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 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 sections represent the new networks for automobile, pedestrian, bicycle, and transit facilities. The maps listed below are shown on the following pages and present a comprehensive look at the Heights and Near-Northside areas.

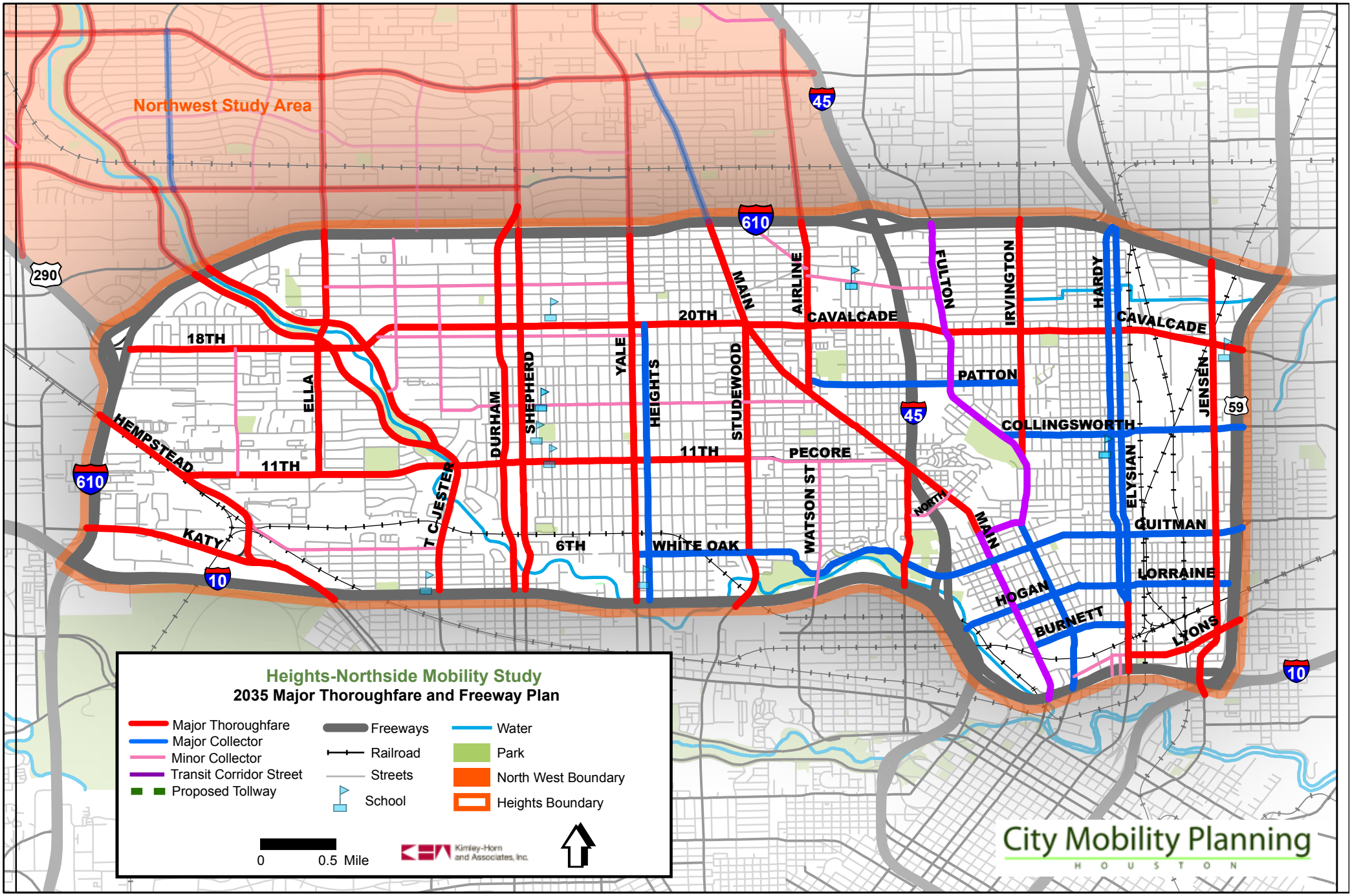
- 2035 Major Thoroughfare and Freeway Plan
- Bike Vision Map
- Intersection Analysis
- Transit and Pedestrian Vision Map

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 road map, identifying projects, funding needs, and priorities would be difficult.

The Heights and Northside areas are both 'built-out', meaning the likelihood of constructing additional or new roads is low. The network the Heights and Northside areas is a well-developed grid pattern. The updated MTFP looks at ways to adjust the existing corridors to better serve the communities' needs. This is accomplished by reclassifying or by planning for the expansion of corridors by adding or re-purposing lanes.

An updated Major Thoroughfare and Freeway Plan is shown in the adjoining map. 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.


Northwest Study Area
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Heights-Northside Mobility Study
2035 Major Thoroughfare and Freeway Plan
Major Thoroughfare
Major Collector
Minor Collector
Transit Corridor Street
Proposed Tollway
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Heights Boundary
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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 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. Doing so may allow for intersection improvements to be made that meet future needs.

Intersection data for the Northside area was not collected for this study as the area was undergoing light-rail construction during the time frame of this Report. Count-based recommendations are not provided. Intersection analysis for the Heights area can be found in the following charts. 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. Additionally, the IH 45 corridor is currently being studied by TxDOT for a future consideration. 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 larger corridors suggests that overall intersection level of service will be manageable in 2035. Figure 7.5 illustrates the intersection congestion levels for the AM peak in 2035. Due to its grid network, intersections within the Heights area operate well. Future Mitigated AM peak has only one major signalized intersection rating an LOS of E. The remaining intersections are ranked A-D. The PM peak period show a similar result. However, there are a few more intersections graded at LOS C-D for the 2035 Mitigated PM Peak Hours. The intersection of North Main/ Studewood and 20th/Cavalcade for the 2035 Mitigated PM Peak hours also has the LOS rating of E. This is a six-prong intersection of two major corridors. Further analysis of this intersection can be found in the intersection policy section.

Mitigating the Near Term Conditions

Specific projects have been identified for the near term at intersections to help mitigate congestion that exist 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

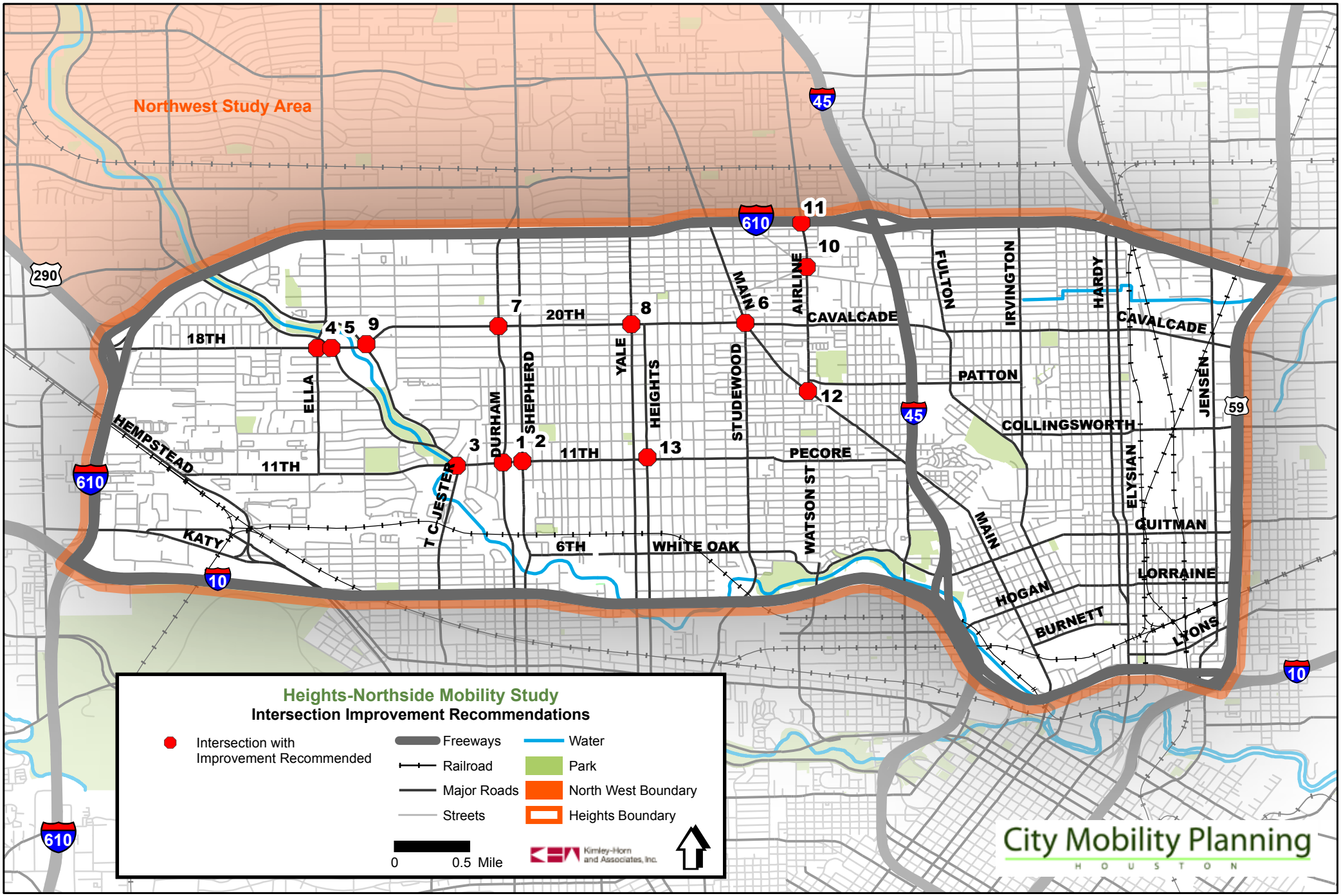
The mitigation opportunities for the 2035 scenario are limited by the existing and proposed right-of-way available for the Heights area. LOS ratings for these intersections were only slightly enhanced by mitigation. Any significant change would require physical improvements and likely involve right-of-way acquisition.

Intersection Improvement Recommendations

Figure 7.1 and the adjoining table indicate the intersections with recommended near- and long-term mitigation improvements. The project team identified improvements based on several variables which include growth rates, existing traffic counts, projected traffic volumes, land use, and the MTFP. The labeled intersection corresponds to the ID number on the following tables.

ID Number	Intersection	Proposed Near Term Mitigation	Proposed Long Term Mitigation	Alternative Mitigation Improvements
1	11th @ Durham	Optimize Offsets Optimize Splits Modify Westbound left-turn phase to permissive/protected on 11th St		
2	11th @ Shepherd	Optimize Offsets Optimize Splits Modify Eastbound left-turn phase to permissive/protected on 11th St		
3	11th @ TC Jester	Optimize Offsets Optimize Splits	Add Westbound right-turn bay on 11th St Add additional Southbound left-turn bay to make dual left-turns on TC Jester	
4	18th @ Ella	Optimize Offsets		
5	18th @ TC Jester		Add Northbound right-turn bay on 18th St	
6	20th/Cavalcade @ Main/Studewood	Optimize Offsets Optimize Splits Modify East and Westbound left-turn phases to permissive/protected phases on 20th/Cavalcade St	Add additional Southbound thru lane on Main St	Installation of 2 lane roundabout could be considered at this intersection
7	20th @ Durham	Optimize Offsets Optimize Splits	Add Additional Westbound thru lanes on 20th St Add two additional Eastbound thru lanes on 20th St Add Eastbound thru lane on 20th St Add exclusive right-turn lane on 20th St	
8	20th @ Yale		Add additional Westbound thru lane on 20th Add Westbound right-turn bay on 20th St Add exclusive left-turn lane on 20th St Add exclusive right-turn lane on 20th St	Add additional Eastbound thru lane on 20th St Add additional Northbound thru lane on Yale Add additional Southbound thru lane on Yale
9	20th @ E TC Jester	Installation of signal for intersection		
10	Gibbs @ Airline			Installation of 2 lane roundabout could be considered at this intersection
11	Service @ Airline			Installation of 2 lane roundabout could be considered at this intersection
12	N Main @ Airline			Consider realigning Airline Drive to avoid the offset at the intersection
13	Heights at 11th			Analysis of a Michigan U-Turn concept

TABLE 7.1 SHORT-TERM INTERSECTION IMPROVEMENTS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Heights-Northside Mobility Study
Intersection Improvement Recommendations
Intersection with Improvement Recommended
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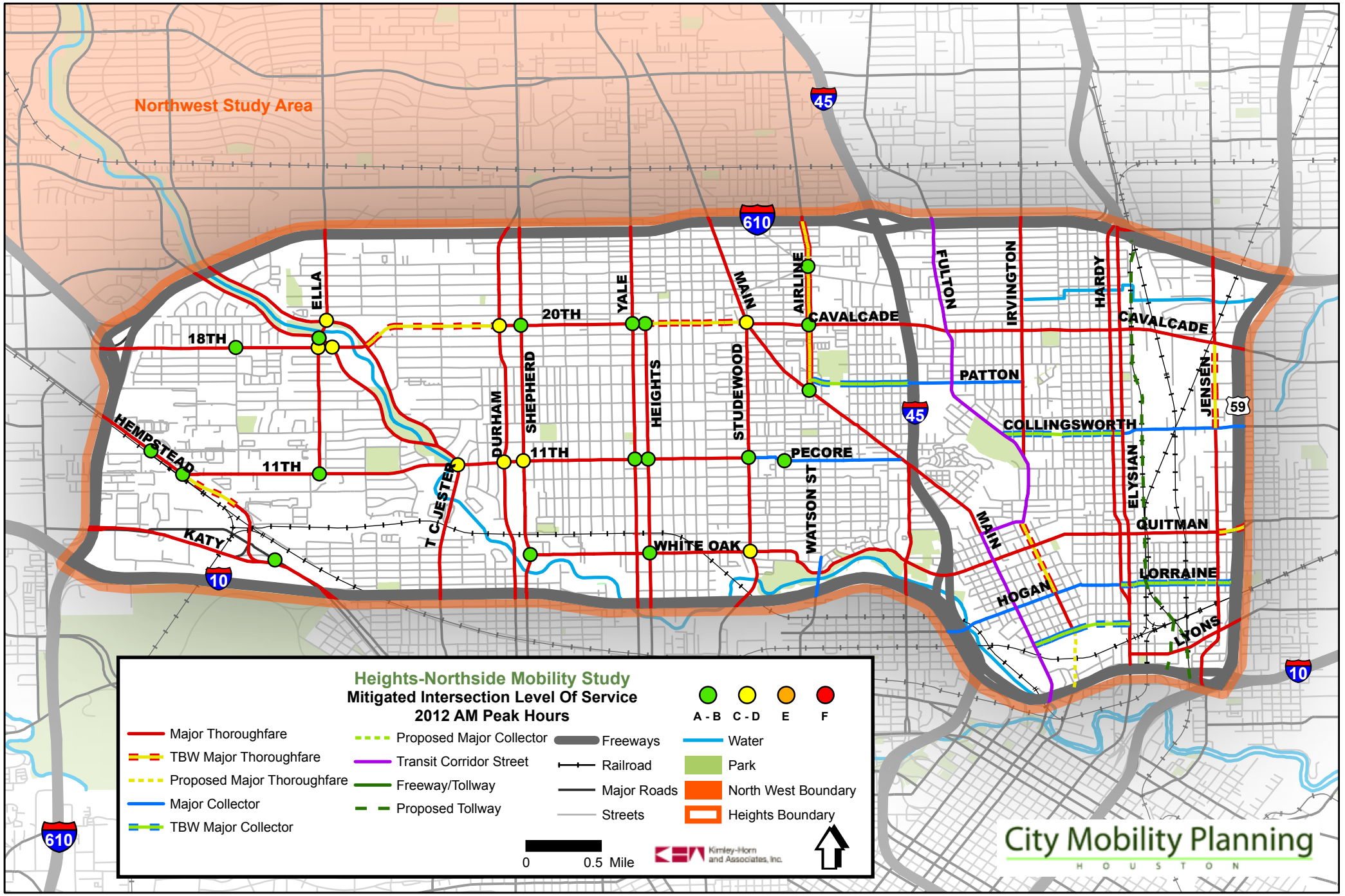
FIGURE 7.2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Heights-Northside Mobility Study
Mitigated Intersection Level Of Service
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Kimley-Horn and Associates, Inc.
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FIGURE 7.3

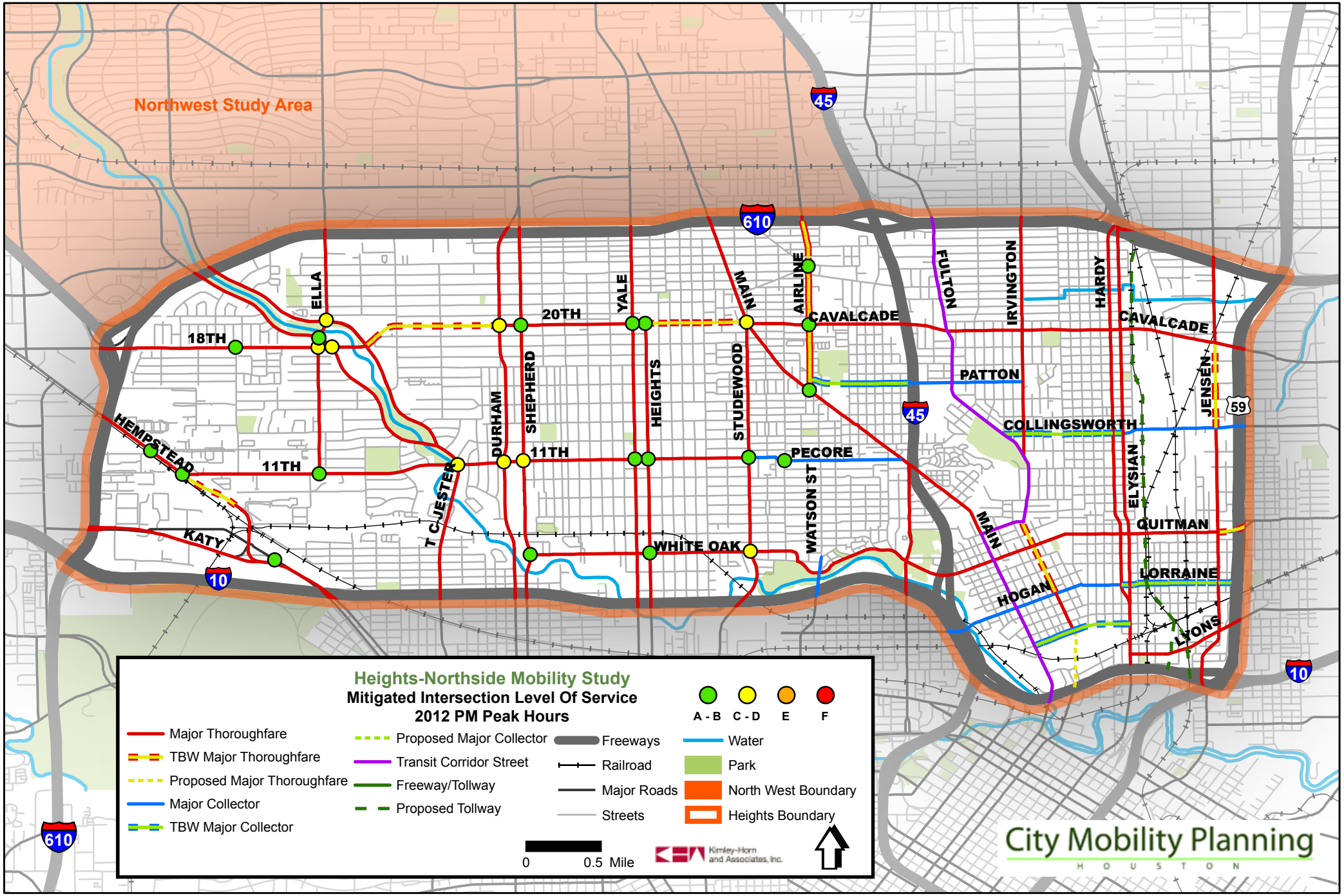
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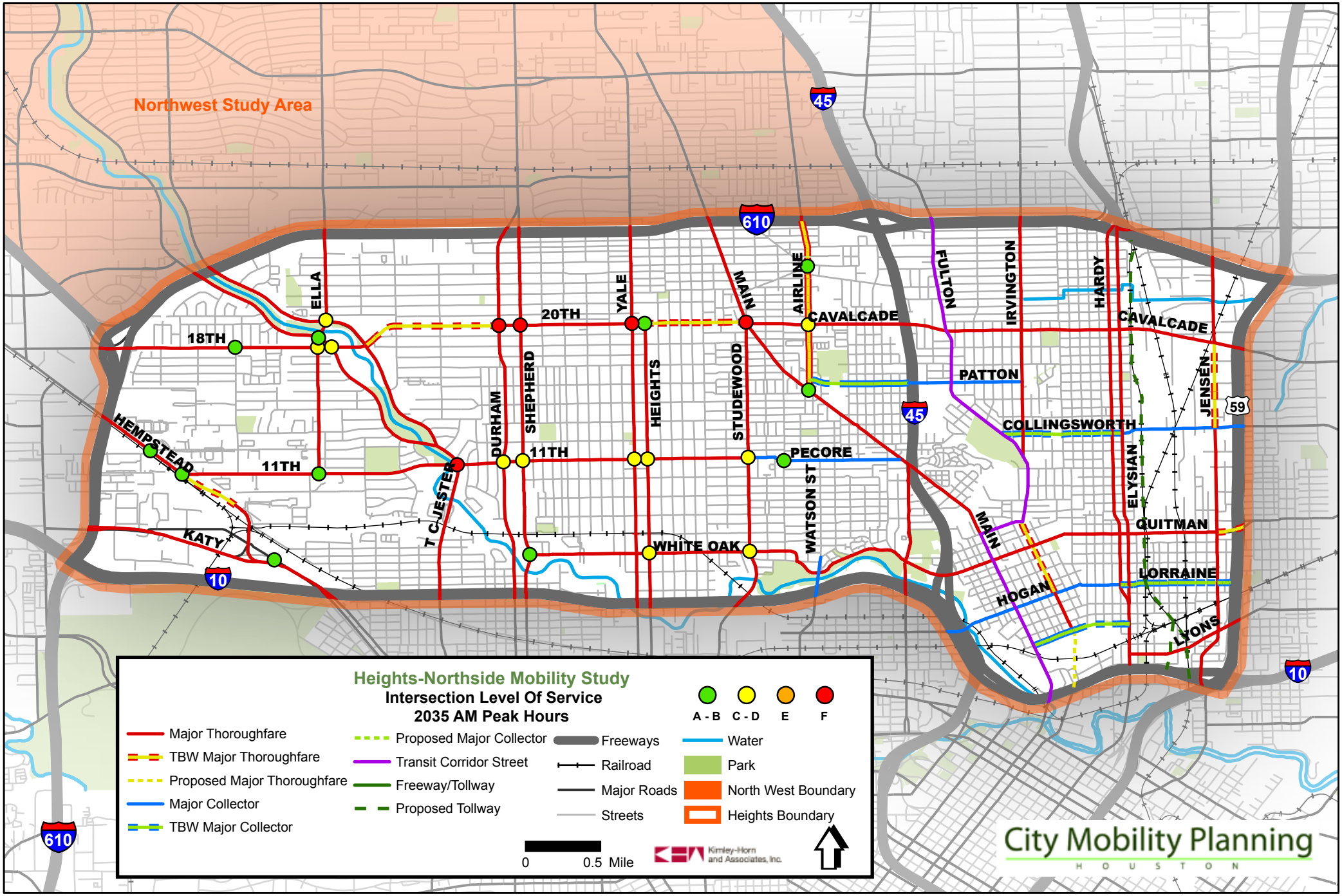
FIGURE 7.4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Kimley-Horn and Associates, Inc.
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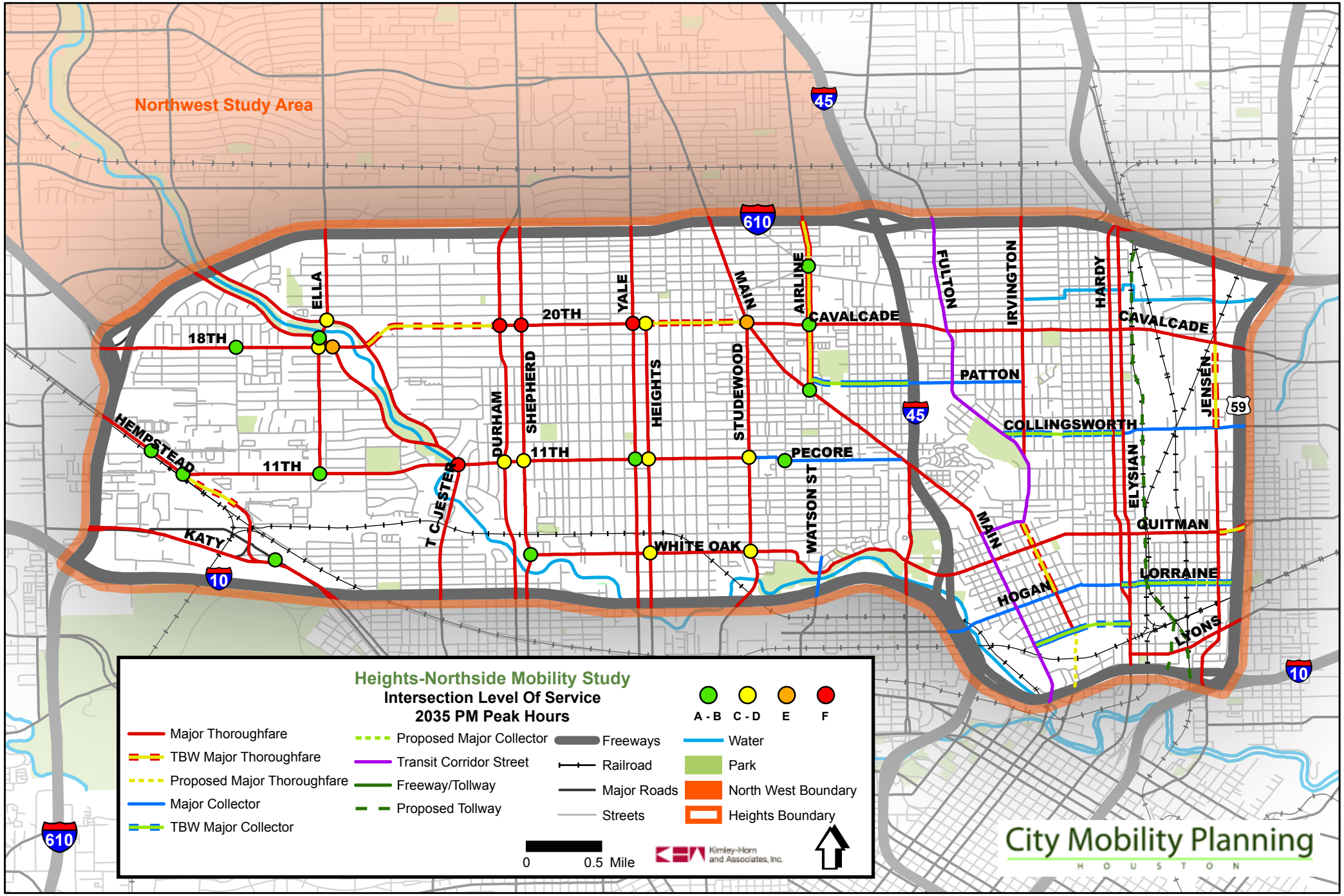
FIGURE 7.5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Kimley-Horn and Associates, Inc.
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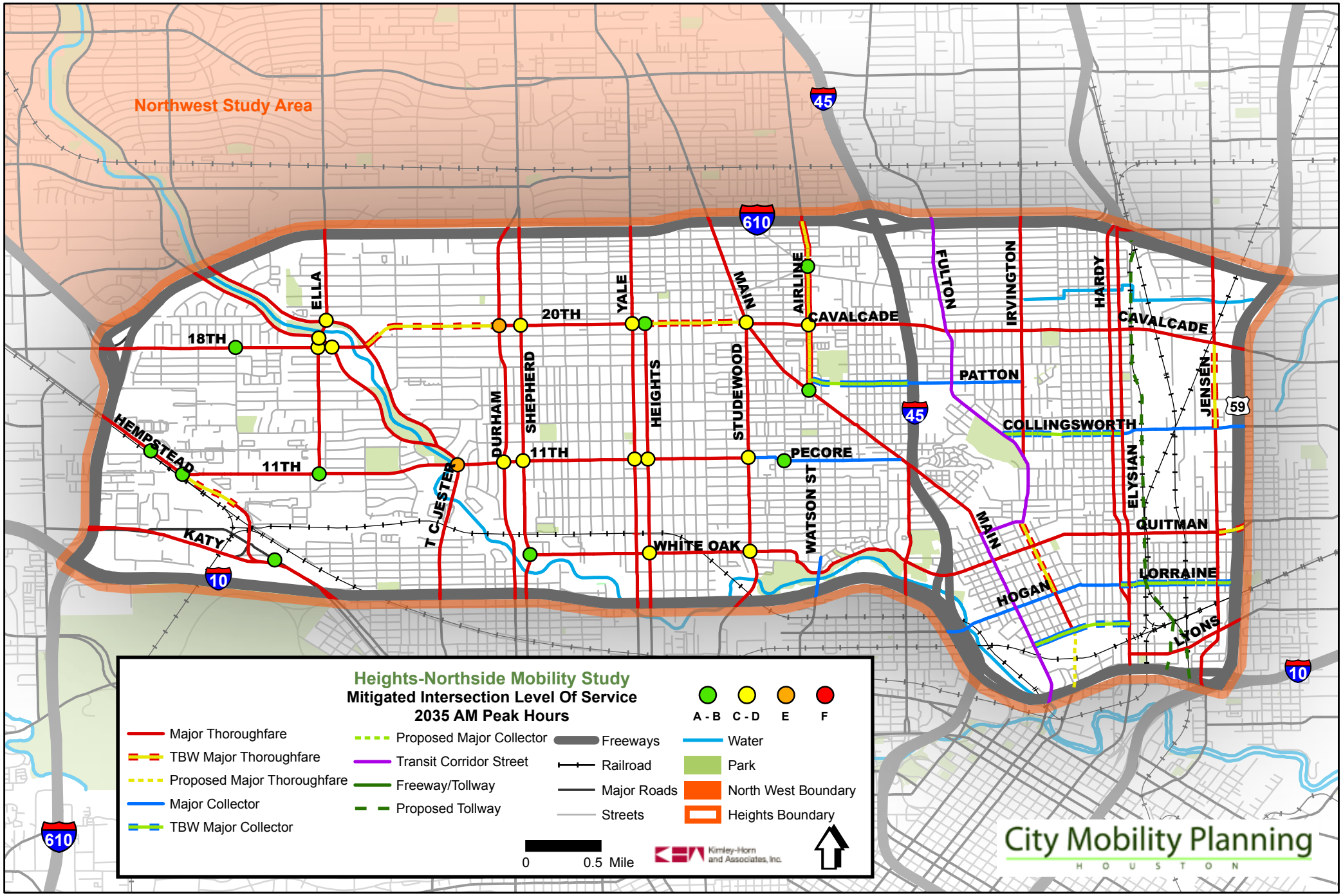
HOUSTON

FIGURE 7.6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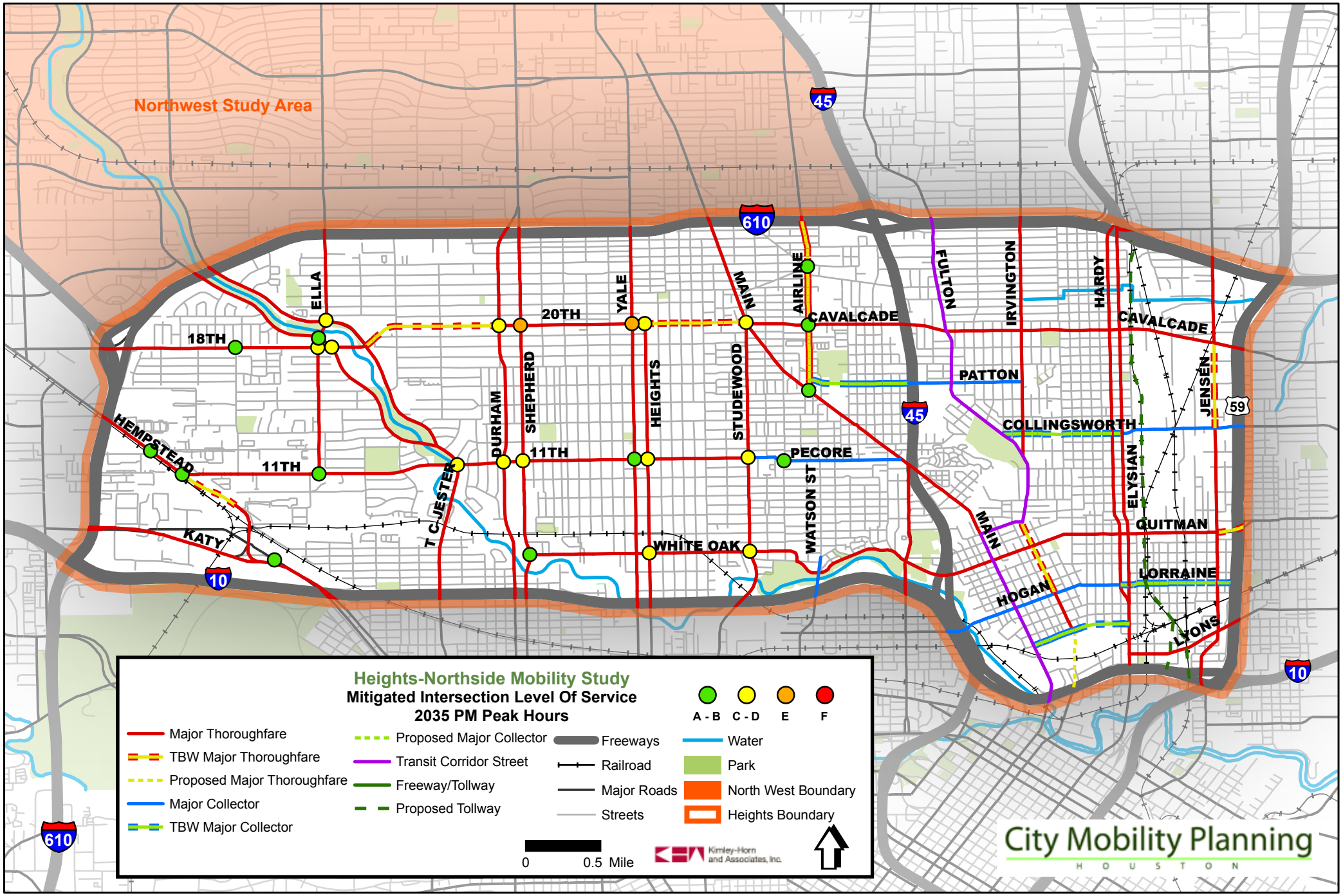
Kimley-Horn and Associates, Inc.
City Mobility Planning
HOUSTON

FIGURE 7.7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Kimley-Horn and Associates, Inc.
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FIGURE 7.8

7.3 Bike System Gaps and Vision

The current bicycle network within the Heights and Northside areas is apparent, 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 - 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.

Heights area

The Heights area is unique in regards to how bicycle facilities are used. Unlike many communities, the Heights has embraced the use of bicycles for commute in addition to recreational use, and encourage the expansion of the network in this area.

The Heights area is well-suited for developing an extensive bike network given that White Oak Bayou Trail cuts through the middle of the community. The IH 610 loop, north of the study area, presents a unique challenge. Although the project team acknowledges a gap between the Heights and the communities north of the IH 610 corridor, the appropriate connection across the highway is unclear. Crossings at TC Jester and Ella should be maintained, but the approximate 4-mile gap within the bicycle network between Ella Blvd and Irvington Blvd presents a large barrier in the existing bicycle network. Main Street is identified as a potential gap solution within the network, however further review is needed. Potential consideration of Durham-Shephard couplet or Yale should be further analyzed as possible connection across the IH 610 corridor.

Northside area

The Northside area has several on-street bike facilities, but are considered narrow and unsafe along many of the communities heavily traveled streets. Local residents were vocal in their desire to expand the bike network within their area, especially for increased connectivity in to the Downtown and Heights areas. Streets, such as Quitman, were also noted as ideal bicycle facilities given the number of schools located along the corridor.

The type of bicycle facility recommended is intended to provide a balance between the associated user of the facility as well as restriction provided by the existing right-of-way. Proposed bicycle facilities types are defined Chapter V, Section 5.4 Bicycle User and Facility Type.

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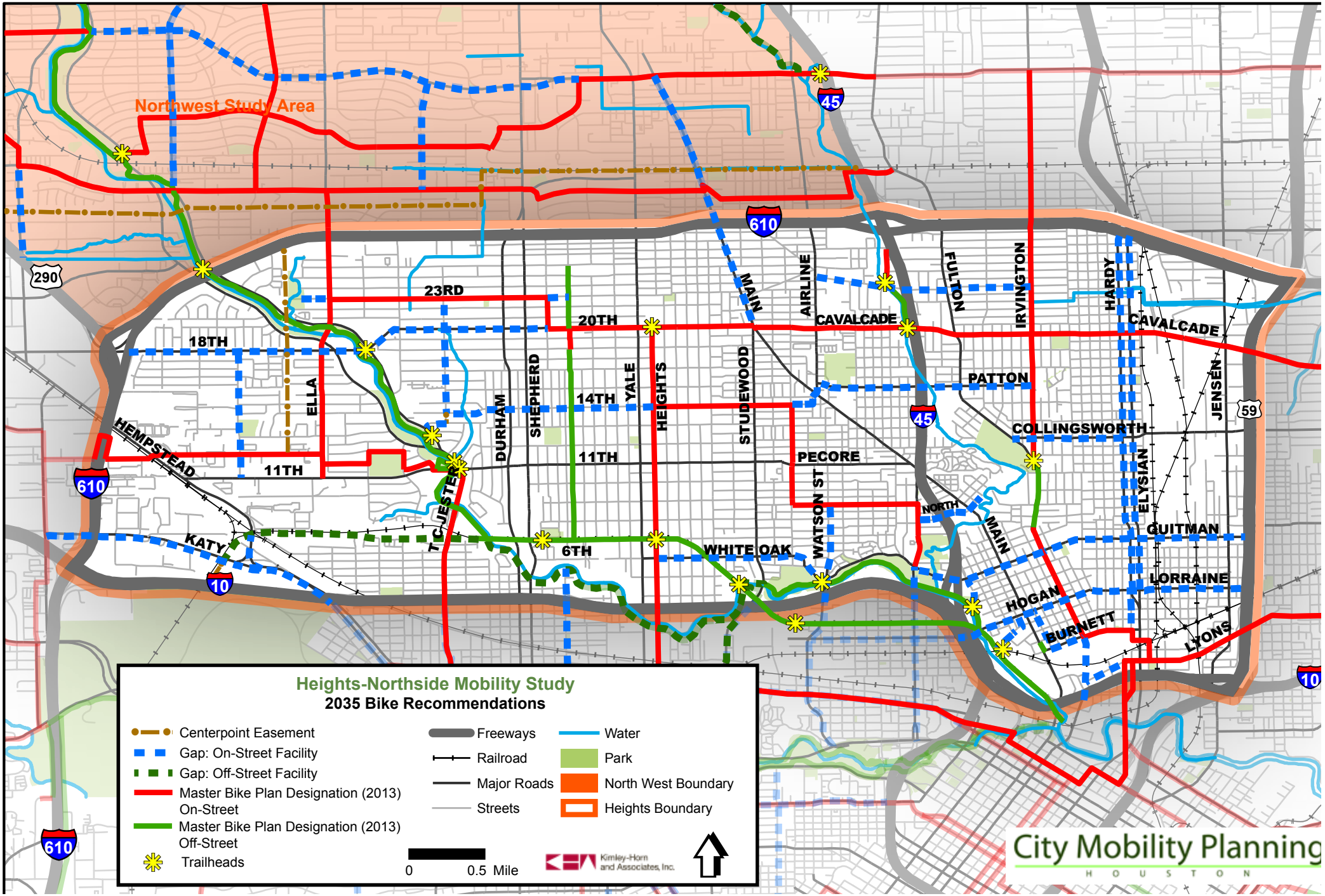
PHOTO PROVIDED COURTESY CITY OF HOUSTON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Heights-Northside Mobility Study
2035 Bike Recommendations
Centerpoint Easement
Gap: On-Street Facility
Gap: Off-Street Facility
Master Bike Plan Designation (2013) On-Street
Master Bike Plan Designation (2013) Off-Street
Trailheads
Freeways
Railroad
Major Roads
Streets
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FIGURE 7.9

7.4 New Transit and Pedestrian Vision Map

The transit network within the Heights area is extensive, as seen in Chapter II. Existing Conditions. As detailed in Chapter V, Section 5.6 Transit Corridor Considerations, the project team evaluated specific corridors and areas of Houston where transit can be most successful in capturing riders, the following factors were analyzed and ranked in the Heights-Northside:

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

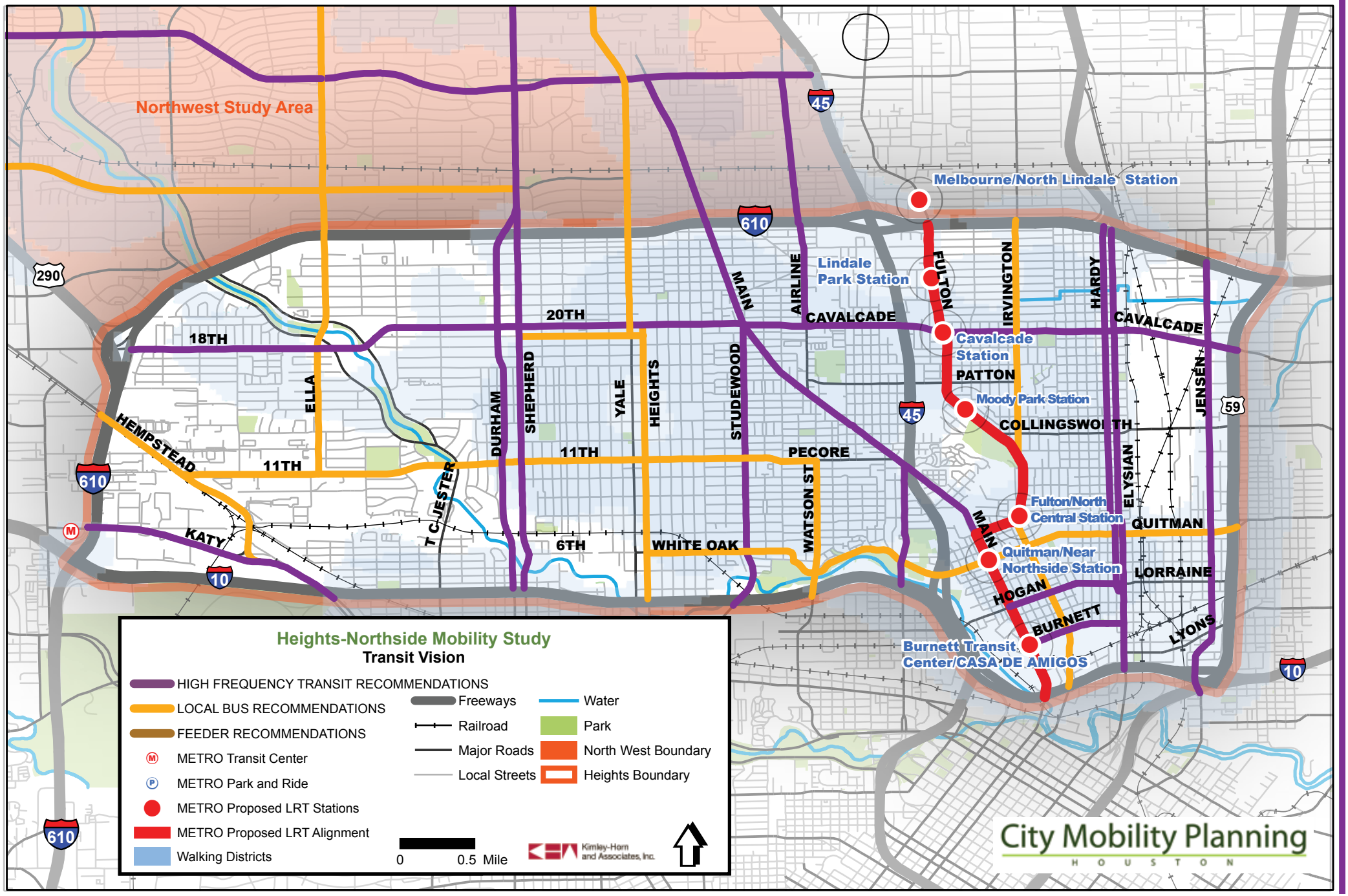
The final output from the resulting analysis (Scenario 5) , was further evaluated by METRO to ensure consistency and modifications to the system where appropriate as part of the greater METRO System Reimagining. Two transit types are depicted in final system recommendations including: Local Bus Routes and Bus Rapid Transit (BRT), or routes that facilitate the movement of larger numbers of persons across greater distances with less stops. METRO's light rail line, which came on line in December of 1013, is also depicted. See Figure 7.10 for more information.

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

BUS RAPID TRANSIT (BRT)

LIGHT-RAIL

LOCAL BUS


Northwest Study Area
Melbourne/North Lindale Station
Lindale Park Station
Cavalcade Station
Moody Park Station
Fulton/North Central Station
Quitman/Near Northside Station
Burnett Transit Center/CASA DE AMIGOS
20TH
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Heights-Northside 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
Local Streets
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North West Boundary
Heights Boundary
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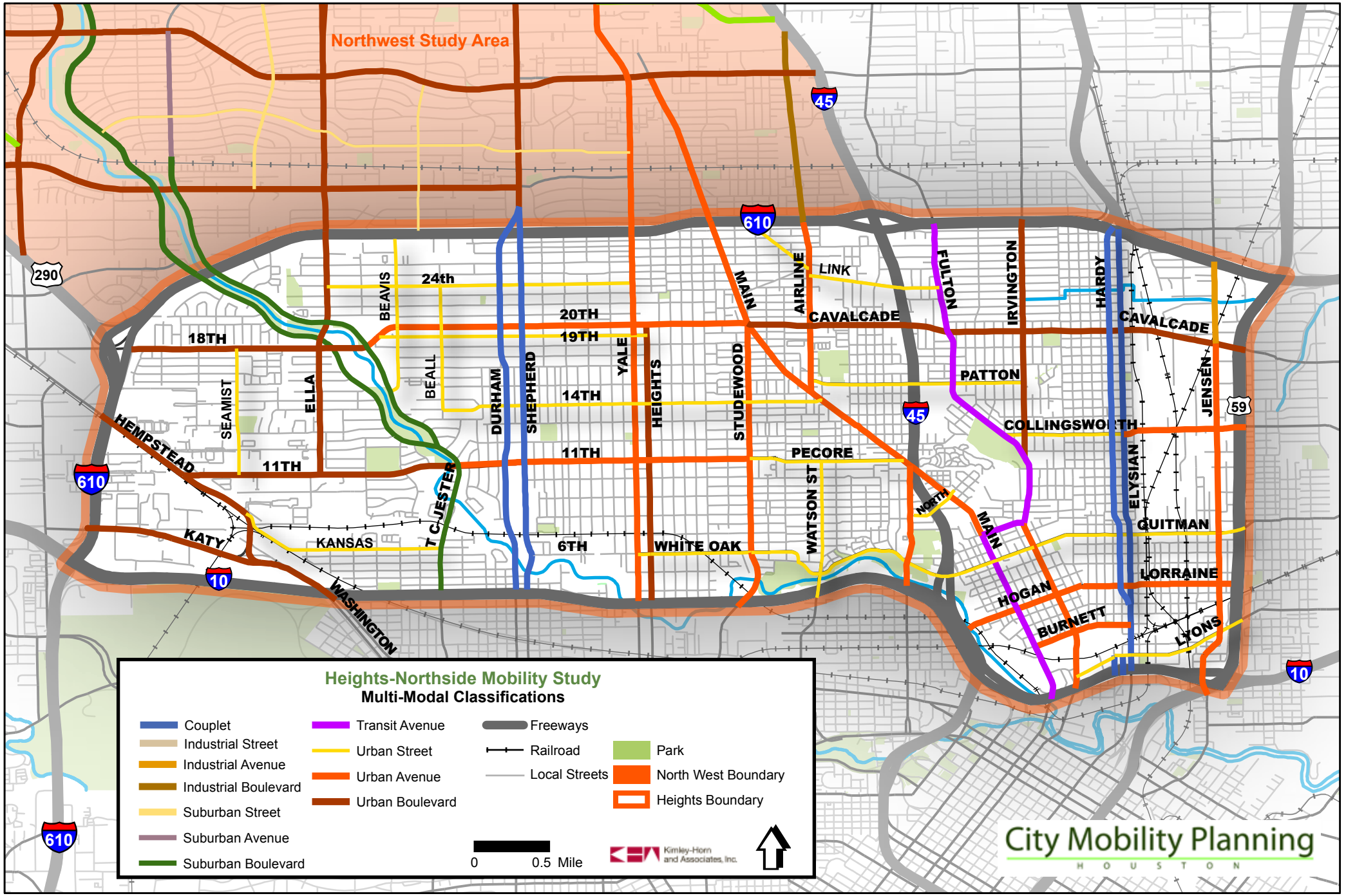
FIGURE 7.10

7.5 Multi-Modal Classification Map

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

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

Based on the evaluation of the MMC designations provided in Chapter 10, Appendix 2 of the City of Houston Infrastructure Design Manual, it is recommended that provided right-of-way designations as currently defined be reevaluated. Specific attention should be given to how a boulevard and avenue are defined where provided ROW designations of 100' or 80' do not necessarily reflect older corridors characteristic of Houston streets. Instead, it is recommended that the use of Urban and Avenue be used as a design consideration where boulevards may be used to improve or alter traffics access management.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Industrial Boulevard
Suburban Street
Suburban Avenue
Suburban Boulevard
Transit Avenue
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FIGURE 7.11

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