIDED	80'	2	11,500-17,700	12,000	C-2-80	MAJOR COLLECTOR	SUBURBAN AVENUE	X			X
ROSSLYN RD (PROPOSED)	PINEMONT DR	WEST RD	N/A	N/A	N/A	N/A	N/A	N/A	C-3/4-80	MAJOR COLLECTOR	SUBURBAN AVENUE	X (Partial)			X
ELLA BLVD	I-610	PINEMONT DR	T-4-80	MEDIAN	80'	4	21,400-28,000	27,000-41,500	T-4-80	MAJOR THOROUGHFARE	SUBURBAN BOULEVARD			X - Express	X
WHEATLEY/ELLA BLVD	PINEMONT DR	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 - Express (Partial)	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	SUBURBAN 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	SUBURBAN 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	SUBURBAN AVENUE			X-local (partial)	X
NORTH MAIN ST	I-610	W CROSSTIMBERS RD	T-4-70	UNDIVIDED	70'	4	5,000-10,500	17,000-26,000	C-2-70	MAJOR COLLECTOR	URBAN AVENUE	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-Local	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	C-4-Varies	MAJOR COLLECTOR	SUBURBAN AVENUE	X (partial)			

X: THIS INDICATES A CORRIDOR WITH LIMITED RIGHT-OF-WAY, SO THE SUGGESTED BICYCLE FACILITY IS A BIKE ROUTE.*
PARTIAL: THIS INDICATES THAT ONLY A PORTION OF THE CORRIDOR CONTAINS THE FACILITY

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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 for the City of Houston.

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 Major Thoroughfare and Freeway Plan.

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	FAIRBANK 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 (parking, transit, pedestrian, bicycle facilities) are evaluated at a more intimate level, where individual corridor examples are assessed to determine "what works" within a given scenario. Each of the Major Thoroughfares and Major Collectors are evaluated individually and can be found in alphabetical order in this chapter. Variables of this analysis include existing right-of-way, traffic counts, and current modal uses. Public comment and the traffic demand model results affect the recommendation process. Future conditions, such as the MTFP designations, projected volumes and other factors are also taken into consideration.

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

- Existing conditions
- Identified needs
- Future vision
- Key factors

Full network considerations as it relates to all modes of transportation (vehicular, transit, and bicycle) are provided in the Outcomes Chapter, or Chapter 7, of this Report.

*Note: Provided corridor sheets serve only as example treatments for potential accommodation of Priority Elements within the prescribed right-of-way (ROW). Final design will be determined upon actual construction of the roadway when and if facility improvements are warranted as deemed appropriate by a Certified Engineer; evaluation of this type is not appropriate at this high level of planning.

Corridor sheets are arranged alphabetically and compliment information provided in summary tables highlighted in Section 6.1: Highlighting Priority Elements. Summary Tables are arranged by a corridors geographic location and may be directly compared to final system maps presented in Chapter 7 of this Report.

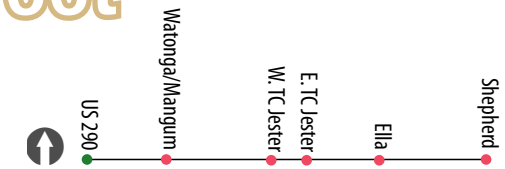
Priority Elements

Note: Although freight is not identified as a priority element, MMC designations of Industrial Boulevard/Avenue/Street are a part of the potential recommendations for consideration provided for: North Houston Rosslyn Road and Airline Drive.

Regional freight mobility, however, 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, September 2011.

W 34th Street

Key Factors



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	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

W. 34th Street is a Major Thoroughfare traveling east/west from US-290 to Shepherd. The road is currently designed with two different cross sections. From US-290 to Mangum, W. 34th Street is a 4-lane thoroughfare with a median within 70' of ROW. East of Mangum, the road acquires bike lanes on both directions of travel within 80' of ROW. W. 34th Street is a commercial/retail corridor with only a few residences facing the street.

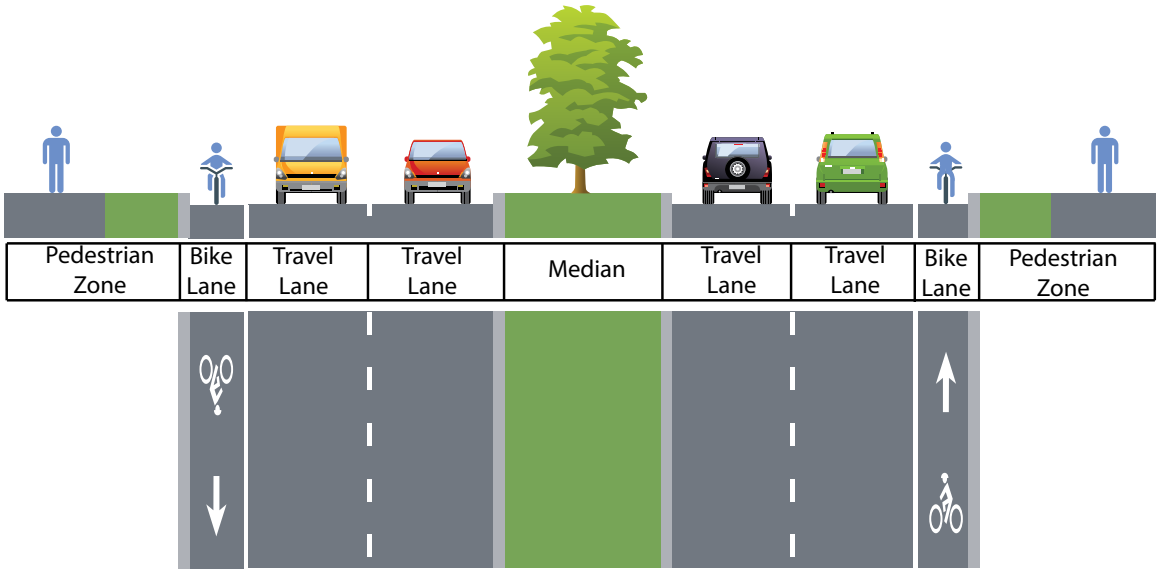
Identified Needs

Comments received from the public identified traffic issues as the main concern. The two schools along the corridor cause major traffic back-up, especially where parents stop to pick up children. Another concern is poor quality and inconsistent sidewalks/crossing for pedestrians, namely students. The bike lane has an opportunity to be utilized by students attending school along this corridor, but safety is considered an issue. The high volumes of traffic decrease the comfort level of adolescents traveling in the narrow bike lane. Intersection mitigation improvements are necessary along the corridor to enhance the flow of traffic.

Future Vision

W 34th Street should maintain its current street cross-section, with enhancements made to existing features. The designation of the street will be a Suburban Boulevard with 80' of ROW. Expanded bike facilities may be achieved via the responsible reduction of the median where appropriate. Sidewalk improvements will also be necessary and should be a priority near the school. A local bus route is recommended along W. 34th Street.

Possible Option(s):



W 43rd Street

Key Factors

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	Suburban Ave/Blvd
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median/CTL

Existing Condition

W 43rd Street is a Major Thoroughfare that transitions between three road designs, and from 100' to 80' of ROW as it moves east/west. Starting at US-290, 43rd is a 4-lane road with a median and bike lanes on both directions of travel. As it moves past TC Jester, the bike lanes drop off. Past Apollo Street the median drops off. The corridor is primarily residential with small segments of commercial/retail development. From Oak Forest Drive to Ella Boulevard, there is a center turn lane instead of a median.

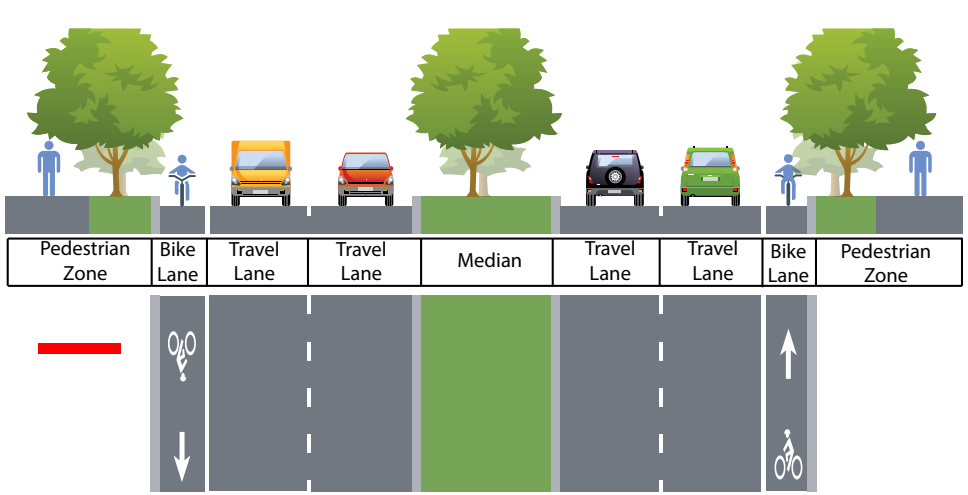
Identified Needs

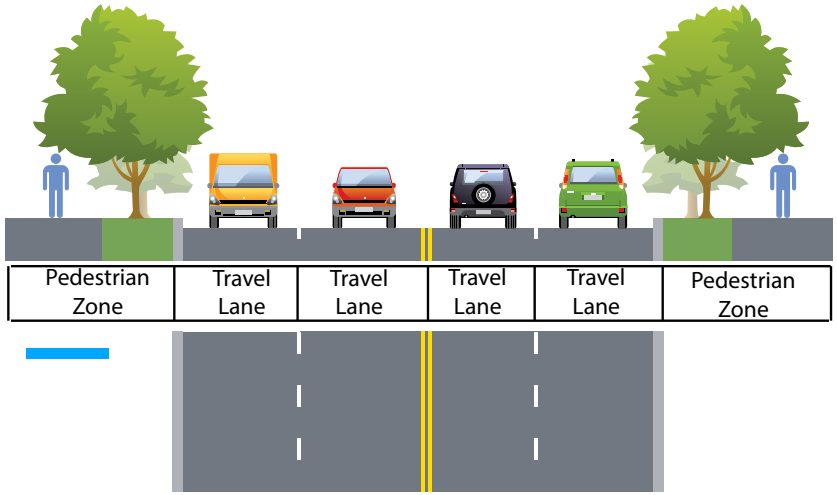
Comments received during the public input portion of this study identified a desire to slow traffic down, especially in the areas near the school. Residents expressed that they were open to options such as speed bumps, midblock crossings for pedestrians, and even a four-way stop light that would be active during the start and end of school hours. A below-grade crossing at the bridge at TC Jester for the multi-use trail was another idea expressed by residents. Other concerns raised involved intersections that needed improvement for pedestrian crossings- especially at the intersections with Oak Forest Drive and Ella Boulevard.

Future Vision

As W 43rd Street grows and redevelops under the classification of a Suburban Avenue & Suburban Boulevard, its different cross sections will adjust accordingly. The road could potentially remain 4-lanes with 80-100' of ROW and add or drop a median based on this allowance. Where medians are present, pedestrian refuges should be installed. These should be implemented near schools as a priority. The bicycle lane should be extended east of TC Jester to the existing bike lane on Crosstimbers. This will accommodate those traveling to the school and the White Oak Bayou Trail. A High Frequency Transit facility is recommended for the corridor.

Possible Option(s):

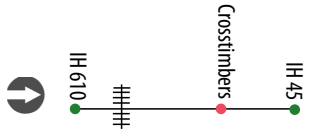




*Recommended High Frequency Transit & Bike Facility. Blke Route may be warranted where ROW is constricted between Ella and Shepherd. However, further evaluation for desired level of saftey should be evaluated.

Airline Drive

Key Factors



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 from IH 610 to IH 45 is a 4-lane divided corridor with 80' of ROW. Commercial and industrial uses line the northern section of the corridor which attract larger truck traffic. South of the rail road tracks, the corridor is edged with residences. 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. Currently the road is classified as a Major Thoroughfare.

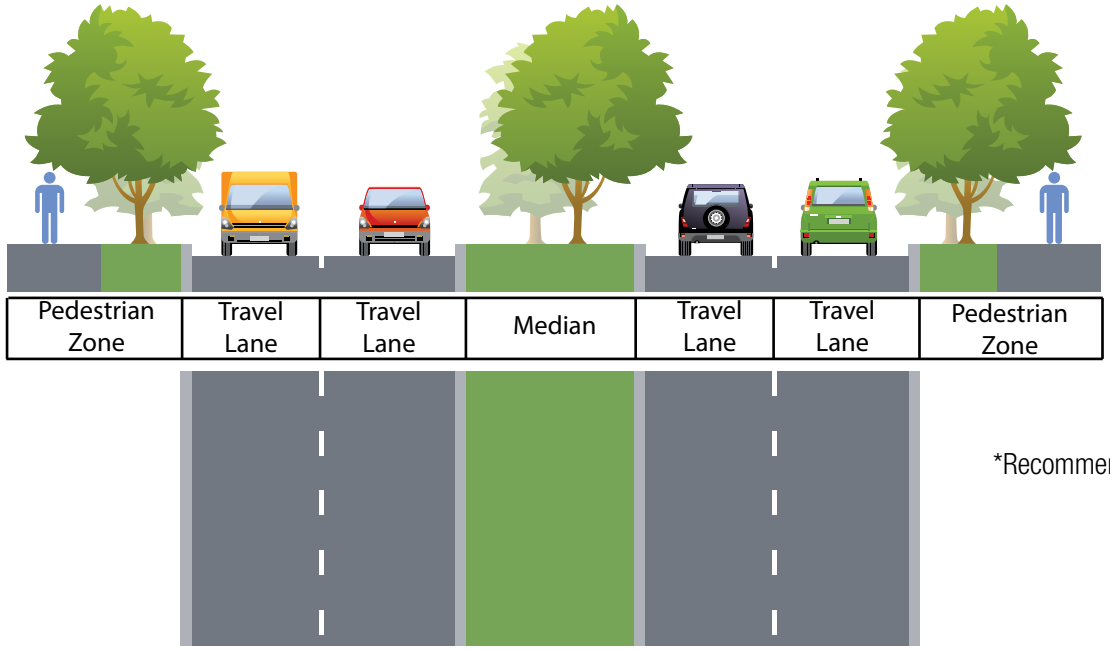
Identified Needs

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 indicated a desire to reduce lanes in order to accommodate an on-street bicycle facility.

Future Vision

The majority of Airline Drive within this Study Area has industrial uses, which justifies its multi-modal classification 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 ROW for Airline Drive is maintained at 80'. Due to the industrial facilities located on the corridor, a local bus facility is recommended for providing access for the public along the local and regional network.

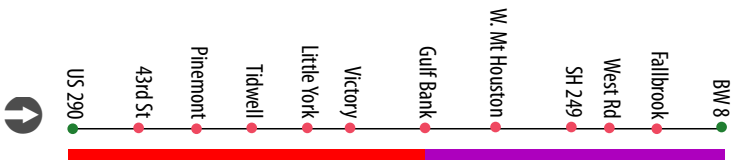
Possible Option(s):



*Recommended Local Bus Route

Antoine Drive

Key Factors



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	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Antoine Drive is a Major Thoroughfare moving north/ south from US-290 to Beltway 8. The corridor is designed as 4-lanes divided from Beltway 8 to Pinemont. A bike lane is then provided for both directions of travel down to US-290. ROW ranges from 100’ to 150’ (where the corridor contains bike lanes). Due to its length, the corridor transitions between residential and retail/commercial uses several times, especially at major intersections.

Identified Needs

Several intersections were identified as needing mitigation improvements to enhance the flow of traffic.

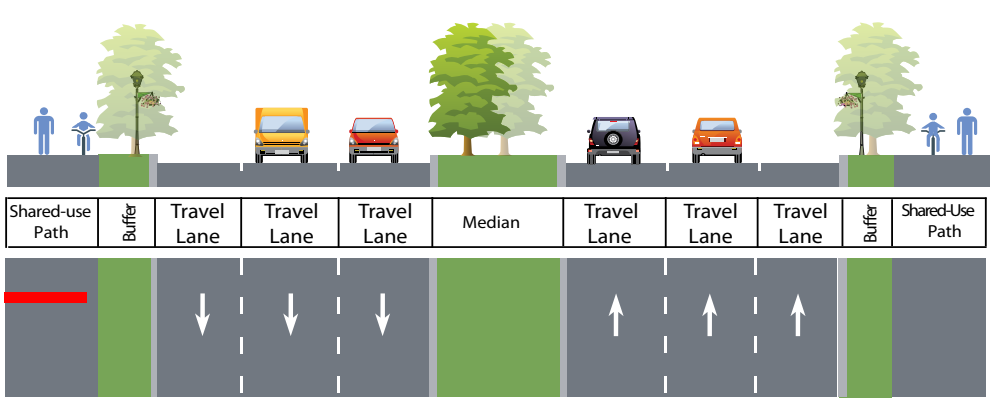
One in particular is the intersection of SH 249/Antoine Drive and West Road/ Antoine Drive which are about 700’ apart from one another. Southbound travelers have a hard time spotting signage to take their correct exit.

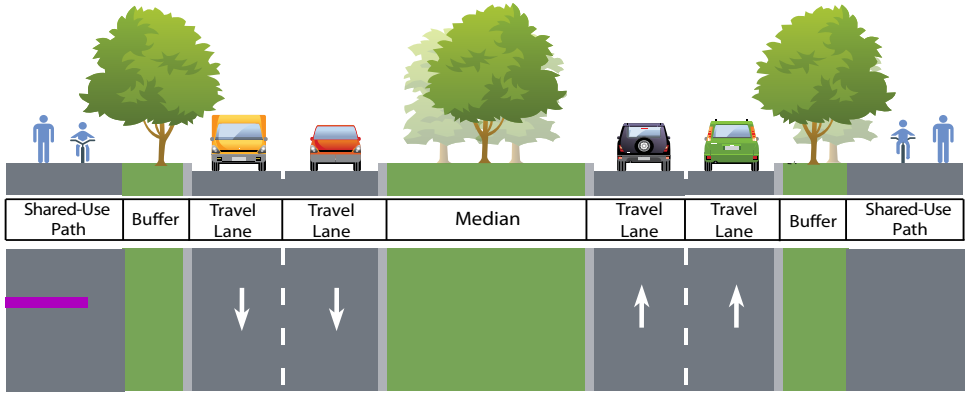
White Oak Trail crosses Antoine Drive at Victory Drive and many residents indicated that a high priority for the corridor is the enhancement of pedestrian facilities to help move residents to this connection. Sidewalks are non-existent at railroad crossings, leaving pedestrians and persons in wheelchairs with a challenge in connectivity.

Future Vision

Antoine Drive is recommended as a Suburban Boulevard. From Beltway 8 to Gulf Bank, Antoine would benefit by maintaining its 4-lane design, with bike lanes for both north and south bound travel. From Gulf Bank to US-290, the corridor should increase to 6-lanes with bike lanes on both directions of travel extending current bike facilities west of West Mount Houston in a safe design recommendation for motorist and bike riders alike. Improvements to the corridor include completing sidewalk gaps along the length of Antoine Drive, for an enhanced pedestrian realm appropriate for a High Frequency Transit corridor, as recommended.

Possible Option(s):





*Recommended High Frequency Transit

Bingle Road

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

Key Factors

Existing Condition

Bingle Road travels north/south from US-290 to Little York where it transitions into N. Houston Rosslyn. The current design is 6-lanes divided, with 100’ of ROW. Bingle/N. Houston Rosslyn function as one of two complete connections from US-290 to Beltway 8 within the Study Area. This justifies its designation as a Principal Thoroughfare. Bingle is defined by commercial and retail uses, promoting more through traffic along the corridor.

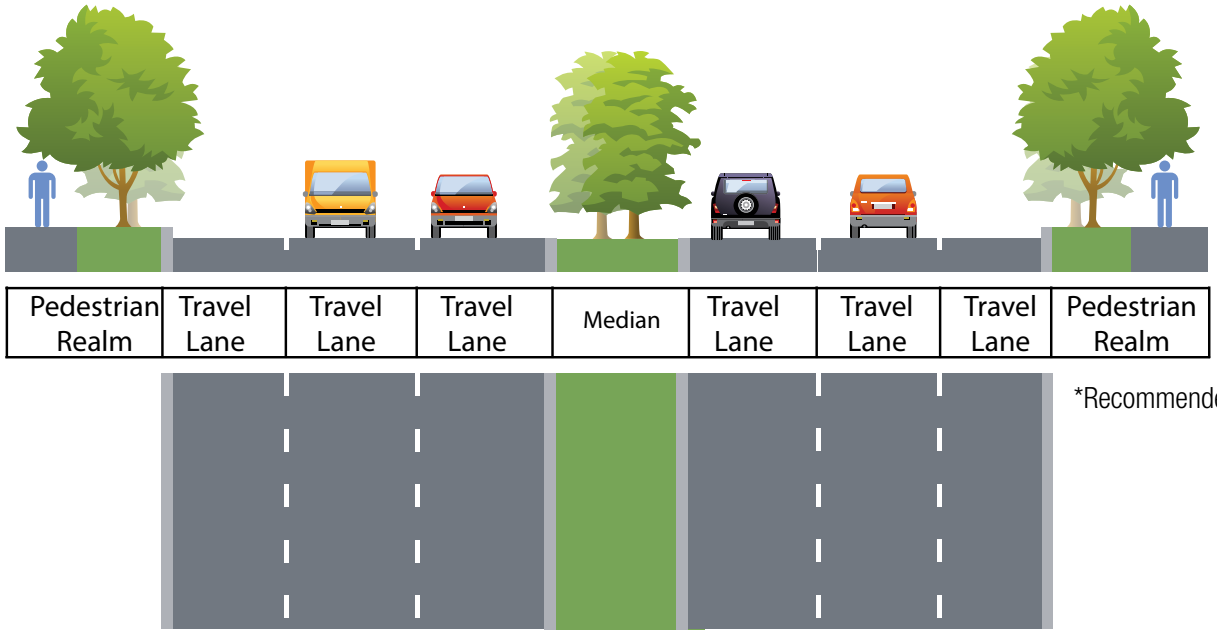
Identified Needs

Public comments indicated that heavy truck traffic is common along this corridor. The intersection of Breen and Bingle as it transitions into N. Houston Rosslyn could potentially use mitigation to enhance the flow at the traffic light. Some portions of Bingle have large gaps in sidewalk connectivity. Similar to other places within the study area, sidewalks at railroad crossings are nonexistent. It was also mentioned that transit is not available along this corridor, which would be useful given its commercial/retail development.

Future Vision

Due to its carrying capacity as a north/south connection, Bingle Rd may maintain its current 6-lanes within 100’ of ROW for the future. Its multi-modal classification is recommended as a Suburban Boulevard. Improvements to the corridor should focus on filling sidewalk gaps and enhancing existing pedestrian facilities. Given the proximity of this corridor to Antione, it is recommended that local transit be accommodated and incorporated where needed to other High Frequency Routes.

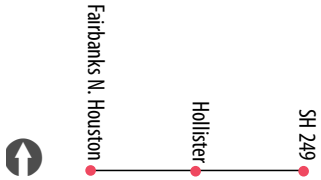
Possible Option(s):



*Recommended Local Bus Route

Breen Drive

Key Factors



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	Suburban Boulevard
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Median

Existing Condition

Breen Drive is currently an east/west connection from Fairbanks N. Houston Road to SH 249. The street design favors a rural schematic accommodating 2-lanes and open ditches and is designated as a Major Thoroughfare. Portions of Breen with 60'-70' of ROW require acquisition of additional ROW. Extension of Breen west to Windfern Road has designated ROW of 100'.

Identified Needs

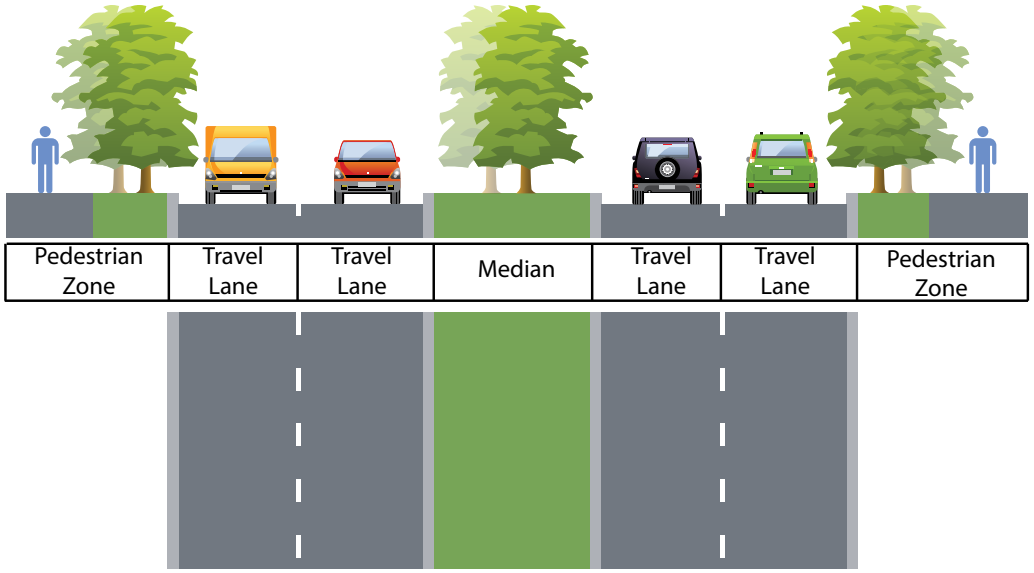
Stakeholders and the public alike noted the absence of sidewalks as a concern for this corridor. The idea of increasing the street to 3- or 4-lanes with sidewalks was indicated as a desirable option.

Another issue identified is the difficult intersection of Breen at Bingle/N. Houston Rosslyn. The intersection of Breen with N. Mount Houston/SH 249 will need to be studied to identify the best option for realignment at the intersection.

Future Vision

Existing and future conditions of the roadway indicate Breen may be best classified as a Suburban Boulevard with a consistent 100' ROW. Future traffic demand indicates a need to expand to 4-lanes with a raised median. Construction of sidewalks is recommended as there are presently none. A bicycle facility is currently not recommended for this corridor given the limited ROW and anticipated traffic volumes. The intersection with N. Mount Houston will need to be redesigned. Possible options can be found in the final system maps in Chapter VII. Outcomes section of this Report.

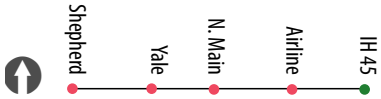
Possible Option(s):



W Crosstimbers Street

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	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Key Factors



Existing Condition

W Crosstimbers Street is currently a 4-lane divided Major Thoroughfare. It is also one of the few existing corridors within the Study Area with a designated bike lane. Crosstimbers provides an east/west continuation of W 43rd Street. Residences are the prominent development type along this small portion of the corridor.

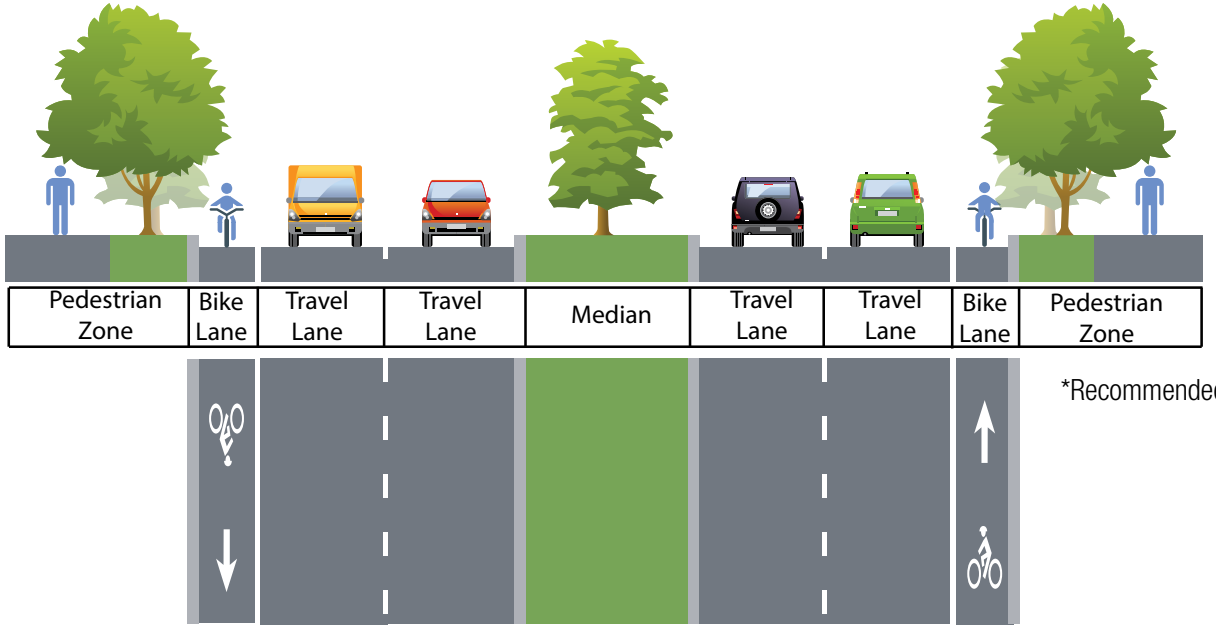
Identified Needs

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

Future Vision

The multi-modal classification of W. Crosstimbers is Suburban Boulevard. W. Crosstimbers should retain the existing bike lane to best accommodate local circulation. For increased safety, an additional five feet from both sides of the right-of-way is warranted. 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

Key Factors

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 Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

Ella Boulevard has an interesting connection through the Northwest area. The street currently exists from IH 610 to Pinemont Drive where it becomes Wheatley Street. It then picks back up in the northern region as two small connections – one from Gulf Bank to Mount Houston as well as a small segment from West Road to Point Blank Drive. The MTFP has Ella Blvd identified as a Major Thoroughfare.

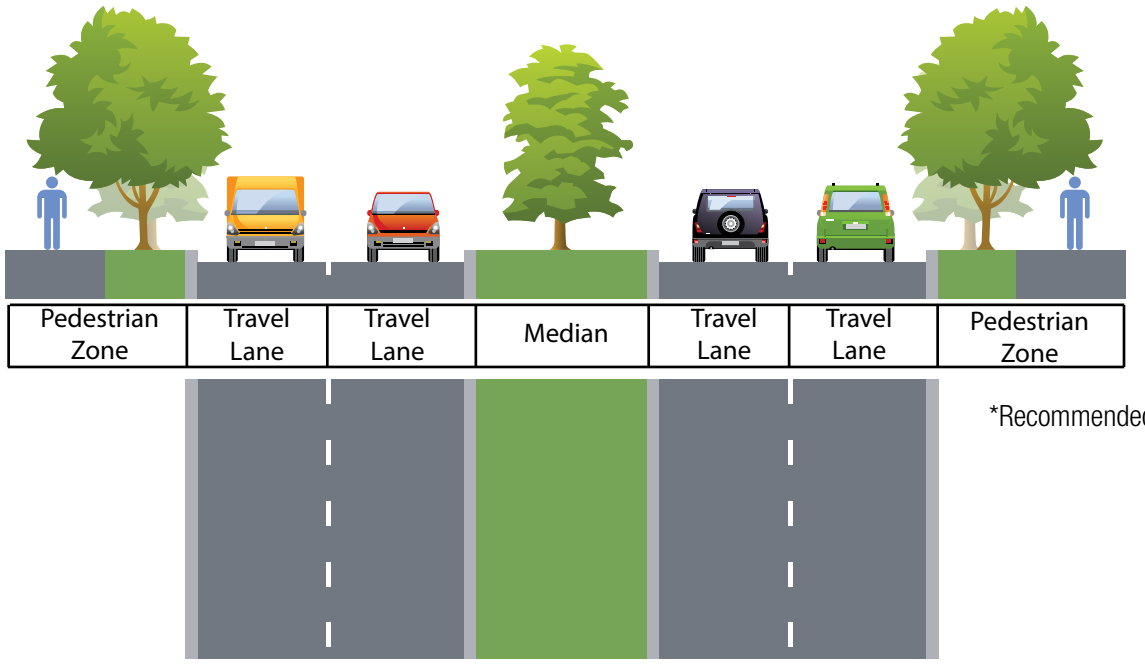
Identified Needs

Intersections are the most prevalent issues along the corridor. Intersections with major thoroughfares and with IH 610, cause heavy traffic, and are regarded as dangerous for both vehicular and non vehicular movement. 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 as a 4-lane divided corridor with the multi-modal classification of Suburban Boulevard. Focus on construction of sidewalks where there presently are none, and the enhancement of existing facilities are priorities for Ella Boulevard. Ella Blvd connects Montgomery down and under IH 610. This, along with other factors, makes it a candidate for a High Frequency Transit facility. The high future volumes are found in the segments of the corridor interacting with the Freeways. The remainder of the corridor predicts volumes closer to the 30,000 mark.

Possible Option(s):



*Recommended High Frequency Transit

Fairbanks N Houston

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

Key Factors

Existing Condition

Fairbanks N. Houston is a Major Thoroughfare moving traffic north/south through the northwest section of the Study Area. It is one of three corridors that fully extends to connect US-290 to Beltway 8. The current cross section is a 4-lane divided corridor with a 30’ median within 100’ of ROW. Sidewalks are nonexistent along the length of the corridor. Development that fronts the corridor is mainly commercial/retail. This increases the through traffic movement along the corridor.

Identified Needs

With the heavy traffic on this corridor, a higher priority is placed on automobile traffic. Widening the road to facilitate the movement of traffic is necessary since projected volumes on the corridor are set to increase as population and employment rise within the Study Area rise.

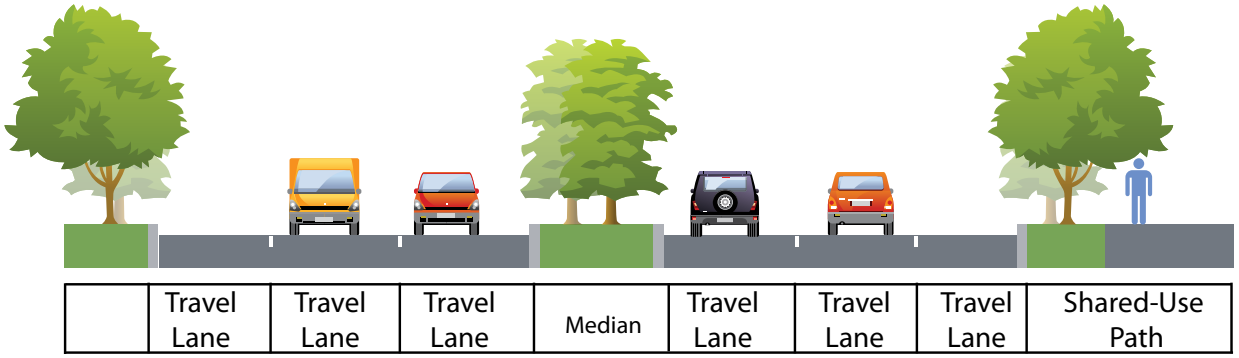
Harris County has previously installed a reliable fiber optic traffic signal communications system along Fairbanks N Houston. This allows the operation of traffic signals along the route to better coordinate with one another. All things being equal, congestion and delay are less here than a similar arterial without signal coordination.

Future Vision

The multi-modal classification recommended for Fairbanks N. Houston is a Suburban Boulevard, and given the importance of the corridor to regional mobility, should be designated as a Principal Thoroughfare on the City’s MTFP. Attention should be given to the enhancement of the pedestrian realm. For instance, sidewalks should be installed along the length of the corridor, especially where currently none exist.

A Shared-Use Path would also be a benefit for the corridor by providing both a pedestrian realm and an off-street bicycle facility. Working with Harris County will be necessary for this corridor improvement, as well as in conjunction with the recommended local bus transit options.

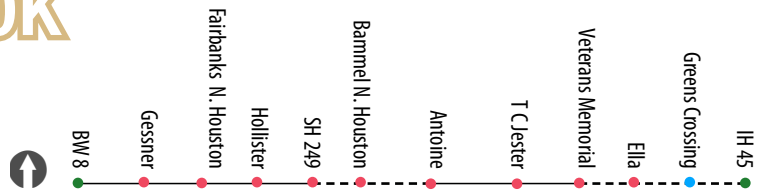
Possible Option(s):



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

Fallbrook

Key Factors



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 east/west Principal Thoroughfare that has not been fully built out as provided by the MTFP. Corridor gaps occur in two places: small portion of the corridor from SH 249 to Old Bammel N Houston Rd; a large segment from Sweetbrook Dr. to IH 45. Fallbrook is designed as a 4-lane divided road with 100' of ROW. The corridor serves a primarily residential context. A small pocket of commercial/retail exists in the northwest section near Beltway 8. The portion of the corridor from Old Bammel N. Houston Road to Sweetbrook Drive has sidewalks on both directions of travel, but the remainder of the corridor does not.

Identified Needs

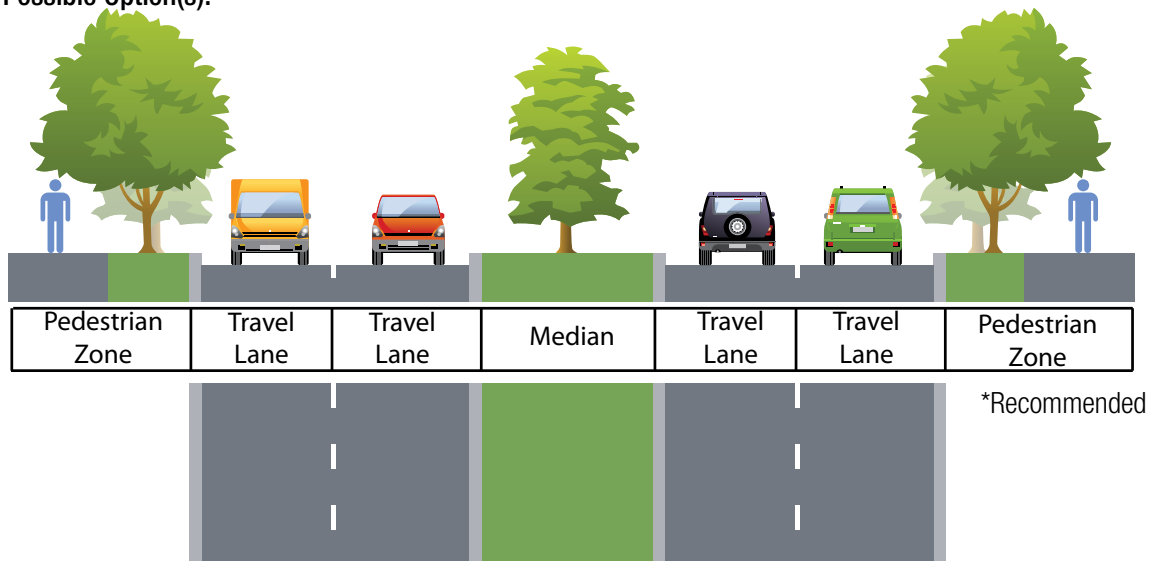
Public input indicated the main priority for the future of this corridor is to have it fully connected for vehicular and pedestrian traffic from Beltway 8 to IH 45. This connection is projected to gain over 10,000 vehicles on average for daily travel if the corridor connections are built out.

Future Vision

Fallbrook's future design would be most suitable as a Suburban Boulevard. Although future model volumes only indicate the need for a 4-lane cross section, the provided corridor example provides an alternative to the Beltway. Given current traffic volumes, the Beltway is only expected to intensify 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. However, to make the corridor less attractive to regional traffic movement and more amenable to local traffic circulation via alternative modes, it is recommended the corridor remain 4-lanes of traffic allowing for greater buildout of the pedestrian network.

It is important to the corridor that significant attention is given to pedestrian accommodations. The City of Houston will need to work with Harris County in developing solutions for pedestrian accommodations to ensure safe and sensible movement along otherwise busy roadways. A local bus facility is recommended for this corridor.

Possible Option(s):



*Recommended Local Bus Route

Gessner Road

Key Factors

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 is a 4-lane divided Major Thoroughfare from Beltway 8 to US-290. The designated ROW for Gessner is 100’. North of W Gulf Bank, the corridor primarily serves residential uses; to the south it serves commercial/retail development. The southern portion of the corridor from Little York to US-290 has sidewalks while the rest of Gessner to the north only has sidewalks on the west side. A section of Gessner from West Road to Fallbrook Drive is missing, with portions of the ROW already designated for the completion of this roadway.

Identified Needs

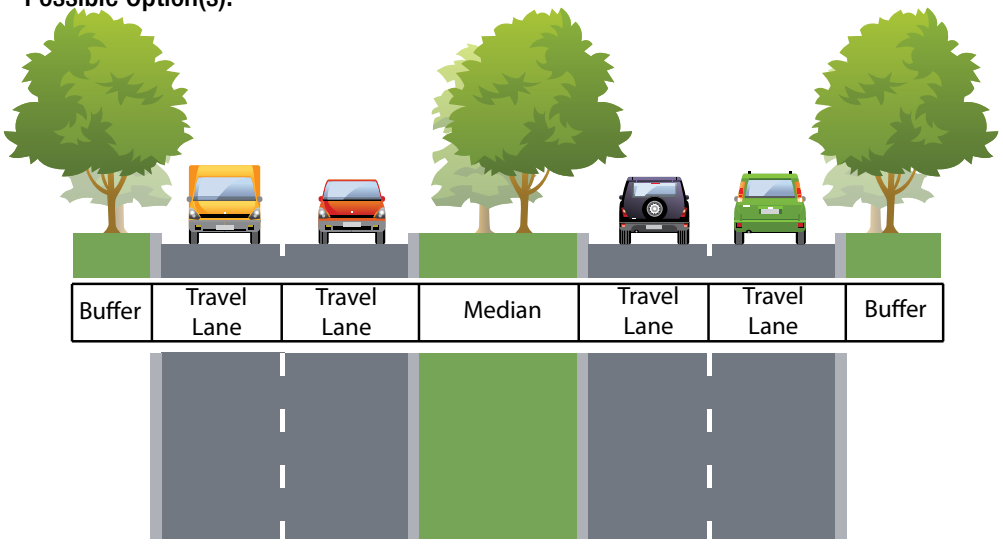
The completion of Gessner was the overall concern for the future of the corridor. Travelers along US-290 and Beltway 8 use Gessner as a cut-through to avoid freeways when traffic is backed up.

Future Vision

The multi-modal classification of Gessner is recommended as a Suburban Boulevard. It should maintain its current cross section of 4-lanes divided within 100’ of ROW.

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

Possible Option(s):



W Gulf Bank Road

Key Factors

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 an east/west (from Beltway 8 to IH 45) corridor with several missing connections between Gessner and Hollister. W. Gulf Bank is a 4-lane divided corridor with 100' ROW. On the City of Houston's MTFP, W Gulf Bank is classified as a Major Thoroughfare.

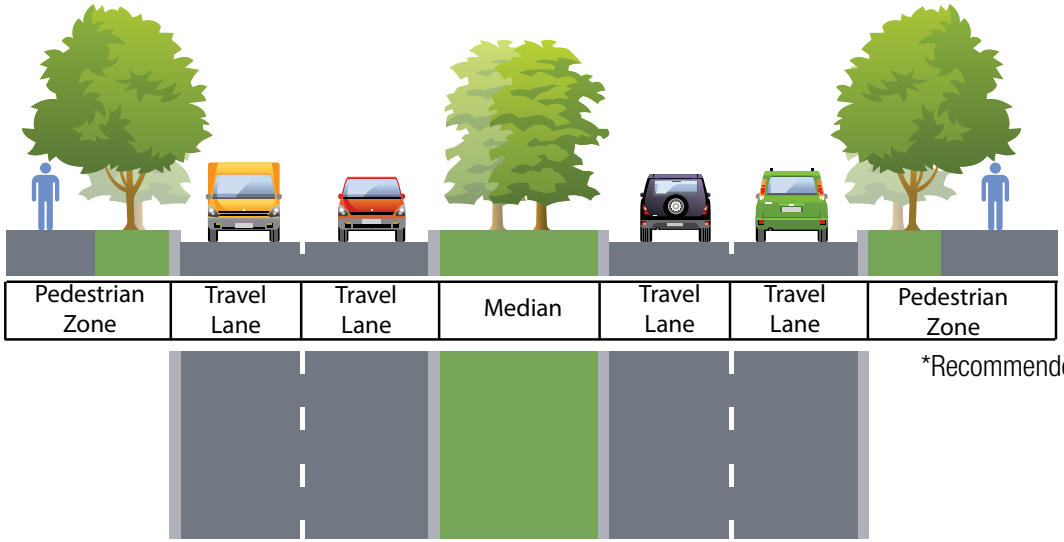
Identified Needs

Although the corridor has some existing facilities for modes other than automobile, improvement to bicycle and pedestrian facilities was suggested by the public. Improvements to crosswalks, sidewalks and signalization for pedestrians, especially near the schools, are a priority. The intersection of W Gulf Bank and Antoine need safer pedestrian crossings. Making transit more available to riders was also desired. The completion of W. Gulf Bank would provide another east/west connection for the Northwest area.

Future Vision

W. Gulf Bank Road is not anticipated to be complete by 2035 due to existing constraints within the ROW. However, based on existing and future traffic conditions the corridor is best suited as a Suburban Boulevard, which may accommodate both local bus service and an enhanced pedestrian zone. Where appropriate, crosswalks should be evaluated for safe crossing of the corridor.

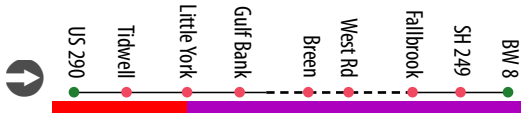
Possible Option(s):



*Recommended Local Bus Route

Hollister Street

Key Factors



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 Road is a discontinuous Major Thoroughfare moving north/south from Beltway 8 to US-290. North of West Road, Hollister has two significant gaps across undeveloped parcels, but the corridor is also sporadic between subdivisions. The road design changes as it moves through commercial/retail development to residential areas from a 4-lane divided corridor to a 2-lane corridor bounded by open ditches. 100' of ROW is designated for the length of the corridor with the exception of two large gaps across undeveloped parcels.

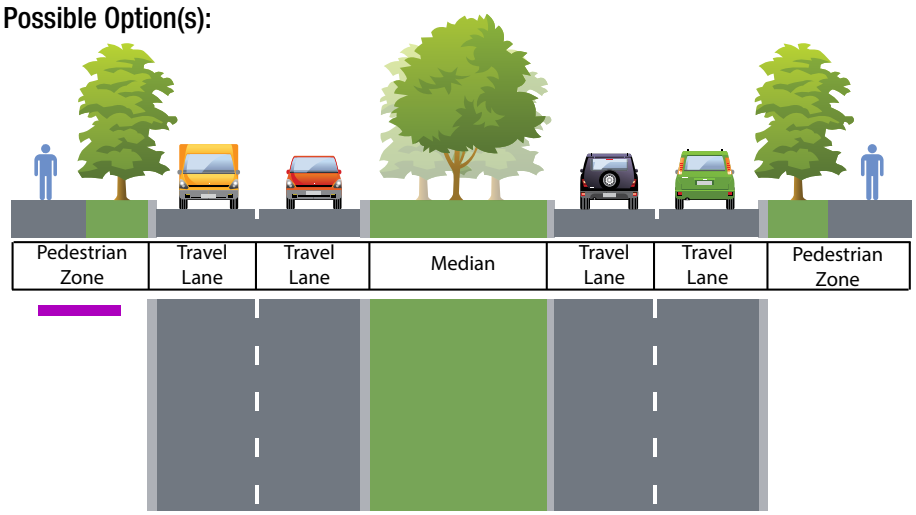
Identified Needs

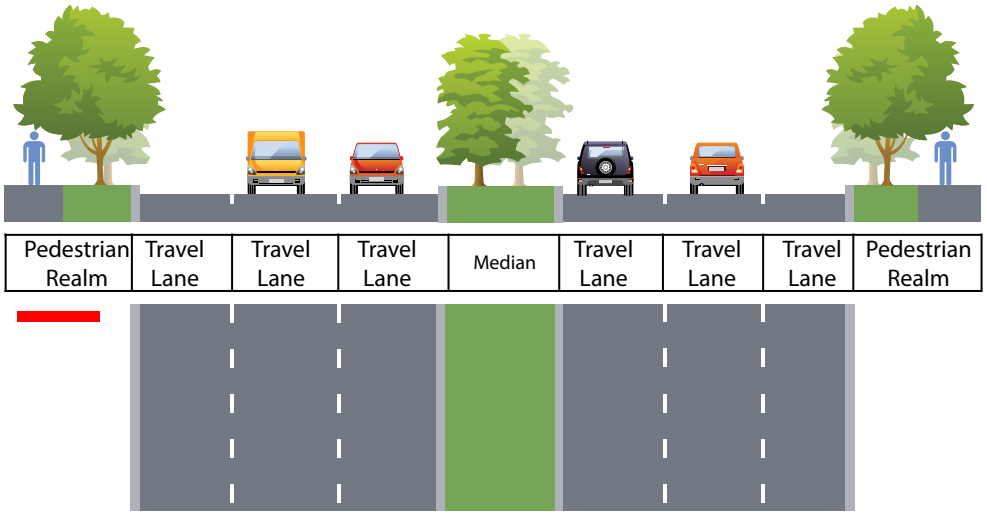
Public input highlighted the need for Hollister Road to be completed. Residences line the corridor for the most part, so providing through connections was indicated as a priority for future growth. Sidewalks are intermittent along Hollister Road, and do not exist in many of the sections within subdivisions. Pedestrian made paths can be seen along these stretches. Residents also expressed a desire for bicycle connections as a means to travel to the White Oak Bayou Trail.

Future Vision

The multi-modal classification of Hollister Road is proposed as a Suburban Boulevard. Completion of Hollister Road is set for 2035, and should be maintained at 4-lanes of traffic (T-4-100) as indicated on the MTFP. However, where provided traffic loads between W Little York and US-290 exceed daily traffic flows of 40,000, the corridor should be expanded to a 6 lane facility (T-6-100). To safely accommodate local access to bus stops and related connectivity, gaps within the sidewalk facilities should also be completed.

Possible Option(s):

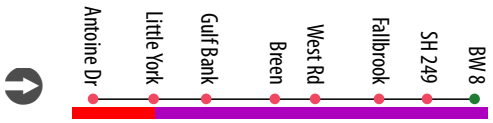




*Recommended Local Bus Route

N Houston Rosslyn Road

Key Factors



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

North Houston Rosslyn Road is a 6-lane divided Principal Thoroughfare from Bingle to Beltway 8. The portion of N Houston Rosslyn Road, from Little York Road to Antoine Drive, is currently not on the Major Thoroughfare and Freeway Plan and is best classified as a Local Street.

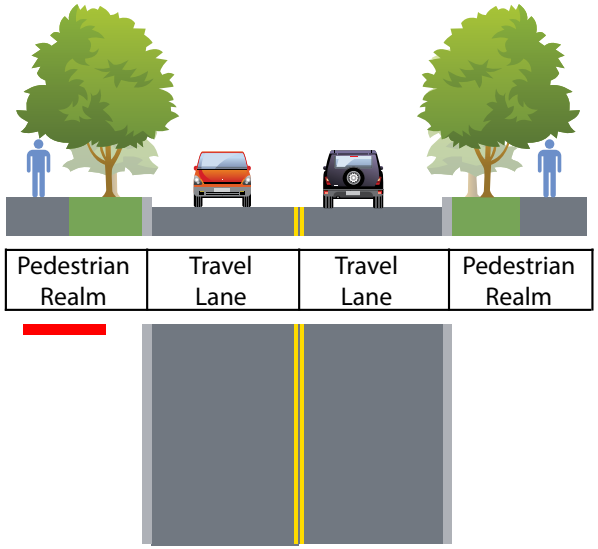
Identified Needs

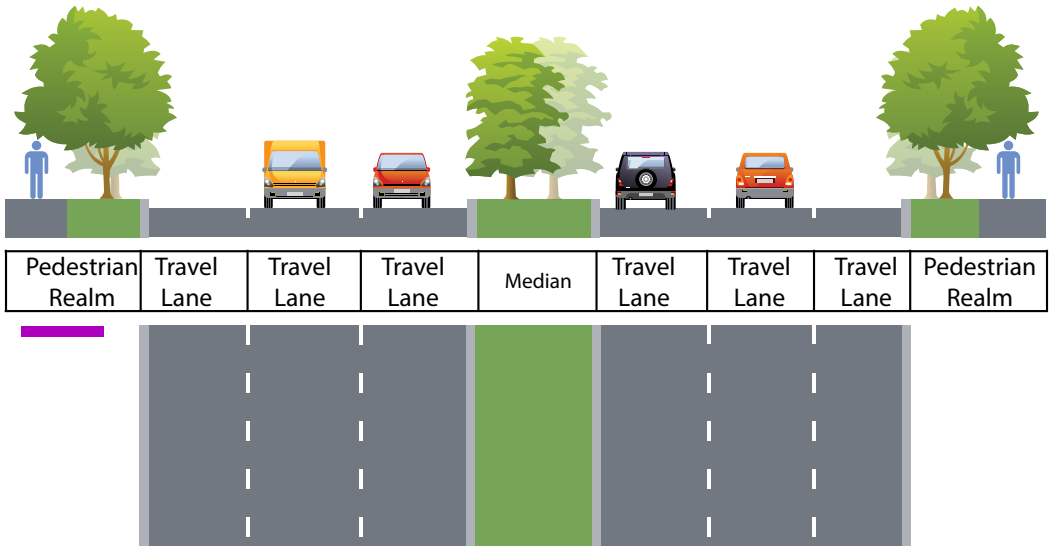
Public input for this corridor did not highlight any big issues. The general desire for street beautification and continuous sidewalks was mentioned.

Future Vision

It is recommended that the corridor maintains its current design and function, with the addition of N Houston Rosslyn from Little York to Antoine to the MTFP as a Minor Collector. The multi-modal classification of N Houston Rosslyn is recommended as an Industrial Boulevard for the 6-lane portion and for the 2-lane segment- Industrial Street.

Possible Option(s):





W Little York Road

Key Factors

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-6-100; C-4-70; P-6-130
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

Existing Condition

West Little York Road is an unusual corridor as it has two different classifications on the MTFP – Major Thoroughfare and Major Collector. This transition occurs when West Little York splits at Victory Drive. The corridor also transitions through three existing cross sections: from US-290 to Hollister, the corridor is 4-lanes with a center turn lane in 120' of ROW; Hollister Road to Victory Drive the corridor replaces the center turn lane for a median within 100' of ROW; from Victory Drive to IH 45 loses the median, but maintains 4-lanes in 60' of ROW.

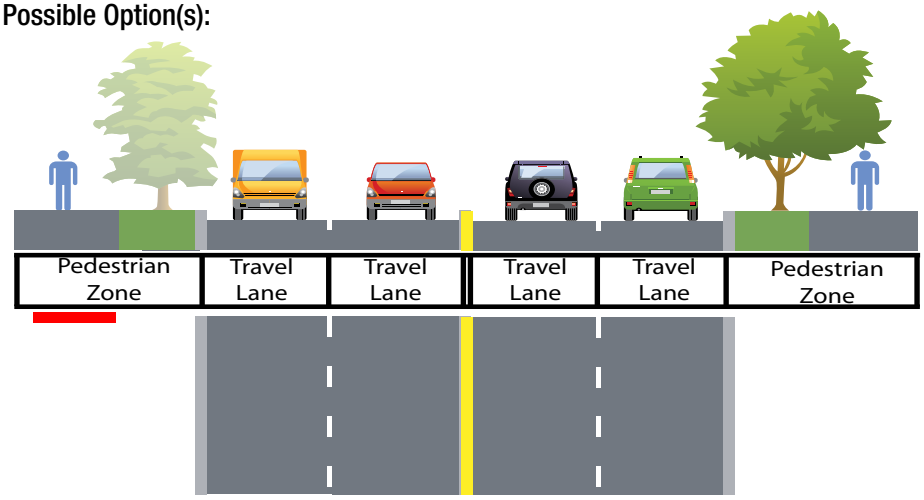
Identified Needs

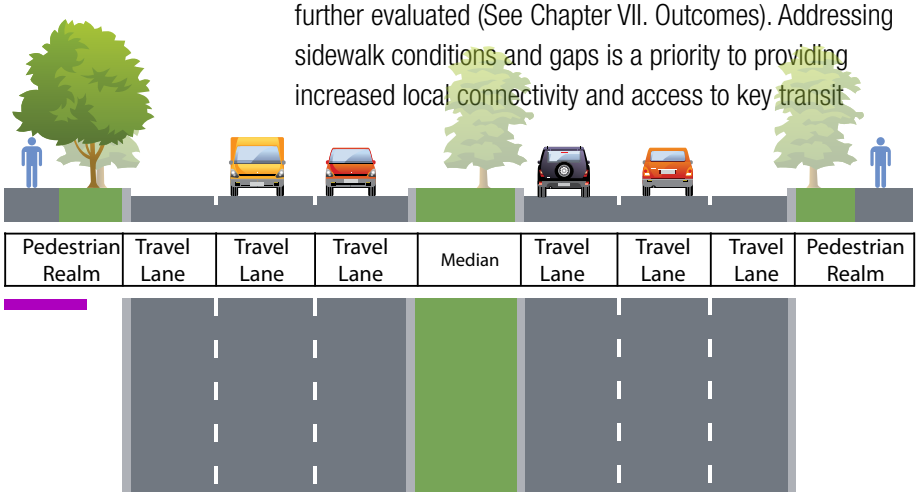
Public input received for this corridor noted a variety of issues. In regards to different mobility uses, transit is noted as lacking for the corridor and is not provided west of Alabonson Road. However, West Little York Road has a transit center at the intersection of Wheatley/ Montgomery/W Little York. Pedestrian facilities are said to have limited availability and are in need of general enhancement. The public also stated there is heavy truck traffic along the corridor.

Future Vision

The recommended multi-modal classification for West Little York Road (from US-290 to Victory Drive) is designated as a Suburban Boulevard. The portion of the W. Little York that is currently a classified as a Major Collector (this less heavily traveled corridor splits southeast at Victory Drive and Alabonson Rd where the more heavily traveled corridor transitions to the name Victory Drive) is proposed as a Suburban Avenue. The addition of a bicycle facility along this smaller corridor is not currently proposed due to safety concerns; however, the corridor is recognized as an east/west connector and as such an existing Gap within the bicycle network to be further evaluated (See Chapter VII. Outcomes). Addressing sidewalk conditions and gaps is a priority to providing increased local connectivity and access to key transit

Possible Option(s):

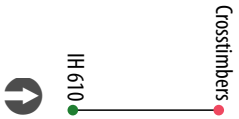




*Recommended Local Bus Route. Bicycle facility gap noted, but not currently recommended (See Chapter VII. Outcomes for more information.

North Main Street

Key Factors



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	Suburban Avenue
Median/CTL/Undivided	Undivided	Median/CTL/Undivided	Undivided

Existing Condition

North Main Street moves from Crosstimbers Streets to IH 610 as a 4-lane undivided road. The corridor maintains 70' of ROW with sidewalks on both directions of travel. North Main Street acts as a Major Thoroughfare as it facilitates movement into the Heights and Northside areas. Locally, the corridor is know as "Church Row" and is seen as the community's link to its economic hub. A school is also present on the north end at the Crosstimbers Street intersection.

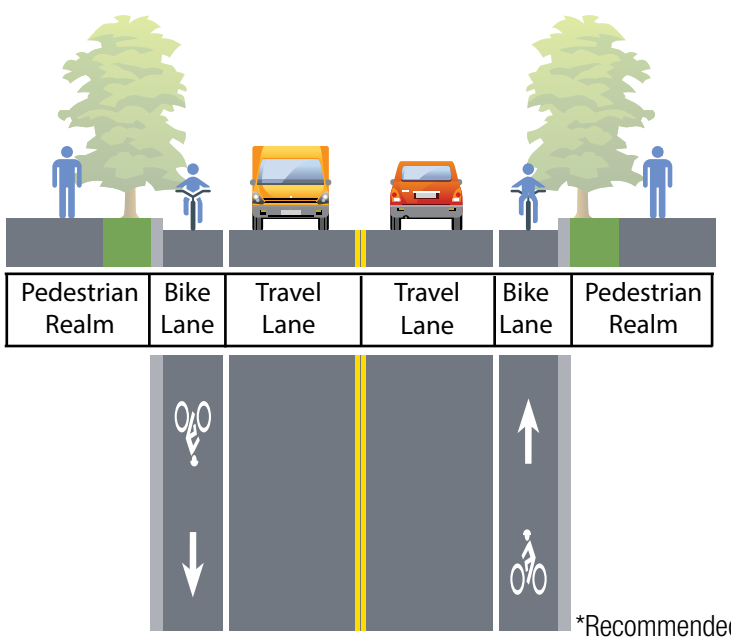
Identified Needs

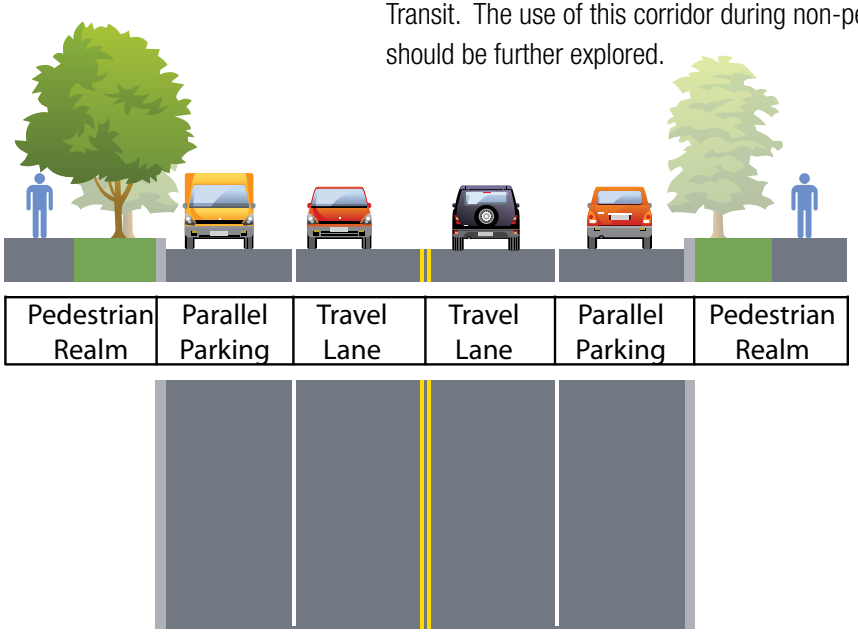
Area residents see this corridor as a gateway into the neighborhood. The intersection of Crosstimbers and North Main is described as the area's current and future economic hub. As such, residents would like to ensure that all users can get to this specific node - pedestrian and bicyclist, alike. Sidewalks 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 Suburban 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 center 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 for High Frequency Transit. The use of this corridor during non-peak hours should be further explored.

Possible Option(s):



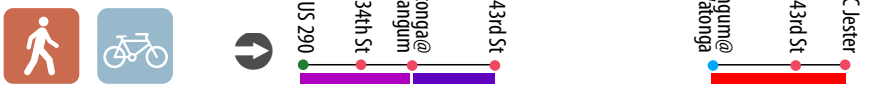


*Recommended High Frequency Transit

Mangum Rd & Watonga Blvd

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

Key Factors



Existing Condition

Mangum Road and Watonga Boulevard are two small corridors connecting TC Jester to US-290 and further south into the Heights area. The connecting corridors share the same cross section of 4-lanes divided within 100' of ROW. Mangum Road begins as a Major Thoroughfare, but then transitions into a Major Collector when it spurs off and Watonga Boulevard continues as the Major Thoroughfare. Sidewalks are continuous for the most part, but have stretches that are in poor condition. Transit is not available on Mangum Road or Watonga Boulevard.

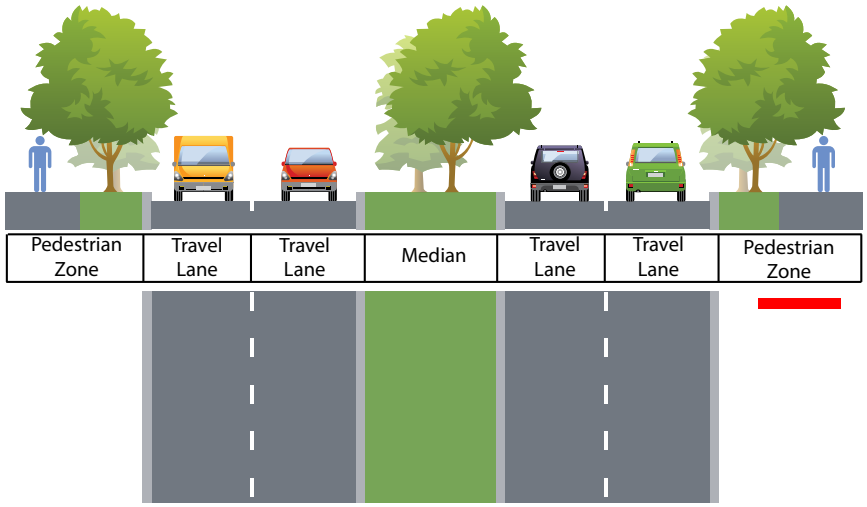
Identified Needs

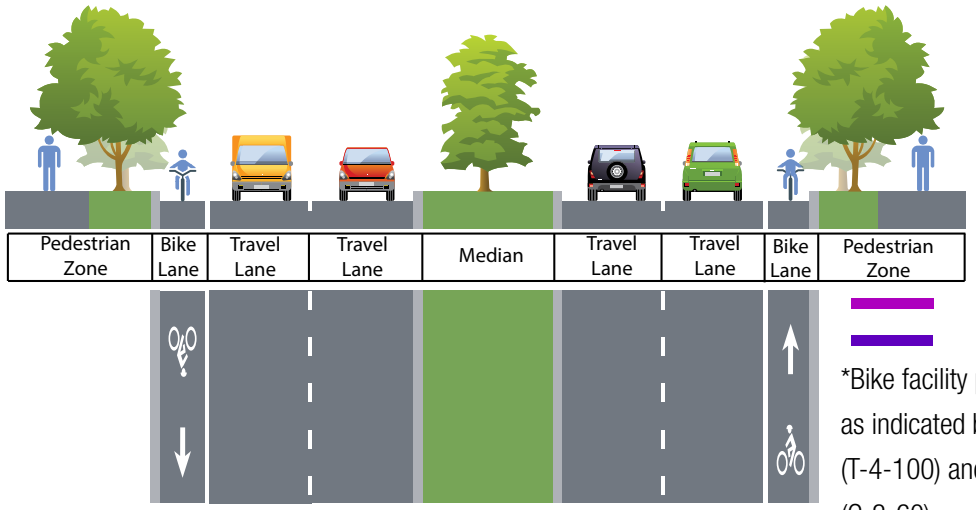
The intersection of W. 43rd and Watonga Boulevard is identified as dangerous, especially with the two-way left turn lane. Mitigation of this intersection is necessary for this corridor. Another need assessed through public input was the general enhancement of pedestrian facilities up to the intersection at TC Jester to provide a connection with the White Oak Bayou Trail.

Future Vision

Where Magnum Road and Watonga Blvd form a continuous corridor, the multi-modal classification of Suburban Boulevard is recommended given higher traffic flows. For the section of Mangum Road that splits into a more residential context at Watonga, a Suburban Street is more appropriate. Attention given to this corridor should focus on enhancing the pedestrian realm. This includes constructing sidewalks where they are not present, and improving existing sidewalks as redevelopment occurs. 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.

Possible Option(s):

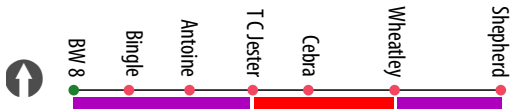




*Bike facility present as indicated by purple (T-4-100) and blue bar. (C-3-60).

Pinemont Drive

Key Factors



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	Suburban Boulevard
Median/CTL/Undivided	Med/CTL/Und	Median/CTL/Undivided	Med/CTL/Und

Existing Condition

Pinemont Drive is a Major Thoroughfare that connects US-290 to Shepherd Drive within the Northwest area. Pinemont Drive transitions through three cross sections all within 80’ of ROW. From US-290 to TC Jester, it is a 4-lane divided corridor with bike lanes on both directions of traffic; from TC Jester to Ella, the corridor exchanges the median for a center turn lane, and loses both bike lanes; from Ella to Shepherd, the corridor changes to a 2-lane undivided road with an open ditch to the north and a sidewalk to the south. Pinemont has a connection to the White Oak Bayou Trail near the intersection with TC Jester.

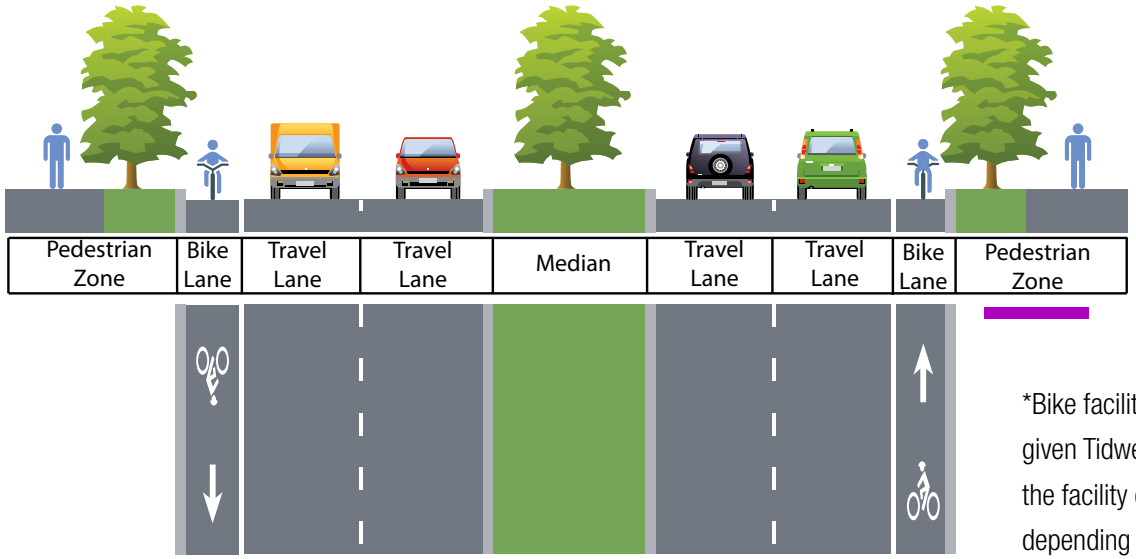
Identified Needs

Sidewalks throughout the corridor are pretty consistent and in good condition except for at the rail crossings where no paved facilities for pedestrians or bicyclists are apparent. Public input also indicated several intersections in the commercial/retail area that cause problems, including the intersections with Antoine, TC Jester, and Ella/Wheatley.

Future Vision

Pinemont Drive is anticipated to remain as a 4-lane Major Thoroughfare appropriate for Suburban Boulevard designation. The existing bike lane or a potential Sharrow is recommended as continued key factor providing necessary east/west connection within the future bicycle system. The identified intersections will need to have the mitigated improvements as recommended in another chapter of this Report.

Possible Option(s):



*Bike facility currently exist up to TC Jester, but a noted gap to Shepherd is evident given Tidwell is not recommended in this section for bikeway traffic. However, although the facility example is presented as a bike lane a sharrow may be more appropriate depending on ROW constraints. Speeds should be adjusted where safety concerns are evident.

Rosslyn Road

Key Factors

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	2	New MTFP Designation	C-2-80; C-3/4-80
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

Existing Condition

Rosslyn Road is currently a 2-lane undivided road without curb and gutter, extending from Judiway Street to 43rd Street. On the western side of the corridor is a sidewalk, but on the east, the corridor is edge by an open ditch and then a sidewalk. The Major Thoroughfare and Freeway Plan designates Rosslyn Road as a Major Collector, and is identified as being built to 4-lanes.

Identified Needs

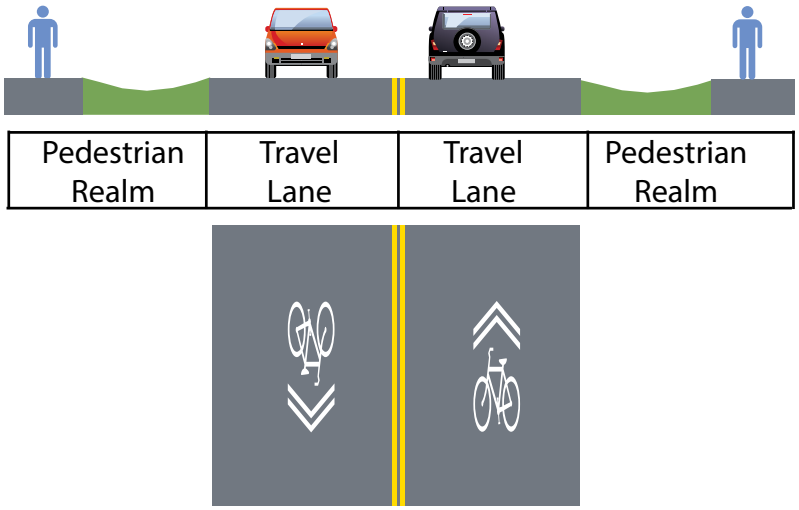
Rosslyn Road is a continuation of E TC Jester Boulevard. It crosses W 34th Street, which affects vehicular travel as the road reduces from a 4-lane boulevard to a 2-lane residential collector. Some pedestrian facilities and amenities are lacking along this road.

Future Vision

Current and projected traffic volumes along with traffic patterns do not show a need for this corridor to be built out to the MTFP C-4-80 designation from 43rd Street to Judiway. However, where Rosslyn Road is currently proposed as a new facility, a C-3-80 or C-4-80 designation on the MTFP should be explored.

Improvements to the corridor could include creating pedestrian crosswalks connecting residential streets across Rosslyn Road. Some small locations could also benefit by enhancements to the existing sidewalks to improve their condition. A bicycle facility is recommended for this corridor as a way to transition to the White Oak Bayou Trail. The future multi-modal classification for the corridor is a Suburban Avenue.

Possible Option(s):



State Highway 249

Key Factors

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 corridor with a center turn lane and 120'-180' of ROW. Beltway 8 is the northern limit of SH 249 (also named Tomball Pkwy) within this Study Area. It continues on to the east as SH 249 (also known as W Mt Houston Rd). SH 249 has curb and gutter, but does not have sidewalks on either directions of travel. SH 249 is a Major Thoroughfare.

Identified Needs

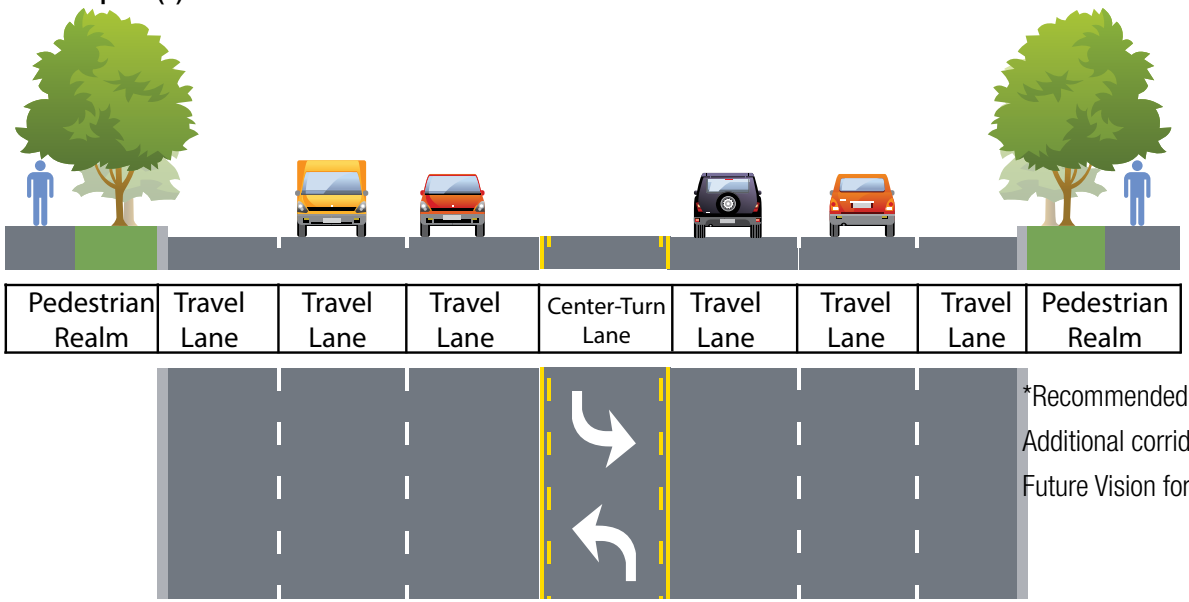
Public comment, along with visual study, showed there is a need for pedestrian facilities along the corridor. There are many man-made paths that have been trudged out by pedestrians moving between residences, businesses, and bus route stops. Crossing SH 249 at intersections is difficult due to traffic issues, coupled with the non-pedestrian friendly design. Several intersections need to have further review if design layout is changed. These are SH 249/West/ Antoine and SH 249/Mt Houston.

Future Vision

State Highway 249 focuses on the facilitation of automobiles through the corridor. It should gain the multi-modal classification of a Suburban Boulevard and be updated on the MTFP as a Principal Thoroughfare. Given expected demands along the corridor, it is recommended that a corridor level analysis, like access management or bus rapid transit studies, be conducted.

Studies such as these assist in the proper determination of certain corridor amenities such as High Frequency Transit and/or a raised median barrier, which may prove a feasible option. With this study, identification of a buffered shared use paths' could also result as an outcome of this type of additional analysis.

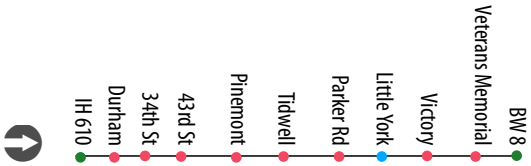
Possible Option(s):



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

N Shepherd Drive

Key Factors



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	6	MTFP 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	Suburban Boulevard
Median/CTL/Undivided	Median/CTL	Median/CTL/Undivided	Median/CTL

Existing Condition

Shepherd Drive runs from IH 45 to just north of IH 610, where it splits into the Shepherd Drive/Durham Drive couplet. Development along Shepherd Dr. is mainly retail and commercial. The corridor is 6-lanes divided and transitions between 150'-200' of ROW as the median transitions into a wide esplanade north of Montgomery Road. The remainder of the corridor maintains 100' of ROW. It is designated as a Major Thoroughfare. Currently, no bike facility exists along the corridor, but sidewalks are consistent on both sides.

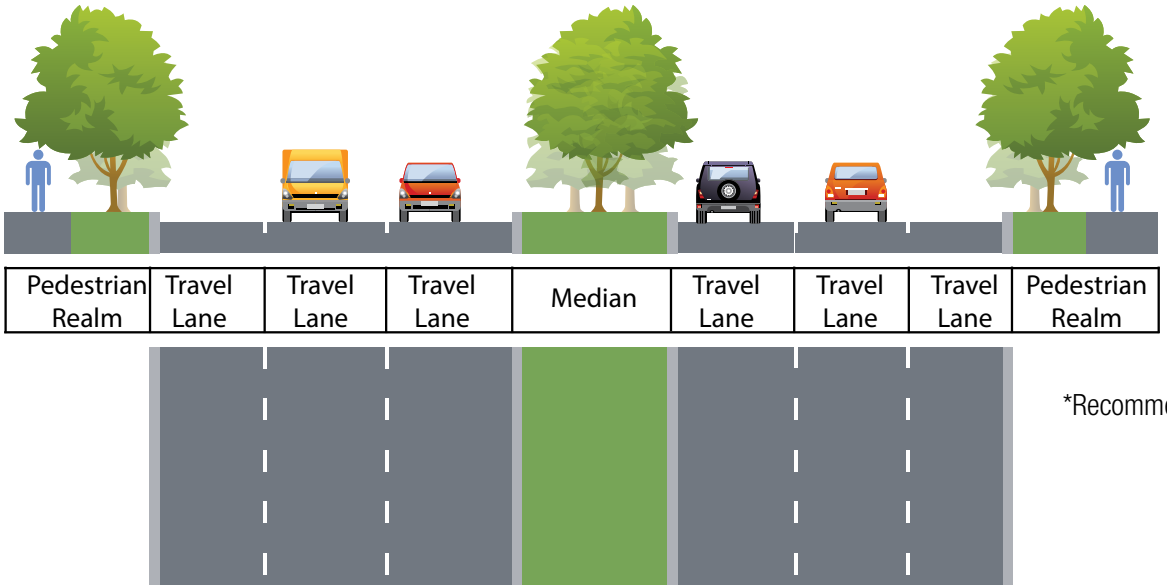
Identified Needs

Traffic back up at intersections is a point of concern for stakeholders traveling the corridor. Shepherd Drives intersections with Tidwell, 43rd and 34th need analysis to determine potential improvements to traffic flow and safety. Shepherd Drive at IH 45 backs up onto the North-bound ramp and causes major congestion issues. Near the intersection with 34th Street, a slip street on the east side of Shepherd Drive - called N Shepherd Trail - confuses drivers gong to retail locations.

Future Vision

The multi-modal classification for Shepherd Drive would best be identified as a Suburban Boulevard. Changes to the 6-lane corridor with a controlled center turn lane would include repurposing some of the ROW to allow for a shared use path if feasible. If unable to create a shared use path, widening sidewalks would be the alternative. 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 Bus Rapid Transit/High Frequency Transit

TC Jester Boulevard

Key Factors

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100/120
Existing Counts Range	9,000-23,500	Future Volume Range	11,500-54,000
Right-of-Way	90'-100'	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

TC Jester Boulevard enters the Northwest Study Area from IH 610 as two separate corridors: East TC Jester Blvd and West TC Jester Blvd. E TC Jester Blvd turns into Rosslyn Road just north of W 34th Street. W TC Jester Blvd is a 4-lane divided corridor with 100'-120' of ROW. This portion of the corridor continues as TC Jester through the remainder of the Study Area after Judiway Street. The corridor is home to residential development with a few nodes of commercial properties. The MTFP designates the boulevard as a Major Thoroughfare. The White Oak Bayou Trail follows on the west side of TC Jester Blvd up to its northern limit at Victory Drive.

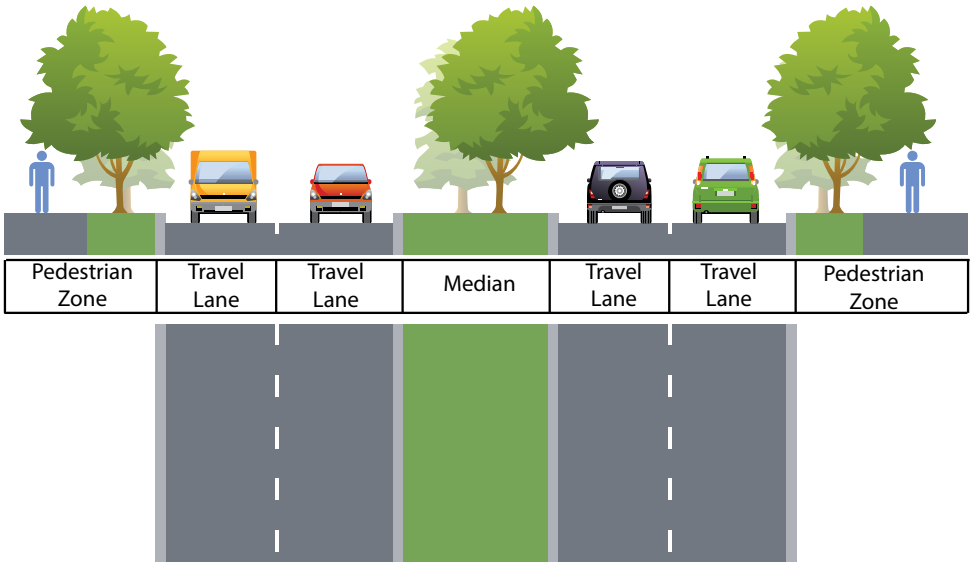
Identified Needs

According to the MTFP, TC Jester has the potential to be built out to connect to Beltway 8 in the north, providing another through north/south connection. Intersections are a topic of concern for the corridor. TC Jester is the closest north/south corridor to the intersection of IH 610 and US-290, and the on-ramps cause major traffic delays. Traffic delays are common along the corridor, especially at the intersections with other Major Thoroughfares. 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

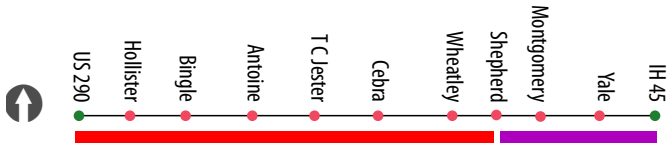
The multi-modal classification for TC Jester Blvd would best be suited as a Suburban Boulevard. The 4-lane divided cross section is an efficient use of the 100' of ROW. Connecting a bicycle facility to the White Oak Bayou Trail is important to creating a multi-modal facility with a functional purpose, but the exact design will depend on the vision of Complete Streets adopted by the City of Houston. This will help to facilitate the movement of residents in the adjoining neighborhoods to the trail.

Possible Option(s):



West Tidwell Road

Key Factors



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 an east/west corridor connecting US-290 to IH 45. It is designed as 4-lanes divided with 80'-100' of ROW. W. Tidwell moves between residential and commercial development, with most of the retail/ commercial properties to the east of Shepherd Drive. Tidwell Road also has heavy multi-family development. The White Oak Bayou Trail crosses W. Tidwell Road just west of TC Jester Blvd. Sidewalks are fairly consistent throughout the corridor, but pedestrian facilities across the bridges are lacking. Presently, no bicycle facility exists along this Major Thoroughfare. Transit exists along the corridor except from Wheatley Street to Shepherd Drive where the route jumps down to Pinemont.

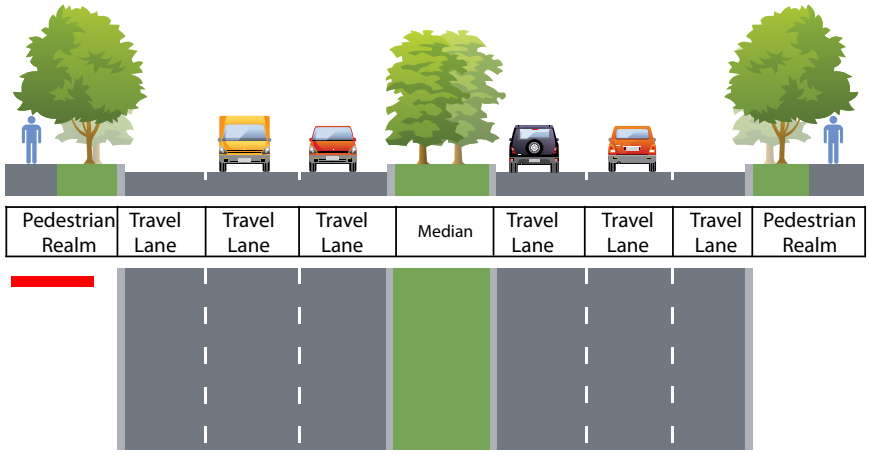
Identified Needs

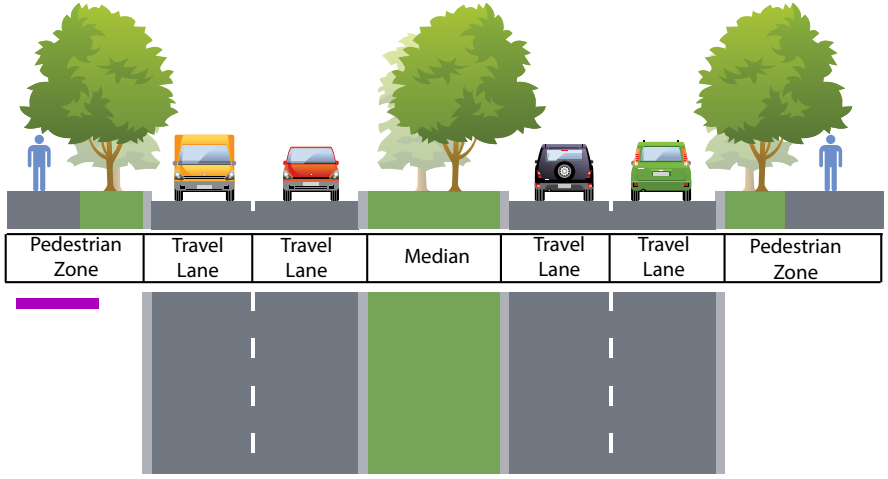
Comments from the public identified most intersections along the corridor as in need of safety and efficiency improvements. Specific intersections that are in need of mitigation include those with US-290 and with US 249. In addition to these improvements, connecting sidewalk gaps through the undeveloped segments of the corridor is important to residents and stakeholders. This would provide a through, safe connection to the White Oak Bayou Trail for residents along the corridor.

Future Vision

The 4-lane divided design 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 demand. Necessary improvements to the corridor include sidewalks where they are not currently present, and enhancing existing sidewalks. W. Tidwell Road is best assigned the classification of Suburban Boulevard. A High Frequency Transit route would be an added benefit to the corridor as well.

Possible Option(s):





*Recommended High Frequency Transit

Veterans Memorial Drive

Key Factors

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	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 connects IH 45 to SH 249 as a Major Thoroughfare. The portion of the corridor is 4-lanes and transitions at W. Mount Houston Road between a divided corridor with a median, to an undivided corridor with the road widening out at strategic places to allow for a center turn lane. From US 249 to BW 8, the corridor does not have curb and gutter, but rather open ditch on both sides. Veterans Memorial Drive primarily consists of residential development, but provides for regional mobility between IH 45 and BW 8.

Identified Needs

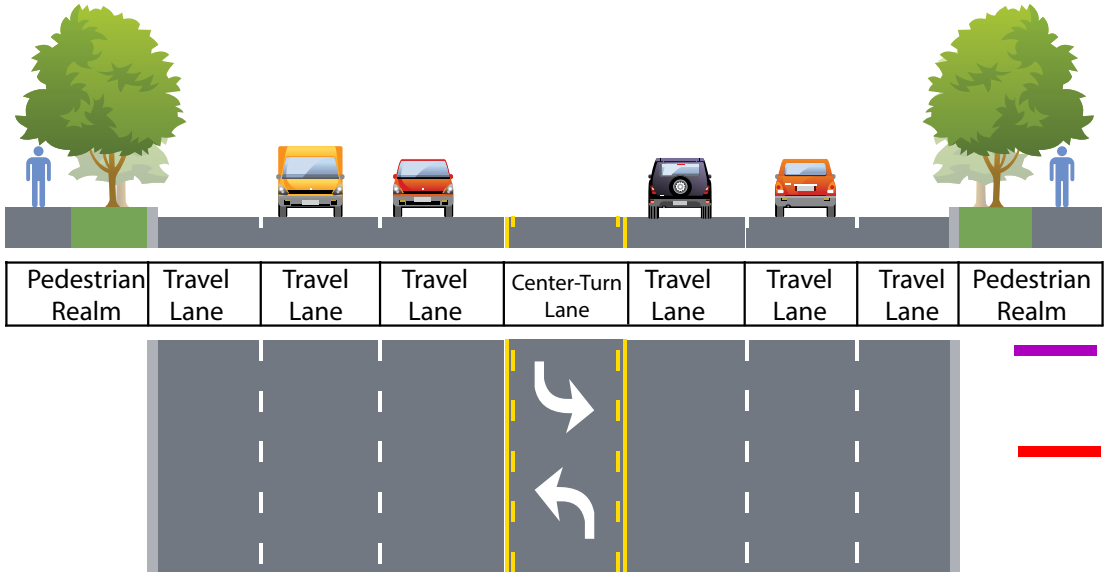
Traffic issues are present along the corridor and are apparent at certain intersections. The light before IH 45 causes traffic to build up and creates delay. Mitigation to this intersection, as well as the one at W Gulf Bank and Veterans Memorial Drive, would improve traffic flow along the corridor. This is essential to the future of the corridor. Creating a connected pedestrian zone along Veterans Memorial Drive is also important as the corridor continues to develop.

Future Vision

Veterans Memorial Drive would best serve future conditions by widening to 6-lanes for the length of the corridor by 2035 and, given its regional significance, reclassified as a Principal Thoroughfare for its entirety. This will increase its carrying capacity to match the projected volumes for the corridor. With the high number of commuters on this thoroughfare, the multi-modal classification for Veterans Memorial Dr. is best described as a Suburban Boulevard. Also, specific lane designation to separate traffic heading to IH 45 North from IH 45 South would help alleviate the traffic congestion at this intersection.

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.

Possible Option(s):



*Recommended High Frequency Transit

Note: Raised median from SH 249 to IH 45

Victory Drive

EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	P-6-100
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

Existing Condition

Victory Drive's western limit is at W Little York Road, and it extends eastward until it rejoins Little York Road at Stuebner Airline Road, just before IH 45. This Major Thoroughfare acts as an alternative through route to Little York Road. Most of the development that fronts Victory Drive is residential. Its cross section is a 4-lane divided corridor with fairly continuous sidewalks on both directions of travel. Victory Drive crosses an offshoot from the White Oak Bayou, which has the potential to be a trail connection.

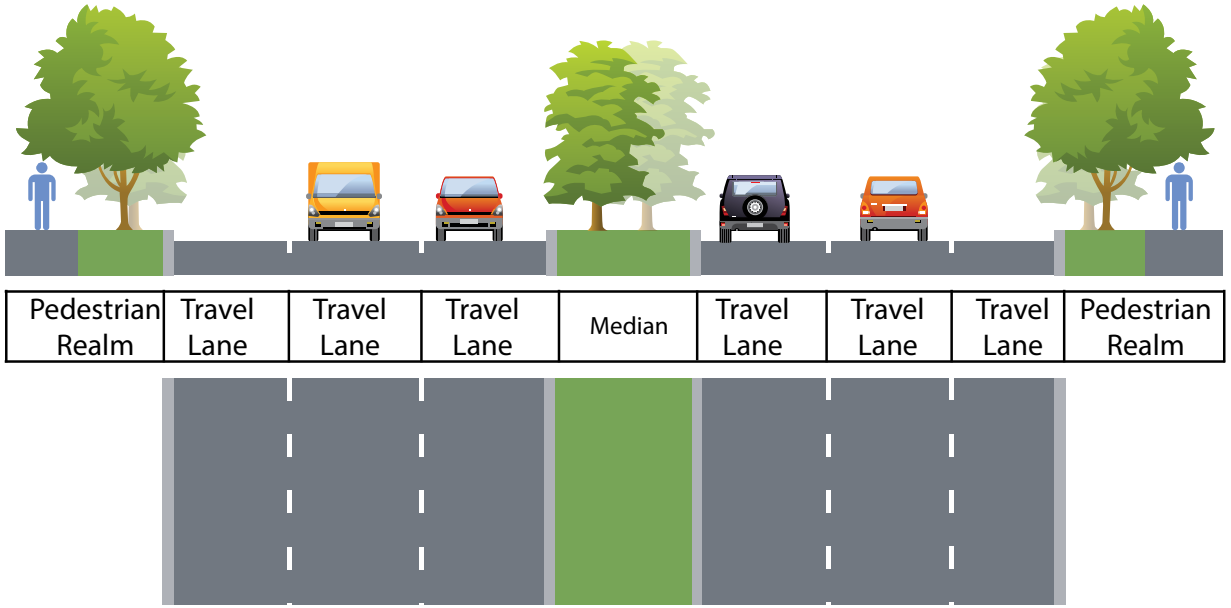
Identified Needs

Public comment identified intersections as the major issue along Victory Drive. These intersections cause traffic back-up and delays. Trucks use the corridor to connect through with Little York Road instead of following Little York as it deviates to the south, and this creates heavy traffic issues. Connections to the White Oak Bayou trail from Victory Drive are needed to facilitate the movement of pedestrians to this trail. Bicycle facilities are not present along the corridor, either.

Future Vision

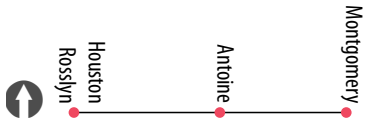
Victory Drive would benefit by increasing from 4- to 6-lanes by 2035. This expansion will encourage through traffic to use this corridor instead of the W Little York Road offshoot, which travels through a residential neighborhood. Victory Drive can be designated as a Suburban Boulevard for its multi-modal classification. Intersection mitigation improvements to signal timing is critical for this corridor. The intersections of Victory Drive with the following cross-streets are in need of improvement: Antoine, TC Jester, W. Montgomery, and Shepherd.

Possible Option(s):



West Mount Houston

Key Factors



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

West Mount Houston Road is a 4-lane divided road with discontinuous sidewalks. It is identified as a Major Thoroughfare on the MTFP. ROW along the corridor is 100'. This section of the corridor is heavily under utilized given the re-configuration of Victory as the primary route for traffic flow starting at Alabonson Road. As a result, this portion of West Mount Houston currently carries loads more appropriately seen along residential streets.

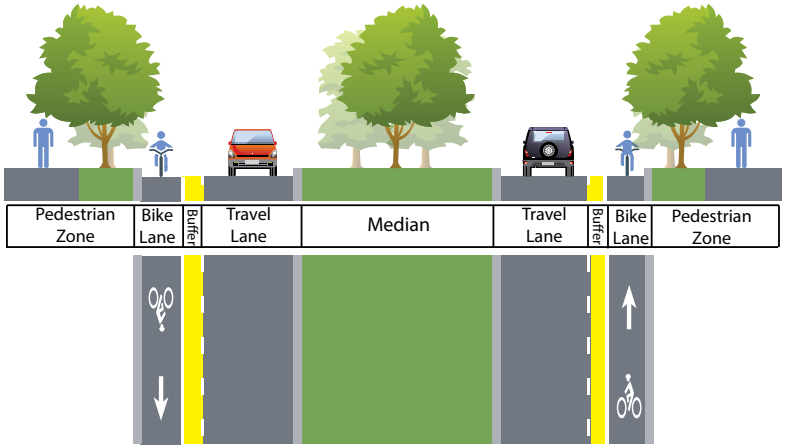
Identified Needs

The intersection of West Mount Houston Road and West Montgomery Road, needs attention if it becomes prudent that the W Mt Houston Rd should connect with SH 249. Consideration of the two schools at this intersection should also be taken into account when planning for the future of the corridor. This is especially true regarding the future construction of sidewalks, which would benefit the schools greatly.

Future Vision

The portion of West Mount Houston to the west of SH 249 should be downgraded on the MTFP from a Major Thoroughfare to a Major Collector with just two lanes of operational traffic. If this occurs, this portion of the corridor could re-purpose the outside travel lanes to be buffered bike lanes/sharrows. The multi-modal classification of this portion of the corridor could then be assigned as a Suburban Street.

Possible Option(s):



West Montgomery Rd

Key Factors

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 offshoots from Breen Road and continues to West Tidwell Road. West Montgomery has two different road cross sections. From SH 249 to Gulf Bank Rd, the Major Thoroughfare is 2-lanes undivided with a center turn lane; the remainder of the corridor is 4-lanes divided by a median. The 4-lane portion of the corridor has sidewalks on both directions of travel, but the 2-lane section does not have any sidewalks. ROW is 80’ throughout the corridor.

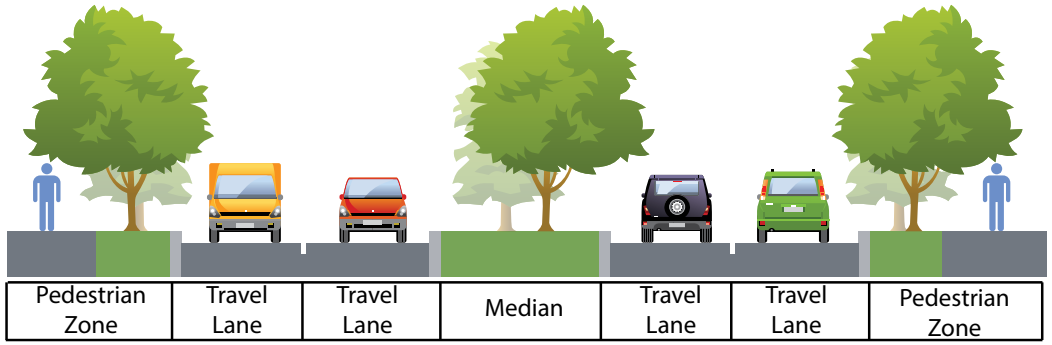
Identified Needs

The intersection of W Montgomery Rd with SH 249 and Mt Houston needs attention should more development occur near this area. Parts of this corridor are already under construction, and future plans should take this into consideration.

Future Vision

West Montgomery Road operates well within the 4-lane divided portion. The 2-lane portion of the corridor from West Mount Houston Road to West Gulf Bank should be expanded to 4-lanes by 2035, given that funding is available. Sidewalk gaps need to be filled in and portions of the corridor with poor quality should be enhanced when able, as this can enhance the viability of this alternative means of transportation. A bicycle facility along this corridor is not warranted. The multi-modal classification best suited for West Montgomery Road is a Suburban Boulevard. A High Frequency Transit facility is also recommended for this corridor.

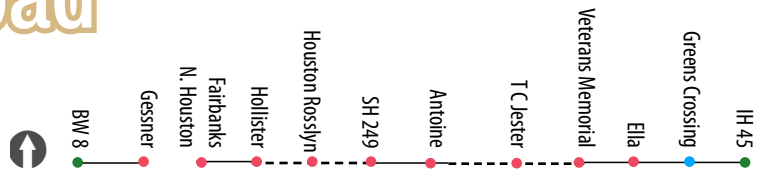
Possible Option(s):



*Recommended High Frequency Transit Route

West Road

Key Factors



EXISTING CONDITIONS:		FUTURE CONDITIONS:	
Existing Lanes	4	MTFP Designation	T-4-100
Existing Counts Range	18,000	Future Volume Range	35,500
Right-of-Way	100’	Proposed MMC	Suburban Boulevard
Median/CTL/Undivided	Median	Median/CTL/Undivided	Median

Existing Condition

West Road is an extremely discontinuous corridor moving from Beltway 8 to IH 45. Currently, there are four segments of West Rd, all with varying lengths, but maintaining the same 4-lane divided street design. Sidewalks are not present along any section of the corridor, neither is a bike facility. Residences line both sides of the existing corridor. The City of Houston’s MTFP designates the corridor as a Major Thoroughfare with 100’ ROW.

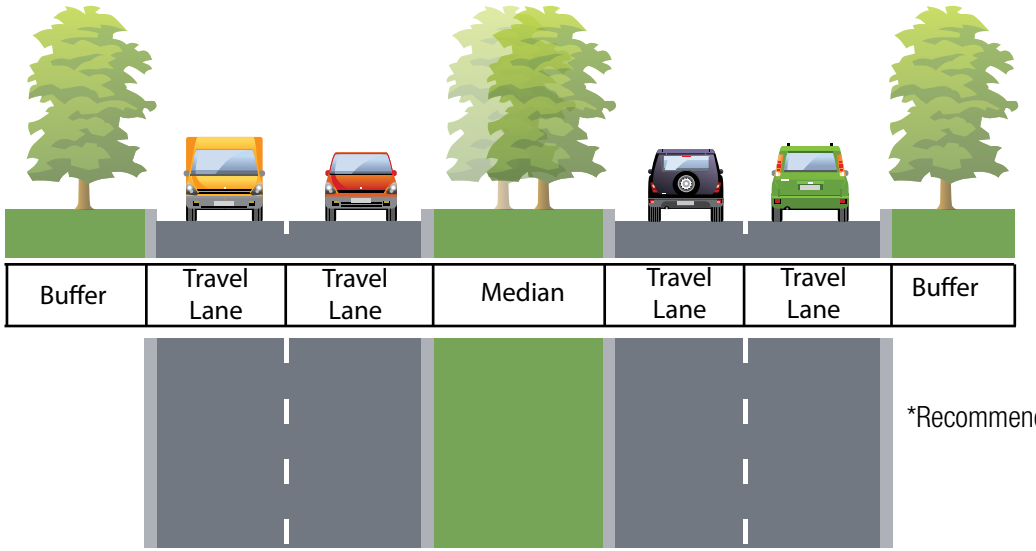
Identified Needs

Connecting West Road was not a priority based on public input. This is due to the separation of existing segments, which diminish the feel that this is a through corridor. The primary concern, however, was increasing the pedestrian realm of the segments that are currently built and in operation today. Existing segments lack sidewalks, but evidence of pedestrian use are evident given the footpaths that can be seen on both sides of the thoroughfare.

Future Vision

Completing 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. Construction of new sidewalks, and replacement of sidewalks in poor condition should be made a priority for this corridor. 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 route, is recommended for the length of the corridor.

Possible Option(s):



*Recommended Local Bus Route

Wheatley (Ella Blvd)

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

Key Factors

Existing Condition

Wheatley is a continuation of Ella Boulevard. Portions of the corridor do not currently exist. From Tidwell to Little York, the corridor is currently 4-lanes with a median. It is classified as a Major Thoroughfare on the City of Houston's MTFP.

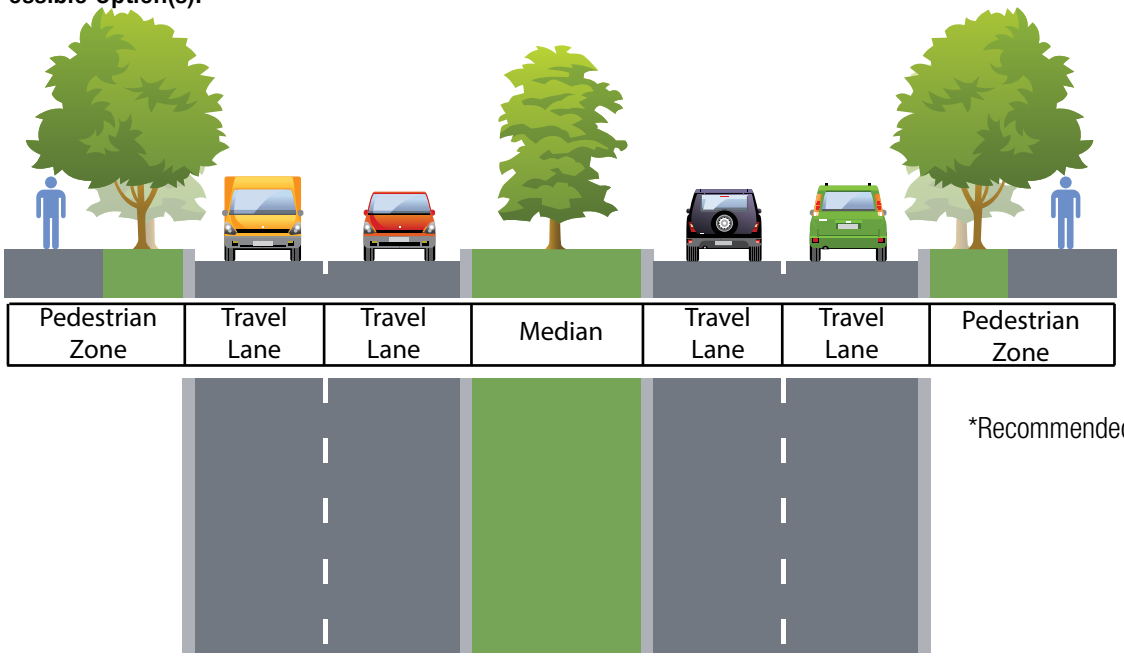
Identified Needs

The extension of the corridor to the north 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 High Frequency Transit route is also recommended for Wheatley.

Possible Option(s):

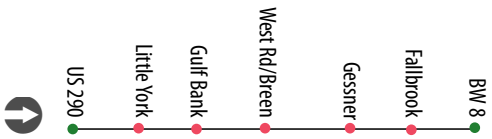


*Recommended High Frequency Transit Route

Windfern Road

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

Key Factors



Existing Condition

Windfern Road is currently 2-lane Local Street with 60’ of ROW. Its current configuration meanders BW 8 to US 290 providing a key route for north/south mobility. Volumes along this corridor are relatively low except for where the corridor intersects with one of the major freeways.

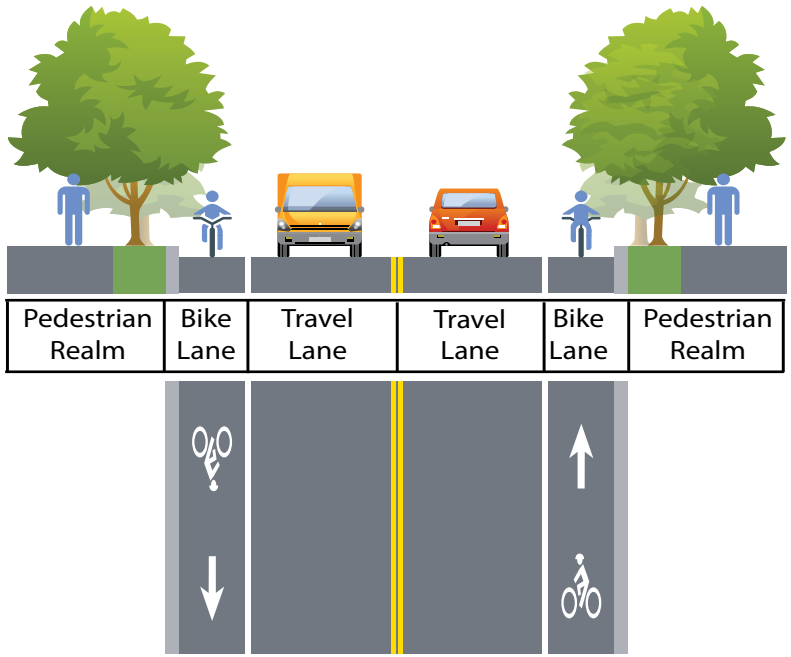
Identified Needs

Local residents and stakeholders indicated that they would like for additional facilities to be available on this corridor. This would include enhanced pedestrian facilities and possibly a bicycle facility.

Future Vision

The corridor is recommeded to be added to the MTFP as a Minor Collector. It could also possibly gain the multi-modal classification of Suburban Street. Given the lower traffic volumes anticipated on this corridor, a bicycle facility is recommended providing a key link and the providing the only north-south connection within the Study Area within the greater bicycle network. Special attention should be given to creating a safe and friendly pedestrian realm to enhance internal and more localized mobility.

Possible Option(s):



Yale Street

Key Factors

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	Suburban Avenue
Median/CTL/Undivided	Median/Und	Median/CTL/Undivided	Median/Und

Existing Condition

Yale Street limits for this study begin at IH 45 and continue to IH 610 where it extends into the Heights area. Within this Study Area, Yale Street (Major Thoroughfare) has two cross section designs. From IH 45 to W Hamilton St, the street is 2-lanes undivided, with open ditch on both sides in 70-80' of ROW. The remaining section from W Hamilton St to IH 610 is a 4-lane divided corridor, with directional turn median openings. This part of the corridor operates within 80'-90' of ROW. Sidewalk gaps are common along the corridor, and sidewalks do not exist north of West Hamilton Street.

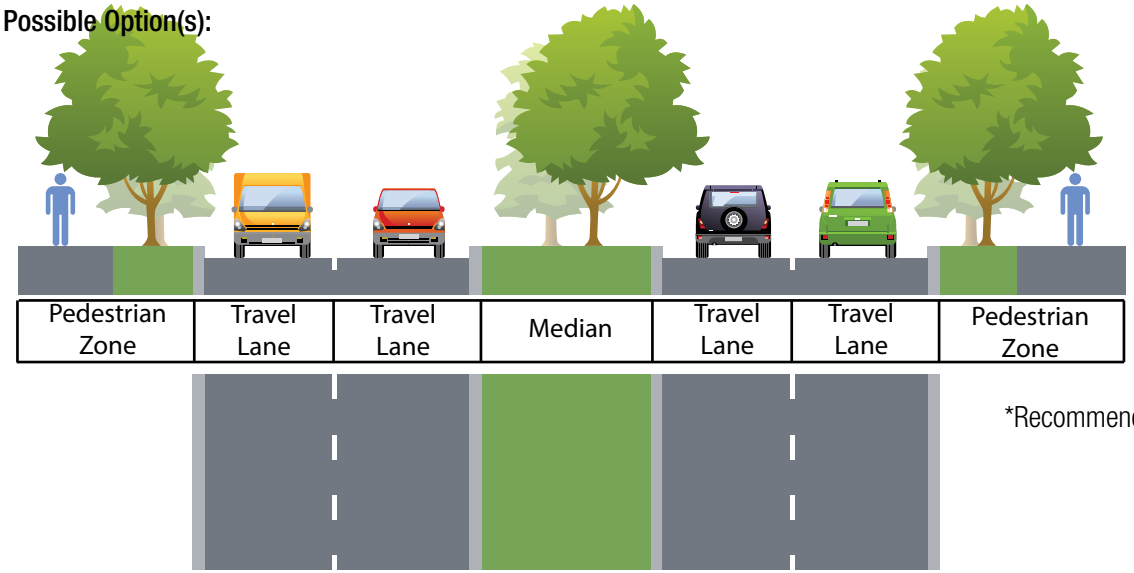
Identified Needs

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.

Future Vision

Yale Street will likely be a 4-lane corridor and be identified as a Suburban Avenue. 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

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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 through movements will increase the efficiency of the 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.

Although not exhaustive, the provided table provides a quick snapshot of the prominent changes recommended for the MTFP, but does not highlight those corridors where only ROW designations were recommended. For a full list of recommendations, please visit the detailed corridor sheets and associated matrix provided in Chapter VI. A Balanced Approach of this Report.

Corridor	Current	Proposed Improvement
Fallbrook	T-4-100	P-6-100
W. Mt. Houston	T-4-100	C-2-100
W. Little York	T-4-100	P-6-100
Tidwell	T-4-80	T-6-100
Windfern	Local	C-2-60/70
Fairbanks N. Houston	T-4-100	P-6-100
N. Houston Rosslyn	Local Street	C-2-60
Antoine (US 290 – Gulf Bank)	T-4-100	T-6-120
Mangum	C-4-60	C-3-60
Rosslyn	C-4-80	C-2-80
Veterans Memorial	T-4-100	P-6-100
North Main	T-4-100	C-4-100

Minor Collectors

- 17 roadways identified
- Predominately local streets reclassified

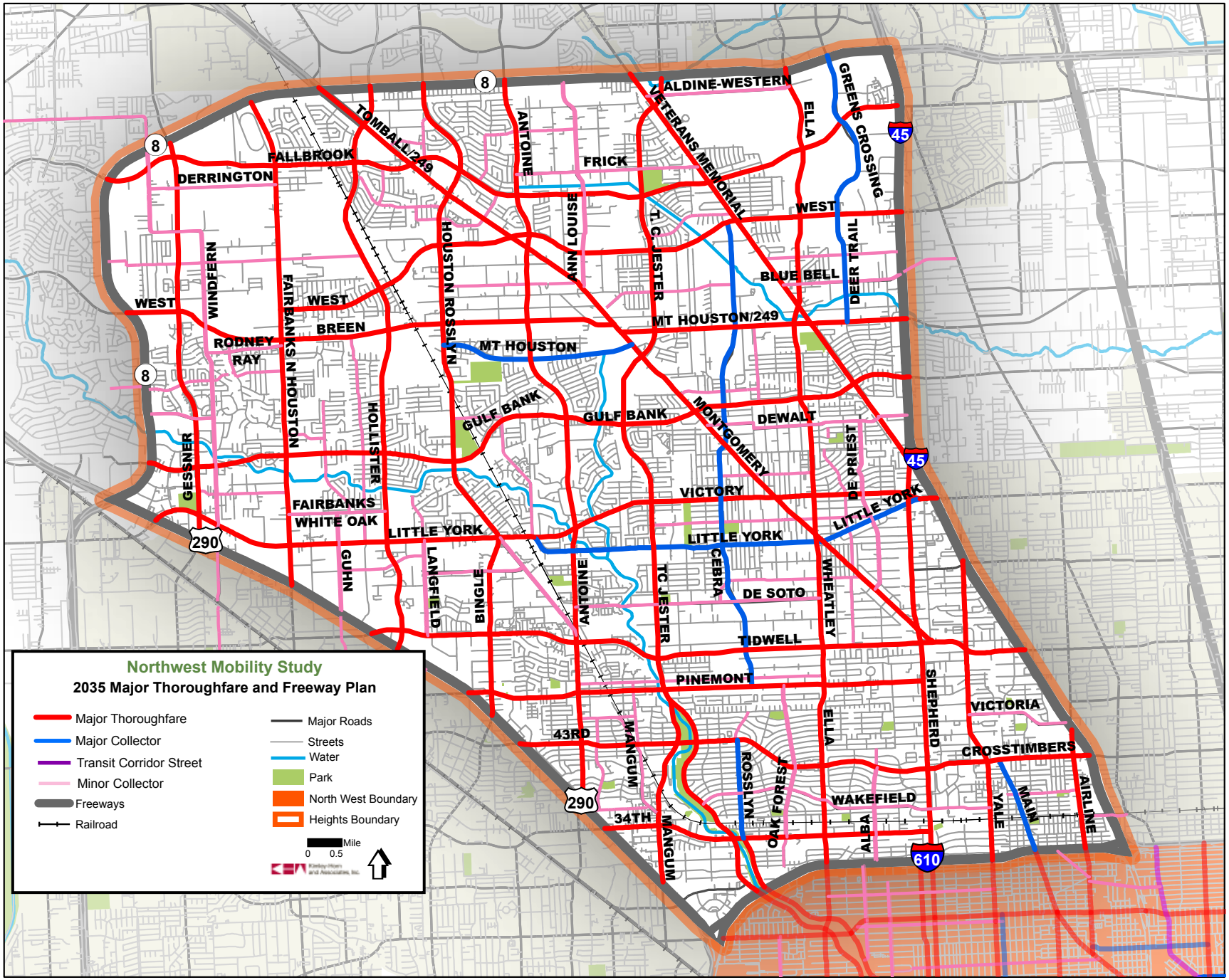

Northwest Mobility Study
2035 Major Thoroughfare and Freeway Plan
Major Thoroughfare
Major Collector
Transit Corridor Street
Minor Collector
Freeways
Railroad
Major Roads
Streets
Water
Park
North West Boundary
Heights Boundary
Mile
0 0.5
8
290
45
610
ALDINE-WESTERN
VETERANS MEMORIAL
GREENS CROSSING
ELLA
FRICK
ANTOINE
TOMBALL/249
FALLBROOK
DERRINGTON
WINDFERN
FAIRBANKS N HOUSTON
HOUSTON ROSSLYN
ANN LOUISE
T.C. JESTER
DEER TRAIL
BLUE BELL
WEST
BREEN
RODNEY
RAY
MT HOUSTON
MT HOUSTON/249
GULF BANK
MONTGOMERY
DEWALT
DE PRIEST
GESSNER
HOLLISTER
FAIRBANKS
WHITE OAK
VICTORY
LITTLE YORK
GUHN
LANGFIELD
BINGLE
CEBRA
DE SOTO
WHEATLEY
TIDWELL
PINEMONT
SHEPHERD
VICTORIA
CROSSTIMBERS
AIRLINE
MAIN
YALE
WAKEFIELD
ALBA
OAK FOREST
ROSSLYN
MANGUM
43RD
34TH

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 TermMitigation	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

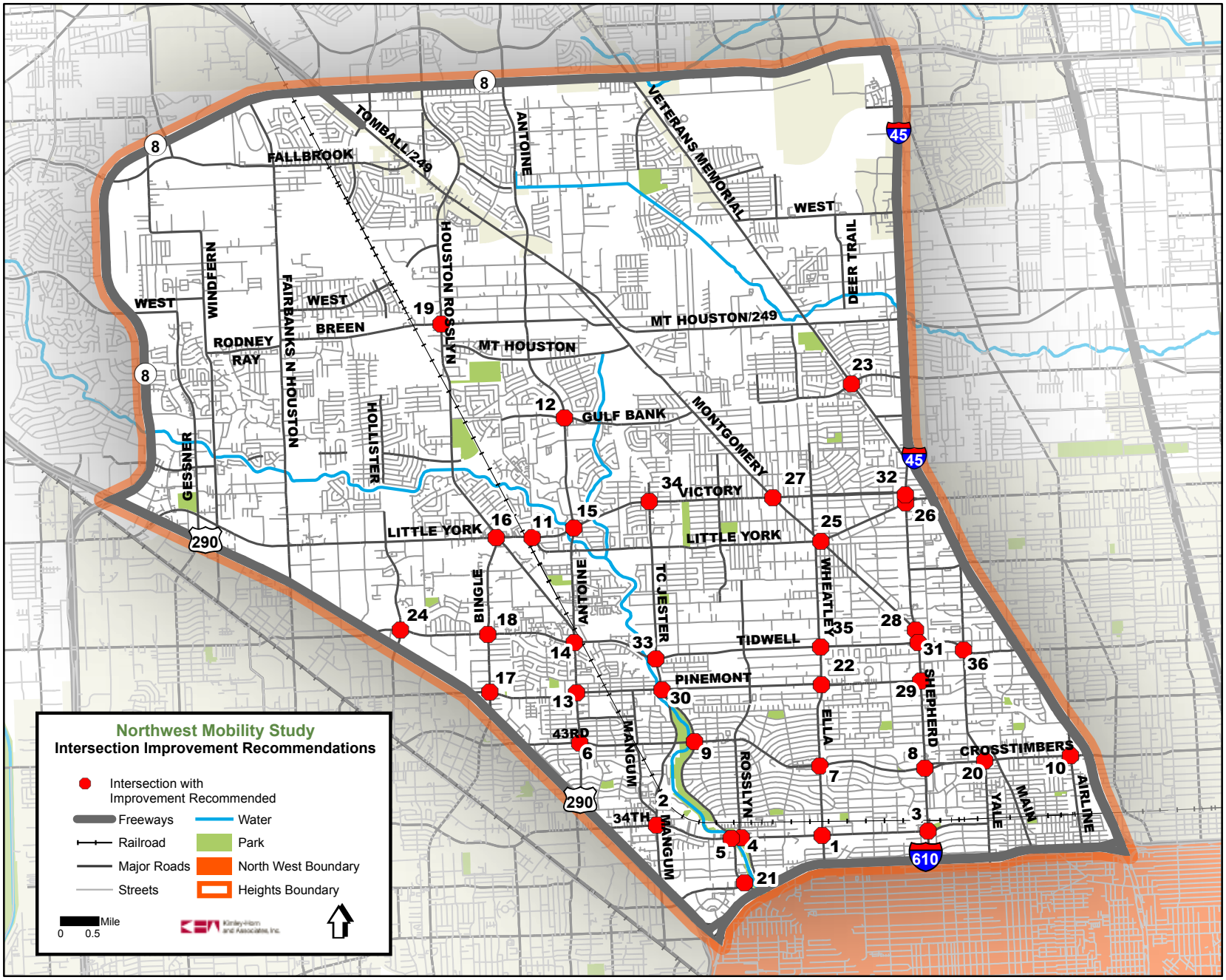
ID Number	Intersection	Proposed Near TermMitigation	Proposed Long Term Mitigation
7	43rd @ Ella	Optimize Offsets Optimize Splits Modify Eastbound, Westbound, Northbound and Southbound left-turn phases to permissive/protected phases at this intersection	Add Northbound and Southbound Right-Turn Bay on 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 TermMitigation	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 Kane Extend Northbound and Southbound Left-Turn Bay by additional 50-100' Add an addition 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 TermMitigation	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 TermMitigation	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 TermMitigation	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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Intersection with Improvement Recommended
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Railroad
Major Roads
Streets
Water
Park
North West Boundary
Heights Boundary
Mile
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Kimley-Horn and Associates, Inc.
FALLBROOK
TOMBALL/249
ANTOINE
VETERANS MEMORIAL
WEST
DEER TRAIL
WINDFERN
FAIRBANKS N HOUSTON
HOUSTON ROSSLYN
MT HOUSTON/249
MT HOUSTON
RODNEY RAY
BREEN
GULF BANK
MONTGOMERY
GESSNER
HOLLISTER
VICTORY
LITTLE YORK
BINGLE
TC JESTER
WHEATLEY
TIDWELL
PINEMONT
43RD
MANGUM
ROSSLYN
ELLA
SHEPHERD
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YALE
MAIN
AIRLINE
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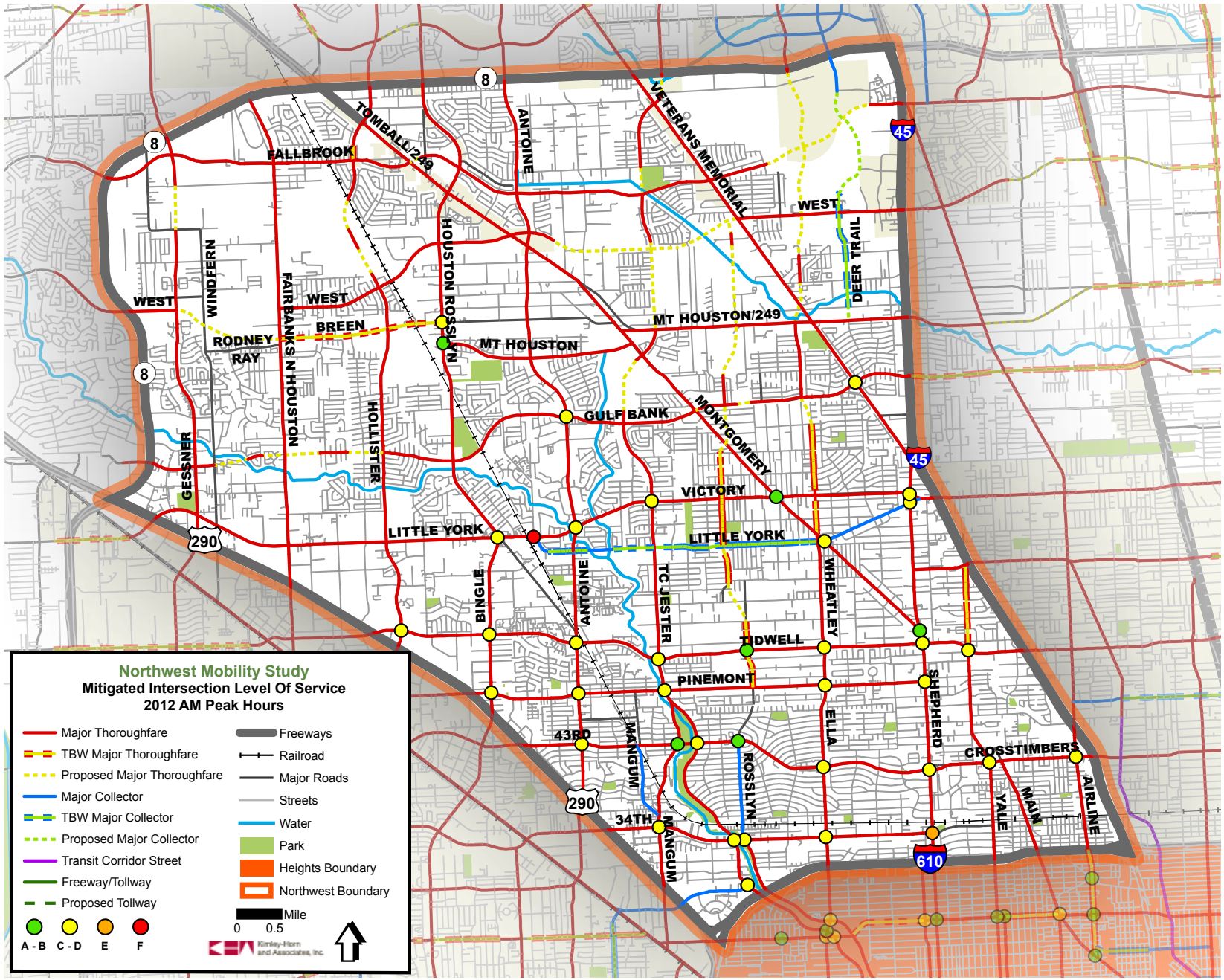
FIGURE 7.2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2012 AM Peak Hours
Major Thoroughfare
TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
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TOMBALL/249
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DEER TRAIL
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HOUSTON ROSSLYN
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VICTORY
LITTLE YORK
BINGLE
TC JESTER
WHEATLEY
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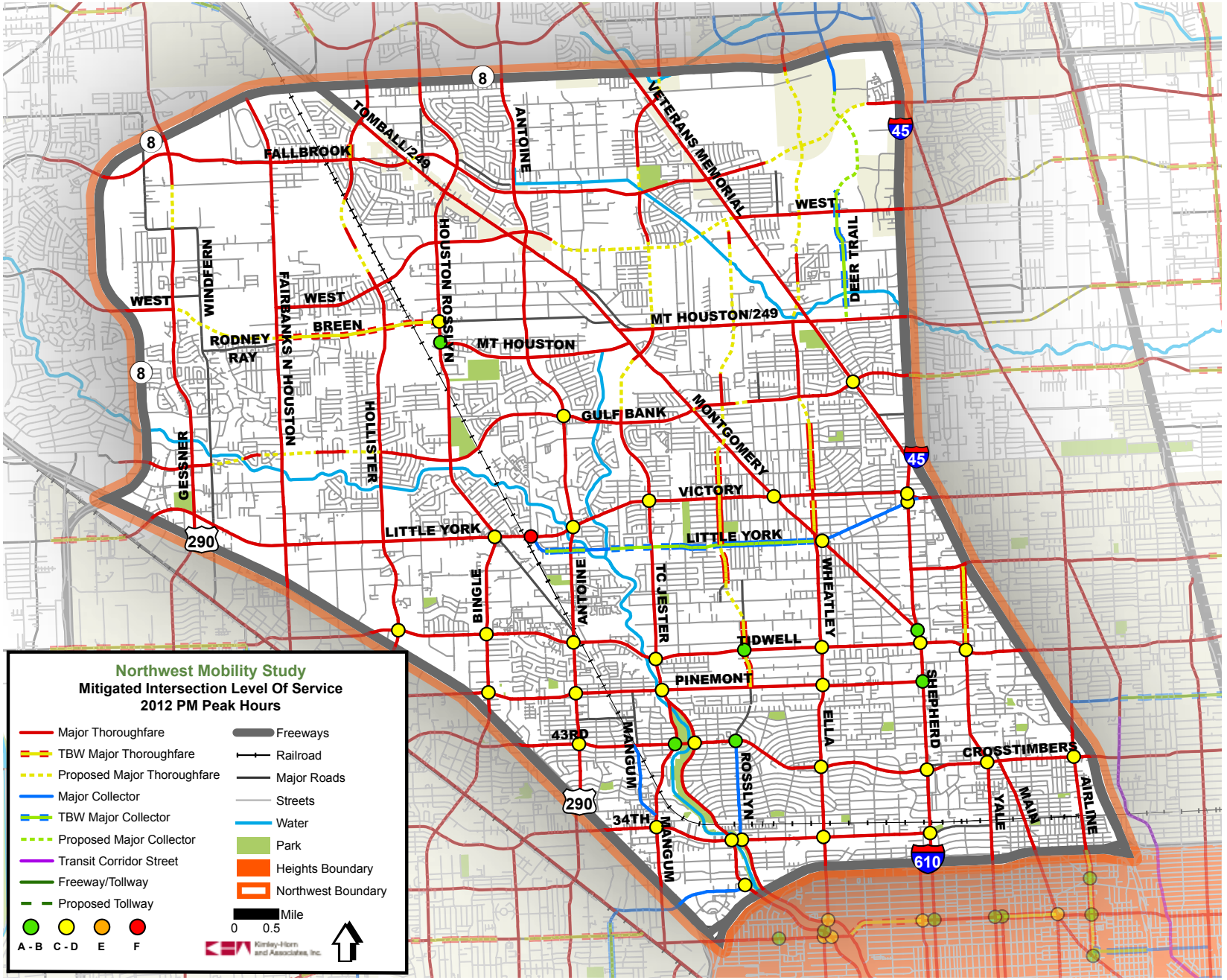
FIGURE 7.3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TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
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TC JESTER
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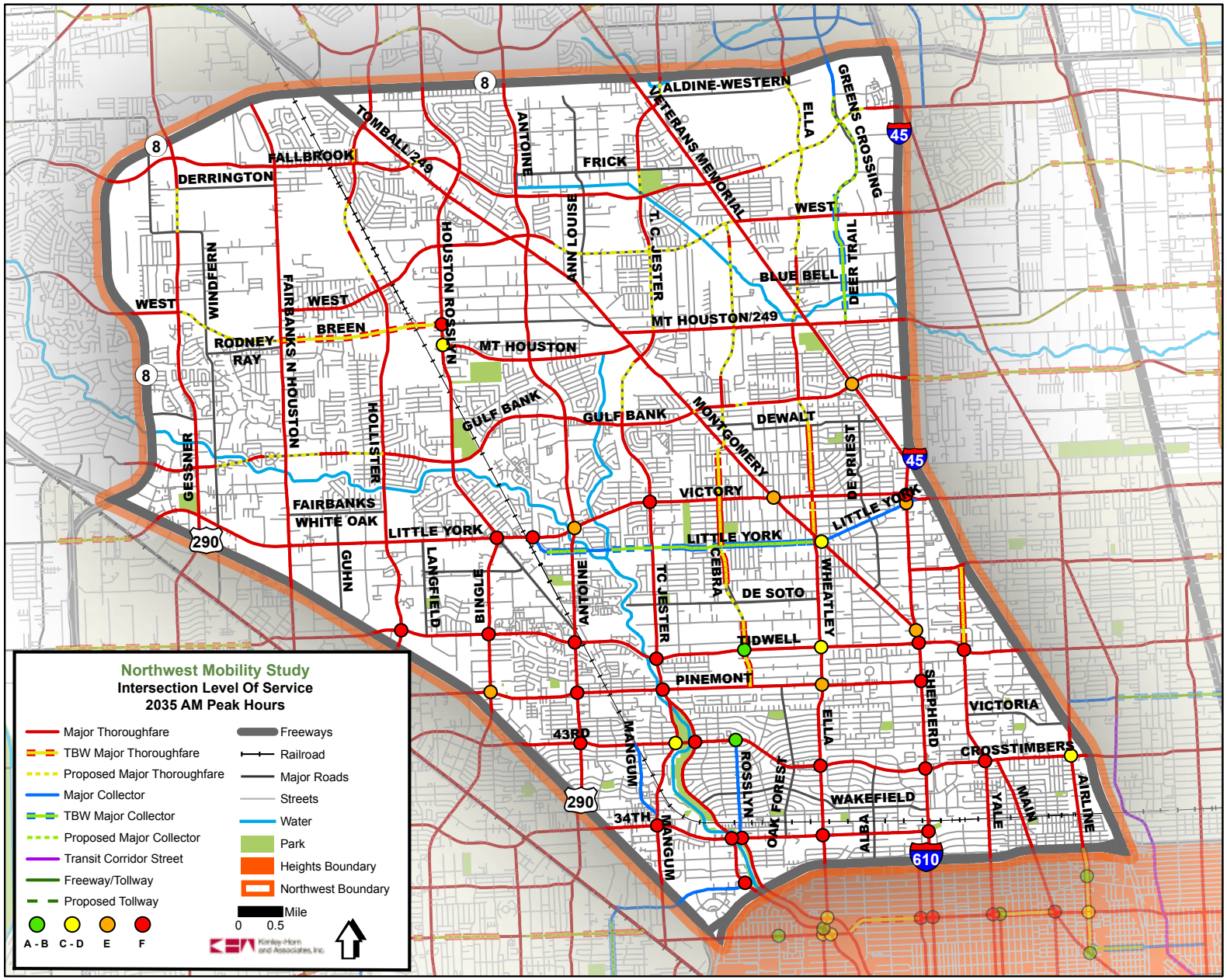
FIGURE 7.4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Major Thoroughfare
TBW Major Thoroughfare
Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
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Freeway/Tollway
Proposed Tollway
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GREENS CROSSING
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ANTOINE
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T. C. JESTER
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BLUE BELL
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RODNEY
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MONTGOMERY
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VICTORY
LITTLE YORK
FAIRBANKS
WHITE OAK
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LANGFIELD
BINGLE
CEBRA
WHEATLEY
DE SOTO
TIDWELL
PINEMONT
SHEPHERD
VICTORIA
43RD
MANGUM
CROSSTIMBERS
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OAK FOREST
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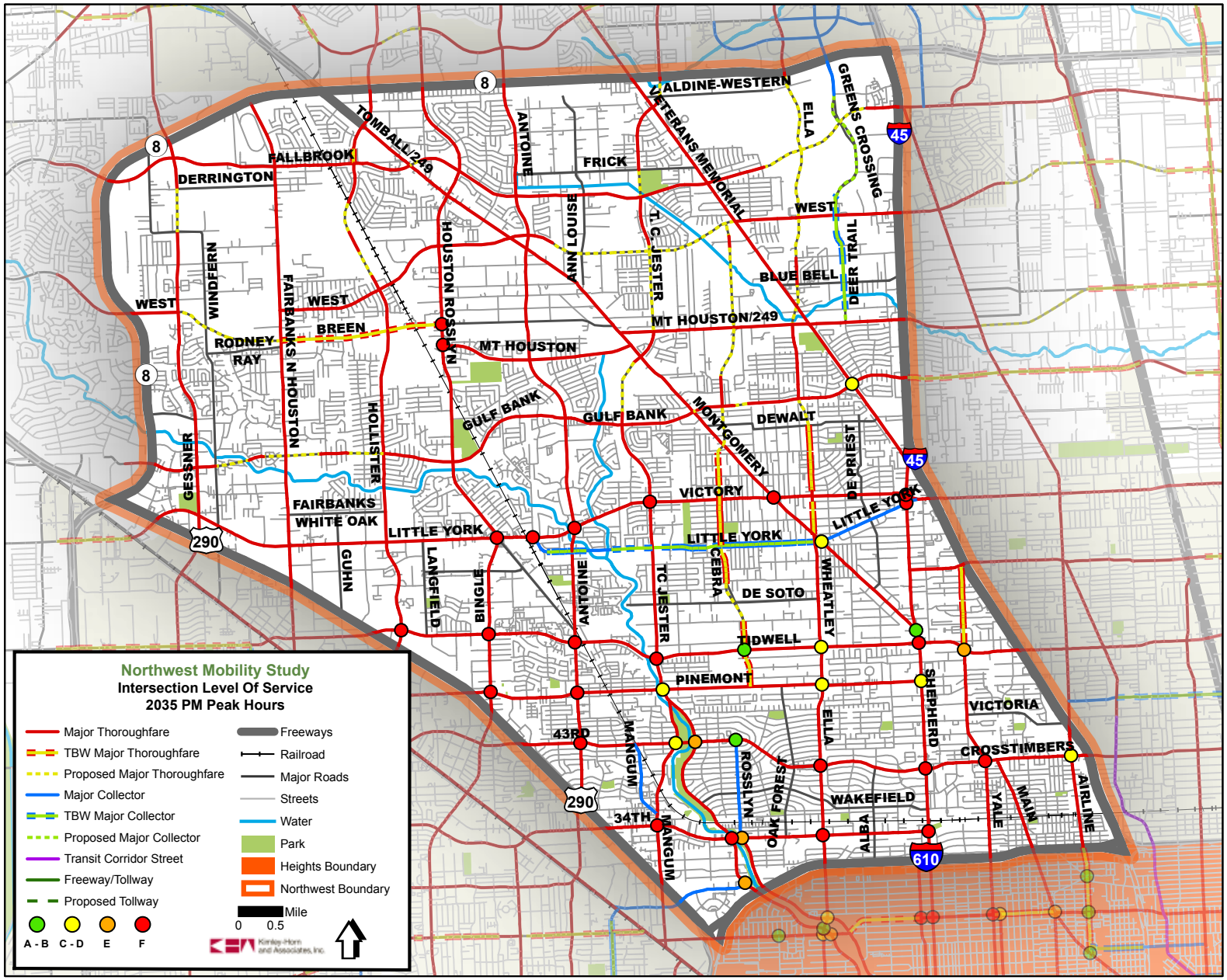
FIGURE 7.5


Northwest Mobility Study
Intersection Level Of Service
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Proposed Major Thoroughfare
Major Collector
TBW Major Collector
Proposed Major Collector
Transit Corridor Street
Freeway/Tollway
Proposed Tollway
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DERRINGTON
WEST
WINDFERN
FAIRBANKS N HOUSTON
HOUSTON ROSSLYN
ANTOINE
FRICK
ALDINE-WESTERN
VETERANS MEMORIAL
ELLA
GREENS CROSSING
ANN LOUISE
T.C. JESTER
DEER TRAIL
BLUE BELL
MT HOUSTON/249
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RODNEY
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CEBRA
WHEATLEY
DE SOTO
TIDWELL
PINEMONT
SHEPHERD
VICTORIA
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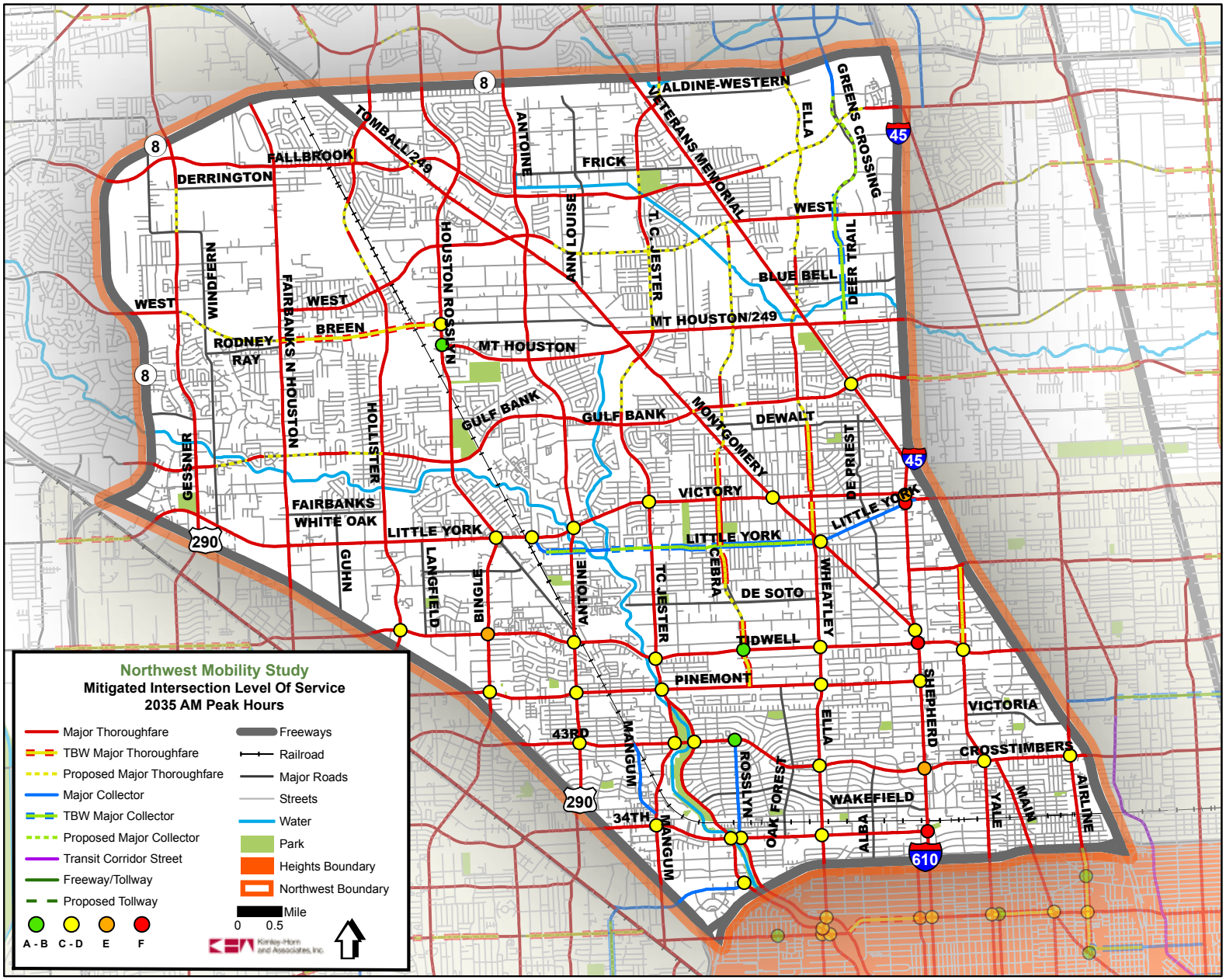
OAK FOREST
WAKEFIELD
ALBA
CROSSTIMBERS
YALE
MAIN
AIRLINE

FIGURE 7.6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Proposed Major Thoroughfare
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Proposed Major Collector
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Freeway/Tollway
Proposed Tollway
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VETERANS MEMORIAL
GREENS CROSSING
ELLA
WEST
DEER TRAIL
BLUE BELL
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TOMBALL/249
ANTOINE
FRICK
ANN LOUISE
T.C. JESTER
HOUSTON ROSSLYN
MT HOUSTON
FALLBROOK
DERRINGTON
WINDFERN
FAIRBANKS N HOUSTON
BREEN
RODNEY RAY
GULF BANK
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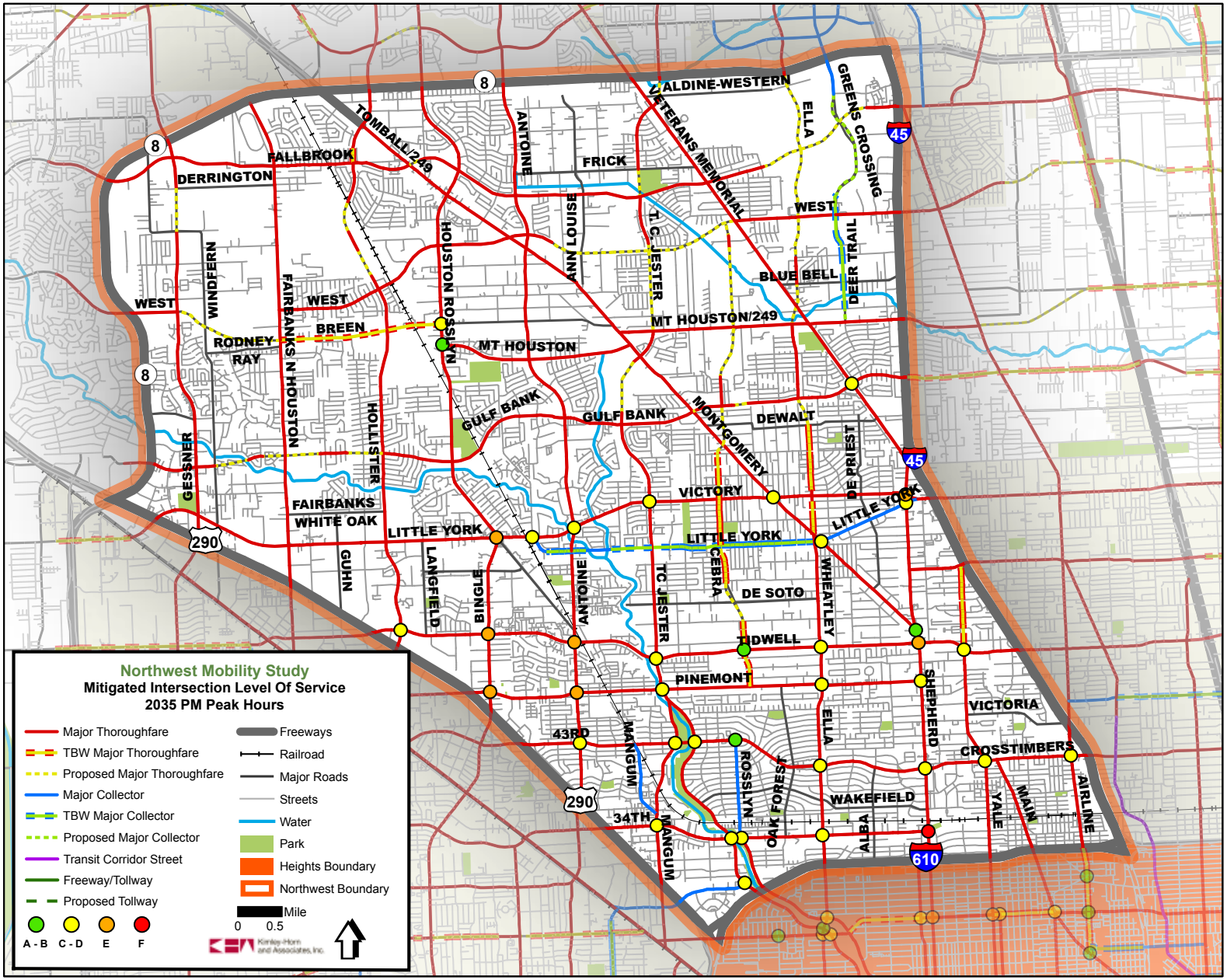
FIGURE 7.7


Northwest Mobility Study
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Major Collector
TBW Major Collector
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Transit Corridor Street
Freeway/Tollway
Proposed Tollway
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FRICK
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WEST
DEER TRAIL
BLUE BELL
MT HOUSTON/249
WINDFERN
FAIRBANKS N'HOUSTON
HOUSTON ROSSLYN
MT HOUSTON
RODNEY
RAY
BREEN
GULF BANK
MONTGOMERY
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MANGUM
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OAK FOREST
WAKEFIELD
CROSSTIMBERS
ALBA
YALE
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AIRLINE
34TH
8
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610

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.

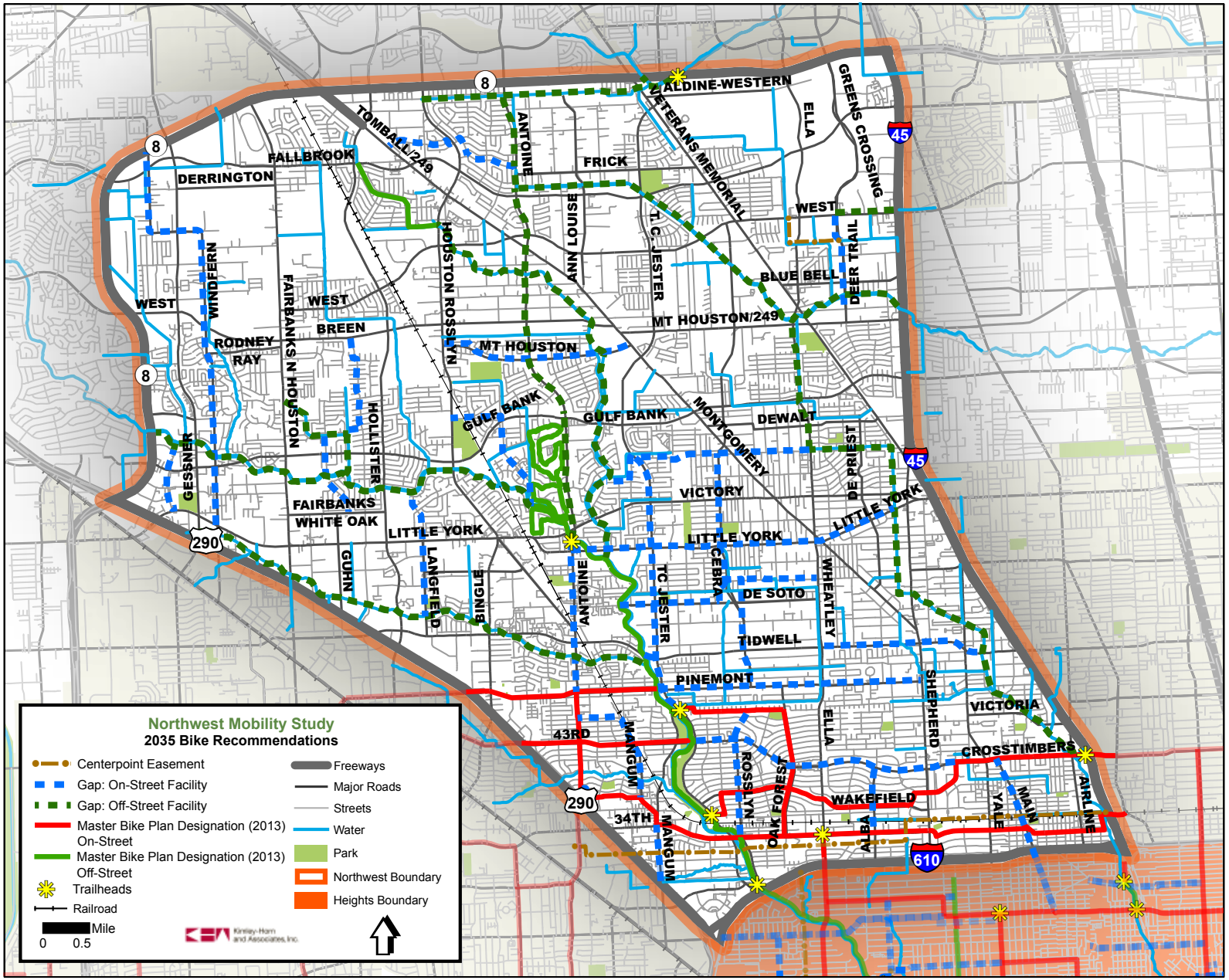
The Northwest area is also home to several bayous, including the larger White Oak and Halls Bayous. These are great assets in developing the off-street bicycle network in the Northwest area. The success of other bayou trail projects will encourage the construction of some form of off-street facility. 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.

PHOTO PROVIDED COURTESY CITY OF HOUSTON

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.


Northwest Mobility Study
2035 Bike Recommendations
Centerpoint Easement
Gap: On-Street Facility
Gap: Off-Street Facility
Master Bike Plan Designation (2013) On-Street
Master Bike Plan Designation (2013) Off-Street
Trailheads
Railroad
Mile
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Freeways
Major Roads
Streets
Water
Park
Northwest Boundary
Heights Boundary
Kinley-Horn and Associates, Inc.
ALDINE-WESTERN
VETERANS MEMORIAL
GREENS CROSSING
ELLA
FRICK
ANTOINE
ANN LOUISE
T.C. JESTER
HOUSTON ROSSLYN
TOMBALL/249
FALLBROOK
DERRINGTON
WINDFERN
FAIRBANKS N HOUSTON
WEST
BREEN
RODNEY RAY
GESSNER
HOLLISTER
FAIRBANKS WHITE OAK
GUHN
LANGFIELD
BITNER
LITTLE YORK
MT HOUSTON
MT HOUSTON/249
BLUE BELL
DEER TRAIL
GULF BANK
MONTGOMERY
DEWALT
DE PRIEST
VICTORY
CEBRA
TC JESTER
DE SOTO
WHEATLEY
TIDWELL
PINEMONT
SHEPHERD
VICTORIA
CROSSTIMBERS
AIRLINE
MAIN
YALE
ALBA
WAKEFIELD
OAK FOREST
ROSSLYN
MANGUM
43RD
34TH
8
45
290
610

FIGURE 7.9

7.4 Transit and Pedestrian Vision Map

In addition to the automobile and bicycle, two other forms of transportation are heavily used within the Northwest. Pedestrians and transit riders are found abundantly throughout the study area. This can be seen at local bus stops, along major corridors, and in the man-made foot paths along the side of the road.

Existing transit within the Northwest covers many of the essential corridors and routes. In order to identify if any changes should be recommended, the sub-region underwent the analysis found in the Transit Corridor Selection Section of this Report. From that process, the following map identified the areas of high need for transit facilities. Recommendations for local buses and High Frequency Transit routes are provided.

These recommendations do not mean that an existing facility does not currently exist, but rather that analysis shows there is a strong need for this type of facility along the corridor. Several High Frequency Routes are recommended and , in the Northwest, are located mostly along high capacity corridors. Facilitating the movement of persons to and from the Downtown will always be a high priority for the area.

- 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, enhancements to pedestrian facilities within the study area are also important. The corridors with high transit use (recommended facilities) are where pedestrian facilities are necessary. The study's recommendations on wider sidewalks can be found in the section on Sidewalk Design Considerations.

- Critical Corridor - These are corridors where there is a demand for pedestrian facilities. Such corridors are key for high transit use or are around retail-commercial areas and pubic/institutional facilities like schools, libraries and parks. These areas are indicated by the light blue pedestrian buffers provided in the following map. To learn more about how the pedestrian sheds were identified, see Transit Corridor Selection Process as detailed in Chapter V of this Report. This analysis is consistent with our findings from site visits and public input within the study area.

BUS RAPID TRANSIT (BRT)

LOCAL BUS

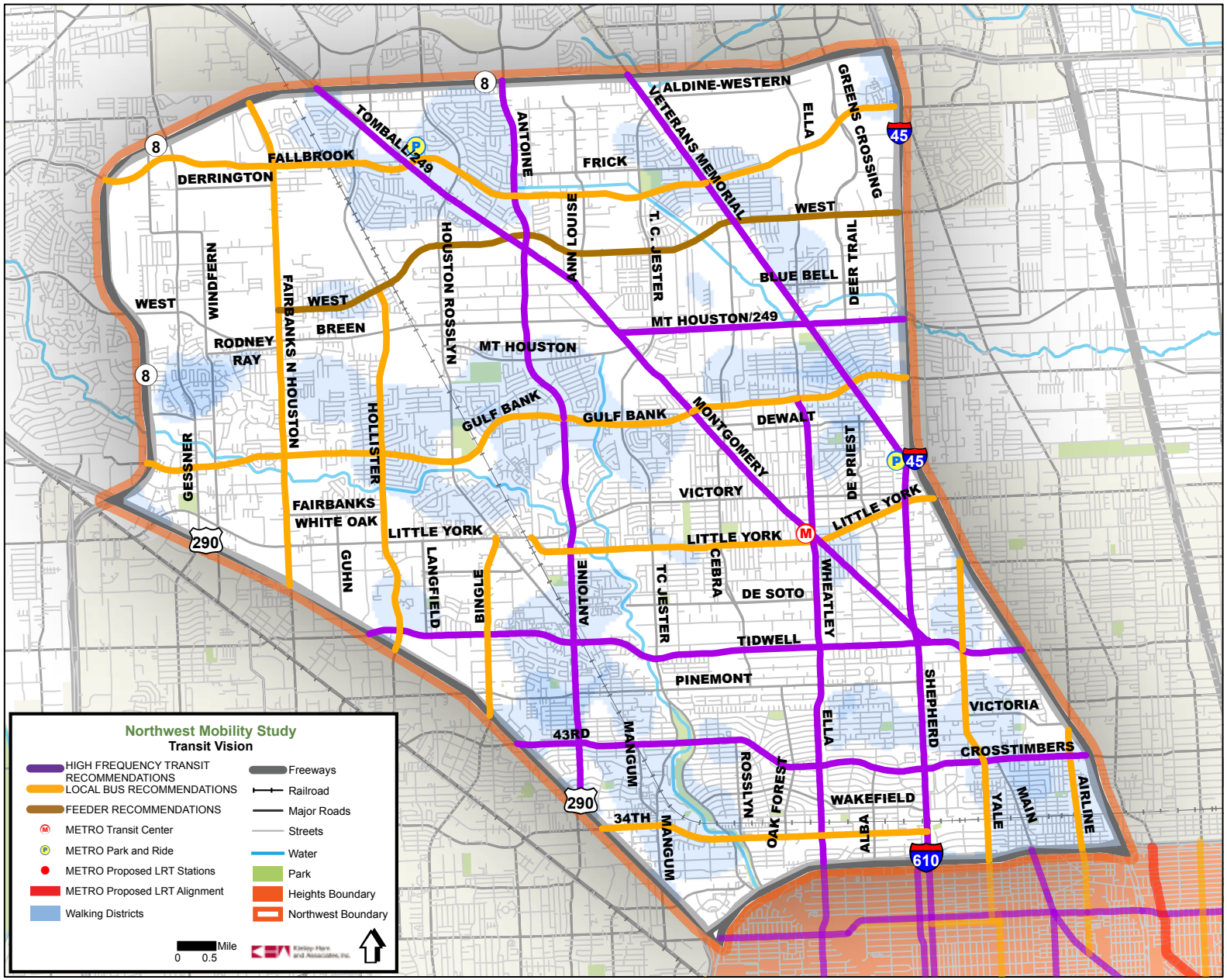
Northwest Mobility Study
Transit Vision
HIGH FREQUENCY TRANSIT RECOMMENDATIONS
LOCAL BUS RECOMMENDATIONS
FEEDER RECOMMENDATIONS
METRO Transit Center
METRO Park and Ride
METRO Proposed LRT Stations
METRO Proposed LRT Alignment
Walking Districts
Freeways
Railroad
Major Roads
Streets
Water
Park
Heights Boundary
Northwest Boundary
Mile
0 0.5
TOMBALL/249
FALLBROOK
DERRINGTON
WINDFERN
WEST
RODNEY
RAY
GESSNER
FAIRBANKS N HOUSTON
WEST
BREEN
HOLLISTER
FAIRBANKS
WHITE OAK
GUHN
LANGFIELD
SINGLE
HOUSTON ROSSLYN
MT HOUSTON
GULF BANK
LITTLE YORK
ANTOINE
FRICK
ANN LOUISE
T. C. JESTER
VETERANS MEMORIAL
ALDINE-WESTERN
ELLA
GREENS CROSSING
WEST
BLUE BELL
DEER TRAIL
MT HOUSTON/249
GULF BANK
MONTGOMERY
DEWALT
DE PRIEST
VICTORY
LITTLE YORK
LITTLE YORK
CEBRA
DE SOTO
WHEATLEY
TC JESTER
ANTOINE
TIDWELL
PINEMONT
43RD
MANGUM
ROSSLYN
OAK FOREST
ELLA
SHEPHERD
VICTORIA
CROSSTIMBERS
WAKEFIELD
34TH
MANGUM
ALBA
YALE
MAIN
AIRLINE
8
290
45
610
P
M

FIGURE 7.10

7.5 Multi-Modal Classification Map

The Multi-Modal Classification (MMC) Map is a product of the first Houston Mobility Study. In that study, new classifications were developed for corridors based on right-of-way, modal types, and volumes. The MMC can be found in Chapter 10 of the Design Manual for Street Paving Design Requirements.

Each corridor within the Study Area was evaluated based on public input, model analysis, and other variables. These variables culminated to create a plan for the major corridors from the consultant and project teams' evaluation, and can be viewed in the section with the Corridor Design Example Sheets. With this information, the project team evaluated and determined the MMC best suited for the future of the corridor.

The MMC identifies the options for widths of the road based on the modal uses. These numbers were devised along with the City of Houston's Public Works and Engineering Department. This allows the Planning Department to identify a realistic design for the corridor before it transitions into a pre-engineering stage.

The Northwest Study Area has a largely suburban composition. Consequently, many of the corridors are recommended with three suburban classifications: Boulevard, Avenue, or Street. The MMC Map shown in Figure 7.11 is representative of the 2035 MTFP network and not the existing roadway network.

During evaluation of the corridors, it became apparent that the existing definitions currently located in Chapter 10, Appendix 2 of the City of Houston Infrastructure Design Manual needs to be updated to more accurately reflect the design considerations as they pertain to the City of Houston. Specific considerations for right-of-way distinctions should be specifically addressed, where ROW of 100' does not necessarily properly reflect required designations of a "Boulevard" nor does 80' ROW necessarily designate an "Avenue".

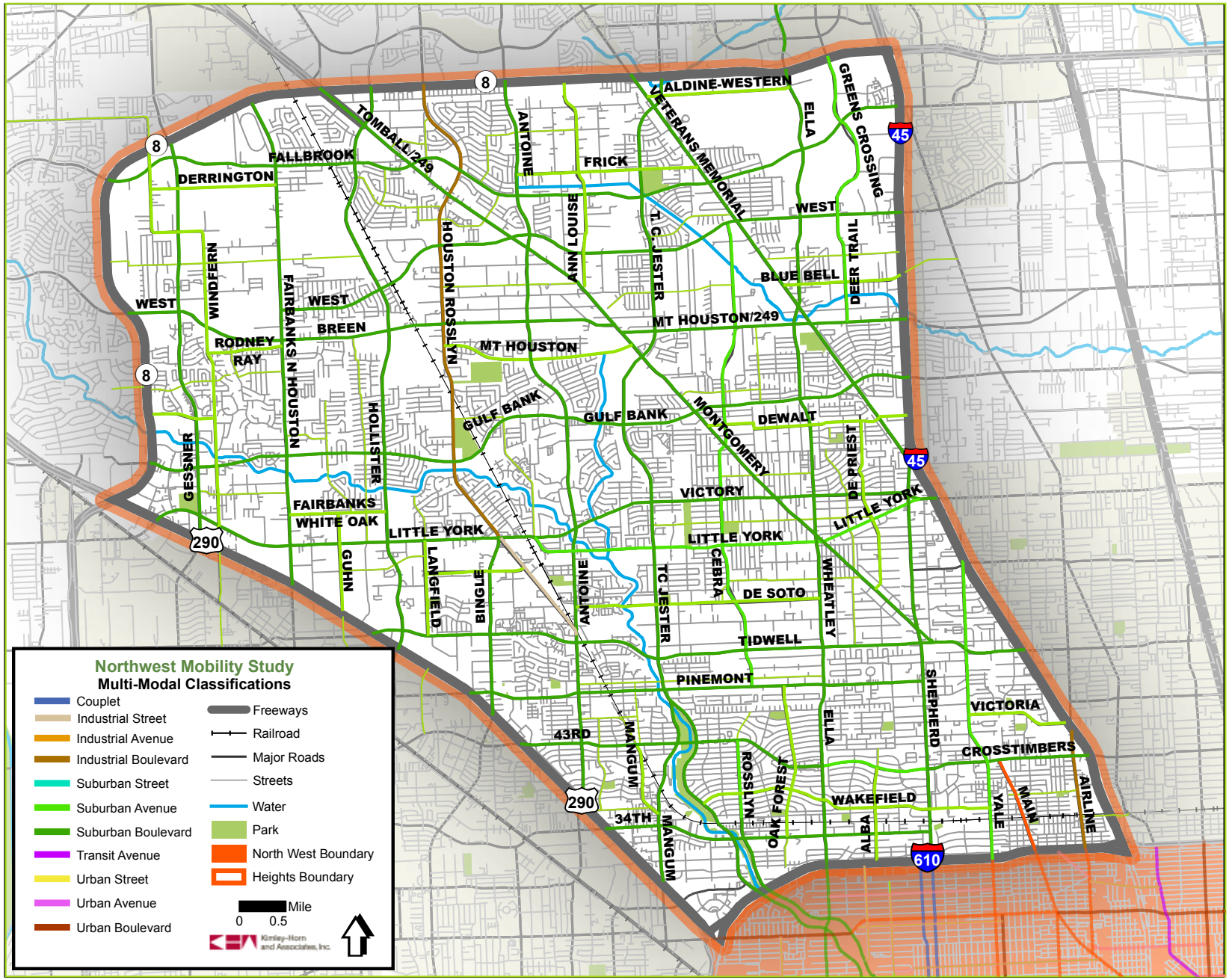
Northwest Mobility Study
Multi-Modal Classifications
Couplet
Industrial Street
Industrial Avenue
Industrial Boulevard
Suburban Street
Suburban Avenue
Suburban Boulevard
Transit Avenue
Urban Street
Urban Avenue
Urban Boulevard
Freeways
Railroad
Major Roads
Streets
Water
Park
North West Boundary
Heights Boundary
Mile
0 0.5
Kimley-Horn and Associates, Inc.
8
45
290
610
TOMBALL/249
FALLBROOK
DERRINGTON
WINDFERN
WEST
FAIRBANKS N HOUSTON
RODNEY
RAY
BREEN
GESSNER
HOLLISTER
FAIRBANKS
WHITE OAK
GUHN
LANGFIELD
BINGLE
HOUSTON ROSSLYN
ANTOINE
LOUISE
FRICK
ALDINE-WESTERN
VETERANS MEMORIAL
T.C. JESTER
MT HOUSTON
MT HOUSTON/249
GULF BANK
MONTGOMERY
DEWALT
VICTORY
LITTLE YORK
CEBRA
DE SOTO
TIDWELL
PINEMONT
43RD
MANGUM
34TH
ROSSLYN
OAK FOREST
ELLA
GREENS CROSSING
WEST
BLUE BELL
DEER TRAIL
DE PRIEST
WHEATLEY
SHEPHERD
VICTORIA
CROSSTIMBERS
WAKEFIELD
ALBA
YALE
MAIN
AIRLINE

FIGURE 7.11

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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 projects and 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, as well as 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 to be examined within the broader citywide capital programming and pre-engineering process.

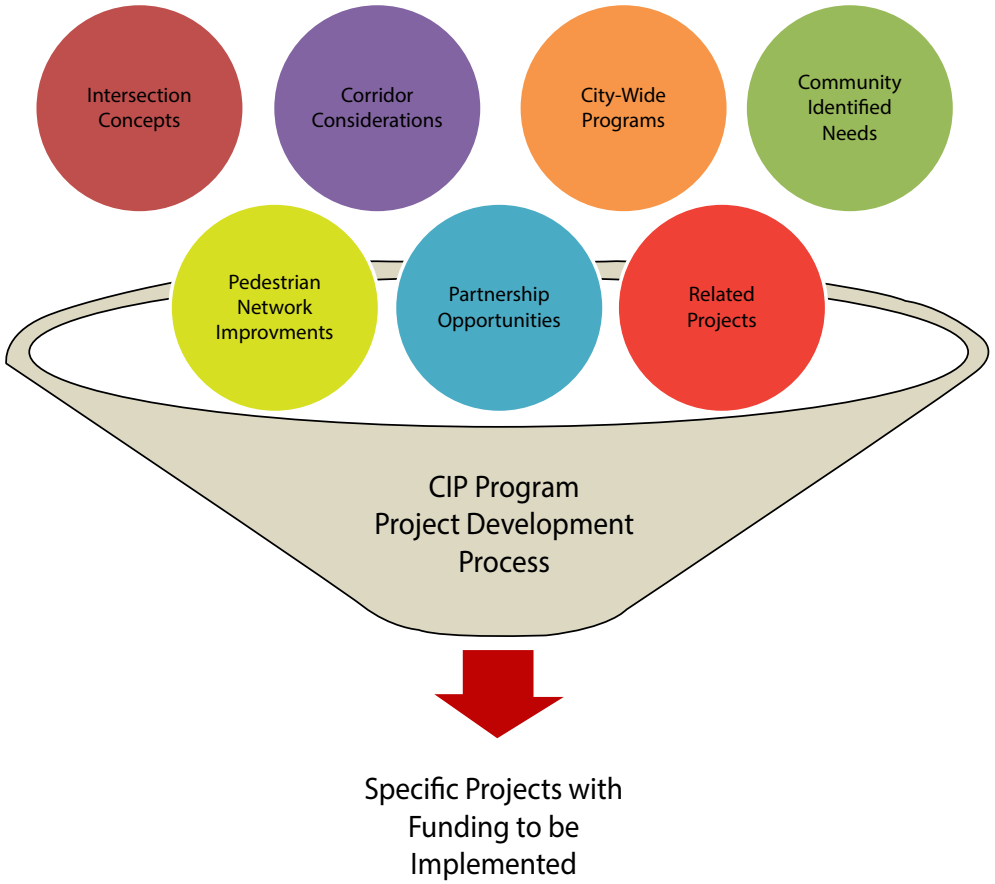


FIGURE 8.1

8.2 Outcomes of this Study

The specific project concepts identified for both the near- 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 ROW is preserved where appropriate and will be the Department 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 during Rebuild Houston. 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 Planning Capital 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 may be examined within 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, and as such offers an intuitive platform for incorporation of 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.

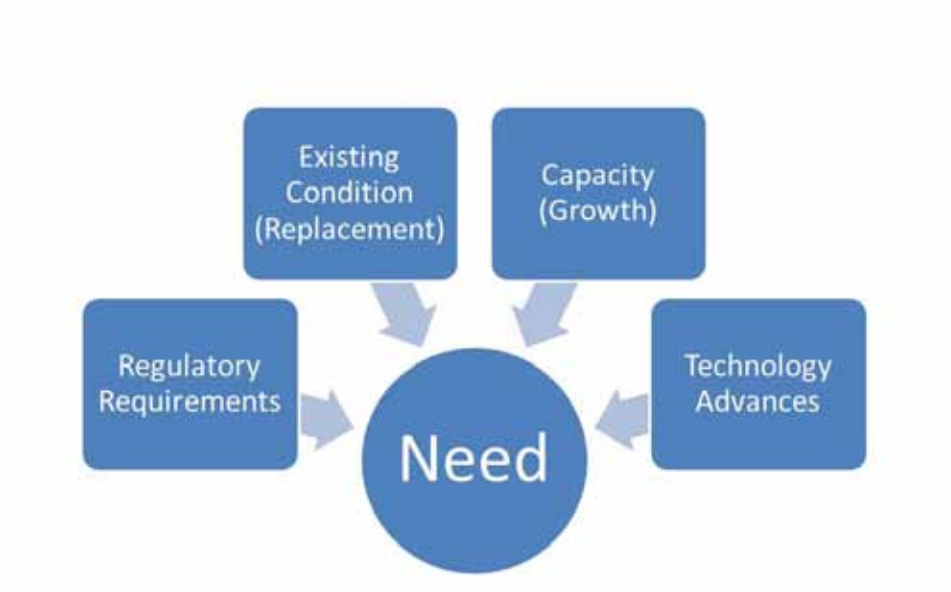


FIGURE 8.2

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 roadway's focused project infrastructure considerations which include such projects 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.

It is important to note that as projects at the top of the prioritization list become Candidate Needs, they are then are passed into the solution development step. 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 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.

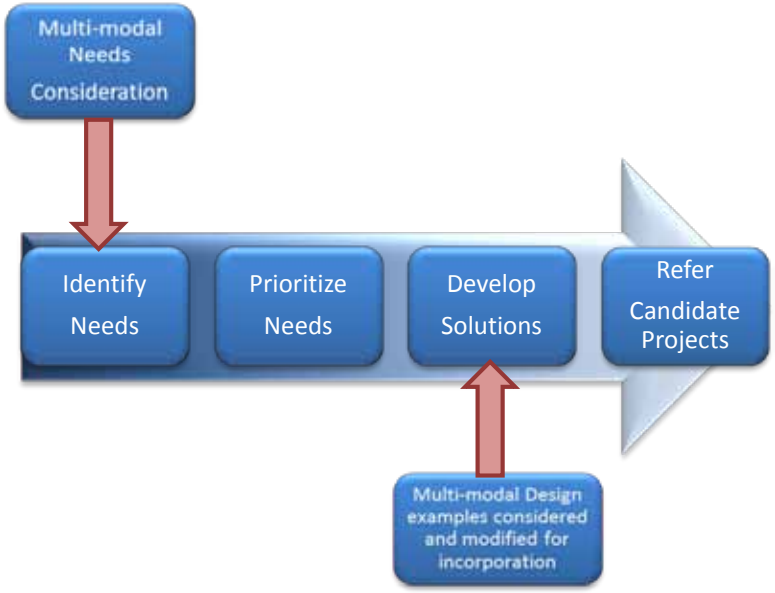


FIGURE 8.3

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 ROW pattern for several streets that currently act as collectors but are not defined on the MTFP as such.
- 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. That is to say, a sidewalk project that completes an identified gap in the network has 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 of others, and include non-motorized connections within other planning and design activities. 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 the appropriate policy revisions to define the proposed Multi-Modal Classification System. Revisions to the main body of policies that define the application of the MTFP would prove 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 corridors can begin to utilize the Multi-Modal Classification System without adversely impacting the remaining elements of the code.

Coordination with Other Entities

One of the most critical components of moving the concepts discussed in this document forward is the continued coordination of efforts between many groups. The Planning and Development Department is often a reviewing agency for several groups that are moving specific projects forward and as such, a review early and often by the Planning Department of project concepts - whether roads, transit, pedestrian, or bicycle related, will help to ensure that the overall direction of the concepts discussed herein.

Another important component of the coordination efforts that need to be enhanced throughout the project development process related to the concepts discussed in the previous sections of this Report is the integration of these concepts into plans that are being developed by agencies other than the City of Houston. Most often, those projects would be 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 a city-wide project prioritization process into which the project concepts defined through this effort will enter.

In addition, the Department of Public Works and Engineering (PWE) has established criteria by which the intersections 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 to receive funding through either a Capital Improvements Plan (CIP), a coordinated project with one of the Management Districts or TIRZs within the Study Area, or outside funding source such as a Private Sector Partner or state and federal funding opportunities.

The project concepts defined for near-term implementation are needed to help the existing transportation network to function better. There projects include intersection improvements listed as well as Scenario 5 improvements depicts improvements feasible for development recognizing those corridors which are not anticipated to be completed any time before 2035 projections.

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 to meet the mobility needs of the future. These corridors include:

- State Highway 249
- Montgomery
- Fairbanks North Houston
- Hollister
- Little York
- Antoine
- TC Jester
- Gulf Bank

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

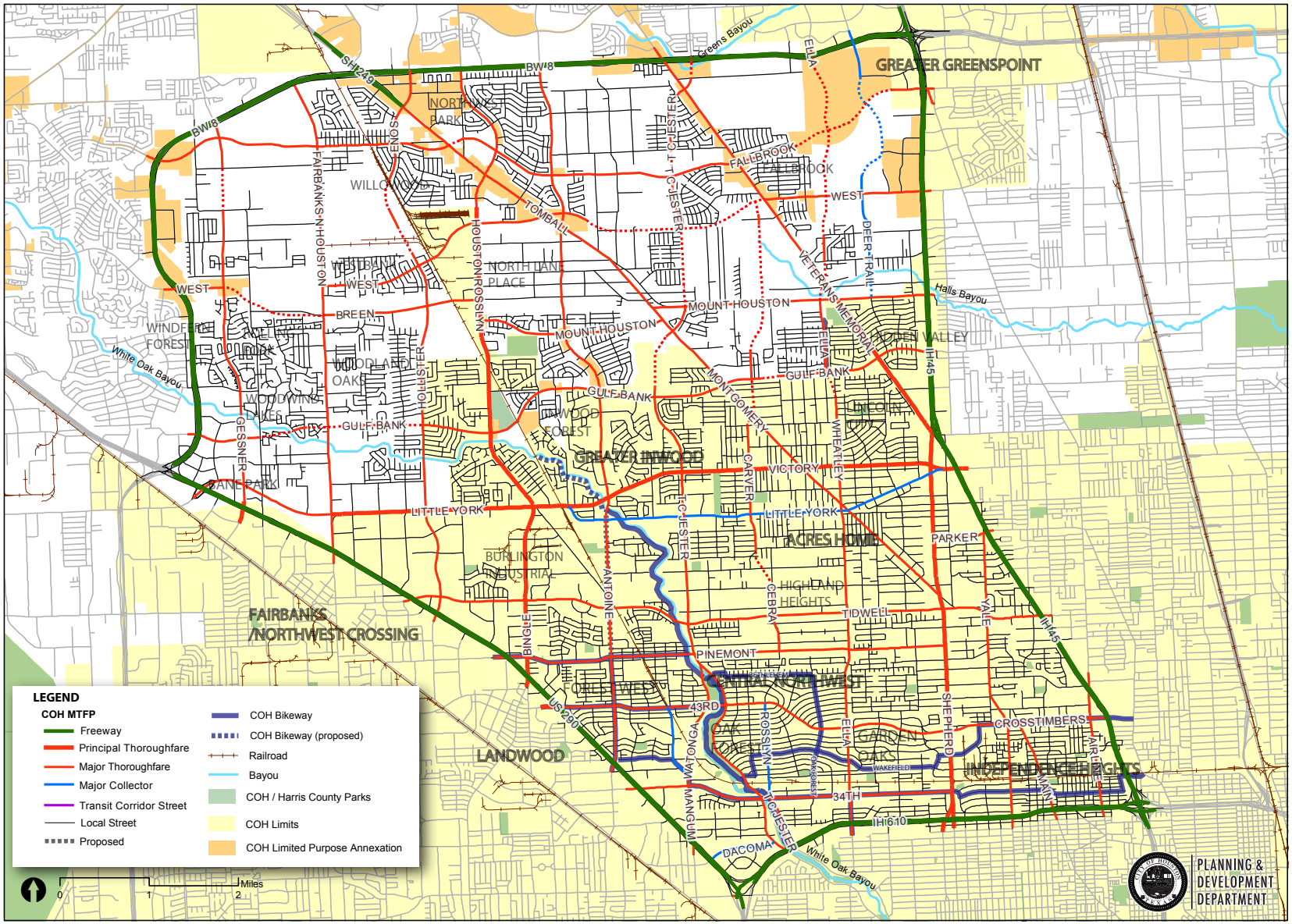
As opportunities arise for coordination between projects, including projects such as utility replacements (which already require the street to be reconstructed), the projects identified for near and long-term improvements will be examined as appropriate.

X. Appendix A

Existing Condition and Projection Map

- Transportation Network: Planned and Existing (2012)
- Population
    - Population Change (1990 - 2010) & Projection (2018 - 2035)
    - Population Density (2010)
- Employment
    - Employment Change (2002 - 2010) & Projection (2018 - 2035)
    - Employment Density (2011)
- Population Density Change by TAZs (2010-2035)
- Employment Density Change by TAZs (2010-2035)
- Land Use (2011)
- METRO Transit Network and Ridership (2012)
- Street Connectivity (2012)

Transportation network: Planned and Existing (2012)

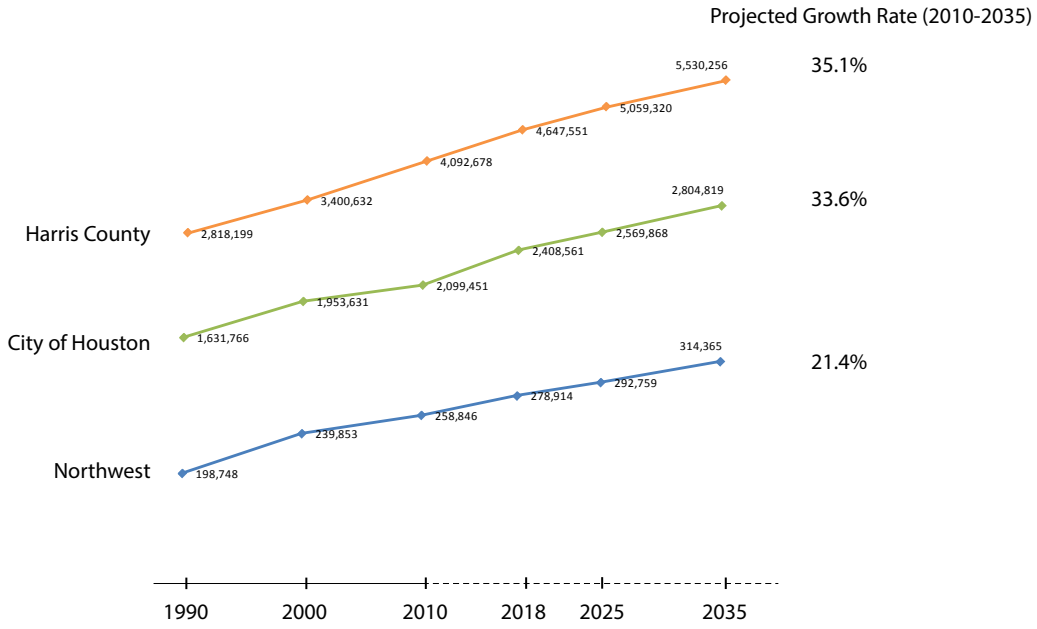


Population

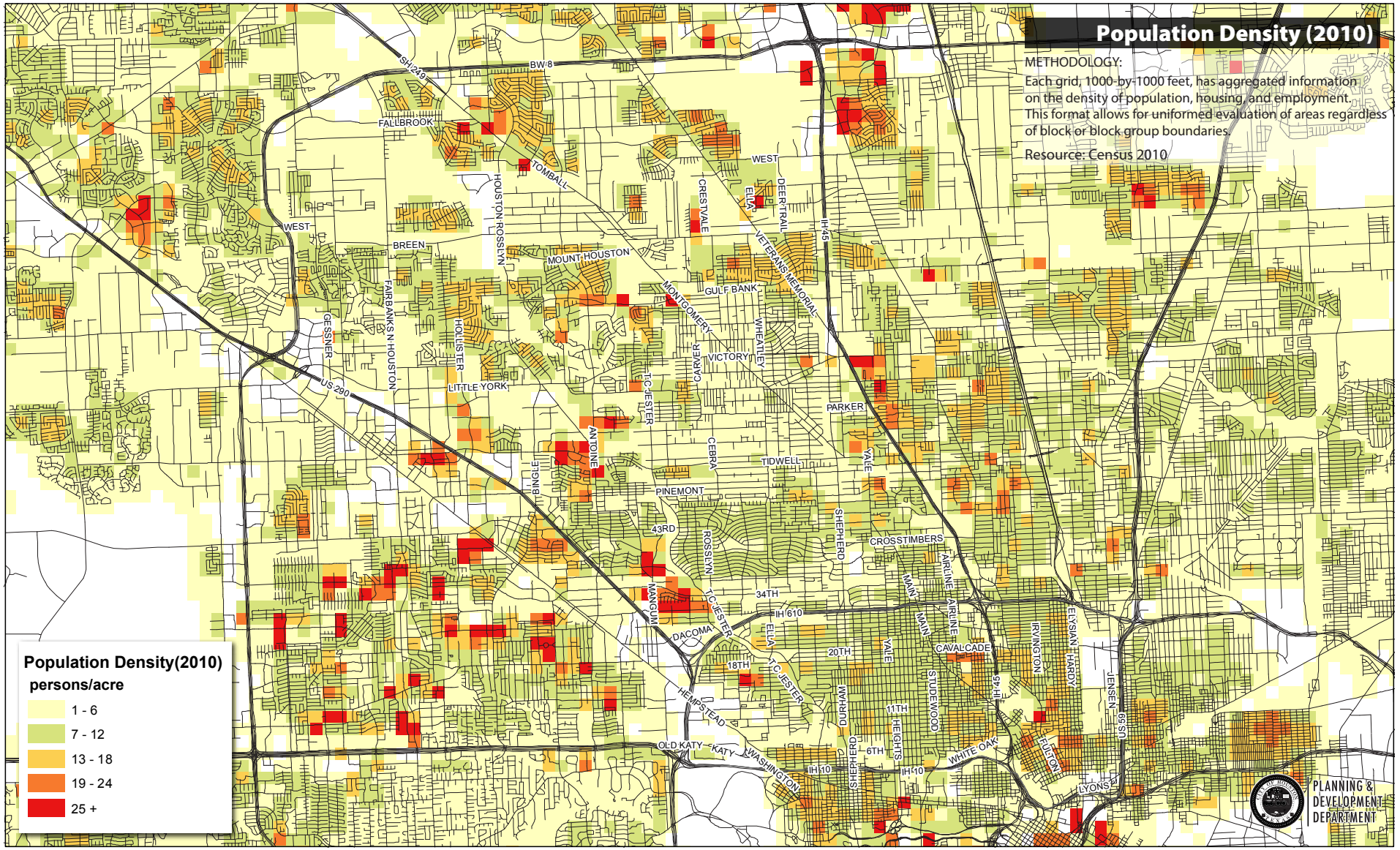
Population Change (1990 - 2010) & Projection (2018 - 2035) * CAGR: Compound Annual Growth Rate

Year	Northwest	CAGR*	City of Houston	CAGR*	Harris County	CAGR*
1990	198,748		1,631,766		2,818,199	
2000	239,853	2.1%	1,953,631	2.0%	3,400,632	2.1%
2010	258,846	0.8%	2,099,451	0.7%	4,092,678	2.0%
2018	278,914	1.1%	2,408,561	1.5%	4,647,551	1.8%
2025	292,759	0.7%	2,569,868	1.0%	5,059,320	1.3%
2035	314,365	0.7%	2,804,819	0.9%	5,530,256	0.9%

Resource: Population Change (1990-2010), US Census
Projection (2018 - 2035), H-GAC



PLANNING & DEVELOPMENT DEPARTMENT



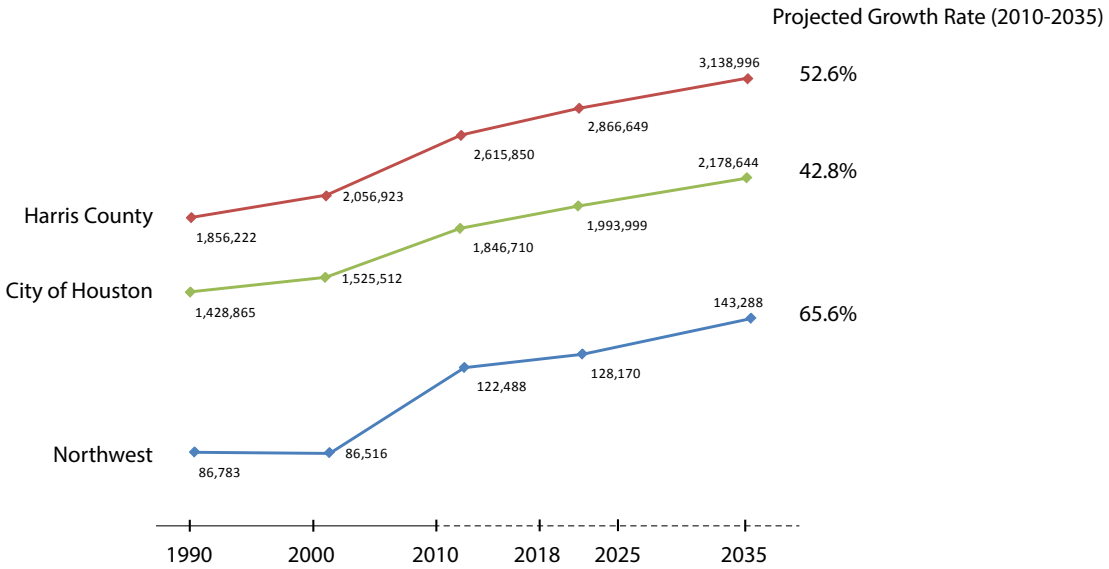
HEIGHTS-NORTHSIDE/NORTHWEST MOBILITY STUDY

Employment

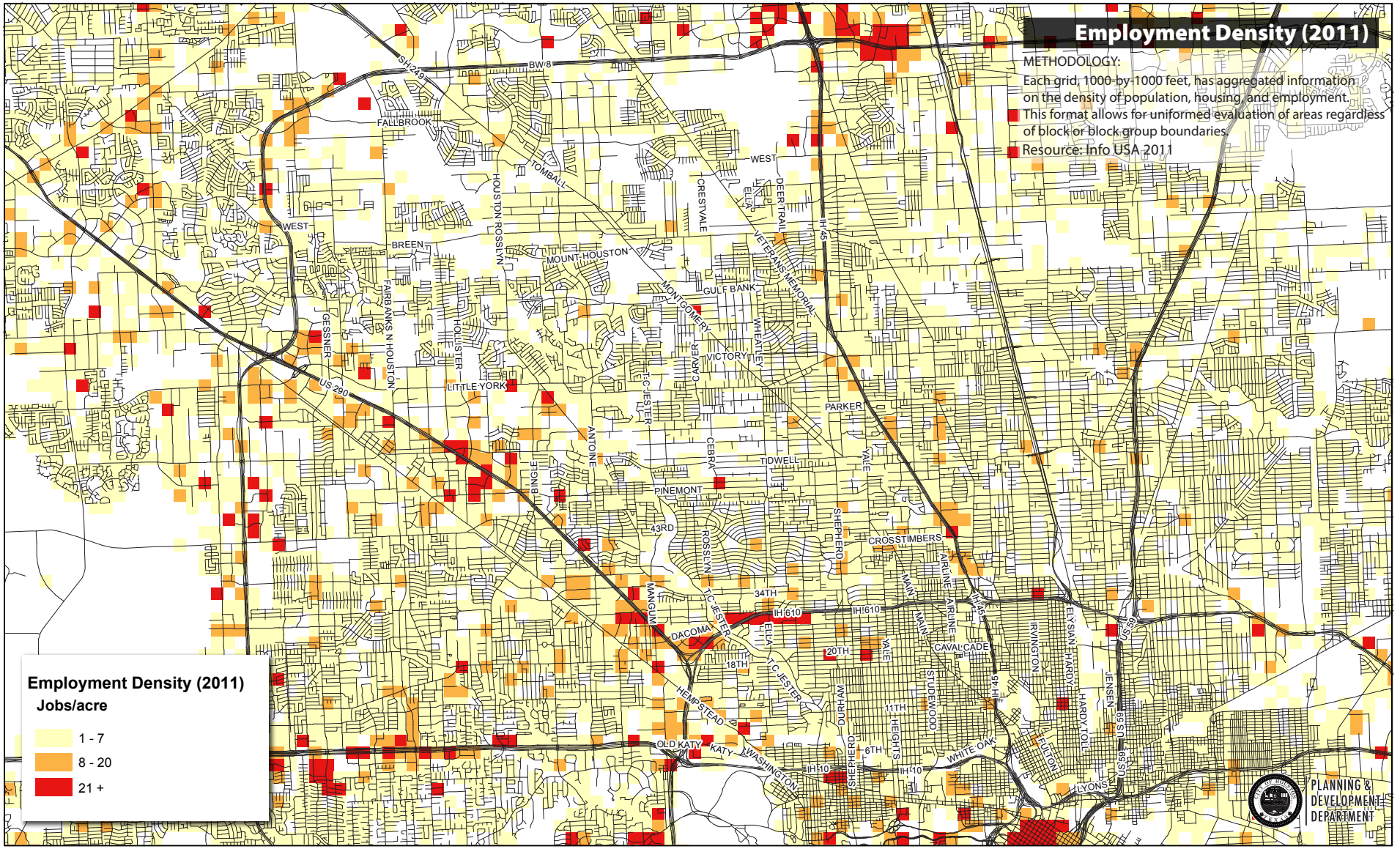
Employment Change (2002 - 2010) & Projection (2018 - 2035) * CAGR: Compound Annual Growth Rate

Year	Northwest	CAGR*	City of Houston	CAGR*	Harris County	CAGR*
2002	86,783		1,428,865		1,856,222	
2010	86,516	0.0%	1,525,512	0.7%	2,056,923	1.1%
2018	122,488	2.0%	1,846,710	1.6%	2,615,850	2.1%
2025	128,170	0.7%	1,993,999	1.1%	2,866,649	1.4%
2035	143,288	1.2%	2,178,644	0.9%	3,138,996	1.0%

Resource: Employment Change (2002-2010), US Census
Projection (2018 - 2035), H-GAC

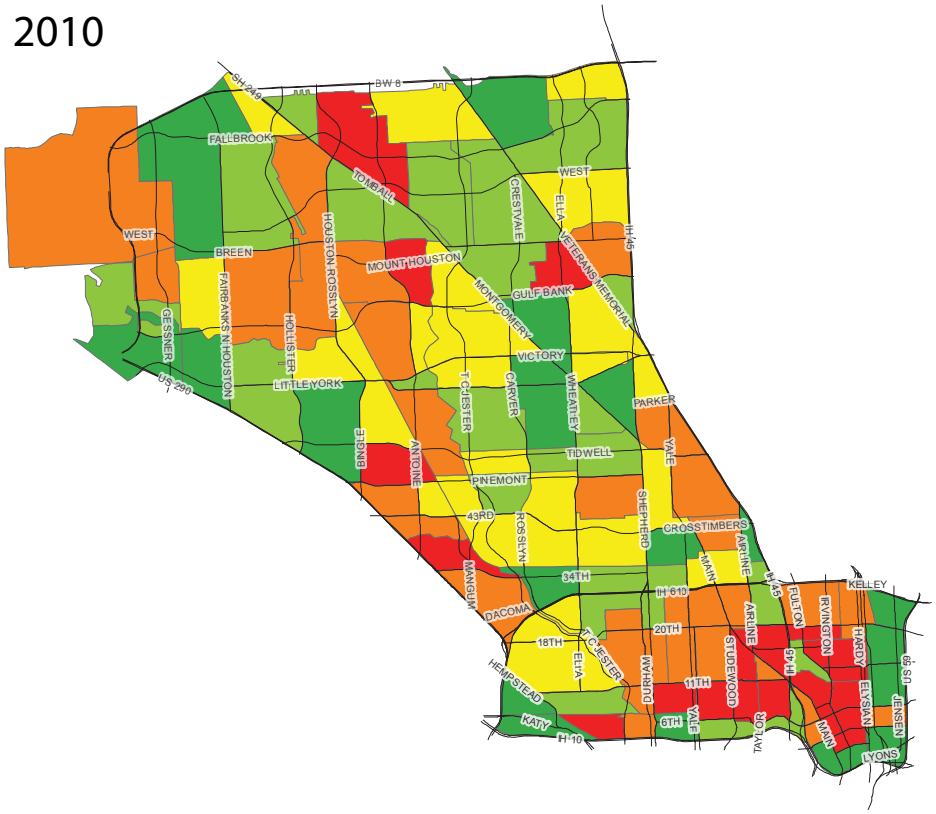


PLANNING & DEVELOPMENT DEPARTMENT

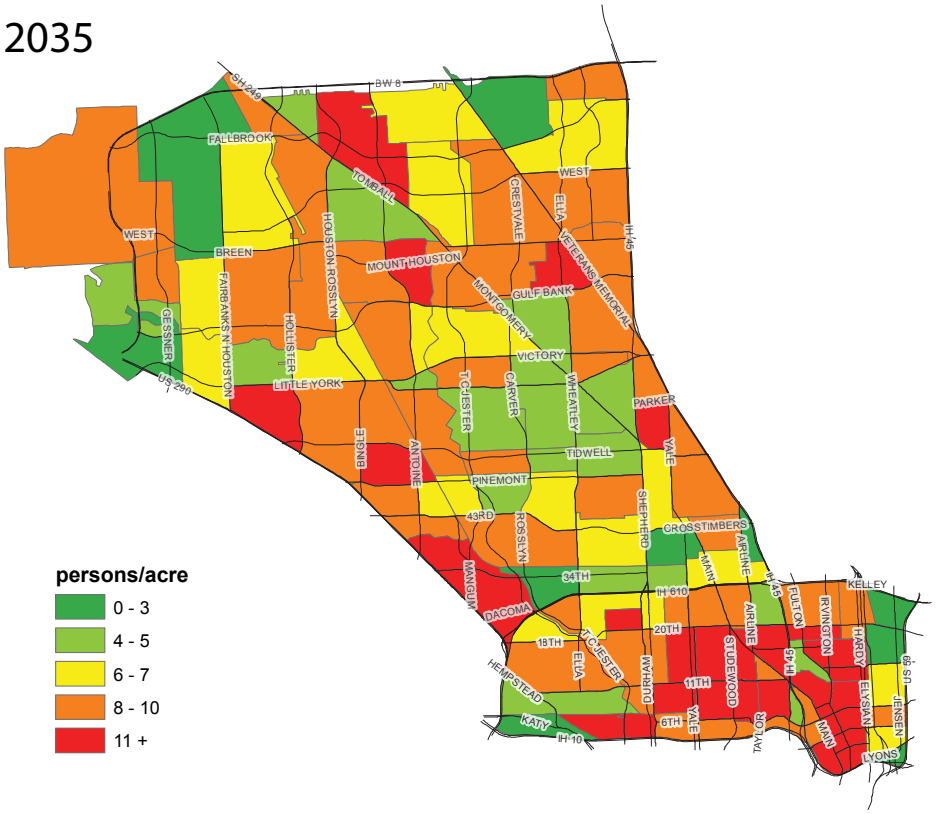

Employment Density (2011)
METHODOLOGY:
Each grid, 1000-by-1000 feet, has aggregated information on the density of population, housing, and employment. This format allows for uniformed evaluation of areas regardless of block or block group boundaries.
Resource: Info USA 2011
Employment Density (2011)
Jobs/acre
1 - 7
8 - 20
21 +
0
2.5
5
Miles
PLANNING & DEVELOPMENT DEPARTMENT
HEIGHTS-NORTHSIDE/NORTHWEST MOBILITY STUDY
FALLBROOK
TOMBALL
WEST
BREEN
MOUNT HOUSTON
GULF BANK
VICTORY
LITTLE YORK
PARKER
TIDWELL
PINEMONT
43RD
34TH
20TH
18TH
11TH
6TH
CROSSTIMBERS
OLD KATY
KATY
WASHINGTON
WHITE OAK
LYONS
HEMPSTEAD
DACOMA
CAVALCADE
IRVINGTON
JENSEN
HUTTON
HARDY TOLL
ELYSIAN
MAIN
AIRLINE
SHEPHERD
YALE
ROSSLYN
MANGUM
ANTOINE
EIGEL
GESSNER
FAIRBANKS N HOUSTON
HOLLISTER
HOUSTON ROSSLYN
CRESTVALE
DEER TRAIL
VETERANS MEMORIAL
MONTGOMERY
WHITAKER
CEBRA
T.C. JESTER
ELLA
WAYNOKA
STUDEWOOD
HEIGHTS
WEBB
SH 249
BW 8
US 290
IH 45
IH 610
IH 10
US 59

Population Density Change (2010-2035)

2010



2035



persons/acre

- 0 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 +

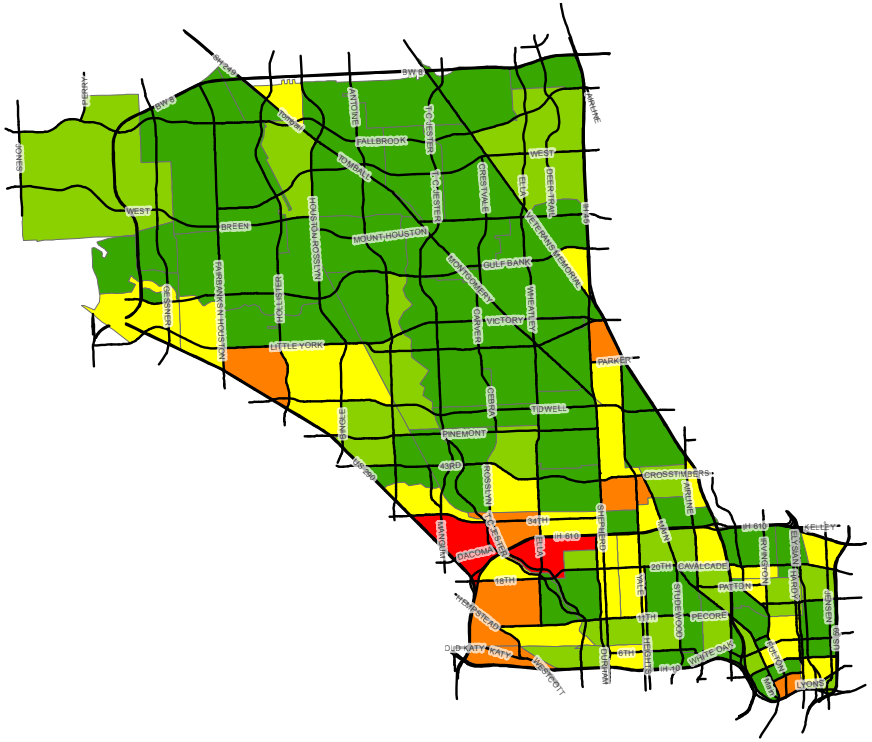
Average Density (persons/acre)

Year	2010	2035
Total	6.1	7.4
Heights-Northside	7.4	8.9
Heights	7.4	9.0
Northside	7.4	8.6
Northwest	5.8	7.0

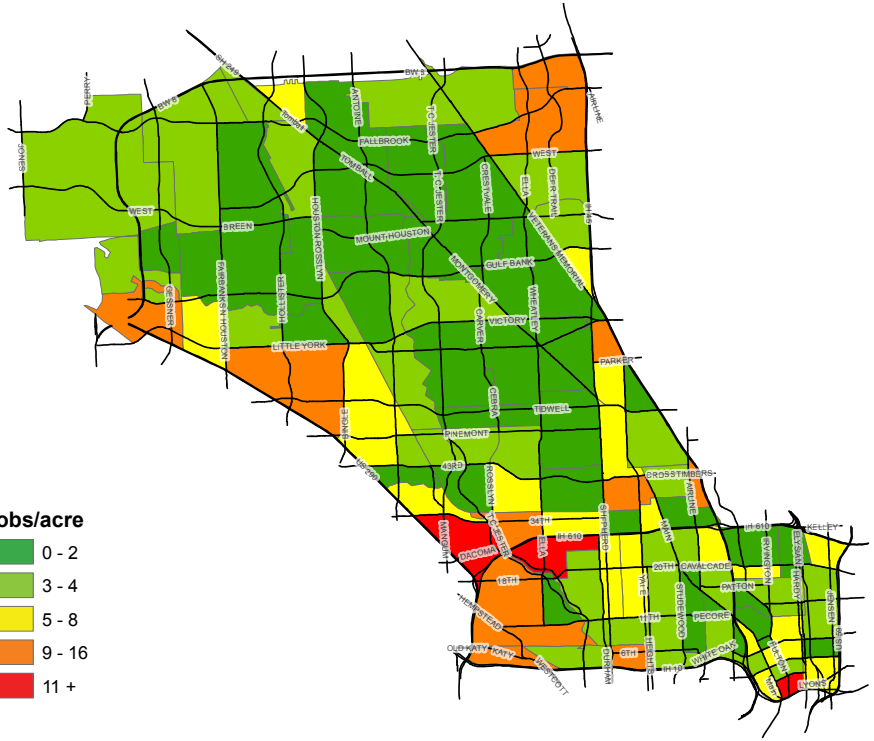
PLANNING & DEVELOPMENT DEPARTMENT

Employment Density Change (2010-2035)

2010



2035



Jobs/acre

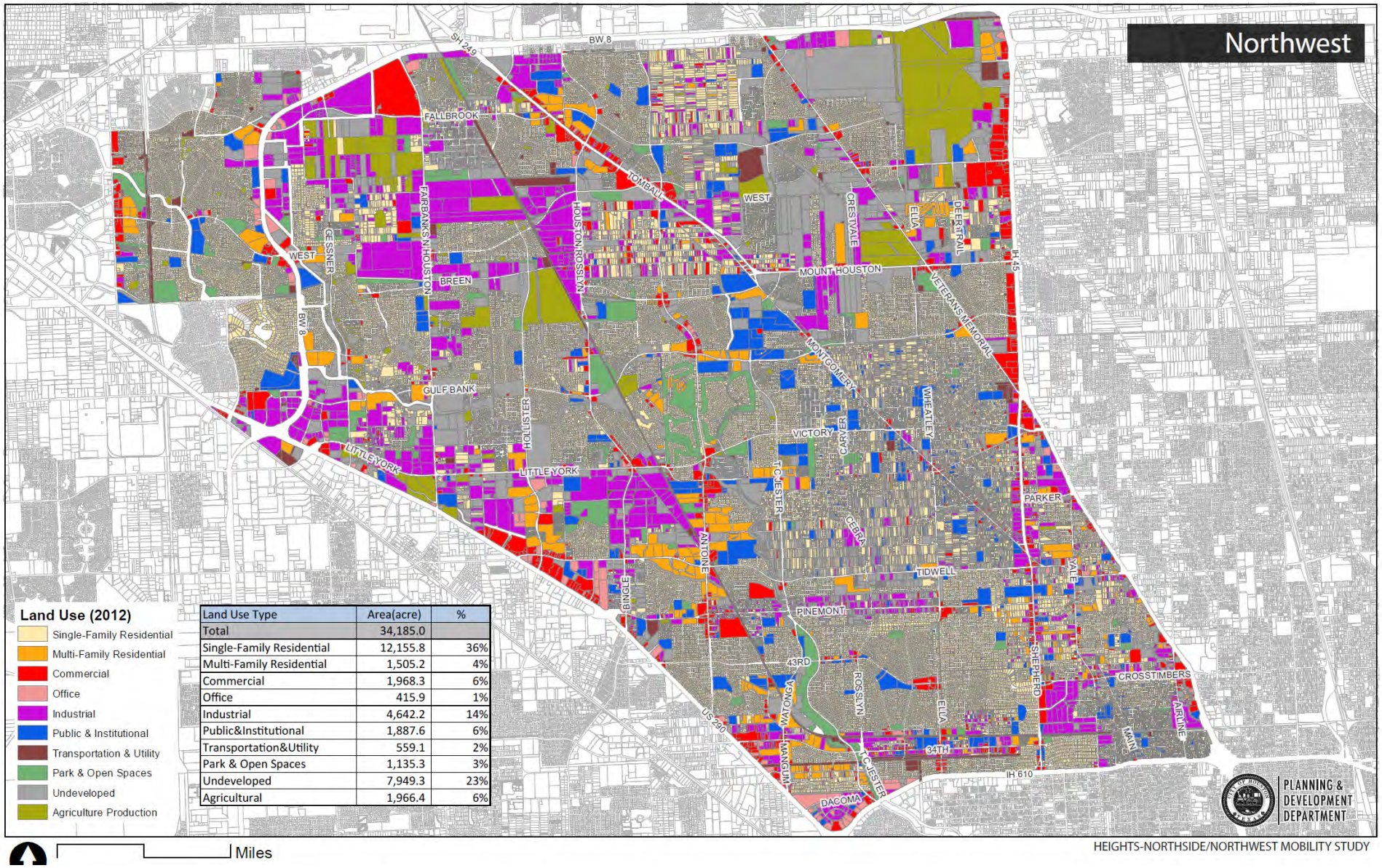
- 0 - 2
- 3 - 4
- 5 - 8
- 9 - 16
- 11 +

Average Density (jobs/acre)

Year	2010	2035
Total	2.9	3.6
Heights-Northside	4.7	5.4
Heights	5.7	6.1
Northside	2.8	3.9
Northwest	2.4	3.2

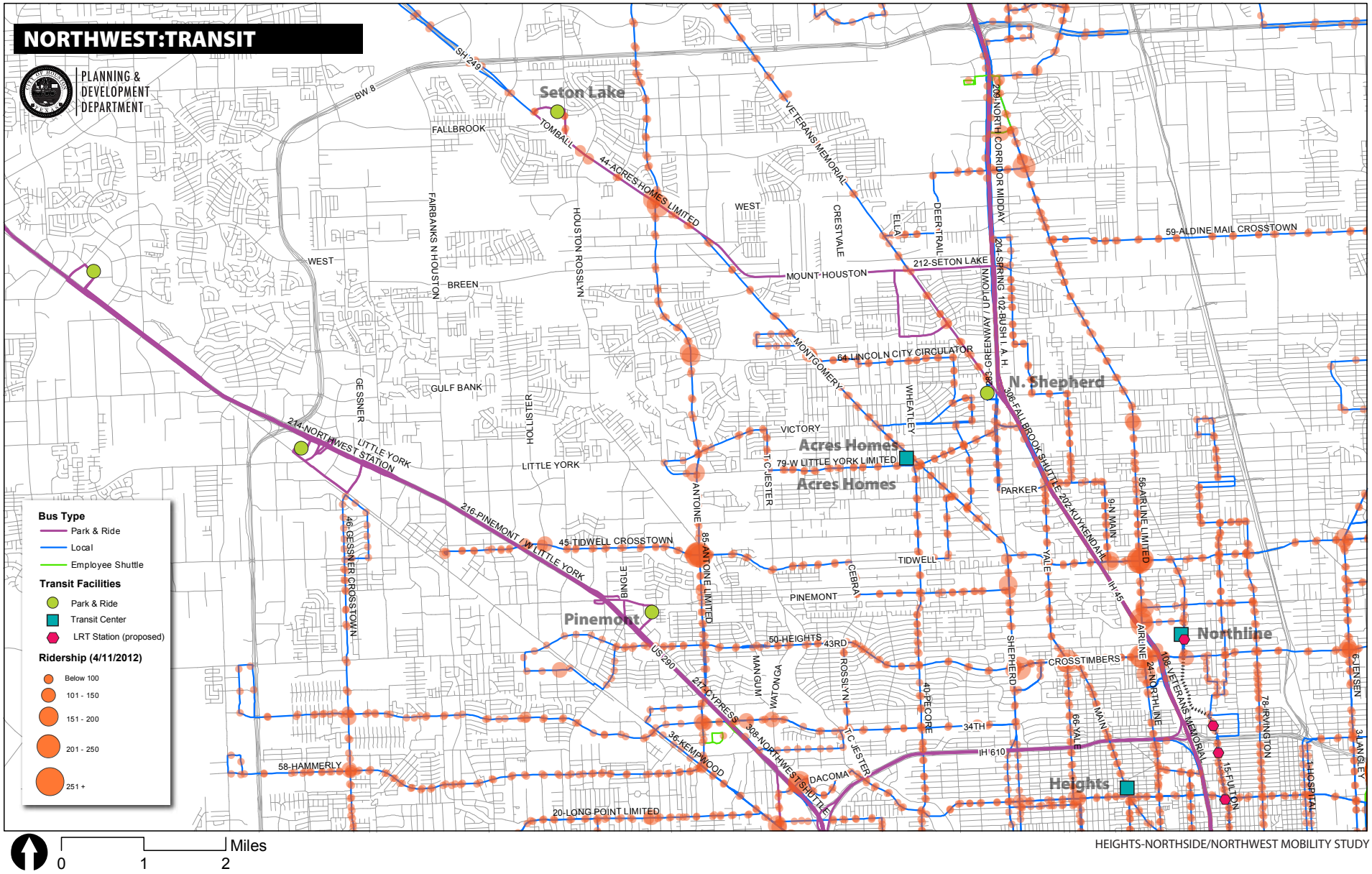
PLANNING & DEVELOPMENT DEPARTMENT

Land Use (2011)

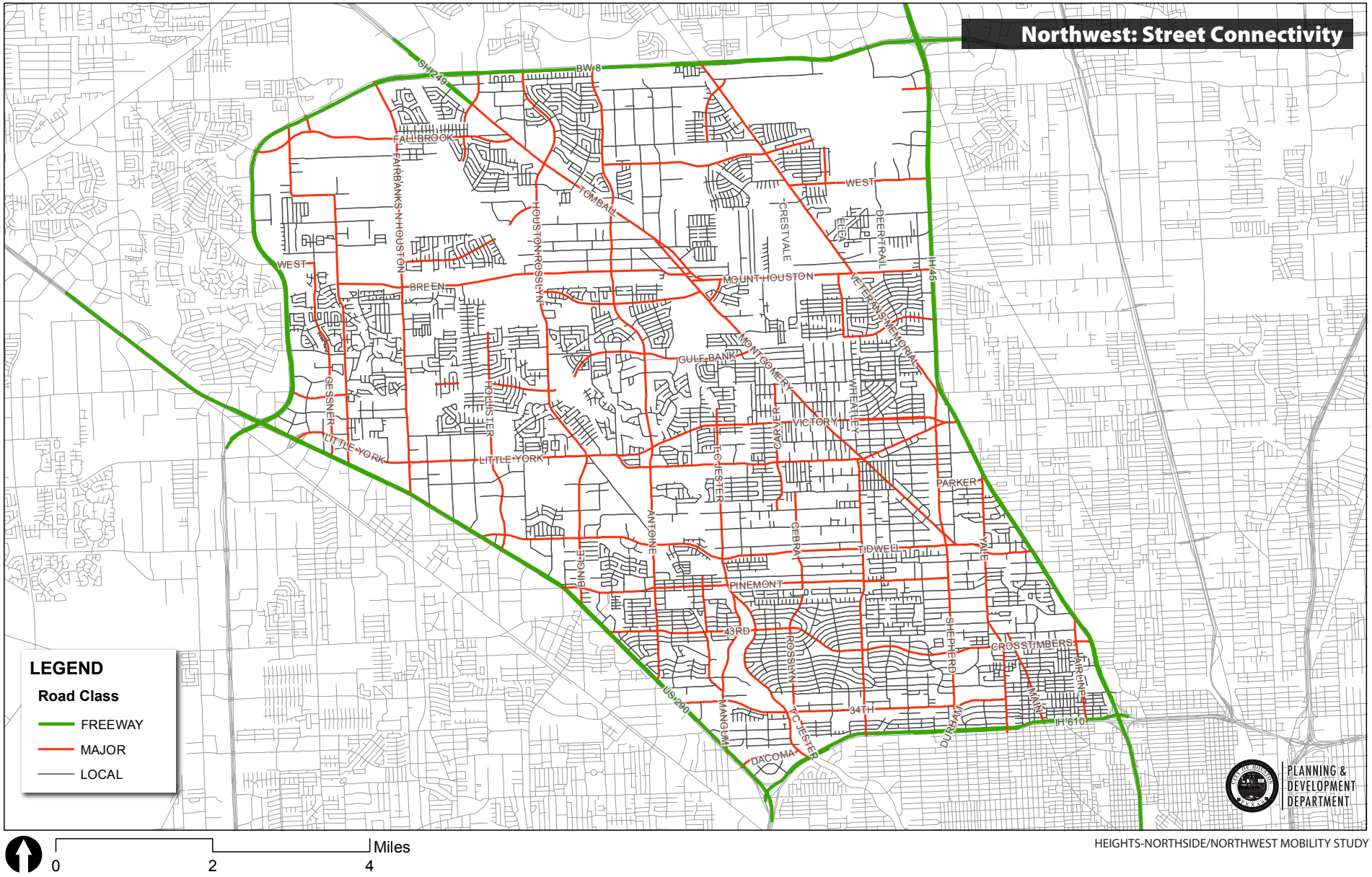


Land Use Type	Area(acre)	%
Total	34,185.0	
Single-Family Residential	12,155.8	36%
Multi-Family Residential	1,505.2	4%
Commercial	1,968.3	6%
Office	415.9	1%
Industrial	4,642.2	14%
Public&Institutional	1,887.6	6%
Transportation&Utility	559.1	2%
Park & Open Spaces	1,135.3	3%
Undeveloped	7,949.3	23%
Agricultural	1,966.4	6%

METRO Transit Network and Ridership 2012)



Street Connectivity (2012)



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X. Appendix B

Thoroughfare Types

The following pages are provided as reference for the reader. This information was developed during Phase 1 of the City Mobility Planning exercise, and led to the development of the Alternative Cross Sections presented in Chapter 10, Appendix 2 of the **Infrastructure Design Manual**. This information is intended to clarify the distinction of Boulevards, Avenues, and Streets within the Urban and Suburban Areas. This nomenclature is less about street name or functional classification and is focused on the context in which the corridor is intended to operate.

Freeway/Expressway/Parkway

Freeways are high speed (50 mph +), controlled-access thoroughfares with grade-separated interchanges and no pedestrian access. (Includes tollways) Expressways and parkways are high- or medium-speed (45 mph +), limited-access thoroughfares with some at-grade intersections. On parkways, landscaping is generally located on each side and has a landscaped median. Truck access on parkways may be limited. In most cases the freeways and tollways are TxDOT or HCTRA controlled facilities and the design elements of those roads are dictated by the State's Design Manual. The parkways are City facilities that function at high speeds. In many cases grade separated limited access facilities.

ALLEN PARKWAY

Urban Boulevard

Urban Boulevards are walkable, lower speed (35 mph or less) divided thoroughfare in urban environments designed to carry both through and local traffic, bicyclists and pedestrians. Urban Boulevards may be long corridors, typically 4 to 6 lanes, but are sometimes wider, serve longer trips and provide limited access to land. Boulevards may be high ridership transit corridors. Boulevards are primary goods movement and emergency response routes and use access management techniques. Urban Boulevards are different from Suburban Boulevards in that the pedestrian and context realms are oriented towards the pedestrian and building frontages. Most often the buildings are close to the street with wide sidewalks and tree wells forming space where a pedestrian feels comfortable and safe. The building height to street ratio often exceeds a 3:1 ratio which creates a comfort level for pedestrians to cross often wide thoroughfares.

POST OAK

Suburban Boulevard

Suburban Boulevards are high speed (40 to 45 mph) divided thoroughfare in suburban environment designed to carry primarily higher speed, long distance traffic and serve large tracts of separated single land uses (for example, residential subdivisions, shopping centers, industrial areas and business parks). High speed suburban boulevards may be long corridors, typically 4 to 8 lanes and provide very limited access to land. They may be transit corridors and accommodate pedestrians with sidewalks or separated paths, but some high speed boulevards may offer limited pedestrian facilities. Suburban boulevards emphasize traffic movement, and signalized pedestrian crossings and cross-streets may be widely spaced. In the context realm, buildings or parking lots adjacent to suburban boulevards typically have large landscaped setbacks. They are routes for primary goods movement and emergency response and widely use access management techniques.

KIRBY

Transit Boulevard/Avenue

Much like the Urban Boulevards, Transit Boulevards are very walkable, lower speed (35 mph or less) divided thoroughfare in urban environments designed to carry both through and local traffic, pedestrians and bicyclists. Transit Boulevards may be long corridors, typically 4 to 6 lanes but sometimes wider, serve longer trips and provide limited access to land. Transit Boulevards are designed to provide space in the median for transit facilities. Transit Boulevards are extremely oriented towards providing the pedestrian with more space and building frontages. Most often the buildings are close to street with wide sidewalks and tree wells forming space where a pedestrian feels comfortable and safe. The building height to street ratio often exceeds a 3:1 ratio which creates a comfort level for pedestrians to cross often wide thoroughfares.

MAIN

Urban Avenue

Urban Avenues are walkable, low-to-medium speed (30 to 35 mph) urban arterials or collector thoroughfare, generally shorter in length than boulevards, serving access to abutting land. Urban Avenues serve as primary pedestrian and bicycle routes and may serve local transit routes. Urban Avenues do not exceed 4 lanes and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. Some Avenues feature a raised landscaped median. Urban Avenues may serve commercial or mixed-use sectors and often provide curb parking. The pedestrian realm is normally a continuous sidewalk from the back of curb to the building face with tree wells spaced near the curb lines.

WEST GRAY

Suburban Avenue

Suburban Avenues are walkable, low-to-medium speed (30 to 35 mph) suburban arterial or collector thoroughfare, generally shorter in length than boulevards, serving access to abutting land. Suburban Avenues serve as primary bicycle and pedestrian routes and may serve local transit routes. Suburban Avenues do not exceed 4 lanes and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. Some Suburban Avenues feature a raised landscaped median. Suburban Avenues may serve commercial or mixed-use sectors and sometimes provide curb parking. The pedestrian realm is usually distinguished by a landscape buffer separating the street from the sidewalk with street trees located outside of the sidewalk area.

YOAKUM

Urban Street

Urban Streets are walkable, low speed (30 mph) thoroughfare in urban areas primarily serving abutting property. A Urban Street is designed to connect residential neighborhoods with each other, connect neighborhoods with commercial and other districts, and connect local streets to arterials. Streets may serve as the main street of commercial or mixed-use sectors and emphasize curb parking. Goods movements are restricted to local deliveries only.

WEST DALLAS

Suburban Street

Suburban Streets are walkable, low speed (30 mph) thoroughfare in suburban areas primarily serving abutting property. A Suburban Street is designed to connect residential neighborhoods with each other, connect neighborhoods with commercial and other districts, and connect local streets to thoroughfares. Suburban Streets may serve as the main street of commercial or mixed-use sectors and emphasize curb parking. The context realm is defined by a landscape buffer, trees with a separated sidewalk. Goods movements are often restricted to local deliveries only.

DUNLAVY

Industrial Boulevard and Avenue

Industrial Boulevard and Avenues vary in speed from 30 to 45 mph in both urban and suburban areas. An industrial street is designed to connect heavy vehicles to and from major highways to industrial areas. These streets have wide travel lanes with large turning radii. Most often have limited pedestrian elements. Medians are optional for Industrial Boulevards.

NAVIGATION

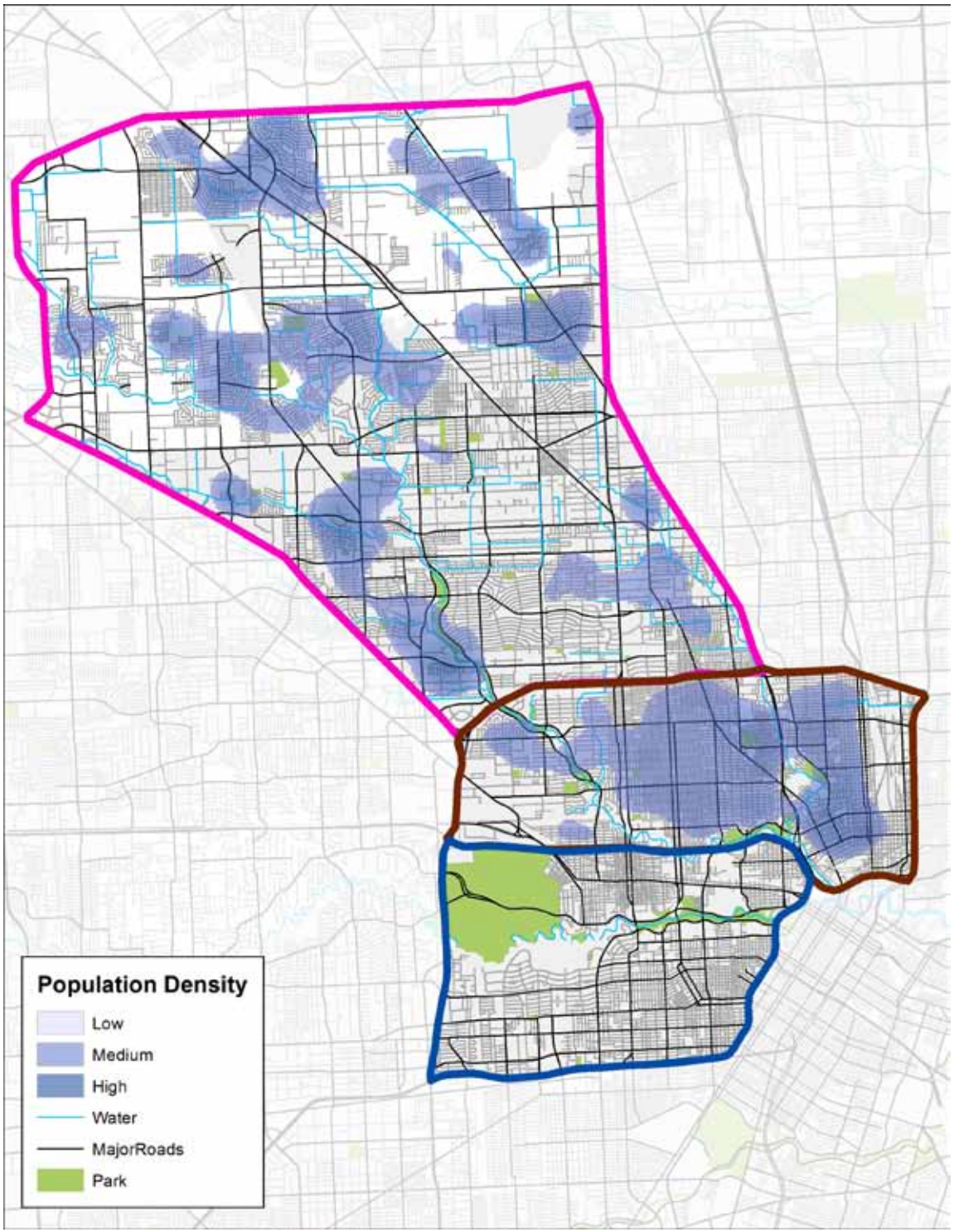
One-Way Couplets

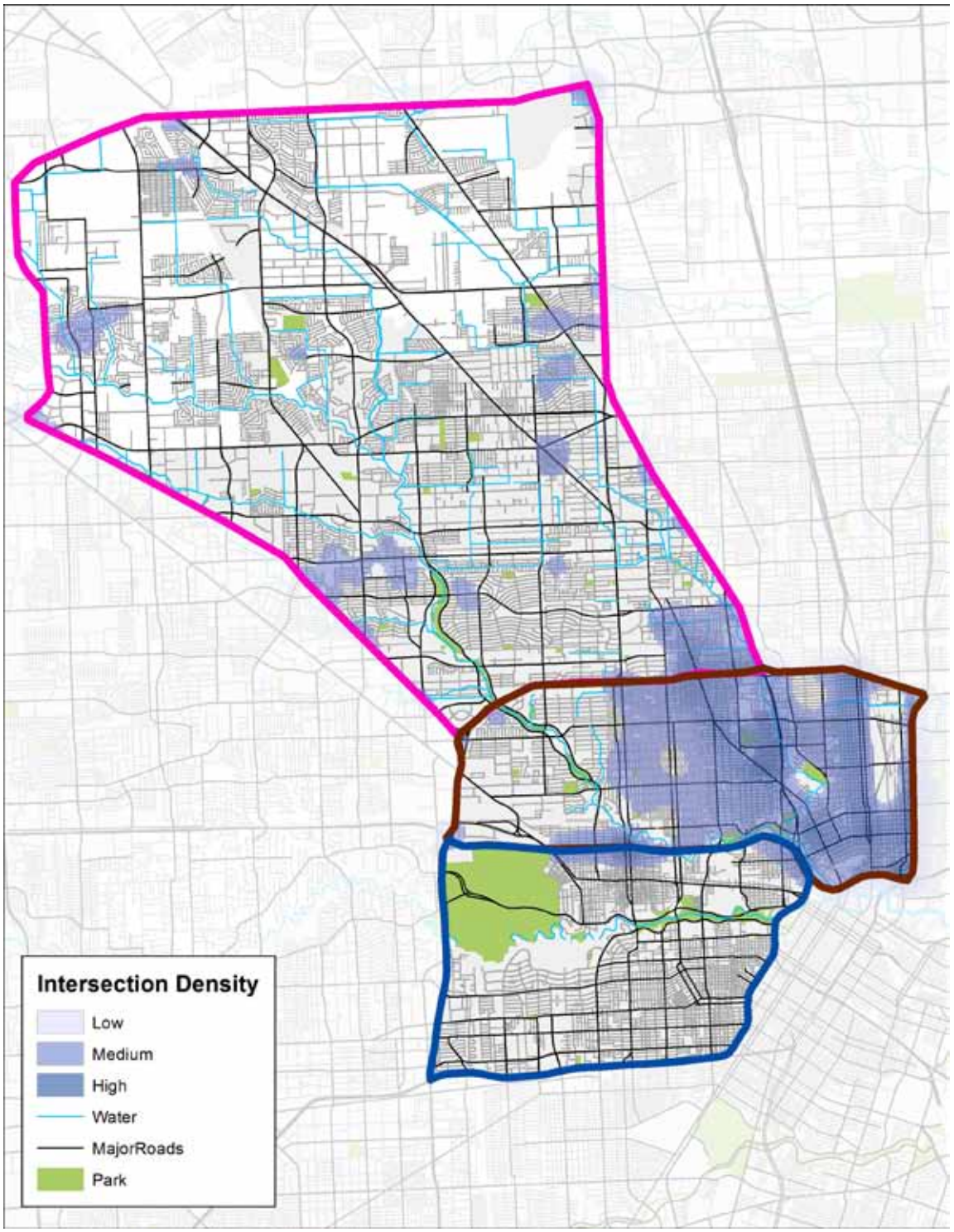
One-Way Couplets are pairs of one-way streets that function as a single higher-capacity street. Couplets are usually separated by one city block, allowing travel in opposite directions. One-Way Couplets serve many different areas of Houston from higher-density commercial and mixed-use areas such as Downtown and regional centers to lower-density residential areas and Main Streets. One –Way Couplets are designed to have a higher transportation capacity than an equivalent two-way street. Both parallel and angled parking are appropriate for these streets.

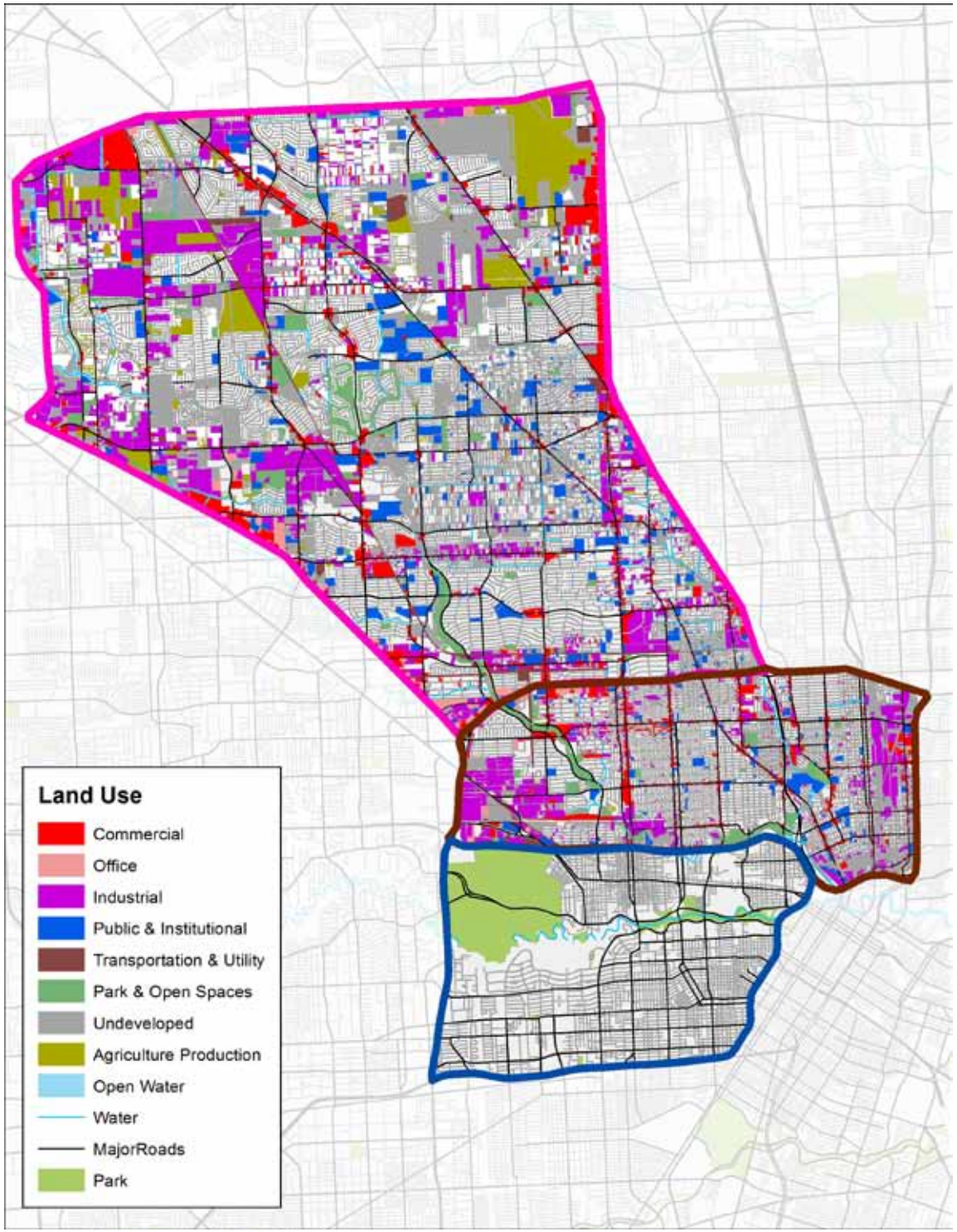
PRAIRIE

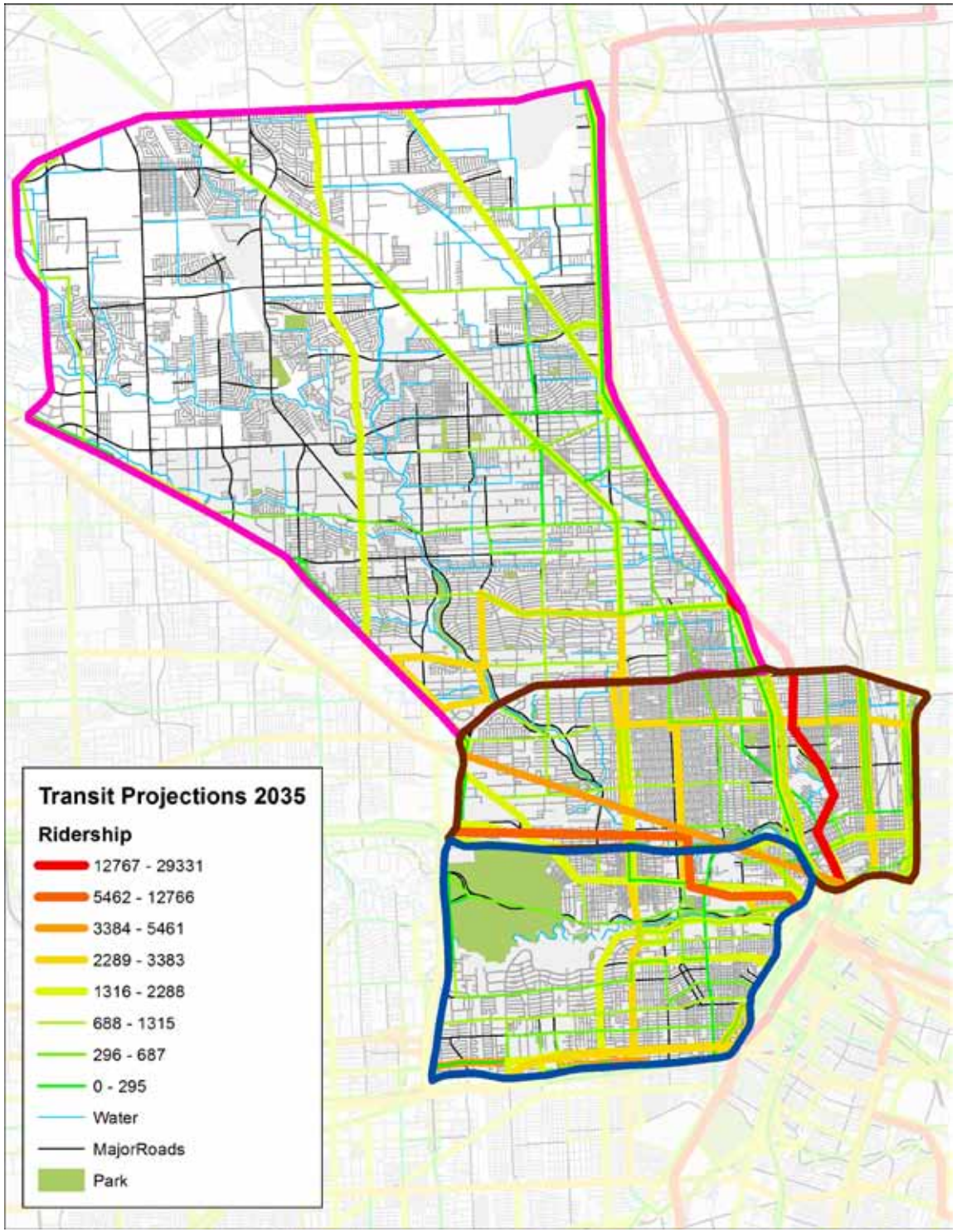
X. Appendix C

Transit Corridor Selection Analysis Maps


Population Density
Low
Medium
High
Water
MajorRoads
Park


Intersection Density
Low
Medium
High
Water
MajorRoads
Park


Land Use
Commercial
Office
Industrial
Public & Institutional
Transportation & Utility
Park & Open Spaces
Undeveloped
Agriculture Production
Open Water
Water
MajorRoads
Park


Transit Projections 2035
Ridership
12767 - 29331
5462 - 12766
3384 - 5461
2289 - 3383
1316 - 2288
688 - 1315
296 - 687
0 - 295
Water
MajorRoads
Park