North Hardy
planning studies

North-Hardy Corridor

Planning Studies

Alternatives Analysis Report
(Transit Component)

Prepared for:
Metropolitan Transit Authority of Harris County
Texas Department of Transportation
Houston-Galveston Area Council

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Texas Department of Transportation

METRO Solutions

Per the community's wishes, transit alternatives were examined and a Locally Preferred Investment Strategy (LPIS) was selected prior to detailed evaluation of highway alternatives. This report therefore focuses on the evaluation and selection of the transit LPIS. Although this report contains background and preliminary work on the highway alternatives, more detailed evaluation of highway options to meet residual corridor travel demand is in progress and will be documented in a subsequent version of this report.

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Executive Summary

1.0: Purpose and Need

Study Area Setting and Context

The North-Hardy Corridor stretches approximately 30 miles from Downtown Houston north to The Woodlands and SH 242 in Montgomery County principally in the area between IH-45 and the Hardy Toll Road. The corridor also extends east to include Bush Intercontinental Airport (IAH). In addition, segments of IH-45 and US 59 south of Downtown for approximately 4 miles are included in the study area. (See Exhibit ES.1).

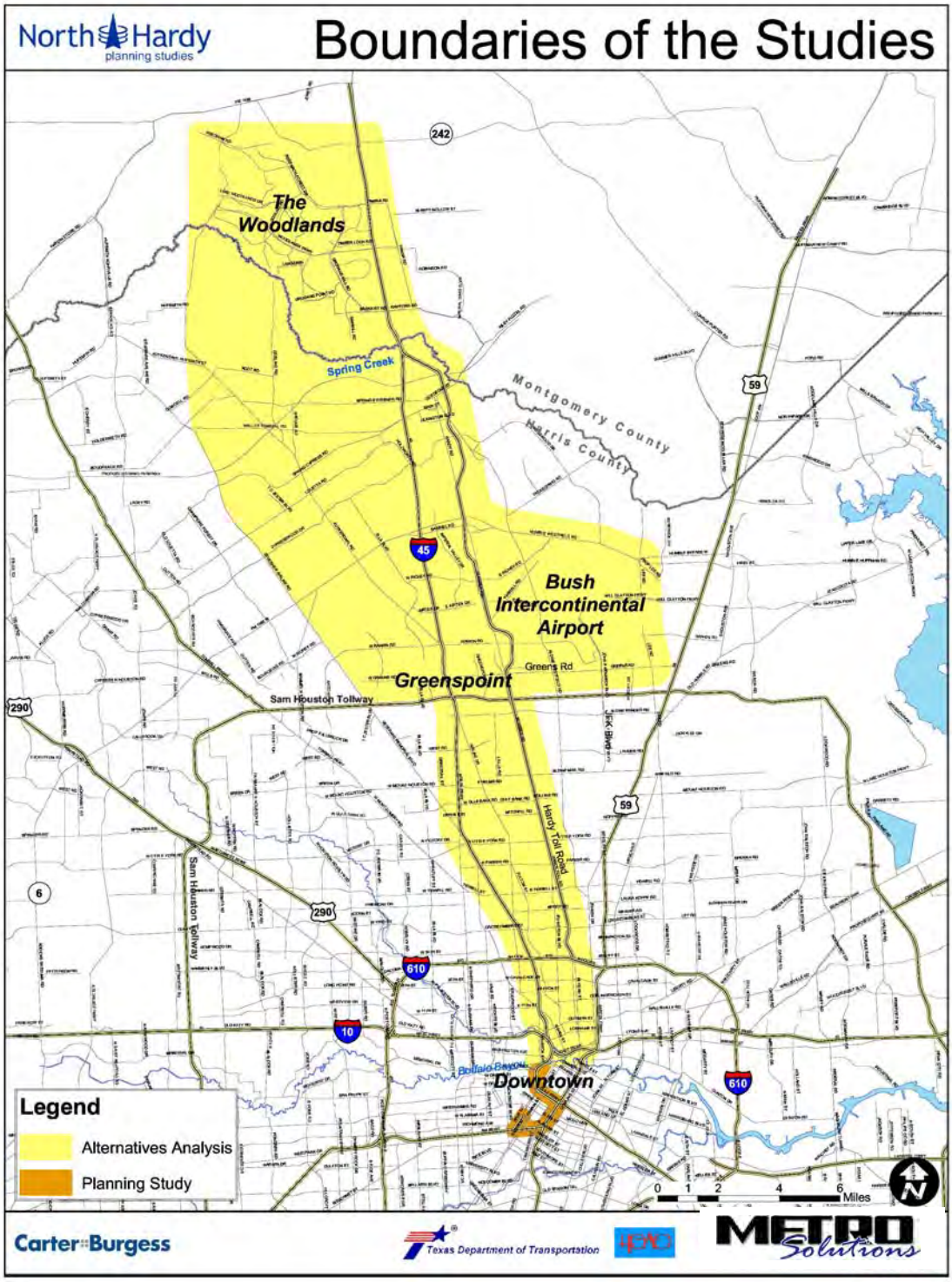
The North-Hardy Planning Studies focus on one study area, which is addressed in two separate studies.

- From Buffalo Bayou north to SH 242 (The Woodlands), extending along and between IH-45 and the Hardy Toll Road, with connections to Bush Intercontinental Airport. The Metropolitan Transit Authority (METRO) and the Texas Department of Transportation (TxDOT) are conducting this study, in partnership with Houston-Galveston Area Council (H-GAC). Highway and transit improvements are considered.

- South from Buffalo Bayou to Spur 527 (Louisiana Street exit from US 59). TxDOT is conducting this study, in partnership with H-GAC. With METRO's plan for this area already approved and in development (METRORail Project and Downtown/Midtown Transit Streets), only highway improvements for IH-45 and US 59 are considered.

Per the community's wishes, transit alternatives were examined and a Locally Preferred Investment Strategy (LPIS) was selected prior to detailed evaluation of highway alternatives. This Executive Summary therefore focuses on the evaluation and selection of the transit LPIS. Work on the highway alternatives to meet residual corridor travel demand is in progress.

Exhibit ES.1: Boundaries of the Study



Growth, Development, and Mobility Issues

The North-Hardy Corridor growth rate is expected to be slightly less than the metropolitan area average over the next 25 years. Population is projected to increase by about 126,000 people from just fewer than 400,000 in 2000 to about 526,000 in 2025. This represents an approximate population growth rate of 32% or about 1.3% per year. Employment is expected to increase from about 386,000 in 2000 to just over 483,000 in 2025. This increase of almost 97,000 jobs equates to a growth rate of approximately 25% or about 1% per year. Exhibit ES.2 details the current and forecasted population and employment figures for the North-Hardy Corridor by subarea and in total. A significant amount of both population and employment growth is projected to occur to the west of IH-45 and in The Woodlands area. The population growth rate for the area west of IH-45 and The Woodlands is expected to be 35%, while employment is expected to grow by 40%.

Exhibit ES.2: North-Hardy Corridor Growth

AREA	POPULATION		EMPLOYMENT	
	2000	2025	2000	2025
Downtown/Midtown/ Binz	25,698	36,757	184,414	206,871
Near Northside Village	52,601	57,575	29,240	33,755
Northline Area	59,081	65,740	23,243	24,467
Aldine Area	66,346	88,565	33,892	46,012
Bush Intercontinental/ Greenspoint	46,967	82,800	69,924	104,272
Spring Area	52,836	78,836	11,151	21,942
Woodlands/ S. Montgomery County	96,171	115,795	34,609	45,822
TOTAL	399,700	525,795	386,471	483,141

Source: Houston-Galveston Area Council
Date: 3/2002

Travel patterns in the North-Hardy Corridor are very diverse ranging from long commutes from the outer suburbs to short trips in the inner city. Major trip destinations for The Woodlands include the FM 1960 at IH-45 area, Bush Intercontinental Airport, the Greenspoint Mall area, and Downtown Houston. The FM 1960 at IH-45 area is projected to generate trips to The Woodlands, Bush Intercontinental Airport, the Greenspoint Mall area, Downtown Houston, and to a lesser extent to the Near Northside Village area. The Bush Intercontinental Airport zone will generate trips destined for the FM 1960 at IH-45 area, the Greenspoint Mall area, Downtown Houston, and again to a lesser extent to the Near Northside Village. Trips generated in the Greenspoint Mall area are expected to be destined to The Woodlands, the FM 1960 at IH-45 area, Bush Intercontinental Airport, and to a lesser extent to Downtown Houston and the Near

Northside Village area. The trip interchange between the Near Northside Village and Downtown Houston light rail line is projected to be significant (7,563 trips in 2007).

Transportation Facilities and Services in the North-Hardy Corridor

The major north-south highway facilities in the North-Hardy Corridor are IH-45 and the Hardy Toll Road. Traversing the corridor east-west are IH-10, IH-610 (North Loop), Beltway 8, FM 1960, and the proposed Grand Parkway. Major north-south arterials that parallel or feed the corridor include Gosling, Aldine Westfield, Hardy Road, Imperial Valley, Ella, Kuykendahl, Veterans Memorial, Airline, W. Montgomery, N. Shepherd, Fulton, Irvington, and N. Main. Major east-west cross streets include SH 242, Research Forest, Woodlands Parkway, Rayford/Sawdust, FM 2920, Spring Cypress, Spring Stuebner, FM 2920, Louetta, Cypresswood, Richey, Airtex, Rankin, Spears, Gears, Greens Road, Aldine Bender, West Road, W. Mt. Houston, Gulf Bank, Little York, Parker, Tidwell, Crosstimbers, and Cavalcade.

Current daily traffic volumes, volume to capacity (V/C) ratios, and peak period speeds along the IH-45 corridor are shown in Exhibit ES.3. V/C ratios that are less than 0.85 are considered to represent tolerable traffic conditions. V/C ratios between 0.85 and 1.00 indicate a modest level of traffic congestion. V/C ratios over 1.00 move into the serious traffic congestion range and over 1.25 indicates a severe level of traffic congestion. These relative levels of traffic congestion are also reflected in the peak period speed for the different sections of IH-45. Use of the one-way reversible HOV lane is controlled, which allows it to operate at much higher speeds. The growth in population and employment anticipated in the study area is expected to increase traffic volumes and traffic congestion in the corridor.

Exhibit ES.3: North-Hardy Year 2000 Traffic

Section	2000 Daily Traffic Volume	Volume to Capacity Ratio	Peak Period Speed	Peak Period HOV Speed
South of Buffalo Bayou				
US 59: Spur 527 to IH-45	175,000	1.24	33 mph	N/A
IH-45: US 59 to IH 10	220,000	1.56	25 mph	N/A
North of Buffalo Bayou		1.19	34 mph	50-55 mph
IH-45: IH 10 & Loop 610	223,000			
IH-45: Loop 610 to Shepherd	259,000	1.38	29 mph	50-55 mph
IH-45: Shepherd to Beltway 8	254,000	1.35	28 mph	50-55 mph
IH-45: Beltway 8 to FM 1960	227,000	0.97	39 mph	50-55 mph
IH-45: FM 1960 to Spring	162,000	0.86	42 mph	N/A
IH-45: Spring to SH 242	142,000	1.01	38 mph	N/A

Source: Texas Department of Transportation, Houston-Galveston Area Council as compiled by Carter & Burgess, Inc.
Date: 2/2002

METRO provides quality local bus service throughout much of the corridor (See Exhibit ES.4). Transit centers exist within the corridor at Greenspoint Mall and Northline Mall. Transit centers near the corridor include the Fifth Ward/Denver Harbor and Heights Transit Centers. In addition, METRO and Brazos Transit express buses utilize the IH-45 HOV lane and direct access ramps to provide peak direction service between Downtown and park-and-ride lots at Research Forest, Sawdust, Spring, Seton Lake, Kuykendahl, and N. Shepherd. Several local bus routes offer transfer opportunities at the park-and-ride lots in addition to the transit centers within and near the corridor. Taxis and shuttles, and two METRO express bus routes connect Bush Intercontinental Airport to hotels and employment centers including Greenspoint Mall and Downtown Houston.

Exhibit ES.4: North-Hardy Transit Routes

	Weekday Boardings	
Route	Total	In Corridor
1 – Hospital	6,220	536
3 – Langley	3,389	250
4 – Jensen	1,835	581
5 – Kashmere	2,819	436
8 – North Main	1,531	641
15 – Fulton	2,545	2,371
23 – Crosstimbers	2,496	545
25 – Northline	2,140	960
26/27 - Outer/Inner Loop	6,652	322
37 - El Sol	1,145	322
45 – Tidwell	3,290	627
52 – Hirch	4,699	1,028
54 - Aldine/Hollyvale	788	297
56 – Airline	6,814	5,256
65 (90) – Yale	2,361	130
78 – Irvington	1,222	1,170
79 - West Little York	1,332	580
80 – Lyons	1,348	48
86 - FM 1960	1,871	383
101 – Airport	792	120
102 - IAH Express	2,324	1,339
201 - N. Shepherd P&R	495	289
202 – Kuykendahl	3,274	1,571
204 – Spring	1,464	771
212 – Seton Lake P&R	1,591	115
Woodlands Express	1,000	1,000
Geenspoint Flyer	500	500

Source: METRO, Brazos Transit, Greater Greenspoint Management District
Date: 1/2002

Transportation Goals and Objectives

The overall transportation goal of the North-Hardy Corridor Planning Studies is to improve the transportation system in the corridor by maximizing mode choice and mobility with environmentally sensitive transit and roadway projects that encourage economic development and revitalization. This overall transportation goal reflects the regional transportation system goals for the metropolitan area.

Specific objectives for the North-Hardy Corridor Planning Studies include the following:

- Seek transportation options that will maximize the use of transit in the corridor
- Seek transportation options that will maximize the use of the Hardy Toll Road by commuter and truck traffic
- Seek transportation options that will improve freeway operating conditions on IH-45 with no or minimal need for additional right-of-way

Specific Problems Related to the North-Hardy Corridor

Generally, the transportation system deficiencies found in the North-Hardy Corridor include the following:

North of Buffalo Bayou

- Congestion in both directions on IH-45, particularly on the older segments immediately north of Downtown for both the existing situation and into the future.
- Existing reversible HOV lane cannot serve both inbound and outbound travel demand at the same time. Therefore, suburban markets may not be adequately served currently in the non-peak direction.
- The pavement on IH-45 south of Shepherd needs to be rehabilitated and the freeway needs to be brought up to current design standards.
- During periods of heavy rainfall, White Oak Bayou floods the depressed section of IH-45 in the vicinity of Main Street.
- Lack of continuity of the thoroughfare system forces short and mid-distance auto trips on to already-congested IH-45.
- Lack of viable alternatives to the private auto for many trips to suburban activity centers in the corridor, including Bush Intercontinental Airport, the greater Greenspoint area, and The Woodlands.
- Existing express/commuter-oriented transit service is heavily focused on providing commute trips to Downtown Houston around traditional work hours.
- Anticipated population and employment growth is expected to exacerbate the problems described above.

South of Buffalo Bayou

- Congestion on IH-45 and US 59 south of Downtown (McKinney/Milam exits and the Pierce Elevated) for both the existing situation and into the future.
- Anticipated population and employment growth is expected to exacerbate the problems described above.

Consistency with Local, State and Federal Planning Process

The Federal Transit Administration (FTA), the Federal Highway Administration (FHWA), METRO, TxDOT, and H-GAC are partnering to conduct the North-Hardy Planning Studies. On January 9, 2002, a Notice of Intent (NOI) was published in the *Federal Register, Vol. 67, No. 6,* and in local publications, announcing METRO's and TxDOT's intent to prepare Environmental Impact Statements (EISs). The publications corresponded with the implementation of METRO's 2025 long-term plan to improve transportation efficiency and effectiveness throughout the Houston region. Both the plan and the environmental process direct that the process begin with a scoping effort in order to solicit agency and public comment on transportation alignments and alternatives.

FHWA and FTA along with the requirements of the National Environmental Policy Act (NEPA) define the formal parameters under which major transportation investments must be developed and analyzed. NEPA was enacted to protect, maintain, and enhance the environment. As defined by NEPA, "environment" includes not only the physical environment but also the man-made environment. The role of the North-Hardy Planning Studies in the statutorily established project development process is presented here.

The purpose of the planning studies is to formally study a variety of alternatives that could address the mobility challenges identified within the North-Hardy travel corridor. The North-Hardy Planning Studies are designed to identify a broad range of alternative actions and investments, to analyze those alternatives, and to develop criteria by which to evaluate the transportation investments. This process is designed to provide critical information to the decision-making process concerning the future of the North-Hardy Corridor.

The North-Hardy Corridor is being advanced in accordance with the project development process through which Federal, State, and local officials plan and make decisions regarding transportation capital investments. The development process contains the following phases:

- Corridor planning study (Alternatives Analysis)
- Selection of Locally Preferred Investment Strategy
- Designation of Minimum Operable Segment
- Conceptual engineering/Draft Environmental Impact Statement
- Preliminary engineering/Final Environmental Impact Statement
- Final design
- Construction
- Operation

The intent of the NEPA process is to ensure that all potential environmental impacts are identified and investigated prior to the decision-making process. NEPA also requires engaging the public in the environmental review process.

The study process is designed to integrate the active participation of the public with detailed technical analysis of the proposed project corridor, its alternatives, and potential issues. During the study process, a wide range of alternatives will be evaluated based on planning factors, cost, and community input culminating in adoption of a Locally Preferred Investment Strategy (LPIS).

2.0: Alternatives Considered

This section of the Executive Summary summarizes the first level alternatives screening and evaluation process for the North-Hardy Corridor planning studies. This section also summarizes the alternatives recommended to be studied in the next phase of the study. It is broken into four major sections: Range of Initial Alternatives; Evaluation Plan; Screening Process and Results; and Recommended Short List of Build Alternatives.

Range of Initial Alternatives

The No Build Alternative includes the Metropolitan Transit Authority (METRO) transit services and facilities that were programmed to be in operation in FY 2007 and the regional roadway/highway system that was programmed to be in place in 2022. The definition of the No Build Alternative was discussed with the Federal Transit Administration (FTA) during its development. A subsequent review concluded with a verbal approval of the concept from the FTA (conference calls held with FTA staff in the first quarter of 2002). It includes the implementation of the Downtown to Reliant Park light rail service, starting in January 2004, but incorporates no other new high capacity transit services. In addition to METRO service, the No Build Alternative includes bus service into Houston provided by the Brazos Transit District (Woodlands Service) and TREKEXPRESS (Fort Bend County/US 59 South). Roadway improvements included in the No Build Alternative, except for IH-45 North where future improvements were removed to test multiple IH-45 highway options, are identified in the Houston-Galveston Area Council (H-GAC) 2022 Metropolitan Transportation Plan (Adopted February 25, 2000). As a result, all highway elements in the IH-45 North and Hardy Toll road corridors represent a FY 2007 level of investment.

The transit service and roadway improvements included in the No Build Alternative respond to the substantial increase in the region's population and employment In twenty years, the Houston area will have two million more people and add over one million new jobs. The additional trips generated by the new residents and jobs and the three-fold increase in motor vehicles will aggravate congestion on the regional roadway system that will need to be mitigated by multiple types of transportation projects.

METRO's service area encompasses 1,285 square miles comprising most of Harris County and small portions of Fort Bend, Waller, and Montgomery Counties. METRO provides approximately 6,700 route miles of service using over 1,450 buses on fixed-routes and special events service (such as sporting and community event shuttles). METRO operates bus service seven days a week, with weekday service operating from 3:47am (first bus in revenue service) to 2:27am (last bus in revenue service), weekdays. The span of service is less on weekends. In addition, METRO offers paratransit services for the senior and disabled communities utilizing 118 vans and 124 sedans. METRO, in conjunction with TxDOT, has funded and constructed over 100 miles of High Occupancy Vehicle (HOV) lanes on six freeways that METRO uses for many of its commuter routes.[1]

In FY2002, METRO carried over 97 million annual boardings on all fixed route and special bus services. In addition, over 20 million person trips in carpools and vanpools on METRO's HOV lanes contributed to systemwide annual boardings.[2]

In January 2004, METRO began operating the Downtown to Reliant Park light rail line with 16 stations, including one new Park & Ride lot, two transit centers and a new light rail maintenance and storage facility.

Concurrent with the operation of light rail, METRO has programmed bus service improvements that include route alignment and service frequency modifications. All of these improvements are included in the No Build Alternative for this study. The No Build bus routes are presented in Exhibit ES.5. Overall, the service improvements will change the existing system as indicated in Exhibit ES.6.

[1] HOV lanes operate between 5:00am and 11:00am and between 2:00pm and 8:00pm weekdays. The HOV lanes on the Katy Freeway are operational on Saturday and Sunday as well.
[2] METRO Office of Management & Budget Department, January 27, 2003.

Exhibit ES.5: Summary of No Build METRO Service Characteristics

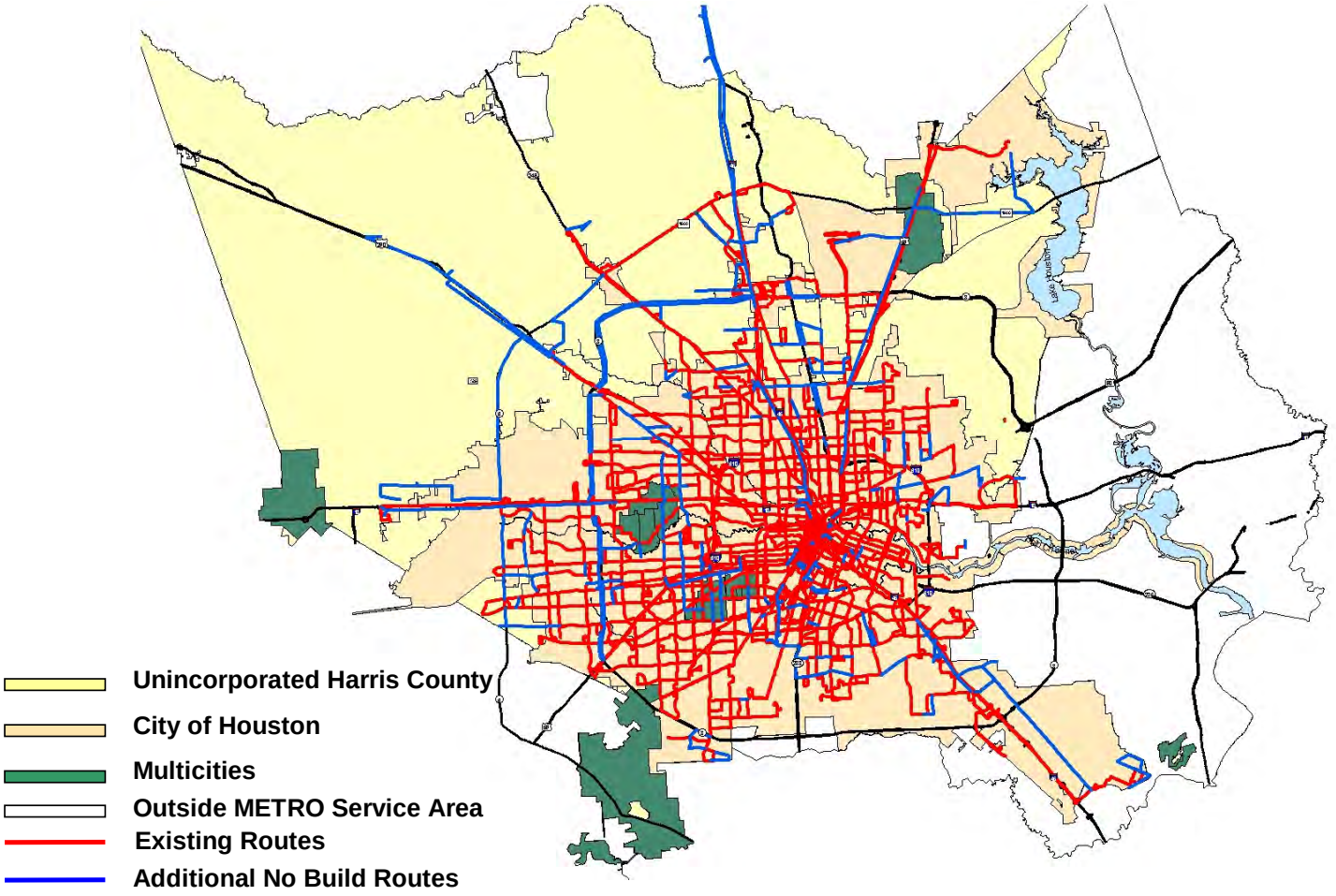
Element	2003	2025 No Build (estimate)
Fixed Routes by Service Type*	74 Local 8 Express 28 Park & Ride	84 Local 10 Express 37 Park & Ride
Bus Fleet Size	1,457 (including spares)	1,600 (including spares)
Annual Revenue Miles of Bus Service**	56.22 million	87.21 million
Annual Revenue Hours of Bus Service**	3.82 million	4.63 million
Light Rail Fleet Size	-	18
Annual Revenue Miles of Light Rail Service	-	836,290
Annual Revenue Hours of Light Rail Service	-	65,346

*Does not include employee shuttles and transit services operated by other entities. Does not count route branches as separate routes. All numbers are based on Year-to-Date figures as of January 2003. No growth was assumed for 2007.
**The 2025 estimates do not assume an increase in Special Bus Services from the 2003 levels and are annualized based on 300 operational days per year.
Source: METRO Scheduling Department, METRO Rail Operations Department, and METRO Capital Planning Department; December 2002; METRO Office of Management & Budget; January 2003.

As a result of No Build service improvements, METRO's total annual transit boardings are expected to increase from 97 million in 2003 to approximately 160 million by 2025.

To accommodate the increase in service levels assumed to occur by 2025, METRO will expand or increase the number of transit facilities, including new locations for METRO's Park & Ride lots and transit centers, METRO's HOV system, and a planned sixth bus maintenance and storage facility has yet to be determined. (See ES.7)

ES.6: No Build Transit Route Network



Source: METRO Transit System Analysis, 03/20/03
Base Map, METRO GIS & Cartography

ES.7: No Build METRO Capital Facilities

Transit Facility	2003	2025 No Build
Bus Park & Ride Lots	25	29
Bus-only Transit Centers	15	19
HOV Lanes Used By METRO (centerline miles	97.7 miles*	187 miles**
Light Rail Park & Ride Lots	0	1
Light Rail-Bus Transit Centers	0	2
Bus and Light Rail Storage and Maintenance Facilities	5 bus facilities	6 bus facilities 1 light rail facility
Other METRO Storage and Maintenance Facilities	1 non-revenue vehicle facility 1 central supply	1 non-revenue vehicle facility 1 central supply

Source: METRO Service Planning, December 17, 2002; 2025 No Build Transit Facilities, METRO Capital Planning.
*Source: METRO Planning, Engineering & Construction, HOV Lane Program Status Report, 04/09/03.
**Generated from Houston METRO EMME/2 Travel Demand Model for No Build Scenario January 2003

The regional highway and roadway system is comprised of interstate and other federal highways, state highways, county roads, toll roads, and arterial roadways in the eight-county metropolitan area. In 2000, the regional roadway system totaled over 20,000 lane miles of major highways and roads. In addition, the regional highway network incorporates a system of freeway HOV lanes, most of which have been constructed and are used by METRO.

Regional roadway mobility levels will deteriorate unless planned transportation improvements are implemented. The planned roadway improvements include expansion of the regional roadway and HOV system. As indicated in Exhibit ES.8, between 2000 and 2022, freeway lane miles will increase by 1,269 miles, but centerline miles (construction of new freeway segments) will increase by only 122 miles. The smaller growth in centerline miles is indicative of more freeway widening projects than construction of new freeways. The regional HOV system is also benefiting from the freeway widening projects. METRO will be operating 112 miles of HOV lanes in 2007, up from 89 miles available in 2000.

ES.8: No Build Regional Roadway Improvements through 2022

Roadway Facility	2002		2022	
	Centerline Miles	Lane Miles	Centerline Miles	Lane Miles
Freeway	510	3,199	714	4,591
Tollway	87	443	139	744
Principal Arterial	1,149	4,485	1,371	5,873
Other Arterial	3,018	8,903	3,219	10,824
Collector	1,502	3,227	1,577	3,791
HOV Lanes	89*	90**	187	316

* Miles of HOV facilities

** Miles of HOV lanes, counting each lane separately, even if an HOV lane parallels another on the same roadway segment

Source: H-GAC 2022 Metropolitan Transportation Plan, 2000; H-GAC, 2/17/2003. (Includes 8 county region)

In addition, the arterial street system will undergo extensive improvements. Supplementing the regional roadway network are toll roads and new toll lanes being constructed by the Harris County Toll Road Authority (HCTRA). Currently, HCTRA operates 87 centerline miles of toll roads and is constructing or planning to construct approximately 139 centerline miles of toll facilities.

Within the Houston-Galveston region, there are approximately 160 miles of bicycle and pedestrian facilities not including sidewalks. The Regional Bicycle and Pedestrian Plan identifies ways to implement and expand the planned 500+ mile network.

The Build Alternatives are Advanced High Capacity Transit (AHCT) and major highway improvements within the North-Hardy Corridor. These transportation improvements are distinguished from the No Build Alternative in terms of scope and capital requirements. The Build Alternatives are larger projects and more capital intensive than the No Build Alternative. This section of the Executive Summary focuses on potential Build Alternatives.

The Build Alternatives were developed after a review of past planning studies; stakeholder and public meetings (including formal public and agency Scoping sessions); and analysis of available technical information such as highway congestion data, transit ridership, demographic forecasts, etc. The list of Build Alternatives is extensive and includes the following types of improvements:

- Light Rail
- Bus Rapid Transit
- People Mover
- Commuter Rail
- High Occupancy Vehicle (including express bus service) Lanes

- Intermodal Center (for Future Consideration) variously assumed to be an interface for intercity rail, intercity bus, commuter rail, and/or local bus with AHCT
- Freeway Interchange Improvements
- Additional Freeway General Purpose Lanes
- Adding Reversible Peak Direction/Peak Period Lanes
- Adding Managed Freeway Lanes (defined as toll lanes managed to maintain a pre-defined minimum level of service with available to High Occupancy Vehicles at a discount)
- Upgraded Arterials
- Modified On and Off Ramp Systems

Evaluation Plan

In order to properly assess the suitability of various alternatives, it is necessary to establish a set of evaluation criteria. These criteria should provide a common basis of comparison for all alternatives relative to the No Build Transit Alternative. The evaluation criteria, which were established with public input and used to screen the initial set of alternatives for the North-Hardy Corridor are as follows:

- Economic Development Potential
- Community Support
- Capital Cost
- Regional Perspective
- Environmental Impacts
- Community Impacts
- Mobility Impacts
- Ease of Implementation

The methodology and approach for screening the initial alternatives is a blend of technical evaluation and public review and input. This evaluation plan defines the evaluation criteria and measurement tools to be utilized to screen and evaluate the alternatives. The emphasis of this evaluation plan is on the screening of the initial alternatives and focuses on qualitative criteria at this conceptual level. The evaluation procedures include impacts and influences on transportation systems, mobility, and travel patterns and impacts to and compatibility with the natural, manmade, and social environments. They also include the potentials for and influences on economic development.

Screening Process and Results

To begin the evaluation process, a technical work session was held on May 6, 2002 with the consultant team, METRO, Texas Department of Transportation (TxDOT), and the Houston-Galveston Area Council (H-GAC) staff. The public review process involved work sessions with stakeholders representing the six North-Hardy segments and three general public meetings. Culminating the public review process, the Stakeholder

Advisory Committee (SAC) met on June 17, 2002. After a review of the results of the technical work session, the stakeholder work sessions and the public meetings, the SAC offered advice on which initial alternatives should be carried into the next phase of study. A completed evaluation matrix (ES.9) presents the evaluation results using the criteria and evaluation methodology. The last column of the matrix indicates those alternatives recommended to be carried forward for further evaluation in the next phase of the North-Hardy Planning Studies.

ES.9: Evaluation Matrix

Evaluation Criteria		Economic Development Potential	Community Support	Capital Cost Ranking	Regional Perspective	Environmental Impacts	Community Impacts	Mobility Impacts	Ease of Implementation	Other Considerations	Carry to Next Phase
Alignment	**Transit Mode or Highway Project**										
North of Buffalo Bayou											
IH-45	LRT	o	+	-	+	+	o	+	-	Requires close coordination with IH-45 highway improvements	Yes
	BRT	o	-	-	o	+	o	+	-		Yes
	Highway										
	Freeway to Standards	o	o*	o	o	o*	o*	-	-		Yes
	Add 1 lane per direction	o	o*	-	+	o*	o*	+	-		Yes
	Add 2 lane per direction	o	o*	-	+	o*	o*	+	-		Yes
	Add Managed Lanes	o	o*	-	+	o*	o*	+	-	* If improvement can be made within existing ROW	Yes
	HOV to Standards	o	+	o	o	o*	o*	o	-		Yes
	HOV 2-way	o	+	-	+	o*	o*	+	-		Yes
Fulton to San Jacinto Arterial Connection		+	+	-	o	o	+	+	o		Yes
Hardy	LRT/Commuter Rail	o	-	o	o	o	o	o	--	Railroad unresponsive	No
	LRT	+	+	-	+	+	+	o	-		Yes
	BRT	+	o	-	o	+	+	o	-		Yes
Airline	LRT	+	+	o	+	+	+	+	-		Yes
	BRT	+	+	o	o	+	+	+	-		Yes
Kuykendahl P&R to IAH	LRT	+	+	o	+	o	o	+	o		Yes
	BRT	+	+	o	o	o	o	+	o		Yes
	Peoplemover	+	o	--	-	o	-	-	-	Requires transfer from other modes	No
Kuykendahl	LRT	+	o	o	-	o	+	+	o		No
	BRT	+	+	o	-	o	+	+	o	Preserves ROW for future LRT	Yes
South of Buffalo Bayou											
IH-45	Ramps in/out of CBD	o	-	-	o	-	-	o	-	Other strategies carried forward	No
	IH-45/US 59 Interchange	o	-	-	o	-	-	o	-		No
US 59 to IH-10											
	Freeway to Standards	o	o	o	o	o	o	o	-	Other strategies carried forward	No
	Add 1 lane per direction	o	-	-	+	-	-	+	-		No
	Add Managed Lanes	o	-	-	+	-	-	+	-		No
	Moveable Barriers	o	-	-	+	-	-	+	-		No
Bagby/Brazos											
	Upgrade Arterials	+	o	+	+	o	o	+	o		Yes

Legend:

+ denotes a positive (better) value for an evaluation measure

o denotes a neutral value for an evaluation measure

- denotes a negative (worse) value for an evaluation measure

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Recommended Short List of Build Alternatives

The screening of the initial alternatives in the North-Hardy Corridor Planning Studies explored a “long list” of conceptual transportation alternatives that attempted to respond to the transportation needs and issues of the North-Hardy Corridor. This screening resulted in a “short list” of alternatives to be taken into a detailed study with the ultimate goal of selecting LPISs for both transit and highway projects in the North-Hardy Corridor. Exhibits ES.10 to ES.12 show the short list of transit alternatives. As previously stated, highway alternatives are still being studied. A discussion of the highway alternatives will be incorporated at a later date. The next tasks in the study provide for the definition, analysis and evaluation of the “short list” as well as selection of a transit LPIS. This section of this Executive Summary presents the “short list” of alternatives, as they are known at the beginning of this detailed analysis. However, as the definition and analysis proceeds, the alternatives may be modified as additional issues surface and are resolved.

Exhibit ES.10: Blue Line

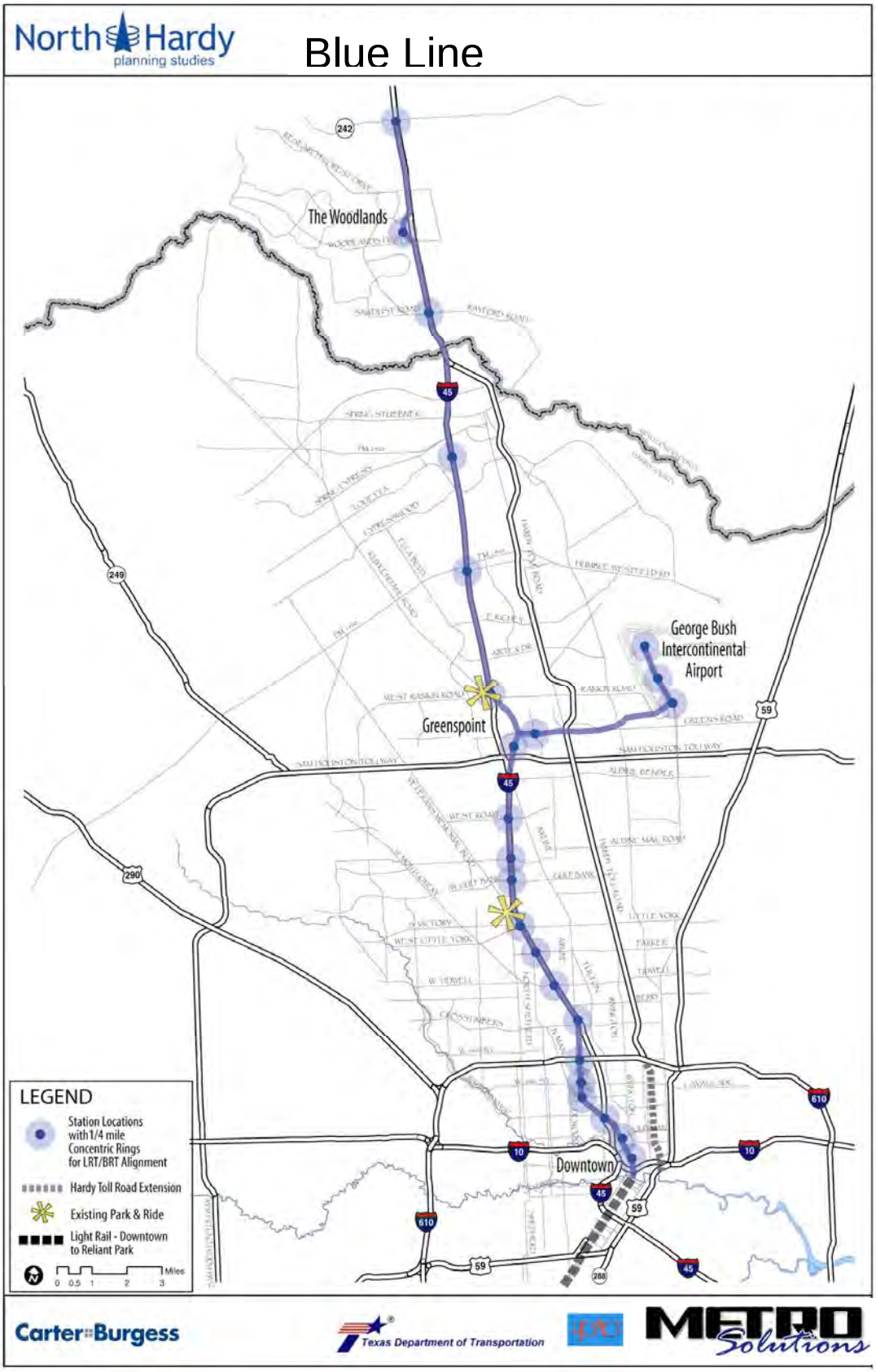
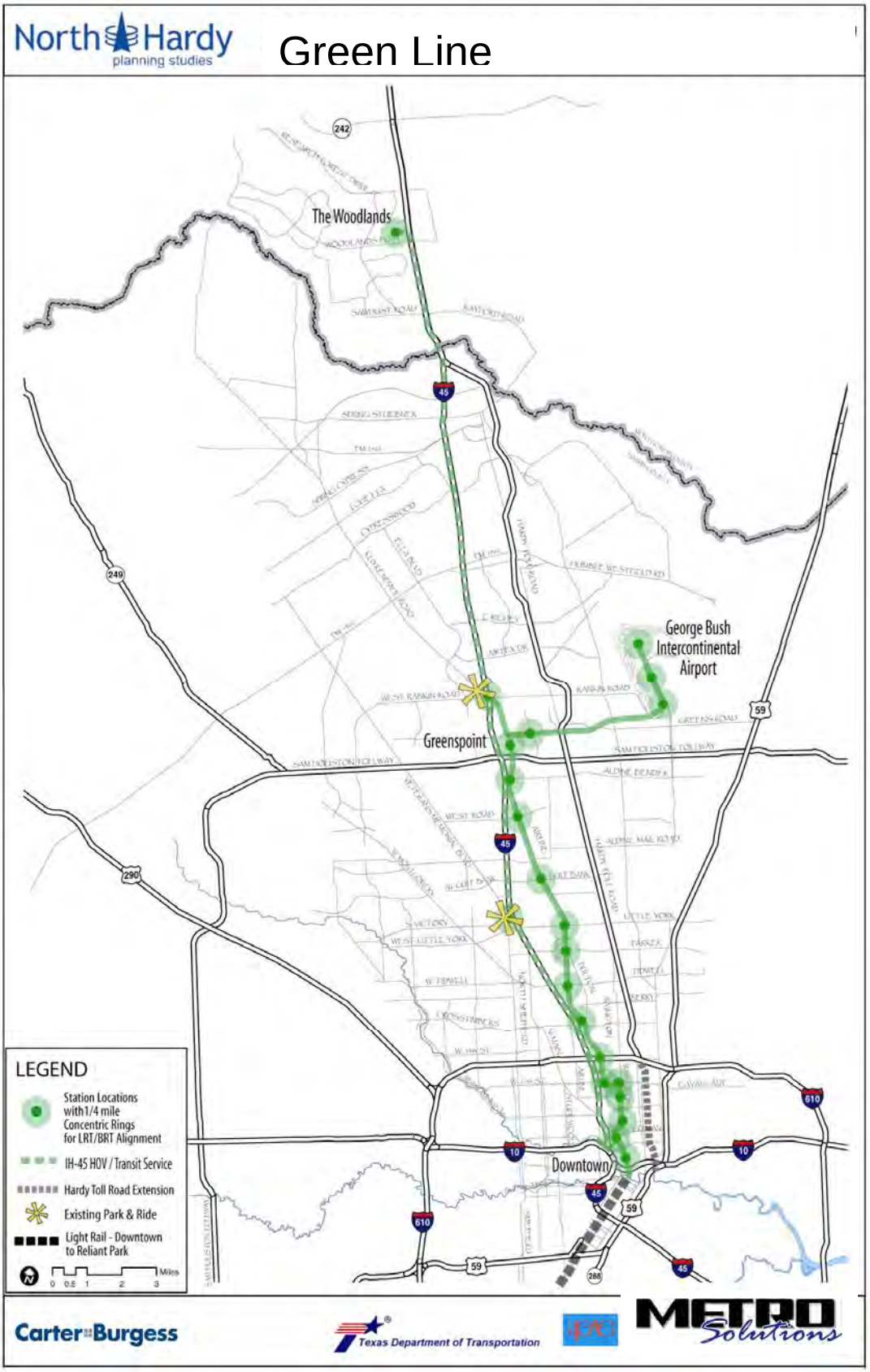


Exhibit ES.11: Red Line

Exhibit ES.12: Green Line



3.0: Environmental Screening of Detailed Alternatives

Description of the Alignments

The North Hardy Corridor is about 30 miles in length, from Downtown Houston to The Woodlands. This section of the Executive Summary considers the potential environmental impacts of the short list of alternatives that were identified for the corridor (discussion of highway alternatives to be added at a later date following additional technical work and public input). The transit short list includes three advanced high capacity transit alignments. The transit modes that are being considered are light rail transit (LRT) and bus rapid transit (BRT). The three LRT/BRT alignments are described below and are depicted graphically in Exhibits ES.10 to ES.12. In addition, Exhibit ES.13 provides a summary of the characteristics of each alignment.

Alignment 1 – Blue Line:

The Blue Line begins at the northern terminus (University of Houston Downtown Station) of the recently completed METRO Rail light rail line. From there the alignment runs along North Main Street to Airline Drive, where it turns north to IH-45 and Northline Mall. The Blue Line continues north along IH-45 to the Greenspoint area, where it swings to the east to serve the Greenspoint Mall and surrounding area. It connects to the Kuykendahl Park & Ride and then continues north following IH-45 to The Woodlands and SH 242. In addition, the Blue Line has an east-west spur providing a connection between the Greenspoint area and the Bush Intercontinental Airport, generally following Greens Road, the Hardy Toll Road connector and JFK Boulevard. About 18 miles of the line are elevated, and there are 25 proposed stations along the route.

Alignment 2 -– Red Line:

The Red Line also starts at U of H Downtown Station. It runs north along North Main Street to the Little White Oak Bayou, where it turns east to Irvington. It follows Irvington to the Hardy Toll Road where it continues north generally following the Hardy Toll Road and Union Pacific Rail corridor to The Woodlands and SH 242. Similar to the Blue Line, the Red Line has an east-west spur providing connection between Greenspoint and the Bush Intercontinental Airport, generally following the same route as above. This Line has 10 miles of elevated sections and 24 proposed stations.

Alignment 3 – Green Line:

The Green Line differs from the other two alignments because it runs only as far north as Greenspoint and the Airport. The alignment begins at UH Downtown, and, in a similar fashion to the Red Line, it follows North Main Street to the Little White Oak Bayou, turns east to Irvington and then follows Calvalcade, Fulton and Airline north to the Greenspoint area. There is also a connection between Greenspoint and the Kuykendahl Park & Ride. An east-west connection between Greenspoint and the Airport is also part of this alignment. Transit connection between Downtown Houston and The Woodlands would continue to be provided by park and ride bus service on high occupancy vehicle (HOV), toll, or managed lanes that emerge from the examination of

IH-45 highway alternatives. This line has about 12 miles of elevated section and 21 proposed stations.

ES.13: Summary of Alignment Characteristics

	Blue Line	Red Line	Green Line
Length of the Alignment	40.63 miles	42.45 mi.	24.09 miles (44.59 miles)*
Number of Stations	25	24	21 (24)*
Length of Aerial Sections	17.96 miles	10.24 miles	11.98 miles
Estimated Right-of-Way Requirements	185.7 acres	219.2 acres	86.7 acres (TBD)*
Capital Cost Index	1.83/1.37	1.47/1.00	1.30/1.01*
Estimated Average Speed	31 mph	33 mph	25 mph (34 mph)*
Demand Potential Index	85	49	100

* With 2-way HOV Facility

Environmental Factors Considered

A wide range of environmental factors was considered in the evaluation of the three proposed LRT/BRT alignments. At this stage of the study, issues were assessed to determine how the three alignments compare when environmental factors are taken into account and which of the three alignments should be recommended for further, more detailed analysis as the Locally Preferred Investment Strategy.

The environmental factors that were assessed range from urban elements, to natural elements to cultural elements. Urban elements include consideration of such issues as the land use impacts, property acquisition and right-of-way impacts, visual and aesthetic impacts (including urban forestry), noise, vibration and air quality impacts, safety and security, energy, impacts on existing communities, potential economic development impacts, and environmental justice considerations. The natural environmental elements that were considered include wetlands, water quality and quantity, subsidence, floodplains, and threatened and endangered species. The cultural elements include historic, archeological and park resources.

Summary of Assessment of Impact

There is not a great deal to distinguish the three alignments in terms of potential environmental impacts in general. While each proposed alignment would have certain issues that would need to be taken into account, each proposed alignment has a

different set of issues. However, none of the proposed alignments would have such a significant potential impact on environmental considerations as to constitute a fatal flaw.

Exhibit ES.14 provides a summary of the potential impacts from the environmental analysis and a grading of the findings for each alignment. High, medium, and low ratings refer to the relative potential environmental impacts.

ES.14: Summary of Potential Environmental Impacts & Grading of Alignments

	Blue Line	Red Line	Green Line
Urban Elements			
Land Use	Medium	Medium	Medium
Acquisitions and Displacements	Medium	High	Low
Air Quality	Low	Low	Low
Noise & Vibration	Medium	Medium	Medium
Energy	Low	Low	Low
Safety & Security	Low	Low	Low
Visual & Aesthetics	Low	Medium	Medium
Communities	Medium	Medium	Medium
Economic Development	Medium	Medium	Medium
Environmental Justice	Low	Low	Low
Natural Environment			
Wetlands	Medium	Low	Medium
Flood Plains and Watercourses	Medium	Medium	Medium
Water Quantity & Subsidence	Low	Low	Low
Water Quality	Low	Low	Low
Threatened & Endangered Species	Low	Low	Low
Environmental Site Assessment	Low	Low	Low
Cultural Resources			
Historical	Medium	Medium	Medium
Archeological	Low	Low	Low
Parks	Low	Low	Low
Construction Impact	Medium	Medium	Medium
Total Grade	**B**	**B**	**B**

4.0 Transportation Impacts

Transit Impacts

This Section addresses the potential transportation impacts of alternative actions under consideration for the North-Hardy Corridor including both transit and roadway impacts.

The transit network for the No Build Transit Alternative consists of transit service and facilities planned for 2007 as developed in previous transit studies. Transit facilities and services that are additions over current conditions include extensions of routes beyond Beltway 8, new routes outside of and along FM 1960, and a park-and-ride facility at Louetta at SH 249. Significant highway improvements include the Hardy Toll Road Extension from IH-610 to Downtown, widening of the Hardy Toll Road north of Beltway 8, addition of the Grand Parkway, and numerous additions and extensions of discontinuous arterials.

The North-Hardy Corridor "build" transit alternatives consist of three alignments and two transit modes. These alternatives are described in detail in Section 2.0.

The METRO Service Estimator is a sketch-planning tool employed in the initial (Phase 1/Phase 2) evaluation to determine the demand potential for new or modified transit service. While detailed modeling is not required at this level of screening, the Service Estimator provides an order-of-magnitude comparison or index of demand potential of any given alignment relative to other potential alignments within the same corridor.

In Phase 3 of the evaluation process, when the System Plan scenarios are tested, METRO's Long-Range Patronage Forecasting Model will be employed. This EMME/2-based model allows for analysis of linked trips in a network of AHCT alternatives, providing forecasted demand potential for various combinations of AHCT alignments and technologies operating within the regional network.

The METRO Service Estimator was run for each of the North-Hardy Corridor alignments. Exhibit ES.15 outlines the results from those runs. Not all of the alignments have all of the segments shown below. For instance, the Blue Line does not serve the Irvington/Cavalcade station. Likewise the Red Line does not serve Northline Mall. In all cases the Service Estimator ranks the Green Line with the highest Demand Potential Index (DPI). It should be noted that the Green Line segment that reaches to SH 242 includes the demand potential for express bus service on a proposed two-way HOV or managed lane facility. If the HOV demand potential were removed from the segment from U of H to SH 242, the Blue and Green Lines would perform about the same with a DPI of 85. As such the Blue Line is considered a close second with respect to demand potential. The Red Line performed poorly when compared to the other two alignments. This is in large part due to the lack of concentrations of population and employment proximate to the Hardy alignment.

Exhibit ES.15: Demand Potential Index by Alignment

Segment	Blue Line	Red Line	Green Line
U of H to Irvington/Cavalcade	--	60	100
U of H to Northline Mall	70	--	100
U of H to Greenspoint	76	38	100
U of H to IAH	78	25	100
U of H to SH 242	85	49	100

Roadway Impacts

The highway network for the No Build Alternative consists of all roadway facilities included in the approved 2022 Metropolitan Transportation Plan (MTP) with the exception of improvements to IH-45 beyond those projects that are planned to be in place by 2007.

[As previously stated, highway alternatives are still being studied. A discussion of the highway alternatives will be incorporated at a later date.]

As described in previous sections, the short list of transit alternatives consists of two technologies and three alignments. These alignments traverse arterials such as North Main, Airline, Fulton, Irvington, Greens, and Kuykendahl.

All available existing traffic data was collected from agencies such as the City of Houston, Harris County and TXDOT. There was no turning movement data available and the only data available along the impacted arterials were 24-hour counts from the 1990s. The Planning Team established 6,300 vehicles per lane per day as the threshold for determining critical intersections along the alignments. Based on this data and criteria, the Planning Team identified the following as critical intersections:

North Main at Quitman
Airline at West Road
Airline at Aldine-Bender
Irvington at IH 610
Fulton at Crosstimbers
Greens Road at Greenspoint Drive

The North-Hardy Corridor Team assumed that existing lane configurations and capacities at the critical intersections would be maintained in all the transit alternatives.

Traffic software, SYNCHRO, was used to analyze the level of service (LOS) of the critical intersections during AM and PM peak hours for Existing, 2025 No-Build and 2025 LRT/BRT conditions. Average delays per vehicle and LOS at the critical intersections during peak hours for all three conditions were determined. Because there is no change in the capacity of intersections, there is no impact on the level of service for 2025 LRT/BRT operation versus the 2025 No-Build conditions.

5.0 Economic Development Analysis

Section 5.0 seeks to evaluate the comparative economic development potential of the three proposed alignments (Blue Line, Red Line and Green Line) for advanced high capacity transit – light rail transit (LRT) and bus rapid transit (BRT) – in the North-Hardy Corridor. For the purpose of this analysis, economic development potential is defined as the opportunities for land use change within a half a mile radius of each of the proposed alignments.

The analysis of economic development potential for the North-Hardy Corridor consists of the following main components:

- Research – including academic research of the potential for economic development associated with transit systems, experience with transit related development activity in other cities, and interviews with transit experts in other locations.

- Quantitative analysis of identifiable and measurable variables related to development trends and opportunities in the North-Hardy Corridor.

- Qualitative analysis of each of the three proposed transit alignments, based on interviews with local economic development and real estate experts, air photo interpretation, and site visits.

Summary of Findings from Experience in Other Cities

Experience in other cities suggests that the potential economic development impacts resulting from LRT/BRT investment vary from one city to another in terms of land value and development/redevelopment. Several observations are relevant to the economic development potential for the North-Hardy Corridor, as follows:

- Regional economic conditions strongly affect economic development impacts resulting from an advanced high-capacity transit investment. Portland provides an example where a weak regional economy was a major factor in limiting new development during the initial years of its light rail service (late-1980s).

- Impacts on land value and development potential are generally concentrated within a quarter mile radius of a station (a quarter of a mile is generally considered to be the distance that people will walk to a transit station). A new study of property value impacts in Dallas showed that residential properties within a quarter mile radius of stations appreciated 39 percent more and office properties 53 percent more than properties even a few hundred feet beyond this radius.

- Residential development, especially higher density, is a likely type of land use that can be anticipated in the area of suburban stations. Three of the four major development projects near DART stations in the Dallas area include multifamily residential as a key component.

- The level of development impact is strongly related to the amount of perceived accessibility benefits the transit service brings to the area, as well as existing development momentum in the corridor. Dallas' Red Line travels along the North Central Expressway corridor, a major focus of recent development activity in Dallas, and is perceived to provide a means of travel during peak times that is equal or superior to the highway.

- Land that has frontage on a freeway or major thoroughfare, in addition to LRT station access, can have increased prospects for development or redevelopment. However, these situations can also provide additional access, design and safety challenges to ensure that development is pedestrian oriented, not just auto-oriented.

- Public redevelopment efforts, public land use policies (that require or use incentives to encourage transit-oriented projects), and public-private partnerships (including financial partnerships with non-profits or the public sector) are an important factor to help drive station-area development. Examples from other cities include: San Diego, where redevelopment agencies have been driving development around rail stations; Portland, where metropolitan public policy dictates concentration of new development around the LRT; and Denver, where non-profit housing corporations and federal programs have helped build new residential projects in a formerly declining area near downtown.

- LRT has proven potential to generate positive economic development impacts, with favorable economic conditions and well-located stations. BRT's potential economic development impacts are still uncertain, because it has not been implemented widely in North America and has experienced widely varying impacts in the places where it does exist.

Quantitative Analysis

Three factors were analyzed to obtain an indicator of general development activity and growth along each alignment, as follows:

- Projected population
- Projected employment
- Historical development activity

H-GAC population projections indicate that the Houston region, including the North-Hardy Corridor, will continue to experience rapid population growth over the next two decades. In the "approved" projections, about 208,000 residents will be added to the North-Hardy Corridor study area, while the "interim" projections show that this number could be as high as 369,000. The North-Hardy Corridor will benefit from this projected regional growth.

Exhibits ES.16 and ES.17 provide the population projections, using all TAZs wholly or partially contained within a half-mile radius of each of alignment.

Exhibit ES.16: H-GAC "Approved" Population Projections

	2000	2025	Actual Change 2000 - 2025	Percent Change 2000-2025
SOUTH SECTION				
Blue	176,887	227,764	50,877	28.8%
Red	155,341	197,195	41,854	26.9%
Green	184,571	233,737	49,166	26.6%
NORTH SECTION				
Blue	51,664	84,896	33,232	64.3%
Red	58,150	95,957	37,807	65.0%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	228,551	312,660	84,109	36.8%
Red	213,491	293,152	79,661	37.3%
Green	184,571	233,737	49,166	26.6%

Source: Houston-Galveston Area Council.

Date: 3/2002.

Exhibit ES.17: H-GAC "Interim" Population Projections

	2000	2025	Actual Change 2000 - 2025	Percent Change 2000-2025
SOUTH SECTION				
Blue	176,887	284,842	107,955	61.0%
Red	155,341	239,881	84,540	54.4%
Green	184,571	281,693	97,122	52.6%
NORTH SECTION				
Blue	51,664	117,403	65,739	127.2%
Red	58,150	125,086	66,936	115.1%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	228,551	402,245	173,964	76.0%
Red	213,491	364,967	151,476	71.0%
Green	184,571	281,693	97,122	52.6%

Source: Houston-Galveston Area Council.
Date: 10/2002.

Regardless of the alignment, significant population increases are anticipated for the entire North-Hardy Corridor, coming from two sources:

- Densification of existing residential areas and mixed-use districts in the south section of the corridor, primarily in existing residential areas inside IH-610 Loop and potentially in major activity centers such as The Woodlands and Greenspoint.

- Development of new residential areas in the north section of the corridor where there are significant amounts of vacant land and where new residential subdivisions are commonplace.

As with population, H-GAC is projecting a substantial increase in employment for the Houston region, especially for the northern portion of the region that includes the North-Hardy Corridor. H-GAC projects that the area that stretches north from downtown Houston into Montgomery County will add about 97,000 jobs in its "approved" projections, or about 170,000 jobs in its "interim" projections. (Like the projection of population, the "interim" projections for employment are generally much more aggressive that the projections contained in the "approved" scenario.) Exhibits ES.18 and ES.19 provide H-GACs "approved" and "interim" employment projections.

Exhibit ES.18: H-GAC "Approved" Employment Projections

	1999	2025	Actual Change 1999 - 2025	Percentage Change 1999 – 2025
SOUTH SECTION				
Blue	134,415	170,664	45,556	36.4%
Red	144,960	185,213	50,070	37.0%
Green	154,152	195,461	51,068	35.4%
NORTH SECTION				
Blue	35,627	50,836	17,840	54.1%
Red	36,829	57,048	23,255	68.8%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	170,042	221,500	63,396	40.1%
Red	181,789	242,261	73,325	43.4%
Green	154,152	195,461	51,068	35.4%

Source: Houston-Galveston Area Council.

Date: 3/2002.

Exhibit ES.19: H-GAC "Interim" Employment Projections

	1999	2025	Actual Change 1999 - 2025	Percentage Change 1999 – 2025
SOUTH SECTION				
Blue	134,415	201,415	76,307	61.0%
Red	144,960	219,366	84,223	62.3%
Green	154,152	230,505	86,112	59.6%
NORTH SECTION				
Blue	35,627	69,362	36,366	110.2%
Red	36,829	64,644	30,851	91.3%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	170,042	270,777	112,673	71.3%
Red	181,789	284,010	115,074	68.1%
Green	154,152	230,505	86,112	59.6%

Source: Houston-Galveston Area Council.

Date: 10/2002.

Overall, all three alignments are projected to have significant increases in employment along their routes. Job growth results from the following:

- Filling existing vacant commercial building space with new tenants.
- Development or redevelopment of lower-density uses or vacant land into more job-intensive commercial uses.

The greatest potential for increased employment opportunities occurs in locations with strong concentrations of office space, particularly high-rise office space, and where employment density is already relatively high. Downtown and the Greenspoint area are the primary locations where this is currently the case. The Woodlands Town Center is also developing into a center of highly concentrated employment.

Recent building permit activity was analyzed to determine the level of new development that has been occurring in the City of Houston and unincorporated Harris County. One important caveat with respect to the comparisons made between the proposed alignments is that each one has a different amount of land located within the limits of the City of Houston. Exhibit ES.20 shows the length of each alignment that lies inside and outside the City of Houston.

Exhibit ES.20: Length of Proposed Alignments Inside and Outside City of Houston Limits(in miles)

	Blue Line	Red Line	Green Line
Inside City of Houston	21.0	15.2	18.1
Outside City of Houston	19.4	27.0	5.9
Total	40.4	42.2	24.0

Source: Knudson & Associates.

The length of the Blue Line inside the City of Houston's city limits is the highest (21 miles), while the Red Line is the least (15 miles). The portion of all three alignments that is located within the City limits is located in the south section of the corridor.

Within the City of Houston, historical building permit activity was analyzed to obtain a sense of the scale and location of recent development. Exhibit ES.21 summarizes the number and value of City of Houston permits for new construction from 1989 to September 2002 for each of the three alignments.

Exhibit ES.21: New Construction Permits – City of Houston, 1989 – 2002

	Blue Line		Red Line		Green Line	
	#	$	#	$	#	$
Single Family	314	$ 23,988,693	237	$ 16,576,260	231	$ 17,287,110
Multifamily	31	14,254,000	29	9,120,000	112	31,167,466
Commercial	413	282,736,284	388	247,619,870	577	293,950,768
Total	770	$558,588,977	670	$511,136,130	932	$580,015,344

Notes: Excludes permits south of IH-10. Values are current dollars (not adjusted for inflation).
Sources: City of Houston and Knudson & Associates.

The Green Line, with 932 permits valued at $580 million, had the greatest amount of new construction activity in terms of both quantity and value, primarily for multi-family residential and commercial development. The Blue and Red Lines had 770 permits valued at $559 million, and 670 permits at $511 million, respectively. For single-family residential construction, the Blue Line had the highest number and value of permits at 314 and approximately $24 million.

An examination of the location of building permits in the City of Houston indicates there has been significant amount of new single-family construction in the Woodland Heights and Independence Heights neighborhoods. The lower number of overall permits, particularly commercial permits; along the Red Line is due partly due to the fact that a shorter length of this alignment is located within the limits of the City of Houston. An important point that is clearly visible from examining building permit activity is that the corridor generally shows a more moderate level of development activity than other parts of the City such as the Heights, Montrose, and River Oaks.

6.0: Cost Estimates

Capital Costs

Capital cost estimates for each alignment alternative were developed using a standardized spreadsheet developed by METRO's General Planning Consultant. The capital cost estimates are based on METRO experience and supplemented with national cost data when applicable. Capital cost estimating Master Spreadsheets were developed for the following transit technologies:

- Light Rail Transit (LRT),
- Commuter Rail (CR),
- Bus Rapid Transit (BRT), and
- High Occupancy Vehicle (HOV)

Each Master Spreadsheet defines the elements to be estimated and specifies the unit cost for each element. Quantities were then estimated for each element to develop the

cost estimate for each of the North-Hardy Corridor short listed alternatives. In early stages of study, quantities are more grossly defined, reflecting the level of definition of the alignments. The Master Spreadsheets at this conceptual stage provide an order of magnitude comparison of costs and include project contingency, management, overhead, and right-of-way costs.

Based on the Capital Cost Methodology, above, unit costs provided by the General Planning Consultant were applied to the estimated quantities for each cost category. Capital costs for each of the three North-Hardy Corridor transit alignments were calculated. For each alignment, a LRT and a BRT overall capital cost was estimated as well as the cost per route mile. All capital cost estimates in this report are in 2002 dollars. The cost estimates are based on the system planned for the year 2025.

For the North-Hardy Corridor, the short-list of transit alternatives consists of LRT and BRT alignments. Exhibits ES.22 and ES.23 present cost estimates for the North-Hardy Corridor Blue, Red, and Green Alternatives for LRT and BRT, respectively.

Exhibit ES.22: Summary of Cost Estimates for LRT Alternatives

Cost Category	Blue Alternative Total Cost Dollars	Red Alternative Total Cost Dollars	Green Alternative Total Cost Dollars
Vehicles	$ 106,260,000	$ 64,400,000	$ 67,620,000
Stations	$ 86,002,800	$ 47,704,800	$ 58,016,400
Guideway/Roadway	$1,364,261,946	$1,227,921,048	$ 946,050,025
Maintenance/Inspection Facilities	$ 44,460,000	$ 26,676,000	$ 28,454,400
Transit Centers	$ 8,424,000	$ 5,616,000	$ 5,616,000
Park-and-Ride Lots	$ 57,720,000	$ 53,040,000	$ 24,960,000
Road Reconstruction	$ 216,881,364	$ 128,027,545	$ 174,855,909
Right-of-Way	$ 62,381,330	$ 94,820,660	$ 34,718,266
Project Contingency	$ 194,639,144	$ 164,820,605	$ 134,029,100
Total Cost (2002 Dollars)	$2,141,030,583	$1,813,026,659	$1,474,320,100
Total Length in Miles	40.3	42.6	24.0
Cost per Mile (2002 dollars)	$ 53,085,896	$ 42,569,342	$ 61,439,701

Exhibit ES.23: Summary of Cost Estimates for BRT Alternatives

Cost Category	Blue Alternative Total Cost Dollars	Red Alternative Total Cost Dollars	Green Alternative Total Cost Dollars
Vehicles	$ 96,140,000	$ 58,190,000	$ 51,865,000
Stations	$ 110,869,200	$ 57,876,000	$ 74,209,200
Guideway/Roadway	$ 869,523,395	$ 720,418,935	$ 623,657,497
Maintenance/Inspection Facilities	$ 37,346,400	$ 22,604,400	$ 20,311,200
Transit Centers	$ 8,424,000	$ 5,616,000	$ 5,616,000
Park-and-Ride Lots	$ 57,720,000	$ 37,440,000	$ 24,960,000
Road Reconstruction	$ 216,881,364	$ 128,027,545	$ 174,855,909
Right-of-Way	$ 63,401,426	$ 95,476,436	$ 34,572,538
Project Contingency	$ 146,030,578	$ 112,564,932	$ 101,004,734
Total Cost (2002 Dollars)	$1,606,336,363	$1,238,214,248	$1,111,052,079
Total Length in Miles	40.3	42.6	24.0
Cost per Mile (2002 dollars)	$ 39,828,392	$ 29,072,913	$ 46,301,144

It should be noted that the cost estimates at this conceptual level of development provide very preliminary estimates of the capital costs. Further, considerable refinement would be required once a particular alignment is selected as the Locally Preferred Investment Strategy, especially as it relates to the mix of aerial versus at-grade construction, and overall project length. Nonetheless, the cost estimates serve as a useful tool for comparing various alternatives and alignments at this stage of investigation.

Corridor Operating and Maintenance (O&M) Costs

The development of METRO Solutions was achieved through a phased approach. This document explains the development of appropriate operating and maintenance (O&M) cost estimates for each phase of the study. The methodologies and associated results are summarized below.

PHASE ONE – CORRIDOR LEVEL SKETCH PLANNING

In Phase One, various high capacity transit alignments and modal technologies were formulated and evaluated along ten corridors within the METRO service area. The purpose of the Phase One evaluation was to screen high capacity transit alternatives using criteria that could differentiate among alternatives at a gross level of comparison. A differential assessment of O&M costs was not conducted as part of the Phase One evaluation because the major characteristics of the initial list of alternatives, such as route alignments and transit operating plans, were similar and would not, at this gross level, identify major cost trade-offs among the alternatives within each corridor. Other

criteria, such as access to population and employment, connectivity to the regional system, and improved travel time or quality of travel were used to screen the alternatives.

PHASE TWO – CORRIDOR REFINEMENT

In Phase Two, indicators of capital and O&M costs were developed to narrow the range of alignment and technology alternatives carried forward into system planning. During this phase, ridership forecasts were generated from a sketch planning tool that was not designed to provide alternative-specific vehicle hours and vehicle miles, which are equilibrated to ridership; thus, detailed O&M cost estimates were not calculated. Instead, O&M cost estimates were indexed on the estimated number of passengers as proposed for the CBD to Reliant Park light rail line.

A cost index was developed for each high capacity transit technology under consideration: light rail transit (LRT) and bus rapid transit (BRT). The four operating scenarios were:

- Exclusive one-car LRT operation (LRT-1);
- Mixed operation using a balance of one and two-car trains (LRT-1.5);
- Exclusive two-car LRT operation (LRT-2); and
- BRT operation.

At the end of Phase Two, BRT was not carried forward into system planning. While other factors established BRT as a non-viable option for this system, the reduced capacity provided by BRT vehicles compared with light rail on a systemwide basis of high ridership corridors and the strong community preference for LRT as the high capacity mode of choice were noted in this element of the study.

PHASE THREE – SYSTEM REFINEMENT

In Phase Three, capital and O&M cost estimates were developed for four system plan scenarios (No Build, Minimum Build, Mid-Range Build, and Maximum Build) and used as evaluation criteria. In this phase, METRO's EMME/2-based Long Range regional travel demand model replaced the sketch planning tool to forecast ridership. O&M costs were estimated systemwide using the cost factors shown in Exhibit ES.24, as well as cost factors for bus service from METRO's bus cost allocation model. Peak vehicle, revenue mile, and revenue hour outputs were also used from the travel demand model. Each of the cost factors shown in Exhibit ES.24 are multiplied by the respective quantity of revenue train hours, revenue car miles, peak vehicles, number of stations, and guideway miles. The results are summed to produce the total annual cost.

Exhibit ES.24
Estimated Service Costs By Scenario
(shown in constant FY 2002 dollars)

	METRO Rail	LRT-1	LRT-1.5	LRT-2
Cost/Rev Train Hour	$69.40	$53.15	$54.36	$56.79
Cost/Rev Car Mile	$6.23	$5.71	$5.71	$5.71
Cost/Peak Vehicle	$42,976	$18,222	$18,222	$18,222
Cost/Station	$138,702	$109,455	$109,455	$109,455
Cost/Guideway Mile	$341,404	$292,265	$292,265	$292,265

Source: METRORail Operations and Maintenance Plan, Revision: 0, Date: 11/07/01; Calculations of LRT scenarios prepared by General Planning Consultant, March 2003.

The scenario-specific cost indicators and service inputs generated the annual LRT O&M costs for the North-Hardy Corridor as shown in Exhibit ES.25. The METRO travel demand model produces daily service inputs that were annualized by multiplying them by 300, a generally accepted practice by the transit industry. The O&M costs were calculated assuming all one-car trains or all two-car trains to provide a range of costs. Annual costs include all fixed-route service but do not include costs for METROLift, special events, and other unmodeled services.

Exhibit ES.25
Estimated Annual LRT Operating & Maintenance Costs by Alignment

Corridor/Alignment	One-Car Trains	Two-Car Trains
North-Hardy		
Blue Line	$15,761	$14,337
Red Line	$11,885	$10,763
Green Line (at grade)	$10,255	$9,027
Green Line (aerial sections)	$9,734	$8,732

Note: in thousands, constant FY2002 dollars
Source: General Planning Consultant Calculations of March 2003

7.0: Evaluation of Alternatives

Goals Attainment

The goals for the North-Hardy Planning Studies were derived from the 2022 Metropolitan Transportation Plan (MTP) and METRO 2025 Transit System Plan as described in Section 1. The analysis of transit alternatives for the North-Hardy Corridor specifically addressed the MTP goal for increasing the number of travel choices. Another MTP goal that was at the forefront of the evaluation of alternatives is the promotion of coordinated land use and transportation system development. Economic development was one of eight evaluation criteria used to compare alternatives. Transit supportive land use has been an important component of several commercial and residential nodes along the North-Hardy Corridor. The transit technology alternatives

and the consideration of AHCT will contribute to an environmentally responsible transportation system. Active and meaningful public and stakeholder involvement has been the backbone of the planning methodology applied to the North-Hardy Planning Studies.

Early in the planning process, the community asked the consultant team to first maximize the use of transit, including AHCT, in the Corridor and maximize the use of the Hardy Toll Road before considering expansion of IH-45. This request was honored. The transit alternatives and findings were completed first, and their results are being factored into the examination of potential highway options.

Community and Political Positions

The North-Hardy Planning Studies were conducted with extensive community outreach and consensus-building. (See Section 10.0 for specifics.) Throughout the conduct of these studies there were 14 formal stakeholder meetings, 9 public meetings, and 62 small group or one-on-one meetings. These contacts with elected officials and interested citizens have allowed the Carter & Burgess team to hear first hand the community's desires and concerns. This input has been woven into the technical findings to produce outcomes that are both technically sound and well supported by the community and their elected officials.

The transit findings presented below represent a well supported, consensus solution for transit improvements in the North-Hardy Corridor. The final set of public meetings on the transit findings provided definitive feedback from the community that the analysis of the alternatives was credible. At the public meetings the community expressed a significant preference for LRT over BRT.

The transit short list of alternatives consisted of three alignments (Blue, Red, and Green) and two technologies (LRT, BRT). These have been described in detail earlier in this report. Each of the alternatives was evaluated using the criteria established at the beginning of the Alternatives Analysis. The evaluation criteria included:

- Mobility Improvements/Demand Potential
- Capital Cost
- Regional Connectivity
- Ease of Implementation
- Economic Development Potential
- Community Impacts
- Environmental Impacts
- Community Support

Early in the public involvement process, an attempt was made to use very technical interpretations of these evaluation criteria. The detailed matrix used to evaluate and

screen the long list of alternatives proved to be confusing and difficult for the public to understand. Although the matrix did allow a short list of alternatives to be formulated, a modified approach to evaluating the short list was employed. Because most people understand the concept of a report card, the evaluation criteria were "translated" into a report card format as shown below:

- Helps Others (Mobility Improvements/Demand Potential)
- Uses Time and Materials Wisely (Capital Cost)
- Plays Well with Others (Regional Connectivity)
- Finishes Work Promptly and Without Difficulty (Ease of Implementation)
- Grows Big and Strong (Economic Development Potential)
- Show Consideration for Others (Community Impacts)
- Respects Property of Others (Environmental Impacts)
- Listens Attentively and Waits Turn to Speak (Community Support)

Exhibit ES.26 shows the report card used to review the North-Hardy transit findings with the public.

Exhibit ES.26: Report Card Graphic

Exhibit ES.27 presents the overall transit findings for the North-Hardy Corridor. As graded, the Green Alignment is slightly better than the Blue Alignment. The public asked that a variation on this assessment be documented as a part of the overall transit findings. Specifically, they asked that phase one for the North-Hardy Corridor be defined as the Green Alternative with its two-way HOV service. They also wanted the

LRT in the median of IH-45 from Beltway 8 to SH 242 as depicted by the Blue Alternative to be considered a later phase for the Corridor.

Exhibit ES.27: Report Card on Alignments

	Blue	Red	Green
Helps Others (Mobility Improvements/Demand Potential	A	F	A
Uses Time and Materials Wisely (Overall Cost)	D	C	B
Plays Well With Others (Regional Connectivity)	A	C	A
Finished Work Promptly and Without Difficulty (Ease of Implementation)	C	B	C
Grows Big and Strong (Economic Development Potential)	C	C	B
Shows Consideration for Others (Community Impacts)	B	B	B
Respects Property of Others (Environmental Impacts)	B	B	B
Listens Attentively and Waits Turn to Speak (Community Support)	B	F	A
Total	B-	D	B+

[As previously stated, highway alternatives are still being studied. A discussion of the highway alternatives will be incorporated at a later date.]

8.0: System Plan Issues

METRO used the transit findings from the North-Hardy Alternative Analysis in the development of a regional Transit System Plan. The System Plan identifies a regional transit network that combines METRO's aggressive bus service program with Advanced High Capacity Transit (AHCT) improvements in high transit demand corridors. Development of the System Plan incorporates additional considerations such as transit efficiencies and connectivity between corridors. These system planning activities are described further in the next section.

9.0: Next Steps

Between January and March 2003, METRO held public meetings and disseminated information to build awareness of the System Plan and to receive comments related to System Plan development. Based on the evaluation of System Plan alternatives and the initial public response a Draft System Plan was assembled and made available for public review in April 2003. A series of public meeting were conducted in May and June 2003 to generate public comments on the Draft Plan. Following the public meetings,

comment from the general public and cooperating agencies were assessed and incorporated into the Draft System Plan, and presented to the METRO Board of Director in June 2003. The Final System Plan was adopted by METRO's Board in July 2003. METRO's System Plan, which includes the North-Hardy transit LPIS, was approved by voters in a November 2003 special election.

10.0: Agency and Public Involvement

The North-Hardy Planning Studies were conducted in partnership with the elected officials representing the Corridor's constituency; the various public agencies responsible for transportation system planning and operation; a diverse group of stakeholders that live or work in the Corridor; and numerous individual, interested citizens. The input and feedback received from the many meetings and workshops were interwoven into the technical tasks of defining and evaluating the North-Hardy Corridor alternative transit improvements.

An advisory committee of key stakeholders was formed early in the study. This Stakeholder Advisory Committee was composed of a broad range of interest groups and individuals and represented the diverse interests within the corridor. Meetings of the Stakeholder Advisory Committee were held to correspond with the completion of major phase of the Planning Studies. In addition to the Stakeholder Advisory Committee meetings, 11 formal stakeholder meetings were held at strategic points during the conduct of the planning studies.

Larger public meetings were held at multiple locations along the corridor during each of the major phases of the Studies. The Scoping Meetings were open houses since this meeting format allowed the greatest opportunity for people to arrive and depart at times most convenient to them. Several of the public meetings used a "working group" format where smaller "facilitated groups studied issues and alignments and then compared findings with the larger group..

Small group and one-on-one meetings were held with stakeholders where requested, or specifically required to fully understand the issues within the corridor.

Throughout the Planning Studies, stakeholders within the corridor were kept well informed. Four general newsletters were prepared. The newsletters were distributed to the various stakeholders at meetings and through direct mail. The direct mailing list included over 2,800 individuals and interested citizens. By providing newsletters during major phases of the Planning Studies, information was provided to a broad audience about the status of the studies and dates of upcoming meetings. They helped to elevate the discussions and importance of regional mobility. Four postcards/meeting notices were also used to provide notice about public meetings through direct mail to the mailing list. These flyers supplemented the Public Notices in the newspaper advertisements.

The North-Hardy Study team hosted a website to enhance communication for stakeholders. The website met METRO's technology and graphic requirements, and served as an additional method of communication for the Studies. The web site for the North-Hardy Planning Studies, North-Hardy.org, was initiated in January 2002 to coincide with initiation of the Scoping process. The site was updated at major study milestones.

Presentation graphics in the form of display boards and PowerPoint presentations were developed and used for all of the major stakeholder meetings and the public meetings. In many cases these presentation graphics were used at the small group and one-on-one meetings. Hard copies of PowerPoint presentations were made available at most of the outreach meetings.

Newspaper advertisements were published in the Houston Chronicle, the Houston Community Newspaper, La Voz, and Semana by METRO.

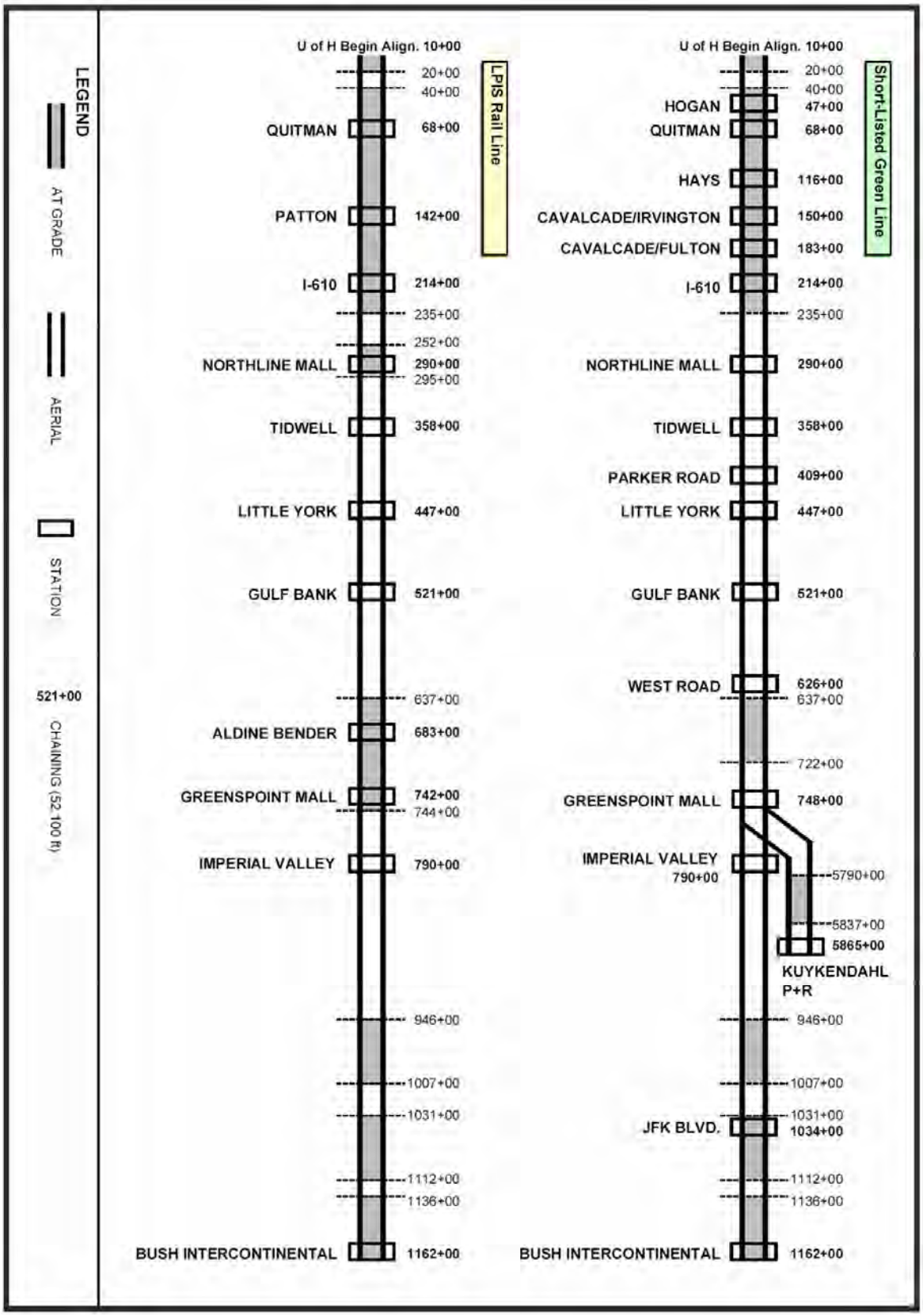
The North-Hardy Planning Studies team worked closely with METRO and it's General Planning Consultant (GPC) in developing the architecture for the comments database. This database facilitated the assembly, review, analysis and maintenance of input received from stakeholders.

11.0: Locally Preferred Investment Strategy

The METRO Solutions Plan incorporated the findings from the North-Hardy AA and other AA and corridor planning studies into a system plan. Travel demand modeling was performed. Based on modeling results, several proposed North-Hardy stations were eliminated. Some of these stations may re-appear as further technical work is done during the DEIS. Based on cost and ridership considerations, the rail extension to the Kuykendahl Park & Ride was eliminated in favor of continuing to serve this facility with two-way Park & Ride service. Differences between the short-listed Green Alternative and the LPIS are shown in Exhibit ES.28.

The METRO Solutions Plan, presented to and passed by voters in a November 2003 special election, included an implementation plan calling for completion of 22.1 miles of light rail extensions by 2012. The two highest priority lines are Minimum Operable Segments (MOSs) of the North-Hardy and Southeast-Universities-Hobby Corridors. The selected MOS for the North-Hardy Corridor extends from The University of Houston Downtown Station to Northline Mall.

Exhibit ES.28: Short-listed Green Line vs. LPIS Rail Line



The LPIS Rail Line begins at the northern terminus of the Downtown to Reliant Park light rail line at U of H Downtown. In the section of the LPIS Rail Line between its point of origin at U of H and Cavalcade, the alignment heads north, at-grade, following the existing right-of-way of North Main Street on the west side. About 500 feet north of I-10, the alignment transitions onto an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 1,900 feet and then returns back to grade in the center of North Main near Harrington Street. Potentially, a station could be located on the elevated section near Hardy Yard. This location would be a possible site for an intermodal center in the future. The alignment continues at-grade in the center of Main Street with a proposed station located at Quitman Street. At Little White Oak Bayou, the LPIS Rail Line shifts to the northeast to follow along the south side of the Bayou at-grade to Fulton Street. An alternate option to reach Fulton Street has been proposed turning east from North Main onto Boundary Street and then north on Fulton. The alternate alignment options meet at Hays and Fulton Streets. Beyond this point the alignment veers to the right to follow Irvington Boulevard with a station proposed at Patton Street. At Cavalcade, the LPIS Rail Line turns west and continues at-grade in the center of Cavalcade to Fulton Street. At Fulton, the alignment turns north and continues in the center of Fulton. An at-grade station is proposed at I-610. Approximately 1,600 feet north of I-610, the LPIS Rail Line rises onto an aerial structure to fly over the HB&T Railroad. The alignment returns to grade near Bennington and continues at-grade in the center of Fulton until reaching Northline Mall at Crosstimbers.

The alignment continues through Northline Mall with an at-grade station proposed on the east side of the Mall. A third track extends at-grade through this station in order to accommodate airport express service. Immediately beyond this station, the alignment veers westward and rises onto an aerial structure as it approaches Airline Drive. The aerial alignment crosses over the northbound lanes of Airline Drive and continues north in the center of Airline Drive for 6.1 miles to just north of West Road. Aerial stations in this segment of the alignment are proposed at Tidwell Street, Little York Road, and Gulf Bank Road.

Approximately 900 feet north of West Road, the alignment comes down to grade in the center of Airline Drive continuing in this fashion to a proposed at-grade station at Aldine Bender Road, where Airline Drive terminates. From this point, the alignment continues at grade onto the southern extension of Greenspoint Drive. The alignment continues in the center of Greenspoint Drive, crossing under Beltway 8, until it reaches Greenspoint Mall. At this point, the alignment swings to the west onto Greenspoint Mall property. It continues at-grade to a proposed Greenspoint Mall station located approximately 1,500 feet south of Greens Road. A third track extends at-grade through this station in order to facilitate airport express service.

Beyond the Greenspoint Mall Station, the alignment continues toward Bush Intercontinental Airport. As the alignment proceeds north after it leaves Greenspoint Mall station, it rises onto an aerial structure and veers to the east as it crosses over the eastbound lanes of Greens Road. The aerial alignment continues in the center of

Greens Road. An aerial station is proposed at Imperial Valley Drive. Shortly before reaching West Hardy Road, the alignment swings to the north side of Greens Road and continues in a northeasterly direction flying over Hardy Road, the Union Pacific Railroad, and the Hardy Toll Road until it reaches the Hardy Toll Road Airport Extension.

The alignment then follows the south side of the Hardy Toll Road Airport Extension. It initially stays aerial to fly over Central Green Boulevard, Air Center Boulevard, and Aldine Westfield Road before continuing at-grade. The alignment transitions onto an aerial structure again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Boulevard. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK lanes. The alignment continues at grade to a proposed terminal station at the intersection of JFK Boulevard and Terminal Road South.

The total distance of the LPIS Rail Line alignment from U of H to Bush Intercontinental Airport is 21.8 miles. The LPIS Rail Line has 7 at-grade stations and 4 aerial stations. The segment from U of H to the Northline Mall Station is 5.4 miles and has 4 at-grade stations. The segment from Northline Mall to the Greenspoint Mall Station is 8.5 miles and has 2 at-grade stations and 3 aerial stations. The segment from Greenspoint Mall to Bush Intercontinental Airport Station is 7.9 miles and has 1 at-grade station and 1 aerial station.

Differences between the Green Line alternative and the LPIS include the deletion of the small branch to the Kuykendahl Park and Ride and the elimination of some stations.

The operating plan for the LPIS Rail Line is based on the service levels for the Downtown-to-Reliant Park light rail line. On the Downtown-to-Reliant Park Line, METRO currently is planning to operate trains on a six-minute interval between trains (or headway) from the station at Fannin South to the station at the University of Houston. In addition to this end-to-end service, METRO is also planning to operate trains every six minutes in a shuttle service from Smithlands Station to the Hermann Park/Rice University Station during peak periods, thereby providing a combined headway of three minutes on this section of the line. Although the shuttle service does not impact the end-to-end service and, therefore, does not directly affect the operation of the LPIS Rail Line, it does impact the total fleet of Light Rail Vehicles (LRVs) and must be accounted for in the LRV fleet computations.

As a result of the review and refinement of the short-listed Green Line Alternative, it is proposed that the LPIS Rail Line would have three services (beyond that of the Smithlands Shuttle mentioned above), as shown in Exhibit ES.29.

Exhibit ES.29: Service Routes

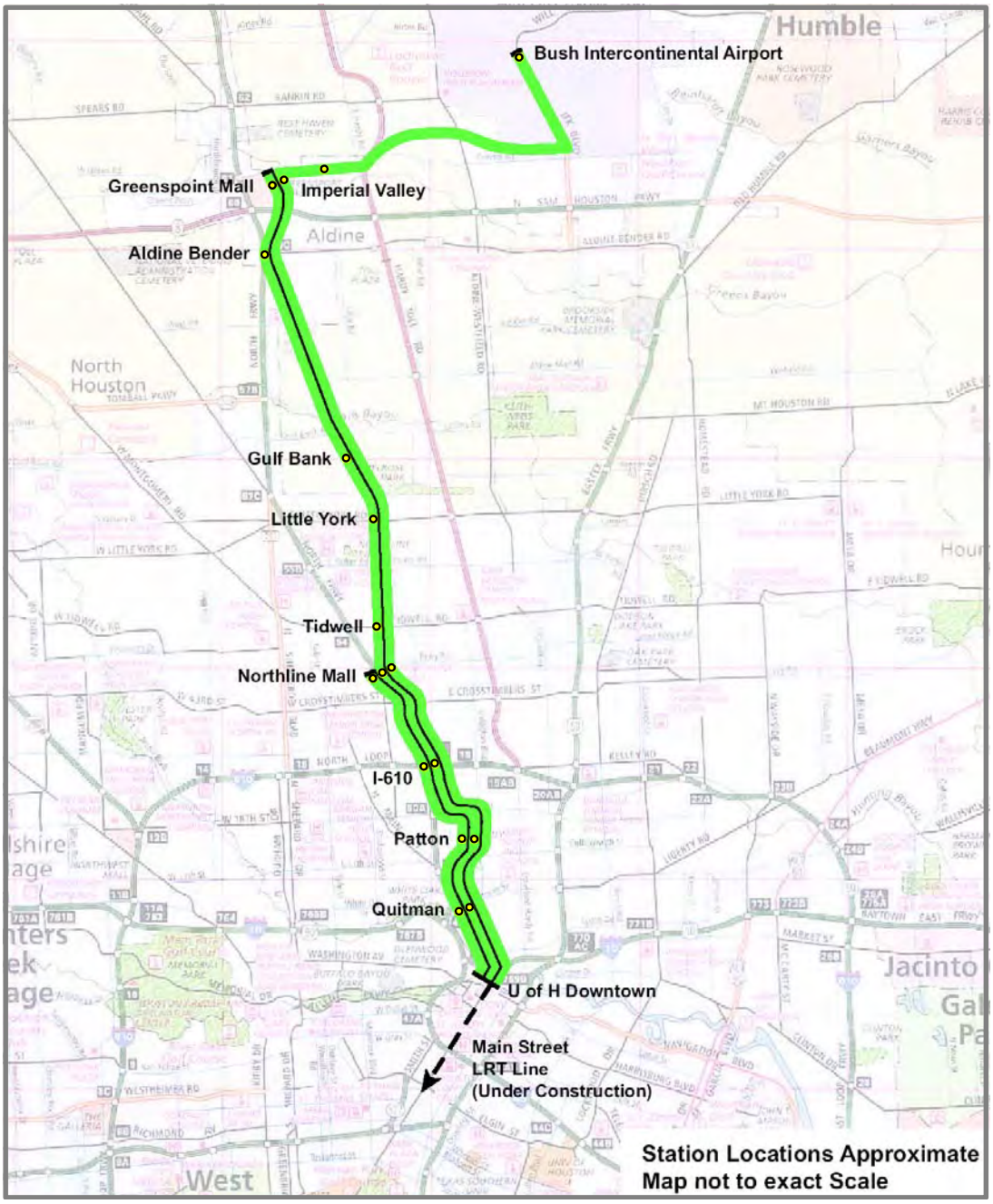


Exhibit ES.30 presents estimated one-way running times for local and express service between U of H and selected destinations on the LPIS Rail Line.

Exhibit ES.30: Selected Running Times To / From U of H (in Minutes)

Location	Local Running Time	Express Running Time
Northline Mall	16.3	14.1
Greenspoint Mall	32.4	26.5
Bush IAH	NA	37.6

Section 6 of this report discusses the methodology for calculating capital costs for the various alternatives. This same methodology was applied to the LPIS, and Exhibit ES.31 presents its capital cost estimate. As described earlier, the LPIS is a modification of the short listed Green Line alternative. Therefore the capital cost estimate for the LPIS is different from the capital cost estimate for the short listed Green Line alternative.

Exhibit ES.31: Capital Cost Estimate for the LPIS Rail Line

Cost Category	**Total Cost**
Vehicles	$ 57,960,000
Stations	$ 23,446,800
Guideway/Roadway	$ 835,911,180
Maintenance/Inspection Facilities	$ 24,008,400
Transit Centers	$ 5,616,000
Park-and-Ride Lots	$ 21,840,000
Road Reconstruction	$ 107,618,784
Right-of-Way	$ 30,150,076
Project Contingency	$ 110,655,124
Pocket Tracks	$ 4,200,000
Total Cost (2002 Dollars)	$1,221,406,364
Total Length in Miles	21.8
Cost per Mile (2002 dollars)	$ 55,950,818

Because of funding constraints, the METRO Board has proposed to build the LPIS Rail Line in segments, consistent with the METRO Solutions Plan. The first segment, called the Minimum Operable Segment or MOS, would extend from the U of H Station to Northline Mall.

The route and facility description of the MOS is the same as described above earlier for the full build-out LPIS Rail Line, except that the alignment of the MOS will not extend beyond the end of the tail track at Northline Mall. The existing Yard and Shop facility on South Fannin will be used to service the additional eight vehicles required to operate the line extension to Northline Mall.

Exhibit ES.32 presents the capital cost estimate for the Minimum Operable Segment of the LPIS Rail Line.

Exhibit ES.32: Capital Cost Estimate for the MOS of the LPIS Rail Line

Cost Category	Total Cost
Vehicles	$ 25,760,000
Stations	$ 4,929,600
Guideway/Roadway	$ 158,187,276
Maintenance/Inspection Facilities	---
Transit Centers	$ 2,808,000
Park-and-Ride Lots	$ 7,800,000
Road Reconstruction	$ 39,188,136
Right-of-Way	$ 5,368,000
Project Contingency	$ 24,404,101
Pocket Track	$ 2,100,000
Total Cost (2002 Dollars)	$ 270,545,113
Total Length in Miles	5.4
Cost per Mile (2002 dollars)	$ 49,916,073

1.0: Purpose and Need

1.1: Study Area Setting and Context

1.1.1: Study Area Description

The North-Hardy Corridor stretches approximately 30 miles from Downtown Houston north to The Woodlands and SH 242 in Montgomery County principally in the area between IH-45 and the Hardy Toll Road. The corridor also extends east to include Bush Intercontinental Airport (IAH). In addition, segments of IH-45 and US 59 south of Downtown for approximately 4 miles are included in the study area. (See Exhibit 1.1).

The North-Hardy Planning Studies focus on one study area, which is addressed in two separate studies.

- From Buffalo Bayou north to SH 242 (The Woodlands), extending along and between IH-45 and the Hardy Toll Road, with connections to Bush Intercontinental Airport. Metropolitan Transit Authority (METRO) and the Texas Department of Transportation (TxDOT) are conducting this study, in partnership with Houston-Galveston Area Council (H-GAC). Highway and transit improvements are considered.

- South from Buffalo Bayou to Spur 527 (Louisiana Street exit from US 59). TxDOT is conducting this section of the study, in partnership with H-GAC. With METRO's plan for this area already approved and in development (METRORail Project and Downtown/Midtown Transit Streets), only highway improvements for IH-45 and US 59 are considered.

Per the community's wishes, transit alternatives were examined and a Locally Preferred Investment Strategy (LPIS) was selected prior to detailed evaluation of highway alternatives. This Section therefore focuses on the evaluation and selection of the transit LPIS. Work on the highway alternatives to meet residual corridor travel demand is in progress.

The North-Hardy Corridor covers a diverse geographic area that connects the rapidly growing northern suburbs and the re-developing Near Northside neighborhoods to Downtown and other activity centers in Houston. For description and analysis purposes, the North-Hardy Corridor has been broken into seven subareas. These include the Downtown/Midtown/Binz area; the Near Northside Village; the Northline area; the Aldine area; the Bush Intercontinental Airport (IAH)/Greenspoint area; the Spring/FM 1960 area; and The Woodlands. The boundaries of each subarea are shown in Exhibit 1.2.

Exhibit 1.1: Boundaries of the Study

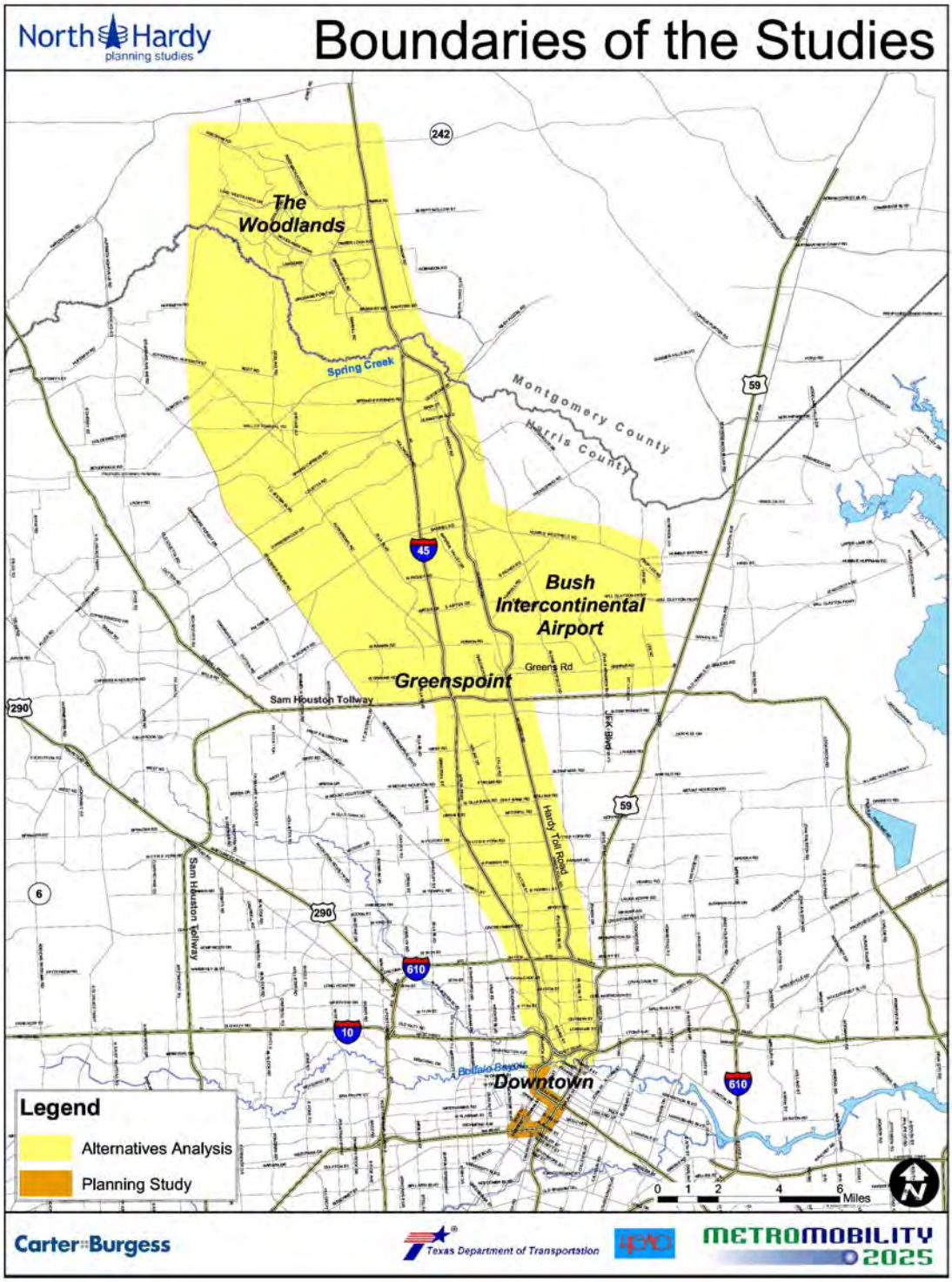
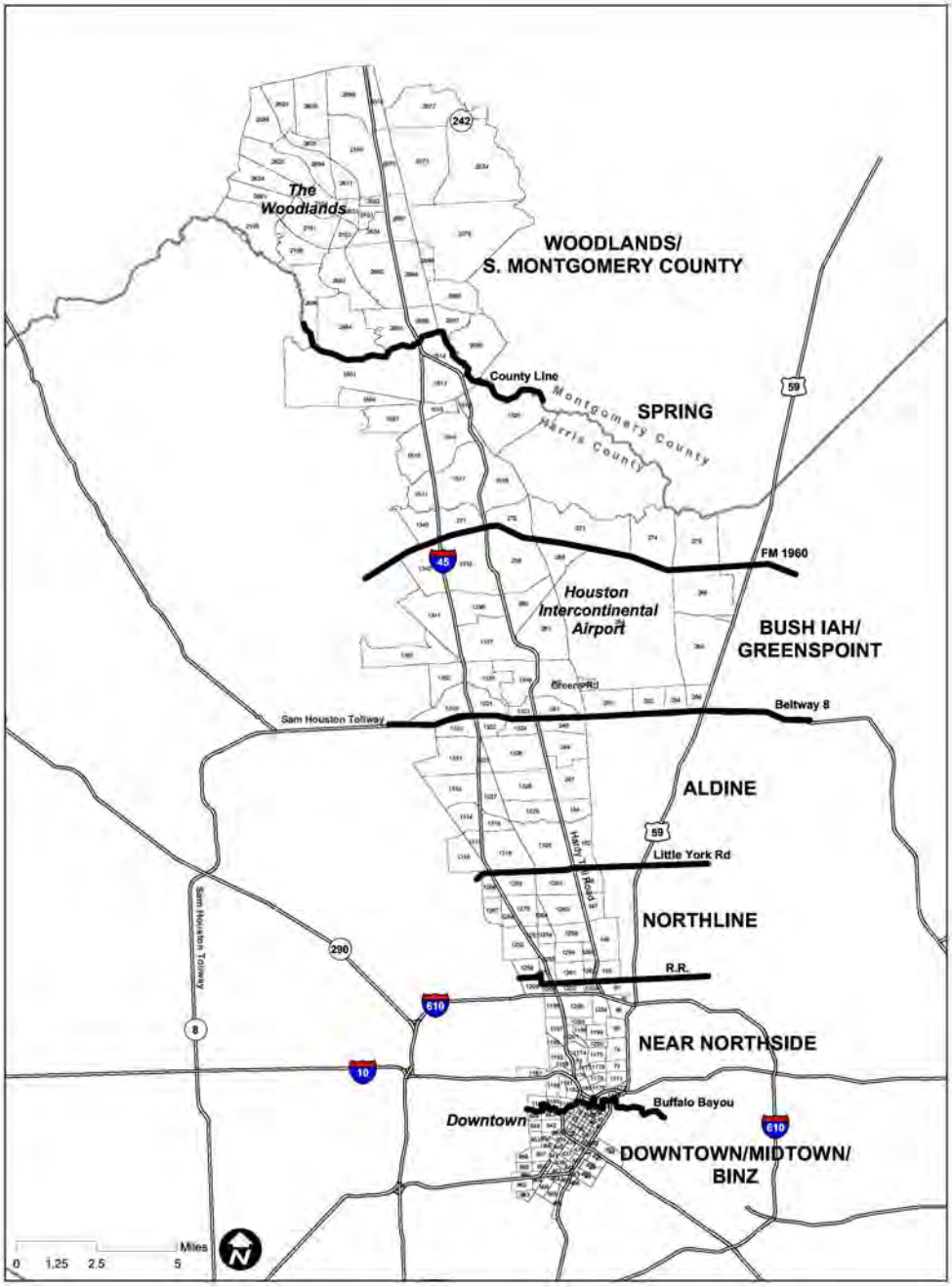


Exhibit 1.2: Boundaries of Sub-Area



1.2: Regional Context

According to the 2001 annual ranking by the U.S. Council of Mayors, the Houston region has the seventh largest economy in the country and ranks among the fastest growing. Houston is the fourth largest city in the U.S. in terms of population. As people continue to flock to the Texas Gulf Coast for jobs and opportunities, mobility has been and will continue to be a major concern.

Annually, the Texas Transportation Institute (TTI) ranks the major metropolitan areas with respect to the level of traffic congestion occurring on their highways. This ranking is reflected in the Roadway Congestion Index (RCI). An RCI of 1.00 or greater indicates congestion levels that are undesirable. The RCI for Houston as reported by TTI was 1.10 in 1999. The congestion level on Houston's roadways is down from its all time high of 1.12 in 1984 but well above its low of 0.99 in 1992. Since 1992 TTI Roadway Congestion Index for the Houston area has continued to rise. TTI reports that nearly 40% of all peak period travel in the metropolitan area experiences significant congestion.

H-GAC, with input from TxDOT, METRO, and others has, and periodically updates, a long-term transportation plan to keep people moving. This Metropolitan Transportation Plan offers multiple transportation alternatives in major corridors throughout the region. Unfortunately, even with the planned $17 billion investment in the transportation system over the next 22 to 25 years, the trend of increasing congestion is expected to continue. The North-Hardy Corridor is no exception to the metropolitan trend.

IH-45, the western spine of the North-Hardy Corridor, is a major travel corridor through the metropolitan area. The eastern spine of the corridor is the Hardy Toll Road and the Union Pacific Railroad (UPRR). The North-Hardy Corridor is not only a conduit for moving commuters to and from Downtown Houston, but is also an active truck and rail freight corridor. Therefore, mobility in the North-Hardy Corridor is essential to economic vitality of the entire metropolitan area and this region of the State.

1.1.3: Corridor Context

The North-Hardy Corridor consists of several major employment centers and discrete commercial and residential communities. South of Buffalo Bayou these include the Houston Central Business District (CBD), Midtown, and the Texas Medical Center. Neighborhoods north of the Bayou include the Near Northside neighborhoods, the greater Northline Mall area, the Aldine area, the greater Greenspoint Mall area, Bush Intercontinental Airport, the historic Old Town Spring/FM 1960 area, and The Woodlands/South Montgomery County area. Each sub-area has its own unique characteristics with varying transportation and economic development needs. Many of these localities are very organized and have a clear vision for their future.

The corridor has many transportation challenges and opportunities. The following is a sampling of the corridor issues that are addressed by the studies:

North of Buffalo Bayou

- Recurring congestion on key segments of IH-45 north of the Bayou.
- Poor pavement condition with less than current design standards on IH-45 south of Shepherd.
- Lack of continuous major thoroughfares forces mid-range auto trips onto already-congested IH-45.
- For many trips within and into the corridor, there are few viable alternatives to the private auto.
- High capacity transit service is predominantly peak period/peak direction and therefore may not adequately serve suburban employment centers.
- Lack of access and mobility within the corridor constrains economic development and re-development.
- Anticipated population and employment growth is expected to exacerbate the problems described above.

South of Buffalo Bayou

- Recurring congestion on key segments of IH-45 passing through Downtown and on IH-45/US 59 south of Downtown.
- Anticipated population and employment growth is expected to exacerbate the problem described above.

As the North-Hardy Planning Studies explore ways to address these corridor issues, proposed transportation improvements must minimize environmental impacts and disruption to neighborhoods, commercial districts and historic areas.

1.1.4: Previous Studies in the North-Hardy Corridor

To support the North-Hardy Planning Studies, a review of previous studies was undertaken. The review focused on recent planning efforts undertaken that relate to the study area. The studies range from specific redevelopment plans to regional transportation plans as follows:

- *Downtown Houston Development Framework*, Downtown District, Fall 2000
- *Near Northside Economic Revitalization Plan*, City of Houston, by Webb Architects, 2001
- *Buffalo Bayou and Beyond*, Workshop by Thompson Design Group Inc./EcoPlan, 2001
- *Executive Summary METRO Mobility 2025*, METRO, May 2001
- *METRO's Vision for 21st Century High Capacity Transit*, METRO, by S.R. Beard, August 1999
- *IH-45/US59 Corridor Study – Recommended Improvements*, TxDOT, by Parsons Transportation Group Inc., April 2001
- *Main Street Corridor Master Plan,* City of Houston, August 2000
- *Tax Increment Reinvestment Zone Number Eleven, City of Houston, Greater Greenspoint Zone: Project Plan and Reinvestment Zone Financing Plan,* Greater Greenspoint Redevelopment Authority, July 1999

- *Airline Corridor Revitalization Phase I: Land Use and Environs Study,* Greater Greenspoint Redevelopment Authority, April 2001
- *Airline Corridor Revitalization Project Area,* City of Houston, July 2000

These studies are significant resources that have been utilized through the course of the North-Hardy Corridor Alternatives Analysis. The wealth of information contained in these studies provided a sound starting point from which viable alternatives were developed and evaluated.

1.2: Growth, Development, and Mobility Issues

According to H-GAC (March 2002), the population of the eight county metropolitan area is expected to grow by almost 1.9 million people from just over 4.5 million in 2000 to approximately 6.4 million in 2025. This represents a growth of about 41% or 1.64% per year. Employment growth during the same time period will increase from approximately 2.4 million in 2000 to 3.1 million in 2025. This increase of approximately 745,000 jobs represents almost a 32% increase or 1.3% annual growth rate. (See Exhibit 1.3.) The North-Hardy Corridor spans both Harris and Montgomery Counties. Population and employment growth rates for Harris County are projected to grow 36% and 55%, respectively, between 1995 and 2025. Montgomery County growth rates in population and employment over the same time period are expected to be 113% and 198%, respectively. This differential in anticipated growth must be factored into the alternatives developed for the study area.

Exhibit 1.3: Metropolitan Area Growth

	2000	2025	Change	% Change
Population	4,531,468	6,394,719	1,863,251	41.12%
Employment	2,363,293	3,108,488	745,195	31.53%

Source: Houston-Galveston Area Council
Date: 3/2002

Houston is a major economic engine that relies on the ability to efficiently and effectively move people and goods. That ability is dependent on the status of its transportation system. Unfortunately, the level of sustained growth expected in the metropolitan area will present significant mobility challenges over the next 25 years. By 2022 the daily vehicle miles of travel (VMT) is expected to be 170 million, up 40% from current conditions and 82% from 1990.

1.2.1: General Overview and Land Use of the North-Hardy Corridor

The land use patterns found in the North-Hardy Corridor include intense commercial development along with medium and low density residential development. Clusters of industrial development are also found in the corridor. These patterns reflect a long-term trend of growth in the suburban portion of the corridor with a more recent modest increase in inner-city redevelopment and infill growth. These land use patterns generate varied travel markets. Overall traffic is made up of daily commutes, business and visitor travel, school trips, shopping trips, and trips for recreation and entertainment.

1.2.2: Growth in the North-Hardy Corridor

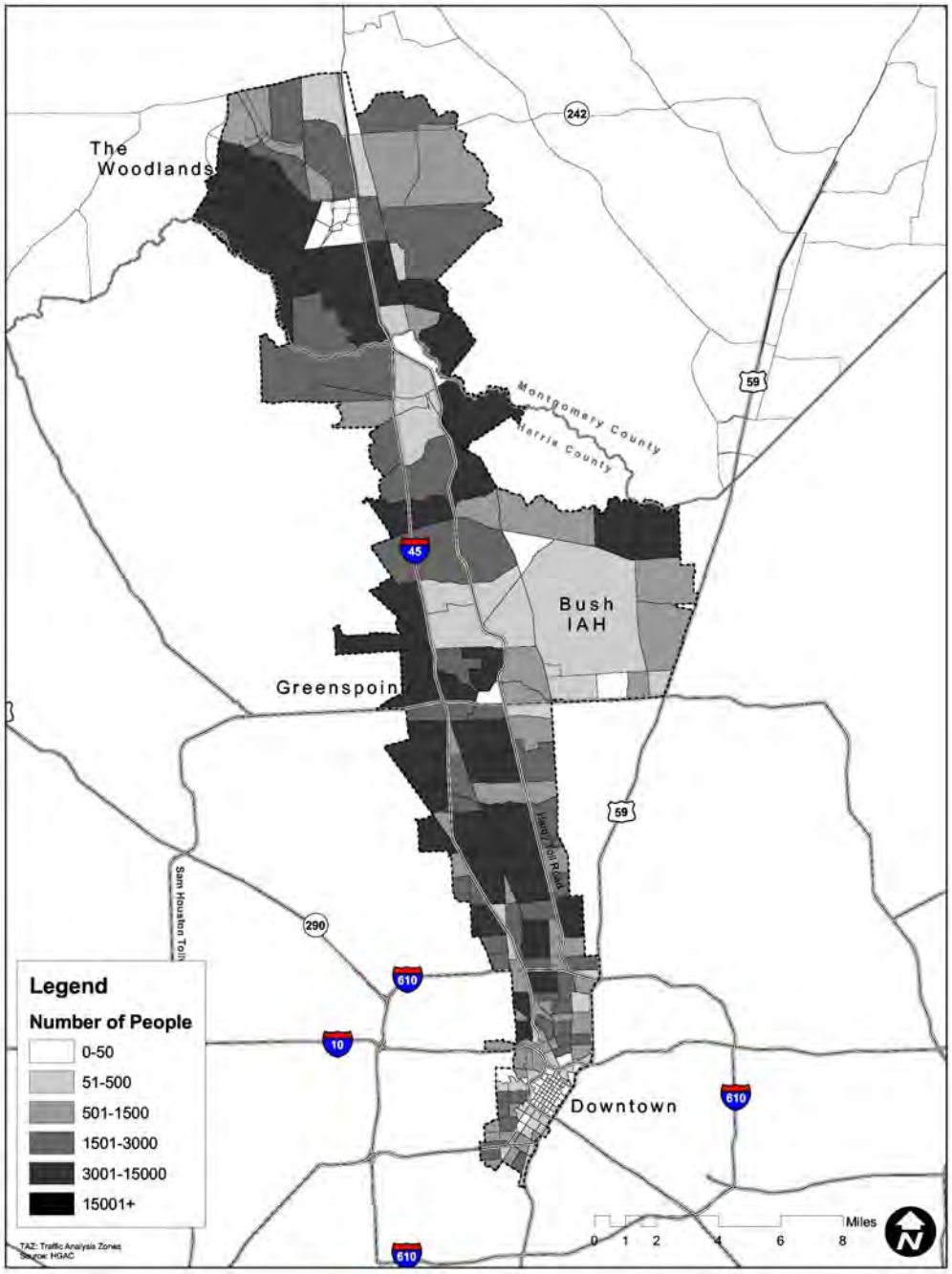
The North-Hardy Corridor growth rate is expected to be slightly less than the metropolitan area average over the next 25 years. Population is projected to increase by about 126,000 people from just fewer than 400,000 in 2000 to about 526,000 in 2025. This represents an approximate population growth rate of 32% or about 1.3% per year. Employment is expected to increase from about 386,000 in 2000 to just over 483,000 in 2025. This increase of almost 97,000 jobs equates to a growth rate of approximately 25% or about 1% per year. Exhibits 1.4 through 1.8 detail the current and forecasted population and employment figures for the North-Hardy Corridor by subarea and in total. A significant amount of both population and employment growth is projected to occur to the west of IH-45 and in The Woodlands area. The population growth rate for the area west of IH-45 and The Woodlands is expected to be 35%, while employment is expected to grow by 40%.

Exhibit 1.4: North-Hardy Corridor Growth

AREA	POPULATION		EMPLOYMENT	
	2000	2025	2000	2025
Downtown/Midtown/ Binz	25,698	36,757	184,414	206,871
Near Northside Village	52,601	57,575	29,240	33,755
Northline Area	59,081	65,740	23,243	24,467
Aldine Area	66,346	88,565	33,892	46,012
Bush Intercontinental/ Greenspoint	46,967	82,800	69,924	104,272
Spring Area	52,836	78,836	11,151	21,942
Woodlands/ S. Montgomery County	96,171	115,795	34,609	45,822
TOTAL	399,700	525,795	386,471	483,141

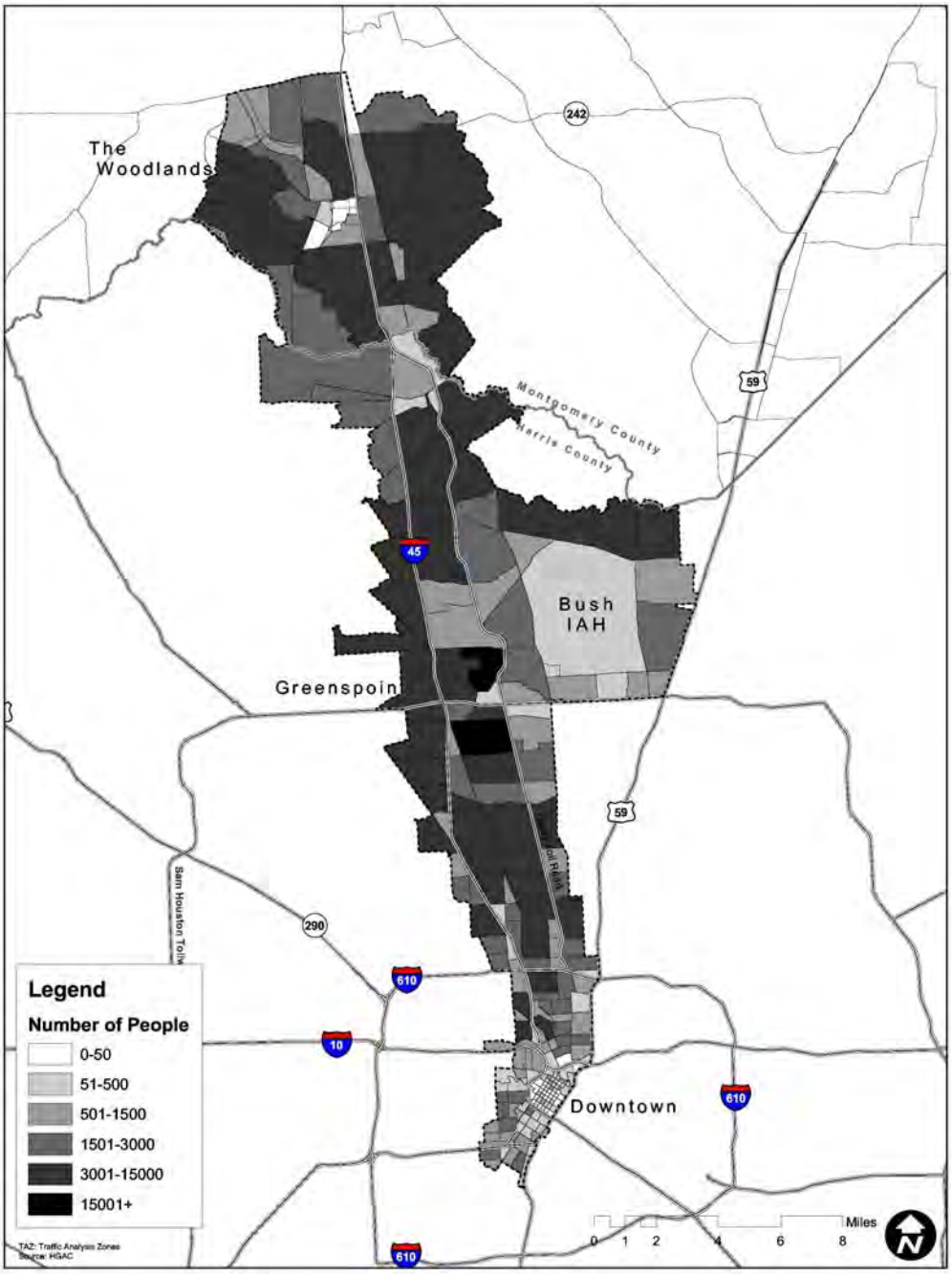
Source: Houston-Galveston Area Council
Date: 3/2002

Exhibit 1.5: Population 2000



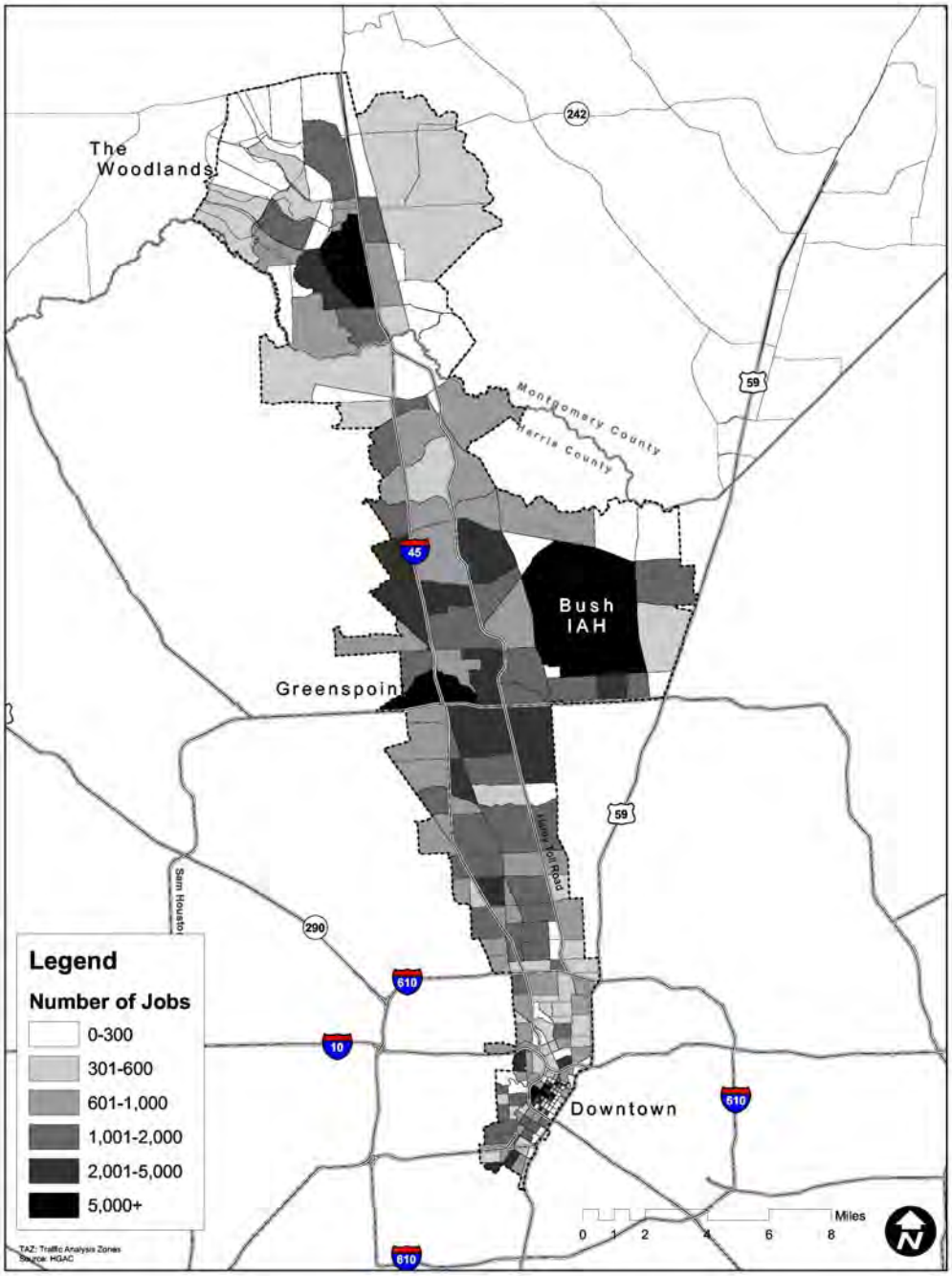
POPULATION 2000

Exhibit 1.6: Population 2025



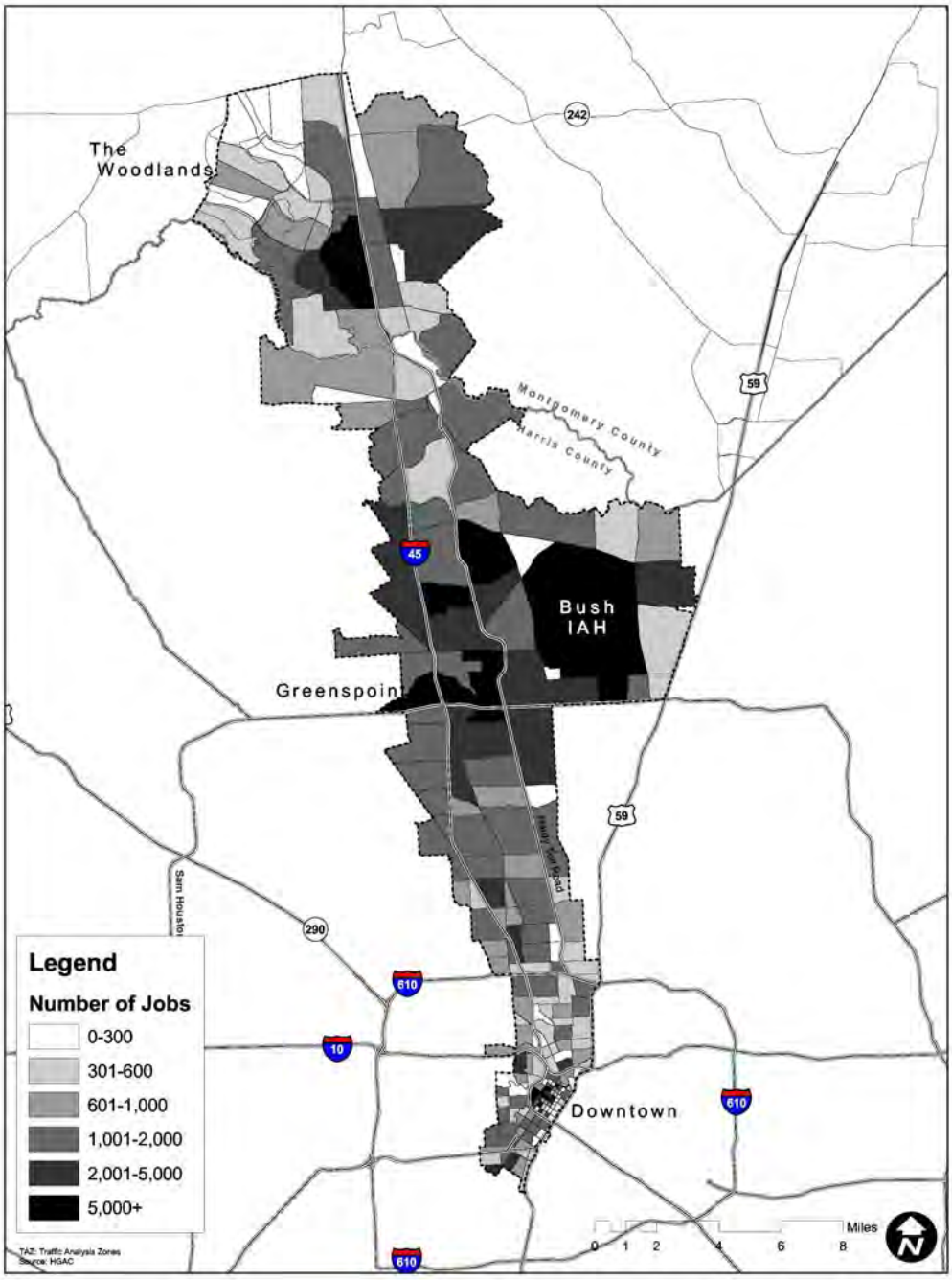
POPULATION 2025

Exhibit 1.7: Employment 2000



Employment 2000

Exhibit 1.8: Employment 2025



Employment 2025

1.2.3: Travel Patterns in the North-Hardy Corridor

Exhibits 1.9 through 1.12 illustrate the projected travel patterns or desire lines in and through the North-Hardy Corridor. Major trip destinations for The Woodlands include the FM 1960 at IH-45 area, Bush Intercontinental Airport, the Greenspoint Mall area, and Downtown Houston. The FM 1960 at IH-45 area is projected to generate trips to The Woodlands, Bush Intercontinental Airport, the Greenspoint Mall area, Downtown Houston, and to a lesser extent to the Near Northside Village area. The Bush Intercontinental Airport zone will generate trips destined for the FM 1960 at IH-45 area, the Greenspoint Mall area, Downtown Houston, and again to a lesser extent to the Near Northside Village. Trips generated in the Greenspoint Mall area are expected to be destined to The Woodlands, the FM 1960 at IH-45 area, Bush Intercontinental Airport, and to a lesser extent to Downtown Houston and the Near Northside Village area. The trip interchange between the Near Northside Village and Downtown Houston light rail line is projected to be significant (7,563 trips in 2007).

Exhibit 1.9: Trips from the Woodlands in 2022

Exhibit 1.10: Trips from FM 1960 Area in 2022

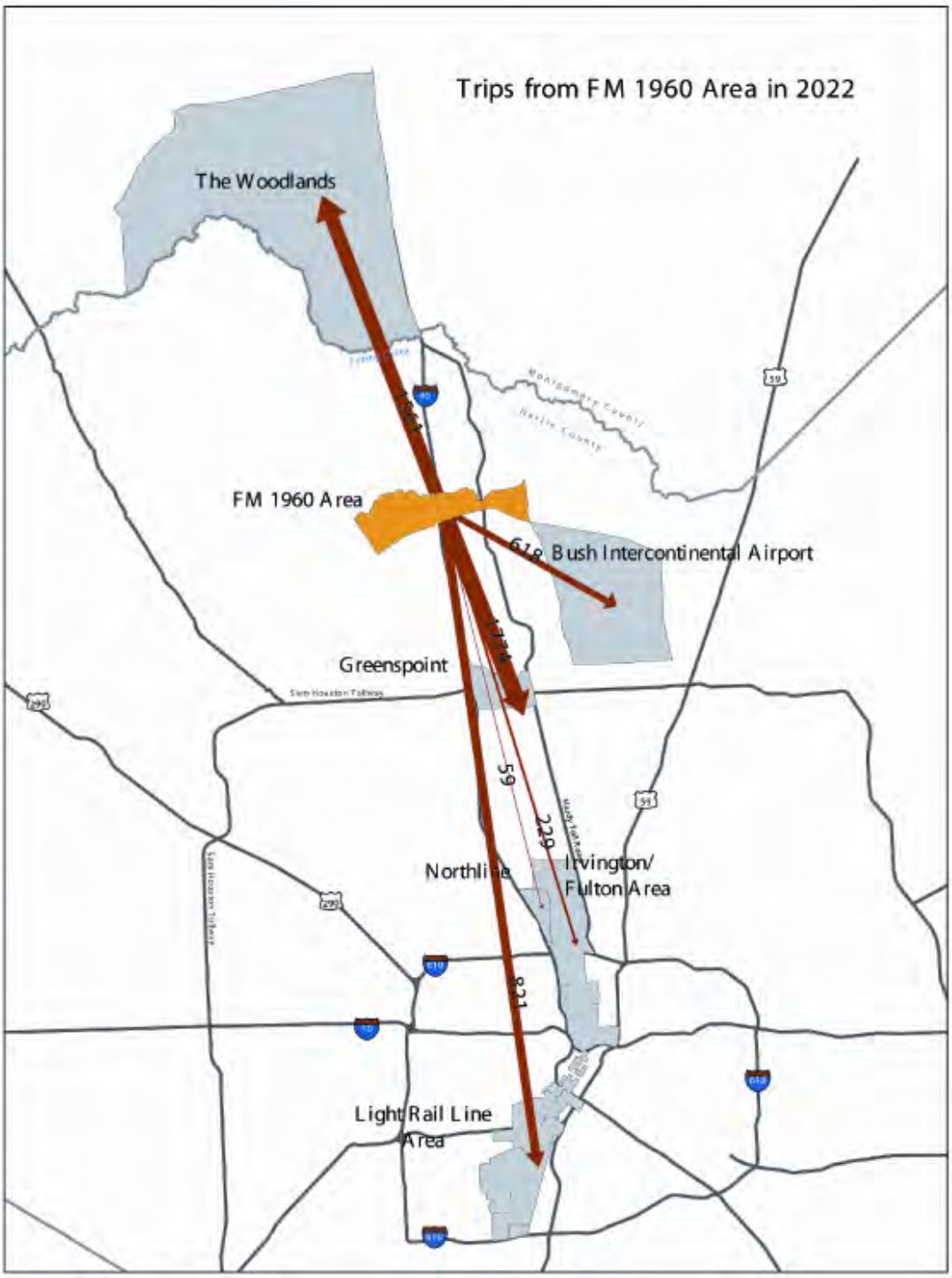


Exhibit 1.11: Trips from Greenspoint in 2022

Exhibit 1.12: Trips from Bush Intercontinental Airport in 2022

1.3: Transportation Facilities and Services in the North-Hardy Corridor

1.3.1: Existing Roadway Facilities, Level of Service, and Safety

The major north-south highway facilities in the North-Hardy Corridor are IH-45 and the Hardy Toll Road. Traversing the corridor east-west are IH-10, IH-610 (North Loop), Beltway 8, FM 1960, and the proposed Grand Parkway. Major north-south arterials that parallel or feed the corridor include Gosling, Aldine Westfield, Hardy Road, Imperial Valley, Ella, Kuykendahl, Veterans Memorial, Airline, W. Montgomery, N. Shepherd, Fulton, Irvington, and N. Main. Major east-west cross streets include SH 242, Research Forest, Woodlands Parkway, Rayford/Sawdust, FM 2920, Spring Cypress, Spring Stuebner, FM 2920, Louetta, Cypresswood, Richey, Airtex, Rankin, Spears, Gears, Greens Road, Aldine Bender, West Road, W. Mt. Houston, Gulf Bank, Little York, Parker, Tidwell, Crosstimbers, and Cavalcade.

The transportation facilities in the North-Hardy Corridor are varied. Segments of IH-45 immediately north of Downtown are characterized by vertical curves that do not meet current design standards. The lack of shoulders and lane widths that are not ideal on this section of IH-45 are exacerbated by the poor pavement condition south of Shepherd Drive. In addition, the depressed section of IH-45 near White Oak Bayou experiences flooding during heavy rainfalls. In contrast, the segments of IH-45 north of Shepherd Drive either meet current design standards or are in the process of being re-built to such standards. A reversible High Occupancy Vehicle (HOV) lane in the center of IH-45 that extends from Downtown to north of FM 1960 provides additional peak direction capacity during peak periods. The Hardy Toll Road, generally perceived as having sufficient capacity to meet current demand on existing segments, is programmed for extension inside IH-610 to connect with the northeast corner of the Downtown.

Current daily traffic volumes, volume to capacity (V/C) ratios, and peak period speeds along the IH-45 corridor are shown in Exhibits 1.13 through 1.15. V/C ratios that are less than 0.85 are considered to represent tolerable traffic conditions. V/C ratios between 0.85 and 1.00 indicate a modest level of traffic congestion. V/C ratios over 1.00 indicate serious traffic congestion range and over 1.25 indicates a severe level of traffic congestion. These relative levels of traffic congestion are also reflected in the peak period speed for the different sections of IH-45. Use of the one-way reversible HOV lane is controlled, which allows it to operate at much higher speeds. The growth in population and employment anticipated in the study area is expected to increase traffic volumes and traffic congestion in the corridor. Current choke points in terms of peak period speeds are depicted in Exhibit 1.15. IH-45 is a radial freeway that, in the past, has experienced peak direction congestion with minimal excess capacity in the off-peak direction indicating a fairly balanced travel demand. This bi-directional travel demand is a factor that must be recognized in developing alternative transportation improvements for the North-Hardy Corridor.

Exhibit 1.13: North-Hardy Year 2000 Traffic

Section	2000 Daily Traffic Volume	Volume to Capacity Ratio	Peak Period Speed	Peak Period HOV Speed
South of Buffalo Bayou				
US 59: Spur 527 to IH-45	175,000	1.24	33 mph	N/A
IH-45: US 59 to IH 10	220,000	1.56	25 mph	N/A
North of Buffalo Bayou		1.19	34 mph	50-55 mph
IH-45: IH 10 & Loop 610	223,000			
IH-45: Loop 610 to Shepherd	259,000	1.38	29 mph	50-55 mph
IH-45: Shepherd to Beltway 8	254,000	1.35	28 mph	50-55 mph
IH-45: Beltway 8 to FM 1960	227,000	0.97	39 mph	50-55 mph
IH-45: FM 1960 to Spring	162,000	0.86	42 mph	N/A
IH-45: Spring to SH 242	142,000	1.01	38 mph	N/A

Source: Texas Department of Transportation, Houston-Galveston Area Council as compiled by Carter & Burgess, Inc.
Date: 2/2002

Exhibit 1.14: North-Hardy Year 2000 Traffic Volumes

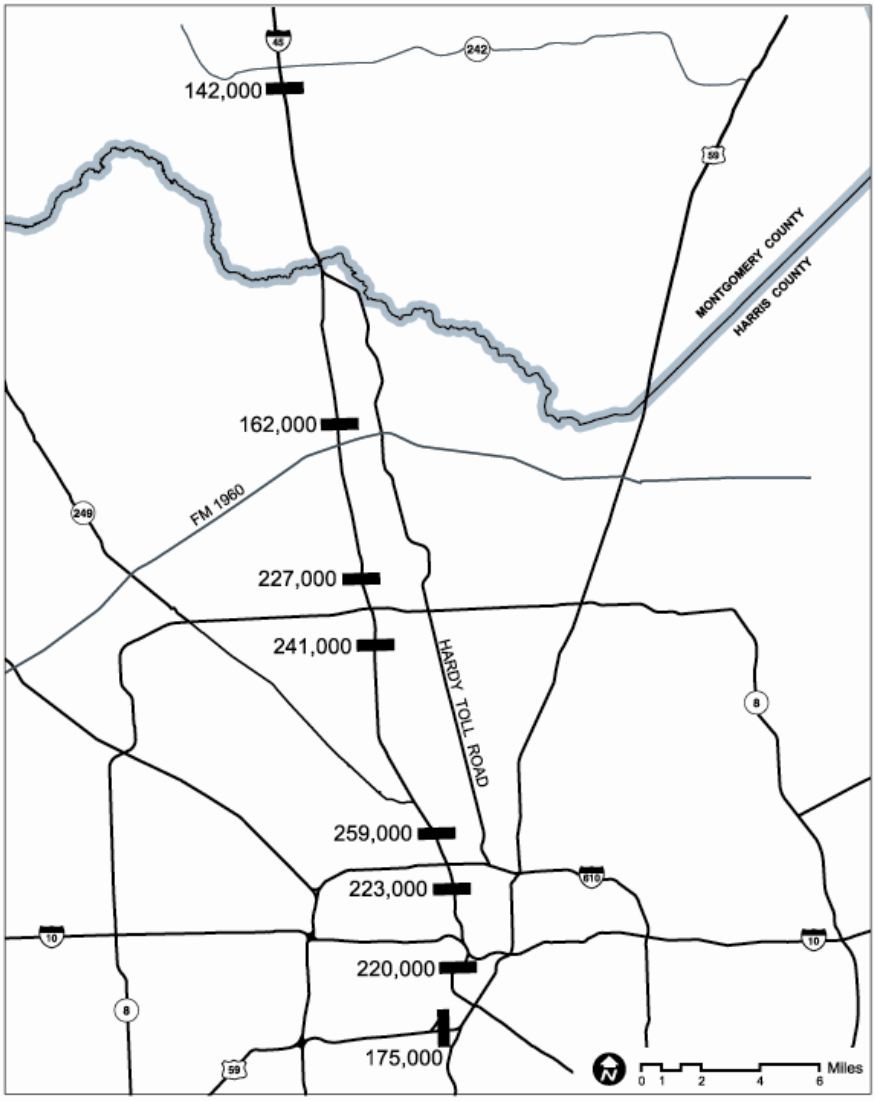
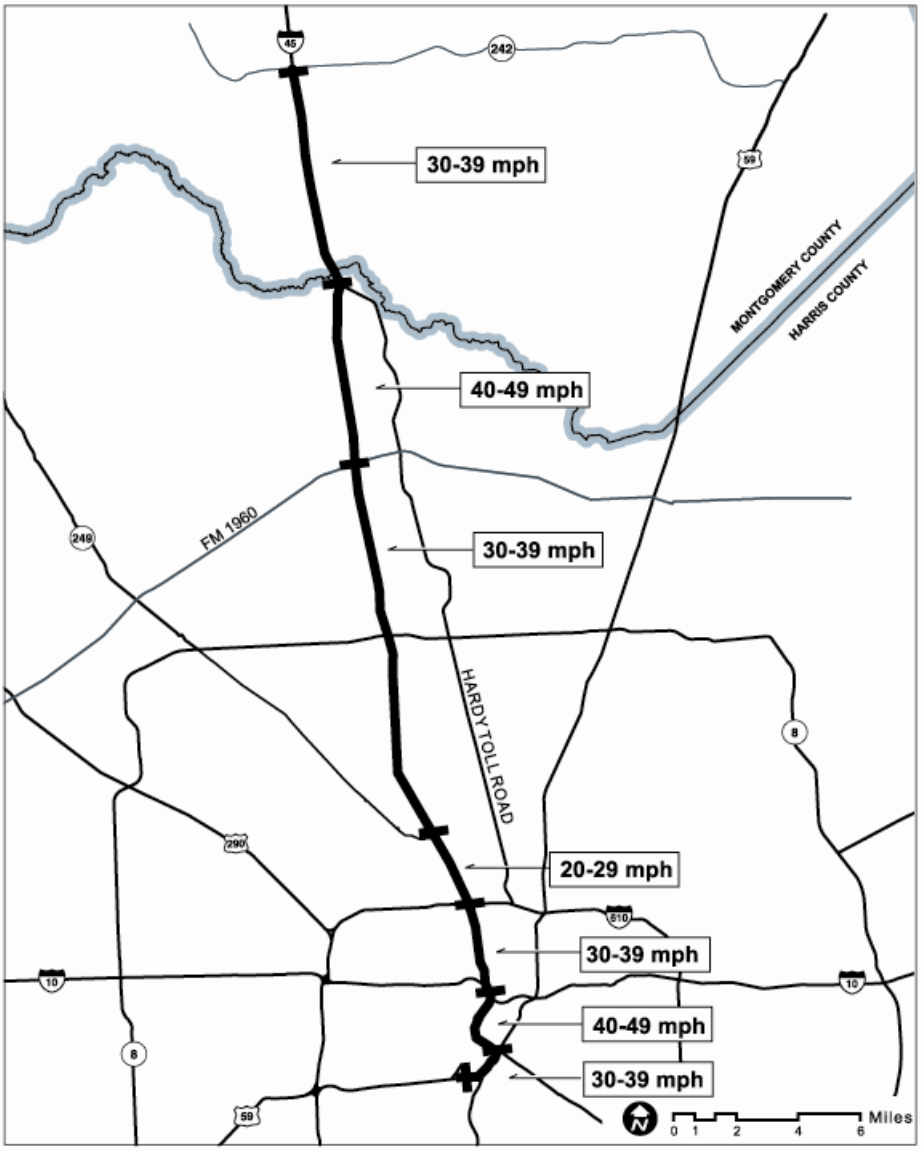


Exhibit 1.15: North-Hardy Year 2000 Peak Period Speeds



1.3.2: Existing Transit Service/Demand Potential

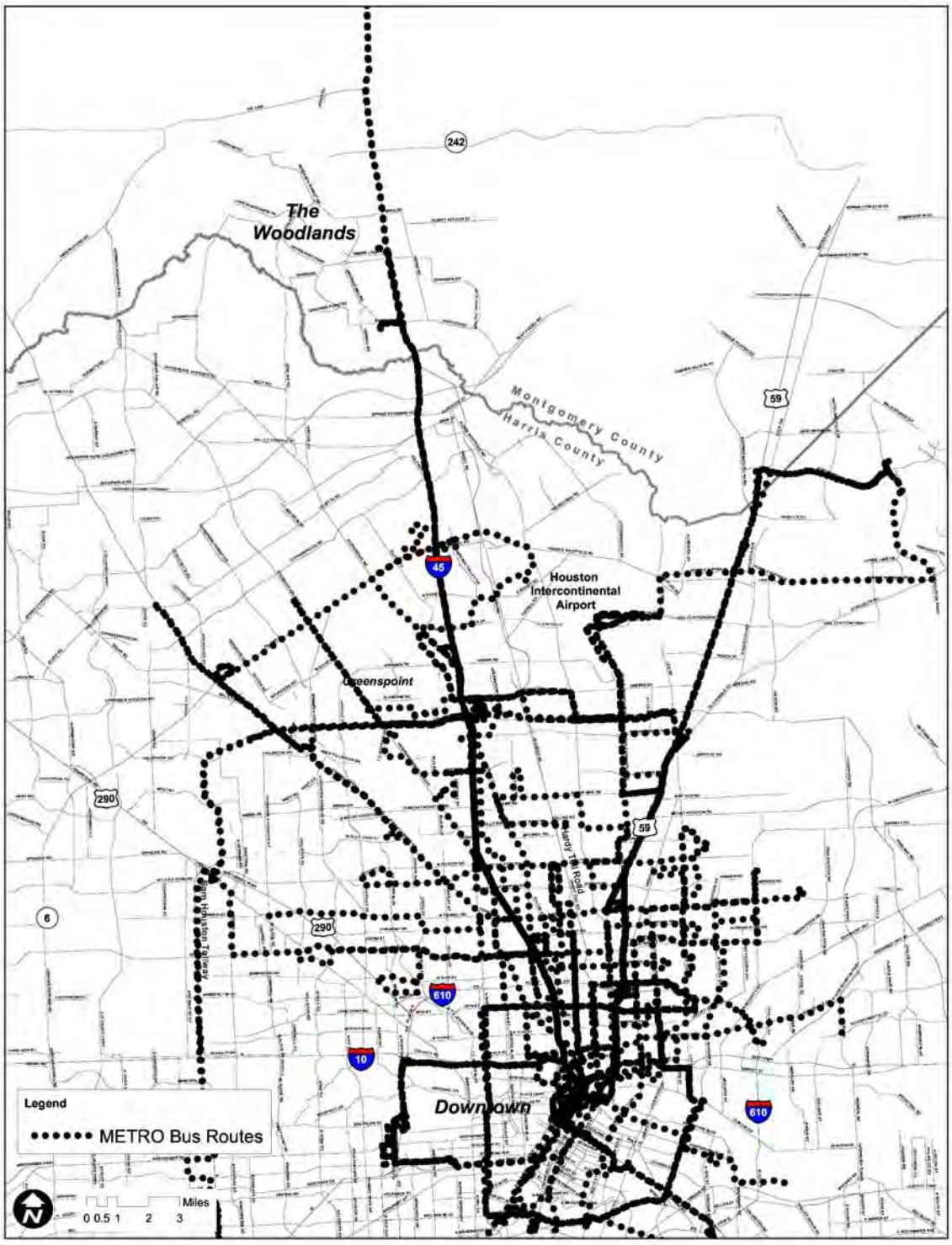
METRO provides quality local bus service throughout much of the corridor (See Exhibit 1.16). Transit centers exist within the corridor at Greenspoint Mall and Northline Mall. Transit centers near the corridor include the Fifth Ward/Denver Harbor and Heights Transit Centers. In addition, METRO and Brazos Transit express buses utilize the IH-45 HOV lane and direct access ramps to provide peak direction service between Downtown and park-and-ride lots at Research Forest, Sawdust, Spring, Seton Lake, Kuykendahl, and N. Shepherd. Several local bus routes offer transfer opportunities at the park-and-ride lots in addition to the transit centers within and near the corridor. Taxis and shuttles, and two METRO express bus routes connect Bush Intercontinental Airport to hotels and employment centers including Greenspoint Mall and Downtown Houston. Exhibit 1.17 illustrates the transit routes that serve the North-Hardy Corridor.

Exhibit 1.16: North-Hardy Transit Routes

	Weekday Boardings	
Route	Total	In Corridor
1 – Hospital	6,220	536
3 – Langley	3,389	250
4 – Jensen	1,835	581
5 – Kashmere	2,819	436
8 – North Main	1,531	641
15 – Fulton	2,545	2,371
23 – Crosstimbers	2,496	545
25 – Northline	2,140	960
26/27 - Outer/Inner Loop	6,652	322
37 - El Sol	1,145	322
45 – Tidwell	3,290	627
52 – Hirch	4,699	1,028
54 - Aldine/Hollyvale	788	297
56 – Airline	6,814	5,256
65 (90) – Yale	2,361	130
78 – Irvington	1,222	1,170
79 - West Little York	1,332	580
80 – Lyons	1,348	48
86 - FM 1960	1,871	383
101 – Airport	792	120
102 - IAH Express	2,324	1,339
201 - N. Shepherd P&R	495	289
202 – Kuykendahl	3,274	1,571
204 – Spring	1,464	771
212 – Seton Lake P&R	1,591	115
Woodlands Express	1,000	1,000
Geenspoint Flyer	500	500

Source: METRO, Brazos Transit, Greater Greenspoint Management District
Date: 1/2002

Exhibit 1.17: Map of North-Hardy Transit Routes



1.4: Transportation Goals and Objectives

The overall transportation goal of the North-Hardy Corridor Planning Studies is to improve the transportation system in the corridor by maximizing mode choice and mobility with environmentally sensitive transit and roadway projects that encourage economic development and revitalization. This overall transportation goal reflects the regional transportation system goals for the metropolitan area. As documented in the 2022 Metropolitan Transportation Plan (MTP) these goals include:

- Increase the number of travel choices for people and freight movement
- Adequately maintain current roads and transit services
- Safe and secure movement of people and commodities
- Promote coordinated land use and transportation development
- Improve access to and connections within transportation system
- Efficient movement of people and goods
- An environmentally responsible system
- Active citizen involvement
- A cost effective and affordable transportation system

Additional transit goals were identified in the METRO 2025 Transit System Plan for Mobility and METRO's Vision for 21st Century High Capacity Transit. In addition to calling for increases in transit routes and existing operations, these plans call for the introduction of advanced high capacity transit in corridors with the following characteristics and/or greatest potential for the following:

- Access to activity centers
- High existing transit demand potential
- High projected route demand potential
- Future congestion
- Use of existing railroad corridors
- Existing/planned transit facilities
- Containment of sprawl
- Transit supportive land use/policies and economic development impacts
- Travel time advantages

Specific objectives for the North-Hardy Corridor Planning Studies include the following:

- Seek transportation options that will maximize the use of transit in the corridor
- Seek transportation options that will maximize the use of the Hardy Toll Road by commuter and truck traffic
- Seek transportation options that will improve freeway operating conditions on IH-45 with no or minimal need for additional right-of-way

1.5: Specific Problems Related to the North-Hardy Corridor

1.5.1: Transit and Roadway Deficiencies

Generally, the transportation system deficiencies found in the North-Hardy Corridor include the following:

North of Buffalo Bayou

- Congestion in both directions on IH-45, particularly on the older segments immediately north of Downtown for both the existing situation and into the future.
- Existing reversible HOV lane cannot serve both inbound and outbound travel demand at the same time. Therefore, suburban markets may not be adequately served currently in the non-peak direction.
- The pavement on IH-45 south of Shepherd needs to be rehabilitated and the freeway needs to be brought up to current design standards.
- During periods of heavy rainfall, White Oak Bayou floods the depressed section of IH-45 in the vicinity of Main Street.
- Lack of continuity of the thoroughfare system forces short and mid-distance auto trips on to already-congested IH-45.
- Lack of viable alternatives to the private auto for many trips to suburban activity centers in the corridor, including Bush Intercontinental Airport, the greater Greenspoint area, and The Woodlands.
- Existing express/commuter-oriented transit service is heavily focused on providing commute trips to Downtown Houston around traditional work hours.
- Anticipated population and employment growth is expected to exacerbate the problems described above.

South of Buffalo Bayou

- Congestion on IH-45 and US 59 south of Downtown (McKinney/Milam exits and the Pierce Elevated) for both the existing situation and into the future.
- Anticipated population and employment growth is expected to exacerbate the problems described above.

1.5.2: Linkage Deficiencies

The IH-45 corridor serves a travel market that is located primarily west of the freeway. Major arterials feed traffic from rapidly growing suburban residential developments located west of the study corridor. Future traffic patterns are expected to continue this trend. As a result, volumes along the IH-45 corridor are projected to increase and the volume to capacity ratios are expected to deteriorate. Exhibits 1.18 through 1.21 illustrate the future choke points in terms of V/C ratios and peak period speeds. The V/C ratios are based on the assumption that the number of lanes on IH-45 remains the same as what exists and is under construction today.

Exhibit 1.18: North-Hardy 2007 Traffic Projections

Section	2007 Projected Travel Volume	Volume to Capacity Ratio	Peak Period Speed
South of Buffalo Bayou			
US 59: Spur 527 to IH-45	232,000	1.65	22 mph
IH-45: US 59 to IH 10	222,000	1.57	25 mph
North of Buffalo Bayou			
IH-45: IH 10 to Loop 610	225,000	1.20	34 mph
IH-45: Loop 610 to Shepherd	259,000	1.38	29 mph
IH-45: Shepherd to Beltway 8	259,000	1.38	29 mph
IH-45: Beltway 8 to FM 1960	303,000	1.29	31 mph
IH-45: FM 1960 to Spring	233,000	1.24	33 mph
IH-45: Spring to SH 242	207,000	1.10	36 mph

Source: Texas Department of Transportation, Houston-Galveston Area Council as compiled by Carter & Burgess, Inc.
Date: 3/2002

Exhibit 1.19: North-Hardy 2022 Traffic Projections

Section	2022 Projected Travel Volume	Volume to Capacity Ratio	Peak Period Speed
South of Buffalo Bayou			
US 59: Spur 527 & IH-45	292,000	2.07	12 mph
IH-45: US 59 to IH 10	259,000	1.83	18 mph
North of Buffalo Bayou			
IH-45: IH 10 to Loop 610	267,000	1.42	28 mph
IH-45: Loop 610 to Shepherd	306,000	1.63	23 mph
IH-45: Shepherd to Beltway 9	321,000	1.71	21 mph
IH-45: Beltway 8 to FM 1960	357,000	1.52	26 mph
IH-45: FM 1960 to Spring	261,000	1.39	29 mph
IH-45: Spring to SH 242	241,000	1.28	32 mph

Source: Texas Department of Transportation, Houston-Galveston Area Council as compiled by Carter & Burgess, Inc.
Date: 3/2002

Exhibit 1.20: North-Hardy Year 2007 Peak Period Speeds

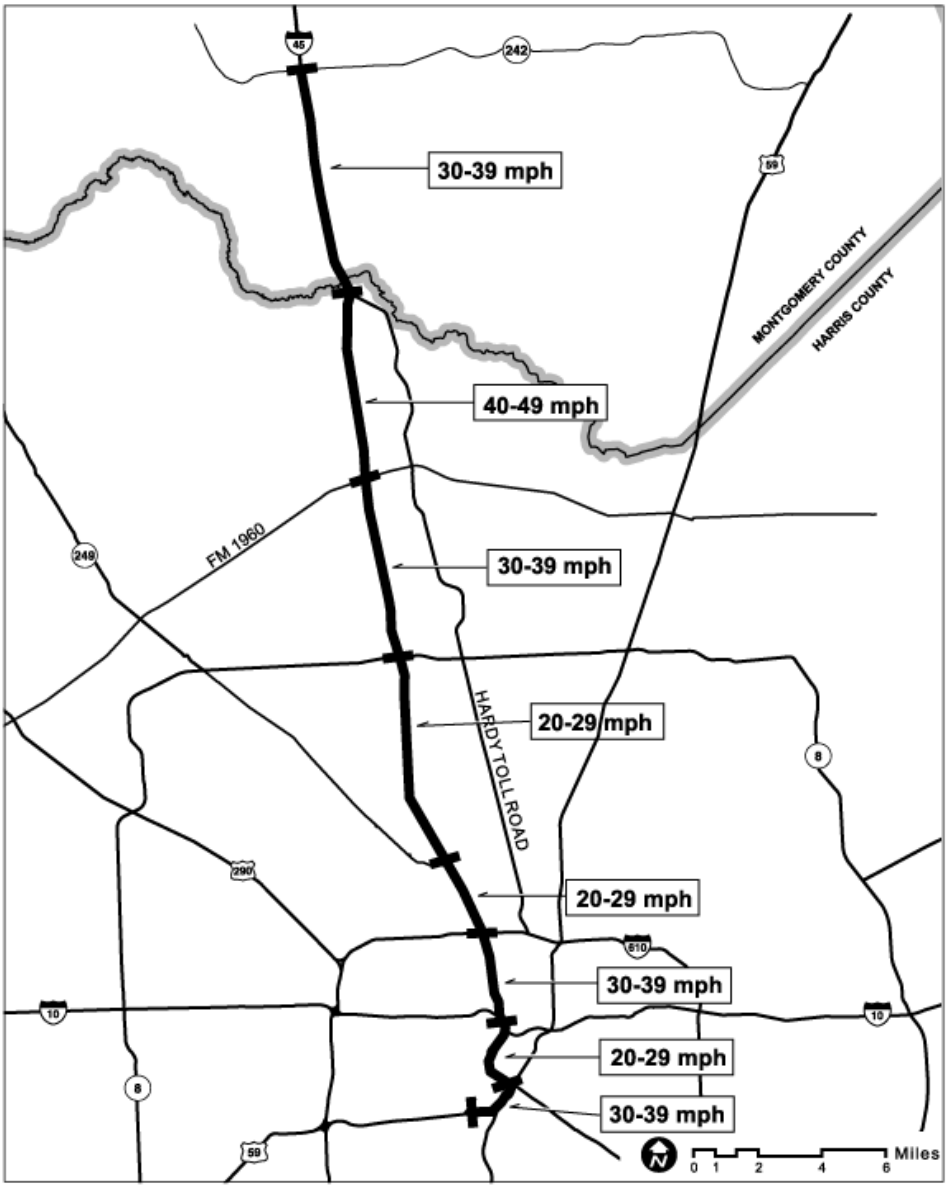
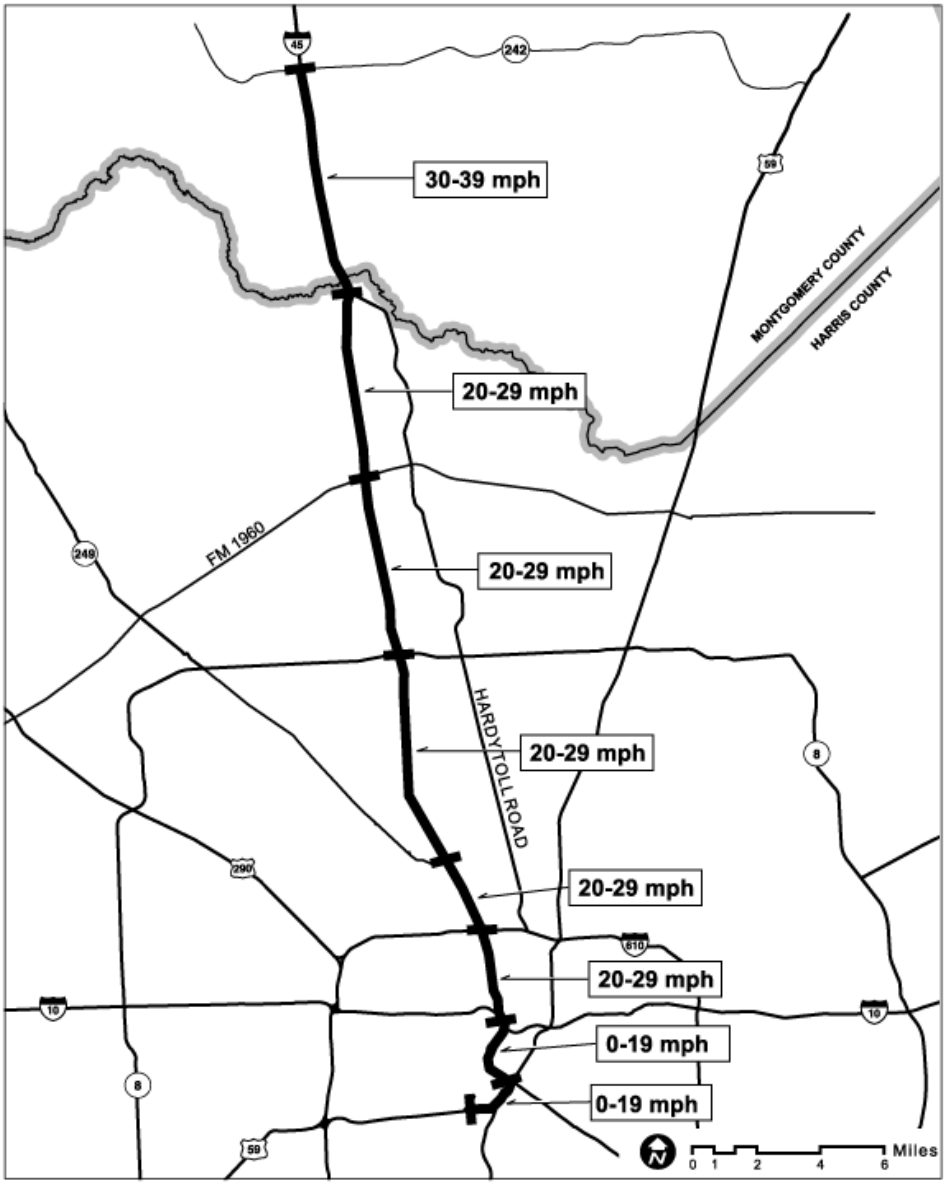


Exhibit 1.21: North-Hardy Year 2022 Peak Period Speeds



In addition to the anticipated congestion in the IH-45 travel corridor, other gaps and deficiencies have been identified. The Hardy Toll Road carries only a fraction of the traffic in the North-Hardy Corridor, approximately 40,000 vehicles per day. Although an extension of the toll road from IH-610 (North Loop) to the east side of Downtown is planned, utilization of the facility is projected to increase only slightly.

The amount of truck traffic on IH-45 has been identified as a transportation issue for the North-Hardy Corridor. According to a 2000 TxDOT survey, IH-45 carries an average number of trucks. Truck traffic on IH-45 as a percentage of total traffic varies from a low of 5% just south of IH-10 to a high of 13% just south of SH 242. Other freeways corridors in the metropolitan area carry much higher percentages of trucks (e.g.: IH-10 east of Houston carries 29% trucks). The fear is that truck traffic on IH-45 as a percentage of total traffic may approach the level of other freeways in the metropolitan area, thus further increasing congestion.

As delineated in the current Transportation Improvement Program (TIP) and the Metropolitan Transportation Plan, Exhibit 1.22 outlines the anticipated roadway improvements over the next 20+ years. Some of these improvements, specifically the IH-45 projects, are subject to the results of the North-Hardy Planning Studies. However, even with this level of investment, the roadway system in the North-Hardy Corridor will still experience significant congestion and less than desirable levels of service. (Note: the 2022 and 2025 data presented in this report are based on the following improvements being in place.) Clearly, therefore, additional person-moving capacity for this corridor will need to be identified and pursued.

Exhibit 1.22: North-Hardy Planned Transportation Improvements

Project	From	To	Description
Airtex Blvd.	Imperial Valley	Aldine Westfield	Construct 4 land roadway
Aldine Westfield	FM 1960	N. Spring	Construct center left turn lane
Aldine Westfield	BW 8	FM 1960	Widen to 4 lanes, divided
Aldine Westfield	Jensen	Tidwell	Widen to 4 lanes, undivided
Aldine Westfield	Tidwell	Little York	Widen to 4 lanes, divided
BW 8	At Hardy Toll Road		Construct EB to NB Hardy Toll Road connector
Ella	SH 249	West Road	Construct 4 lane blvd.
Ella	SH 249	Gulf Bank	Construct 4 lane blvd.
Ella	Gears Road	S of Rankin Road	Construct 4 lane blvd.
Ella	Louetta	Spring Cypress	Construct 2 lane roadway
Ella	Louetta	FM 1960	Widen to 4 lane blvd.
Ella (Wheatley)	Little York	Gulf Bank	Widen to 4 lanes, divided
Fulton	E. Crosstimbers	Parker	Widen to 4 lanes, divided
Gears Road	Veterans Memorial	Ella	Widen to 4 lanes, undivided
Gosling	At Spring Creek		Construct 2 lane bridge
Gosling	FM 2920	Spring Stuebner	Construct 2 lane roadway
Gosling	FM 242	S of Research Forest	Widen to 4 lanes, undivided
Gosling	Spring Creek	Flintridge	Construct 2 lane roadway
Gosling	FM 2920	Kuykendahl	Construct 2 lane roadway
Gosling	SH 242	FM 1488	Construct 4 lanes, divided

Project	From	To	Description
Greens Road	IH-45 N	Imperial Valley	Reconstruct to 2 lanes, 33' wide
Greens Road	Old Greens	Aldine Westfield	Widen to 4 lane blvd.
Greens Road	JFK Blvd.	Aldine Westfield	Widen to 4 lanes, divided
Greens Road	JFK Blvd.	Lee Road	Widen to 4 lanes, divided
Hardy Toll Road	Loop 610	Houston CBD	Construct toll road extension
Hardy Toll Road	BW 8	IH-45 N	Widen to 6 lanes
Imperial Valley	Rankin Road	Airtex Blvd.	Construct 4 lanes, undivided
Kuykendahl	Spring Cypress	FM 2920	Widen to 4 lanes w/CLT and LT lanes
Kuykendahl	Lake Woodlands Drive	FM 1488	Construct 4 lanes, divided
Little York	N. Shepherd	Alabonson	Widen to 4 lanes, undivided
Little York	Airline	Hardy	Reconstruct to 2 lane roadway
Little York	IH-45 N	Airline	Widen to 6 lanes, divided
Mt. Houston	IH-45 N	Aldine Westfield	Widen to 4 lanes, undivided
Northline	Parker	Canino	Construct 4 lane roadway; sidewalks
Parker	IH-45 N	Airline	Widen to 4 lanes, divided
Parker	W. Montgomery	N. Shepherd	Construct 4 lanes, divided
Rayford	IH-45 N	Richard	Widen to 6 lanes, divided
Research Forest	FM 2978	Alden Bridge	Widen to 4 lanes, divided
Research Forest	Kuykendahl	Cochrans Crossing	Construct 4 lanes, divided
Research Forest	FM 2978	Branch Crossing	Construct 2 lanes, divided
Research Forest	IH-45 N	Gosling	Widen to 6 lanes, divided
Richey Road	SH 249	IH-45 N	Construct 4 lane roadway
Robinson	IH-45 N	Hardy	Widen to 4 lanes, undivided
Sawdust	Grogan's Mill	IH-45 N	Widen to 6 lanes, divided
SH 99 (Grand Parkway)	SH 249	IH-45 N	Construct 4 lanes, divided
SH 99 (Grand Parkway)	IH-45 N	Montgomery C/L	Construct 4 lanes, divided
Spears Road	Veterans Memorial	Spears-Gears Road	Widen to 4 lane blvd.
West Road	Airline	US 59	Construct 4 lanes, undivided
Woodlands Parkway	Gosling	Kuykendahl	Widen to 4 lanes, divided
Woodlands Parkway	IH-45 N	Gosling	Widen to 6 lanes, divided
Yale	Tidwell	Parker	Widen to 4 lanes, divided

Source: Houston-Galveston Area Council
Date: 3/2002

1.5.3: Air Quality Concerns

The Houston metropolitan area is a severe non-attainment area for ground-level ozone. The 2022 MTP conformity analysis shows that the planned transportation system will not degrade the air quality for the metropolitan area any further. Improvements to the North-Hardy Corridor at a minimum must not degrade air quality and should strive to improve mobile source emissions in the future. Providing alternatives to single occupancy vehicle (SOV) travel is a key ingredient in reducing mobile source emissions. Transportation investments that promote transit and ride sharing contribute favorably towards cleaner air. Particular attention to the metropolitan air quality status must be an integral component in evaluating transportation improvements in the North-Hardy Corridor.

1.5.4: Economic Development and Revitalization

Many of the subareas within the corridor are extremely interested in economic development and revitalization for their neighborhoods and developments. These visions have been or are being documented in the following:

- Near Northside Economic Development Revitalization Plan
- North-Hardy Yard development plans
- Greenspoint development/redevelopment plans
- Woodlands Town Center development plans
- Bush Intercontinental Airport plans

The success of these development plans are tied to and dependent upon the level of mobility the transportation system can deliver for the movement of both people and goods. Access to high capacity transit and the availability of uncongested roadways are integral to many of these subarea plans. As the North-Hardy Planning Studies proceed, the desire for economic development throughout the corridor and its relationship to high capacity transit must be respected.

1.6: Consistency with Local, State and Federal Planning Process

1.6.1: Agencies Involved in the North-Hardy Corridor Planning Process

The Federal Transit Administration (FTA), the Federal Highway Administration (FHWA), METRO, TxDOT, and H-GAC are partnering to conduct the North-Hardy Planning Studies. On January 9, 2002, a Notice of Intent (NOI) was published in the *Federal Register, Vol. 67, No. 6,* and in local publications, announcing METRO's and TxDOT's intent to prepare Environmental Impact Statements (EISs). The publications corresponded with the implementation of METRO's 2025 long-term plan to improve transportation efficiency and effectiveness throughout the Houston region. Both the plan and the environmental process direct that the process begin with a scoping effort in order to solicit agency and public comment on transportation alignments and alternatives.

The scoping effort was directed toward two groups. The general public was invited to participate in a series of meetings describing the planning studies and was solicited to provide public comment; and local, State, and Federal regulatory agencies were invited to comment on issues of concern at a special agency scoping meeting at the H-GAC offices. The goal of the scoping process was to distribute information on METRO's and TxDOT's efforts as well as to gather information about the public's transportation concerns and preferences. Although the general public was invited to both types of meetings, the agency scoping meeting was intended to be a formal opportunity for regulatory agencies to respond to the idea of proposed transportation investments and express issues of concern within certain corridors. Invitations were sent to 55 agencies.

The purpose of the meeting was to establish early coordination and opportunities for agency input into the planning process. Agency representatives were given overviews of previous scoping activities and the responses received. Details pertaining to each of three METRO corridor studies were briefly presented. Agency representatives were

then invited to comment on issues of special concern within each corridor. METRO staff recorded the comments and separated them by issue and corridor for distribution to each corridor's planning team. Agency comments were used along with other transportation and environmental data and analysis collected during the planning process to assist in the development of alternatives and ultimately with the decision-making process.

The agency representatives invited to the scoping meeting responded favorably towards the development of transit and highway investments in the North-Hardy Corridor. Agency representatives stated that the following issues are of special concern:

- Air quality
- Subsidence and drainage
- Flooding
- Hurricane evacuation routes
- Long range demographics, with particular emphasis on the elderly population
- Accessibility
- Data collection and interpretation
- A variety of commute patterns (e.g. suburb to suburb travel)
- Historic resources

The agency scoping meeting was intended to provide the North-Hardy Planning Studies partners with an overview of agency concerns related to the North-Hardy Corridor. Staff will continue to coordinate with agency representatives as the study and subsequent environmental process advance. In addition, an Interagency Steering Committee for the North-Hardy Planning Studies will provide continuing agency coordination for this effort.

1.6.2: Role of the Planning Studies in the Project Development Process

FHWA and FTA along with the requirements of the National Environmental Policy Act (NEPA) define the formal parameters under which major transportation investments must be developed and analyzed. NEPA was enacted to protect, maintain, and enhance the environment. As defined by NEPA, "environment" includes not only the physical environment but also the man-made environment. The role of the North-Hardy Planning Studies in the statutorily established project development process is presented here.

The purpose of the planning studies is to formally study a variety of alternatives that could address the mobility challenges identified within the North-Hardy travel corridor. The North-Hardy Planning Studies are designed to identify a broad range of alternative actions and investments, to analyze those alternatives, and to develop criteria by which to evaluate the transportation investments. This process is designed to provide critical information to the decision-making process concerning the future of the North-Hardy Corridor.

A major transportation investment can be a significant improvement to the roadway system or a substantial upgrade in transit facilities or services, or both. These major transportation investments may include lower cost improvements such as pedestrian,

bicycle, and intelligent transportation system (ITS) options. Planning studies evaluate alternative transportation investments within the travel corridor and conclude with a single alternative known as the "Locally Preferred Investment Strategy" (LPIS).

NEPA requires that an environmental document (EIS or Environmental Assessment [EA]) be prepared for all proposed Federal actions (those involving the use of Federal funds) that could significantly affect the environment. An EIS or EA must identify and address all potential environmental impacts of a project. It is anticipated that Federal funds will be sought to pay for a portion of any "build" alternative that is selected for implementation.

The North-Hardy Corridor is being advanced in accordance with the project development process through which Federal, State, and local officials plan and make decisions regarding transportation capital investments. The development process contains the following phases:

- Corridor planning study (Alternatives Analysis)
- Selection of Locally Preferred Investment Strategy
- Designation of Minimum Operable Segment
- Conceptual engineering/Draft Environmental Impact Statement
- Preliminary engineering/Final Environmental Impact Statement
- Final design
- Construction
- Operation

Throughout all phases of project development, aggressive public involvement is required. In the first development phase, a wide range of alternatives is evaluated based on planning, cost, community input and financial issues. At the conclusion of the corridor planning studies public meetings will be held to take comments on the recommended LPISs. TxDOT and METRO will select highway and transit LPISs respectively in full consideration of public and agency input on the technical recommendation. The LPISs will then be presented to the region's Transportation Policy Council for inclusion in the MTP. The LPISs will be evaluated in the Draft EISs (DEISs). These projects would be further refined and mitigation measures finalized during the preliminary engineering/Final EISs (FEISs) phase. Following receipt of environmental clearance from FTA (for transit projects) and FHWA (for highway projects), and funding commitments, the projects would be advanced to final design and construction.

The intent of the NEPA process is to ensure that all potential environmental impacts are identified and investigated prior to the decision-making process. NEPA also requires engaging the public in the environmental review process.

The study process is designed to integrate the active participation of the public with detailed technical analysis of the proposed project corridor, its alternatives, and potential issues. During the study process, a wide range of alternatives will be evaluated based on planning factors, cost, and community input culminating in adoption of a Locally Preferred Investment Strategies (LPISs).

1.6.3: Documentation of Consistency with the Planning Process

As the North-Hardy Corridor Planning Studies progress, documentation of several key milestones will demonstrate consistency with the transportation planning process. These milestone documents include the Notice of Intent, the Scoping Information Package, the Statement of Purpose and Need, the Scoping Results Report, the Alternatives Analysis Report and Recommendation of LPISs, the DEIS, the FEIS, and the Record of Decision. Each milestone is required to satisfy the prescribed transportation planning process.

1.6.4: Relationship to Other On-going Studies

H-GAC, TxDOT, METRO, and other area transportation providers work closely together to address the growing concern for future mobility. H-GAC is in the process of updating the region's 25-year MTP. H-GAC, TxDOT, and METRO are partners in conducting the North-Hardy Planning Studies. The LPISs that emerge from these studies will be incorporated into the region's MTP.

2.0: Alternatives Considered

2.1: "No Build" Transit Alternative

The No Build Alternative includes the Metropolitan Transit Authority (METRO) transit services and facilities that were programmed to be in operation in FY 2007 and the regional roadway/highway system that was programmed to be in place in 2022. The definition of the No Build Alternative was discussed with the Federal Transit Administration (FTA) during its development. A subsequent review concluded with a verbal approval of the concept from the FTA (conference calls held with FTA staff in the first quarter of 2002). It includes the implementation of the Downtown to Reliant Park light rail service, starting in January 2004, but incorporates no other new high capacity transit services. In addition to METRO service, the No Build Alternative includes bus service into Houston provided by the Brazos Transit District (Woodlands Service) and TREKEXPRESS (Fort Bend County/US 59 South). These services are listed in Appendix A. Appendix B presents METRO's transit capital facilities. Roadway improvements included in the No Build Alternative, except for IH-45 North where future improvements were removed to test multiple IH-45 highway options, are identified in the Houston-Galveston Area Council (H-GAC) 2022 Metropolitan Transportation Plan (Adopted February 25, 2000). As a result, all highway elements in the I-45 North and Hardy Toll road corridors represent a FY 2007 level of investment.

The transit service and roadway improvements included in the No Build Alternative respond to the substantial increase in the region's population and employment (Exhibits 2.1 and 2.2). In twenty years, the Houston area will have two million more people and add over one million new jobs.[1] In addition, the number of motor vehicles registered in the eight-county region is expected to increase from 3.3 million in 1996 to 10.6 million in 2020.[2] The additional trips generated by the new residents and jobs and the three-fold increase in motor vehicles will aggravate congestion on the regional roadway system that will need to be mitigated by multiple types of transportation projects.

Accommodating this growth will require a team effort, with all transportation agencies aggressively making improvements. METRO intends to accommodate the increased demand for transit by initiating new bus routes, bus route enhancements, constructing new transit facilities, and implementing a network of Advanced High Capacity Transit. In addition, TxDOT and the Harris County Toll Road Authority (HCTRA) plan to increase regional freeway and tollway lane miles by 35 percent over the next 20 years.

2.1.1: Existing METRO Service and Programmed Improvements

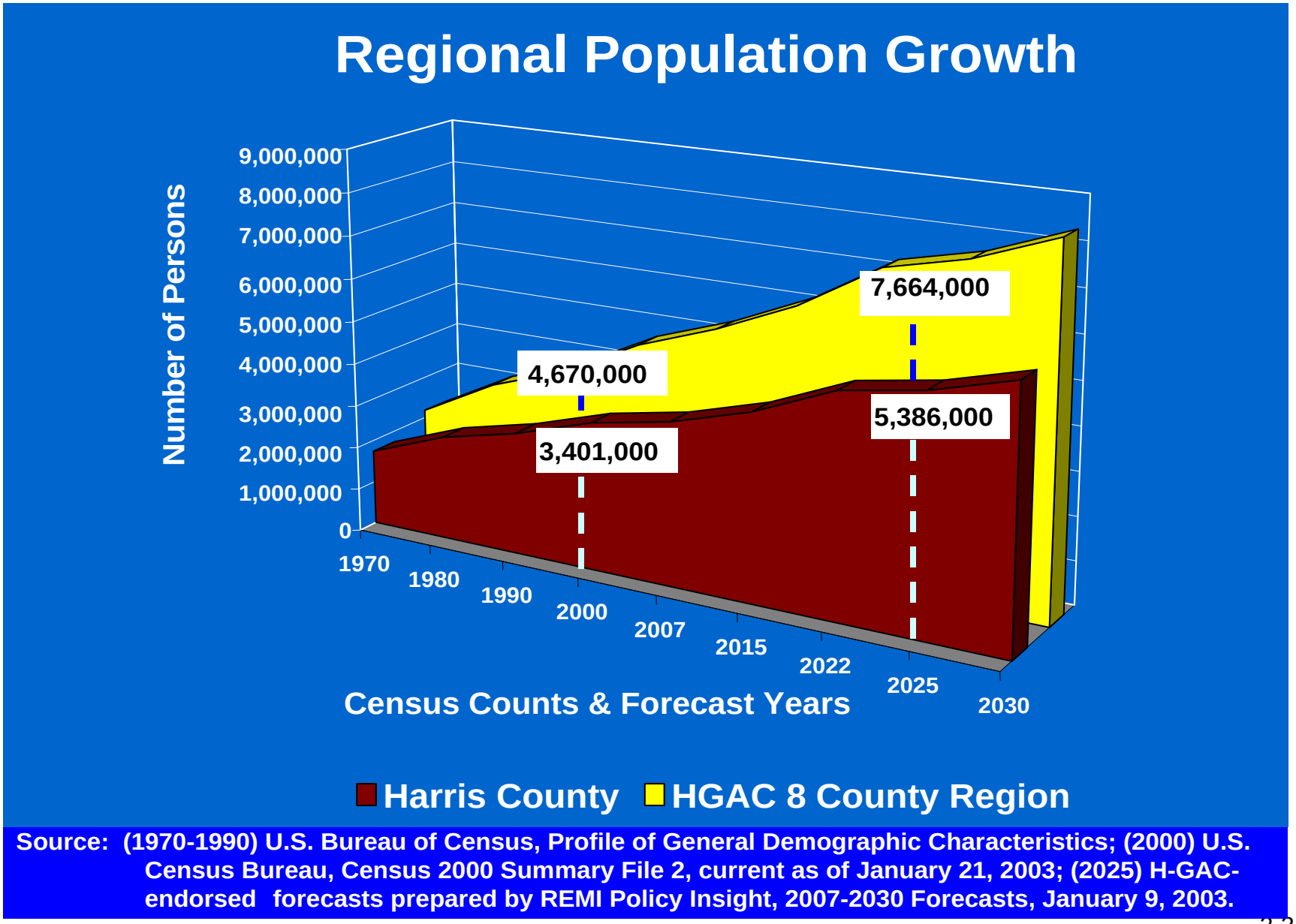
METRO's service area encompasses 1,285 square miles comprising most of Harris County and small portions of Fort Bend, Waller, and Montgomery Counties (Exhibit 2.3).

[1] Houston-Galveston Area Council, Transportation Department, January 2003.
[2] 2022 Metropolitan Transportation Plan, Houston-Galveston Area Council, February 25, 2000, Section 7.3, Regional Roadway System, pg. 59. This projected growth assumes an average annual increase of nine percent.

METRO provides approximately 6,700 route miles of service using over 1,450 buses on fixed-routes and special events service (such as sporting and community event shuttles). METRO operates bus service seven days a week, with weekday service operating from 3:47am (first bus in revenue service) to 2:27am (last bus in revenue service), weekdays. The span of service is less on weekends. As part of the fixed route system, METRO operates 36 commuter routes (express and park-and-ride) that serve the Central Business District (CBD) and other major, regional employment centers, primarily weekdays, during peak periods. METRO's fixed route services are listed by route, by type of service, and by peak/off-peak service frequencies in Appendix A. In addition, METRO offers paratransit services for the senior and disabled communities utilizing 118 vans and 124 sedans. METRO, in conjunction with TxDOT, has funded and constructed over 100 miles of High Occupancy Vehicle (HOV) lanes on six freeways that METRO uses for many of its commuter routes.[3]

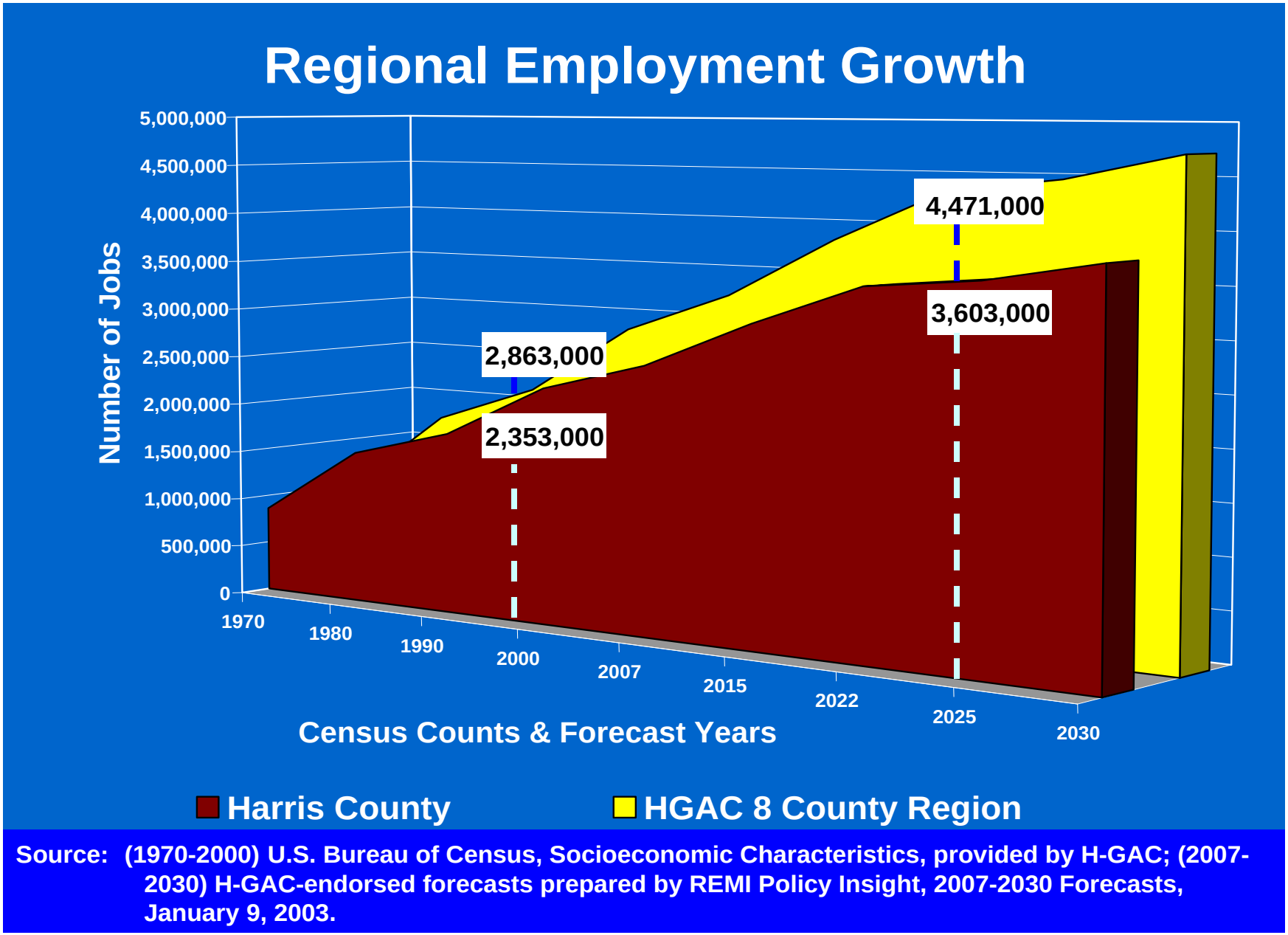
[3] HOV lanes operate between 5:00am and 11:00am and between 2:00pm and 8:00pm weekdays. The HOV lanes on the Katy Freeway are operational on Saturday and Sunday as well.

Exhibit 2.1: Regional Population Growth (1970 – 2030)



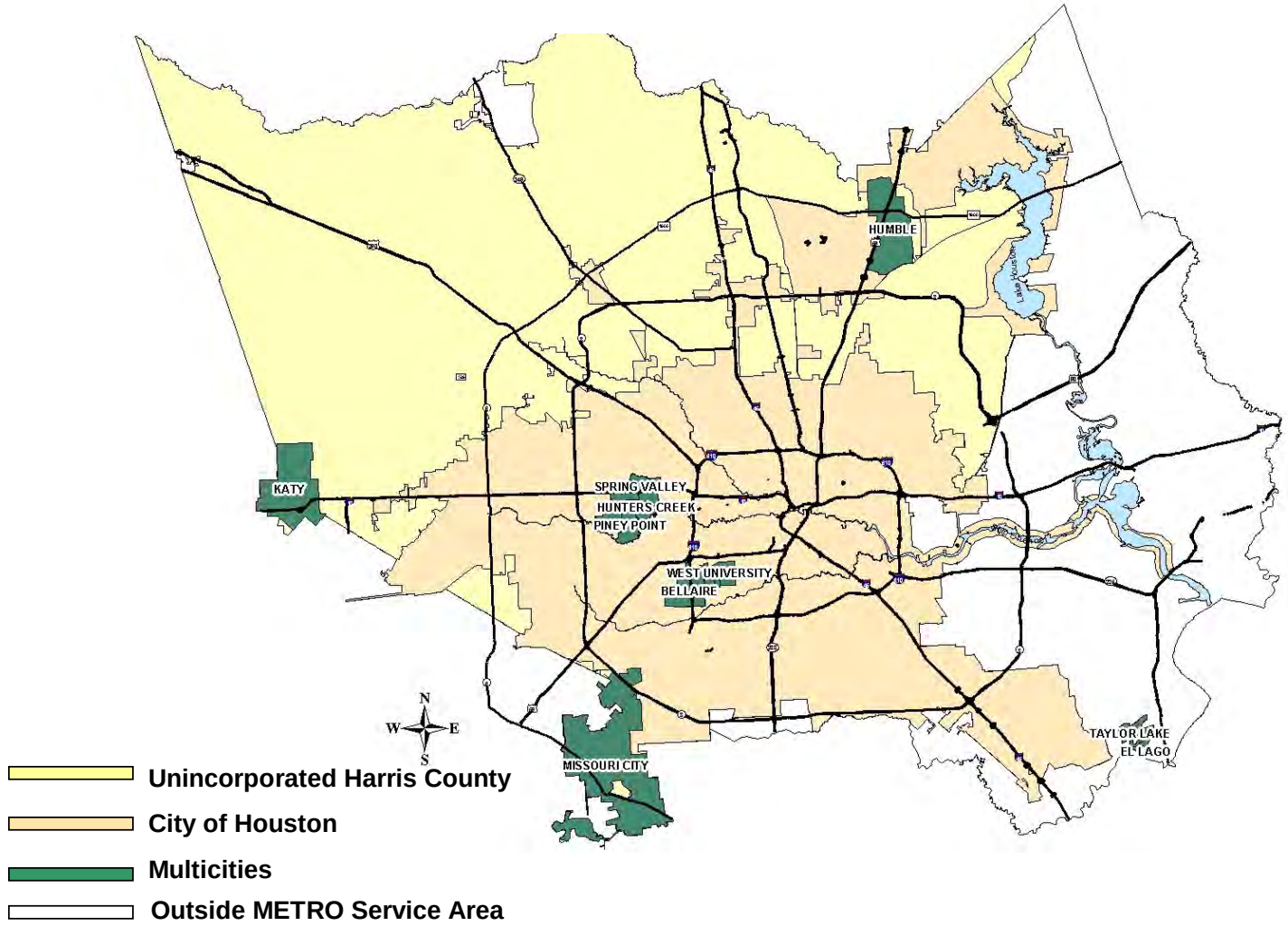
Source: (1970-1990) U.S. Bureau of Census, Profile of General Demographic Characteristics; (2000) U.S. Census Bureau, Census 2000 Summary File 2, current as of January 21, 2003; (2025) H-GAC-endorsed forecasts prepared by REMI Policy Insight, 2007-2030 Forecasts, January 9, 2003.

Exhibit 2.2: Regional Employment Growth (1970 – 2030)



Source: (1970-2000) U.S. Bureau of Census, Socioeconomic Characteristics, provided by H-GAC; (2007-2030) H-GAC-endorsed forecasts prepared by REMI Policy Insight, 2007-2030 Forecasts, January 9, 2003.

Exhibit 2.3: METRO Service Area



Source: METRO Transit System Analysis, 03/18/03
Base Map, METRO GIS & Cartography

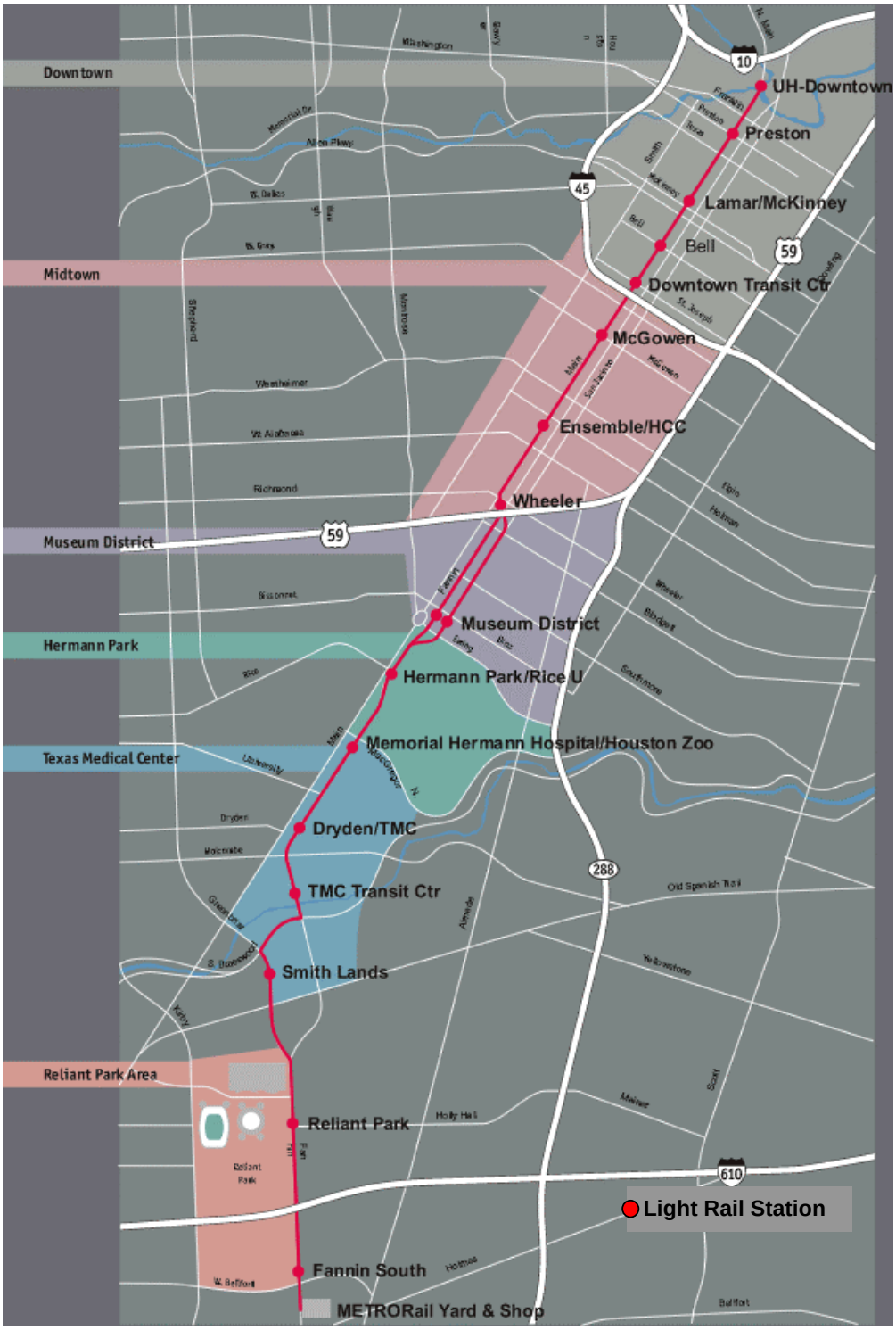
In FY2002, METRO carried over 97 million annual boardings on all fixed route and special bus services. In addition, over 20 million person trips in carpools and vanpools on METRO's HOV lanes contributed to systemwide annual boardings.[4]

In January 2004, METRO will begin operating the Downtown to Reliant Park light rail line with 16 stations, including one new Park & Ride lot, two transit centers and a new light rail maintenance and storage facility (Exhibit 2.4**)**. Light rail service will operate seven days per week, with weekday service operating from 4:30am and 12:38am. The span of service will be somewhat reduced on weekends. During peak periods, light rail is proposed to operate at six-minute intervals. In addition, METRO plans to provide a shuttle between Smith Lands Station and Hermann Park/Rice Station offering three-minute peak headways to the Texas Medical Center. During midday, light rail service will operate at six-minute intervals, increasing to 12 and 18 minutes during evenings and weekends, respectively.

Concurrent with the operation of light rail, METRO has programmed bus service improvements that include route alignment and service frequency modifications. All of these improvements are included in the No Build Alternative for this study. The No Build bus routes are presented in Exhibit 2.5. Overall, the service improvements will change the existing system as indicated in Exhibit 2.6.

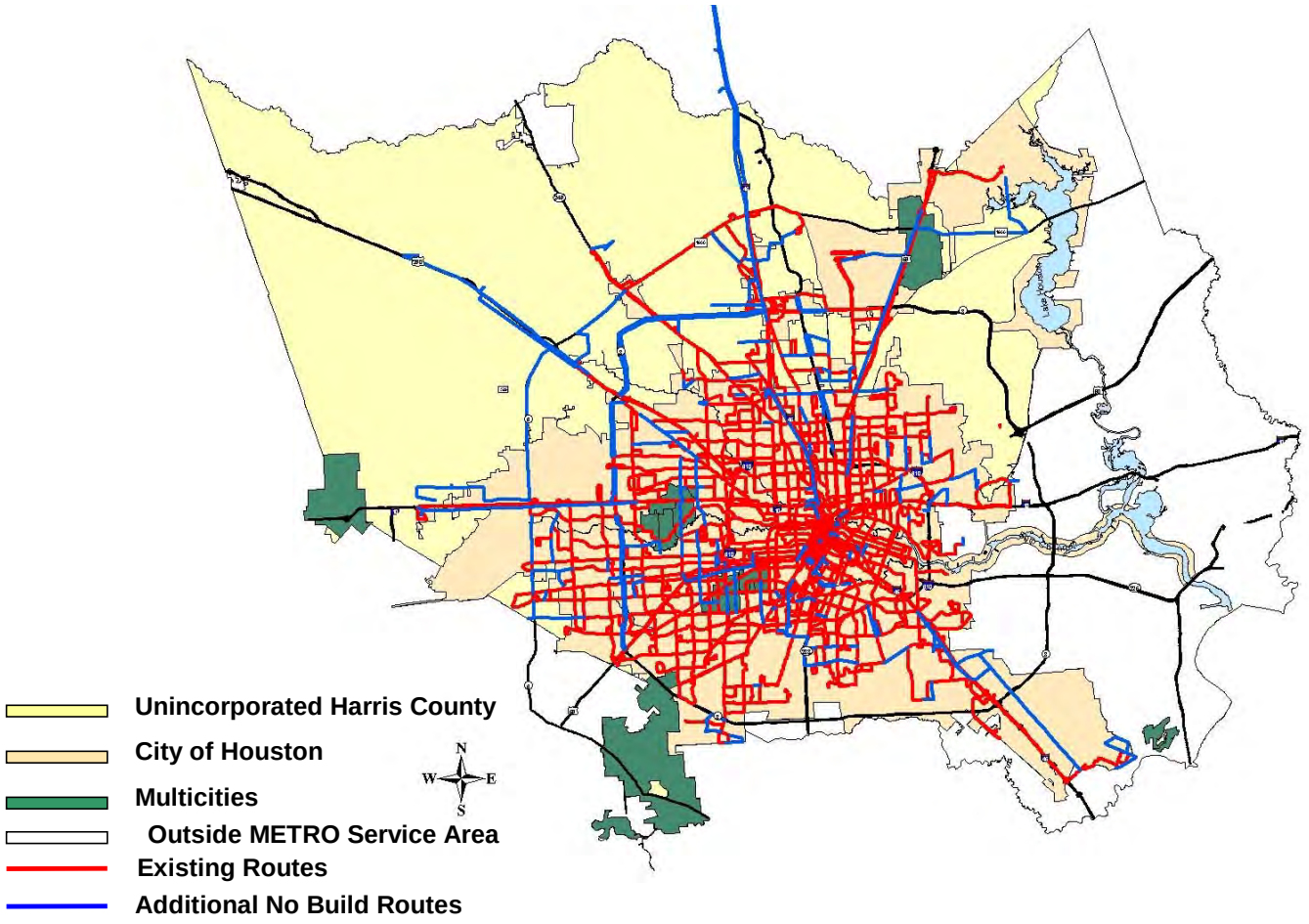
[4] METRO Office of Management & Budget Department, January 27, 2003.

Exhibit 2.4: Downtown to Reliant Park



Source: METRO Marketing & Communications 2003

Exhibit 2.5: No Build Transit Route Network



Source: METRO Transit System Analysis, 03/20/03
Base Map, METRO GIS & Cartography

Exhibit 2.6: Summary of No Build METRO Service Characteristics

Element	2003	2025 No Build (estimate)
Fixed Routes by Service Type*	74 Local 8 Express 28 Park & Ride	84 Local 10 Express 37 Park & Ride
Bus Fleet Size	1,457 (including spares)	1,600 (including spares)
Annual Revenue Miles of Bus Service**	56.22 million	87.21 million
Annual Revenue Hours of Bus Service**	3.82 million	4.63 million
Light Rail Fleet Size	-	18
Annual Revenue Miles of Light Rail Service	-	836,290
Annual Revenue Hours of Light Rail Service	-	65,346

*Does not include employee shuttles and transit services operated by other entities. Does not count route branches as separate routes. All numbers are based on Year-to-Date figures as of January 2003. No growth was assumed for 2007.
**The 2025 estimates do not assume an increase in Special Bus Services from the 2003 levels and are annualized based on 300 operational days per year.
Source: METRO Scheduling Department, METRO Rail Operations Department, and METRO Capital Planning Department; December 2002; METRO Office of Management & Budget; January 2003.

As a result of No Build service improvements, METRO's total annual transit boardings are expected to increase from 97 million in 2003 to approximately 160 million by 2025.

2.1.2: Existing METRO Capital Facilities and Programmed Improvements

METRO has constructed transit facilities, such as transit centers, Park & Ride lots, and storage and maintenance facilities, to support its current operations. In addition, METRO currently operates 107.4 lane miles of HOV that commuter routes and carpools/vanpools use.

To accommodate the increase in service levels assumed to occur by 2025, METRO will expand or increase the number of transit facilities as indicated in Exhibit 2.7. Exhibit 2.8 identifies existing and programmed locations for METRO's Park & Ride lots and transit centers that are included in the No Build Alternative. Similarly, Exhibit 2.9 and 2.10 indicate METRO's HOV system and the locations for METRO's maintenance and storage facility sites that are in the No Build Alternative, respectively. The site for METRO's planned sixth bus maintenance and storage facility has yet to be determined. A complete list of METRO's transit capital facilities that are included in the No Build Alternative is presented in Appendix B.

Exhibit 2.7: No Build METRO Capital Facilities

Transit Facility	2003	2025 No Build
Bus Park & Ride Lots	25	29
Bus-only Transit Centers	15	19
HOV Lanes Used By METRO (Centerline Miles	97.7 miles*	187 miles**
Light Rail Park & Ride Lots	0	1
Light Rail-Bus Transit Centers	0	2
Bus and Light Rail Storage and Maintenance Facilities	5 bus facilities	6 bus facilities 1 light rail facility
Other METRO Storage and Maintenance Facilities	1 non-revenue vehicle facility 1 central supply	1 non-revenue vehicle facility 1 central supply

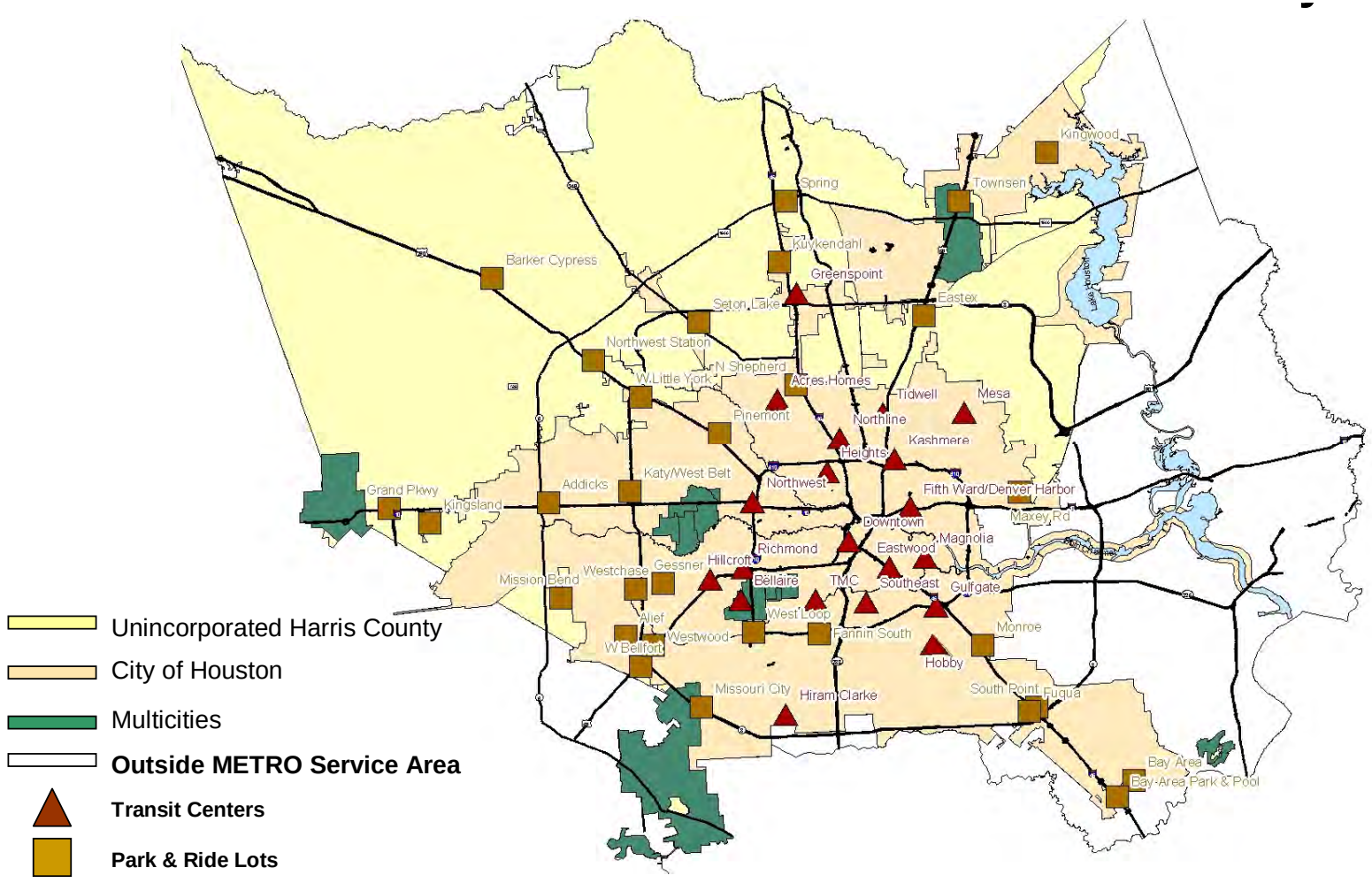
Source: METRO Service Planning, December 17, 2002; 2025 No Build Transit Facilities, METRO Capital Planning.
*Source: METRO Planning, Engineering & Construction, HOV Lane Program Status Report, 04/09/03.
**Generated from Houston METRO EMME/2 Travel Demand Model for No Build Scenario January 2003

2.1.3: Highway and Roadway Improvements

The regional highway and roadway system is comprised of interstate and other federal highways, state highways, county roads, toll roads, and arterial roadways in the eight-county metropolitan area. In 2000, the regional roadway system totaled over 20,000 lane miles of major highways and roads. In addition, the regional highway network incorporates a system of freeway HOV lanes, most of which have been constructed and are used by METRO.

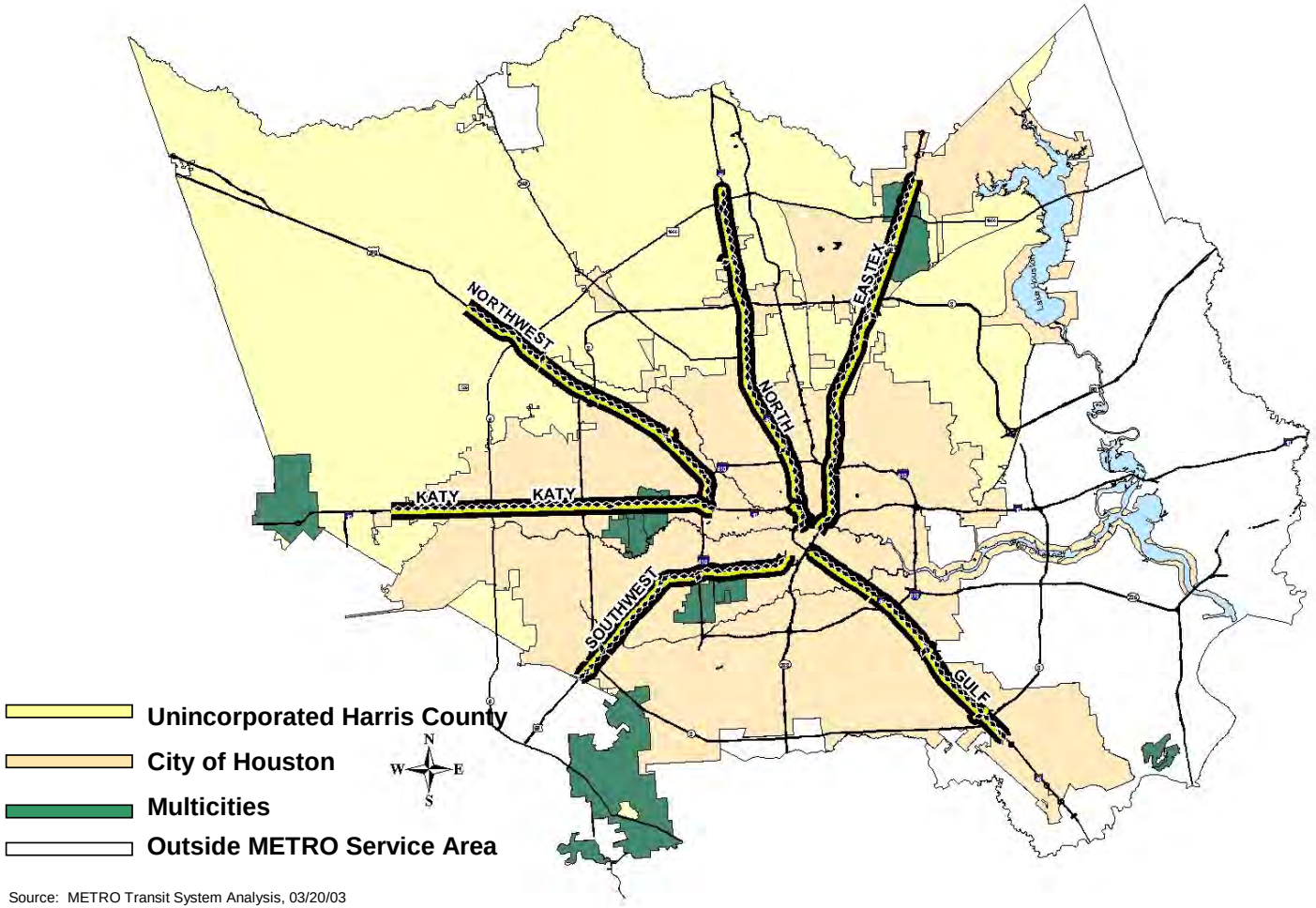
The Level of Mobility (LOM) or the degree of congestion measure for roadways within the Houston-Galveston Transportation Management Area (TMA) is similar to the standard engineering Level of Service (LOS) criteria which ranges from LOS-A representing free-flow operating conditions to LOS-F representing gridlock. The LOM measure incorporates an evaluation capacity, which is usually higher than the design capacity to account for higher than average traffic volumes. H-GAC's Transportation Department has developed criteria for determining the levels of mobility as shown in Exhibit 2.11.

Exhibit 2.8: No Build METRO Transit Center and Park & Ride Facility Sites



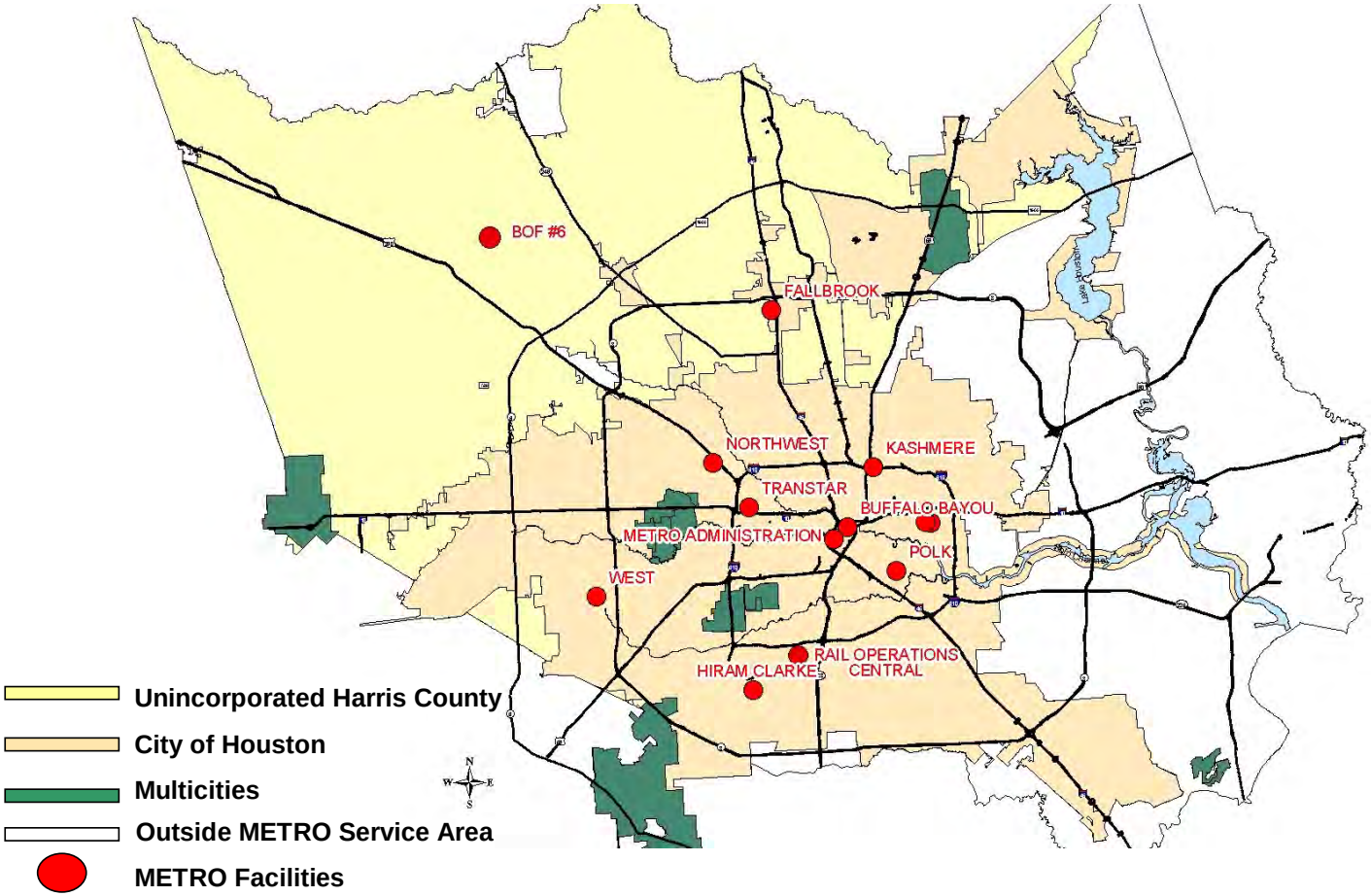
Source: METRO Transit System Analysis, 03/21/03
Base Map, METRO GIS & Cartography

Exhibit 2.9: No Build METRO Service Area HOV System



Source: METRO Transit System Analysis, 03/20/03
Base Map, METRO GIS & Cartography

Exhibit 2.10: No Build METRO Maintenance and Storage Facility Sites



Source: METRO Transit System Analysis, 03/20/03
Base Map, METRO GIS & Cartography

BOF #6 Location not determined as of 1-2004. Presently located in area forecasting need

Exhibit 2.11: Criteria for Levels of Mobility

Level of Mobility	V/C Ratio*
Tolerable	V/C less than 0.85
Moderate	V/C between 0.85 and 1.00
Serious	V/C between 1.00 and 1.25
Severe	V/C greater than 1.25

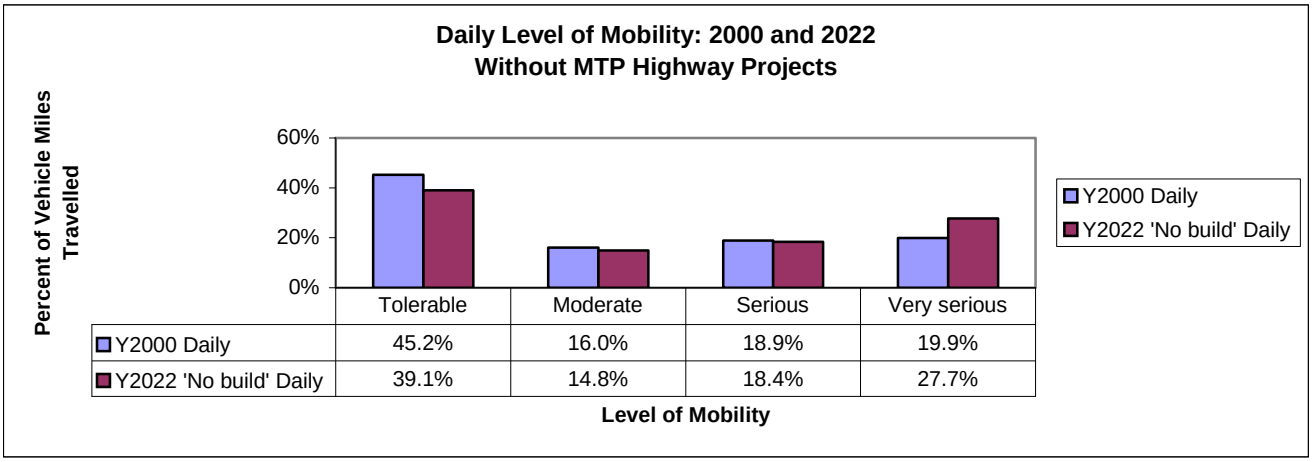
*The V/C ratio is the measure of roadway volume divided by roadway capacity. The dividend indicates the level of congestion. The closer the ratio is to 1.0, the more congested the roadway. At 1.0 or above, traffic is operating in stop-and-go conditions.
Source: H-GAC Transportation Department, 2/19/2003.

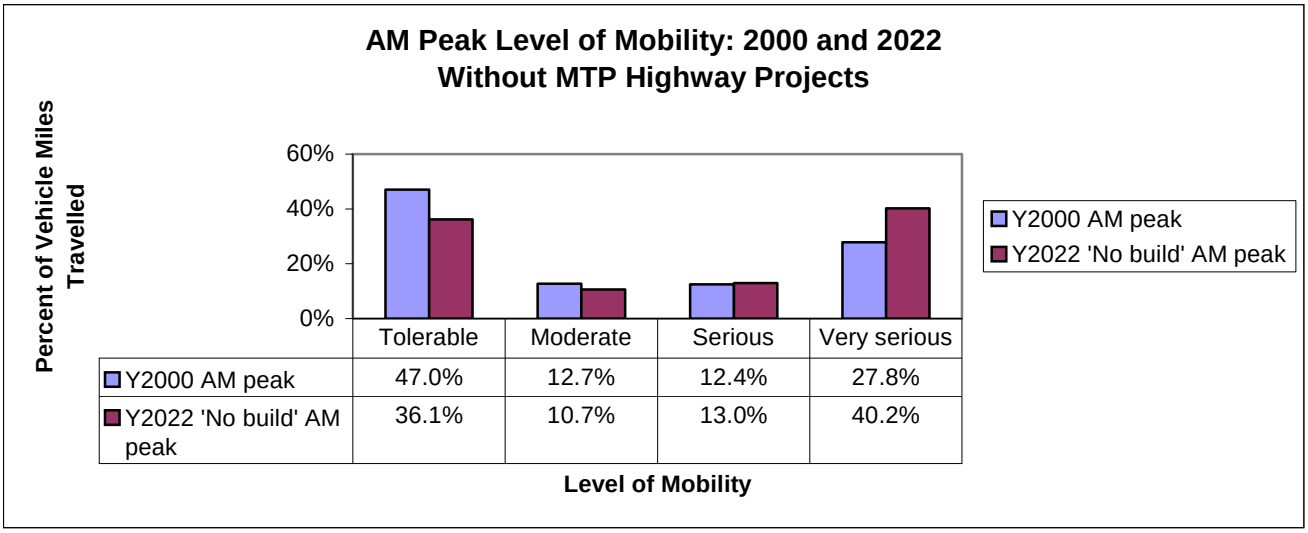
The following graphs (Exhibit 2.12) illustrate the daily and peak period LOM summaries by category for the current and future systems. The comparison is made between the Level of Mobility for 2000 and for 2022, with and without planned Metropolitan Transportation Plan (MTP) projects. The graphs show mobility levels deteriorating unless planned transportation improvements are implemented. (More detailed information pertaining to regional traffic congestion is presented in Appendix C.)

The planned roadway improvements include expansion of the regional roadway and HOV system. As indicated in Exhibit 2.13, between 2000 and 2022, freeway lane miles will increase by 1,269 miles, but centerline miles (construction of new freeway segments) will increase by only 122 miles. The smaller growth in centerline miles is indicative of more freeway widening projects than construction of new freeways. The regional HOV system is also benefiting from the freeway widening projects. METRO will be operating 112 miles of HOV lanes in 2007, up from 89 miles available in 2000. The 2022 MTP, which includes 8 counties, envisions this expansion of the HOV system to continue over the next twenty years which will include diamond lanes and managed lanes. According to the 2022 MTP, the region will have 187 centerline miles of HOV completed by 2022, much of it in two-way operation (indicated by 316 lane miles in Exhibit 2.13). Some of these proposed two-way HOV lanes were placeholder projects in METRO's 2022 long-range plan.

In addition, the arterial street system will undergo extensive improvements. Inside Beltway 8, where the road network is well established, the roadway improvements will focus on widening projects and projects to close the gaps in the existing roadway network. Outside Beltway 8, several new thoroughfares have been identified to accommodate growth primarily in the northern and western sections of Harris County. In addition, TxDOT is planning to improve access to/from the regional freeway network. Supplementing the regional roadway network are toll roads and new toll lanes being constructed by the Harris County Toll Road Authority (HCTRA). Currently, HCTRA operates 87 centerline miles of toll roads and is constructing or planning to construct approximately 139 centerline miles of toll facilities, as indicated in Appendix D. The regional roadway improvements planned through 2022 are presented in Exhibit 2.14. Roadway improvements included in the No Build Alternative are identified in the Houston-Galveston Area Council (H-GAC) Metropolitan Transportation Plan (Adopted February 25, 2000).

Exhibit 2.12: Level of Mobility





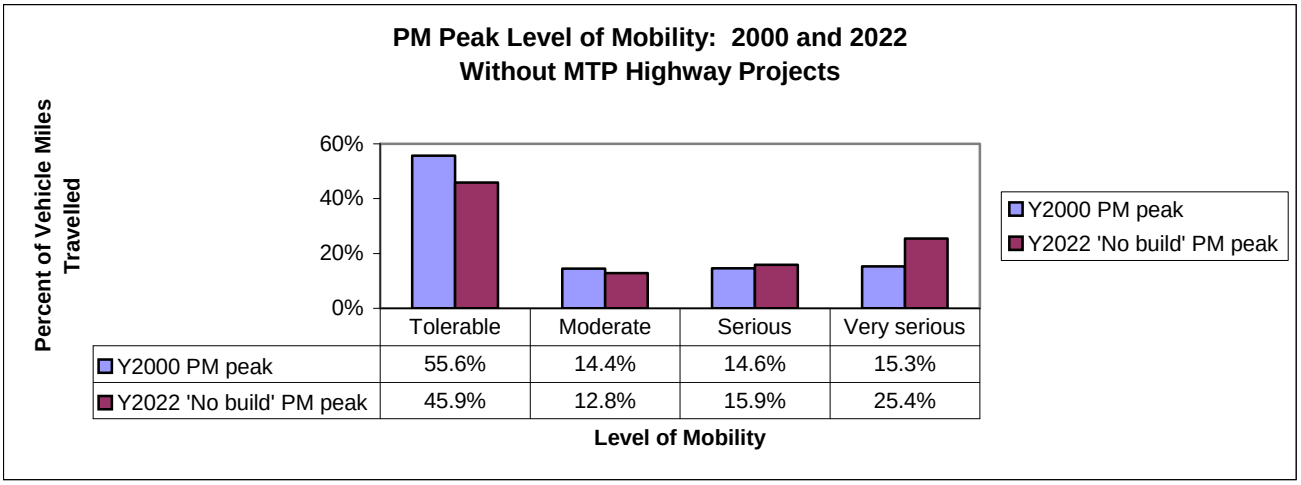


Exhibit 2.13: No Build Regional Roadway Improvements through 2022

Roadway Facility	2002		2022	
	Centerline Miles	Lane Miles	Centerline Miles	Lane Miles
Freeway	510	3,199	714	4,591
Tollway	87	443	139	744
Principal Arterial	1,149	4,485	1,371	5,873
Other Arterial	3,018	8,903	3,219	10,824
Collector	1,502	3,227	1,577	3,791
HOV Lanes	89*	90**	187	316

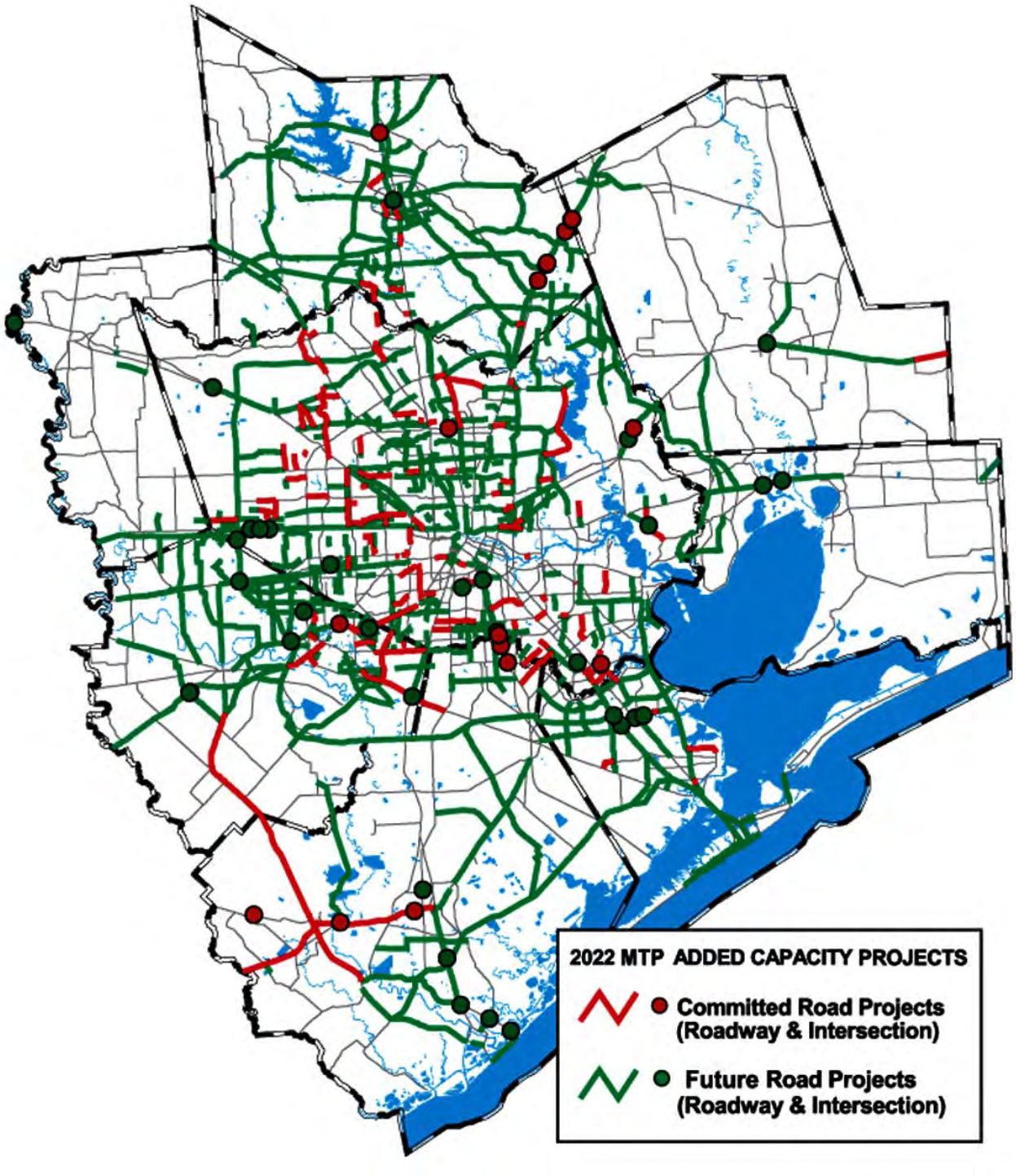
* Miles of HOV facilities

** Miles of HOV lanes, counting each lane separately, even if an HOV lane parallels another on the same roadway segment

Source: H-GAC 2022 Metropolitan Transportation Plan, 2000; H-GAC, 2/17/2003. (Includes 8 county region)

Within the Houston-Galveston region, combined bicycle and pedestrian trips account for approximately 2.6 percent of total work trips. There is a potential for bicycle and pedestrian travel to increase with adequate infrastructure. Currently there are approximately 160 miles of bicycle and pedestrian facilities not including sidewalks), a significant amount found in “master planned communities.” Existing plans call for construction of 391 miles of on- and off-road facilities. Once completed, this would provide over 500 miles of bicycle and pedestrian facilities (not including sidewalks) interlinked in a comprehensive, cohesive network. The Regional Bicycle and Pedestrian Plan identifies ways to implement and expand the planned 500+ mile network.

Exhibit 2.14: No Build Regional Roadway Improvements through 2022



Source: HGAC Transportation Department, 2003

2.2: Major Investment Build Alternatives

The Build Alternatives are AHCT and major highway improvements within the North-Hardy Corridor. These transportation improvements are distinguished from the No Build Alternative in terms of scope and capital requirements. The Build Alternatives are larger projects and more capital intensive than the No Build Alternative. This section of the Alternatives Analysis Report focuses on potential Build Alternatives.

2.2.1: Transit Technologies

Exhibit 2.15 illustrates the type of transit technologies that are being considered for application in the North-Hardy Corridor. Exhibit 2.15 also provides a short description as well as the operating characteristics of each potential technology.

2.2.2: Transit and Highway Alternatives – North of Buffalo Bayou

A number of alignments and transit technologies were studied as AHCT candidates within the North-Hardy Corridor. In addition, a number of highway and arterial improvements were studied. To facilitate public outreach in this 30-mile corridor, the study area was divided into manageable geographic segments. (See Exhibit 2.16.) Proceeding north from Buffalo Bayou, transit and highway alternatives were developed for the Northside Village Area and the Northline/Northside within the inner corridor; Geenspoint Area, Bush Intercontinental Airport, and the North Harris County within the mid corridor; and South Montgomery County Area within the outer corridor.

A comprehensive description of both the transit and highway initial alternatives is presented in Exhibit 2.17. Exhibits 2.18 through 2.22 graphically portray all of the transit and highway initial alternatives.

All Light Rail Transit (LRT) alternatives start at the University of Houston Station which is the northern terminus of the light rail line currently under construction in order to provide direct access to Houston's Central Business District (CBD). The starting point for Bus Rapid Transit (BRT) alternatives would be Downtown Houston. The northern terminus for both LRT and BRT alternatives would be in the vicinity of SH 242. All of the LRT and BRT alignments would interconnect directly with branch lines extending from the Kuykendahl Park & Ride to Bush Intercontinental Airport, thus providing through services between Downtown Houston and the Kuykendahl Park & Ride and Bush Intercontinental Airport. Consideration was also given to the possible application of People Mover technology between the Kuykendahl Park & Ride and Bush Intercontinental Airport. Note that all line extensions into Bush Intercontinental Airport would be directly to the airport terminals to facilitate passenger access.

North Hardy planning studies

Exhibit 2.15: Transit Technologies Being Considered

Light Rail Transit (LRT)

An intermediate-to-high capacity transit mode operating on steel tracks, LRT can operate on city streets, medians, or on dedicated rights-of-way such as railroad alignments, elevated structures, or tunnels. Light rail vehicles (LRVs) are typically electrically powered from overhead wires, and can operate at speeds up to 66 mph in dedicated right-of-way. LRT typically provides frequent service with trains every 5 to 15 minutes during peak periods. Stations include platforms, shelters, and other amenities and are spaced as needed – from 1,500 feet to several miles. Light rail cannot operate simultaneously with freight trains on the same track.

Commuter Rail (CR)

A longer-distance commuter oriented transit mode operating on tracks of the general railroad system, Commuter Rail typically uses conventional diesel locomotives and passenger cars similar to intercity trains. It can share tracks with freight trains and typically provides service during peak periods and in the peak direction, i.e. suburb to downtown. The service is typically limited to peak periods, and stations are typically spaced five miles or more apart. The maximum speed is dependent on track and on freight operations but is typically 60 mph or higher. Stations include platforms, shelters, and are usually heavily oriented toward park-&-ride access.

High Occupancy Vehicle (HOV) Bus

High Occupancy Vehicle (HOV) lanes provide improved travel speed for transit buses and carpools. HOV lanes are typically constructed on freeways although they also exist on major arterials and, in some cases, as separate facilities. Bus service on HOV lanes operates in mixed traffic with other "high-occupancy" users, and typically provides frequent service, though oriented toward the peak period and peak direction of travel (especially for a single lane, reversible HOV facility). Two-directional HOV facilities are warranted in corridors with high traffic volumes in both directions. Stations are constructed in combination with major park-&-ride facilities and are often spaced several miles apart. Bus service operating "express" in the HOV section at maximum speeds between 55 and 70 mph can provide local service at either end of the HOV facility.

Bus Rapid Transit (BRT)

BRT is a rubber-tired transit mode that, in concept, provides the speed and utility associated with rail transit. It operates in exclusive rights-of-way such as in street medians or on a separate facility (busway) with frequent service and stations spaced as needed. BRT is also typically associated with state-of-the-art buses, transit priority measures, and appealing stations with amenities similar to light rail. In addition to the improved speed and reliability of an exclusive facility, BRT offers the flexibility to operate in an on-street environment similar to traditional bus service to provide greater service coverage at either end of the service.

People Mover

The people mover transit mode includes automated guideway transit (AGT) and monorail systems most typically used as circulators and shuttles within, or connecting major activity centers such as airports. The capacity and speed of these systems is lower than other rail systems (40 mph maximum speed) and they require an exclusive, fully separated guideway consisting of elevated structures or tunnels. In most cases these systems are fully automated and can, therefore, provide a very frequent service. They are electrically powered and typically have stations spaced at 1,500 feet or more.

Texas Department of Transportation

METRO Solutions

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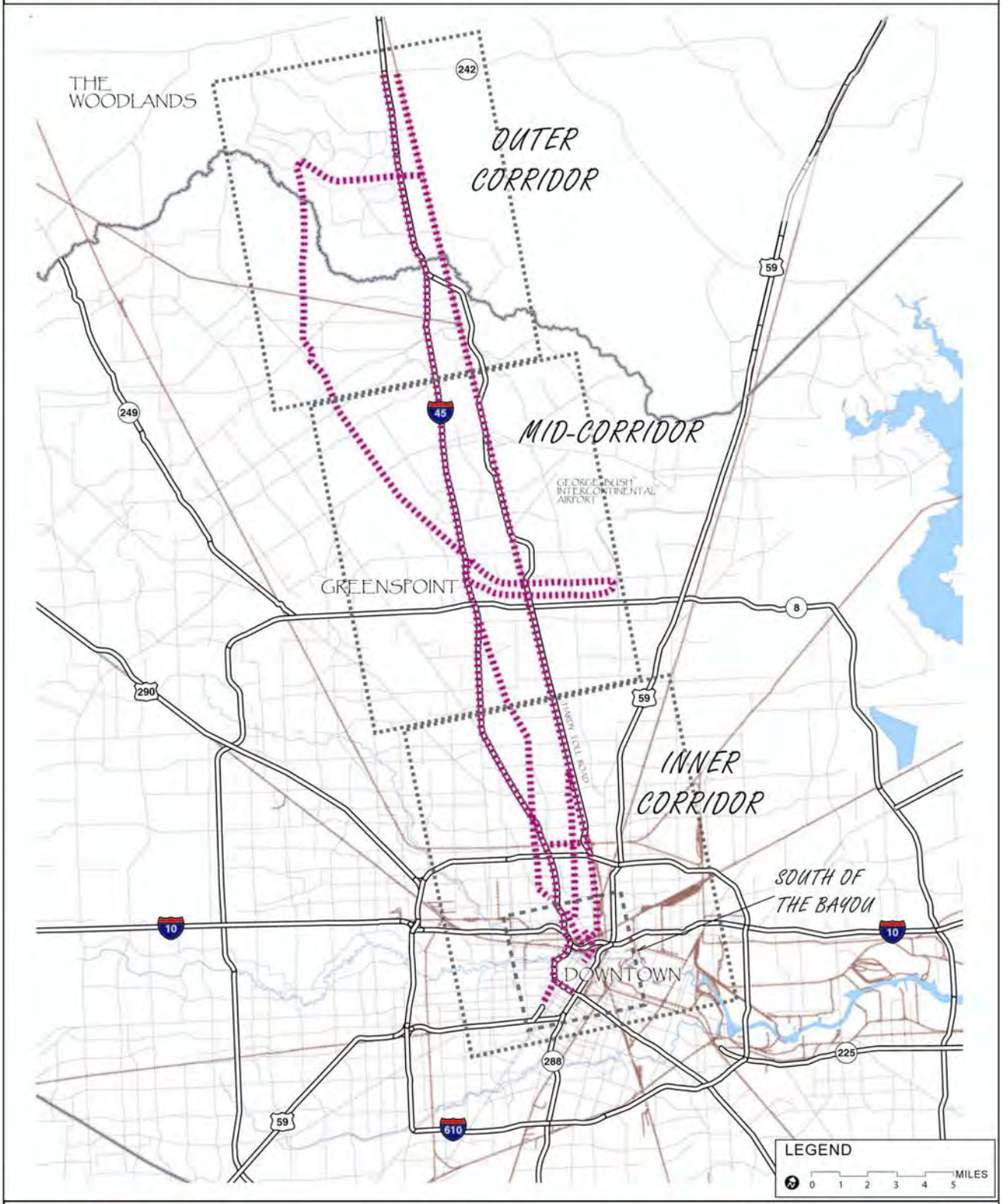
North Hardy planning studies

Exhibit 2.16: Geographic Segments



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Texas Department of Transportation

METROMOBILITY 2025

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Exhibit 2.17: Description of Initial Alternatives

NORTHSIDE VILLAGE AREA		
Alignment	**Limits**	**Description**
N. Main/Airline	From "existing" LRT to IH-45/Airline Intersection	The LRT or BRT would proceed north from the present terminus of the LRT line at the Downtown U of H station along North Main to Airline Drive, then north to the intersection of IH-45 and Airline Drive (just north of Crosstimbers Street). **Assumed Characteristics** **Arterial:** Location in alignment: Center of the street; at-grade Stop Frequency: ½ mile – ¾ mile Maximum Speed: Speed limit of adjacent auto lanes up to 35 mph **Expanded Arterial:** Location in alignment: Center of the street; at-grade Stop Frequency: ¾ mile – 1 mile Maximum Speed: Speed limit of adjacent auto lanes up to 45 mph **Aerial:** Location in alignment: Center of the street; elevated Stop Frequency: 1 mile – 1 ½ mile Maximum Speed: 66 mph
N. Main/IH-45	From "existing" LRT to IH-45/Airline Intersection	The LRT or BRT would proceed north from the present terminus of the LRT line at the Downtown U of H station along North Main to IH-45. After transitioning into the median of IH-45 or onto an aerial structure adjacent to IH-45, the LRT or BRT would proceed north to the intersection of IH-45 and Airline Drive main lanes (just north of Crosstimbers Street). **Assumed Characteristics** **Arterial Portion:** Location in alignment: Center of the street; at-grade Stop Frequency: ½ mile – ¾ mile Maximum Speed: Speed limit of adjacent auto lanes **Expanded Arterial:** Location in alignment: Center of the street; at-grade Stop Frequency: ¾ mile – 1 mile Maximum Speed: Speed limit of adjacent auto lanes up to 45 mph

		Aerial: Location in alignment: Center of the street; elevated Stop Frequency: 1 mile – 1 ½ mile Maximum Speed: 66 mph **Freeway Portion:** Location in alignment: In the median of the IH-45 or between main lanes & frontage roads; elevated Stop Frequency: 1mile – 2 miles Maximum Speed: 66 mph
N. Main/Irvington	From "existing" LRT to Hardy	The LRT or BRT would proceed north from the current terminus of the LRT line at the Downtown U of H station along North Main. After transitioning east along White Oak Bayou, Quitman, Hogan or Boundary Streets (or a combination of these streets) to Fulton and Irvington Streets, the LRT or BRT would proceed north on Irvington to the intersection of Irvington and the Hardy Toll Road. **Assumed Characteristics** **Arterial Portions** Location in alignment: Center of the street; at-grade Stop Frequency: ½ mile – ¾ mile Maximum Speed: Speed limit of adjacent auto lanes **Separate Right of Way** Location in alignment: New alignment; at-grade Stop Frequency: ½ mile - ¾ mile Maximum Speed: 35 mph
N. Main/Hardy Yard/Hardy	From "existing" LRT to Irvington intersection	The LRT would proceed north from the current terminus of the LRT line at the downtown U of H station along North Main to a new LRT terminal station at the intersection of North Main and the Hardy Street Yard. Passengers would transfer to and from commuter rail at the new station. The Commuter Rail would proceed from the Hardy Street Yard east and then north along a new track adjacent to one of the several existing freight lines to the intersection of Irvington and the Hardy Toll Road. **Assumed Characteristics** **Arterial Portion for LRT/BRT:** Location in alignment: Center of Main Street; at-grade between U of H and the Hardy Street Yard Stop Frequency: ½ mile - ¾ mile

		Maximum Speed: speed limit of adjacent auto lanes **Commuter Rail:** Location in alignment: Varies as necessary in rail right of way Stop Frequency: 2 miles – 3 miles Maximum Speed: Same as freight trains
IH-45	IH-10 to Patton	The freeway would be brought up to current design standards. Although the scope of work will vary by segment, this will generally require the following: • rehabilitation of the existing pavement • widening of the main lanes to 12' • adding shoulders where they do not exist • increasing shoulder widths to 10' where they do exist • adding space between the main lanes and frontage roads and/or braiding ramps • adding space between the frontage roads and property lines
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, two 12' lanes would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly. Due to the magnitude of the changes in this, it is logical that the HOV lane would be brought up to standards as well.
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly. This additional lane would be used as a toll facility, with discounts for HOVs. The toll pricing structure would be adjusted as necessary to maintain a Level of Service C during peak periods.
		The HOV lane would be increased by 9.5' to provide sufficient width to permit vehicles to pass a stalled vehicle. The main lanes, shoulders, etc. would be adjusted accordingly.
		The HOV lane would be increased by 27' to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes plus shoulders. The main lanes, shoulders, etc. would be adjusted accordingly. The existing HOV access ramps would be modified as needed.

IH-45	Patton to Airline	The freeway would be brought up to current design standards. Although the scope of work will vary by segment, this will generally require the following: • rehabilitation of the existing pavement • widening of the main lanes to 12' • adding shoulders where they do not exist • increasing shoulder widths to 10' where they do exist • adding space between the main lanes and frontage roads and/or braiding ramps • adding space between the frontage roads and property lines
		In addition to bringing the freeway to standards, two 12' lanes would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly. This additional lane would be used as a toll facility, with discounts for HOVs. The toll pricing structure would be adjusted as necessary to maintain a Level of Service C during peak periods.
		The HOV lane would be increased by 1' to bring this facility up to full HOV standards. The main lanes, shoulders, etc. would be adjusted accordingly.
		The HOV lane would be increased by 18.5' to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes plus shoulders. The main lanes, shoulders, etc. would be adjusted accordingly. The existing HOV access ramps would be modified as needed.
Fulton/San Jacinto	Connect these streets across Railroad & IH-10	Fulton and San Jacinto would be connected by constructing an arterial roadway through the Hardy Rail Yard and under IH-10. A grade separation of the remaining railroad tracks in the proposed Hardy Yard re-development would be required.

NORTHLINE/NORTHSIDE AREA & GREENSPOINT AREA		
Alignment	**Limits**	**Description**
Shepherd	IH-610 to IN-45	Arterial Upgrade.
IH-45/IH-610	Interchange	Interchange Improvement.
Airline	IH-45 to Greenspoint & Kuykendahl	The LRT or BRT would proceed north from the intersection of Airline Drive and IH-45 along Airline Drive to Greenspoint, then along Greens Road and/or Greens Bayou to the Kuykendahl Park & Ride. **Assumed Characteristics** **Arterial Portion:** *Location in alignment:* Center of the street; at-grade Stop Frequency: ½ mile – ¾ mile Maximum Speed: Speed limit of adjacent auto lanes up to 35 mph **Expanded Arterial:** Location in alignment: Center of the street; at-grade Stop Frequency: ¾ mile – 1 mile Maximum Speed: Speed limit of adjacent auto lanes up to 45 mph **Aerial:** Location in alignment: Center of the street; elevated Stop Frequency: 1 mile – 1 ½ mile Maximum Speed: 66 mph
IH-45	Airline to Greenspoint and Kuykendahl	The LRT or BRT would proceed north in the median of IH-45 or on an aerial structure adjacent to IH-45 main lanes from the intersection of IH-45 and Airline Drive to Greenspoint and the Kuykendahl Park & Ride. **Assumed Characteristics** Location in alignment: In the median of the IH-45 or between main lanes of IH-45 & frontage roads; elevated Stop Frequency: 1 mile – 2 miles Maximum Speed: 66 mph

IH-45	Airline to Greenspoint and Kuykendahl	The freeway would be brought up to current design standards. Although the scope of work will vary by segment, this will generally require the following: • rehabilitation of the existing pavement • widening of the main lanes to 12' • adding shoulders where they do not exist • increasing shoulder widths to 10' where they do exist • adding space between the main lanes and frontage roads and/or braiding ramps • adding space between the frontage roads and property lines
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, two 12' lanes would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly. This additional lane would be used as a toll facility, with discounts for HOVs. The toll pricing structure would be adjusted as necessary to maintain a Level of Service C during peak periods.
		The HOV lane would be increased by 1' to bring this facility up to full HOV standards. The main lanes, shoulders, etc. would be adjusted accordingly.
		The HOV lane would be increased by 27' to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes plus' shoulders. The main lanes, shoulders, etc. would be adjusted accordingly. The existing HOV access ramps would be modified as needed.
IH-45	Shepherd to Greenspoint	The HOV lane would be increased by 1' to bring this facility up to full HOV standards. The main lanes, shoulders, etc. would be adjusted accordingly.
		The HOV lane would be increased by 27' to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes and two 8' shoulders. The main lanes, shoulders, etc. would be adjusted accordingly.

Hardy	Irvington to Greens Road/Greens Bayou	The LRT or BRT would proceed north from the intersection of Irvington and the Hardy Toll Road along the Hardy Toll Road alignment to vicinity of the Greens Road or Greens Bayou. **Assumed Characteristics** Location in alignment: Varies; Reliant Energy and/or UPRR ROW Stop Frequency: 2 miles – 3 miles Maximum Speed: 66 mph
Greens Bayou	Kuykendahl to Greenspoint to IAH	The LRT, BRT, or Peoplemover would proceed east from the Kuykendahl Park & Ride along Greens Bayou to just east of JFK Boulevard on Greens Road. **Assumed Characteristics** **Separate Right of Way:** Location in alignment: New alignment; at-grade Stop Frequency: ½ mile - ¾ mile Maximum Speed: 35 mph **Peoplemover; aerial BRT/LRT:** Location in alignment: Center or edge of street, or new alignment; elevated Stop Frequency: 1 mile - 2 miles Maximum Speed: 45 mph- Peoplemover 66 mph- Aerial BRT/LRT

Greens Road	Kuykendahl to Greenspoint to IAH	The LRT, BRT, or Peoplemover would proceed east from the Kuykendahl Park & Ride along Greens Road to just east of JFK Boulevard on Greens Road. **Assumed Characteristics** **Arterial Portions:** Location in alignment: Center of the street; at-grade Stop Frequency: ½ mile - ¾ mile Maximum Speed: Speed limit of adjacent auto lanes **Peoplemover; aerial** **BRT/LRT:** Location in alignment: Center or edge of street, or new alignment; elevated Stop Frequency: 1 mile - 2 miles Maximum Speed: 45 mph- Peoplemover 66 mph- Aerial BRT or LRT

N. HARRIS COUNTY & S. MONTGOMERY COUNTY		
Alignment	**Limits**	**Description**
Kuykendahl, Gosling, Woodlands Parkway & IH-45	IH-45 to The Woodlands Town Center to SH-242	The LRT or BRT would proceed north from the Kuykendahl Park & Ride along Kuykendahl and Gosling Road, then east along the Woodlands Parkway and north along IH-45 to State Highway 242. **Assumed Characteristics:** **Arterial Portion:** Location in alignment: Center of the street; at-grade Stop Frequency: 1 mile- 2 miles Maximum Speed: Speed limit of adjacent auto lanes **Freeway Portion:** Location in alignment Between main lanes of IH-45 & frontage roads or in the median of IH-45; elevated Stop Frequency: 1 mile- 2miles Maximum Speed: 66 mph

IH-45	Greenspoint to SH-242	The LRT or BRT would proceed north along IH-45 from the Kuykendahl Park & Ride to the intersection of State Highway 242 and IH-45. **Assumed Characteristics** Location in alignment: Between main lanes of IH-45 & frontage roads or Stop Frequency: in the median of IH-45; elevated Maximum Speed: 2 miles - 3 miles 66 mph
Hardy	Greens Road/Greens Bayou to SH-242	The LRT or BRT would proceed north along the Hardy Toll Road alignment from the vicinity of Greens Road and Greens Bayou to State Highway 242. **Assumed Characteristics** Location in alignment: Varies; UPRR ROW Stop Frequency: 2 miles – 3 miles Maximum Speed: 66 mph
Hardy	Greenspoint to SH-242	The Commuter Rail would proceed north along the UPRR alignment from the vicinity of Greens Road and Greens Bayou to State Highway 242. **Assumed Characteristics** Location in alignment: Varies as necessary in rail right of way Stop Frequency: 2 miles – 3 miles Maximum Speed: 60 mph
IH-45	Greenspoint to SH 242	The HOV lane would be increased by one foot to bring this facility up to full HOV standards. The main lanes, shoulders, etc. would be adjusted accordingly. Portions currently proposed as non-separated HOV lanes would be converted into a 1-way separated HOV.
		The HOV lane would be increased by 27feet to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes plus shoulders. The main lanes, shoulders, etc. would be adjusted accordingly. The existing HOV access ramps would be modified as needed.

SOUTH OF BUFFALO BAYOU		
Alignment	**Limits**	**Description**
IH-45	Ramps into and out of Downtown	Improve interchanges
IH-45	IH-45/US 59 Interchange	Improve interchange
IH-45	US 59 to IH-10	The freeway would be brought up to current design standards. Although the scope of work will vary by segment, this will generally require the following: • rehabilitation of the existing pavement • widening of the main lanes to 12' • adding shoulders where they do not exist • increasing shoulder widths to 10' where they do exist • adding space between the main lanes and frontage roads and/or braiding ramps • adding space between the frontage roads and property lines
		In addition to bringing the freeway to standards, one 12' lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, one 12' managed lane would be added to the main lanes in each direction. The shoulders, frontage roads and ramps would be adjusted accordingly.
		In addition to bringing the freeway to standards, moveable barriers would be added to take advantage of off peak capacity. The shoulders, frontage roads and ramps would be adjusted accordingly.
Bagby and Brazos	Spur 527 to IH-45	Upgrade arterials

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Exhibit 2.18: Initial Alternatives (Transit) – Inner Corridor

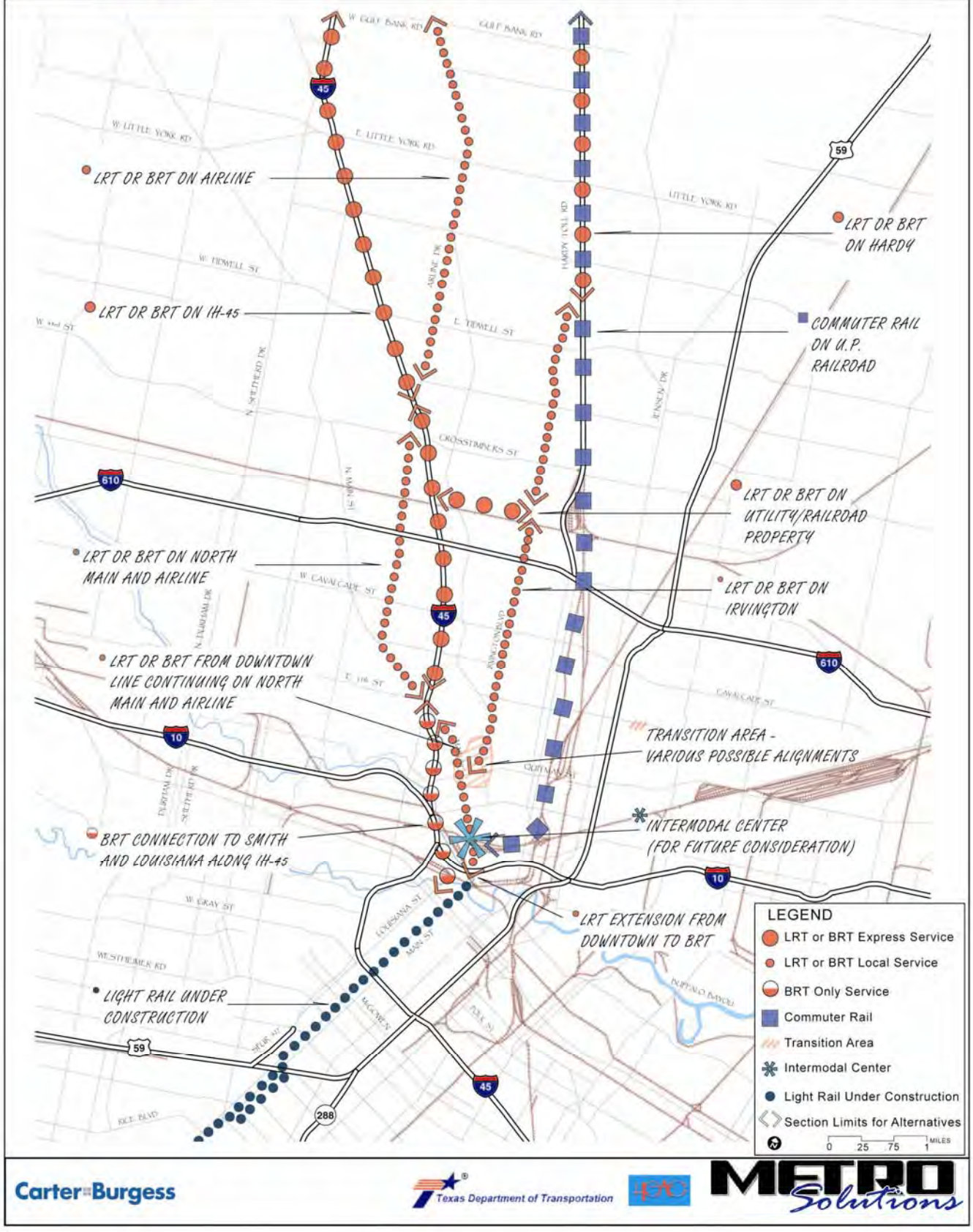

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Exhibit 2.19: Initial Alternatives (Highway) – Inner Corridor

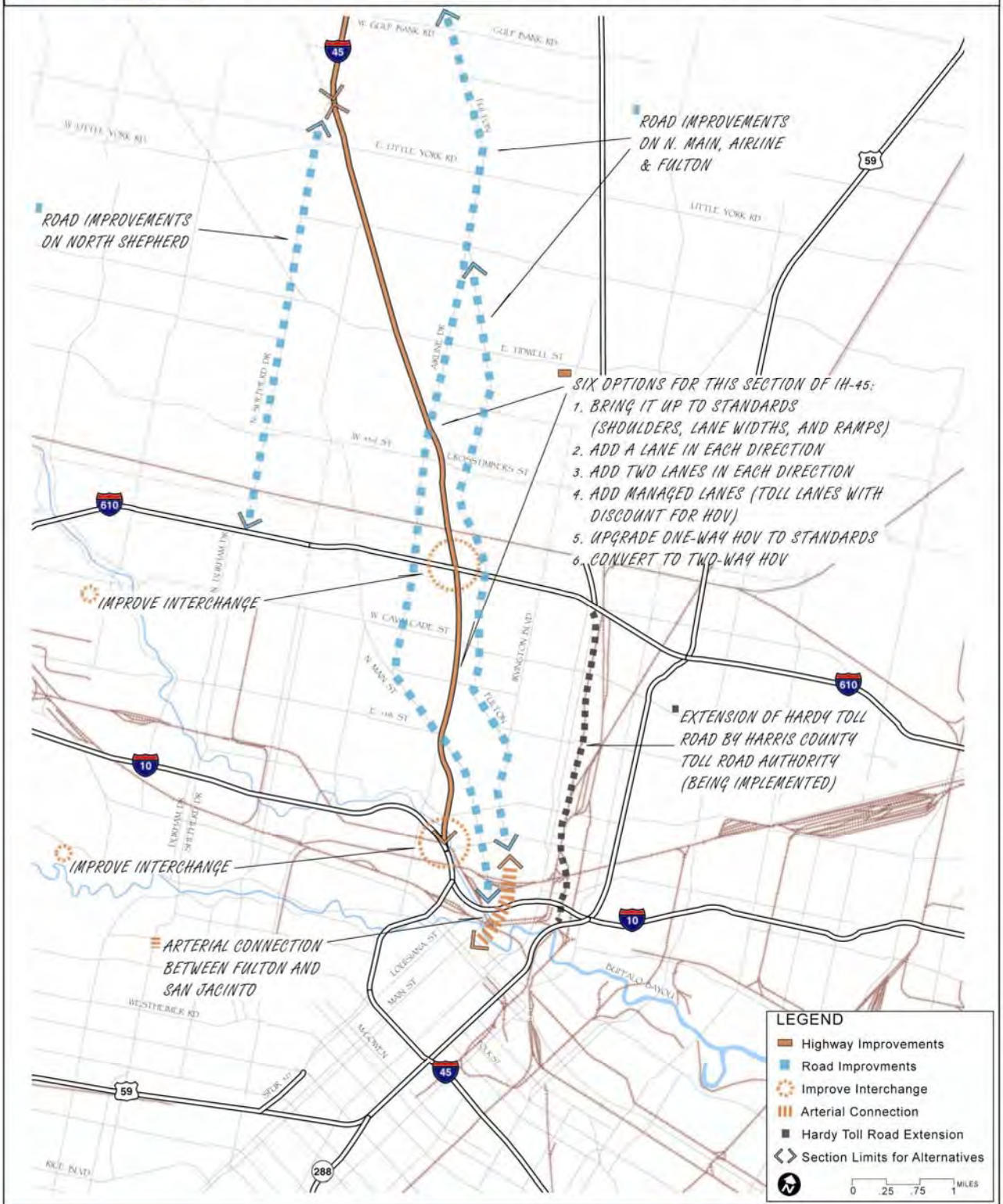

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Exhibit 2.20: Initial Alternatives (All) – Mid Corridor

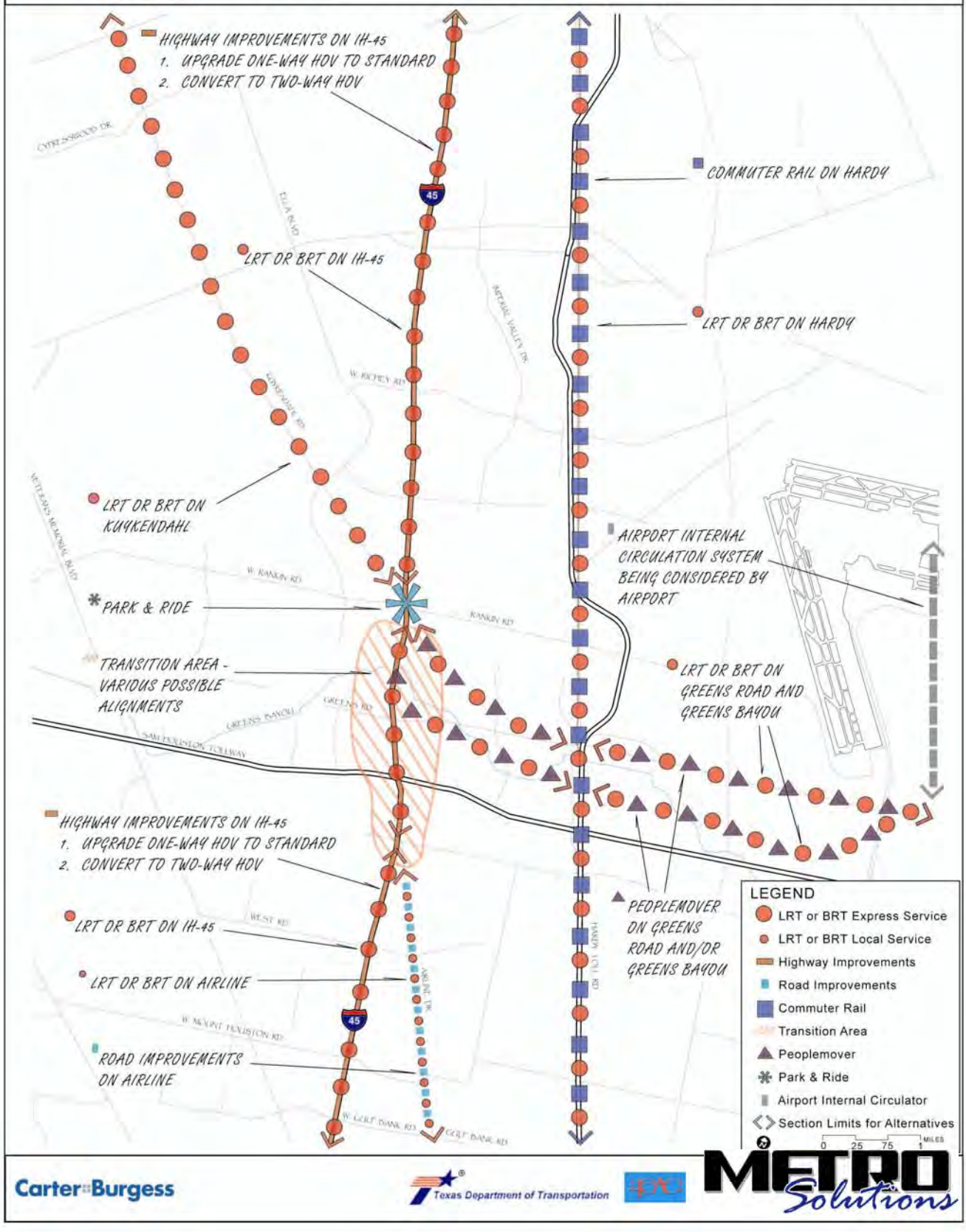

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Exhibit 2.21: Initial Alternatives (All) – Outer Corridor

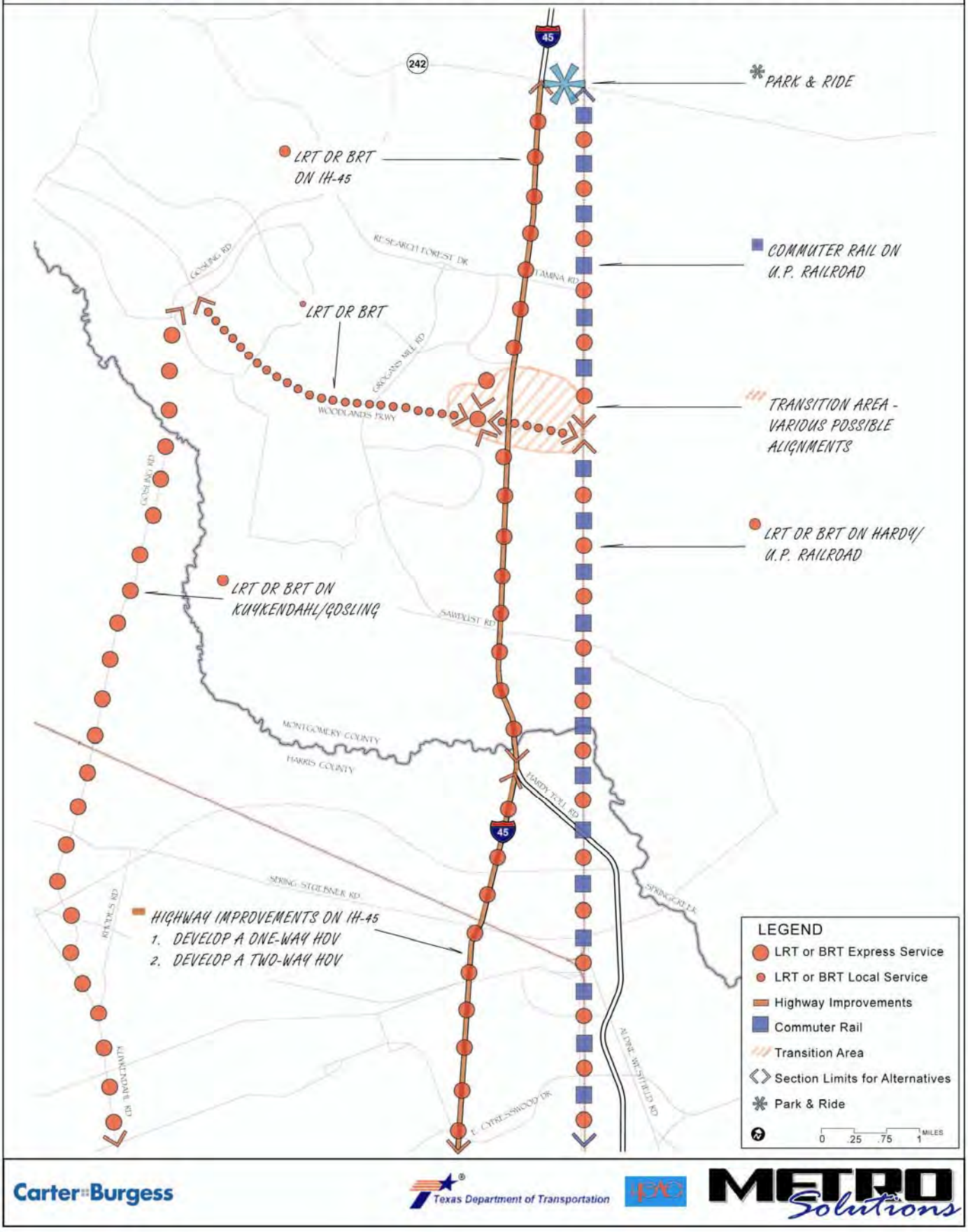

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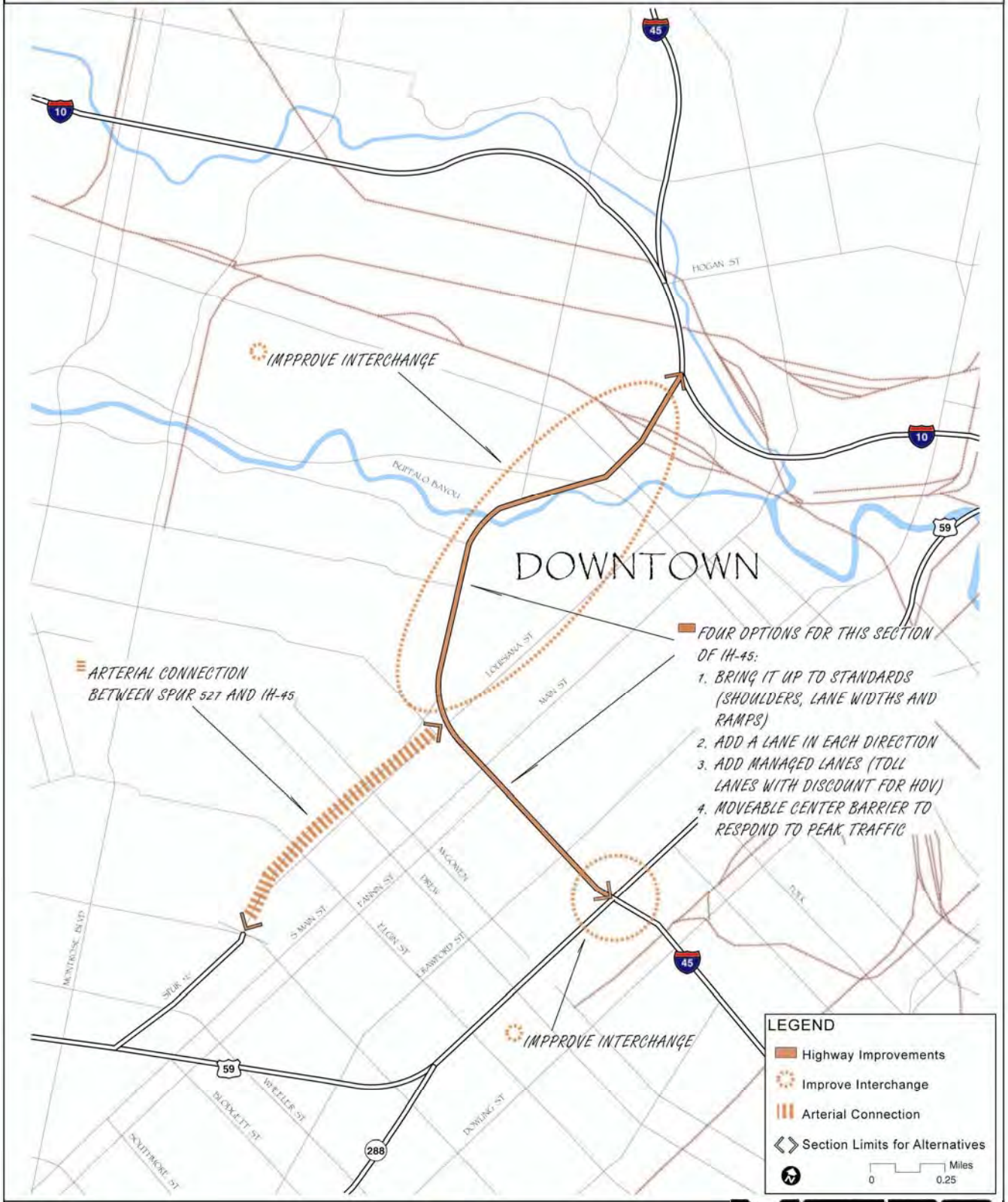
Exhibit 2.22: Initial Alternatives (Highway) – South of Bayou



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Pertinent attributes such as estimated travel times and capital cost ranges were determined for each segment. The suitability of various technologies and alignments in each segment was analyzed in conjunction with community input in order to determine the most viable options.

Segments were then combined and optimized into continuous north-south transit alignments through the North-Hardy Corridor. Each north-south transit alignment has an east-west branch or cross-line in the vicinity of Greens Road or Beltway 8 that would connect Kuykendahl Park and Ride on the west and Bush Intercontinental Airport on the east.

In addition, the highway alternatives considered north of Buffalo Bayou consist of varying degrees of improvement to the freeway cross-section. The highway alternatives also include upgrades to various arterials serving the corridor. The first alternative involves bringing IH-45 to current design standards, as well as improvements to the IH-45/IH-610 and IH-45/IH-10 interchanges. Specifically, this alternative would provide for 12-foot lanes and both inside and outside shoulders. The second alternative builds on the first alternative and adds one general purpose main lane in each direction. The third alternative builds even further on the first and second by adding two general purpose main lanes in each direction. The fourth highway alternative brings the freeway to current design standards and adds managed lanes (toll lanes with discounts for HOV traffic). The fifth highway alternative focuses on the existing one-way reversible HOV lane by bringing it up to current design standards. The sixth highway alternative builds on the fifth alternative and converts the HOV lane to a two-way facility.

2.2.3: Highway Alternatives – South of Buffalo Bayou

The highway alternatives considered South of Buffalo Bayou consist of significant improvements to critical interchanges in addition to upgraded freeway design standards and added capacity. The first alternative addresses improving and simplifying the on and off ramps to Downtown. The second alternative involves reconfiguring the IH-45 and US 59 interchange.

Alternatives for the section of IH-45 between IH-10 and US 59 are again degrees of improvement to the freeway cross-section. Thus, the third alternative South of Buffalo Bayou involves bringing the freeway up to current design standards. The fourth alternative adds one general purpose main lane in each direction. The fifth alternative adds managed lanes and the sixth investigates the use of a moveable barrier to increase peak direction capacity.

2.2.4: Integration of Transit and Highway Alternatives

It is imperative that transit and highway alternatives be integrated to provide a comprehensive and coordinated transportation system. To achieve this end, all alternatives were analyzed to determine the optimum mix of highway and transit improvements to serve the North-Hardy Corridor. The proper mix of recommended highway and transit improvements for the North-Hardy Corridor were determined during

the next phase of the study as the short list of alternatives was further evaluated and analyzed.

2.3: Screening the Long List of Alternatives

2.3.1: Evaluation Measures

In order to properly assess the suitability of various alternatives, it was necessary to establish a set of evaluation criteria. These criteria provide a common basis of comparison for all of the alternatives considered. The evaluation criteria used to screen the initial set of alternatives for the North-Hardy Corridor were as follows:

- Economic Development Potential
- Community Support
- Capital Cost
- Regional Perspective
- Environmental Impacts
- Community Impacts
- Mobility Impacts
- Ease of Implementation

2.3.2: Initial Screening Methodology

The methodology and approach for screening the initial alternatives is a blend of technical evaluation and public review and input. This evaluation plan defines the evaluation criteria and measurement tools to be utilized to screen and evaluate the alternatives. The emphasis of this evaluation plan is on the screening of the initial alternatives and focuses on qualitative criteria at this conceptual level. The evaluation procedures include impacts and influences on transportation systems, mobility, and travel patterns and impacts to and compatibility with the natural, manmade, and social environments. They also include the potentials for and influences on economic development.

With the alternatives and evaluation criteria defined, preliminary technical data were developed for each alternative segment including:

- Illustrative drawings meant to convey a general sense of the alternative being considered
- Generic “cost per mile” capital cost ranges (including pro rata costs for stations, maintenance facilities, transit vehicles, ramps, etc.)
- Transit market potential based on population and employment concentrations (both existing and projected) and current transit demand potential patterns
- Freeway level of service and travel time assessments
- Preliminary transit travel times

The process of screening the initial alternatives involved conducting a series of facilitated working sessions with study partners, stakeholder groups and the general public. The series of work sessions were conducted in the following sequence:

- Study partners (technical review)
- Stakeholder groups
- General public meetings
- Stakeholder Advisory Committee

The North-Hardy Corridor Stakeholder Advisory Committee consists of a broad range of stakeholders. The stakeholders include:

- Property Owners
- Residents
- Businesses
- Employees

The Stakeholder Advisory Committee was established to make recommendations to the Consultant Team at key points in the project's schedule. The Stakeholder Advisory Committee was assigned the additional task of reviewing the recommendations from the previous meetings and considering these recommendations in a consolidated evaluation for this phase of the project. All of the groups were given the evaluation criteria and a definition of the measures for each criterion (as shown in Exhibit 2.23) in addition to the available preliminary technical data. Each group was asked to document their perceived pros and cons of each alternative. The evaluation process resulted in a recommendation for each alternative either to be included for further evaluation or dropped from consideration.

Exhibit 2.23: Evaluation of Initial Alternatives
Evaluation Criteria and Measures

EVALUATION CRITERIA	MEASURE
❑ **Economic Development Potential** • Potential for development, redevelopment, and/or revitalization along and adjacent to the alignment	Estimate Using: Availability of vacant or unrestricted parcels in combination with established strong growth trends for areas of potential station or ramp locations - Adopted master plans or neighborhood plans - Permanency and image of the transit alternative - Potential station locations in areas with potential for desirable development
❑ **Community Support** • Neighborhood and business community support (or opposition) to a specific alignment or alternative	Estimate Using: Direct input from community as illustrated by comments during scoping and at work sessions

EVALUATION CRITERIA	MEASURE
❑ **Capital Cost** • Alternative's capital cost based on consensus $/mile costs for technology or treatment	Estimate Using: Very preliminary estimates based on recent pricing for METRO & TxDOT projects. Generic, top level estimates only. Indicate costs/mile.
❑ **Regional Perspective** • Future Expansion Capability – can the alternative be extended over time; can the alternative be expanded to increase person-carrying capacity to meet systemwide needs • Multiple Destinations Served – number of activity centers served • System Connectivity – connectivity between major activity centers; neighborhood connectivity. • Operational Considerations	Estimate Using: Describe the following for each alternative: • Ability for expansion toward The Woodlands, Conroe, Kingwood, Tomball • Means to add additional capacity; define maximum practical capacity • Activity centers w/ direct service; candidate centers = Downtown, Greenspoint Mall/offices/convention center, IAH, The Woodlands Town Center • Directly connect key neighborhoods & activity centers – name each. • Likely to be more or less costly to operate. • Is a mode change required?
❑ **Environmental Impacts** • Noise and Vibration • Visual • Natural Environment • Cultural Resource • Safety and Security • Air Quality	Estimate Using: List sensitive locations in proximity to project Based on the above, rate qualitatively.
❑ **Community Impacts** • Environmental Justice – disproportionate impact on "traditionally underserved" communities • Neighborhood Impacts – impacts on neighborhood cohesion; compatibility with established neighborhood plans/visions • Business Impacts – effects of alternatives on business viability and vitality (not construction related)	Estimate Using: List areas of concern. Based on the above, rate qualitatively

EVALUATION CRITERIA	MEASURE
❑ **Mobility Impacts** • Potential Capacity – person-carrying capacity; demand potential • Potential Markets Served – number of markets or major origins/destinations along alignment • Travel time Competitiveness – travel time compared to SOV travel time (current condition) • Traffic Congestion Relief	Estimate Using: Describe using the following: • Potential Capacity – calculate capacity based on operating assumptions – persons/hour for transit and highway • Potential Markets – Transit: People and jobs in proximity to generic "stations"; likely park & ride markets. Highway: NA • Travel time – transit travel time based on operation plan; • Congestion relief – Qualitative sense that Alternative will contribute to traffic relief
❑ **Ease of Implementation** • Proven Technology – technology in service elsewhere; experience of technology service elsewhere • Right of Way Availability – ROW necessary; order of magnitude of ROW required • Constructability – ease of construction; length of time to construct; construction phasing possibilities • Traffic Disruption during construction – impact on traffic during construction • Business Disruption during construction – access to businesses during construction; phasing possibilities • Ability of the community to control its own destiny	Estimate Using: • Proven technology – note if used extensively elsewhere & service record • ROW – Describe likely ROW issues (not parcel specific or number of parcels) • Constructibility – Is there an obvious construction approach? • Traffic during construction -- Is there an obvious way to deal with traffic during construction? • Business disruption – Are there likely to be disruptions to businesses during construction • Are there key aspects of the Alternative beyond the control of the community?

2.3.3: Screening Process and Results

Employing the methodology and approach for screening the initial alternatives described above, the evaluation process began with a technical work session on May 6, 2002 with the North-Hardy Consultant Team, METRO, TxDOT, and H-GAC staff. The technical group reviewed the alternatives and the available technical data in light of the established evaluation criteria. The results of the technical review served as the basis for the public review process.

The public review process involved work sessions with stakeholders from six North-Hardy areas and three general public meetings.

The stakeholder work sessions varied from two hours to half-day meetings in the following corridor segments:

- Near Northside Village Group – May 11, 2002
- Northwest Chamber of Commerce/FM 1960 Group – May 16, 2002
- Northside/Northline Super Neighborhood Group – May 18, 2002
- South Montgomery County Chamber of Commerce – May 20, 2002
- Greater Greenspoint/IAH Group – May 30, 2002
- Midtown/Downtown Group – June 3, 2002

The leadership of groups in the individual corridor areas handled invitations to the work sessions. The Consultant Team asked that those invited represent diverse points of view, and, therefore, represent a cross-section of opinion for their area. Although not statistically rigorous, this attempt to bring diverse points of view was successful in bringing a range of community concerns.

Each work session started with the same overview presentation describing the alternatives, the evaluation criteria (including the opportunity to offer additional or amended criteria), the available technical data, and the insights from the previous stakeholder meeting(s). Small groups of 10 to 15 people were formed to allow for detailed discussion on each of the initial alternatives. The small groups were charged with the task of providing specific pros and cons on each of the alternatives in light of the evaluation criteria and any other criteria or concerns they thought important. At the end of the work session, each small group reported their findings to the large group as a whole. Attempts were made to develop a consolidated recommendation from the large group before closing the meeting.

After the series of stakeholder work sessions were completed, three public meetings were held. These meetings were publicized by METRO in the local newspapers. The public meetings had the same basic format as the stakeholder work sessions. The dates and locations for the North-Hardy public meetings were:

- Greenspoint Mall – June 4, 2002
- South Main Baptist Church – June 6, 2002
- St. Patrick's Catholic Church – June 15, 2002

Concluding the public review process, the Stakeholder Advisory Committee (SAC) met on June 17, 2002. After a review of the results of the technical work session, the stakeholder work sessions and the public meetings, the SAC offered advice on which initial alternatives should be carried into the next phase of study.

Upon conclusion of the evaluation phase, a proposed short list of alternatives was submitted to both METRO and TxDOT by the Consultant Team. Final review with METRO and TxDOT staff produced a proposed short list of alternatives. The proposed short list of transit alternatives was presented to the METRO Board's Futures Committee on June 27, 2002. The proposed short list of highway alternatives was presented to TxDOT's senior staff on July 8, 2002. The resulting short list of transit and highway alternatives is discussed in Section 2.4.

2.3.4: Results from Work Sessions

Exhibit 2.24 summarizes the public and stakeholder input received during the evaluation of the initial alternatives phase. Since the "Do's and Don'ts" in Exhibit 2.10 were developed in a number of meetings with different groups, some items are contradictory (e.g. LRT on Kuykendahl).

Exhibit 2.24: What We Have Heard

OVERALL SUMMARY: Provide quality inner city transit service and high-speed transit service for the long distance commute.

DO:

- Maximize use of Hardy Toll Road and maximize opportunity for transit (before widening IH-45)
- Add sound walls and landscaping to IH-45 and reduce air and visual pollution
- Improve interchanges and ramps on IH-45
- Light rail transit (LRT) on Main/Airline and Main/Irvington (Fulton) – local service
- High-speed LRT long distance commute trips between Downtown, Greenspoint, Bush Intercontinental Airport, and The Woodlands
- East-west transit connections to Inner Katy Corridor
- High-speed light rail or bus rapid transit (LRT/BRT) on Hardy Toll Road alignment north of Tidwell
- LRT/BRT on IH-45 built in conjunction with freeway expansion
- Local LRT/BRT service on Airline using elevated structures
- Combine high-speed and local LRT/BRT service within the same alignment (especially along Airline)
- Improve north-south arterial street connections
- Improve east-west arterial street connections
- LRT service between Greenspoint and Bush Intercontinental Airport
- High-speed LRT service on IH-45 from The Woodlands to Downtown
- Local LRT/BRT service on Kuykendahl
- Extend study area and service considerations to Conroe and western Montgomery County
- Extend Hardy Toll Road to Conroe

OVERALL SUMMARY: Don't disrupt established neighborhoods

DON'T:

- Widen IH-45 beyond current right of way inside of IH-610
- Build elevated lanes on IH-45 inside of IH-610
- Build LRT/BRT at-grade on Airline
- Build LRT/BRT on IH-45 outside of Beltway 8
- Build LRT on Kuykendahl (in the short run)
- Build LRT/BRT on Woodlands Parkway or Gosling Road
- Build new crossings over Spring Creek

2.3.5: Evaluation of Transit Alternatives

The following discussion focuses only on those transit alternatives recommended to be dropped, since the purpose of the first-level analysis is to eliminate those alternatives deemed unworthy of further consideration.

Commuter Rail

Commuter rail service can and has been implemented economically elsewhere in the country when the passenger service can share existing tracks with a freight railroad operation. The advantage of track-sharing is reduced capital costs. The commuter rail alternative was dropped, however, from further consideration for the following reasons:

- The Union Pacific Railroad has been unresponsive to attempts to secure its consideration for sharing its facilities. Therefore, commuter rail can only be implemented in this corridor by constructing new tracks at a much higher capital cost.

- It is not practical to bring commuter rail trains directly into Downtown. Such a service would necessitate a transfer to the LRT line currently under construction. A transfer would discourage patronage, especially from a commuter rail service with limited peak period service (weekdays only) in each direction. Likewise, an additional transfer would be needed in the vicinity of Greens Road to another mode of transportation (e.g. LRT, BRT or People Mover) to complete the trip to Greenspoint or Bush Intercontinental Airport.

- The space available within the railroad right of way is insufficient for station locations, especially since a third track is needed to allow operation of commuter rail trains in addition to freight trains. To accommodate stations would entail reconfiguring the Hardy Toll Road at each station site, which is a complicated and expensive effort.

- Commuter rail service along the Union Pacific/Hardy Toll Road alignment would bypass the inner city. This final reason was considered a “fatal flaw” because commuter rail service alone would not satisfy the economic development goals for the inner city.

People Mover

People Movers are mostly designed to operate in airport or campus environments. As a result, People Movers operate at only moderate speeds (40 miles per hour is typical maximum speed) due to the short distance between stations. Smaller vehicles are also generally used so that the People Mover systems can be built and operated within dense development without being unduly intrusive. As a result, People Movers are generally not suitable for regional transit applications where trip lengths are longer than several miles and larger passenger volumes make large vehicles more efficient.

The list of initial alternatives included a People Mover approximately five miles in length (from Kuykendahl Park & Ride to Bush Intercontinental Airport) as an extension of a potential airport circulator. Such a People Mover is probably at the practical limit – due largely to the relatively low speed – of a People Mover application. While such a system might provide adequate connectivity within the Greenspoint/Beltway/Airport area, it would require transferring (no possibility for a "one seat ride") between the People Mover and a regional AHCT system in order to travel between Downtown or other activity centers and sites within the Greenspoint/Beltway/Airport area. Thus, a People Mover scores poorly on the Regional Perspective Evaluation Criteria (see Exhibit 2.1) in terms of both future expansion capability and ability to expand toward Spring, The Woodlands, and Conroe.

People Mover systems are generally automated (i.e. driverless) and, therefore, must be grade separated from vehicular and pedestrian traffic. The cost of automation plus the cost of grade separation place the People Mover in the high range for capital costs in the evaluation, thus scoring poorly on the Capital Cost Range criterion.

People Mover also rated poorly on Community Impacts since elevated structures would be much more likely to be used, even in areas where at-grade facilities would be less disruptive. The People Mover alternative also rated poorly on Mobility Impacts due to longer travel times (due to slower maximum speed) and Potential Capacity Limitations (due to smaller vehicles).

Finally, the People Mover rated poorly on the Ease of Implementation criteria. People Movers are proprietary technology and, thus, require a complex procurement process in order to comply with typical government procurement regulations (key aspects of the alternative beyond the control of the community).

The poor rating across these numerous criteria lead to the dropping of the People Mover alternative from further consideration.

LRT on Kuykendahl

The alternative for LRT or BRT on Kuykendahl Road was dropped from further consideration because it would provide a circuitous route to the Woodlands and southern Montgomery County. Therefore, this alignment scored poorly on the Regional Perspective criterion. However, it is recommended that consideration be given to preserving right of way on Kuykendahl for future LRT or BRT development.

2.3.6: Evaluation of Highway Alternatives

With respect to the highway alternatives, the overwhelming concern expressed by the public was the requirement not adversely impact inner city neighborhoods by taking substantial right of way in sensitive areas, in order to widen IH-45. However, when the option of adding capacity to IH-45 without taking right of way in these sensitive areas was posed, the public reaction was generally favorable. Alternatives that involved

extended elevated sections of freeway were not generally acceptable because of noise and visual impact.

2.3.7: Results of the Evaluation Process

Exhibit 2.25 presents the evaluation results using the criteria and evaluation methodology. The last column of Exhibit 2.25 indicates those alternatives recommended to be carried forward for further evaluation in the next phase of the North-Hardy Planning Studies.

2.4: Short List of Build Alternatives

The technical analysis and public input provided insights into the performance of the initial set of alternatives. These insights were used to develop a “short list“ of alternatives to study in detail in the next phase of the planning studies.

2.4.1: Short list of Transit Alternatives

In the initial analysis and screening phase of the study, the transit alternatives were evaluated on a segment-by-segment basis. In the subsequent phase of study, involving more detailed analysis, the segments were combined into a limited number of corridor-wide alternatives to permit a more comprehensive analysis of corridor impacts and, ultimately, to include in a systemwide assessment and regional transit plan.

The transit segments were combined into three alternative alignments with both LRT and BRT being considered for each alignment. All of the transit alternatives provide AHCT service to inner city neighborhoods and direct service to Bush Intercontinental Airport. All alternatives connect Downtown to The Woodlands, Greenspoint and the Kuykendahl Park & Ride with AHCT, although in some cases a transfer will be required.

Exhibit 2.25: Evaluation Matrix

Evaluation Criteria		Economic Development Potential	Community Support	Capital Cost Ranking	Regional Perspective	Environmental Impacts	Community Impacts	Mobility Impacts	Ease of Implementation	Other Considerations	Carry to Next Phase
Alignment	**Transit Mode or Highway Project**										
North of Buffalo Bayou											
IH-45	LRT	o	+	-	+	+	o	+	-	Requires close coordination with IH-45 highway improvements	Yes
	BRT	o	-	-	o	+	o	+	-		Yes
	Highway										
	Freeway to Standards	o	o*	o	o	o*	o*	-	-		Yes
	Add 1 lane per direction	o	o*	-	+	o*	o*	+	-		Yes
	Add 2 lane per direction	o	o*	-	+	o*	o*	+	-		Yes
	Add Managed Lanes	o	o*	-	+	o*	o*	+	-	* If improvement can be made within existing ROW	Yes
	HOV to Standards	o	+	o	o	o*	o*	o	-		Yes
	HOV 2-way	o	+	-	+	o*	o*	+	-		Yes
Fulton to San Jacinto Arterial Connection		+	+	-	o	o	+	+	o		Yes
Hardy	LRT/Commuter Rail	o	-	o	o	o	o	o	--	Railroad unresponsive	No
	LRT	+	+	-	+	+	+	o	-		Yes
	BRT	+	o	-	o	+	+	o	-		Yes
Airline	LRT	+	+	o	+	+	+	+	-		Yes
	BRT	+	+	o	o	+	+	+	-		Yes
Kuykendahl P&R to IAH	LRT	+	+	o	+	o	o	+	o		Yes
	BRT	+	+	o	o	o	o	+	o		Yes
	Peoplemover	+	o	--	-	o	-	-	-	Requires transfer from other modes	No
Kuykendahl	LRT	+	o	o	-	o	+	+	o		No
	BRT	+	+	o	-	o	+	+	o	Preserves ROW for future LRT	Yes
South of Buffalo Bayou											
IH-45	Ramps in/out of CBD	o	-	-	o	-	-	o	-	Other strategies carried forward	No
	IH-45/US 59 Interchange	o	-	-	o	-	-	o	-		No
US 59 to IH-10											
	Freeway to Standards	o	o	o	o	o	o	o	-	Other strategies carried forward	No
	Add 1 lane per direction	o	-	-	+	-	-	+	-		No
	Add Managed Lanes	o	-	-	+	-	-	+	-		No
	Moveable Barriers	o	-	-	+	-	-	+	-		No
Bagby/Brazos											
	Upgrade Arterials	+	o	+	+	o	o	+	o		Yes

Legend:

+ denotes a positive (better) value for an evaluation measure

o denotes a neutral value for an evaluation measure

- denotes a negative (worse) value for an evaluation measure

The screening of the initial alternatives in the North-Hardy Corridor Planning Studies explored a "long list" of conceptual transportation alternatives that attempted to respond to the transportation needs and issues of the North-Hardy Corridor. This screening resulted in a "short list" of alternatives to be taken into a detailed study with the ultimate goal of selecting LPISs for transit and highway projects in the North-Hardy Corridor. As previously stated highway alternatives are still being studied. A discussion of the highway alternatives following additional technical work and public input will be incorporated into the Alternatives Analysis Report at a later date. The transit alternatives were carefully crafted to explore a number of issues that surfaced during the earlier analysis, as follows:

- **Alignment 1 (Blue Line)** focuses on the IH-45 alignment with the thought that these LRT and BRT alternatives will likely be most effective at serving the established park and ride market in this corridor; probably provide the fastest trips between Downtown, Greenspoint and The Woodlands; will likely be the most capital intensive; and will explore technical, environmental and institutional issues relative to developing AHCT in conjunction with possible added capacity highway projects.

- **Alternative 2 (Red Line)** focuses on the Hardy alignment and is generally thought to have the most available right of way; the fastest and most direct trip to Bush Intercontinental Airport; the lowest capital cost per mile (taking advantage of existing cross street grade separations along the toll road); probably the lowest demand potential potential; and the least ability to stimulate economic development.

- **Alternative 3 (Green Line)** focuses on the Airline alignment in an attempt to effectively serve established local demand potential along Airline and Fulton; explores a mix of at grade and aerial alignments in a commercial, arterial environment; relies on express bus service in existing/committed HOV lanes on IH-45 to serve the “outside the Belt to Downtown” commuter niche market as a supplement to AHCT; and the lowest overall capital cost (due to AHCT not being developed substantially beyond the Beltway).

The short list of transit alternatives is described in Exhibits 2.26 through 2.28 and is shown graphically in Exhibit 2.29. Please note that the descriptions of each alternative were done at the completion of the initial screening process. Subsequent to the initial screening, further refinement of the short list of alternatives has occurred. Additional refinement will continue to occur through the environmental process.

Exhibit 2.26: Transit Alignment 1 – Blue Line

Both Light Rail Transit and Bus Rapid Transit will be considered for this alignment. Similar horizontal and vertical design criteria were used for the two modes and the plan views generally used a single symbol to represent both modes. Both modes are expected to operate in both express and local service. In an arterial environment, operating speeds would be dictated by the adjacent vehicular traffic speed limit.

Alignment	Initial Description
Main Line	
N. Main St.	Begin at the "existing' light rail station at U of H Downtown; Proceed north to approximately Burnett on aerial structure to be above the floodplain & railroad; Proceed northwest to Airline at-grade, probably in the middle of the street.
Airline	Proceed north to IH-45, probably at-grade in the middle of the street although aerial sections may be needed in some areas due to inadequate right of way or traffic conflicts.
IH-45	Proceed northwest to approximately Fallbrook/Aldine Bender, probably on aerial structure between the main lanes and frontage road.
Traverse across vacant parcels more-or-less following the extension of Greenspoint Dr.	Proceed northeast to the southern terminus of Greenspoint Dr., probably at-grade.
Greenspoint Dr.	Proceed north to approximately Greens Rd., probably at-grade and integrated into mall and/or office complex development.
Greens Bayou or new alignment +/- ½ mile east of IH-45	Proceed northwest to the Kuykendahl Park & Ride lot, generally at-grade with aerial structure over IH-45.
IH-45	Proceed north to approximately SH 242, probably using a combination of at-grade and aerial structure between the main lanes and frontage road including a slight westward "swing" into Woodlands Mall area.
Spur to Bush IAH	
Greens Rd.	Proceed east to Central Greens Blvd., probably at-grade in the median.
Central Greens Blvd.	Proceed north to Hardy Airport Connector, probably at-grade
Hardy Airport Connector	Proceed east to JFK Blvd., probably at-grade
JFK Blvd.	Proceed to the vicinity of Terminal C, probably at-grade in the median.

Exhibit 2.27: Transit Alignment 2 – Red Line

Both Light Rail Transit and Bus Rapid Transit will be considered for this alignment. Similar horizontal and vertical design criteria were used for the two modes and the plan views generally used a single symbol to represent both modes. Both modes are expected to operate in both express and local service. In an arterial environment, operating speeds would be dictated by the adjacent vehicular traffic speed limit.

Alignment	Initial Description
Main Line	
N. Main St.	Begin at the "existing" light rail station at U of H Downtown; Proceed north to approximately Burnett on aerial structure to be above the floodplain & railroad; Proceed northwest to approximately Boundary at-grade, probably in the middle of the street.
Little White Oak Bayou & Hays St.	Proceed northeast to Fulton within the drainage right of way, probably at-grade.
Fulton	Proceed north to Irvington, probably at-grade.
Irvington	Proceed north to Hardy Rd., probably at-grade in the median.
Hardy Rd.	Proceed north to approximately SH 242, probably at-grade using a combination of Hardy Rd., Reliant Energy, UPRR and Hardy Toll Road rights of way or new right of way adjacent to existing public rights of way in order to take advantage of the access restrictions and grade separations where practical; Includes a slight westward "swing" into Woodlands Mall area.
Spur to Greenspoint & Kuykendahl Park & Ride	
Greens Rd.	Proceed west to Greenspoint Dr., probably at-grade in the median.
Greenspoint Dr.	Proceed south to Greenspoint Mall.
Greens Bayou or new alignment +/- ½ mile east of IH-45	Proceed north on Greenspoint then northwest on new alignment to the Kuykendahl Park & Ride lot, generally at-grade with aerial structure over IH-45.
Spur to Bush IAH	
Hardy Airport Connector	Proceed east to JFK Blvd., probably at-grade
JFK Blvd.	Proceed to the vicinity of Terminal C, probably at-grade in the median.

Exhibit 2.28: Transit Alignment 3 – Green Line

Both Light Rail Transit and Bus Rapid Transit will be considered for this alignment. Similar horizontal and vertical design criteria were used for the two modes and the plan views generally used a single symbol to represent both modes. Both modes are expected to operate in both express and local service. In an arterial environment, operating speeds would be dictated by the adjacent vehicular traffic speed limit.

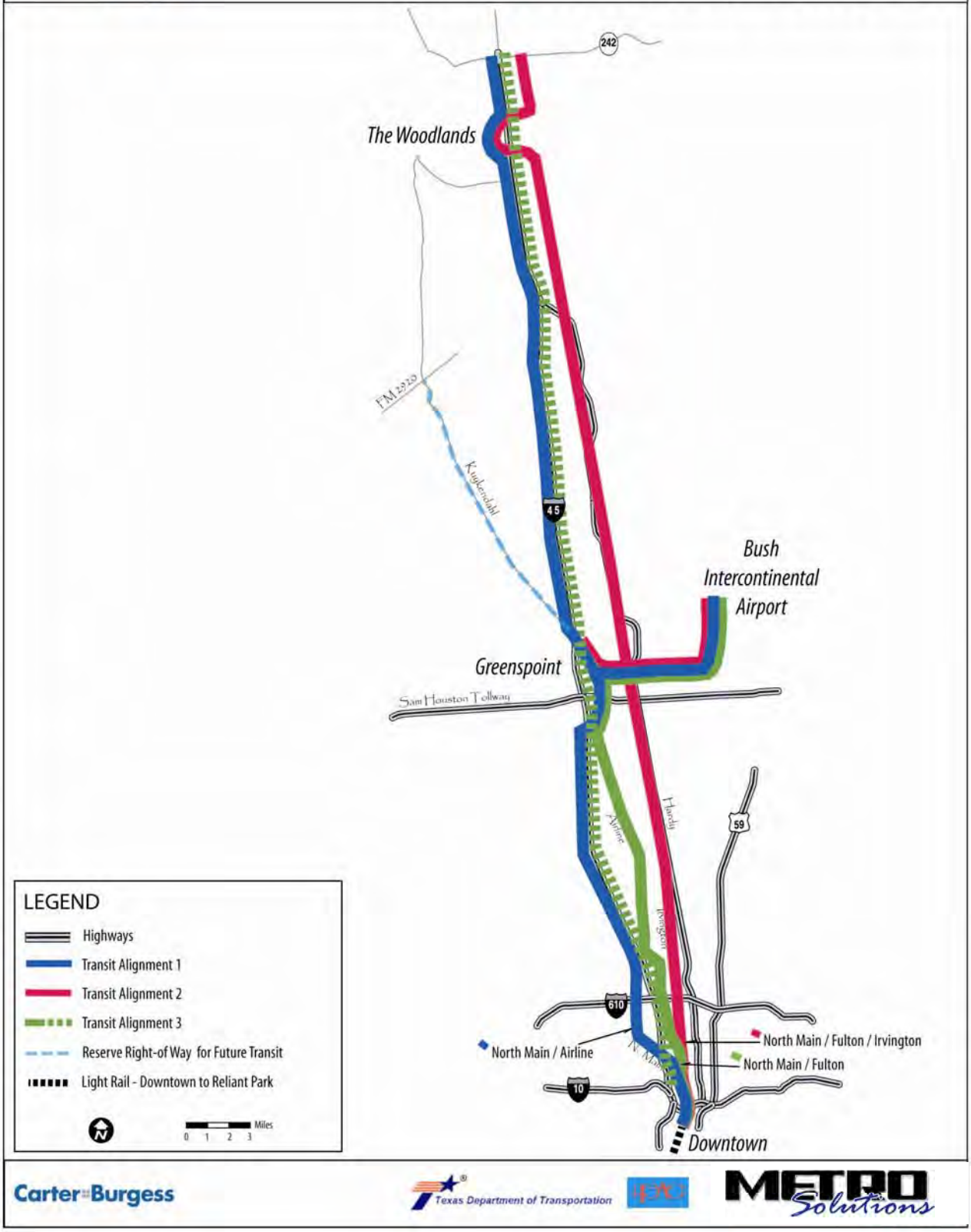
This alternative uses High Occupancy Vehicle (HOV) facilities in IH-45 to provide express connections to areas outside of Beltway 8.

Alignment	**Initial Description**
Main Line	
N. Main St.	Begin at the "existing" light rail station at U of H Downtown; Proceed north to approximately Burnett on aerial structure to be above the floodplain & railroad; Proceed northwest to approximately Boundary at-grade, probably in the middle of the street.
Little White Oak Bayou & Hays St.	Proceed northeast to Fulton within the drainage right of way, probably at-grade.
Fulton	Proceed north to Irvington, probably at-grade.
Irvington	Proceed north to Cavalcade, probably at-grade in the median.
Cavalcade	Proceed west to Fulton, probably at-grade in the median.
Fulton	Proceed north to vicinity of Crosstimbers, probably at-grade in the median.
Northline Mall	Proceed northwest to Airline, generally in the vicinity of Northline Mall, probably at-grade.
Airline	Proceed north to approximately West Road on elevated structure; then continue to Aldine Bender at-grade in the middle of the street.
Future Extension of Greenspoint Dr.	Proceed northeast to the southern terminus of Greenspoint Dr., probably at-grade.
Greenspoint Dr.	Proceed north to approximately Greens Rd., probably at-grade and integrated into mall and/or office complex development.
Greens Rd.	Proceed east to Central Greens Blvd., probably at-grade in the median.
Central Greens Blvd.	Proceed north to Hardy Airport Connector, probably at-grade
Hardy Airport Connector	Proceed east to JFK Blvd., probably at-grade
JFK Blvd.	Proceed to the vicinity of Terminal C, probably at-grade in the median.

Spur to Greenspoint & Kuykendahl Park & Ride	
Greens Bayou or new alignment +/- ½ mile east of IH-45	Proceed northwest to the Kuykendahl Park & Ride lot, generally at-grade with aerial structure over IH-45.
HOV to the North	
IH-45	Modify the existing HOV lane as necessary or incorporate transit service into managed lanes on IH-45 to provide point-to-point, high speed, reliable express transit service from north of Beltway 8 (The Woodlands, Kuykendahl park & ride, etc.) to Downtown. Incidental service would be provided from inside-the-Belt locations such as the Shepherd park & ride lot.

North Hardy planning studies

Exhibit 2.29: Transit Alternatives – Short List



Carter Burgess

Texas Department of Transportation

METRO Solutions

2.4.2: Short List of Highway Alternatives

The screening of the initial alternatives highlighted the need to add additional highway capacity to the IH-45 corridor without negatively impacting sensitive neighborhoods by either taking right of way or constructing/widening elevated freeway lanes. The discussions during screening indicated that highway alternatives that explored added capacity projects other than typical general purpose freeway lanes should be pursued. These alternative highway improvements include projects such as upgraded arterials; maximizing the use of parallel freeway or toll roads; peak period reversible freeway lanes; managed lanes (defined as toll facilities with HOVs that are managed to maintain pre-defined minimum levels of service); upgrading the IH-45/IH-10 and IH-45/IH-610 interchanges to current standards; and HOV lanes. Thus, the short list of highway alternatives includes these types of improvements.

The regional travel demand models indicate a 30-70% increase in traffic demand by the year 2022 beyond the capacity of the existing IH-45. Several alternative approaches are explored for meeting this anticipated demand.

North of Buffalo Bayou

Arterial Upgrades. Using the travel demand modeling process, a comprehensive upgrade of arterials will be studied as diversions for traffic from IH-45 to north/south arterials (e.g. Fulton/San Jacinto, Airline, N. Main and Shepherd). In addition, upgrades to east/west arterials will be modeled to better understand the ability of the arterial system to satisfy short and medium distance trips, thereby removing these trips from the freeway system.

Maximizing Hardy Toll Road Extension. The regional travel demand model will be used to investigate means of maximizing the planned Hardy Toll Road Extension to the Downtown as a reliever facility for IH-45 between IH-610 & Downtown. Direct connection ramps to/from IH-610; ramps to/from other entry points to Downtown (i.e. – the Elysian Viaduct and/or McKee); and on/off ramps to Quitman will be modeled.

IH-45 Additional Capacity. The narrowest portion of the IH-45 right of way is immediately north of the N. Main St. bridge and is approximately 245 feet in width. This width should be sufficient for bringing the existing eight general purpose lanes and one HOV lane to current design standards and adding approximately four additional lanes using such design and construction techniques as vertical retaining walls and cantilevered frontage roads. Additional general purpose and/or managed lanes will be investigated, as will additional HOV lanes. One option will explore the use of an elevated structure through this section to add capacity.

Options found to be feasible for adding capacity to IH-45 in this narrowest section will be applied to the remainder of IH-45 between IH-10 and Beltway 8, based upon the initial assumption that an approximate 50% increase in capacity is required.

The results of the arterial upgrade analysis, the maximizing of the Hardy Toll Road, and the transit alternatives will be considered when the final demand estimates and facility requirements are developed.

IH-45 Flood Relief. A portion of IH-45 in the vicinity of N. Main is prone to flooding by nearby waterways. The hydraulic record will be investigated to determine the extent of this flooding and an option will be developed to elevate IH-45 sufficiently to prevent flooding of the main lanes between approximately Patton and IH-10.

South of Buffalo Bayou.

Alternatives to Expanding IH-45 and US 59. Using the regional travel demand models, two alternative means of relieving anticipated congestion will be investigated, as follows:

- Modifications to other freeways (IH-10 and US 59 on the north & east sides of Downtown, respectively) to divert traffic from key segments of IH-45 & US 59.
- Develop a combination of “super streets” and upgraded arterials to remove Downtown/Midtown-bound traffic from key segments of IH-45.

The resulting traffic assignments will be converted into an estimate of the number of lanes for IH-45 and US 59 required to meet the estimated demand.

2.5: Build Alternatives Carried Forward

2.5.1. Description of Alignments

The following sections describe in text form the alignment and station locations of each of the short list of transit alternatives: the Blue Line, the Red Line, and the Green Line. The alignment and stations have also been documented in the form of conceptual alignment drawings as included in Appendix E. These alignment drawings are at a scale of 1 inch = 400 feet, and conceptually illustrate the horizontal alignment, general locations of stations, horizontal stationing and curvature, as well as provide an indication of where the alignment is at-grade, aerial, or crosses underneath other structures.

Blue Line

U of H to The Woodlands

The proposed Blue Line begins at the northern terminus of the Downtown to Reliant Park light rail line at U of H Downtown. From there it heads north, at-grade, following the existing right-of-way of Main Street on the west side. About 500 feet north of IH-10, the LRT/BRT alignment becomes an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 1,900 feet and then returns back to grade in the center of North Main near Harrington Street,

just north of which, an at-grade station is located at Hogan Street. Potentially, a station could be located on the elevated section near Hardy Yard.

The Blue Line continues at-grade in the center of North Main for approximately 2 miles to Airline Drive. In this section three stations are planned – at Quitman Street, at IH-45 just west of the freeway, and at Airline Drive. The alignment then turns north and continues at-grade in the center of Airline Drive for approximately 2 miles with stations at Cavalcade Street and at IH-610. After IH-610, the alignment is on aerial structure in the center of Airline Drive to cross over the Houston Belt and Terminal (HB&T) railroad, then returns to grade. Shortly before Crosstimbers the Blue Line rises again onto an elevated structure in the center of Airline and then turns northeastward flying over Crosstimbers Street and IH-45 to reach Northline Mall. An aerial station would be located on the west side of Northline Mall.

From Northline Mall, the alignment continues north on an aerial structure along IH-45 for approximately 7.6 miles positioned in the narrow strip of space between the northbound freeway lanes and the adjacent frontage road. Aerial stations are proposed at the following major cross streets: Tidwell Street, Parker Road, Little York Road, Gulf Bank Road, West Mount Houston Road, and West Road. Just north of Aldine Bender Road, the Blue Line returns to grade as it turns to the northeast. The alignment continues at grade turning north onto the southern extension of Greenspoint Drive. After crossing under Beltway 8, the Blue Line ramps up onto an aerial structure and swings onto Greenspoint Mall property on the west side of Greenspoint Drive. It continues on aerial guideway to a Greenspoint Mall station located approximately 1,000 feet south of Greens Road. Leaving the Greenspoint Mall Station the aerial alignment turns west toward IH-45 paralleling Greens Road for a short distance while ramping higher before turning northward and flying over Greens Road and the northbound lanes of IH-45. The alignment comes to grade in the center of IH-45 and continues at grade to Rankin Road. It then ramps up onto aerial structure and turns northwestward to reach the Kuykendahl Park-and-Ride facility. A new aerial station would be located along the east side of the current Park-and-Ride facility. The alignment would continue on aerial structure, turning back toward IH-45 and come to grade in the center of IH-45 near Airtex Drive. It then continues north in the center of IH-45 almost entirely at-grade for approximately 12.3 miles to The Woodlands Parkway. Three stations are proposed in this segment, at FM 1960, at Louetta, and at Rayford/Sawdust Road. At FM 1960 and Rayford/Sawdust, the alignment rises onto an aerial structure in the center of IH-45. These stations would be aerial stations in order to provide elevated passenger access over the adjacent freeway lanes.

At Woodlands Parkway, the Blue Line becomes an aerial structure in order to cross to the west side of IH-45 and to the west side of Lake Woodlands to an aerial station at the Woodlands Mall. Beyond the Woodlands Mall station the aerial alignment turns eastward toward IH-45 flying over Lake Woodlands Drive and coming down to grade in the center of IH-45 near Medical Plaza Drive. The alignment continues at-grade in the center of IH-45 for 2.2 miles and then transitions into an aerial structure as it crosses SH 242 and terminates at an aerial station just north of SH 242.

The total alignment distance of the north-south alignment is 32.6 miles, consisting of 13.8 miles from U of H to the junction with the Airport spur at Greenspoint Mall, and 18.8 miles between this junction and SH 242.

Bush Intercontinental Airport Spur

Leaving the proposed aerial station at Greenspoint Mall the Blue Line has a spur that turns east toward Bush Intercontinental Airport. The alignment stays aerial and continues east in the center of Greens Road. An aerial station is proposed at Imperial Valley Drive. Shortly before reaching West Hardy Road, the alignment swings to the north side of Greens Road and continues in a northeasterly direction flying over Hardy Road, the Union Pacific Railroad, and the Hardy Toll Road until it reaches the Hardy Toll Road Airport Extension.

The alignment then follows the south side of the Hardy Toll Road extension. The alignment stays aerial initially to fly over Central Green Blvd, Air Center Blvd, and Aldine Westfield Road before continuing at-grade. The alignment becomes aerial again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Blvd. A station is proposed immediately after the northward turn as the alignment comes to grade near the City Economy Lot. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK Boulevard lanes continuing at grade to a proposed terminal station at the intersection of JFK Boulevard and Terminal Road South. The total length from Greenspoint Mall to Bush Intercontinental Airport is 7.7 miles.

Red Line

U of H to The Woodlands

The Red Line follows the same alignment with identical stations as the Blue Line from its point of origin at U of H, along North Main to Little White Oak Bayou, just north of Boundary Road. In this section the alignment heads north, at-grade, following the existing right-of-way of Main Street on the west side. About 500 feet north of I-10, the alignment becomes an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 1,900 feet and then returns back to grade in the center of North Main near Harrington Street, just north of which an at-grade station is located at Hogan Street. Potentially, a station could be located on the elevated section near Hardy Yard. Beyond Hogan the alignment continues at-grade in the center of Main with an additional station at Quitman Street. At Little White Oak Bayou, the Red Line shifts to the northeast to follow along the south side of the Bayou to Fulton Street at-grade. An alternate option to reach Fulton Street has been proposed turning east on Boundary Street and then north on Fulton. The alternate alignment options meet at Hays and Fulton Streets. Beyond this point the

alignment veers to the right to follow Irvington Blvd. It continues almost entirely at-grade in the center of Irvington for 4.5 miles to West Hardy Road. Stations in this segment are proposed north of Hays Street near Bigelow, at Patton Street, Cavalcade Street, IH-610, Crosstimbers Street, and at Tidwell Street. North of IH-610, the alignment rises onto an aerial structure for 2,400 feet to fly over the HB&T railroad.

Where Irvington terminates at West Hardy Road, the alignment veers north entering Reliant Energy right-of-way between the Hardy Toll Road and West Hardy Road – a wide unpaved, grassy area. As it crosses West Hardy Road, it remains at-grade. The Red Line follows the Hardy Toll Road within the existing Reliant Energy right-of-way to just north of Gulf Bank, a distance of 2.8 miles. In this section, it becomes aerial just north of Parker to fly over the Hardy Toll Road exit and entrance ramps and then returns to grade at Little York where an at-grade station is proposed. Beyond Little York the alignment again becomes aerial to fly over the Hardy Toll Road exit ramp for Little York. The remainder of this section is at-grade with an at-grade station at Gulf Bank. The Reliant Energy right-of-way terminates approximately 2,000 feet north of Gulf Bank Road. The alignment would continue north adjacent to the Hardy Toll Road in the space currently occupied by West Hardy Road lanes. The displaced West Hardy Road lanes would be shifted westward.

Approximately 1.1 miles south of Aldine Bender Road the Hardy Toll Road lanes shift to the east side of the UP Railroad. This provides additional space adjacent to West Hardy Road so that the alignment will be located adjacent to the existing West Hardy Road lanes along the east side. Shortly before Beltway 8 the Red Line alignment shifts from this position to the median of West Hardy Road. It continues at-grade in the median to an at-grade station for Greens Road, which actually will be located some distance south of Greens Road. Beyond this station, the alignment splits into three branches: the main branch continuing to The Woodlands, and two spurs diverging, one to Bush Intercontinental Airport and one to Greenspoint and the Kuykendahl Park-and-Ride as discussed below.

As the Red Line continues north to The Woodlands, it stays primarily at-grade adjacent to and west of the UPRR, except for a 5.2 mile section in the area of GMAC Yard, where it follows along the west side of the Hardy Toll Road. Stations in this section are proposed at Richey Road, FM 1960, Louetta, and Rayford Road. Immediately north of Louetta station the alignment would rise onto an aerial structure for 4,900 feet to fly-over UPRR rail spurs in the Old Town Spring area. Beyond Rayford Road, the Red Line continues north adjacent to the UPRR right-of-way to Robinson Road, where it turns to the west toward The Woodlands. As it approaches IH-45 at Woodlands Parkway, the Red Line becomes elevated to cross to the west side of IH-45. It continues on an aerial structure to a proposed aerial station at The Woodlands Mall identical to the station proposed for the Blue Line. From this point north the Red Line follows the same alignment as the Blue Line. It turns eastward toward IH-45 flying over Lake Woodlands Drive and returns to grade in the center of IH-45 near Medical Plaza Drive. The alignment continues at-grade in the center of IH-45 for 2.2 miles and then transitions

into an aerial structure as it crosses SH 242 and terminates at an aerial station just north of SH 242.

The total alignment distance of the main north-south alignment is 32.3 miles, consisting of 12.9 miles from U of H to the junction with the Airport and Greenspoint spurs at Greens Road, and 19.4 miles between this junction and SH 242.

Bush Intercontinental Airport Spur

Immediately after the Greens Road Station (located on West Hardy Road south of Greens Road), the airport spur alignment would rise onto a separate elevated structure to fly over Greens Road, the UPRR, and the Hardy Toll Road to reach the Hardy Toll Road Airport Extension. Identical to the Blue Line from that point to the Airport, the alignment follows the south side of the Hardy Toll Road Airport Extension. Initially it stays aerial to fly over Central Green Blvd, Air Center Blvd, and Aldine Westfield Road before continuing at-grade. The alignment becomes aerial again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Blvd. A station is proposed immediately after the northward turn as the alignment comes to grade near the City Economy Lot. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK Boulevard lanes continuing at grade to a proposed terminal station at the intersection of JFK Boulevard. and Terminal Road South. The total length of the spur from the West Hardy Road/Greens Road Station to Bush Intercontinental Airport is 6.6 miles.

Greenspoint/Kuykendahl Spur

Beyond the Greens Road station on West Hardy Road, the alignment of the spur to Greenspoint and Kuykendahl turns west after crossing under Greens Road staying initially at-grade, and then ramping up onto an aerial structure. The aerial alignment crosses the westbound lanes of Greens Road and then continues west on an aerial structure in the center of Greens Road. This section is similar to the Blue Line, with an aerial station at Imperial Valley Road. As the alignment reaches Greenspoint Drive, it swings back to the north side of Greens Road with an elevated station near this intersection to serve Greenspoint Mall. Beyond the station as the alignment approaches IH-45, the aerial structure rises and turns northward flying over the northbound lanes of IH-45 and comes to grade in the center of IH-45. Identical to the Blue Line, it continues at-grade to Rankin Road before ramping up onto aerial structure and turning northwestward to reach the Kuykendahl Park-and-Ride facility. A new aerial station would be located along the east side of the current Park-and-Ride facility. This station would be the terminus for this Red Line spur. The total length of the spur from the West Hardy Road/Greens Road Station to Kuykendahl Park-and-Ride is approximately 3.7 miles.

U of H to Bush Intercontinental Airport

The Green Line follows the same alignment with identical stations as the Red Line from its point of origin at U of H to Cavalcade. In this section it heads north, at-grade, following the existing right-of-way of Main Street on the west side. About 500 feet north of I-10, the alignment becomes an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 1,900 feet and then returns back to grade in the center of North Main near Harrington Street, just north of which, an at-grade station is located at Hogan Street. Potentially, a station could be located on the elevated section near Hardy Yard. Beyond Hogan the alignment continues at-grade in the center of Main with an additional station at Quitman Street. At Little White Oak Bayou, the Green Line shifts to the northeast to follow along the south side of the Bayou to Fulton Street at-grade. An alternate option to reach Fulton Street has been proposed turning east on Boundary Street and then north on Fulton. The alternate alignment options meet at Hays and Fulton Streets. Beyond this point the alignment veers to the right to follow Irvington Blvd. with stations proposed north of Hays Street near Bigelow, at Patton Street and at Cavalcade Street. At Cavalcade, the Green Line turns west and continues at-grade in the center of Cavalcade to Fulton Street. At Fulton, the alignment turns north with an at-grade station at Cavalcade and Fulton and continues in the center of Fulton to Crosstimbers. At IH-610 an at-grade station is proposed. Approximately 1,600 feet north of IH-610, the Green Line rises onto an aerial structure to fly over the HB&T Railroad. It continues on an elevated structure in the center of Fulton until reaching Northline Mall at Crosstimbers.

The alignment continues through Northline Mall with an aerial station proposed on the east side of the Mall. Beyond the station the alignment turns westward to reach Airline Drive, then turns north onto Airline and continues on an aerial structure in the center of Airline for 6.1 miles to just north of West Road. Aerial stations in this segment are proposed at Tidwell Street, Parker Road, Little York Road, Gulf Bank Road, and West Road.

Approximately 900 feet north of the station at West Road, the alignment comes down to grade in the center of Airline Drive continuing in this fashion past Aldine Bender Road, where Airline Drive terminates. North of Aldine Bender Road, the Green Line has the same alignment and stations as the Blue Line. The alignment continues at grade onto the southern extension of Greenspoint Drive. After crossing under Beltway 8, it ramps up onto an aerial structure and swings onto Greenspoint Mall property on the west side of Greenspoint Drive. It continues on aerial guideway to a Greenspoint Mall station located approximately 1,000 feet south of Greens Road. Beyond the Greenspoint Mall station, the alignment splits into two spurs, one to Bush Intercontinental Airport, and one to Kuykendahl Park-and-Ride, as described below.

The alignment of the Airport spur is identical to the Blue Line staying aerial and continuing east in the center of Greens Road. An aerial station is proposed at Imperial Valley Drive. Shortly before reaching West Hardy Road, the alignment swings to the north side of Greens Road and continues in a northeasterly direction flying over Hardy Road, the Union Pacific Railroad, and the Hardy Toll Road until it reaches the Hardy Toll Road Airport Extension.

The alignment then follows the south side of the Hardy Toll Road extension. The alignment stays aerial initially to fly over Central Green Blvd, Air Center Blvd, and Aldine Westfield Road before continuing at-grade. The alignment becomes aerial again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Blvd. A station is proposed immediately after the northward turn as the alignment comes to grade near the City Economy Lot. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK Boulevard lanes continuing at grade to a proposed terminal station at the intersection of JFK Boulevard and Terminal Road South. The total alignment distance from U of H to Bush Intercontinental Airport is 21.8 miles, 14.1 miles of which make up the segment from U of H to the Greenspoint Mall Station.

Kuykendahl Park-and-Ride Spur

After leaving the Greenspoint Mall station the aerial alignment of the Green Line spur to the Kuykendahl Park-and-Ride turns west toward IH-45 paralleling Greens Road for a short distance while ramping higher before turning northward and flying over Greens Road and the northbound lanes of IH-45. This section is also identical to a portion of the Blue Line. The alignment comes to grade in the center of IH-45 and continues at grade to Rankin Road. It then ramps up onto aerial structure and turns northwestward to reach the Kuykendahl Park-and-Ride facility. A new aerial station would be located along the east side of the current Park-and-Ride facility. This station would be the terminus for this Green Line spur. The distance from the Greenspoint Mall Station to Kuykendahl Park-and-Ride is approximately 2.2 miles.

2.5.2 Technology Options

A North-Hardy Corridor Report entitled “Results of the First Level Alternative Screening and Evaluation Process” and dated August 2002 recommended that two transit technologies be considered for further evaluation in each of the three short-listed North-Hardy alignments. The two technologies are Light Rail Transit (LRT) and Bus Rapid Transit (BRT). Descriptions of each of these technologies are provided in Section 2.2.1. LRT and BRT share the same footprint in plan view in each of the alignments. Study of the alignments involved numerous field investigations to determine how best to apply LRT and BRT along each alignment. Refinements of the North-Hardy Corridor Alternatives were made after consultations with staffs of METRO and the General

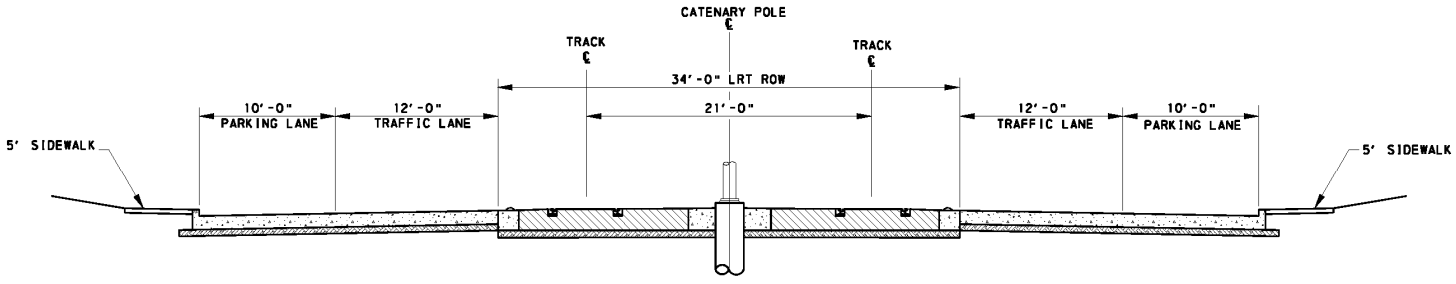
Planning Consultant. Preliminary alignments are presented on 400 feet equal one-inch scale plan-view drawings, which are included in Appendix A. Aerial sections versus at-grade sections of the alignment are shown on the drawings. The alignments conform to METRO's civil criteria.

To better visualize the physical aspects of each technology, a number of typical cross-sectional views have been prepared. These are presented in Exhibits 2.30 through 2.37.

Please note that the BRT alignment shares most of the physical characteristics of the line-haul LRT alignment. BRT vehicles would travel along the same alignments on pavement instead of rails and make the same station stops as LRT trains. BRT operations, of course, would not require certain system elements, such as running rails, traction power, catenary poles and signal equipment, which are needed for LRT operations. Each of the corridor Study Teams has been asked by METRO to assume that LRT and BRT vehicles have the same performance characteristics. This assumption has been applied to basic operating plans that were devised for each of the three alignments of the North-Hardy Corridor, resulting in identical travel times for LRT and BRT technologies. The maintenance facility, transit centers, and parking facilities would also be similar except for the differences dictated by bus versus light rail technology.

Exhibit 2.30 presents a cross-section of typical at-grade LRT embedded double track. Such a cross-section would apply to North Main and Greenspoint Drive.

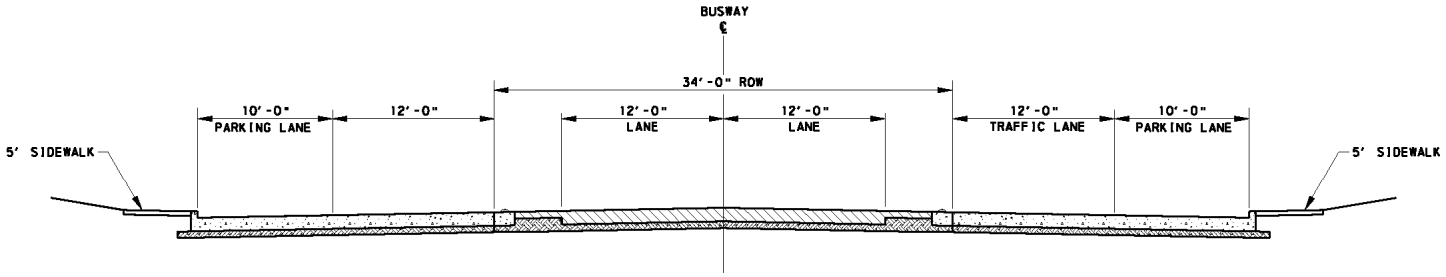
Exhibit 2.30: Typical – At Grade Embedded Double Track



TYPICAL - AT GRADE EMBEDDED DOUBLE TRACK

Exhibit 2.31 presents a typical at-grade double lane BRT cross-section.

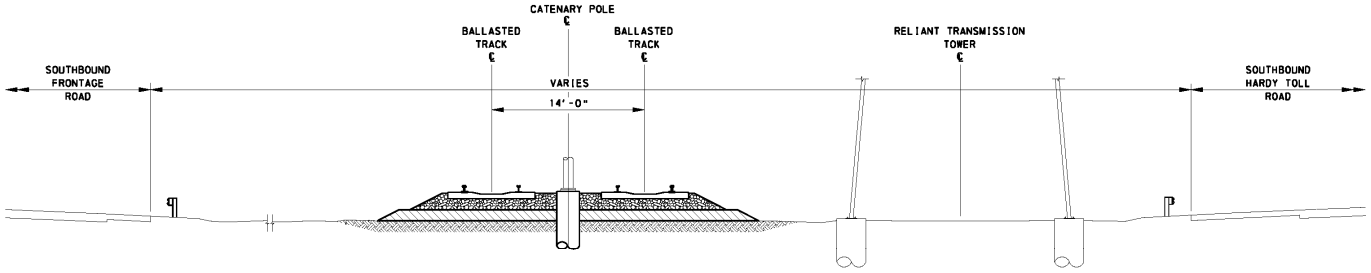
Exhibit 2.31: Typical – At-Grade Double Lane BRT



TYPICAL - AT GRADE BUSWAY (TWO LANES)

Exhibit 2.32 shows a cross-section of ballasted double track. The section of ballasted track shown in this particular view is located adjacent to a Reliant Energy transmission line as would be the case for the Red LRT Alternative alignment (i.e.; LRT Alternative 2). Preliminary discussions with Reliant Energy indicate that they may be willing to cooperate with METRO in providing a strip of their right-of-way to accommodate a transit alignment.

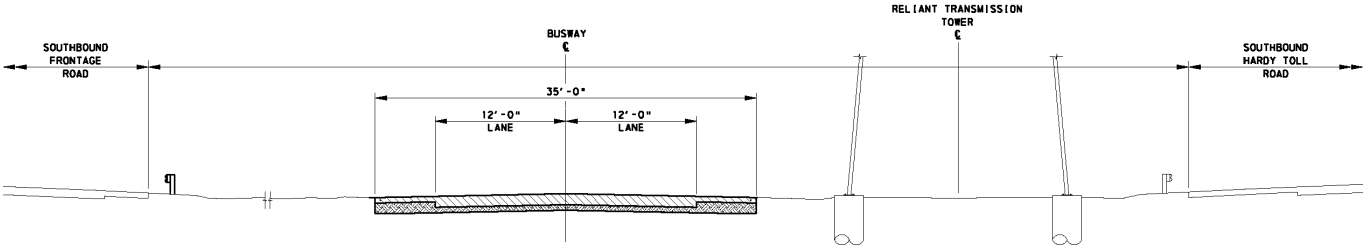
Exhibit 2.32: Typical – At Grade Ballasted Track



TYPICAL - AT GRADE BALLASTED TRACK
IN RELIANT ENERGY ROW ADJACENT TO
HARDY TOLL ROAD

Exhibit 2.33 illustrates the same representative section for BRT.

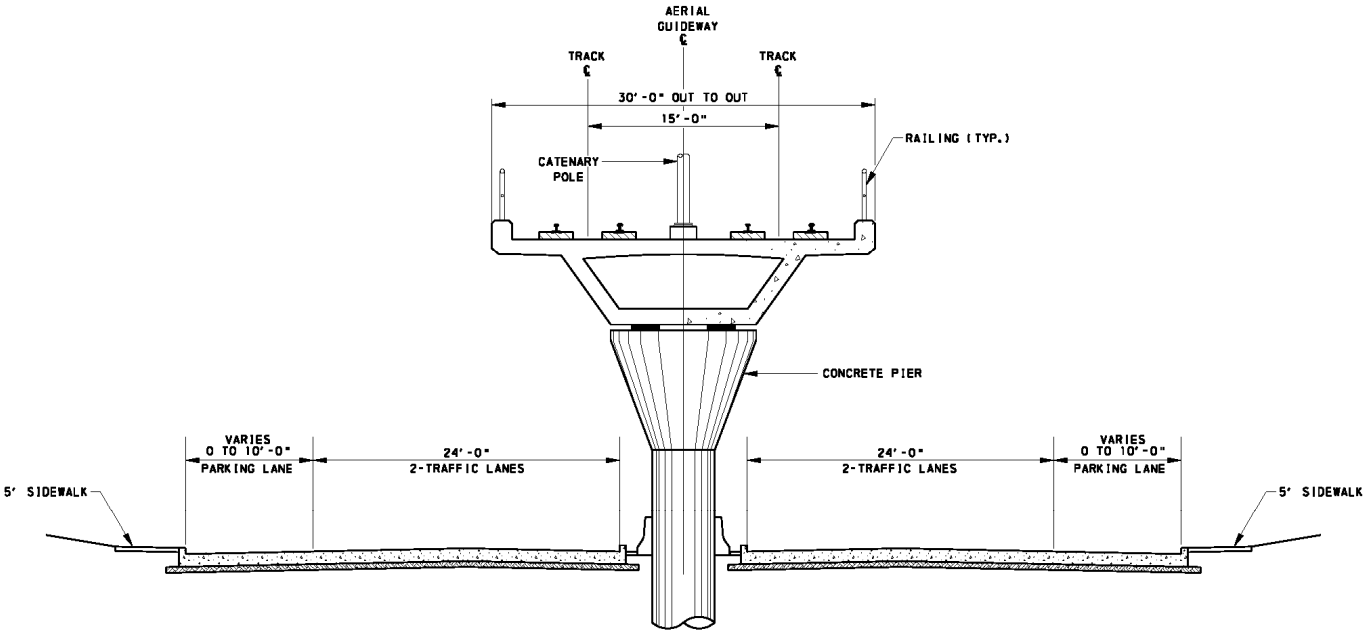
Exhibit 2.33: Typical – At Grade Busway (Two Lanes)



TYPICAL - AT GRADE BUSWAY (TWO LANES)
IN RELIANT ENERGY ROW ADJACENT TO HARDY TOLL ROAD

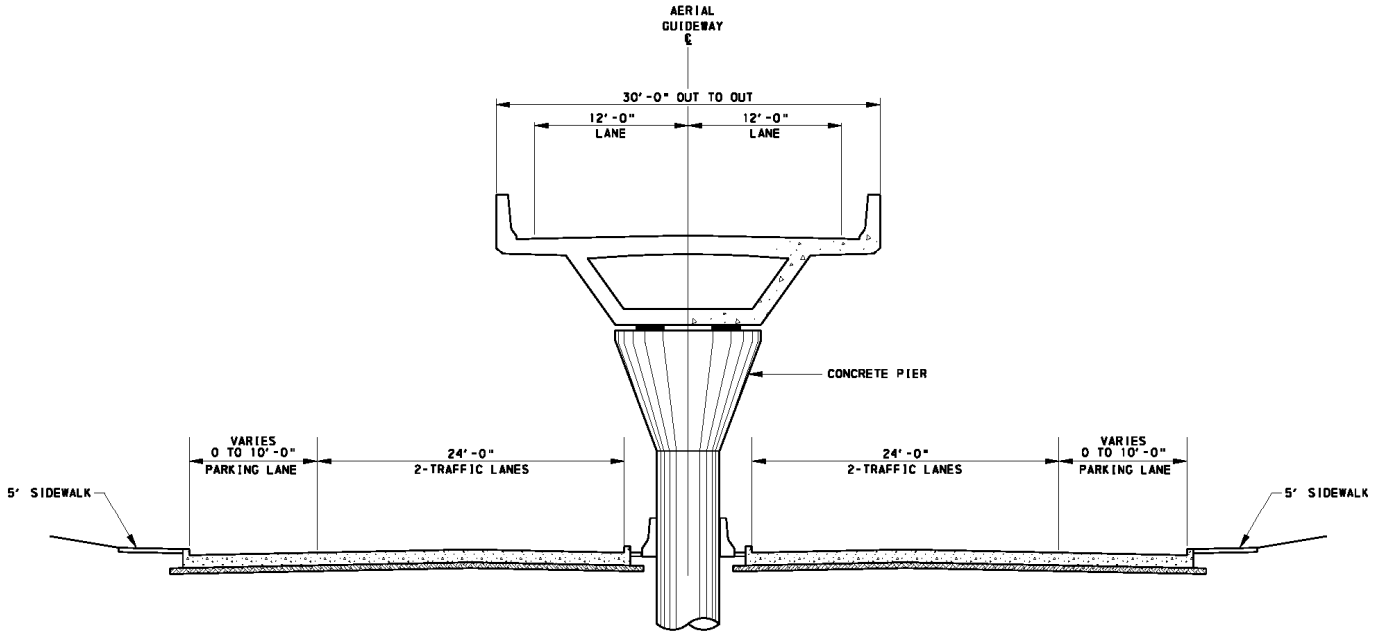
Exhibits 2.34 and 2.35 show a typical cross-section for aerial LRT and BRT, respectively, as would appear on Airline Drive in Green Alternative # 3 or on Greens Road in all three alternatives.

Exhibit 2.34: Typical – LRT Aerial Structure on Airline Drive and Greens Road



TYPICAL - LRT AERIAL STRUCTURE
AND TRAFFIC LANES ON AIRLINE DRIVE AND GREENS ROAD

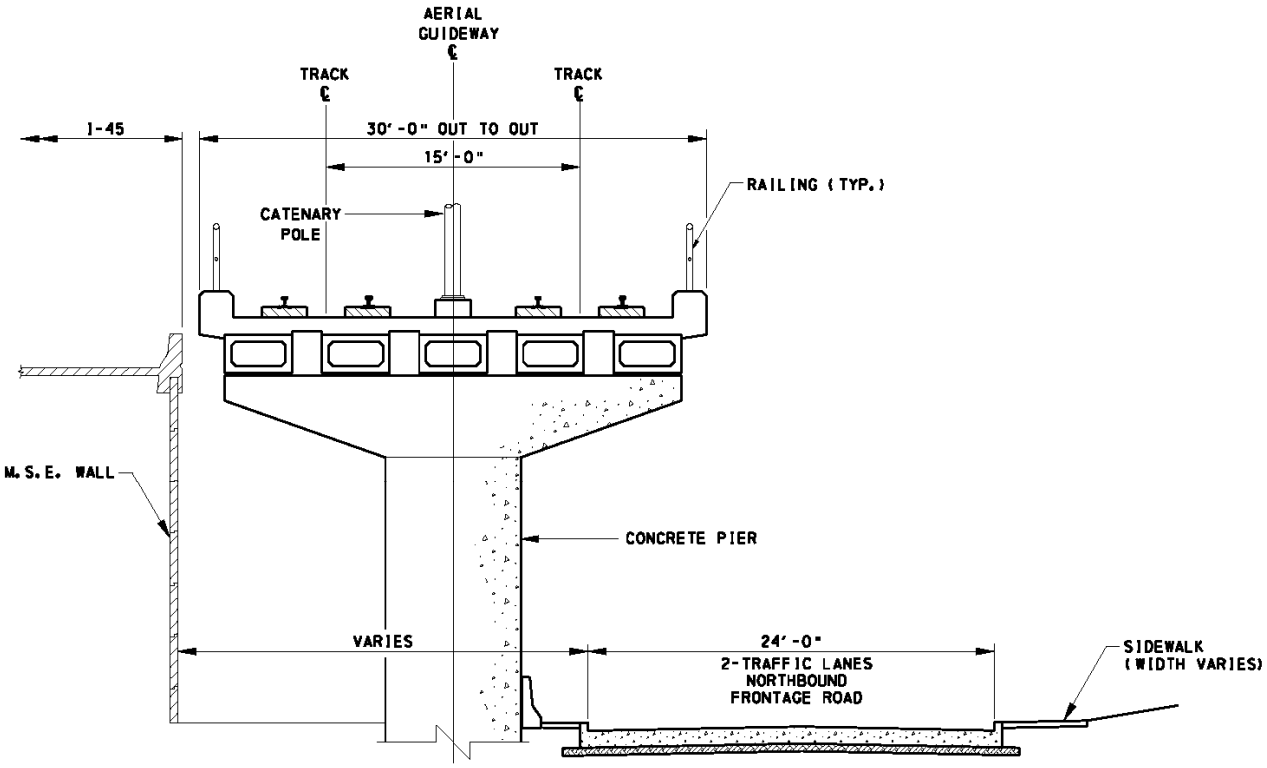
Exhibit 2.35: Typical – BRT Aerial Structure on Airline Drive and Greens Road



TYPICAL -BUSWAY AERIAL STRUCTURE
AND TRAFFIC LANES ON AIRLINE DRIVE AND GREENS ROAD

Exhibits 2.36 and 2.37 depict a cross-section for aerial LRT and BRT, respectively, as would appear along the IH-45 northbound frontage road. The existing two lanes of northbound traffic and sidewalks are maintained. Although the cross-sections in Exhibits 2.36 and 2.37 indicate a single-column aerial structure supporting two LRT tracks or two BRT lanes, the aerial structure can be replaced by retained fill sections adjacent to IH-45 where it is deemed more economical to do so.

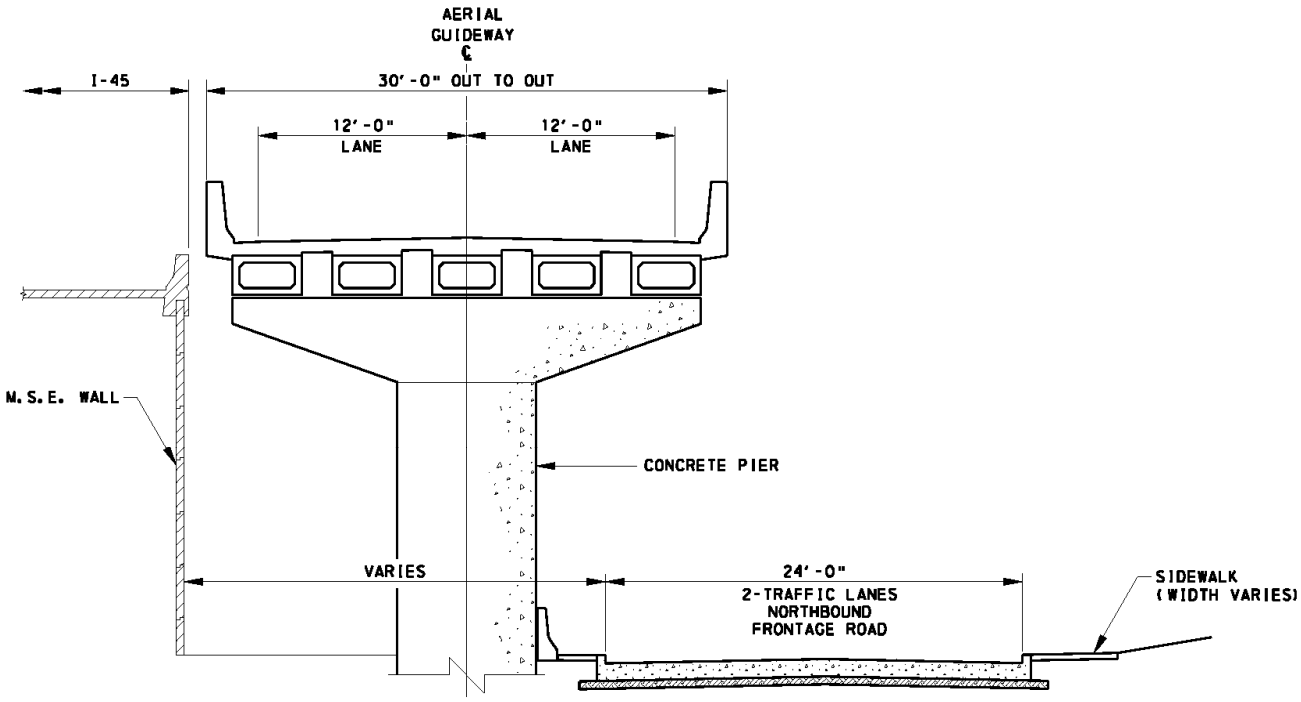
Exhibit 2.36: Typical LRT Aerial Structure Adjacent to IH-45



TYPICAL - LRT AERIAL STRUCTURE

AND NORTHBOUND FRONTAGE ROAD LANE ON
THE EAST SIDE OF I-45 NORTH OF
CROSSTIMBERS AND I-45

Exhibit 2.37: Typical BRT Aerial Structure Adjacent to IH-45



TYPICAL - BUSWAY AERIAL STRUCTURE

AND NORTHBOUND FRONTAGE ROAD LANE ON
THE EAST SIDE OF I-45 NORTH OF
CROSSTIMBERS AND I-45

2.5.3. Facility Requirements

LRT or BRT Maintenance Facilities will be required for all three North-Hardy Corridor transit alignments.

The present LRT Yard and Shop located at South Fannin will not be able to handle the additional vehicles required to service line extensions. The present LRT Maintenance Facility is sized to store up to 60 light rail vehicles, which are projected to support operations in the year 2025 on the Downtown to Reliant Park LRT line only. The shop is sized and equipped to service 60 vehicles and to provide periodic heavy equipment overhaul. The facility also provides for Maintenance-of-Way equipment and auxiliary support vehicles. The shop also houses most METRORail operations and maintenance administrative personnel.

For a North-Hardy LRT line extension, a light maintenance and inspection facility would be required. The facility would include storage tracks for the additional fleet of vehicles needed to support 2025 service requirements of the extended line. The new maintenance facility would reduce vehicle deadhead time by providing another vehicle

supply point for METRO's LRT system. A similar maintenance and storage facility would be needed to support a new fleet of BRT vehicles, if BRT technology was chosen as the preferred Alternative for the North-Hardy Corridor.

Although the capital cost of a LRT and BRT maintenance facility has been accounted for, its exact location is deferred to later studies that would occur if and when a locally preferred alternative for the North-Hardy Corridor is selected. Nonetheless, there are some general locations that are worthy of future investigation. All three North-Hardy alignments have a branch that goes to the Bush Intercontinental Airport. Approximately 2.5 miles of this branch follows the Hardy Toll Road Airport Connector on its south side. There appears to be plenty of suitable, undeveloped land in this general area where a maintenance facility can be situated. Other than this general location, which is common for three alternatives, there are other locations that can be considered for each alignment. For the Blue Alternative, there are numerous potential sites where a maintenance facility can be located along IH-45. Similarly, for the Red Alternative, there are numerous locations along Union Pacific Railroad corridor, which the alignment follows, particularly in the stretch between Greens Road and Robinson Road. For the Green Alternative, there may be opportunities to locate a maintenance facility along Airline Drive in the general vicinity between Gulf Bank and Aldine Bender Road.

The number of maintenance facility vehicle spaces is based on the LRT or BRT vehicles required for each alternative alignment. To allow for future expansion, the maintenance facility is sized for 50% more vehicles than the estimated 2025 fleet requirement. It is assumed that two BRT vehicles are required to provide the equivalent passenger capacity of one LRT vehicle. The space required for a 50-car LRT fleet or a 100-car BRT fleet is estimated to be 15 acres. The space needed for smaller or larger fleets is proportionately sized based on this estimated acreage.

Parking facilities are included along each alignment adjacent to selected passenger stations. Key determinants in the selection of parking facilities are the anticipated need for such facilities and the availability of land adjacent to passenger stations. Two types of parking facilities are provided; i.e., surface parking and structured parking. Each parking facility is assumed to provide an initial capacity of 500 car-spaces. Surface parking is less costly per vehicle space, but requires more acreage than structured parking. Consequently, structured parking is located within high activity areas where property space and associated costs are at a premium. For this reason, structured parking in the North-Hardy Corridor is only located at major shopping malls. Four bus bays and associated access roads and amenities are included at structured parking locations only. In effect, the structured parking facility locations also serve as transit center locations by providing parking, kiss & ride, and bus transfer functions.

Passenger stations at which surface and structured parking locations are situated for each of the North-Hardy Corridor alignments are indicated in Exhibit 2.38 below.

Exhibit 2.38: Parking at Passenger Stations

	Surface Parking	Structured Parking
Blue Alternative # 1	Tidwell, Parker, Little York, Gulf Bank, West Mount Houston, West Road, Kuykendahl P&R, FM 1960, Louetta, Rayford Sawdust, SH-242	Northline Mall, Greenspoint Mall, Woodlands Mall
Red Alternative # 2	Little York, Gulf Bank, Richey Road, FM 1960, Louetta, Rayford, SH-242	Greenspoint Mall, Woodlands Mall
Green Alternative # 3	Gulf Bank, West Road, Kuykendahl P&R	Northline Mall, Greenspoint Mall

Please note that surface parking at the existing Kuykendahl P&R facility would be expanded in order to accommodate growth in demand if the Blue or Green Alternative should be selected for implementation in the North-Hardy Corridor.

2.5.4. Operating Plans

Bus Operating Plan

For each of the three alignments the following assumptions were used to construct the underlying bus networks:

- Maintain 30-minute headways for local service on competing routes
- Use Northline Mall Transit Center, Greenspoint Mall Transit Center, and Kuykendahl Park-and-Ride as both local service and AHCT service transfer locations to facilitate transfers
- Place AHCT stations at all cross-town route intersections with each of the AHCT alignments
- Reduce bus (non-BRT) volumes on N. Main (Assumes the Fulton/San Jacinto connection is in place)
- Eliminate competing commuter service from Park-and-Rides that use (or are planned) to use the existing HOV lane (Exception: Alternative 3 – Green Line specifically uses a two-way HOV facility. Park-and-Ride service is maintained throughout the corridor for this alternative.)
- Attempt to preserve all through-routed lines in the corridor even if they compete with the AHCT service (Some through-routing cannot be maintained because of existing imbalance in service between the northern and southern parts of a route)

Written descriptions of each bus route for the “short list” transit alternatives were used to code and test each alternative. Individual route descriptions are in Appendix F.

Guideway Operating Plan

One of the important steps in evaluating alternatives is the establishment of an appropriate operating plan for the service to be provided. In this first step of alternatives analysis, where operating and maintenance costs are not calculated and assessed, the operating plan is needed to determine the running times for each alternative. These, together with the service frequency, can then used to determine demand potential levels. The service provided must then be compared to anticipated demand in order to determine that they are both in balance.

LRT

Since the three alternatives being considered in the North-Hardy Corridor Study (Number 1 – Blue Line, Number 2 – Red Line, and Number 3 – Green Line) are all extensions of the Main Street LRT Line that is under construction, their service levels, etc. must be coordinated with it. On weekdays it is planned to operate a six-minute interval service or headway composed of single-car trains in the peak and mid-day periods running between the northern terminal at the University of Houston Downtown (U of H) Station and the southern terminal at Fannin South (Fannin). An additional six-minute headway service (also with one-car trains) would be operated between the Smithlands and Hermann Park/Rice University stations, but in peak periods only. This provides a combined three-minute peak period headway between the Smithlands and Hermann Park/Rice U. stations to accommodate parking demand at Smithlands for the Texas Medical Center. In the peak periods, then, there will be 10 car trips per hour arriving and departing the U of H Station and 20 car trips per hour in both directions between Smithlands and Hermann Park.

Service Patterns

Alternative 1 (Blue Line) would have two services. One service would run between the Fannin and the SH 242 station near the Woodlands. The second service would run between the Fannin and the Bush Intercontinental Airport (BIAH) stations. Initially, it was determined that each service would run one-half of the trains; in other words, each service would run at a 12-minute headway north of the U of H Station. As will be discussed later in Section 2.5.5: Vehicle Requirements; however, this operating plan was subsequently optimized to provide suitable capacity with fewer Light Rail Vehicles.

Alternative 2 (Red Line) would have three services. The first would run between the Fannin and the SH 242 stations. The second would run from Fannin to the BIAH station. The third would run from Fannin to the Kuykendahl Park and Ride (Kuykendahl) stations. In the case of Alternative 2, each service would operate at three times the combined 6-minute headway of the trunk line, or at an interval of every 18 minutes, north of the U of H Station.

Alternative 3 (Green Line) would have two services. One would connect the Fannin and Kuykendahl Park and Ride stations, and the second would connect Fannin and the

BIAH stations. Each service would operate at double the combined 6-minute headway of the trunk line, or every 12 minutes between the U of H Station and the outlying terminals.

For a preliminary planning study such as this, dividing the services of each branch evenly as a "first cut" estimate treats each branch with the same emphasis from the standpoint of considering potential demand potential and capacity levels. Further, from a practical standpoint, it also would be easier to manage and dispatch the total service levels if they were to be divided in this manner. In keeping with the preliminary nature of this work, it was assumed that all trains would make all stops.

BRT

In the case of BRT, it was assumed that its service would not operate between the U of H Station and Fannin South along Main Street, as this would be a wasteful duplication of the forthcoming LRT service. Instead, after leaving the U of H Station, southbound BRT vehicles would descend the Main Street Bridge and then turn west and then south on city streets to reach the Downtown Transit Center where they would terminate. In addition to avoiding unnecessary duplication of the Main Street LRT service, shortening the BRT routes in this manner would reduce their overall running time, thereby also reducing their operating miles and vehicle hours and, further, reducing their vehicle requirements. Should operation to/from the Downtown Transit Center not be practical, the BRT services could loop via city streets in the same vicinity, instead.

Running Times

The second part of developing an operating plan is the determination of running times. A computer-based Train Performance Simulation was run using the performance characteristics of the METRO LRV, assuming level, tangent track. Station locations were established, using the same alignment drawings that are used for the cost estimating purposes.

The methodology used to calculate the running times between stations makes the following assumptions:

1. There will be one acceleration/braking cycle per station-to-station run.

2. For the distance remaining in this station-to-station run the train would cruise at the maximum speed allowed in that segment:

    a. 30 miles per hour for at-grade operation on streets where that is the vehicular traffic speed limit.

    b. 35 miles per hour for at-grade operation on streets where that is the vehicular traffic speed limit.

    c. 66 miles per hour for grade-separated operation.

3. Where the station-to-station distance is insufficient for trains to reach the top speed generally allowed, the top speed was reduced so that the top speed allowed some cruising time and distance. For example, in Alternative 1, the distance between Parker and Little York is somewhat less than that required to attain 66 miles per hour and then brake to a stop (4,179.6 feet). In this case, the speed limit was reduced to 60 miles per hour (requiring only 2,899.2 feet) and the cruising distance (at 60 mph) was increased. In operating reality, trains would actually attain speeds slightly greater than 60 mph, and running times would be slightly shorter than by this calculation.

4. Station dwell times would average 20 seconds.

5. In view of the preliminary nature of alignment data and the fact that the methodology assumes complete preemption of traffic signals on at-grade alignment segments, which may not be possible at all locations, an upward Schedule Adjustment Factor was applied to the calculated station-to-station run times as follows:

   a. Plus 30 percent for at-grade segments

   b. Plus 20 percent for grade-separated segments.

In the absence of detailed performance data for BRT vehicles, METRO asked that the same running time data be used for BRT as for LRT. As noted in the discussion of service patterns above, this assumption applies from the U of H Station north only. The BRT run time between the U of H Station and the Downtown Transit Center was estimated to be 7.5 minutes, which compares to the 29 minutes currently assumed from U of H to Fannin South for LRT.

Exhibit 2.39 provides sample running times for the various alternatives along the North-Hardy Corridor alignments. They are presented to / from the U of H Station and to/from the Bush Intercontinental Airport Station.

Exhibit 2.39: Running Time Summaries – Light Rail / Bus Rapid Transit

Location	Alternative 1	Alternative 2	Alternative 3
	To / From U of H (in Minutes)		
Woodlands Mall	56.7	53.1	NA
Bush IAH	47.7	42.8	49.5
Greenspoint Mall	34.1	36.5	35.1
Kuykendahl P&R	38.4	41.3	38.1
	To / From Bush IAH (in Minutes)		
Greenspoint Mall	13.6	27.0	12.9
Woodlands Mall	41.2	43.6	NA

Note: For those trips requiring a transfer between services, the time shown includes one half of a service frequency.

Vehicle Capacity

A Loading Standard of 144 passengers per LRV was used to represent the average peak period capacity for LRT. This Loading Standard represents a capacity that allows for fluctuations in loading during the peak period above and below this mean value, facilitates passenger boarding and alighting at intermediate stations, and also provides reasonable passenger comfort. It is not the maximum possible number of passengers that could board an LRV, (such as immediately after a sporting event at Reliant Park), which is significantly greater, possibly in excess of 200. For BRT, METRO has directed a loading standard of 72; i.e., half that of a LRV.

Demand Potential

The General Planning Consultant supplied very preliminary demand potential data. This was expressed in terms of riders leaving each station in the AM peak period, which was then factored to represent the peak AM hour. The peak hour is assumed to be approximately 50 percent of the three-hour peak period. Further, this data was supplied for each individual service; i.e., for Alternative 1 by the SH 242 service and by the BIAH service, even at the stations which are common to the two services. The one exception to this breakdown structure is that south of the U of H Station, where the peak hour demand potential is shown as a combined number for all services.

The demand potential numbers were derived based on an early version of the station locations and the running times associated with them. Subsequently, the actual station quantities and locations were revised somewhat as the result of discussions with METRO staff. Demand potential data reflecting these changes was not received, and much of the station access is assumed to be by automobile in the form of Kiss and Ride (drop off of passengers) or by Park and Ride facilities, both forms of access being relatively unaffected by the actual station locations. Therefore, the demand potential data leaving any eliminated stations was ignored since the riders were assumed to be on trains leaving the next retained station.

METRO has directed that the BRT demand potential is to be assumed to be the same as for LRT. However, if the BRT services are to terminate at, or near, the Downtown Transit Center, this assumption should be revisited in subsequent study efforts.

2.5.5. Vehicle Requirements

LRT

The determination of vehicle fleet requirements is based on the peak period requirements for the two modes selected for the technologies considered for the short-listed North-Hardy Alignments, namely LRT and BRT. This is because the AM and PM rush hours represent the time when demand potential is highest and the capacity needs are the greatest.

The number of vehicles required is composed of the number of trains required and the number of cars per train. In the case of Alternative 1 – the Blue Line, the number of trains, computed separately for the service to SH 242 and the service to BIAH, is 38. However, it must be noted that this is based on a five-minute combined headway (or 10 minutes on each route). Given the assumption that 50 percent of the peak period demand potential is carried in the peak 60 minutes, some 1,684 passengers would be carried on the SH 242 service between the Hogan and U of H stations, where the peak link load occurs. By providing some 12 car trips per hour in the peak 60 minutes (6 two-car trains), the average demand potential per car will be 140 passengers, just below the 144 loading standard. On the BIAH service, one-car trains on a 10-minute headway will carry an average of 114 passengers per car. With a Round Trip Cycle Time (running time in both directions plus layovers at both ends) of 200 minutes for the SH 242 service and 180 minutes for the BIAH service 38 trains and 44 cars will be required for both services. Allowing a 15% spare ratio, the total fleet required will be 51 vehicles.

A major reason for adopting ten-minute peak period headways for these two services is to provide sufficient capacity for the shoulder hours on each side of the peak hour. Assuming that each is approximately 25 percent of the peak period, its demand potential at the peak load point will be one-half of that during the peak hour. This will require some 12 trips per hour (of one-car trains) to stay within the loading standard of 144 passengers per LRT vehicle for the SH 242 service. Although the projected demand potential for the BIAH service is somewhat lower, the need to run compatible service frequencies on both services necessitates a like frequency on it.

It must be remembered that these services extend from Fannin South to their outer terminals. Therefore, they include the entire Main Street Line. Further, it is assumed that the two-car trains can be scheduled at appropriate times for the Smithlands shuttle service requirements. Thus, the entire fleet of LRVs currently on order (18 cars) can be subtracted from the 51 LRV requirement in order to establish the net number of LRVs that must be purchased for the Blue Alternative (33).

In a like manner, fleet requirements were established for the Red and Green Alternatives. In both cases, there was no need to reduce the combined headway of 6 minutes.

The Red Line's service to SH 242 would require 4 two-car and 7 one-car trains, while the 18 trains required on the BIAH and Kuykendahl services combined would all require only one car per train. Thus the Red Line would require 38 total cars, including spares, of which 18 are already on order, resulting in a net fleet requirement of 20 LRVs.

The Green Line's two services would be mostly composed of one-car trains, with a single two-car train being required on the Kuykendahl service. With spares, this results in a total fleet requirement of 34 LRVs. However, since there are not a sufficient two-car trains in service, the Smithlands shuttle service is still required and the net fleet requirement for the Green Alternative is some 21 cars.

In the case of the BRT alternatives, the Round Trip Cycle time is shorter due to the truncation of BRT service at the Downtown Transit Center. However, this only partially offsets the smaller capacity of the BRT vehicles. Further, the BRT alternatives cannot offset their vehicle requirements with the LRVs on order for the Main Street Line. In addition, the lower capacity per vehicle requires the operation of more service on shorter headways. For example, the Red Line's service to SH 242 has a Round Trip Cycle Time of only 160 minutes because BRT vehicles turn back at the Downtown Transit Center, instead of the South Fannin as is the case for the LRT Alternatives. However, it needs a five-minute peak headway, plus 12 extra peak hour trips to keep its average peak loading below 72 passengers per bus. Its companion service to BIAH would run on a six-minute headway, which keeps its vehicle loading down to 68 passengers per bus. It is further assumed that, without the speed restrictions imposed by a LRT signal system, BRT routes can operate up to 34 buses per hour per lane without any major safety concerns, even at an assumed speed of 66 miles per hour. Overall, the Red Line requires a fleet of 66 BRT vehicles in service, or 76 with spares. This total also is a net BRT fleet requirement, since there is no offset as is the case for the LRVs.

The Red Line BRT Alternative would require all three services to operate on 12-minute headways. In addition, the SH 242 and Kuykendahl services would require 5 and 2 extra peak hour trips, respectively, to keep loadings within the 72 passenger loading standard. This requires a total Red Line BRT vehicle fleet of 46, including spares.

For the Green Line BRT Alternative, the Kuykendahl and BIAH services would each require a 10-minute peak headway. In addition, both services would require five additional peak hour trips to keep within the BRT loading standard. The total BRT vehicle requirement for this alternative, including spares, is 41.

3.0: Environmental Screening of Detailed Alternatives

3.1: Land Use

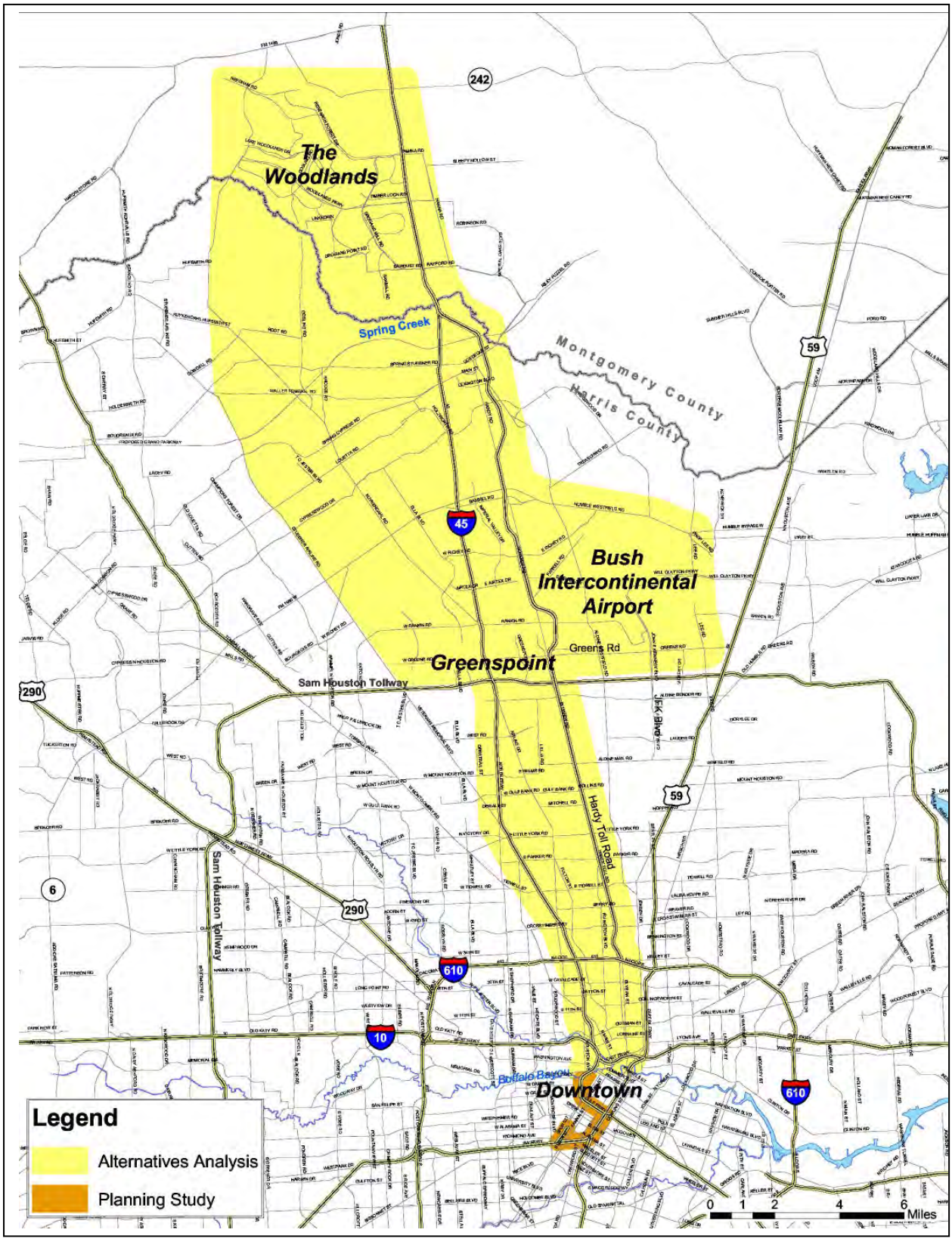
The North-Hardy Corridor study area extends about 30 miles north from the Buffalo Bayou in Downtown Houston to State Highway 242 (SH 242) at The Woodlands, and east from Greenspoint to Bush Intercontinental Airport (see Exhibit 3.1). The corridor includes several major activity centers – Greenspoint, Bush Intercontinental Airport (IAH), The Woodlands – as well as a full array of both urban and rural land uses. The Woodlands, a master planned community, anchors the corridor on the north. The southern reaches of the study area include major residential neighborhoods just north of Downtown Houston. The travel shed for the corridor includes significantly large areas to the west and northeast. The corridor includes major north-south highway, toll road and rail corridors.

In 1942, Houston established a Major Thoroughfare and Freeway Plan that was aimed at creating a system of east-west and north-south connections, spaced from half of a mile to one mile apart. While many of the connections have been completed, there are some that remain incomplete. Portions of the corridor's travel shed, particularly in the northern section, are impacted by an incomplete system of major thoroughfares.

The southern portion of the corridor is almost fully within the boundaries of the City of Houston. This area includes many older and well-established neighborhoods and residential areas. The Major Thoroughfare and Freeway Plan in the southern portion of the corridor has been completed. The northern portion of the corridor, on the other hand, has significant amounts of vacant land, an incomplete system of major thoroughfares, and land uses that are developed at much lower densities. There are also some newer residential subdivisions in this area of the corridor.

The pattern of development throughout the corridor is generally influenced by the ease of automobile access afforded by the North Freeway/Interstate Highway 45 (IH-45) and the network of connecting major thoroughfares accessing this highway. There are three Metropolitan Transit Authority of Harris County (METRO) Park and Ride lots located within the study area, as well as two additional Park and Ride lots operated by Brazos Transit. The majority of the more intense commercial activity is focused directly along IH-45.

Exhibit 3.1: North-Hardy Study Area



Development along the Hardy Toll Road remains much less intense, with little or no orientation to the Toll Road, since this highway was designed specifically to provide limited points of access and to act mostly as a long distance conveyor of traffic between Houston, IAH, and The Woodlands.

The purpose of this section of the Alternatives Analysis Report is to examine the short list of alternatives with respect to potential environmental issues – including urban elements, natural elements and cultural elements. The short list of alternatives includes three advanced high capacity transit alignments – Light Rail Transit/Bus Rapid Transit (LRT/BRT) – and proposed highway and road improvements, as shown in Exhibit 3.2. Each of the LRT/BRT alignments are described generally in the Executive Summary and in greater detail throughout this document, starting in this section in terms of land use, and in the next section regarding acquisition and displacements. The alignments and their proposed station locations are also shown in Exhibit 3.3, 3.4 and 3.5.

For the purposes of the environmental analysis, the North-Hardy Corridor has been divided into six identifiable community areas, from south to north as follows (see Exhibit 3.6):

- Near Northside
- Northside/Northline
- Aldine
- Greenspoint/IAH
- Spring
- The Woodlands/South Montgomery County

The land use characteristics of each of these communities are discussed below, in relation to each of the proposed LRT/BRT alignments and the proposed highway and road improvements. The land uses in the North-Hardy Corridor are shown in Exhibits 3.7 through 3.23. The detailed discussion of the land uses along the proposed LRT/BRT alignments follows the Exhibits.

Exhibit 3.2: Short List of Alternatives

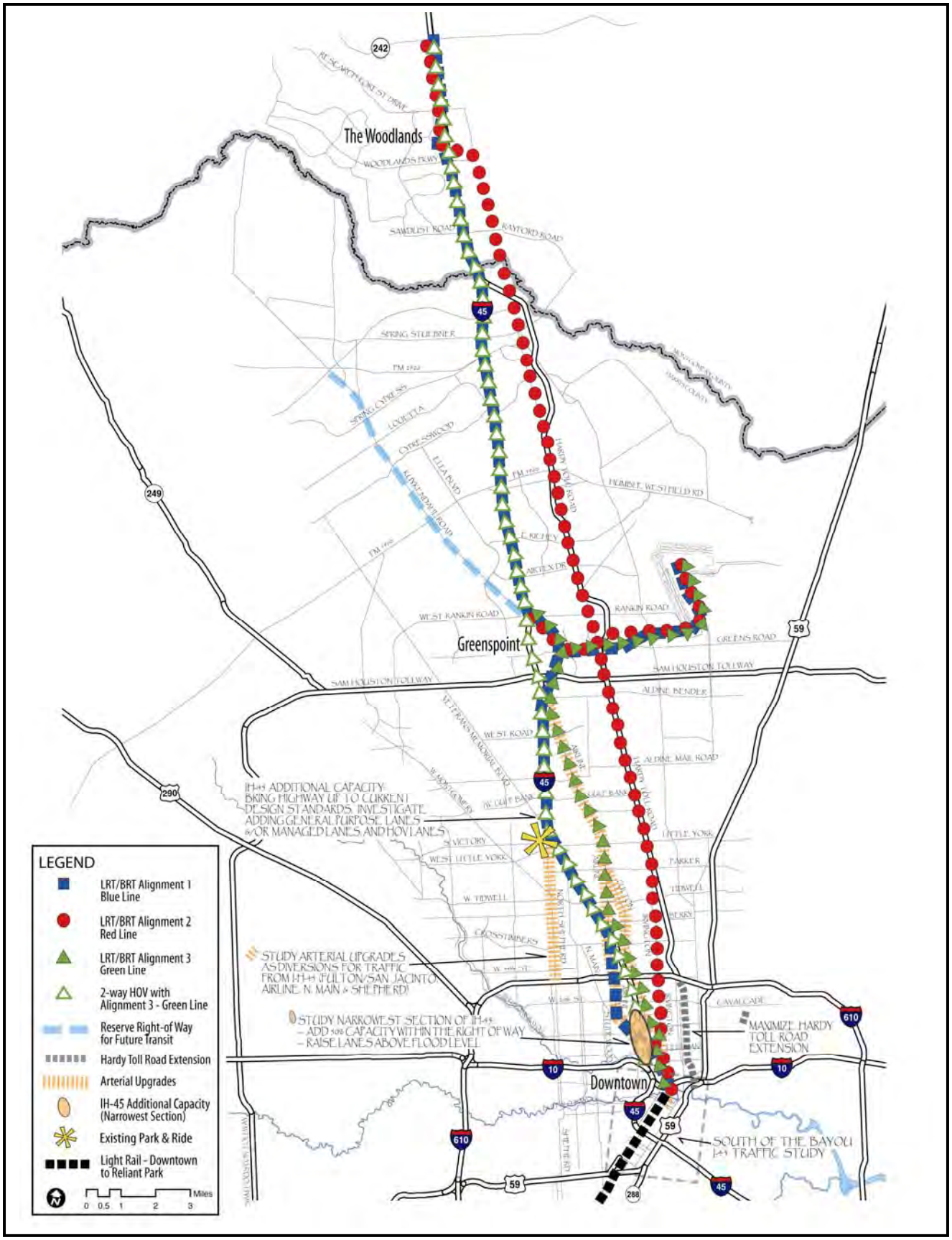


Exhibit 3.3: Station Locations – Blue Line

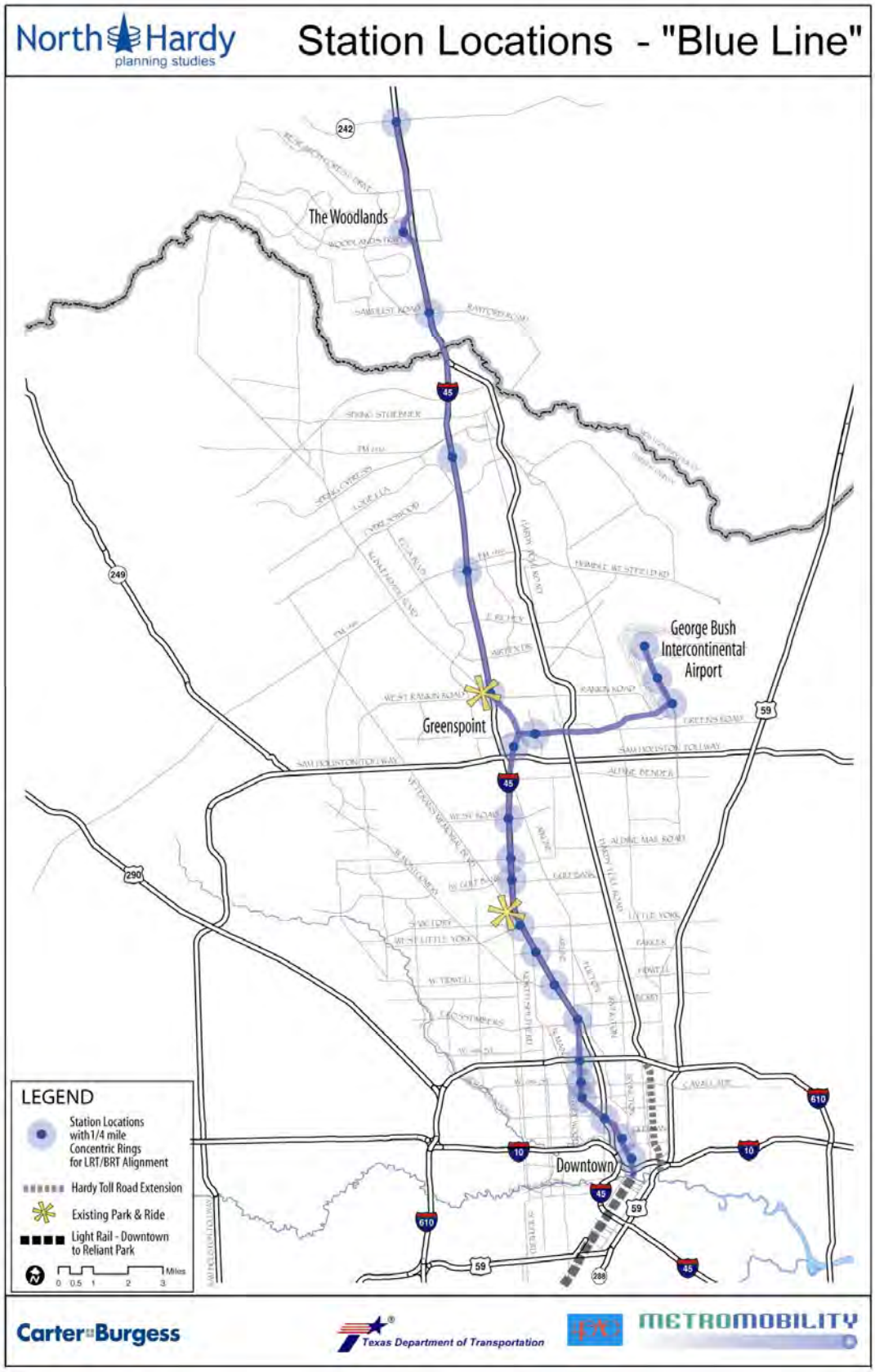


Exhibit 3.4: Station Locations – Red Line

Exhibit 3.5: Station Locations – Green Line

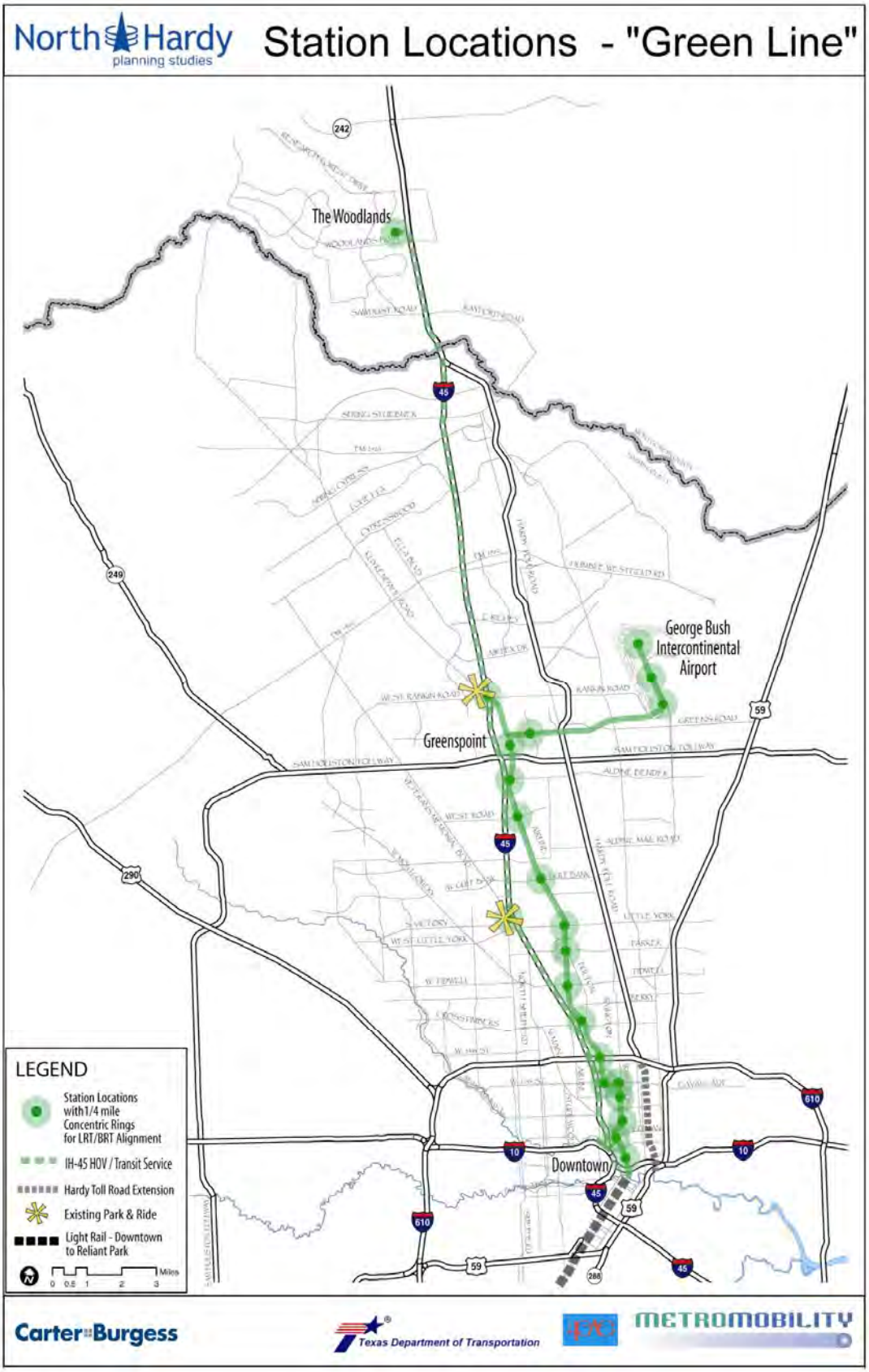


Exhibit 3.6: Communities in the Corridor

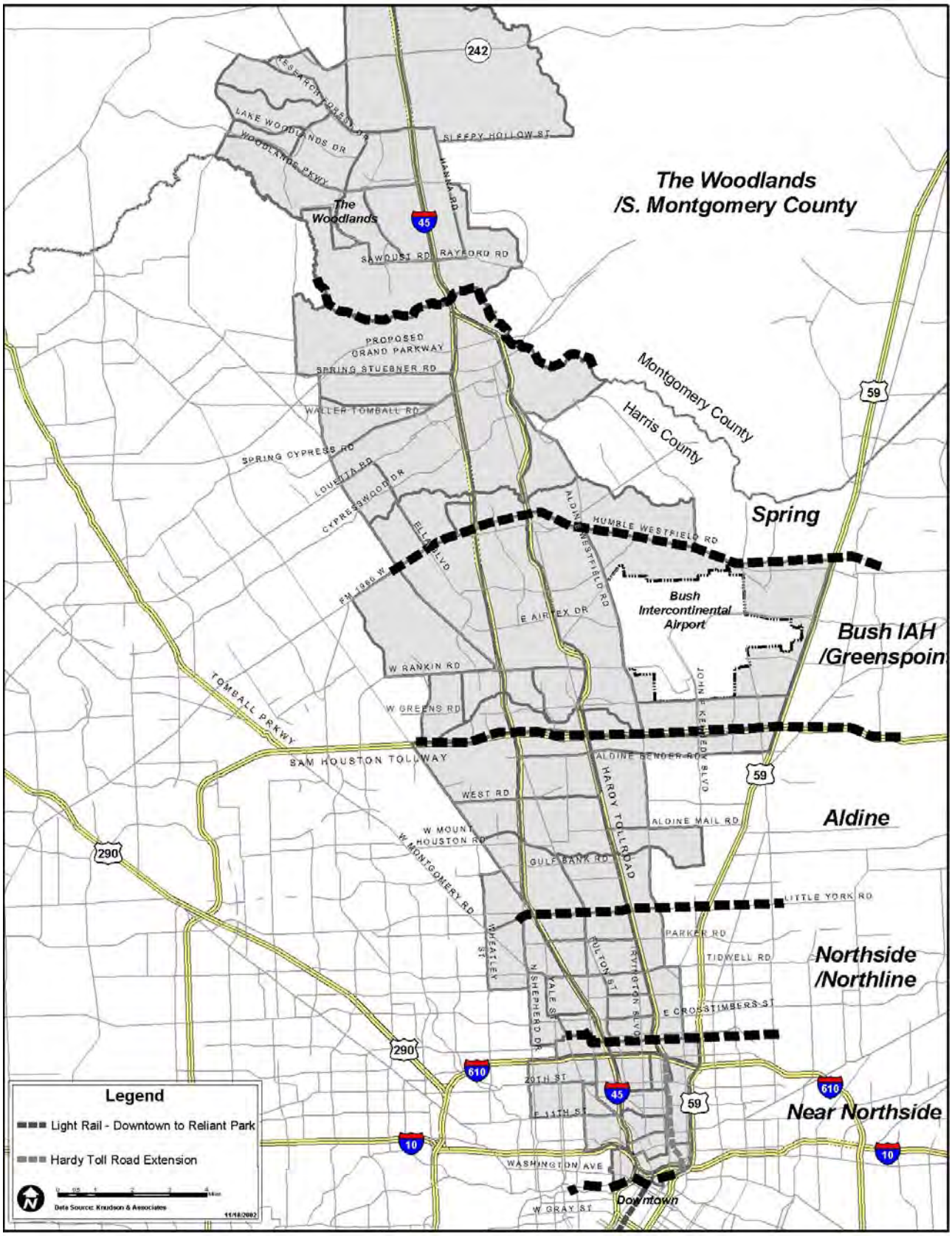


Exhibit 3.7: Land Use (1)

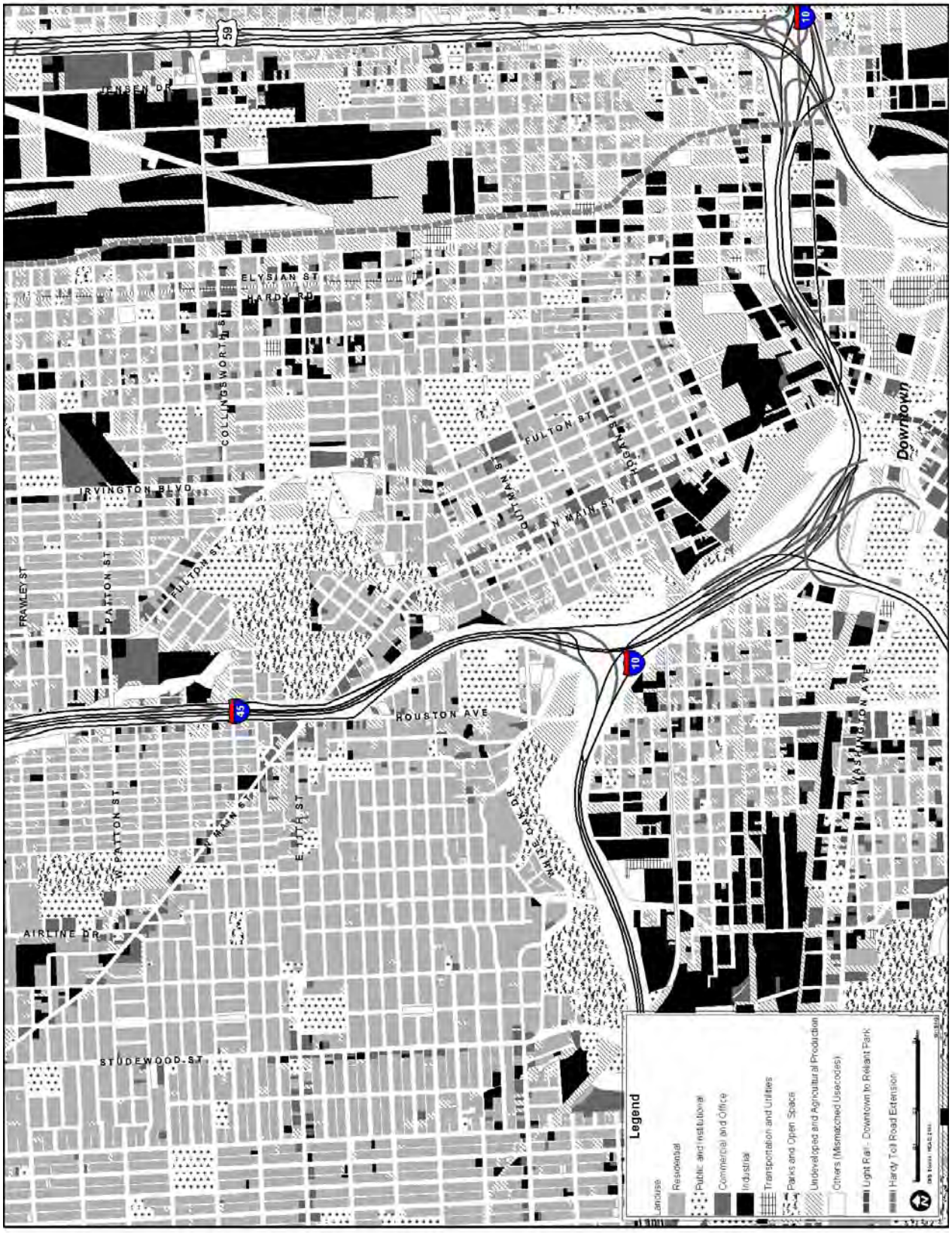


Exhibit 3.8: Land Use (2)

Exhibit 3.9: Land Use (3 West)

Exhibit 3.10: Land Use (3 East)

Exhibit 3.11: Land Use (4 West)

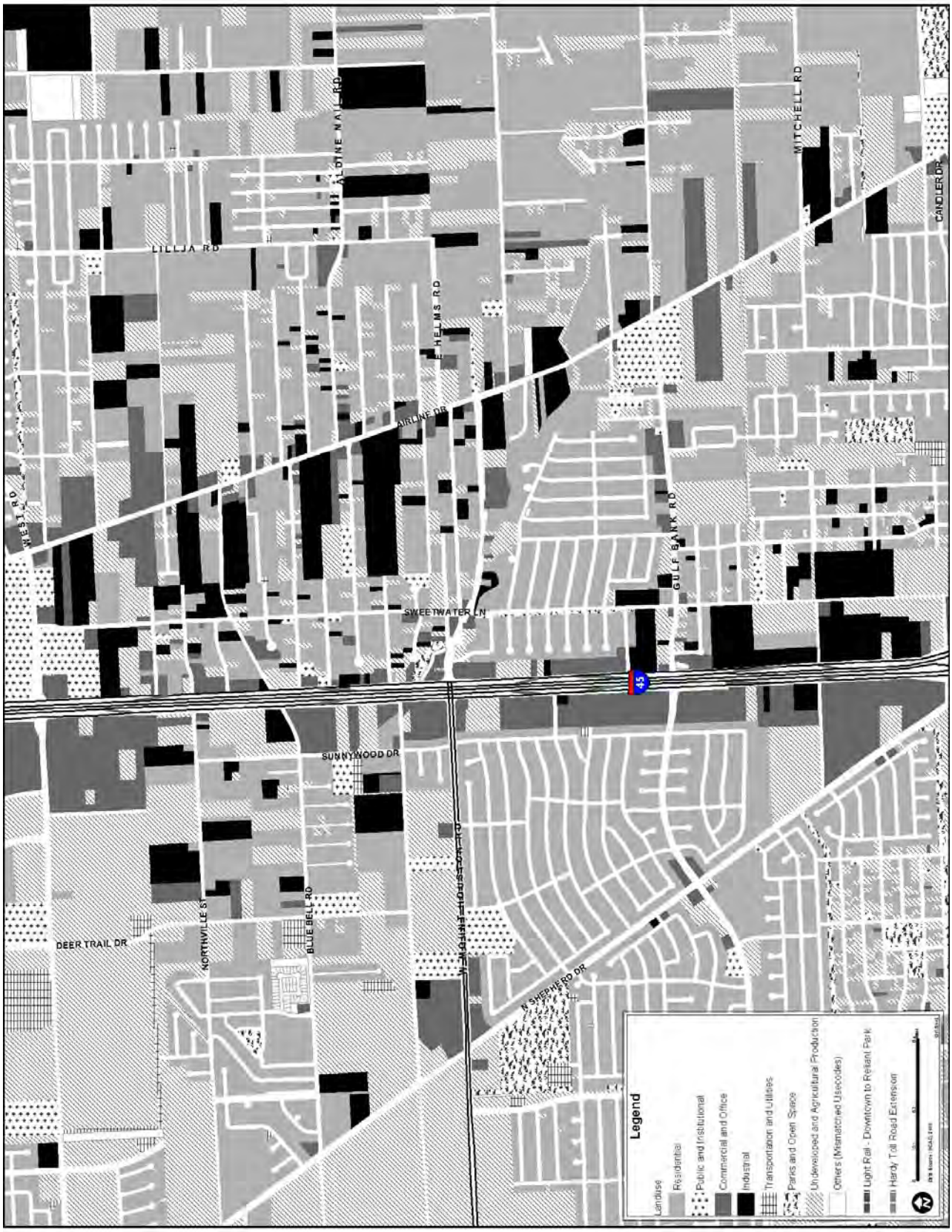


Exhibit 3.12: Land Use (4 East)

Exhibit 3.13: Land Use (5 West)

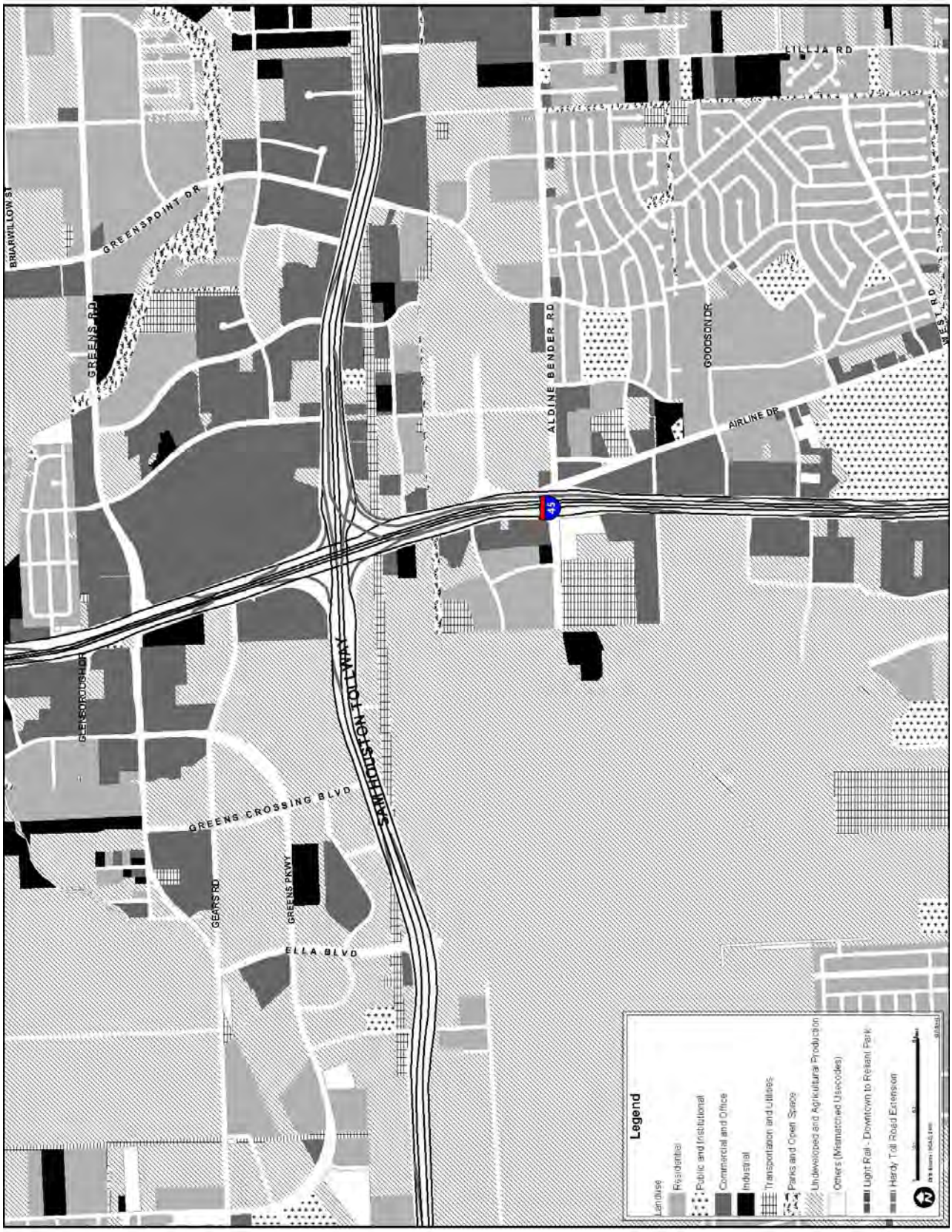


Exhibit 3.14: Land Use (5 East)

Exhibit 3.15: Land Use (6 West)

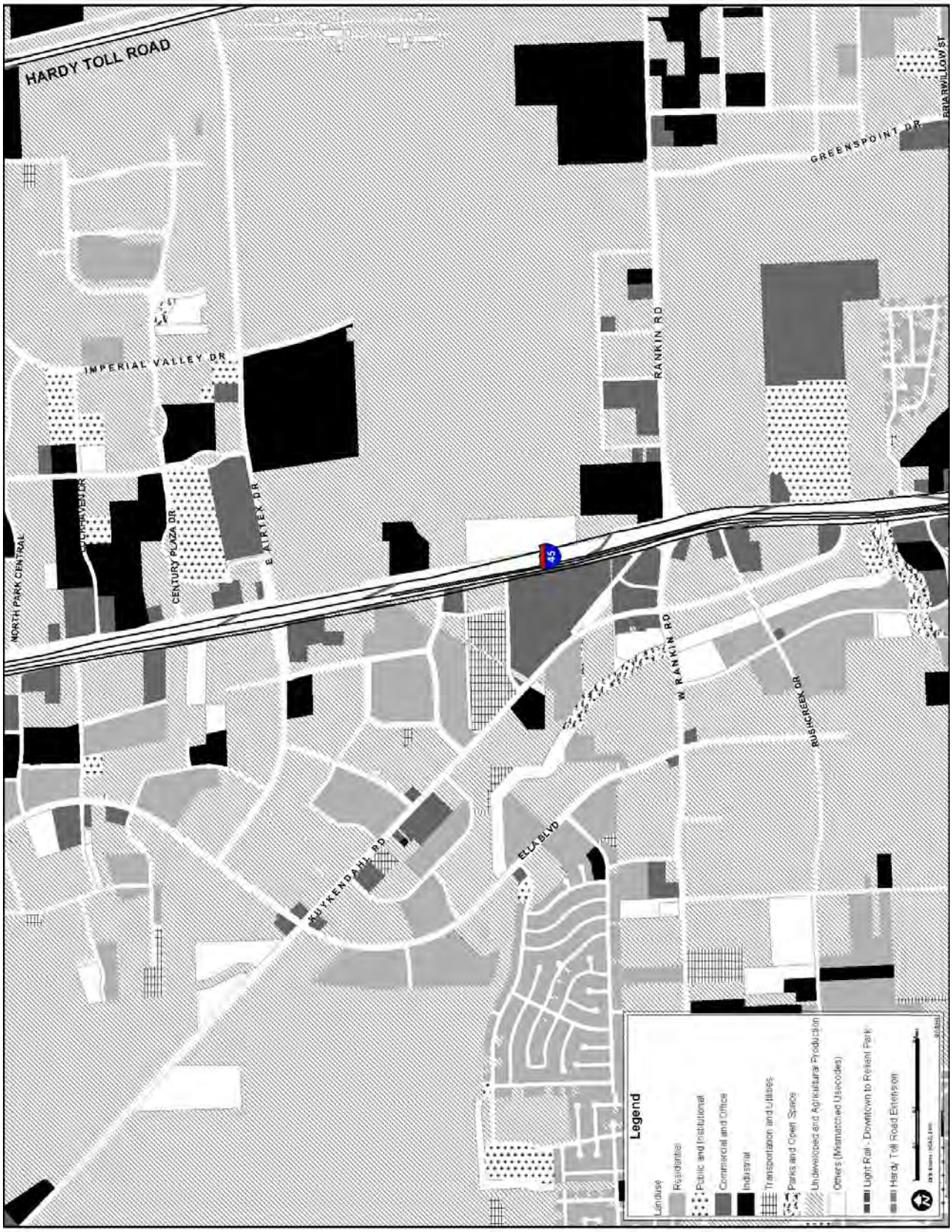


Exhibit 3.16: Land Use (6 East)

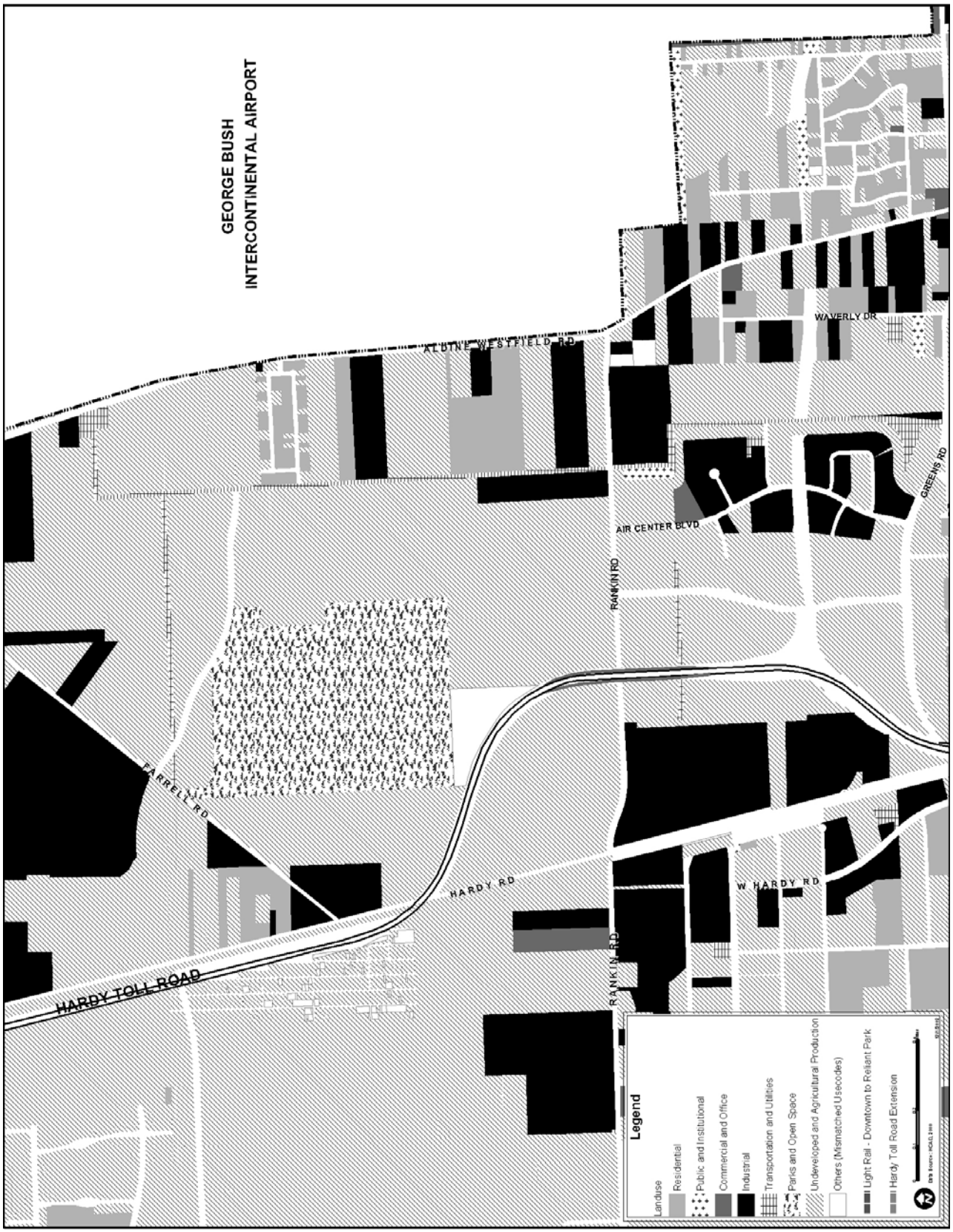


Exhibit 3.17: Land Use (7 West)

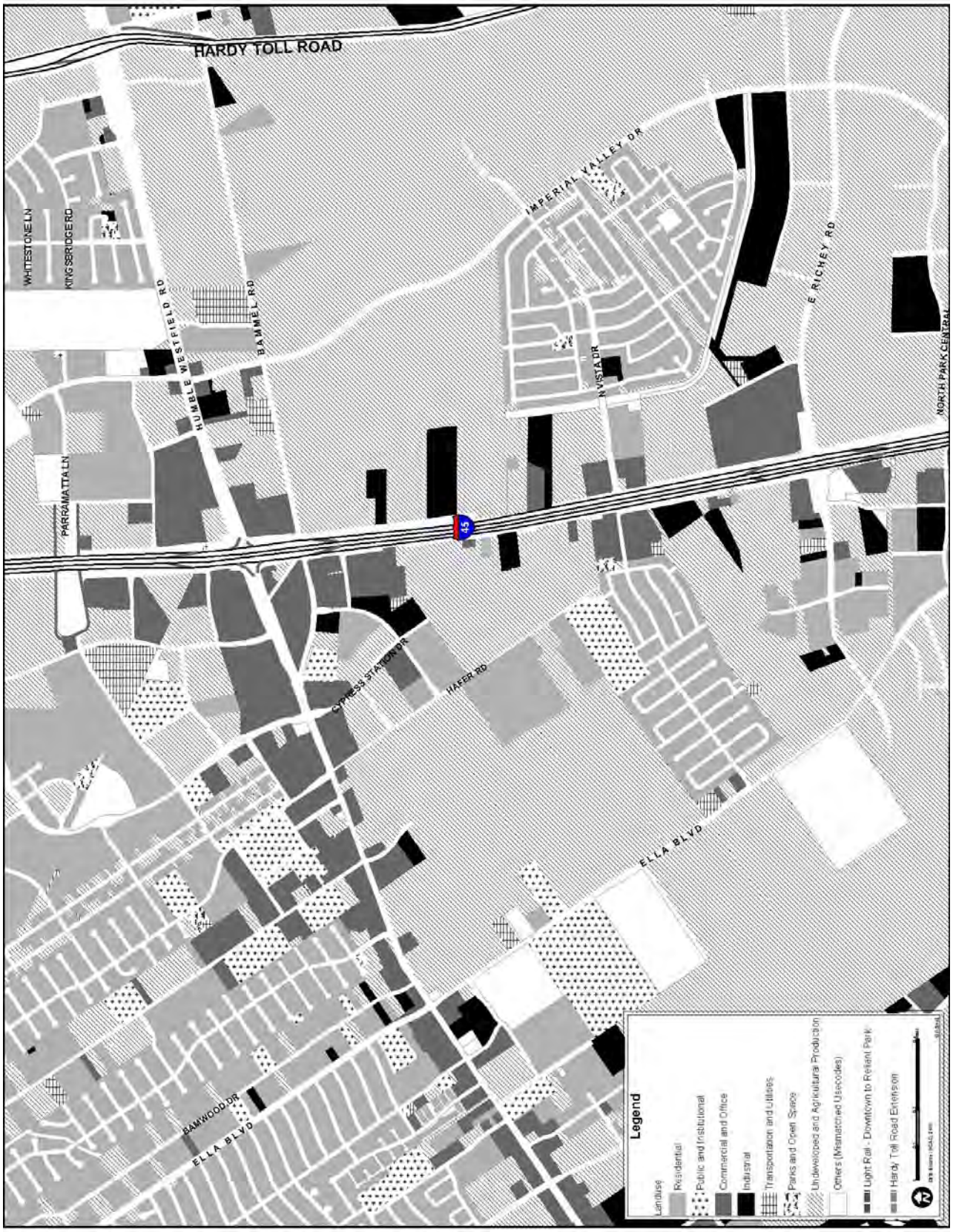


Exhibit 3.18: Land Use (7 East)

Exhibit 3.19: Land Use (8 West)

Exhibit 3.20: Land Use (8 East)

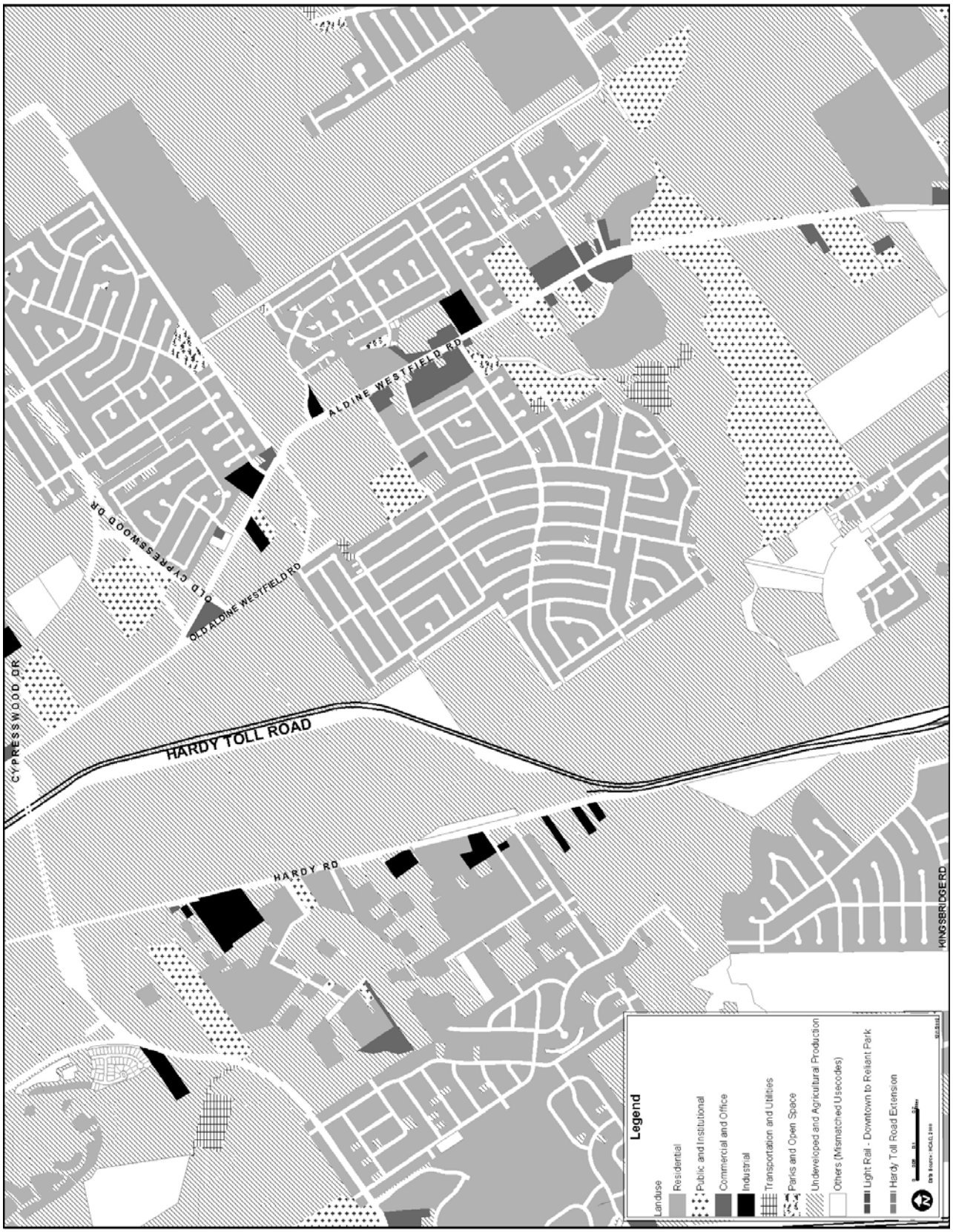


Exhibit 3.21: Land Use (9 West)

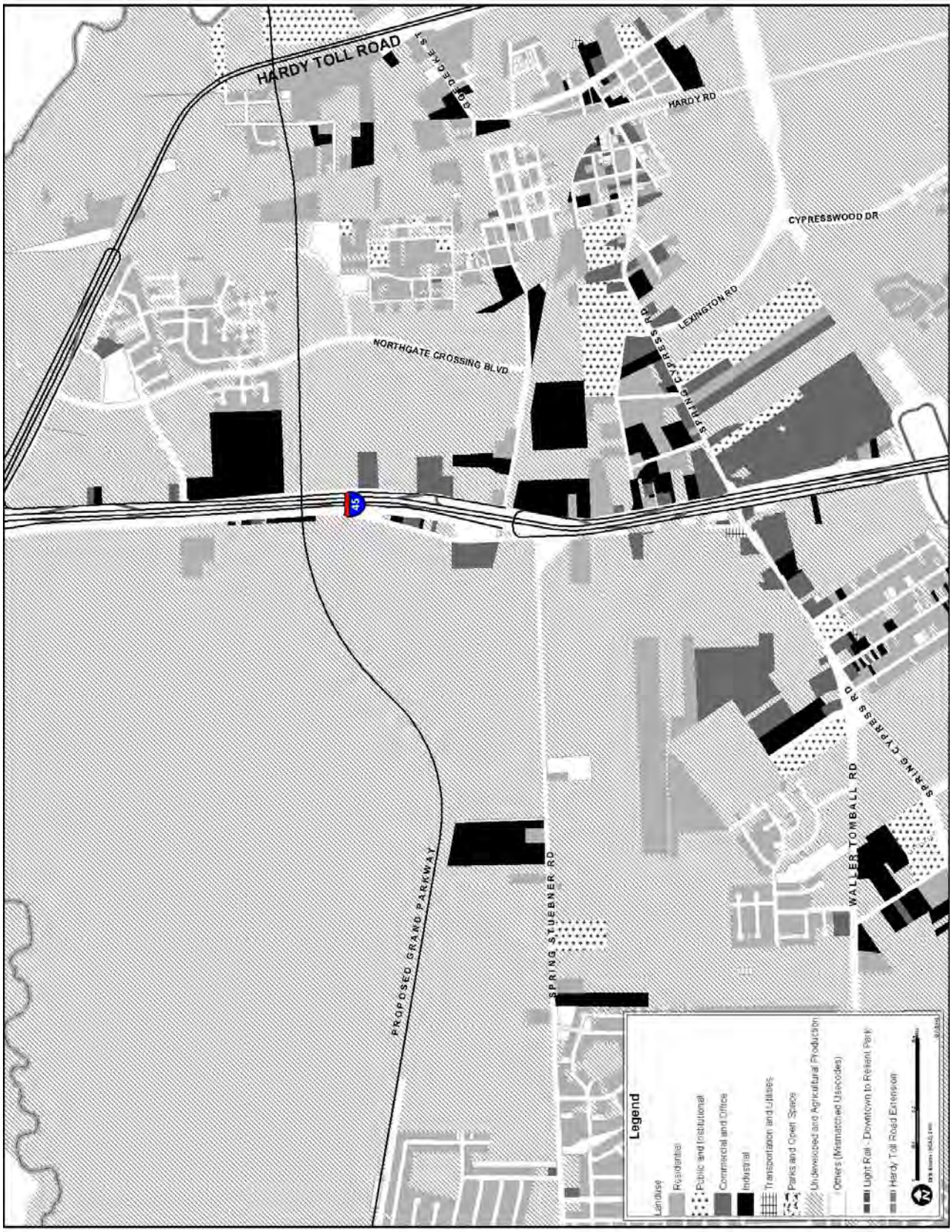


Exhibit 3.22: Land Use (9 East)

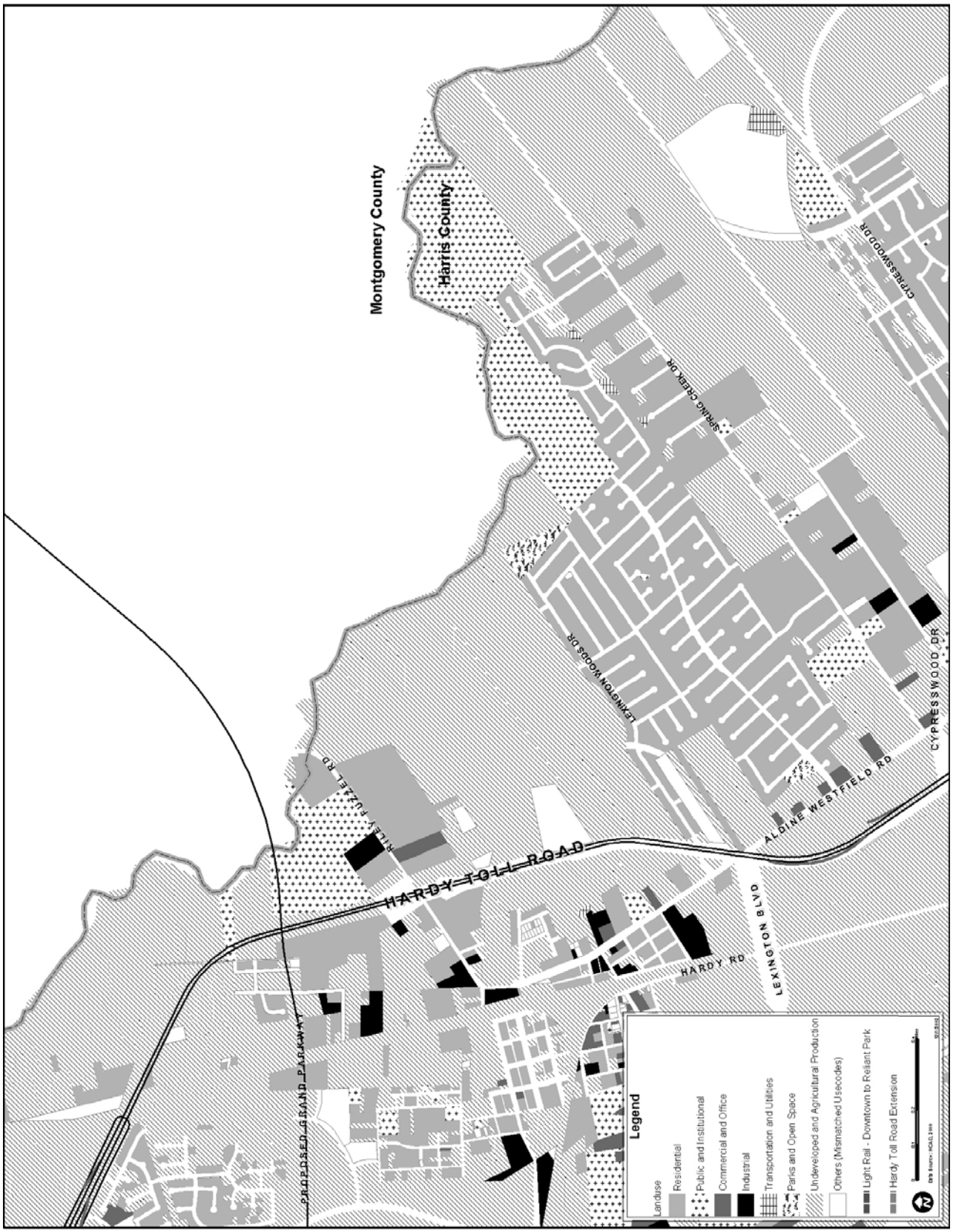
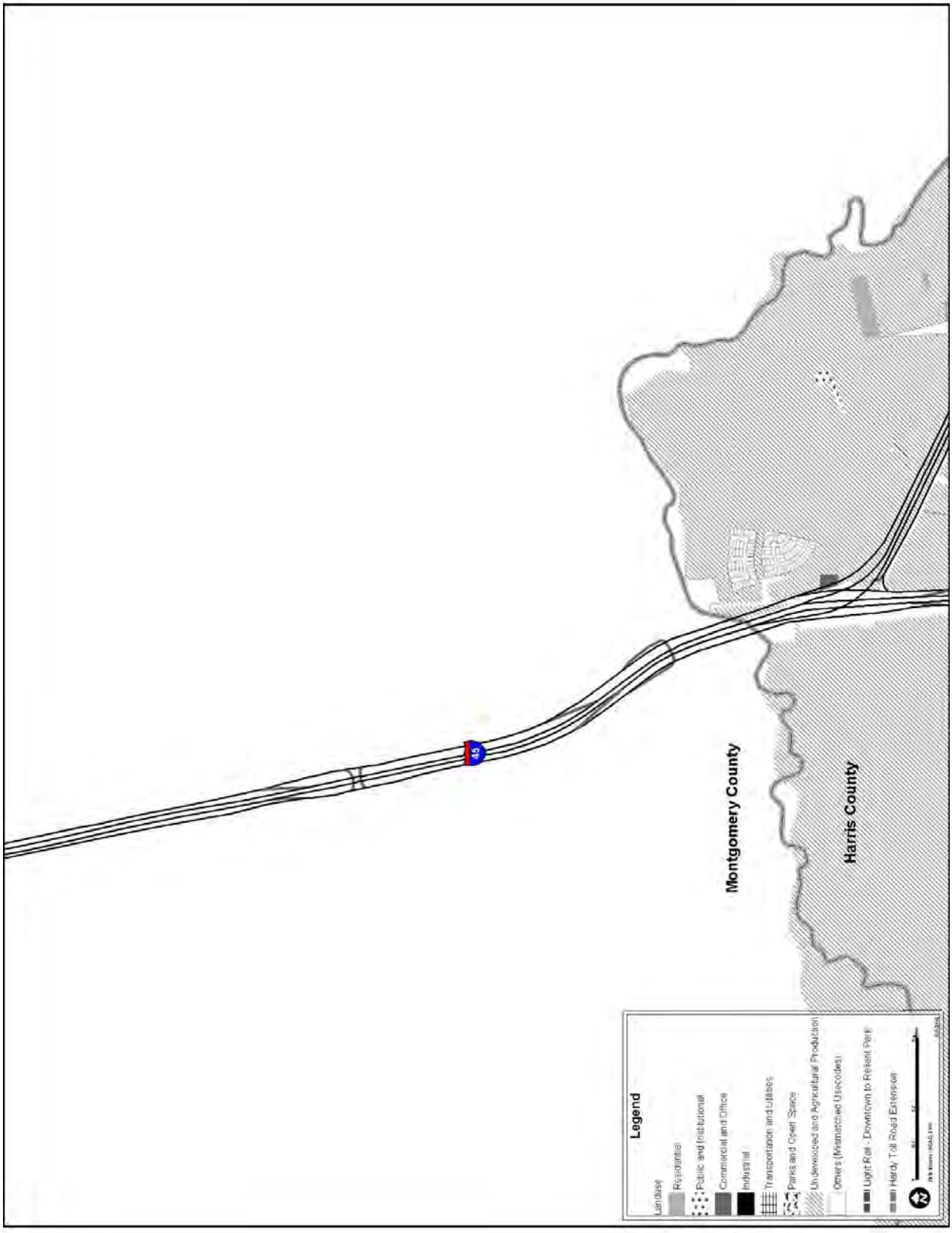


Exhibit 3.23: Land Use (10)



3.1.1: Blue Line

Near Northside

The Blue Line begins in the Near Northside area, where the land uses exhibit typical urban characteristics, with a mix of commercial, residential and community related activities.

Along North Main Street, between UH Downtown and Burnett, the Blue Line crosses the Buffalo Bayou floodplain and the Union Pacific Hardy Rail Yard, and passes through older industrial properties. Most of the Hardy Yard property is currently being considered for a major redevelopment effort, though some railroad use is expected to continue through the site. Between Burnett and Boundary streets, there are some small neighborhood commerce and community facilities, older single-family homes and scattered, small vacant lots. The pattern of development in the area generally exhibits a continuous street grid with small blocks and lots. From Boundary Street to Airline Drive, it crosses Little White Oak Bayou and passes through small neighborhood commerce, older single-family homes, a cemetery, and scattered, small vacant lots.

The general characteristics of the land uses along Airline Drive in this area are similar to that of North Main – there are small neighborhood commerce uses and community facilities, older single-family homes and scattered, small vacant lots. In this area there is also a farmers' market, and some older apartment complexes.

Northside/Northline

Through this area, the Blue Line follows Airline Drive to Northline Mall and then runs along the northbound frontage road of IH-45. Airline passes through highway-oriented commerce (towards IH-45), industrial uses, older single-family homes, small neighborhood commerce and scattered, small vacant lots.

IH-45, between Airline and North Shepherd contains a variety of highway-oriented commercial uses, highway-oriented industrial properties and some residential – both single-family homes and apartment complexes. There are also some neighborhood community facilities and scattered vacant tracts and lots.

Aldine

In the Aldine area, the Blue Line follows the IH-45 alignment until just south of Beltway 8 where new right-of-way would need to be acquired. Land uses in this area include highway-oriented commercial, highway-oriented industrial properties, single-family homes, Aldine Ninth Grade School, neighborhood community facilities and scattered vacant tracts. There are some apartment complexes located between Blue Bell and Aldine Bender, as well as single family residential properties.

Greenspoint/IAH

As the Blue Line enters the Greenspoint area, it travels off IH-45 in a northeasterly direction along Greenspoint Drive. In this area there are large tracts of vacant land, large apartment complexes, commercial and office buildings, and Greenspoint Mall. There are also some single-family homes and industrial properties adjacent to IH-45 where the Blue Line is proposed to connect between Greens Road and Rankin Road. The Greens Bayou is also located along this section of the Blue Line.

As the Blue Line connects to the Kuykendahl Park and Ride just west of IH-45, there are large tracts of vacant land, apartment complexes, single-family neighborhoods and highway-oriented commercial and industrial uses and community facilities (e.g., large school buildings). In addition, there are some scattered light industrial uses and newer single-family subdivisions.

In this area, the Blue Line includes a spur to IAH. Along this section of the alignment as it follows Greens Rd. from Greenspoint Drive to Central Greens Boulevard, there are some large apartment complexes, commercial and office buildings, single-family neighborhoods, and scattered vacant tracts.

Along Central Greens Boulevard, from Greens Rd. to the Hardy Airport Connector, there are large tracts of vacant land and industrial properties. Along the Hardy Airport Connector from Central Greens Boulevard to JFK Boulevard there are single-family neighborhoods, scattered vacant tracts and lots, industrial buildings and facilities and lands and facilities related to IAH. Once the alignment merges onto JFK Boulevard, it enters the central access road to the airport terminals and associated facilities.

Spring

In the Spring area of the Blue Line along IH-45, the land uses continue to become more scattered and more suburban, with large tracts of vacant land, along with pockets of apartment development, scattered light industrial uses, highway-oriented commercial uses, and single-family subdivisions. The Spring High School campus is also located along this section of the Blue Line.

The Woodlands/South Montgomery County

As the Blue Line continues north on IH-45 towards The Woodlands, the land uses include more large tracts of vacant land, strip retail, The Woodlands Town Center, medical/professional uses, low-rise office/research facilities, light industrial uses, single family subdivisions, and apartment complexes.

3.1.2: Red Line

Near Northside

The Red Line follows North Main Street from UH Downtown to Little White Oak Bayou. In the Near Northside the Red Line crosses the Buffalo Bayou floodplain and the Union Pacific Rail Yard, and passes through older industrial properties, some neighborhood-oriented commercial development, community facilities, older single-family homes and scattered, small vacant lots. The Hardy Rail Yard is currently being considered for a major redevelopment effort, though some railroad use is expected to continue through the site. The Red Line then follows along the south side of the Little White Oak Bayou in order to reach Fulton. An alternative option is also proposed in this location, with the alignment turning east at Boundary Road to Fulton, rather than going along the Bayou to Fulton. The land uses along Boundary are primarily residential.

Along Fulton, the land uses include Moody Park and Clemente Martinez Elementary School. Along Irvington, there are small neighborhood commercial centers and community facilities, older single-family homes, small apartment buildings, and scattered, small vacant lots.

Northside/Northline

In this area, the Red Line continues north on Irvington and passes through small neighborhood commercial centers and community facilities, older single-family residential, small apartment buildings, and scattered, small vacant lots.

The land uses along the Hardy Toll Road include single-family homes (small and large lots), small neighborhood commercial centers and community facilities, scattered, small vacant lots, small apartment buildings and some scattered, large, vacant single family lots. The development in this area is semi-rural, with large blocks and lots.

Aldine

The Hardy Toll Road is surrounded by single-family homes on large lots, scattered, large, vacant tracts and various industrial facilities. There are also some mobile home parks and rural-style development with large lots and tracts in this area. This area is within the City of Houston's Extra Territorial District (ETJ) – it is unorganized and has limited infrastructure availability.

Greenspoint/IAH

In this area, the Red Line passes through development that is primarily on large lots, including light industrial and apartments. There are also large tracts of vacant land.

Like the Blue Line, this area also includes the east-west spurs to IAH and the Kuykendahl Park and Ride. The east-west spur to the Kuykendahl Park and Ride passes through the Greenspoint activity center. Land uses along the east-west spur include single-family neighborhoods, scattered vacant tracts and lots, industrial buildings and facilities, and lands and facilities related to IAH.

The east-west spur to the Kuykendahl Park and Ride includes Greenspoint Mall, large apartment complexes, commercial and office buildings, single-family neighborhoods, industrial properties, and scattered vacant tracts. Greens Bayou is also adjacent to portions of the Red Line.

Spring

The land uses along Hardy continue to be significant amounts of large vacant tracts of land, along with some single family subdivisions, low density commercial uses, light industrial, and large areas of vacant land containing smaller, isolated residential and commercial/industrial developments. In this area the Red Line also passes through Old Town Spring with its boutique style retail development and residential uses.

The Woodlands/South Montgomery County

In this area, the Red Line follows the Union Pacific Railroad (UPRR) right-of-way which passes alongside large vacant tracts, single family subdivisions, semi-rural residential, scattered small-to-mid scale industrial properties, and a borrow pit.

As it veers to the west from the UPRR right-of-way to connect with The Woodlands Town Center, the Red Line passes through single-family subdivisions, small light industrial properties and highway-oriented retail. The Red Line then travels north on IH-45 to SH 242 past large vacant tracts, strip retail centers, medical/professional uses, highway-oriented retail/commercial uses, and low-rise office/research.

3.1.3: Green Line

Near Northside

As described for both the Blue Line and the Red Line, the Green Line traverses North Main from UH Downtown to Boundary Street. The land uses along this section include the Buffalo Bayou floodplain, Hardy Rail Yard, older industrial properties, small neighborhood commerce and community facilities, older single-family homes and scattered, small vacant lots. The Hardy Rail Yard is currently being considered for a major redevelopment effort, though some railroad use is expected to continue through the site. Like the Red Line, the Green Line follows along the south side of the Little White Oak Bayou in order to reach Fulton. There is also an alternative alignment proposed along Boundary Road to Fulton.

Once on Fulton, the Green Line for a short distance follows the same route as the Red Line, north on Fulton and Irvington, until it reaches Cavalcade. On Cavalcade, it turns west to Fulton. At Fulton, the Green Line turns north to Airline Drive. Along Fulton, the land uses include Moody Park and Clemente Martinez Elementary School. Along Irvington, there are small neighborhood commercial centers and community facilities, older single-family homes, small apartment buildings, and scattered, small vacant lots. Along Cavalcade, the land uses include older single-family homes, small neighborhood commercial centers and community facilities, and scattered vacant lots.

Northside/Northline

In the Northside/Northline area, the Green Line continues along Fulton, alongside older single-family homes, small neighborhood commercial centers and establishments, and community facilities. The Green line has a stop at Northline Mall.

On Airline Drive there are small neighborhood commercial centers and establishments, highway-oriented commercial buildings, older single-family homes, industrial establishments, community facilities, small apartment buildings, and scattered, vacant tracts and lots. The street grid becomes somewhat irregular in this area, with a variety of different-sized lots and tracts.

Aldine

As the Green Line continues to follow the Airline Drive right-of-way, there are small neighborhood-level commercial buildings, single-family subdivisions, scattered industrial/warehouse properties, semi-rural residential and the occasional small to mid-size vacant and underutilized tracts. The Major Thoroughfare and Freeway Plan has not been completed in this area, creating a discontinuous road network.

Along Airline, as the Green Line approaches the Greenspoint area (north of West Road); there is a school, highway-oriented commercial development and large apartment complexes. There are also some single-family homes.

Greenspoint/IAH

Like the Blue Line, as the Green Line enters the Greenspoint area, it travels away from IH-45 in a northeasterly direction towards Greenspoint Drive. In this area there are large tracts of vacant land, large apartment complexes, commercial and office buildings and Greenspoint Mall. There are also some single-family homes and industrial properties where the Green Line runs between Greens Road and Rankin Road. Greens Bayou is also located along this section of the Green Line.

As the Green Line passes Rankin Road and the Kuykendahl Park and Ride on the west side of IH-45, there are large tracts of vacant land, apartment complexes, single-family neighborhoods and highway-oriented commercial and industrial uses and community facilities (e.g., large school buildings). In addition, there are some scattered light

industrial uses and newer single-family subdivisions.

Like the Blue and Red Lines, the Green Line includes the spur to IAH. Along this section of the alignment as it follows Greens Rd. from Greenspoint Drive to Central Greens Boulevard, there are some large apartment complexes, commercial and office buildings, single-family neighborhoods and scattered vacant tracts.

Along Central Greens Boulevard, from Greens Rd. to the Hardy Airport Connector, there are large tracts of vacant land and some industrial properties. Along the Hardy Airport Connector from Central Greens Boulevard to JFK Boulevard, there are single-family neighborhoods, scattered vacant tracts and lots, industrial buildings and facilities, and lands and facilities related to IAH. Once the alignment merges onto the JFK Boulevard right-of-way, it is traversing along the central roadway toward the airport terminals. The Green Line is proposed to terminate at the airport terminals.

Spring

The Green Line does not traverse the Spring area.

The Woodlands/South Montgomery County

The Green Line does not traverse The Woodlands/South Montgomery County area.

3.1.4: Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

3.1.5: Assessment of Impact

From the perspective of land use sensitivity, potentially the most critical impacts occur as each of the three alignments go through the older, established residential neighborhoods in the Near Northside and Northside/Northline areas, and also to some degree in the Aldine area. Care must be taken to protect against neighborhood disruption and displacement of existing residents, as well as to ensure that safety issues are adequately addressed. All three proposed alignments rely, at least to some degree, on existing roadways going through neighborhoods, where the potential impacts on sensitive land uses could be most significant. (See also Section 3.6: Safety and Security, Section 3.7: Visual and Aesthetics, and Section 3.8: Communities for more discussion on these issues.)

The likelihood of impacts on land use through new development would likely be felt strongest in the Aldine, Greenspoint, Spring, and The Woodlands/South Montgomery County area, where there is a greater amount of vacant land available for development. There are also some activity centers that could undergo additional development through

redevelopment and intensification, including the Northline Mall, Greenspoint and The Woodlands.

Development pressure will also be felt in close proximity to proposed stations, especially where good pedestrian access is provided. This pressure could impact land values in areas of existing development. Where the alignments follow major thoroughfares there could be some land use changes through development and redevelopment. Development and redevelopment opportunities would be enhanced where there are supporting policies and design guidelines in place, such as in the Northside Village neighborhood (Near Northside area) and the Greenspoint Tax Increment Reinvestment Zone (TIRZ)/Management District. (For more detailed discussion on potential development and redevelopment opportunities, see Section 5.0: Economic Development).

Other than the issues raised above with respect to the potential impacts on existing residential areas, the overall land use pattern throughout the corridor does not pose significant issues or obstacles to the development of LRT/BRT. Further, the overall impacts on land use do not differ significantly between the Blue, Red or Green Lines. More detailed analysis on potential land use impacts should be conducted once the Locally Preferred Investment Strategy (LPIS) is selected.

3.2: Acquisition & Displacements

3.2.1: Blue Line

North-South Alignment

The proposed Blue Line begins at the northern terminus of UH Downtown to Reliant Park light rail line at UH Downtown. From there it heads north, at-grade, following the existing right-of-way of North Main Street. About 500 feet north of IH-10, the LRT/BRT alignment transitions to an aerial structure, ramping up to fly over the Hardy Yard. It continues on an aerial structure for a distance of about 2,000 feet and then returns back to grade in the center of North Main near Harrington Street, just north of which, an at-grade station is location at Hogan Street. The total distance of right-of-way acquisition required for this section of the LRT/BRT would be about 2,200 feet.[1] The majority of this section runs through the area of Hardy Rail Yard.[2] There are a few existing industrial buildings in this section which are either very close to, or within the LRT/BRT right-of-way. Since redevelopment of the Hardy Rail Yard area is currently being considered,

[1] This discussion assumes that road right-of-way-of-way and paved section of a road are synonymous, as depicted on air photos of the LRT/BRT alignments prepared by STV Incorporated, dated February 2003. A more precise analysis of potential right-of-way requirements and impacts would need to be based on more accurate property and right-of-way surveys during the analysis of the LPIS.

[2] The proposed Hardy Rail Yard redevelopment area is an irregularly shaped collection of parcels of land comprising about 200 acres, generally bounded by IH-45 on the west, IH-10 on the south, Maury Street on the east and Quitman Street on the north.

the placement of the alignment through this section could possibly be accommodated as part of the redevelopment plans, to minimize acquisition impacts. Joint development opportunities in this area should be explored. Potentially, a station could be located on the elevated section near the Hardy Yard.

The Blue Line continues at-grade in the center of North Main for approximately 2 miles to Airline Drive. Along this section, there are three planned stations – Quitman Street, IH-45 (just west of the freeway), and Airline Drive – each of which would appear to have potential displacement and acquisition impacts on commercial properties/buildings.

The alignment then turns north and continues at-grade in the center of Airline Drive for approximately 2 miles with stations at Cavalcade Street and at IH-610. After IH-610, the alignment transitions to an aerial structure in the center of Airline Drive to cross over the Houston Belt and Terminal (HB&T) railroad, then returns to grade. Shortly before Crosstimbers, the Blue Line rises again onto an elevated structure in the center of Airline and then turns northeastward flying over Crosstimbers Street and IH-45 to reach Northline Mall. An aerial station would be located on the west side of Northline Mall.

Some property acquisition may be required from the commercial properties located on the east side of Airline between Cavalcade and IH-610 Loop. Some property acquisition and displacement of existing commercial buildings may be necessary in the vicinity of the Cavalcade station. At the IH-610 Loop, adjacent properties that could be impacted include some residential buildings. Where the alignment swings to the east just south of Crosstimbers towards the Northline Mall commercial buildings may also be impacted; however, since the alignment is in an aerial structure at this point, displacement could possibly be minimized. Acquisition of property would also be required (see Exhibit 3.24.)

At Northline Mall the alignment swings to the north along IH-45. Some property acquisition would be required at Northline Mall to accommodate the alignment, as well as a station. Opportunities for joint development should be explored at this location. In this section there are two existing commercial buildings that are directly within the proposed right-of-way of the proposed aerial structure (see Exhibit 3.25). However, since the alignment is in an aerial structure at this point, displacement could possibly be minimized. On the north side of Northline Mall, the alignment continues aerial as it connects over to the east side of the IH-45 right-of-way (between the freeway and the northbound frontage road.

Exhibit 3.24: Commercial Buildings at Crosstimbers

Exhibit 3.25: Commercial/Institutional Buildings at Northline Mall

From Northline Mall, the alignment continues north on an aerial structure along IH-45 for approximately 7.6 miles positioned for the most part in the narrow strip of space between the northbound freeway lanes and the adjacent frontage road. Aerial stations are proposed at the following major cross streets: Tidwell Street, Parker Road, Little York Road, Gulf Bank Road, West Mount Houston Road, and West Road. There may be displacement or acquisition impacts along this section of the alignment in order to maintain the two northbound frontage road lanes that currently exist. There could also be some impacts to adjacent commercial properties in proximity to the proposed stations, depending on the exact size and location of these stations.

Just north of Aldine Bender, the Blue Line returns to grade as it turns to the northeast. New right-of-way would be required for this section since there is no existing road; however, no existing buildings would be impacted.

The alignment continues at grade turning north onto the southern extension of Greenspoint Drive. After crossing under Beltway 8, the Blue Line ramps up onto an aerial structure and swings onto Greenspoint Mall property on the west side of Greenspoint Drive. It continues on aerial guideway to a Greenspoint Mall station located approximately 1,000 feet south of Greens Road. Leaving the Greenspoint Mall Station the aerial alignment turns west toward IH-45 paralleling Greens Road for a short distance while ramping higher before turning northward and flying over Greens Road and the northbound lanes of IH-45. Right-of-way acquisition would be required from the west side of Greenspoint Drive and the south side of Greens Road. In addition, the existing commercial buildings at the southwest corner of Greenspoint Drive and Greens Rd. and the northeast corner of Greens Road and I-45 might be displaced (see Exhibits 3.26 and 3.27). However, since the alignment is in an aerial structure at this point, displacement could possibly be minimized.

Exhibit 3.26: Office Building at Greenspoint Drive & Greens Road

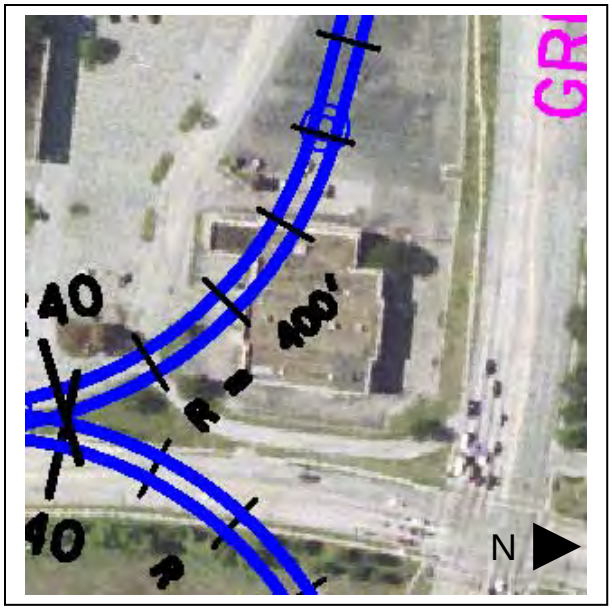


Exhibit 3.27: Commercial Building at Greenspoint Drive & IH-45

The alignment comes to grade in the center of IH-45 and continues at grade in the median of IH-45 to Rankin Road. It then ramps up onto aerial structure and turns northwestward to clear the southbound lanes of IH-45 and reach the Kuykendahl Park and Ride facility. A new aerial station would be located along the east side of the current Park-and-Ride facility. There will be property acquisition required in the vicinity of this station. In addition, approximately four existing commercial structures on the west side of IH-45 would likely be displaced; however, since the alignment is in an aerial structure at this point, displacement could possibly be minimized (see Exhibit 3.28).

Exhibit 3.28: Commercial Buildings at Kuykendahl Park and Ride

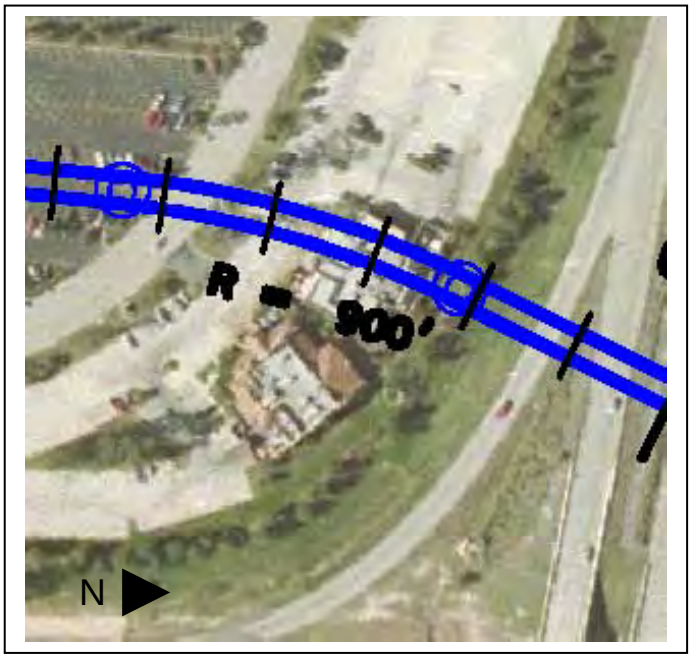
The alignment continues on aerial structure, turning back toward IH-45 and, after clearing the southbound lanes, comes to grade in the center of IH-45 near Airtex Drive. Some property acquisition would be required in this section between the Kuykendahl Park and Ride station and IH-45 to facilitate a new right-of-way alignment. It appears to be primarily following some open space adjacent to a residential development in this location. No buildings appear to be impacted.

The Blue Line continues north in the center of IH-45 almost entirely at-grade for approximately 12.3 miles to The Woodlands Parkway. Three stations are proposed in this segment at FM 1960, at Louetta, and at Rayford/Sawdust Road. At FM 1960 and Rayford/Sawdust, the alignment rises onto an aerial structure in the center of IH-45. No displacement or acquisition impacts are foreseen along this entire section of the alignment.

At Woodlands Parkway, the Blue Line transitions to an aerial structure in order to cross over the southbound lanes of IH-45 to the west side of the freeway and to the west side of Lake Woodlands to an aerial station at The Woodlands Town Center. Some property acquisition would be required for this section, in the vicinity of Lake Robbins Drive, as well as for the station.

Beyond the station at The Woodlands Town Center, the aerial alignment turns eastward toward IH-45 flying over Lake Woodlands Drive and over the southbound lanes of the freeway coming down to grade in the center of IH-45 near Medical Plaza Drive. There would be property acquisition needed throughout this section. In addition, the alignment would cause displacement of an office building at the southwest quadrant of Lake Woodlands Drive and IH-45, however since the alignment is in an aerial structure at this point, displacement could possibly be minimized (see Exhibit 3.29).

Exhibit 3.29: Office Building North of The Woodlands Town Center



The alignment continues at-grade in the center of IH-45 for 2.2 miles and then transitions into an aerial structure as it crosses SH 242 and terminates at an aerial station just north of SH 242. There are no property acquisition needs or displacement issues in this section.

East-West Spur

Leaving the proposed station at Greenspoint Mall, the Blue Line has a spur that turns east toward IAH. As the alignment turns east at Greens Road, there will be some property acquisition needs at the southeast quadrant of Greenspoint Drive and Greens Road. The alignment stays aerial and continues east in the center of Greens Road. An aerial station is proposed at Imperial Valley Drive. Some property acquisition may be required to facilitate construction of the station. Shortly before reaching West Hardy Road, the alignment swings to the north side of Greens Road and continues in a northeasterly direction flying over Hardy Road, the Union Pacific Railroad, and the Hardy Toll Road until it reaches the Hardy Toll Road Airport Extension. The alignment then follows the south side of the Hardy Toll Road extension towards IAH.

Property acquisition would be required along the north side of Greens Road in the vicinity of Hardy Road/Hardy Toll Road, and along the south side of the Hardy Toll Road extension as the alignment continues on a curve to the northeast towards IAH. In addition, there may be some building displacement; however, since the alignment is in an aerial structure at this point, displacement could possibly be minimized (see Exhibits 3.30 and 3.31).

Exhibit 3.30: Commercial Building on South Side of Hardy Toll Road Extension to IAH

Exhibit 3.31: Building on South Side of Hardy Toll Road Extension to IAH

The alignment stays aerial initially to fly over Central Green Blvd, Air Center Blvd, and Aldine Westfield Road before continuing at-grade. The alignment becomes aerial again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Blvd. A station is proposed immediately after the northward turn as the alignment comes to grade near the City Economy Lot. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK Blvd. lanes continuing at grade to a proposed terminal station at the intersection of JFK Blvd. and Terminal Road South.

Property would need to be acquired throughout this section – although these are primarily lands owned by City of Houston Airport System. There may be an issue with the size of the existing grade-separated crossings at the runway overpasses.

Parking & Maintenance Facilities[3]

Parking facilities will be needed at a variety of locations along the corridor. Surface parking areas near stations will need to accommodate at least 500 automobile spaces. Assuming that 1 acre is required per 100 automobiles (or 435.6 square feet per automobile), each surface parking area will need to be about 5 acres. It is expected that surface parking will be needed very close to 11 stations along the Blue Line, as follows: Tidwell, Parker, Little York, Gulf Bank, West Mount Houston, West Road, Kuykendahl, FM 1960, Louetta, Rayford/Sawdust, and SH-242.

Parking structures will also be needed at key locations along the alignment. Each parking structure should also accommodate at least 500 automobile spaces. Assuming 5 levels of parking with 100 spaces per level, at least 1 acre would be required for each parking structure. A transit center with about four bus bays will likely also be needed

[3] Source for parking and maintenance facility needs: STV Inc.

near each parking structure. For the Blue Line, structured parking would be needed at Northline Mall, Greenspoint Mall, and The Woodlands Mall.

Land would need to be acquired for each parking lot and parking structure to accommodate needed parking. There are a number of existing parking lots that might have shared parking opportunities, or large tracts of vacant or underutilized land close to some station locations that might be suitable (i.e. Northline Mall, Tidwell, Parker, West Mount Houston, West Road, Greenspoint Mall, Kuykendahl, FM1960, Louetta, Rayford/Sawdust, The Woodlands Mall and SH 242). However, building acquisition will likely be needed at most locations to accommodate parking needs.

LRT or BRT maintenance facilities will be required for all three alignments. The present LRT Yard and Shop located at South Fannin will not be able to handle the additional vehicles required to service line extensions. The present LRT maintenance facility is sized to store up to 60 light rail vehicles, which are projected to support operations in the year 2025 on the Downtown to Dome LRT line only. The shop is sized and equipped to service 60 vehicles and to provide periodic heavy equipment overhaul. The facility also provides for maintenance-of-way equipment and auxiliary support vehicles. The shop also houses most METRO operations and maintenance administrative personnel.

A new maintenance facility in the North-Hardy Corridor would include storage tracks for the additional fleet of vehicles needed to support 2025 service requirements of the North-Hardy line. The new maintenance facility would reduce vehicle deadhead time by providing another vehicle supply point for METRO's LRT system. A similar maintenance and storage facility would also be needed to support a new fleet of BRT vehicles.

The exact location for a new maintenance facility will be determined once the Locally Preferred Investment Strategy is selected. Nonetheless, there are some general locations that are worthy of future investigation. All three alignments have a branch that goes to the George Bush Intercontinental Airport. Approximately 2.5 miles of this branch follows the Hardy Toll Road Airport Connector on its south side. There appears to be plenty of suitable, undeveloped land in this general area where a maintenance facility could be situated. Other than this general location, which is common for three alignments, there are other locations that can be considered. For the Blue Alternative, there are numerous potential sites where a maintenance facility can be located along IH-45.

Roughly 15 to 25 acres would be required for a maintenance facility, depending on the fleet size required. The Blue Line would have the highest fleet requirement and, therefore, have a maintenance facility at the high-end of the range, whereas the Red and Green Lines would have a much lower fleet requirements and are, consequently, at the low end of the range.

3.2.2: Red Line

North-South Alignment

The Red Line follows the same alignment with identical stations as the Blue Line from its point of origin at UH Downtown, along North Main to Little White Oak Bayou, just north of Boundary Road. In this section the alignment heads north, at-grade, following the existing right-of-way of Main Street on the west side. About 500 feet north of IH-10, the alignment transitions to an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 2,000 feet and then returns back to grade in the center of North Main near Harrington Street, just north of which an at-grade station is located at Hogan Street. Potentially, a station could be located on the elevated section near Hardy Yard, if plans for an intermodal center at this location are pursued. Beyond Hogan the alignment continues at-grade in the center of North Main with an additional station at Quitman Street. All impacts on acquisitions and displacements in this section of the Red Line would be the same as the Blue Line.

At Little White Oak Bayou, the Red Line shifts to the northeast to follow along the south side of the Bayou to Fulton Street at-grade. This section will require property acquisition and has some apparent displacement to commercial and residential properties, as well as the southeast corner of Moody Park (see Exhibits 3.32 and 3.33.).

Exhibit 3.32: Little White Oak Bayou

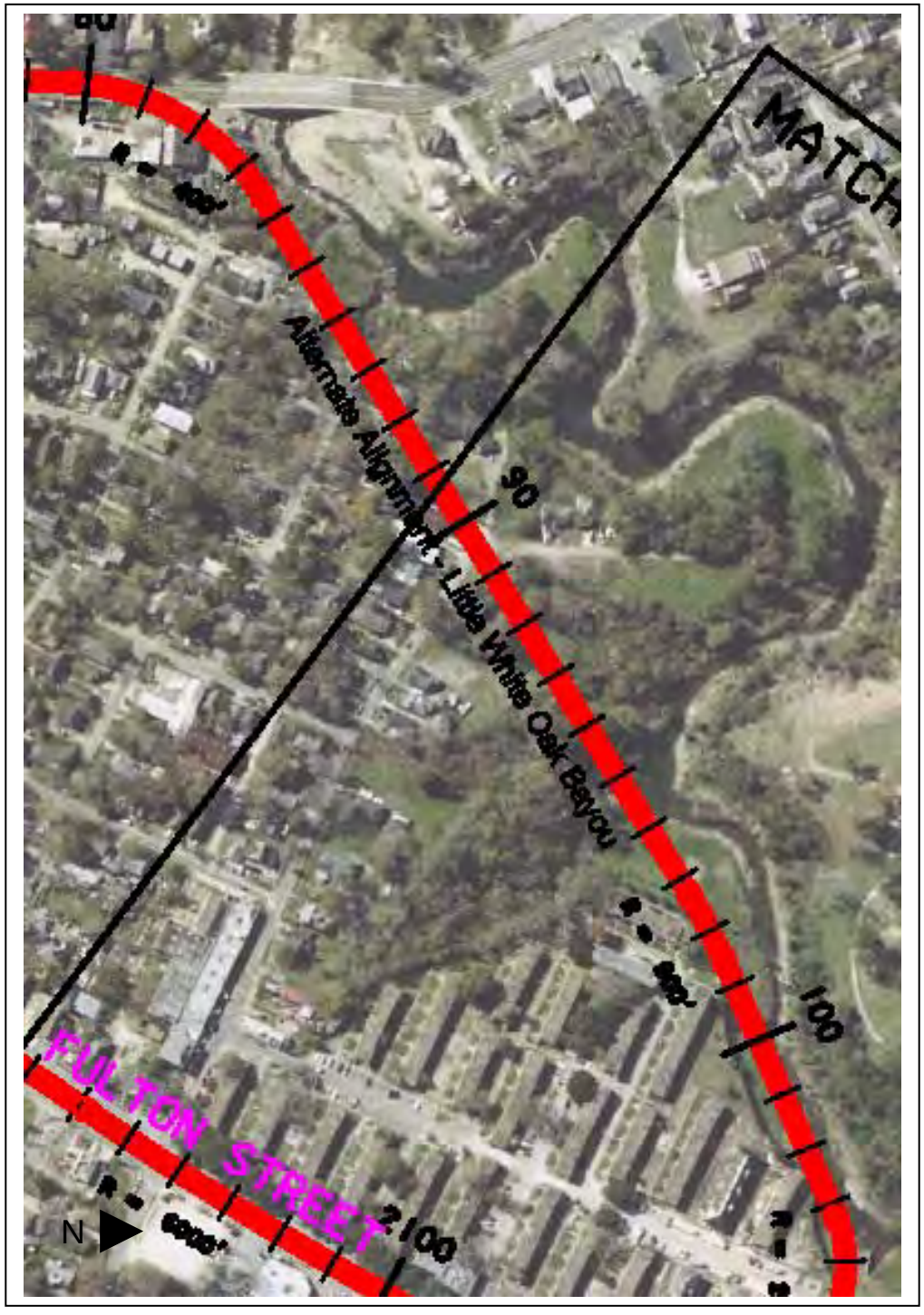
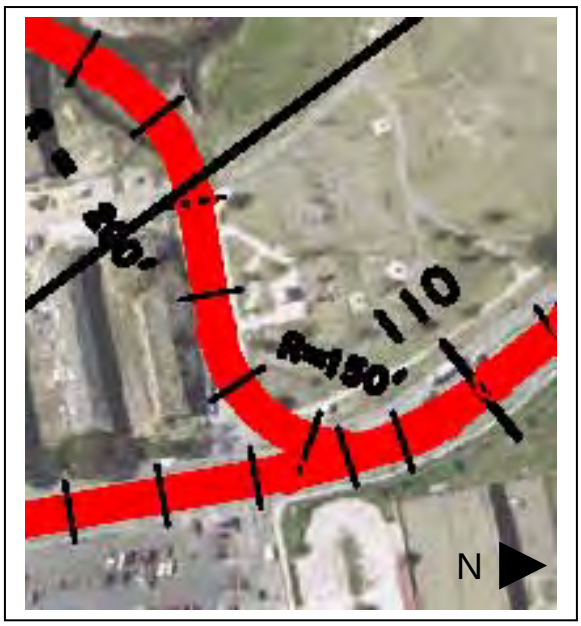
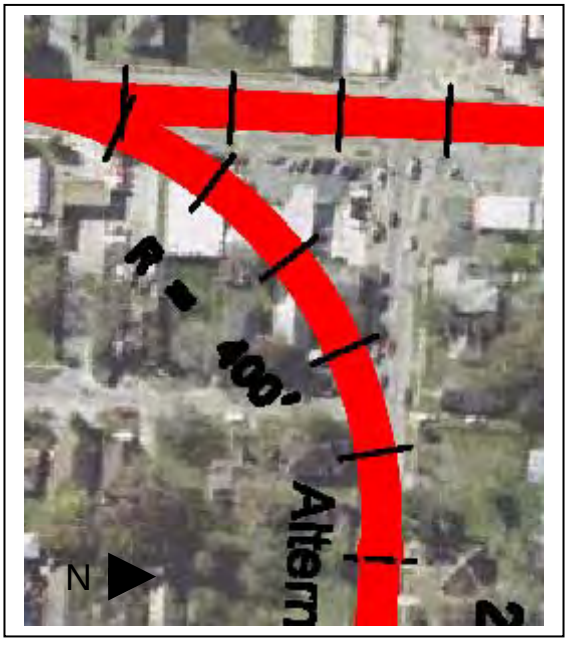


Exhibit 3.33: Turn North at Moody Park



An alternate option to reach Fulton Street has been proposed, turning east on Boundary Street and then north on Fulton. The alternate alignment options meet at Hays and Fulton Streets. This alternate option also has some property acquisition and displacement issues, including impacts on residential (see Exhibit 3.34).

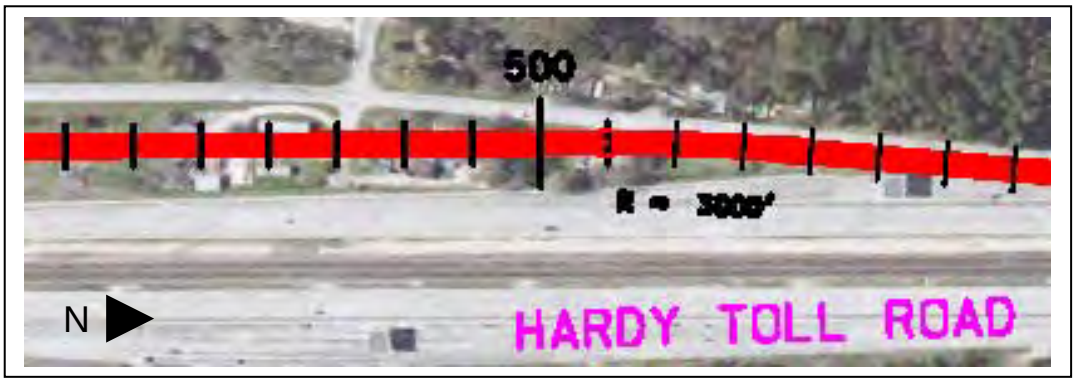
Exhibit 3.34: Alternate Option – Commercial and Residential Structures



Beyond this point the alignment veers to the right to follow Irvington Blvd. It continues almost entirely at-grade in the center of Irvington for 4.5 miles to West Hardy Road. Stations in this segment on Irvington Boulevard are proposed north of Hays Street near Bigelow, at Patton Street, Cavalcade Street, IH-610, Crosstimbers Street, and at Tidwell Street. The proposed stations could have some property acquisition needs, as well as some potential displacement issues, depending on exactly how they positioned and their size.

North of IH-610, the alignment rises onto an aerial structure for 2,400 feet to fly over the HB&T railroad. Where Irvington terminates at West Hardy Road, the alignment veers north entering Reliant Energy right-of-way between the Hardy Toll Road and West Hardy Road – a wide unpaved, grassy area. As it crosses West Hardy Road, it remains at-grade. The Red Line follows the Hardy Toll Road within the existing Reliant Energy right-of-way to just north of Gulf Bank, a distance of 2.8 miles. In this section, it becomes aerial just north of Parker to fly over the Hardy Toll Road exit and entrance ramps and then returns to grade at Little York where an at-grade station is proposed. Beyond Little York the alignment again becomes aerial to fly over the Hardy Toll Road exit ramp for Little York. The remainder of this section is at-grade with an at-grade station at Gulf Bank. The Reliant Energy right-of-way terminates approximately 2,000 feet north of Gulf Bank Road. In this area, there would be property acquisition needs as well as displacement concerns near the intersection of West Hardy Road and Hill (see Exhibit 3.35).

Exhibit 3.35: West Hardy Road at Hill



The alignment would continue north adjacent to the Hardy Toll Road in the space just to the west of the West Hardy Road lanes. This section would have property acquisition needs for the new transit right-of-way and displacement of existing structures; including some residential disruption (see Exhibit 3.36).

Exhibit 3.36: West Hardy Road – North of Aldine Mail

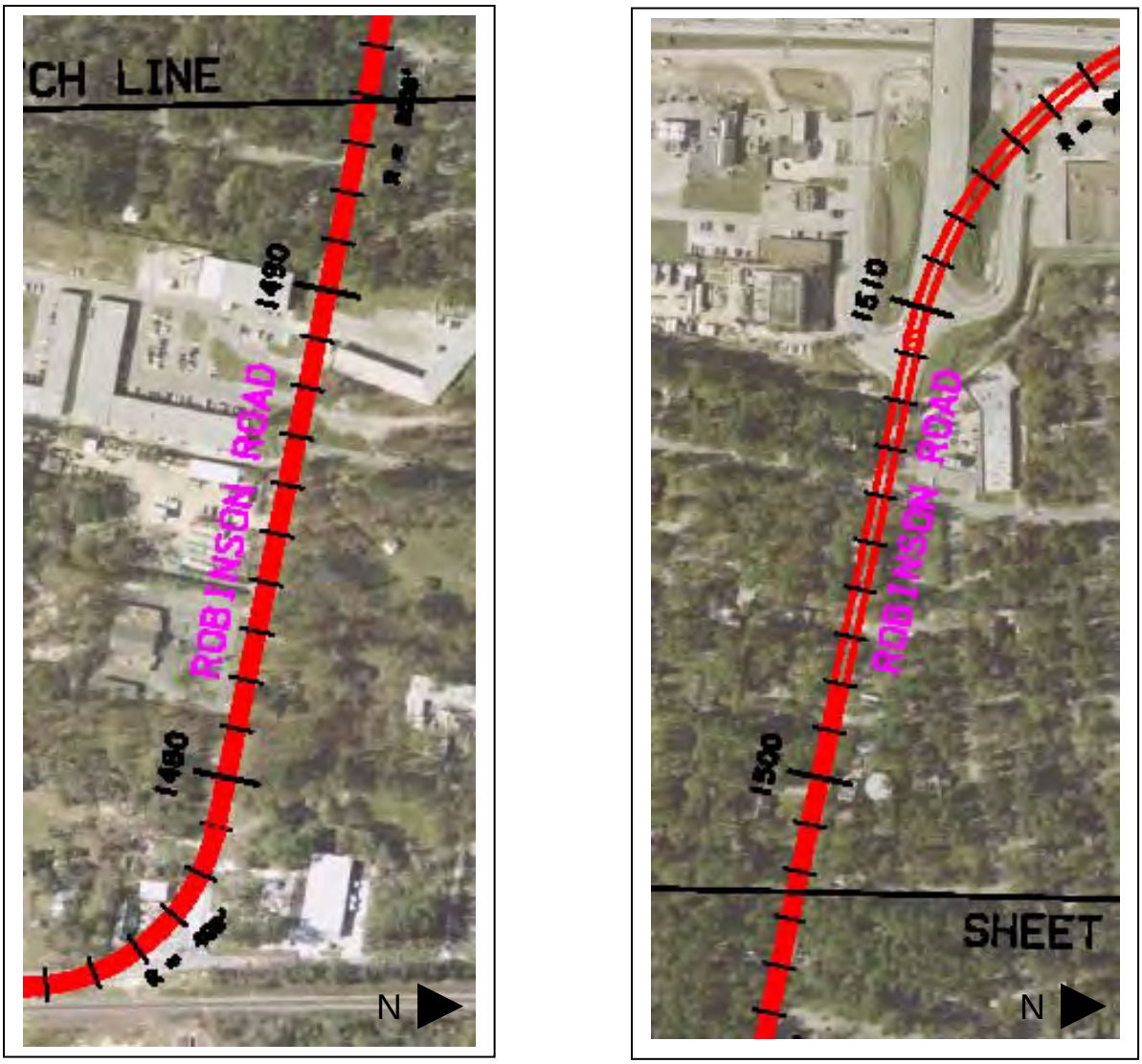
Approximately 1.1 miles south of Aldine Bender Road the alignment shifts to the east side of West Hardy Road, adjacent to the UP Railroad, and would likely result in property acquisition in that stretch. Shortly before Beltway 8 the Red Line shifts from this position to the median of West Hardy Road. It continues at-grade in the median to an at-grade station for Greens Road, which actually will be located approximately 2,000 feet south of Greens Road. There are no apparent acquisition needs or displacement issues through this section.

Beyond the Greens Road Station, the alignment splits into three branches: the main branch continuing to The Woodlands, and two spurs diverging, one to IAH and one to Greenspoint and the Kuykendahl Park and Ride, as discussed below.

As the Red Line continues north to The Woodlands, it stays primarily at-grade adjacent to and west of the UPRR, except for a 5.2 mile section beginning approximately 2,000 feet north of Rankin Road, where it follows along the west side of the Hardy Toll Road. Stations in this section are proposed at Richey Road, FM 1960, Louetta, and Rayford Road. Immediately north of Louetta station the alignment would rise onto an aerial structure for 4,700 feet to fly-over UPRR spur tracks in the Old Town Spring area. Property would likely need to be acquired for a significant portion of this entire section. Just north of Rayford Road, the alignment appears to encroach on an existing trailer park. No other existing buildings would appear to be displaced through this section.

Beyond Rayford Road, the Red Line continues north adjacent to the UPRR right-of-way to Robinson Road, where it turns to the west toward The Woodlands. This east-west section may require new right-of-way to be acquired, with some possible building displacement, including single family residential, depending on the width of the right-of-way needed (see Exhibits 3.37(a) and (b)).

Exhibits 3.37 (a) and (b): Robinson Road



As it approaches IH-45 at Woodlands Parkway, the Red Line becomes elevated to cross to the west side of IH-45. It continues on an aerial structure to a proposed aerial station at The Woodlands Mall identical to the station proposed for the Blue Line.

From this point north the Red Line follows the same alignment as the Blue Line. It turns eastward toward IH-45 flying over Lake Woodlands Drive and returns to grade in the center of IH-45 near Medical Plaza Drive. The alignment continues at-grade in the center of IH-45 for 2.2 miles and then transitions into an aerial structure as it crosses SH 242 and terminates at an aerial station just north of SH 242.

East-West Spur

With the exception of the transition point at Hardy Toll Road near Greens Road and the location of the proposed station at Greenspoint Mall, the Red Line's east-west spur is identical to the Blue Line. The transition point may require some property acquisition to make the turn from north-south to east-west, but for the most part, it stays within existing right-of-way. From the Greenspoint Mall station, the alignment follows the same route as the Blue Line to the proposed station at Kuykendahl Park and Ride.

Parking & Maintenance Facilities[4]

As mentioned above for the Blue Line, parking facilities will be needed at a variety of locations along the corridor. Surface parking areas near stations will need to accommodate at least 500 automobile spaces. Assuming that 1 acre is required per 100 automobiles (or 435.6 square feet per automobile), each surface parking area will need to be about 5 acres. It is expected that surface parking will be needed very close to 8 stations along the Red Line, as follows: Little York, Gulf Bank, Kuykendahl, Richey Road, FM 1960, Louetta, Rayford, and SH-242.

Parking structures will also be needed at key locations along the alignment. Each parking structure will should also accommodate at least 500 automobile spaces. Assuming 5 levels of parking with 100 spaces per level, at least 1 acre would be required for each parking structure. A transit center with about four bus bays will likely also be needed near each parking structure. For the Red Line, structured parking would be needed at Greenspoint Mall and The Woodlands Mall.

Land would need to be acquired for each parking lot and parking structure to accommodate needed parking. There are a number of existing parking lots that might have shared parking opportunities, or large tracts of vacant or underutilized land close to some station locations that might be suitable (i.e. Greenspoint Mall, Kuykendahl, Richey Road, FM 1960, Louetta, The Woodlands Mall, and SH 242). However, building acquisition will likely be needed at most locations to accommodate parking needs.

As discussed above for the Blue Line, LRT or BRT maintenance facilities will be required for all three alignments. The exact location for a new maintenance facility will be determined once the Locally Preferred Investment Strategy is selected. Roughly 15 to 25 acres would be required, depending on the fleet size required. The Red Line would have a lower fleet requirement than the Blue Line and, consequently, would be at the lower end of the range. In addition to the opportunities on the south side of the Hardy Toll Road Airport Connector that are common to all three alignments, there are numerous locations along the Union Pacific Railroad corridor, particularly in the stretch

[4] Source for parking and maintenance facility needs: STV Inc.

between Greens Road and Robinson Road, which might be suitable for locating a maintenance facility.

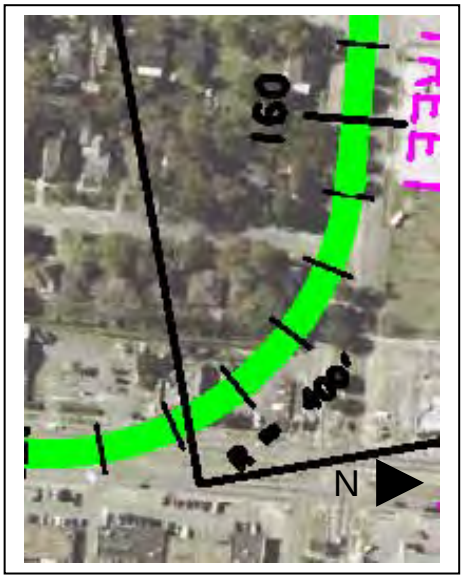
3.2.3: Green Line

North-South Alignment

The Green Line follows the same alignment with identical stations as the Red Line from its point of origin at UH Downtown to Cavalcade. All acquisitions needs and displacements impacts would be the same in this section.

At Cavalcade, the Green Line turns west from Irvington and continues at-grade in the center of Cavalcade. This turn will necessitate some property acquisition from the commercial property on the southwest corner. Some displacement of existing buildings may also be possible (see Exhibit 3.38)

Exhibit 3.38: Turn West from Irvington to Cavalcade



At Fulton, the alignment turns north, where there will also be some property acquisition impacts. An at-grade station is proposed immediately after the turn, which could also have displacement impacts (see Exhibit 3.39).

Exhibit 3.39: Turn North from Cavalcade to Fulton

The Green Line follows the existing right-of-way of Fulton to Crosstimbers and Northline Mall, at which point it leaves existing right-of-way and enters the Northline Mall site. An at-grade station is proposed at IH-610 Loop.

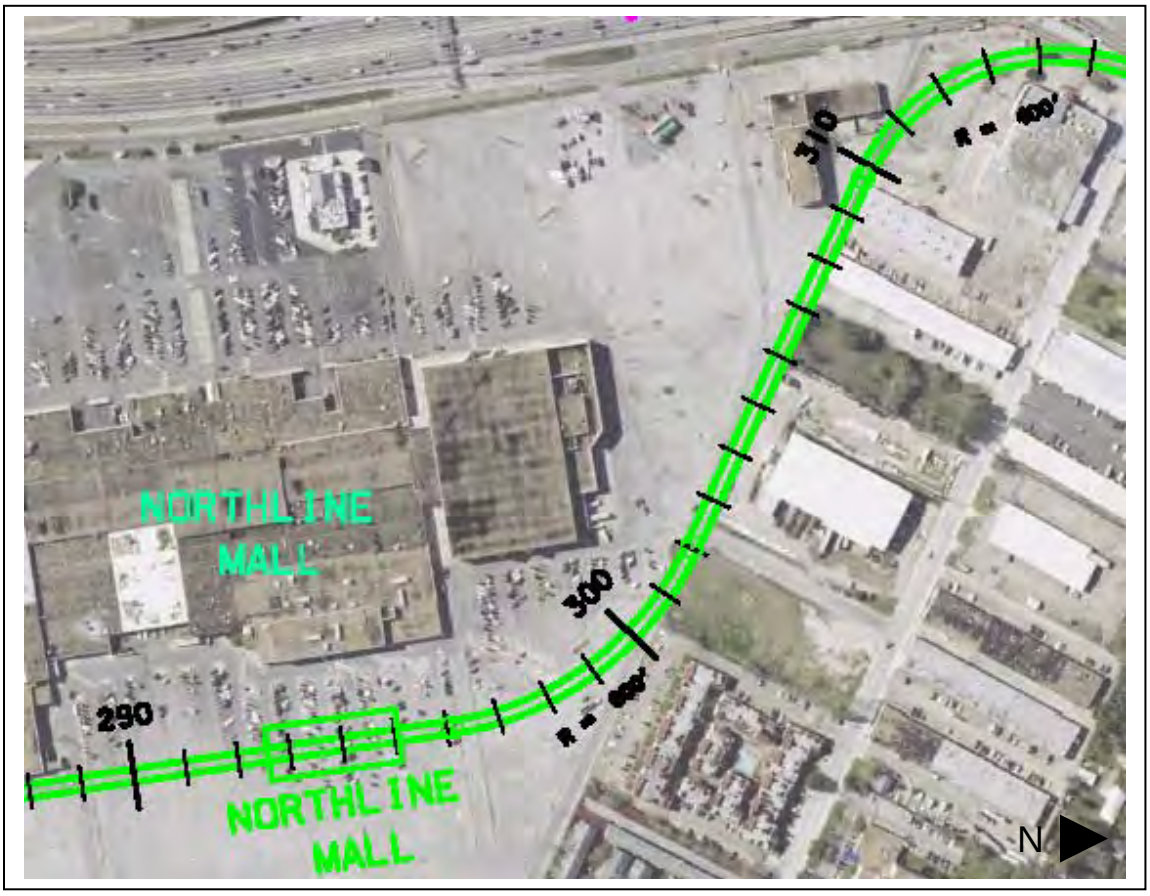
Approximately 1,600 feet north of IH-610 Loop, the Green Line rises onto an aerial structure to fly over the HB&T Railroad. It continues on an elevated structure in the center of Fulton until reaching Northline Mall at Crosstimbers.

The alignment continues through Northline Mall with an aerial station proposed on the east side of the Mall. Beyond the station the alignment turns westward to reach Airline Drive, then turns north onto Airline and continues on an aerial structure in the center of Airline for 6.1 miles to just north of West Road. This section will require property acquisition at Northline Mall, as well as at the turn to the north at Airline (see Exhibit 3.40).

Aerial stations in this segment are proposed at Tidwell Street, Parker Road, Little York Road, Gulf Bank Road, and West Road. Property acquisition may be required at the station locations, depending on the exact size and location of these stations.

Approximately 1,000 feet north of the station at West Road, the alignment comes down to grade in the center of Airline Drive continuing in this fashion past Aldine Bender Road, where Airline Drive terminates. North of Aldine Bender Road, the Green Line has the same alignment and stations as the Blue Line, except that the western branch of the Green Line terminates at the Kuykendahl Park and Ride.

Exhibit 3.40: Northline Mall/Airline



East-West Spur

The alignment of the east-west spur for the Green Line, including the connection to the Kuykendahl Park and Ride, is the same as the Blue Line, with the same resulting impacts on acquisitions and displacements.

Parking & Maintenance Facilities[5]

As mentioned above for both the Blue Line and the Red Line, parking facilities will be needed at a variety of locations along the corridor. Surface parking areas near stations will need to accommodate at least 500 automobile spaces. Assuming that 1 acre is required per 100 automobiles (or 435.6 square feet per automobile), each surface parking area will need to be about 5 acres. It is expected that surface parking will be

[5] Source for parking and maintenance facility needs: STV Inc.

needed very close to 3 stations along the Green Line, as follows: Gulf Bank, West Road, and Kuykendahl.

Parking structures will also be needed at key locations along the alignment. Each parking structure will should also accommodate at least 500 automobile spaces. Assuming 5 levels of parking with 100 spaces per level, at least 1 acre would be required for each parking structure. A transit center with about four bus bays will likely also be needed near each parking structure. For the Green Line, structured parking would be needed at Northline Mall and Greenspoint Mall.

Land would need to be acquired for each parking lot and parking structure to accommodate needed parking. There are existing parking lots that might have shared parking opportunities, or large tracts of vacant or underutilized land close to each of the station locations where parking is planned that might be suitable. However, some building acquisition may be needed at some of the locations to accommodate parking needs.

As discussed above for the Blue and Red Line, LRT or BRT maintenance facilities will be required for all three alignments. The exact location for a new maintenance facility will be determined once the Locally Preferred Investment Strategy is selected. Roughly 15 to 25 acres would be required, depending on the fleet size required. Like the Red Line, the Green Line would have a lower fleet requirement than the Blue Line and, consequently, the size of the maintenance facility would be at the lower end of the range. In addition to the opportunities on the south side of the Hardy Toll Road Airport Connector that are common to all three alignments, there may be opportunities for the Green Line to locate a maintenance facility along Airline Drive between Gulf Bank and Aldine Bender Road.

3.2.4: Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

3.2.5: Assessment of Impact

Each of the alignments would have impacts on property acquisition and result in displacement of some existing buildings. In addition, any of the proposed stations, parking facilities, and maintenance facilities could have some property acquisition needs, as well as some potential displacement issues, depending on exactly how they positioned and their size. However, since many sections of the alignments are proposed to be on aerial structures, potential impacts could possibly be minimized.

The most significant potential impacts would be caused by the Red Line, which would require right-of-way acquisition for a significant length of the alignment north of Irvington Boulevard. All three alignments may require new right-of-way along North Main Street

and impact some existing industrial buildings. Both the Red and Green Lines could require right-of-way acquisition and results in displacement of existing commercial and residential properties in the vicinity of Little White Oak Bayou/Moody Park/Boundary/Fulton.

The Red Line would have property acquisition needs as well as displacement concerns near the intersection of West Hardy Road and Hill. Along West Hardy Road, north of Aldine Mail Route and south of Beltway 8, there would be property acquisition needs for the new road right-of-way and displacement of existing structures, including some residential disruption. Where the Red Line runs adjacent to the UPRR and the Hardy Toll Road north of Greens Road, property would likely need to be acquired for a significant portion of this entire section. Just north of Rayford Road, the alignment appears to encroach on an existing trailer park. No other existing buildings would appear to be displaced through this section. There may also be new right-of-way needed, with some possible building displacement, including single family residential, depending on the width of the right-of-way needed, where the alignment turns towards The Woodlands at Robinson Road. Property acquisition would be required at Greenspoint Mall and The Woodlands Town Center to accommodate the Red Line alignment, as well as proposed stations at these locations.

The Blue Line would need additional right-of-way and impact commercial properties on the east side of Airline between Cavalcade and IH-610 Loop. At the IH-610 Loop, adjacent properties that could be impacted include some residential buildings. Where the alignment swings to the east just south of Crosstimbers towards the Northline Mall commercial buildings may also be impacted. Acquisition of property would also be required to facilitate this turn. Property acquisition would be required at Northline Mall, Greenspoint Mall, and The Woodlands Town Center to accommodate the Blue Line alignment, as well as the proposed stations at these locations.

On the north side of Northline Mall, as the alignment transitions to the east side of IH-45, there are two existing commercial buildings located within the proposed alignment. In the Greenspoint area, right-of-way acquisition would be required from the west side of Greenspoint Drive and the south side of Greens Road. In addition, the existing commercial buildings at the southwest corner of Greenspoint Drive and Greens Rd. and the northeast corner of Greens Road and I-45 could be displaced. At the Kuykendahl Park and Ride, there would be property acquisition required in the vicinity of the proposed station. In addition, approximately four existing commercial structures on the west side of IH-45 would likely be displaced. Some property acquisition would be required in the section between the proposed station and IH-45 to facilitate a new right-of-way alignment. At The Woodlands Town Center, some property acquisition would be required in the vicinity of Lake Robbins Drive, as well as for the station. As the alignment turns eastward toward IH-45 property acquisition would be needed. In addition, the alignment would cause displacement of an office building at the southwest quadrant of Lake Woodlands Drive and IH-45.

The Green Line would have less need for property acquisition and displacement of existing buildings than either the Blue Line or Red Line (even south of Greens Road). As mentioned above, both the Red and Green Lines have some property acquisitions needs and displacement impacts on existing commercial and residential properties in the vicinity of Little White Oak Bayou/Moody Park/Boundary/Fulton. At Cavalcade, where the Green Line turns west from Irvington to Cavalcade, there will be some property acquisition needed from the commercial property on the southwest corner. Some displacement of existing buildings may also be possible. At Fulton, where the alignment turns north, there will also be some property acquisition impacts. Property acquisition will be needed at Northline Mall, as well as at the turn to the north at Airline Drive.

All three alignments share the same impacts for the east-west spur. There will be some property acquisition needs at the intersection of Greenspoint Drive and Greens Road. Property acquisition would be required along the north side of Greens Road in the vicinity of Hardy Road/Hardy Toll Road, and along the south side of the Hardy Toll Road extension as the alignment continues on a northeast curve to the northeast towards IAH. In addition, there may be some building displacement in this area. Property would need to be acquired throughout the section in the vicinity of IAH – although these are primarily lands owned by City of Houston Airport System. Property acquisition and building displacement would occur on the connection to the Kuykendahl Park and Ride for both the Green and Red Lines.

Each of the alignments will have land acquisition needs and building displacement related to needed parking lots/structures and a maintenance facility. However, there may be opportunities to reduce this impact through shared parking and use of vacant and underutilized land. The Blue Line would appear to have the greatest potential impacts, followed by the Red Line and then the Green Line.

3.3: Air Quality

3.3.1: Background

The Houston area[6] is currently designated by the Environmental Protection Agency (EPA) as a “nonattainment area for one or more critical pollutants” – specifically ozone. Ozone, formed by the combination of emitted nitrogen oxides (NOx) and hydrocarbons, also called photochemical smog, is the only criteria pollutant for which the eight-county Houston-Galveston area currently fails to meet the National Ambient Air Quality Standards (NAAQS). An area that fails to meet the NAAQS for a pollutant is said to be in nonattainment for that pollutant.

6 The eight counties that make up the Houston-Galveston ozone nonattainment area for the one-hour standard are Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller. The counties comprise the Consolidated Metropolitan Statistical Area (CMSA) for the Houston region.

The ozone nonattainment area is classified as "severe"[7] and is required to attain a 1-hour ozone standard of 0.12 parts per million (ppm) by November 15, 2007. This issue is being addressed in a comprehensive manner on a variety of fronts, under the coordination of the Houston-Galveston Area Council (H-GAC). Some reduction measures are being imposed, such as the reduced speed limits along State freeways, while other measures are incentive-based and voluntary, such as tax incentives, funding opportunities, public relations and marketing, emission reduction methodologies, technical and financial assistance to create emission reductions credits, education in the use of emission reductions credits: donating, selling and trading, and assistance with other grant and rebate programs under the State's Texas Emission Reduction Plan (TERP). All efforts are aimed at a demonstration of attainment by the required date.

> "The majority of area air quality efforts in this region are focused on (1) obtaining a better understanding and measuring of the area's ozone levels and its precursors, and (2) identifying and implementing effective ozone reduction control strategies."[8]

Long-term reduction in ozone for Houston will generally be the result of efforts made to reduce emissions from various sources of Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx). One of the sources of VOC and NOx emissions is "on-road mobile sources", which consist of automobiles, trucks, motorcycles and other types of vehicles.

3.3.2: State Implementation Plan (SIP)

The EPA requires that States with areas that fail to meet the National Ambient Air Quality Standards prepare and execute a State Implementation Plan (SIP). The purpose of the SIP is to demonstrate attainment of the federal air quality standards in a nonattainment area.

From its review of the November 1999 SIP prepared by the Texas Commission on Environmental Quality (TCEQ),[9] the EPA determined that there was a gap of 118 tons per day (tpd) between the reductions proposed by the plan and those needed for attainment. As a consequence, the EPA required further control measures and commitments to be prepared. In December 2000, the TCEQ submitted a SIP revision to reduce the shortfall ("gap SIP").

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7 The Houston nonattainment area is classified as a Severe-17 nonattainment area, based on its highest ozone levels during 1987-89. The Clean Air Act Amendments gave these areas 17 years to meet the one-hour ozone standard, and, therefore, they have a one-hour ozone attainment deadline of 2007. Source: "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.

8 "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.

9 Formerly the Texas Natural Resource Conservation Commission (TNRCC)

> "For the first time, the agency [TCEQ] was forced to adopt strategies that influenced behavior because no additional technologically based strategies were available." [10]

A follow-up SIP revision ("clean-up SIP") was submitted in September 2001 and on October 21, 2001 the EPA approved both the December 2000 and September 2001 SIP revisions as demonstration of attainment.

Two further SIP revisions are being prepared (2002 and 2004). "These revisions will consider the results of new research and modeling obtained from the Texas Air Quality Study 2000, specifically the affects of highly reactive VOC emissions on ozone formation. Additionally, new technologies and innovative ideas are being studied as potential future control measures to further reduce VOC and NOx emissions. The TCEQ anticipates that the new measures and scientific enhancements incorporated into the 2002 and 2004 revisions of the SIP will fulfill its commitment to obtain the additional emission reductions necessary to close the shortfall and demonstrate attainment."[11]

The SIP includes numerous transportation control measures identified by H-GAC such as traffic signalization, bicycle-pedestrian projects, intersection improvements, and park-and-ride lots.

Implementation of the measures contained in the SIP is intended to achieve attainment of the 1-hour ozone standard in the Houston area by November 15, 2007, the date required for attainment.

3.3.3: Transportation Conformity

"Transportation conformity is required by §176(c) of the FCAA. The FCAA requires that transportation plans, programs, and projects conform to SIPs in order to receive federal transportation funding and project approvals. Conformity to a SIP means that transportation activities will not cause or contribute to new air quality violations, increase the frequency or severity of existing violations, or delay timely attainment of the NAAQS."[12]

It is the responsibility of the H-GAC, as the Metropolitan Planning Organization (MPO), acting through its Transportation Policy Council (TPC), to ensure that the transportation plans for the Houston-Galveston area – including plans for freeways, surface roads,

[10] "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.
[11] "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.
[12] "Revisions To The State Implementation Plan (SIP) for the Control of Ozone Air Pollution, Post-1999 Rate-Of-Progress and Attainment Demonstration SIP for the Houston/Galveston Ozone Nonattainment Area, Inspection/Maintenance SIP for the Houston/Galveston Ozone Nonattainment Area", Texas Natural Resource Conservation Commission, December 6, 2000.

HOV lanes and transit – are in conformity with the SIP. Both the Metropolitan Transportation Plan (MTP), a 20-year long-range transportation plan, and the Transportation Improvement Program (TIP), a three-year implementation plan, need to be in conformity with the SIP.

Conformity is also necessary in order to obtain continued Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funding of transportation plans, programs and projects. The Transportation Equity Act (TEA-21)[13] requires that projects must be in a fiscally constrained and conforming transportation plan and transportation improvement program in order to be approved, funded, advanced through the planning process or implemented.

To conform, there cannot be an increase in the VOC or NOx emissions generated by on-road mobile sources from those shown in the 1990 emissions inventory, even if there is an increase in vehicle miles traveled. Transportation emissions must continue to decline throughout the long-range transportation planning time.[14]

Transportation conformity must be periodically revised based on changing requirements of the SIP and revisions to the MTP. Transportation conformity is an analytical process that establishes the major connection between transportation planning and emission reductions from transportation sources. [15]

In May 2002, H-GAC prepared a conformity re-determination document to show that the *2022 Metropolitan Transportation Plan Update* and the *2002 - 2004 Transportation Improvement Program* for the Houston-Galveston Transportation Management Area meet the requirements of the SIP for the Houston-Galveston Ozone Nonattainment Area.

The preferred alignment for North-Hardy, once selected and included in the MTP and TIP, will require a similar conformity re-determination by H-GAC. On-road mobile emissions must meet the motor vehicle emission budget (MVEB) requirements in the SIP by the 2007 attainment date and cannot increase the number or severity of ozone exceedances in the Houston region. Since the transportation modes being considered for North-Hardy involve LRT/BRT and HOV lanes, any of the alternatives are projected to reduce motor vehicle emissions and thereby contribute in a positive way to the overall regional conformity determinations. Public transit and HOV projects are specifically geared towards reducing reliance on the automobile, traffic congestion and vehicle emissions. In addition, the proposed LRT/BRT can contribute to transit oriented development, increased population density and mixed-land use initiatives, which can

[13] Transportation Equity Act (TEA-21) authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003.
[14] "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.
[15] "Transportation Conformity: A Basic Guide for State & Local Officials," U.S. Department of Transportation, Publication No. FHWA-PD-97-035.

further reduce the number, frequency and length of trips, thereby reducing Vehicle Miles Traveled (VMT) and total emission of air contaminants.[16]

3.3.4: Emission Rates

Local Emissions Analysis

Air quality local analysis focuses on conditions in the immediate proximity of the alignment of the LPIS. The EPA recommends analyzing intersections that currently operate or are expected to operate in the future at a Level of Service (LOS) of D or worse. Once the LPIS has been identified as part of the Alternatives Analysis, the major intersections along the preferred alignment should be analyzed in terms of their LOS for current conditions, no-build future conditions, and LPIS future conditions. The results of the LOS analysis will serve as the basis for determining if additional analysis or modeling of carbon monoxide (CO) is necessary. If the LPIS future conditions does not degrade any intersections from LOS C or better to LOS D or worse, then further "hot spot" analysis should not be necessary. Once the LPIS is identified and a formal National Environmental Policy Act (NEPA) assessment (Environmental Assessment - EA/Environmental Impact Statement - EIS) is undertaken, a hot spot analysis should be conducted.

Regional Emissions Analysis

Regional emissions analysis is derived from the output of the regional travel demand model maintained by H-GAC. Regional air quality analysis for the North-Hardy Corridor will involve comparing the regional vehicle miles traveled (VMT) for the "No Build" network to the VMT for the System Plan network that contains the North-Hardy LPIS. Overall reductions in VMT will have a positive impact on the regional air quality. Once the LPIS for North-Hardy is selected, this analysis should be conducted. If the System Plan with the North-Hardy LPIS reduces region-wide emissions, we will conclude that the LPIS has a positive impact on regional air quality.

3.3.5: Assessment of Impact

Because each of the alternatives resulted in a decrease in drive alone trips over the No Build alternative, the transit alternatives would have a positive impact on air quality. The Green Line showed the greatest decrease in drive alone, linked trips – a decrease of 17,773 trips per day. The Red Line produced the next highest decrease of 2,400 trips per day, followed by the Blue Line at 1,632 trips per day.

[16] "Air Quality Reference Guide for the Houston-Galveston Area", prepared by the Regional Air Quality Planning Committee of the Houston-Galveston Area Council, July 2002.

3.4: Noise & Vibration

3.4.1: Introduction & Methodology

In conducting the analysis for the North Hardy Planning Study, the methods of the FTA's Transit Noise and Vibration Impact Assessment guidance manual screening procedures were applied to both LRT and BRT. The noise screening procedure utilized the general screening distance found in the manual and it was then refined to include light rail and bus source reference levels, vehicle headways, and speeds. The LRT source level came from the specifications of the vehicle expected to be used in Houston. The bus noise source level was assumed to be that of a diesel articulated bus, as the data for a hybrid bus was not available. This assumption is representative of the existing technology and represents a worst-case scenario.

Adjustments were made to the source levels to account for operations on the aerial and at-grade sections. The existing noise levels were estimated using the table of typical levels given in the FTA guidance manual (Table 5.7) and with a 5 dBA factor of safety. FTA criteria for impact were used to develop a noise impact contour for each alternative. The noise contours were then superimposed onto a base map.

The vibration contours were developed using the distances given in the FTA guidance manual's screening procedure. No detailed data of the soil conditions or the road and guideway surfaces was available and therefore the distances were not refined to reflect that information. The vibration contours were then superimposed onto a base map.

Exhibits 3.41, 3.42, and 3.43 give the distances used for the noise and vibration screening. These are the distances at which the contours have been drawn.

Exhibit 3.41: Noise Screening Distances for Red Line (in feet)

		At-Grade				Aerial			
		Near Highway		No Highway		Near Highway		No Highway	
		Impact	Severe	Impact	Severe	Impact	Severe	Impact	Severe
	LRT	0	0	55	0	55	0	110	0
Before Greens Rd	BRT	80	0	150	55	150	55	255	110
	LRT	0	0	0	0	0	0	70	0
After Greens Rd	BRT	50	0	73	0	73	0	175	70

Exhibit 3.42: Noise Screening Distances for Blue Line and Green Line (in feet)

		At-Grade				Aerial			
		Near Highway		No Highway		Near Highway		No Highway	
		Impact	Severe	Impact	Severe	Impact	Severe	Impact	Severe
Before Greens Rd	LRT	0	0	55	0	55	0	110	0
	BRT	80	0	150	55	150	55	255	110
After Greens Rd	LRT	0	0	0	0	0	0	75	0
	BRT	50	0	73	0	73	0	175	70

Exhibit 3.43: Vibration Screening Distances for All Alternatives (in feet)

LRT	150
BRT	50

Land use Category 2 (residential) buildings that fell within the contours were counted and the resulting numbers of potential impacts are shown in Exhibits 3.44 and 3.45. The corridor has been split into six segments for each of the three alternatives to make the comparison of impacts associated with the LRT (Exhibit 3.44) and BRT (Exhibit 3.45) options and the type of structure (aerial, at-grade) more straightforward.

The impacted buildings include single and multi-family residences in addition to park areas. If potential impact was shown at a park, it was counted as one receiver and is shown in both tables below.

3.4.2: Assessment of Impact

Exhibits 3.44 and 3.45 below show the potential noise and vibration impacts.

Exhibit 3.44: Potential Noise and Vibration Impacts for Category 2 Receivers - LRT

Segment	Red Alternative			Blue Alternative			Green Alternative		
	Noise		Vibration	Noise		Vibration	Noise		Vibration
	Impact	Severe		Impact	Severe		Impact	Severe	
Existing to Boundary	7	0	36	7	0	36	7	0	36
Boundary to Cavalcade	12, park	0	44	---	---	---	12, park	0	44
Boundary to Northline	---	---	---	87	0	209	---	---	---
Cavalcade to Greens	95	0	283	---	---	---	---	---	---
Cavalcade to Northline	---	---	---	---	---	---	73	0	147
Northline to Greens	---	---	---	19	0	55	124	0	257
Greens to IAH	6	0	8	36	0	248	36	0	248
Greens to Kuykendahl	0	0	240	0	0	0	0	0	0
Greens to North End	10	0	81	---	---	---	---	---	---
Kuykendahl North	---	---	---	0	0	20	---	---	---
Total	130	0	692	149	0	568	252	0	732

Exhibit 3.45: Potential Noise and Vibration Impacts for Category 2 Receivers - BRT

Segment	Red Alternative			Blue Alternative			Green Alternative		
	Noise		Vibration	Noise		Vibration	Noise		Vibration
	Impact	Severe		Impact	Severe		Impact	Severe	
Existing to Boundary	36	7	6	36	7	6	36	7	6
Boundary to Cavalcade	32	12, park	12	---	---	---	32	12, park	12
Boundary to Northline	---	---	---	112	92	92	89	63	63
Cavalcade to Greens	167	95	110	---	---	---	146	124	113
Cavalcade to Northline	---	---	---	---	---	---	---	---	---
Northline to Greens	---	---	---	36	19	19	---	---	---
Greens to IAH	0	6	6	210	36	72	210	36	72
Greens to Kuykendahl	120	0	120	0	0	0	0	0	0
Greens to North End	15	10	25	---	---	---	---	---	---
Kuykendahl North	---	---	---	0	0	0	---	---	---
Total	370	130	279	394	154	189	513	242	266

3.5: Energy

3.5.1: Introduction

The total energy consumption of the proposed improvements for the North-Hardy Corridor can be measured as the sum of two elements: construction energy and operating energy. Construction energy usage includes the energy used in operating equipment at the construction site, in producing and transporting construction materials, energy consumed by vehicles that are delayed by the construction of facilities, and in manufacturing vehicles and equipment. Operating energy usage includes energy consumed by the operation and maintenance of the facilities. The net energy consumed by the LRT/BRT would be the total construction energy plus the total operating energy minus the energy savings resulting from trip diversion from other less-efficient transportation modes.

Mass transit in general, as opposed to individual transit, provides an inherent energy savings if a greater proportion of people using the corridor for transportation switch to a less energy consumptive mode of travel. For example, the conversion of petroleum-based automobile trips to electrically propelled light rail trips should provide a net gain for less energy consumption. However, the overall energy savings from an operational aspect would be dependent upon how many current and future automobile drivers make the switch from auto-use to use of the LRT/BRT. Transit use is dependent upon the selection of an alignment that would the highest potential for generating transit ridership and promoting economic development opportunities in order to generate the highest concentrations of demand.

3.5.2: Operating Energy

It would be expected that any of the LRT/BRT alignments would cause a net reduction in petroleum-based energy consumption due to the diversion of auto trips, with fewer potential passengers per auto to the LRT/BRT vehicles, either of which would carry more passengers per mile traveled. It is empirically possible to estimate the equivalent British Thermal Units (BTU) saved per year due to the reduced gasoline consumption by automobiles from the BTU's expended per year for either LRT/BRT.

Additional petroleum-based energy savings can be determined for bus operations associated with possible modifications of the feeder bus system, as the system could run more efficiently in the way that it serves the North-Hardy Corridor. By adding the mode reduction and the associated bus reduction, the total reduction in energy consumption can be determined. It is anticipated that the net reduction in petroleum-based fuel energy consumption under any of the alignment and/or either mode, which although beneficial, will not materially affect the overall regional energy consumption.

LRT would increase electrically generated energy consumption. It is anticipated that the electrical energy considered in an analysis of the amount of consumption would be

generated at a power plant using a variety of energy sources including coal, nuclear, hydroelectric, diesel, or natural gas, and transmitted to the user. In the Houston area, the typical source of generated power is diesel or natural gas fuels. When taken from a regional perspective, it is anticipated that the change in electrical energy BTU generation for LRT would not materially affect the overall regional energy consumption.

3.5.3: Construction Energy

The construction of any LRT/BRT facility will use energy to operate equipment at the site, producing and transporting construction materials, and manufacturing vehicles and equipment. Some consideration should also be given to energy expended to compensate for slower travel speeds near construction sites, and longer travel times due to construction delays. While construction energy is difficult to estimate and cannot be directly compared with operating energy, it may be a factor in considering the overall energy analysis of transportation improvements.

3.5.4: Assessment of Impact

The initial and long-term energy consumption should be a factor in the decision-making process. An empirical process is available to measure and estimate the energy expended for the construction and operation of transit facilities. While the energy consumption for a transit improvement is significant when taken on a project basis, in the overall scheme of things, the percentage of impact from energy consumption alone is not significant enough to warrant decision-making based exclusively on energy consumption. The inherent difference between individual versus mass transit will have greater overall impact than the differences in energy consumption between the different alignments and modal alternatives.

In the final Alternatives Analysis report (EA/EIS), the impacts should be revisited to determine whether any of the alignments, or modal alternatives, would have a greater or lesser impact on fuel consumption or energy efficiency.

3.6: Safety & Security

3.6.1: Introduction

This section examines safety and security considerations for the proposed improvements, including the introduction of LRT/BRT stations, facilities and services along the various transit alignments. More specifically, this section is concerned with the degree to which the alternatives reduce or create the potential for injury or accident from initial design, to construction, to maintenance. The assessment of safety and security examines potential impacts of safety during construction and operations, and design features to reduce hazards and increase public safety in the long term.

3.6.2: Existing Conditions

Each of the proposed transit alignments largely follows existing highway, road and rail rights-of-way. As a result, they are located along routes that currently carry high volumes of auto, bus and truck traffic. Many of the intersections are signal controlled with turning restrictions, including “walk-don’t walk” signals as a part of the traffic light cycle. There is a large number of existing bus operations along major roads and there are a large number of curbside bus stops in operation, some requiring pedestrian street crossings to gain access.

3.6.3: Design

Crime Prevention Through Environmental Design

The METRO program for Crime Prevention Through Environmental Design (CPTED) should be thoroughly incorporated into the design of all stations, Park and Ride facilities and Yard and Shop locations. METRO also requires that one person on each design team has undergone CPTED training. Final design sign-off includes a review by METRO Police officers who have been designated as CPTED specialists.

The main premise of CPTED is that proper design and effective use of the built environment can lead to a reduction in the incidence and fear of crime – and to an increase in the quality of life. CPTED design strategies seek to prevent crime within a defined environment by manipulating variables that are closely related to the environment itself. CPTED strategies include access control, surveillance, and influencing territorial behavior.

The primary thrust of access control is to deny access to a crime target and to create the perception of risk in the perpetrators of a crime. Surveillance is a design concept directed at keeping intruders under observation. Surveillance strategies can include police/security patrols, ensuring areas are well-lit, careful structural design including the placement of windows (the concept of “eyes-on-the-street”), and landscaping. The concept of territoriality suggests that physical design can contribute to a sense of territory. Physical design can create or extend a sense of “ownership” and the potential for offenders to perceive that sense of territorial influence.

There are many examples of CPTED techniques in practice. Some examples of CPTED techniques are:

- Clear definition of the boundaries of the controlled space.
- Natural surveillance and access control in public gathering areas, especially when activities are located in unsafe locations.
- Natural barriers to conflicting activities through better designation of space.
- Effective use of “critical intensity” through improved space design.
- Increased perception of natural surveillance by redesigning or revamping space.

- Improved communications to overcome distance and isolation.

Lighting and communication design is an important consideration in the design of LRT/BRT stations or facilities for the North-Hardy Corridor. Both are significant in producing a sense of security in the public that would use the system. Additionally, consideration should be given to increasing police patrols in order to provide security for stations and facilities, as well as vehicles. Emergency communications and closed circuit television should be made available at stations and facilities. Facility design should be open to enable activities to be easily observed. Driver, pedestrian, and transit user information and educational safety campaigns should be run prior to the start of operations. Long-term public relations both written and electronic will provide a needed sense of comfort for continued transit use.

Graffiti and Vandalism

Graffiti and vandalism are problems that will have to be dealt with both during construction and after completion of the transit stations and facilities. The solutions to the problem begin with the initial design phase. Washington D.C.'s transit system is often cited as a leading example of a safe, clean, and relatively crime-free rail system. D.C. transit officials attribute this success to architectural design that incorporated crime prevention techniques – such as open station designs, clear visibility, and abundant surveillance cameras – along with policies of active maintenance with regard to vandalism and graffiti, and strict enforcement of rules and laws.[17] There are few opportunities to apply graffiti in the stations because many platforms are situated in the center of the station, with the tracks separating the traveler from the station's walls.

As the example of Washington's Metro suggests, preventing or minimizing graffiti and vandalism involves a host of measures to create a "package" of elements. No one element will solve all of the potential problems. The program should include not only design features, maintenance, surveillance, and law enforcement as discussed above, but also continuing education campaigns, and programs and activities that prove attractive to young people. International evidence suggests that reducing graffiti and vandalism is accomplished not just by the measures outlined above, but also by diverting motivation by involving young people and the community as a whole in creative schemes to improve the transit environment, and by giving transportation systems a personable feature to reduce the "us versus them" attitude. One possible response that has also been successful is to provide graffitists with a legal outlet for their art.

[17] For more information see http://www.lawlink.nsw.gov.au/cpd.nsf/pages/violrep_chapter2 and http://www.ncjrs.org/pdffiles/166372.pdf .

Accessibility and Barrier-Free Design

The design of all stations and facilities will need to conform to the Americans with Disabilities Act (ADA) code requirements and the Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes (which is more stringent than ADA), along with particular municipal requirements where required. The initial design for stations and facilities should be submitted to the Architectural Barriers Department (or an approved review contractor), revised per their comments, and, upon completion, be inspected for plan compliance.

Creating Pedestrian- and Bicycle-Friendly Environments

The design of LRT/BRT stations should include ways to ensure a good pedestrian and bicycle environment through the use of such techniques as widening sidewalks, shortening the length of crosswalks, reducing the number of traffic lanes at intersections, marked access lanes for bikes, designated areas for bike parking (bike racks).

Additionally, improvements to the stops along connecting bus routes should also be considered in order to enhance the comfort and security of transit patrons. Design should include typical urban auto/pedestrian traffic controls since these are familiar to both drivers and pedestrians. Current METRO plans include provide improved accessibility for bicycles, such as bike racks on busses and at Park and Ride locations. This type of consideration for bike access and safety should also be included for the LRT/BRT system.

A variety of specific operational conditions for LRT/BRT should be addressed to relate to site-specific needs, such as signal-protected crosswalks, protected left-turn signals for vehicles to eliminate conflicts between different types of vehicles, bikes and pedestrians, special signal phasing, and overhead pedestrian bridges to connect to stations at key locations.

3.6.4: Construction

It is anticipated that the methods and processes to be used in the construction of proposed improvements would be similar to typical street/highway construction techniques currently in use. Adaptation should be made for special materials or mode-specific needs such as rail-bed preparation or overhead power supply. Displacement of existing traffic along proposed transit routes is an important safety issue. A through-traffic plan should be reviewed and in place prior to construction to address these issues.

It is not anticipated that construction of any of the proposed improvements will involve unusual or particularly dangerous construction types, procedures, or locations that will pose any significant safety or security impacts. Standard construction safety practices, as established by government regulations, including the Occupational Safety and Health Administration (OSHA), as well as METRO specifications, will minimize the potential for accidents and other safety problems. Extended efforts should be made for public awareness during construction to minimize public inconvenience.

A Safety Plan will need to be developed and implemented to ensure pedestrian safety during construction, and to monitor and respond to any safety issues as they arise, in keeping with federal guidelines.

3.6.5: Post-Construction & System Operation

Continued vigilance of safety and security issues should be maintained once the improvements have been initiated and as the system becomes operational.

Since all transit alignments primarily following existing right-of-way, there will not be significant negative impacts on existing safety issues from a traffic perspective. And, since many portions of each of the proposed alignments would be grade-separated, traffic safety may actually improve with fewer opportunities for conflicts with pedestrian, bicycle, automobile or other modes of transit.

Passenger safety and security is an important consideration for broad public acceptance and use of the system. Public education programs should be in place prior to system implementation to facilitate communication. Quick resolution to issues will also be very important.

A post-construction evaluation should be conducted of the entire process, phase by phase, in order to elevate issues to a point of resolution prior to the next phase of construction. Keeping the process as clean as possible and learning from past issues is important to keeping the positive support that is necessary to maintaining a long-term viable transit system.

3.6.6: Assessment of Impact

All applicable safety and security guidelines and policies should be followed during the construction and operation of the LRT/BRT, regardless of which alignment is selected.

3.7: Visual & Aesthetics

3.7.1: Introduction

As mentioned in Section 3.1 (Land Use), the North-Hardy Corridor traverses six identifiable community areas. Each of these six community areas has distinctive features that are established by a wide range of factors. For the purposes of the evaluation of visual and aesthetic impacts of the three transit alignments, the factors that are being considered are as follows:

- **Neighborhood structure and identity** (prevailing street grid/block lengths, access routes/obstructions such as railroad crossings, bayous, and general homogeneity of the built environment).

- **Street character** (local street/major thoroughfare status, number of lanes, right-of-way/setbacks, presence/absence of boulevards, and observed traffic volumes/speed).

- **Streetscape quality** (vegetation, landscaping and streets trees, absence or the presence of visual clutter such as power and light poles and lines, signs/billboards, elevated structures including cell towers, freeway overpasses and ramps).

- **Views and major focal points** (vegetation breaks, bayous, drainage canals, landmark buildings and skylines).

The following sections discuss these factors, and the potential impact of each of the three LRT/BRT alignments, for each of the six community areas.

3.7.2: Near Northside

General Description (Buffalo Bayou to the Houston, Belt and Terminal Rail Line North of IH-610)

The Near Northside area takes in the most southerly section of the corridor, from Buffalo Bayou to the rail line just north of IH-610. The Near Northside is part of Houston's old Fifth Ward and was first settled in the 1880s. It is the oldest and most urban of the six community areas. Historically, railroads have had a major impact on this area. Beginning in the 1850s, the Near Northside was the site of Southern Pacific Company's railroad car shop and yards and grew to become an employment center with subsidiary industries and blue-collar population. "As a traditional workshop of the city, a certain gritty texture has survived". [18] Like the older subdivision patterns of downtown and adjacent areas, the Near Northside area is organized on a regular, urban street grid. Street widths are relatively narrow, reflecting a pre-automobile functionality, and land

[18] Houston Architectural Guide, American Institute of Architects/Houston Chapter, 1990.

uses are mixed, including a combination of residential, commercial and institutional activities.

In recent years, the Near Northside area has begun to attract interest for its development and redevelopment potential, and a number of initiatives, both public and private, are underway. This includes the *"Northside Village Economic Revitalization Plan"* prepared by the City of Houston's Planning and Development Department in June 2002. The focus of the Plan is to encourage and attract new development/investment, while maintaining the feel of a small village. The Plan identifies three target areas for investment and redevelopment and recommends implementation strategies.

One target area is called Economic Development Node 1 (EDN 1) – which runs along North Main Street, from IH-10 to Boundary Street. According to the Plan, this area holds much potential for redevelopment, especially for professional and medical offices, because of existing development activity in the area and the construction of a new elementary school.[19] All three of the proposed LRT/BRT alignments pass through EDN 1 and each have proposed stations at Hogan and Quitman. Therefore, each alignment would be equally supportive of the redevelopment opportunities contemplated by the Plan for this area.

Economic Development Node IA (EDN 1A) lies to the south of EDN 1 and includes lands on either side of North Main Street, as well as the Hardy Rail Yard lands. This area is seen as having significant potential for mixed-use redevelopment with densities that approach those of Downtown and the Midtown area.[20] The redevelopment opportunities for the Hardy Rail Yard are currently being actively considered. As above for EDN 1, all three alignments would be equally supportive of the plans for this area, and each would include a station in this area, at Hogan.

Economic Development Node 2 (EDN 2) includes lands on either side of Irvington Boulevard between Hays and Cavalcade. This Node focuses on a large tract of land that offers redevelopment potential – the American Freightways facility on the east side of Irvington at Patton. Both the Red Line and Green Line are proposed to traverse this Node, and so would support development and redevelopment within EDN 2. Each of the two alignments has three proposed stations – at Hays, Patton and Cavalcade.

The key goal for these nodes is to create signature transit and pedestrian-oriented areas. The objectives are to encourage more pedestrian activity by orienting buildings at the sidewalk/street edge, eliminate large setbacks/front yards devoted to surface parking lots, and "green" the corridors through a network of sidewalks and bike paths using natural landscaping to buffer incompatible uses. A key strategy is to improve the visual appearance of the commercial corridors (North Main St. – between IH-10 and Boundary Street; Fulton and Irvington – between Quitman Street and Cavalcade; and Quitman Street – between North Main and Chapman.)

[19] Northside Village Economic Revitalization Plan, City of Houston, July 2002, page 4-3.
[20] Ibid, page 4-5.

The Plan includes three main strategies for implementation – partnership development, marketing outreach and financing options. Joint development opportunities could be explored for this area with any of the proposed LRT/BRT alignments.

Blue, Red and Green Lines *(Buffalo Bayou to White Oak Bayou)*

This section discusses the visual and aesthetic features for the Blue, Red and Green Lines where they have a common alignment at the southern end of the corridor.

The physical connection between Downtown and the Near Northside area is provided by a number of road and freeway crossings of Buffalo Bayou. This section of Buffalo Bayou has considerable historical significance and is the object of a major development plan by the Buffalo Bayou Partnership. Of major visual prominence is UH Downtown, which is also the northern terminus of the Downtown to Reliant Park LRT currently under construction. All three proposed LRT/BRT alignments for the North-Hardy Corridor begin at the U of H Station, which is located on the Main Street Bridge over Buffalo Bayou. Proceeding north from this point would provide panoramic views of the Buffalo Bayou floodplain and portions of the Hardy Rail Yard.

The Hardy Rail Yard is presently being considered for redevelopment for a mix of residential and commercial uses. Today, this area has a variety of older, deteriorated low-rise commercial/retail structures. Each of the three alignments would support redevelopment of this area and, thereby, make it more visually and aesthetically appealing.

Through this area, North Main Street is a six lane, divided street with frequent intersecting local streets, curb cuts and driveways. There is an absence of landscaping and overhead power lines are noticeable. There could be an opportunity to improve the street character with the development of LRT/BRT through this section through careful design and plantings.

It should be noted that Lamar/Lee Elementary School is located at the northeast corner of North Main and Quitman Street. This school (completed in 2002) was developed using a site assembly process that required the removal of single-family properties through condemnation.

At North Main Street and Boundary, the undulating topography is influenced by the Little White Oak Bayou; the surrounding character is less urban and more natural. There is a significant amount of vegetation framing views of the Bayou to the north, and low-rise commercial buildings to the south. The view to the south at this point also includes the skyline of Downtown Houston. To the west, along Little White Oak Bayou, there are views towards IH-45, and the Bayou to the east. All three alignments have an opportunity to take advantage of these views, as the Blue Line continues along North Main Street, and the Red and Green Lines turn to the east.

Blue Line *(White Oak Bayou to the Houston, Belt and Terminal Rail Line North of IH-610)*

The Blue Line continues north along North Main Street, where the existing road right-of-way is a four-lane, undivided roadway with sidewalks on the west side and minimal building setbacks. Hollywood Cemetery is located on the east side, producing a soft edge, in contrast to the prevalence of paving, noise and vehicular traffic. No right-of-way widening is proposed for this section of North Main in the City of Houston's Major Thoroughfare and Freeway Plan.

On the east side of I-45 up to Airline, North Main Street has pockets of older homes and commercial structures that are located close to the street, creating a contained, small town feeling. Moderate traffic speeds and the occasional pedestrian contribute to the quaint neighborhood character in this area.

Houston's Farmers Market, located on Airline just south of IH-610, represents a major focus of activity and regional point of interest. The Market occupies a series of sheds and industrial-type buildings. The segment of Airline Drive from North Main to IH-610 is planned to be widened to a 70-foot right-of-way in the City of Houston's Major Thoroughfare Plan.

Red & Green Lines *(Little White Oak Bayou to Irvington/Cavalcade)*

Two alternatives are proposed for both the Red and Green Lines in the vicinity of Little White Oak Bayou/Boundary Road/Fulton Street. One alternative proceeds eastward along the south side of Little White Oak Bayou, Moody Park and Hollywood Cemetery. This alignment passes immediately north of Irvington Village, a public housing project undergoing a major renovation program. Clemente Martinez Elementary School is located on the east side as the alignment turns north at Irvington, with commercial retail to the southeast. The Boundary Road/Fulton alternative is a mixed residential and commercial environment.

This area has a predominantly mixed-use, urban character, with low-rise commercial and institutional buildings and associated parking lots interspersed with residential structures. Of significance is the heavy shading provided by the eight signature Live Oaks at Irvington Village and other major street trees associated with Moody Park on the west side of the street. Together with the openness of the park, these qualities combine to soften views and contribute to a tranquil, small town feel.

Irvington is presently a four-lane, divided thoroughfare with a 25-30 foot esplanade. The street is heavily planted with trees, including Live Oaks as large as 18" in diameter. Power, light and signal poles and lines are noticeable.

A brief transition occurs along the eastside of Irvington at the American Freightways facility at Patton, where street trees are absent. At Cavalcade, the Red Line stays on Irvington northward, while the Green Line turns westward on Cavalcade.

Red Line *(Irvington/Cavalcade to the Houston, Belt and Terminal Rail Line North of IH-610)*

The intersection of Cavalcade and Irvington has predominantly commercial retail uses with neighborhood-oriented commercial on all corners, except the northwest corner, where Jefferson Elementary is situated. Between Cavalcade and IH-610, Irvington passes through the residential community of Lindale Park. Great views of Downtown occur here.

This segment of Irvington is primarily residential and has a boulevard planted with a mix of trees – some mature – including Oak and Pecan. Structures are situated close to the street, except at the major intersections where there are commercial/retail activities with larger building setbacks to accommodate parking lots in front.

A contrasting focal point on the north end of Irvington in Lindale Park is the IH-610 overpass. In the vicinity of IH-610, the Lindale Baptist Church, Harris County Department of Education/Adult Learning Center and Administrative Building, and City of Houston Fire Station provide some street life. This immediate environment is relatively pedestrian-oriented and there are unobstructed views of Downtown looking south.

Green Line (*Irvington/Cavalcade to the Houston, Belt and Terminal Rail Line North of IH-610)*

Between Irvington and Fulton, Cavalcade is a 100-foot, four-lane divided right-of-way, with bike lanes and sidewalks on both sides. A 30-foot boulevard is planted with large Live Oaks (10-12 inches in diameter). The character is this area is consistent with the pedestrian ambiance of Near Northside area in general. Residential properties line both sides of the street.

The Fulton/Cavalcade intersection has an irregular geometry with Fulton contained within an undivided four-lane, 100-foot right-of-way, with continuous center turning lane and bike lanes between Cavalcade and the northern extent of this section.

Highway and Road Improvements *(IH-10 to IH-610)*

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Assessment of Impact *(Buffalo Bayou to Houston, Belt and Terminal Rail Line North of IH-610)*

Strong community interest in light rail as a catalyst for redevelopment in this area is apparent from recent and on-going local initiatives. This has included consideration of the desired character of new development/redevelopment, particularly with respect to the public realm of the street. METRO has a good record of locating transit improvements in urban areas like the Near Northside. The 20th Street transit stop in the

Houston Heights from the early 1990s is an example of how such facilities can be accommodated in a neighborhood that is older and has relatively complex character and function. The proposed stations within the Near Northside area will require sensitivity in siting, circulation, scale, materials, lighting and landscaping, to insure that each location contributes positively to the immediate surroundings.

Three specific areas of the alignments through Near Northside area warrant special sensitivity. The first is Little White Oak Bayou, which is traversed by one of the alternatives for both the Red and Green Lines. The second is the west side of Irvington at Hays in proximity to the Live Oaks mentioned above, again for the Red and Green Lines. Thirdly, Cavalcade, between Irvington and Fulton, which also has large Live Oaks planted in the median, for the Green Line. Generally, proposals to locate improvements in the center of the affected streets will have varying impacts on existing vegetation, and consequently, on the character of the streetscape.

The potential visual and aesthetic impacts of the elevated portions of any of the alignments may be most significant where the alignments follow major thoroughfares and/or travel through urbanized areas. In the Near Northside area, the areas of potential impact would be north of Buffalo Bayou, where the alignment is elevated to clear portions of the Hardy Rail Yard. The recent proliferation of elevated transportation structures in the downtown area has raised public concern that unencumbered views of Houston's downtown skyline are disappearing.

All three LRT/BRT alignments have the potential to support development and redevelopment opportunities within the Near Northside area and contribute in a positive way to the visual and aesthetic quality of the streetscape. The Red and Green lines also benefit from the fact that they could contribute to the plans for Economic Development Nodes 1 and 2, as described in the *Near Northside Village Economic Revitalization Plan*. Since all three alignments are primarily at-grade throughout this area (with the exception of the Hardy Yard crossing at the south end), each could be integrated well into the community structure and support a pedestrian-oriented environment.

3.7.3: Northside/Northline

General Description *(Houston, Belt and Terminal Railroad Line North of IH-610 to Little York)*

Abutting the Near Northside area to the north, stretching from the Houston, Belt and Terminal Railroad line north of IH-610 to Little York Road, is Northside/Northline. This area gets its name from the Northline Mall, which is located at IH-45 and East Crosstimbers. Northline Mall, which opened in the mid-1960s, was one of Houston's first suburban, indoor shopping malls. Like other malls developed in Houston around this time, the Northline Mall began to decline in the 1970s as the population continued to move to new suburban locations and the second ring of shopping malls were developed farther out at the perimeter of the city.

The Northside/Northline area is characterized by a suburban street pattern, with major thoroughfares spaced at one-half to one-mile apart. In this area, only Berry (between Hardy and Fulton) and Parker (between Hardy and Airline) are identified for widening in the City's Major Thoroughfare and Freeway Plan.

In contrast to Near Northside, the Northside/Northline area is the product of an automobile-oriented development pattern, with generally wide street rights-of-way. The uniform pattern of land uses is dominated by a proliferation of small commercial businesses along the major thoroughfares, with residential areas developed behind them.

There is little to promote pedestrian activity, safety or comfort along the streets in this area. Vehicular traffic moves at a relatively constant volume, at the posted speed of 35 miles per hour. Pockets of vacant land are widely evident and are a testimony to Houston's suburbanization and the resultant leapfrog pattern of development.

Blue Line *(Houston, Belt and Terminal Rail Line North of IH-610 to Little York)*

In this section, the Blue Line traverses an area with transitional/declining residential and a mix of industrial and commercial buildings, including abandoned properties. Airline and Crosstimbers are four-lane divided roadways in this section with ten-foot grass medians and the occasional small tree.

The visual/aesthetic experience is principally a vehicular one. Views are generally chaotic, with attendant ramps, poles, signage and vehicular traffic. There are distant views to the south of Downtown. The Northline Mall area and IH-45 portions of this alignment provide hard-edged, freeway-oriented commercial environments.

Red Line *(Houston, Belt and Terminal Rail Line North of IH-610 to Little York)*

The Red Line continues north along Irvington, which is a four-lane roadway for the length of this section. To about Berry, the right-of-way is a commercial thoroughfare, with high traffic speeds and large building setbacks that are occupied by surface parking. This section has a center, unplanted esplanade. Between Berry Street and IH-45 there is a thirty-foot treed median on Irvington. Local views along the corridor are of low rise, one-story structures. There are distant views to IH-610 to the south.

Green Line *(Houston, Belt and Terminal Rail Line North of IH-610 to Little York)*

The Green Line continues along Fulton and then transitions to Airline through the area of the Northline Mall. This is a freeway-oriented commercial environment. Airline in this vicinity is a four-lane divided roadway with a modestly planted ten-foot median.

As the alignment approaches Tidwell, the freeway's commercial environment transitions to an old commercial strip. The Adath Yeshurun Cemetery is located in this section.

Industrial, vacant, and transitional residential predominate in generally single-story structures. Significant vegetation is typically associated with residential lots.

There are longer, broad views over the commercial strip to the outer edges of older residential neighborhoods. North of Tidwell, Airline is a four-lane section with a continuous center turn lane. The built-up commercial strip with high-levels of vehicular traffic creates an auto-oriented, non-pedestrian environment that is lacking in visual appeal.

Highway and Road Improvements (*Houston, Belt and Terminal Rail Line North of IH-610 to Little York)*

[At the request of the community, highway improvements will be considered only after advanced high-capacity transit options are thoroughly explored. Therefore, this section will be completed at a later date.]

Assessment of Impact *(Houston, Belt and Terminal Rail Line North of IH-610 to Little York)*

Due to the more suburban, automobile oriented character of the Northside/Northline area as compared to the Near Northside area, any of the three proposed LRT/BRT alignments would have less potential for impact on the immediate area. Locating the proposed alignments within center medians of Airline, Crosstimbers, Fulton or Irvington would have varying, but not significant, impacts on existing vegetation and on the character of the streetscape.

The portions of the alignments that are proposed to be aerial will represent the greatest visual impact. These sections will provide a positive experience for transit patrons through unobstructed views on the elevated line. On the ground, however, the aerial structures will introduce a number of potential issues, including the following: a non-contributing structure that is out of scale with the surroundings; light pollution from the overhead, lighted deck; sites for illegal dumping of refuse under the aerial structures; and, a refuge for homeless people.

3.7.4: Aldine

General Description *(Little York to Beltway 8)*

The area between Little York and Beltway 8 has significant portions of land that are located outside the corporate limits of the City of Houston. This area is more sparsely developed, with a more rural street system (two-lane roadways, discontinuous street grid) considering its close-in location.

Gulf Bank (from Hardy to IH-45), Aldine Mail Route (from Hardy to Airline), and West Road (no current roadway from Hardy to Luthe) are identified in the City's Major Thoroughfare and Freeway Plan as being in need of widening and/or acquisition.

The Aldine area shares many of Northside/Northline qualities from the standpoint of the visual environment, particularly at major intersections where vehicular oriented, commercial strips dominate. In the vicinity of Beltway 8 there is a significant amount of existing visual congestion. Many of the support columns for Beltway 8 and freeway signs are finished in decorative, rusticated concrete patterns.

Blue Line *(Little York to Beltway 8)*

The Blue Line through this section follows IH-45 exclusively until just south of Beltway 8, where the alignment swings northeast towards Greenspoint Mall. At Little York, where there is a pronounced bend in the alignment of IH-45, some taller structures (medical facilities) are visible, surrounded by vacant tracts. Major thoroughfare overpasses of I-45 break the freeway's linear monotony. Occasional vegetation can be seen between the main lanes and frontage roads.

At West Mount Houston, the high-rise buildings at Greenspoint come into view, along with a line of communication towers. Closer to the IH-45/Beltway 8 interchange, uses along the freeway are in newer, low rise developments and are generally more uniform in character. This interchange is visually complex at both the freeway deck level and on the service roads located below.

Red Line *(Little York to Beltway 8)*

The Red Line follows the Hardy Toll Road throughout this section. The Toll Road is a long ribbon of concrete along either side of the UPRR right-of-way, with a power transmission lines and towers along the west side. The corridor is broken only at the points where it is crossed by major thoroughfares.

A wide range of uses front either side of the Toll Road from residential to industrial and modest, neighborhood-oriented commercial/retail. Almost all of the structures are single story. With the exception of the industrial buildings, these structures pre-date the construction of the Hardy Toll Road.

Vegetation along the corridor is almost entirely associated with vacant tracts and residential properties. The principal point of interest is the occasional appearance of a UPRR train at the center of the corridor, and the approach to Beltway 8. Here an opportunity is presented for distant, westerly views to office buildings at Greenspoint and occasional airplane flying over-head from IAH.

Green Line *(Little York to Beltway 8)*

As the Green Line continues to follow Airline Drive, there are small neighborhood-level commercial buildings, single-family subdivisions, scattered industrial/warehouse properties, semi-rural residential, and the occasional small to mid-size vacant and underutilized parcel.

North of Little York, just inside the city limits, Airline Drive is heavily planted and St. Joseph cemetery interrupts the commercial strip. Airline Drive transitions to a semi-rural character defined by open fields, softened by vegetation and large lot residential. Interspersed are small commercial establishments including flea markets and car lots. North of Gulf Bank, Airline Drive has an 80-foot right-of-way with a four-lane continuous center turn lane and sidewalks on the outside, with noticeable power poles and overhead lines.

As Airline Drive crosses Halls Bayou, there are open views along this engineered channel. In the vicinity of West Road, north of which Airline Drive is once again inside the City limits, the environment is predominantly strip commercial. To the north, high-rise buildings at Greenspoint become visible, along with glimpses of IH-45. North of West Road, a 30-foot esplanade is planted with small crepe myrtles. As Airline Drive approaches the Greenspoint area, there is a school, highway-oriented commercial development, large apartment complexes and some single-family homes.

Highway and Road Improvements *(Little York to Beltway 8)*

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Assessment of Impact *(Little York to Beltway 8)*

Visual and aesthetic impacts in the Aldine area generally follow those cited above in Section 7.3 for the Northside/Northline area, in that they would be minimal. The specific exception would be the crossing of Beltway 8. This area is already visually chaotic, so any additional elevated crossings would only add to that character and also have the potential to block views around the Greenspoint environment. None of the proposed LRT/BRT alignments would have significant or differentiating visual or aesthetic impacts through the Aldine area.

3.7.5: Greenspoint/IAH

General Description *(Beltway 8 to FM1960)*

The Greenspoint area has long attracted new development due to the accessibility to IAH and Greenspoint Mall. Recently growing residential communities to the north, east, and west have also added to the attraction for the mall and related development activity.

Development in this area began in 1969 in conjunction with the opening of IAH, which was connected to IH-45 and U.S. 59 via Beltway 8 service lanes in 1970. This corridor eventually evolved as the focal point of development activities through that decade and into the early 1980s. Federated Realty Corporation, as part of a 500-acre master planned development, opened Greenspoint Mall in 1976, which was eventually expanded in 1980 to 1.5 million square feet. The Mall became a major catalyst for new development in this area.

By the early 1980s, Greenspoint was acknowledged as one of Houston prime activity centers with in excess of 10 million square feet of office space and employment of 20,000 workers. The economic downturn during the 1980s had a significant, deteriorating impact on the area. By the mid-1990s various redevelopment initiatives were put in place to stabilize the economy and development of the area.

Today, activities of the Greenspoint TIRZ and Management District are widely evident in the refurbishment of thousands of multi-family units and the improvements to the surrounding streetscape. Abundant landscaping, banners, and other decorative features are found along the major thoroughfares in the area.

Blue, Red and Green Lines *(Beltway 8 to Kuykendahl Park and Ride)*

The Greenspoint activity center dominates this area with the shopping mall in the foreground and the high-rise buildings further east. All three alignments traverse portions of Greens Bayou, which provides views along this highly engineered channel. Looking south from the Kuykendahl Park and Ride, distant views are to the Greenspoint activity center. The Kuykendahl Park and Ride is connected to the HOV lane via an elevated ramp over IH-45. The surroundings are suburban, with an open and vegetated environment, with scattered development and many vacant tracts of land.

Blue Line *(Kuykendahl Park and Ride to FM 1960)*

The Blue Line continues north through this section along IH-45 in a fairly uniform environment that can be characterized as suburban, with a predominant freeway character and alternating older and newer commercial developments clustered at the interchanges. The interchanges break the horizontal freeway monotony and offer higher vantage points to surrounding areas. The Greenspoint activity center provides a distant focal point.

Red Line *(Hardy Toll Road from Beltway 8 to FM1960)*

North of Beltway 8, the Hardy Toll Road is fairly uniform in character providing short, contained views. The experience consists of periodic residential development, noticeable water, telecommunication, lighting and electrical towers, industrial activities located closer to IAH, and intermittent rural/vacant areas with pockets of large residential acreage. There are two rail yards (Spring Rail Yard/Lloyd Yard near

Cypresswood and General Motors Acceptance Corporation (GMAC) Yard between Turkey Creek and FM 1960).

Elevated ramps along the Hardy Toll Road offer vantage points to a rich tree canopy on the north end of the corridor. The Greenspoint and Downtown Houston skylines are visible from Rankin Road. Periodically along the corridor there are noticeable power transmission lines both following along, as well as crossing the corridor.

Blue, Red and Green Lines *(East-West Greenspoint/IAH Spur)*

Between IH-45 and Central Greens Boulevard, Greens Road is a 100-foot right-of-way, four-lane boulevard section, with a 15-foot wide median planted with pine trees. The general character of the area is suburban, despite the density of some of the high-rise buildings as viewed across the large grass field to the south.

In the vicinity of Northchase Drive and Greens Bayou, the environment becomes predominantly multi-family residential, with abutting, large apartment projects and open space (Tom Wussow Park). Planting in the widened 30-foot esplanade is more reflective of the transition, with accent planting and street trees.
Views to the east are to the overpass at the Hardy Toll Road and to the west to the offices at Greenspoint. At the Hardy Toll Road overpass, views to the east are to airside facilities at IAH with Downtown Houston visible to the south. As the alignments turn onto JFK Boulevard they pass commercial uses and aviation related facilities as they enter IAH property. Views are to the forested edge, with glimpses through this natural but vanishing screen to various facilities including surface parking lots, low-rise administrative buildings, large hangar space, the terminal complex and the car rental facility that is under construction. Occasionally, there are areas of mass accent planting. Closer to the terminals, the roadway is depressed to allow runway ramps to cross overhead. Construction is currently on going virtually everywhere along JFK Boulevard and in the area of IAH in general.

Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Assessment of Impact

There are no significant visual or aesthetic features through this area that would be impacted by any of the three proposed LRT/BRT alignments. This is especially true since each of the alignments primarily follow existing rights-of-way. The alignments share a virtually common alignment for the east-west spur between Greenspoint and IAH. As a result, there is nothing to distinguish one alignment from another in this section.

In general, the out-lying areas of the North-Hardy Corridor are less developed and, therefore, would be less problematic than the more urbanized areas when considering the integration of transit improvements. Nevertheless, the addition of aerial structures may have long-term consequences as the corridor continues to develop and urbanize. Over time, aerial sections of an LRT/BRT may intrude on and be in conflict with new development.

3.7.6: Spring

General Description *(FM1960 to Harris/Montgomery County Line)*

The northern part of Harris County has long been known for its idyllic, rural setting, consisting of large lot residential, small farms, and undeveloped, forested tracts of land. Located between The Woodlands and expanding residential development in southern Montgomery County, and the movement of new development northwards from the City of Houston, the Spring area is undergoing a relatively rapid transformation.

Blue Line *(FM1960 to Harris/Montgomery County Line)*

The proposed alignment of the Blue Line is limited to the IH-45 right-of-way throughout this area. Cypress Creek provides lateral vistas. North of the Creek, the surroundings are relatively open, with some residential development located behind noise barriers. Cypresswood presents a transitional point with elevated, unobstructed views from IH-45 to a denser pattern of development. Telecommunication towers and power transmission lines are noticeable, as are the high freeway lighting masts.

Red Line *(FM1960 to Harris/Montgomery County Line)*

The Red Line follows along the Hardy Toll Road and UPRR rights-of-way through the length of this area. The visual and aesthetic character is uniform, with short, contained views, alternating between pockets of multi-family and water towers, to intermittent rural/vacant areas with pockets of large residential acreage.

The Red Line passes along the east side of Old Town Spring. This activity center and tourist attraction provides a unique destination in the North-Hardy Corridor that is influenced by its small town character.

The open, undeveloped character of this part of the corridor is best experienced at its numerous, elevated intersections. These offer vantage points to the rich tree canopy on the north end of the corridor to the landmark buildings at Greenspoint and Downtown Houston visible at Rankin Road. There are periodically noticeable power transmission lines both following along, as well as crossing, this section of the proposed alignment.

Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Assessment of Impact *(FM1960 to Harris/Montgomery County Line)*

The Red and Blue Lines go through this area. The one feature that is particularly worthy of note is Old Town Spring. The Red Line is proposed to pass along the east side of Old Town Spring. The addition of aerial structures may have long-term consequences as this portion of the corridor continues to develop and urbanize. Over time, aerial sections of an LRT/BRT may intrude on and be in conflict with new development.

3.7.7: The Woodlands/South Montgomery County

General Description (*Harris/Montgomery County Line to SH 242)*

In 1961, Mitchell Energy & Development Corporation began an eleven-year acquisition program in The Woodlands area. In 1972, the U.S. Department of Housing and Urban Development (HUD) pledged the support of its Title 7 program, guaranteeing $50 million in debt, the largest guarantee ever given. Development commenced in 1973 and today, The Woodlands has become a signature new town development. A significant amount of additional development is planned to take place in this area.

The general character of South Montgomery County has been shaped largely by The Woodlands in terms of the proliferation of residential subdivisions and supporting commercial/retail developments. The proposed alignment for a transit system would feed directly into the Town Center, which is currently undergoing development.

Blue Line (*Harris/Montgomery County Line to SH242)*

The Blue Line continues its route north along IH-45, with a connection into the Woodlands Town Center. The character of this section is predominantly a hard-edged and contained freeway experience, as the elevated freeway crosses the expanse of the Spring Creek floodplain. Meanderings in the freeway alignment break the monotony, as the density of development increases towards The Woodlands.

As it enters The Woodlands, the Blue Line would provide a dramatic view into this activity center. The Anadarko Tower, a high-rise office building on a waterway at The Woodlands, provides a strong visual encounter and a main focal point for the area. As this commercial center continues to develop, further interesting visual experiences of commercial/urban development can be anticipated. Elevated ramps feeding large volumes of traffic westward behind the forest edge creates a futuristic impression.

Northward toward SH 242, the foreground is uniformly developed with a mix of primarily low rise freeway commercial, sited within a retreating forest edge.

Red Line (*Harris/Montgomery County Line to SH242)*

The Red Line continues north along the UPRR right-of-way and then turns west on an aerial section to enter The Woodlands Town Center. The character of the area along the UPRR right-of-way is open and primarily undeveloped, with an abundance of rich tree canopy. There are some short, contained views, along with pockets of single-family subdivisions and large acreage residential. As it turns west towards The Woodlands, the alignment crosses through a large area of residential development along Robinson Road. The alignment is proposed to be at grade through this section. The character within The Woodlands Town Center and heading north to SH 242 is the same as that described for the Blue Line above in Section 7.7.2.

Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Assessment of Impact (*Harris/Montgomery County Line to SH242)*

Connections of both the Blue and Red Lines to The Woodlands Town Center/Mall would require careful coordination with The Woodlands Operating Company and municipal utility districts in the area to ensure that they are compatible with the character of existing and planned development within that area. Advantage could be taken of the gateway opportunity provided by The Woodlands as the proposed LRT/BRT makes its entry into this area. The proposed elevated approach of both the Blue and Red Lines to the Town Center have the potential to provide enhanced visual experiences for both LRT/BRT passengers and for the area itself.

Care would be required with the Red Line's crossing from east to west from the UPRR right-of-way to The Woodlands to be as non-obtrusive as possible in the residential neighborhood. For this reason, the Red Line may have more potential for having a negative impact on the visual and aesthetic character of the area.

Comments made above for Greenspoint/IAH and Spring regarding elevated structures should be taken into regard for this area as well.

3.8: Communities

3.8.1: Introduction

As discussed earlier in the Land Use and Visual and Aesthetics sections, and as shown in Exhibit 3.6, the study area for North-Hardy Corridor environmental analysis has six identifiable community areas (from south to north) as follows:

- Near Northside
- Northside/Northline
- Aldine
- Greenspoint/IAH
- Spring
- The Woodlands/South Montgomery County

This section discusses the characteristics of these communities in terms of their population and demographics, as well as the potential for neighborhood disruption as a result of the development of the proposed LRT/BRT alignments.

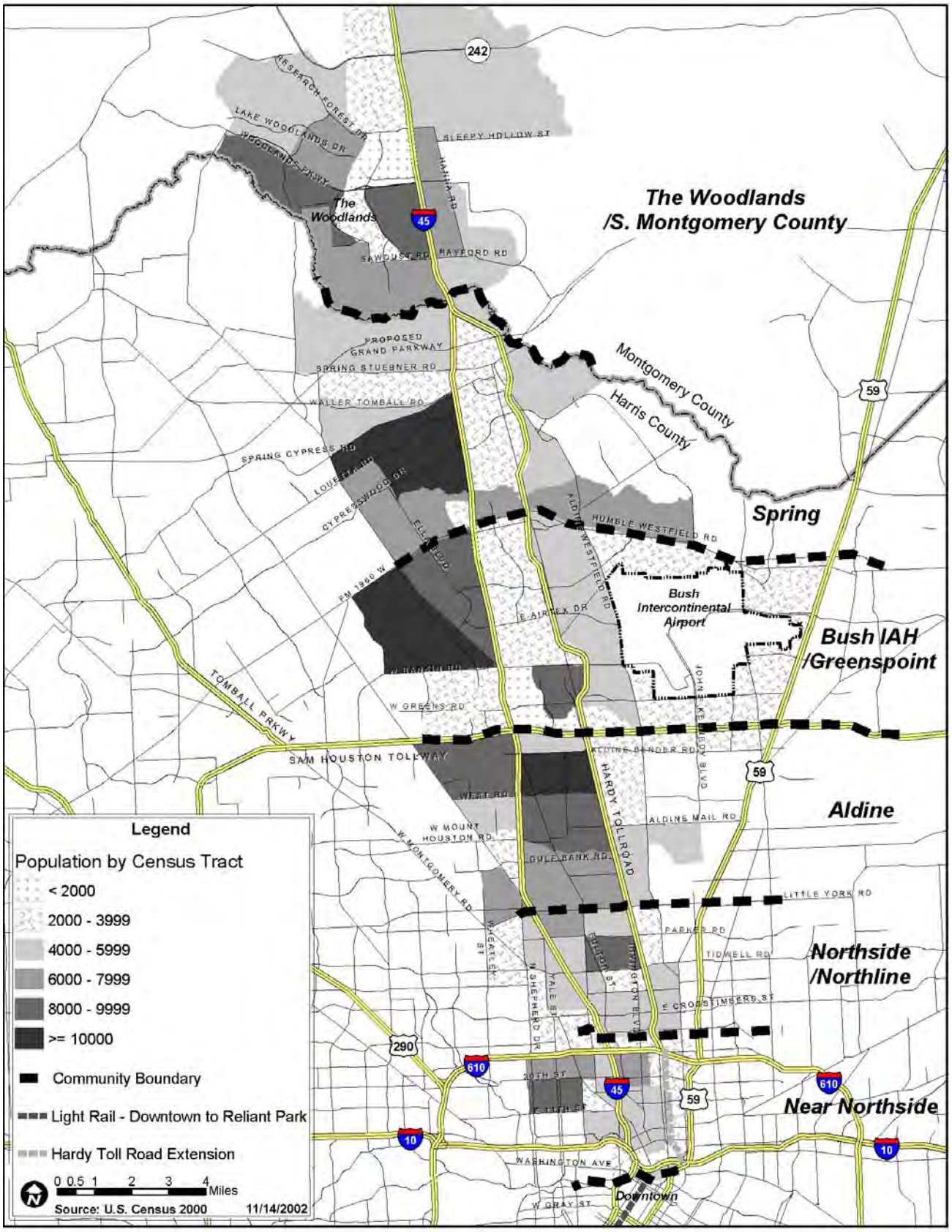
3.8.2: Population & Households

The total population and households within the communities within the study area, based on U.S. Census 2000 data, is 435,137 people and 147,275 households, as shown in Exhibit 3.46. The household size within the North-Hardy Corridor study area is generally larger than it is for the City of Houston or the Houston-Galveston-Brazoria Consolidated Metropolitan Statistical Area (CMSA) as a whole; 2.95 persons per household for the corridor, vs. 2.72 for the City of Houston and 2.85 for the CMSA. Exhibit 3.47 illustrates the population distribution within the communities in the corridor.

Exhibit 3.46: Population/Households

	Population (2000)	Households (2000)	Average Household Size (pph)
Near Northside	74,366	24,239	3.07
Northside/Northline	73,822	22,239	3.32
Aldine	62,970	18,706	3.37
Greenspoint/Bush Intercontinental Airport	79,953	29,769	2.69
Spring	69,708	25,622	2.72
The Woodlands/South Montgomery County	74,318	26,700	2.78
Total Corridor	435,137	147,275	2.95
City of Houston	1,954,848	718,897	2.72
Houston-Galveston-Brazoria CMSA	4,669,571	1,640,843	2.85

Exhibit 3.47: Population Distribution



3.8.3: Ethnicity

For the purposes of this analysis, ethnicity in the corridor has been divided into four main categories: Hispanic, White, Black and Other.[21] Based on U.S. Census 2000 data, the ethnicity of people living in the corridor is predominantly both White and Hispanic – with the White (Non-Hispanic) population being the principal ethnicity in the northern portions of the corridor (Spring and the Woodlands/South Montgomery County) and the Hispanic population (all races) being the predominant group in the southern communities (Near Northside, Northside/Northline, and Aldine). The Greenspoint/IAH area is fairly evenly split, with Hispanic, Black, and White populations, in descending order.

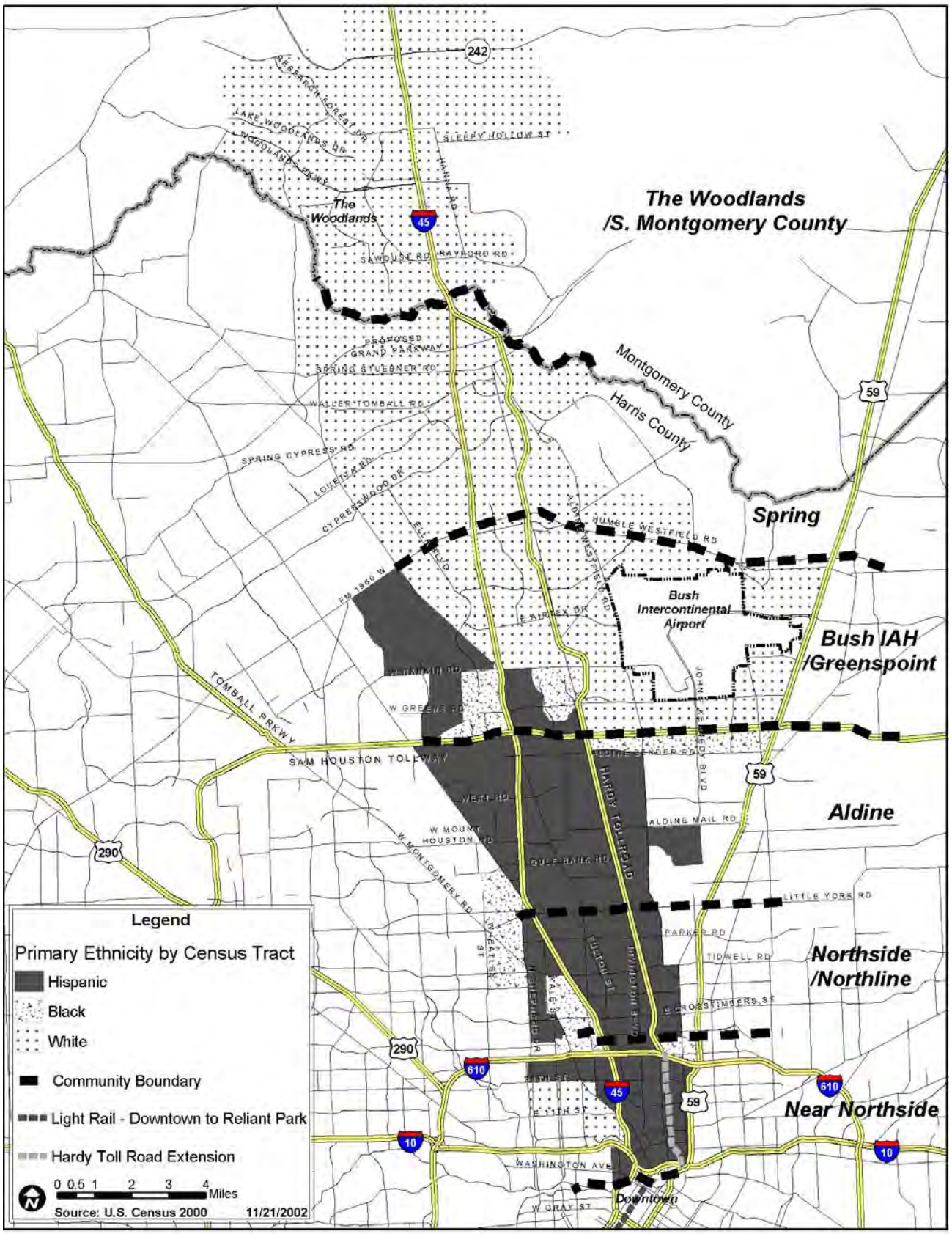
The ethnic distribution within the North-Hardy Corridor contrasts with that of both the City of Houston and the CMSA. The City has a fairly even distribution of each ethnic group, whereas at the CMSA level, the population is mostly White. Exhibits 3.48 and 3.49 both illustrate the ethnicity within the corridor.

Exhibit 3.48: Ethnicity

	Population (2000)	Households (2000)	Household Ethnicity							
			Hispanic		Black		White		Other	
Near Northside	74,366	24,239	45,672	61%	11,133	15%	16,911	23%	650	1%
Northside/Northline	73,822	22,239	47,827	65%	14,790	20%	10,629	14%	576	1%
Aldine	62,970	18,706	33,079	53%	13,871	22%	14,008	22%	2,012	3%
Greenspoint/Bush Intercontinental Airport	79,953	29,769	30,946	39%	25,730	32%	20,082	25%	3,195	4%
Spring	69,708	25,622	10,136	15%	5,485	8%	51,465	74%	2,622	4%
The Woodlands/South Montgomery County	74,318	26,700	6,381	9%	1,982	3%	63,721	86%	2,234	3%
Total Corridor	435,137	147,275	174,041	40%	72,991	17%	176,816	41%	11,289	3%
City of Houston	1,954,848	718,897	731,680	37%	487,094	25%	601,105	31%	134,969	7%
Houston-Galveston-Brazoria CMSA	4,669,571	1,640,843	1,349,506	29%	776,907	17%	2,236,569	48%	306,589	7%

[21] The U.S. Census collects information regarding two ethnic groups – Hispanic and Non-Hispanic. Within these two ethnic groups, seven groups are identified with respect to race. For the purposes of this analysis, Hispanic includes data regarding all seven races identified by the U.S. Census (including White, Black and Other), whereas the specific information that is presented above regarding White, Black and Other, only includes U.S. Census data for the Non-Hispanic population.

Exhibit 3.49: Map of Corridor Ethnicity



3.8.4: Household Income

Based on the U.S. Census 2000 data, the median household income in the corridor is $39,231. This median income is somewhat higher than that for the City as a whole, but lower than median income for the CMSA; $36,616 and $44,761, respectively. There is a wide range in median household income of the community areas within the corridor – with The Woodlands/South Montgomery County area being at the high end with $71,885, and the Northside/Northline area being at low end with $26,329.

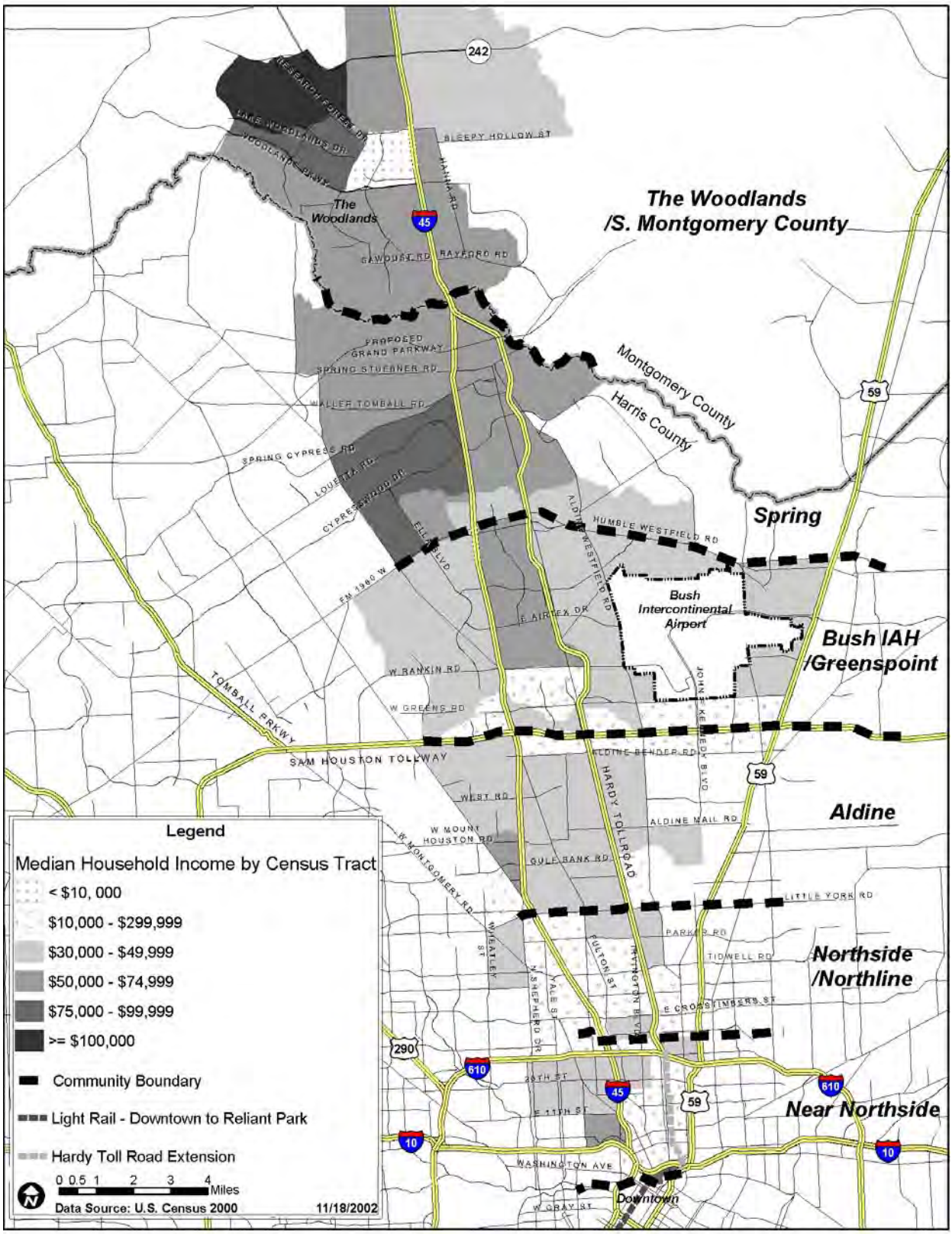
Several areas within the corridor demonstrate median income levels lower than those of both the City and the CMSA (Near Northside, Northside/Northline, Aldine and Greenspoint/IAH). Spring and The Woodlands/South Montgomery County are areas with median incomes higher than either the City or CMSA. Exhibits 3.50 and 3.51 illustrate the median household income within the communities in the corridor.

Exhibit 3.50: Median Household Income

	Population (2000)	Households (2000)	Median Household Income (Estimate)
Near Northside	74,366	24,239	$32,172
Northside/Northline	73,822	22,239	$26,329
Aldine	62,970	18,706	$31,247
Greenspoint/Bush Intercontinental Airport	79,953	29,769	$33,285
Spring	69,708	25,622	$58,211
The Woodlands/ South Montgomery County	74,318	26,700	$71,885
Total Corridor	435,137	147,275	$39,231
City of Houston	1,954,848	718,897	$36,616
Houston-Galveston-Brazoria CMSA	4,669,571	1,640,843	$44,761

Note: Median household income calculation assumes that population counts are uniformly distributed in the median income class.
Source: 2000 US Census

Exhibit 3.51: Household Income



3.8.5: Poverty Levels

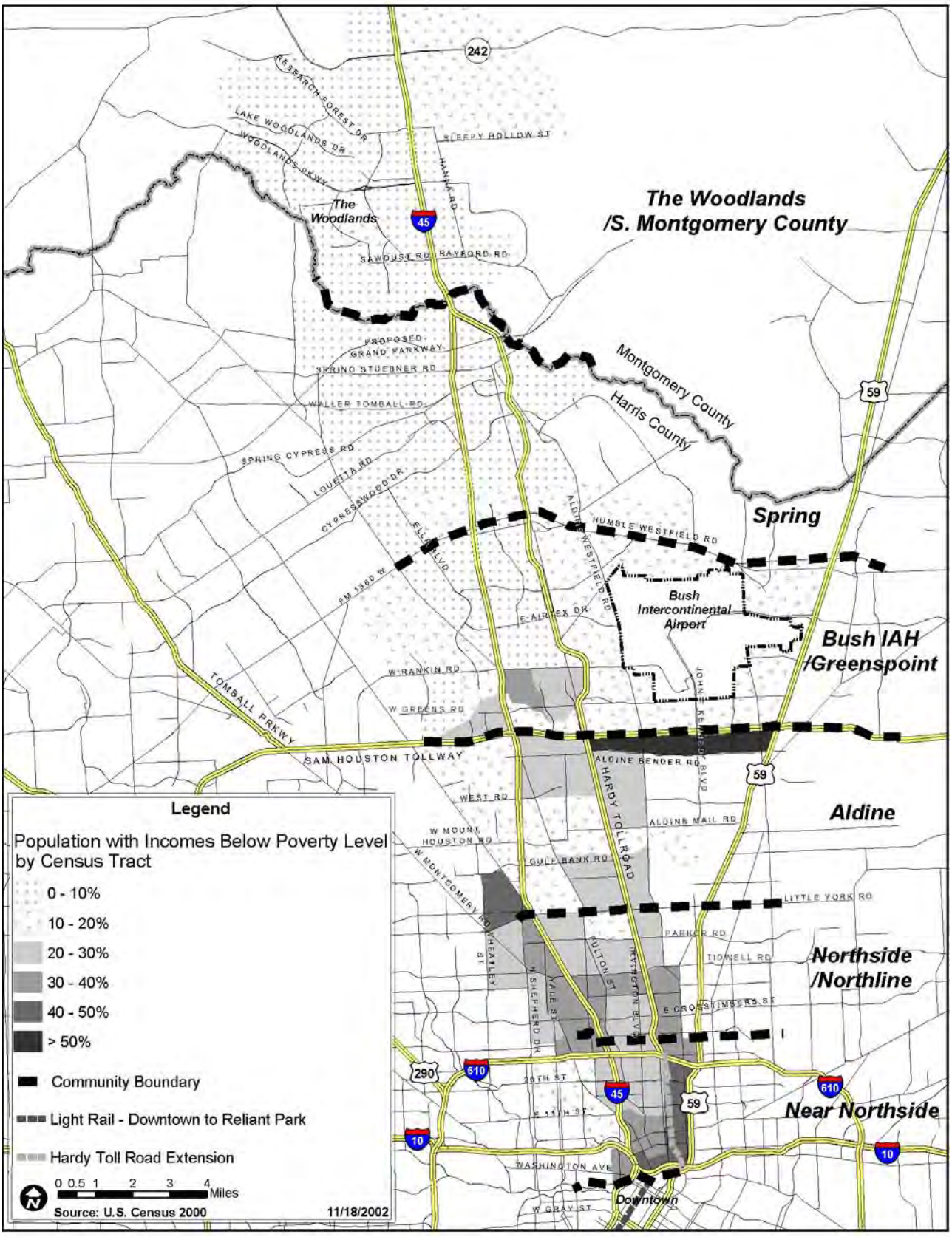
U.S. Census 2000 data shows that the overall poverty levels (as defined by the U.S. Census) within the North-Hardy Corridor are generally in keeping with the rest of the City and the CMSA. However, the southern portions of the corridor (Near Northside, Northside/Northline and Aldine areas) have poverty levels that are higher than both the City and the CMSA. Certain areas exhibit significantly lower levels of poverty, specifically Spring and The Woodlands/South Montgomery County. Exhibits 3.52 and 3.53 illustrate the poverty levels within the communities in the corridor.

Exhibit 3.52: Poverty Levels

	Population (2000)	People Below Poverty Level	
		#	%
Near Northside	74,366	16,974	23%
Northside/Northline	73,822	19,578	27%
Aldine	62,970	13,928	22%
Greenspoint/Bush Intercontinental Airport	79,953	13,885	17%
Spring	69,708	4,013	6%
The Woodlands/South Montgomery County	74,318	4,118	6%
Total Corridor	435,137	72,496	17%
City of Houston	1,954,848	369,045	19%
Houston-Galveston-Brazoria CMSA	4,669,571	628,385	14%

Note: The U.S. Census Bureau excludes the following from the numerator and denominator when calculating poverty rates: institutionalized people, people in military group quarters, people in college dormitories, and unrelated individuals under 15 years old.
Source: 2000 US Census

Exhibit 3.53: Map of Corridor Poverty Levels



3.8.6 Potential for Neighborhood Disruption

There is potential for each of the proposed LRT/BRT alignments to disrupt the existing traffic flow within neighborhoods and to alter neighborhood character, especially where the alignments follow local streets and major thoroughfares.

Current traffic flow/patterns may be altered by the elimination of some left turn opportunities along at-grade alignments; for example, turns from cross-streets could be hampered, as could left turn access to existing uses. This potential impact is anticipated because it is likely that the LRT/BRT would have some type of barrier separation, even when it is running at-grade within the median of a road. These impacts would be felt most at intersections that are not signalized, but are customarily used to provide access into the neighborhood areas.

There are both negative and positive aspects to this potential impact. On the negative side: businesses may suffer if part of their customer access is inconvenienced or cut-off; residents may find it more difficult to access their homes and needed services; streets where signals are provided and left turns are permitted may become more congested; and emergency vehicle accessibility may be affected if left turn opportunities are reduced or eliminated. The positive aspects include: having better organized, more predictable traffic flow; and reducing the cut-through traffic currently using residential streets.

The character of existing neighborhoods may be altered, since LRT/BRT is expected to attract opportunities for economic development. Changes may include the development of new multi-family, commercial office and retail uses, additional traffic/parking concerns, and changes in property value, such as for those properties that are in close proximity to stations. (For more discussion on economic development issues and impacts, see Section 5.0: Economic Development.)

As determined to-date through meetings with stakeholders and the public in the corridor, some of the neighborhoods within the North-Hardy Corridor have strong positions one way or another on some of these potential impacts. The Near Northside neighborhoods are generally supportive of improved transit services and opportunities to enhance economic development, and so the potential impacts in this area may be more desirable and welcomed than in some others. Conversely, the Woodland Heights area has expressed strong interest in minimizing any potential for change or disruption in that neighborhood.

The following are some specific instances where there could be potential impacts on neighborhoods.

- There is high potential for neighborhood disruption with both the Red and Green Lines as they turn north onto Fulton from the Little White Oak Bayou. There are currently some interrelated activities at this intersection, including Moody Park, Irvington Village (public housing), Clemente Martinez Elementary School, and commercial retail. The alternative alignment along Boundary between North Main and Fulton may help to mitigated this issue to some degree.

- As the Red line travels in a north-south direction on Irvington between Cavalcade and IH-610 it is surrounded by primarily low density residential, which could be sensitive to disruption, especially for access to residential units fronting on Irvington. However, most of the residential units front on the cross-streets, so this might help to minimize the potential for disruption.

- As the Red Line turns east/west at Robinson Road near The Woodlands it crosses at-grade through a residential neighborhood. There could be potential for neighborhood disruption.

- Cavalcade is primarily a residential street, and similar to the comment above regarding the Red Line on Irvington or Robinson Road, the Green Line could pose potential for neighborhood disruption, especially regarding the homes fronting on Cavalcade.

3.8.7: Assessment of Impact

There are no significant differences between the three alignments in terms of their potential impact on the communities within the corridor. Nevertheless, there are some characteristics worth noting.

The southern portion of the North-Hardy Corridor is primarily Hispanic, with lower median household incomes and higher poverty levels than the northern portions of the corridor, and the City and CMSA. All three LRT/BRT alignments would serve the southern portion.

The Red Line appears to have the greatest potential for neighborhood disruption, followed by the Green and then the Blue Line. However, each of the specific areas of potential impact is relatively contained and can likely be mitigated through careful planning and design.

3.9: Environmental Justice

3.9.1: Introduction

In February 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This Executive Order requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low-income populations.

> "Environmental justice is the goal to be achieved for all communities and persons across this Nation. Environmental justice is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work " [22]

An Environmental Justice Community is defined as "any aggregated or dispersed population that (a) is a low-income population based on the Bureau of the Census (BOC) Current Population reports, (b) is over 50-percent minority, or (c) contains a minority population percentage meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis."[23]

For the purposes of Environmental Justice, "minority" is defined as "individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic."[24]

One of the most effective ways to ensure that no Environmental Justice community is disproportionately impacted is to have an effective and meaningful public involvement program. During the Alternatives Analysis study for the North-Hardy Corridor all reasonable efforts were made to encourage broad public participation from all communities within the study area, and to take into account other current and past local planning efforts and studies (such as the Northside Village Economic Revitalization Plan). The results of these planning efforts are reflected in the short list of alternatives that were analyzed. Further opportunities for public involvement are planned as the study progresses.

[22] http://www.epa.gov/compliance/environmentaljustice/index.html
[23] http://hydra.gsa.gov/pbs/pt/call-in/factshet/0298b/02_98_1.htm
[24] Guidance for Federal Agencies on Key Terms in Executive Order 12898, Federal Working Group on Environmental Justice.

In order to assess the potential impacts of the proposed LRT/BRT and highway/road improvements in the North-Hardy Corridor on environmental justice issues, the following components have been evaluated:

- Acquisitions and Displacements
- Air Quality
- Noise & Vibration
- Safety & Security
- Visual & Aesthetics
- Communities/neighborhoods
- Economic Development
- Cultural Resources

The following provides a summary of the results of the analysis of each of these topics and discusses potential impacts in the context of Environmental Justice. For additional information, consult the sections of this report referenced above. Once the LPIS is selected, further consideration will be given to potential Environmental Justice issues.

3.9.2: Blue Line

Acquisition and Displacements

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to acquisition or displacements. Based on the preliminary engineering drawings, and as discussed in the Acquisition and Displacements section of this report, there is some potential right-of-way acquisition required and displacement of some existing buildings; however, the Blue Line primarily follows existing rights-of-way, so potential acquisitions and displacements are minimized. The following is a summary of the potential displacements/acquisitions for the Blue Line:

- **Near Northside**

  The following potential acquisitions/displacements occur in the Near Northside community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (61 percent of households), with about 23 percent of the population living below the poverty level.

  - North Main Street (aerial section), IH-10 to Harrington

    Some acquisition of additional right-of-way and displacement of existing buildings may be necessary to accommodate this aerial section of the LRT/BRT. However, the majority of this section runs through the Hardy Yard, an area for which redevelopment plans are currently being considered.

- **Northside/Northline**

  The following potential acquisitions/displacements occur in the Northside/Northline community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (65 percent of households), with about 27 percent of the population living below the poverty level in this community.

  - Airline
    Right-of-way acquisition needs could impact the commercial properties located on the east side of Airline between Cavalcade and IH-610 Loop.

  - Crosstimbers/Northline Mall
    Right-of-way acquisition would be required in order to accommodate the Blue Line as it turns east from Airline near Crosstimbers toward Northline Mall, as well as through the area of the Northline Mall. Some disruption of existing buildings could result in this area as well.

  - Buildings North of Northline Mall
    There are two existing buildings located within the proposed right-of-way as in turns north toward IH-45. Since the structure is aerial in this location, it may be possible to minimize the need for displacement.

- **Aldine**

  The following potential acquisitions/displacements occur in the Aldine community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (53 percent of households), with about 22 percent of the population living below the poverty level in this community.

  - New Right-of-Way for Greenspoint Connection
    New right-of-way would need to be acquired for the Blue Line as it veers to the northeast from IH-45 to connect to the Greenspoint Mall area.

- **Greenspoint/IAH**

  The following potential acquisitions/displacements occur in the Greenspoint/IAH community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (39 percent of households), although the population is more evenly dispersed among ethnic groups than in the other communities within the study area. About 17 percent of the population is living below the poverty level in this community.

  - IH-45/Kuykendahl Park and Ride
    There would be some acquisition of right-of-way needed in the vicinity of the proposed Kuykendahl Park and Ride station and for the connection north back to the freeway. Based on the 2000 Census, this particular Census Tract has an ethnicity that is primarily White.

- East-West Spur Connection to IAH
  There may be property acquisition/building displacement impacts in this area, including at the intersection of Greens Road and Greenspoint Drive, along the north side of Greens Road near Hardy Road/Hardy Toll Road, along the south side of Hardy Toll Road connection to IAH, at the station proposed near Imperial Valley Drive, and as the proposed alignment travels through City of Houston Airport System lands.

- **Spring**

  The Blue Line is within the IH-45 right-of-way for the full length of this section. There are no potential acquisitions/displacements identified for this area.

- **The Woodlands/South Montgomery County**

  The following potential acquisitions/displacements occur in The Woodlands/South Montgomery County community (as shown in Exhibit 3.6). The ethnicity in this community is primarily White (86 percent of households), with about 6 percent of the population living below the poverty level in this community.

  - Connection to The Woodlands Town Center Station
    Some property acquisition would be needed in order for the LRT/BRT to reach The Woodlands Town Center, as well for the proposed station.

  - North of The Woodlands Town Center
    There appears to be right-of-way required north of The Woodlands Town Center as the alignment heads back towards IH-45. In addition, an office building could be displaced at the southwest quadrant of Lake Woodlands Drive and IH-45.

Air Quality

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to air quality. The results of the H-GAC regional travel demand model will provide further information concerning impacts on air quality.

Safety & Security

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations anticipated with respect to safety and security. The Blue Line primarily follows existing highway and road rights-of-way that currently carry high volumes of traffic. Any potential issues with respect to safety vis-à-vis conflicts with other modes of traffic, including pedestrians, can be mitigated through careful design and proper signalization. Further, METRO's existing CPTED program should be incorporated into the design of all stations, Park and Ride facilities and Yard and Shop locations. A Safety Plan should be developed and implemented to ensure

pedestrian safety during construction, and to monitor and respond to any safety issues as they arise.

Visual & Aesthetics

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to visual and aesthetic issues. The following summarizes the sensitive areas that should be given special consideration.

- **Near Northside**

  There is a high degree of community interest in this area for LRT/BRT to act as a catalyst for redevelopment, as is apparent from recent and on-going local planning initiatives. There are also opportunities to take advantage of the panoramic views of both natural and urban features in the vicinity of Buffalo Bayou and White Oak Bayou. The design of the LRT/BRT can be integrated with the redevelopment proposals for the Hardy Yard. There are no specific areas identified as requiring special consideration.

- **Northside/Northline**

  The Blue Line is within the IH-45 right-of-way for the majority of this section. There are no specific areas identified as requiring special consideration.

- **Aldine**

  The Blue Line is within the IH-45 right-of-way for the majority of this section. There are no areas identified as requiring special consideration.

- **Greenspoint/IAH**

  Special care will need to be given to portions of the Blue Line that are elevated to ensure that they are well designed and integrated within the structure of the surrounding development and take into account the future evolution of the area to more urban uses. The Blue Line should take advantage of the views of the Greenspoint and Downtown skylines from this area. There are no specific areas identified as requiring special consideration.

- **Spring**

  The Blue Line is within the IH-45 right-of-way for the full length of this section. There are no areas identified as requiring special consideration.

- **The Woodlands/South Montgomery County**

  The Blue Line is within the IH-45 right-of-way for the majority of this section. The connection of the Blue Line into The Woodlands Town Center would require special consideration to ensure compatibility with the character of existing and planned development in this area. The elevated approach could to take

advantage of enhanced visual experiences into the Town Center. Otherwise, there are no specific areas identified as requiring special consideration.

Communities

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to communities. The southern portions of the North-Hardy Corridor, including the Near Northside, Northside/Northline and Aldine communities, as shown in Exhibit 3.6, are primarily Hispanic, with lower median household incomes and higher poverty levels than the northern portions of the corridor, and the City and CMSA. All three LRT/BRT alignments would serve the population in this part of the corridor.

Since it largely follows the right-of-way of IH-45, the Blue Line has a low potential for changing current traffic patterns within neighborhoods, such as might result from eliminating some of the existing left turn opportunities on major roads. Each of the specific areas of potential impact in which this situation may arise is relatively contained and can likely be mitigated through careful planning and design.

Economic Development

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to economic development.

These findings considered the ability of each alignment to:

- Connect and support the major activity centers in the corridor.
- Encourage large-scale TOD.
- Serve and support existing neighborhoods with revitalization potential, existing improvements plans and smaller infill or redevelopment plans.

In comparison with the other two alignments, the Blue Line would provide slightly more opportunities to link major activity centers. The TOD opportunities are similar for all alignments south of the east-west spur, and somewhat better for the Blue Line north of the spur. Neighborhood-level economic development opportunities are somewhat lower for the Blue Line than the other two alignments. Redevelopment opportunities can provide alternative housing and business options within the same area for any displacement resulting from changing land use patterns or increased property values, and that may occur with transit oriented development.

Cultural Resources

There are no disproportionately high or adverse effects anticipated from the Blue Line on minority and low-income populations with respect to cultural resources. The potential historic resources that have been identified, as discussed in Section 17 (Historic Resources), are located along North Main Street in the Near Northside area and along Airline in the Northside/Northline area. Every effort should be made to minimize disruption of and preserve existing historic resources.

3.9.3: Red Line

Acquisition & Displacements

There are no disproportionately high or adverse effects anticipated from the Red Line on minority and low-income populations with respect to acquisition or displacements. Based on the preliminary engineering drawings, and as discussed in Section 2 (Acquisition and Displacements) of this report, there may be some potential right-of-way acquisition required and some displacement of existing buildings; however, the Red Line primarily follows existing rights-of-way, so potential acquisitions and displacements are minimized. The following is a summary of the potential displacements/acquisitions for the Red Line:

- **Near Northside**

  The following potential acquisitions/displacements occur in the Near Northside community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (61 percent of households), with about 23 percent of the population living below the poverty level.

  - North Main Street (aerial section), IH-10 to Harrington

    Like the impacts for the Blue Line in this section, some acquisition of additional right-of-way and displacement of existing buildings may be necessary to accommodate this aerial section of the LRT/BRT. However, the majority of this section runs through the Hardy Yard, an area for which redevelopment plans are currently being considered.

  - Little White Oak Bayou, North Main to Fulton

    This section would require property acquisition and has some apparent displacement to commercial and residential properties as well as the southwest corner of Moody Park.

  -

    - Boundary Road, North Main to Fulton

    The alternative option also would have some property acquisition and displacement issues, including impacts on residential.

- **Northside/Northline**

  The Red Line is within Reliant Energy/Hardy Toll Road corridor through this area.

- **Aldine**

  The following potential acquisitions/displacements occur in the Aldine community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (53 percent of households), with about 22 percent of the population living below the poverty level in this community.

  - West Hardy Road/Hill-Aldine Mail Route

    There would be some property acquisition needs in this area, as well as the possible displacement of existing structures. In addition, the section of the alignment along West Hardy Road, north of Aldine Mail Route, would require some property acquisition and result in displacement of existing residential and industrial structures.

- **Greenspoint/IAH**

  The following potential acquisitions/displacements occur in the Greenspoint/IAH community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (39 percent of households), although the population is more evenly dispersed amongst ethnic groups than in the other communities within the study area. About 17 percent of the population is living below the poverty level in this community.

  - East-West Spur Connection to IAH

    Like the Blue Line, there may be property acquisition/building displacement impacts in this area, including at the intersection of Greens Road and Greenspoint Drive, along the north side of Greens Road near Hardy Road/Hardy Toll Road, along the south side of Hardy Toll Road connection to IAH, at the station proposed near Imperial Valley Drive, and as the proposed alignment travels through City of Houston Airport System lands.

  - UPRR North of Greens Road

    Where the Red Line runs adjacent to the UPRR and the Hardy Toll Road north of Greens Road, property would need to be acquired for a significant portion of this entire section. Just north of Rayford Road, the alignment appears to encroach on an existing trailer park. No other existing buildings would appear to be displaced through this section

- **Spring**

  The following potential acquisitions/displacements occur in the Spring community (as shown in Exhibit 3.6). The ethnicity in this community is primarily White (74 percent of households), with about 6 percent of the population living below the poverty level in this community.

- North of Old Town Spring
  There may be some property acquisition required adjacent to the existing UPRR right-or-way as it travels through the primarily undeveloped, vacant land north of Old Town Spring, depending on the width of that right-of-way and the ability of the Red Line to remain with that right-of-way.

- **The Woodlands/South Montgomery County**

  The following potential acquisitions/displacements occur in The Woodlands/South Montgomery County community (as shown in Exhibit 3.6). The ethnicity in this community is primarily White (86 percent of households), with about 6 percent of the population living below the poverty level in this community.

  - Robinson Road
    This section may require new right-of-way to be acquired, with some possible building displacement, including single family residential, depending on the width of the right-of-way.

  - Connection to The Woodlands Town Center Station
    Like the Blue Line, some property acquisition would be needed in order for the LRT/BRT to reach The Woodlands Town Center.

  - North of The Woodlands Town Center
    As is the case with the Blue Line, there appears to be right-of-way required north of The Woodlands Town Center as the alignment heads back towards IH-45. In addition, an existing office building at the southwest quadrant of Lake Woodlands Drive and IH-45 could be impacted.

Air Quality

The Red Line would not have disproportionately high or adverse effects on minority and low-income populations with respect to air quality. The results of the H-GAC regional travel demand model will provide further information concerning impacts on air quality.

Safety and Security

The Red Line primarily follows existing highway and road rights-of-way that currently carry high volumes of traffic. Any potential issues with respect to safety vis-à-vis conflicts with other modes of traffic (including pedestrians) can be mitigated through careful design and proper signalization. In addition, METRO's existing CPTED program should be incorporated into the design of all stations, Park and Ride facilities and Yard and Shop locations. A Safety Plan should be developed and implemented to ensure pedestrian safety during construction, and to monitor and respond to any safety issues

as they arise. There are no disproportionately high or adverse effects on minority and low-income populations anticipated with respect to safety and security.

Visual & Aesthetics

There are no disproportionately high or adverse effects on minority and low-income populations anticipated with respect to visual and aesthetic issues from the Red Line. The following summarizes the sensitive areas that should be given special consideration.

- **Near Northside**

  There is a high degree of community interest in this area for LRT/BRT to act as a catalyst for redevelopment, as is apparent from recent and on-going local planning initiatives. There are two specific areas of Near Northside area that need to be given special consideration in terms of potential visual and aesthetic impacts for the Red Line: 1) Little White Oak Bayou; and 2) the west side of Irvington at Hays where there are street trees planted in the median, including a number of large Live Oaks. There is also an opportunity to take advantage of the panoramic views of both natural and urban features in the vicinity of Buffalo Bayou, Little White Oak Bayou and along Irvington between Cavalcade and IH-610. In addition, the design of the LRT/BRT can be integrated with the redevelopment proposals for the Hardy Yard.

- **Northside/Northline**

  There are no specific areas identified as requiring special consideration.

- **Aldine**

  The Red Line is within the Hardy Toll Road/West Hardy Road rights-of-way for nearly the full length of this section. Special consideration should be given as the Red Line crosses Beltway 8, in order to minimize additional visual chaos, and to take advantage of views of the skyline at Greenspoint. There are no additional areas identified as requiring special consideration.

- **Greenspoint/IAH**

  Special care will need to be given to portions of the Red Line that are elevated to ensure they are well designed and integrated within the structure of the surrounding development and take into account the future evolution of the area to more urban uses. The Red Line should take advantage of the views of Greenspoint and Downtown skylines. Otherwise, there are no specific areas identified as requiring special consideration.

- **Spring**

  The Red Line follows the Hardy Toll Road and existing UPRR rights-of-way for the length of this section. Old Town Spring provides opportunities for the Red Line to be integrated into the development and character of this special

destination activity center. Otherwise, there are no specific areas identified as requiring special consideration.

- **The Woodlands/South Montgomery County**

  Connections of the Red Line into The Woodlands Town Center will require special consideration to ensure compatibility with the character of existing and planned development in this area. The elevated approach could take advantage of enhanced visual experiences into the Town Center. Care would be required with the Red Line as this at-grade portion runs through the residential neighborhood in the vicinity of Robinson Road. Otherwise, there were no specific areas identified as requiring special consideration.

Communities

There are no disproportionately high or adverse effects anticipated from the Red Line on minority and low-income populations with respect to communities. The southern portions of the North-Hardy Corridor, including the Near Northside, Northside/Northline and Aldine communities, as shown in Exhibit 3.6, are primarily Hispanic, with lower median household incomes and higher poverty levels than the northern portions of the corridor, and the City and CMSA. All three LRT/BRT alignments would serve the population in the southern portion of the corridor.

The Red Line has some potential for changing current traffic patterns within neighborhoods, such as what might result from eliminating some of the existing left turn opportunities on major roads. However, each of the specific areas of potential impact in which this situation may arise is relatively contained and can likely be mitigated through careful planning and design. Key locations where additional care should be taken to minimize potential disruption include, at Little White Oak Bayou and Fulton, on Irvington between Cavalcade and IH-610, and at Robinson Road in The Woodlands.

Economic Development

There are no disproportionately high or adverse effects anticipated from the Red Line on minority and low-income populations with respect to economic development.

These findings considered the ability of each alignment to:

- Connect and support the major activity centers in the corridor.
- Encourage large-scale TOD.
- Serve and support existing neighborhoods with revitalization potential, existing improvements plans and smaller infill or redevelopment plans.

In comparison with the other two alignments, the Red Line would link fewer major activity centers than the Blue Line (but more than the Green Line) and provide fewer TOD opportunities than the Blue Line north of the east-west spur (but more than the Green Line), but provide more neighborhood-level economic development opportunities

than the Blue Line (but less than the Red Line). Redevelopment opportunities can provide alternative housing and business options within the same area for any displacement resulting from changing land use patterns or increased property values that may occur with TOD.

Cultural Resources

There are no disproportionately high or adverse effects anticipated from the Red Line on minority and low-income populations with respect to cultural resources. The potential historic resources that have been identified, as discussed in Section 17 (Historic Resources), are primarily in the vicinity of the Hardy Toll Road/IH-610 and West Hardy Road in the Northside/Northline area. Every effort should be made to minimize disruption of and preserve existing historic resources.

3.9.4: Green Line

Acquisition & Displacements

There are no disproportionately high or adverse effects anticipated from the Green Line on minority and low-income populations with respect to acquisition or displacements. Based on the preliminary engineering drawings, and as discussed in Section 2 (Acquisition and Displacements) of this report, there may be some potential right-of-way acquisition required and some displacement of existing buildings; however, the Green Line primarily follows existing rights-of-way, so potential acquisitions and displacements are minimized. The following is a summary of the potential displacements/acquisitions for the Green Line:

- **Near Northside**

  The following potential acquisitions/displacements occur in the Near Northside community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (61 percent of households), with about 23 percent of the population living below the poverty level.

  - North Main Street (aerial section), IH-610 to Harrington

    Like the impacts for both the Blue Line and the Red line in this section, some acquisition of additional right-of-way and displacement of existing buildings may be necessary to accommodate this aerial section of the LRT/BRT. However, the majority of this section runs through the Hardy Yard, an area for which redevelopment plans are currently being considered.

- Little White Oak Bayou, North Main to Fulton
  This section of the Green Line, like the Red Line, will require property acquisition and has some apparent displacement to commercial and residential properties as well as the southwest corner of Moody Park.

- Boundary Road, North Main to Fulton
  Like the Red Line, the alternative option for the Green Line would have some property acquisition and displacement issues, including impacts on residential.

- Turn at Irvington & Cavalcade
  The turn onto Cavalcade will necessitate some property acquisition from the commercial property at the southwest corner. Some displacement of existing buildings may also occur.

- Turn at Fulton & Cavalcade
  This turn will also have some property acquisition needs and displacement impacts.

- **Northside/Northline**

  The following potential acquisitions/displacements occur in the Northside/Northline community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (65 percent of households), with about 27 percent of the population living below the poverty level in this community.

  - Northline Mall
    Like the Blue Line, some acquisition would be required in order to accommodate the Green Line through the area of the Northline Mall.

- **Aldine**

  The following potential acquisitions/displacements occur in the Aldine community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (53 percent of households), with about 22 percent of the population living below the poverty level in this community.

  - New Right-of-way for Greenspoint Connection
    New right-of-way would need to be acquired for the Green Line as it veers to the northeast to connect to the Greenspoint Mall.

- **Greenspoint/IAH**

  The following potential acquisitions/displacements occur in the Greenspoint/IAH community (as shown in Exhibit 3.6). The ethnicity in this community is primarily Hispanic (39 percent of households), although the population is more evenly dispersed among ethnic groups than in the other communities within the study

area. About 17 percent of the population is living below the poverty level in this community.

- East-West Spur Connection to IAH
  Like the Blue Line and the Red Line, there may be property acquisition/building displacement impacts in this area, including at the intersection of Greens Road and Greenspoint Drive, along the north side of Greens Road near Hardy Road/Hardy Toll Road, along the south side of Hardy Toll Road connection to IAH, at the station proposed near Imperial Valley Drive, and as the proposed alignment travels through City of Houston Airport System lands.

- **Spring**
  The Green Line does not run through this area.

- **The Woodlands/South Montgomery County**
  The Green Line does not run through this area.

Air Quality

The Green Line would not have disproportionately high or adverse effects on minority and low-income populations with respect to air quality. The results of the H-GAC regional travel demand model will provide further information concerning impacts on air quality.

Safety & Security

The Green Line primarily follows existing highway and road rights-of-way that currently carry high volumes of traffic. Any potential issues with respect to safety vis-à-vis conflicts with other modes of traffic can be mitigated through careful design and proper signalization. Further, METRO's existing CPTED program should be incorporated into the design of all stations, Park and Ride facilities and Yard and Shop locations. A Safety Plan should be developed and implemented to ensure pedestrian safety during construction, and to monitor and respond to any safety issues as they arise. There are no disproportionately high or adverse effects on minority and low-income populations anticipated with respect to safety and security.

Visual & Aesthetics

There are no disproportionately high or adverse effects on minority and low-income populations anticipated with respect to visual and aesthetic issues from the Green Line. The following summarizes the sensitive areas that should be given special consideration.

- **Near Northside**

  There is a high degree of community interest in this area for LRT/BRT to act as a catalyst for redevelopment, as is apparent from recent and on-going local planning initiatives. There are three specific areas of Near Northside area that need to be given special consideration in terms of potential visual and aesthetic impacts for the Green Line: 1) Little White Oak Bayou; 2) the west side of Irvington at Hays where there are street trees planted in the median, including a number of large Live Oaks; and 3) Cavalcade, between Irvington and Fulton, which also has large Live Oaks planted in the median. There is also an opportunity to take advantage of the panoramic views of both natural and urban features in the vicinity of Buffalo Bayou and Little White Oak Bayou. Further the design of the LRT/BRT can be integrated with the redevelopment proposals for the Hardy Yard.

- **Northside/Northline**

  Special care will need to be given to portions of the Green Line (i.e. along Airline Drive) that are elevated to ensure they are well designed and integrated within the structure of the surrounding development. Otherwise there are no specific areas identified as requiring special consideration.

- **Aldine**

  As with the comments above for the Northside/Northline community, special care will need to be given to portions of the Green Line (i.e. along Airline Drive) that are elevated within the Aldine community to ensure they are well designed and integrated within the structure of the surrounding development. There are no other areas identified as requiring special consideration.

- **Greenspoint/IAH**

  Special care will need to be given to portions of the Green Line that are elevated to ensure they are well designed and integrated within the structure of the surrounding development and take into account the future evolution of the area to more urban uses. The Green Line should take advantage of the views of Greenspoint and Downtown skylines. Otherwise, there are no specific areas identified as requiring special consideration.

- **Spring**

  The Green Line does not go through this area.

- **The Woodlands/South Montgomery County**

  The Green Line does not go through this area.

Communities

There are no disproportionately high or adverse effects anticipated from the Green Line on minority and low-income populations with respect to communities. The southern

portions of the North-Hardy Corridor, including the Near Northside, Northside/Northline and Aldine communities, as shown in Exhibit 3.6, are primarily Hispanic, with lower median household incomes and higher poverty levels than the northern portions of the corridor, and the City and CMSA. All three LRT/BRT alignments would serve the population in the southern portion of the corridor.

The Green Line has minimal potential for changing current traffic patterns within neighborhoods, such as what might result from eliminating some of the existing left turn opportunities on roads. However, each of the specific areas of potential impact in which this situation may arise is relatively contained and can likely be mitigated through careful planning and design. One location where additional care should be taken to minimize potential disruption is Cavalcade, between Irvington and Fulton.

Economic Development

There are no disproportionately high or adverse effects anticipated from the Green Line on minority and low-income populations with respect to economic development.

These findings considered the ability of each alignment to:

- Connect and support the major activity centers in the corridor.
- Encourage large-scale TOD.
- Serve and support existing neighborhoods with revitalization potential, existing improvements plans and smaller infill or redevelopment plans.

In comparison with the other two alignments, the Green Line would link the least number of major activity centers and provide the least TOD opportunities (north of the east-west spur), but provide the most neighborhood-level economic development opportunities. Redevelopment opportunities provide can provide alternative housing and business options within the same area for any displacement resulting from changing land use patterns or increased property values and that may occur with transit oriented development.

Cultural Resources

There are no disproportionately high or adverse effects anticipated from the Green Line on minority and low-income populations with respect to cultural resources. The potential historic resources that have been identified, as discussed in the Historic Resources section, are the Irvington Village housing project at Fulton and Halpern, the Silverdale District, and some structures along Fulton in the Near Northside area, and some structures along Fulton in the Northside/Northline area. Every effort should be made to minimize disruption of and preserve existing historic resources.

3.9.5: Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

3.9.6: Assessment of Impact

Based on an assessment of a variety of factors that are considerations for environmental justice, there are no disproportionately high or adverse effects anticipated from any of the proposed alignments on minority and low-income populations.

3.10: Wetlands

3.10.1: Analysis

The North-Hardy Corridor contains some large pockets of potential for wetlands – most notably in the vicinity of Greenspoint/IAH, and The Woodlands/SH 242 area. There are some additional small pockets of potential for wetlands scattered throughout the corridor (see Exhibit 3.54).

There has been a significant loss of wetlands in Harris County over the past 50 years (data is not readily available for Montgomery County). Wetland loss can be attributed to a number of causes, including development, agriculture, conversion to ponds, and subsidence. In Harris County, wetland loss can be mainly attributable to urban and rural development.[25]

Wetlands play a number of valuable roles in our quality of life and the environment, including[26]:

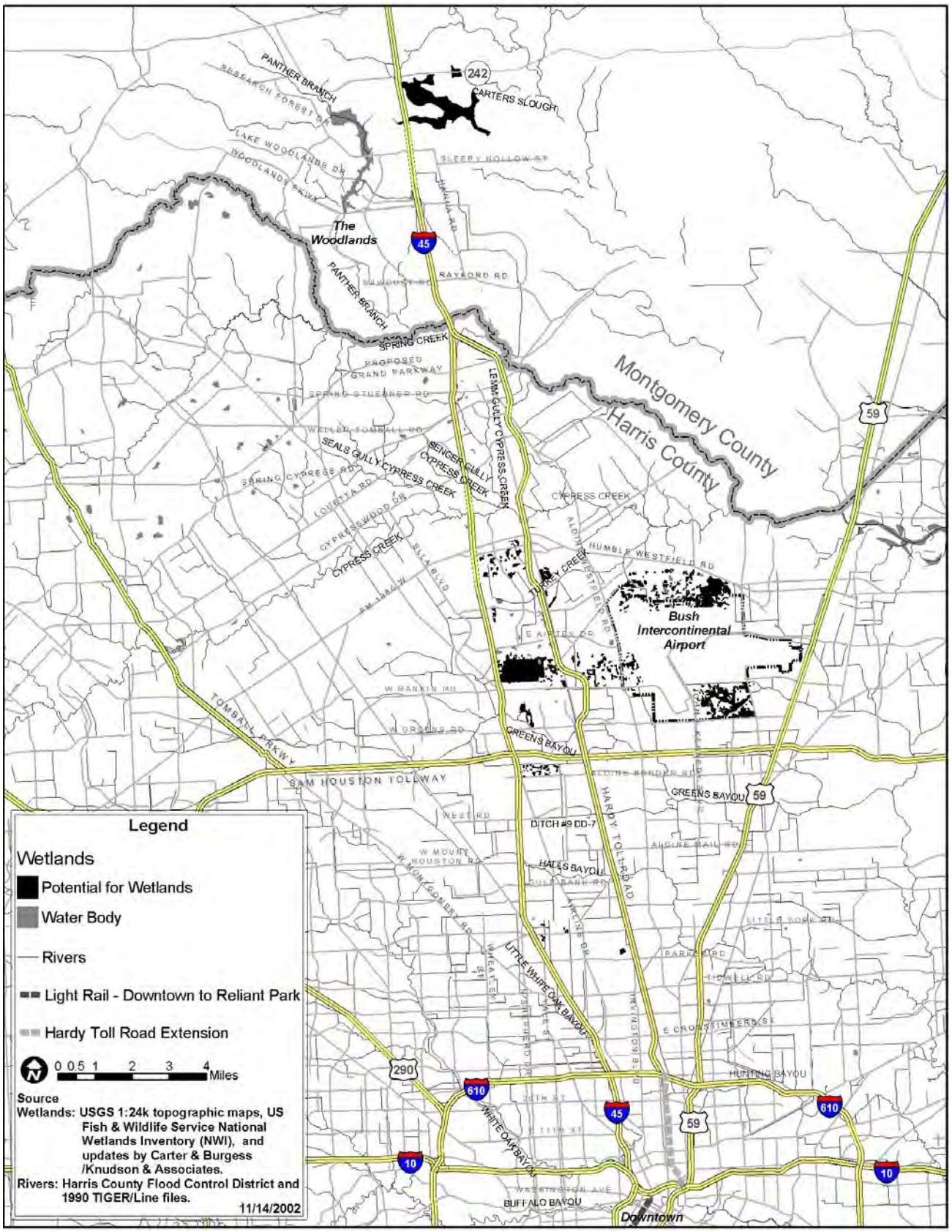
Environmental Quality Functions

- Water Quality Maintenance
- Hydrologic Functions
- Ecosystem Stabilization
- Biological Diversity
- Fish & Wildlife Habitat

[25] Texas Coastal Wetlands, Status and Trends, Mid-1950s To Early 1990s, Texas Parks and Wildlife, U.S. Department of the Interior, U.S. Fish and Wildlife Service, March 1997. http://ifw2es.fws.gov/Documents/R2ES/TexasWetlands.pdf

[26] Texas Coastal Wetlands, Status and Trends, Mid-1950s To Early 1990s, Texas Parks and Wildlife, U.S. Department of the Interior, U.S. Fish and Wildlife Service, March 1997. http://ifw2es.fws.gov/Documents/R2ES/TexasWetlands.pdf

Exhibit 3.54: Wetlands



Socioeconomic Values

- Products (such as fish, timber, fur)
- Recreation & Nature Tourism
- Water Supply
- Wastewater Treatment
- Flood Control
- Erosion Control
- Education & Scientific Research
- Cultural/Archaeological

The EPA and U.S. Army Corps of Engineers regulate wetlands with the goal of "no net loss," under the Clean Water Act (CWA). The lead agency at the state level for protection of wetlands is the Texas Commission on Environmental Quality (TCEQ) (formerly the Texas Natural Resources Conservation Commission). The TCEQ maintains a policy to achieve no overall net loss of existing wetlands, with respect to wetlands functions and values.[27]

Section 401 of the CWA requires that states certify that a proposed CWA Section 404 permit will not violate water quality standards. The TCEQ makes these certifications for all projects except those related to the exploration, development and production of oil, gas, or geothermal resources, which the Texas Railroad Commission certifies. Section 404 permit applications are for the discharge of dredged or fill material into waters of the U.S., including wetlands.[28]

In Texas, the emphasis for protection of wetlands is on non-regulatory, voluntary approaches, particularly through developing new incentives to encourage conservation of wetlands on private lands (Texas State Wetlands Conservation Plan).[29]

3.10.2: Assessment of Impact

None of the proposed transit alignments would have a significant impact on wetlands within the study area, nor are there significant differentiating features between the three alignments to indicate that one would have greater or lesser potential impact than another. The only potential impact worth noting is the new right-of-way that would needed south of Beltway 8, east of IH-45 for both the Blue Line and the Green Line, as these alignments head towards Greenspoint. There are pockets of potential for wetlands located on the vacant lands in this vicinity which should be taken into account during the design phase, should one of these alignments be selected as the LPIS.

[27] http://www.wetlands.com/tex/tnrccwqc.htm
[28] http://www.wetlands.com/tex/tnrcc298.htm
[29] http://www.tpwd.state.tx.us/wetlands/programs/conservation/

3.11: Floodplains & Watercourses

3.11.1: Terrain

Like the rest of the Houston area, the North-Hardy Corridor is located within the natural, physiographic region called the Gulf Coastal Plain. The primary features of this region are that the terrain is nearly level, low-lying, and slow draining; the North-Hardy Corridor is no exception in this regard.[30]

The elevation of the lands within the corridor rises gently from south to north, as illustrated in Exhibit 3.55.

Exhibit 3.55: Elevation of Land in the Corridor

General Area within the Corridor	Approximate Elevation[31]
Buffalo Bayou/IH-10	32-45 feet
IH-610 Loop/The Heights	50-65 feet
Beltway 8/Greenspoint	80-100 feet
The Woodlands	125-160 feet

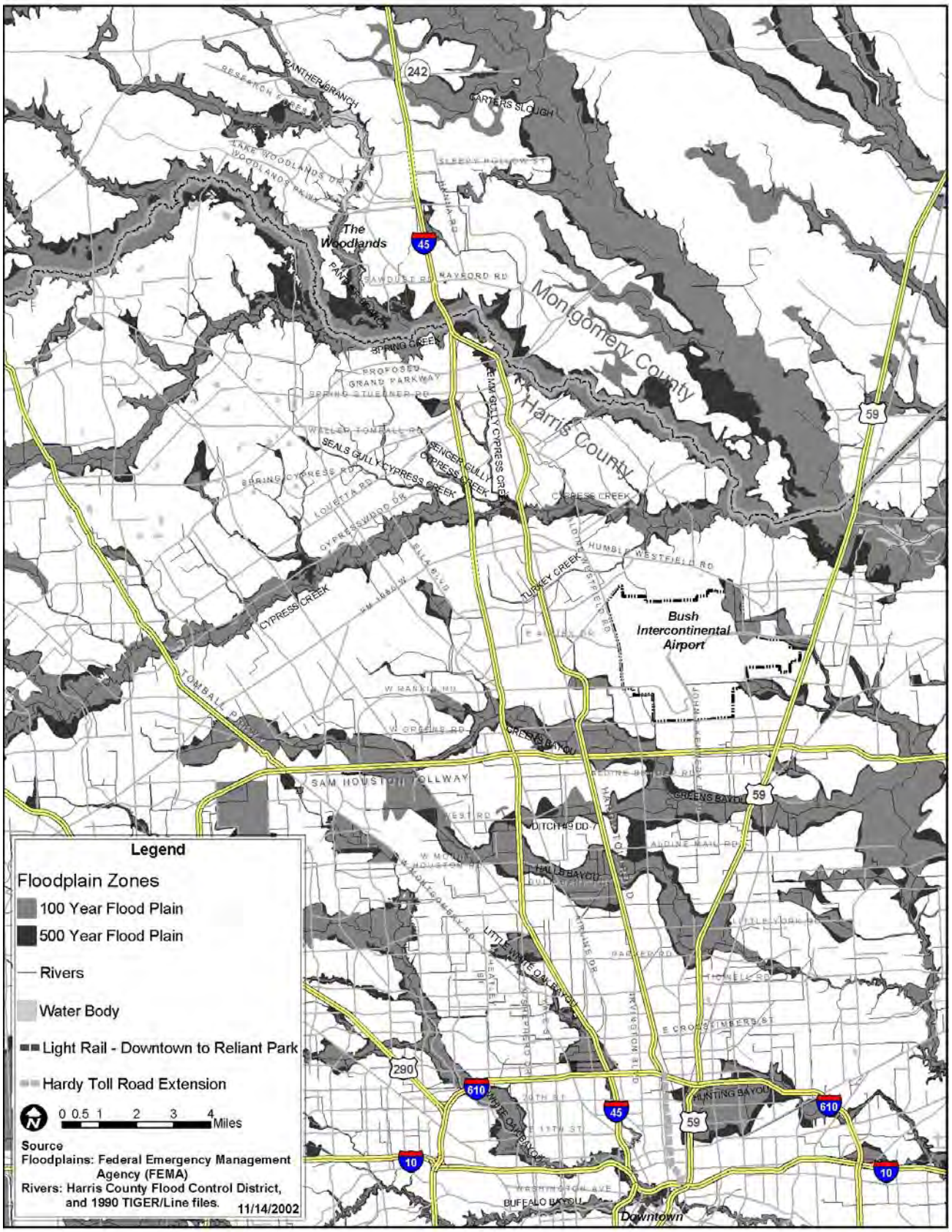
3.11.2: Watercourses

The corridor is bisected by a number of bayous and streams that flow toward Galveston Bay and the Gulf of Mexico, as shown on the Exhibit 3.56. These are as follows (from the south to north):

- Buffalo Bayou
- White Oak Bayou
- Little White Oak Bayou
- Hunting Bayou
- Halls Bayou
- Greens Bayou
- Turkey Creek
- Cypress Creek (including Seals Gully, Senger Gully, Lemm Gully)
- Spring Creek (which also forms the County Line between Harris and Montgomery)
- Sam Bell Gulley

[30] http://www.tpwd.state.tx.us/expltx/gulf/gulfchart.htm
[31] USGS 1:24,000 topographic data, 1979 and 1982.

Exhibit 3.56: Floodplains & Watercourses



- Panther Branch
- Carters Slough

There are no major water bodies located within the corridor, but there are some small ponds and reservoirs, primarily to the northwest of the corridor in the Spring area and in The Woodlands.

3.11.3: Floodplains

Certain lands adjacent to the bayous and streams within the corridor have been designated as being within the 100-year and 500-year floodplains, as shown in Exhibit 3.57.[32]

The Harris County Flood Control District (HCFCD) advises that the updated floodplain mapping to reflect the severe flooding that occurred due to Tropical Storm Allison in June 2001 will be available later this year. Currently, data is available from HCFCD to show the extent of the flooding that occurred during Allison, as shown in Exhibit 3.60, however this information has not yet been incorporated into the official Federal Emergency Management Agency (FEMA) flood plain mapping.[33]

3.11.4: Assessment of Impact

Since each of the three transit alignments principally follows existing highway, road and UPRR rights-of-way, the potential for impacts on the natural environmental, including floodplains and watercourses, is minimized, as long as new structures for crossings are not required. Care would be needed in the design of any facility which is located close to or crosses flood prone areas and watercourses, such as Buffalo Bayou (all three Lines), Little White Oak Bayou (all three Lines), Halls Bayou (all three Lines), Greens Bayou (all three Lines), Cypress Creek and Spring Creek (Blue and Red Lines). In addition, the station that is proposed to be located just north of SH 242 appears to be within the 100-year flood plain at Carter's Slough.

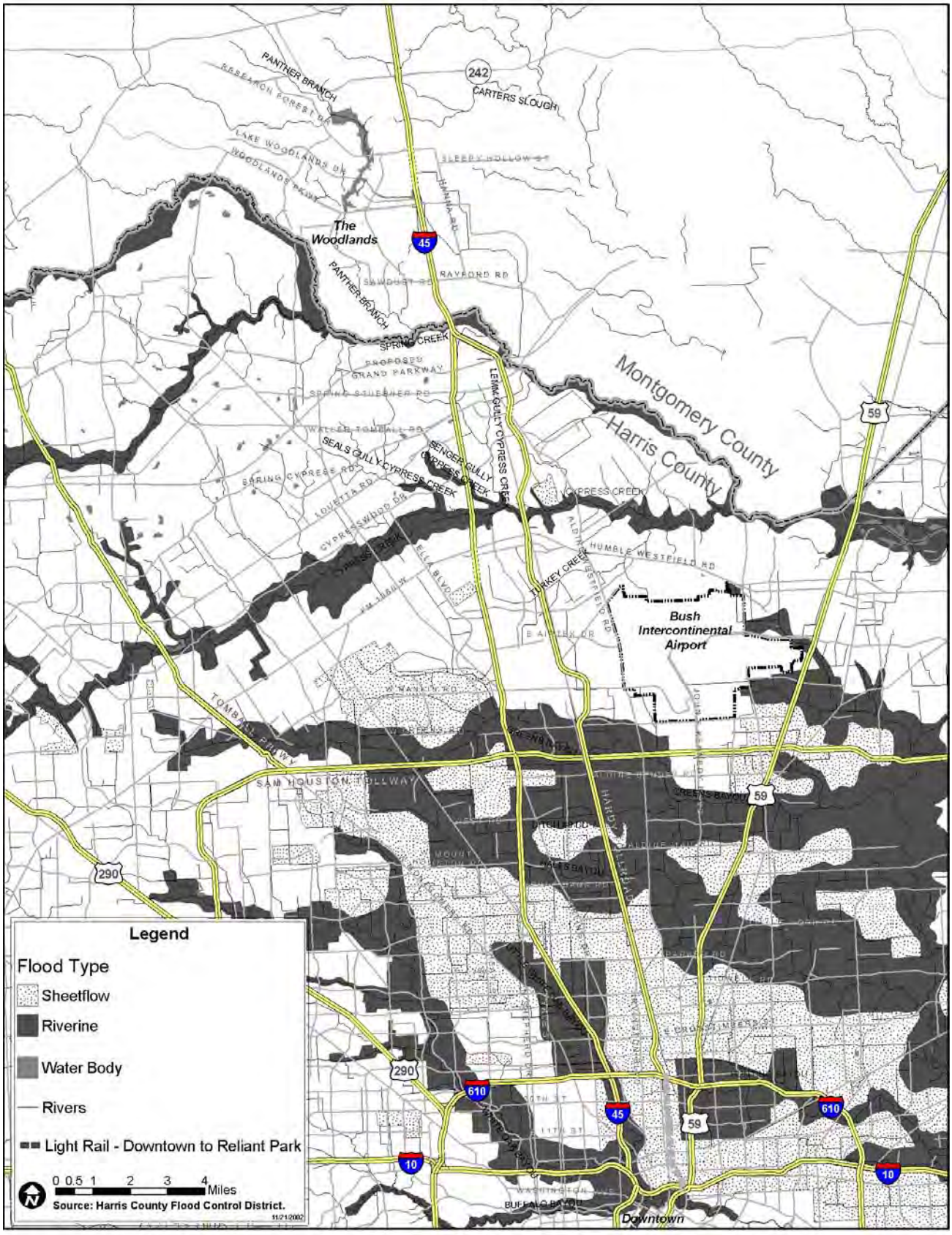
3.12: Water Quantity & Subsidence

3.12.1: Analysis

Historically, much of the development in the area of the North-Hardy Corridor has been serviced by underground water sources. Hundreds of Municipal Utility Districts (MUDs) have been created in and around Houston over the years to facilitate growth and

[32] FEMA 1996, updated by COHGIS, 2001
[33] Harris County Flood Control District, October 2002.

Exhibit 3.57: Flooding from Tropical Storm Allison



development where there has been no access to a municipally treated surface water source (see Exhibit 3.58).

As a result of the amount of growth and development that has taken place and the resulting withdrawal of water from underground aquifers, Harris County is experiencing significant issues related to subsidence. The Harris-Galveston Coastal Subsidence District was created by the Texas Legislature in 1975 to regulate the withdrawal of groundwater "for the purpose of ending subsidence, which contributes to or precipitates flooding, inundation, or overflow of the district, including without limitation rising waters resulting from storms or hurricanes."[34]

The impacts of fluid withdrawal on subsidence have been the subject of investigation in this area for nearly 100 years.

> "Documented land-subsidence elevations were initially established in 1906. Benchmark relevelings performed in the early 1940's verified that subsidence was occurring; the Baytown area had lowered 3.2 feet, and the Texas City area had subsided 1.6 feet. Measurements in the 1950's continued to document substantial additional subsidence. Subsidence in this region of the gulf coast is most notable in the critical areas along Galveston Bay, where the land surface has sunk as much as 19 feet since 1906, causing serious flooding and inundation. "[35]

The underground aquifers within the area of the North-Hardy Corridor (and the Houston region in general) are the Chicot and Evangeline (see Exhibit 3.59 below).[36] Data concerning the hydrological characteristics of these aquifers has been collected by the City of Houston and the U.S. Geological Survey (USGS) since 1930. Since 1976, the Subsidence District has been compiling hydrologic information on the characteristics of the Chicot and Evangeline aquifers, information on water usage and water supply in Harris and Galveston Counties, and implementing regulatory procedures associated with groundwater regulatory plans. The Subsidence District continues to work on minimizing the potential impacts of subsidence within the region.[37]

[34] http://www.hgsubsidence.org/
[35] http://www.hgsubsidence.org/
[36] http://wwwrgaatl.er.usgs.gov/~elkunian/gwmconcept/sld033.htm
[37] http://www.hgsubsidence.org/

Exhibit 3.58: Municipal Utility Districts

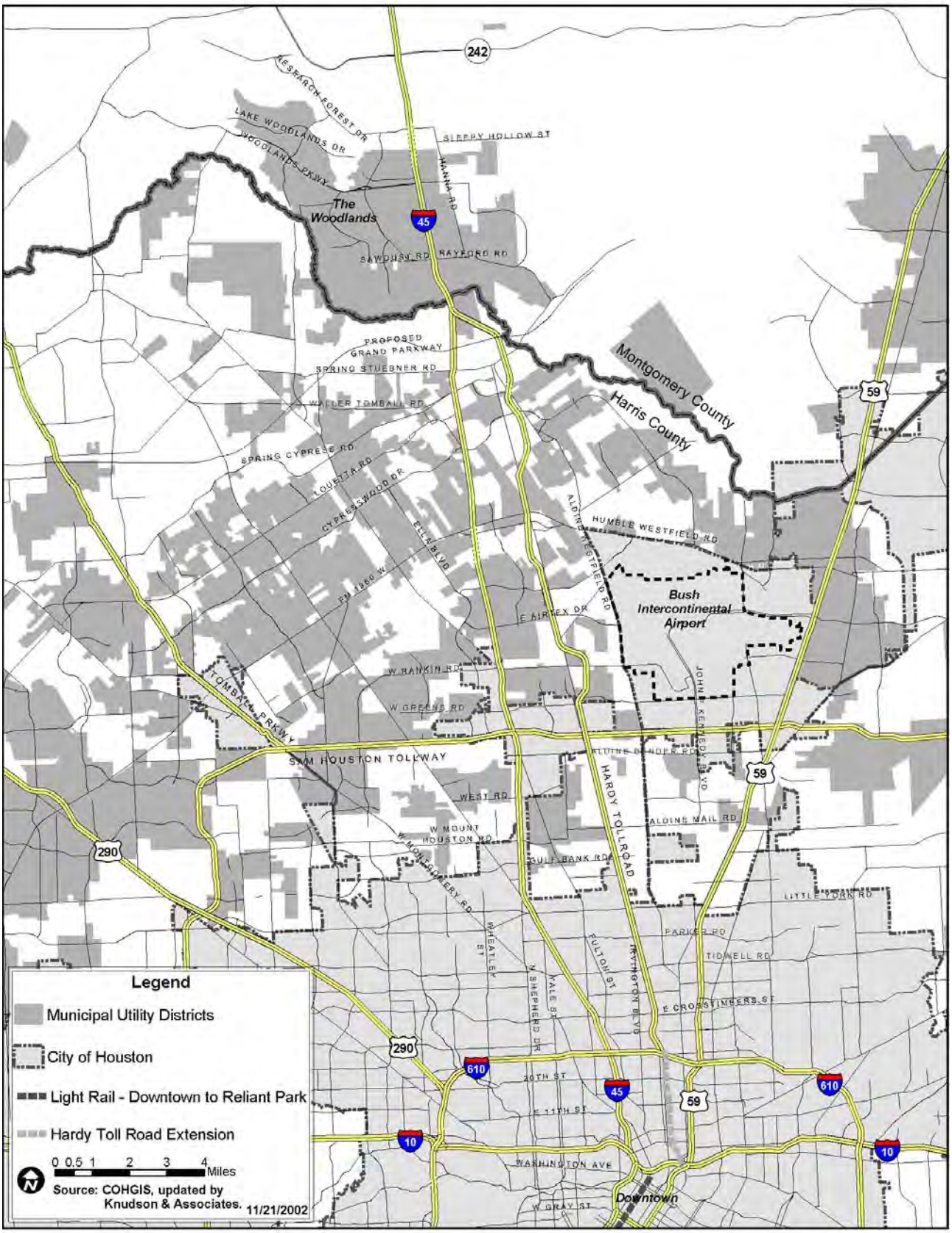
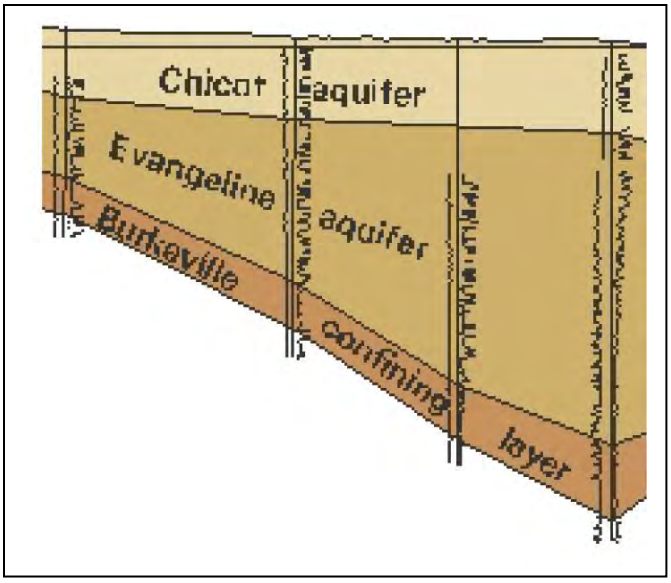


Exhibit 3.59: Underground Aquifers

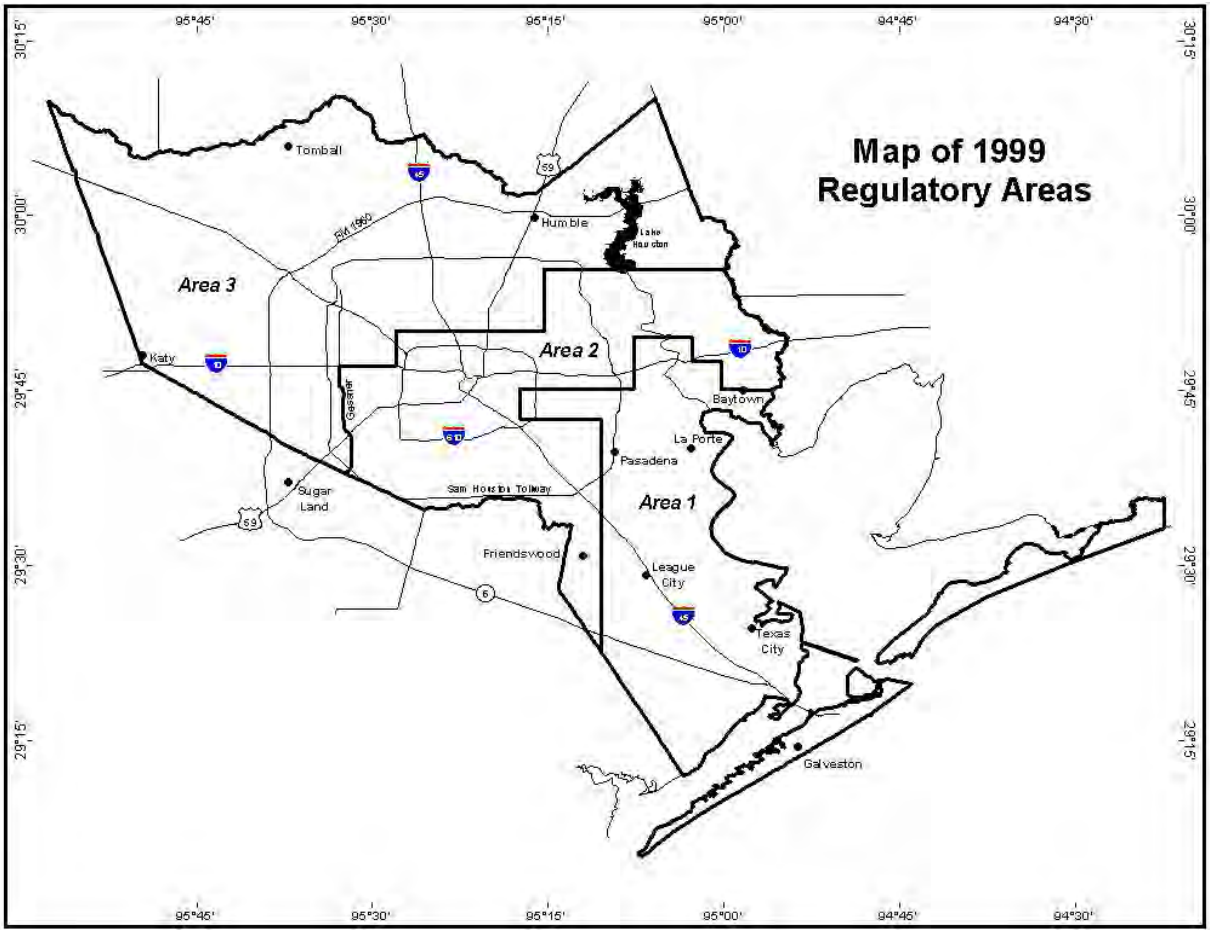


The Subsidence District regulations set out specific mandates for a phased conversion to surface water. In preparing its 1999 District Regulatory Plan, the Subsidence District updated population and water demand forecasts and analyzed their effect on the Chicot and Evangeline aquifers. "The results of these analyses support the need for significant further reductions in groundwater withdrawal."[38] The District's Regulatory Plan is concerned with reducing the reliance on the use of ground water resources and to foster a greater reliance on surface water sources. In order to accomplish this, the Plan prescribes ratios of groundwater withdrawal to total water demand.

The lands under the jurisdiction of the Subsidence District have been divided into three regulatory areas. The majority of the North-Hardy Corridor is located within Regulatory Area 3, with the southerly portion of the corridor (south of approximately Berry Road) being located within Area 2, as shown in Exhibit 3.60.

[38] HGCSD 1999 Regulatory Plan, Adopted April 14, 1999, page 4.

Exhibit 3.60: Subsidence District Regulatory Areas



The Subsidence District Regulations for these two areas are as follows:

Area 2

1. Groundwater withdrawal for each permittee must comprise no more than 20 percent of the permittee's total water demand.

2. If a permittee has already established an initial groundwater reduction to 20 percent of their total water demand, then increases in groundwater withdrawal may be permitted so long as the quantity of surface water used is not decreased. Beginning in January, 2001, and continuing thereafter, annual groundwater withdrawals for each permittee must again be not more than 20 percent of the permittee's total water demand.

3. Beginning January, 2001, a disincentive fee will be applied to any groundwater withdrawn that constitute greater than 20 percent of a permittee's total water demand.

The disincentive fee will be waived if a permittee has a certified Groundwater Reduction Plan (GRP) and is on schedule with required implementation actions contained within the GRP.

Area 3

1. Following adoption of the District's Regulatory Plan, the District will require that unconverted permittees begin a planning process to define acceptable methods necessary to meet the groundwater compliance requirements established within this Regulatory Plan.
2. Beginning in January, 2003, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) will be required to submit a Groundwater Reduction Plan (GRP) to the District for certification. (Minimum requirements for an acceptable GRP are presented in more detail further in this Regulatory Plan).
3. Beginning in January, 2005, a permittee will be required to provide the District with evidence that construction of the infrastructure defined within the permittee's certified GRP has started.
4. Beginning in January, 2010, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 70 percent of the permittee's total water demand.
5. Beginning in January, 2020, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 30 percent of the permittee's total water demand.
6. Beginning in January, 2030, and continuing thereafter, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 20 percent of the permittee's total water demand.
7. A disincentive fee shall be applied to any groundwater withdrawals that constitute greater than 20 percent of a permittee's (or a group of permittee's operating under a single permit, within the same regulatory area) total water demand if a permittee has not developed and received certification of a GRP by January, 2003 (Item 2 of this section) or if a permittee is not able to provide evidence of construction of the infrastructure defined within the permittee's certified GRP by January, 2005 (Item 3 of this section).
8. A disincentive fee shall be applied to any groundwater withdrawals that constitute greater than 20 percent of a permittee's (or a group of permittee's operating under a single permit, within the same regulatory area) total water demand if a permittee is not in compliance with the reduction schedule found in Items 4, 5, an 6, of this section."[39]

The southern portion of the North-Hardy Corridor, which is located within Regulatory Area 2, is generally within the City of Houston boundaries. The City's Ground Water

[39] HGCSD 1999 Regulatory Plan, Adopted April 14, 1999, pages 9-10.

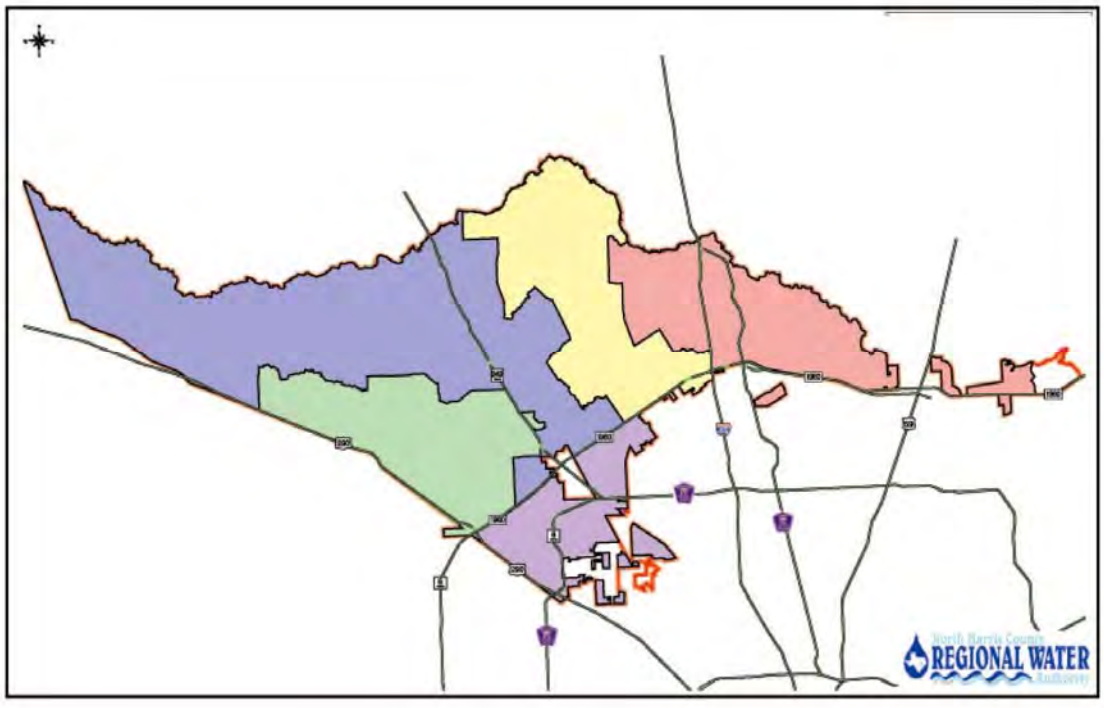
Reduction Plan has recently been certified by the Subsidence District as being in compliance with the Regulations. In addition, the City is actively pursuing expansion of its municipal water infrastructure to service areas further north of its existing service area to meet current and projected future water demands within this area.

The northern portion of the North-Hardy Corridor is located with Regulatory Area 3. A large portion of this area is within the jurisdiction of the North Harris County Regional Water Authority, which was created in 1999 by the Texas legislature to deal with the critical water supply issues facing the area. The Authority's boundaries take the northern portion of the corridor lying between Beltway 8 and the Harris-Montgomery County boundary at Spring Creek (see Exhibit 3.61 below[40]).

The mandate of the North Harris County Regional Water Authority is to

- To find and assure a long-term supply of quality drinking water at the lowest responsible cost, and in so doing, to:
- Promote water conservation.
- Identify/provide cost-effective alternative water sources.
- Maintain regulatory compliance, and,
- Encourage intergovernmental cooperation.[41]

Exhibit 3.61: North Harris County Regional Water Authority



[40] http://www.nhcrwa.com
[41] http://www.nhcrwa.com

As a single entity with responsibility over an area covered by hundreds of Municipal Utility Districts and individual groundwater permittees, the Authority is required to prepare and submit a GRP to the Subsidence District which sets out an overall strategy for reducing reliance on groundwater. The Authority has submitted a draft GRP for the review and approval of the Subsidence District. The Authority has determined that negotiating a contract with the City of Houston for the provision of surface water is the most logical long-term solution. These negotiations are currently underway.

The lands generally located between Berry Road and Beltway 8, which are not located within either the City of Houston boundaries or within the North Harris County Regional Water Authority, do not currently have an overall water service provider for conversion to surface water. However, the City of Houston is expected to submit a revision to its GRP within the next few months that may bring much of these areas to be within its future service area, along with the lands within the jurisdiction of the North Harris County Regional Water Authority.

3.12.2: Assessment of Impact

There are no significant impacts or apparent long-term obstacles with respect to water quantity for any of the proposed improvements or the future development potential within the corridor, as long as surface water sources can continue to be found to meet the general long-term demands within the Houston area in general.

3.13: Water Quality

3.13.1: Analysis

Development in the North-Hardy Corridor has traditionally been serviced via groundwater sources. This has not only lead to water quantity problems and subsidence, but also to water quality problems. In the extensive area that lies within several miles of, and generally following the arc of Beltway 8 from IAH west and south to about U.S. 59, many of the MUDs have reported water quality problems with respect to groundwater (i.e. gas intrusion, arsenic, radon). In addition, there are some water quality problems that relate to surface water. The water quality issues for the bayous and streams within the North-Hardy Corridor relate largely to high level of bacteria. Since there have been quite a few known septic system failures in this area, this is a likely contributing factor.

The lands located within the North-Hardy Corridor, and in fact almost all of Harris and Montgomery Counties, are located within the San Jacinto River Basin.[42] The Houston-Galveston Area Council (HGAC) study entitled “2001 Basin Summary Report”, prepared

[42] http://www.hgac.cog.tx.us/resources/wq/crp/bhr2002.pdf

under the Texas Clean Rivers Program, reports the following findings and recommendations with respect to water quality for the San Jacinto River Basin:

"Findings:

- Elevated bacteria levels continue to be the dominant problem in the basin. Non-point sources (i.e. failing septic systems and animal and pet waste) appear to be the biggest contributor to the problem. Point sources can never be ruled out, illicit discharges and sanitary sewer leaks are ongoing problems that need to be monitored.
- Elevated nutrient loadings are a concern in the upper reaches of the basin. Eight segments exceed state screening criteria for one or more nutrients.
- Toxicity continues to be a problem in the lower portions of the basin (Houston Ship Channel area and upper portions of Galveston Bay). Parameters of concern are mainly dioxin and copper. Sediment toxicity in Patrick and Vince Bayous is also of concern.
- Dissolved oxygen does not pose a major problem in the basin. Spring Creek is the only segment listed for depressed dissolved oxygen levels. In areas that low dissolved oxygen levels have been found, the cause is most likely due to low flow levels caused by drought.

Recommendations:

- Make basin wide change from fecal coliform monitoring to E. coli and enterococcus. Continue to improve bacteria monitoring throughout the basin.
- Finalize dioxin total maximum daily load (TMDL) in next biennium.
- Conduct systematic watershed monitoring in Peach, Lake and Caney Creeks.
- Conduct special studies in Cypress Creek, Spring Creek and San Jacinto River Tidal to address bacteria, dissolved oxygen, and total dissolved solids (TDS) issues.
- Conduct Houston Ship Channel waste load evaluation.
- Continue to address nutrient concerns through ambient monitoring program.
- Assess habitat and riparian areas at local monitoring sites." [43]

In Cypress Creek, there are specific water quality concerns regarding bacteria and TDS. The report recommends that a study be conducted to address water quality issues. With respect to Greens Bayou, there are concerns regarding bacteria and possible concerns regarding nutrients. The report recommends that the existing ambient monitoring be continued for Greens Bayou. The report states that for Spring Creek there are concerns regarding dissolved oxygen and bacteria. For White Oak Bayou, there are concerns for bacteria and possible concerns for nutrients.

[43] 2001 Basin Summary Report, HGAC, 2001, page 3.

3.13.2: Assessment of Impact

There are no significant impacts or obstacles with respect to water quality for any of the proposed alignments or the future development potential within the corridor.

3.14. Threatened & Endangered Species

3.14.1: Analysis

The U.S. Endangered Species Act (ESA) requires that the critical habitats for threatened and endangered species be protected.[44] This relates to both plants and animals. The 1973 Texas Threatened and Endangered Species Regulations provide a list of endangered animals in the state and in 1988 the Texas Parks and Wildlife Department published a list of threatened and endangered plant species for Harris and Montgomery Counties.

The U.S. Fish and Wildlife Service has advised that there is a Bald Eagle Nest on the east shore of Lake Woodlands. In addition, the Red-Cockaded Woodpecker can be found in the W. Goodrich Jones State Forest (to the north of SH 242 and west of IH-45).[45]

Other than that, there are no federally listed or proposed threatened or endangered species currently known to occur with the area of the North-Hardy Corridor.

> "The [Fish and Wildlife] Service strongly supports the … objective of diverting trips from automobiles to transit. Increasing the use of mass transit will improve air quality, reduce non-point sources water pollution, and reduce run-off and thus flooding problems. The indirect benefit of mass transit is a better quality habituate for fish and wildlife resources, especially aquatic dependent species.
>
> The use of mass transit also reduced the need for new roads. New roads destroy habitat and facilitate human disturbance and destruction of the habitat that remains. Although the actual areas converted by highways, railways, and power line right-of-ways may cover only a small proportion of a region, the fragmentation of habitats caused by these projects is often severe, especially in forested and riparian environments. These disturbances can cause (1) dramatic physical disruption to the continuous vegetative community; (2) disruption of the structure and function of habitat; and (3) impacts to residential wildlife, which must negotiate, tolerate, and cope with the habitat barriers.

[44] http://www.tpwd.state.tx.us/nature/endang/usendang.htm
[45] Source: Edith Erfling, U.S. Department of the Interior, Fish and Wildlife Service, November 2002.

> The NEPA process is intended to assist identify and assess the potential environmental consequences of a proposed action before a decision on the proposed action is made. One of the stated purposes of NEPA is to promote efforts which will prevent or eliminate damage to the environment. One way to reduce environmental impacts is to use existing facilities. If new facilities are to be built, they should be located in previously disturbed areas or follow existing right-of-way."[46]

3.14.2: Assessment of Impact

Each of the proposed LRT/BRT alignments avoids impacts on threatened and endangered species since they primarily follow existing rights-of-way. In addition, the habitat areas mentioned above are well removed from each of the proposed alignments. No impacts on threatened or endangered species are anticipated for any of the alignments.

3.15: Environmental Site Assessment

Exhibit 3.62 shows the location of hazardous waste sites and federal/state Superfund Sites. None of the proposed alignments would be directly impacted by the location of these sites. However, both the Red and Green Lines are proposed to be located within a one-mile radius of the Superfund Sites that area located in the vicinity of U.S. 59/Cavalcade/Hardy Street/Collingsworth. In addition, the Red Line would be within a one-mile radius of a Superfund Site off Aldine Westfield, between Little York and Aldine Mail Route.

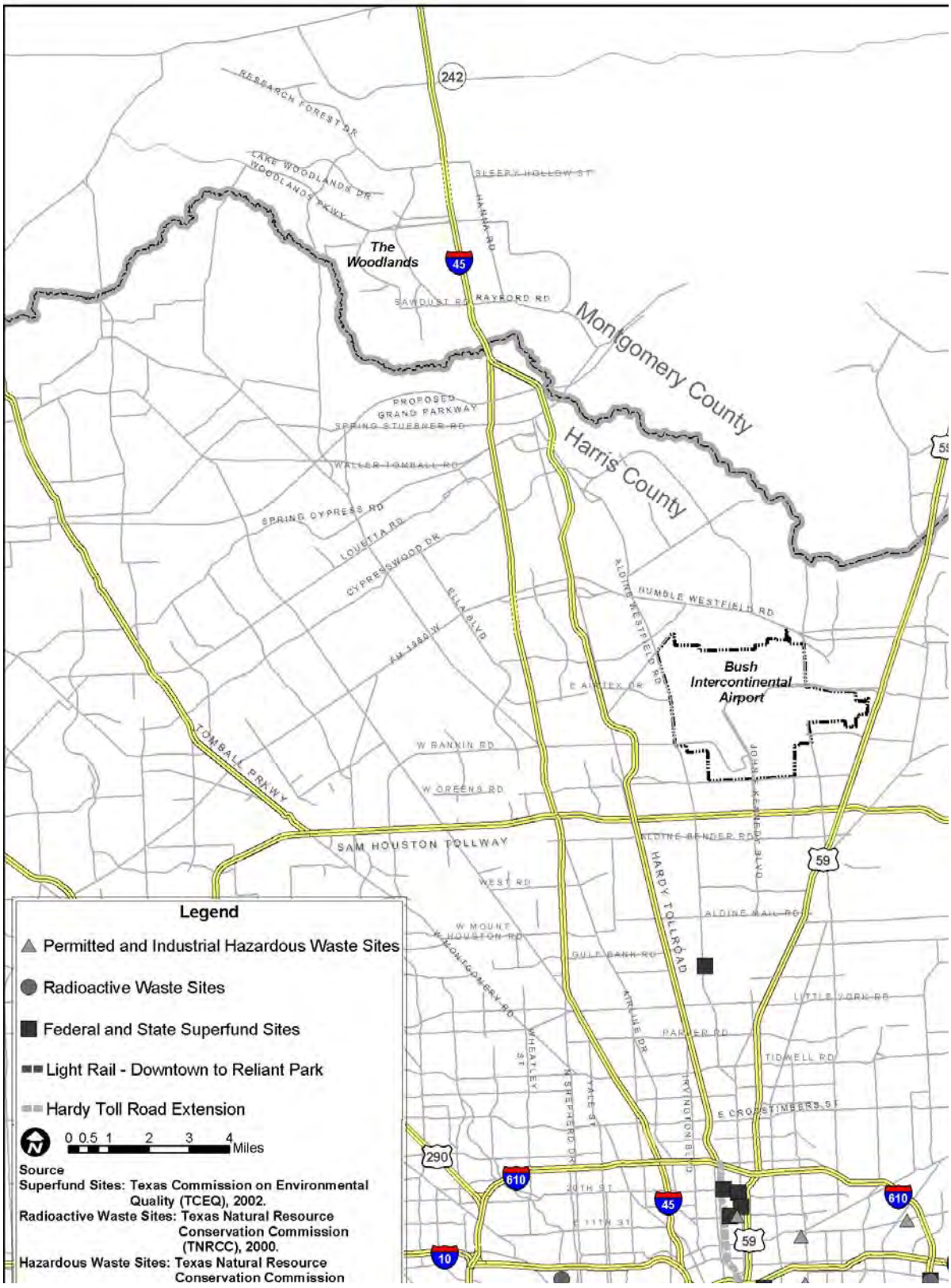
There are a variety of oil fields located within the study area, including the following:

- Rayford Oil Field, in the vicinity of Rayford Road/Spring Creek, either side of IH-45
- Bammel Oil and Gas Field, northwest of IH-45/Kuykendahl/Rankin Road
- Oil and Gas field north and west of Veteran's Memorial Boulevard /West Mount Houston

There are several large-scale industrial sites in the vicinity of the North-Hardy Corridor, including the Hardy Rail Yard area that is currently being planned for redevelopment, and the industrial area near U.S. 59 and Collingsworth (also mentioned above as being a Superfund Site.) There are also numerous pipelines (about 12) and rail crossings of the corridor.

[46] Letter dated March 8, 2002, from Carlos H. Mendoza, Project Leader, Clear Lake ES Field Office, U.S. Department of the Interior, Fish and Wildlife Service.

Exhibit 3.62: Hazardous Waste and Superfund Sites



The majority of the length of each alignment would be constructed within existing road and highway rights-of-way; therefore, impacts from hazardous waste sites or other potential environmental issues are not anticipated. As Yard and Shop and Park and Ride locations are determined once the LPIS is identified, a more detailed environmental site assessment should be conducted for these locations.

3.16: Historic Resources[47]

3.16.1: Introduction

With respect to cultural resources, the most significant portion of the North-Hardy Corridor centers almost entirely on the neighborhoods south of the IH-610 North Loop. While there are scattered groupings of older (i.e., 50 years old or older) houses north of IH-610, they are not architecturally noteworthy, and unless there are strong countervailing historical associations that link these buildings as part of a grouping (viz., Old Spring village), or which invest certain of the buildings individually with special historical associations, they do not appear to be significant. This is also true of the commercial development along the Hardy Toll Road and North Freeway rights-of-way, where all but a handful of the buildings appear to be products of the recent past (in most instances, 30 years old or less). Only seven-eight buildings north of the IH-610 North Loop were thought significant or notable.

In the area south of the IH-610 North Loop, however, we note a number of potential historic districts, and roughly a dozen or so individual stand-alone resources potentially eligible for local, state landmark consideration. These exist chiefly along the North Main Street-Airline Drive corridor, and to a lesser degree, along the Fulton-Airline corridor. Some of the districts may qualify for the National Register of Historic Places. Based upon the historic resource information contained in several current community plans (e.g., Northside Village Economic Revitalization Plan, June 2002), as well as input from Randy Pace of the Houston Planning & Development Department, the proposed alignments appear to traverse five potential historic districts:

- Warehouse District (below the Union Pacific RR tracks/Harriman-Liberty Road)
- Northside Village
- Glen Park (just east of Woodland Heights, south of Holy Cross-Hollywood Cemetery)
- Noble-Cascara-Little/Dickinson Tracts (Maury to North Main south of Quitman)
- East Germantown (west from North Main to White Oak Bayou)

[47] Assessment of Cultural Resources provided by Myra L. Frank & Associates.

- Silverdale (adjoining Fulton at Calhoun)
- Union Pacific Rail Yard (at Burnett and Chestnut)
- Woodland Heights

There is a high potential of causing an “adverse effect” on historic resources where rail alignments traverse these potential historic districts. “Adverse effect” can be defined as demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the physical characteristics that justify the classification as an historic resource are materially impaired. Note that the introduction of new permanent visual elements that further diminish the ability of the setting to convey the time period to which the resource belongs, or its physical association to that setting, is considered a significant effect.

3.16.2: Blue Line

Warehouse District

The grouping of buildings between White Oak Bayou and Buffalo Bayou below Harriman-Liberty Road are part of a possible historic district already documented by the City of Houston. The North Main Street corridor contains three buildings that are probably contributors to that district, including:

- 300 North Main. Utility Warehouse Building (circa late nineteenth century)
- 407 North Main. Jacobs Warehouse
- 417 North Main. Houston Handbag Company

Northside Village

There are several potential individual landmarks and a number of potential historic districts within the Northside Village Economic Revitalization Plan area. Due to the +50 year-old average age of a majority of the buildings there, the potential exists that other districts may be delineated in the future, and that buildings on alignments could be considered contributing resources.

- **Noble-Cascara-Little/Dickinson Tract**

  This is a large grouping of commercial, residential and institutional buildings bounded by North Main, Quitman, Burnett and Maury Streets. It is a fairly cohesive neighborhood consisting of numerous Queen Anne, Transitional Victorian and Craftsman style-influenced bungalows, and several buildings that are individually eligible for landmark status (e.g., Jefferson Davis Senior High School, 1200 Quitman Street; Briscoe & Dixon et al, architects). A majority of the buildings along the North Main Street corridor are contributing resources within this district (viz., the larger commercial buildings, fraternal societies, a theater, etc.).

- **Glen Park District**

  Along the westside of North Main Street are buildings consisting of modest Transitional Victorian cottages and Craftsman bungalows from the early twentieth century and last several years of the nineteenth century (Exhibits 3.63 and 3.64). While not individually distinguished in architectural terms, they appear to be part of a district referenced as such in the Northside Village Economic Revitalization Plan. Therefore, design of the North Main Street-Airline Drive alignment should avoid adversely affecting the district. In those instances where buildings are determined to be contributing resources, relocation (e.g., moving buildings back a few feet further from the roadway where this is physically possible) would be a preferable strategy to demolition.

Exhibit 3.63: Houses Along the West Side of North Main St. – Between Cosmos and Oleander Streets (contributing resources to potential district)

Exhibit 3.64: House Along the West Side of North Main St. – Near Oleander contributing resource to potential district)

- **East Germantown District**

  The district includes the subdivisions between North Main and White Oak Bayou below Quitman. The neighborhood contains a large grouping of Queen Anne style cottages and Craftsman style bungalows. Though not located adjoining the alignments under study, the Lee Elementary School (2101 South Street; Alfred C. Finn, architect) and the Southern Pacific Hospital (2015 Thomas Street) are part of the grouping. The two buildings appear to be individually eligible for landmark status. Some of the specific resources of concern along the Main Street corridor include:

  - 1923 North Main (Probably an old fraternal organization building originally.)
  - 2023 North Main. “Label Warehouse”.
  - 2109 North Main. “Ay Chiwawa Tacos.” Folk design; remodeled early twentieth-century gas station.

  Although not actually traversing it, the alignment for the North Main-Airline Road alignment also adjoins a portion of the Norhill North-Stude neighborhood historic district (at De George Street). Other resources bordering this district include:

  - 4410 North Main (at Moss?), Christ the King Catholic Church – an architecturally and historically significant resource.
  - 4307 North Main (at Airline Drive), Admiral Motel – a fanciful roadside architectural design.

  Street improvements, demolition and rail alignments between Moss Street and Airline Drive should be predicated upon minimizing adverse effects to this district.

  - North of the IH-610 North Loop:
    4400 Block of Airline Drive (eastside of street, north of Neyland Street):

  Adjoining residences set far back from roadway on large lots that back up to Little White Oak Bayou. These fairly high style residences – possibly architect-designed, potentially landmark eligible locally – are noteworthy in their neighborhood setting of modest homes:

  - One-story, brick Mediterranean Revival residence, circa 1930
  - One-and-one-half story American Colonial Revival residence, circa 1940 (Exhibit 3.65)
  - Adath Israel Cemetery (just south of Berry Road). Possibly eligible for local landmark status.
  - Memorial Baptist Church (at northwest corner of Gulf Bank and Airline Road). Classic southern American Colonial Revival church design – red brick; pedimented portico with columns across front façade; steeple. Circa 1950. The building is probably eligible for local landmark status.

Exhibit 3.65: Colonial Revival Style House – 4400 Block of Airline Drive

3.16.3: Red Line

Little was noted of concern, excepting the five following resources/resource groupings:

- Old Spring Village contains a documented historic district as well as individually listed properties (e.g., Wunsche Saloon). This district consists of nineteenth and early twentieth century buildings forming a fairly cohesive grouping that would be highly sensitive to, and potentially adversely affected by the visual impacts associated with the proposed new construction along the railroad right-of-way.

- Two-story building of castellated design at W. Hardy Road and King is of unusual architectural design (in close proximity to the roadway). It appears eligible for local landmark listing.

Requiring further research as to their significance:

- Sam Houston Senior High School between W. Hardy and Tidwell Roads, at Irvington Boulevard (see Exhibit 3.66). This is a fine example of local school design (circa 1955) – possibly the work of architect Stayton Nunn. Research will be done to determine the designer, and whether it is meets the criteria for local landmark listing.

- 12500 Block of West Hardy Road – One-story store with arcade across front. Date of construction and history of building are to be determined.

- 10321West Hardy Road (N. of Irvington Boulevard intersection) – This gas station (altered) is a remarkable surviving example of circa 1940 roadside architecture.

Exhibit 3.66: Sam Houston High School (view southeast, on Irvington Boulevard)

3.16.4: Green Line

Boundary Street/Germantown Neighborhood

Boundary Street cuts through what is sometimes referred to as the Germantown neighborhood (bounded by Quitman on the south, Holy Cross-Hollywood Cemetery and the pending Glen Park historic district on the north). It is being documented by the City of Houston for consideration as a potential historic district.

- 2901 Fulton Street – Irvington Village housing project (at Halpern Street):
  This appears to be an early example of public housing design (circa 1940) by a talented architect (possibly the work of Stayton Nunn and Milton McGinty, architects of the Cuney Homes – 1940, in the Third Ward). Irvington Village is potentially eligible for local landmark status.

- **Silverdale District**

  Bounded by Fulton (on northeast), Maverick and Searle Streets, this single residential subdivision consists of Craftsman style bungalows and Transitional Victorian cottages. The grouping appears eligible for local landmark designation as an historic district and is referenced as such in the Northside Village Economic Revitalization Plan.

  Reid Memorial Methodist Church, 5203 Fulton Street. The church is an architecturally significant example of local church architecture from the late 1930s-early 1940s-era, and potentially eligible for local landmark status.

4115 Fulton Street, circa 1905 Colonial Revival hipped, metal-roofed bungalow with a portico supported by fluted columns across the front. Building sits back approximately 40 feet from the road, and appears to be a remnant of an old turn-of-the-century farmstead. Further research will be done to determine the history of the property, and an assessment of its historical significance will be made.

North of the IH-610 North Loop:

Fulton Cabins (at Basswood). This intact, circa 1920 grouping of perhaps 20 modest one-story Craftsman-style cottages could possibly have been a migrant worker camp (Exhibit 3.67). Further research will be done to determine the history of the Fulton Cabins grouping, and an assessment of their historical significance will be made.

Theodore Roosevelt Elementary School (6700 Fulton Street). This is a noteworthy example (circa 1920) of the Mission Revival Style. It is potentially eligible for local landmark status.

Exhibit 3.67: Fulton Cabins – at Fulton and Basswood Streets (possible migrant camp from circa 1920)

3.16.5: Highway and Road Improvements

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

3.16.6: Assessment of Impact

No formal determination of effects per the Criteria of Effect (the measures specified for assessing impacts for federally-assisted projects) has been made at this point in project planning, nor should a property being included in this section be considered as a determination. It is important, however, to identify situations that which could cause an “adverse effect” on historic resources, so that planning and design considerations to avoid such situations can take place as alternatives and alignments are developed over time. An “adverse effect” could arise from alteration of the resource or its immediate surroundings such that the physical characteristics that justify the classification as an historic resource might be materially impaired. Periodic review during the design phase will be undertaken to determine whether such situations are developing and ways that adjustments can be made to avoid or lessen potential adverse effects.

3.17: Archeology

Proposed alignments pass through areas where there is the likelihood of encountering archeological resources. The likelihood is based on both the known settlement and development in the area beginning in the 19th century, as well as the probability of Native American occupation of areas near major streams. NEPA documentation will require a thorough records search, and perhaps some field investigations will be necessary to determine whether such resources would qualify for listing in the National Register of Historic Places (NRHP). This investigative report is subject to consultation with the State Historic Preservation Officer under Section 106, with regard to the eligibility of resources for the NRHP and anticipated effects to those resources by the proposed project. In addition, a Section 4(f) impact analysis must report whether the proposed project would make "use" of archeological resources determined eligible for the NRHP.

3.18: Park Resources

Potential alignments pass near city and county parks. NEPA documentation will require an assessment of impacts to parks arising from the proposed transportation improvement. A limiting distance from proposed alignments in which impacts would be likely to accrue to parks, typically 500 feet, should be established in consultation among the park agencies, METRO, and FTA. In addition to reporting impacts in an environmental assessment or environmental impact statement, a separate Section 4(f) impact report would need to be prepared. The Section (4) report must document whether there are direct uses (i.e., acquisition of park property), substantial construction-period impacts, or constructive use of park property (indirect impacts of such magnitude as to diminish the intended functions of a park). If these types of use are shown, then the report must also document avoidance alternatives and all reasonable planning efforts to reduce harm.

3.19: Construction Impact

3.19.1: Introduction

Each of the three proposed alignments primarily follows existing rights-of-way, therefore the potential impacts from construction on the surrounding communities and land uses would be minimized. In addition, there would not be a significant difference between the potential construction impacts of the three alignments.

Construction of the proposed LRT/BRT has the potential to cause intermittent, short-term impacts on the surrounding communities, businesses and the natural environment. These impacts may include noise, vibration, air quality, water quality, disruption to existing businesses and residential areas. If properly planned and scheduled, these types of impacts can be mitigated to minimize their effects.

This section provides an overview of the potential construction impacts and the potential impacts that should be considered in greater detail once the LPIS is selected and the likely construction time horizon can be better determined.

3.19.2: Capital Improvements by Others

Once the LPIS is selected, the most up-to-date information concerning other capital improvements should be reviewed to determine whether there are any potential conflicts with the construction schedule and phasing. Sources that should be consulted include the following:

- City of Houston's Capital Improvement Program
- TxDOT's proposed letting schedule
- Harris County Flood Control District's proposed improvements
- Harris County Toll Road Authority proposed improvements

Every effort should be made by the above agencies and METRO to ensure that capital improvements are well coordinated to maximize opportunities and eliminate duplication. One of the ways to help achieve this goal is to coordinate all related improvements in a particular right-of-way within a phased construction schedule.

3.19.3: Noise & Vibration

Noise and vibration impacts during construction could potentially be generated by heavy equipment. Anticipated levels of noise and vibration, and the techniques for mitigation, would be similar to those used for the METRO Transit Streets Program and the METRO Downtown to Reliant Park Light Rail.

Once the LPIS is selected, the potential impacts from noise and vibration should be more closely evaluated. One of the main ways to minimize the impacts of noise and vibration would be to limit the highest noise producing activities (such as hauling, jack hammering, and the use of other demolition equipment) near residential areas during evening hours and on weekends and holidays. Furthermore, engine-powered equipment can be required to have mufflers installed according to the manufacturer's specification and all equipment can be required to comply with pertinent equipment noise standards of the EPA.

3.19.4: Cultural Resources

The potential short-term impacts from construction on cultural resources could include dust, noise and vibration. This would be temporary and would likely not harm any of the existing resources; however, any potential impacts on cultural resources from construction activities should be more closely evaluated once the LPIS is selected.

The construction project specifications should include provisions such as site watering to minimize dust. Short-term noise and vibration impacts could be mitigated by limiting construction times and by ensuring that all equipment has proper mufflers and shrouds. Restricting and monitoring vibration producing activities could keep vibration impacts from construction at a minimum. METRO's Worker Education Program should be implemented to ensure construction and planning personnel are educated about the location of cultural resources.

3.19.5: Air Quality

Construction related impacts, although being short-term and intermittent, could include increased dust and emissions from construction equipment and activities, as well as increased emissions from idling vehicles caused by traffic disruption and delays.

The potential impacts on air quality should be more closely examined once the LPIS is selected. Some of the techniques to help reduce potentially adverse effects of dust include minimizing land disturbance, using watering trucks to minimize dust, covering trucks when hauling dirt and transferring material, and using windbreaks. In order to minimize the amount of emissions generated, every effort should be made during construction to limit disruption to traffic, especially during peak travel times.

3.19.6: Water Quality & Runoff Control

Once the LPIS is selected, a stormwater pollution prevention plan must be prepared as required by the Texas Pollution Discharge System (TXPDES). These regulations protect the receiving stream from pollution from runoff. Techniques to prevent erosion and sediment runoff include the use of fencing or hay bales.

3.19.7: Surrounding Neighborhoods and Businesses

Potential impacts on the adjoining community, in addition to those issues mentioned above, can include the following:

- Increased on-street parking in residential areas due to displacement or disruption of access.
- Increased cut-through traffic in residential areas due to traffic diversion.
- Decreased points of access and reduced on-street parking for customers of local businesses.

Every effort should be made to minimize impacts of construction on surrounding areas. Techniques such as phasing of construction activities and properly maintaining construction schedules should be employed.

4.0: Transportation Impacts

This Section addresses the potential transportation impacts of alternative actions under consideration for the North-Hardy Corridor including both transit and roadway impacts.

4.1: Transit Impacts

The transit network for the No Build Transit Alternative consists of transit service and facilities planned for 2007 as developed in previous transit studies. Transit facilities and services that are additions over current conditions include extensions of routes beyond Beltway 8, new routes outside of and along FM 1960, and a park-and-ride facility at Louetta at SH 249. Significant highway improvements include the Hardy Toll Road Extension from IH-610 to Downtown, widening of the Hardy Toll Road north of Beltway 8, addition of the Grand Parkway, and numerous additions and extensions of discontinuous arterials.

The North-Hardy Corridor "build" transit alternatives consist of three alignments and two transit modes. These alternatives are described in detail in Section 2.0.

4.1.1: Transit Demand Potential Methodology

The METRO Service Estimator is a sketch-planning tool employed in the initial (Phase 1/Phase 2) evaluation to determine the demand potential for new or modified transit service. While detailed modeling is not required at this level of screening, the Service Estimator provides an order-of-magnitude comparison or index of demand potential of any given alignment relative to other potential alignments within the same corridor. The index is calculated by determining the following characteristics for each alignment:

- Total employment within any travel zone that touches a one-tenth mile buffer around the proposed Advance High Capacity (AHCT) Transit alignment;
- The AM peak service frequency;
- Span of service;
- The number of low-income households within any travel zone that touches a one-tenth mile buffer around the proposed AHCT alignment; and
- The number of mid- and high-income households within a five-mile buffer of stations with park and ride facilities.

In addition, population is extracted for a one-tenth mile buffer, population and employment for a one-quarter mile buffer (the threshold distance for accessing AHCT), and population and employment for a one-half mile buffer (for high density areas with pedestrian friendly environments). Population is also extracted for a five-mile buffer surrounding AHCT stations with park and ride facilities. The five-mile buffer represents a catchment area for transit riders who drive to facilities that provide parking. Each characteristic contributes to the demand potential calculation based on a unique coefficient derived during the model calibration process. The contribution of each characteristic is totaled and the resulting number is divided by 1000 to produce the

demand potential index for a given corridor alignment. Subsequently, the demand potential indices for all alignments for a given corridor are scaled in comparison to the alignment with the highest calculated potential, which is scaled at 100.

In Phase 3 of the evaluation process, when the System Plan scenarios are tested, METRO's Long-Range Patronage Forecasting Model will be employed. This EMME/2-based model allows for analysis of linked trips in a network of AHCT alternatives, providing forecasted demand potential for various combinations of AHCT alignments and technologies operating within the regional network. The model provides data for:

- Systemwide linked trips;
- Systemwide boardings;
- Systemwide capital costs;
- Systemwide operating costs; and
- BRT, LRT, and total AHCT boardings (descriptions of these modes can be found in Section 2.0)

More detailed information regarding travel demand methodology is presented in the METRO Mobility Travel Demand Estimation Methods Working Paper (dated December 2002).

4.1.2: Transit Demand Potential Results

The METRO Service Estimator was run for each of the North-Hardy Corridor alignments. Exhibit 4.1 outlines the results from those runs. Not all of the alignments have all of the segments shown below. For instance, the Blue Line does not serve the Irvington/Cavalcade station. Likewise the Red Line does not serve Northline Mall. In all cases the Service Estimator ranks the Green Line with the highest Demand Potential Index (DPI). It should be noted that the Green Line segment that reaches to SH 242 includes the demand potential for express bus service on the proposed two-way HOV facility. If the HOV demand potential were removed from the segment from U of H to SH 242, the Blue and Green Lines would perform about the same with a DPI of 85. As such the Blue Line is considered a close second with respect to demand potential. The Red Line performed poorly when compared to the other two alignments. This is in large part due to the lack of concentrations of population and employment in proximity to the Hardy alignment.

Exhibit 4.1: Demand Potential Index by Alignment

Segment	Blue Line	Red Line	Green Line
U of H to Irvington/Cavalcade	--	60	100
U of H to Northline Mall	70	--	100
U of H to Greenspoint	76	38	100
U of H to IAH	78	25	100
U of H to SH 242	85	49	100

4.2: Roadway Impacts

The highway network for the No Build Alternative consists of all roadway facilities included in the approved 2022 Metropolitan Transportation Plan (MTP) with the exception of improvements to IH-45 beyond those projects that are planned to be in place by 2007.

4.2.1: Highway Travel Demand Results

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

4.2.2: Arterial Level of Service

As described in previous sections, the short list of transit alternatives consists of two technologies and three alignments. These alignments traverse arterials such as North Main, Airline, Fulton, Irvington, Greens, and Kuykendahl. Projected LRT/BRT operations on these arterials are as follows:

North Main from Hogan to Airline – mostly at grade, in the middle of the street
Airline from North Main to West Road – elevated on structure
Airline from West Road to Greenspoint Drive – at grade, in the median
Irvington from Fulton to W. Hardy – mostly at grade, in the median
Fulton from Hays Street to Irvington – at grade, in the median
Fulton from Cavalcade to Crosstimbers – mostly at grade, in the median
Greens Road from Greenspoint Drive to Hardy Toll Road Connector – elevated, in the median
Greens Road from Greenspoint Drive to Kuykendahl Park and Ride – – partly elevated on structure and partly at grade in the median of IH-45

All available existing traffic data was collected from agencies such as the City of Houston, Harris County and TXDOT. There was no turning movement data available and the only data available along the impacted arterials were 24-hour counts from the 1990s. The Planning Team established 6,300 vehicles per lane per day as the threshold for determining critical intersections along the alignments. Based on this data and criteria, the Planning Team identified the following as critical intersections:

North Main at Quitman
Airline at West Road
Airline at Aldine-Bender
Irvington at IH 610
Fulton at Crosstimbers
Greens Road at Greenspoint Drive

The North-Hardy Corridor Team assumed that existing lane configurations and capacities at the critical intersections would be maintained in all the transit alternatives.

Turning Movement Count (TMC) data was collected at the critical intersections during AM and PM peak periods. Existing peak hour TMCs during AM and PM peak periods are shown in Exhibit 4.2. Detailed TMCs are included in Appendix G. The Metropolitan Transportation Plan (MTP) 2025 traffic assignments from the regional travel demand model results were assembled for the critical intersections and are also included in Appendix G. Year 2025 turning movements were calculated by utilizing existing turning movement ratios and 2025 traffic assignments, and are shown in Exhibit 4.3. Existing traffic signal timing for the critical intersections was obtained from City of Houston records.

Traffic software, SYNCHRO, was used to analyze the level of service (LOS) of the critical intersections during AM and PM peak hours for Existing, 2025 No-Build and 2025 LRT/BRT conditions. Average delays per vehicle and LOS at the critical intersections during peak hours for all three conditions are shown in Exhibit 4.4.

As can be seen in Exhibit 4.4, because there is no change in the capacity of intersections, there is no impact on the level of service for 2025 LRT/BRT operation versus the 2025 No-Build conditions.

The analysis of individual intersections may not reflect exact arterial conditions; but, it does identify any potential capacity problems. Due to the decision to maintain existing lane configuration and operational capacity at the critical intersections, the impact of 2025 LRT/BRT operation at the critical intersections is considered to be minimal.

As the planning study progresses further, it is recommended that detailed corridor analysis be conducted before selecting a final alternative. It is also recommended that the traffic signals along the corridor that would be impacted by the AHCT option be upgraded with new hardware, communication and optimized timings. The capital cost of such upgrades would be included in the selected AHCT option.

Exhibit 4.2: Existing Conditions – Turning Movement Counts

Turning Movement	N. Main @ Quitman		Airline @ West Road		Airline @ Aldine-Bender		Irvington @ IH-610 SSR		Irvington @ IH-610 NSR		Fulton @ Crosstimbers		Greens @ Greenspoint	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
EB Left	18	27	253	348	n/a	n/a	186	266	n/a	n/a	106	154	55	76
EB Thru	136	190	120	344	1188	783	160	331	n/a	n/a	393	699	1401	742
EB Right	89	108	301	398	36	71	155	158	n/a	n/a	116	113	597	217
WB Left	78	66	181	183	238	463	n/a	n/a	210	172	58	38	86	111
WB Thru	216	102	293	277	807	1393	n/a	n/a	357	196	719	574	640	1320
WB Right	46	57	36	39	n/a	n/a	n/a	n/a	184	286	122	139	37	115
NB Left	79	70	281	399	183	317	n/a	n/a	140	150	162	237	206	522
NB Thru	208	313	301	572	n/a	n/a	308	568	354	684	223	517	14	98
NB Right	76	63	54	103	303	388	108	212	n/a	n/a	31	54	123	125
SB Left	56	58	46	47	n/a	n/a	143	142	n/a	n/a	100	139	64	41
SB Thru	461	332	329	332	n/a	n/a	758	600	691	570	291	265	19	34
SB Right	47	15	249	282	n/a	n/a	n/a	n/a	220	207	198	158	22	46

Exhibit 4.3: Year 2025 Projections – Peak Hour Turning Movement Counts

Turning Movement	N. Main @ Quitman	Airline @ West Road	Airline @ Aldine-Bender	Irvington @ IH-610 SSR	Irvington @ IH-610 NSR	Fulton @ Crosstimbers	Greens @ Greenspoint
EB Left	31	806	n/a	589	n/a	372	132
EB Thru	222	797	1429	733	n/a	1691	1285
EB Right	126	922	130	350	n/a	273	376
WB Left	77	424	890	n/a	n/a	49	192
WB Thru	119	642	2678	n/a	1574	574	2286
WB Right	66	90	n/a	n/a	n/a	139	199
NB Left	n/a	754	609	n/a	361	271	1509
NB Thru	447	1081	n/a	926	1647	591	283
NB Right	143	195	746	558	n/a	62	361
SB Left	n/a	89	n/a	314	n/a	207	132
SB Thru	444	628	n/a	1329	1528	291	1285
SB Right	99	533	n/a	n/a	n/a	198	376

Exhibit 4.4: Signalized Intersection Average Delay/Level of Service Comparison

INTERSECTION	EXISTING CONDITIONS				YEAR 2025 PROJECTIONS			
	AM Peak Hour		PM Peak Hour		No-Build Option		Build Option	
	Average Delay (sec/veh)	Intersection LOS	Average Delay (sec/veh)	Intersection LOS	Average Delay (sec/veh)	Intersection LOS	Average Delay (sec/veh)	Intersection LOS
N Main/Quitman	9.2	A	8.8	A	8.1	A	8.1	A
Airline/West Rd	21.5	C	53.0	D	201.8	F	201.8	F
Airline/Aldine-Bender	9.9	A	11.5	B	54.0	D	54.0	D
Irvington/IH-610 SSR	15.6	B	17.4	B	132.6	F	132.6	F
Irvington/IH-610 NSR	67.3	E	16.8	B	137.3	F	137.3	F
Fulton/Crosstimbers	27.4	C	43.8	D	111.9	F	111.9	F
Greens/Greenspoint	82.2	F	42.2	D	243.3	D	243.3	D

5.0: Economic Development Analysis

5.1: Introduction

Section 5.0 seeks to evaluate the comparative economic development potential of the three proposed alignments (Blue Line, Red Line and Green Line) for advanced high capacity transit – light rail transit (LRT) and bus rapid transit (BRT) – in the North-Hardy Corridor. For the purpose of this analysis, economic development potential is defined as the opportunities for land use change within a half a mile radius of each of the proposed alignments.[1]

5.2: Approach

The analysis of economic development potential for the North-Hardy Corridor consists of the following main components:

- Research – including academic research of the potential for economic development associated with transit systems, experience with transit related development activity in other cities, and interviews with transit experts in other locations.

- Quantitative analysis of identifiable and measurable variables related to development trends and opportunities in the North-Hardy Corridor.

- Qualitative analysis of each of the three proposed transit alignments, based on interviews with local economic development and real estate experts, air photo interpretation, and site visits.

All three proposed LRT/BRT alignments are located within a relatively narrow regional corridor. They often overlap and serve many of the same neighborhoods and activity centers. However, they contain significant differences with respect to their economic development potential. The key variables that were analyzed include: historic and projected growth and development trends, land available for development and redevelopment, and the existence of special districts to facilitate the provision of infrastructure and services. Analysis of these variables was conducted using Geographic Information System (GIS), based on a one-mile area (half a mile on either side) for each of the proposed alignments.[2] The alignments were analyzed for both

[1] Typically a quarter mile radius is used for the purposes of discussing the potential for transit-oriented development, especially around stations. However, since the location of the proposed alignments is somewhat conceptual at this time, a larger area was identified for analysis.

[2] The HOV service that is part of the Green Line was not included are part of the quantitative analysis since there is no evidence to suggest that HOV service induces development activity beyond its downtown destination.

historical and projected development trends and for the land use variables that are indicators of economic development opportunities and constraints.[3]

To provide a basis for comparative analysis, considering that the Green Line does not extend the full length of the corridor, the alignments were divided into south and north sections (see Exhibits 5.1, 5.2, & 5.3). This allowed a comparative analysis of all three alignments in the south section, with an analysis of only the Blue and Red Lines in the north section.

The effort to analyze quantitative variables was supplemented with a general analysis of development trends and opportunities in the corridor, assisted through interviews with local real estate professionals and community representatives.

The findings from the academic research and experience from other cities are summarized in Section 5.3 and discussed in detail in Appendix H, attached to this report. The analysis of the quantitative variables is discussed in Section 5.4, and the qualitative analysis is provided in Section 5.5. The evaluation of findings is contained in Section 5.6.

5.3: Experience in Other Cities

5.3.1: Economic Development Related to Transit

To frame the analysis of economic development potential for the North-Hardy Corridor, experience in other cities was considered. This included a review of academic research of the potential for economic development associated with transit systems, articles and papers describing the experience with transit related development activity in other cities, and interviews with transit experts in other locations. A detailed discussion of the experience in other cities is provided in Appendix H attached to this report.

[3] There was a general lack of data available for the portion of the corridor located in Montgomery County, so the quantitative analysis for this portion of each of the Red and Blue Lines is limited.

Exhibit 5.1: Analysis Area – Blue Line

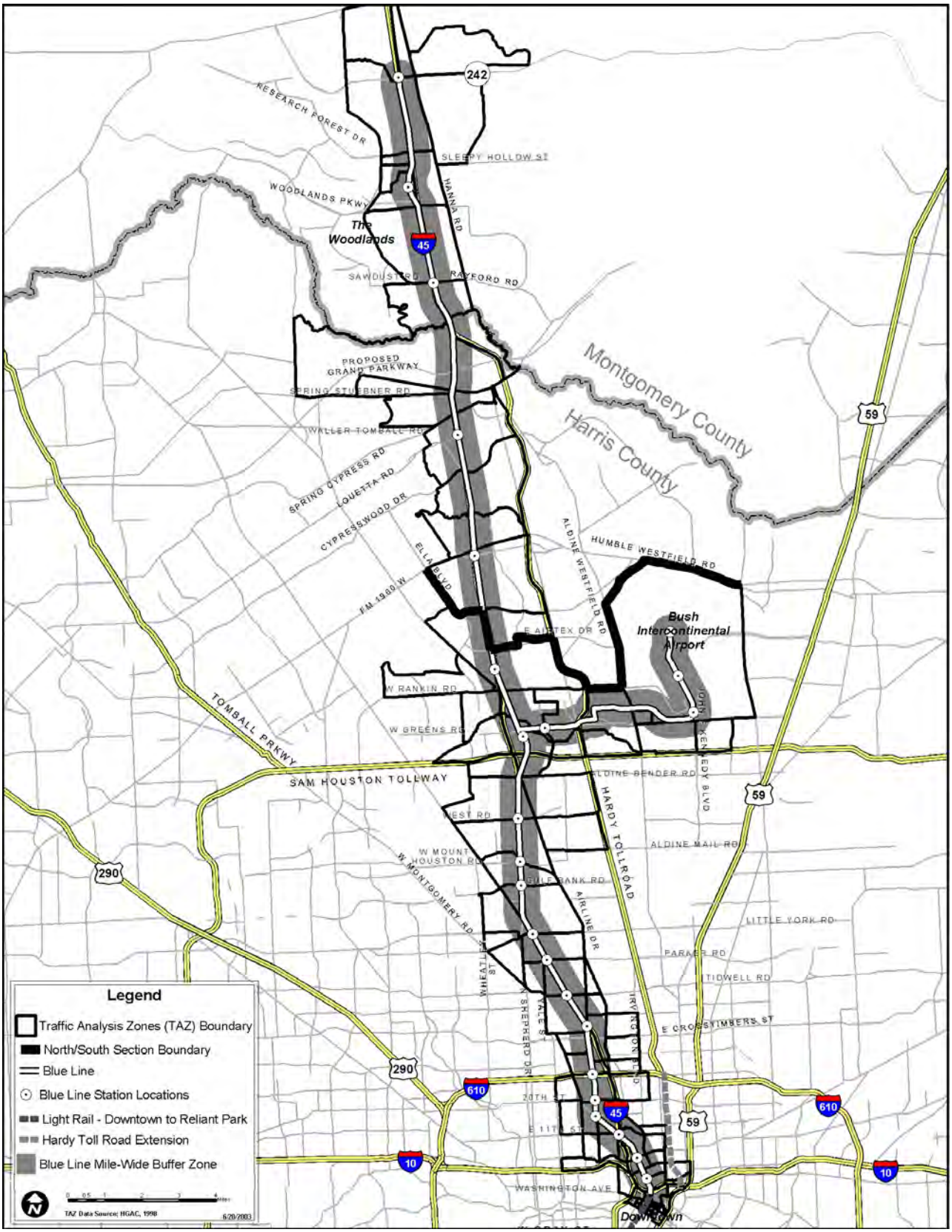


Exhibit 5.2: Analysis Area – Red Line

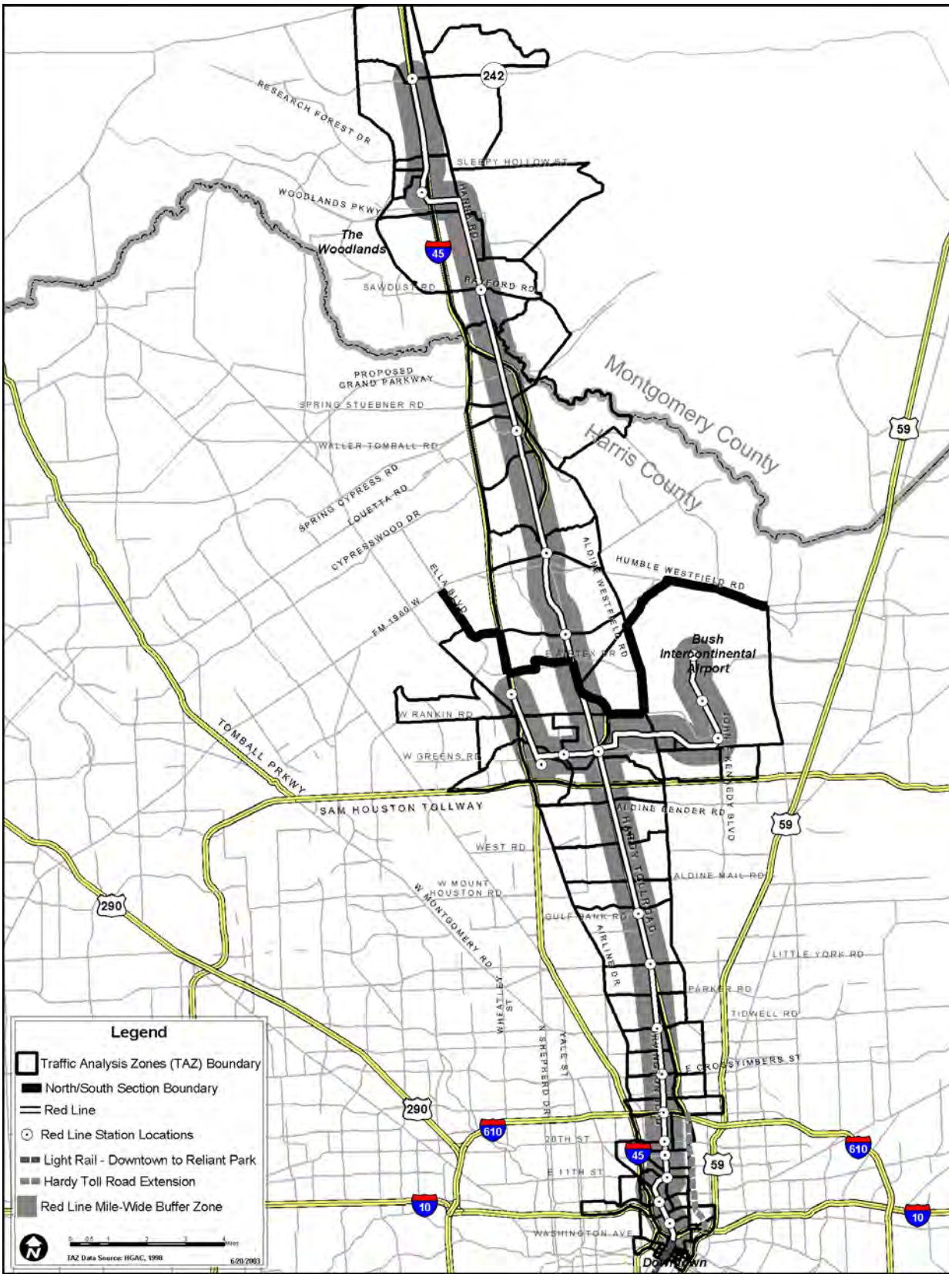
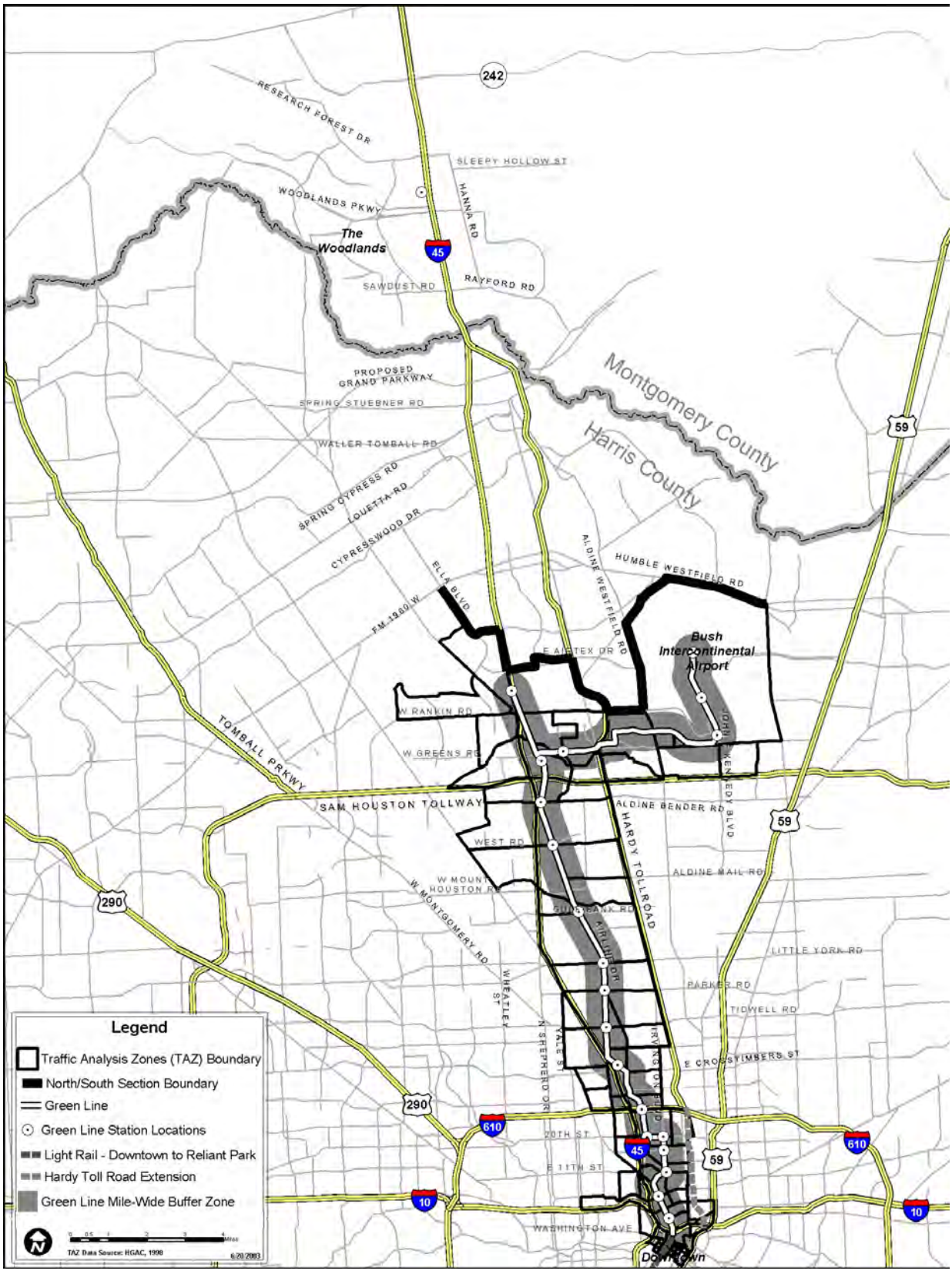


Exhibit 5.3: Analysis Area – Green Line



Most academic research focuses on the impacts on property values and rents near LRT facilities. Research generally shows that there tends to be a positive impact on real estate prices for locations within a one-quarter mile walk of an LRT station. For example, a study of Dallas shows an increase in commercial property values for properties within a one quarter-mile radius of LRT stations that was 25 percent greater than for non-station-area properties.[4] Beyond this standard one-quarter-mile walking distance, studies from several cities show that impacts appear to be minimal.[5]

The experience of other cities, such as Portland, Atlanta, Washington D.C. and Dallas, is that there has been at least some development activity around stations.[6] However, most development that occurred prior to the mid-1990s involved either public/institutional projects or projects initiated or facilitated by government programs and policies.

In Portland for example, which implemented LRT in 1986, policies at the metropolitan level generally direct new development toward station areas. Even so, significant non-public or institutional development has occurred only in the last several years. In San Diego, station-area projects have for the most part been initiated by private redevelopment groups. Denver's Five Points neighborhood, just outside of downtown, is an example of smaller private residential projects around LRT that take advantage of special public partnership opportunities, such as affordable housing programs.

Dallas, due to its nearby location and similarities of its urban form to Houston, was considered to provide the most relevant comparison. Several development projects adjacent to LRT stations have occurred since the system opened in 1996. Most of these projects have been privately initiated, though supported by City administrative actions and public-area improvement financing from various levels of government.

BRT systems have been less widely implemented in the United States than LRT; therefore there are fewer cases to study in order to understand potential economic development impacts. Some transit experts indicate that, assuming service levels being equal to LRT, with similar investment in permanent infrastructure (separate right-of-way) and appropriate levels of public and government policy support, the development impacts should not be significantly different.[7] However, BRT's potential economic development impacts are still uncertain, because it has not been implemented in very many communities in North America and since it has experienced widely varying impacts in the places where it does exist.

The BRT system in Ottawa, Ontario is one of the most heavily used high-capacity transit systems of any that were considered, and much of the city's intensive commercial

[4] Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. The Initial Economic Impacts of the DART LRT System. Denton, TX: University of North Texas, July 1999.
[5] Cervero, Robert and Michael Duncan. Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values. Berkeley, CA: University of California, Berkeley, November 2001.
[6] Research of experience in other cities focused on areas that are similar in nature to the North-Hardy Corridor. For example, experiences in highly urbanized downtown locations were not considered to be comparable.
[7] From interviews with John Bonsall and Sam Zimmerman

development has occurred around its busway stations. Contributing to this trend are that City's public policies that provide development incentives for station-area development. As well, Ottawa's infrastructure policy has essentially placed a moratorium on extensions of public services beyond the existing urban fringe.

In Pittsburgh, which has three busways, only one has been studied for development impacts. Over $300 million in development has occurred along its East Busway, though not all of that development was within walking distance of stations, or specifically oriented to transit. Of the $300 million in development that has occurred in this area, $176 million or 58% is associated with development around BRT station locations. Miami's busway, which opened in 1997, appears to have had little or no development impacts so far; this is at least partially due to its placement next to a major regional highway with difficult pedestrian access.

5.3.2: Summary of Findings from Experience in Other Cities

Experience in other cities suggests that the potential economic development impacts resulting from LRT/BRT investment vary from one city to another in terms of land value and development/redevelopment. Several observations are relevant to the economic development potential for the North-Hardy Corridor, as follows:

- Regional economic conditions strongly affect economic development impacts resulting from an advanced high-capacity transit investment. Portland provides an example where a weak regional economy was a major factor in limiting new development during the initial years of its light rail service (late-1980s).

- Impacts on land value and development potential are generally concentrated within a quarter mile radius of a station (a quarter of a mile is generally considered to be the distance that people will walk to a transit station). A new study of property value impacts in Dallas showed that residential properties within a quarter mile radius of stations appreciated 39 percent more and office properties 53 percent more than properties even a few hundred feet beyond this radius.[8]

- Residential development, especially higher density, is a likely type of land use that can be anticipated in the area of suburban stations. Three of the four major development projects near DART stations in the Dallas area include multifamily residential as a key component.

- The level of development impact is strongly related to the amount of perceived accessibility benefits the transit service brings to the area,[9] as well as existing

[8] Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. DART Light Rail's Effect on Taxable Property Valuations and Transit-Oriented Development. Denton, TX: University of North Texas, January 2003.
[9] Cervero, Robert and Michael Duncan. Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values. Berkeley, CA: University of California, Berkeley, November 2001.

development momentum in the corridor. Dallas' Red Line travels along the North Central Expressway corridor, a major focus of recent development activity in Dallas, and is perceived to provide a means of travel during peak times that is equal or superior to the highway.

- Land that has frontage on a freeway or major thoroughfare, in addition to LRT station access, can have increased prospects for development or redevelopment. However, these situations can also provide additional access, design and safety challenges to ensure that development is pedestrian oriented, not just auto-oriented.[10]

- Public redevelopment efforts, public land use policies (that require or use incentives to encourage transit-oriented projects), and public-private partnerships (including financial partnerships with non-profits or the public sector) are an important factor to help drive station-area development. Examples from other cities include: San Diego, where redevelopment agencies have been driving development around rail stations; Portland, where metropolitan public policy dictates concentration of new development around the LRT; and Denver, where non-profit housing corporations and federal programs have helped build new residential projects in a formerly declining area near downtown.

- LRT has proven potential to generate positive economic development impacts, with favorable economic conditions and well-located stations. BRT's potential economic development impacts are still uncertain, because it has not been implemented widely in North America and has experienced widely varying impacts in the places where it does exist.

5.4: Quantitative Analysis

5.4.1: Historic Trends and Future Projections

Three factors were analyzed to obtain an indicator of general development activity and growth along each alignment, as follows:

- Projected population
- Projected employment
- Historical development activity

For population and employment, projections prepared by the Houston-Galveston Area Council (H-GAC) by Transportation Analysis Zones (TAZs) were used. Entire TAZs were included for the population and employment analyses, regardless of the extent of their coverage within a half-mile radius for each alignment. In some areas, particularly

[10] Dallas' Mockingbird Station is an excellent example of using a combination of frontages – freeway, thoroughfare, and LRT – to maximize economic potential and still provide a rewarding pedestrian environment.

northern portions of the North-Hardy Corridor, TAZs overlap more than one alignment. The TAZs for each alignment are shown in Exhibits 5.1, 5.2, & 5.3.

H-GAC base data for population (2000) and employment (1999) was also used, although the population data set is based on the U.S Census 2000 data. Two different sets of H-GAC 2025 population and employment projections were considered: an "approved" data set and an "interim" data set. The "approved" projections, shown in Exhibit 5.4 for population and Exhibit 5.6 for employment, were developed by H-GAC prior to the availability of U.S. Census 2000 data. The "interim" data, shown in Exhibit 5.5 for population and Exhibit 5.7 for employment, provides adjusted and reallocated projected increases in population and employment prepared by H-GAC in response to the findings of U.S. Census 2000. Generally, the revised "interim" projections show significantly more people and jobs than previously projected for the corridor.

In order to gain an understanding of recent development activity along each of the alignments – in other words, where the existing development momentum exists – recent building permits were also analyzed. The data consists of building permits for new construction issued by the City of Houston between 1989 and 2002, as well as development permit data obtained from unincorporated Harris County from 1991 to 2002.[11]

Population

H-GAC population projections indicate that the Houston region, including the North-Hardy Corridor, will continue to experience rapid population growth over the next two decades. In the "approved" projections, about 208,000 residents will be added to the North-Hardy Corridor study area, while the "interim" projections show that this number could be as high as 369,000.[12] The North-Hardy Corridor will benefit from this projected regional growth.

Exhibits 5.4 and 5.5 provide the population projections, using all TAZs wholly or partially contained within a half-mile radius of each of alignment. Exhibits 5.1, 5.2, and 5.3 show the area used for data collection for the alignments and the dividing line between the north and south sections of the corridor used for the purposes of this analysis.

Exhibit 5.4: H-GAC "Approved" Population Projections[13]

	2000	2025	Actual Change 2000 - 2025	Percent Change 2000-2025
SOUTH SECTION				

[11] Building/development activity data for Montgomery County was not available in a form suitable for this level of analysis.

[12] For a definition of the study area for the North-Hardy Corridor, see Figure 1.1 from the main document of the "Environmental Analysis of the Short List of Alternatives", prepared by Knudson & Associates.

[13] H-GAC data for 2000 are recently developed baseline TAZ figures based on the 2000 Census. The "approved" projections were developed prior to the availability of Census 2000 data.

Blue	176,887	227,764	50,877	28.8%
Red	155,341	197,195	41,854	26.9%
Green	184,571	233,737	49,166	26.6%
NORTH SECTION				
Blue	51,664	84,896	33,232	64.3%
Red	58,150	95,957	37,807	65.0%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	228,551	312,660	84,109	36.8%
Red	213,491	293,152	79,661	37.3%
Green	184,571	233,737	49,166	26.6%

Source: Houston-Galveston Area Council.

Date: 3/2002.

Exhibit 5.5: H-GAC "Interim" Population Projections [14]

	2000	2025	Actual Change 2000 - 2025	Percent Change 2000-2025
SOUTH SECTION				
Blue	176,887	284,842	107,955	61.0%
Red	155,341	239,881	84,540	54.4%
Green	184,571	281,693	97,122	52.6%
NORTH SECTION				
Blue	51,664	117,403	65,739	127.2%
Red	58,150	125,086	66,936	115.1%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	228,551	402,245	173,964	76.0%
Red	213,491	364,967	151,476	71.0%
Green	184,571	281,693	97,122	52.6%

Source: Houston-Galveston Area Council.

Date: 10/2002.

In the south section of the North-Hardy Corridor the Green Line passes through the most populated area with almost 185,000 residents, while the Blue Line has nearly 177,000 residents and the Red Line has the least number of residents, at about 155,000.

According to H-GACs "approved" population projections, the Green Line will have the most residents by 2025 at approximately 234,000 people, followed by the Blue Line at about 228,000 people. On the contrary, the "interim" population projections indicate that by 2025 the Blue Line will have a higher population with about 285,000 people, while the Green Line will have slightly less, with about 282,000 people. In both the "approved" and "interim" scenarios, the Red Line lags behind in total projected population (197,000 and 240,000, respectively).

In terms of the incremental growth projected for the south section of the corridor, the "approved" data set shows that there will be nearly equal amounts of population growth along the Blue and Green Lines, at about 51,000 and 49,000 new people, respectively. On the contrary, the "interim" projections show a greater disparity between these two alignments with higher level of growth being projected along the Blue Line with about 108,000 new residents, while the Green Line is projected to have about 97,000 new residents. In both the "approved" and "interim" projections, the Red Line is projected to have the least amount of new population added, with about 42,000 and 84,500, respectively.

[14] Both the year 2000 data and H-GAC's "interim" projections in this table are based on Census 2000.

The most striking difference between H-GAC's two population projection scenarios is that the change in population – or the incremental growth – in the "interim" projections is about twice as much as what is shown in the "approved" projections. This is a significant increase for the corridor overall.

In the north section of the corridor, the 2000 baseline data shows that the Red Line has the highest current levels of population with about 58,000 residents, as compared to about 51,000 for the Blue Line. Both growth scenarios show a continuation of this trend to 2025, with the "approved" and "interim" projections for the Red Line showing a population projection of 96,000 and 125,000, respectively. The population for the Blue Line is projected to increase to 85,000 and 117,000, respectively.

Similar to the south section, the difference between the two scenarios in terms of the population change is significant. The incremental growth projected between 2000 and 2025 for the Red Line would see about 38,000 people added according to the "approved" projections and about 67,000 people added by the "interim" projections. For the Blue Line, the incremental growth projections are approximately 33,000 residents in the "approved" projections and about 66,000 residents in the "interim" projections, which is almost as much actual growth as projected along the Red Line.

Regardless of the alignment, significant population increases are anticipated for the entire North-Hardy Corridor, coming from two sources:

- Densification of existing residential areas and mixed-use districts in the south section of the corridor, primarily in existing residential areas inside IH-610 Loop and potentially in major activity centers such as The Woodlands and Greenspoint.

- Development of new residential areas in the north section of the corridor where there are significant amounts of vacant land and where new residential subdivisions are commonplace.[15]

Employment

As with population, H-GAC is projecting a substantial increase in employment for the Houston region, especially for the northern portion of the region that includes the North-Hardy Corridor. H-GAC projects that the area that stretches north from downtown Houston into Montgomery County will add about 97,000 jobs in its "approved" projections, or about 170,000 jobs in its "interim" projections. (Like the projection of population, the "interim" projections for employment are generally much more aggressive that the projections contained in the "approved" scenario.) Exhibits 5.6 and 5.7 provide H-GACs "approved" and "interim" employment projections.

[15] As noted in "Lot Price Survey 2002 Mid-year Report," CDS Market Research.

Exhibit 5.6: H-GAC "Approved" Employment Projections

	1999	2025	Actual Change 1999 - 2025	Percentage Change 1999 – 2025
SOUTH SECTION				
Blue	134,415	170,664	45,556	36.4%
Red	144,960	185,213	50,070	37.0%
Green	154,152	195,461	51,068	35.4%
NORTH SECTION				
Blue	35,627	50,836	17,840	54.1%
Red	36,829	57,048	23,255	68.8%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	170,042	221,500	63,396	40.1%
Red	181,789	242,261	73,325	43.4%
Green	154,152	195,461	51,068	35.4%

Source: Houston-Galveston Area Council.

Date: 3/2002.

Exhibit 5.7: H-GAC "Interim" Employment Projections

	1999	2025	Actual Change 1999 - 2025	Percentage Change 1999 – 2025
SOUTH SECTION				
Blue	134,415	201,415	76,307	61.0%
Red	144,960	219,366	84,223	62.3%
Green	154,152	230,505	86,112	59.6%
NORTH SECTION				
Blue	35,627	69,362	36,366	110.2%
Red	36,829	64,644	30,851	91.3%
Green	---	---	---	---
TOTAL CORRIDOR				
Blue	170,042	270,777	112,673	71.3%
Red	181,789	284,010	115,074	68.1%
Green	154,152	230,505	86,112	59.6%

Source: Houston-Galveston Area Council.

Date: 10/2002.

According to the 1999 baseline data for the south section of the North-Hardy Corridor, the Green Line has the highest number of jobs, with approximately 154,000, followed by the Red Line with about 145,000 and the Blue Line with about 134,000. By 2025, both the "approved" and "interim" projections show that trend will continue, with the Green Line still leading in the highest projected number of jobs. However, the total number of jobs is substantially different between the two data sets: in the "approved" projections,

the Green Line will have about 195,000 jobs while the "interim" projections show that there will be nearly 231,000 jobs.

There is not a significant difference between the Green Line and the Red Line in terms of new jobs projected for the south section of the corridor in both the "approved" and "interim" projections, although the "interim" projections show overall higher numbers for all three alignments. The projected employment for the Green Line and the Red Line show that there will be about 50,000 new jobs according to the "approved" projections and roughly 85,000 jobs in the "interim" projections. According to both scenarios, the south section of the Blue Line shows less growth in employment – with about 46,000 new jobs in the "approved" projections and about 76,000 new jobs in the "interim" projections.

In the north section of the corridor, where only the Blue Line and Red Line extend, the 1999 baseline data indicates there are a similar number of jobs (roughly 36,000). In terms of the 2025 projections, the "approved" projections show that the Red Line will have more jobs than the Blue Line, at 57,000 versus 51,000. The "interim" projections show a higher number of jobs than the "approved" projections for both alignments in the north section of the corridor, with the Blue Line gaining more than the Red Line. The "interim" projections show that there will be 69,000 jobs along the Blue Line with about 65,000 jobs along the Red Line. There are fewer jobs projected for the north section of the corridor than the south section, since the only major activity center in the north section is The Woodlands.

Overall, all three alignments are projected to have significant increases in employment along their routes. Job growth results from the following:

- Filling existing vacant commercial building space with new tenants.
- Development or redevelopment of lower-density uses or vacant land into more job-intensive commercial uses.

The greatest potential for increased employment opportunities occurs in locations with strong concentrations of office space, particularly high-rise office space, and where employment density is already relatively high. Downtown and the Greenspoint area are the primary locations where this is currently the case. The Woodlands Town Center is also developing into a center of highly concentrated employment.

Development

Recent building permit activity was analyzed to determine the level of new development that has been occurring in the City of Houston and unincorporated Harris County.[16] One important caveat with respect to the comparisons made between the proposed alignments is that each one has a different amount of land located within the limits of the City of Houston. Exhibit 5.8 shows the length of each alignment that lies inside and outside the City of Houston.

[16] Data for Montgomery County was not available in a form suitable for this analysis.

Exhibit 5.8: Length of Proposed Alignments
Inside and Outside City of Houston Limits (in miles)

	Blue Line	Red Line	Green Line
Inside City of Houston	21.0	15.2	18.1
Outside City of Houston	19.4	27.0	5.9
Total	40.4	42.2	24.0

Source: Knudson & Associates.

The length of the Blue Line inside the City of Houston's city limits is the highest (21 miles), while the Red Line is the least (15 miles). The portion of all three alignments that is located within the City limits is located in the south section of the corridor.

Within the City of Houston, historical building permit activity was analyzed to obtain a sense of the scale and location of recent development. Exhibit 5.9 summarizes the number and value of City of Houston permits for new construction from 1989 to September 2002 for each of the three alignments.[17]

Exhibit 5.9: New Construction Permits – City of Houston, 1989 – 2002

	Blue Line		Red Line		Green Line	
	#	$	#	$	#	$
Single Family	314	$ 23,988,693	237	$ 16,576,260	231	$ 17,287,110
Multifamily	31	14,254,000	29	9,120,000	112	31,167,466
Commercial	413	282,736,284	388	247,619,870	577	293,950,768
Total	770	$558,588,977	670	$511,136,130	932	$580,015,344

Notes: Excludes permits south of IH-10. Values are current dollars (not adjusted for inflation).
Sources: City of Houston and Knudson & Associates.

The Green Line, with 932 permits valued at $580 million, had the greatest amount of new construction activity in terms of both quantity and value, primarily for multi-family residential and commercial development. The Blue and Red Lines had 770 permits valued at $559 million, and 670 permits at $511 million, respectively. For single-family residential construction, the Blue Line had the highest number and value of permits at 314 and approximately $24 million.

An examination of the location of building permits in the City of Houston, as shown in Exhibits 5.10, 5.11, and 5.12, indicates there has been significant amount of new single-family construction in the Woodland Heights and Independence Heights neighborhoods. The lower number of overall permits, particularly commercial permits; along the Red

[17] These calculations exclude the portions of the Corridor that are located south of I-10 – these building permit records could not be geo-coded for the purposes of this analysis.

Line is due partly due to the fact that a shorter length of this alignment is located within the limits of the City of Houston. An important point that is clearly visible from examining building permit activity is that the corridor generally shows a more moderate level of development activity than other parts of the City such as the Heights, Montrose, and River Oaks.

Exhibit 5.10: New Construction Permits, City of Houston, 1989 to 2002 – Blue Line

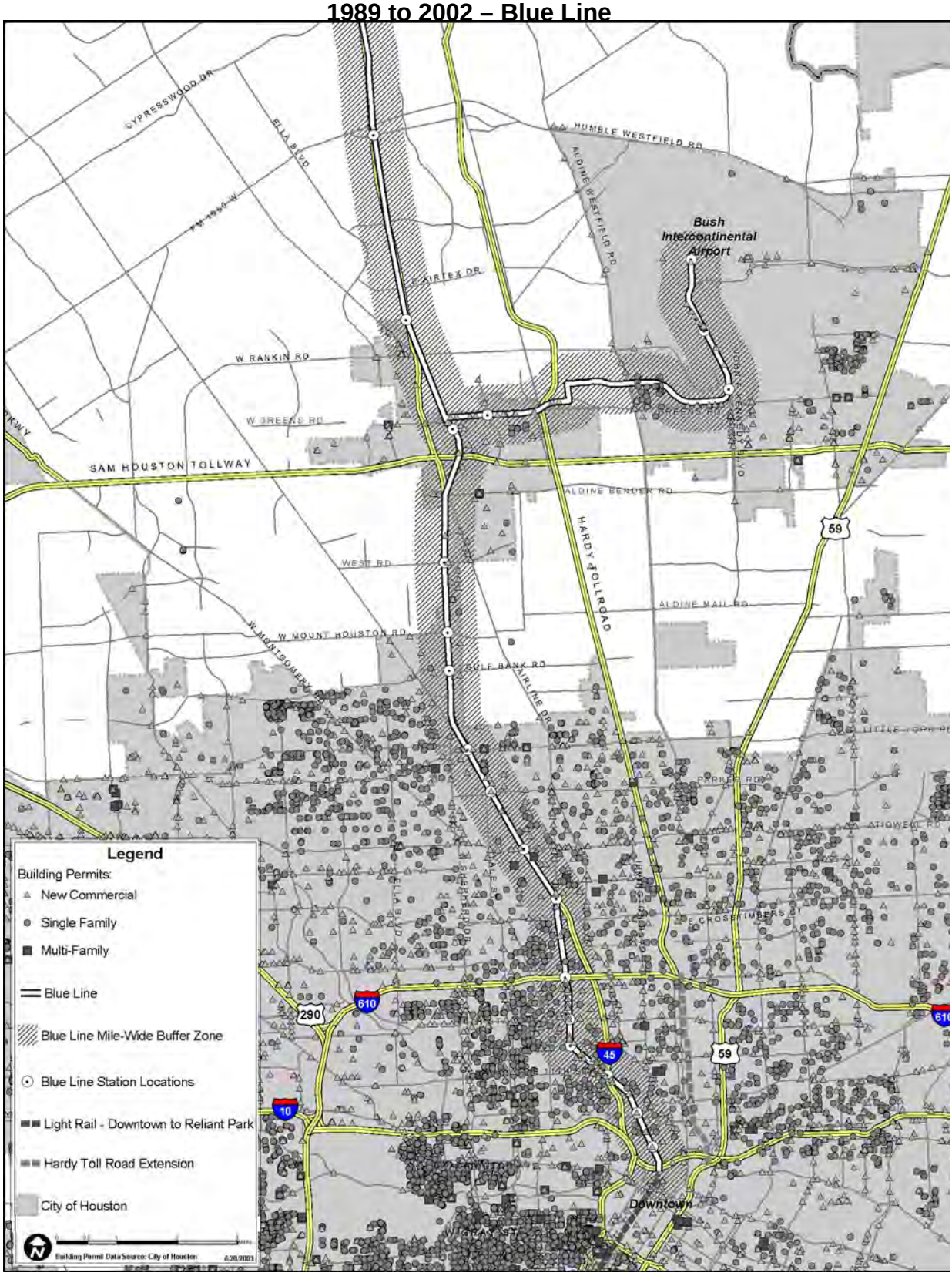


Exhibit 5.11: New Construction Permits, City of Houston, 1989 to 2002 – Red Line

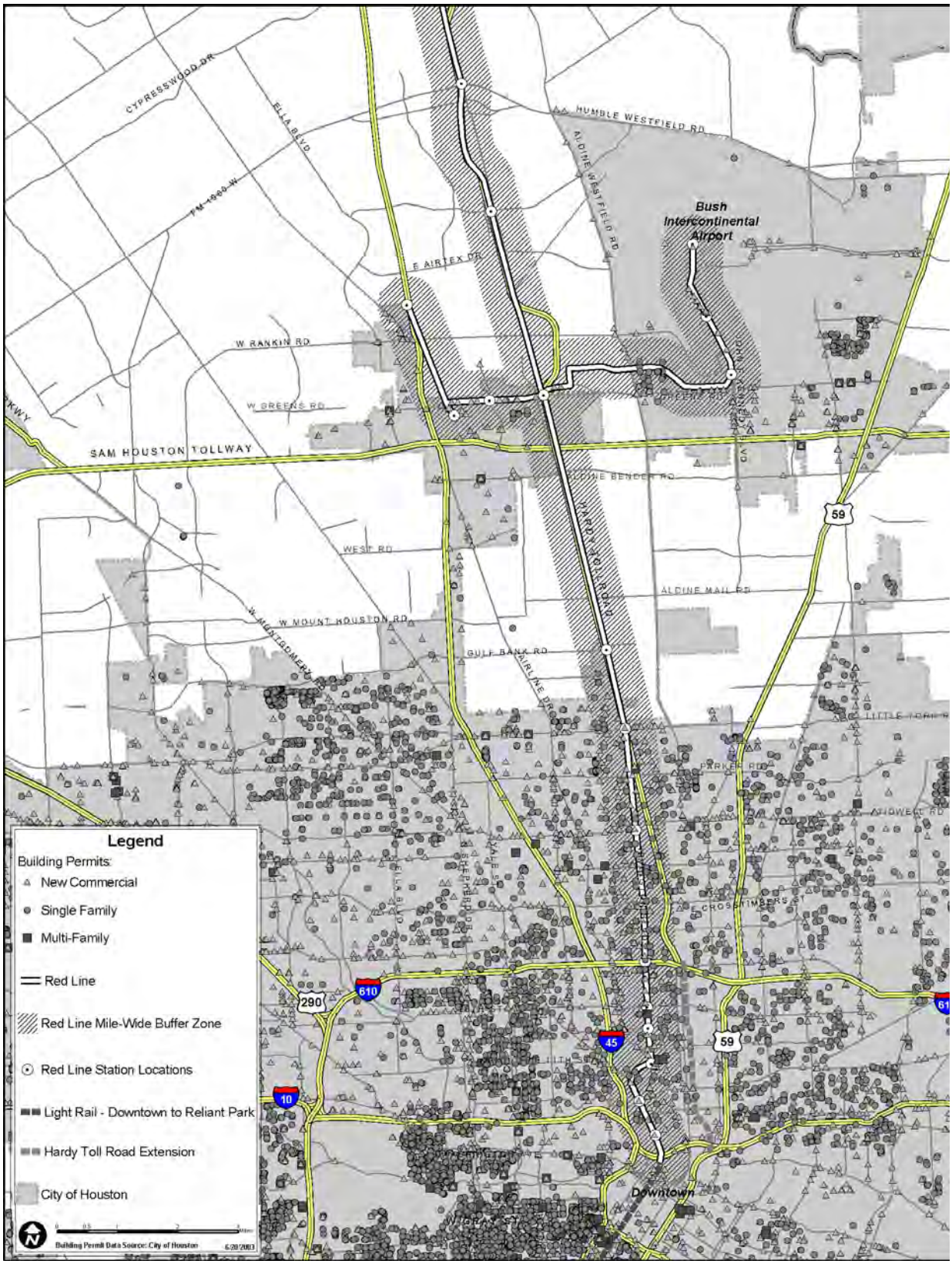
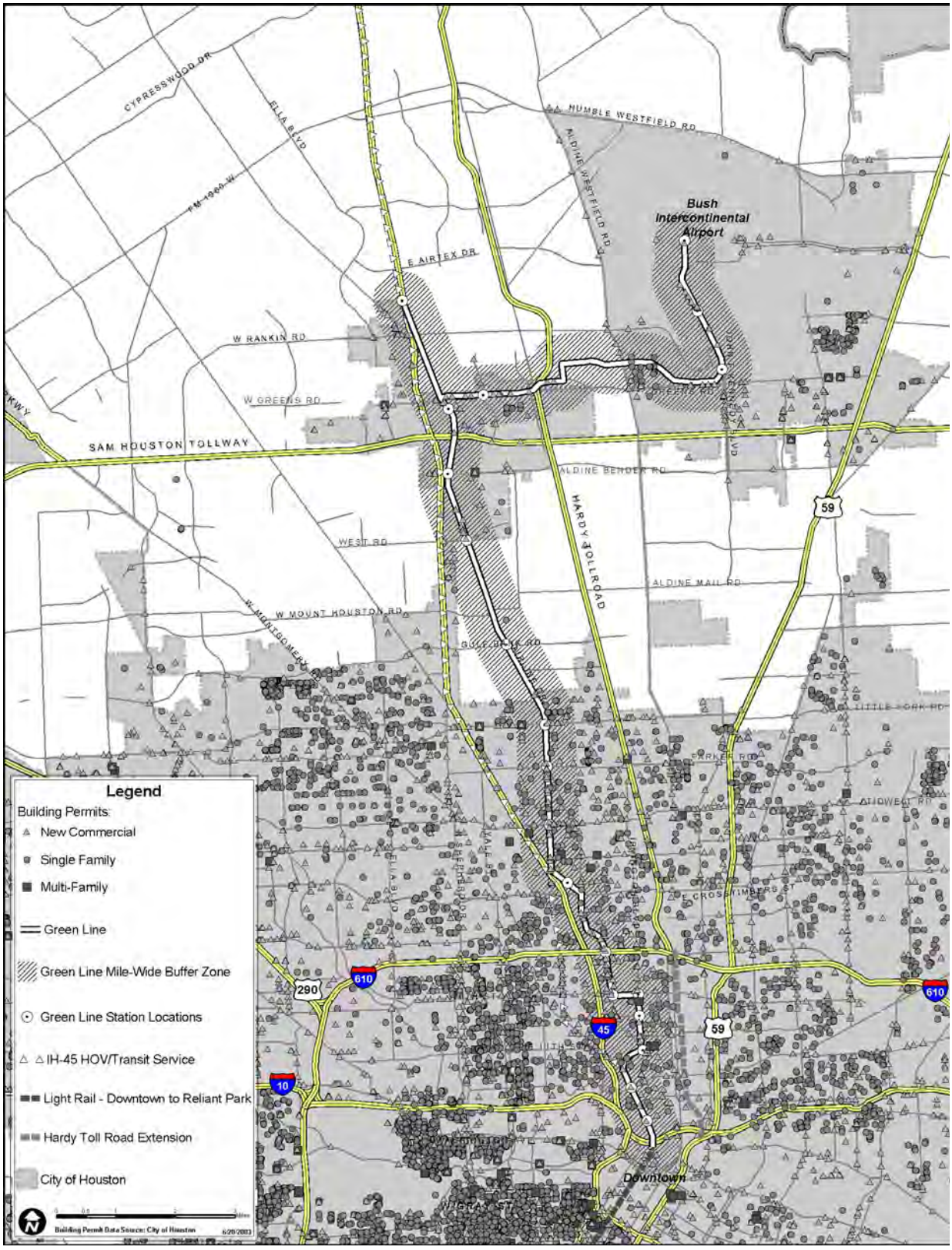


Exhibit 5.12: New Construction Permits City of Houston, 1989 to 2002 – Green Line



In the unincorporated areas of Harris County, which comprise the majority of the remainder of the three alignments, county development permits from 1991 to 2002 were analyzed in a similar manner to the City of Houston permits.[18,19] The number of value of new construction permits are provided in Exhibit 5.13. Maps showing the location of new construction permits in the unincorporated areas of Harris County are shown in Exhibits 5.14, 5.15, and 5.16.

Exhibit 5.13: New Construction Permits
Unincorporated Harris County 1991 – 2002

	Blue Line		Red Line		Green Line	
	#	$	#	$	#	$
Single Family	309	$26,794,800	172	$14,990,644	24	$ 1,505,563
Multifamily	63	27,051,712	11	9,582,192	10	9,552,192
Commercial	61	34,876,563	96	41,983,477	49	27,266,726
Total	433	$88,723,075	279	$66,556,313	83	$38,324,481

Note: Values are current dollars (not adjusted for inflation).
Sources: City of Houston and Knudson & Associates.

The most apparent difference between the alignments in terms of development activity in the unincorporated area of Harris County is the relatively low number and value of permits along the Green Line, which had only 83 permits during the time period analyzed, as compared to the Blue Line with 433 permits and the Red Line with 279 permits. Referring back to Exhibit 5.8, this is primarily because the Green Line has a much shorter section running through the unincorporated area than the other two alignments.

Land adjacent to the Blue Line has experienced the most development activity in the unincorporated areas, with 433 total permits compared to 279 for the Red Line and 83 for the Green Line. The same is true for total permit value, with the Blue Line having the greatest total value at approximately $89 million compared to $67 million for the Red Line and $38 million for the Green Line. The trend of relatively more intense development along the Blue Line in the unincorporated Harris County is further magnified when the Blue Line's shorter span outside of the City of Houston is taken into account. As shown in Exhibit 5.8, the Blue Line has about 19 miles located outside the City of Houston, considerably less than the Red Line's 27 miles; yet it has experienced considerably greater development activity as measured by development permits.[20]

[18] Permits were not available for Montgomery County.
[19] Many permits issued from 2000 and later were not geo-coded due to their locations along new streets that were not available in GIS base data.
[20] These mileage numbers also include portions of the alignments in Montgomery County, for which permit data was not available. However, most of their lengths lie within Harris County, so the significance of the comparison is still relevant.

Exhibit 5.14: New Construction Permits Unincorporated Harris County, 1991 to 2002 – Blue Line

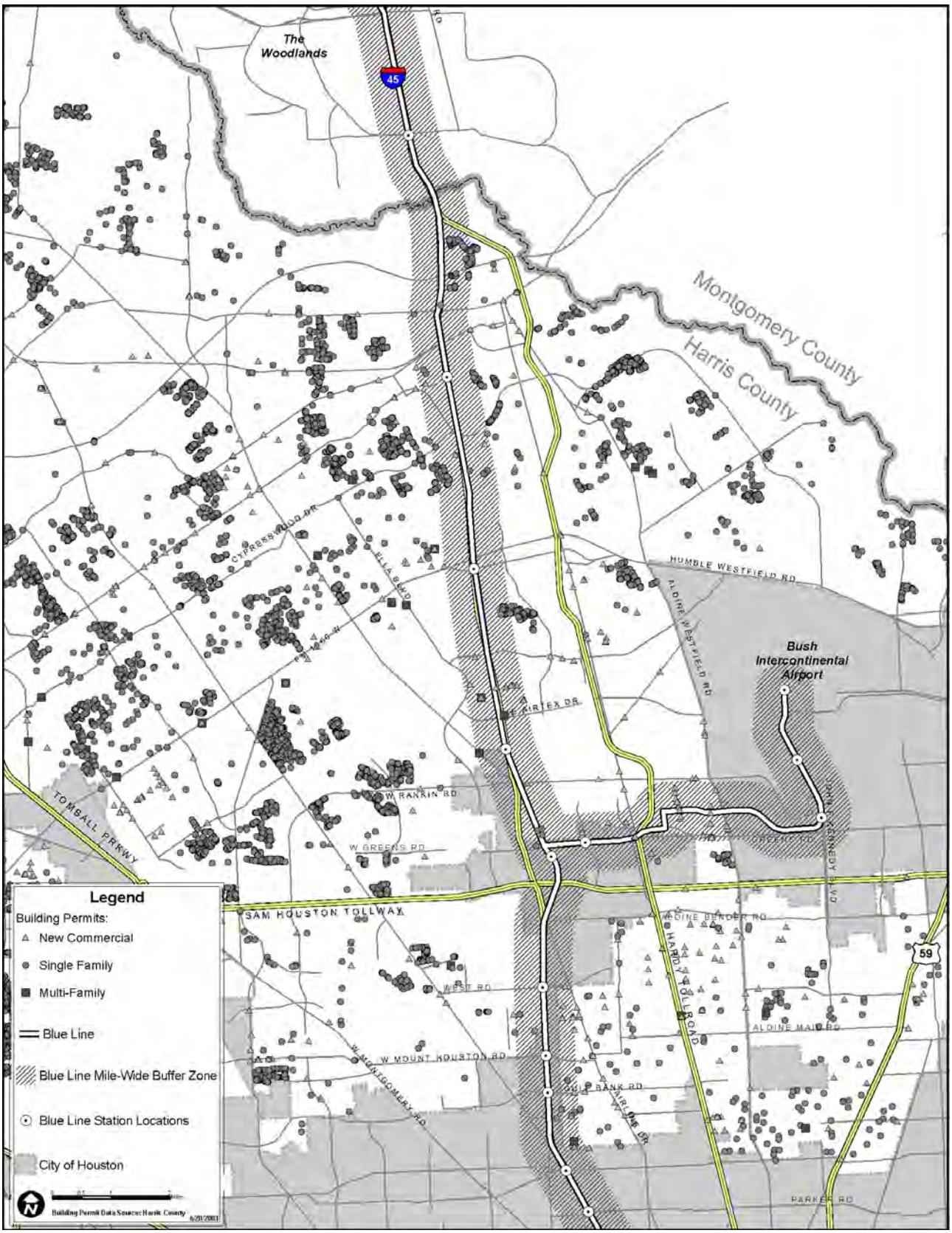
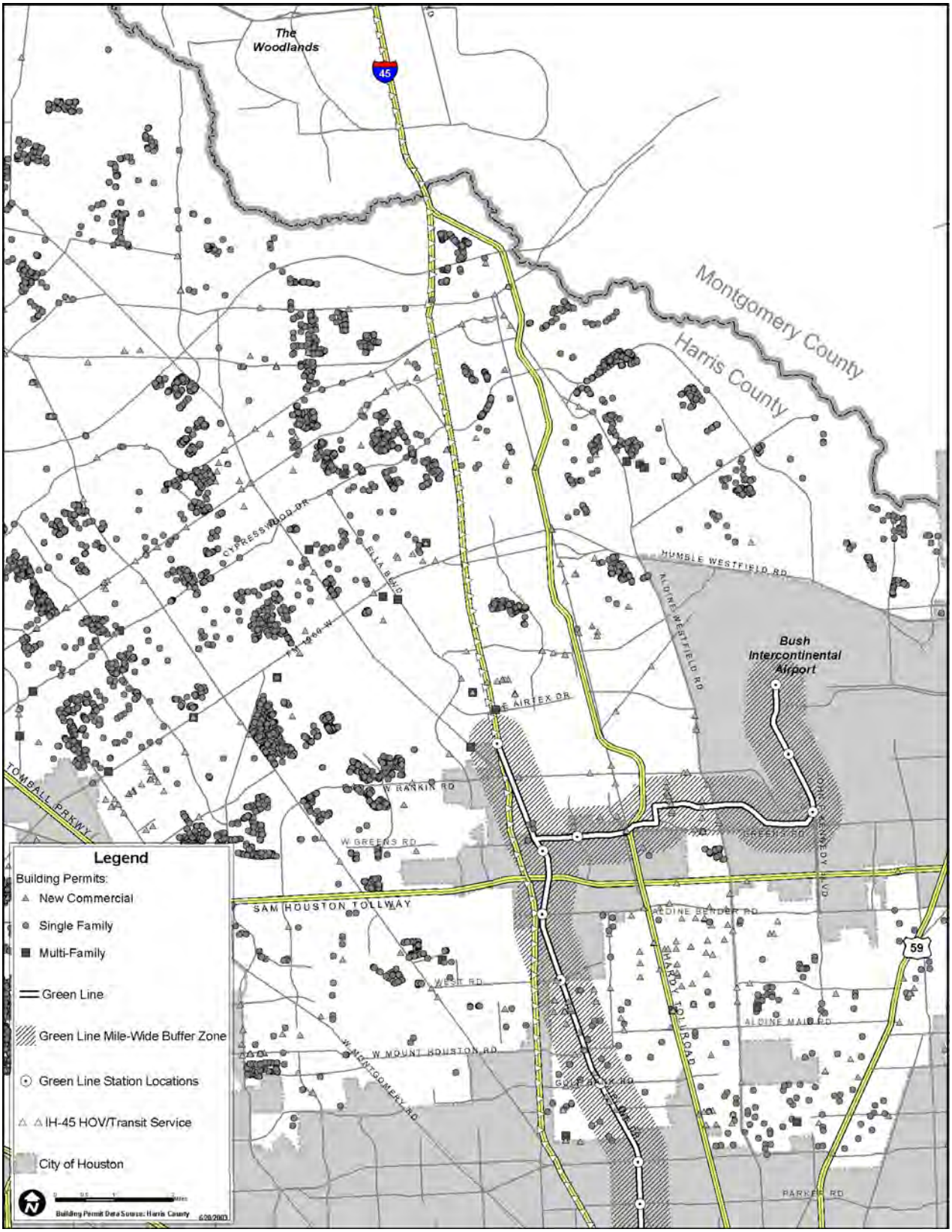


Exhibit 5.15: New Construction Permits Unincorporated Harris County, 1991 to 2002 – Red Line

Exhibit 5.16: New Construction Permits, Unincorporated Harris County, 1991 to 2002 – Green Line



North of Greenspoint, where only the Blue and Red Lines extend, the driver of development has been new residential subdivisions. As shown in Exhibit 5.13, permits for single family residential development have dominated the unincorporated areas along those two lines, accounting for 309 of 433 permits along the Blue Line, and 172 of 279 permits along the Red Line.

A lot and home survey conducted by CDS Market Research in 2002 included ten subdivisions that are currently selling new homes along the Blue and Red alignments. (The survey was not exhaustive so there may be other subdivisions with new homes within these areas.) These ten subdivisions contained a total of about 5,800 potential new residential lots. Typical home prices in these subdivisions ranged from $120,000 to $200,000, with a few subdivisions selling homes above and below that range.[21] This residential activity indicates that the northern section of the corridor is a prime location for growth of new entry-level and middle-income housing.

Summary of Findings

The key findings regarding the population and employment projections and the development trends in the corridor are as follows:

- When considering the corridor as a whole, the highest number of people are projected to live along the Blue Line, with the Red Line having the second highest projected population, and the Green Line having the lowest population projections. (This is influenced by the fact that the Green Line does not extend the full length of the corridor.)

- H-GAC's two sets of projections vary in terms of which alignment is expected to have the highest population in the south section of the corridor. In the "approved" projections, the Green Line would have the most people; according to the "interim" projections, the Blue Line will have the highest population. Nevertheless, the greatest actual population increase is projected to be along the Blue Line in both scenarios. Also, both scenarios project that the lowest levels of population growth and the lowest total 2025 population in the south section of the corridor would be along the Red Line. However, in the north section of the corridor, the projections along the Red Line are higher than the Blue Line in both scenarios.

- For projected employment, looking at the corridor as a whole, the Red Line leads over the Blue Line, followed by Green Line. (However, the Green Line does not extend the full length of the corridor.) However, projected employment is relatively high for all three alignments.

- For the south section of the corridor, projected employment is highest along the Green Line, and lowest along the Blue Line. In the north section, the

[21] "Lot Price Survey 2002 Mid-Year Report," CDS Market Research, 2002.

employment projections for the Red Line show a higher total projected employment in the "approved" projections, with the projections for the Blue Line being higher in the "interim" projections.

- The Green Line shows the greatest number and value of new construction activity in the City of Houston between 1989 and 2002, despite the fact that the Blue Line has a longer extent of its alignment within the City limits. The majority of this new construction was commercial and multi-family development. The Blue Line showed the greatest amount of single-family residential construction within the City limits.

- The Blue and Red lines both have considerable portions of alignment in the unincorporated portions of Harris County. In this area, the Blue Line had the greatest number and value of development permits between 1991 and 2002. New development is dominated by relatively affordable single-family residential.

5.4.2 Land Available for Development/Redevelopment

An analysis of development and redevelopment opportunities was conducted using Harris County Appraisal District data.[22] For the purposes of the analysis, the data was categorized as follows:

- **"Vacant/Underutilized land"**
  Parcels of land that are either vacant, occupied by low-intensity uses, or are otherwise underutilized and may have some redevelopment potential. Examples of underutilized land uses are salvage yards and abandoned industrial properties. In terms of land available for development/redevelopment, vacant and underutilized properties can be considered as the most obvious opportunities, and the most useful for comparing the relative economic development potential of the alignments.

- **"Restricted or Unclassified"**
  This category includes parcels of land that are occupied by uses with significant restrictions on new development or redevelopment. The uses were assumed to be fairly established and, in general, resistant to redevelopment. Examples are established single family residential neighborhoods and cemeteries.

[22] Source: Harris County Appraisal District, 2000 parcel data. Data in a format suitable for this analysis was not available for Montgomery County.

- **"Other potential opportunities"**
  This category includes parcels of land with uses that are neither necessarily restricted, nor readily available for development/redevelopment, but still might have some future potential for change in land use. These parcels represent the remainder of the land after having classified the "vacant/underutilized" and "restricted or unclassified" parcels.

"Vacant/underutilized" parcels are those that provide the most immediate and attractive opportunities for development, while the "restricted or unclassified" represents the least attractive opportunities. "Other potential opportunities" represents a moderate level of development potential.

The amount of land available for development/redevelopment was calculated in GIS using Harris County Appraisal District (HCAD) data. The HCAD data is parcel-based, and assigns a detailed three-digit land use code for each parcel of land within Harris County.

In order to obtain the amount of land available, the HCAD land use codes were grouped according to the categories described above. Appendix H provides a detailed list of the land use codes and shows how each was categorized.[23]

By identifying parcels that could likely provide immediate development opportunities, such as vacant lots, salvage yards, etc., or parcels that present longer-term possibilities for redevelopment into more dense and transit-friendly uses, the economic development opportunities were quantified for each alignment.

The analysis shows that there are significant amounts of land available for development and redevelopment throughout the North-Hardy Corridor for each of the three alignments. From a corridor-wide perspective, the Red Line has the most vacant/underutilized land available (7,236 acres, as compared to 5,772 for the Blue Line and 2,666 for the Green Line.) When other potential development opportunities are taken into account, the Blue Line has the highest development/redevelopment potential (11,015 acres, as compared to 10,803 acres for the Red Line and 6,004 acres for the Green Line). However, it should be noted that the Green Line does not extend into the north section of the corridor.

In the south section of the corridor, the alignments have very comparable development/ redevelopment potential, with the Blue Line having a slight edge when taking into account all available land (6,504 acres, as compared to 5,811 for the Red line and 6,004 for the Green Line). In the north section of the corridor, the Red Line has more available land than the Blue Line (5,203 acres vs. 4,298 acres.) It is interesting to note that 74 percent of the land in the in the north section for the Red Line is categorized as vacant/underutilized land.

[23] Parcels smaller than 15,000 square feet (roughly one-third of an acre) were excluded, since it was considered that their small size could hinder redevelopment, and because most of such parcels represented undeveloped lots within single-family subdivisions.

Exhibit 5.17 provides a summary of the results of the analysis of land available for development and redevelopment. The results are divided into north and south sections for each alignment (see Exhibits 5.1, 5.2, and 5.3 for the division between the north and south sections). The results of the analysis are illustrated in Exhibits 5.18, 5.19, and 5.20.

Exhibit 5.17: Summary of Land Available for Development [24]

	Blue Line		Red Line		Green Line	
SOUTH SECTION	Acres	Share	Acres	Share	Acres	Share
Vacant/Underutilized	2,981.64	29.2%	2,852.51	28.0%	2,666.63	25.7%
Other Potential Opportunities	3,523.07	34.5%	2,959.30	29.1%	3,337.94	32.2%
Subtotal	6,504.71	63.6%	5,811.81	57.1%	6,004.57	57.9%
Restricted or Unclassified	3,715.96	36.4%	4,357.86	42.9%	4,363.65	42.1%
Total South Section	10,220.67	100.0%	10,169.67	100.0%	10,368.22	100.0%
NORTH SECTION						
Vacant/Underutilized	2,791.24	6.9%	4,384.37	74.0%	---	---
Other Potential Opportunities	1,507.16	30.7%	819.54	13.8%	---	---
Subtotal	4,298.40	87.7%	5,203.91	87.8%	---	---
Restricted or Unclassified	603.59	12.3%	723.04	12.2%	---	---
Total North Section	4,901.99	100.0%	5,926.95	100.0%	---	---
TOTAL CORRIDOR						
Vacant/Underutilized	5,772.88	38.2%	7,236.88	45.0%	2,666.63	25.7%
Other Potential Opportunities	5,030.23	33.3%	3,778.84	23.5%	3,337.94	32.2%
Subtotal	10,803.11	71.4%	11,015.72	68.4%	6,004.57	57.9%
Restricted or Unclassified	4,319.55	28.6%	5,080.90	31.6%	4,363.65	42.1%
Total Corridor	15,122.66	100.0%	16,096.62	100.0%	10,368.22	100.0%

Sources: Knudson & Associates, based on Harris County Appraisal District 2000 data.

[24] Parcels of land that are smaller than 15,000 square feet were excluded.

Exhibit 5.18: Economic Development Opportunities – Blue Line

Exhibit 5.19: Economic Development Opportunities– Red Line

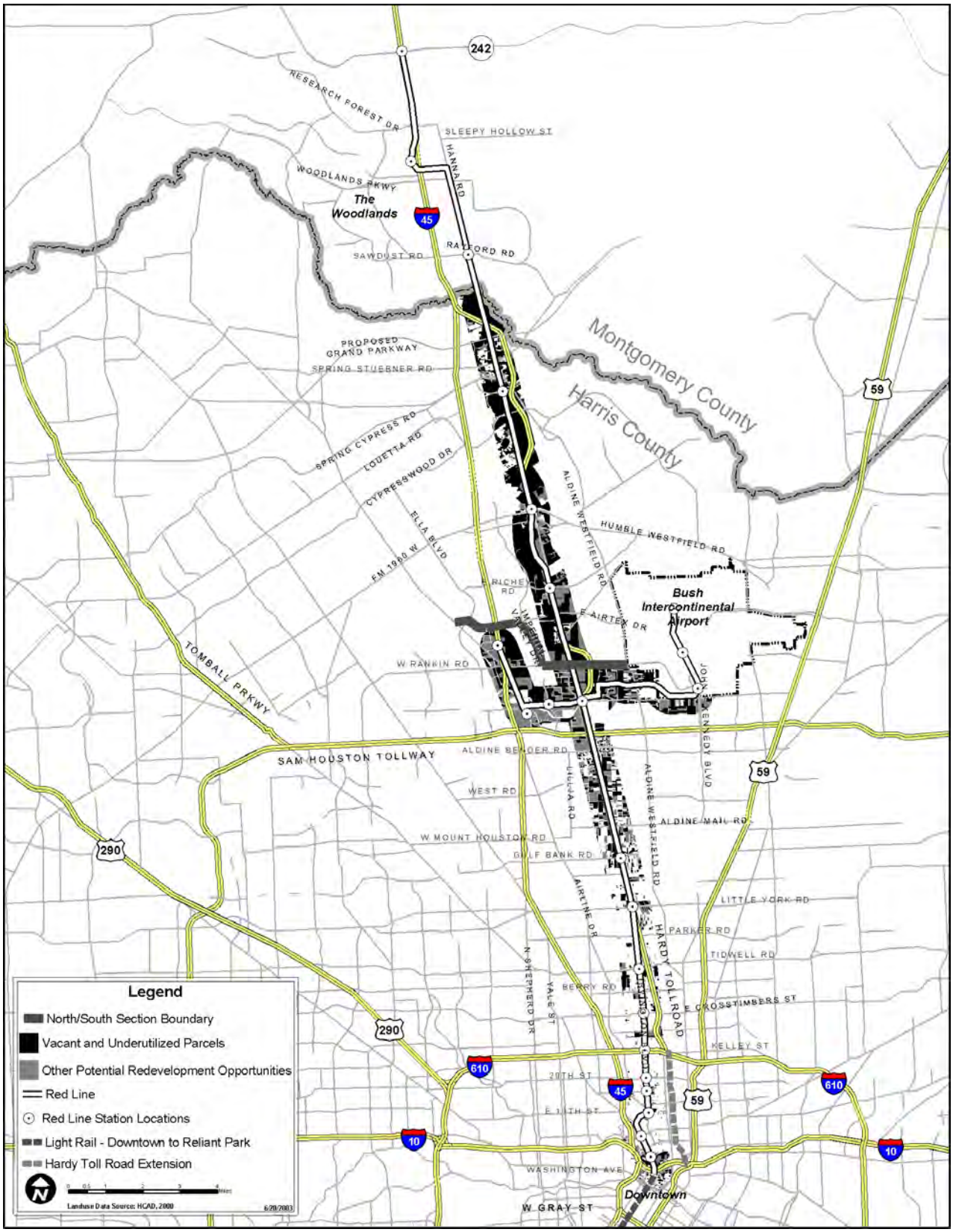
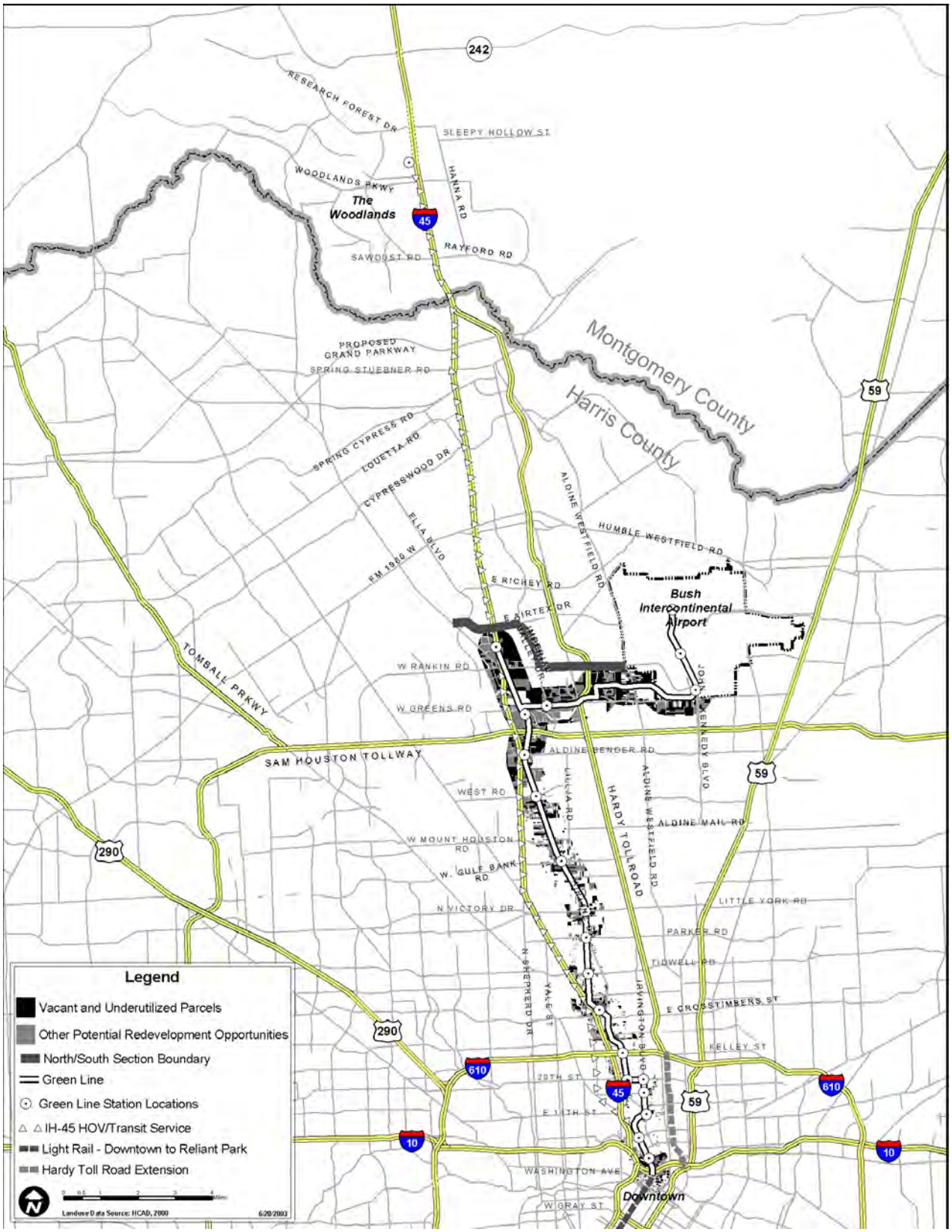


Exhibit 5.20: Economic Development Opportunities – Green Line



5.4.3: Special Districts & Municipalities to Support Economic Development

An important consideration for examining economic development opportunities is the ability to provide services and improvements to support such development. In Texas, both municipalities and a variety of special districts can provide these services and improvements. This section explores this issue with respect to the North-Hardy Corridor.

Special Districts: Introduction and Definitions

Certain types of public entities, termed special districts in this report, offer unique opportunities for financing, planning, and implementing public and private improvements and services. They are particularly capable of encouraging transit-oriented development and redevelopment by providing improvements and services tailored to such environments. Three types of these special districts were considered in this analysis: Municipal Utility Districts (MUDs), Tax Increment Reinvestment Zones (TIRZs), and Municipal Management/Improvement Districts, as defined and described below:

- Municipal Utility Districts (MUDs)
  MUDs are created by provisions of the Texas Constitution, the Water Code or Legislative Act. They help finance the cost of development, usually (but not necessarily) in unincorporated areas. MUDs generally reimburse developers from between 70% to 100% for water, sewer, drainage and detention costs, as well as associated financing costs. MUDs have recently been given broader powers to provide such additional services as garbage collection, security, and parks construction. MUDs have been very effective in providing infrastructure to fuel growth in the Houston region for several decades, as demonstrated by the sheer number of MUDs currently in existence in the five-county area (currently 467). MUDs have had a significant influence on development patterns across the region, allowing for the development of low density housing at reasonable prices, typically followed by commercial uses as market conditions have dictated. MUDs are a very common development tool used the northern portion of the Houston region, including the North-Hardy Corridor.

- Tax Increment Reinvestment Zones (TIRZs)
  TIRZs are created by a municipality to help finance the cost of developing or redeveloping a specific geographic area that would not otherwise attract significant private investment. TIRZs can fund or reimburse for both the capital and financing costs for basic infrastructure, including streets, pedestrian improvements, water, sewer, storm drainage, and accompanying enhancements such as landscaping. Additionally, TIRZs can acquire and dispose of property, and remediate environmentally impacted property. TIRZs can provide useful planning and funding to develop or redevelop urban areas in support of transit-friendly projects. TIRZs are created with a specific time frame within which improvements are financed.

The City of Houston has usually incorporated a local government corporation to function as an administrative adjunct to its TIRZs. The local government corporations are generally referred to as redevelopment authorities (RDAs). The RDAs can function on a peer level with other public agencies providing a mechanism for interaction between the agencies, property owners, tenants and residents to guide the cooperative processes typically necessary for effective large-scale transit-oriented development. At the present time, there are only two TIRZs in the North-Hardy Corridor: the Greenspoint TIRZ and the Market Square TIRZ (within Downtown Houston).

- Municipal Management/Improvement Districts
  Municipal management/improvement districts are created either by a special act of the Legislature or through petition to the Texas Commission on Environmental Quality ("TCEQ"). Property owners within these districts are authorized to assess, and in some instances tax, themselves to fund specific improvements, including those related to quality of life issues such as beautification, security, mobility, transit, traffic control, and marketing. Also, these districts can operate and maintain infrastructure through services such as landscape maintenance and street and sidewalk sweeping.

Municipal management/improvement districts can also function on a peer level with other public agencies to provide a similar mechanism for interaction between the agencies, property owners, tenants and residents to guide the cooperative processes typically necessary for effective large-scale transit-oriented development. Municipal management/improvement districts have the ability to provide long term maintenance to improvements supporting transit-oriented development, such as sidewalks, crosswalks, transit stops, and public plazas. There are currently six municipal management/improvement districts in the North-Hardy Corridor: the Downtown Houston Management District, the Greater Northside Management District, the Aldine Community Improvement District, the Greater Greenspoint Management District, the Old Town Spring Improvement District, and the Woodlands Town Center Improvement District.

Special District Coverage in the Corridor

An analysis was conducted of the existing coverage by the three types of special districts in the North-Hardy Corridor. First, within Harris and Montgomery counties, the amount of land along each alignment that is within MUDs was calculated using GIS.[25] Exhibit 5.21 shows the results of this analysis.

[25] Only areas outside the City of Houston were analyzed for MUD coverage. Normally, the responsibility for the improvements and services provided by MUDs is assumed by the City of Houston upon annexation.

Exhibit 5.21: Special Financing Districts Coverage – MUDs (in acres)

	Blue Line	Red Line	Green Line
South Section	1,947	1,715	2,396
North Section	5,622	5,008	---
Total Corridor	7,569	6,723	2,396

Sources: Harris County Appraisal District and Knudson & Associates.

The results show that MUDs are most significant in the north section of the corridor. Overall, the Blue Line has more MUD coverage than the Red Line, at 7,569 acres to 6,723 acres respectively. The Green Line, however, has the most coverage in the South Section, with 2,396 acres, while the other two alignments both have less than 2,000 acres of land located within MUDs.

An analysis was also performed for lands located within TIRZs and Municipal Management/Improvement Districts. Exhibits 5.22 and 5.23 present information about how much land is located within TIRZs and Municipal Management/Improvement Districts using the same classifications for land available for development as in Section 9.4.2.

Exhibit 5.22: Special Financing Districts Coverage – TIRZs (in acres)

	Blue Line	Red Line	Green Line
VACANT/UNDERUTILIZED LAND			
South Section	429	273	429
North Section	---	---	---
Total Corridor	429	273	429
OTHER POTENTIAL OPPORTUNITIES			
South Section	978	818	989
North Section	---	---	---
Total Corridor	978	818	989
TOTAL			
South Section	1,407	1,091	1,418
North Section	---	---	---
Total Corridor	1,407	1,091	1,418

Sources: Harris County Appraisal District and Knudson & Associates.

Regarding TIRZs, the most significant point is that both the Blue and Green lines have more acreage within these special districts than the Red Line – the Blue and Green Lines both have about 1,400 acres, and the Red Line has about 1,100 acres. The primary reason for this is that there is less coverage by the Greenspoint TIRZ along the

Red Line than for the other two alignments. There is no TIRZ coverage in the north section of the North-Hardy Corridor for any of the alignments.

Exhibit 5.23: Special Financing Districts Coverage – Municipal Management/Improvement Districts (in acres)

	Blue Line	Red Line	Green Line
VACANT/UNDERUTILIZED			
South Section	1,524	1,569	1,399
North Section	---	117	---
Total Corridor	1,524	1,686	1,399
OTHER POTENTIAL OPPORTUNITIES			
South Section	2,346	2,263	2,361
North Section	---	27	---
Total Corridor	2,346	2,290	2,361
TOTAL			
South Section	3,869	3,832	3,760
North Section	---	144	---
Total Corridor	3,869	3,976	3,760

Sources: Harris County Appraisal District and Knudson & Associates.

Coverage by Municipal Management/Improvement Districts is similar for all the three alignments in the south section of the corridor – ranging from 3,760 to 3,976 acres. For vacant/underutilized land only, the Red Line has the greatest amount at 1,569 acres, and the Green Line has the least at 1,399 acres. In the North Section of the corridor, the Red Line is the only alignment where there is Municipal Management/Improvement District coverage within Harris County, owing to the presence of the Old Town Spring Improvement District. [26]

The results of the analyses for all three types of special districts are shown graphically in Exhibits 5.24, 5.25, and 5.26.

[26] The Blue and Red lines both have lands located within The Woodlands Town Center Improvement District in Montgomery County. However, data in a form suitable for GIS analysis was not available, there fore this information was not included in the above analysis.

Exhibit 5.24: Special Districts – Blue Line

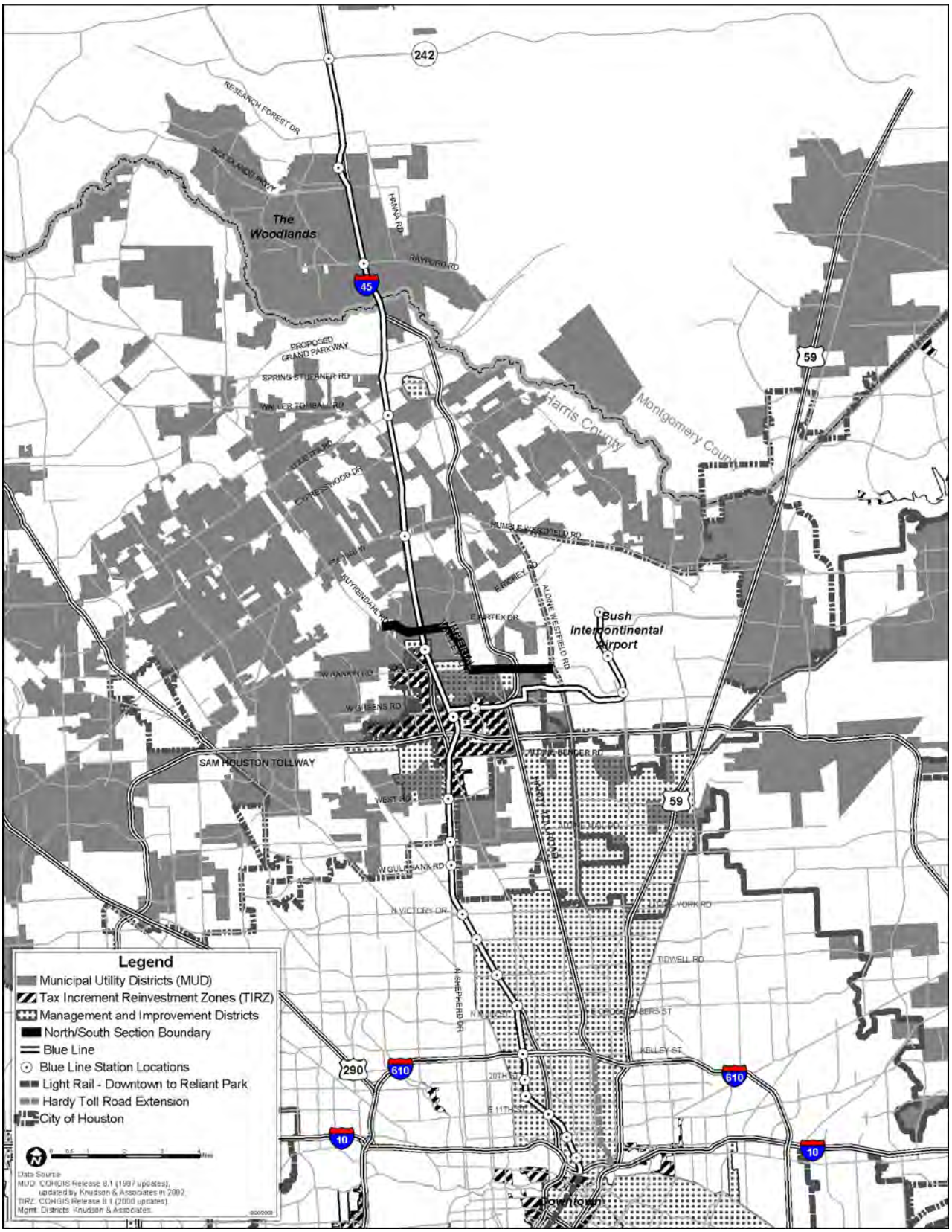


Exhibit 5.25: Special Districts – Red Line

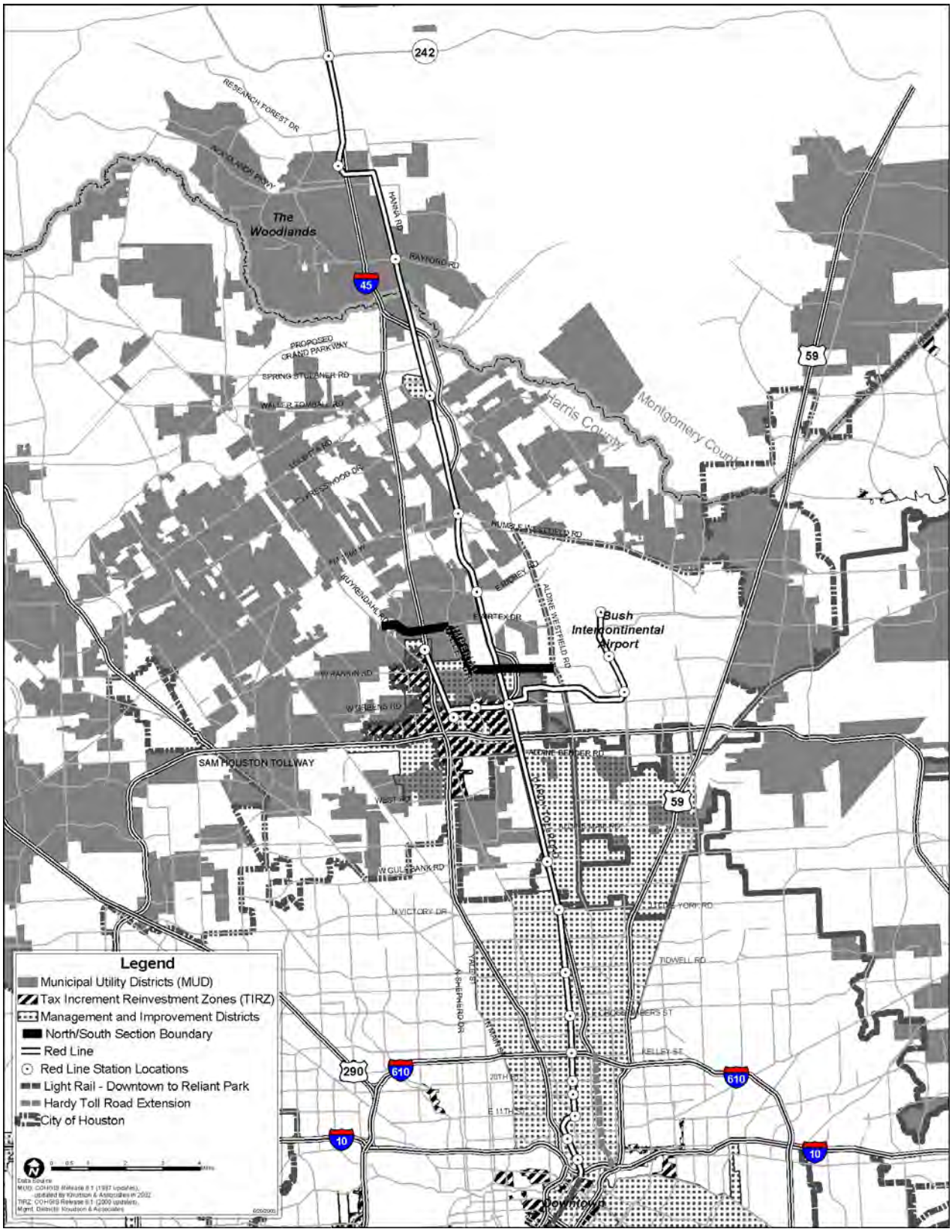
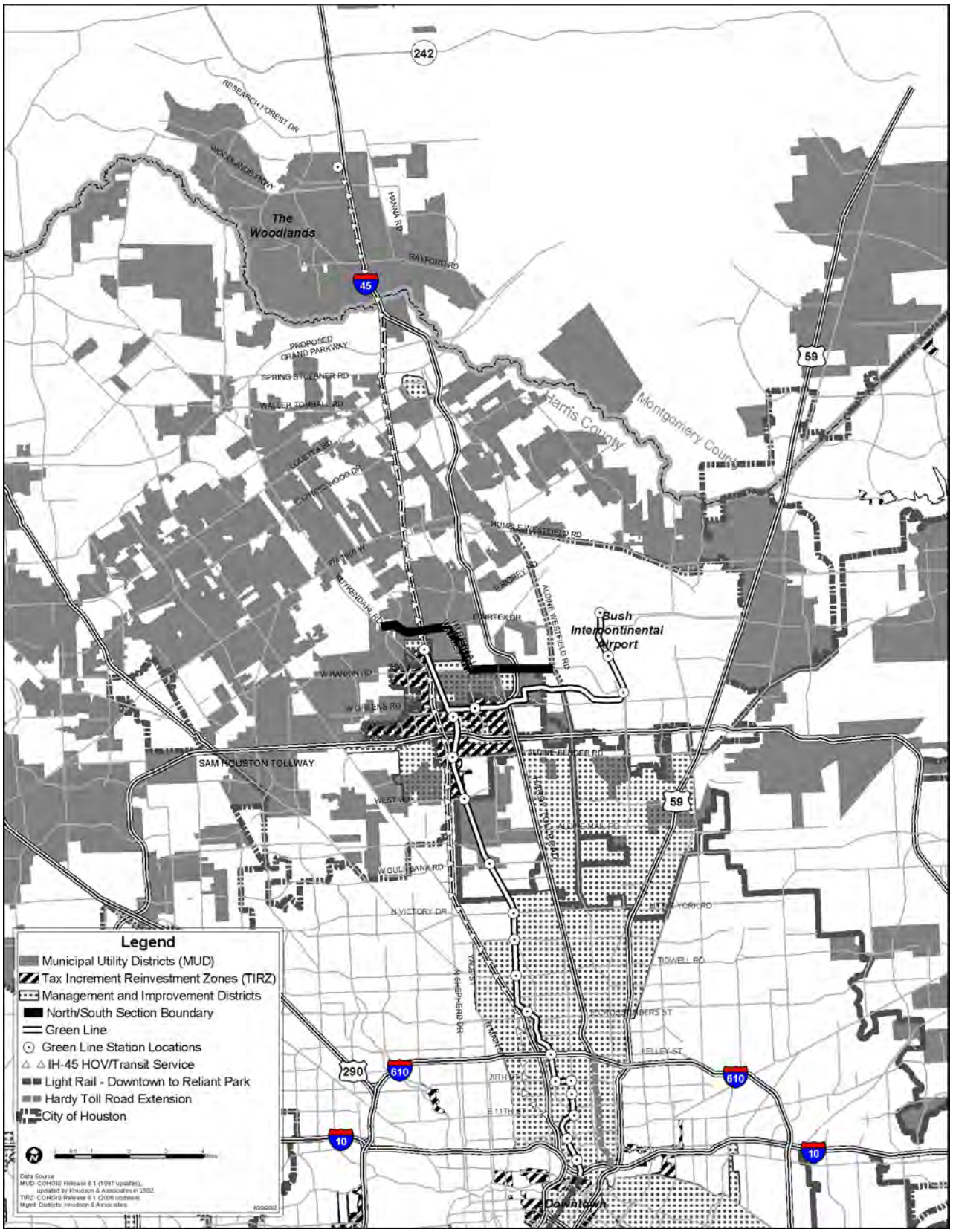


Exhibit 5.26: Special Districts – Green Line



Municipal Coverage in the Corridor

Coverage by municipalities is also relevant to the provision of improvements and services that would support economic development. Municipalities can fund public infrastructure and services directly. They can also fund specialized improvements and services targeted to transit-based economic development, although they may be less effective than special districts in supporting such development within specific areas around stations. It should be noted as well that certain special districts, most notably TIRZs, can only be created within the boundaries of municipalities.

Much of the North-Hardy Corridor is located within the City of Houston, as shown in Exhibit 5.27. The Blue Line has the most land located within the limits of the City of Houston at 9667 acres, and the Red Line has the least at 8,062 acres.

Exhibit 5.27: Municipal Coverage –City of Houston (in acres)

	Blue Line	Red Line	Green Line
South Section	9,667	8,062	9,116
North Section	---	---	---
Total Corridor	9,667	8,062	9,116

Sources: Harris County Appraisal District and Knudson & Associates.

Summary of Findings

The analysis of the mechanisms to provide services and improvements to support economic development opportunities shows the following:

- The Red line has the least amount of land located inside of the existing limits for City of Houston. Consequently, the economic potential associated with the Red Line would likely be the most dependent on the creation of MUDs for providing infrastructure to support new development. However, the Red Line has the least amount of land within existing MUD districts in the south section of the corridor, and less than the Blue Line in the north section.

- In the north section of the corridor, with respect to land within the limits of the City of Houston and within MUDs, the Blue Line has an advantage over the Red Line, with 5,622 acres vs. 5,008 acres.

- The Blue Line has both the most land located within the existing limits of the City of Houston in the south section of the corridor. As a result, it has the highest potential for being able to take advantage of municipal services provided by the City, as well as the creation of new TIRZs to help finance infrastructure improvements to facilitate development (TIRZ can only be created in incorporated areas).

- Existing TIRZs are found only in the south section of the corridor.

- The Blue and Green Lines have very similar amounts of land located with TIRZs, 1,407 and 1418 areas, respective, while the Red Line has less, at 1,091 acres. This is primarily because the Red Line does not include as much of the Greenspoint TIRZ as either of the other two alignments.

- All three alignments have similar amounts of coverage by municipal management/improvement districts (between 3,700 and 4,000 acres). They all pass through the Greater Northside and Greater Greenspoint Management Districts. The Red Line also passes through the Aldine Community and Old Town Spring improvement districts.

5.4.4 Summary of Findings from Quantitative Analysis

For ease of comparison, the results from the quantitative analysis have been converted to descriptive language. Exhibits 5.28 and 5.29 summarize the economic development potential for each alignment based on the quantitative variables discussed in the sections above.

Exhibit 5.28: Summary of Quantitative Variables
Economic Development Potential in the South Section of Corridor

	Blue Line	Red Line	Green Line
Population Growth	High	High	High
Employment Growth	High	High	High
Development Trends	Moderate	Moderate	Moderate
Land Availability	Moderate	Moderate	Moderate
Special District Coverage	High	Moderate	High
Municipal Coverage	High	Moderate	Moderate

Exhibit 5.29: Summary of Quantitative Variables
Economic Development Potential in the North Section of Corridor

Variable	Blue Line	Red Line	Green Line
Population Growth	Moderate	Moderate	---
Employment Growth	Moderate	Moderate	---
Development Trends	N/A	N/A	---
Land Availability	High	High	---
Special District Coverage	Low	Low	---
Municipal Coverage	Low	Low	---

The key findings from the quantitative analysis are as follows:

- In the south section of the corridor, the results of the quantitative analysis are "moderate" and "high" for all variables, indicating favorable conditions for economic development potential for all three alignments. The Blue and Green lines appear to show slightly stronger potential than the Red Line.

- In the north section of the corridor (which applies only to the Blue and Red Lines), the quantitative variables for which data was available show results ranging from "low" to "high" for both alignments. This indicates that there would be similar economic development potential in this area for both alignments based on the data that was analyzed.

5.5 Qualitative Analysis

Based on the quantitative analysis discussed in Section 5.4, together with air photo interpretation, and interviews with a variety of local experts in the field of economic development and real estate, detailed profiles of each alignment were prepared. These profiles are included in Appendix H attached to this report.

This section presents a summary of the opinions of the people who were interviewed as part of this analysis, as well as a summary of the detailed profiles.

5.5.1 Interviews with Economic Development & Real Estate Experts

The people who were interviewed as part of the analysis of economic development in the North-Hardy Corridor represent real estate and development professionals who are familiar with the corridor and local real estate issues specifically, as well as development market trends in general. A list of the people who were interviewed is included in Appendix H, attached to this report.

In summary, the experts agree that an advanced high-capacity transit service in the corridor could stimulate new growth in the area and bring about changes in the pattern

of land use. The nature of these potential changes would differ depending on the alignment chosen and the speed of service provided, since areas within the corridor vary in terms of the characteristics of its resident population, the types of existing commercial development, their degree of accessibility, and their availability of infrastructure.

In general, the experts viewed the proposed advanced high capacity transit as potentially reinforcing and supporting growth congruent with the type of development and income groups currently present along the different alignments. While the people who were interviewed did not express strong opinions that favored the economic development potential of one alignment over another, they generally preferred the Blue and Green Lines to the Red Line.

The following provides a summary of the opinions expressed by the people who were interviewed, regarding the corridor in general and each of the proposed alignments.

Economic Development Potential – Corridor in General

The North-Hardy Corridor, especially between downtown Houston and Greenspoint, has been relatively uncompetitive with other areas of the region in recent decades in terms of attracting development, due to a variety of factors.[27] The corridor has a distinctly industrial character in certain portions, its residential population is perceived to be primarily low- to moderate-income, its residential density, especially north of the IH-610 Loop, is low and there is a perception of poor quality schools in the area. These factors have contributed to a general lack of new commercial development to support the local population.

Because much of the corridor lacks the prestige and services of the central business district or Greenspoint, for example, there is a lack of residential areas for higher-income employees. Regional-serving, high-quality office development has not been attracted to the area. However, there is positive sentiment that major stimulus projects such as the Hardy Rail Yard redevelopment could generate more momentum in selected areas of the corridor.[28] In addition, communities in areas such as the Near Northside and the Airline Drive area just south of Greenspoint have been formulating revitalization plans (the Northside Village Revitalization Plan is an example) that aim to take advantage of transit investment, particularly LRT if it is implemented.

Potential impacts on housing development in the corridor depend on several factors. Relative to other commuting corridors in Houston, improved access via a new advanced high capacity transit investment will help redirect housing demand if travel times to employment centers are significantly reduced. However, most of this effect would be felt for lower- and middle-income housing, the occupants of which may be more likely to ride transit. Other factors, such as where potentially relocating households reside now,

[27] From interviews with local real estate professionals, including Mike Inselmann of Metro/Study, Kelly Parker of Cushman and Wakefield, and Jim McAllister of McAllister & Associates.
[28] From interview with Kelly Parker of Cushman & Wakefield.

the relative quality of the schools, and the location of a spouse's workplace, will also be strong influences on residential demand impacts.[29]

Potential impacts on commercial development would likely differ with the type of service offered by a transit investment. A slower-speed service with frequent stops would probably generate positive impacts on neighborhood-level commercial uses, such as convenience retail and smaller medical/professional buildings. For an advanced high-capacity transit facility to impact regional-serving uses such as large office buildings, the service would need to be at least comparable in speed and directness to automobile travel between major activity centers and major middle- and upper-income residential areas.[30]

Proximity to major highways would make a difference in the potential impacts of advanced high capacity transit. Freeway access in particular would improve the potential not only for larger-scale commercial, but also for residential development. However, the relative perceived benefits of transit access would likely be overwhelmed by the benefits of freeway access, thus reducing the potential for land use changes that would be primarily induced by or oriented to the advanced high capacity transit.[31]

Real estate professionals report that there may be limited potential for transit-oriented site and building designs. For retail in particular, developers would need to see evidence of strong pedestrian traffic, including that from feeder buses, to orient structures and entrances closer to the street instead of behind parking. Regarding feeder buses, they are viewed positively as long as public space is available for congregating patrons.[32] Transit-friendly residential subdivisions would have appeal, as long as automobile access and circulation is not penalized.[33]

Economic Development Potential – Blue Line

The Blue Line passes through the Woodland Heights area south of the IH-610 Loop. The residents of this area might be inclined to use transit but are also active in preserving the existing character of the neighborhood. Existing home values could increase with an advanced high capacity transit investment, but the potential for new transit-oriented residential and commercial development in this area could be limited.
In the northern half of the corridor, the Blue Line is located primarily along IH-45 and is more proximate to growing higher-income neighborhoods to the west than either of the other two alignments. This factor, plus the additional benefits of IH-45 frontage and access, could be more encouraging to residential and commercial development in

[29] From interview with Mike Inselmann of Metro/Study.
[30] From interview with Kelly Parker of Cushman and Wakefield and similar to conclusions from background research.
[31] From interviews with real estate professionals including Kelly Parker and Jim McAllister.
[32] From interview with Kelly Parker.
[33] From interview with Mike Inselmann of Metro/Study.

general, although impacts specific to an advanced high capacity transit line would likely be limited.[34]

Much of west side of the northern portion of the Blue Line lies within The Woodlands, a fact that would likely enhance coordination of new development with transit facilities.

Economic Development Potential – Red Line

Inside the IH-610 Loop, advanced high-capacity transit could provide the stimulus for significant neighborhood-level development and redevelopment within the existing residential neighborhoods east of IH-45, which have less economic momentum than neighborhoods west of IH-45. North of the IH-610 Loop, the challenges of lack of infrastructure, scattered industrial sites, and generally poor image could hamper both residential and commercial development, despite significant available land, especially north of Little York Road.[35]

New low-to-moderate income residential projects along an LRT line would be less likely to be negatively influenced by the industrial image of the environment, because residents already have few options for affordable new housing development in close-in locations.[36] The Hardy Toll Road provides little incentive for development because it has so few access/egress points and lacks continuous, adjacent frontage roads, meaning developers are unable to capitalize on the benefits of highway visibility through improved highway access.[37]

Economic Development Potential – Green Line

The Green Line's general development trends inside the IH-610 Loop generally mirror that of the Red Line, since they share much of the same alignment through different parts of the same neighborhoods. North of the IH-610 Loop, the Green Line is distinguished by its location along Airline Drive. The neighborhoods along the Green Line have experienced recent commercial and residential development south of Little York. However, north of Little York, this alignment has been relatively stagnant in terms of development and has little to give it a competitive edge for large-scale projects, save for public investment efforts within the Greenspoint TIRZ.[38] Since Airline Drive is a major thoroughfare, it is conducive to transit-friendly neighborhood-level development and redevelopment.

[34] From meeting conducted at Houston Northwest Chamber of Commerce, including Jim McAllister and Sue Pellegrino.
[35] From meetings with Houston Northwest Chamber of Commerce and Greater Greenspoint Management District.
[36] From interview with Mike Inselmann of Metro/Study.
[37] From meeting with Houston Northwest Chamber of Commerce.
[38] From meeting with Greater Greenspoint Management District.

5.5.2: Summary of Findings from Qualitative Analysis

Appendix H provides detailed descriptions of each alignment with regard to factors that would likely affect economic development potential. Detailed information is provided regarding a variety of factors, including vacant land, special financing districts, environmental constraints, and sites that present significant or special economic development potential. A summary of the key findings from the qualitative analysis is provided below.

Blue Line

- Large potential development/redevelopment sites such as the Hardy Rail Yard border I-10.
- Northside Village Economic Revitalization Plan calls for neighborhood economic development with transit on North Main Street and intersections with Quitman and Hogan as key nodes.
- Woodland Heights neighborhood generally opposes densification and additional commercial encroachment.
- Major redevelopment opportunity exists at Northline Mall.
- There are large vacant tracts of land just south of the Greenspoint area.
- The Greenspoint TIRZ seeks to promote transit-friendly development and redevelopment of Greenspoint Mall.
- Many large vacant tracts are located along IH-45 between Greenspoint and The Woodlands, though many may be already committed for development.
- The Woodlands Town Center is rapidly developing as a mixed-use activity center, portions of which are planned to be pedestrian-friendly.

Red Line

- Large potential development/redevelopment sites, such as the Hardy Rail Yard border IH-10.
- Northside Village Economic Revitalization Plan calls for neighborhood economic development with transit on North Main Street and intersections with Quitman and Hogan as key nodes.
- The large trucking terminal site at Irvington and Patton has redevelopment potential, with community support.
- Areas along Irvington Boulevard are affected by deed restrictions.

- Scattered industrial sites, lack of infrastructure, and limited access to Hardy Toll Road are challenges to development along Hardy Road north to Spring.

- The alignment touches the eastern extremity of Greenspoint TIRZ.

- Old Town Spring is a pedestrian-oriented, historic commercial district adjacent to the Red Line.

- Portions of the alignment north of the Montgomery County line lack road access.

- The Woodlands Town Center is rapidly developing as a mixed-use activity center, portions of which will be pedestrian-friendly.

Green Line

- Large potential development/redevelopment sites such as the Hardy Rail Yard border I-10.

- Northside Village Economic Revitalization Plan calls for neighborhood economic development with transit on North Main Street and intersections with Quitman and Hogan as key nodes.

- The large trucking terminal site at Irvington and Patton has redevelopment potential with community backing.

- Major redevelopment opportunity exists at Northline Mall.

- Airline Drive between Tidwell and West Road has numerous vacant or underutilized tracts of land.

- Portions of Airline Drive just south of Greenspoint are targeted for transit-friendly revitalization by the Greenspoint TIRZ and area civic groups.

- The Greenspoint TIRZ seeks to promote transit-friendly development and redevelopment of Greenspoint Mall.

5.6 Evaluation of Findings

5.6.1: Evaluation Framework

The evaluation of the findings from the research and both the quantitative and qualitative analyses hinges upon being able to determine to what extent there are opportunities for land use changes that are related to, or potentially induced by, the proposed advanced high-capacity transit. There are certain common characteristics for

all three alignments that help to define the nature of their economic development potential. These common characteristics include:

- Connection to and through several major activity centers.

- Routing along major thoroughfares and highways extending from the urban core into the growing suburban fringe areas.

- Established residential neighborhoods with relatively few large development or redevelopment opportunities within the south section of the corridor.

The relationships between these commonalities and consideration of the varying land use characteristics along the three alignments imply that the following conditions exist, related to economic development potential of the corridor:

- Within existing activity centers, such as Greenspoint, The Woodlands, and (on a smaller scale) Northline Mall, advanced high capacity transit would serve commuters and business travelers to and from these centers and could add to their dynamism by spurring large-scale, high-value commercial development such as office buildings, regional retail centers, or high-density multifamily residential projects.

- In other areas, mostly to the north of Greenspoint, the economic development scenario is related more to the potential for development of new residential subdivisions and mixed-use projects on large sites, ideally with transit connections in mind (large-scale transit-oriented development (TOD).

- In some portions of the corridor, principally south of Greenspoint, the alignments would serve the needs of existing neighborhoods and potentially bring some degree of new development or redevelopment, upgrading of existing development, and general revitalization.

The differences in economic development potential between the LRT and BRT technologies were difficult to determine. Local real estate professionals and community representatives generally thought of the potential alignments as LRT, probably because that was the concept with which they were most familiar. The lack of familiarity with BRT would likely have short-term implications for economic development potential. Developers and tenants would likely be more cautious about the accessibility benefits of BRT in the short term, and thus land use changes and new economic activity would likely come about more slowly than with LRT, all other factors being equal and assuming that BRT did not already exist in other corridors in Houston.

There is a lack of empirical evidence to indicate a correlation between economic development and bus rapid transit (BRT) in the United States. As a form of public transit, BRT is not familiar to the public. When compared to rail based systems, "BRT

has little in the way of the psychological, nostalgic and even romantic attraction." [39] As a point of reference, there are cases of economic development associated with the investment in BRT systems in other countries (Brazil and Canada).

To provide a framework for the evaluation of the qualitative analysis in order to compare the three alignments for the North-Hardy Study, the following evaluation criteria were established based on the conditions discussed above:

- How well does each alignment connect and support the major activity centers and areas with a commercial focus within the corridor.[40]
- How well does each alignment allow for and encourage the development of large-scale TOD.
- How well does each alignment serve and support existing neighborhoods with revitalization potential, existing improvement plans, and smaller infill or redevelopment sites.

The results from the analysis of the three alignments were evaluated based on the above criteria. In addition, consideration was given to the expected operational and design characteristics of the proposed advanced high capacity transit service (speed, travel time, frequency, number of stops, etc.).[41]

A “do nothing” scenario was included in the evaluation in order to provide a benchmark for the comparative evaluation of the alignments. The “do nothing” scenario is defined as the absence of new advanced high-capacity transit investment in the corridor and a level of transit-oriented policies similar to those currently existing, perhaps with some enhancements such as increased frequency of local buses, improved bus stops, and additional or expanded Park & Ride facilities. It assumes that freeway improvements that would have been made in conjunction with an advanced high-capacity transit investment, will not be made, likely resulting in increased congestion, particularly in the southern portion of the corridor. The “Trip 2000” report from the Greater Houston Partnership states that, with projected growth in the Houston region of 2 million people and 1 million jobs through 2025, regional vehicle miles traveled is projected to grow 55 percent. This illustrates the increase in demand that can be expected to burden freeways such as IH-45 in the North-Hardy Corridor.[42]

Under a “do nothing” scenario, it is reasonable to expect that population, employment, and development would proceed based on past trends and current land use patterns.

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[39] Zimmerman, Samuel, et al. Bus Rapid Transit: An Overview: Some Initial Findings of the U.S. Transportation Research Board’s Transit Cooperative Research Program Project “Development of Bus Rapid Transit Planning and Implementation Guidelines.” Prepared by DMJM+Harris, November 2001, Page 3

[40] Bush Intercontinental Airport, despite having strong economic development potential, was not considered under this criterion, for two reasons: (1) the lands are under City of Houston control and therefore it operates with a different market dynamic from the rest of the corridor, and (2) all three alignments follow the same route on their segments within the boundary of IAH so there are no differences between them.

[41] For reference, a summary of projected 2025 travel times is included as Appendix H.

[42] “TRIP 2000: Travel Rate Improvement Program for the Houston Area Preserving Mobility in the 21st Century.” Greater Houston Partnership, 2000.

The H-GAC population and employment projections presented earlier in Section 5.4 of this report reflect this assumption.

In southern parts of the North-Hardy Corridor, most new development under a "do nothing" scenario would likely be small-scale infill or redevelopment projects. Demand for existing commercial properties in this part of the corridor, particularly office properties, would be impacted by the increased freeway congestion. Without the planned freeway improvements associated with an advanced high-capacity transit investment, businesses that depend upon a workforce commuting from suburban areas to the north would tend to move to locations closer to their employee's homes.

In northern portions of the corridor, new subdivisions would likely be developed in a scattered fashion on vacant land, and commercial developments would continue to locate along major roads and highways. All development could be expected to be automobile-oriented in its location, orientation and site layout.

5.6.2: Evaluation

The following presents the evaluation of the three proposed alignments, along with the do nothing scenario, against the three criteria defined above (activity centers, large scale TOD, and neighborhood revitalization).

Activity Centers

Typical land use in activity centers includes large-scale office buildings, regional-serving retail properties, or high-quality multifamily residential projects. The relative potential for such land uses associated with advanced high-capacity transit would be linked to the type of transit service provided for suburban commutes and for business trips to other key commercial districts.

To have a strong impact, the transit service needs to be perceived as relatively high-speed, regionally connected, centrally located, and requiring as few transfers as possible.[43] In general, the transit service would need to be competitive with, if not superior to, auto travel during peak periods of the day for suburban residents, and roughly comparable to auto travel during other times, in order to significantly spur economic development. Based on the projected travel times for both the transit service and automobile travel in 2025, all three proposed alignments appear to offer at least moderate potential for economic development in the corridor's activity centers.

- Blue Line
  The Blue Line is the only alignment that would connect all of the major activity centers in the corridor – Downtown Houston, The Woodlands, Greenspoint, IAH, and Northline Mall. As such, it would serve sites that are likely candidates for major development or redevelopment projects. Projected travel times on the

[43] Based on background research and interview with Kelly Parker.

Blue Line, after accounting for waiting and station access time, are projected to be competitive with or superior to auto travel during peak commute hours and largely uncompetitive during less congested periods.

This relative improvement in accessibility would generate the potential for economic development in Greenspoint. However, the Blue Line's economic development potential in Downtown Houston would be moderated, because it would result in the elimination of the HOV service on IH-45 between Downtown and points to the north. The travel times via the proposed advanced high-capacity transit service from outlying areas would be significantly slower than that of the existing HOV system.

In summary, the Blue Line offers a significant opportunity to generate economic development impacts for the activity centers in the corridor. However, there would be a less positive impact for Downtown Houston, resulting from the loss of the existing HOV lane on IH-45.

- Red Line

  Because the Red Line would not provide a direct connection between Greenspoint and The Woodlands, its economic development potential for those two activity centers would be less than that of the Blue Line. Still, travel times between the two activity centers would be competitive with IH-45 during peak commute times, as would travel times between The Woodlands and Downtown Houston. Northline Mall would not be served by the Red Line.

  Service speeds from The Woodlands to Downtown Houston would be competitive with auto travel during peak commute times. Within the Greenspoint area, the Red Line might not be as central to potential development and redevelopment sites, such as Greenspoint Mall, as the other two alignments.

  The Red Line would not result in the loss of HOV connection to Downtown Houston along IH-45, as with the Blue Line.

  The north section of the Red Line could promote economic development for the outlying activity centers, although the impacts would likely be more limited than that of the Blue Line. The south section of the alignment would support slightly higher level of economic development potential for Downtown Houston than the Blue Line, since existing HOV connections would be preserved.

- Green Line

  The Green Line would provide connections between Downtown Houston, Greenspoint, Northline Mall, and IAH. It would provide greater benefits to Downtown Houston than the Blue Line since it preserves existing HOV service along IH-45.

The Green Line would not serve The Woodlands, other than with HOV service. This is a limiting factor with this alignment, since it does not promote two-way connections between The Woodlands and the other activity centers in the corridor (except for Downtown Houston). Improving HOV service and Park & Ride facilities can help to maintain existing levels of economic activity in activity centers as highway congestion increases. However, unless the geographic scope and frequency of the HOV service is improved beyond the connection to Downtown Houston, HOV service is unlikely to anchor new development in The Woodlands in the absence of other contributing factors. Overall, the anticipated economic development potential for activity centers resulting from the Green Line would be moderate at best.

- "Do Nothing" Scenario
  Under the "do nothing" scenario, growing freeway congestion would likely transfer economic activity from southern activity centers to northern ones. Otherwise, economic activity would probably continue in a manner similar to existing patterns. Development in Downtown Houston would continue to be supported by HOV service from suburban areas.

Large-Scale TOD

The speed of service and frequency of stops also influences the potential for large-scale TOD. In order for developers to implement large-scale TOD, (that is, physically orienting development to a transit station and marketing the project to buyers and tenants as such), the developers must perceive real accessibility benefits conferred by transit. This means that transit travel would generally need to be more convenient or faster than auto travel for a significant potential pool of buyers or tenants. Therefore, transit service that encourages large-scale TOD would need to offer commute times that are roughly equal to, or preferably faster than, auto travel for a significant pool of potential residents. The operating speeds for all three alignments would be sufficiently rapid during peak hours to encourage large-scale TOD that appeal to commuters.

- Blue Line
  The Blue Line offers strong demographic projections, a plentiful supply of vacant land, recent commercial and residential development in nearby areas, and a relatively positive market image, all of which would work well in favor of large-scale TOD. In addition, there are many areas of the Blue Line that are located within special districts, which would help to build basic infrastructure and provide improvements required for TOD. The speed and direct connections to activity centers of this alignment would be appealing to commuters, further supporting the potential that this alignment has for TOD.

  The Blue Line would offer access to both Northline Mall and Greenspoint Mall, both opportunities for large-scale TOD in the south section of the corridor. However, in the northern portion of the corridor, where most of the significant areas of vacant land are found, the alignment would be primarily within the IH-45

right-of-way. Market pressures could skew development away from a pedestrian-friendly transit orientation, toward highway-oriented commercial activities. Real estate professionals familiar with the northern section of the corridor indicated that most of the vacant land in the area is already committed for development, although perhaps not in the short term.

In general, the Blue Line would offer some large-scale TOD opportunities, but there also could be significant challenges involved in generating market interest in such development concepts.

- Red Line

  The Red Line has some characteristics that would support large-scale TOD, similar to the Blue Line, including strong demographic projections and abundant vacant land. However, the market image and development activity in the vicinity of this alignment has historically been much weaker. Scattered industrial projects would also discourage new single-family residential development in many locations.

  The Red Line has an absence of coverage by special districts in many areas, presenting a challenge to the provision of even basic infrastructure. The presence of heavily used freight rail road tracks would present challenges to achieving the level of pedestrian and vehicular movement that is key to TOD, and the associated noise impacts could present another deterrent to residential development.

  From the interviews with local real estate/development experts, it became apparent that both access and general opportunities for large-scale TOD would be improved along the Red Line if the alignment made its western swing over to IH-45 via the Hardy Toll Road instead of in the Oak Ridge North area.

  In summary, despite the presence of large vacant tracts and strong demographic growth forecasts in the general area, the Red Line offers opportunities for large-scale TOD that are more challenging in many ways than along the Blue Line because of both basic infrastructure issues and market perceptions.

- Green Line

  The potential for large-scale TOD along the Green Line would rest mostly with a few possible large redevelopment sites, including the existing trucking facility at Irvington and Patton. A positive characteristic of the Green Line is that it would cross or be proximate to IH-45 at several locations, including Northline Mall. The Green Line also supports potential opportunities for large-scale TOD in the Greenspoint area. These situations create possibilities for large-scale TOD with non-conflicting access from both highways and transit, a highly attractive combination. Like both the Blue Line and Red Line, while there are some opportunities for large-scale TOD, these opportunities would be tempered by the level of acceptance by the development community of the TOD concept in these

largely suburban areas, at the time of redevelopment. Overall, however, the potential for large scale TOD along the Green Line would be limited due to a general lack of large tract opportunities, since the Green Line does not extent into the northern portion of the corridor.

- Do Nothing
  Existing HOV and Park & Ride service has proven unable to generate large-scale TOD projects in non-downtown locations. Without additional advanced high-capacity transit investment, there would be limited potential for large-scale TOD projects in the North-Hardy Corridor, short of a dramatic change in market perceptions of these existing transit services and facilities.

Support for Neighborhood Revitalization

In comparison to evaluation criteria for activity centers and large-scale TOD, transit service does not need the same emphasis on speed in order to promote significant impacts on neighborhood revitalization. Transit service improvements, over the existing service provided by local bus, and more aesthetically attractive transit infrastructure, could assist in generating neighborhood-level economic development. This could be felt particularly in neighborhoods that are within the urban core, or close to major activity centers where many residents may use transit to make work, errand, or leisure trips that are significantly shorter in length than those typically made by suburban commuters. Neighborhood revitalization associated with transit works best in a "pedestrian-scaled" environment, where streets and traffic, as well as buildings, are conducive to walkability.

A reasonable initial indicator for evaluating neighborhood revitalization is to examine the length that each alignment travels along major thoroughfares, as opposed to freeways, tollways, or railroads. Thoroughfares are more likely to be central to an existing residential area and associated neighborhood businesses, with greater possibilities for safe and convenient pedestrian movement. Exhibit 5.30 provides a summary of the type of right-of-way environment that each alignment is proposed to follow:

Exhibit 5.30: Right-of-Way Environments

	Length in Miles		
	Blue Line	Red Line	Green Line
Major Thoroughfares	8.6	9.0	14.5
Highway/Railroad	25.8	27.4	3.4
Other	6.0	5.8	6.1
Total	40.4	42.2	24.0

Source: Knudson & Associates.

As shown in the above table, the Green Line would have more of its alignment located along major thoroughfares, so it could be more conducive to neighborhood revitalization than the other two alignments. The existing neighborhoods that would be served by any

of the alignments are located primarily in the south section of the corridor, so the evaluation of the potential for neighborhood revitalization focused on this area.

A consideration that affects all three alignments is the potentially negative impact that the proposed number of stations would have for neighborhood revitalization, especially between Crosstimbers and Downtown Houston. The density of development may not be sufficient to support significant economic development impacts at every proposed station. Further, having too many stations could dilute the revitalization opportunities. With fewer stations, the potential impacts could be more concentrated and effectively generate higher quality neighborhood revitalization.

Based on experiences in other cities, the economic stimulus provided by new stations could result in increased real estate prices for properties that are in close proximity to the stations (i.e., within a ¼-mile radius). These new station areas could provide an opportunity for public agencies, such as the City of Houston and its Housing and Community Development Department, other nonprofit housing corporations, and civic groups to work together to develop policies and programs to ensure that a range of inclusive housing options continues to be available within existing neighborhoods.

- Blue Line
  North of Northline Mall, the Blue Line is poorly suited to neighborhood-level development by virtue of its freeway orientation. There would be challenges associated with auto-dominated uses that are typical of freeway frontage, as well as station locations that would be peripheral to existing neighborhoods instead of integral to them. Inside the IH-610 Loop, the Blue Line serves the Woodland Heights neighborhood which has some revitalization momentum, but also has historic preservation and community resistance issues that could act to discourage significant redevelopment or land use densification.

- Red Line
  The majority of the Red Line's length would be along a highway or freight railroad right-of-way. Therefore, similar to the Blue Line, it would not be well suited to serving existing residential neighborhoods. However, the extent that the Red Line travels through highway/rail environments is slightly shorter than that of the Blue Line and it has a longer stretch along major thoroughfares.

  In its southern section of the corridor along Irvington, the Red Line would serve existing neighborhoods well. The portions of Irvington north of the IH-610 Loop might be receptive to transit-based revitalization. However, the Lindale Park area, which has deed restrictions that include many of the private properties along Irvington, could be more limited in its potential for neighborhood revitalization.

- Green Line
  Of the three alignments, the Green Line would have the longest total stretch along major thoroughfares in existing residential and neighborhood commercial

areas. Therefore, it would offer the greatest potential for supporting neighborhood revitalization, as long as some form of transit-related revitalization is part of community plans and expectations.

One example would be the Near Northside area, where the alignment would travel along properties not subject to deed restrictions and through neighborhoods that are seeking transit-based revitalization as indicated by the Northside Village Economic Revitalization Plan. The portion of Airline Drive that is within the Greenspoint District also has improvement plans that would tie into the potential for neighborhood revitalization provided by the Green Line.

- Do Nothing
  Existing bus service has possibly led to minor levels of revitalization in some Houston neighborhoods. Continued improvements in basic bus service might continue these effects, but without new permanent advanced high capacity transit infrastructure that would provide a significant increase in the quality of service and the visibility of the role of transit within a community, it is unlikely that there will be much noticeable impact in terms of neighborhood-level economic development.

5.6.3 Summary of Economic Development Potential

Exhibits 5.31, 5.32, and 5.33 present a summary of the evaluation of each alignment with respect to the economic development criteria discussed in the previous section – connection of activity centers, potential for large-scale TOD and support neighborhood revitalization.

Exhibit 5.31: Economic Development Potential – South of Beltway 8

Criteria	Blue Line	Red Line	Green Line	Do-Nothing
Connect Activity Centers	C	C	B	C
Potential for Large-Scale TOD	C	D	C	F
Support Neighborhood Revitalization	C	B	A	D
Overall Economic Development Potential (South Section)	C	C	B	D

Exhibit 5.32: Economic Development Potential – North of Beltway 8

Criteria	Blue Line	Red Line	Green Line	Do-Nothing
Connect Activity Centers	B	C	---	C
Potential for Large-Scale TOD	B	C	---	F
Support Neighborhood Revitalization	F	F	---	F
Overall Economic Development Potential (North Section)	C	D+	---	D-

Exhibit 5.33: Economic Development Potential – Total Corridor

	Blue Line	Red Line	Green Line	Do-Nothing
Overall Grade	C	C-	B	D

Generally, each of the proposed alignments offers at least some improvement over a "do nothing" scenario. The Green Line shows the greatest overall potential for economic development in the south section. In the north section, the Blue Line shows a greater potential for economic development than the Red Line.

6.0: Cost Estimates

6.1: Capital Costs

6.1.1: Methodology

Capital cost estimates for each alignment alternative were developed using a standardized spreadsheet developed by METRO's General Planning Consultant. The capital cost estimates are based on METRO experience and supplemented with national cost data when applicable. Capital cost estimating Master Spreadsheets were developed for the following transit technologies:

- Light Rail Transit (LRT),
- Commuter Rail (CR),
- Bus Rapid Transit (BRT), and
- High Occupancy Vehicle (HOV)

Each Master Spreadsheet defines the elements to be estimated and specifies the unit cost for each element. Quantities were then estimated for each element to develop the cost estimate for each of the North-Hardy Corridor short listed alternatives. In early stages of study, quantities are more grossly defined, reflecting the level of definition of the alignments. The Master Spreadsheets at this conceptual stage provide an order of magnitude comparison of costs and include project contingency, management, overhead, and right-of-way costs.

In subsequent phases, as greater engineering definition becomes available and the alignments are more specifically defined, the Master Spreadsheets can be used to provide refined capital costs. Unit costs remain constant to ensure consistency. For buses and light rail vehicles, adjustments to life cycle costs are based on current FTA guidance and METRO operating experience. Quantity estimates would be refined and cost estimates would be developed using 2003 constant dollars.

6.1.2: Results

Based on the Capital Cost Methodology, above, unit costs provided by the General Planning Consultant were applied to the estimated quantities for each cost category. Capital costs for each of the three North-Hardy Corridor Alternative alignments were calculated. For each alignment, a LRT and a BRT overall capital cost was estimated as well as the cost per route mile. All capital cost estimates in this report are in 2002 dollars. The cost estimates are based on the system planned for the year 2025.

In order to provide consistency over several Study Corridors, the General Planning Consultant furnished a Master Spreadsheet to all Corridor Consultants. As indicated in Section 6.1.1, the Master Spreadsheet provided each Corridor Consultant with a working template, from which to calculate capital costs for various alignments and technologies under consideration.

For the North-Hardy Corridor, the short-list of Alternatives consists of LRT and BRT alignments. Exhibits 6.1 and 6.2 present cost estimates for the North-Hardy Corridor Blue, Red, and Green Alternatives for LRT and BRT, respectively.

Exhibit 6.1: Summary of Cost Estimates for LRT Alternatives

Cost Category	Blue Alternative Total Cost Dollars	Red Alternative Total Cost Dollars	Green Alternative Total Cost Dollars
Vehicles	$ 106,260,000	$ 64,400,000	$ 67,620,000
Stations	$ 86,002,800	$ 47,704,800	$ 58,016,400
Guideway/Roadway	$1,364,261,946	$1,227,921,048	$ 946,050,025
Maintenance/Inspection Facilities	$ 44,460,000	$ 26,676,000	$ 28,454,400
Transit Centers	$ 8,424,000	$ 5,616,000	$ 5,616,000
Park-and-Ride Lots	$ 57,720,000	$ 53,040,000	$ 24,960,000
Road Reconstruction	$ 216,881,364	$ 128,027,545	$ 174,855,909
Right-of-Way	$ 62,381,330	$ 94,820,660	$ 34,718,266
Project Contingency	$ 194,639,144	$ 164,820,605	$ 134,029,100
Total Cost (2002 Dollars)	$2,141,030,583	$1,813,026,659	$1,474,320,100
Total Length in Miles	40.3	42.6	24.0
Cost per Mile (2002 dollars)	$ 53,085,896	$ 42,569,342	$ 61,439,701

Exhibit 6.2: Summary of Cost Estimates for BRT Alternatives

Cost Category	Blue Alternative Total Cost Dollars	Red Alternative Total Cost Dollars	Green Alternative Total Cost Dollars
Vehicles	$ 96,140,000	$ 58,190,000	$ 51,865,000
Stations	$ 110,869,200	$ 57,876,000	$ 74,209,200
Guideway/Roadway	$ 869,523,395	$ 720,418,935	$ 623,657,497
Maintenance/Inspection Facilities	$ 37,346,400	$ 22,604,400	$ 20,311,200
Transit Centers	$ 8,424,000	$ 5,616,000	$ 5,616,000
Park-and-Ride Lots	$ 57,720,000	$ 37,440,000	$ 24,960,000
Road Reconstruction	$ 216,881,364	$ 128,027,545	$ 174,855,909
Right-of-Way	$ 63,401,426	$ 95,476,436	$ 34,572,538
Project Contingency	$ 146,030,578	$ 112,564,932	$ 101,004,734
Total Cost (2002 Dollars)	$1,606,336,363	$1,238,214,248	$1,111,052,079
Total Length in Miles	40.3	42.6	24.0
Cost per Mile (2002 dollars)	$ 39,828,392	$ 29,072,913	$ 46,301,144

As can be seen, the Master Spreadsheet divides overall capital costs for LRT and BRT into the following top-tier cost categories: vehicles, stations, guideway/roadway, maintenance/inspection facilities, transit centers, park & ride facilities, road reconstruction, right-of-way acquisition, and overall project contingency. Each top-tier cost category is, in turn, broken down into lower-tier cost drivers. It is first necessary to determine the quantities of each applicable cost driver prior to applying the associated unit cost. For example, the top-tier category, Stations, is divided into lower-tier cost drivers: At-grade, Elevated, Underground, and Add-On Costs. Therefore, for any particular alignment and technology, it is first necessary to determine the quantities of each type of station. (For North-Hardy Alternatives, Underground Stations are not applicable.) The various quantities are then inserted into the Master Spreadsheet, which automatically calculates the cost of each type of station as well as the associated add-on costs (which are principally soft costs relating to design, engineering, and other ancillary costs). Thus, the primary exercise of each Corridor Consultant is to compute the site and system specific quantities for each alignment and technology. Once this is done, the quantities are inserted into the Master Spreadsheet, which automatically calculates the total cost after applying an overall project contingency of 10%. The Master Spreadsheet also calculates the capital cost per route mile for each alternative alignment.

The estimated quantities for each of the three North-Hardy Alternatives for LRT and BRT technologies are presented in Exhibits 6.3 and 6.4 respectively.

Quantities of civil elements, such as number and type of stations, parking facilities, maintenance facilities, transit centers, guideway miles, road reconstruction, and right-of-way requirements are taken directly from the CAD drawings that were prepared for the Blue, Red and Green Alternatives. Notes on the spreadsheets for each alignment and technology explain the assumptions used in determining the estimated quantities.

It should be noted that the cost estimates at this conceptual level of development provide very preliminary estimates of the capital costs. Further, considerable refinement would be required once a particular alignment is selected as the Locally Preferred Investment Strategy, especially as it relates to the mix of aerial versus at-grade construction, and overall project length. Nonetheless, the cost estimates serve as a useful tool for comparing various Alternatives and alignments at this stage of investigation.

Exhibit 6.3: Summary of Quantities for LRT Alternatives

Cost Category	Unit Cost	Unit Quantity	Light Rail Input Quantities					
			Blue Alternative		Red Alternative		Green Alternative	
			Input Quantity	Output Cost	Input Quantity	Output Cost	Input Quantity	Output Cost
Vehicles		**Vehicle**		**$ 106,260,000**		**$ 64,400,000**		**$ 67,620,000**
Vehicles	$ 2,800,000	Vehicle	33	$ 92,400,000	20	$ 56,000,000	21	$ 58,800,000
Add-On Costs	15%	Percentage		$ 13,860,000		$ 8,400,000		$ 8,820,000
Stations		**Station**		**$ 86,002,800**		**$ 47,704,800**		**$ 58,016,400**
At-Grade	$ 790,000	Station	9	$ 7,110,000	17	$ 13,430,000	8	$ 6,320,000
Elevated	$ 3,430,000	Station	14	$ 48,020,000	5	$ 17,150,000	9	$ 30,870,000
Underground	$15,760,000	Station	0		0		0	
Add-On Cost	56%	Percentage		$ 30,872,800		$ 17,124,800		$ 20,826,400
Guideway/Roadway		**Mile**		**$1,364,261,946**		**$1,227,921,048**		**$ 946,050,025**
In-Street (single track)	$10,500,000	Mile	0		0		0	
In-Street (double track)	$17,250,000	Mile	4.95	$ 85,358,097	9.29	$ 160,173,438	5.58	$ 96,302,699
Exclusive Surface	$11,990,000	Mile	17.27	$ 207,100,000	22.01	$ 263,870,833	4.05	$ 48,595,833
Elevated	$32,140,000	Mile	18.11	$ 582,068,792	11.30	$ 363,084,606	14.36	$ 461,543,792
Underground	$45,370,000	Mile	0		0		0	
Add-On Cost	56%	Percentage		$ 489,735,057		$ 440,792,171		$ 339,607,701
Maintenance/Inspection Facilities		**Vehicle**		**$ 44,460,000**		**$ 26,676,000**		**$ 28,454,400**
Maintenance/Inspection Facilities	$ 570,000	Vehicle	50	$ 28,500,000	30	$ 17,100,000	32	$ 18,240,000
Add-On Cost	56%	Percentage		$ 15,960,000		$ 9,576,000		$ 10,214,400
Transit Centers		**Center**		**$ 8,424,000**		**$ 5,616,000**		**$ 5,616,000**
Transit Centers	$ 450,000	Bus Bay	12	$ 5,400,000	8	$ 3,600,000	8	$ 3,600,000
Associated Surface Parking	$ 2,000	Space	0		0		0	
Add-On Cost	56%	Percentage		$ 3,024,000		$ 2,016,000		$ 2,016,000
Park-and-Ride Lots		**Space**		**$ 57,720,000**		**$ 53,040,000**		**$ 24,960,000**
Surface	$ 4,000	Space	5,500	$ 22,000,000	3,500	$ 14,000,000	1,500	$ 6,000,000
Structure	$ 10,000	Space	1,500	$ 15,000,000	2,000	$ 20,000,000	1,000	$ 10,000,000
Add-On Cost	56%	Percentage		$ 20,720,000		$ 19,040,000		$ 8,960,000
Road Reconstruction		**Lane-Mile**		**$ 216,881,364**		**$ 128,027,545**		**$ 174,855,909**
Road Reconstruction	$ 2,540,000	Lane-Mile	54.7	$ 139,026,515	32.3	$ 82,068,939	44.1	$ 112,087,121
Add-On Cost	56%	Percentage		$ 77,854,848		$ 45,958,606		$ 62,768,788
Right-of-Way		**Square Foot**		**$ 62,381,330**		**$ 94,820,660**		**$ 34,718,266**
Right-of-Way	$ 11	Square Foot	5,671,030	$ 62,381,330	8,620,060	$ 94,820,660	3,156,206	$ 34,718,266
Project Contingency	10%	Percentage		**$ 194,639,114**		**$ 164,820,605**		**$ 134,029,100**
Total Cost (2002 Dollars)				**$2,141,030,583**		**$1,813,026,659**		**$1,474,320,100**
Total Length in Miles				**40.3**		**42.6**		**24.0**
Cost per Mile (Constant Dollars)				**$ 53,085,896**		**$ 42,569,342**		**$ 61,439,701**

Exhibit 6.4: Summary of Quantities for BRT Alternatives

Cost Category	Unit Cost	Unit Quantity	Light Rail Input Quantities					
			Blue Alternative		Red Alternative		Green Alternative	
			Input Quantity	Output Cost	Input Quantity	Output Cost	Input Quantity	Output Cost
Vehicles		**Vehicle**		**$ 96,140,000**		**$ 58,190,000**		**$ 51,865,000**
Vehicles	$ 1,100,000	Vehicle	76	$ 83,600,000	46	$ 50,600,000	41	$ 45,100,000
Add-On Costs	15%	Percentage		$ 12,540,000		$ 7,590,000		$ 6,765,000
Stations		**Station**		**$ 110,869,200**		**$ 57,876,000**		**$ 74,209,200**
At-Grade	$ 850,000	Station	9	$ 7,650,000	17	$ 14,450,000	8	$ 6,800,000
Elevated	$ 4,530,000	Station	14	$ 63,420,000	5	$ 22,650,000	9	$ 40,770,000
Underground	$17,660,000	Station	0		0		0	
Add-On Cost	56%	Percentage		$ 39,799,200		$ 20,776,000		$ 26,639,200
Guideway/Roadway		**Mile**		**$ 869,523,395**		**$ 720,418,935**		**$ 623,657,497**
In-Street (single track)	$ 7,990,000	Mile	0		0		0	
In-Street (double track)	$ 5,750,000	Mile	4.95	$ 39,536,881	9.29	$ 74,190,479	5.58	$ 44,606,294
Exclusive Surface	$23,110,000	Mile	17.27	$ 99,318,182	22.01	$ 126,543,561	4.05	$ 23,304,924
Elevated	$32,140,000	Mile	18.11	$ 418,531,729	11.30	$ 261,072,970	14.36	$ 331,869,229
Underground	$53,440,000	Mile	0		0		0	
Add-On Cost	56%	Percentage		$ 312,136,603		$ 258,611,925		$ 223,877,050
Maintenance/Inspection Facilities		**Vehicle**		**$ 37,346,400**		**$ 22,604,400**		**$ 20,311,200**
Maintenance/Inspection Facilities	$ 210,000	Vehicle	114	$ 23,940,000	69	$ 14,490,000	62	$ 13,020,000
Add-On Cost	56%	Percentage		$ 13,406,400		$ 8,114,400		$ 7,291,200
Transit Centers		**Center**		**$ 8,424,000**		**$ 5,616,000**		**$ 5,616,000**
Transit Centers	$ 450,000	Bus Bay	12	$ 5,400,000	8	$ 3,600,000	8	$ 3,600,000
Associated Surface Parking	$ 2,000	Space	0		0		0	
Add-On Cost	56%	Percentage		$ 3,024,000		$ 2,016,000		$ 2,016,000
Park-and-Ride Lots		**Space**		**$ 57,720,000**		**$ 37,440,000**		**$ 24,960,000**
Surface	$ 4,000	Space	5,500	$ 22,000,000	3,500	$ 14,000,000	1,500	$ 6,000,000
Structure	$ 10,000	Space	1,500	$ 15,000,000	2,000	$ 10,000,000	1,000	$ 10,000,000
Add-On Cost	56%	Percentage		$ 20,720,000		$ 13,440,000		$ 8,960,000
Road Reconstruction		**Lane-Mile**		**$ 216,881,364**		**$ 128,027,545**		**$ 174,855,909**
Road Reconstruction	$ 2,540,000	Lane-Mile	54.7	$ 139,026,515	32.3	$ 82,068,939	44.1	$ 112,087,121
Add-On Cost	56%	Percentage		$ 77,854,848		$ 45,958,606		$ 62,768,788
Right-of-Way		**Square Foot**		**$ 63,401,426**		**$ 95,476,436**		**$ 34,572,538**
Right-of-Way	$ 11	Square Foot	5,763,766	$ 63,401,426	8,679,676	$ 95,476,436	3,142,958	$ 34,572,538
Project Contingency	10%	Percentage		**$ 146,030,578**		**$ 112,564,932**		**$ 101,004,734**
Total Cost (2002 Dollars)				**$1,606,336,363**		**$1,238,214,248**		**$1,111,052,079**
Total Length in Miles				**40.3**		**42.6**		**24.0**
Cost per Mile (Constant Dollars)				**$ 39,828,392**		**$ 29,072,913**		**$ 46,301,144**

6.2: Corridor Operating and Maintenance (O&M)

6.2.1: Project Approach and Cost Estimating Methodology

The development of METRO Solutions was achieved through a phased approach. This document explains the development of appropriate operating and maintenance (O&M) cost estimates for each phase of the study. The methodologies and associated results for each phase are presented below.

Phase one – corridor level sketch planning

In Phase One, various high capacity transit alignments and modal technologies were formulated and evaluated along ten corridors within the METRO service area. The purpose of the Phase One evaluation was to screen high capacity transit alternatives using criteria that could differentiate among alternatives at a gross level of comparison. A differential assessment of O&M costs was not conducted as part of the Phase One evaluation because the major characteristics of the initial list of alternatives, such as route alignments and transit operating plans, were similar and would not, at this gross level, identify major cost trade-offs among the alternatives within each corridor. Other criteria, such as access to population and employment, connectivity to the regional system, and improved travel time or quality of travel were used to screen the alternatives.

Phase two – corridor refinement

In Phase Two, indicators of capital and O&M costs were developed to narrow the range of alignment and technology alternatives carried forward into system planning. During this phase, ridership forecasts were generated from a sketch planning tool that was not designed to provide alternative-specific vehicle hours and vehicle miles, which are equilibrated to ridership; thus, detailed O&M cost estimates were not calculated. Instead, O&M cost estimates were indexed on the estimated number of passengers as proposed for the CBD to Reliant Park light rail line.

A cost index was developed for each high capacity transit technology under consideration: light rail transit (LRT) and bus rapid transit (BRT). The four operating scenarios were:

- Exclusive one-car LRT operation (LRT-1);
- Mixed operation using a balance of one and two-car trains (LRT-1.5);
- Exclusive two-car LRT operation (LRT-2); and
- BRT operation.

Since the CBD to Reliant Park light rail line was designed for initial operation with one-car trains, the operating costs of LRT-1 simply used the cost estimates provided in METRO's METRORail Operations and Maintenance Plan report for the CBD to Reliant Park light rail line. This report provides an estimation of vehicle hours of service and

operator costs based on a specific plan of operation. Some cost adjustments were made to reflect system extension operations versus system start-up operation. The cost of LRT-1.5 was computed by reducing vehicle hours of service and operator cost to 75 percent of LRT-1. The cost of LRT-2 was computed by reducing vehicle hours of service and operator costs to 50 percent of LRT-1. BRT costs were developed as a hybrid of METRO-operated Park & Ride bus service and LRT costs, assuming each BRT vehicle could carry 45 percent of the capacity of one light rail car.

The annual O&M costs to carry the same number of passengers as was proposed for the METRORail CBD to Reliant Park light rail line were estimated for each scenario. These calculations were based on the budgeted light rail operations and maintenance costs for FY2005 (revised as of first quarter of 2003). Each scenario retained the level of service required to carry the same number of passengers, but differed according to the number of trains (or buses) required to accommodate that level of ridership, as follows: LRT-1, $12,708,406; LRT-1.5, $11,875,868; LRT-2, $11,043,331; and BRT, $10,673,852.

The O&M Cost Index was then calculated by dividing the Total Annual Cost of each mode by the baseline case (LRT-1) to show the relative difference in O&M cost estimates of the other modes, as follows: LRT-1, 1.0; LRT-1.5, .934; LRT-2, .869; and BRT, .840. In the simplified case of providing service to carry the initial METRORail ridership, BRT had a slightly lower annual cost and, thus, lower O&M Cost Index.

However, one of the advantages of a light rail system is the cost savings realized through system expansion. As levels of ridership increase with the expansion of the system, LRT has a lower O&M cost than BRT to carry the higher ridership. The more limited carrying capacity of a BRT vehicle results in a faster growth rate for O&M costs than realized in a LRT system. Eventually, BRT O&M costs exceed LRT O&M costs when the system expands. This is due to the higher capacity of LRT vehicles as compared to BRT buses. For example, in each LRT scenario noted above, 15 LRT vehicles were assumed to provide the required level of service. Under the BRT scenario, 34 vehicles would be required to provide the same level of service shown for LRT. If capacity need doubled with expansion of the system, 30 LRT vehicles would be required, compared to 67 BRT buses.

At the end of Phase Two, BRT was not carried forward into system planning. While other factors established BRT as a non-viable option for this system, the reduced capacity provided by BRT vehicles compared with light rail on a systemwide basis of high ridership corridors and the strong community preference for LRT as the high capacity mode of choice were noted in this element of the study.

Phase three – system refinement

In Phase Three, capital and O&M cost estimates were developed for four system plan scenarios (No Build, Minimum Build, Mid-Range Build, and Maximum Build) and used as evaluation criteria. In this phase, METRO's EMME/2-based Long Range regional

travel demand model replaced the sketch planning tool to forecast ridership. O&M costs were estimated systemwide using the cost factors shown in Exhibit 6.5, as well as cost factors for bus service from METRO's bus cost allocation model. Peak vehicle, revenue mile, and revenue hour outputs were also used from the travel demand model. Each of the cost factors shown in Exhibit 6.6 are multiplied by the respective quantity of revenue train hours, revenue car miles, peak vehicles, number of stations, and guideway miles. The results are summed to produce the total annual cost.

Exhibit 6.5: Estimated Service Costs By Scenario
(shown in constant FY 2002 dollars)

	METRO Rail	LRT-1	LRT-1.5	LRT-2
Cost/Rev Train Hour	$69.40	$53.15	$54.36	$56.79
Cost/Rev Car Mile	$6.23	$5.71	$5.71	$5.71
Cost/Peak Vehicle	$42,976	$18,222	$18,222	$18,222
Cost/Station	$138,702	$109,455	$109,455	$109,455
Cost/Guideway Mile	$341,404	$292,265	$292,265	$292,265

Source: METRORail Operations and Maintenance Plan, Revision: 0, Date: 11/07/01; Calculations of LRT scenarios prepared by General Planning Consultant, March 2003.

When the cost indicators and service inputs shown in Exhibit 6.5 were applied, the following annual systemwide O&M cost estimates were generated. Annual systemwide costs include all fixed-route service but do not include costs for METROLift, special events, and other unmodeled services.

Exhibit 6.6: Estimated Annual Systemwide Operating & Maintenance Costs By System Scenario and Service Type
(Fixed Route services only, shown in constant FY 2002 dollars)

Mode	No Build	Minimum Build	Mid-Range Build	Maximum Build
Local Bus	$207,089	$241,768	$241,764	$238,852
Express Bus	$ 19,422	$46,904	$ 46,328	$ 45,055
Commuter Bus	$ 49,326	$71,212	$ 66,125	$ 22,381
Rail	$ 10,736	$65,314	$125,883	$172,928
Total	$286,572	$425,198	$480,100	$479,215

Notes: in thousands, constant FY2002 dollars
Source: Calculations based on LRT cost estimates documented in METRORail Operations and Maintenance Plan, Revision: 0, Date: 11/07/01; Based on the budgeted light rail operations and maintenance costs for FY2005 (revised as of first quarter of 2003).

The scenario-specific cost indicators and service inputs generated the following annual LRT O&M costs for the North-Hardy Corridor. The METRO travel demand model

produces daily service inputs that were annualized by multiplying them by 300, a generally accepted practice by the transit industry. The O&M costs were calculated assuming all one-car trains or all two-car trains to provide a range of costs.

Exhibit 6.7: Estimated Annual LRT Operating & Maintenance Costs by Alignment

Alignment	One-Car Trains	Two-Car Trains
Blue Line	$15,761	$14,337
Red Line	$11,885	$10,763
Green Line (at grade)	$10,255	$9,027
Green Line (aerial)	$9,734	$8,732

Note: in thousands, constant FY2002 dollars
Source: General Planning Consultant Calculations of March 2003

7.0: Evaluation of Alternatives

7.1: Goals Attainment

The goals for the North-Hardy Planning Studies were derived from the 2022 Metropolitan Transportation Plan (MTP) and METRO 2025 Transit System Plan as described in Section 1. The analysis of transit alternatives for the North-Hardy Corridor specifically addressed the MTP goal for increasing the number of travel choices. Another MTP goal that was at the forefront of the evaluation of alternatives is the promotion of coordinated land use and transportation system development. Economic development was one of eight evaluation criteria used to compare alternatives. Transit supportive land use has been an important component of several commercial and residential nodes along the North-Hardy Corridor. The transit technology alternatives and the consideration of AHCT will contribute to an environmentally responsible transportation system. Active and meaningful public and stakeholder involvement has been the backbone of the planning methodology applied to the North-Hardy Planning Studies.

Many of METRO 2025 goals for AHCT were incorporated into the evaluation criteria for the North-Hardy Planning Studies. Access and connectivity to activity centers along the Corridor was a primary goal as each alternative was developed. Alignments that took advantage of existing high bus patronage were incorporated into the alternatives where ever practical. Two of the three alignments (i.e., the Blue and Green Lines) received very favorable demand potential indices. Only the Red Line performed less than expected with respect to demand potential. The North-Hardy Planning Studies included the analysis of potential highway improvements on IH-45 in addition to potential transit options. IH-45 is a congested commute Corridor today and is expected to be congested in the future. The Red Line attempted to take advantage of the existing Union Pacific Railroad Corridor along the Hardy Toll Road. Unfortunately, this is an extremely busy freight Corridor and Union Pacific was not receptive to possible track sharing or shared use of their right-of-way. The North-Hardy Corridor has many existing transit investments – Shepherd, Kuykendahl, Spring, Rayford/Sawdust, and Research Forest Park-and-Rides, and the Greenspoint and Northline Transit Centers. Where practical, each of these transit investments was included in the development of the alternatives. Land use and transit supportive development are addressed in Section 5.0. Each of the AHCT alternatives offers a travel time advantage over existing bus service in the Corridor.

Early in the planning process, the community asked the consultant team to first maximize the use of transit, including AHCT, in the Corridor and maximize the use of the Hardy Toll Road before considering expansion of IH-45. This request was honored. The transit alternatives and findings were completed first, and their results are being factored into the examination of potential highway options.

7.2: Summary of Potential Environmental Impacts

7.2.1: Environmental Factors Considered

A wide range of environmental factors was considered in the evaluation of the three proposed LRT/BRT alignments. At this stage of the study, issues were assessed to determine how the three alignments compare when environmental factors are taken into account and which of the three alignments should be recommended for more detailed analysis as the Locally Preferred Investment Strategy.

The environmental factors that were assessed range from urban elements, to natural elements to cultural elements. Urban elements include consideration of such issues as the land use impacts, property acquisition and right-of-way impacts, visual and aesthetic impacts (including urban forestry), noise, vibration and air quality impacts, safety and security, energy, impacts on existing communities, potential economic development impacts, and environmental justice considerations. The natural environmental elements that were considered include wetlands, water quality and quantity, subsidence, floodplains, and threatened and endangered species. The cultural elements include historic, archeological and park resources.

A summary of the findings is provided below. The analysis of economic development potential, while part of the environmental analysis, is provided in Section 5.

7.2.2: Summary of Assessment of Impact

There is not a great deal to distinguish the three transit alignments in terms of potential environmental impacts in general. While each proposed alignment would have certain issues that would need to be taken into account, each proposed alignment has a different set of issues. However, none of the proposed alignments would have such a significant potential impact on environmental considerations as to constitute a fatal flaw.

Exhibit 7.1 provides a summary of the potential impacts from the environmental analysis and a grading of the findings for each transit alignment.

Exhibit 7.1: Summary of Potential Environmental Impacts by Alignments

	Blue Line	Red Line	Green Line
Urban Elements			
Land Use	Medium	Medium	Medium
Acquisitions and Displacements	Medium	High	Low
Air Quality	Low	Low	Low
Noise & Vibration	Medium	Medium	Medium
Energy	Low	Low	Low
Safety & Security	Low	Low	Low
Visual & Aesthetics	Low	Medium	Medium
Communities	Medium	Medium	Medium
Economic Development	Medium	Medium	Medium
Environmental Justice	Low	Low	Low
Natural Environment			
Wetlands	Medium	Low	Medium
Flood Plains and Watercourses	Medium	Medium	Medium
Water Quantity & Subsidence	Low	Low	Low
Water Quality	Low	Low	Low
Threatened & Endangered Species	Low	Low	Low
Environmental Site Assessment	Low	Low	Low
Cultural Resources			
Historical	Medium	Medium	Medium
Archeological	Low	Low	Low
Parks	Low	Low	Low
Construction Impact	Medium	Medium	Medium
Total Grade	**B**	**B**	**B**

7.3: Summary of Potential Transportation Impacts

7.3.1: Transit Impacts

The METRO Service Estimator was run for each of the North-Hardy Corridor alignments. Exhibit 7.2 outlines the results from those runs. Not all of the alignments

have all of the segments shown below. For instance the Blue Line does not serve the Irvington/Cavalcade station. Likewise the Red Line does not serve Northline Mall. In all cases the Service Estimator ranks the Green Line with the highest Demand Potential Index (DPI). It should be noted that the Green Line segment that reaches to SH 242 includes the demand potential for express bus service on the proposed two-way HOV facility. If the HOV demand potential were removed from the segment from U of H to SH 242, the Blue and Green Lines would perform about the same with a DPI of 85. As such the Blue Line is considered a close second with respect to demand potential. The Red Line performed poorly when compared to the other two alignments. This is in part due to the lack of concentrations of population and employment in proximity to the Hardy alignment.

Exhibit 7.2: Demand Potential Index by Alignment

Segment	Blue Line	Red Line	Green Line
U of H to Irvington/Cavalcade	--	60	100
U of H to Northline Mall	70	--	100
U of H to Greenspoint	76	38	100
U of H to IAH	78	25	100
U of H to SH 242	85	49	100

7.3.2: Roadway Impacts

Highway Travel Demand Results

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

Arterial Level of Service

Traffic software, SYNCHRO, was used to analyze the level of service (LOS) of the critical intersections during AM and PM peak hours for Existing, 2025 No-build and 2025 LRT/BRT conditions. Average delays per vehicle and LOS at the critical intersections during peak hours for all three conditions were determined. Because there is no change in the capacity of intersections, there is no impact on the level of service for 2025 LRT/BRT operation versus the 2025 No-Build conditions.

The analysis of individual intersections may not reflect exact arterial conditions; but, it does identify any potential capacity problems. Due to the decision to maintain existing lane configuration and operational capacity at the critical intersections, the impact of 2025 LRT/BRT operation at the critical intersections is considered to be minimal.

As the planning studies progress, it is recommended that detailed Corridor analysis be conducted before selecting a final alternative. It is also recommended that the traffic signals along the Corridor that are impacted by the AHCT option be upgraded with new hardware, communications and optimized timings.

7.4: Potential Economic Impacts

Exhibits 7.3, 7.4, and 7.5 present a summary of the evaluation of each alignment with respect to the economic development criteria discussed in the previous section – connection of activity centers, potential for large-scale TOD and support neighborhood revitalization.

Exhibit 7.3: Economic Development Potential – South of Beltway 8

Criteria	Blue Line	Red Line	Green Line	Do-Nothing
Connect Activity Centers	C	C	B	C
Potential for Large-Scale TOD	C	D	C	F
Support Neighborhood Revitalization	C	B	A	D
Overall Economic Development Potential (South Section)	C	C	B	D

Exhibit 7.4: Economic Development Potential – North of Beltway 8

Criteria	Blue Line	Red Line	Green Line	Do-Nothing
Connect Activity Centers	B	C	---	C
Potential for Large-Scale TOD	B	C	---	F
Support Neighborhood Revitalization	F	F	---	F
Overall Economic Development Potential (North Section)	C	D+	---	D-

Exhibit 7.5: Economic Development Potential – Total Corridor

	Blue Line	Red Line	Green Line	Do-Nothing
Overall Grade	C	C-	B	D

Generally, each of the proposed alignments offers at least some improvement over a "do nothing" scenario. The Green Line shows the greatest overall potential for economic development in the south section. In the north section, the Blue Line shows a greater potential for economic development than the Red Line.

7.5: Community and Political Positions

The North-Hardy Planning Studies were conducted with extensive community outreach and consensus-building. (See Section 10.0 for specifics.) Throughout the conduct of these studies there were 14 formal stakeholder meetings, 9 public meetings, and 62 small group or one-on-one meetings. These contacts with elected officials and interested citizens have allowed the Carter & Burgess team to hear first hand the community's desires and concerns. This input has been woven into the technical findings to produce outcomes that are both technically sound and well supported by the community and their elected officials.

7.5.1: Community and Political Positions on Transit Findings

The transit finings presented below represent a well supported, consensus solution for transit improvements in the North-Hardy Corridor. The final set of public meetings on the transit findings provided definitive feedback from the community that the analysis of the alternatives was credible. At the public meetings the community expressed a significant preference for LRT over BRT.

7.5.2: Community and Political Positions on Highway Findings North of Buffalo Bayou

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

7.5.3: Community and Political Positions on Highway Findings South of Buffalo Bayou

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

7.6: Study Findings

7.6.1: Transit Findings

The transit short list of alternatives consisted of three alignments (Blue, Red, and Green) and two technologies (LRT, BRT). These have been described in detail earlier in this report. Each of the alternatives was evaluated using the criteria established at the beginning of the Alternatives Analysis. The evaluation criteria included:

- Mobility Improvements/Demand Potential
- Capital Cost
- Regional Connectivity
- Ease of Implementation
- Economic Development Potential
- Community Impacts
- Environmental Impacts
- Community Support

Early in the public involvement process, an attempt was made to use very technical interpretations of these evaluation criteria. The detailed matrix used to evaluate and screen the long list of alternatives proved to be confusing and difficult for the public to understand. Although the matrix did allow a short list of alternatives to be formulated, a modified approach to evaluating the short list was employed. Because most people understand the concept of a report card, the evaluation criteria were "translated" into an elementary school report card format as shown below:

- Helps Others (Mobility Improvements/Demand Potential)
- Uses Time and Materials Wisely (Capital Cost)
- Plays Well with Others (Regional Connectivity)
- Finishes Work Promptly and Without Difficulty (Ease of Implementation)
- Grows Big and Strong (Economic Development Potential)
- Show Consideration for Others (Community Impacts)
- Respects Property of Others (Environmental Impacts)
- Listens Attentively and Waits Turn to Speak (Community Support)

Exhibit 7.6 shows the report card used to review the North-Hardy transit findings with the public.

Exhibit 7.6: Report Card Graphic

The characteristics of each of the alternatives were developed for the area within the METRO service area and the portion of the alignments that are outside the service area. Exhibits 7.7 to 7.9 provide these characteristics. Total length, number of stations, length of aerial stations, estimated right-of-way, capital cost, estimated average speed, and demand potential were developed for each of the alternatives. The Blue and Red alignments are similar in length and number of stations. The Blue and Green alignments contain the most aerial sections, which contributes to their overall capital

cost per mile. The Red alignment would require the most acquisition of right-of-way. Overall, the Blue LRT alternative would be the most expensive to build and the Green BRT would be the least expensive. Estimated operating speeds are about the same for all of the alignments. The Blue and Green alignments are expected to produce the highest ridership. The Red alignment is expected to produce about one half of the demand generated by either the Blue or the Green. If the demand potential for the express bus service using the two-way HOV facility is added to the demand potential for the Green LRT/BRT, the Green alignment would be expected to produce the highest ridership.

Exhibit 7.7: Facility Characteristics within METRO Service Area

Characteristics	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT [HOV]
Length	30.2 miles	32.3 miles	24.0 miles [20.5 miles]
Number of Stations	22	21	21
Length of Aerial Sections	16.15 miles	8.60 miles	14.36 miles
Estimated Right-of-way Requirements (acres)	115/117	147/148	72/72 [TBD]
Capital Cost (in millions)	$1,704/$1,302	$1,390/$948	$1,474/$1,111 [TBD]

Exhibit 7.8: Facility Characteristics Outside METRO Service Area

Characteristics	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT [HOV]
Length	10.1 miles	10.3 miles	--
Number of Stations	3	3	--
Length of Aerial Sections	1.96 miles	2.70 miles	--
Estimated Right-of-way Requirements (acres)	15/15	51/51	--
Capital Cost (in millions)	$437/$304	$423/$290	--

Exhibit 7.9: Total Facility Characteristics

Characteristics	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT [HOV]
Length	40.3 miles	42.6 miles	24.0 miles [20.5 miles]
Number of Stations	25	24	21
Length of Aerial Sections	18.11 miles	11.30 miles	14.36 miles
Estimated Right-of-way Requirements (acres)	130/132	198/199	72/72 [TBD]
Capital Cost (in millions)	$2,141/$1,606	$1,813/$1,238	$1,474/$1,111 [TBD]
Estimated Average Speed	31 mph	33 mph	25 mph [34 mph]
Demand Potential Index	85	49	85 [100]*

*With two-way HOV facility.

One of the major factors that influenced public perception of each alignment was the estimated travel times for each of the alignments. Exhibit 7.10 illustrates the relative expected travel times.

Exhibit 7.10: Estimated Travel Times in Minutes

	CBD	Near Northside	Greenspoint	FM 1960	The Woodlands	IAH
CBD		Blue – 11 Red – 10 Green - 10	Blue - 35 Red - 39 Green – 36	Blue - 44 Red - 40 Green - 35●	Blue - 58 Red - 54 Green - 40●	Blue - 48 Red - 41 Green – 49
Near Northside	Blue - 11 Red - 10 Green – 10		Blue - 24 Red - 29 Green – 26	Blue - 34 Red - 30 Green - 46●♣	Blue - 47 Red - 44 Green – X	Blue - 37 Red - 31 Green – 41
Greenspoint	Blue - 35 Red - 39 Green – 36	Blue - 24 Red - 29 Green - 26		Blue - 10 Red – 16* Green - 18●♣	Blue - 24 Red – 31* Green – X	Blue - 13 Red – 17* Green – 13
FM 1960	Blue - 44 Red - 40 Green – 35*	Blue - 34 Red - 30 Green - 46●♣	Blue - 10 Red – 16* Green - 18●♣		Blue - 14 Red - 14 Green – X	Blue – 23^ Red – 14* Green – X
The Woodlands	Blue - 58 Red - 54 Green – 40*	Blue - 47 Red - 44 Green - X	Blue - 24 Red – 31* Green – X	Blue - 14 Red - 14 Green – X		Blue – 37^ Red – 33* Green – X
IAH	Blue - 48 Red - 41 Green – 49	Blue - 37 Red - 31 Green - 41	Blue - 13 Red – 17* Green - 13	Blue – 23^ Red – 14* Green – X	Blue – 37^ Red – 33* Green - X	

●Via the HOV lane ♣Plus a transfer at Kuykendahl Park & Ride
*Plus a transfer at Beltway 8 ^Plus a transfer at Greenspoint

Montgomery County stakeholders initial reaction to the Green Line was very negative. They wanted LRT to be considered all the way to The Woodlands, and were not happy with the proposed two-way HOV bus service. However, after seeing the estimated travel times for LRT and for the point to point express bus service using the two-way

HOV facility, their opinion of the Green Line improved. Currently, express bus service between The Woodlands and the CBD takes 40 minutes. With numerous stops on an LRT/BRT line, the same trip would take almost an hour. Several trips would require a transfer including:

- Blue Alignment – FM 1960 to IAH and The Woodlands to IAH
- Red Alignment – Greenspoint to IAH; The Woodlands to IAH; Greenspoint to FM 1960; Greenspoint to The Woodlands; and FM 1960 to IAH

Additional trips using the Green alignments would require the use of express bus service on the HOV facility. These include FM 1960 to downtown and The Woodlands to downtown. Other trips using a combination of express bus and LRT/BRT would require a transfer at Kuykendahl Park & Ride – Near Northside to FM 1960 and Greenspoint to FM 1960. Finally, some trip interchanges could not be made using the Green Alternative – Near Northside to The Woodlands; Greenspoint to The Woodlands; FM 1960 to The Woodlands; The Woodlands to IAH; and FM 1960 to IAH. These inaccessible trips could be made possible with limited stop bus service on the HOV facility. As operating plans are refined during the environmental process, these opportunities will be explored.
Exhibit 7.11 presents the demand potential results. Additional discussion of the demand potential may be found in Section 4.0.

Exhibit 7.11: Mobility Impacts Based on Alignment

	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT [HOV]
Demand Potential Index	85	49	85 [100]
Average Travel Time	See Exhibit 7.10		
Total	A	F	A

Exhibit 7.12 presents the capital costs indices by alignment and mode. The indices equate the least cost alternative to 1.00. All other alternative indices are factored above the least cost alternative. (For example: the capital cost estimate of the Red Line LRT is 1.47 times that of the cost estimate for the Red Line BRT.) Additional discussion of the capital and operating cost estimates may be found in Section 6.0.

Exhibit 7.12: Overall Cost by Alignment and Mode

	Blue		Red		Green	
	LRT	BRT	LRT	BRT	LRT	BRT
Capital Cost Index Construction Cost Right-of-way Cost	1.83	1.37	1.47	1.00	1.30	1.01
Operational and Maintenance Costs Cost of providing service Fuel Costs Labor Costs Maintenance of Facilities Maintenance of Vehicles	C		B		B	
Total	D		C		B	

Exhibit 7.13 presents the assessment of regional connectivity for each of the alignments. Corridor connectivity was previously addressed as a part of the travel time discussion. Factors considered included the ability to reach activity centers and neighborhoods using each of the alignments in addition to the travel times for specific trip interchanges.

Exhibit 7.13: Regional Connectivity Based on Alignment

	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT
Corridor Connectivity • Number of Activity Centers Served • Number of Neighborhoods Served • Future Growth Potential • Mode Change Required	A	C	A
Regional Connectivity	A	C	A
Total	A	C	A

Exhibit 7.14 presents the evaluation of each of the alignments with respect to ease of implementation and construction. The amount of right-of-way needed along with its ease or difficulty in acquiring it was one factor considered. The relative ease of construction and its impact on both traffic operations and businesses was another major factor assessed for this evaluation. It was concluded that the easiest alignment to construct would be the Red Alignment because it is somewhat removed from both traffic and businesses. However, the Red Alignment would require the most right-of-way acquisition.

Exhibit 7.14: Ease of Implementation Based on Alignment

Issues	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT
• Right-of-way Availability	C	C	B
• Ease of Construction	C	B	C
• Traffic Impacts during Construction	C	B	C
• Business Impacts during Construction	B	B	D
Total	C	B	C

Exhibit 7.15 presents the findings on economic development potential for each of the alignments. Details of this evaluation may be found in Section 5.0.

Exhibit 7.15: Development Potential Based on Alignment

		Blue LRT	Red LRT	Green LRT
Connect Activity Centers	South of BW 8	C	C	B
	North of BW 8	B	C	--
Large-scale Transit Oriented Development	South of BW 8	C	D	C
	North of BW 8	B	C	--
Support Neighborhood Revitalization	South of BW 8	C	C+	A
	North of BW 8	F	F	--
Total		C	C-	B

Note: Due to lack of academic research and local familiarity with BRT, its potential economic development impacts are less certain than for LRT. Therefore, the economic development potential for BRT was not evaluated.

Exhibits 7.16 and 7.17 present the preliminary assessment of potential socio-economic and natural environmental impacts of each of the alignments. Details of this assessment may be found in Section 3.0.

Exhibit 7.16: Community Impacts Based on Alignments

	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT
Compatibility with Adopted Plans	B	A	A
Potential Relocations/Acquisitions	C	D	C
Impact on Cultural Resources • Historical • Archeological • Parks	B	B	B
Visual Impacts	C	B	C
Environmental Justice	A	A	A
Total	B	B	B

Exhibit 7.17: Environmental Impact Based on Alignment

	Blue LRT/BRT	Red LRT/BRT	Green LRT/BRT
Noise and Vibration	B	B	B
Air Quality	B	B	B
Wetlands	B	B	B
Flood Plains and Water Courses	C	B	C
Threatened/Endangered Species	A	A	A
Water Quality	B	B	B
Forests	B	D	B
Total	B	B	B

Exhibit 7.18 documents the reaction of the community to each of the alignments. The most support was for the Green Alignment with the Blue Alignment coming in a close second. Most people judged the Red Alignment to be the least desirable primarily because it would not serve the majority of the population and employment centers. From a community support perspective, the vast majority favored LRT over BRT. Most people believed the LRT would be more beneficial for their community. BRT was considered to be a somewhat unproven technology in the United States.

Exhibit 7.18: Community Support Based on Alignment

	Blue	Red	Green
Business Overall Community Neighborhood Groups Special Interests Environmental Preservation Society/Historic "Smart Growth"	B	F	A
Total	B	F	A

Exhibit 7.19 presents the overall transit findings for the North-Hardy Corridor. As graded, the Green Alignment is slightly better than the Blue Alignment. The public asked that a variation on this assessment be documented as a part of the overall transit findings. Specifically, they asked that phase one for the North-Hardy Corridor be the Green Alternative with its two-way HOV service They also wanted the LRT in the median of IH-45 from Beltway 8 to SH 242 as depicted by the Blue Alternative to be considered a later phase for the Corridor.

Exhibit 7.19: Report Card on Alignments

	Blue	Red	Green
Helps Others (Mobility Improvements/Demand Potential	A	F	A
Uses Time and Materials Wisely (Overall Cost)	D	C	B
Plays Well With Others (Regional Connectivity)	A	C	A
Finished Work Promptly and Without Difficulty (Ease of Implementation)	C	B	C
Grows Big and Strong (Economic Development Potential)	C	C	B
Shows Consideration for Others (Community Impacts)	B	B	B
Respects Property of Others (Environmental Impacts)	B	B	B
Listens Attentively and Waits Turn to Speak (Community Support)	B	F	A
Total	B-	D	B+

7.6.2: Highway Findings

[Highway improvements elements will be considered in 2004. Therefore, this section will be included in North-Hardy Highway Alternatives Analysis Report.]

8.0: System Plan Issues

METRO used the transit findings from the North-Hardy Alternative Analysis in the development of a regional Transit System Plan. The System Plan identifies a regional transit network that combines METRO's aggressive bus service program with Advanced High Capacity Transit (AHCT) improvements in high transit demand corridors. Development of the System Plan incorporates additional considerations such as transit efficiencies and connectivity between corridors. These system planning activities are described further in the next section.

The 2025 Plan identified ten promising corridors for consideration of AHCT. Each of these prospective corridors has been examined through the Alternative Analysis process or through regional sub-area studies. The findings from these studies, as well as TxDOT's US 290 study, will be used to formulate and test a series of alignment, technology and operating scenarios (transit improvement alternatives) that would, when assembled, constitute the System Plan.

To determine which transit improvement alternatives or combination of alternatives are most suitable for AHCT, several factors will be considered. These factors include: system connectivity, use of existing right-of-way and facilities, and potential to generate increased transit ridership. With a system-level understanding of where AHCT is the appropriate transit improvement alternative, more detailed consideration will be given to issues and questions such as:

- Which AHCT alignments can be produce a regional network of high capacity transit service that best serves work and non-work travel and improves the quality of travel for trips?
- How can AHCT alignment be structured and METRO service coordinated, to facilitate Houston area trips and improve access to METRO-wide services and facilities?
- Which AHCT station locations and alignments and operating scenarios best serve the greatest number of riders at a reasonable capital and operating cost?
- Which AHCT technology or a combination of technologies can best accommodate future demand at reasonable capital and operation cost?
- What improvements to the existing bus system are most likely to improve transit use and support AHCT service?
- Which AHCT network and operating scenarios enhance the mobility of transit dependent populations?
- Which AHCT alignment and station locations offer the greatest potential for economic development, while minimizing environmental impacts?
- Which alternatives produce the greatest environmental and transportation benefits?
- Which alternatives are most likely to gain community and political support?

These issues will be examined as part of Phase 3 of the System Plan development process. Phases 1 and 2 of the development process evaluated and compared possible transit improvement alignments and technologies on an order-of-magnitude basis in each individual corridor. The evaluation criteria focused on capital and

operating costs, population and employment projections, demand potential, travel times and system connectivity, economic development potential, and environmental fatal flaws, as well as community and agency support. The Phase 1 and Phase 2 evaluations provided the rationale for eliminating less viable alignments and technologies from further consideration and for carrying forward more suitable alternatives into Phase 3.

In Phase 3, the evaluation criteria used in the first two phases of the evaluation are employed to test System Plan scenarios integrating the alternatives carried forward from Phase 2. Unlike the initial evaluation phases, travel demand model runs are conducted in the final evaluation phase to provide a more accurate representation of ridership potential for a regional network of AHCT alternatives. Additionally, quantitative information that pertains to the other evaluation criteria, such as capital and operation costs are refined in this phase of the evaluation.

The final (Phase 3) evaluation phase determined which System Plan scenario produces the best overall systemwide results, one that can effectively serve the Houston area and generate public support. The System Plan identified alignments, station locations, operating plans, and technologies to be used in the AHCT network, as well as the complementary improvements to METRO's bus service and facilities to support the System Plan.

9.0: Next Steps

9.1: Public Meetings

Between January and March 2003, METRO held public meetings and disseminated information to build awareness of the System Plan and to receive comments related to System Plan development. Based on the evaluation of System Plan alternatives and the initial public response a Draft System Plan was assembled and made available for public review in April 2003. A series of public meeting were conducted in May and June 2003 to generate public comments on the Draft Plan. Following the public meetings, comment from the general public and cooperating agencies were assessed and incorporated into the Draft System Plan, and presented to the METRO Board of Director in June 2003. The Final System Plan was adopted by METRO's Board in July 2003. METRO's System Plan, which includes the North-Hardy transit LPIS, was approved by voters in a November 2003 special election.

A summary of the System Plan public involvement activities in 2003 leading up to July Board approval is outline in Exhibit 9.1.

Exhibit 9.1: System Plan Public Involvement

MONTH	PUBLIC INVOLVEMENT ACTIVITY
January	City of Houston and City of Southside Place Water Bill Survey; Focus Groups; Stakeholder Meetings; Public Meetings; Newsletter
February	Public Meetings
March	Stakeholder Briefings
April	Proposed City of Houston Water Bill Survey; Draft System Plan Available for Public Review
May/ June	Public Meetings on the Draft System Plan; Focus Groups; Newsletter
July	Final System Plan Published; METRO Board of Directors Approval

9.2: Next Tasks

In accordance with the project development process through which Federal, State, and local officials plan and make decisions regarding transportation capital investments, the next task for developing the transit LPIS will be the preparation of a Draft Environmental Impact Statement (DEIS) on the Minimum Operable Segment (MOS).

Per the community's wishes, transit alternatives were examined and an LPIS was selected prior to detailed evaluation of highway alternatives. The next task for the highway alternatives will be more detailed evaluation of highway options to meet residual corridor travel demand is in progress and will be documented in a subsequent version of this report.

Both of these next steps will be conducted with close cooperation with the established stakeholders in the corridor and the public.

10.0: Agency and Public Involvement

The North-Hardy Planning Studies were conducted in partnership with the elected officials representing the Corridor's constituency; the various public agencies responsible for transportation system planning and operation; a diverse group of stakeholders that live or work in the Corridor; and numerous individual, interested citizens. The input and feedback received from the many meetings and workshops were interwoven into the technical tasks of defining and evaluating the North-Hardy Corridor alternative transportation improvements.

10.1: Agency Coordination

10.1.1: City of Houston

Meeting summaries for all seven meetings with the City of Houston staff are on file with the project files.

Exhibit 10.1: Meetings with the City of Houston

Date	Group/Topic	Attendees	Meeting Purpose
December 6, 2001	Houston Airport System	Kent McLemore – Assistant Director of Aviation, Planning Division John Jackson – Chief, Long Range Planning Janet Kennison – C-B Team Larry Venturato – C-B Team Jonathan Boyer – C-B Team James Vick – C-B Team	The purpose of the meeting was to identify and discuss available planning data on Intercontinental Airport as they relate to potential access as part of the North-Hardy Corridor Study.
May 17, 2002	Houston Airport System	Kent McLemore – Assistant Director of Aviation, Planning Division Rod Smith – C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss North-Hardy transit access to Bush Intercontinental Airport.
June 20, 2002	City of Houston – Planning	Patricia Rincon Rod Smith - C-B Team	Meeting purpose was to discuss North-Hardy transit and highway alternatives and coordination with the City of Houston's planning personnel.
June 27, 2002	City of Houston – Public Works	Rick Grochoske, P.E. – Assistant Director PW Bill Graham – C of H – Public Works Teofilo Rebagay, P.E. – C of H – Public Works Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss North-Hardy transit and highway alternatives and coordination with the City of Houston's traffic personnel.

Date	Group/Topic	Attendees	Meeting Purpose
September 3, 2002	Houston Airport System	Kent McLemore, Houston Airport System John Jackson, Houston Airport System Rod Smith - C-B Team Janet Kennison – C-B Team Larry Venturato – C-B Team Mario Semmler – C-B Team Stella Gustavson – C-B Team	Meeting purpose was to further discuss North-Hardy transit access to Bush Intercontinental Airport in light of the short list of alternatives.
October 15, 2002	City of Houston Parks Dept.	Betto Batista - Facilities Management Gregory Paul - Real Estate Rod Smith - C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies with an emphasis on the transit short list and possible interaction with City park lands.
December 9, 2002	City of Houston Public Works	Rick Grochoske – City of Houston Gary Schatz - City of Houston Bill Graham – City of Houston Teofilo Rebagay – City of Houston Janet Kennison – C-B Team	The purpose of the meeting was to review the short list of alternatives in detail with the City of Houston Public Works staff.

10.1.2: Harris County

Meeting summaries for all six meetings with Harris County staff are on file with the project files.

Exhibit 10.2: Meetings with the Harris County

Date	Group/Topic	Attendees	Meeting Purpose
November 12, 2001	Harris County Infrastructure	Charles Dean - Art Storey's office James Vick – C-B Team	Purpose of the call was to determine what suggestions there might be for specific stakeholders whether organizations or individuals; the optimal method of their being included in the process and actively involved; and any contact lists that might be available.
July 8, 2002	Harris County Precinct 4 & Engineering Staff	Jackie Freeman, Harris County Engineering Charles Dean, Harris County Engineering Andy Mayo, Harris County Engineering/Traffic Pam Rocchi, Precinct 1 Kathy Guenther, Precinct 1 Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss North-Hardy transit and highway alternatives and coordination with the Harris County traffic personnel.
July 9, 2002	Harris County Precinct 1 Staff	Chuck Wilcox – Precinct 1 Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss North-Hardy transit and highway alternatives and coordination with the Harris County traffic personnel.

Date	Group/Topic	Attendees	Meeting Purpose
October 30, 2002	Harris County Precinct 4 & Engineering Staff	Jackie Freeman, Harris County Engineering Charles Dean, Harris County Engineering Andy Mayo, Harris County Engineering/Traffic Pam Rocchi, Precinct 1 Kathy Guenther, Precinct 1 Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies. The discussion focused primarily on the short list of alternatives. We discussed both the transit and IH 45 short list alternatives.
November 4, 2002	Harris County Flood Control District	Shannon Watson, HCFCD Public agency Coordinator Gary Green, HCFCD Director Gregory DiCioccio, HCFCD Property Management Dept. Manager Joe Myers, HCFCD Infrastructure Rod Smith - C-B Team	Purpose of meeting was to explore the potential to use Little White Oak Bayou and Greens Bayou rights-of-way for the North-Hardy project.
November 8, 2002	Harris County Precinct 1	Chuck Wilcox – Manager of Engineering Pct. 1 Rod Smith – C-B Team Janet Kennison C-B Team	Meeting purpose was to present the transit short list of alternatives.

10.1.3: Texas Department of Transportation

Meeting summaries for all seven meetings with Texas Department of Transportation staff are on file with the project files.

Exhibit 10.3: Meetings with the Texas Department of Transportation

Date	Group/Topic	Attendees	Meeting Purpose
February 5, 2002	Houston Transtar	John Gaynor – Transtar Rod Smith – C-B Team Janet Kennison – C-B Team	The purpose of the meeting was to determine the availability of traffic data from the Transtar system.
October 17, 2002	Transit and Highway Travel Demand Modeling Runs	Barbara Ogilvie - METRO Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Rakesh Tripathi – TxDOT Mike Tello - TxDOT Alan Clark – H-GAC Kari Hackett – H-GAC Ranga Kandalam – H-GAC Rod Smith – C-B Team Janet Kennison – C-B Team	The purpose of the teleconference was to discuss schedule and agency responsibilities for running travel demand model for the transit and highway alternatives.
December 5, 2002	Highway Travel Demand Modeling Runs	Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Mike Tello – TxDOT Alan Clark – H-GAC Kari Hackett – H-GAC Ranga Kandalam – H-GAC Michael Onuogu – H-GAC Rod Smith - Carter-Burgess Janet Kennison – C-B Team	The purpose for the meeting was to address specific modeling issues for the highway alternatives north of the Bayou and to discuss/describe the alternatives for south of the Bayou.

Date	Group/Topic	Attendees	Meeting Purpose
December 12, 2002	Texas Department of Transportation	Gary Trietch – TxDOT Delvin Dennis – TxDOT Carol Nixon – TxDOT Rakesh Tripathi – TxDOT Sally Wegmann - TxDOT Mike Tello – TxDOT Karen Baker - TxDOT Kari Hackett – H-GAC John Sedlak – METRO Barbara Ogilvie - METRO Greg Rhodes – METRO Steve Beard – SR Beard John Holzwarth – C-B Team Janet Kennison – C-B Team Rod Smith – C—B Team	The purpose of this meeting was to provide a formal status report on the North-Hardy Planning Studies as required by the Congressional Mandate.
March 10, 2003	Highway Travel Demand Modeling Runs	Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Alan Clark – H-GAC Janet Kennison – C-B Team	The purpose of the teleconference was to confirm the schedule for running the travel demand model for the highway alternatives.
April 17, 2003	Texas Department of Transportation	Gary Trietch – TxDOT Delvin Dennis – TxDOT Carol Nixon – TxDOT Sally Wegmann - TxDOT Mike Tello – TxDOT John Sedlak – METRO Barbara Ogilvie - METRO Greg Rhodes – METRO Steve Beard – SR Beard Keith Hall – SR Beard John Holzwarth – C-B Team Janet Kennison – C-B Team	The purpose of this meeting was to provide a formal status report on the North-Hardy Planning Studies as required by the Congressional Mandate – Preliminary Transit Findings.

May 12, 2003	Texas Department of Transportation	Gary Trietch – TxDOT Delvin Dennis – TxDOT Carol Nixon – TxDOT Sally Wegmann - TxDOT Mike Tello – TxDOT Rachel Steele C-B Team John Holzwarth – C-B Team Harold Joiner – C-B Team Janet Kennison – C-B Team	The purpose of this meeting was to provide a status report on the North-Hardy Planning Studies – Preliminary Highway Findings.

10.1.4: Houston-Galveston Area Council

Meeting summaries for all five meetings with Houston-Galveston Area Council staff are on file with the project files.

Exhibit 10.4: Meetings with the Houston-Galveston Area Council

Date	Group/Topic	Attendees	Meeting Purpose
December 17, 2001	Houston-Galveston Area Council	Alan Clark – H-GAC Andy Mullins – H-GAC Seyoum Biresol – METRO Rod Smith – C-B Team Janet Kennison – C-B Team James Vick – C-B Team Arial Espino – C-B Team Mark Metyko – DMJM+Harris Clint Harbert – DMJM+Harris	The purpose of the meeting was to determine GIS, demographic and travel demand data availability.
June 28, 2002	Houston-Galveston Area Council	Alan Clark – H-GAC Andy Mullins – H-GAC Mike Tello - TxDOT Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss North-Hardy highway alternatives (toll/managed lanes) and how H-GAC's regional model forecasts toll trips. Also discussed highway alternatives South of Buffalo Bayou. Specifically, super arterial approach to moving traffic into and from the CDB and rerouting through movement traffic to IH-10 and US 59 from the Pierce Elevated.

Date	Group/Topic	Attendees	Meeting Purpose
October 17, 2002	Transit and Highway Travel Demand Modeling Runs	Barbara Ogilvie - METRO Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Rakesh Tripathi – TxDOT Mike Tello - TxDOT Alan Clark – H-GAC Kari Hackett – H-GAC Ranga Kandalam – H-GAC Rod Smith – C-B Team Janet Kennison – C-B Team	The purpose of the teleconference was to discuss schedule and agency responsibilities for running travel demand model for the transit and highway alternatives.
December 5, 2002	Highway Travel Demand Modeling Runs	Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Mike Tello – TxDOT Alan Clark – H-GAC Kari Hackett – H-GAC Ranga Kandalam – H-GAC Michael Onuogu – H-GAC Rod Smith - Carter-Burgess Janet Kennison – C-B Team	The purpose for the meeting was to address specific modeling issues for the highway alternatives north of the Bayou and to discuss/describe the alternatives for south of the Bayou.
March 10, 2003	Highway Travel Demand Modeling Runs	Greg Rhodes – METRO Kim Slaughter – GPC Carol Nixon – TxDOT Alan Clark – H-GAC Janet Kennison – C-B Team	The purpose of the teleconference was to confirm the schedule for running the travel demand model for the highway alternatives.

10.2: Public Involvement

10.2.1: Formal Stakeholder Meetings

An advisory committee of key stakeholders was formed early in the study. This Stakeholder Advisory Committee was composed of a broad range of interest groups and individuals and represented the diverse interests within the corridor. Meetings of the Stakeholder Advisory Committee were held as follows corresponding to completion of major phase of the Planning Studies. Meeting agendas, sign-in sheets, presentation materials and recorded comments and responses for each of the Stakeholder Advisory Committee Meetings are in Appendix I.

Exhibit 10.5: Stakeholder Advisory Committee Meetings

Date	Location	Number of Attendees	Meeting Purpose
February 19, 2002	Greenspoint Mall Community Room	14	Review of issues and challenges and preliminary alternative solutions.
June 17, 2002	Lindale Park Civic Club	13	Review the evaluation of the long list of alternatives.
January 9, 2003	Greenspoint Mall Community Room	6	Review the preliminary transit findings.

In addition to the Stakeholder Advisory Committee meetings, 11 formal stakeholder meetings were held at strategic points during the conduct of the planning studies. Meeting agendas, sign-in sheets, presentation materials and recorded comments and responses for each of the Stakeholder Meetings are in Appendix I.

Exhibit 10.6: Formal Stakeholder Meetings

Date	Stakeholder Group	Number of Attendees	Meeting Purpose
December 20, 2001	North Corridor Coalition	22	Facilitated session to identify the transportation issues, challenges, and opportunities facing the North-Hardy Corridor.
May 11, 2002	Near Northside Neighborhoods	24	Facilitated session – review the long list of highway and transit alternatives.
May 16, 2002	NW/FM 1960 Chamber of Commerce	18	Facilitated session – review the long list of highway and transit alternatives.
May 18, 2002	Northline Super Neighborhood Council	16	Facilitated session – review the long list of highway and transit alternatives.
May 20, 2002	S. Montgomery/The Woodlands Chamber of Commerce	18	Facilitated session – review the long list of highway and transit alternatives.
May 30 2002	North Corridor Coalition	62	Facilitated session – review the long list of highway and transit alternatives.
June 3, 2002	South of Buffalo Bayou	24	Facilitated session – review the long list of highway alternatives for south of Buffalo Bayou
November 20, 2002	NW/FM 1960 Chamber of Commerce	22	Reviewed the short list of transit alternatives.
January 14, 2003	NW/FM 1960 Chamber of Commerce	18	Presented preliminary transit findings for the North-Hardy Corridor
January 23, 2003	Northline Super Neighborhood Council	16	Presented preliminary transit findings for the North-Hardy Corridor
January 30, 2003	North Corridor Coalition	32	Presented preliminary transit findings for the North-Hardy Corridor

10.2.2: Public Meetings

General, larger audience, meetings with the public were held at multiple locations along the corridor during each of the major phases of the Studies. The Scoping Meetings were open houses since this meeting format allowing the greatest opportunity for people to arrive and depart at times most convenient to them. Subsequent public meetings were small group facilitated sessions. Meeting agendas, sign-in sheets, presentation materials and recorded comments and responses for each of the Public Meetings are in Appendix I.

Exhibit 10.7: Public Meetings

Date	Location	Number of Attendees	Meeting Purpose
February 5, 2002	Wesley Community Center	39	Public Scoping Meeting
February 6, 2002	Northline Mall	24	Public Scoping Meeting
February 13, 2002	North Harris Montgomery Community College	20	Public Scoping Meeting
February 20, 2002	Houston Community College System	15	Public Scoping Meeting
June 4, 2002	Greenspoint Mall	11	Review long list of highway and transit alternatives
June 6, 2002	S. Main Baptist Church	15	Review long list of highway alternatives for south of Buffalo Bayou
June 15, 2002	St. Patrick's Catholic Church	193	Review long list of highway and transit alternatives
February 4, 2003	Greenspoint Mall	16	Present preliminary transit findings
February 8, 2003	Davis High School	34	Present preliminary transit findings

10.2.3: Small Group and One-on-One Meetings

Small group and one-on-one meetings were held with stakeholders where requested, or specifically required to fully understand the issues within the corridor. Meeting summaries for all small group and one-on-one meetings are on file with the project files.

Exhibit 10.8: Small Group and One-on-One Meetings

Date	Group	Attendees	Meeting Purpose
October 29, 2001	State Representative Jessica Farrar	Rep. Farrar Drexel Turner – U of H John Sedlak - METRO Gilda Martinez – METRO Barbara Ogilvie – METRO Rod Smith – C-B Team	The purpose of the meeting was to present the plan for conducting the North-Hardy AA including general schedule and consultant team.
November 8, 2001	Greater Greenspoint Management District	Jack Drake - GGMD Tina Araujo – GGMD Patti Joiner - - C-B Team Margaret Menger - - C-B Team Rod Smith - C-B Team	Discussion centered on GGMD facts and information about the North Corridor Coalition initiated by GGMD leadership.
November 9, 2001	The Woodlands Operating Company	Bob Stout - Woodlands Operating Company Margaret Menger - C-B Team	Discussion centered on stakeholders in the Woodlands – individuals and corporate groups to add to the mailing list.
November 13, 2001	Lindale Park Civic Association	Mike Catrett – Lindale Park Ariel Espino – C-B Team	Purpose of the call was to determine what suggestions there might be for specific stakeholders whether organizations or individuals; the optimal method of their being included in the process and actively involved; and any contact lists that might be available.

Date	Group	Attendees	Meeting Purpose
November 14, 2001	Council member Gabriel Vasquez	Robert Fiederlein - Chief of Staff James Vick - -C-B Team	The purpose of the call was to identify significant stakeholders, available stakeholder lists, and recommendations for out-reach formats that might be particularly successful in the Corridor.
November 15, 2001	North Corridor Coalition	Coalition Members Rod Smith – C-B Team	Presentation on scope, schedule, and consultant team.
December 19, 2001	The Woodlands Operating Company	Robert Heinemann – The Woodlands Operating Company Janet Kennison – C-B Team James Vick – C-B Team Larry Venturato – C-B Team A.J. Widacki – C-B Team	The purpose of the meeting was to determine demographic, land use, and development plan data availability.
January 9, 2002	Union Pacific Railroad	Ken Rouse – UP Regional Manager Ind. & Public Projects Lyle Hamm – UP Program Manager Rod Smith – C-B Team Janet Kennison – C-B Team Fred Meyers – C-B Team	The purpose of the meeting was to explore the potential of share use of track and/or right-of-way.
January 17, 2002	North Corridor Coalition	Coalition Members Greg Rhodes – METRO Mike Tello - TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning studies including plans for upcoming public scoping meetings.

Date	Group	Attendees	Meeting Purpose
January 24, 2002	Northside Village Super Neighborhood Executive Committee	Ed Reyes - President Dewitt MacAfee Vincent Marquez – Northside Redevelopment Center Virginia Duke Mark Cerano Shanna Barnstone – Silverdale Civic Association Fernando Cisneros – North Central Civic Association Beatrice Rosales Robert Fiederlein – CM Vasquez Chief of Staff Art Murillo - METRO Andy Alarcon – City of Houston Bill Zrioka – City of Houston	To present a status report on the North-Hardy Planning Studies
January 29, 2002	Midtown Development Authority	Charles LeBlanc – Executive Director Calvin Morgan – C & B Rod Smith – C-B Team	Introduction and initial briefing on the North-Hardy Planning Studies. Specifically discussed transportation issues in the Midtown area.

Date	Group	Attendees	Meeting Purpose
February 14, 2002	Hardy Yard Development	Dawn Moses – Brownfields Coordinator, C of Houston Pamela Berger – Director of Environmental Quality, C of H Kelley Parker – Cushman & Wakefield, agent for property owner Doug Williams – agent for property owner David Bradley – U of H Downtown, Assist. VP Admin. Chris McCall – U of H Downtown, Facilities Mgmt. Ramona Davis – Greater Houston Preservation Alliance Rafael Longoria – U of H Architecture Scott Leafe – SKA Jessica Jenkins – SKA Rep. Jessica Farrar – State Rep. District 148 Tom Jasien – METRO Rod Smith – C-B Team	The purpose of the meeting was to discuss the potential redevelopment of the Hardy Yard site as a multi-use development.

Date	Group	Attendees	Meeting Purpose
February 15, 2002	Transportation Focus Group for Buffalo Bayou Partnership	Aaron Tuley - Buffalo Bayou Partnership Guy Hagstette - Downtown District Bob Eury - Downtown District Valerie Weber - Gensler Architects Robert Yaro - Regional Plan Association Chaney Anderson – U of H Downtown Chris McCall– U of H Downtown Jerry King – Sunland Engineering Lynda Mifsud - METRO Rod Smith – C-B Team	The planning team for the Buffalo Bayou improvements presented their proposals for improving the Bayou from Shepherd to the Turning Basin.
February 21, 2002	North Corridor Coalition	Coalition Members Greg Rhodes - METRO Mike Tello - TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies.
February 28, 2002	Reliant Energy	John Lengyel - Joint Use Michael Pakelitis, Transmission Engineering Rod Smith – C-B Team	The purpose of the meeting was to discuss the opportunities and constraints in using the Reliant right-of-way adjacent to the Hardy Toll Road.

Date	Group	Attendees	Meeting Purpose
March 7, 2002	North Corridor Coalition	Tina Araujo - NCC Barry Carpenter – S Montgomery Chamber Jack Drake – NCC Ivon DuPont – Woodlands Heights Mayor Michels – Oak Ridge Gary Montgomery – S Montgomery Chamber Greg Rhodes – METRO Stella Gustavson – C-B Team Rod Smith – C-B Team	Discussion of public involvement and outreach for the North-Hardy Planning Studies.
March 12, 2002	Midtown Civic Club	Civic Club members Mike Tello – TxDOT Rod Smith – C-B Team	Provided a briefing on the North-Hardy Planning Studies with an emphasis on the area south of Buffalo Bayou.
March 21, 2002	North Corridor Coalition	Coalition Members Mike Tello - TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies, and asked for participation in co-sponsored stakeholder meetings.
April 18, 2002	North Corridor Coalition	Coalition Members Greg Rhodes - METRO Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies. Discussed planning for stakeholder meetings.
April 18, 2002	Downtown Management District	Citizens Rod Smith – C-B Team	Provided a briefing on the North-Hardy Planning Studies.
April 22, 2002	Sierra Club	Frank Blake John Wilson Brandt Mannchen Polly Ledvina Peter Tyler Mike Tello – TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies including a description of the overall process and work-to-date. Responded to specific concerns raised by the group.

Date	Group	Attendees	Meeting Purpose
May 13, 2002	Council Member Vasquez's Office	Robert Fiederlein – Chief of Staff Rachel Spencer – C-B Team Janet Kennison – C-B Team Rod Smith – C-B Team	Provided a status report on the Phase 1 work and recent stakeholder meetings.
May 16, 2002	Judge Sadler, Montgomery County	Judge Sadler John Holzwarth - C-B Team Janet Kennison – C-B Team	Meeting purpose was to brief Judge Sadler on the North-Hardy Planning Studies in advance of the Work Session scheduled for May 20, 2002.
May 17, 2002	Commissioner Ed Chance, Montgomery County	Commissioner Chance John Holzwarth - C-B Team Rod Smith – C-B Team Janet Kennison – C-B Team	Meeting purpose was to brief Commissioner Chance on the North-Hardy Planning Studies in advance of the Work Session scheduled for May 20, 2002.
May 21, 2002	Cushman Wakefield Industrial Broker Group	Kelley Parker – Cushman Wakefield Group members Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies.
June 17, 2002	Council Member Vasquez	Council Member Vasquez Shirley DeLibero – METRO John Sedlak – METRO Barbara Ogilvie - METRO Rod Smith - C-B Team	The purpose of the meeting was to discuss CM Vasquez's request that METRO fund a portion of an extension of Fulton to connect with San Jacinto.
June 19, 2002	Greenspoint Mall Developers	Jack Drake – Greenspoint Management District Tina Araujo - Greenspoint Management District Jack Linville – PGAL Hines Development Mall Design Group Convention Center Design Group Retail Consultants Rod Smith - C-B Team	The purpose of the meeting was to bring together the design team and various parties interested in the redevelopment of Greenspoint Mall. We provided a status report with respect to potential transit plans for the Greenspoint Mall area.

Date	Group	Attendees	Meeting Purpose
June 20, 2002	North Corridor Coalition	Coalition Members Greg Rhodes - METRO Rod Smith – C-B Team	Reviewed information from the stakeholder meetings.
June 24, 2002	State Representative Garnett Coleman	Rep. Coleman Gary Trietsch – TxDOT Government Relations Coordinator – METRO Rod Smith – C-B Team	The purpose of the meeting was to discuss with the Representative potential highway improvements for the Midtown area.
June 26, 2002	North Houston Association – Transportation Committee	Committee Members Rod Smith – C-B Team Janet Kennison – C-B Team	Regularly scheduled meeting where we made a presentation on the North-Hardy Planning Studies.
July 9, 2002	Joe Webb	Joe Webb – Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to discuss the Northside Redevelopment Plan as it relates to North-Hardy.
July 9, 2002	State Representative Jessica Farrar	Rep. Farrar Raul – Farrar's Staff Russ Frank – METRO Scott Barker – METRO Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies. Discussed specific concerns with respect to IH-45 access from the Near Northside and widening of N. Main.
July 10, 2002	State Representative Peggy Hamric	Rep. Hamric Scott Barker – METRO Tom Jasien - METRO Rod Smith - C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies.
July 17, 2002	Hardy Yard Developers	Kelley Parker – Cushman & Wakefield, agent for property owner Doug Williams – agent for property owner Peter Brown – planner for development Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies and to receive a report on the development's progress.

Date	Group	Attendees	Meeting Purpose
July 17, 2002	Mid Town/3rd Ward Association	Citizens Rod Smith - C-B Team	This was a regular meeting of the Association. A brief presentation on the North-Hardy Planning Studies was given.
July 18, 2003	North Corridor Coalition	Coalition Members Mike Tello - TxDOT Janet Kennison – C-B Team	Presented the North-Hardy short list of alternatives.
August 14, 2002	Old West End Association	Christine Farrier – Old West End Guy Hagstette, Central Houston Ann Olsen, Buffalo Bayou Partnership Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies. Particular attention was given to potential IH-45 alternatives that may impact areas west of IH-45.
August 15, 2002	North Corridor Coalition	Coalition Members Janet Kennison – C-B Team	Status report on the North-Hardy Planning Studies.
August 20, 2002	Woodlands/S Montgomery County Chamber of Commerce	Membership Janet Kennison – C-B Team	Meeting purpose was to give a presentation on the status of the North-Hardy Planning Studies – project overview through “short list”.
August 22, 2002	The Woodlands Association	Membership Janet Kennison – C-B Team	Meeting purpose was to give a presentation on the status of the North-Hardy Planning Studies – project overview through “short list”.
August 28, 2002	The Woodlands Community Association	Membership Janet Kennison – C-B Team	Meeting purpose was to give a presentation on the status of the North-Hardy Planning Studies – project overview through “short list”.
September 19, 2002	North Corridor Coalition	Coalition Members Greg Rhodes – METRO Mike Tello - TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies including a review of the revised schedule for reporting study finding to the METRO Board.

Date	Group	Attendees	Meeting Purpose
October 3, 2002	Buffalo Bayou Partnership	Aaron Tuley – Buffalo Bayou Partnership Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies with an emphasis on the transit short list.
October 17, 2002	North Corridor Coalition	Coalition Members Art Murillo - METRO Janet Kennison – C-B Team	Provided a status report on the North-Hardy Planning Studies including what would be presented to the METRO Board in February.
October 28, 2002	Old Town Spring Improvement District	Vance Fellars – President Old Town Spring Improvement District Charlotte Joiner – Administrator, Old Town Spring Improvement District Rod Smith - C-B Team Janet Kennison – C-B Team	The purpose of the meeting was to brief Old Town Spring ID on the current project status. We left copies of the newsletter & colored graphics indicating the three transit alignments (corridor wide & by inner/mid/outer portions of the corridor.
October 29, 2002	Traffic Engineers Inc. (TEI)	Susan Alleman - TEI Project Manager, Greenspoint Traffic Study Dustin Qualls - TEI Roger Armstrong - TEI Rod Smith - C-B Team Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Studies. The discussion focused primarily on the short list of alternatives - both the transit and IH 45 in the vicinity of Greenspoint area.
October 29, 2002	Northside Redevelopment Center	Vincent Marquez – NRC Mike Tello - TxDOT Rod Smith – C-B Team Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies and to facilitate coordination between NRC and TxDOT.
October 31, 2002	Council Member Vasquez	Lisa Dimond – New Chief of Staff Robert Fiederlein – Old Chief of Staff Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies for the new Chief of Staff.

Date	Group	Attendees	Meeting Purpose
November 7, 2002	Legacy Land Trust	Neil Mitchell - LLT Damien Carey – LLT Jennifer Lorenz – LLC Bill Turner - LLC Rod Smith – C-B Team Janet Kennison – C-B Team	The purpose of the meeting was to review the three alignments and two technologies that make up the short list of alternatives.
November 19, 2002	Aldine Improvement District	AID Board Members and Staff Citizens in the Audience (30 to 40) Janet Kennison – C-B Team	Meeting purpose was to provide a status report on the North-Hardy Planning Studies with emphasis on the transit short list.
November 26, 2002	North Corridor Coalition	Coalition Members Mike Tello - TxDOT Rod Smith – C-B Team	Provided a status report on the North-Hardy Planning Studies - PowerPoint presentation on short list of alternatives.
November 26, 2002	Lindale Park Civic Association	Civic Associations Members Mike Tello - TxDOT Rod Smith – C-B Team	This was the regularly scheduled monthly meeting of the civic association. We were one of several agenda items. The Status Report slide show was presented. Attendees received copies of the newsletter, black and white copies of the slideshow and 11x17's of the 3 alternatives being considered in detail.

Date	Group	Attendees	Meeting Purpose
December 3, 2002	Greenspoint Management District Volunteer Awards & Recognition	Greenspoint Management District Members & Volunteers – 100+ Art Murillo – METRO Shelly Whitworth – H-GAC Gary Montgomery – NCC Chairman Ivon Du Pont – NCC Vice Chairman Jack Drake - Greenspoint Management District Tina Araujo - Greenspoint Management District Councilmember Galloway – City of Houston Senator Jon Lindsay – State Senator Rod Smith – C-B	This is an annual event to recognize individuals & firms that have volunteered during the year to assist the district with their programs. Art Murillo accepted the award on behalf of METRO. Shelly Whitworth accepted the award on behalf of H-GAC for the shuttle bus service to IAH. There were numerous awards for property management, etc.
January 30, 2003	North Corridor Coalition	Coalition Members Greg Rhodes – METRO Thomas Gray – METRO Mike Tello – TxDOT Rachel Spencer – C-B Team Janet Kennison – C-B Team	Presentation of preliminary transit findings for the North-Hardy Corridor.
January 28, 2003	Acres Homes Chamber of Commerce	Members of Acres Homes Chamber and Interested Parties Dr. Lewis – METRO Dr. Gilbert – METRO Karen Marshall – METRO Janet Kennison – C-B Team	A brief presentation on the status and preliminary transit findings for the North-Hardy Planning Studies was given. A copy of the presentation was given to the Chamber.

Date	Group	Attendees	Meeting Purpose
February 20, 2003	North Corridor Coalition	Coalition Members Art Murillo – METRO Russ Frank – METRO Mike Tello - TxDOT Janet Kennison – C-B Team	Provided an update on North-Hardy Planning Studies and the development of the System Plan.
February 26, 2003	Council Member Vasquez	Council Member Vasquez Lisa Dimond – City of Houston Barbara Ogilvie – METRO Greg Rhodes – METRO Russ Frank - METRO Janet Kennison – C-B Team	Council Member Vasquez requested the meeting to discuss the possibility of adding an additional route segment to the Green Line alternative. Specifically, he wanted to know what the ridership and capital cost would be to add a branch from Main at Boundary, along N Main to Airline and north to Northline Mall. This branch follows the Blue Line alternative from U of H to Northline. The Green Line would remain intact.
February 27, 2003	Northside Village Workshop	Council Member Vasquez – City of Houston Vincent Marquez – NRC Patricia Rincon-Kallman – City of Houston Carol Nixon - TxDOT Janet Kennison – C-B Team Workshop participants	The purpose of the meeting was to explore redevelopment possibilities for the Northside Village. A presentation was given on the short list of transit alternatives.
March 20, 2003	North Corridor Coalition	Coalition Members Mike Tello - TxDOT Janet Kennison – C-B Team	Provided an update on North-Hardy Planning Studies and the development of the System Plan.
April 15, 2003	North Corridor Coalition	Coalition Members Greg Rhodes – METRO Karen Marshall – METRO Mayor Owens – Missouri City Janet Kennison – C-B Team	Provided an update on North-Hardy Planning Studies and the development of the System Plan.

Date	Group	Attendees	Meeting Purpose
April 17, 2003	Northside Redevelopment Center	Vincent Marquez – Northside Redevelopment Center Carol Nixon – TxDOT Mike Tello - TxDOT Janet Kennison – C-B Team	The purpose of this meeting was to follow up on the workshop held in late February 2003. The transit findings for the North-Hardy Planning Studies were briefly reviewed. Specifically, each of the short list of alternatives were described with particular attention to how they would traverse the Near Northside

10.3: Communications

10.3.1: Newsletters and Meeting Notices

Throughout the Planning Studies, stakeholders within the corridor were kept well informed. Four general newsletters were prepared. The newsletters were distributed to the various stakeholders at meetings and through direct mail. The direct mailing list included over 2,800 individuals and interested citizens. By providing newsletters during major phases of the Planning Studies, information was provided to a broad audience about the status of the studies and dates of upcoming meetings. They helped to elevate the discussions and importance of regional mobility. Four postcards/meeting notices were also used to provide notice about public meetings through direct mail to the mailing list. These flyers supplemented the Public Notices in the newspaper advertisements. Copies of the four newsletters and flyers may be found in Appendix I. The following table outlines the formal communications provided on the North-Hardy Planning Studies

Exhibit 10.9: Summary of Formal Communications

Communication	Purpose	Date
Flyer #1	Announce Public Scoping Meetings	Winter 2002
Newsletter #1	Describe Long List of Alternatives	Spring 2002
Newsletter #2	Describe Short List of Alternatives	Fall 2002
Flyer #2	Announce Meeting for Preliminary Transit Findings	Winter 2003
Newsletter #3	Describe Preliminary Transit Findings	Spring 2003
Flyer #3	Announce Meetings for Preliminary Highway Findings North of Buffalo Bayou	2004
Flyer #4	Announce Meetings for Preliminary Highway Findings South of Buffalo Bayou	2004
Newsletter #4	Describe Final Transit and Highway Findings	2004

10.3.2: Web Site

The North-Hardy Study team hosted a website to enhance communication for stakeholders. The website met METRO's technology and graphic requirements, and served as an additional method of communication for the Studies. The web site for the North-Hardy Planning Studies, North-Hardy.org, was initiated in January 2002 coincidentally with initiation of the Scoping process. The site has received major updates as discrete phases of work were completed. Major updates were accomplished as follows:

- February/March 2002
- May 2002
- August 2002
- October 2002
- January 2003
- April/May 2003

The website was used as a tool for communicating substantive facts regarding the following:

- Status of the Planning Studies
- Location map, issues and approach
- Schedule of upcoming public meetings
- Alternatives under consideration
- Study findings

Interactive uses for the website included information requests, submittal of inquiries or comments and requests to be added to the mailing list. Base map pop-up and locator modes were used to make the website more appealing, accessible and informative.

10.3.3: Presentation Graphics and Handouts

Presentation graphics in the form of display boards and PowerPoint presentations were developed and used for all of the major stakeholder meetings and the public meetings. In many cases these presentation graphics were used at the small group and one-on-one meetings. Hard copies of PowerPoint presentations were made available at most of the outreach meetings. An inventory of all presentation graphics may be found in Appendix I.

10.3.4: Newspaper Advertisements

Newspaper advertisements were published in the Houston Chronicle, the Houston Community Newspaper, La Voz, and Semana by METRO. The text and layout for these ads may be found in Appendix I.

10.3.5: Comments Database

The North-Hardy Planning Studies team worked closely with METRO and its General Planning Consultant (GPC) in developing the architecture for the comments database. This database facilitated the assembly, review, analysis and maintenance of input received from stakeholders. A hard copy of the comments database may be found in Appendix I.

11.0: Locally Preferred Investment Strategy

The METRO Solutions Plan incorporated the findings from the North-Hardy AA and other AA and corridor planning studies into a system plan. Travel demand modeling was performed. Based on modeling results, several proposed North-Hardy stations were eliminated. Some of these stations may re-appear as further technical work is done during the DEIS. Based on cost and ridership considerations, the rail extension to the Kuykendahl Park & Ride was eliminated in favor of continuing to serve this facility with two-way Park & Ride service.

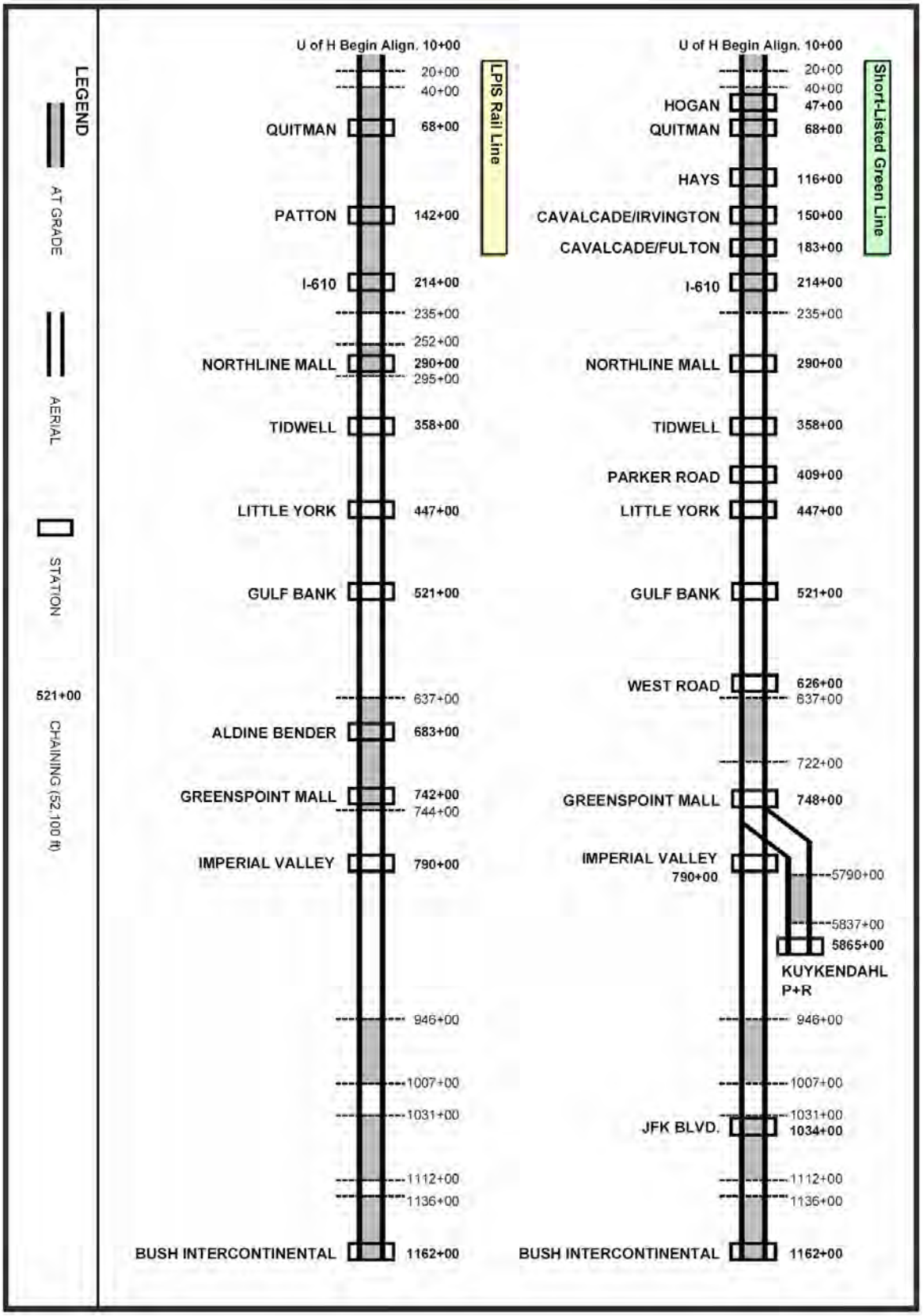
The METRO Solutions Plan, presented to and passed by voters in a November 2003 special election, included an implementation plan calling for completion of 22.1 miles of light rail extensions by 2012. The two highest priority lines are Minimum Operable Segments (MOSs) of the North-Hardy and Southeast-Universities-Hobby Corridors. The selected MOS for the North-Hardy Corridor extends from The University of Houston Downtown Station to Northline Mall.

11.1: LPIS Overview

The METRO Board of Directors based its selection of the short-listed Green Alternative for inclusion in the METRO Solutions System Plan, on the Alternatives Analysis Study (AA) technical work and public input. The METRO Board held numerous system plan meetings with its staff, local constituencies and stakeholders, other agencies, and the public before it arrived at its decision that the short-listed Green Alternative is the most suitable choice for the North-Hardy Corridor. Once the short-listed Green Alternative was selected, the consultant was asked to investigate ways to further refine the Green Line. For example, the consultant was asked to find ways to reduce the capital cost of the Green Line. In response, the number of stations and the extent of aerial guideway were reduced. The 2.2-mile spur to the Kuykendahl Park & Ride was also deleted. The METRO Board asked that the travel time to Bush Intercontinental Airport be reduced. As a result, an airport express service was incorporated into a new operating plan that replaces that of the original short-listed Green Alternative.

Drawings of the short-listed Green Line are in Appendix E of this report. Drawings of the LPIS Rail Line are in Appendix J of this report. Exhibit 11.1 compares the short-listed Green Line with the LPIS Rail Line showing the key differences between the two alignments.

Exhibit 11.1: Short-listed Green Line vs. LPIS Rail Line



Although not part of the North-Hardy Corridor LPIS, the expansion of Park and Ride service to two-directional service was included in the voter-approved METRO Solutions Plan. This service will operate on a managed or toll lanes, prepared as a part of the highway LPIS. This approach reflects the community's wishes that a decision be made on the transit alternative prior to consideration of expanding IH-45. The limits of the managed or toll lanes will be determined as a part of the highway alternatives analysis. Further aspects of the IH-45 highway improvements will be addressed in the Highway Alternatives Analysis Report. METRO's bus network will be reconfigured to optimize passenger transfers between the LRT system and selected bus routes.

The following Sections describe the North-Hardy Corridor LPIS Rail Line as it is presently configured. The planned operation and estimated capital cost of the LPIS Rail Line are also addressed. Please note that the LPIS Rail Line will undoubtedly undergo further modifications and refinements as additional engineering and environmental work is done and additional community input is received.

11.1.1: Route and Facility Description

Please refer to Appendix J for the alignment drawings of the LPIS Rail Line, which is described below.

The LPIS Rail Line begins at the northern terminus of the Downtown to Reliant Park light rail line at U of H Downtown. In the section of the LPIS Rail Line between its point of origin at U of H and Cavalcade, the alignment heads north, at-grade, following the existing right-of-way of North Main Street on the west side. About 500 feet north of I-10, the alignment transitions onto an aerial structure, ramping up to fly over the Hardy Yard railroad facility. It continues on an aerial structure for a distance of about 1,900 feet and then returns back to grade in the center of North Main near Harrington Street. Potentially, a station could be located on the elevated section near Hardy Yard. This location would be a possible site for an intermodal center in the future. The alignment continues at-grade in the center of Main Street with a proposed station located at Quitman Street. At Little White Oak Bayou, the LPIS Rail Line shifts to the northeast to follow along the south side of the Bayou at-grade to Fulton Street. An alternate option to reach Fulton Street has been proposed turning east from North Main onto Boundary Street and then north on Fulton. The alternate alignment options meet at Hays and Fulton Streets. Beyond this point the alignment veers to the right to follow Irvington Boulevard with a station proposed at Patton Street. At Cavalcade, the LPIS Rail Line turns west and continues at-grade in the center of Cavalcade to Fulton Street. At Fulton, the alignment turns north and continues in the center of Fulton. An at-grade station is proposed at I-610. Approximately 1,600 feet north of I-610, the LPIS Rail Line rises onto an aerial structure to fly over the HB&T Railroad. The alignment returns to grade near Bennington and

continues at-grade in the center of Fulton until reaching Northline Mall at Crosstimbers.

The alignment continues through Northline Mall with an at-grade station proposed on the east side of the Mall. A third track extends at-grade through this station in order to accommodate airport express service. Immediately beyond this station, the alignment veers westward and rises onto an aerial structure as it approaches Airline Drive. The aerial alignment crosses over the northbound lanes of Airline Drive and continues north in the center of Airline Drive for 6.1 miles to just north of West Road. Aerial stations in this segment of the alignment are proposed at Tidwell Street, Little York Road, and Gulf Bank Road.

Approximately 900 feet north of West Road, the alignment comes down to grade in the center of Airline Drive continuing in this fashion to a proposed at-grade station at Aldine Bender Road, where Airline Drive terminates. From this point, the alignment continues at grade onto the southern extension of Greenspoint Drive. The alignment continues in the center of Greenspoint Drive, crossing under Beltway 8, until it reaches Greenspoint Mall. At this point, the alignment swings to the west onto Greenspoint Mall property. It continues at-grade to a proposed Greenspoint Mall station located approximately 1,500 feet south of Greens Road. A third track extends at-grade through this station in order to facilitate airport express service.

Beyond the Greenspoint Mall Station, the alignment continues toward Bush Intercontinental Airport. As the alignment proceeds north after it leaves Greenspoint Mall station, it rises onto an aerial structure and veers to the east as it crosses over the eastbound lanes of Greens Road. The aerial alignment continues in the center of Greens Road. An aerial station is proposed at Imperial Valley Drive. Shortly before reaching West Hardy Road, the alignment swings to the north side of Greens Road and continues in a northeasterly direction flying over Hardy Road, the Union Pacific Railroad, and the Hardy Toll Road until it reaches the Hardy Toll Road Airport Extension.

The alignment then follows the south side of the Hardy Toll Road Airport Extension. It initially stays aerial to fly over Central Green Boulevard, Air Center Boulevard, and Aldine Westfield Road before continuing at-grade. The alignment transitions onto an aerial structure again on its approach to JFK Boulevard turning northward while flying over to the east side of JFK Boulevard. The alignment continues north on the east side of the northbound frontage road of JFK Boulevard, veers further east toward the new consolidated car rental facility with provisions for a future station. The alignment then returns to JFK Boulevard flying over the northbound lanes on aerial structure before coming to grade on the west side of the northbound JFK lanes. The alignment continues at grade to a proposed terminal station at the intersection of JFK Boulevard and Terminal Road South.

The total distance of the LPIS Rail Line alignment from U of H to Bush Intercontinental Airport is 21.8 miles. The LPIS Rail Line has 7 at-grade stations and 4 aerial stations. The segment from U of H to the Northline Mall Station is 5.4 miles and has 4 at-grade stations. The segment from Northline Mall to the Greenspoint Mall Station is 8.5 miles and has 2 at-grade stations and 3 aerial stations. The segment from Greenspoint Mall to Bush Intercontinental Airport Station is 7.9 miles and has 1 at-grade station and 1 aerial station.

Differences between the short-listed Green Line alternative and the transit LPIS include the deletion of the small branch to the Kuykendahl Park and Ride and the elimination of some stations.

The present LRT Yard and Shop located at South Fannin will not be able to handle the additional vehicles required to service the LPIS Rail Line. The present facility is sized to store up to 60 light rail vehicles, which are projected to support operations in the year 2025 on the Downtown to Reliant Park LRT line. The shop is sized and equipped to service the vehicles and to provide periodic heavy equipment overhaul. It provides for Maintenance-of-Way equipment and auxiliary support vehicles, and also houses most METRO rail maintenance, operations, and administrative personnel.

For the LPIS Rail Line, a light maintenance and inspection facility would be required. The facility would include storage tracks for the additional fleet of vehicles needed to support 2025 service requirements of the extended line. The new maintenance facility would reduce vehicle deadhead time by providing another vehicle supply point for METRO's LRT system.

Although the capital cost of a LRT maintenance facility has been accounted for, its exact location on the LPIS Rail Line is deferred to later studies. Nonetheless, there are some general locations that are worthy of future investigation. Approximately 2.5 miles of the LPIS Rail Line follow the Hardy Toll Road Airport Extension on its south side. There appears to be suitable, undeveloped land in this general area where a maintenance facility can be situated. There may also be opportunities to locate a maintenance facility along Airline Drive in the general vicinity between Gulf Bank and Aldine Bender Road.

The number of maintenance facility vehicle spaces is based on the number of LRT vehicles required to operate the LPIS Rail Line. To allow for future expansion, the maintenance facility is sized for 27 vehicles. This is 50% more vehicles than the estimated 2025 fleet requirement of 18 cars. Approximately 10 acres of space will be needed for the maintenance site.

Parking facilities are included along the LPIS Rail Line alignment adjacent to selected passenger stations. Key determinants in the selection of parking facilities are the anticipated need for such facilities and the availability of land adjacent to passenger stations. Two types of parking facilities are provided; i.e.,

surface parking and structured parking. Each parking facility is assumed to provide an initial capacity of 500 car-spaces. Surface parking is less costly per vehicle space, but requires more acreage than structured parking. Consequently, structured parking is located within high activity areas where property space and associated costs are at a premium. For this reason, structured parking along the LPIS Rail Line is only located at major shopping malls. Four bus bays and associated access roads and amenities are included at structured parking locations only. In effect, the structured parking facility locations also serve as transit center locations by providing parking, kiss & ride, and bus transfer functions. Please note that other stations will also function as bus transfer points, but in a less integrated way.

Exhibit 11.2 indicates passenger stations at which surface and structured parking are located on the LPIS Rail Line.

Exhibit 11.2: Parking at Passenger Stations

Surface Parking	Structured Parking
Little York Gulf Bank	Northline Mall Greenspoint Mall

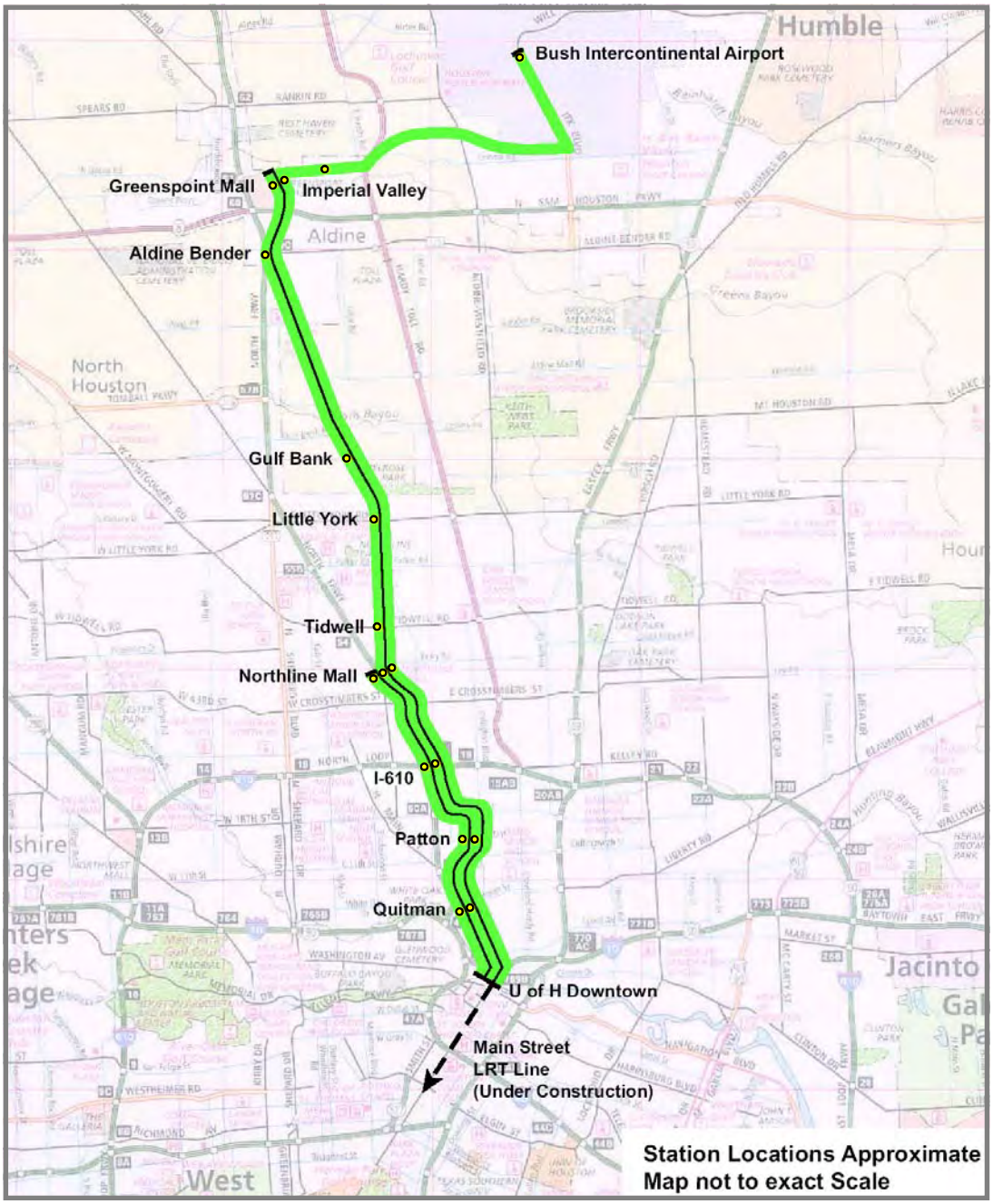
11.1.2: Operating Plan

The operating plan for the LPIS Rail Line is based on the service levels for the Downtown-to-Reliant Park light rail line. On the Downtown-to-Reliant Park Line, METRO currently is planning to operate trains on a six-minute interval between trains (or headway) from the station at Fannin South to the station at the University of Houston. In addition to this end-to-end service, METRO is also planning to operate trains every six minutes in a shuttle service from Smithlands Station to the Hermann Park/Rice University Station during peak periods, thereby providing a combined headway of three minutes on this section of the line. Although the shuttle service does not impact the end-to-end service and, therefore, does not directly affect the operation of the LPIS Rail Line, it does impact the total fleet of Light Rail Vehicles (LRVs) and must be accounted for in the LRV fleet computations.

Service Patterns

As a result of the review and refinement of the short-listed Green Line Alternative, it is proposed that the LPIS Rail Line would have three services (beyond that of the Smithlands Shuttle mentioned above), as shown in Exhibit 11.3.

Exhibit 11.3: Service Routes



One service would extend from the U of H Station to Greenspoint Mall. This local would serve the U of H, Quitman, Patton, IH-610, Northline Mall, Tidwell, Little York, Gulf Bank, Aldine-Bender, and Greenspoint Mall Stations. In peak periods and for most weekdays, this service would operate on a 12-minute headway (i.e., a train every 12 minutes), which equals one-half of the Downtown-to-Reliant Park train service at the U of H Station.

The second service would be another local service extending from the U of H Station to Northline Mall. This local would service the U of H, Quitman, Patton, I-610, and Northline Mall Stations. By operating this service on a 24-minute headway and providing a third track at Northline Mall Station, the Northline local trains would arrive there just before the arrival of the following airport express train which is about to overtake it. This service pattern should allow the operation of express and local trains on a two-track route without significant delay to airport express trains.

Operation of the Northline locals on a 24-minute headway would facilitate the operation of the third service; i.e., an express service between the U of H and the Bush International Airport Station (BIAH). Express trains would only serve the U of H, Northline Mall, Greenspoint Mall, Imperial Valley and Bush International Airport Stations on the LPIS Rail Line. Operating on a 24-minute headway, and using the third track at Northline, the northbound express trains would catch up to the Northline local immediately ahead of it and pass around it, as the Northline local takes its northern layover prior to returning south. At Greenspoint Mall Station, the northbound express will arrive just after the northbound Greenspoint local train has arrived; again using the third track to pass around the Greenspoint local that will be on its northern layover prior to returning south.

In the southbound direction, the Greenspoint and Northline local trains would depart their respective northern terminals just after the express service has left each of the stations. In effect, the express trains would “run away from” the slower locals, while at the same time not catching up to the Greenspoint locals that would arrive six minutes ahead of them at the U of H Station. In this manner, it should be possible to provide a faster service to Bush Intercontinental Airport without the need for a completely three-tracked alignment. LPIS Rail Line trains also start from, and return to, the U of H Station every six minutes, which is consistent with the current service plan for the Downtown-to-Reliant Park Line. It is estimated that express operation would take 14.1 minutes between the U of H and Northline Mall Stations versus 16.3 minutes for the local, and 26.5 minutes versus 32.4 minutes for the local between the U of H and Greenspoint Stations. The time savings amount to 13.5% and 18.2%, respectively, which definitely benefit travelers to and from Bush Intercontinental Airport who have the longest travel times. South of the U of H Station, all trains would service the same stops as currently planned.

Exhibit 11.4 presents estimated one-way running times for local and express service between U of H and selected destinations on the LPIS Rail Line.

Exhibit 11.4: Selected Running Times To / From U of H (in Minutes)

Location	Local Running Time	Express Running Time
Northline Mall	16.3	14.1
Greenspoint Mall	32.4	26.5
Bush IAH	NA	37.6

Vehicle Requirements

The methodology employed for calculating fleet requirements for the LPIS Rail Line is essentially the same as that discussed earlier in Section 2.5.5 of this report. The running times for the three services from U of H to their terminal stations (in minutes) are 16.3 for the Northline local, 32.4 for the Greenspoint local, and 37.6 for the Bush Intercontinental Airport express, as indicated in Exhibit 11.3 above.

To determine the capacity requirements for each service on the LPIS Rail Line, it was necessary to adjust the preliminary ridership data previously supplied for the short-listed Green Line. This adjustment included reallocating the ridership of the two services of the short-lined Green Line into the three services proposed for the Green Line LPIS. This results in a peak hour, peak direction estimate of 1,042 riders on the Greenspoint local service, 269 riders on the Northline local service, and 208 riders on the Bush Intercontinental Airport express service. This yields a total peak loadpoint of 1,519 riders leaving Quitman Station, southbound. It should be noted, however, that the maximum estimated combined peak loadpoint on this line remains the 1,551 riders leaving Preston, southbound, on the Downtown-to-Reliant Park line.

Given the estimated 1,042 riders on the Greenspoint service, it would be necessary for it to be comprised of 5 two-car and 7 one-car trains, with the two-car trains being scheduled for the peak hour trains. In contrast, the other two services would all be one-car trains: 5 on the Northline local service and 7 on the airport express service. The result is an average of 139 riders per car on the Greenspoint local trains, 108 riders on the Northline local trains, and slightly more than 83 riders on the airport express trains, during the peak hour.

The proposed service would require a total of 31 vehicles for both the Downtown to Reliant Park Line and LPIS Rail Line, including the two cars on the Smithlands Shuttle. An additional 5 spares (16.1%) results in an overall fleet requirement of

36 vehicles. However, since 18 of these vehicles are in the existing fleet, the net additional fleet requirement would only be 18 new vehicles.

11.1.3: Capital Cost

Section 6.1 of this report discusses the methodology for calculating capital costs for various alternatives. This same methodology was applied to the LPIS, and Exhibit 11.5 presents its capital cost estimate. As described earlier, the transit LPIS is a modification of the short-listed Green Line alternative. Therefore the capital cost estimate for the LPIS is different from the capital cost estimated for the short-listed Green Line alternative.

Exhibit 11.5: Capital Cost Estimate for the LPIS Rail Line

Cost Category	Total Cost
Vehicles	$ 57,960,000
Stations	$ 23,446,800
Guideway/Roadway	$ 835,911,180
Maintenance/Inspection Facilities	$ 24,008,400
Transit Centers	$ 5,616,000
Park-and-Ride Lots	$ 21,840,000
Road Reconstruction	$ 107,618,784
Right-of-Way	$ 30,150,076
Project Contingency	$ 110,655,124
Pocket Tracks	$ 4,200,000
Total Cost (2002 Dollars)	$1,221,406,364
Total Length in Miles	21.8
Cost per Mile (2002 dollars)	$ 55,950,818

11.2: Minimum Operable Segment

Because of funding constraints, the METRO Board has proposed to build the LPIS Rail Line in segments, consistent with the METRO Solutions Plan. The first segment, called the Minimum Operable Segment or MOS, would extend from the U of H Station to Northline Mall.

11.2.1: Route and Facility Description

The route and facility description of the MOS is the same as described above in Section 11.1.1 for the full build-out LPIS Rail Line, except that the alignment of the MOS will not extend beyond the end of the tail track at Northline Mall. The existing Yard and Shop facility on South Fannin will be used to service the additional eight vehicles required to operate the line extension to Northline Mall.

11.2.2: Operating Plan

It is proposed that the MOS be operated by a single local service on 6-minute headway. Estimating a maximum demand of 757 peak hour, peak direction riders for this shortened route would result in a requirement of 19 trains. However, assuming that the peak passenger demand of 1,551 riders at Preston Station still applies, one of these trains would require a second car in the peak hour in order to keep the average riders per car below the 144-passenger per car standard that METRO has established. Thus, the 19 trains would require a total of 20 cars in service (i.e., 18 one-car trains and 1 two-car train). Adding the two Smithlands Shuttle vehicles, the active fleet required to implement the U of H to Northline Mall service would be 22 vehicles. Allowing 4 spares (18.2%), the total fleet would be 26 vehicles. Again, subtracting the 18 vehicles in the existing fleet, the net number of new vehicles for the U of H to Northline Mall MOS service would be 8.

11.2.3: Capital Cost

Exhibit 11.6 presents the capital cost estimate for the Minimum Operable Segment of the LPIS Rail Line.

Exhibit 11.6: Capital Cost Estimate for the MOS of the LPIS Rail Line

Cost Category	Total Cost
Vehicles	$ 25,760,000
Stations	$ 4,929,600
Guideway/Roadway	$ 158,187,276
Maintenance/Inspection Facilities	---
Transit Centers	$ 2,808,000
Park-and-Ride Lots	$ 7,800,000
Road Reconstruction	$ 39,188,136
Right-of-Way	$ 5,368,000
Project Contingency	$ 24,404,101
Pocket Track	$ 2,100,000
Total Cost (2002 Dollars)	$ 270,545,113
Total Length in Miles	5.4
Cost per Mile (2002 dollars)	$ 49,916,073

APPENDIX A
*NO BUILD ALTERNATIVE**

** Includes transit service operated by METRO, the Brazos Transit District (Woodlands Service), and TREKEXPRESS (Fort Bend County/ US 59 South)*

Route Number	Description	Service Type	Headway	
			Peak	Off-Peak
001ar	Hospital Crosstown	local	15	15
002ar	Bellaire-7600trnbk	local	30	60
002br	Bellaire-Alief	local	10	30
002cr	Bellaire-Westchase	local	30	30
003ar	Langley/Southmore-Bellfort-Hk	local	30	40
003br	Langley/Southmore-Gulf-HK	local	30	40
004ar	Beechnut	local	7	20
004br	Jensen	local	7	20
005ar	Kashmere	local	15	26
008ar	N/S.Main-Bell HK	local	30	30
008br	N/S.Main-Willowbend HK	local	30	30
008cr	S.Main-Bellfort TB	local	60	60
008dr	S.Main-Willowbend TB	local	60	60
009ar	West Gray	local	15	30
011ar	Nance/Almeda-HK	local	25	35
015ar	Fulton	local	10	15
015br	HC-Southmont	local	20	30
015cr	H.C. - Orem/TMC	local	20	30
017ar	Tanglewood/Gulfton-HK	local	20	25
018ar	Kirby Limited	local	27	35
019ar	Wilcrest Crosstown	local	15	40
020ar	Canal-Long Pt-MeC-HK	local	25	40
020br	Canal-Long Pt-Mem/___-HK	local	60	60
020cr	Canal-Long Pt-NeC-HK	local	15	40
020dr	Canal-Long Point-Neu/-HK	local	60	60
023ar	Crosstimbers Crosstown	local	27	30
025ar	Northline Rich-W Oaks-HK	local	12	30
025br	Northline Rich-Sharps-HK	local	12	30
026ar	Outer Loop Crosstown	local	15	30
026br	Outer Loop Crosstown TMCTB	local	40	40
027ar	Inner Loop Crosstown	local	15	30
027br	Inner Loop Crosstown TMCTB	local	40	40
029ar	TSU/UH Hirsch Xtown	local	18	20
030ar	Cullen/Clinton Pk-HK	local	40	60
030br	Clinton/Galena Pk. -HK	local	40	60
030cr	Clinton/Denver Har - HK	local	40	50
030dr	Cullen/Clinton Pk FWY-HK	local	60	60
030er	Clinton/Galena Pk FWY-HK	local	60	60

030fr	Clinton/Denver Har FWY-HK	local	60	60
033ar	Post Oak - Fuqua	local	25	40
033br	Post Oak - Ridgemont	local	25	40
034ar	Montrose Crosstown	local	25	45
035ar	Leeland/Fairview -HK	local	30	45
036ar	Lawndale-Wayside	local	30	60
036br	Lawndale-Wayside DTT	local	60	60
036cr	Lawndale	local	40	60
037ar	El Sol Crosstown	local	35	35
040ar	Pecore-NWM/Tel Richey-HK	local	30	60
040br	Pecore-Ella/Tel Richey-HK	local	30	60
040cr	Pecore-NWM/Richey GHC-HK	local	60	60
040dr	Pecore-Ela/Richey GHC-HK	local	60	60
040er	Pecore-Ella-Dtwn Tb	local	60	60
041ar	Gulf Medows Circ	local	40	40
042ar	Holmes Crosstown Magnolia	local	30	30
042br	Holmes Crosstown 5th Ward/De	local	30	30
043ar	Pinemont Plaza	local	30	55
044ar	Acres Homes	local	20	30
044br	Acres Home via Stall	local	40	60
045ar	Tidwell Crosstown	local	20	40
046ar	Gessner Crosstown	local	10	30
047ar	Hillcroft/Voss Crosstown	local	20	25
048ar	Nav-Mag/W. Dallas-HK	local	60	60
048br	Nav-Plv/W. Dallas-HK	local	30	60
048cr	Nav-Pv(Lab)/W Dal-HK	local	60	60
049ar	Chimney Rock Crosstown	local	40	50
050ar	Harrisburg-Airport/Ht HK	local	30	40
050br	Harrisburg-Pk Pl/Ht HK	local	30	40
050cr	Harrisburg-LaPrt/Ht HK	local	40	60
050dr	Harrisburg-Airp/Ht FWY HK	local	60	60
050er	Harrisburg-PkPl/Ht FWY HK	local	60	60
050fr	Harrisburg-LaPt/Ht FWY HK	local	60	60
052ar	Scott-Sunysd/Hrsch-HK	local	20	35
052br	Scott Frwy/Hirsch-HK	local	40	40
052cr	Scott-Suny/Hrsh-FWY HK	local	40	60
052dr	Scott-fwy/Hrsch-FWY HK	local	60	60
052er	Scott-Downtown TB	local	60	60
052fr	Scott-8000 TB	local	60	60
053ar	Westheimer LTD Briar	local	13	23
054ar	Aldine/Hollyvale	local	30	50
056ar	Airline	local	10	15
058ar	Hammerly	local	20	60
058br	Hammerly via Fwy/Kty	local	60	60
060ar	South MacGregor	local	30	60
064ar	Lincoln City	local	30	60
065ar	Bissonnet	local	15	20
065br	Bissonnet via Fwy	local	60	60
065cr	Bissonnet via Westwood P&R	local	60	60

067ar	Dairy Ashford Crosstown	local	30	60
068ar	Braes Bayou-West Belt	local	24	40
068br	Braes Bayou-L610 West Belt	local	60	60
068cr	Braes Bayou-FonMeadw	local	24	40
068dr	Braes Bayou-Med. Ctr TB	local	60	60
070ar	University/Memorial-HK	local	25	60
072ar	Westview	local	20	30
073ar	Bellfort Crosstown	local	30	40
073br	Bellfort Crosstown TMC TB	local	8	20
077ar	Liberty/MLK-Trswy HK	local	24	60
077br	Liberty FWY/MLK-Twy HK	local	24	60
077cr	Liberty/MLK-no Trswy H	local	60	60
077dr	Liberty FW/MLK-no Twy H	local	60	60
078ar	Irvington/Alabama-HK	local	60	60
078br	Irvington Berry/Alabama-HK	local	60	60
078cr	Irvington Downtown TB	local	60	60
078dr	Irvington 9800/ Berry D-TB	local	60	60
079ar	W. Little York Xtown	local	35	35
080ar	Lyons-Kelley/Dowling-HK	local	40	60
080br	Lyons-Waco/Dowling-HK	local	60	80
080cr	Lyons-Calvacade/Dowling-HK	local	40	60
082ar	Westheimer-West Oaks	local	30	60
082br	Westheimer-Dairy Ash	local	30	60
082cr	Westheimer-Woodlake	local	10	20
083ar	Lee Road Circulator	local	30	40
085ar	Antoine-via Freeway	local	8	30
085br	Antoine-Washington	local	40	60
085cr	Antoine-via Frwy/Kty	local	40	60
086ar	FM 1960 Circ	local	15	30
087ar	Yellowstone Circulator	local	15	25
089ar	South Park Circulator	local	35	60
090ar	Yale	local	15	40
090br	Yale(8200 TB)	local	40	40
093ar	NWTC – Greenway Shuttle	Local	20	No service
097ar	Settegast	local	40	60
098ar	Briargate&Via N/Thum	local	70	70
098br	Briargate	local	35	35
101ar	Airport	local	20	40
102ar	IAH Express AM Route	express	60	60
102br	IAH Express-Non Hov	express	20	40
108ar	.1 Veterans Highway	express	20	40
1098ar	Smith Lands-TMC Shuttle	Rail	6	No service
131ar	Memorial Exp Ges/HOV	express	29	60
131br	Memorial Exp WB /HOV	express	10	60
132ar	Harwin Exp-Cook Rd.	express	30	60
132br	Harwin-Exp/Mis-Bend	express	10	40
137ar	Northshore Exp	express	15	40
163ar	Fondren Exp-M/City	express	20	40

163br	Fondren Exp-Airport	express	20	40
170ar	Missouri City Exp	express	15	60
201ar	N. Shepherd P&R	commuter	10	No service
202ar	Kuykendahl P&R Center	commuter	8	No service
202br	Kuykendahl P&R Houston Ctr	commuter	30	No service
204ar	Spring P&R	commuter	8	No service
204br	Spring-Kuykendahl P&R	Commuter	No service	30
2051ar	CBD to Astrodome	rail	6	6
205ar	Kingwood P&R	commuter	10	30
205br	Kingwood-Houston Center	commuter	30	No service
206ar	Eastex-P & R	commuter	10	No service
210ar	West Belt P&R via Katy/CBD	commuter	15	No service
212ar	Seton Lake P&R	commuter	10	No service
212br	Seton Lake Hou Ctr P&R	commuter	30	No service
214ar	NW Station via Katy/CBD P&R	commuter	7	No service
216ar	WLY/Pmnt-Katy/CBD P&R	commuter	6	No service
221ar	Kingsland P&R Katy/CBD	commuter	5	30
228ar	Addicks P&R Katy CBD	commuter	3	No service
228br	Addicks P&R/Sh/Co Katy	commuter	60	No service
236ar	Maxey Rd P&R	commuter	12	No service
244ar	Monroe P&R	commuter	15	No service
244br	Monroe P&R via EWTC	commuter	60	No service
246ar	Bay Area P&R	commuter	10	No service
246br	Bay Area P&R-EWTC	commuter	45	No service
246cr	Bay Area via NASA	commuter	60	No service
246dr	Bay Area NASA & EWTC	commuter	60	30
247ar	Fuqua P&R	commuter	10	No service
247br	Fuqua P&R - EWTC	commuter	20	No service
257ar	Townsen P&R	commuter	15	No service
261ar	West Loop P&R	commuter	15	No service
262ar	Alief/Westwood P&R	commuter	10	No service
262br	Alief/Westwood P&R-Hou Ctr	commuter	30	30
265ar	West Bellfort P&R	commuter	6	30
273ar	Gessner P&R	commuter	12	No service
283ar	Kuykendahl/Uptown P&R	commuter	15	30
284ar	Kingwood/Uptown P&R	commuter	20	30
285ar	Kingsland/Addicks/Uptown	commuter	20	No service
285br	NWTC/Greenway Plaza	commuter	20	No service
291ar	N.Shepherd-TMC P&R	commuter	15	No service
292ar	W.Bel/W.Wood-TMC P&R	commuter	15	30
297ar	S. Point/Mon/TMC P&R	commuter	15	No service
298ar	Addicks/NWTC/TMC P&R	commuter	10	No service
313ar	Allen Parkway Special	local	6	15
320ar	TMC Circulator White	local	4	15
321ar	TMC Circulator Blue	local	4	No service
443ar	T.C. Jester Ltd.	local	20	40
451ar	Trolley Route A	local	7	7
452ar	Trolley Route B	local	10	10
453ar	Trolley Route C	local	7	7

454ar	Trolley Route D	local	8	8
455ar	Trolley Route E	local	8	8
601ar	Sawdust P&R/CBD	Commuter	10	No service
601br	Sawdust P&R-Uptown/Greenway	Commuter	10	No service
601cr	Sawdust P&R-TMC	Commuter	10	No service
602ar	Woodlands P&R / CBD	commuter	10	No service
602br	Woodlands P&R-Upt/Grnwy	commuter	10	No service
602cr	Woodlands P&R-TMC	commuter	10	No service

Note: Shaded lines identify routes that are to be implemented as part of the No Build Alternative
Source: Houston METRO Scheduling Department, 2003

APPENDIX B
NO BUILD ALTERNATIVE
METRO TRANSIT CAPITAL FACILITIES

CORRIDOR/PROJECT	LIMITS/LOCATION	2007 No Build	STATUS/COMMENTS
Downtown to Reliant Park Corridor			
Yard & Shop		LRT	existing
Stations (16 stations)		LRT	existing
Fannin South	On Fannin, south of Loop 610 at Astroworld	P&R/TS	existing
Reliant Park	On Fannin, east of Astrodome	TS	existing
Smith Lands	On Greenbriar, between Braeswood and OST	TS	existing
Texas Medical Center Transit Center	On Fannin, north of Galen intersection	TC/TS	existing
Dryden/TMC	On Fannin, south of Dryden	TS	existing
Memorial Hermann Hospital/Zoo	On Fannin, south of N. MacGregor	TS	existing
Hermann Park/Rice University	On Fannin, south of Sunset Blvd.	TS	existing
Museum District	Split track – on Fannin & San Jacinto, between Binz and Ewing (side platforms)	TS	existing
Wheeler	Split track – on Fannin & San Jacinto, between Wheeler and Blodgett	TC/TS	existing
Ensemble/Houston Community College	On Main, at Berry	TS	existing
McGowen	On Main, at McGowen	TS	existing
Downtown Transit Center	On Main, between St. Joseph Prkway and Pierce	TC/TS	existing
Bell	On Main, at Bell	TS	existing
Main Street Square	On Main, between Dallas, McKinney and Lamar	TS	existing
Preston	On Main, at Preston	TS	existing
U of H Downtown	On Main Street Bridge @ U of H	TS	existing

Downtown Superstop	Travis/Lamar/Main/McKinney	TC	existing
South Main/TMC Transit Street Recons	Major arterials in the TMC area (Fannin, Main)	TSM	existing
Downtown/Midtown Streets	Selected Downtown and Midtown transit streets	TSM	existing
South Main			
Missouri City Park & Ride	Beltway 8 @ Fondren	P&R	existing
Gulf			
Gulf HOV Lane	Pierce/Dowling to Dixie Farm Road	HOV-3+/1/1	existing
Bay Area Park & Ride	Bay Area Blvd. @ Feathercraft	P&R	existing
Bay Area Park & Pool	I-45 and Bay Area Blvd.	P&P	existing
Fuqua Park & Ride	Fuqua and Sabo	P&R	existing
South Point Park & Ride	Across from the Fuqua Park & Ride	P&R	existing, previously called Fuqua East
Monroe Park & Ride	At Gulf Freeway and Canniff	P&R	existing
Eastwood Transit Center	Gulf Freeway @ Calhoun	TC	existing
Southeast			
Southeast Transit Center	Located at OST and Scottcrest	TC	existing
Gulfgate Transit Center	On Evergreen, just south of I-610 and Gulf Freeway	TC	Programmed
Hobby Transit Center	Airport Blvd. @ Broadway		Proposed; also includes relocation of facility to accommodate light rail operations
Eastex			
Eastex HOV Lane	Quitman to Will Clayton Parkway	HOV-3+/1/1	existing
Eastex HOV Lane*	Will Clayton Parkway to Kingwood	HOV-3+/1/1	under construction

Eastex HOV Lane	Jackson/Chenevert to Quitman	HOV-3+/1/1	under construction
Eastex Park & Ride w/HOV ramp	Aldine Bender and Old Humble Road	P&R	existing
Kingwood Park & Ride	Just north of Kingwood Dr. on Lake Houston Parkway	P&R	existing
Tidwell Transit Center	US 59 (Eastex) @ Tidwell	TC	existing
Townsen Park & Ride	West of Eastex Frwy @ Townsen Blvd.	P&R	existing
Kashmere Transit Center	Kelley Rd. @ Hirsch	TC	existing
I-10 East			
Maxey Road Park & Ride	Maxey Road and Federal Road	P&R	existing
Fifth Ward/Denver Harbor Transit Center	Lockwood between Lyons Ave and Farmers St	TC	existing
Katy			
Katy HOV	SH6 to Inner Katy Connector	HOV-3+/1/1	existing
Katy Diamond Lanes*	Between Barker-Cypress/Hwy. 6 to Grand Parkway	HOV-3+/2/2	existing
Katy/CBD HOV Ramp to Downtown	Direct ramp to north side of CBD at Franklin	HOV-3+/3/2	existing
Kingsland Park & Ride	On Kingsland Blvd., just east of Town & Country	P&R	existing
Addicks Park & Ride	Just north of 1-10, between SH 6 and Eldridge	P&R	existing
Katy/West Belt Park & Ride	On West Belt, north of I-10	P&R	existing
Northwest Transit Center	Old Katy Rd. @ I-10 West	TC w/park	existing
North/Hardy HOV			
North HOV Lane	Smith/Louisiana to north of FM 1960	HOV-3+/1/1	existing
North HOV Lane Crosstimbers Ramp	direct access ramp from Northline TC	HOV/ramp	existing

North HOV Lane Connection "L"	direct ramp connection	HOV-3+/1/1	existing
Kuykendahl Park & Ride	I-45 @ Kuykendahl and DeMontrond	P&R	existing
North Shepherd Park & Ride	North Shepherd @ Little York	P&R	existing
Spring Park & Ride	FM 1960 @ Carlsway	P&R	existing
Northline Mall Transit Center	Northline Mall	TC	existing
Greenspoint Dr./Greenspoint Mall Transit Center	Greenspoint Dr./Greenspoint Mall	TC	existing
Northwest			
Northwest HOV Lane	Northwest Transit Center to FM 1960	HOV-3+/1/1	existing
Northwest Transit Center	I-10 (Katy Frwy) @ I-610 (West Loop)	TC w/park	existing
Pinemont Park & Ride	Pinemont @ Bingle	P&R	existing
West Little York Park & Ride	West Little York, between West Belt & US 290	P&R	existing
Northwest Station P&R	Northwest Frwy (US 290) @ West Rd.	P&R	existing
Barker Cypress Park & Ride	US 290 @ Skinner	P&R	Programmed
Uptown-West Loop			
Richmond Transit Center	In the median on Richmond, between Post Oak & Rice; relocate to S. Rice with LRT	TC	Programmed
West Loop Improvements	Portals at Westpark/US 59 and Post Oak Blvd.	TSM	Programmed
SH 249/Tomball Corridor			
Seton Lake Park & Ride	Seton Lake @ Bammel North Houston	P&R	existing
Acres Home Transit Center	West Little York, just west of SH 249	TC	existing

South Loop			
West Loop Park & Ride	Intersection of West Loop 610/South Loop 610	P&R	existing

Southwest			
Southwest HOV Lane	Shepherd to County Line	HOV-3+/1/1	existing
Southwest HOV Lane*	South of Elgin to Shepherd	HOV-3+/1/1	under construction
Hillcroft Transit Center	On Westpark between US59 and Hillcroft	TC	existing
Westwood Park & Ride	Southwest Freeway @ Bissonnet	P&R	existing
Alief Park & Ride	Boone Rd. and Bissonnet	P&R	existing
West Bellfort Park & Ride	Southwest Freeway @ West Bellfort	P&R	existing
Westpark			
Mission Bend Park & Ride	Alief-Clodine and Eldridge Pkwy	P&R	existing
Westchase Park & Ride	Northwest corner of Rogersdale and Harwin	P&R	under construction
Westpark Toll Lanes*	IH-610 to Beltway 8	HOV-3+/2/2	under construction
Gessner Park & Ride	Westpark and Gessner	P&R	existing
Harrisburg/SH 225 Corridor			
Magnolia Transit Center	East of M. Garcia between Harrisburg and Capitol	TC	existing
Non-Corridor Facilities			
Bellaire Transit Center	On Bellaire between Bissonnet and S. Rice Ave.	TC	existing
Heights Transit Center	N. Main/W. 20th, and Studewood	TC	existing
Hiram Clarke Transit Center	Buffalo Speedway @ Fuqua	TC	existing
Mesa Transit Center	Mesa @ Tidwell	TC	existing
Facilities Operated By Other Entities*			
Brazos Transit District - The Woodlands Express			

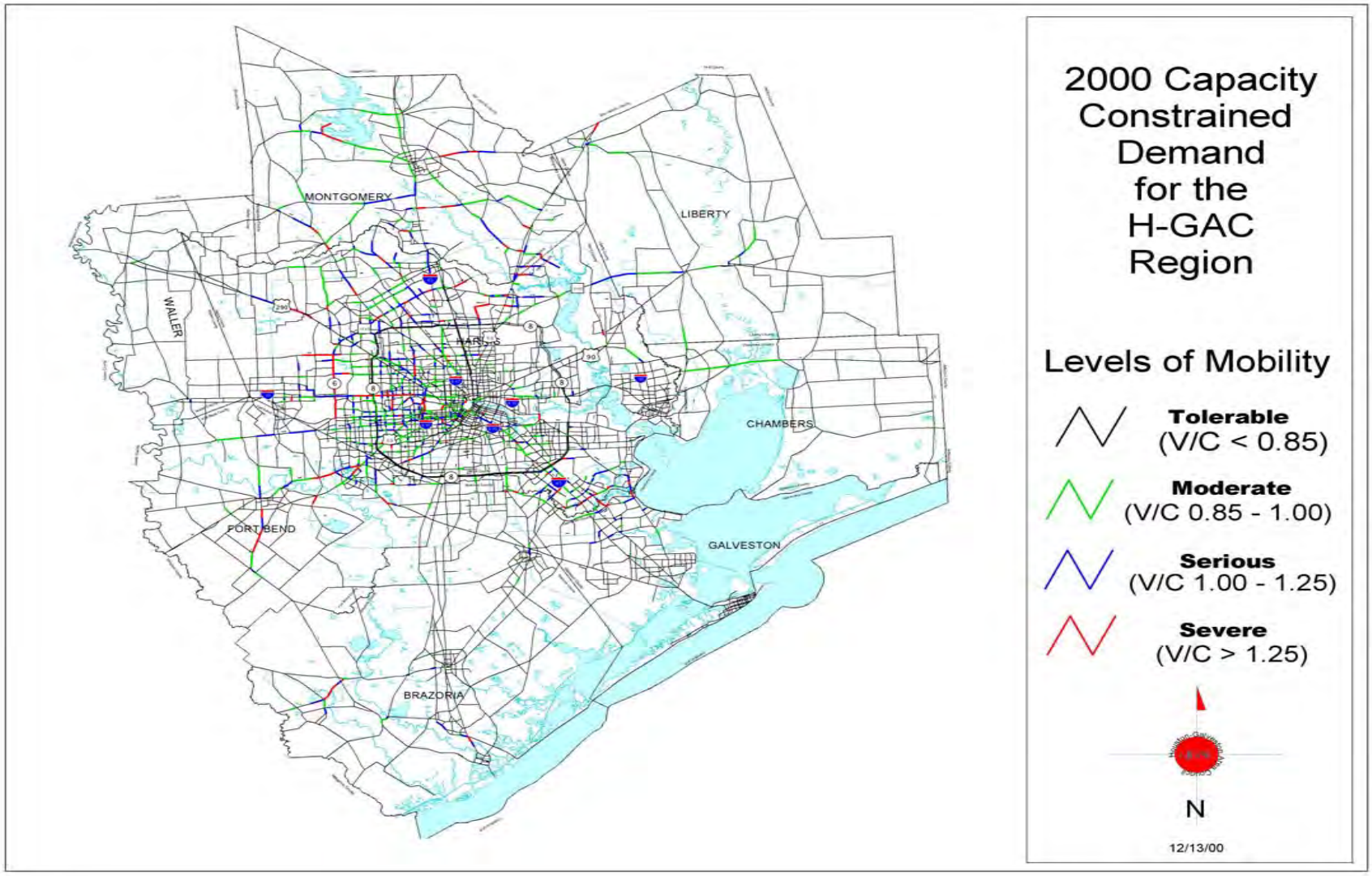
Research Forest Park & Ride	3900 Marisco Place in The Woodlands	P&R	existing
Sawdust Park & Ride	701 West Ridge in Spring, Tx	P&R	existing
TREKEXPRESS			
University of Houston Park & Ride	University Blvd. & US 59 South, Sugar Land, Tx	P&R	existing
First Colony AMC Theatre Park & Ride	AMC Theatre lot, Sweetwater Blvd. @ US 59 South, Sugarland, Tx	P&R	existing

NOTE:
(1) a grouping of low cost project improvements;
(2) AHCT = Advanced High Capacity Transit;
(3) HOV designations = # people in carpool/ # of lanes/ # of directions of HOV operation;
(4) LRT = Light Rail Transit;
(5) SIP = Service Improvements Package
(6) CRT = Commuter Rail Transit

LRT	**Light Rail Transit**
TS	**Transit Station**
TC	**Transit Center**
TSM	**Transportation System Management**
P&R	**Park & Ride**
HOV	**High Occupancy Vehicle**

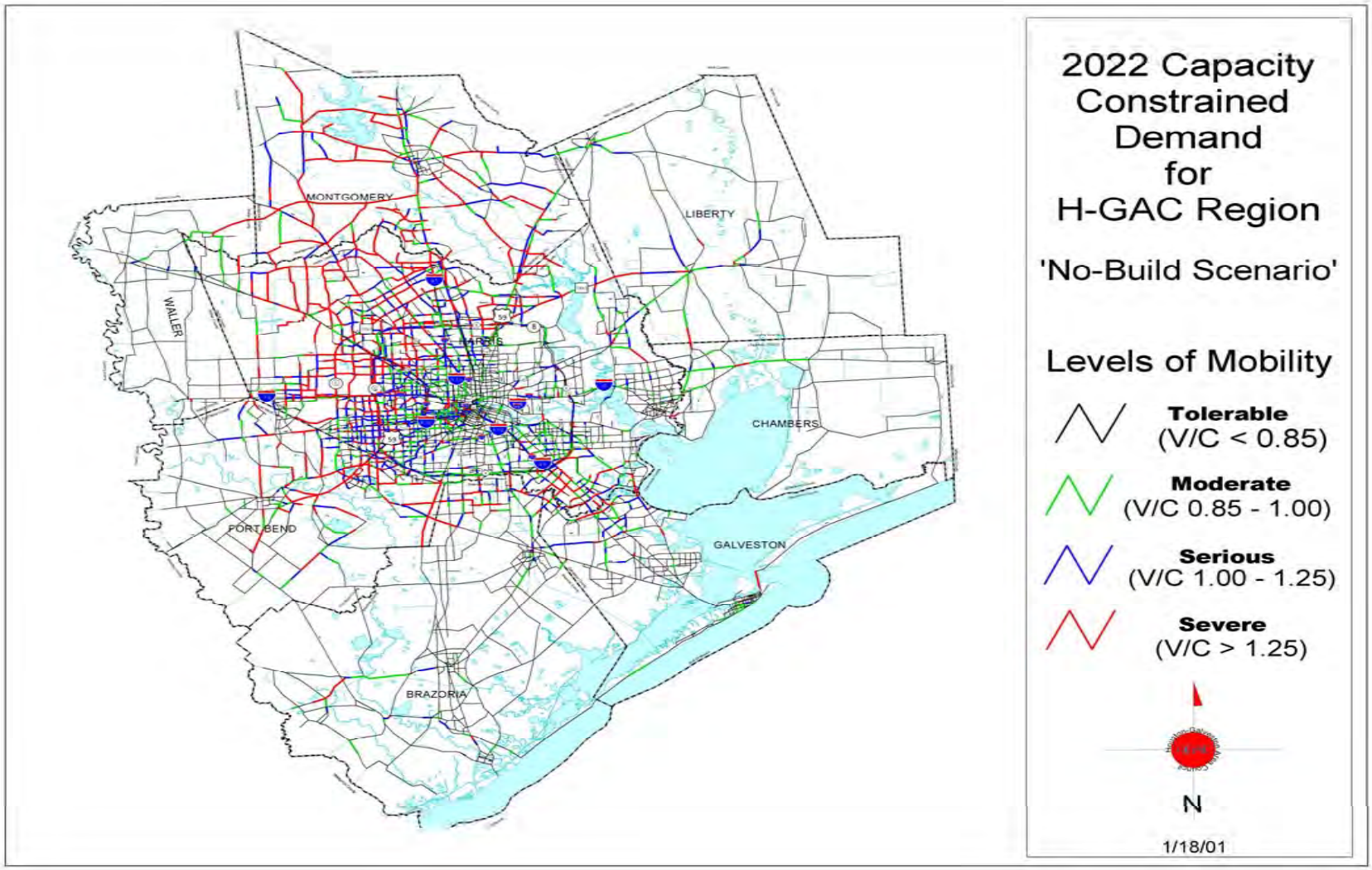
Source: Houston METRO Capital Planning, 2003

APPENDIX C
CURRENT AND FUTURE REGIONAL LEVELS OF MOBILITY
FIGURE c-1 Current Levels of Mobility (2000)



Source: HGAC Transportation Department 12-13-00

FIGURE C-2
2022 NO BUILD SCENARIO (FUTURE DEMAND ON CURRENT ROADWAYS)



APPENDIX D

FUTURE HARRIS COUNTY TOLL ROAD PROJECTS

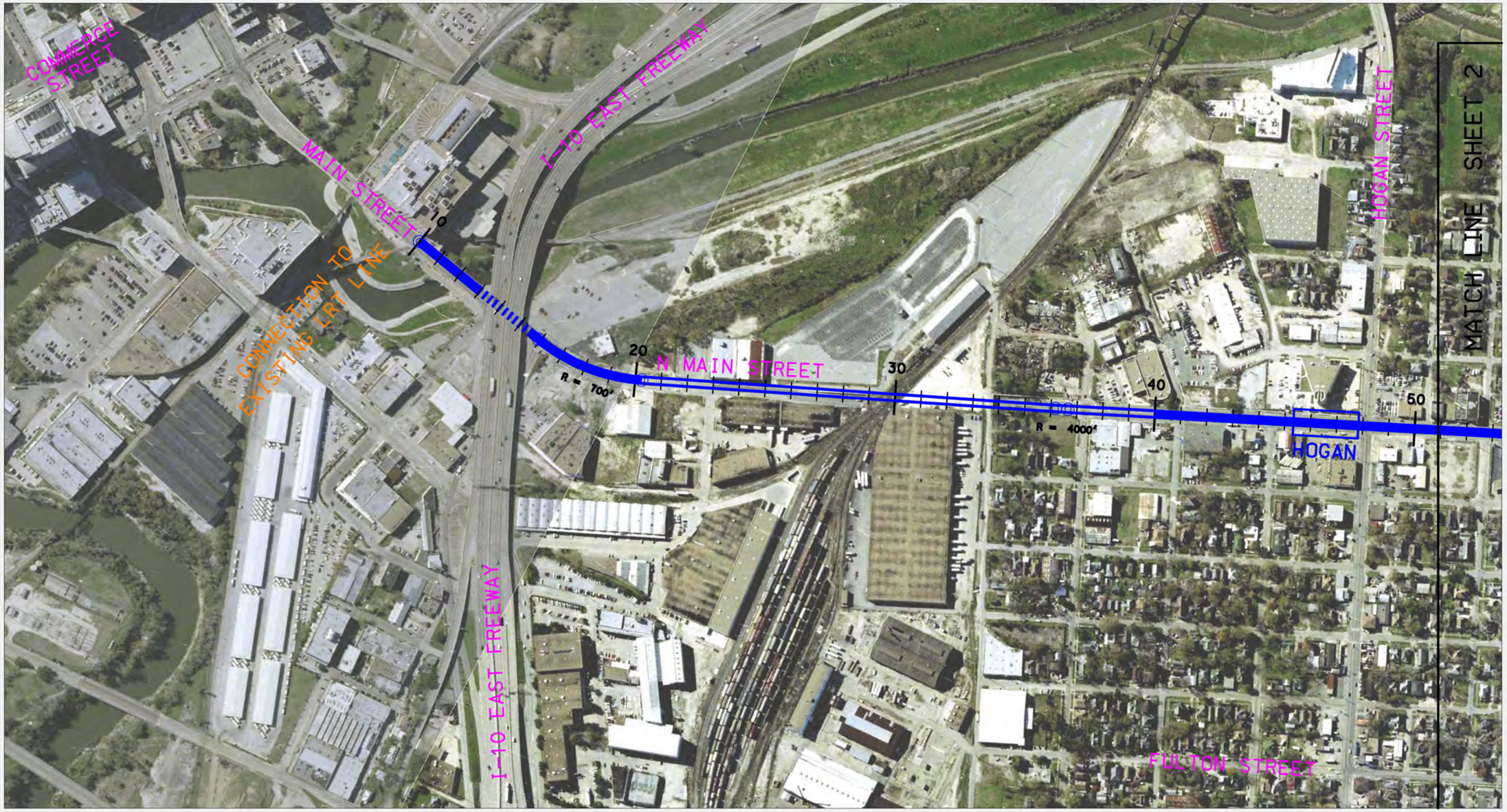
Project	Limits From	To	Distance in miles	Est. Cost in $ millions	Facility
Ft. Bend Parkway	Beltway 8 W @ Hillcroft	Grand Parkway South of SH 6	18.7	Phase 1 49.	4 lanes
Ft. Bend Westpark	FM 1464	Grand Parkway	6	41.5	4 lanes
Westpark Toll Road	I-610 W	FM 1464	16	391	4 lanes
Post Oak Rd Extension	I-610 S	Beltway 8 S @ Hillcroft	5	55	4 lanes
I-10 W Toll Lanes	I-610 W	City of Katy	20	266	4 high occupancy toll lanes
Northwest Tollway	I-610 N	Grand Parkway	20	-	4 lanes using railroad ROW
Grand Parkway Tollway NW	I-10 W	US 59 N	53	487	4 lanes
Grand Parkway Tollway East	I-10 E	US 59 N			
Grand Parkway Tollway S	US 59 S	Fred Hartman Bridge SH 146			
SH 87 Toll Bridge	Galveston	Bolivar Peninsula		211	
Kingsland Blvd	SH 6	Barker Cypress	3.5		4 lanes
Barker Cypress	Westpark Tollway	I-10 W	5		4 lanes
Briar Forest	SH 6	W of Barker Reservoir	5		4 lanes
Beltway 8 East Tollway	US 59 N	US 90 E			
US 290 Toll Lanes	I-610	Grand Parkway			
SPRR Corridor	I-610 N	I-610 S			
SH 35 S	Old Spanish Trail	Grand Parkway			
Fairmont Pkwy E	Beltway 8 E	Grand Parkway			

Source: HGAC Transportation Department 1-18-01

Toll Road Authority.

APPENDIX E

RED, BLUE, GREEN Alignment



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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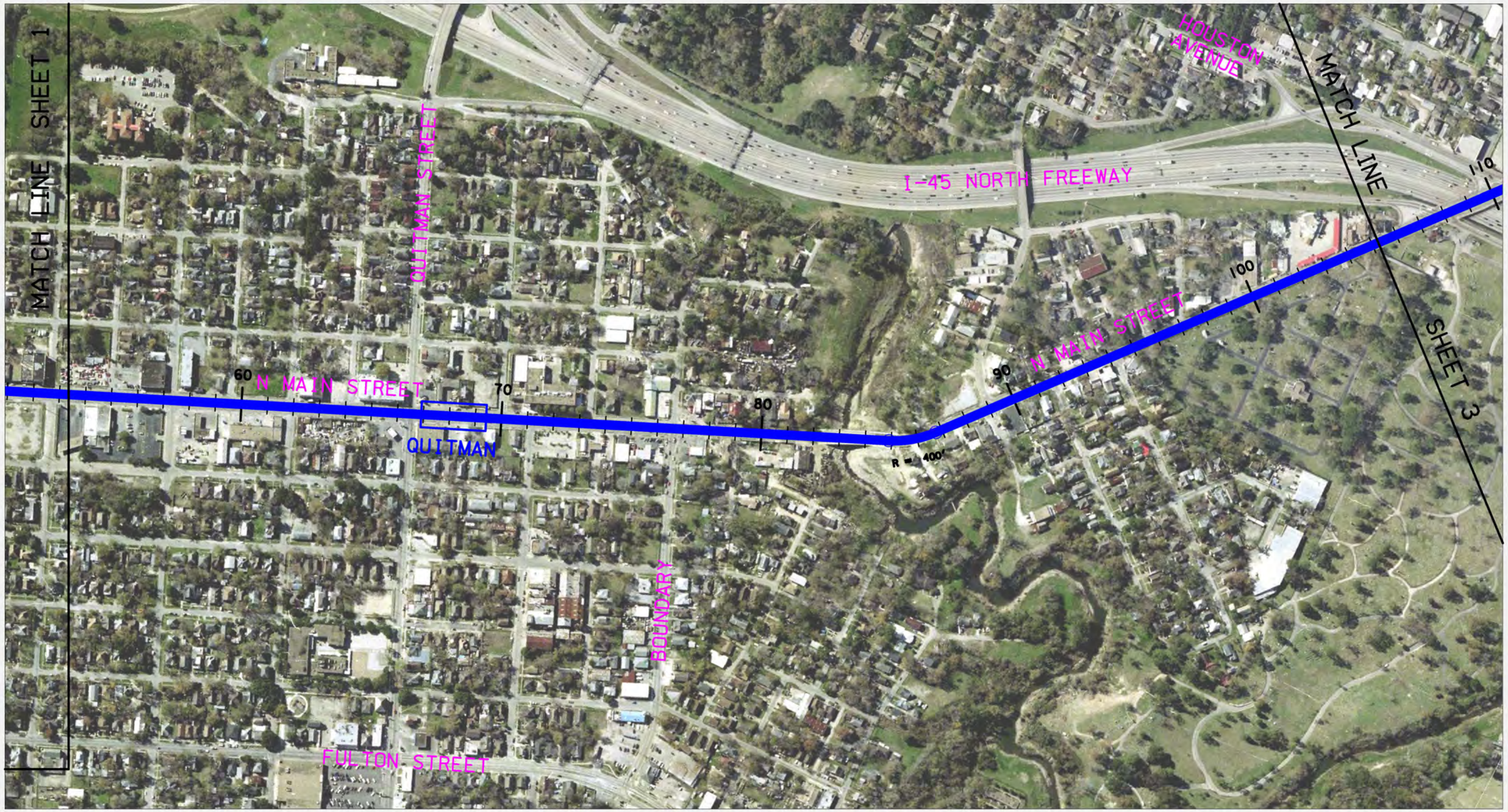
ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 01



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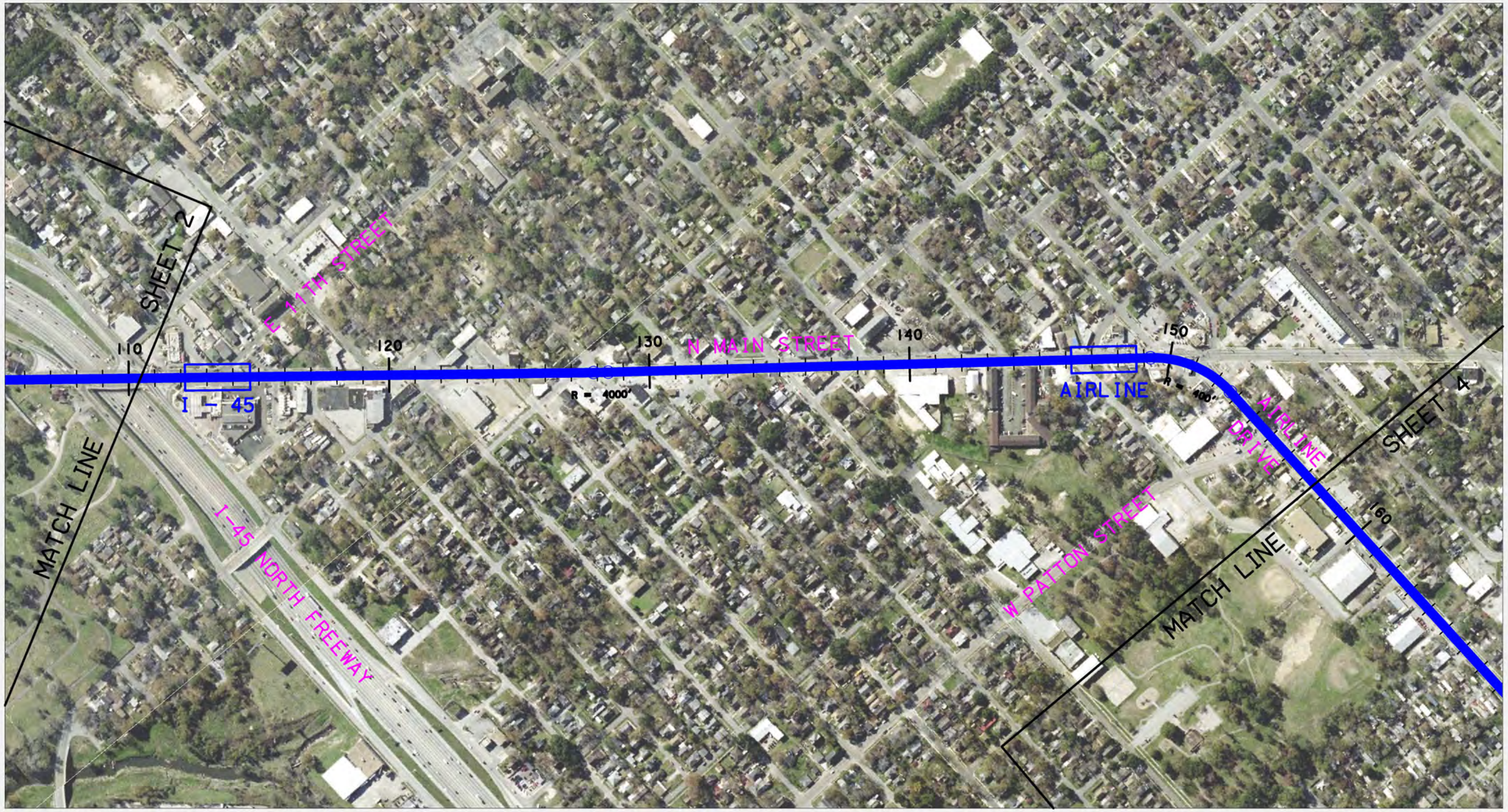

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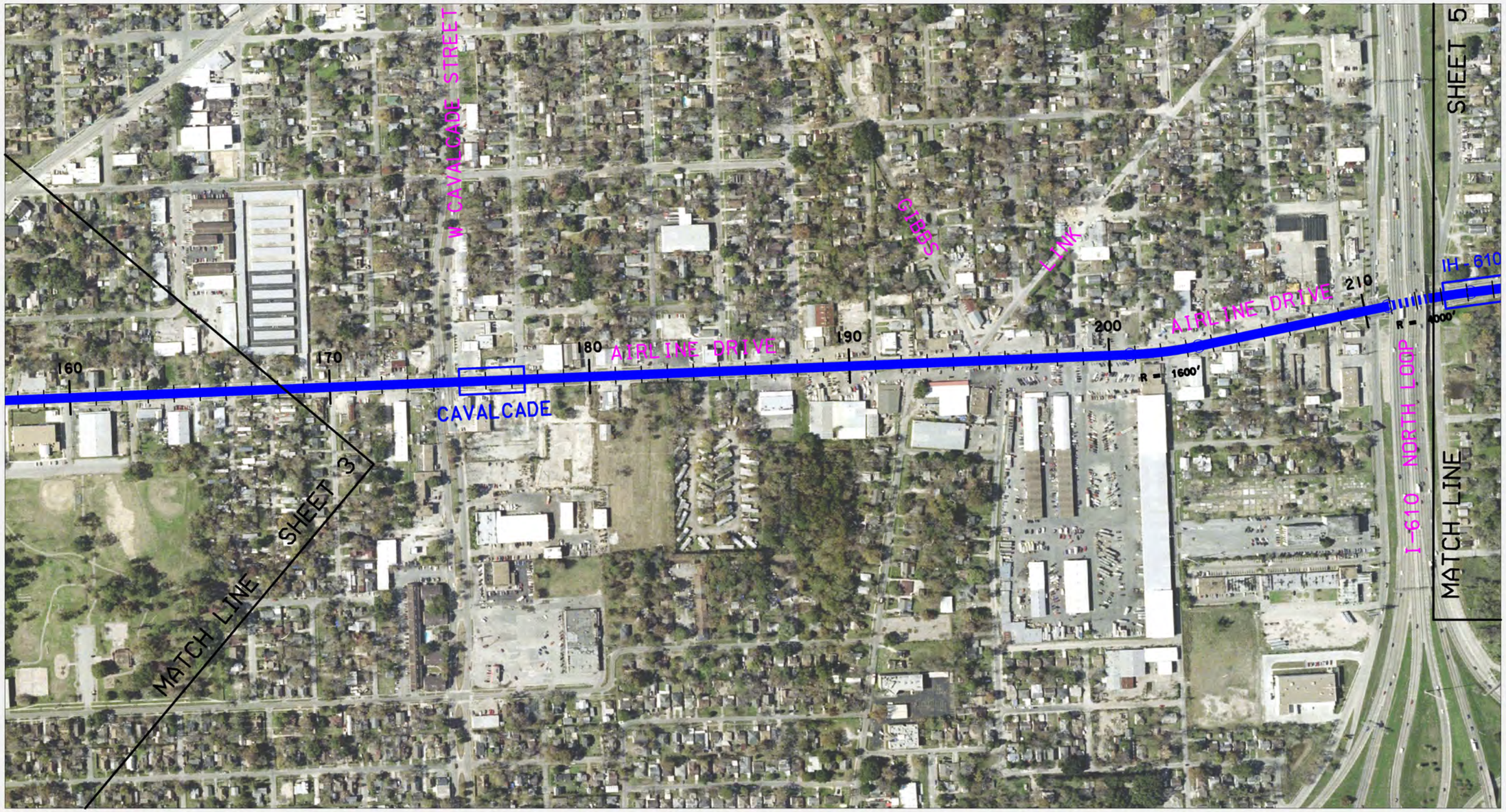

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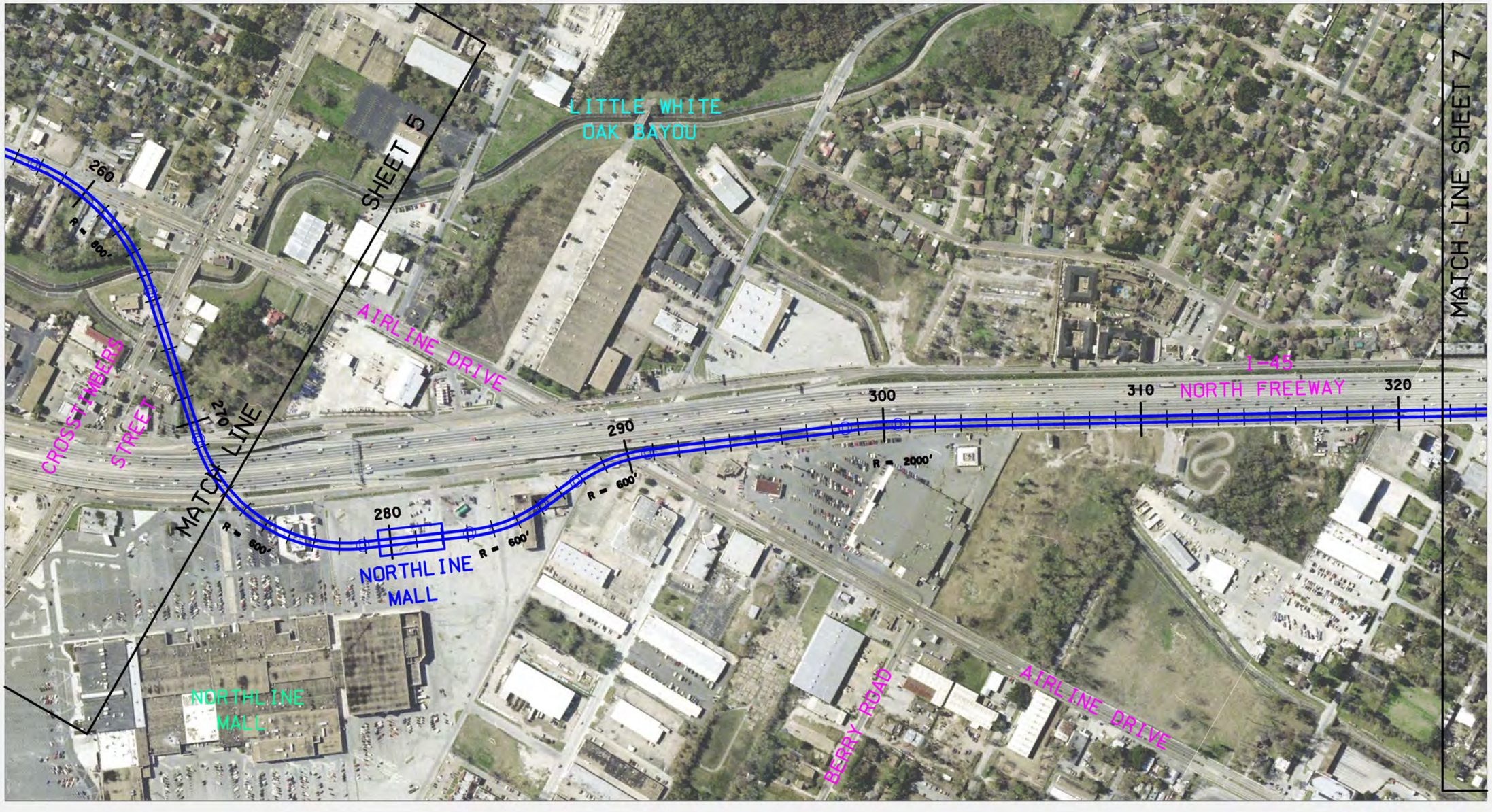

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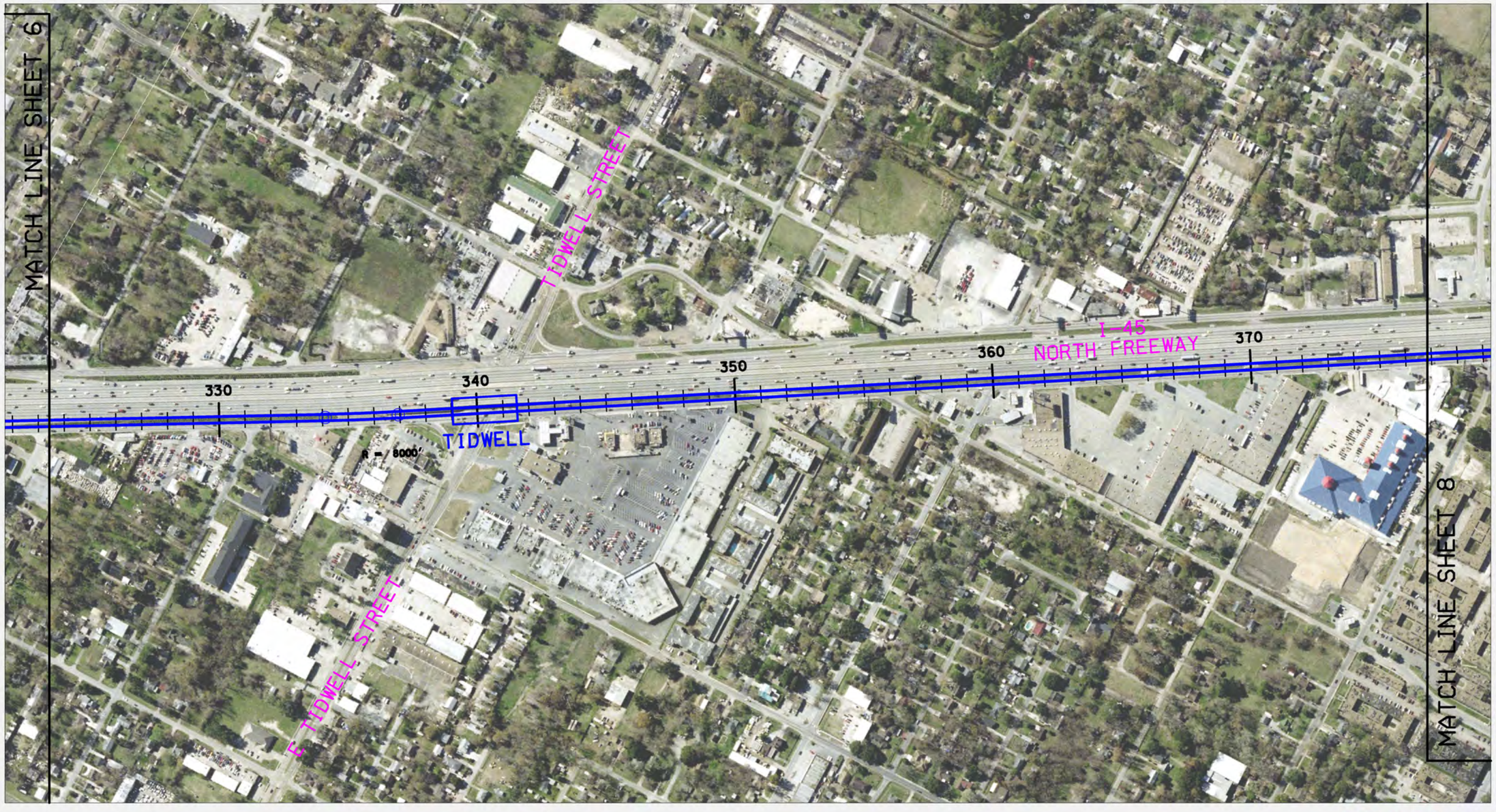

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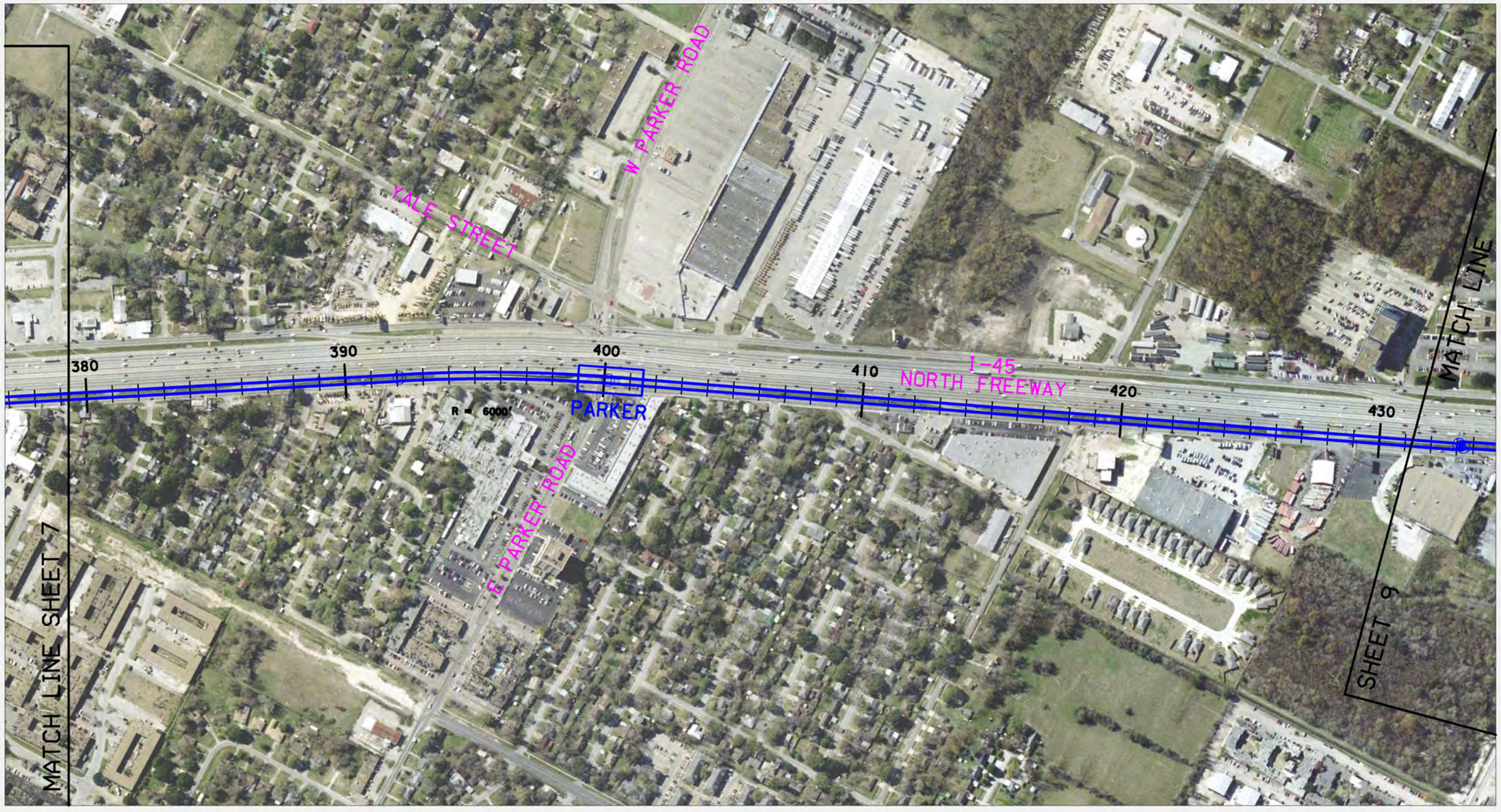

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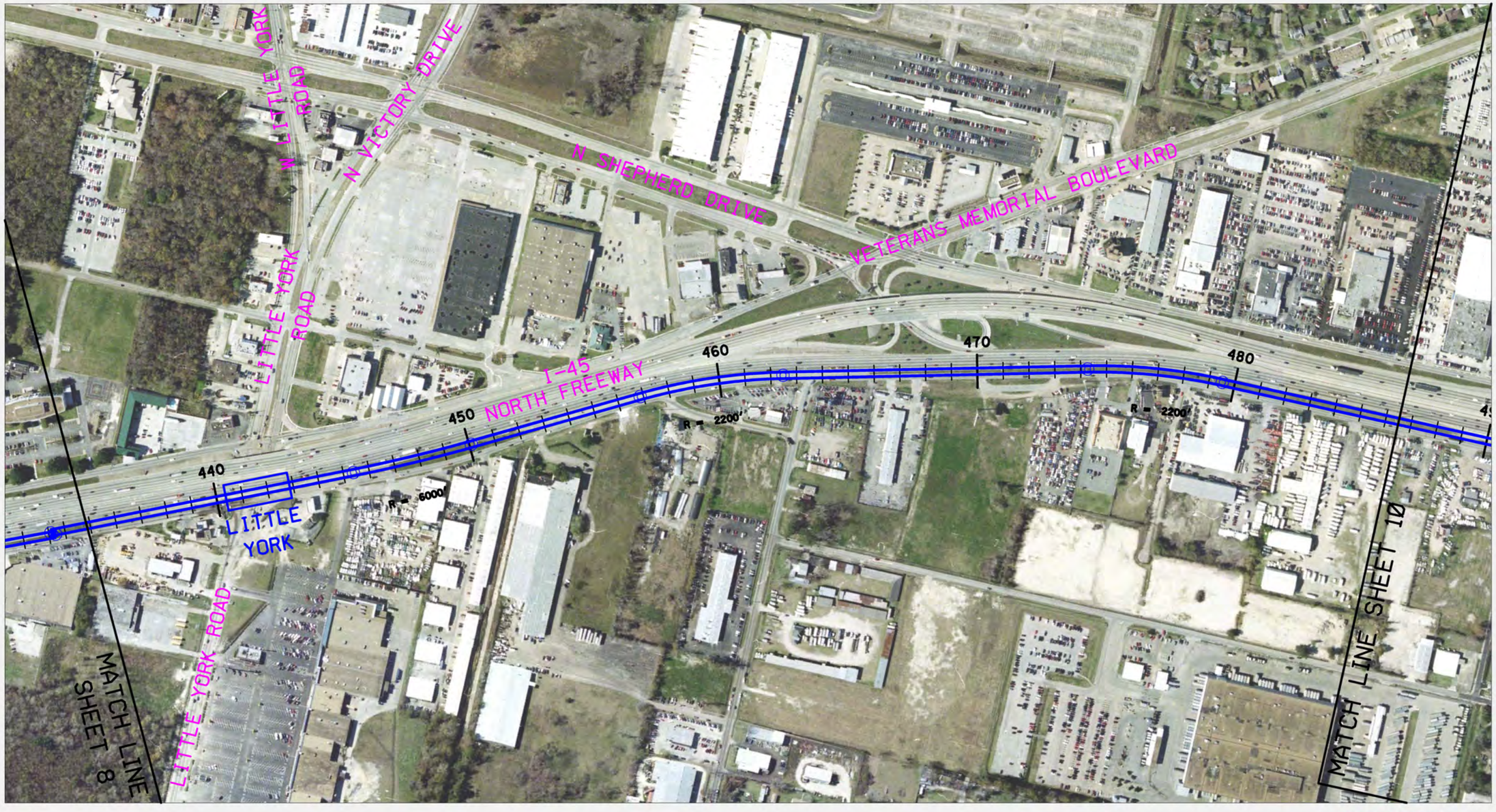

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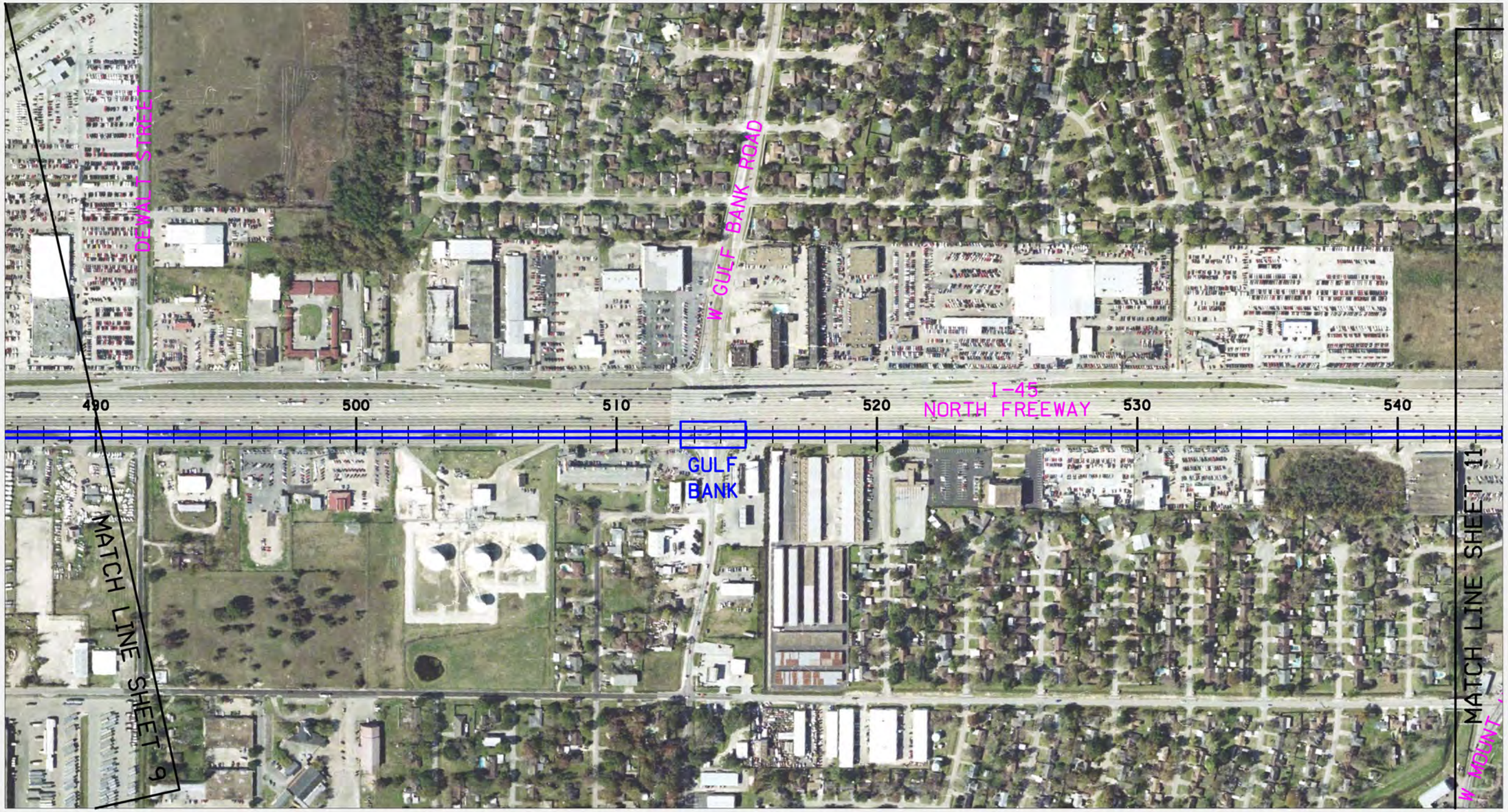

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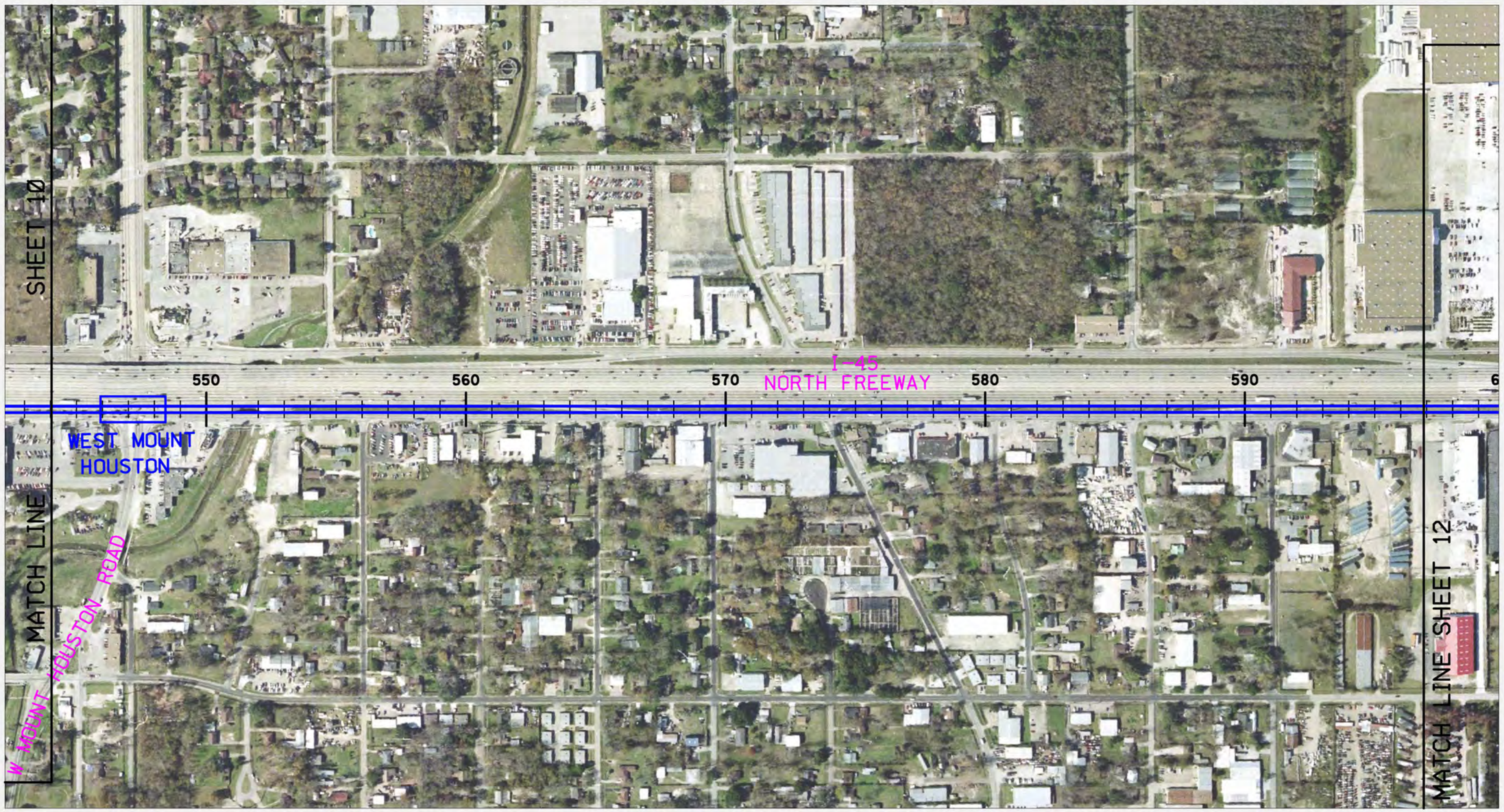

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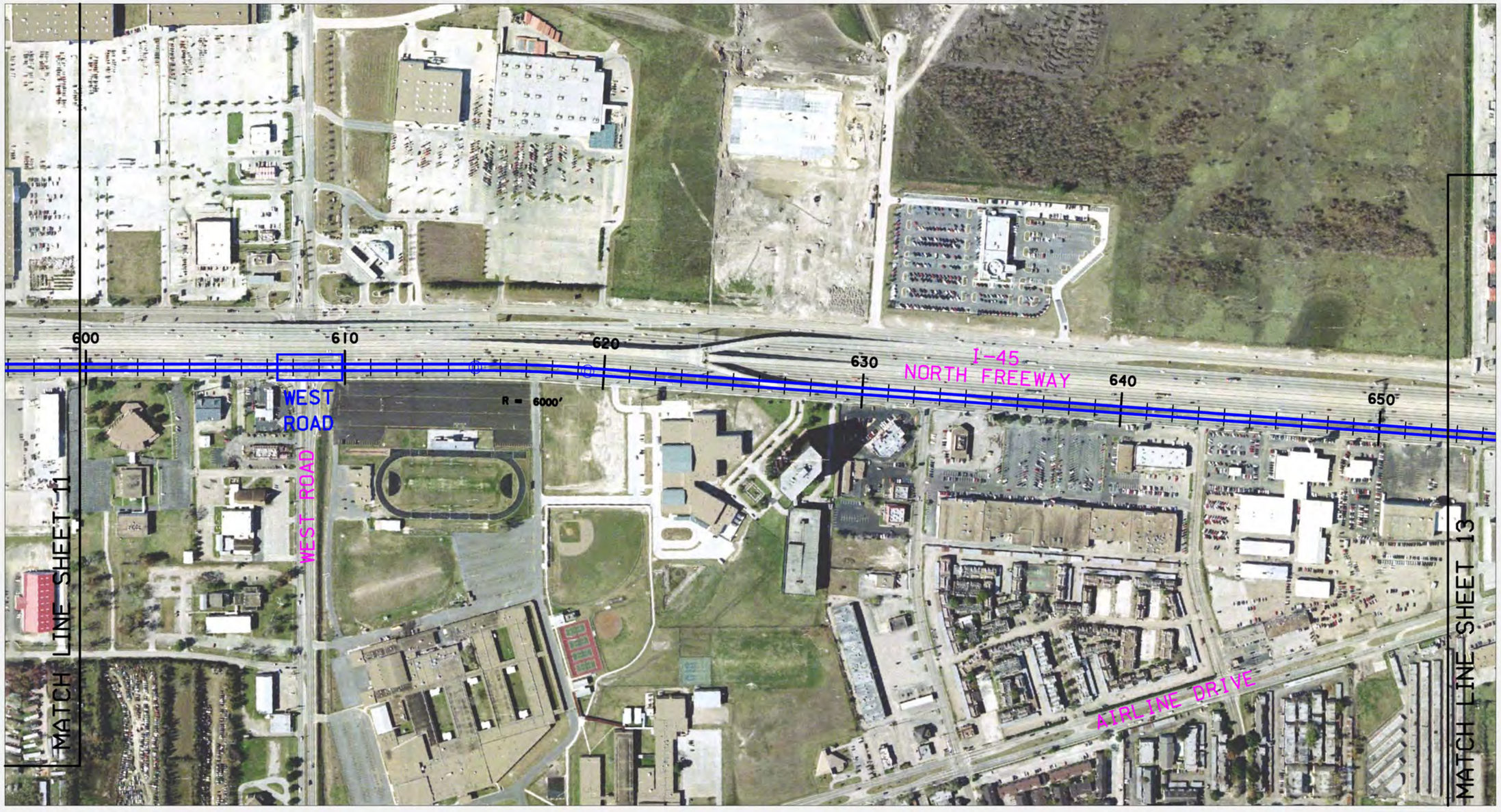

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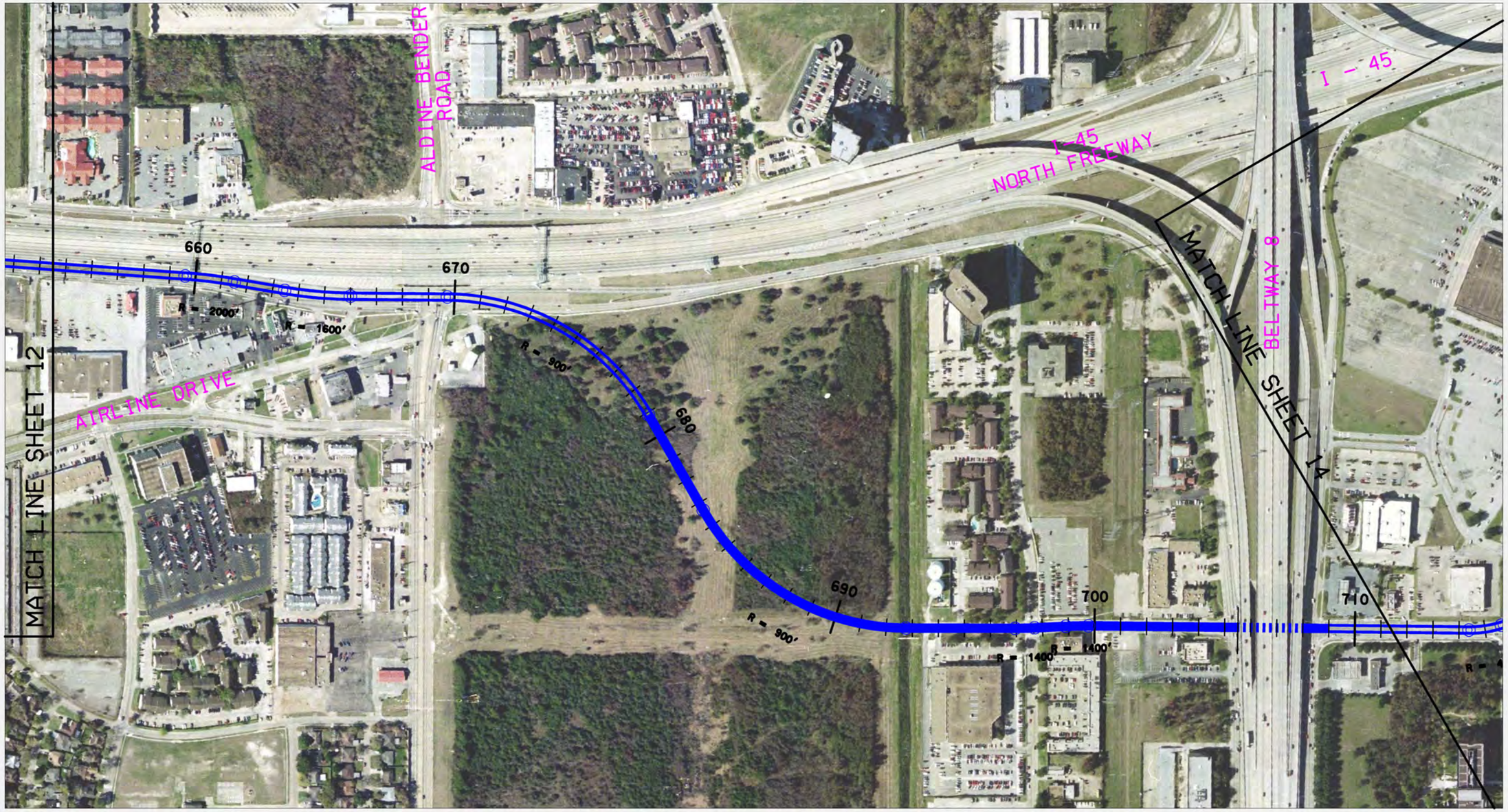

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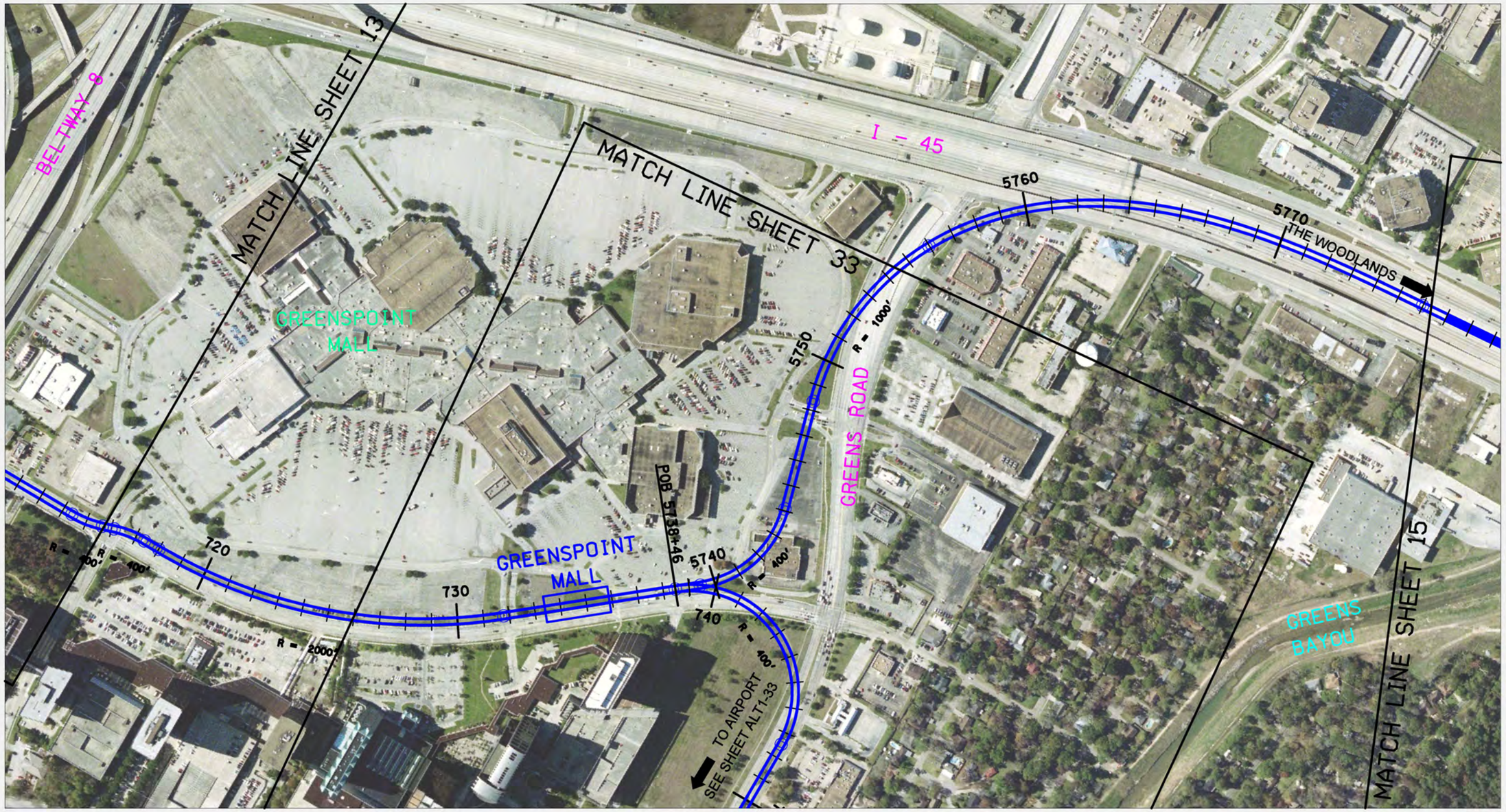

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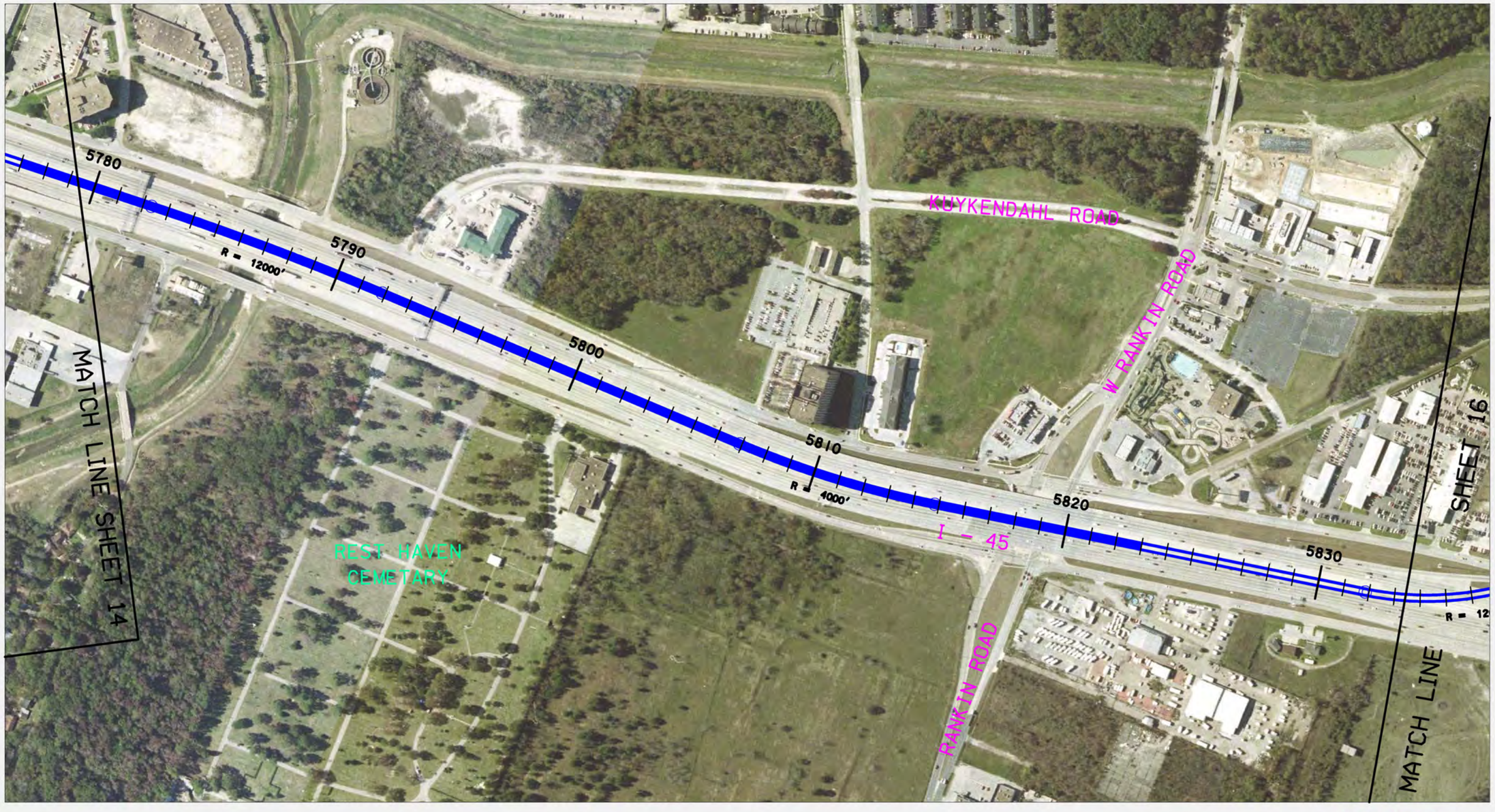

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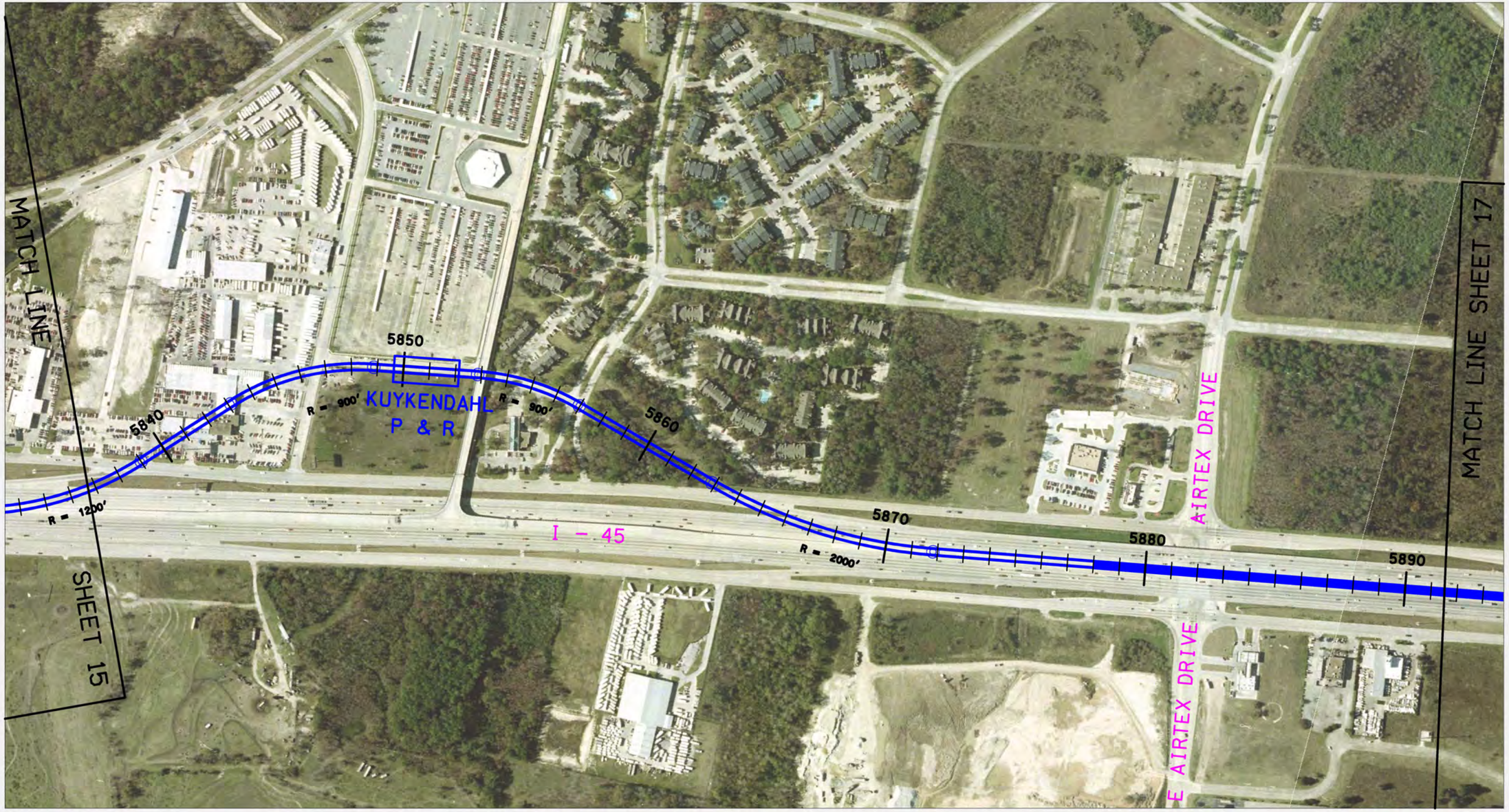

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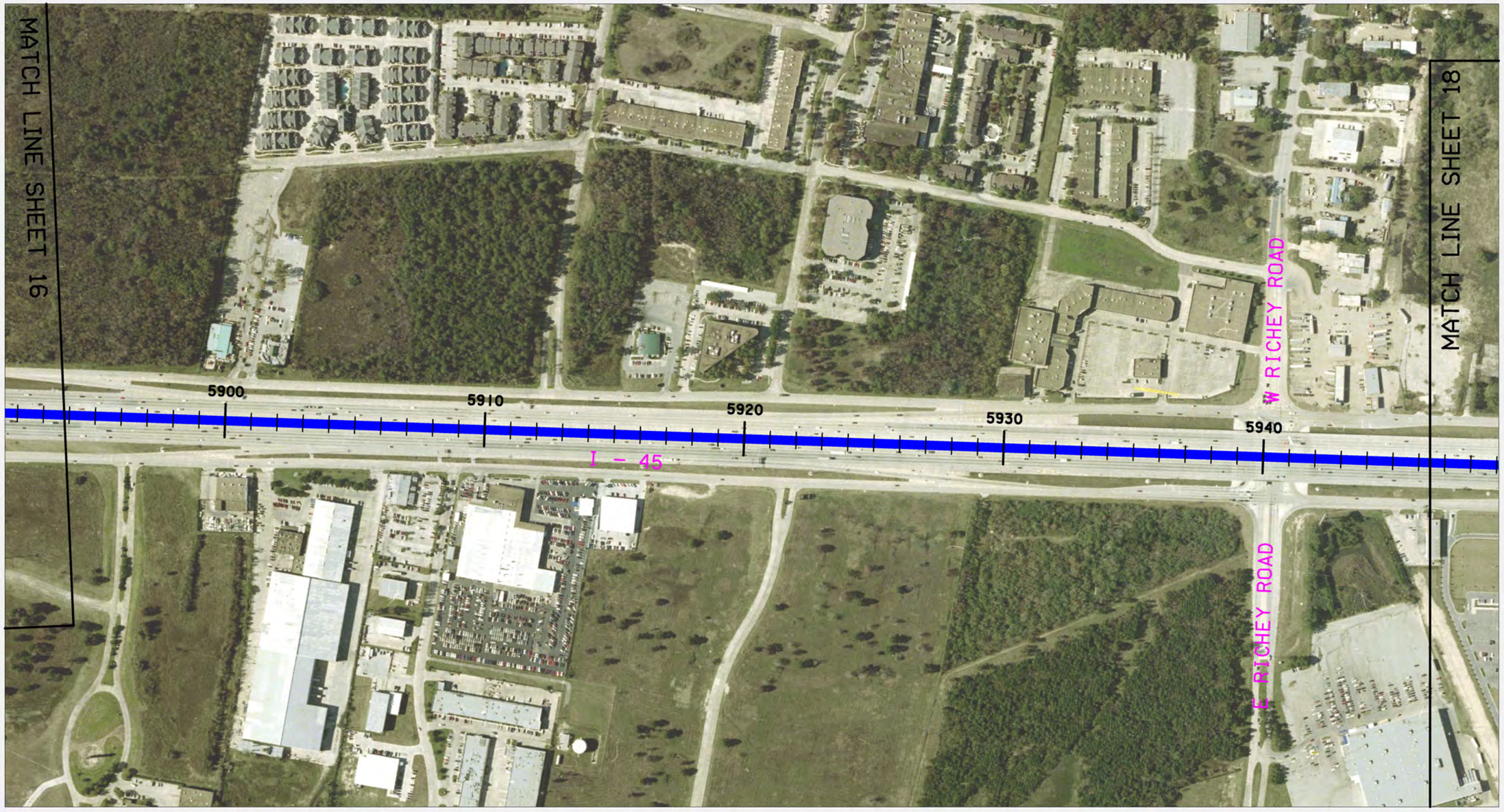

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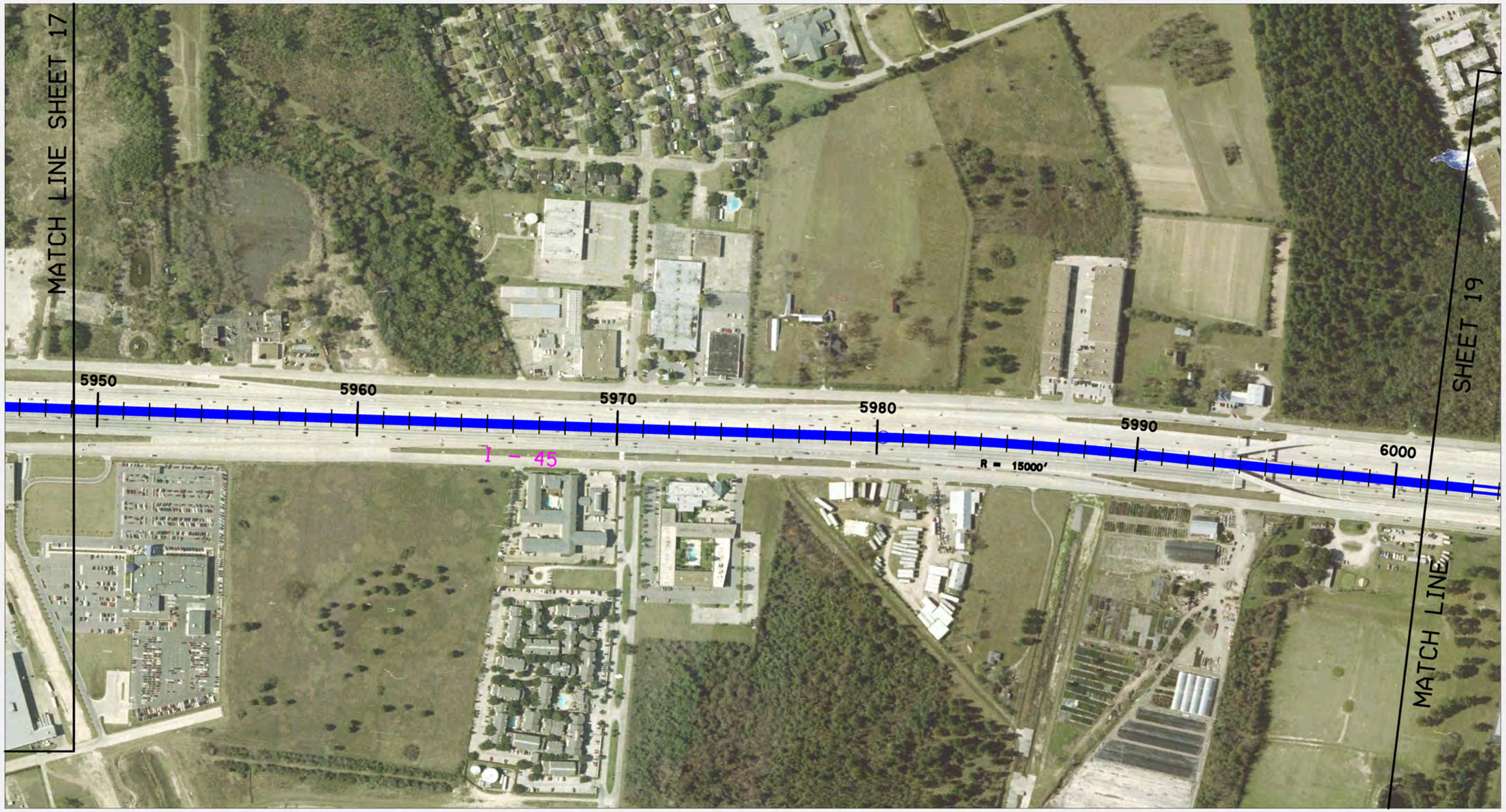
DATE 25 JAN. 2003

SHEET NO. ALT1 - 17



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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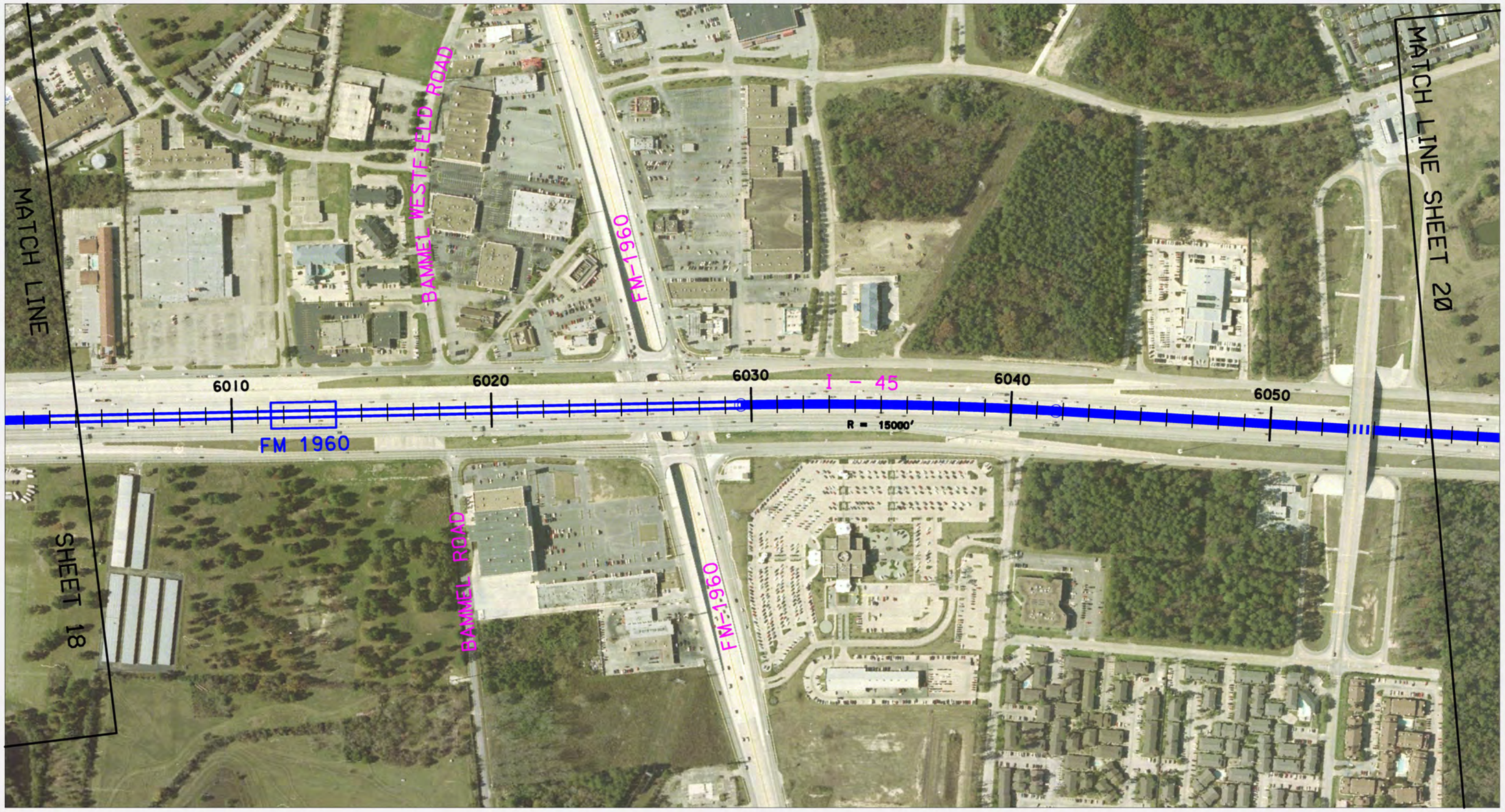
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 18



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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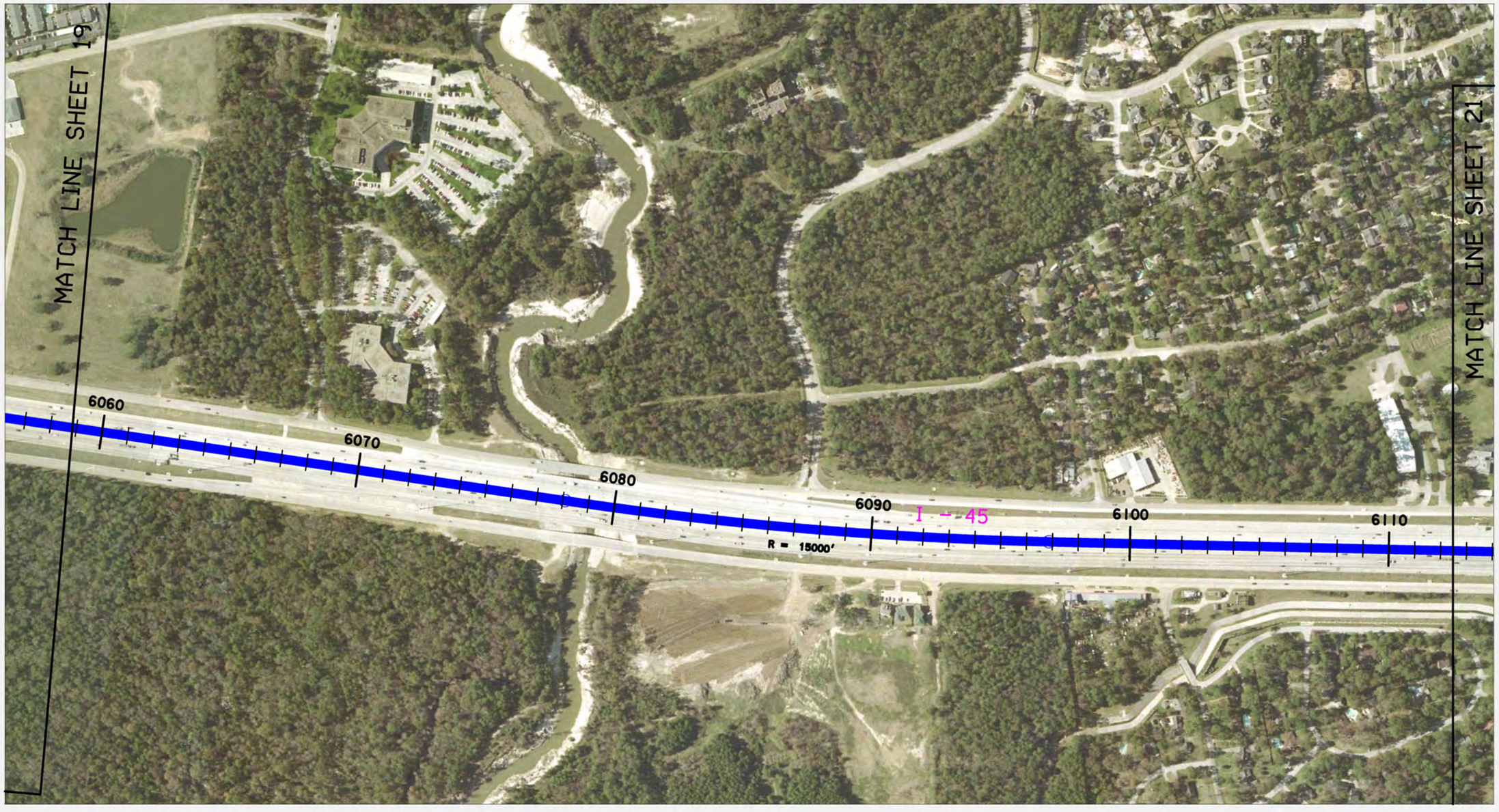
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 19



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LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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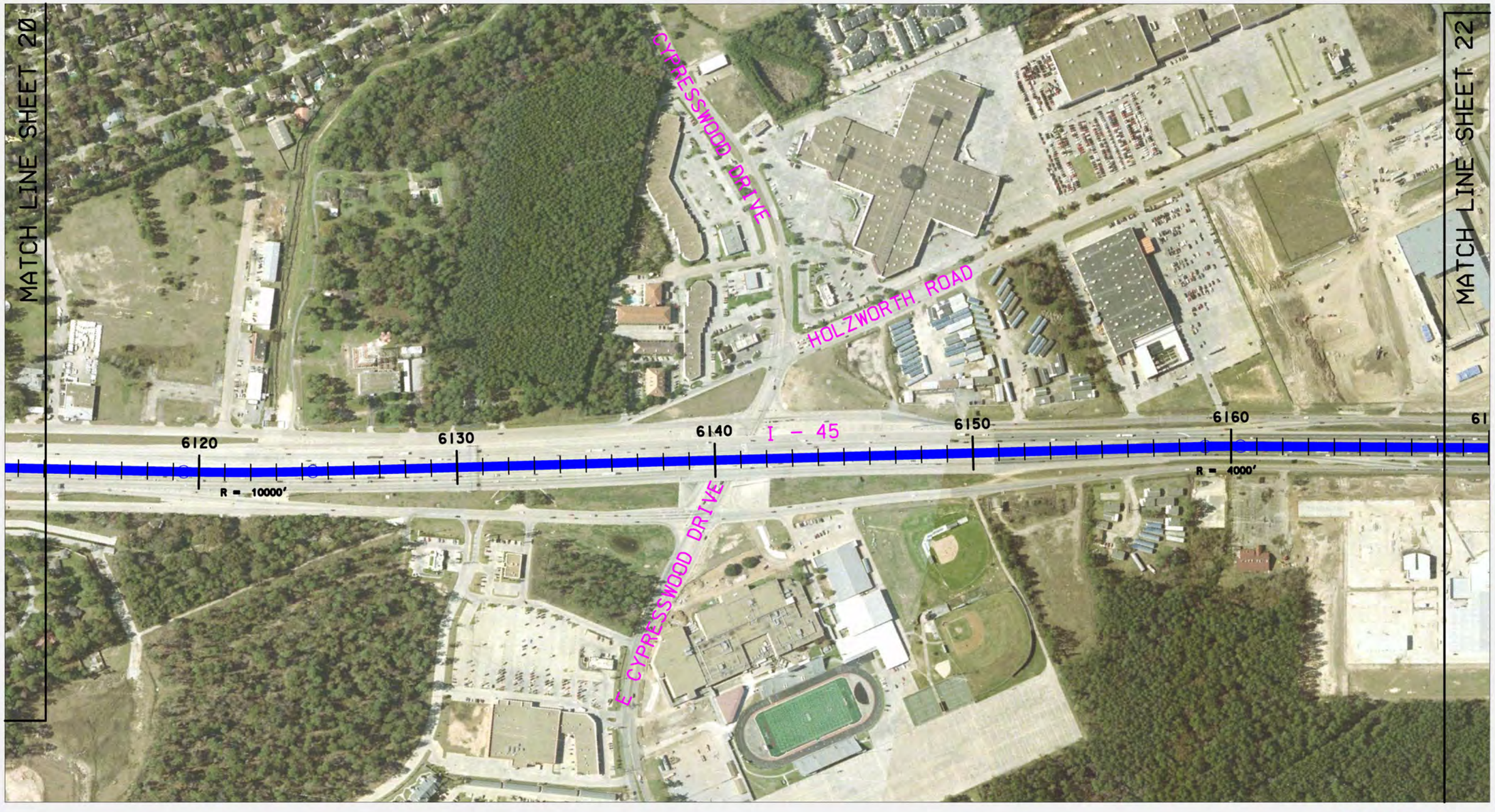
North Hardy
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 20



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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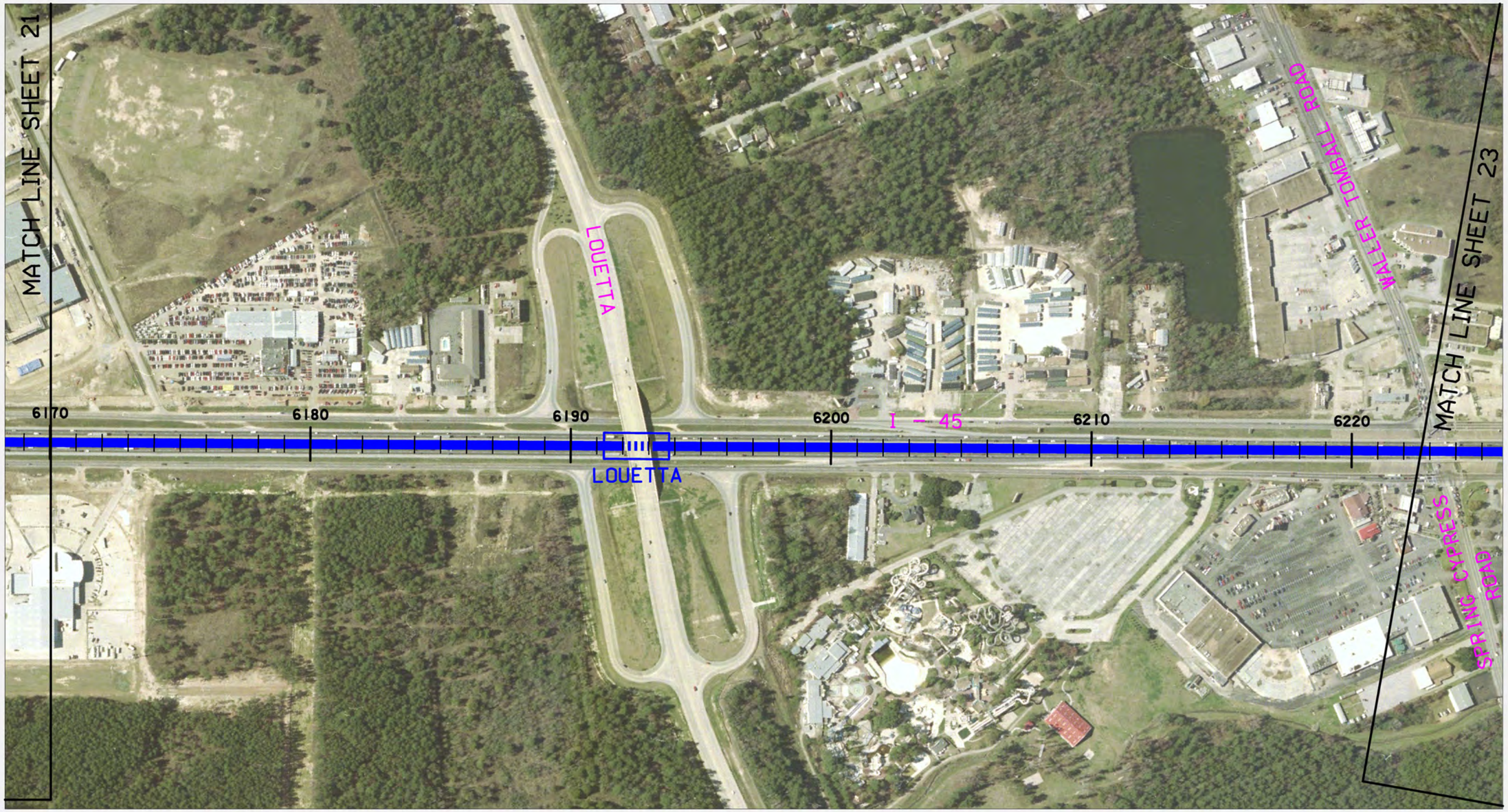
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 21



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LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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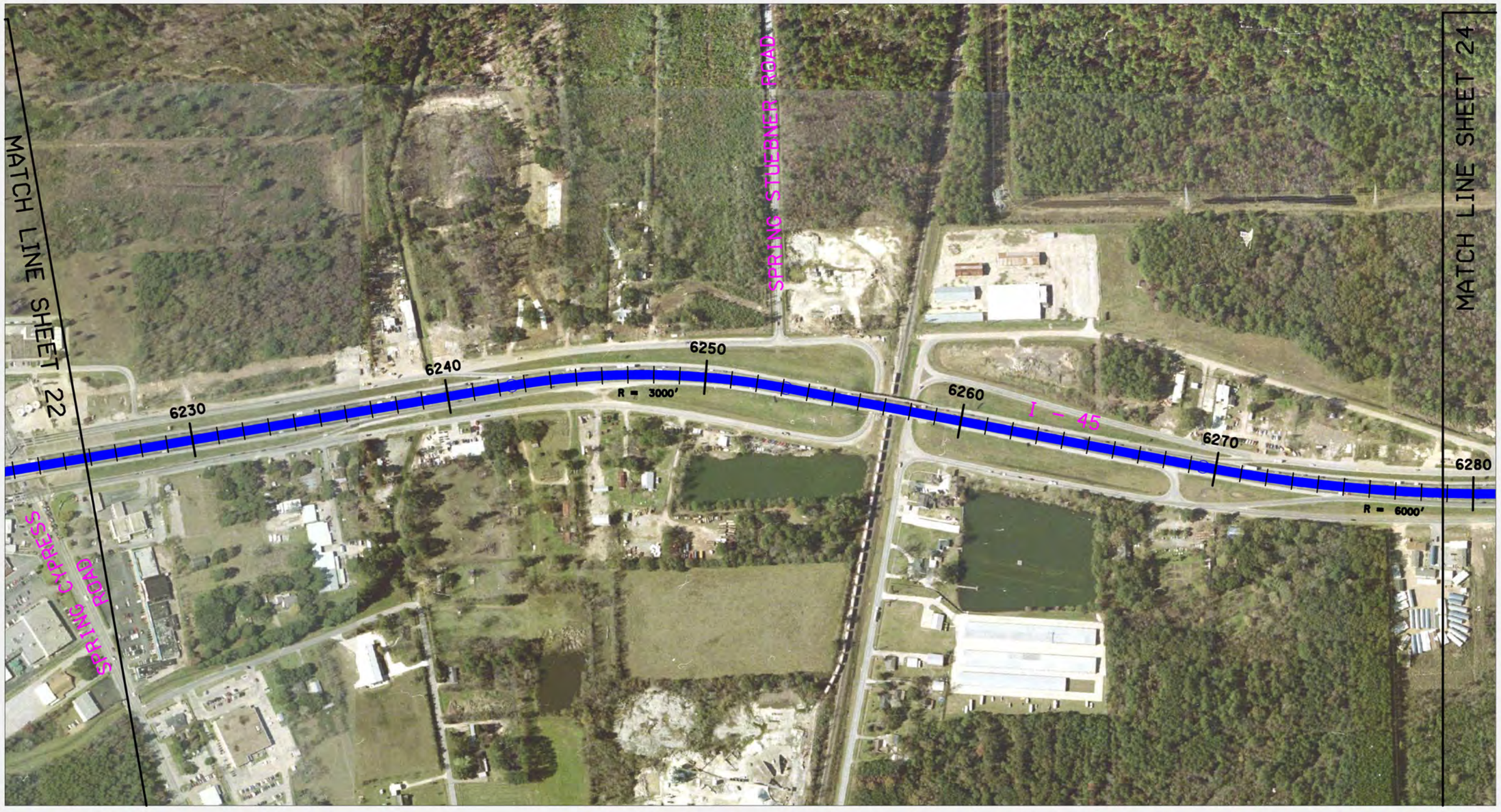
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 22



DRAFT

LEGEND
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AERIAL
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 23

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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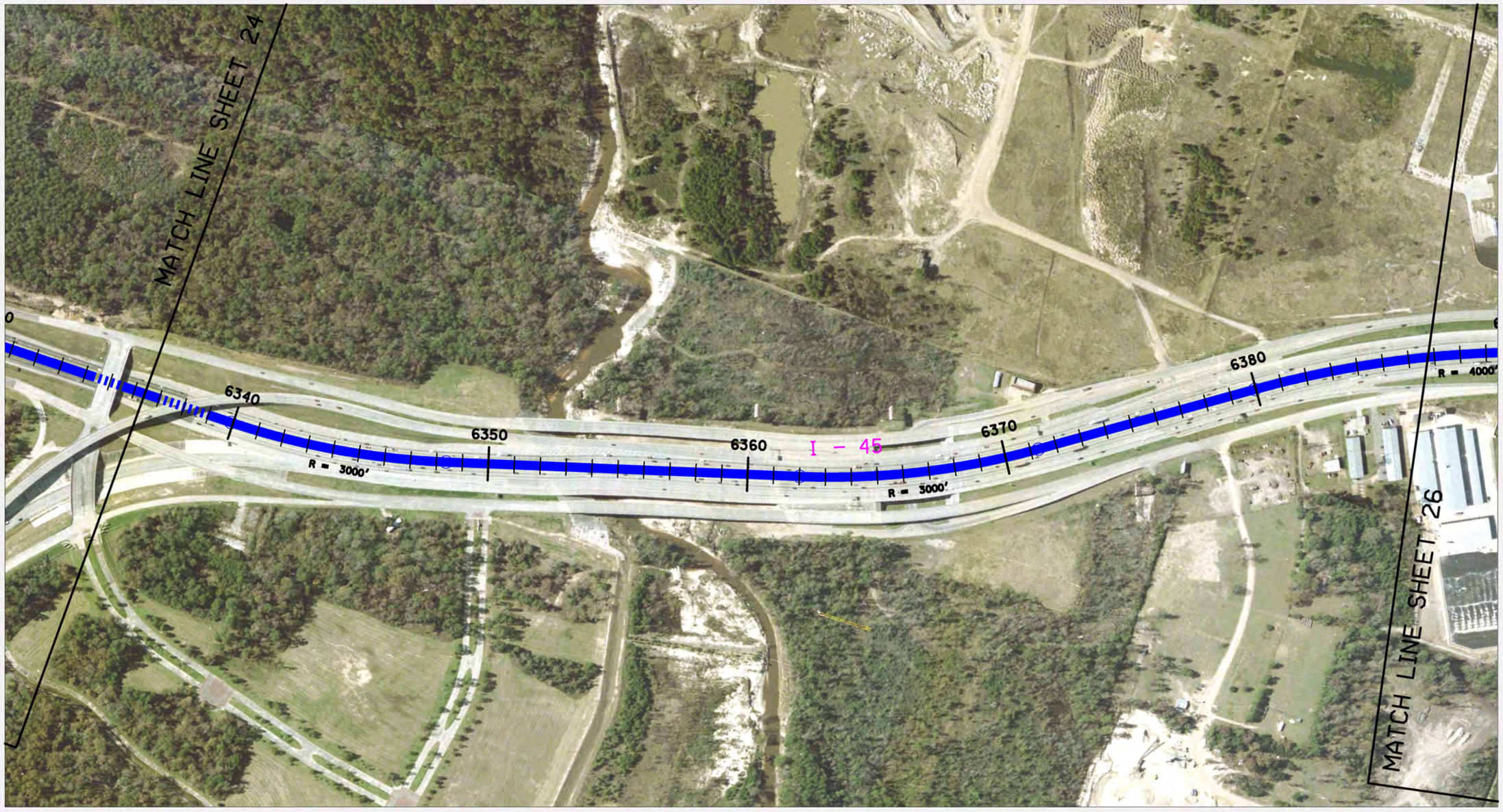
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 24



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LEGEND

AT GRADE

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

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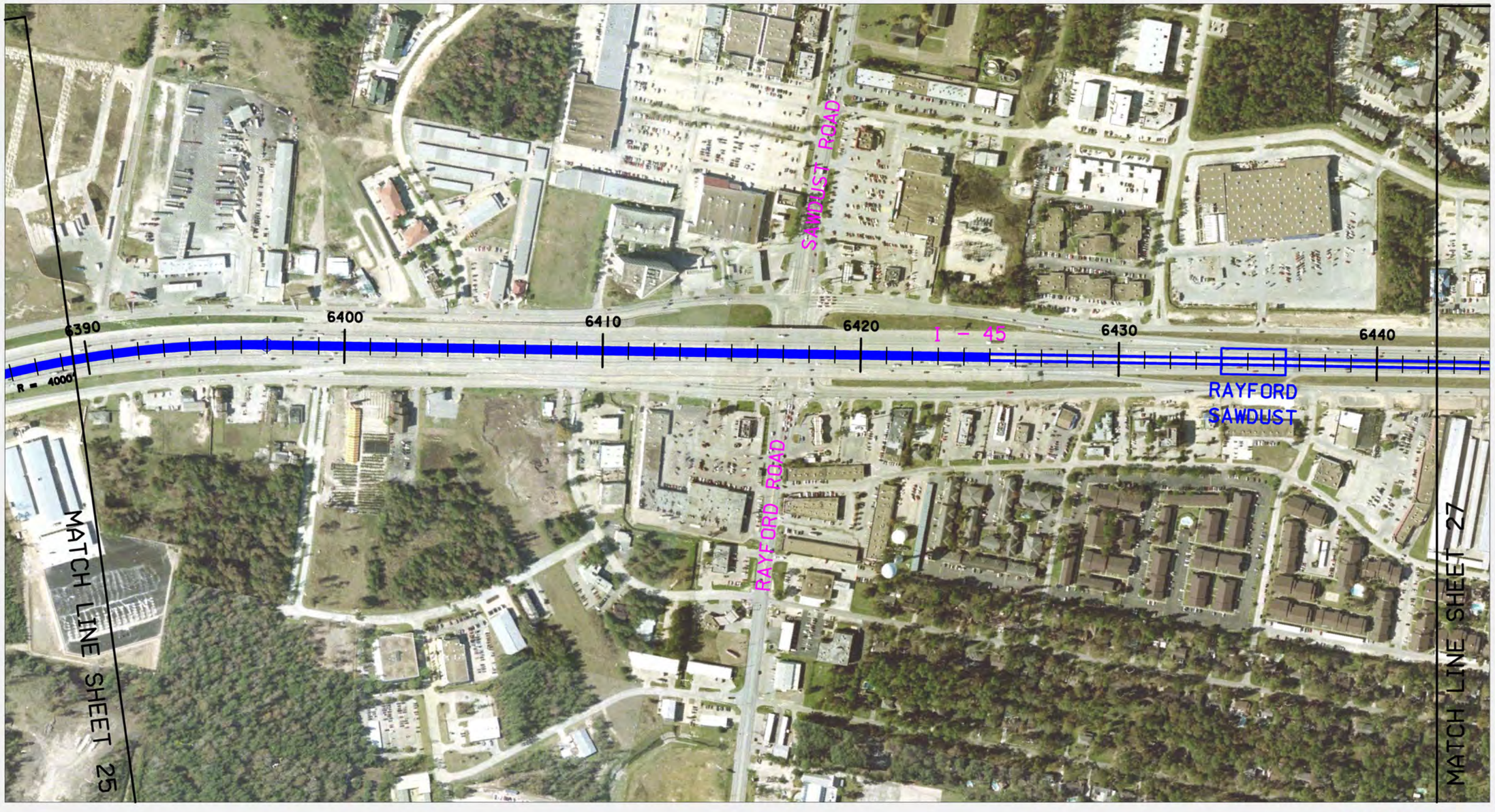

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LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 26

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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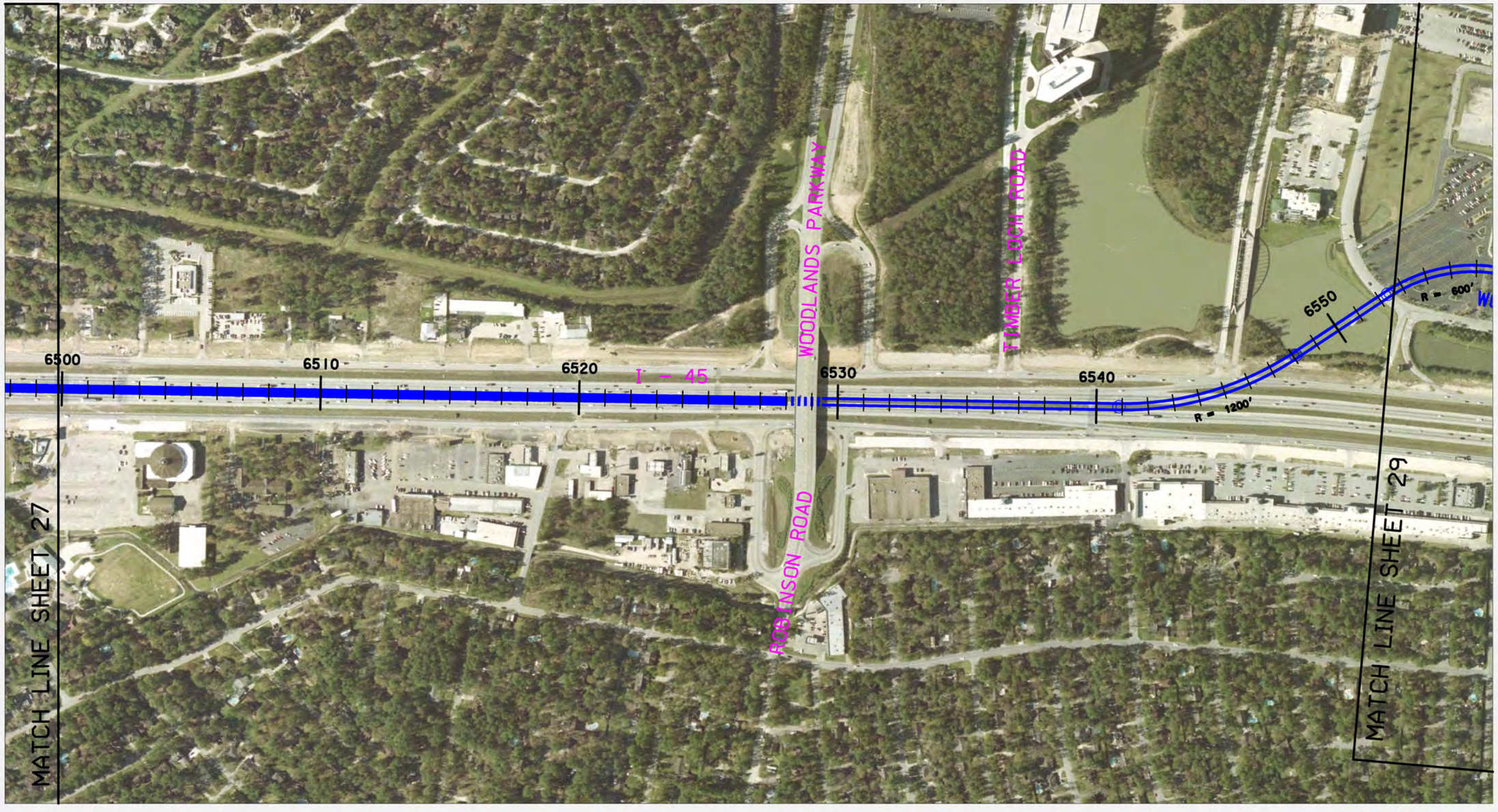
North Hardy
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 27



DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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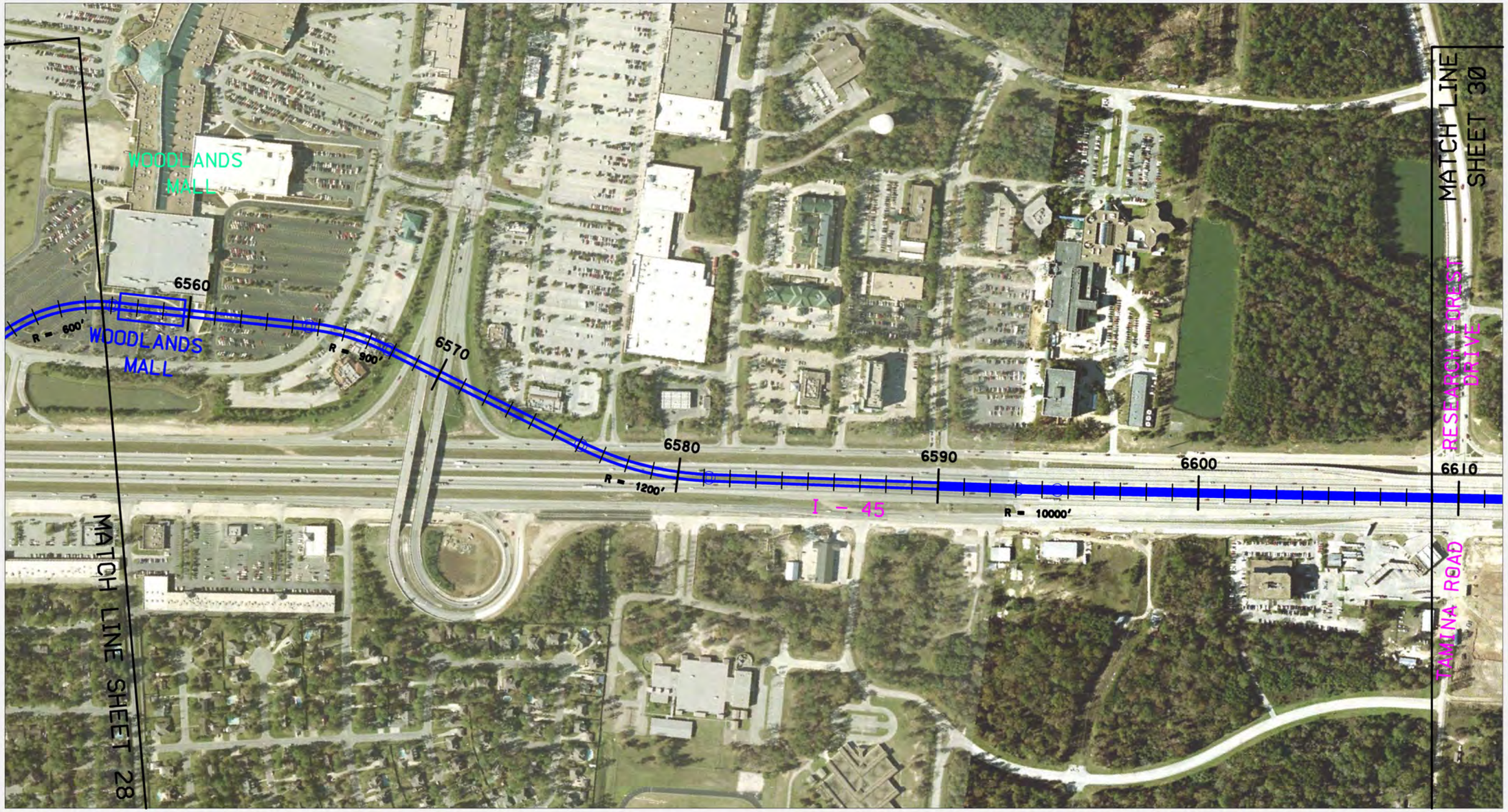
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 28



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
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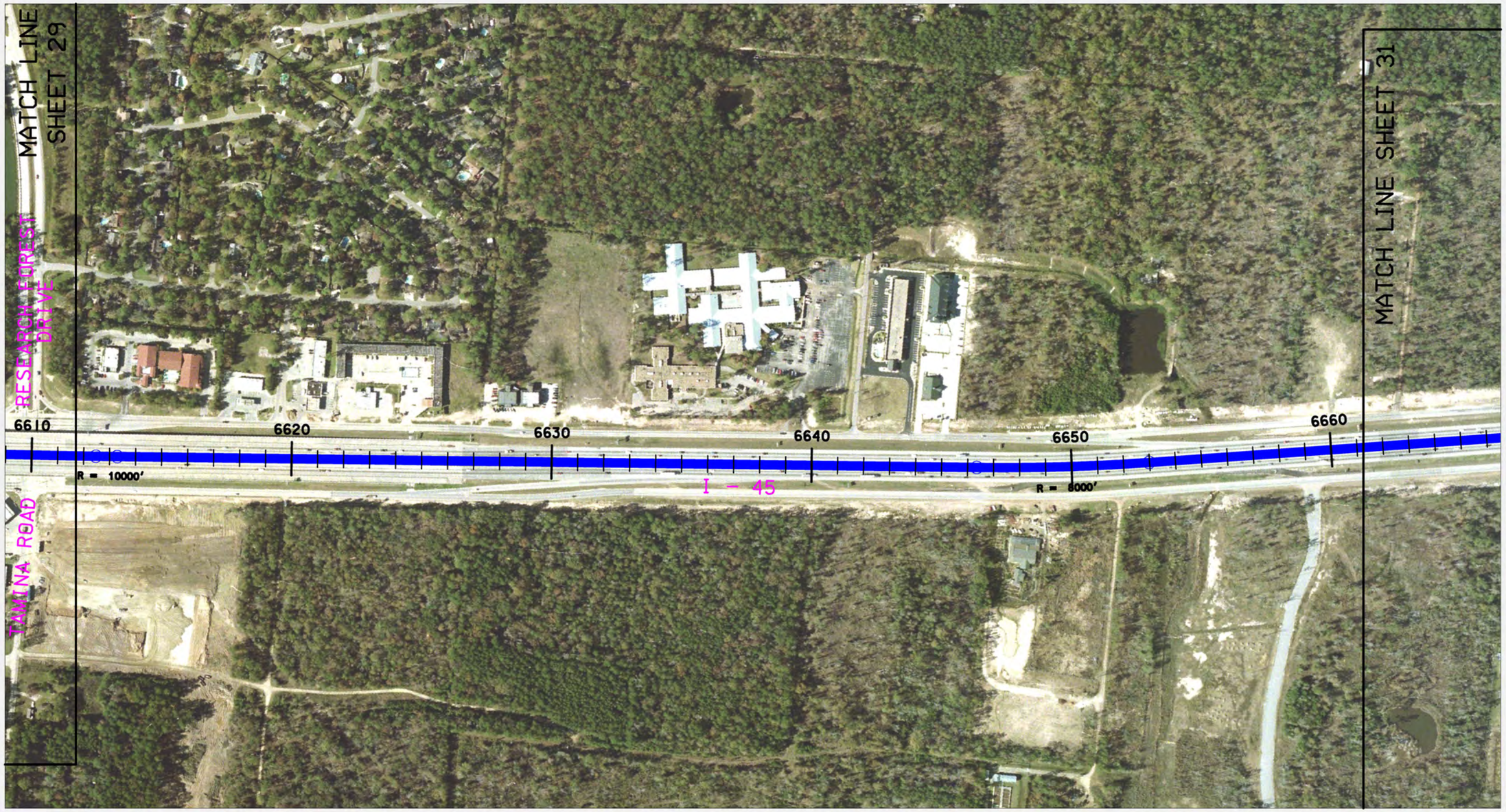

DRAFT

LEGEND
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AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

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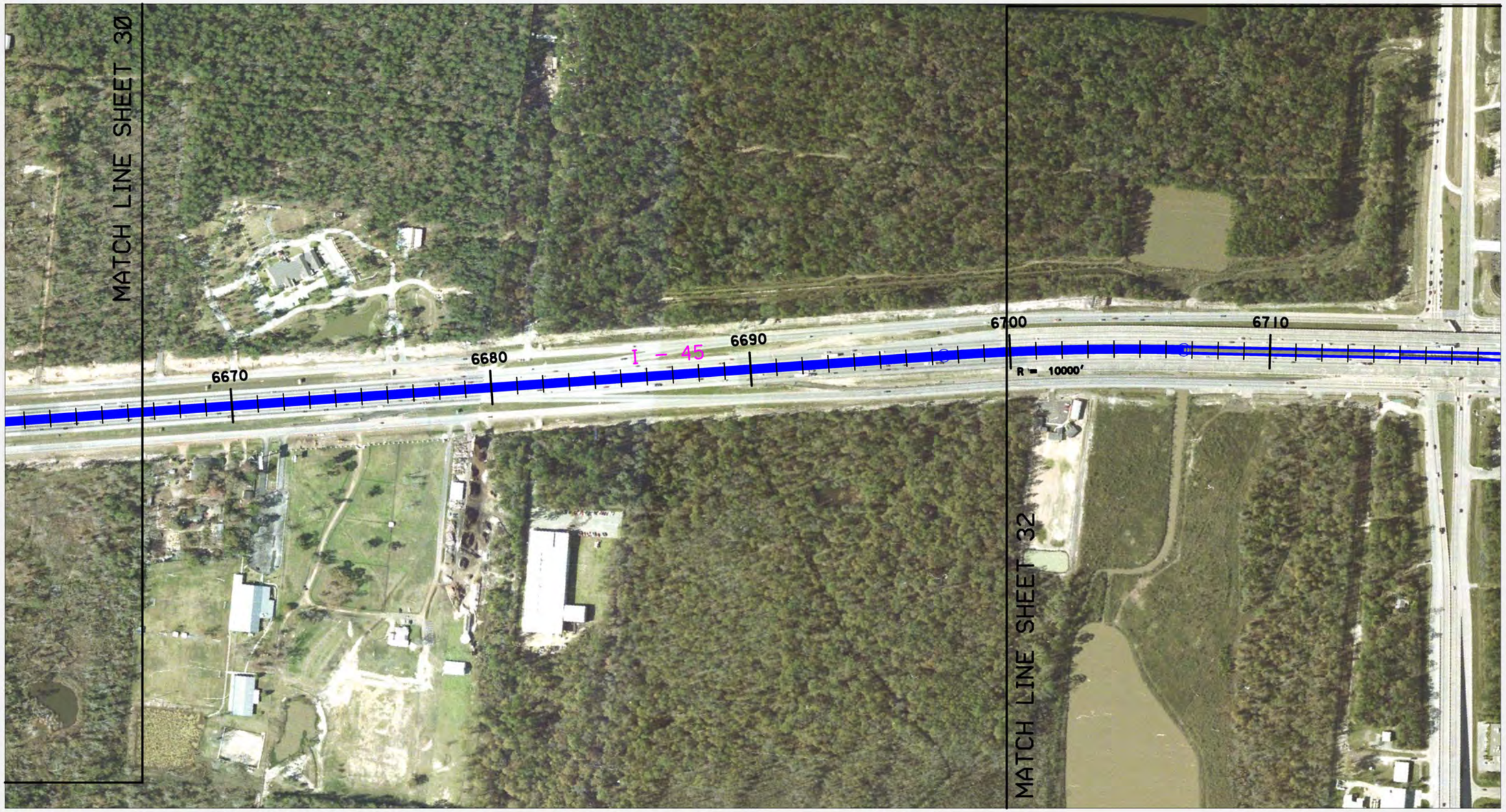

DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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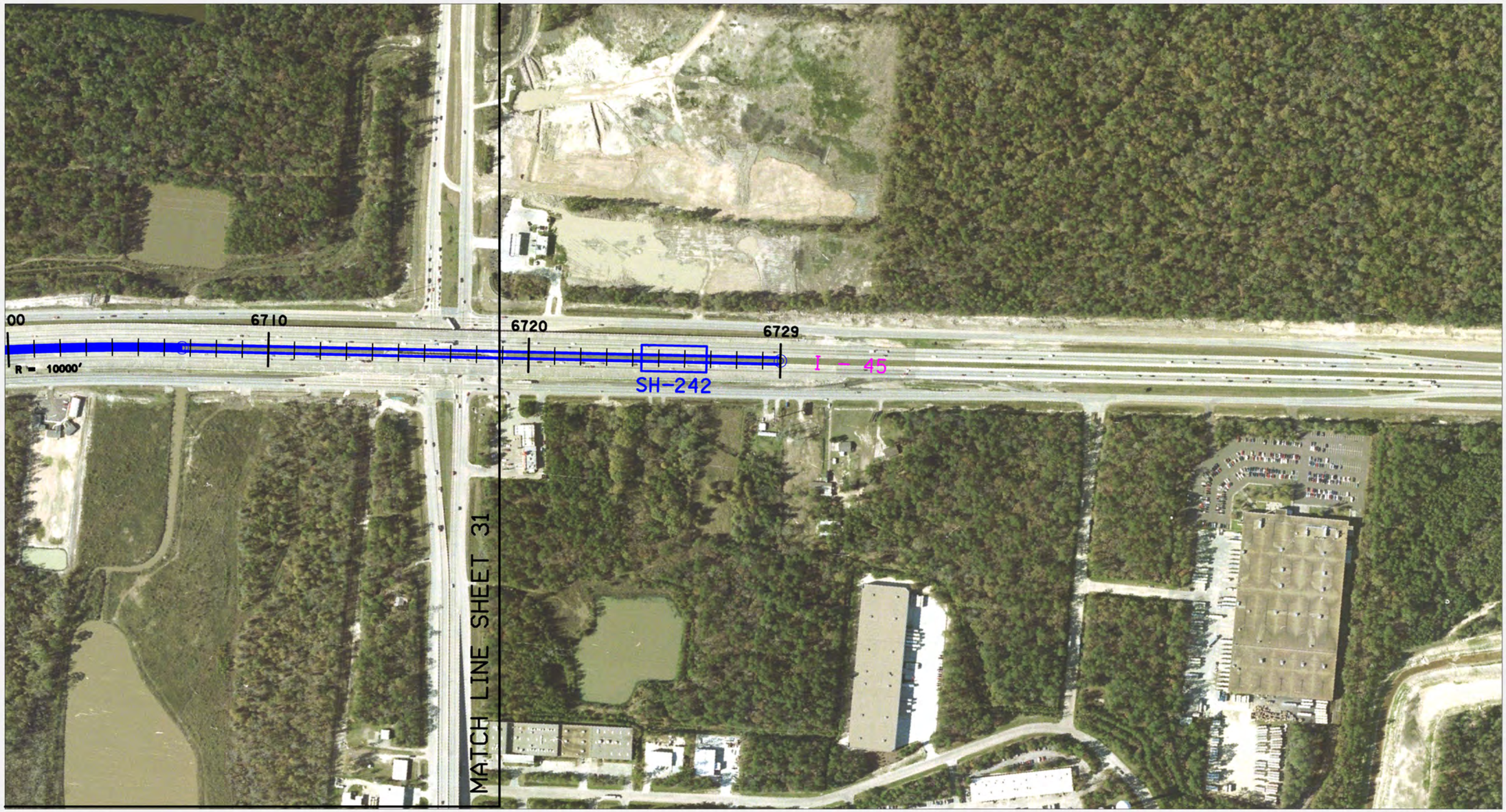
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 31



DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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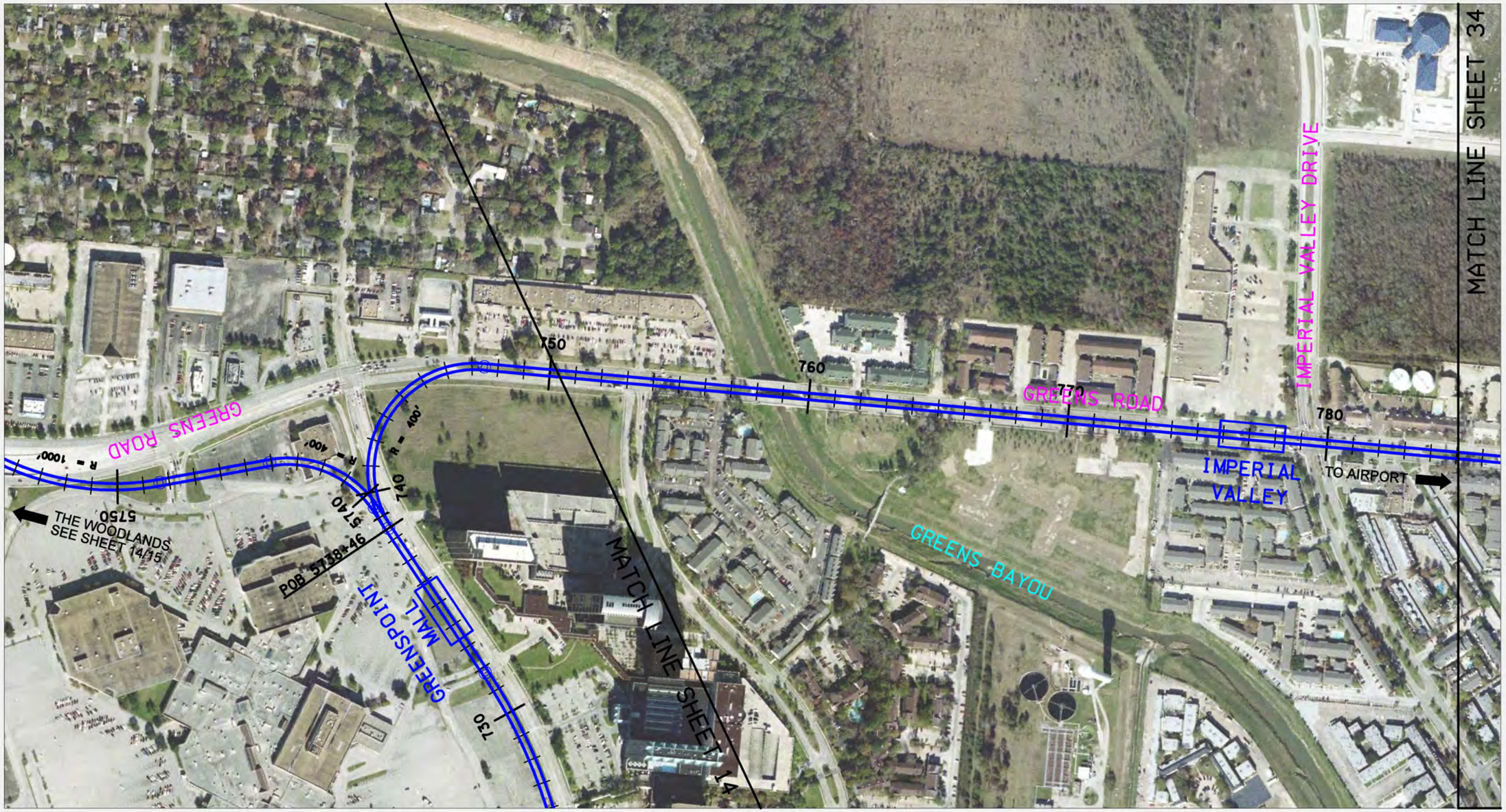
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 32



DRAFT

LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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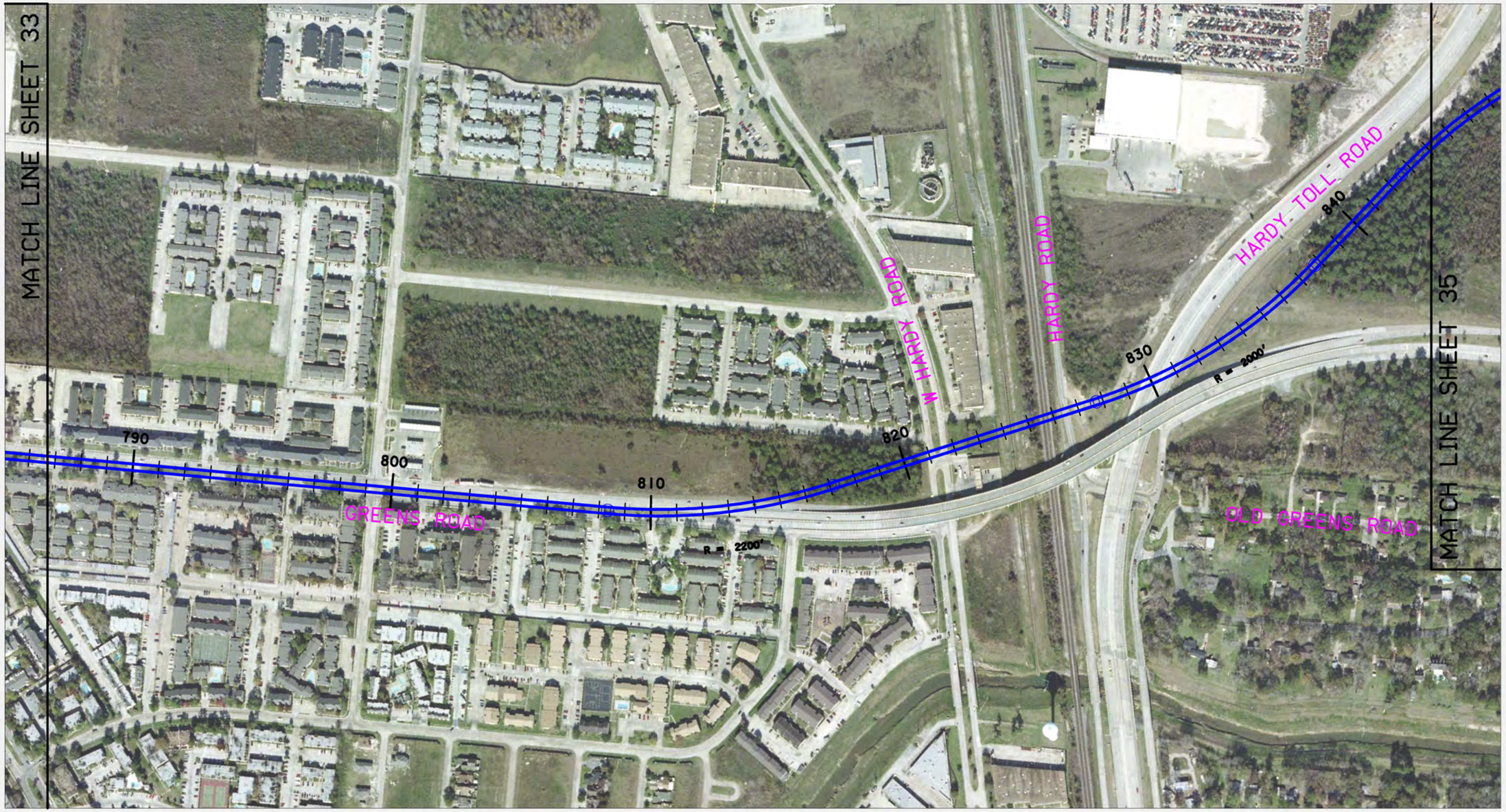
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 33



DRAFT

LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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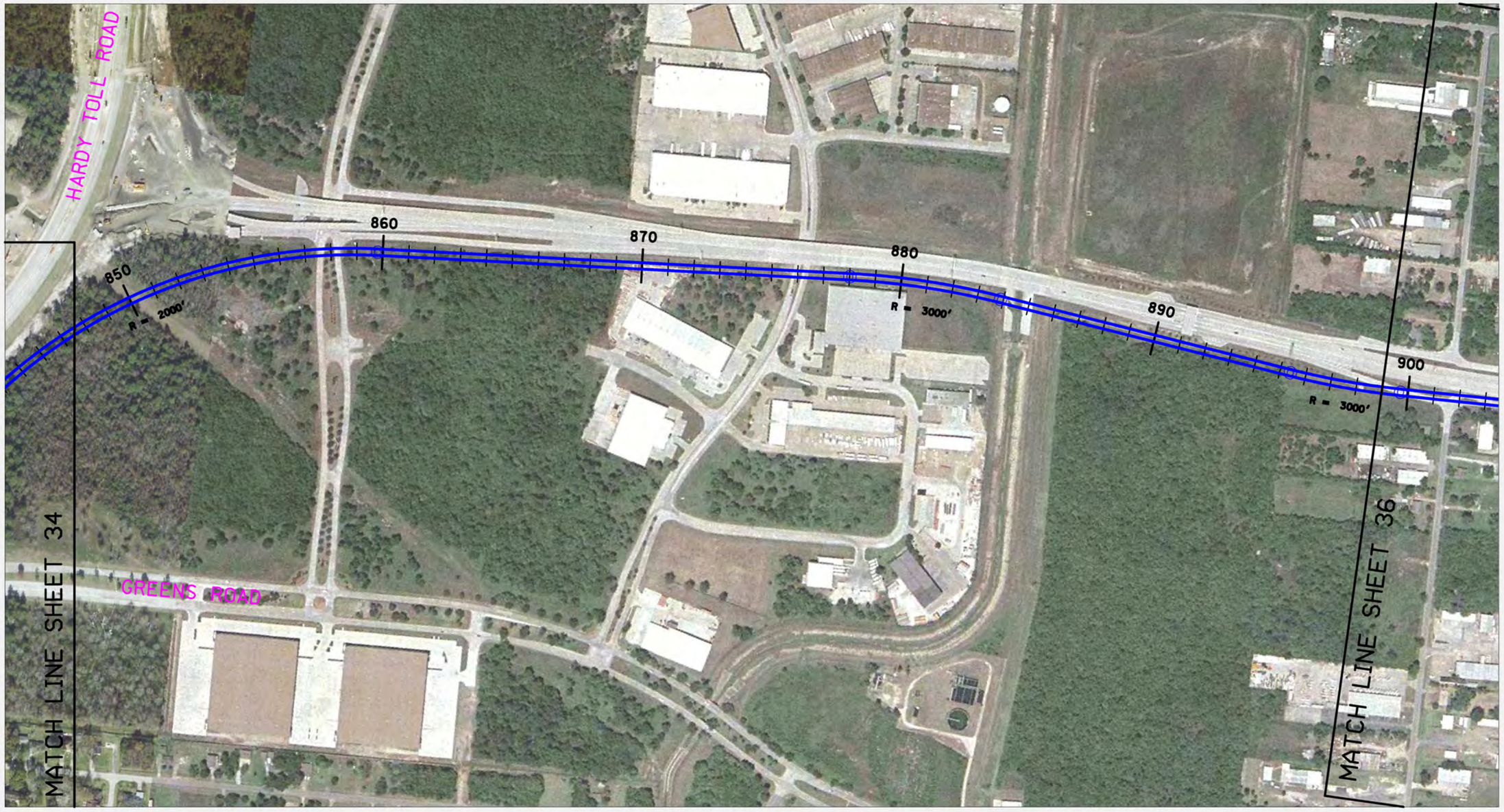
North Hardy
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 34



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LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 35

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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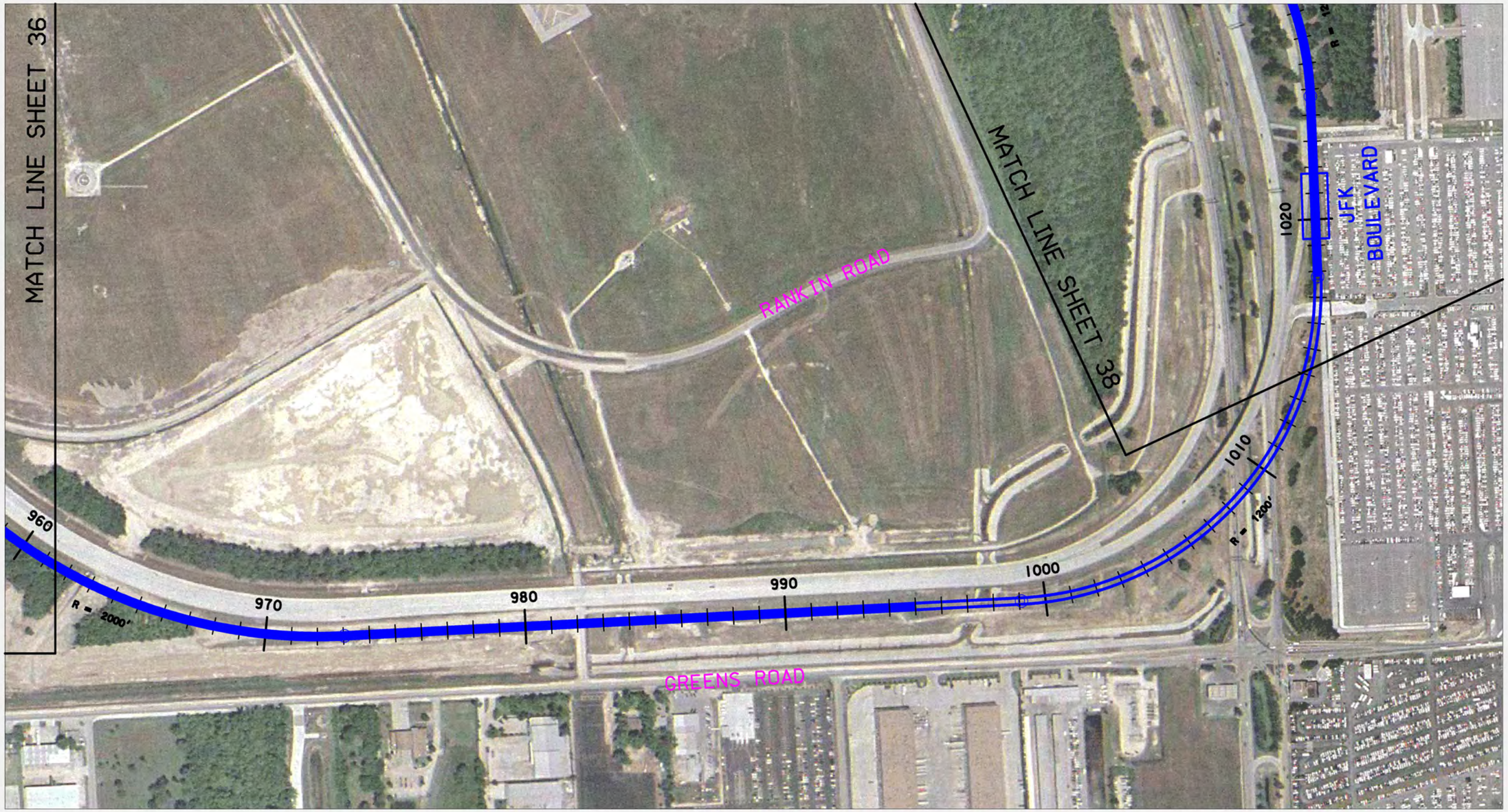
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 36



DRAFT

LEGEND
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AERIAL
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STATION LOCATION

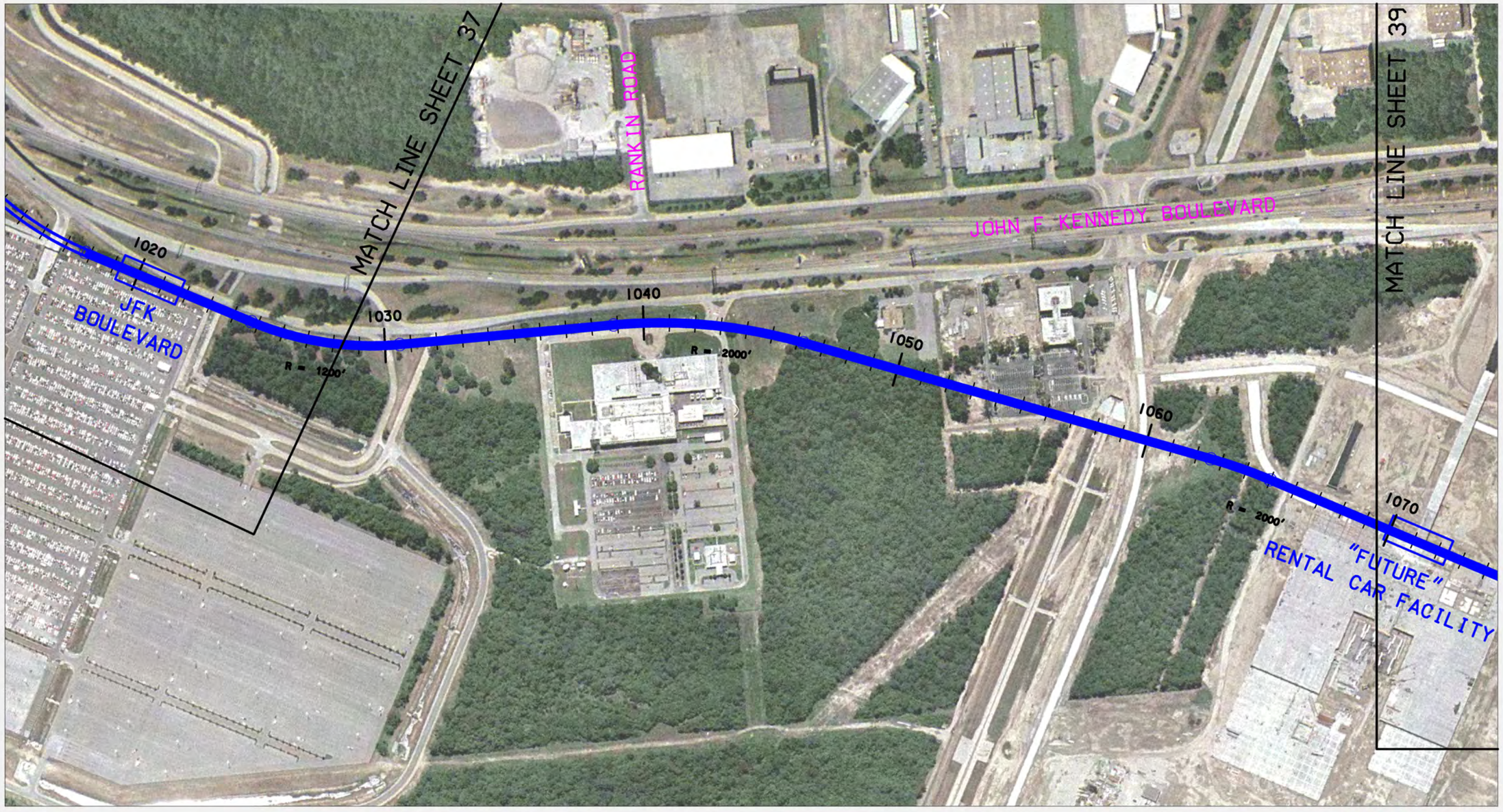
GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy
planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 37



DRAFT

LEGEND
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AERIAL
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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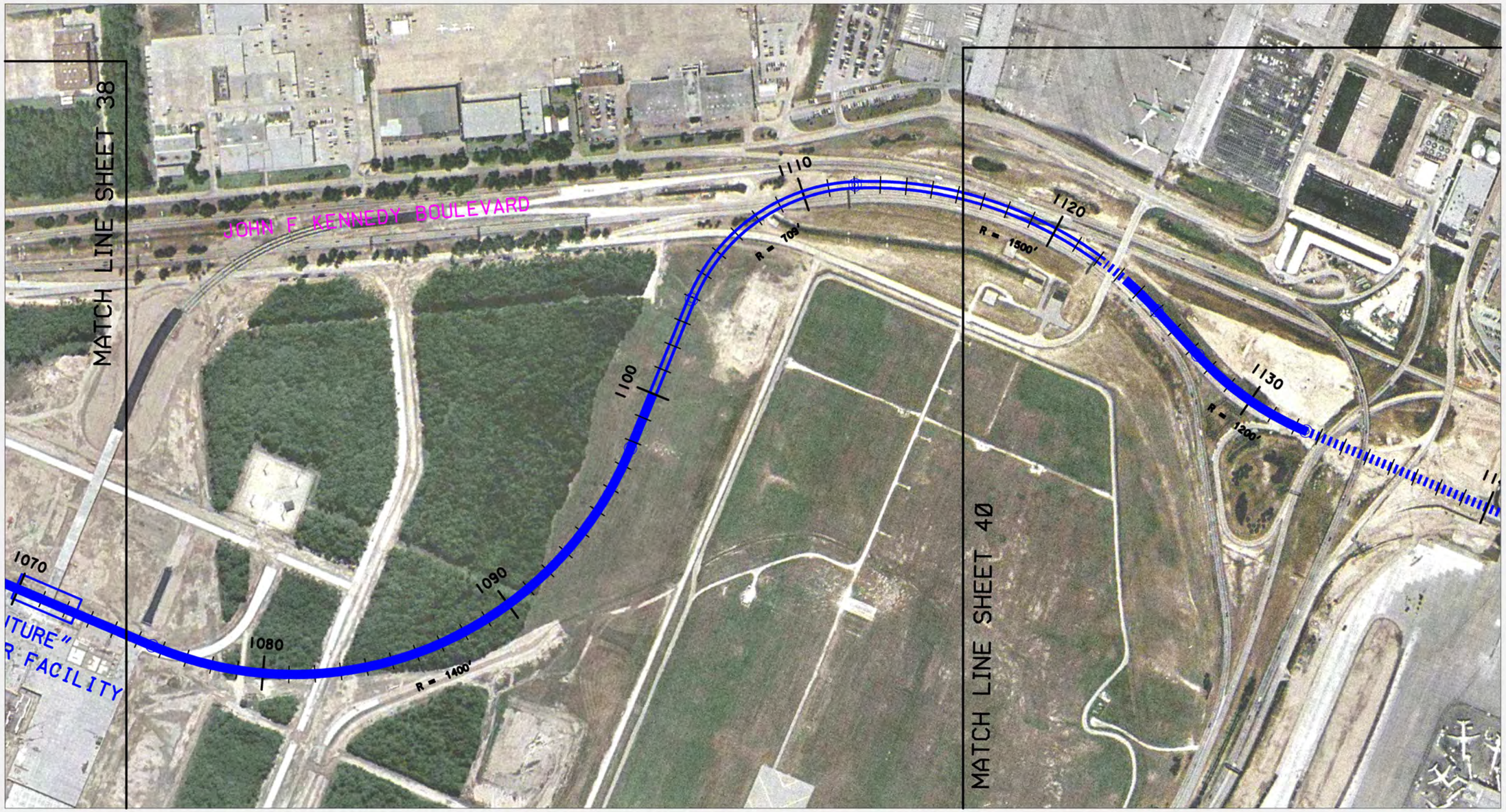
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003
SHEET NO. ALT1 - 38



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LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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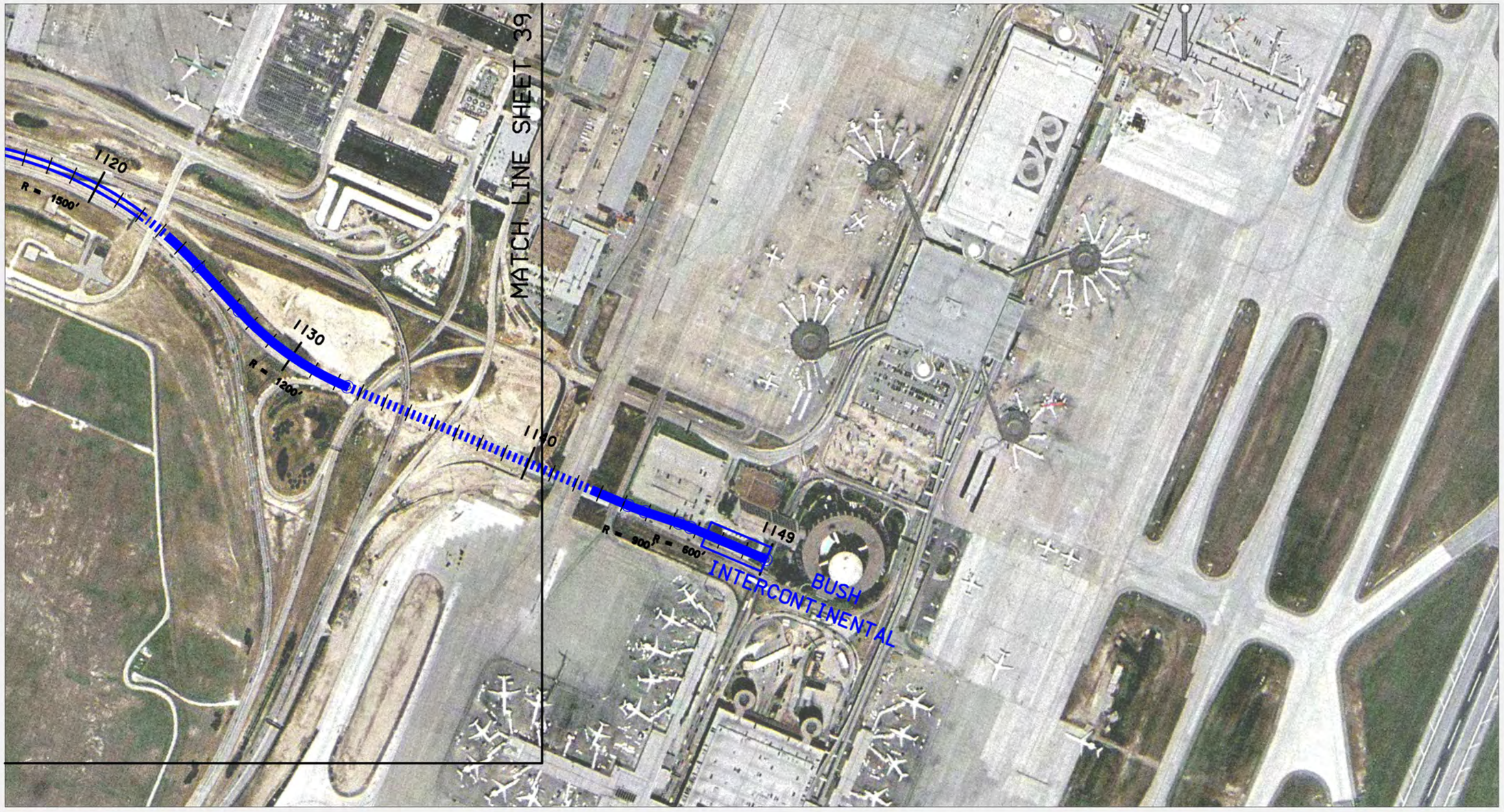
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 39



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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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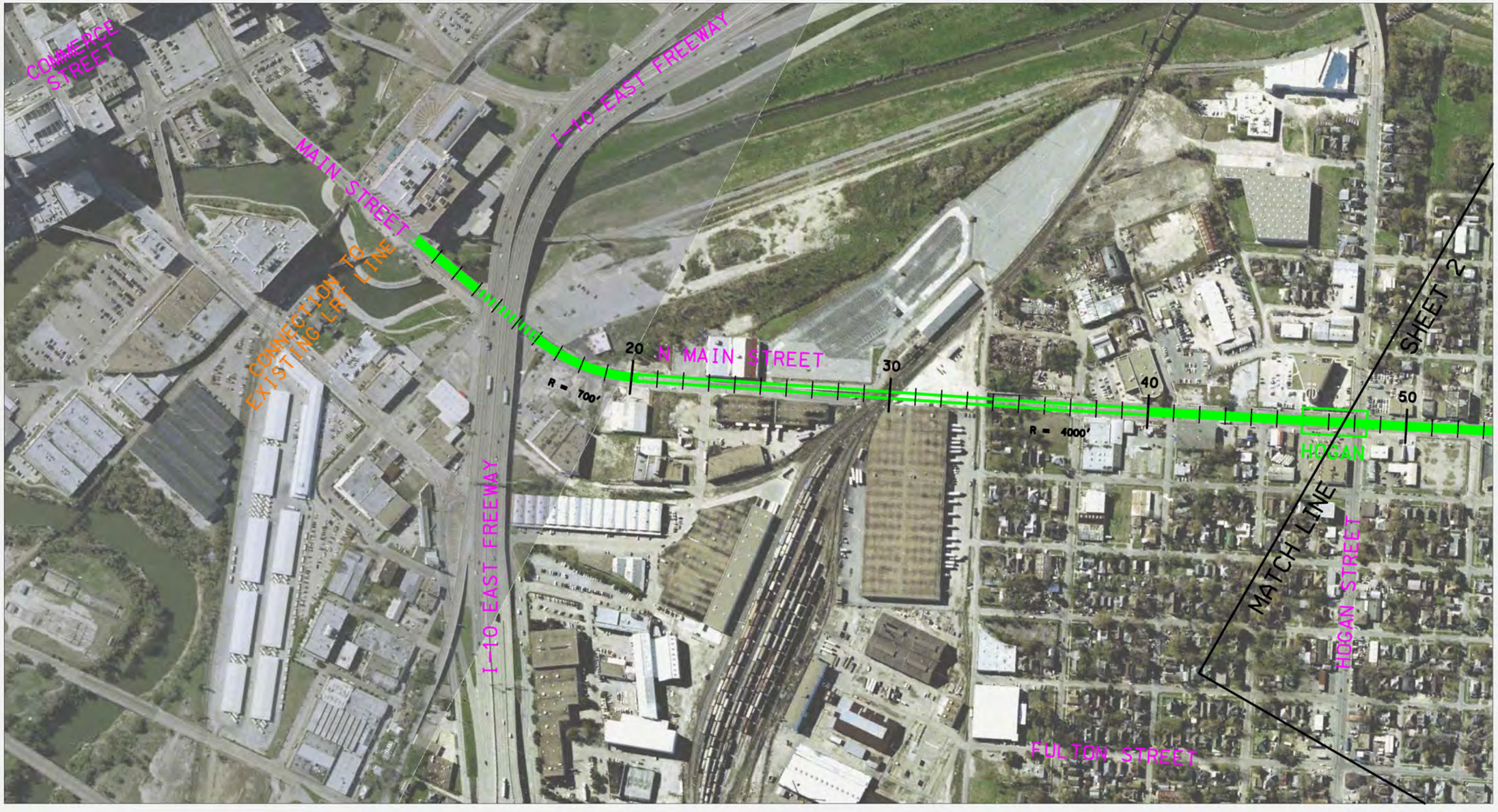
North Hardy planning studies

ALTERNATE NO. 1
BLUE ALIGNMENT

DATE 25 JAN. 2003

SHEET NO. ALT1 - 40



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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 01

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 02

DRAFT

LEGEND

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AERIAL

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 03

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 3
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DATE 10 FEB. 2003

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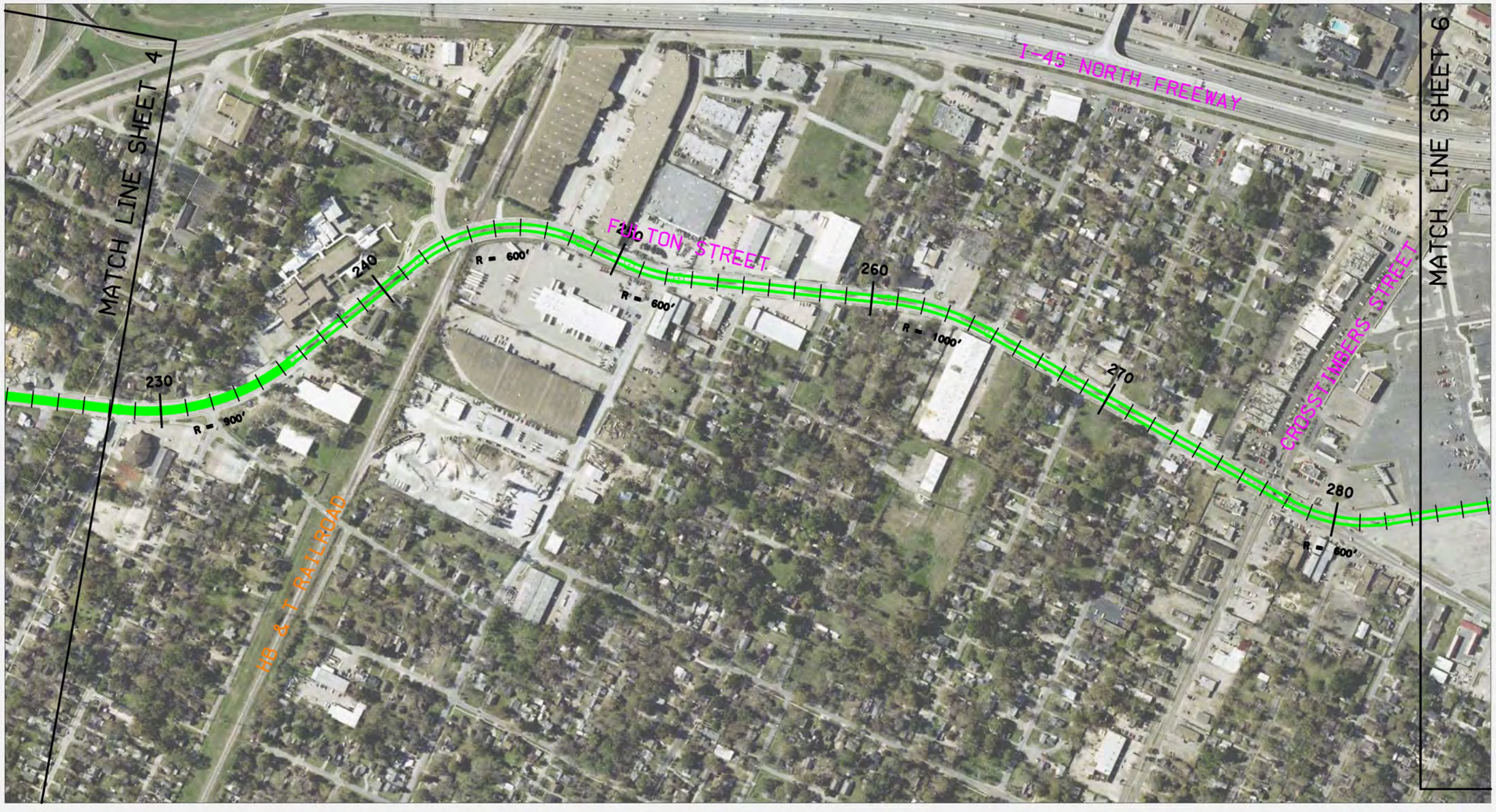

DRAFT

LEGEND

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 3 GREEN ALIGNMENT

DATE 10 FEB. 2003

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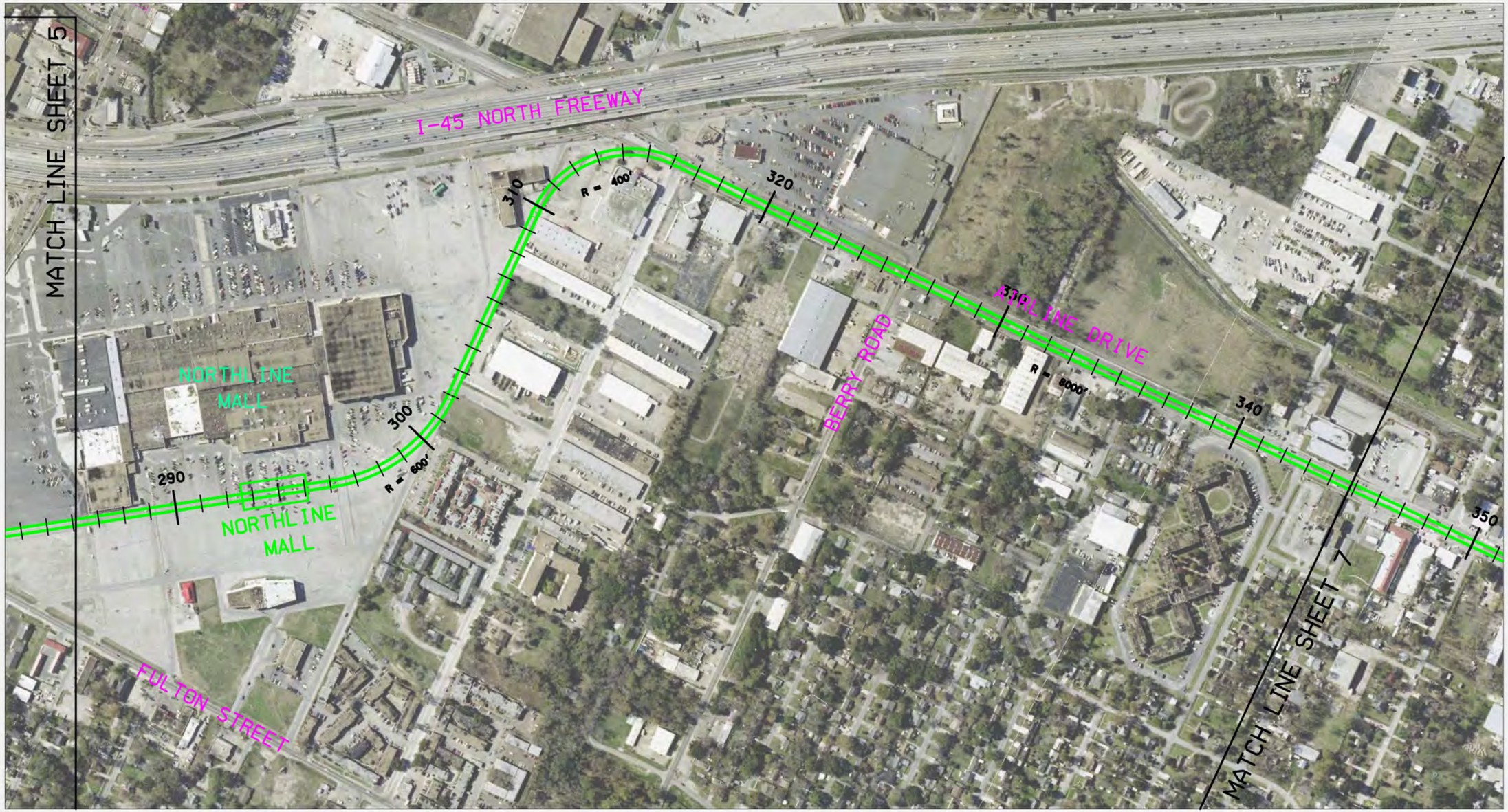

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 3 GREEN ALIGNMENT

DATE 10 FEB. 2003

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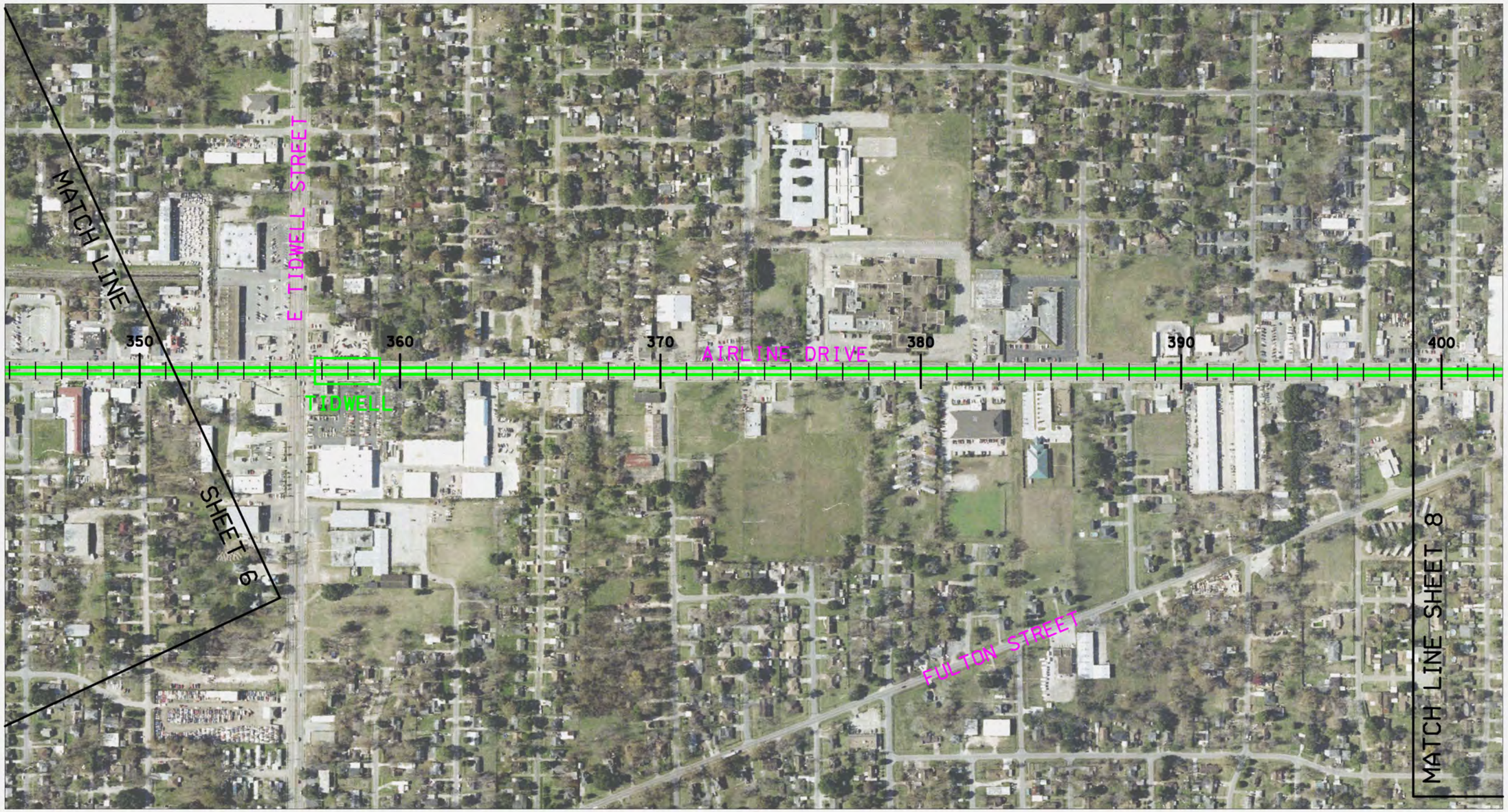

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 3 GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 07

DRAFT

LEGEND
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AERIAL
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 08

DRAFT

LEGEND

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 09

DRAFT

LEGEND

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 3
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DATE 10 FEB. 2003

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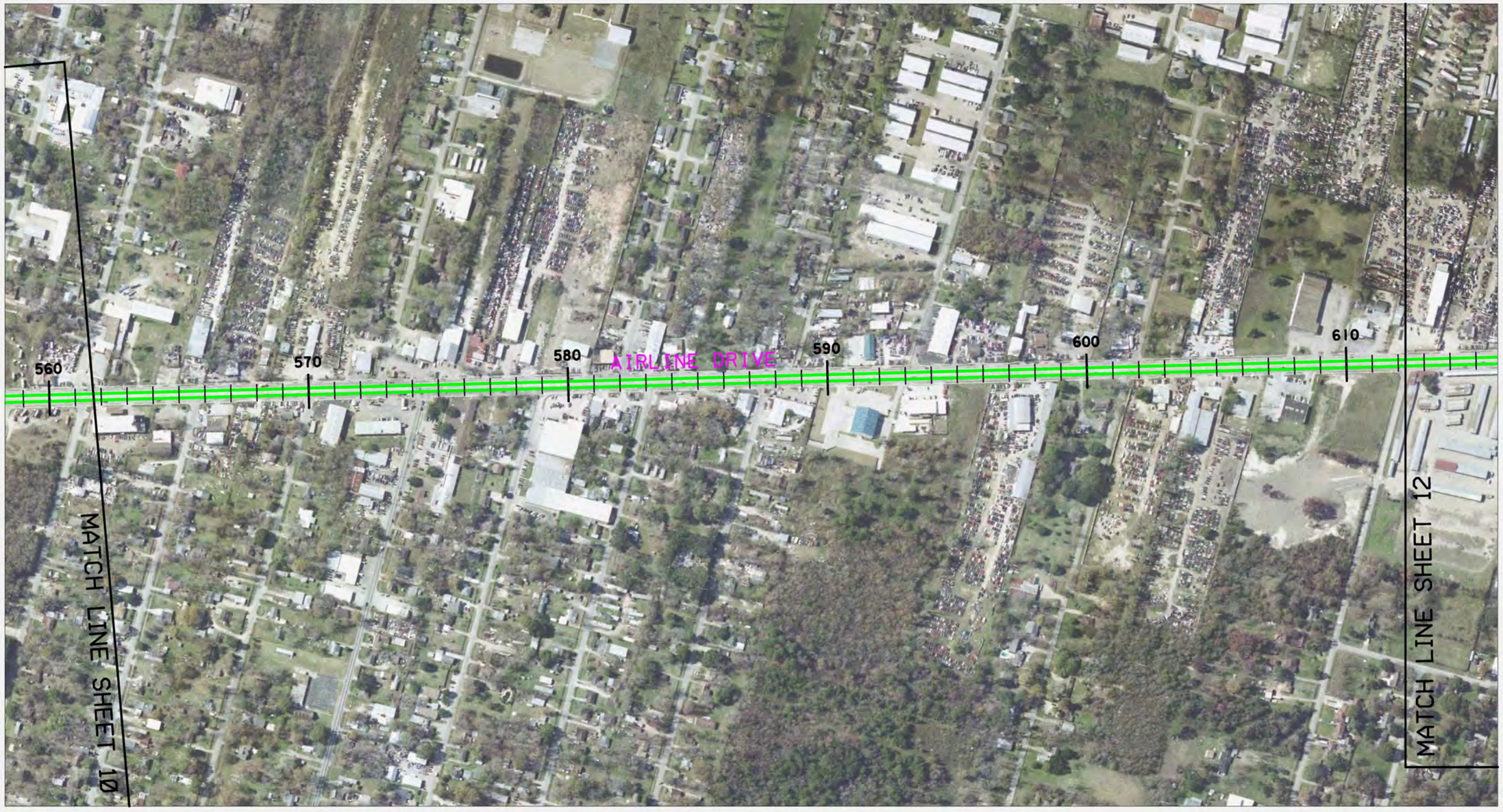

DRAFT

LEGEND
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GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 11

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

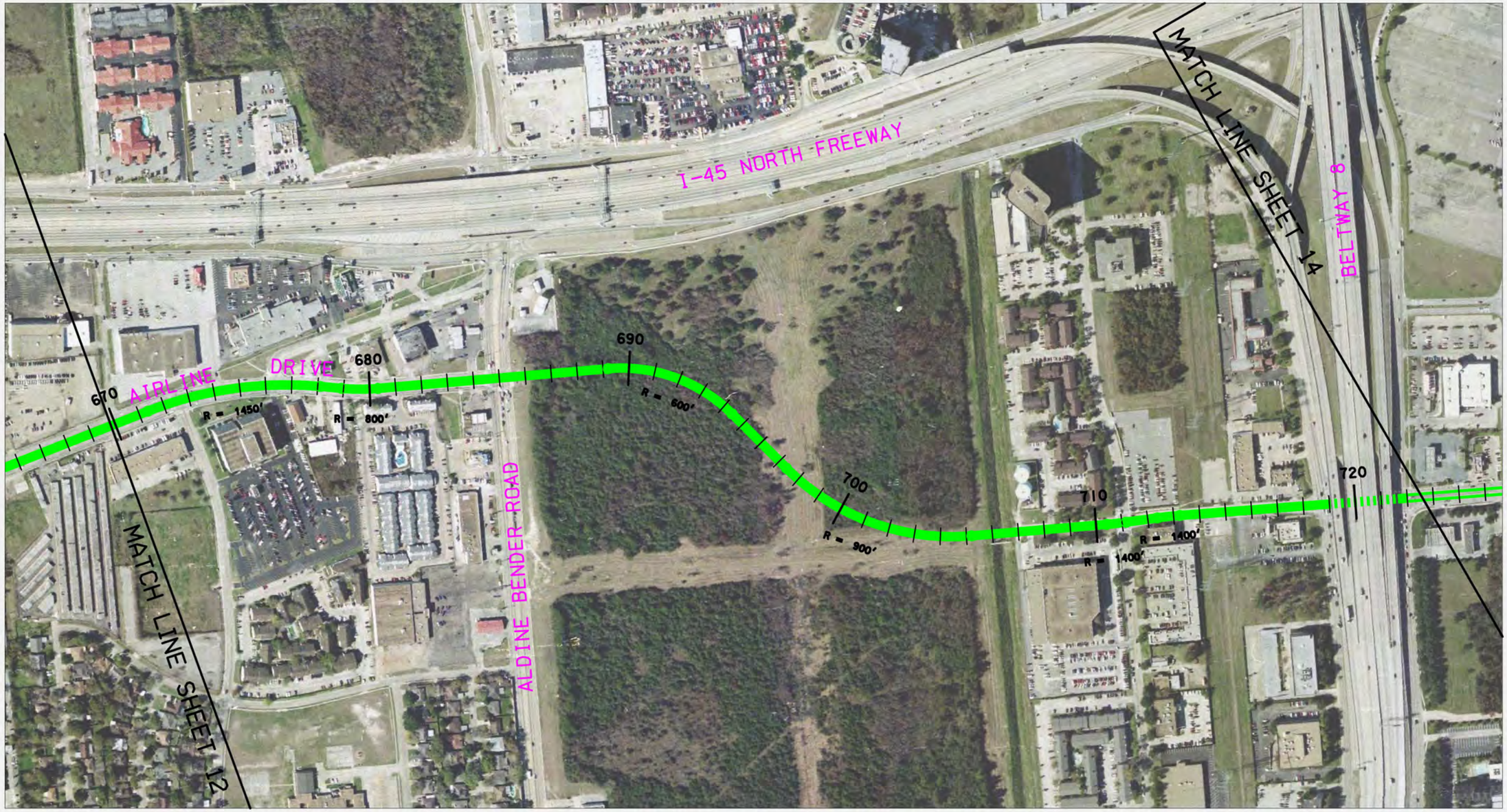
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 12



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LEGEND

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

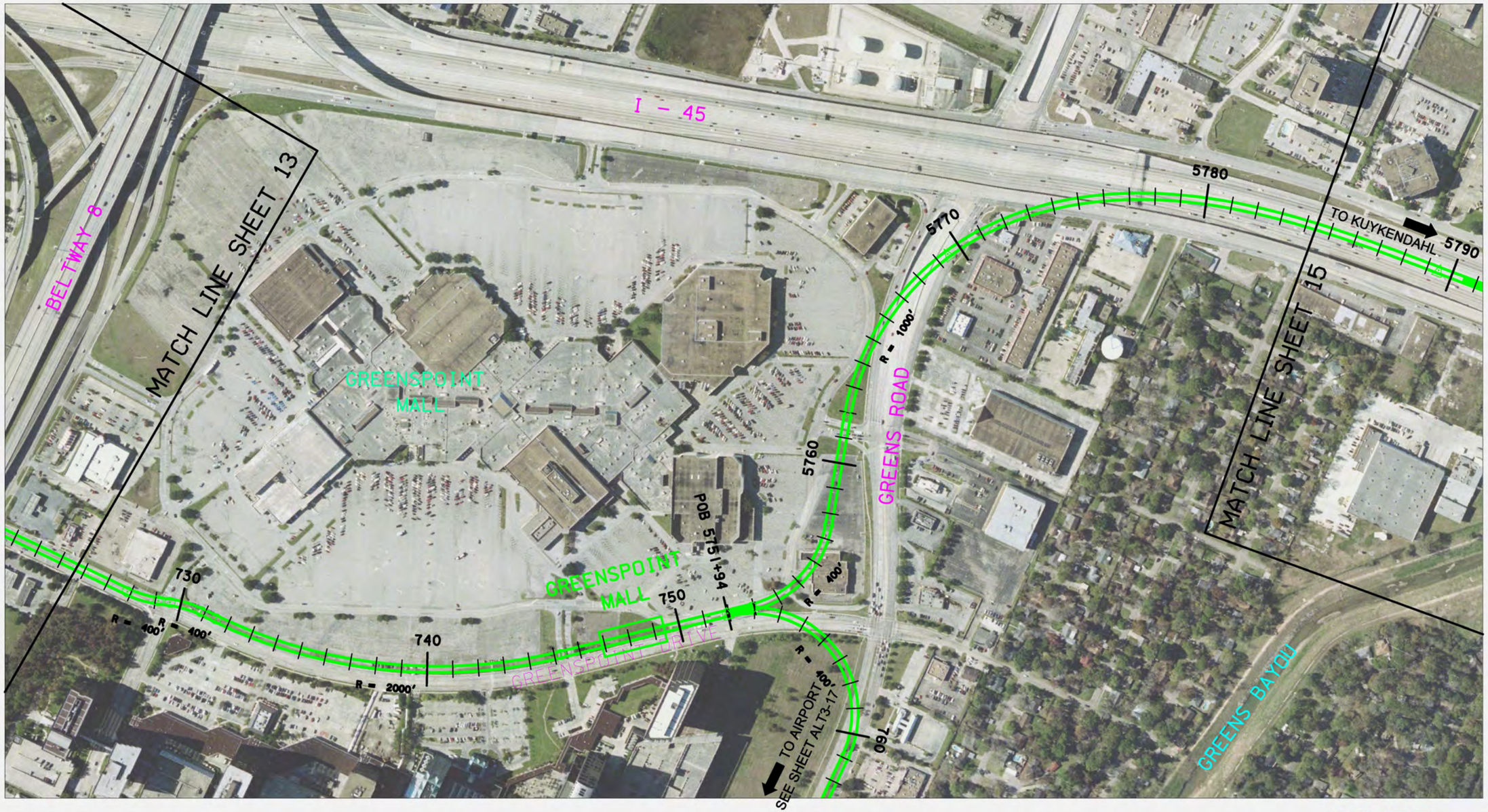
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 3 GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 13



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LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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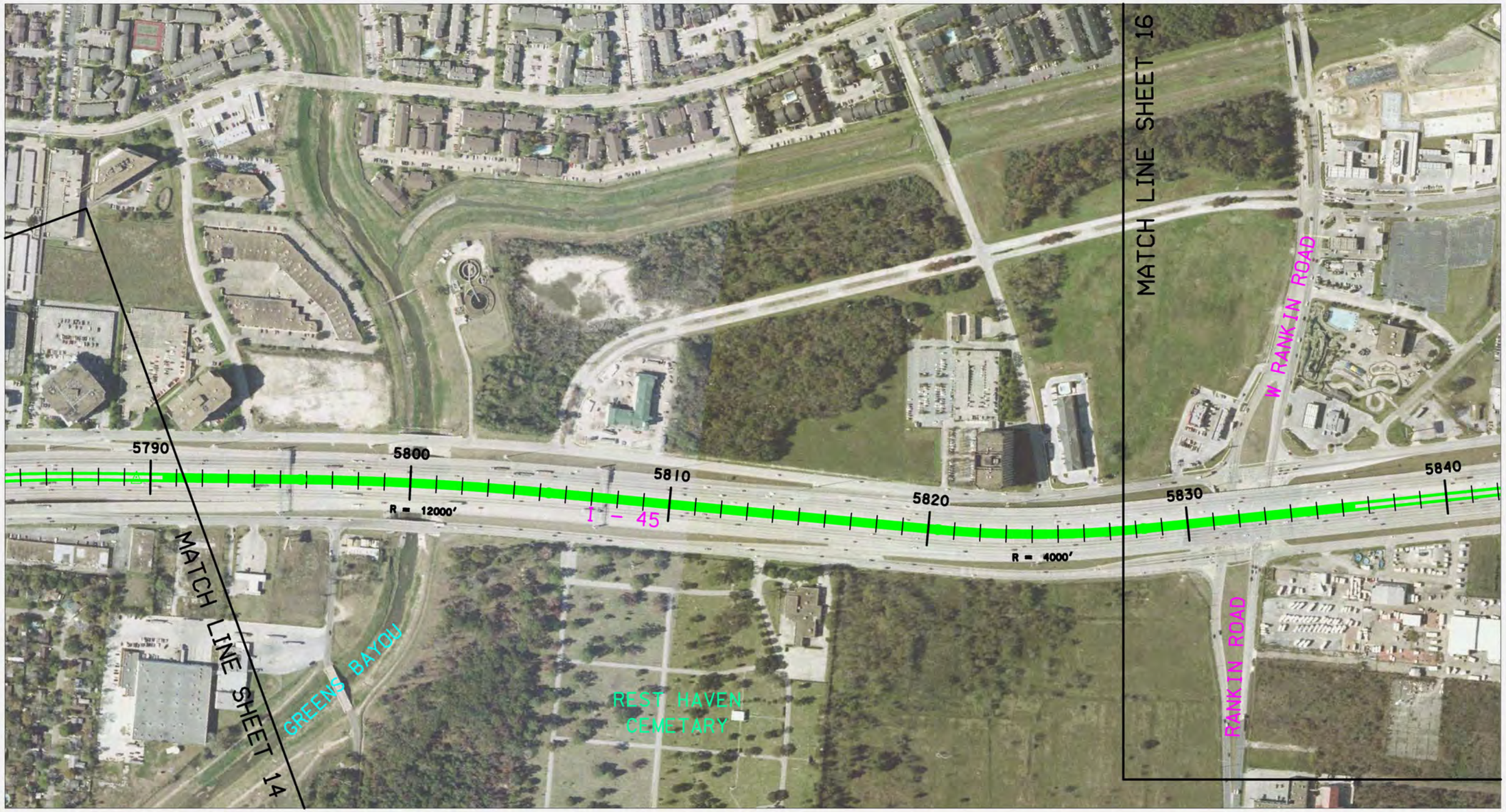
North Hardy
planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 14



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LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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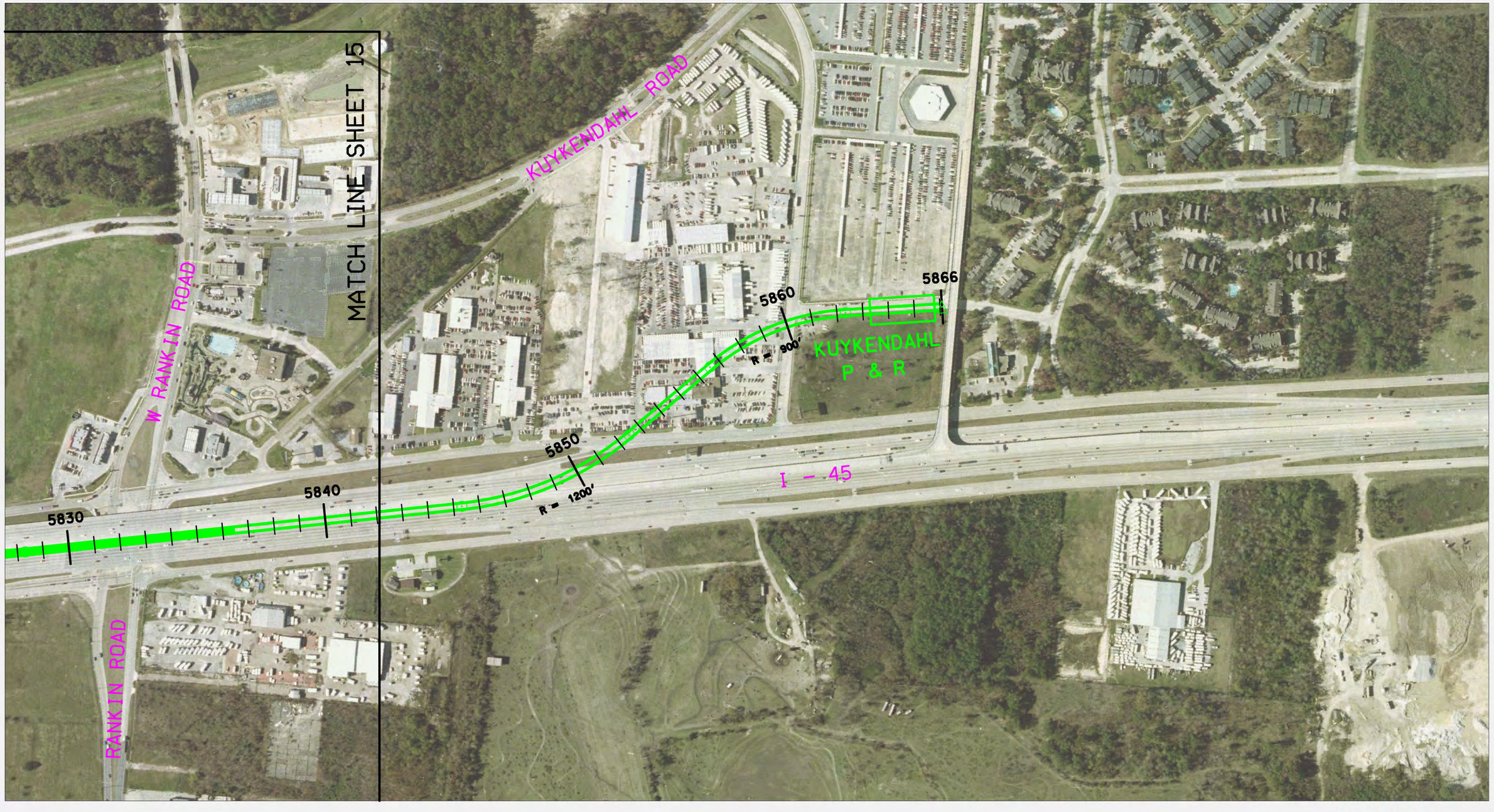
North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 15



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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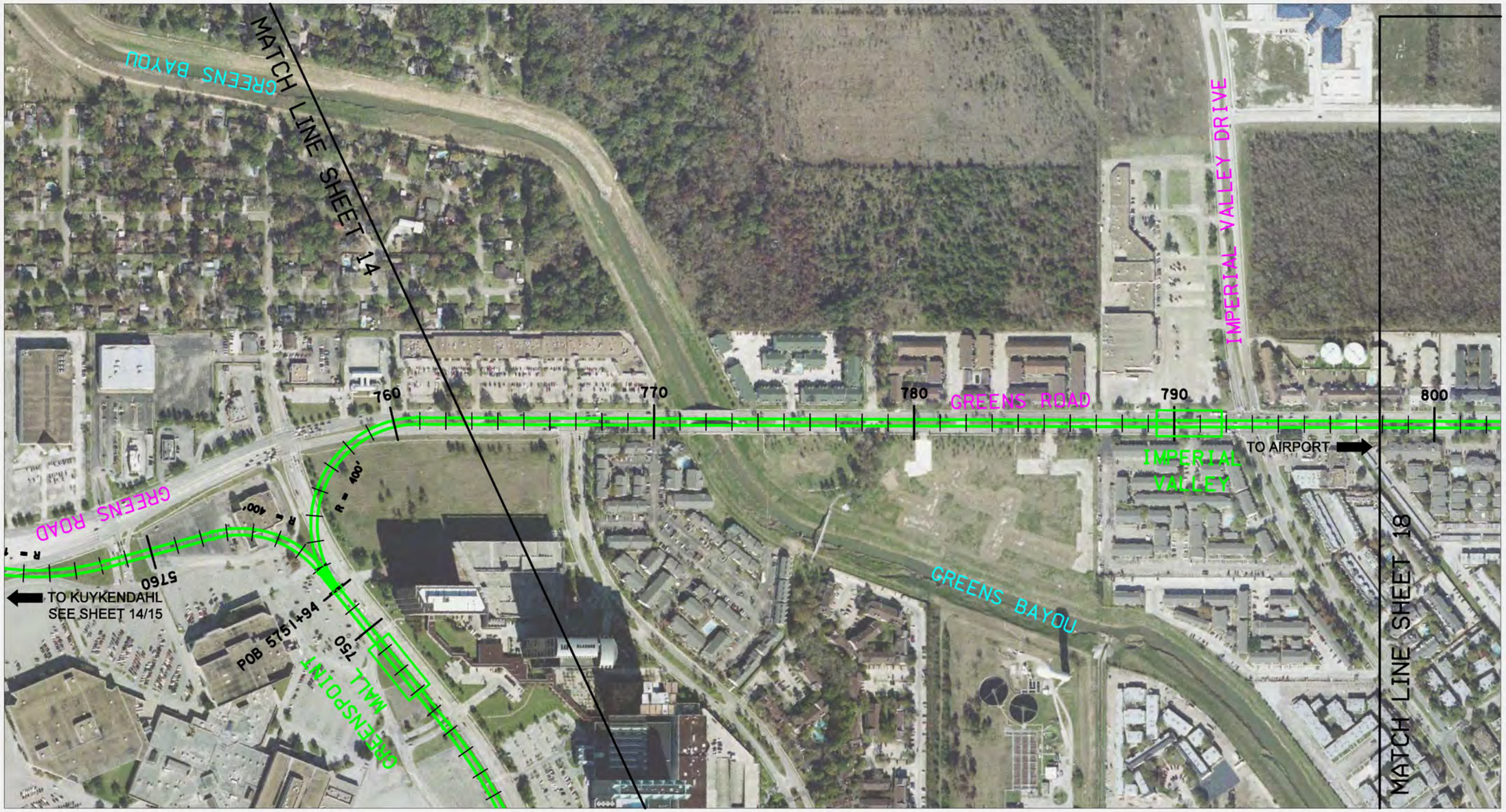
North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 16



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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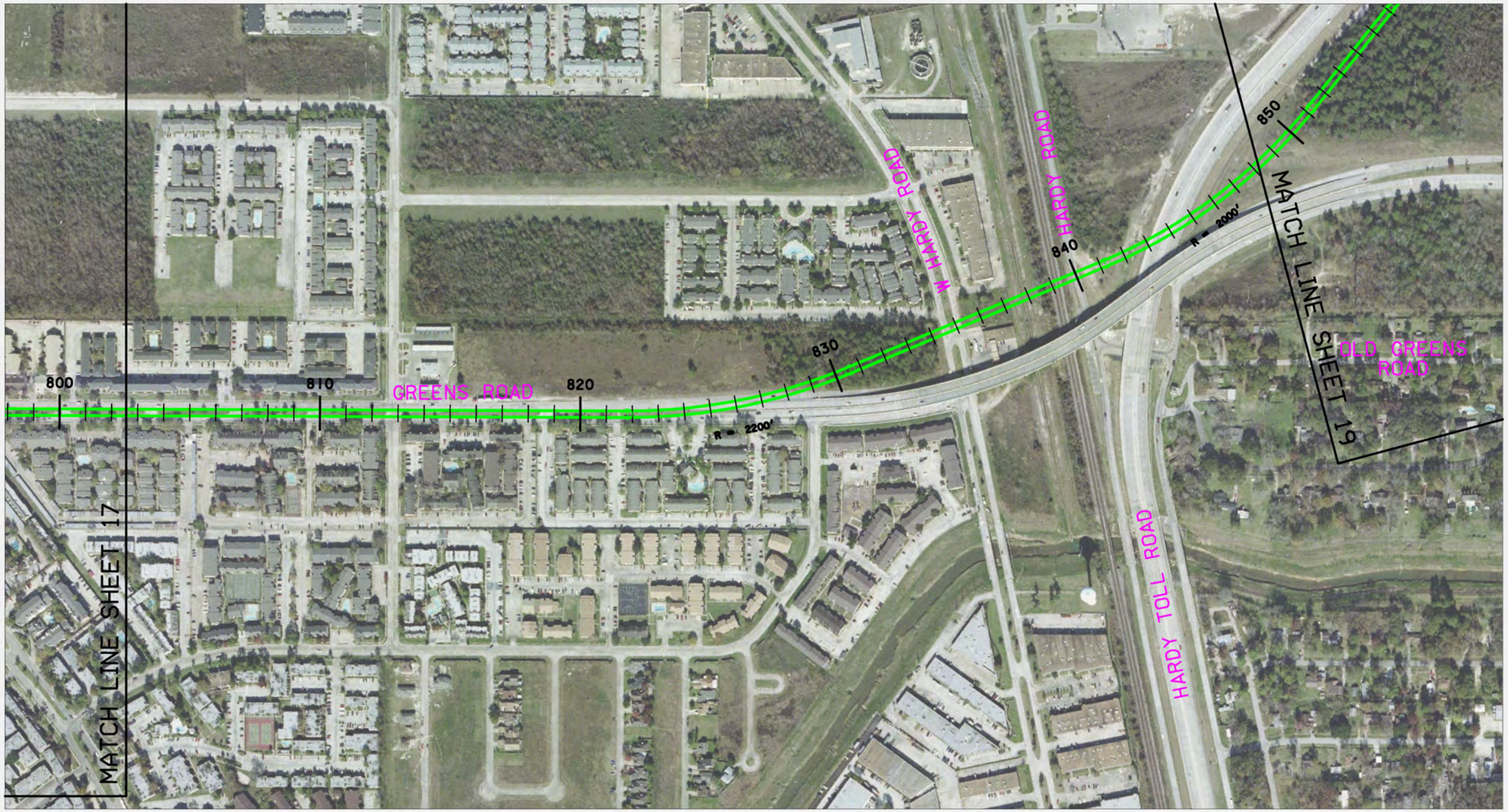
North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 17



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT3 - 18

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

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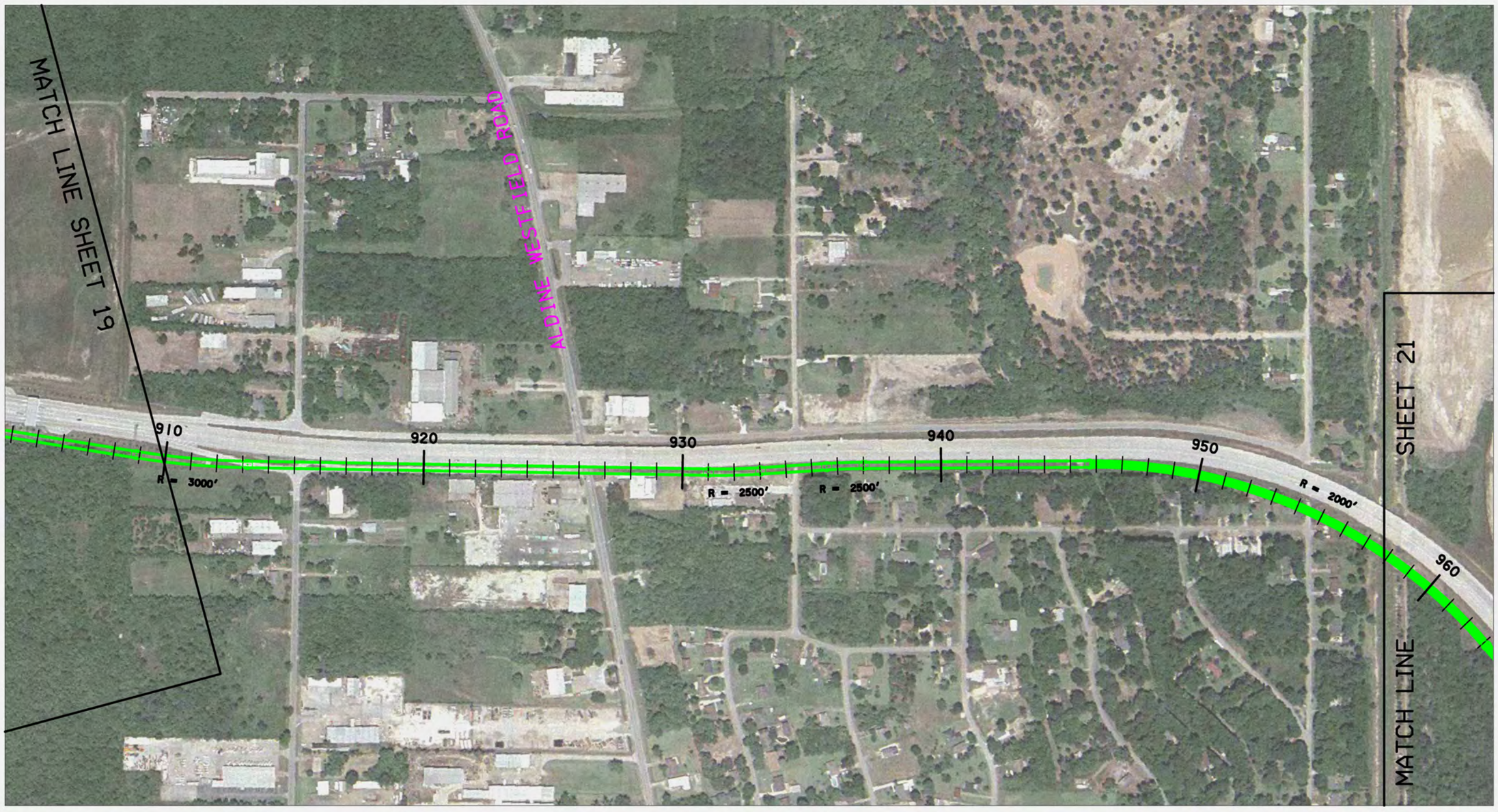

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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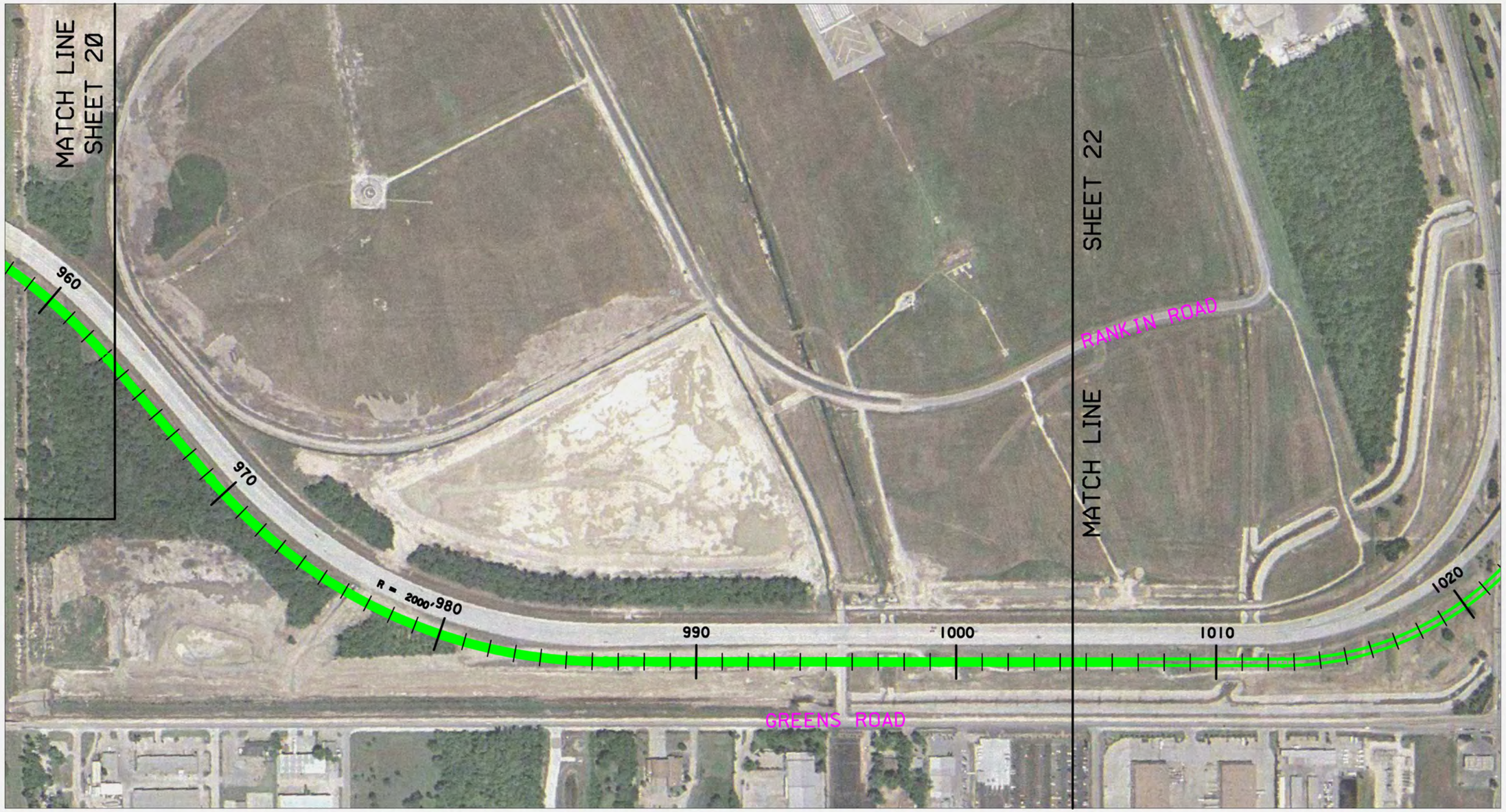
North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 20



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LEGEND

AT GRADE

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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

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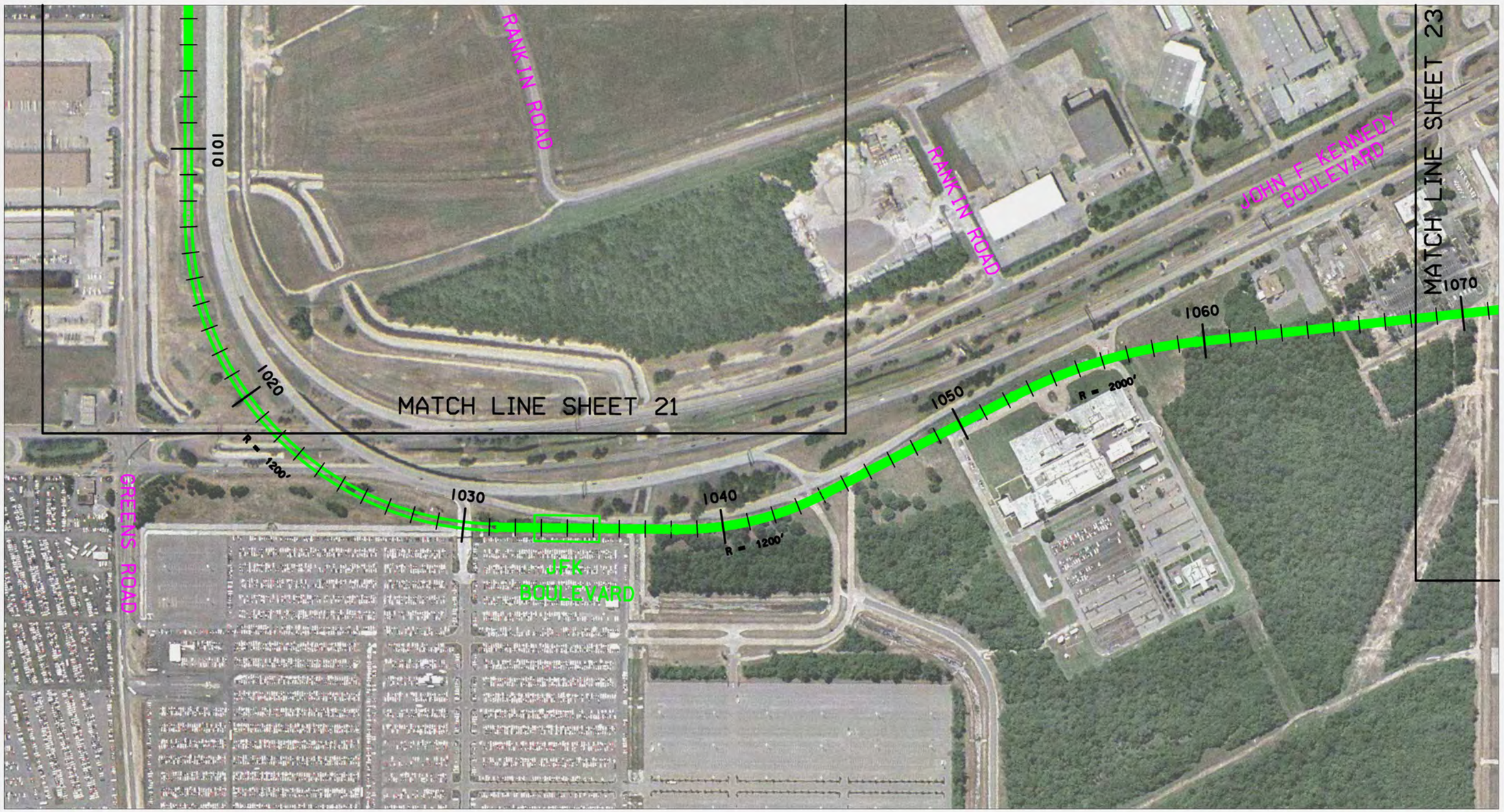

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LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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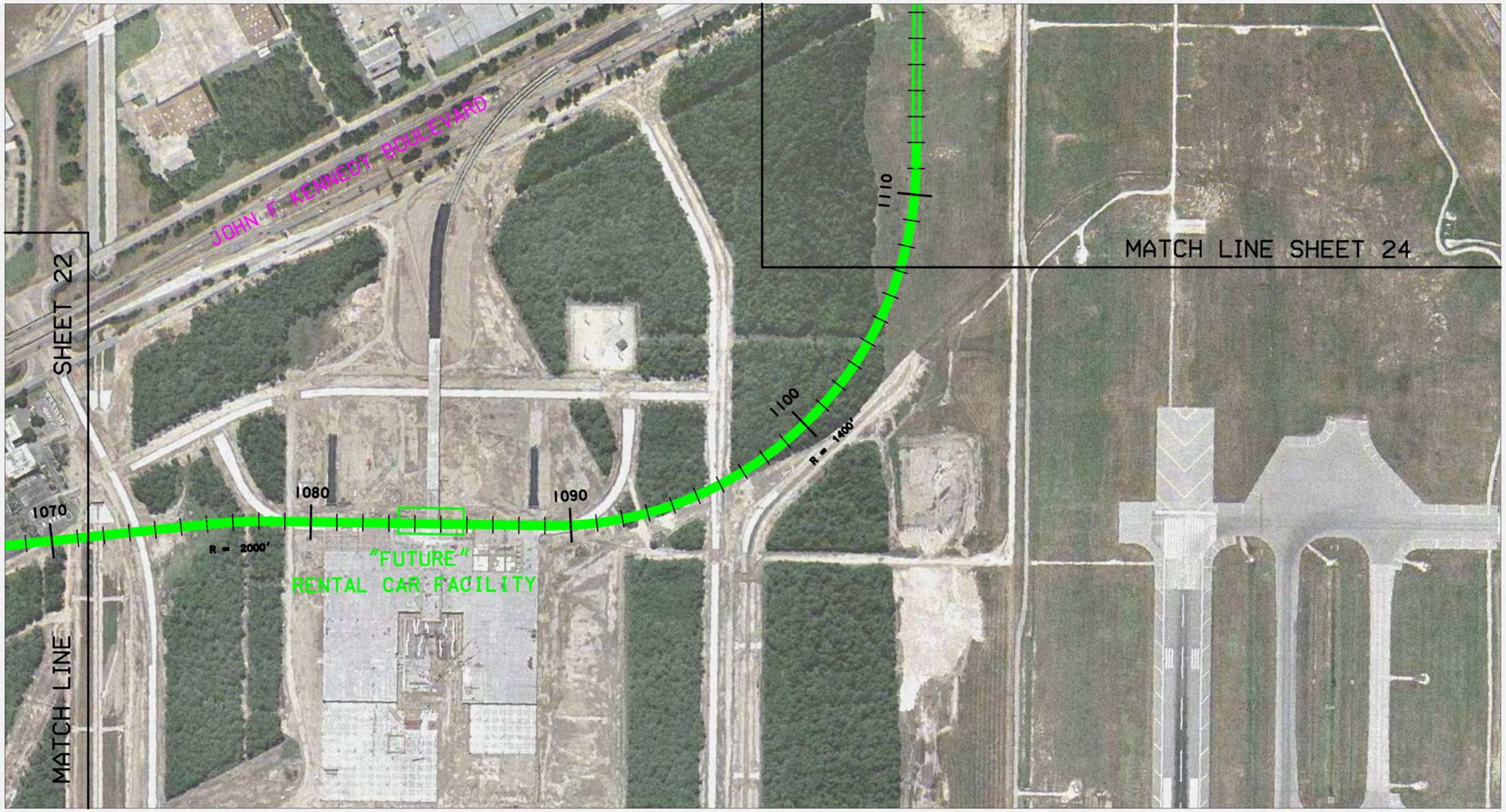
North Hardy
planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 22



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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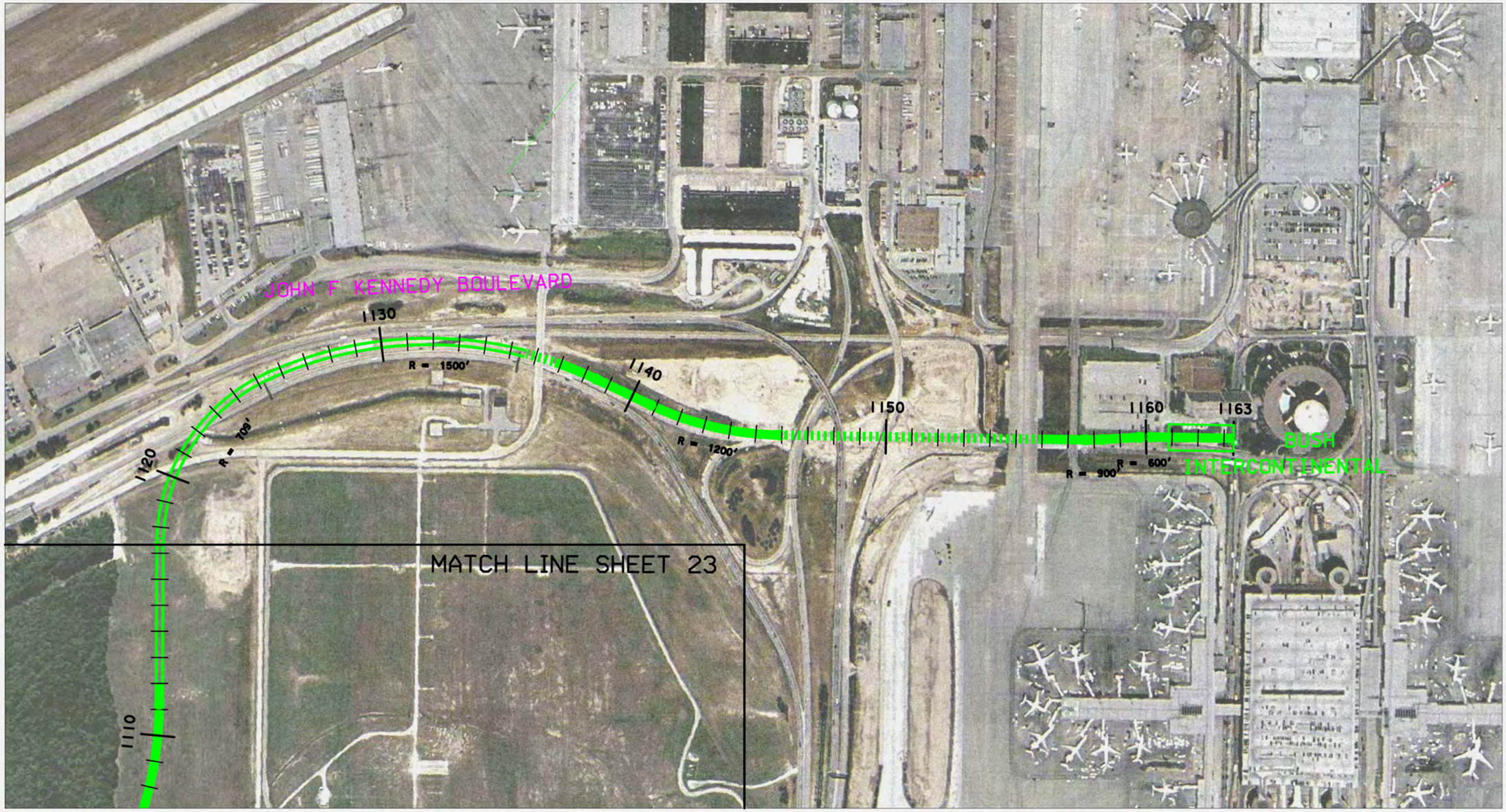
North Hardy
planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT3 - 23



DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

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planning studies

ALTERNATE NO. 3
GREEN ALIGNMENT

DATE 10 FEB. 2003

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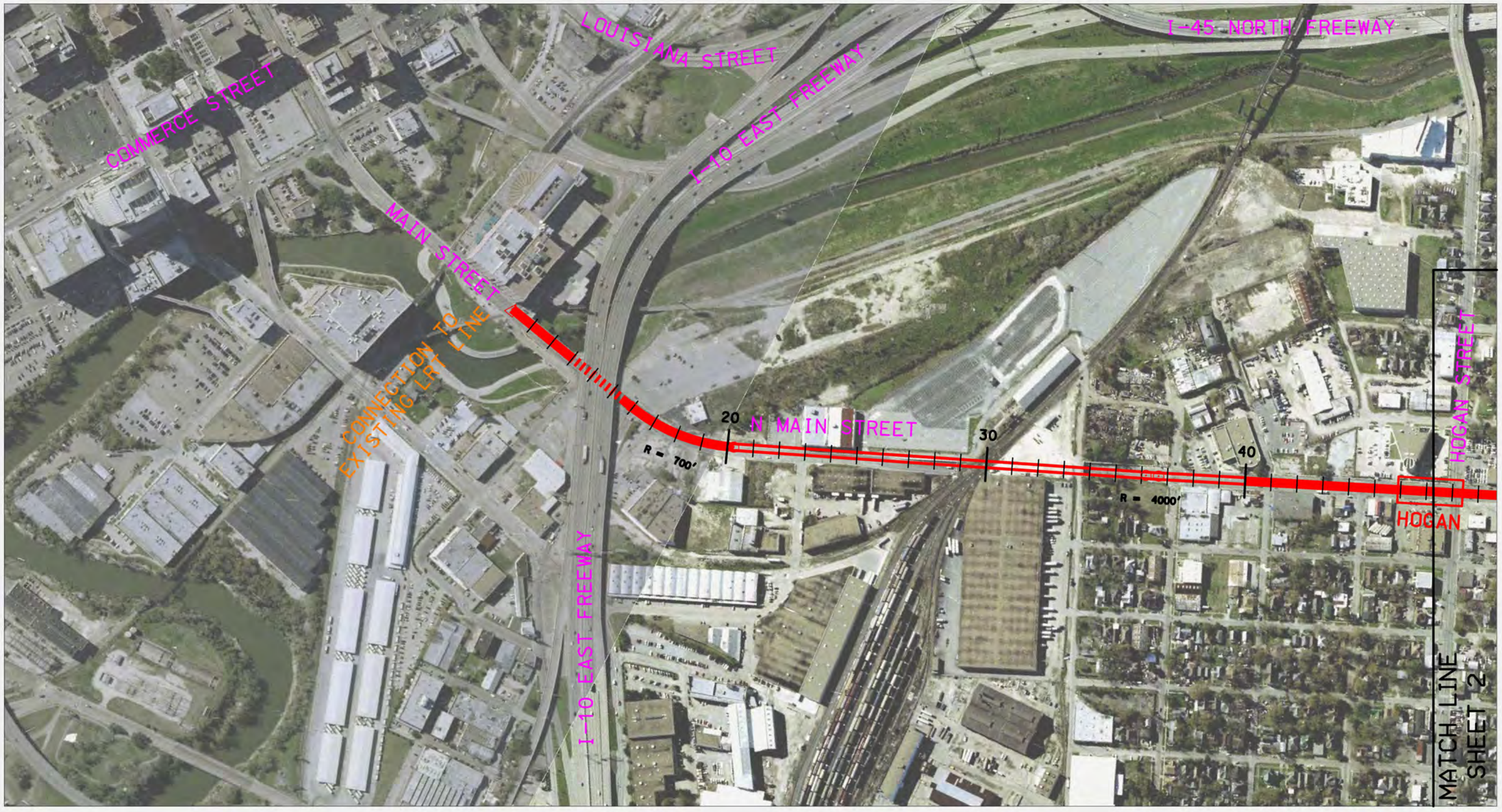

DRAFT

LEGEND

AT GRADE — STATION LOCATION

AERIAL

AT GRADE BELOW STRUCTURE

GRAPHIC SCALE

400' 0 400'

Prepared By:

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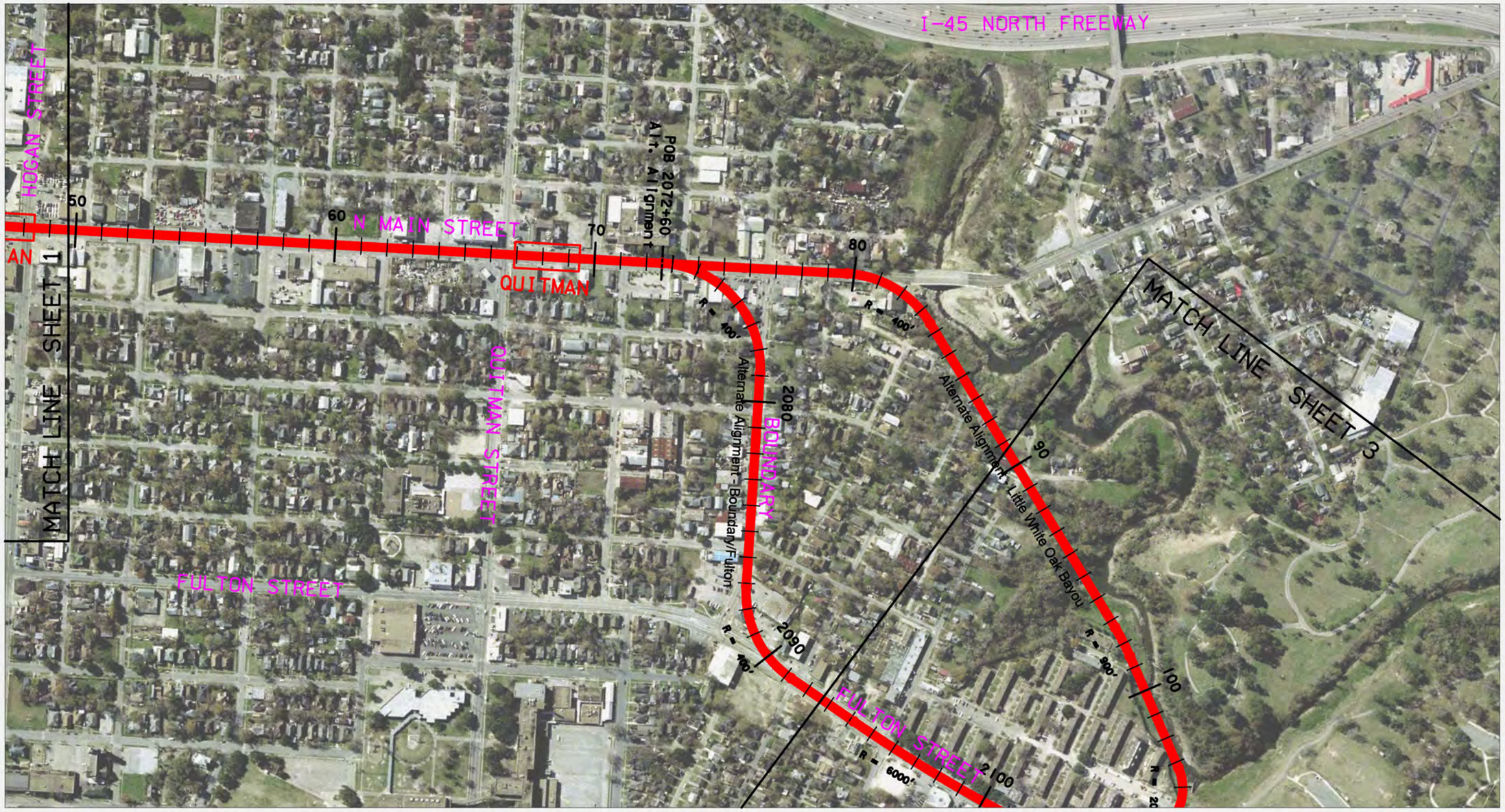
North Hardy planning studies

ALTERNATE NO. 2 RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 01



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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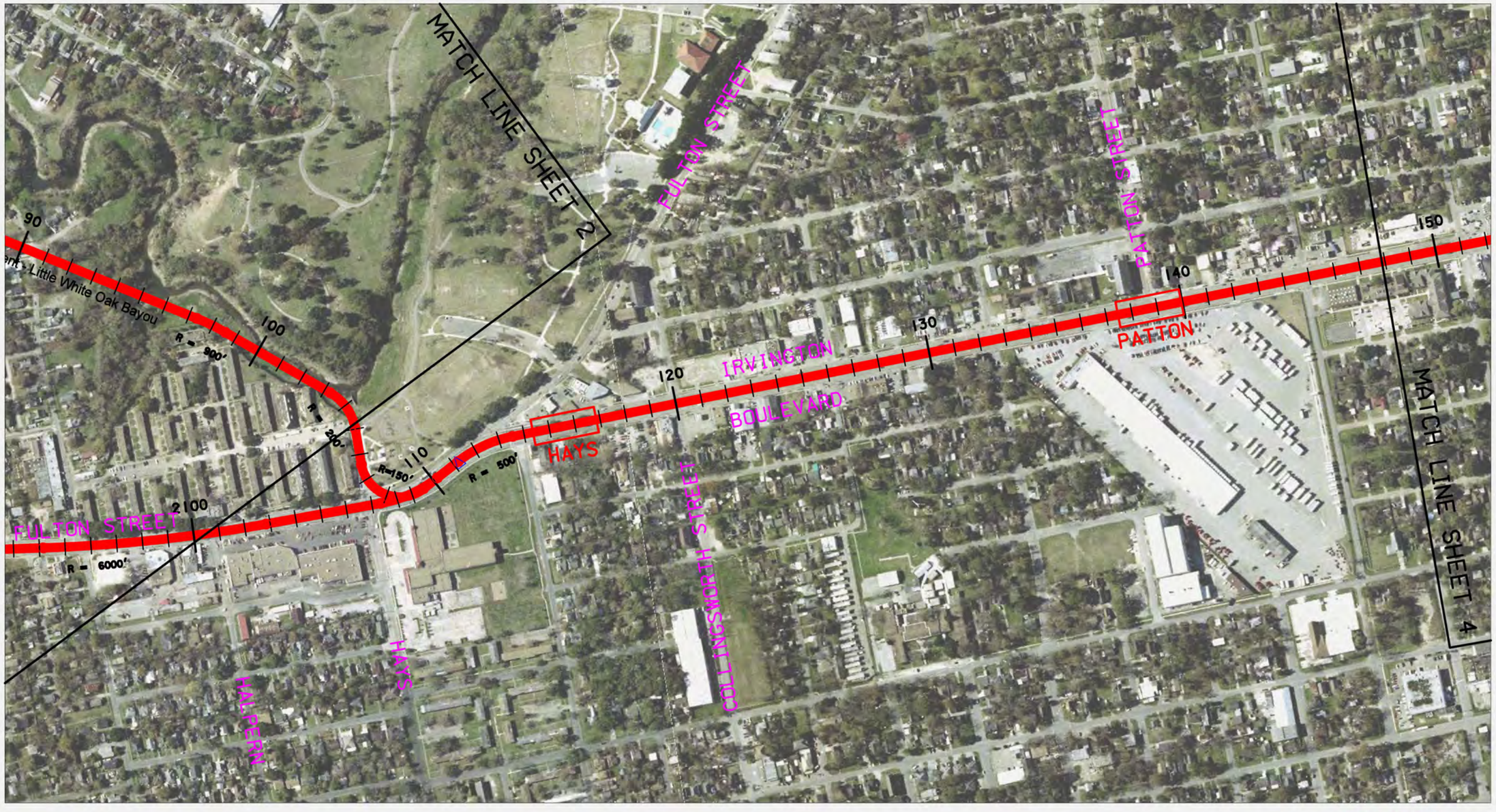
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT2 - 02



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
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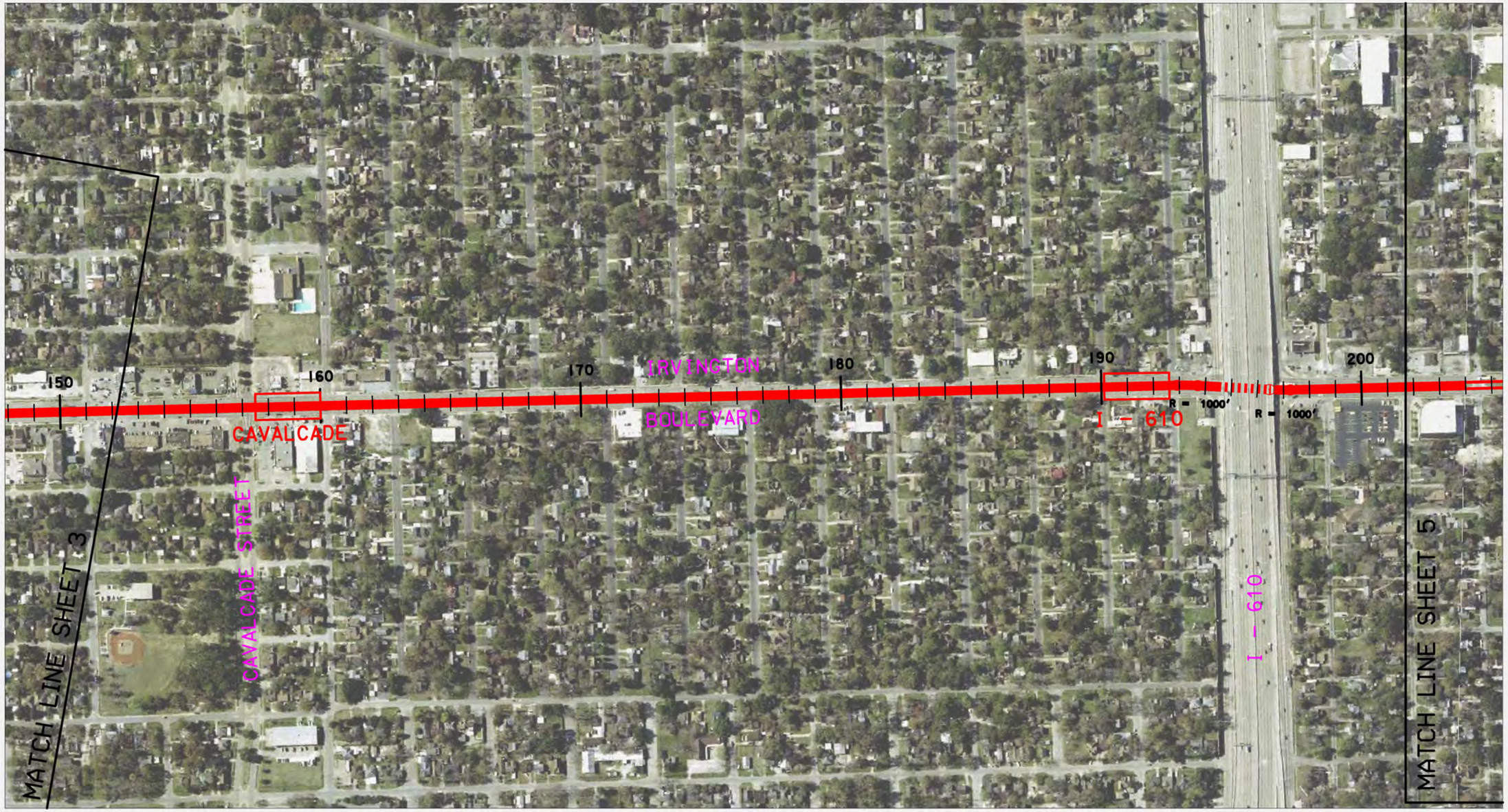

DRAFT

LEGEND
AT GRADE
AERIAL
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

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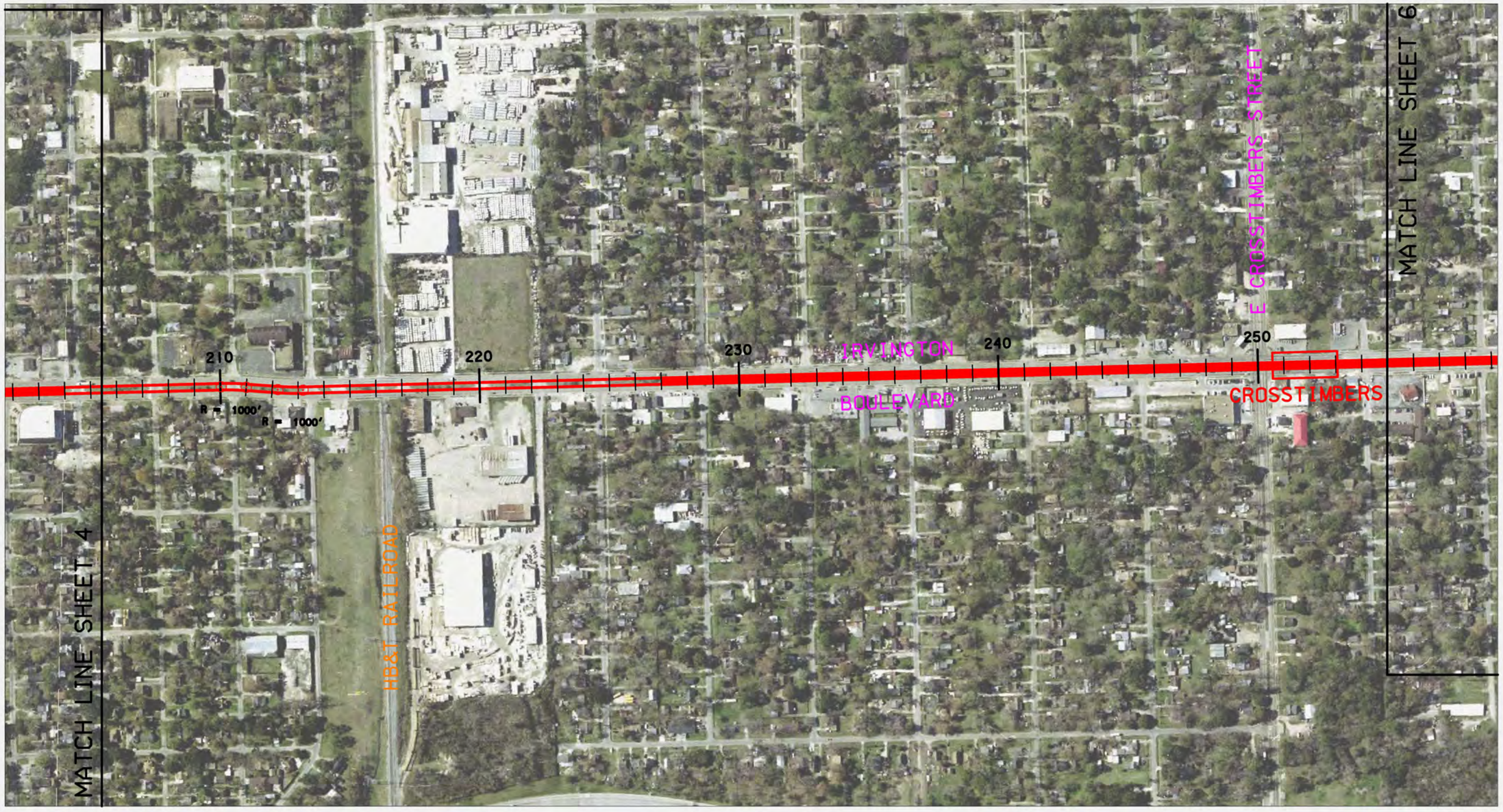

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 05

DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT2 - 06

DRAFT

LEGEND
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AERIAL
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 07

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

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North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT2 - 08

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

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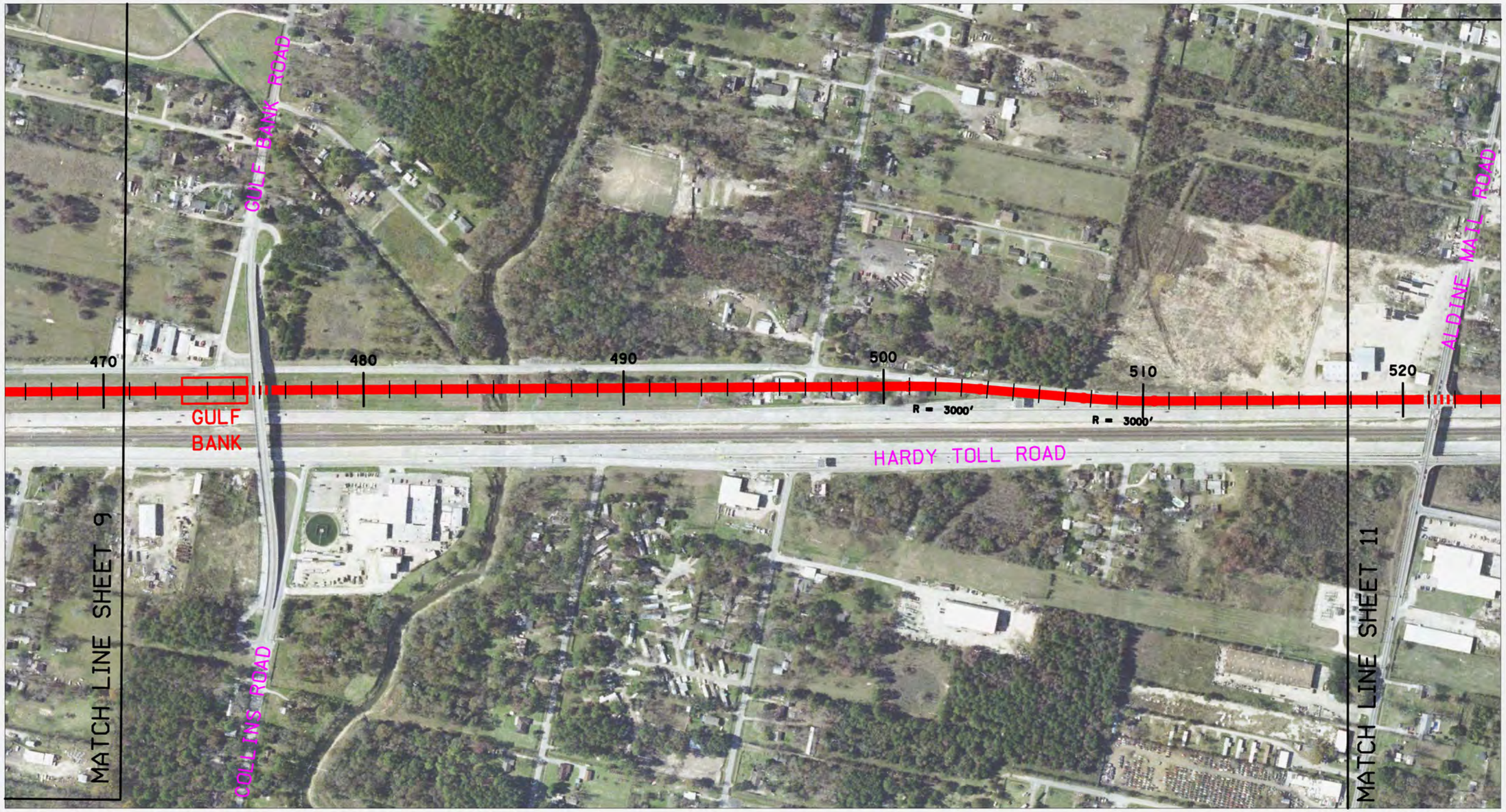

DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
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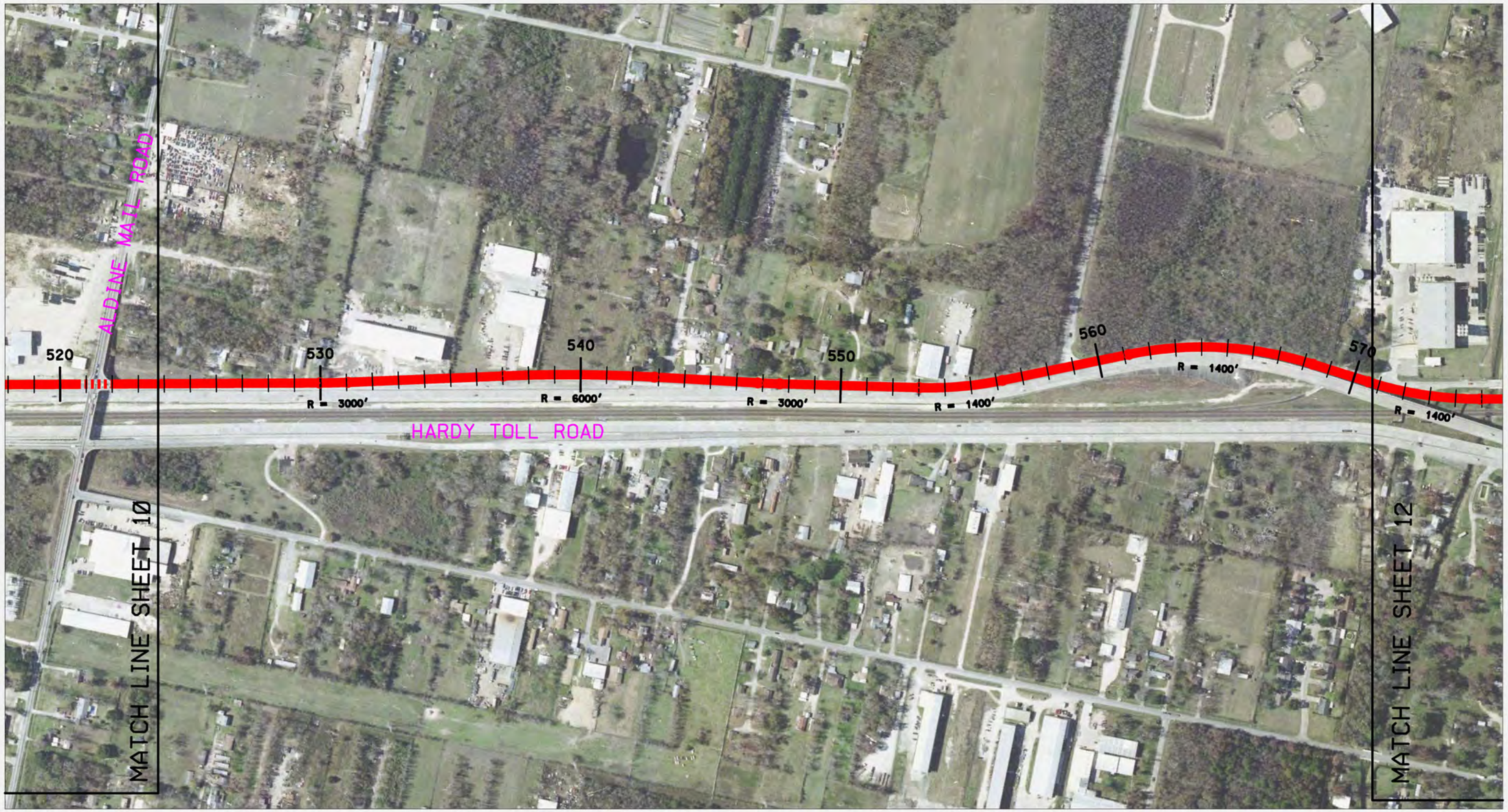

DRAFT

LEGEND

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 11

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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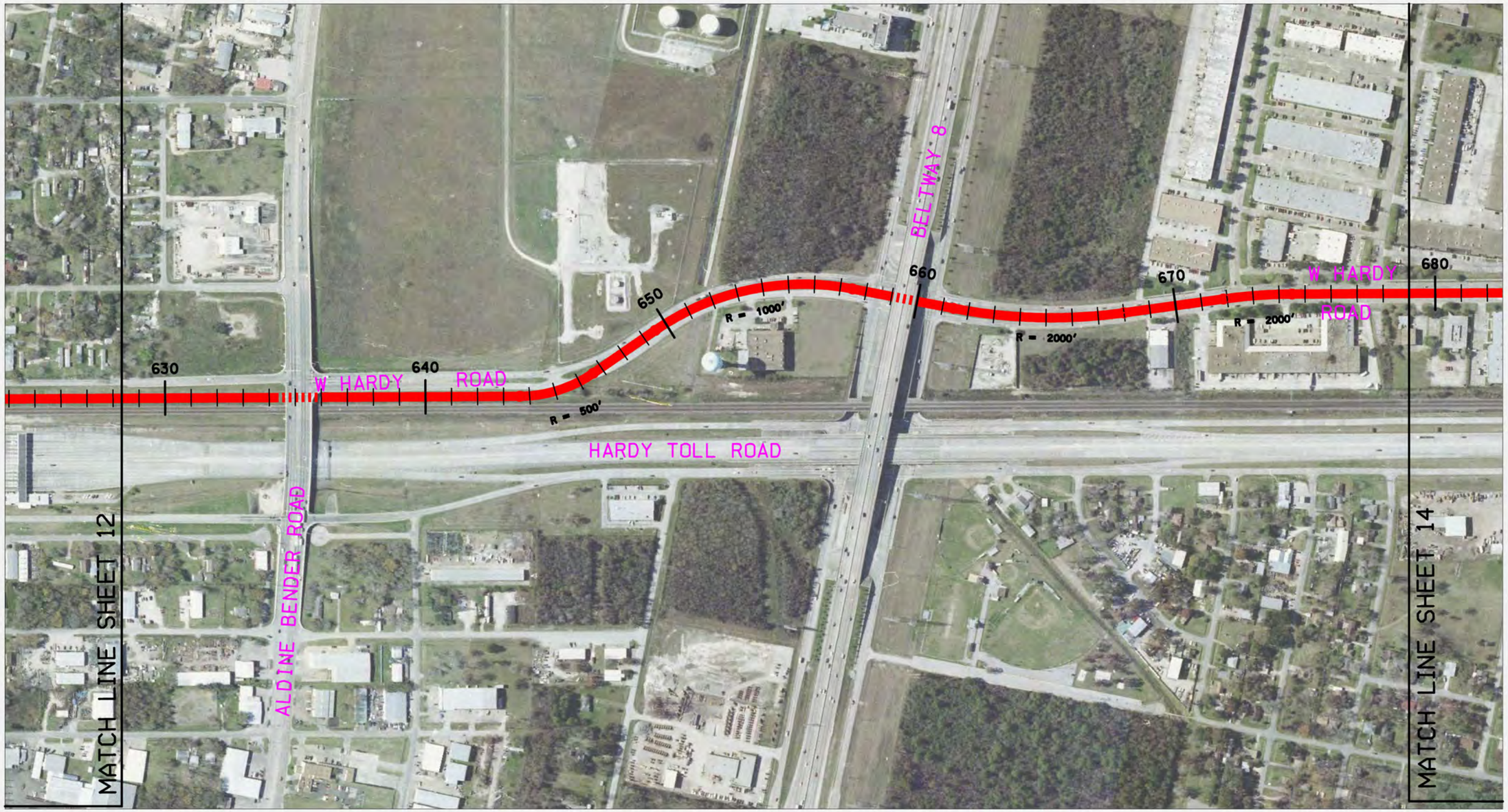
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 12



DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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North Hardy
planning studies

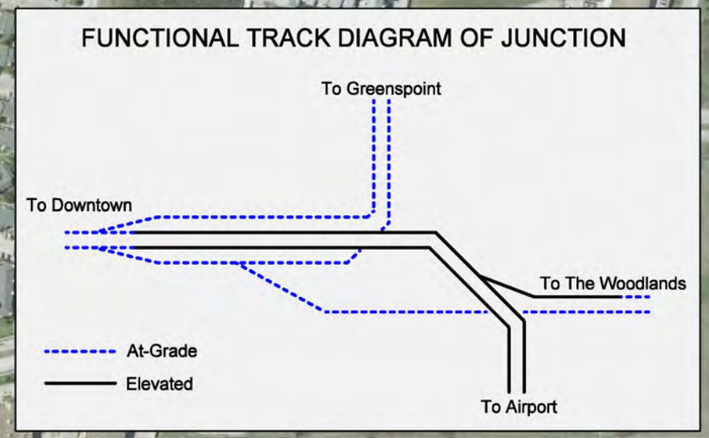
ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 13

To Greenspoint

SEE SHEET 39 FOR CONTINUATION



To Downtown

To The Woodlands

680

4690

690

6700

4700

700

710

720

730

4710

4720

4730

6710

R = 900'

R = 500'

R = 800'

R = 400'

R = 300'

Kuykendahl Align

POB 6698+50

Airport Align

POB 4689+25

W HARDY ROAD

GREENS ROAD

HARDY TOLL ROAD

HARDY ROAD

OLD GREENS ROAD

HARDY TOLL

MATCH LINE SHEET 13

MATCH LINE SHEET 15

SEE SHEET 33 FOR CONTINUATION

To Airport

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

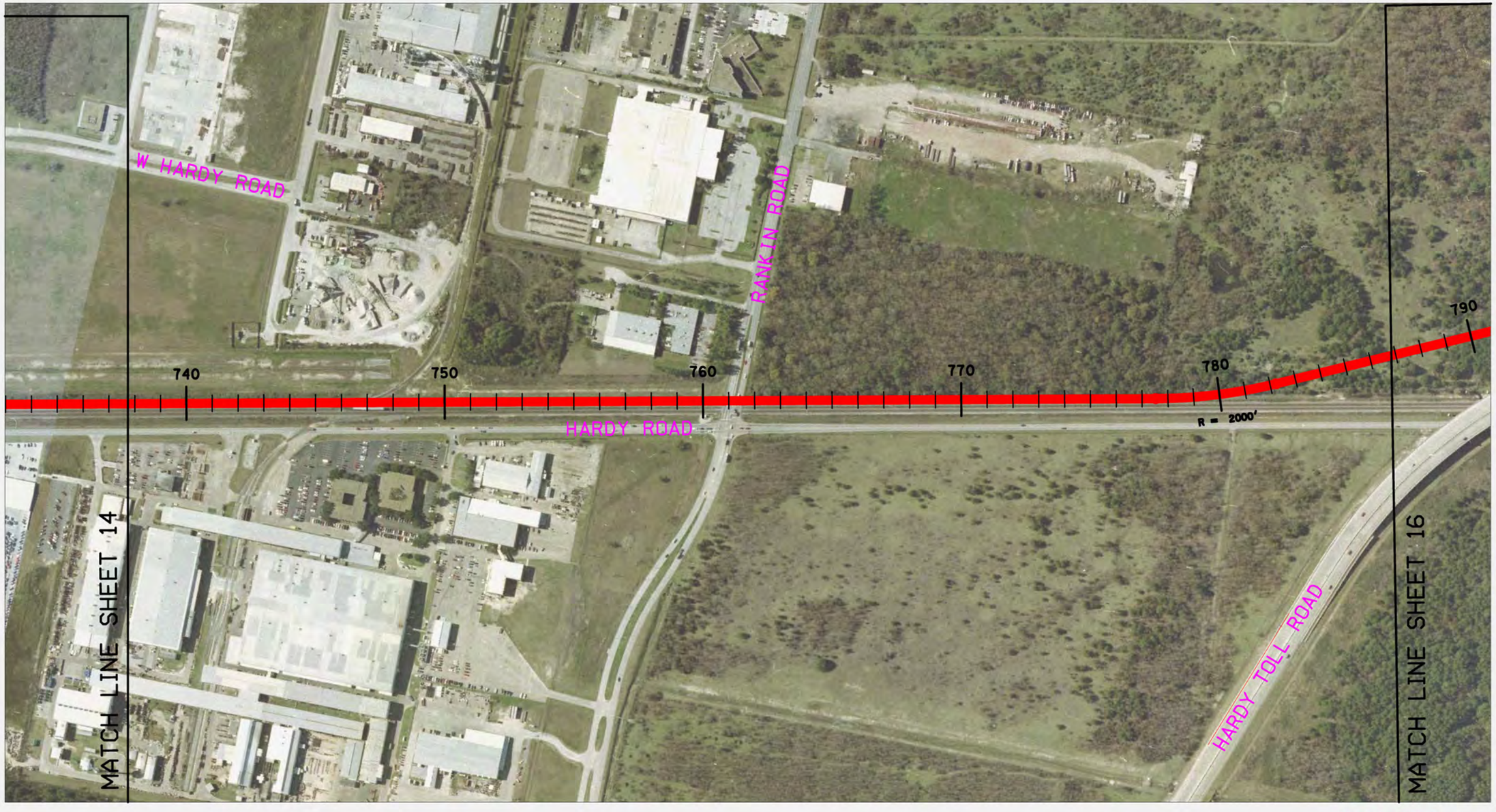
Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 14



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

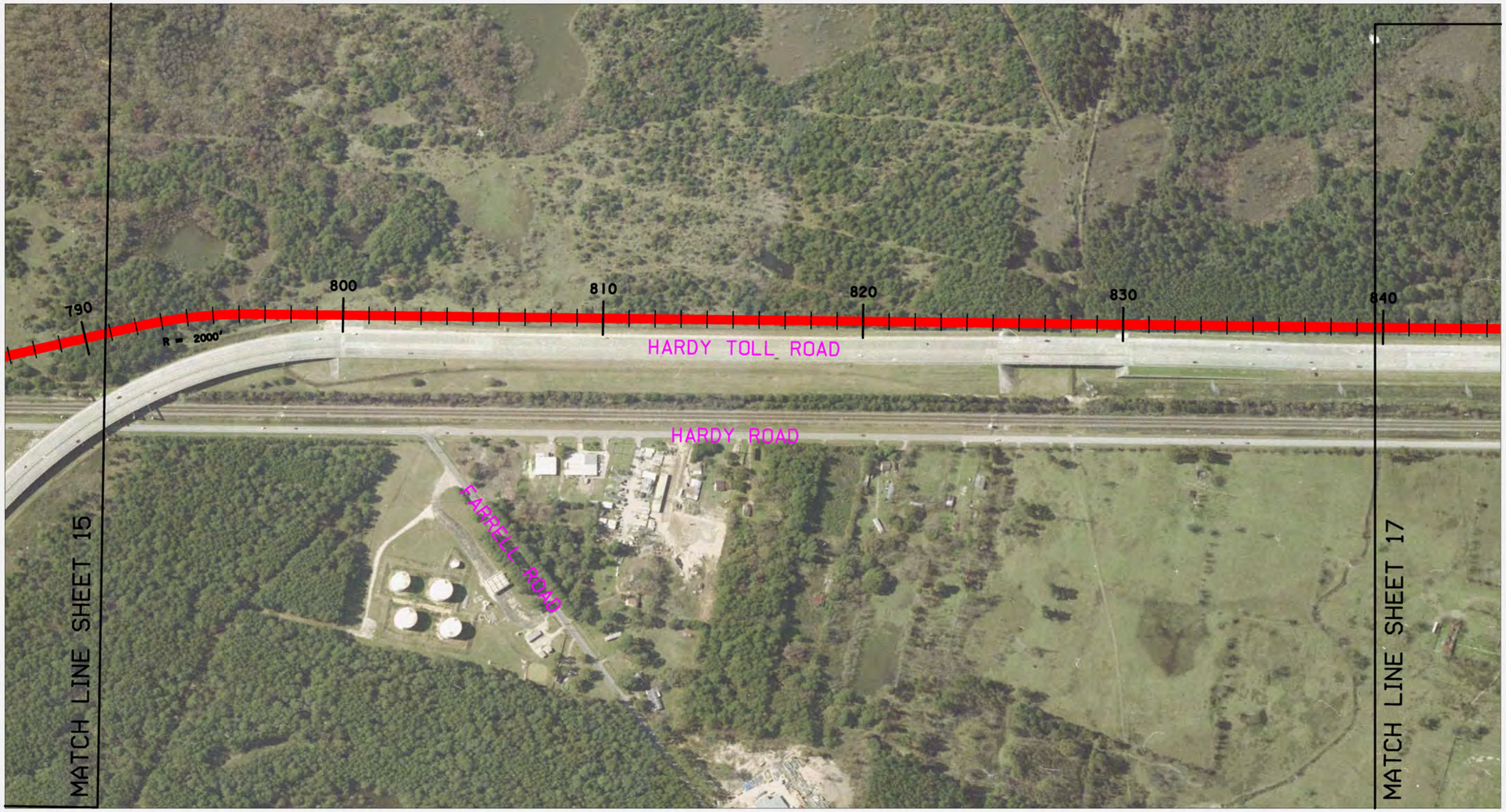
Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 15



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LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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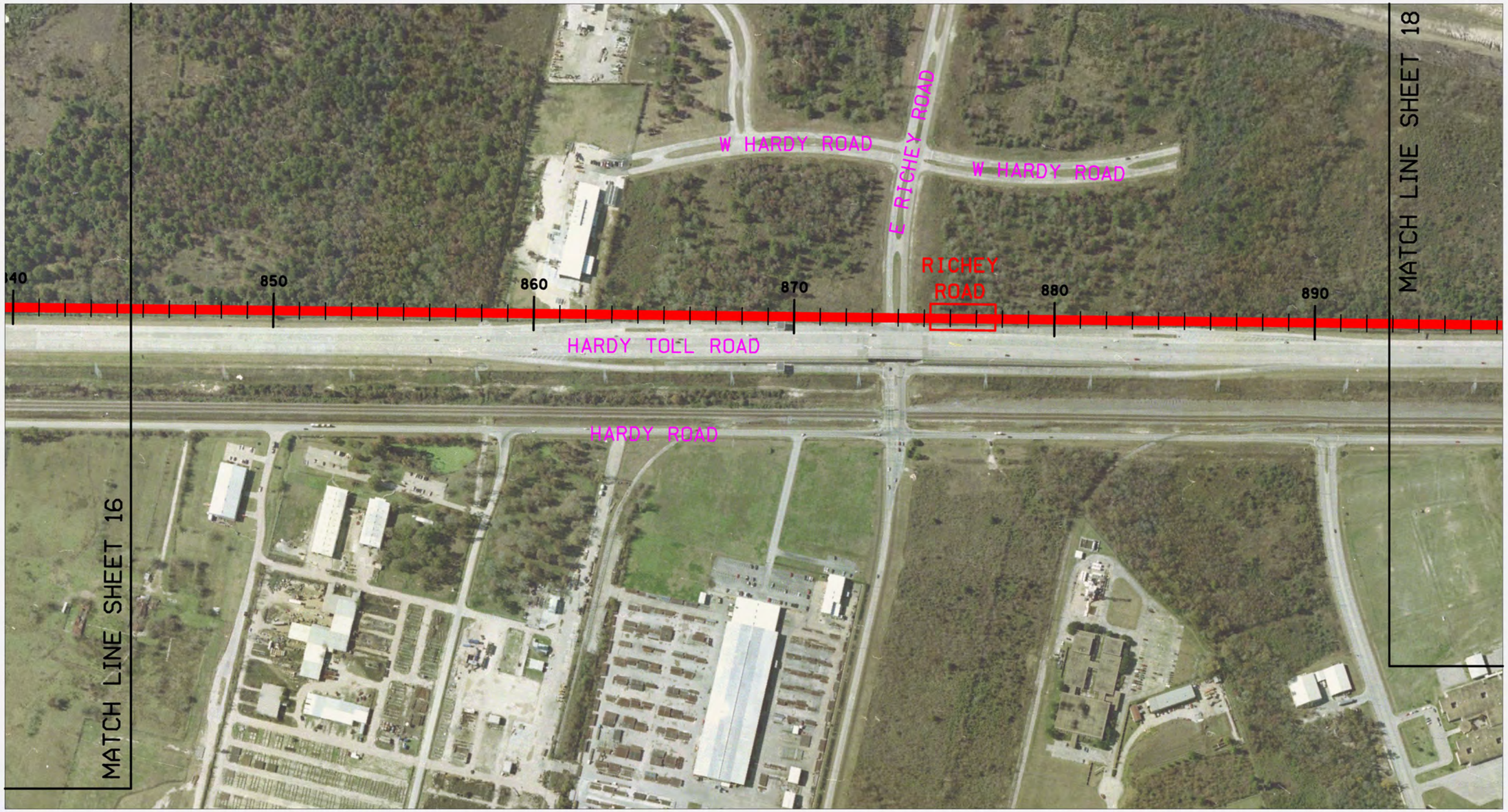
North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 16



DRAFT

LEGEND
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STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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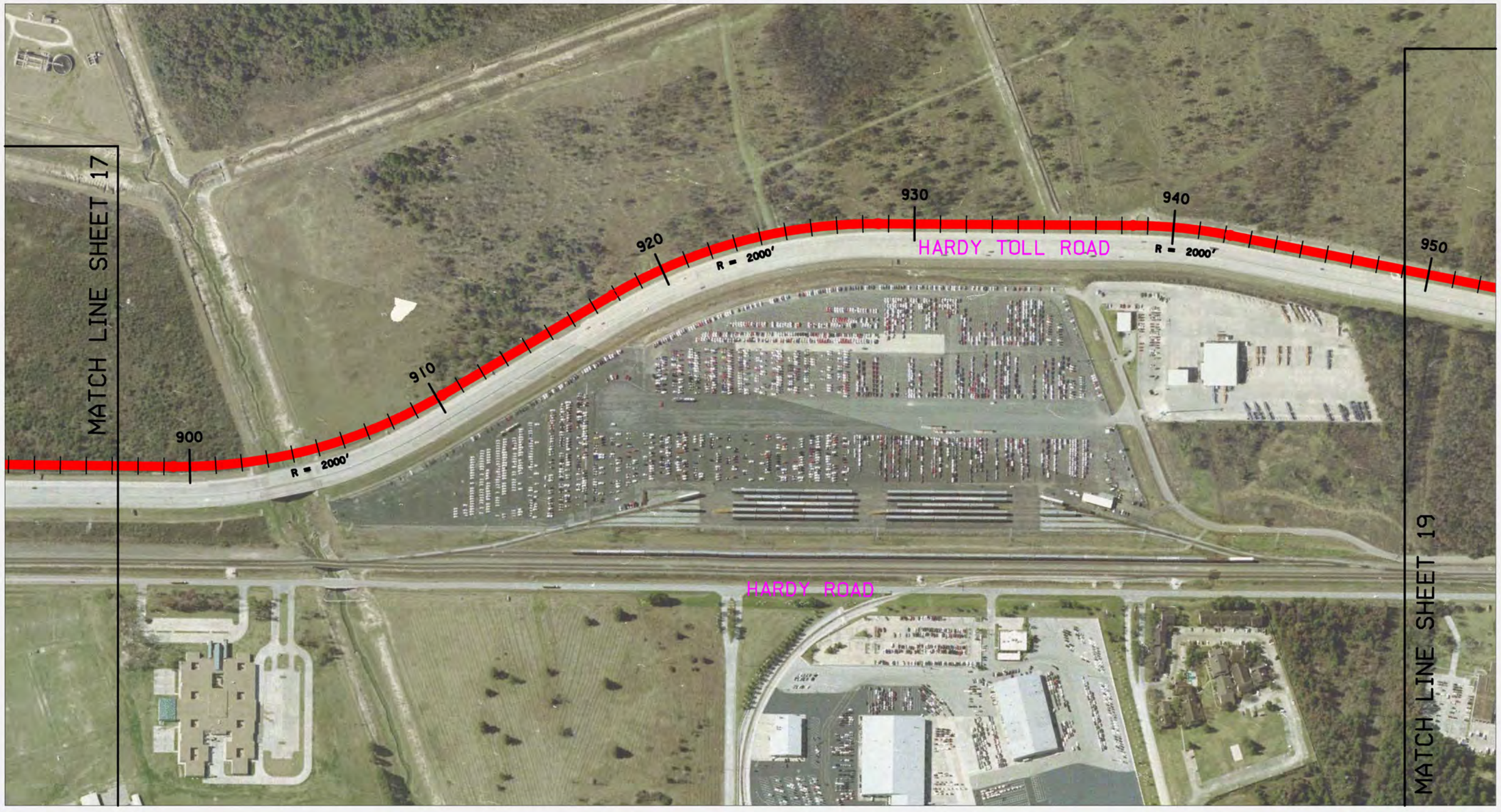
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 17



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LEGEND

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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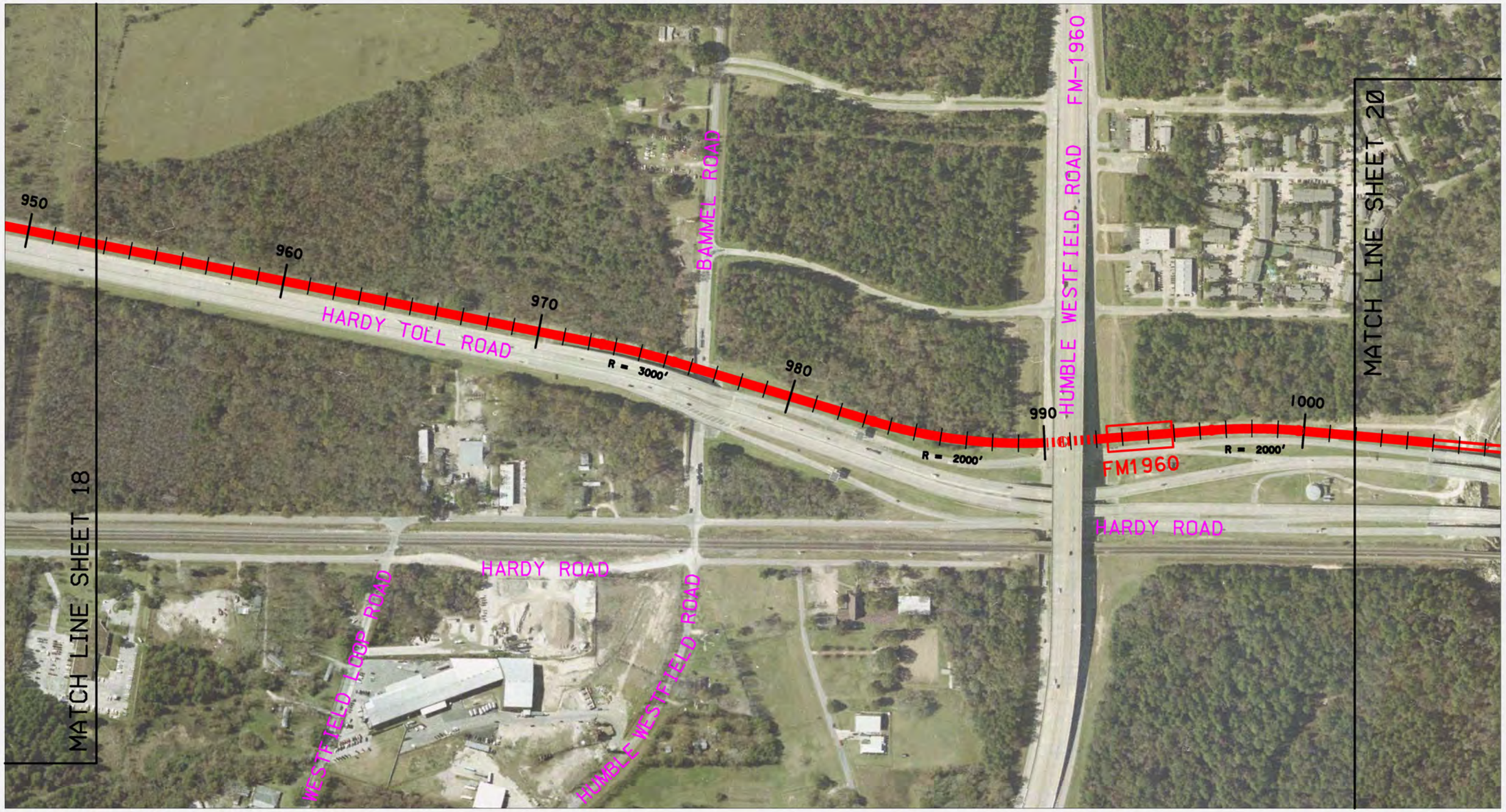
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 18



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LEGEND

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

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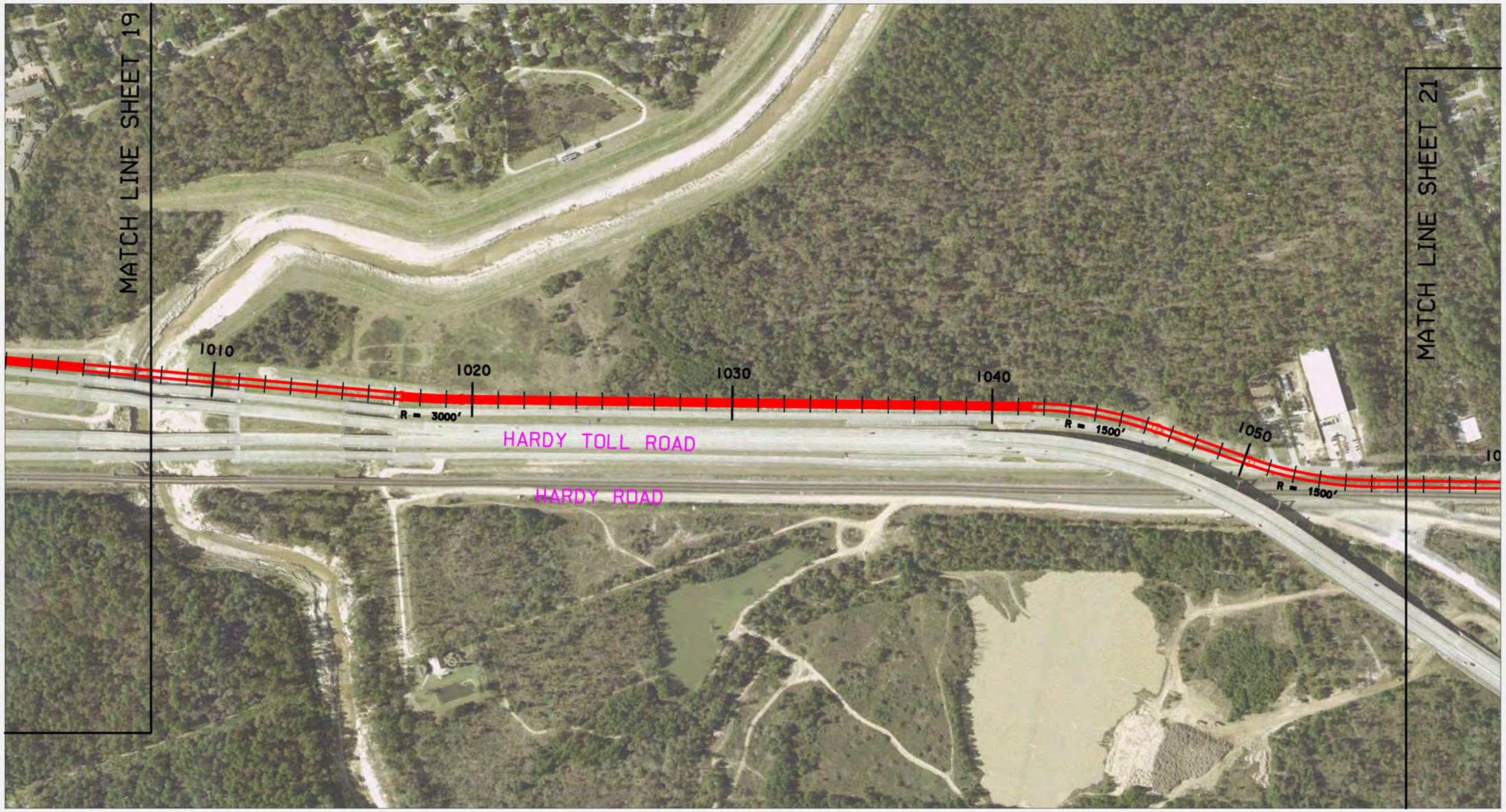

DRAFT

LEGEND
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AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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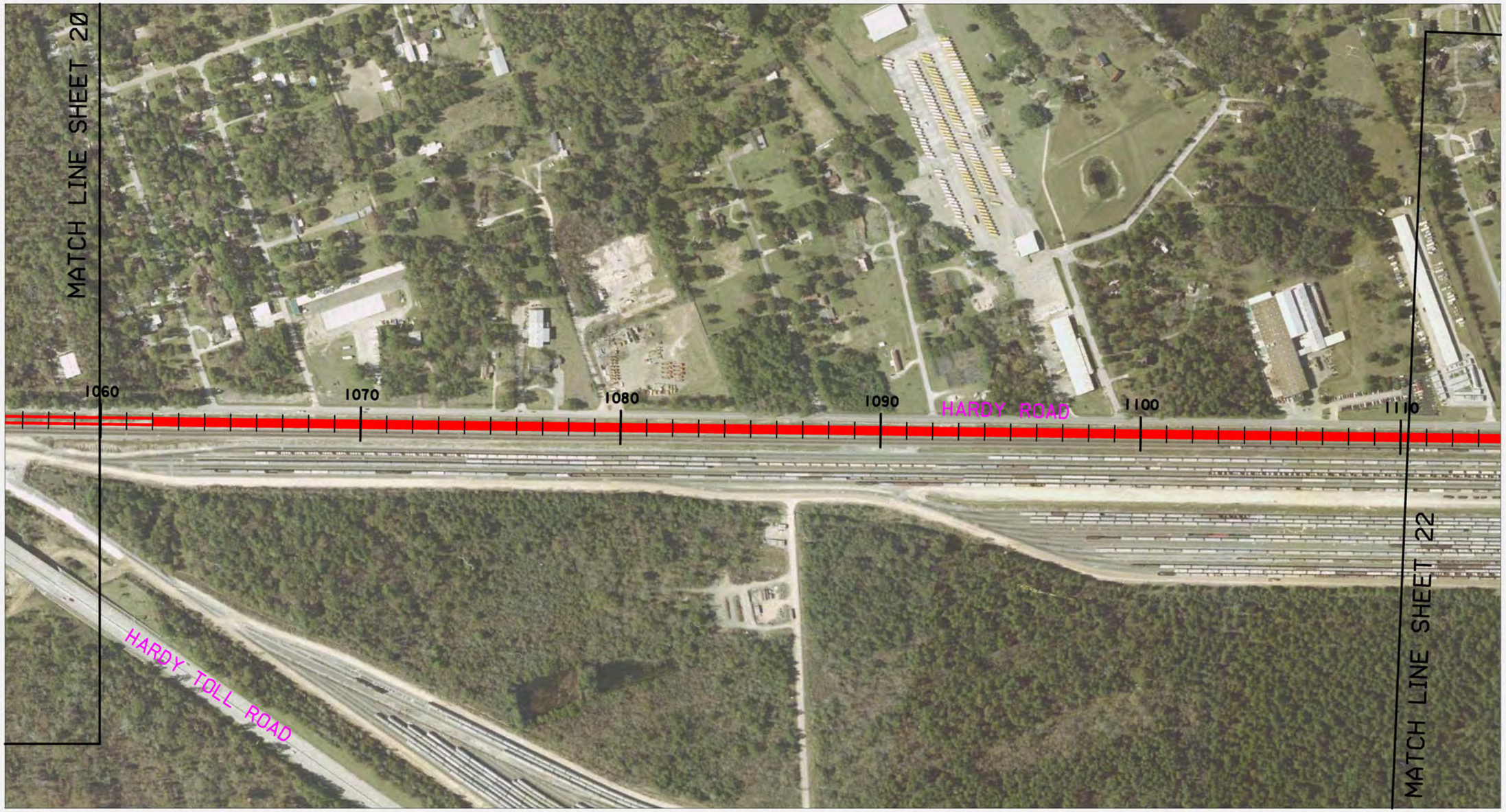
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003
SHEET NO. ALT2 - 20



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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

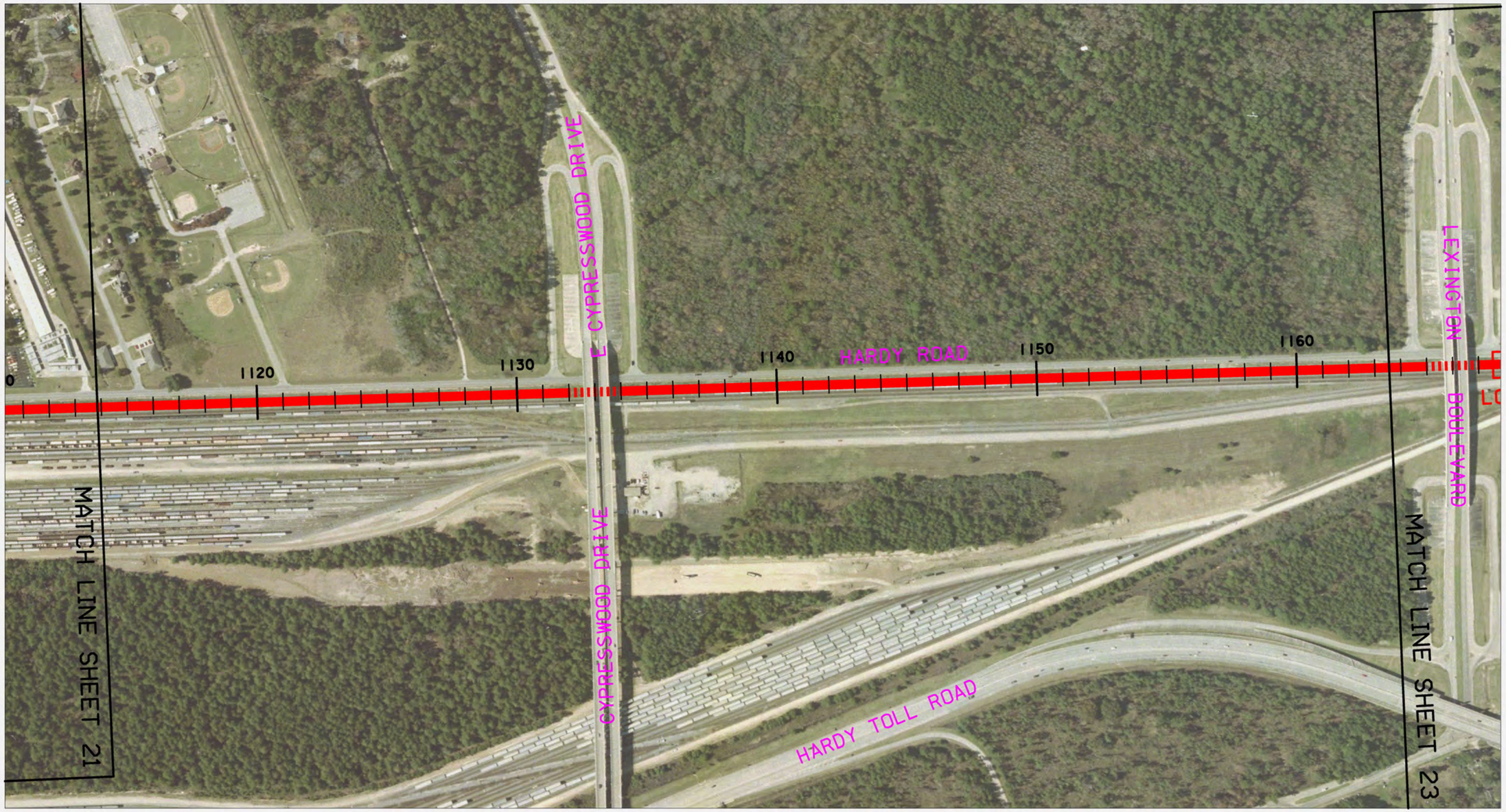
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 21



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Prepared By:

STV Incorporated

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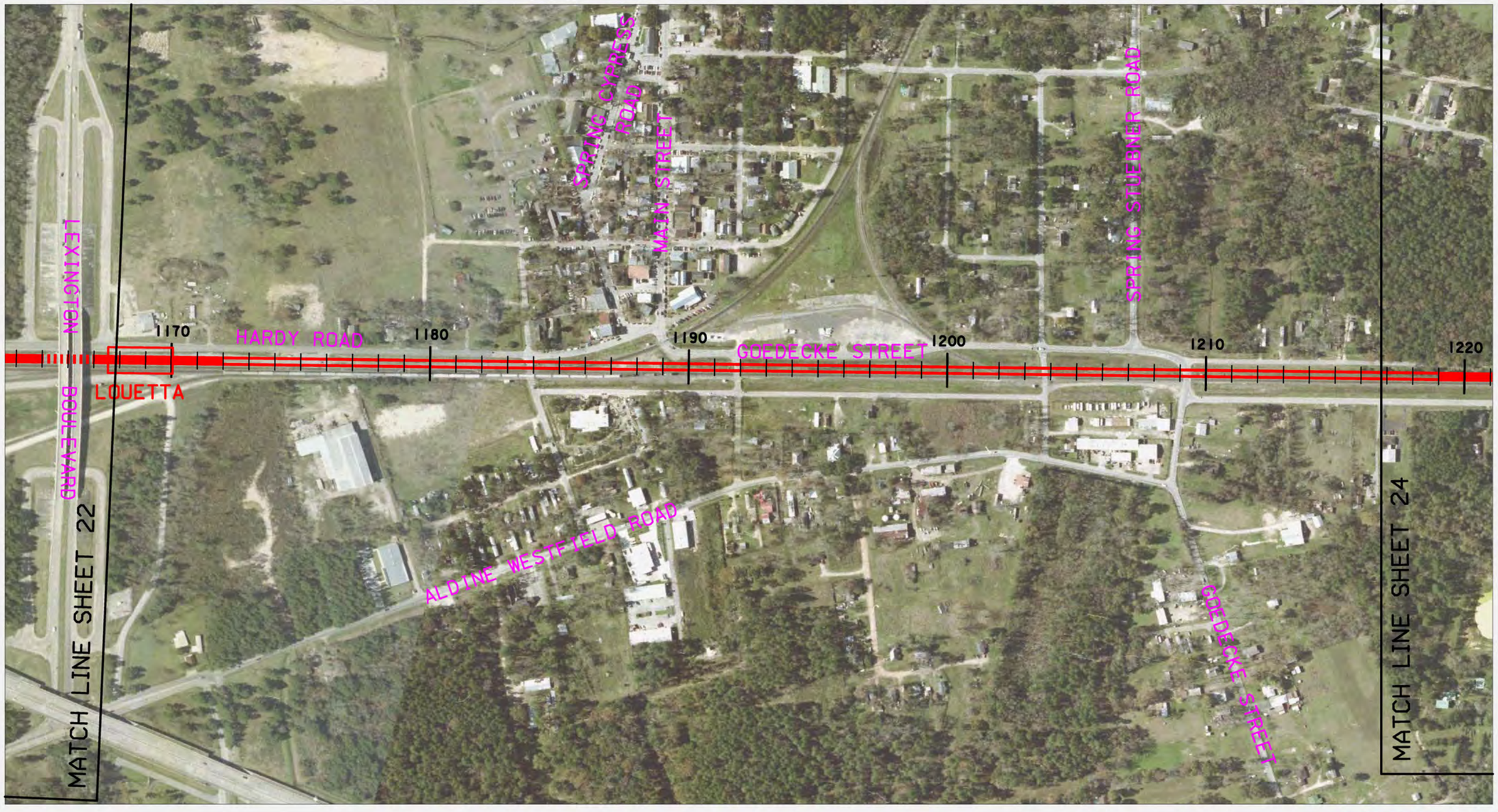
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 22



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Prepared By:

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North Hardy planning studies

ALTERNATE NO. 2
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DATE 10 FEB. 2003

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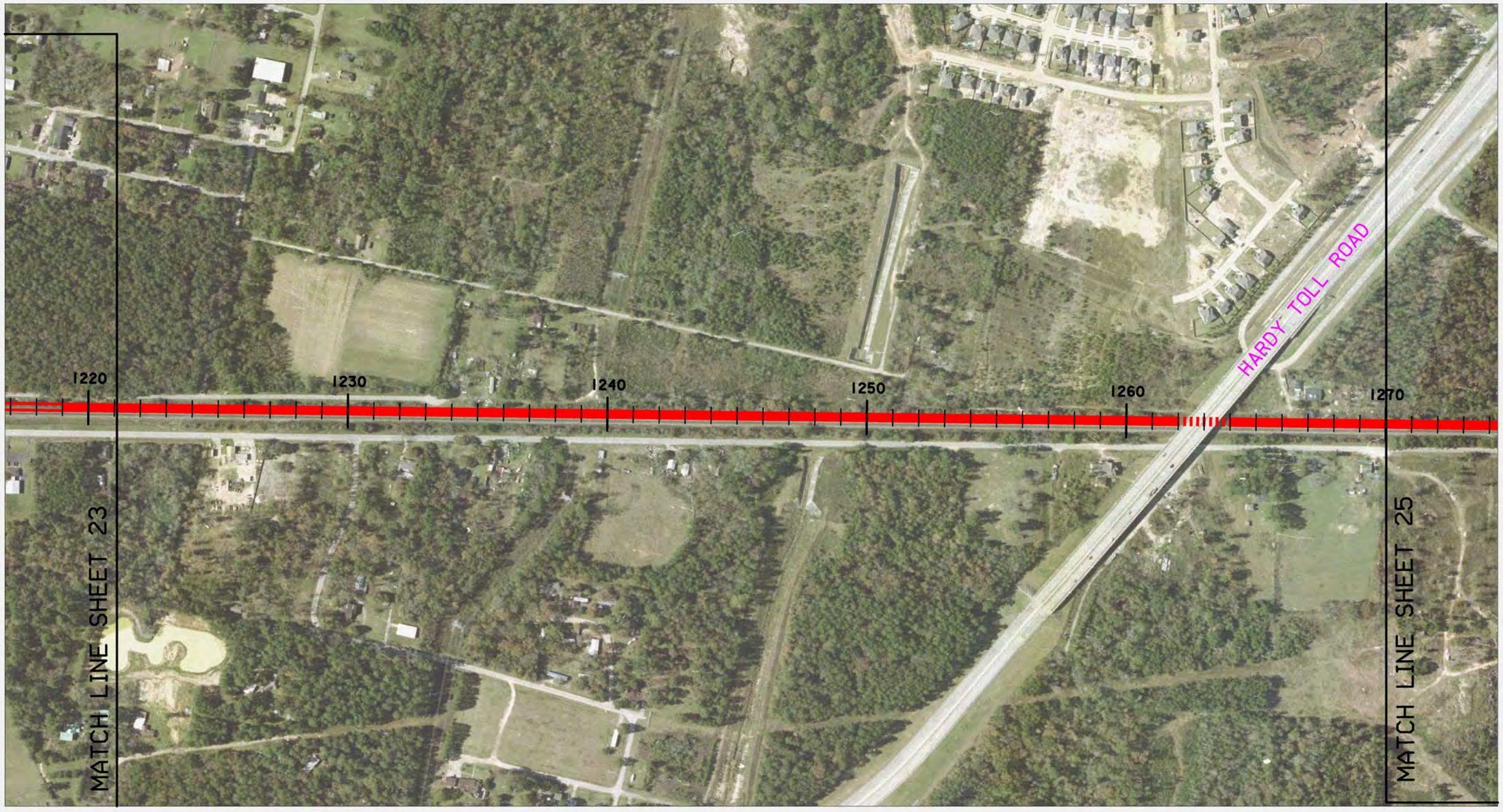

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LEGEND
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AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 24

DRAFT

LEGEND

AT GRADE — STATION LOCATION

AERIAL

AT GRADE BELOW STRUCTURE

GRAPHIC SCALE

400' 0 400'

Prepared By:

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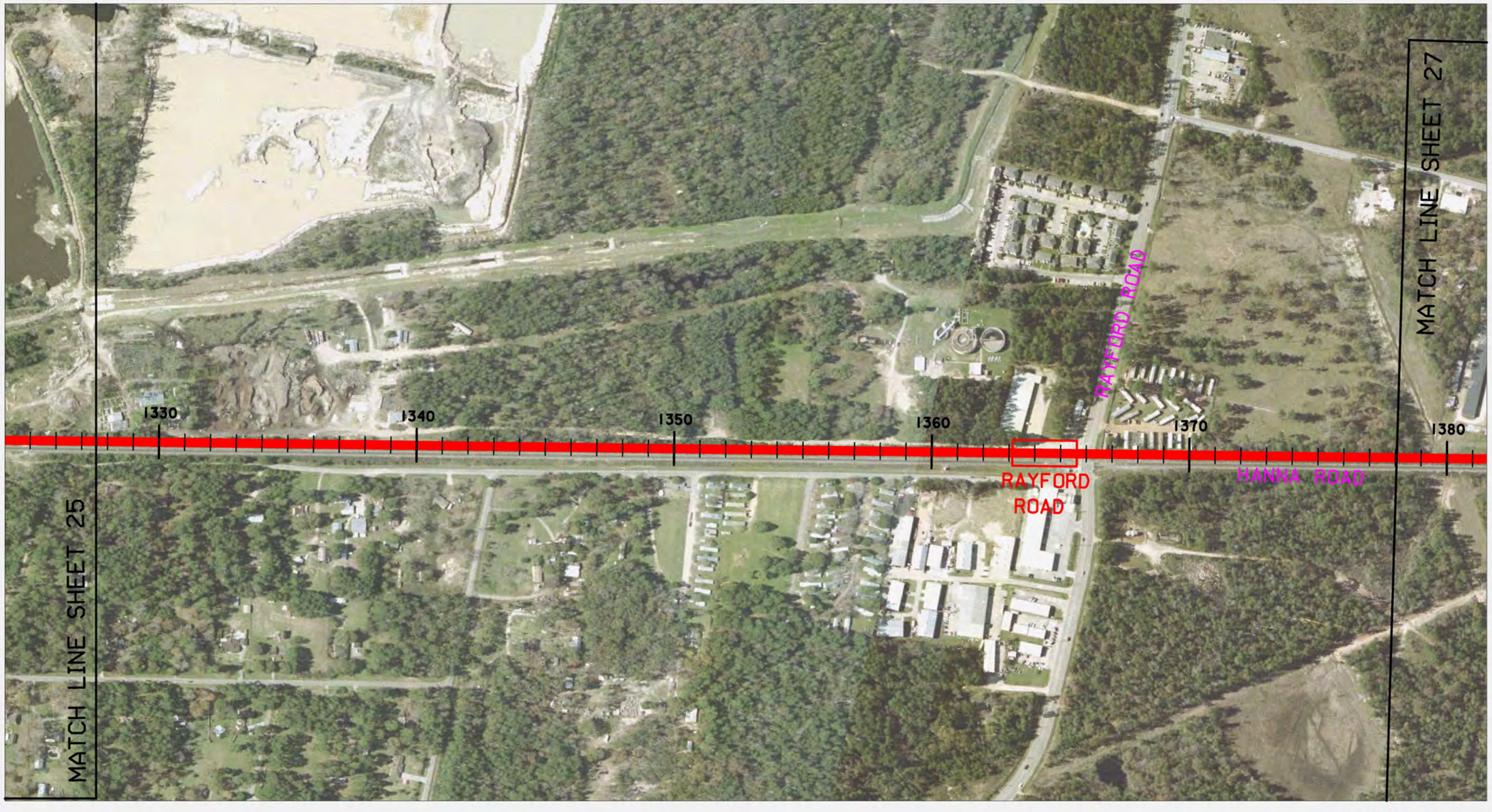
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 25



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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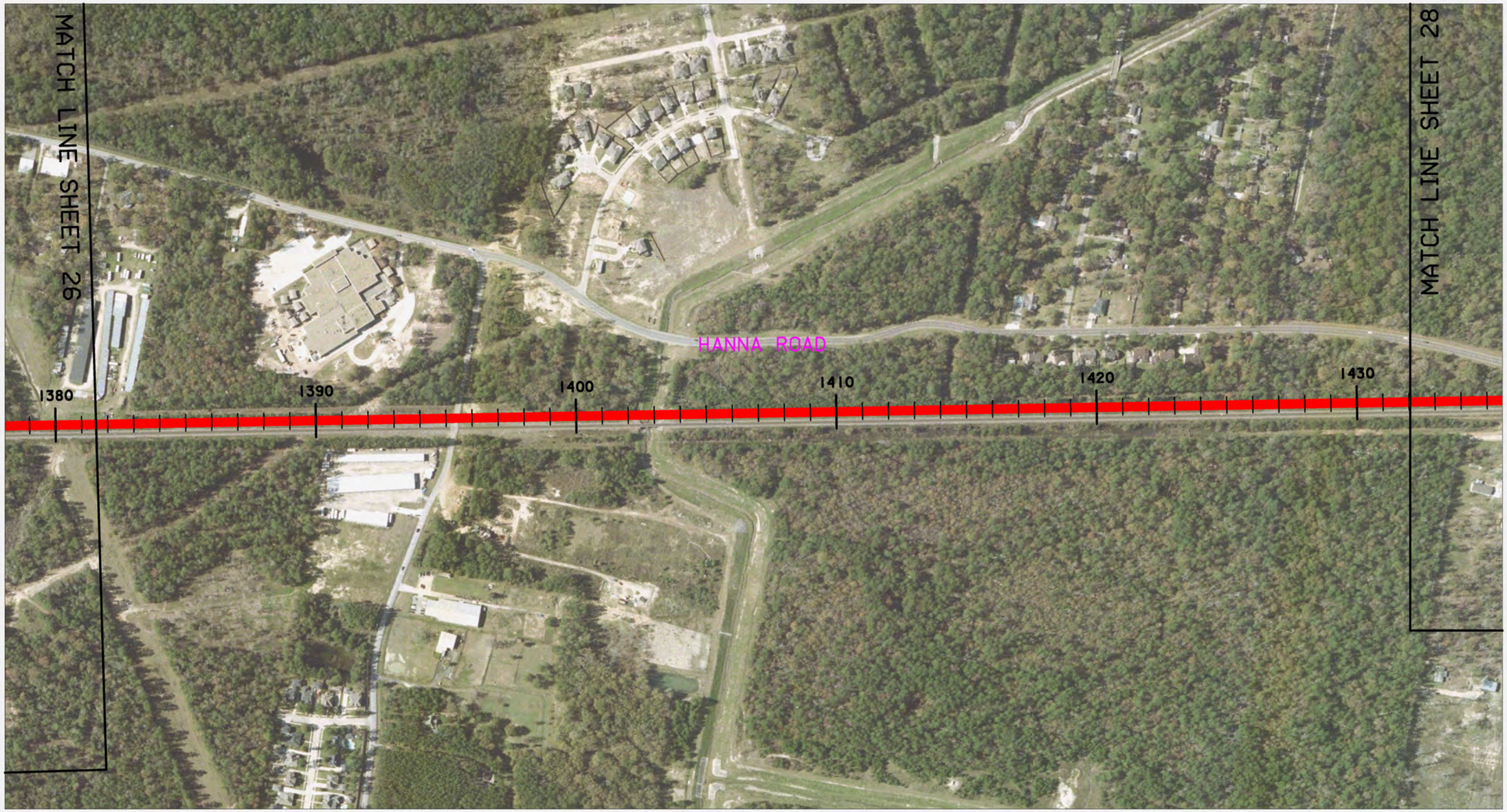
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 26



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LEGEND

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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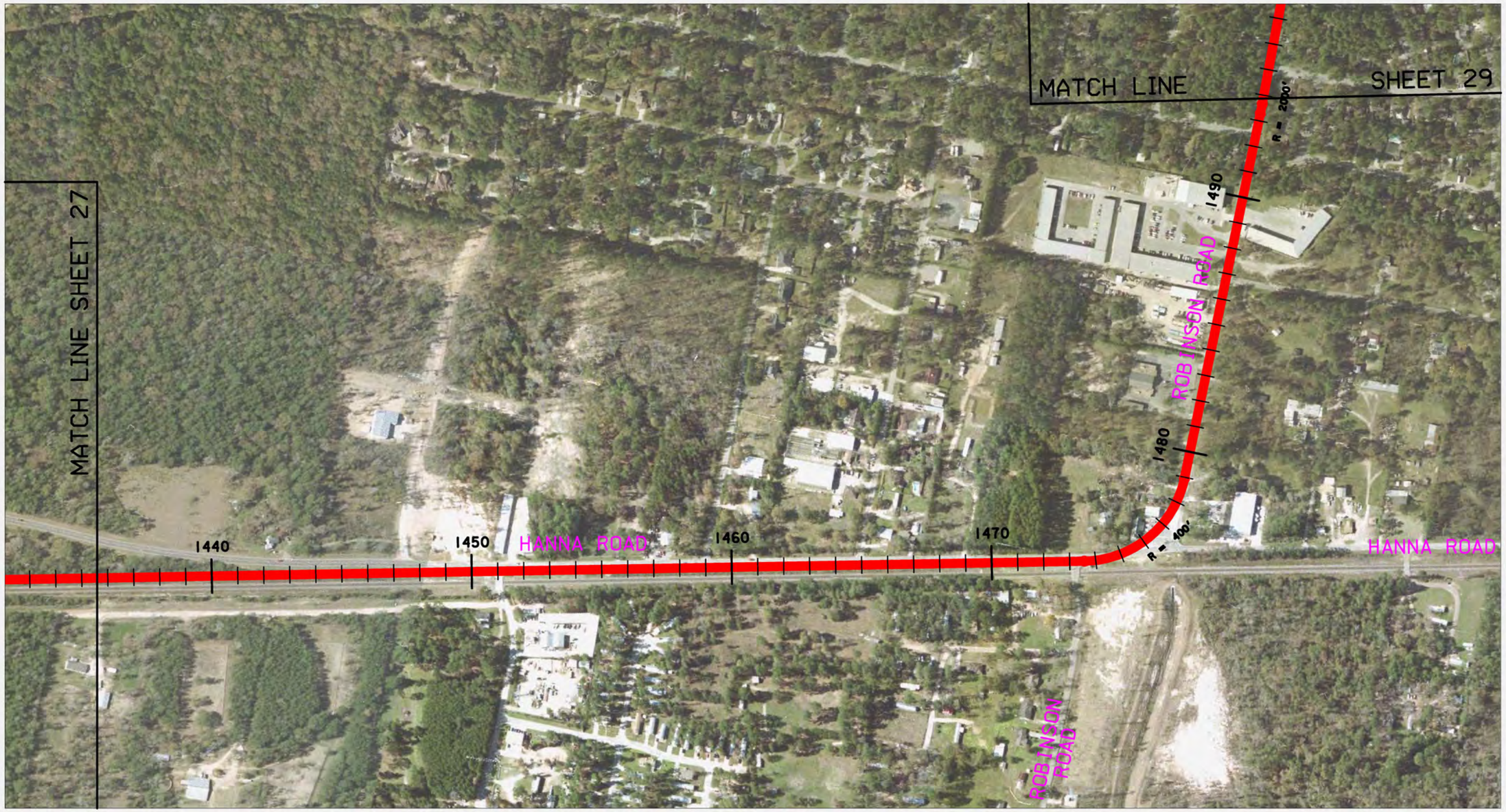
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 27



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

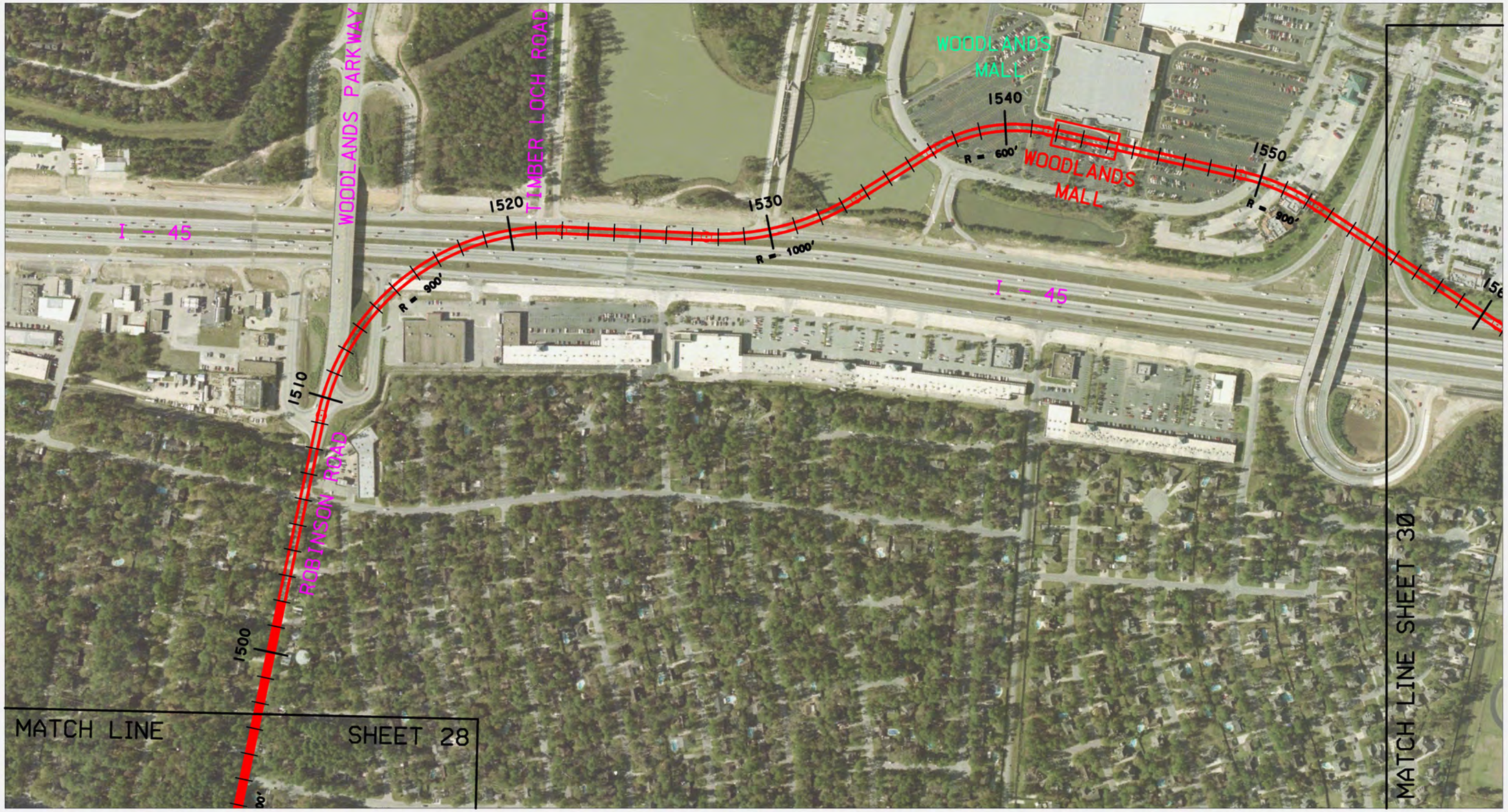
Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 28



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

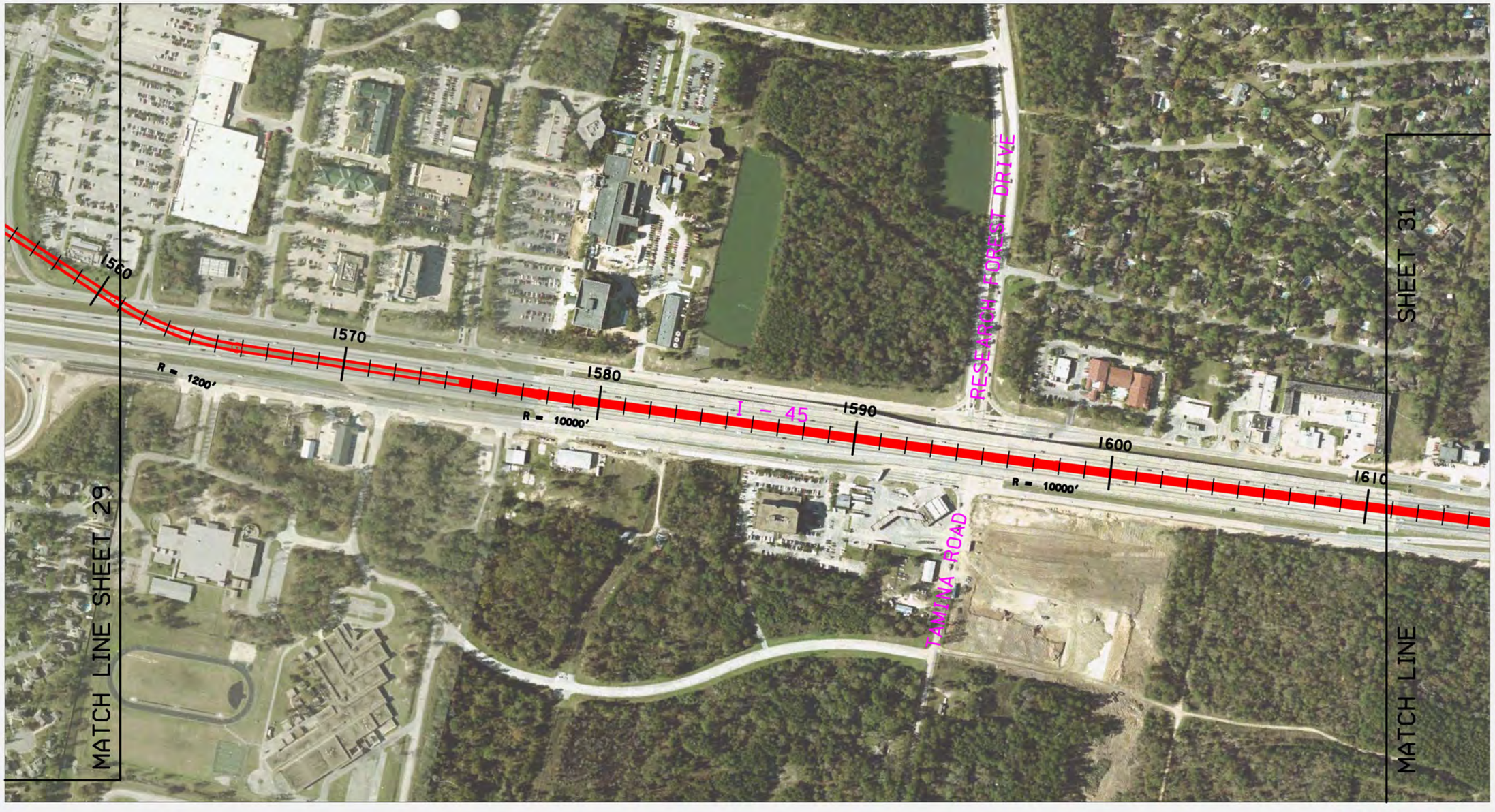
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 29



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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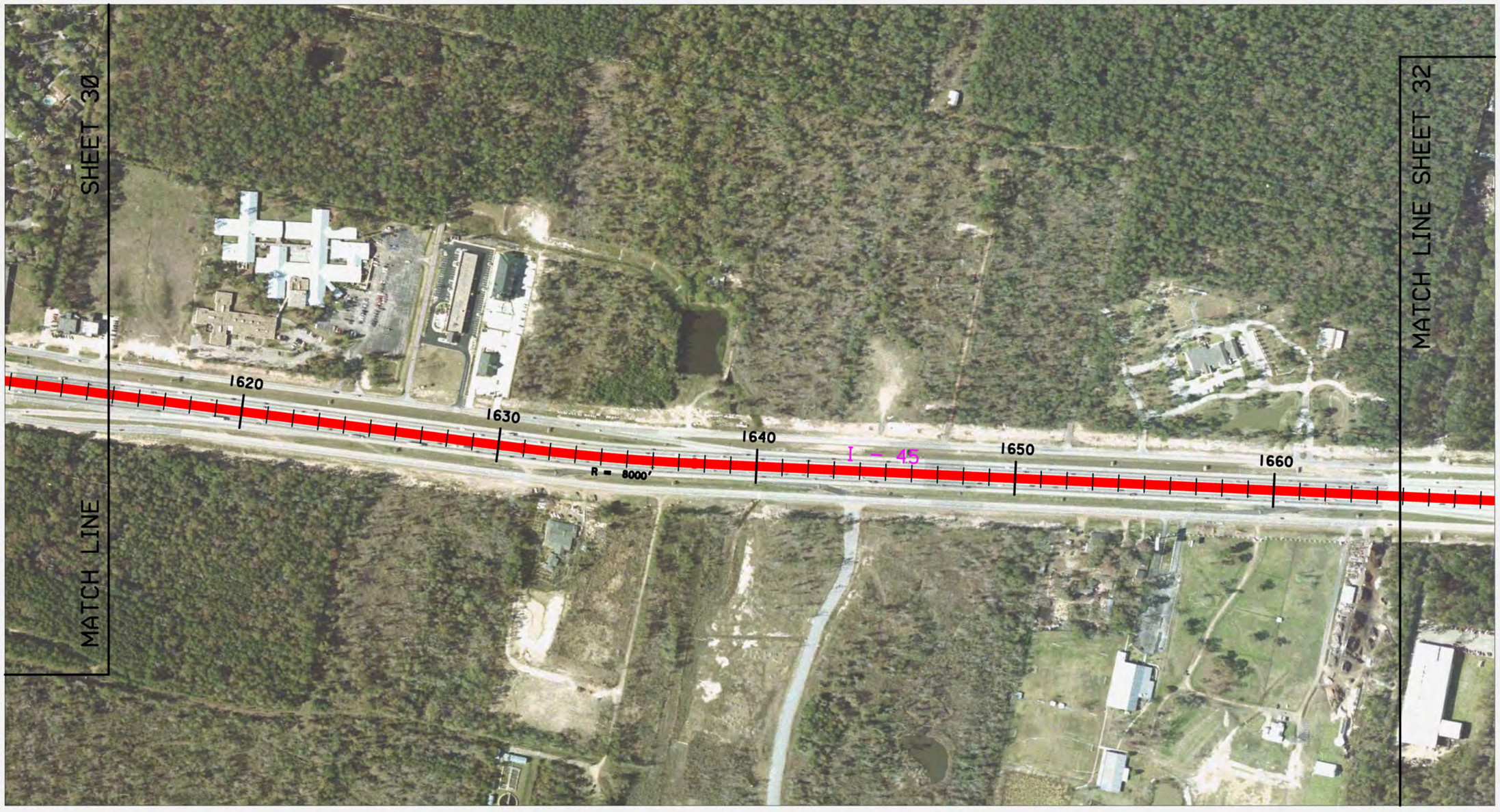
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 30



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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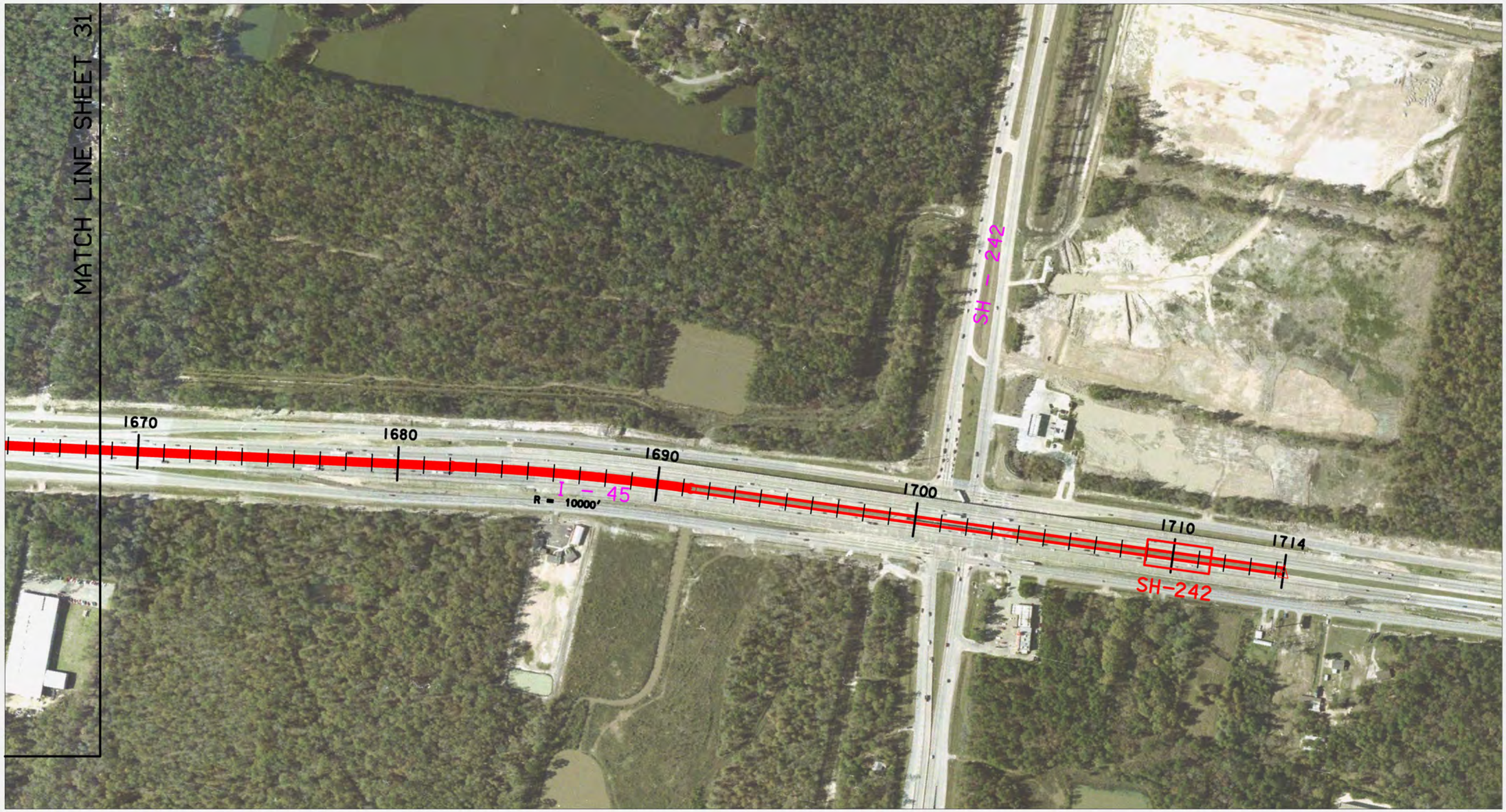
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 31



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 32

To The Woodlands

730

720

HARDY ROAD

SHEET 14

4720

R = 500'

HARDY TOLL ROAD

4730

R = 900'

4740

R = 900'

4750

4760

R =

To Airport

MATCH LINE SHEET 34

4710

710

R = 800'

R = 300'

R = 400'

R = 500'

GREENS ROAD

MATCH LINE

OLD GREENS ROAD

GREENS ROAD

6700

4700

To Greenspoint

To Downtown

SEE SHEET ALT2 - 14 FOR FUNCTIONAL TRACK DIAGRAM OF JUNCTION

DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 33

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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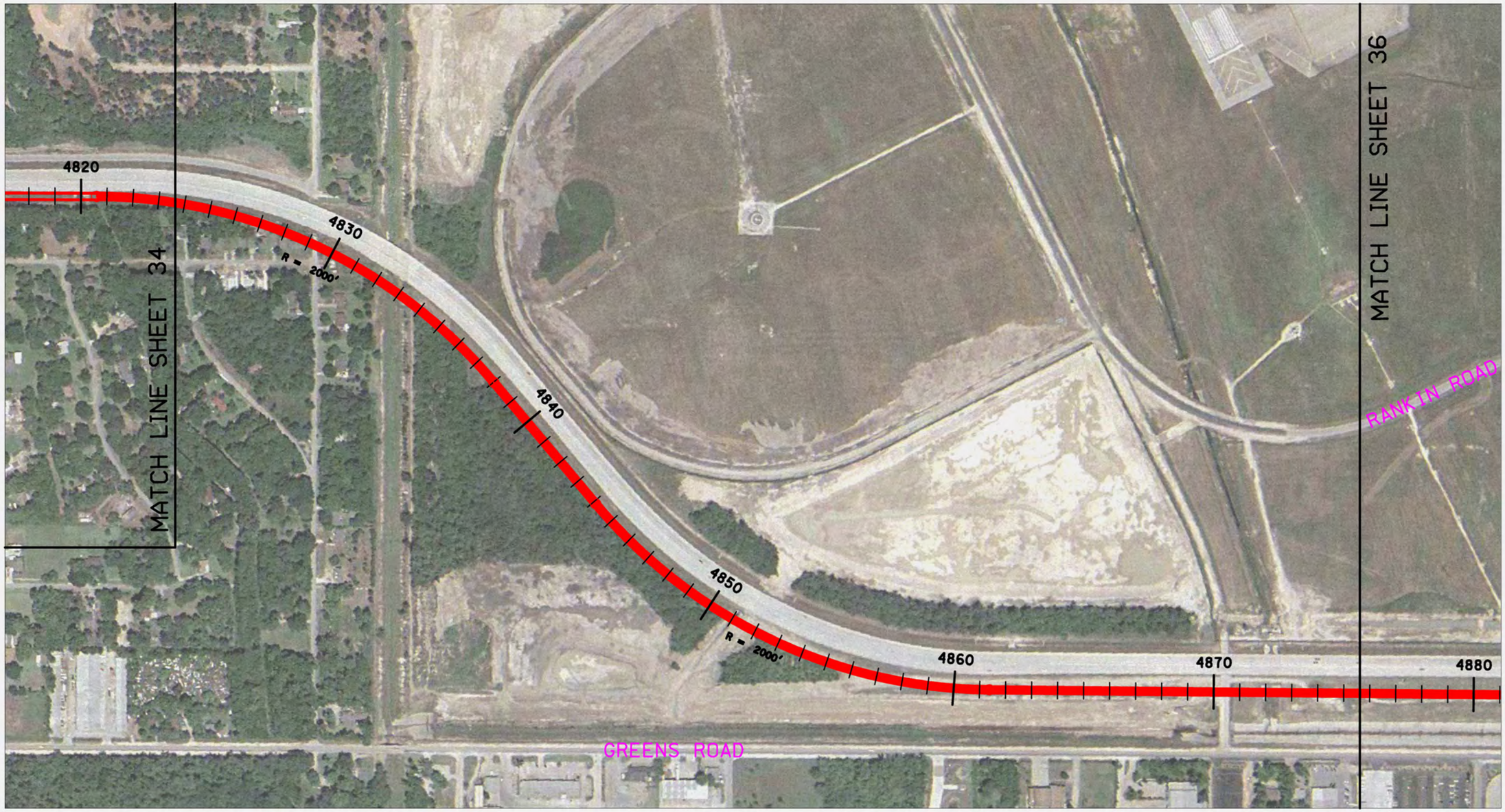
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 34



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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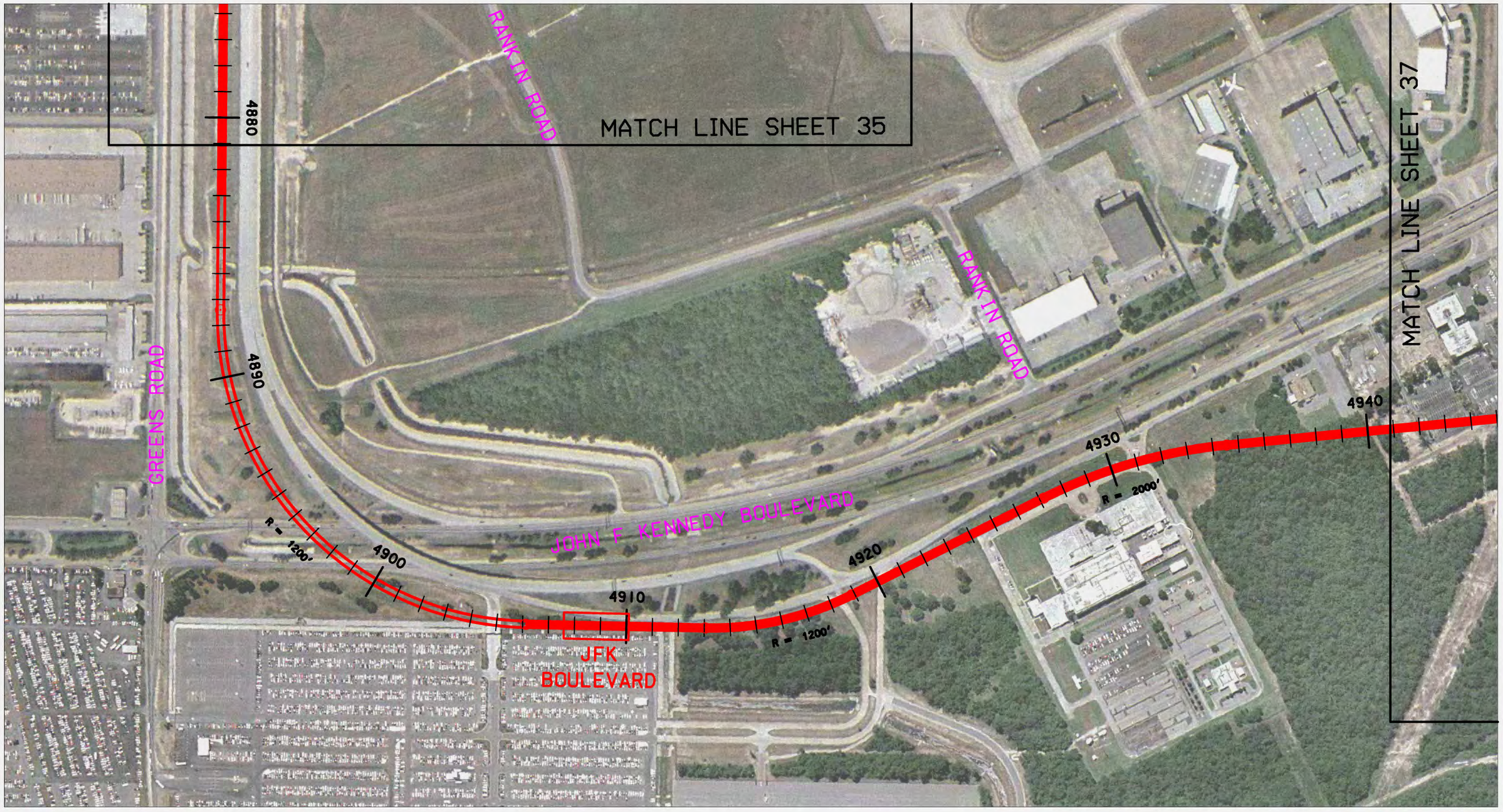
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 35



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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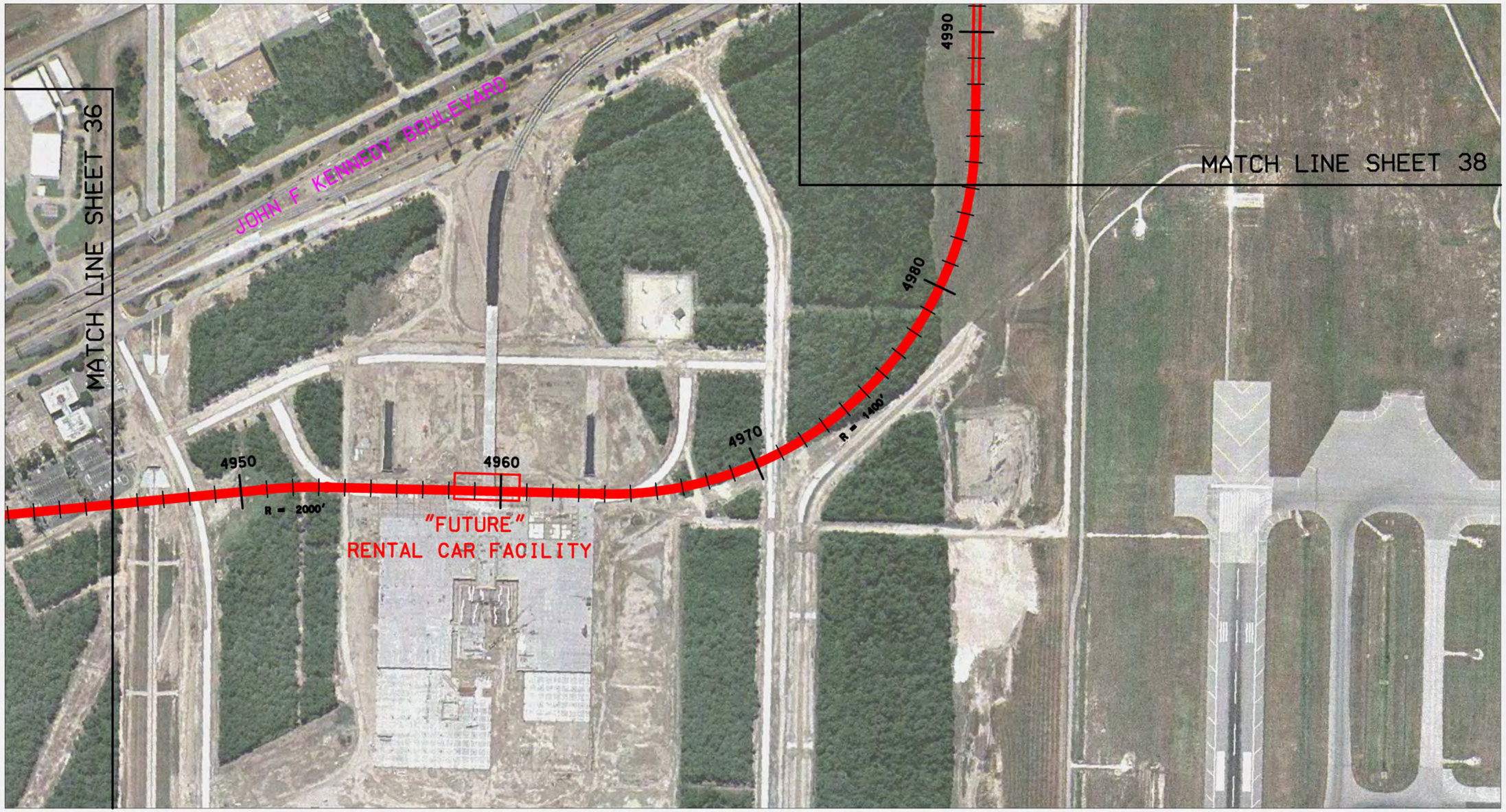
North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 36



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

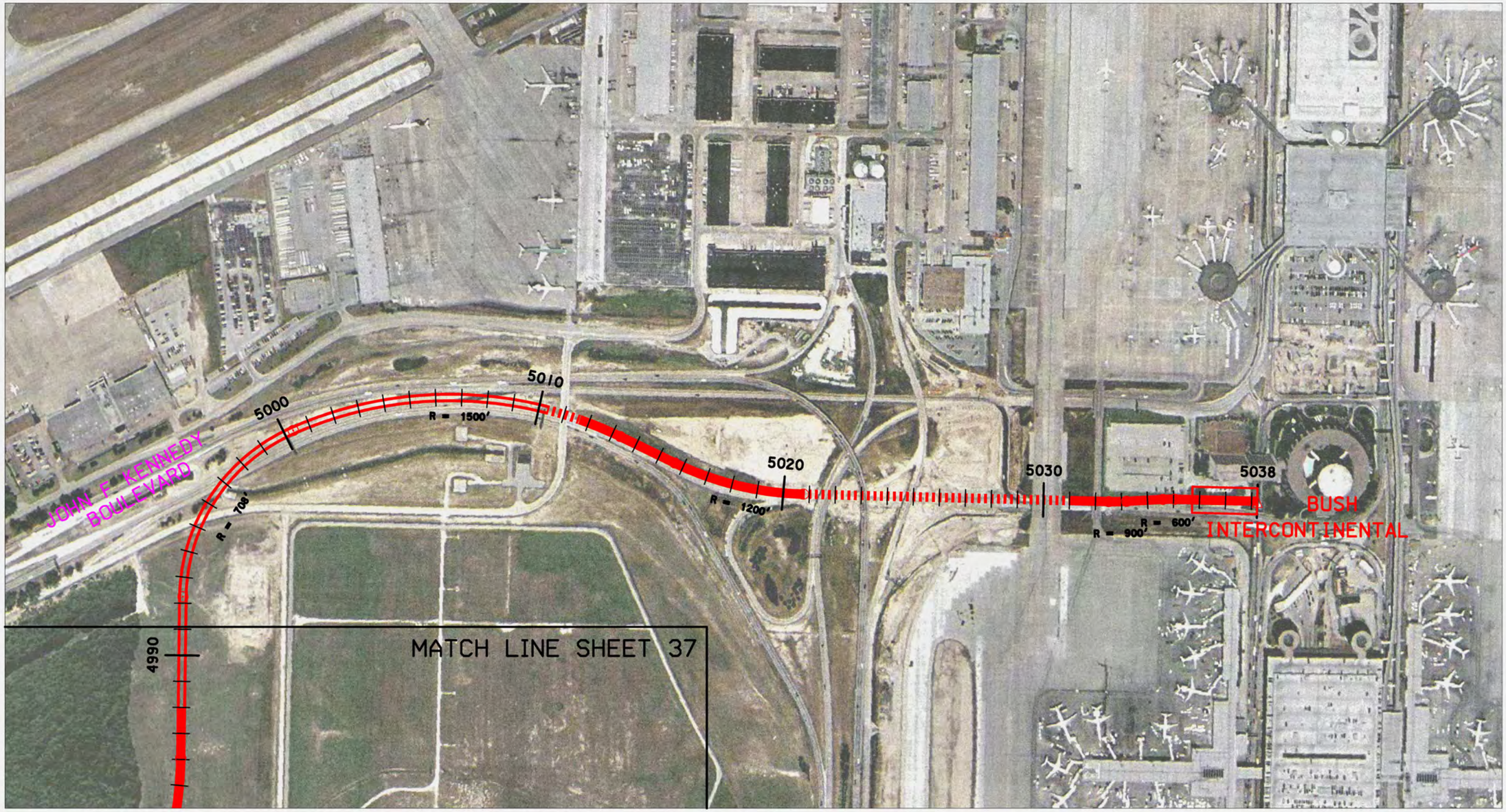
Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 37



DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
STV Incorporated
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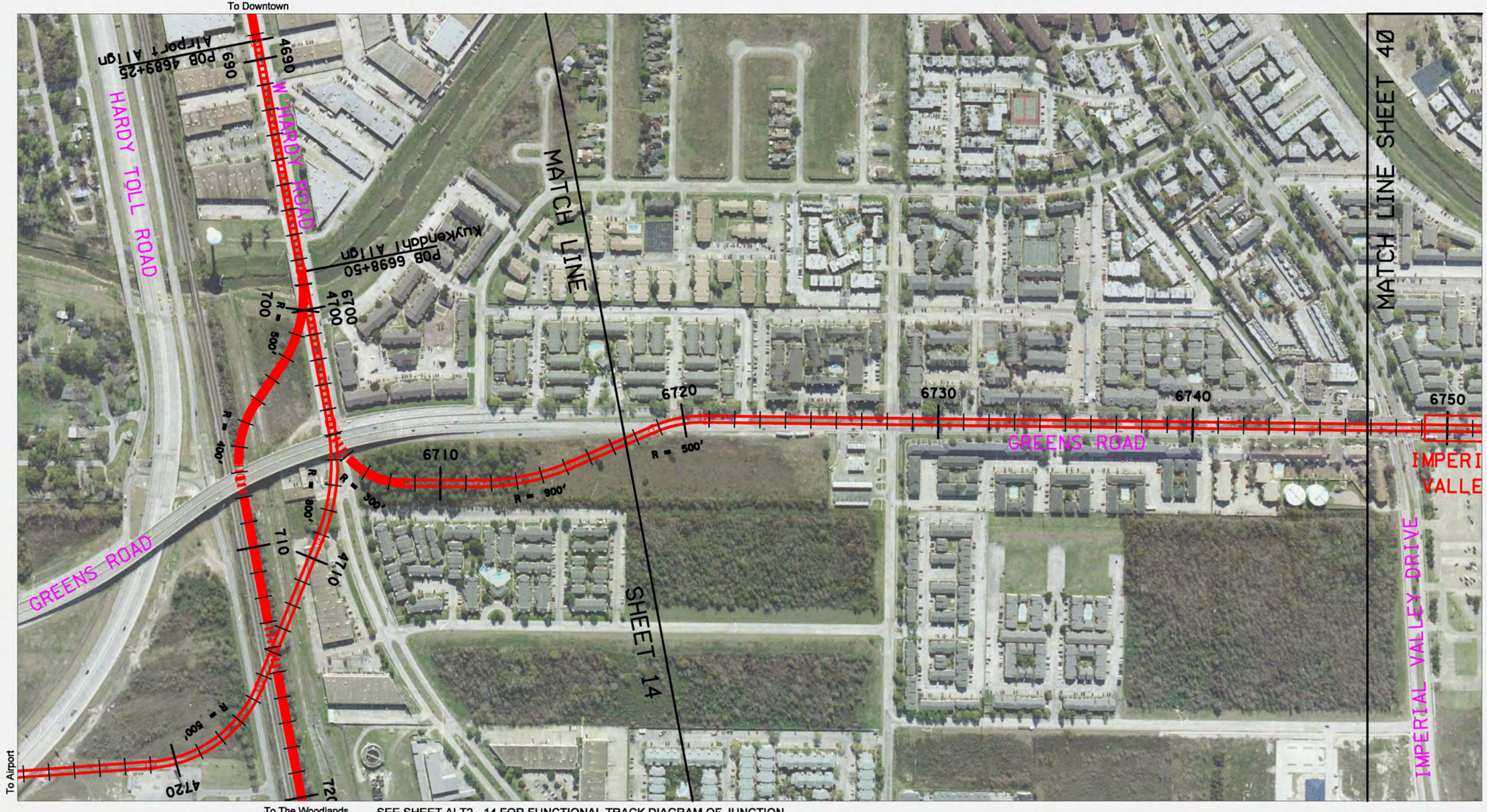
North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 38



SEE SHEET ALT2 - 14 FOR FUNCTIONAL TRACK DIAGRAM OF JUNCTION

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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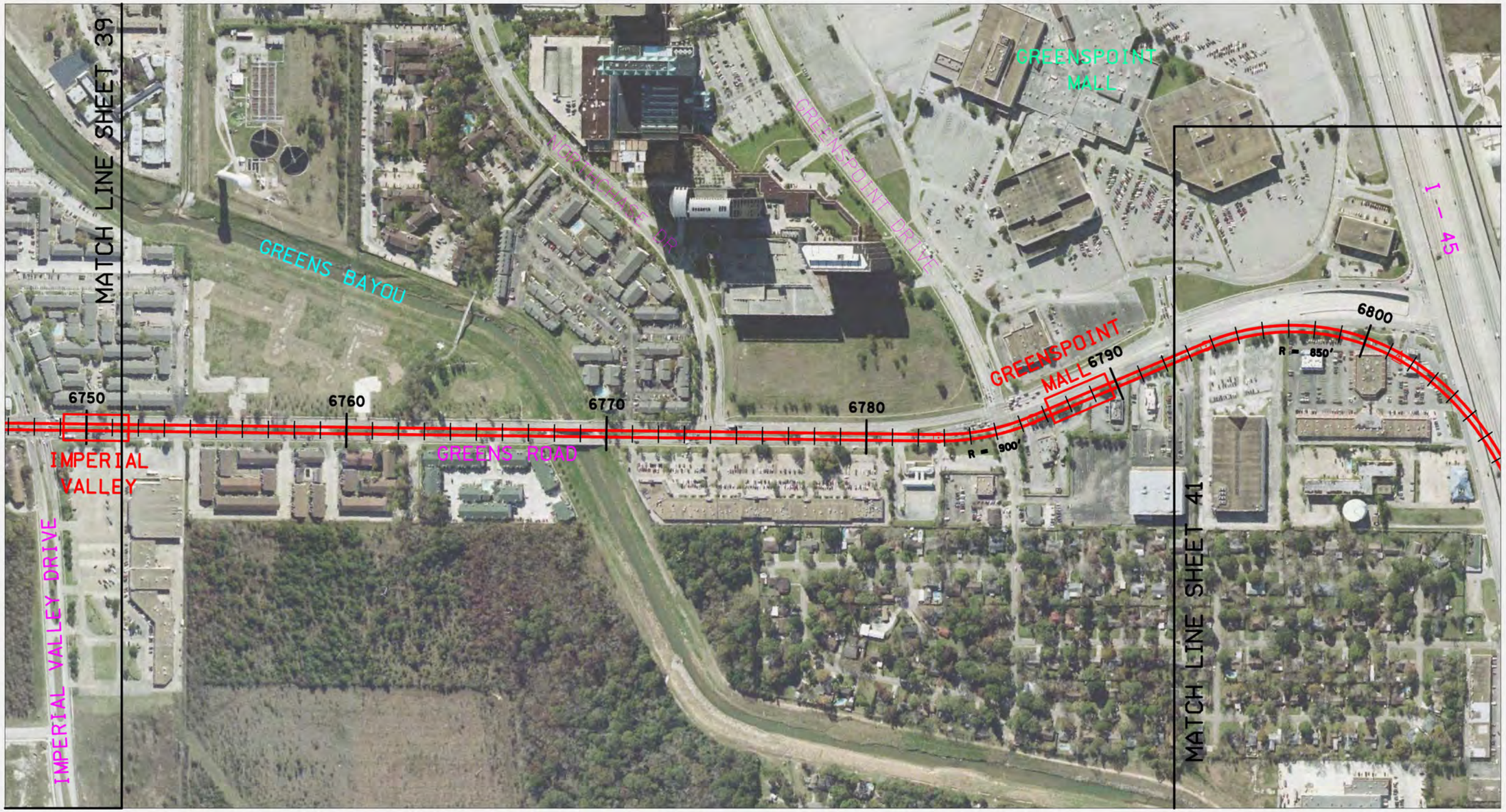
Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 39



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 40

DRAFT

LEGEND
AT GRADE
AERIAL
AT GRADE BELOW STRUCTURE
STATION LOCATION

GRAPHIC SCALE
400' 0 400'

Prepared By:
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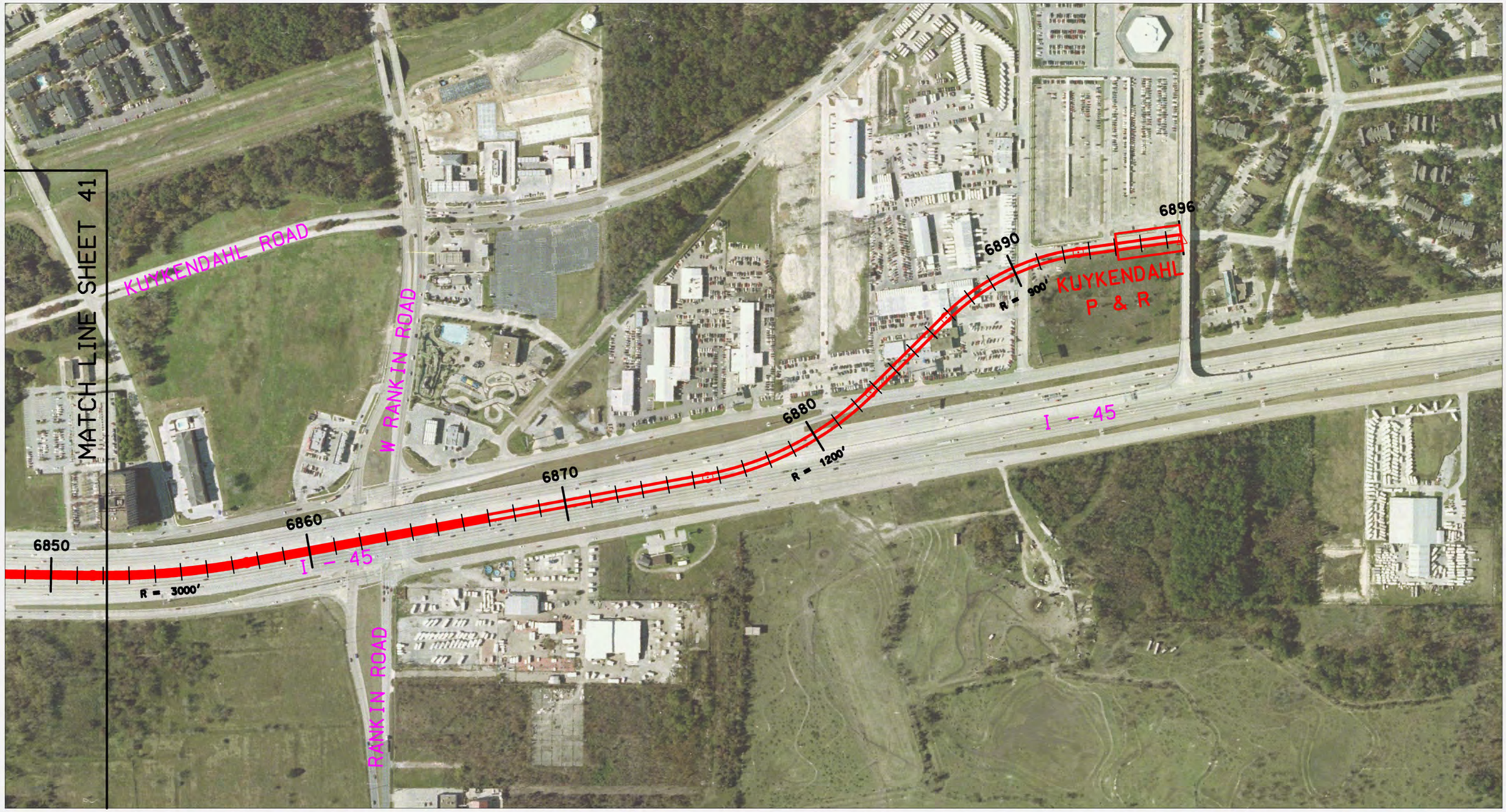
Engineers / Architects / Planners / Construction Managers

North Hardy
planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 41



DRAFT

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

ALTERNATE NO. 2
RED ALIGNMENT

DATE 10 FEB. 2003

SHEET NO. ALT2 - 42

APPENDIX F

Blue, Green, and Red Bus Routes

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 1 (blue)
Route Number:	1
Route Name:	Hospital Crosstown
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 15 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the VA Hospital, via Sheehan to Ringness, left on Holcombe, right on S. Braeswood, left on N. MacGregor, left on Ben Taub Loop Drive, left on N. MacGregor, right on S. Main, right into Wheeler LRT, exit to Main, right on Wheeler, left on San Jacinto **to Fulton**, right on Brooks, left on Chapman, right on Quittman, left on Elysian to Hardy Rd., right on Kelley, left on Hirsch, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right into LBJ Hospital, exit right onto Kelley to North Loop Freeway service road, via North Loop Freeway service road to second on-ramp, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit McCarty, left on Gellhorn, right on Woodforest, right on Dividend to Currency.

Southbound – From Dividend & Currency, via Currency, right on North Loop Freeway service road, via North Loop Freeway service road to on-ramp past McCarty, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit Kirkpatrick, via North Loop Freeway service road to Kelley, left into LBJ Hospital, exit left onto Kelley, right into Kashmere TC, exit right onto Los Angeles, right on Kelley, left on Hardy, right on Quittman, left on Chapman, right on Brooks, **left on Fulton to San Jacinto,** right on Fannin, right into Wheeler LRT, exit to Main, right on Wheeler, right on Fannin, right on Southmore, left on S. Main, left on N. MacGregor, right on Ben Taub Loop Drive, right on N. MacGregor, right on S. Braeswood, left on Holcombe, right on Ringness, right on Cate Terrace, left on Le Captin, right on Mixon, left on Shields to VA Hospital.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 1 (blue)
Route Number:	5
Route Name:	Kashmere
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 26 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Bagby & Webster, via eastbound Webster, left on San Jacinto **to Fulton**, right on Hogan to Lorraine, left on Eastex Freeway service road, right on Collingsworth, left on Wipprecht, right on Rand, left on Lockwood, left on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, left on Lockwood, right on Laura Koppe, right on Homestead, left on West Knoll, left on Elbert, left on Laura Koppe to Elbert.

Southbound – From Elbert & Laura Koppe, via Laura Koppe to Darien, left on Darien, right on Touchstone, right on Homestead, left on Laura Koppe, left on Lockwood, right on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right on Lockwood, right on Rand, left on Wipprecht, right on Collingsworth, left on Eastex Freeway service road, right on Lorraine to Hogan, left on **Fulton to San Jacinto,** right on Fannin, right on Gray, left on Bagby to Webster.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	8
Route Name:	N. Main
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	60 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No route changes only headways]**

Northbound – From the 8 S. Main route at San Jacinto & McKinney, north on San Jacinto, left on Commerce, right on S. Main, right into Heights TC, exit right onto N. Main, left on Crosstimbers, right on Yale, right on Tidwell, left on Nordling, left on Parker, right on Northline, left on Canino, right on Berwyn, left on Smart, right on Sweetwater, left on West Road, right on Veterans Memorial, left on Frick Rd., right on TC Jester, right into Veteran's Memorial Cemetery.

Southbound – From Veteran's Memorial Cemetery, exit left onto Veterans Memorial, right on TC Jester, left on Frick, right on Veterans Memorial, left on West Road, right on Sweetwater, left on Smart, right on Berwyn, left on Canino, right on Northline, left on Parker, right on Nordling, right on Tidwell, left on Yale, left on Crosstimbers, right on N. Main, left into Heights TC, exit left onto N. Main, left on Franklin, right on Fannin to McKinney, continue as the 8 S. Main route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	15
Route Name:	Fulton
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 15 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From N. Main and Quitman, right on Quitman, left on Fulton, right on Bennington, left on Appleton, right on Plymouth, left on Appleton, left on Berry, right on Bauman to Tidwell.

Southbound – From Bauman & Tidwell, via Tidwell to Fulton, left on Fulton, right into Northline Transit Center, exit via left on Fulton, left on Crosstimbers, right on Bauman, left on Plymouth, right on Roswell, right on Bennington, left on Fulton, right on Quitman to N. Main.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	22
Route Name:	Bennington
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	30 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Eastbound – From Pitner & Sowden, via Sowden to Bingle, left on Bingle, right on W. 43rd, left on Crosstimbers, **left on Fulton, left into Northline TC**, right on Fulton, left on Bennington, right on Lockwood, left on Shreveport, right on Bennington, left on Sandra, right on Denmark, right on Hoffman, right on Lynnfield to Sandra.

Westbound – From Lynnfield & Sandra, via Sandra to to Bennington, right on Bennington, left on Shreveport, right on Lockwood, left on Bennington, **right on Fulton, left into Northline TC, right on Fulton, right** on Crosstimbers to W. 43rd, left on Hollister, left on Pitner to Sowden.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	25
Route Name:	Northline
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	40 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, northwest on N. Main**, right on Airline, right on Crosstimbers, left on North Freeway service road, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main **to Quitman**.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	25
Route Name:	Northline (via Enid)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	40 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, nowrthwest on N. Main,** right Enid, left on Linte, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main **to Quitman**.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	44
Route Name:	Acres Homes (via Stallings)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	40 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **the Northline Transit Center go south on Fulton, west on** Crosstimbers, north on N. Shepherd, northwest on W. Montgomery, south into Acres Homes TC, exit northwest onto W. Montgomery, west on Stallings, north on Bonazzi, east on McCrarey, northwest on W. Montgomery, northwest on SH249, north on Old Bammel-N. Houston, west on Seton Lake, south into Seton Lake P&R, exit west on Seton Lake, northwest on SH249, northeast on Willowchase, southeast on Breton Ridge to FM1960.

Southbound – From Breton Ridge & FM1960, southwest on FM1960, southeast on SH249, east on Seton Lake, south into Seton Lake P&R, exit east on Seton Lake, south on Old Bammel-N. Houston, southeast on SH249, southeast on W. Montgomery, west on McCrarey, south on Bonazzi, east on Stallings, southeast on W. Montgomery Rd., south into Acres Homes TC, exit southeast on W. Montgomery Rd., south on N. Shepherd, east on Crosstimbers, **north on Fulton, west into Northline Transit Center.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	44
Route Name:	Acres Homes
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **the Northline Transit Center, south on Fulton,** west on Crosstimbers, north on N. Shepherd, northwest on W. Montgomery, south into Acres Homes TC, exit northwest onto W. Montgomery, northwest on SH249, north on Old Bammel-N. Houston, west on Seton Lake, south into Seton Lake P&R, exit west on Seton Lake, northwest on SH249, northeast on Willowchase, southeast on Breton Ridge to FM1960.

Southbound – From Breton Ridge & FM1960, southwest on FM1960, southeast on SH249, east on Seton Lake, south into Seton Lake P&R, exit east on Seton Lake, south on Old Bammel-N. Houston, southeast on SH249, southeast on W. Montgomery, south into Acres Homes TC, exit southeast on W. Montgomery Rd., south on N. Shepherd, east on Crosstimbers, **north on Fulton, west into Northline Transit Center.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	50
Route Name:	Heights (via Freeway)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	60 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Westbound – From **Northline Transit Center, south on Fulton,** west on Crosstimbers to W. 43rd, begin making stops at N. Shepherd, south on Rosslyn, west on W. 34th, south on W. TC Jester, west on Sherwood Lane to Northwest Freeway service road.

Eastbound – Sherwood Lane & Northwest Freeway service road, northwest via Northwest Freeway service road, east on W. 34th, north on Rosslyn, east on W. 43rd, limited stop service, **east on Crosstimbers, north on Fulton, west into Northline Transit Center.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	52
Route Name:	Hirsch (via Freeway)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	Peak / Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the 52 Scott route at San Jacinto & Lamar, via northbound San Jacinto to Rothwell, east on Rothwell to East Freeway service road, enter I-10, exit to US59 north, exit Cavalcade, east on Cavalcade, north on Hirsch, east into Kashmere TC, exit north onto Hirsch, east on Weaver to Ley Road, north on Mesa, west on Tidwell, south into Mesa TC, exit east onto Tidwell, north on Mesa, east on Forest Hollow, north around loop to stop at sidewalk.

Southbound – From Forest Hollow & Mesa, via southbound Mesa to Tidwell, west on Tidwell, south into Mesa TC, exit east onto Tidwell, south on Mesa, west on Ley Road to Weaver, south on Hirsch, east into Kashmere TC, exit south onto Hirsch, west on Cavalcade, south on Eastex Freeway service road, enter freeway, exit to I-10 west, exit San Jacinto, via East Freeway service road to San Jacinto, south on San Jacinto to Fannin, south on Fannin to Lamar, continue as the 52 Scott route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	52
Route Name:	Hirsch
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	Peak 20/ Off Peak 35
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the 52 Scott route at San Jacinto & Lamar, via northbound **San Jacinto to Fulton**, east on Quittman, north on Eastex Freeway service road, east on Cavalcade, north on Hirsch, east into Kashmere TC, exit north onto Hirsch, east on Weaver to Ley Road, north on Mesa, west on Tidwell, south into Mesa TC, exit east onto Tidwell, north on Mesa, east on Forest Hollow, north around loop to stop at sidewalk.

Southbound – From Forest Hollow & Mesa, via southbound Mesa to Tidwell, west on Tidwell, south into Mesa TC, exit east onto Tidwell, south on Mesa, west on Ley Road to Weaver, south on Hirsch, east into Kashmere TC, exit south onto Hirsch, west on Cavalcade, south on Eastex Freeway service road, west on Quitman, south on **Fulton to San Jacinto**, south on Fannin to Lamar, continue as the 52 Scott route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	56
Route Name:	Airline
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 15 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **the Northline Transit Center, north on Fulton, west on Lyerly,** north on Airline, east on Aldine-Bender, north on Imperial Valley, west on Greens Rd, north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl Park and Ride lot, exit northwest onto Kuykendahl, east on FM 1960, north on Red Oaks, east on Peakwood, south on Cali, east on FM 1960, north on Cypress Station Drive, east on Cypress Station, south to North Freeway service road & Hollow Tree.

Southbound – From North Freeway service road & Hollow Tree, west on Hollow Tree, north on Westfield, west on Cypress Station, south on Cypress Station Drive, west on FM 1960, north on Cali, west on Peakwood, south on Red Oaks, west on FM 1960, southeast on Kuykendahl, east into Kuykedahl Park and Ride lot, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd, south on Imperial Valley, west on Aldine Bender, south on Airline**, east on Lyerly, south on Fulton, west into Northline Transit Center.**

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	78
Route Name:	Irvington 9800 (via Berry Downtown Turnback)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	78
Route Name:	Irvington (Downtown Turnback)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 1 (blue)
Route Number:	78
Route Name:	Irvington
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	30 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No change in route only headways]**

Northbound – From the 78 Alabama route at Travis & Lamar, via northbound Travis to Commerce, east on Commerce, north on Main, east on Hogan, north on Fulton, north on Irvington, west on Turner, north on Bauman, east on Little York to McGallion.

Southbound – From Little York & McGallion, via southbound McGallion to Wellington, west on Wellington, south on Bauman, east on Turner, south on Irvington, south on Fulton, west on Hogan, south on Main, west on Franklin, south on Milam to Lamar, continue as the 78 Alabama route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	86
Route Name:	FM 1960
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	From Louetta P&R to Kuykendahl P&R: 15 Peak / 30 Off Peak From Kuykendahl P&R to Greenspoint: 30 Peak/ 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No change in route only headways.]**

Westbound – From Northpoint & North Freeway service road, via northbound North Freeway service road to Beltway 8 service road, east on Beltway 8 service road, north on Greenspoint, east on Benmar, north on Northchase, west on Greens Rd., north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest on Kuykendahl, north on Ella, east on Airtex, north on Imperial Valley, east on Richey, north on Hardy Rd., east on W. W. Thorne Dr., south on Hurricane Lane, east on W. W. Thorne Dr., north on Aldine-Westfield, west on FM 1960, south into Spring P&R, exit west onto FM 1960, northwest on SH249 service road, U-turn at Louetta, west into Entrance 3 to bus shelter.

Eastbound – From Compaq bus shelter, exit via southbound SH249 service road, U-turn at FM1960, northeast on Willowchase, southeast on Breton Ridge, east on FM 1960, south into Spring P&R, exit north onto FM 1960, south on Aldine-Westfield, west on W. W. Thorne Dr., south on Hurricane Lane, west on W. W. Thorne Dr., south on Hardy Rd., west on Richey, south on Imperial Valley, west on Airtex, south on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd., south on Greenspoint Drive, east on Beltway 8 service road, south on Northchase, west on Northpoint to North Freeway service road.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	86
Route Name:	FM 1960
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	From Louetta P&R to Kuykendahl P&R: 15 Peak / 30 Off Peak From Kuykendahl P&R to Greenspoint: 30 Peak/ 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No change in route only headways.]**

Westbound – From Northpoint & North Freeway service road, via northbound North Freeway service road to Beltway 8 service road, east on Beltway 8 service road, north on Greenspoint, east on Benmar, north on Northchase, west on Greens Rd., north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest on Kuykendahl, north on Ella, east on Airtex, north on Imperial Valley, east on Richey, north on Hardy Rd., east on W. W. Thorne Dr., south on Hurricane Lane, east on W. W. Thorne Dr., north on Aldine-Westfield, west on FM 1960, south into Spring P&R, exit west onto FM 1960, northwest on SH249 service road, U-turn at Louetta, west into Entrance 3 to bus shelter.

Eastbound – From Compaq bus shelter, exit via southbound SH249 service road, U-turn at FM1960, northeast on Willowchase, southeast on Breton Ridge, east on FM 1960, south into Spring P&R, exit north onto FM 1960, south on Aldine-Westfield, west on W. W. Thorne Dr., south on Hurricane Lane, west on W. W. Thorne Dr., south on Hardy Rd., west on Richey, south on Imperial Valley, west on Airtex, south on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd., south on Greenspoint Drive, east on Beltway 8 service road, south on Northchase, west on Northpoint to North Freeway service road.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	101
Route Name:	Airport Express – **change to Kingwood-Airport Express**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated/
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From San Jacinto College, exit via driveway to Beamer, right on Beamer, right on Astoria to Southeast Memorial Hospital driveway, left on Astoria, right on Beamer, right on Fuqua, left on Sabo, right on Kingspoint, right on Kleckley, left on Thermon, right on Rowlett, left on Almeda-Genoa, right on Clearwood, left on Edgebrook, right on East Haven, left on Scranton, right on Hansen, left on Airport Blvd., left into Hobby Airport, exit via Circular Drive to northbound Broadway, left on Bellfort, right on Telephone Rd. to northbound Revielle Rd., left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, left into Gulf Transitway, exit via T-Ramp to Eastwood Transit Center, exit via right onto Lockwood, left on Munger, left on Ernestine to Lockwood, right on Elgin, right on Cullen, left on Gulf Freeway service road to westbound Pease, left on Dowling, right on Saint Joseph Pkwy, right on Louisiana, right on Franklin, left on San Jacinto, right on Rothwell to East Freeway service road, enter freeway, exit to US 59 North, exit Tidwell, left on Tidwell, right on Jensen, right into Tidwell Transit Center via South Drive, exit South Drive, right on Jensen, right on Saunders, left on Eastex Freeway service road, enter freeway, exit Aldine Mail Route, left on Aldine Mail Route, right on JFK Blvd. to JFK Service Road to JFK Blvd., right on Will Clayton Pkwy, right to Terminal C, exit via Will Clayton Pkwy towards the Eastex Fwy, left on Colonel Fisher to Wright Road, east on Will Clayton, north on McKay, east on FM1960, north on Eastex Freeway service road, west into Townsen P&R, exit via southbound Eastex Freeway service road, east on FM1960, north on Lake Houston Pkwy, east into Kingwood P&R.

Southbound – From Kingwood P&R, exit via southbound Lake Houston Pkwy, west on FM1960, north on Eastex Fwy service road, west into Townsen P&R, exit via southbound Eastex Fwy service road, west on FM1960, south on McKay, west on Will Clayton, north on Wright Rd., south on Col. Fischer, west on Will Clayton to Terminal C, exit via Will Clayton to JFK Blvd., left on Aldine Mail Route, right on Eastex Fwy service road, enter freeway, exit Little York, right on Jensen, left on South Drive into Tidwell Transit Center, exit via T-Ramp to Eastex Transitway, exit via southbound Hamilton, right on Congress, left on Smith, left on Pierce to Gulf Freeway service road, right on Cullen, left on Elgin to Lockwood, right into Eastwood Transit Center, exit right onto Lockwood, left on Munger, left on Ernestine to Lockwood, left on Gulf Freeway service road, enter freeway, exit via SH35, left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, right on Revielle Rd. to southbound Telephone Rd., left on Bellfort, right on Broadway to Hobby Airport, exit via right on Airport Blvd., right on Hansen, left on Scranton, right on East Haven, left on Edgebrook, right on Clearwood, left on Almeda-Genoa, right on Rowlett, left on Thermon, right on Kleckley, right on Kingspoint, left on Sabo, right on Fuqua, left on Beamer, left on Astoria to Southeast Memorial Hospital, exit via left on Astoria, left on Beamer, left into San Jacinto College South – South Driveway.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	102
Route Name:	IAH Express
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	201
Route Name:	N. Shephard
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	202
Route Name:	Kuykendahl P&R Houston Ctr.
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	202
Route Name:	Kuykendahl P&R Ctr.
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	204
Route Name:	Spring P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	283
Route Name:	Kuykendahl/Greenway Plaza/Uptown P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Kuykendahl P&R, enter IH-45 North Freeway, right I-10 Katy Freeway, left to 610 Loop, exit S. Post Oak, right on San Felipe, left on McCue, right on Westheimer, left on Sage, left on Richmond, right on Buffalo Speedway into Greenway Plaza.

Northbound – From Greenway Plaza, left on Buffalo Speedway, left on Richmond, right on Sage, right on Westheimer, right on McCue, right on San Felipe to 610 Loop entrance ramp, enter 610 Loop main lanes, right to I-10 Katy Freeway, left to I-45 North Freeway main lanes, exit Rankin, west on Rankin, north on Kuykendahl, east into Kuykendahl P&R.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	291
Route Name:	Kuykendahl-N. Shephard
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	460
Route Name:	Kingwood-Greenspoint Express **[hook to 101 Airport Express]**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	500
Route Name:	Louetta P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **Greenspoint Mall, south on Greenspoint Dr.,** west on North Belt Freeway service road, north on SH249, east into Louetta P&R.

Southbound – From the Louetta P&R lot, south on SH 249, east on North Belt Freeway service road, **north on Greenspoint Dr., west into Greenspoint Mall.**

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	602a
Route Name:	Woodlands Mall TC/Woodlands P&R - CBD
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	602c
Route Name:	Woodlands Mall TC/Woodlands P&R - TMC
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	603a
Route Name:	Conroe P&R - Downtown
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound –**From the station at SH 242 and IH-45,** northbound North Freeway, exit US75, west into Conroe P&R.

Southbound – From Conroe P&R, exit to southbound U.S. 75 to southbound I-45, enter North Transitway, **exit SH 242, enter station at SH 242 and IH-45**.

Route Description Card

New: X Modify: Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	950
Route Name:	Kuykendahl – FM 2920
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Kuykendahl Park and Ride lot, exit northwest onto Kuykendahl to FM 2920.

Southbound – From Kuykendahl and FM 2920, south on Kuykendahl to kuykendahl Park and Ride lot.

Route Description Card

New: X Modify: Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	951
Route Name:	Stuebner - Loutetta
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Westbound – From, station on BLUE alignment at Louetta and IH-45, west on Louetta, south on Stuebner-Airline, west on Mittlesteadt into Stuebner P&R.

Eastbound – From the Stuebner P&R lot via eastbound Mittlesteadt, north on Stuebner-Airline, east on Louetta to station on BLUE alignment at Louetta and IH-45.

Route Description Card

New: X Modify: Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 1 (blue)
Route Number:	952
Route Name:	Woodlands Local Service
Service Type:	Local
Vehicle Type:	Standard or 25’
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Westbound – From Woodlands Mall TC, south on Woodloch Forest Dr., west on Woodlands Parkway, north on N. Panther Creek to W. Panther Creek to Panther Creek, south on Glen Loch Dr., east on Sawdust, south on South Park, east into Woodlands Park and Ride, exit via northbound South Park, east on Sawdust to IH-45 station on BLUE alignment.

Eastbound – From Sawdust and IH-45 station on BLUE alignment, west on Sawdust, south on South Park, east into Woodlands Park and Ride, exit via northbound South Park, west on Sawdust, north on Glen Loch Dr., west on Panther Creek to W. Panther Creek to N. Panther Creek, east on Woodlands Parkway, north on Woodloch Forest Dr. into Woodlands Mall TC.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 3 (green)
Route Number:	1
Route Name:	Hospital Crosstown
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 15 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the VA Hospital, via Sheehan to Ringness, left on Holcombe, right on S. Braeswood, left on N. MacGregor, left on Ben Taub Loop Drive, left on N. MacGregor, right on S. Main, right into Wheeler LRT, exit to Main, right on Wheeler, left on San Jacinto **to Fulton**, right on Brooks, left on Chapman, right on Quittman, left on Elysian to Hardy Rd., right on Kelley, left on Hirsch, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right into LBJ Hospital, exit right onto Kelley to North Loop Freeway service road, via North Loop Freeway service road to second on-ramp, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit McCarty, left on Gellhorn, right on Woodforest, right on Dividend to Currency.

Southbound – From Dividend & Currency, via Currency, right on North Loop Freeway service road, via North Loop Freeway service road to on-ramp past McCarty, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit Kirkpatrick, via North Loop Freeway service road to Kelley, left into LBJ Hospital, exit left onto Kelley, right into Kashmere TC, exit right onto Los Angeles, right on Kelley, left on Hardy, right on Quittman, left on Chapman, right on Brooks, **left on Fulton to San Jacinto,** right on Fannin, right into Wheeler LRT, exit to Main, right on Wheeler, right on Fannin, right on Southmore, left on S. Main, left on N. MacGregor, right on Ben Taub Loop Drive, right on N. MacGregor, right on S. Braeswood, left on Holcombe, right on Ringness, right on Cate Terrace, left on Le Captin, right on Mixon, left on Shields to VA Hospital.

Route Description Card

New: Modify: X Delete:

Card ID: Date:

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 3 (green)

Route Number:	5
Route Name:	Kashmere
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 26 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Bagby & Webster, via eastbound Webster, left on San Jacinto **to Fulton**, right on Hogan to Lorraine, left on Eastex Freeway service road, right on Collingsworth, left on Wipprecht, right on Rand, left on Lockwood, left on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, left on Lockwood, right on Laura Koppe, right on Homestead, left on West Knoll, left on Elbert, left on Laura Koppe to Elbert.

Southbound – From Elbert & Laura Koppe, via Laura Koppe to Darien, left on Darien, right on Touchstone, right on Homestead, left on Laura Koppe, left on Lockwood, right on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right on Lockwood, right on Rand, left on Wipprecht, right on Collingsworth, left on Eastex Freeway service road, right on Lorraine to Hogan, left on **Fulton to San Jacinto,** right on Fannin, right on Gray, left on Bagby to Webster.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	15
Route Name:	Fulton
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From N. Main and Quitman, right on ~~Hogan~~ Quitman, left on Fulton, right on Bennington, left on Appleton, right on Plymouth, left on Appleton, left on Berry, right on Bauman to Tidwell.

Southbound – From Bauman & Tidwell, via Tidwell to Fulton, left on Fulton, right into Northline Transit Center, exit via left on Fulton, left on Crosstimbers, right on Bauman, left on Plymouth, right on Roswell, right on Bennington, left on Fulton, right on Quitman to N. Main.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	25
Route Name:	Northline
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	24 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, north on N. Main,** right on Airline, right on Crosstimbers, left on North Freeway service road, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main to Quitman.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	25
Route Name:	Northline (via Enid)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	24 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, north on N. Main**, right Enid, left on Linte, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main **to Quitman.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	44
Route Name:	Acres Homes
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From LaBranch & Gray, west on Gray, north on Austin, west on St. Joseph Pkwy, north on Travis to North Freeway, **enter HOV facility**, exit Crosstimbers, **east on Crosstimbers, north on Fulton, west into Northline Transit Center, south on Fulton,** west on Crosstimbers, north on N. Shepherd, northwest on W. Montgomery, south into Acres Homes TC, exit northwest onto W. Montgomery, northwest on SH249, north on Old Bammel-N. Houston, west on Seton Lake, south into Seton Lake P&R, exit west on Seton Lake, northwest on SH249, northeast on Willowchase, southeast on Breton Ridge to FM1960.

Southbound – From Breton Ridge & FM1960, southwest on FM1960, southeast on SH249, east on Seton Lake, south into Seton Lake P&R, exit east on Seton Lake, south on Old Bammel-N. Houston, southeast on SH249, southeast on W. Montgomery, south into Acres Homes TC, exit southeast on W. Montgomery Rd., south on N. Shepherd, east on Crosstimbers, **north on Fulton, west into Northline Transit Center, south on Fulton, west on Crosstimbers, south** on North Freeway service road, enter freeway **HOV facility**, exit Milam, via southbound Milam to Pierce, east on Pierce, south on LaBranch to Gray.

Route Description Card

New: Modify: X Delete:

Card ID: Date:

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	44
Route Name:	Acres Homes (via Stallings)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	40 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From LaBranch & Gray, west on Gray, north on Austin, west on St. Joseph Pkwy, north on Travis to North Freeway, **enter HOV facility, exit to Crosstimers, east on Crosstimbers, north on Fulton, west into Northline Transit Center, south on Fulton,** west on Crosstimbers, north on N. Shepherd, northwest on W. Montgomery, south into Acres Homes TC, exit northwest onto W. Montgomery, west on Stallings, north on Bonazzi, east on McCrarey, northwest on W. Montgomery, northwest on SH249, north on Old Bammel-N. Houston, west on Seton Lake, south into Seton Lake P&R, exit west on Seton Lake, northwest on SH249, northeast on Willowchase, southeast on Breton Ridge to FM1960.

Southbound – From Breton Ridge & FM1960, southwest on FM1960, southeast on SH249, east on Seton Lake, south into Seton Lake P&R, exit east on Seton Lake, south on Old Bammel-N. Houston, southeast on SH249, southeast on W. Montgomery, west on McCrarey, south on Bonazzi, east on Stallings, southeast on W. Montgomery Rd., south into Acres Homes TC, exit southeast on W. Montgomery Rd., south on N. Shepherd, east on Crosstimbers, **north on Fulton, west into Northline Transit Center, south on Fulton, west on Crosstimbers,** ~~right~~ **south** on North Freeway service road, enter HOV facility~~freeway~~, exit Milam, via southbound Milam to Pierce, east on Pierce, south on LaBranch to Gray.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	50
Route Name:	Heights (via Freeway)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	60 Peak / 60 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Westbound – From the 50 Harrisburg route at Fannin & Lamar, westbound via Lamar to Bagby, north on Bagby, east **on McKinney, north on Louisiana to North Freeway, enter northbound I-45 HOV facility**, exit Crosstimbers, **west on Crosstimbers, north on Fulton, west into Northline Transit Center, south on Fulton,** west on Crosstimbers to W. 43rd, begin making stops at N. Shepherd, south on Rosslyn, west on W. 34th, south on W. TC Jester, west on Sherwood Lane to Northwest Freeway service road.

Eastbound – Sherwood Lane & Northwest Freeway service road, northwest via Northwest Freeway service road, east on W. 34th, north on Rosslyn, east on W. 43rd, limited stop service, **east on Crosstimbers, north on Fulton, west into Northline Transit Center, south on Fulton, west on Crosstimbers,** south on North Freeway service road, enter North Freeway **HOV facility**, exit at McKinney, via eastbound McKinney to Bagby, south on Bagby, east on Dallas to San Jacinto, continue as the 50 Harrisburg route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	52
Route Name:	Hirsch
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	Peak 20/ Off Peak 35
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the 52 Scott route at San Jacinto & Lamar, via northbound San Jacinto to Fulton, east on Quittman, north on Eastex Freeway service road, east on Cavalcade, north on Hirsch, east into Kashmere TC, exit north onto Hirsch, east on Weaver to Ley Road, north on Mesa, west on Tidwell, south into Mesa TC, exit east onto Tidwell, north on Mesa, east on Forest Hollow, north around loop to stop at sidewalk.

Southbound – From Forest Hollow & Mesa, via southbound Mesa to Tidwell, west on Tidwell, south into Mesa TC, exit east onto Tidwell, south on Mesa, west on Ley Road to Weaver, south on Hirsch, east into Kashmere TC, exit south onto Hirsch, west on Cavalcade, south on Eastex Freeway service road, west on Quitman, south on Fulton to San Jacinto, south on Fannin to Lamar, continue as the 52 Scott route.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	56
Route Name:	Airline
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **the Northline Transit Center, north on Fulton, west on Lyerly,** north on Airline, east on Aldine-Bender, north on Imperial Valley, west on Greens Rd, north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl Park and Ride lot, exit northwest onto Kuykendahl, east on FM 1960, north on Red Oaks, east on Peakwood, south on Cali, east on FM 1960, north on Cypress Station Drive, east on Cypress Station, south to North Freeway service road & Hollow Tree.

Southbound – From North Freeway service road & Hollow Tree, west on Hollow Tree, north on Westfield, west on Cypress Station, south on Cypress Station Drive, west on FM 1960, north on Cali, west on Peakwood, south on Red Oaks, west on FM 1960, southeast on Kuykendahl, east into Kuykedahl Park and Ride lot, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd, south on Imperial Valley, west on Aldine Bender, south on Airline**, east on Lyerly, south on Fulton, west into Northline Transit Center.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	78
Route Name:	Irvington 9800 (via Berry)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	30 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the 78 Alabama route at Travis & Lamar, via northbound Travis to Commerce, east on Commerce, north on Main, east on Hogan, north on Fulton, north on Irvington, west on Berry, north on McGallion, west on Turner, north on Bauman, east on Little York to McGallion.

Southbound – From Little York & McGallion, via southbound McGallion to Wellington, west on Wellington, south on Bauman, east on Turner, south on McGallion, east on Berry, south on Irvington, south on Fulton, west on Hogan, south on Main, west on Franklin, south on Milam to Lamar, continue as the 78 Alabama route.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	78
Route Name:	Irvington 9800 (via Berry Downtown Turnback)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	86
Route Name:	FM 1960
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	From Louetta P&R to Kuykendahl P&R: 15 Peak / 30 Off Peak From Kuykendahl P&R to Greenspoint: 30 Peak/ 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No change in route only headways.]**

Westbound – From Northpoint & North Freeway service road, via northbound North Freeway service road to Beltway 8 service road, east on Beltway 8 service road, north on Greenspoint, east on Benmar, north on Northchase, west on Greens Rd., north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest on Kuykendahl, north on Ella, east on Airtex, north on Imperial Valley, east on Richey, north on Hardy Rd., east on W. W. Thorne Dr., south on Hurricane Lane, east on W. W. Thorne Dr., north on Aldine-Westfield, west on FM 1960, south into Spring P&R, exit west onto FM 1960, northwest on SH249 service road, U-turn at Louetta, west into Entrance 3 to bus shelter.

Eastbound – From Compaq bus shelter, exit via southbound SH249 service road, U-turn at FM1960, northeast on Willowchase, southeast on Breton Ridge, east on FM 1960, south into Spring P&R, exit north onto FM 1960, south on Aldine-Westfield, west on W. W. Thorne Dr., south on Hurricane Lane, west on W. W. Thorne Dr., south on Hardy Rd., west on Richey, south on Imperial Valley, west on Airtex, south on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd., south on Greenspoint Drive, east on Beltway 8 service road, south on Northchase, west on Northpoint to North Freeway service road.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	101
Route Name:	Airport Express – **change to Kingwood-Airport Express**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated/
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From San Jacinto College, exit via driveway to Beamer, right on Beamer, right on Astoria to Southeast Memorial Hospital driveway, left on Astoria, right on Beamer, right on Fuqua, left on Sabo, right on Kingspoint, right on Kleckley, left on Thermon, right on Rowlett, left on Almeda-Genoa, right on Clearwood, left on Edgebrook, right on East Haven, left on Scranton, right on Hansen, left on Airport Blvd., left into Hobby Airport, exit via Circular Drive to northbound Broadway, left on Bellfort, right on Telephone Rd. to northbound Revielle Rd., left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, left into Gulf Transitway, exit via T-Ramp to Eastwood Transit Center, exit via right onto Lockwood, left on Munger, left on Ernestine to Lockwood, right on Elgin, right on Cullen, left on Gulf Freeway service road to westbound Pease, left on Dowling, right on Saint Joseph Pkwy, right on Louisiana, right on Franklin, left on San Jacinto, right on Rothwell to East Freeway service road, enter freeway, exit to US 59 North, exit Tidwell, left on Tidwell, right on Jensen, right into Tidwell Transit Center via South Drive, exit South Drive, right on Jensen, right on Saunders, left on Eastex Freeway service road, enter freeway, exit Aldine Mail Route, left on Aldine Mail Route, right on JFK Blvd. to JFK Service Road to JFK Blvd., right on Will Clayton Pkwy, right to Terminal C, exit via Will Clayton Pkwy towards the Eastex Fwy, left on Colonel Fisher to Wright Road, east on Will Clayton, north on McKay, east on FM1960, north on Eastex Freeway service road, west into Townsen P&R, exit via southbound Eastex Freeway service road, east on FM1960, north on Lake Houston Pkwy, east into Kingwood P&R.

Southbound – From Kingwood P&R, exit via southbound Lake Houston Pkwy, west on FM1960, north on Eastex Fwy service road, west into Townsen P&R, exit via southbound Eastex Fwy service road, west on FM1960, south on McKay, west on Will Clayton, north on Wright Rd., south on Col. Fischer, west on Will Clayton to Terminal C, exit via Will Clayton to JFK Blvd., left on Aldine Mail Route, right on Eastex Fwy service road, enter freeway, exit Little York, right on Jensen, left on South Drive into Tidwell Transit Center, exit via T-Ramp to Eastex Transitway, exit via southbound Hamilton, right on Congress, left on Smith, left on Pierce to Gulf Freeway service road, right on Cullen, left on Elgin to Lockwood, right into Eastwood Transit Center, exit right onto Lockwood, left on Munger, left on Ernestine to Lockwood, left on Gulf Freeway service road, enter freeway, exit via SH35, left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, right on Revielle Rd. to southbound Telephone Rd., left on Bellfort, right on Broadway to Hobby Airport, exit via right on Airport Blvd., right on Hansen, left on Scranton, right on East Haven, left on Edgebrook, right on Clearwood, left on Almeda-Genoa, right on Rowlett, left on Thermon, right on Kleckley, right on Kingspoint, left on Sabo, right on Fuqua, left on Beamer, left on Astoria to Southeast Memorial Hospital, exit via left on Astoria, left on Beamer, left into San Jacinto College South – South Driveway.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	202
Route Name:	Kuykendahl P&R Ctr.
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	8 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Kuykendahl P&R, exit via T-Ramp to North **Freeway HOV facility** ~~Transitway~~, exit Milam, via southbound Milam to Saint Joseph Pkwy.

Northbound – From Milam & Saint Joseph Pkwy, via westbound Saint Joseph Pkwy to I-45, enter northbound I-45, enter **HOV facility just north of Quitman**, exit Rankin, west on Rankin, north on Kuykendahl, east into Kuykendahl P&R.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	202
Route Name:	Kuykendahl P&R Houston Ctr.
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	30 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Kuykendahl P&R, exit via T-Ramp to North **Freeway HOV facility** ~~Transitway~~, exit Milam, via southbound Milam to McKinney, east on McKinney, north on Crawford, west on Walker to Fannin.

Northbound – From Walker & Fannin, via westbound Walker to northbound I-45, enter **HOV facility just north of Quitman**, exit Rankin, west on Rankin, north on Kuykendahl, east into Kuykendahl P&R.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	204
Route Name:	Spring P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	8 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Spring P&R, exit via southbound Carlsway to Bammel, west on Bammel, north on North Freeway service road, U-turn at FM1960, via southbound North Freeway service road, enter freeway, enter North **Freeway HOV facility**, exit via southbound Milam to Saint Joseph Pkwy.

Northbound – From Milam & Saint Joseph Pkwy, via westbound Saint Joseph Pkwy to I-45, enter northbound I-45, enter **HOV facility just north of Quitman**, exit FM1960, via northbound North Freeway service road to Bammel, east on Bammel, north on Carlsway, east into Spring P&R.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	291
Route Name:	Kuykendahl-N. Shephard
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Kuykendahl Park & Ride, exit via Blue Ash, east on Dominion Park, south on North Freeway service road, enter southbound I-45, exit North Shepherd, west into North Shepherd P&R, exit north onto N. Shepherd, southeast on Veteran's Memorial to transitway on-ramp, via North **HOV facility** to Milam, via southbound Milam, east on Richmond Ave. to Wheeler, south on S. Main Street, east on North MacGregor, south on Fannin, east on John Freeman, south on East Cullen to southbound Bertner, west on Holcombe, south on Shamrock to Galen, north on Fannin to University.

Northbound – From Fannin & University, via northbound Fannin to northbound San Jacinto, east into northbound US59, exit to northbound I-45**, enter HOV facility just north of Quitman**, exit Rankin, west on Rankin, north on Kuykendahl, north into Kuykendahl Park & Ride.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	460
Route Name:	Kingwood-Greenspoint Express **[hook to 101 Airport Express]**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	500
Route Name:	Louetta P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **Greenspoint Mall, south on Greenspoint Dr.,** west on North Belt Freeway service road, north on SH249, east into Louetta P&R.

Southbound – From the Louetta P&R lot, south on SH 249, east on North Belt Freeway service road, **north on Greenspoint Dr., west into Greenspoint Mall.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	501
Route Name:	Stuebner P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **Greenspoint Mall, south on Greenspoint Dr.** to Beltway 8, via westbound North Belt Freeway service road to Veteran's Memorial, north on Veteran's Memorial to Stuebner-Airline, west on Mittlesteadt into Stuebner P&R.

Southbound – From the Stuebner P&R lot via eastboundMittlesteadt, south on Stuebner-Airline to Veteran's Memorial, east on North Belt Freeway service road, **north on Greenspoint Dr., west into Greenspoint Mall.**

Route Description Card

New: X Modify: Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 3 (green)
Route Number:	950
Route Name:	Kuykendahl – FM 2920
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Kuykendahl Park and Ride lot, exit northwest onto Kuykendahl to FM 2920.

Southbound – From Kuykendahl and FM 2920, south on Kuykendahl to kuykendahl Park and Ride lot.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 2 (red)
Route Number:	1
Route Name:	Hospital Crosstown
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 15 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the VA Hospital, via Sheehan to Ringness, left on Holcombe, right on S. Braeswood, left on N. MacGregor, left on Ben Taub Loop Drive, left on N. MacGregor, right on S. Main, right into Wheeler LRT, exit to Main, right on Wheeler, left on San Jacinto **to Fulton**, right on Brooks, left on Chapman, right on Quittman, left on Elysian to Hardy Rd., right on Kelley, left on Hirsch, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right into LBJ Hospital, exit right onto Kelley to North Loop Freeway service road, via North Loop Freeway service road to second on-ramp, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit McCarty, left on Gellhorn, right on Woodforest, right on Dividend to Currency.

Southbound – From Dividend & Currency, via Currency, right on North Loop Freeway service road, via North Loop Freeway service road to on-ramp past McCarty, enter North Loop Freeway, exit N. Wayside, via North Loop Freeway service road to next on-ramp, enter North Loop Freeway, exit Kirkpatrick, via North Loop Freeway service road to Kelley, left into LBJ Hospital, exit left onto Kelley, right into Kashmere TC, exit right onto Los Angeles, right on Kelley, left on Hardy, right on Quittman, left on Chapman, right on Brooks, **left on Fulton to San Jacinto,** right on Fannin, right into Wheeler LRT, exit to Main, right on Wheeler, right on Fannin, right on Southmore, left on S. Main, left on N. MacGregor, right on Ben Taub Loop Drive, right on N. MacGregor, right on S. Braeswood, left on Holcombe, right on Ringness, right on Cate Terrace, left on Le Captin, right on Mixon, left on Shields to VA Hospital.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy Corridor
Alternative:	Alternative 2 (red)
Route Number:	5
Route Name:	Kashmere
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 26 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Bagby & Webster, via eastbound Webster, left on San Jacinto **to Fulton**, right on Hogan to Lorraine, left on Eastex Freeway service road, right on Collingsworth, left on Wipprecht, right on Rand, left on Lockwood, left on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, left on Lockwood, right on Laura Koppe, right on Homestead, left on West Knoll, left on Elbert, left on Laura Koppe to Elbert.

Southbound – From Elbert & Laura Koppe, via Laura Koppe to Darien, left on Darien, right on Touchstone, right on Homestead, left on Laura Koppe, left on Lockwood, right on Kelley, right into Kashmere TC, exit right onto Los Angeles, left on Kelley, right on Lockwood, right on Rand, left on Wipprecht, right on Collingsworth, left on Eastex Freeway service road, right on Lorraine to Hogan, left on **Fulton to San Jacinto,** right on Fannin, right on Gray, left on Bagby to Webster.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	15
Route Name:	Fulton
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From N. Main and Quitman, right on ~~Hogan~~ Quitman, left on Fulton, right on Bennington, left on Appleton, right on Plymouth, left on Appleton, left on Berry, right on Bauman to Tidwell.

Southbound – From Bauman & Tidwell, via Tidwell to Fulton, left on Fulton, right into Northline Transit Center, exit via left on Fulton, left on Crosstimbers, right on Bauman, left on Plymouth, right on Roswell, right on Bennington, left on Fulton, right on Quitman to N. Main.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	25
Route Name:	Northline
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	24 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, north on N. Main,** right on Airline, right on Crosstimbers, left on North Freeway service road, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main to Quitman.

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	25
Route Name:	Northline (via Enid)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	24 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From **N. Main and Quitman, north on N. Main**, right Enid, left on Linte, right on Airline, right on Lyerly, right on Fulton, right into Northline TC.

Southbound – From Northline TC, exit left on Fulton, left on Barry, left on Airline, left on N. Main **to Quitman.**

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	52
Route Name:	Hirsch
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	Peak 20/ Off Peak 35
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From the 52 Scott route at San Jacinto & Lamar, via northbound San Jacinto to Fulton, east on Quittman, north on Eastex Freeway service road, east on Cavalcade, north on Hirsch, east into Kashmere TC, exit north onto Hirsch, east on Weaver to Ley Road, north on Mesa, west on Tidwell, south into Mesa TC, exit east onto Tidwell, north on Mesa, east on Forest Hollow, north around loop to stop at sidewalk.

Southbound – From Forest Hollow & Mesa, via southbound Mesa to Tidwell, west on Tidwell, south into Mesa TC, exit east onto Tidwell, south on Mesa, west on Ley Road to Weaver, south on Hirsch, east into Kashmere TC, exit south onto Hirsch, west on Cavalcade, south on Eastex Freeway service road, west on Quitman, south on Fulton to San Jacinto, south on Fannin to Lamar, continue as the 52 Scott route.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	78
Route Name:	Irvington 9800 (via Berry Downtown Turnback)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	78
Route Name:	Irvington (Downtown Turnback)
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	86
Route Name:	FM 1960
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	From Louetta P&R to Kuykendahl P&R: 15 Peak / 30 Off Peak From Kuykendahl P&R to Greenspoint: 30 Peak/ 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description: **[No change in route only headways.]**

Westbound – From Northpoint & North Freeway service road, via northbound North Freeway service road to Beltway 8 service road, east on Beltway 8 service road, north on Greenspoint, east on Benmar, north on Northchase, west on Greens Rd., north on Northborough, west on Rankin, north on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest on Kuykendahl, north on Ella, east on Airtex, north on Imperial Valley, east on Richey, north on Hardy Rd., east on W. W. Thorne Dr., south on Hurricane Lane, east on W. W. Thorne Dr., north on Aldine-Westfield, west on FM 1960, south into Spring P&R, exit west onto FM 1960, northwest on SH249 service road, U-turn at Louetta, west into Entrance 3 to bus shelter.

Eastbound – From Compaq bus shelter, exit via southbound SH249 service road, U-turn at FM1960, northeast on Willowchase, southeast on Breton Ridge, east on FM 1960, south into Spring P&R, exit north onto FM 1960, south on Aldine-Westfield, west on W. W. Thorne Dr., south on Hurricane Lane, west on W. W. Thorne Dr., south on Hardy Rd., west on Richey, south on Imperial Valley, west on Airtex, south on Ella, southeast on Kuykendahl, east into Kuykendahl P&R, exit northwest onto Kuykendahl, south on Ella, east on Rankin, south on Northborough, east on Greens Rd., south on Greenspoint Drive, east on Beltway 8 service road, south on Northchase, west on Northpoint to North Freeway service road.

Route Description Card

New: Modify: X Delete:

Card ID: Date:

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	101
Route Name:	Airport Express – **change to Kingwood-Airport Express**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated/
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From San Jacinto College, exit via driveway to Beamer, right on Beamer, right on Astoria to Southeast Memorial Hospital driveway, left on Astoria, right on Beamer, right on Fuqua, left on Sabo, right on Kingspoint, right on Kleckley, left on Thermon, right on Rowlett, left on Almeda-Genoa, right on Clearwood, left on Edgebrook, right on East Haven, left on Scranton, right on Hansen, left on Airport Blvd., left into Hobby Airport, exit via Circular Drive to northbound Broadway, left on Bellfort, right on Telephone Rd. to northbound Revielle Rd., left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, left into Gulf Transitway, exit via T-Ramp to Eastwood Transit Center, exit via right onto Lockwood, left on Munger, left on Ernestine to Lockwood, right on Elgin, right on Cullen, left on Gulf Freeway service road to westbound Pease, left on Dowling, right on Saint Joseph Pkwy, right on Louisiana, right on Franklin, left on San Jacinto, right on Rothwell to East Freeway service road, enter freeway, exit to US 59 North, exit Tidwell, left on Tidwell, right on Jensen, right into Tidwell Transit Center via South Drive, exit South Drive, right on Jensen, right on Saunders, left on Eastex Freeway service road, enter freeway, exit Aldine Mail Route, left on Aldine Mail Route, right on JFK Blvd. to JFK Service Road to JFK Blvd., right on Will Clayton Pkwy, right to Terminal C, exit via Will Clayton Pkwy towards the Eastex Fwy, left on Colonel Fisher to Wright Road, east on Will Clayton, north on McKay, east on FM1960, north on Eastex Freeway service road, west into Townsen P&R, exit via southbound Eastex Freeway service road, east on FM1960, north on Lake Houston Pkwy, east into Kingwood P&R.

Southbound – From Kingwood P&R, exit via southbound Lake Houston Pkwy, west on FM1960, north on Eastex Fwy service road, west into Townsen P&R, exit via southbound Eastex Fwy service road, west on FM1960, south on McKay, west on Will Clayton, north on Wright Rd., south on Col. Fischer, west on Will Clayton to Terminal C, exit via Will Clayton to JFK Blvd., left on Aldine Mail Route, right on Eastex Fwy service road, enter freeway, exit Little York, right on Jensen, left on South Drive into Tidwell Transit Center, exit via T-Ramp to Eastex Transitway, exit via southbound Hamilton, right on Congress, left on Smith, left on Pierce to Gulf Freeway service road, right on Cullen, left on Elgin to Lockwood, right into Eastwood Transit Center, exit right onto Lockwood, left on Munger, left on Ernestine to Lockwood, left on Gulf Freeway service road, enter freeway, exit via SH35, left on E. South Loop Freeway service road, left on Evergreen, right into Gulfgate Transit Center, exit via right on E. South Loop Freeway service road, right on Revielle Rd. to southbound Telephone Rd., left on Bellfort, right on Broadway to Hobby Airport, exit via right on Airport Blvd., right on Hansen, left on Scranton, right on East Haven, left on Edgebrook, right on Clearwood, left on Almeda-Genoa, right on Rowlett, left on Thermon, right on Kleckley, right on Kingspoint, left on Sabo, right on Fuqua, left on Beamer, left on Astoria to Southeast Memorial Hospital, exit via left on Astoria, left on Beamer, left into San Jacinto College South – South Driveway.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	102
Route Name:	IAH Express
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	283
Route Name:	Kuykendahl/Greenway Plaza/Uptown P&R
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Southbound – From Kuykendahl P&R, enter IH-45 North Freeway, right I-10 Katy Freeway, left to 610 Loop, exit S. Post Oak, right on San Felipe, left on McCue, right on Westheimer, left on Sage, left on Richmond, right on Buffalo Speedway into Greenway Plaza.

Northbound –From Greenway Plaza, left on Buffalo Speedway, left on Richmond, right on Sage, right on Westheimer, right on McCue, right on San Felipe to 610 Loop entrance ramp, enter 610 Loop main lanes, right to I-10 Katy Freeway, left to I-45 North Freeway main lanes, exit Rankin, west on Rankin, north on Kuykendahl, east into Kuykendahl P&R.

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	460
Route Name:	Kingwood-Greenspoint Express **[hook to 101 Airport Express]**
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	602a
Route Name:	Woodlands Mall TC/Woodlands P&R - CBD
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: Delete: X

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	602c
Route Name:	Woodlands Mall TC/Woodlands P&R - TMC
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	0 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Route Description Card

New: Modify: X Delete:

Card ID: Date: June 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	603a
Route Name:	Conroe P&R - Downtown
Service Type:	Commuter
Vehicle Type:	Standard/Articulated
Headway (min):	10 Peak / 0 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – **From the station at SH 242 and IH-45,** northbound North Freeway, exit US75, west into Conroe P&R.

Southbound – From Conroe P&R, exit to southbound U.S. 75 to southbound I-45, enter North Transitway, **exit SH 242, enter station at SH 242 and IH-45**.

Route Description Card

New: X Modify: Delete:

Card ID: Date: July 2002

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	950
Route Name:	Kuykendahl – FM 2920
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	20 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Northbound – From Kuykendahl Park and Ride lot, exit northwest onto Kuykendahl to FM 2920.

Southbound – From Kuykendahl and FM 2920, south on Kuykendahl to kuykendahl Park and Ride lot.

Route Description Card

New: X Modify: Delete:

Card ID: Date:

Project:	METRO Mobility 2025
Corridor:	North-Hardy
Alternative:	Alternative 2 (red)
Route Number:	951
Route Name:	Stuebner - Loutetta
Service Type:	Local
Vehicle Type:	Standard/Articulated
Headway (min):	15 Peak / 30 Off Peak
Station-to-Station Running Time:	
Layover1 (min):	
Layover2 (min):	

Route Description:

Westbound – From, station on RED alignment at Louetta, west on Louetta, south on Stuebner-Airline, west on Mittlesteadt into Stuebner P&R.

Eastbound – From the Stuebner P&R lot via eastbound Mittlesteadt, north on Stuebner-Airline, east on Louetta to station on RED alignment.

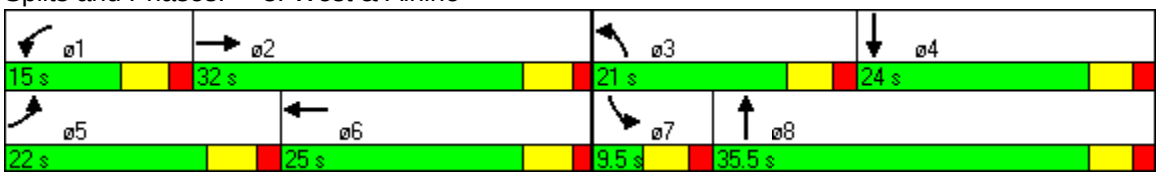
APPENDIX G

Synchro

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3176	0	1770	3460	0	1770	3438	0	1770	3226	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1749	3176	0	1766	3460	0	1759	3438	0	1763	3226	0
Satd. Flow (RTOR)		296			15			24			213	
Volume (vph)	806	797	922	424	642	90	754	1081	195	89	628	533
Lane Group Flow (vph)	876	1868	0	461	796	0	820	1387	0	97	1262	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	22.0	32.0	0.0	15.0	25.0	0.0	21.0	35.5	0.0	9.5	24.0	0.0
Act Effct Green (s)	18.0	28.0		11.0	21.0		17.0	31.5		5.5	20.0	
Actuated g/C Ratio	0.20	0.30		0.12	0.23		0.18	0.34		0.06	0.22	
v/c Ratio	2.53	1.59		2.17	0.99		2.51	1.16		0.92	1.45	
Uniform Delay, d1	37.0	23.9		40.5	34.8		37.5	29.6		43.0	27.2	
Delay	328.5	213.3		299.9	60.1		326.8	103.4		97.9	185.5	
LOS	F	F		F	E		F	F		F	F	
Approach Delay		250.0			148.0			186.4			179.3	
Approach LOS		F			F			F			F	
Stops (vph)	3012	4146		1464	1213		2805	2034		119	2633	
Fuel Used(gal)	84	127		42	29		77	58		4	76	
CO Emmisions (g/hr)	5905	8894		2913	2023		5406	4042		264	5308	
NOx Emmisions (g/hr)	1149	1731		567	394		1052	786		51	1033	
VOC Emmisions (g/hr)	1369	2061		675	469		1253	937		61	1230	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 92	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 2.53	
Intersection Signal Delay: 201.8	Intersection LOS: F
Intersection Capacity Utilization 179.8%	ICU Level of Service H

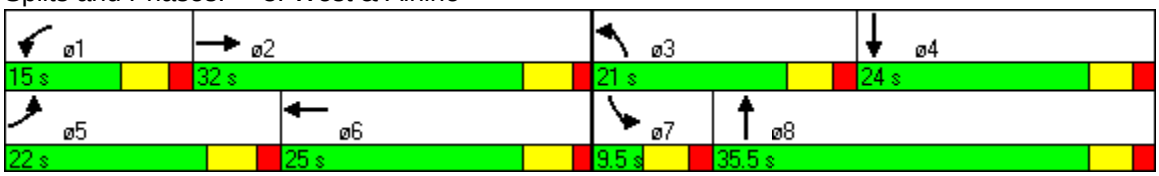
Splits and Phases: 3: West & Airline



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3176	0	1770	3460	0	1770	3438	0	1770	3226	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1749	3176	0	1766	3460	0	1759	3438	0	1763	3226	0
Satd. Flow (RTOR)		296			15			24			213	
Volume (vph)	806	797	922	424	642	90	754	1081	195	89	628	533
Lane Group Flow (vph)	876	1868	0	461	796	0	820	1387	0	97	1262	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	22.0	32.0	0.0	15.0	25.0	0.0	21.0	35.5	0.0	9.5	24.0	0.0
Act Effct Green (s)	18.0	28.0		11.0	21.0		17.0	31.5		5.5	20.0	
Actuated g/C Ratio	0.20	0.30		0.12	0.23		0.18	0.34		0.06	0.22	
v/c Ratio	2.53	1.59		2.17	0.99		2.51	1.16		0.92	1.45	
Uniform Delay, d1	37.0	23.9		40.5	34.8		37.5	29.6		43.0	27.2	
Delay	328.5	213.3		299.9	60.1		326.8	103.4		97.9	185.5	
LOS	F	F		F	E		F	F		F	F	
Approach Delay		250.0			148.0			186.4			179.3	
Approach LOS		F			F			F			F	

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 92	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 2.53	
Intersection Signal Delay: 201.8	Intersection LOS: F
Intersection Capacity Utilization 179.8%	ICU Level of Service H

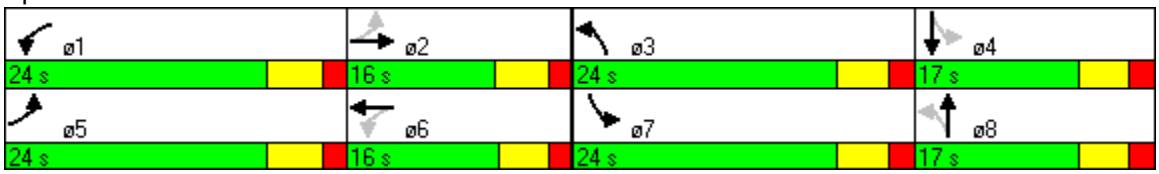
Splits and Phases: 3: West & Airline



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3100	0	1770	3475	0	1770	3445	0	1770	3277	0
Flt Permitted	0.357			0.333			0.308			0.336		
Satd. Flow (perm)	661	3100	0	618	3475	0	573	3445	0	621	3277	0
Satd. Flow (RTOR)		327			14			22			202	
Volume (vph)	253	120	301	181	293	36	281	301	54	46	329	249
Lane Group Flow (vph)	275	457	0	197	357	0	305	386	0	50	629	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Total Split (s)	24.0	16.0	0.0	24.0	16.0	0.0	24.0	17.0	0.0	24.0	17.0	0.0
Act Effct Green (s)	31.7	11.7		31.7	11.7		37.0	24.7		21.3	13.0	
Actuated g/C Ratio	0.39	0.14		0.39	0.14		0.46	0.31		0.26	0.16	
v/c Ratio	0.51	0.63		0.37	0.69		0.55	0.36		0.18	0.90	
Uniform Delay, d1	15.0	8.8		14.3	31.4		14.3	20.5		13.8	22.4	
Delay	15.4	9.9		14.6	31.8		14.8	21.1		14.1	33.2	
LOS	B	A		B	C		B	C		B	C	
Approach Delay		11.9			25.7			18.3			31.8	
Approach LOS		B			C			B			C	

Intersection Summary	
Cycle Length: 81	
Actuated Cycle Length: 80.7	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 77.7%	ICU Level of Service C

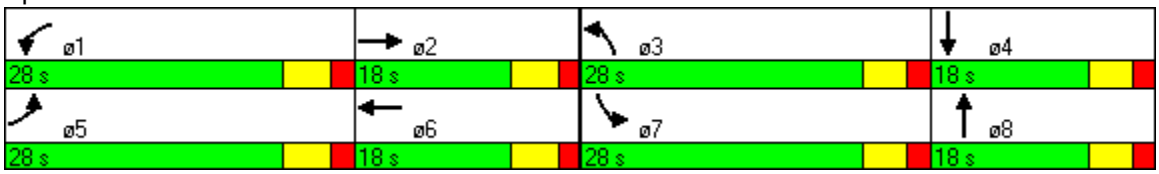
Splits and Phases: 3: West & Airline



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3176	0	1770	3460	0	1770	3438	0	1770	3226	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1732	3176	0	1755	3460	0	1745	3438	0	1753	3226	0
Satd. Flow (RTOR)		270			14			19			197	
Volume (vph)	348	344	398	183	277	39	399	572	103	47	332	282
Lane Group Flow (vph)	378	807	0	199	343	0	434	734	0	51	668	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	28.0	18.0	0.0	28.0	18.0	0.0	28.0	18.0	0.0	28.0	18.0	0.0
Act Effct Green (s)	24.0	14.0		24.0	14.0		24.0	33.5		9.3	14.0	
Actuated g/C Ratio	0.26	0.15		0.26	0.15		0.26	0.36		0.10	0.15	
v/c Ratio	0.82	1.13		0.43	0.64		0.94	0.58		0.30	1.02	
Uniform Delay, d1	33.2	24.7		29.4	36.2		34.7	24.1		41.7	26.9	
Delay	39.1	91.5		28.9	35.4		55.5	24.9		38.6	60.8	
LOS	D	F		C	D		E	C		D	E	
Approach Delay		74.8			33.0			36.2			59.3	
Approach LOS		E			C			D			E	

Intersection Summary	
Cycle Length: 92	
Actuated Cycle Length: 92	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 53.0	Intersection LOS: D
Intersection Capacity Utilization 94.4%	ICU Level of Service E

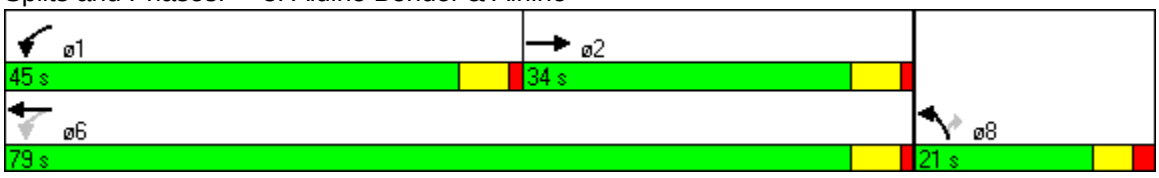
Splits and Phases: 3: West & Airline



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	5013	0	1770	5085	3433	1441
Flt Permitted			0.118		0.950	
Satd. Flow (perm)	5013	0	220	5085	3420	1418
Satd. Flow (RTOR)	15					634
Volume (vph)	1429	130	890	2678	609	746
Lane Group Flow (vph)	1694	0	967	2911	662	811
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Total Split (s)	34.0	0.0	45.0	79.0	21.0	21.0
Act Effct Green (s)	30.0		75.0	75.0	17.0	17.0
Actuated g/C Ratio	0.30		0.75	0.75	0.17	0.17
v/c Ratio	1.12		1.21	0.76	1.13	1.06
Uniform Delay, d1	34.6		23.7	7.3	41.5	7.2
Delay	86.3		108.5	7.5	101.4	49.3
LOS	F		F	A	F	D
Approach Delay	86.3			32.7	72.7	
Approach LOS	F			C	E	
Stops (vph)	2491		1353	1428	875	415
Fuel Used(gal)	66		43	61	29	24
CO Emmisions (g/hr)	4603		3029	4245	2035	1686
NOx Emmisions (g/hr)	896		589	826	396	328
VOC Emmisions (g/hr)	1067		702	984	472	391
Dilemma Vehicles (#)	0		0	0	0	0

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 54.0	Intersection LOS: D
Intersection Capacity Utilization 124.2%	ICU Level of Service H

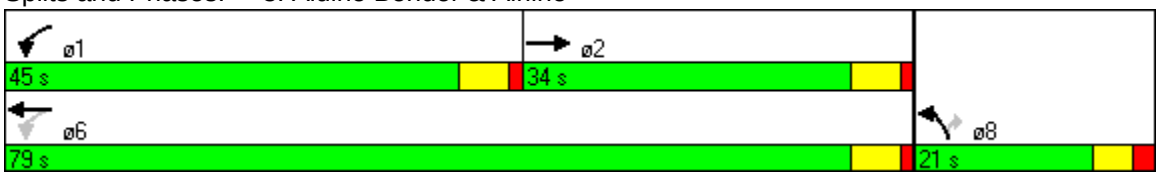
Splits and Phases: 3: Aldine Bender & Airline



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	5013	0	1770	5085	3433	1441
Flt Permitted			0.118		0.950	
Satd. Flow (perm)	5013	0	220	5085	3420	1418
Satd. Flow (RTOR)	15					634
Volume (vph)	1429	130	890	2678	609	746
Lane Group Flow (vph)	1694	0	967	2911	662	811
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Total Split (s)	34.0	0.0	45.0	79.0	21.0	21.0
Act Effct Green (s)	30.0		75.0	75.0	17.0	17.0
Actuated g/C Ratio	0.30		0.75	0.75	0.17	0.17
v/c Ratio	1.12		1.21	0.76	1.13	1.06
Uniform Delay, d1	34.6		23.7	7.3	41.5	7.2
Delay	86.3		108.5	7.5	101.4	49.3
LOS	F		F	A	F	D
Approach Delay	86.3			32.7	72.7	
Approach LOS	F			C	E	
Stops (vph)	2491		1353	1428	875	415
Fuel Used(gal)	66		43	61	29	24
CO Emmisions (g/hr)	4603		3029	4245	2035	1686
NOx Emmisions (g/hr)	896		589	826	396	328
VOC Emmisions (g/hr)	1067		702	984	472	391
Dilemma Vehicles (#)	0		0	0	0	0

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 54.0	Intersection LOS: D
Intersection Capacity Utilization 124.2%	ICU Level of Service H

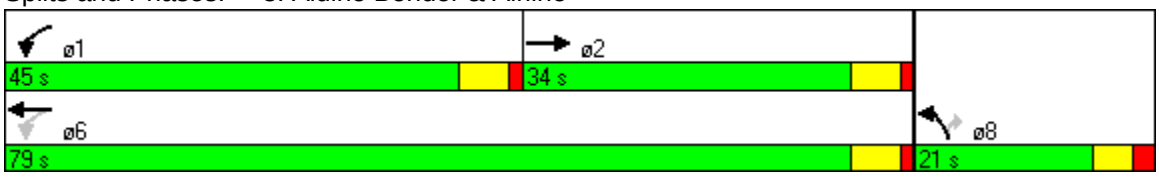
Splits and Phases: 3: Aldine Bender & Airline



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	5013	0	1770	5085	3433	1441
Flt Permitted			0.118		0.950	
Satd. Flow (perm)	5013	0	220	5085	3420	1418
Satd. Flow (RTOR)	15					634
Volume (vph)	1429	130	890	2678	609	746
Lane Group Flow (vph)	1694	0	967	2911	662	811
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Total Split (s)	34.0	0.0	45.0	79.0	21.0	21.0
Act Effct Green (s)	30.0		75.0	75.0	17.0	17.0
Actuated g/C Ratio	0.30		0.75	0.75	0.17	0.17
v/c Ratio	1.12		1.21	0.76	1.13	1.06
Uniform Delay, d1	34.6		23.7	7.3	41.5	7.2
Delay	86.3		108.5	7.5	101.4	49.3
LOS	F		F	A	F	D
Approach Delay	86.3			32.7	72.7	
Approach LOS	F			C	E	
Stops (vph)	2491		1353	1428	875	415
Fuel Used(gal)	66		43	61	29	24
CO Emmisions (g/hr)	4603		3029	4245	2035	1686
NOx Emmisions (g/hr)	896		589	826	396	328
VOC Emmisions (g/hr)	1067		702	984	472	391
Dilemma Vehicles (#)	0		0	0	0	0

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 54.0	Intersection LOS: D
Intersection Capacity Utilization 124.2%	ICU Level of Service H

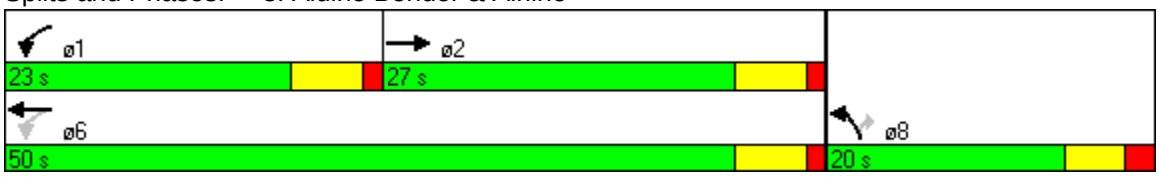
Splits and Phases: 3: Aldine Bender & Airline



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	5065	0	1770	3539	3288	1441
Flt Permitted			0.148		0.972	
Satd. Flow (perm)	5065	0	276	3539	3288	1441
Satd. Flow (RTOR)	7				148	181
Volume (vph)	1188	36	238	807	183	303
Lane Group Flow (vph)	1330	0	259	877	347	181
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Total Split (s)	27.0	0.0	23.0	50.0	20.0	20.0
Act Effct Green (s)	30.7		46.1	46.1	11.3	11.3
Actuated g/C Ratio	0.47		0.70	0.70	0.17	0.17
v/c Ratio	0.56		0.57	0.35	0.50	0.45
Uniform Delay, d1	12.4		3.3	3.8	13.7	0.0
Delay	14.0		6.6	4.2	13.5	4.5
LOS	B		A	A	B	A
Approach Delay	14.0			4.8	10.4	
Approach LOS	B			A	B	
Stops (vph)	1206		94	283	154	27
Fuel Used(gal)	30		5	17	8	4
CO Emmisions (g/hr)	2066		362	1185	549	245
NOx Emmisions (g/hr)	402		70	230	107	48
VOC Emmisions (g/hr)	479		84	275	127	57
Dilemma Vehicles (#)	0		0	0	0	0

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 65.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 9.9	Intersection LOS: A
Intersection Capacity Utilization 59.3%	ICU Level of Service A

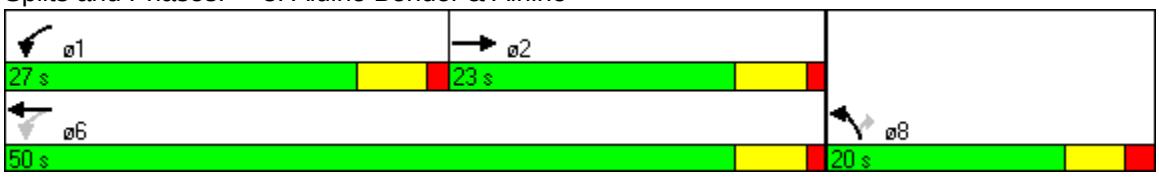
Splits and Phases: 3: Aldine Bender & Airline



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	5014	0	1770	5085	3340	1441
Flt Permitted			0.174		0.964	
Satd. Flow (perm)	5014	0	324	5085	3325	1415
Satd. Flow (RTOR)	21				61	309
Volume (vph)	783	71	463	1393	317	388
Lane Group Flow (vph)	928	0	503	1514	458	309
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Total Split (s)	23.0	0.0	27.0	50.0	20.0	20.0
Act Effct Green (s)	23.6		46.1	46.1	13.5	13.5
Actuated g/C Ratio	0.35		0.68	0.68	0.20	0.20
v/c Ratio	0.52		0.82	0.44	0.64	0.58
Uniform Delay, d1	17.0		11.4	4.9	21.3	0.0
Delay	18.9		12.8	5.2	21.4	3.5
LOS	B		B	A	C	A
Approach Delay	18.9			7.1	14.2	
Approach LOS	B			A	B	
Stops (vph)	899		281	564	319	40
Fuel Used(gal)	22		11	30	12	6
CO Emmisions (g/hr)	1524		782	2093	817	411
NOx Emmisions (g/hr)	296		152	407	159	80
VOC Emmisions (g/hr)	353		181	485	189	95
Dilemma Vehicles (#)	0		0	0	0	0

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 67.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 70.4%	ICU Level of Service C

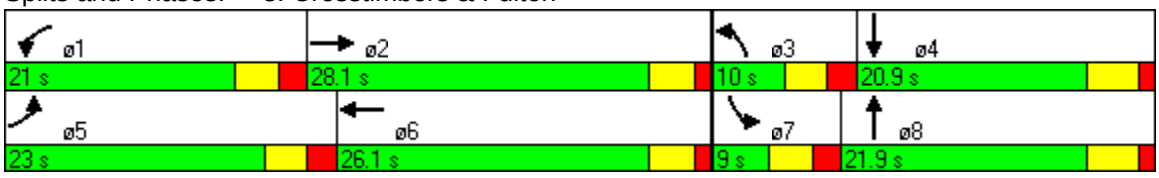
Splits and Phases: 3: Aldine Bender & Airline



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3441	0	1770	3396	0	1770	3468	0	1770	3262	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1749	3441	0	1765	3396	0	1737	3468	0	1737	3262	0
Satd. Flow (RTOR)		23			37			13			192	
Volume (vph)	372	1691	273	49	574	139	271	591	62	207	291	198
Lane Group Flow (vph)	404	2135	0	53	775	0	295	709	0	225	531	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	23.0	28.1	0.0	21.0	26.1	0.0	10.0	21.9	0.0	9.0	20.9	0.0
Act Effct Green (s)	19.0	35.7		8.7	20.8		6.0	17.7		5.0	16.7	
Actuated g/C Ratio	0.24	0.45		0.10	0.26		0.08	0.23		0.06	0.21	
v/c Ratio	0.94	1.35		0.28	0.84		2.19	0.89		1.99	0.63	
Uniform Delay, d1	30.5	22.0		35.5	25.2		37.3	30.1		37.8	18.2	
Delay	57.3	158.8		32.9	27.8		298.8	38.3		281.9	18.1	
LOS	E	F		C	C		F	D		F	B	
Approach Delay		142.6			28.1			114.8			96.6	
Approach LOS		F			C			F			F	
Stops (vph)	422	4389		44	940		1072	627		773	280	
Fuel Used(gal)	13	120		2	23		27	19		19	9	
CO Emmisions (g/hr)	898	8410		108	1640		1874	1337		1295	626	
NOx Emmisions (g/hr)	175	1636		21	319		365	260		252	122	
VOC Emmisions (g/hr)	208	1949		25	380		434	310		300	145	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 78.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 2.19	
Intersection Signal Delay: 111.9	Intersection LOS: F
Intersection Capacity Utilization 110.1%	ICU Level of Service G

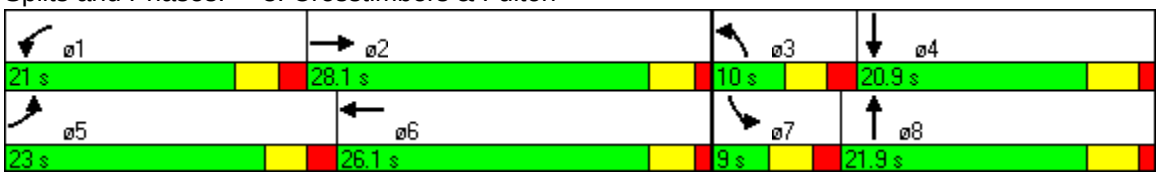
Splits and Phases: 3: Crosstimbers & Fulton



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3441	0	1770	3396	0	1770	3468	0	1770	3262	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1749	3441	0	1765	3396	0	1737	3468	0	1737	3262	0
Satd. Flow (RTOR)		23			37			13			192	
Volume (vph)	372	1691	273	49	574	139	271	591	62	207	291	198
Lane Group Flow (vph)	404	2135	0	53	775	0	295	709	0	225	531	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	23.0	28.1	0.0	21.0	26.1	0.0	10.0	21.9	0.0	9.0	20.9	0.0
Act Effct Green (s)	19.0	35.7		8.7	20.8		6.0	17.7		5.0	16.7	
Actuated g/C Ratio	0.24	0.45		0.10	0.26		0.08	0.23		0.06	0.21	
v/c Ratio	0.94	1.35		0.28	0.84		2.19	0.89		1.99	0.63	
Uniform Delay, d1	30.5	22.0		35.5	25.2		37.3	30.1		37.8	18.2	
Delay	57.3	158.8		32.9	27.8		298.8	38.3		281.9	18.1	
LOS	E	F		C	C		F	D		F	B	
Approach Delay		142.6			28.1			114.8			96.6	
Approach LOS		F			C			F			F	
Stops (vph)	422	4389		44	940		1072	627		773	280	
Fuel Used(gal)	13	120		2	23		27	19		19	9	
CO Emmisions (g/hr)	898	8410		108	1640		1874	1337		1295	626	
NOx Emmisions (g/hr)	175	1636		21	319		365	260		252	122	
VOC Emmisions (g/hr)	208	1949		25	380		434	310		300	145	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 78.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 2.19	
Intersection Signal Delay: 111.9	Intersection LOS: F
Intersection Capacity Utilization 110.1%	ICU Level of Service G

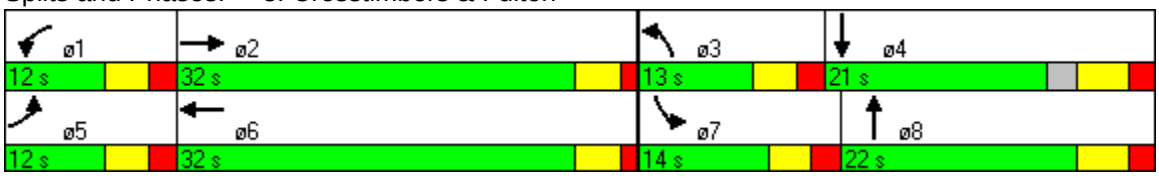
Splits and Phases: 3: Crosstimbers & Fulton



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3396	0	1770	3448	0	1770	3463	0	1770	3285	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1761	3396	0	1756	3448	0	1754	3463	0	1752	3285	0
Satd. Flow (RTOR)		53			26			18			198	
Volume (vph)	106	393	116	58	719	122	162	223	31	100	291	198
Lane Group Flow (vph)	115	553	0	63	915	0	176	276	0	109	531	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	12.0	32.0	0.0	12.0	32.0	0.0	13.0	22.0	0.0	14.0	21.0	0.0
Act Effct Green (s)	17.1	34.1		8.0	25.1		9.0	16.6		9.3	14.3	
Actuated g/C Ratio	0.21	0.42		0.10	0.31		0.11	0.20		0.11	0.18	
v/c Ratio	0.31	0.38		0.36	0.85		0.90	0.38		0.56	0.72	
Uniform Delay, d1	27.8	15.1		35.0	26.3		36.4	26.7		36.0	19.2	
Delay	29.7	15.0		37.2	27.4		77.3	28.4		36.3	19.9	
LOS	C	B		D	C		E	C		D	B	
Approach Delay		17.5			28.0			47.5			22.7	
Approach LOS		B			C			D			C	
Stops (vph)	86	496		53	1141		196	200		93	281	
Fuel Used(gal)	3	13		2	28		6	7		2	9	
CO Emmisions (g/hr)	201	891		132	1944		438	468		168	640	
NOx Emmisions (g/hr)	39	173		26	378		85	91		33	124	
VOC Emmisions (g/hr)	47	206		31	450		101	108		39	148	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 81.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 71.6%	ICU Level of Service C

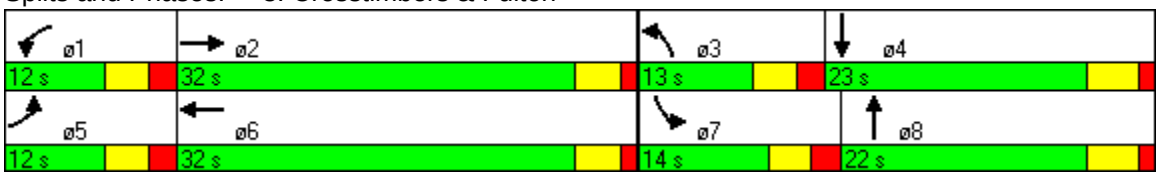
Splits and Phases: 3: Crosstimbers & Fulton



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3441	0	1770	3396	0	1770	3468	0	1770	3284	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1749	3441	0	1742	3396	0	1733	3468	0	1733	3284	0
Satd. Flow (RTOR)		25			41			13			145	
Volume (vph)	154	699	113	38	574	139	237	517	54	139	265	158
Lane Group Flow (vph)	167	883	0	41	775	0	258	621	0	151	460	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Total Split (s)	12.0	32.0	0.0	12.0	32.0	0.0	13.0	22.0	0.0	14.0	23.0	0.0
Act Effct Green (s)	8.0	24.7		17.1	33.8		9.0	17.3		9.7	18.0	
Actuated g/C Ratio	0.09	0.29		0.20	0.40		0.11	0.20		0.11	0.21	
v/c Ratio	1.00	0.87		0.12	0.56		1.37	0.86		0.74	0.57	
Uniform Delay, d1	38.4	27.6		27.7	18.6		37.9	31.9		36.4	20.0	
Delay	103.6	29.0		29.9	18.9		180.5	39.3		50.3	20.7	
LOS	F	C		C	B		F	D		D	C	
Approach Delay		40.9			19.5			80.8			28.0	
Approach LOS		D			B			F			C	
Stops (vph)	222	1138		32	706		558	536		137	252	
Fuel Used(gal)	7	25		1	21		16	17		4	8	
CO Emmisions (g/hr)	491	1717		82	1459		1093	1174		264	561	
NOx Emmisions (g/hr)	96	334		16	284		213	228		51	109	
VOC Emmisions (g/hr)	114	398		19	338		253	272		61	130	
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 84.9	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.37	
Intersection Signal Delay: 43.8	Intersection LOS: D
Intersection Capacity Utilization 73.8%	ICU Level of Service C

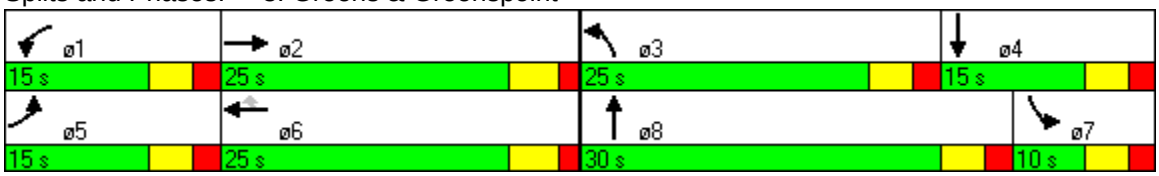
Splits and Phases: 3: Crosstimbers & Fulton



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4894	0	1770	5085	1583	1610	3159	0	1770	3408	0
Flt Permitted	0.950			0.950			0.950	0.890		0.950		
Satd. Flow (perm)	1770	4894	0	1769	5085	1560	1610	2886	0	1769	3408	0
Satd. Flow (RTOR)		89				159		59			39	
Volume (vph)	132	1285	376	192	2286	199	1509	283	361	132	1285	376
Lane Group Flow (vph)	143	1806	0	209	2485	216	820	1520	0	143	1806	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Total Split (s)	15.0	25.0	0.0	15.0	25.0	25.0	25.0	30.0	0.0	10.0	15.0	0.0
Act Effct Green (s)	11.0	21.0		11.0	21.0	21.0	21.0	26.0		6.0	11.0	
Actuated g/C Ratio	0.14	0.26		0.14	0.26	0.26	0.26	0.33		0.08	0.14	
v/c Ratio	0.59	1.34		0.86	1.86	0.41	1.94	1.69dl		1.08	3.60	
Uniform Delay, d1	32.3	27.5		33.7	29.5	6.0	29.5	24.1		37.0	31.8	
Delay	33.6	157.2		54.9	262.8	7.9	273.2	216.1		119.9	388.0	
LOS	C	F		D	F	A	F	F		F	F	
Approach Delay		148.1			229.0			236.1			368.3	
Approach LOS		F			F			F			F	
Stops (vph)	123	4504		207	8021	84	2735	4176		229	8186	
Fuel Used(gal)	4	103		6	197	3	68	105		6	199	
CO Emmisions (g/hr)	246	7168		407	13762	239	4771	7363		439	13919	
NOx Emmisions (g/hr)	48	1395		79	2678	46	928	1433		85	2708	
VOC Emmisions (g/hr)	57	1661		94	3189	55	1106	1707		102	3226	
Dilemma Vehicles (#)	0	0		0	0	0	0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Offset: 20 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 3.60	
Intersection Signal Delay: 243.3	Intersection LOS: F
Intersection Capacity Utilization 166.9%	ICU Level of Service H
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

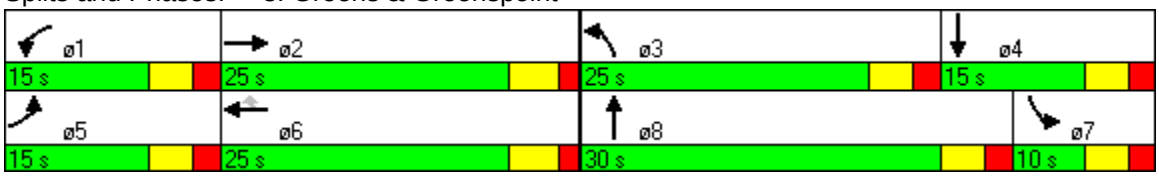
Splits and Phases: 3: Greens & Greenspoint



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4894	0	1770	5085	1583	1610	3159	0	1770	3408	0
Flt Permitted	0.950			0.950			0.950	0.890		0.950		
Satd. Flow (perm)	1770	4894	0	1769	5085	1560	1610	2886	0	1769	3408	0
Satd. Flow (RTOR)		89				159		59			39	
Volume (vph)	132	1285	376	192	2286	199	1509	283	361	132	1285	376
Lane Group Flow (vph)	143	1806	0	209	2485	216	820	1520	0	143	1806	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Total Split (s)	15.0	25.0	0.0	15.0	25.0	25.0	25.0	30.0	0.0	10.0	15.0	0.0
Act Effct Green (s)	11.0	21.0		11.0	21.0	21.0	21.0	26.0		6.0	11.0	
Actuated g/C Ratio	0.14	0.26		0.14	0.26	0.26	0.26	0.33		0.08	0.14	
v/c Ratio	0.59	1.34		0.86	1.86	0.41	1.94	1.69dl		1.08	3.60	
Uniform Delay, d1	32.3	27.5		33.7	29.5	6.0	29.5	24.1		37.0	31.8	
Delay	33.6	157.2		54.9	262.8	7.9	273.2	216.1		119.9	388.0	
LOS	C	F		D	F	A	F	F		F	F	
Approach Delay		148.1			229.0			236.1			368.3	
Approach LOS		F			F			F			F	
Stops (vph)	123	4504		207	8021	84	2735	4176		229	8186	
Fuel Used(gal)	4	103		6	197	3	68	105		6	199	
CO Emmisions (g/hr)	246	7168		407	13762	239	4771	7363		439	13919	
NOx Emmisions (g/hr)	48	1395		79	2678	46	928	1433		85	2708	
VOC Emmisions (g/hr)	57	1661		94	3189	55	1106	1707		102	3226	
Dilemma Vehicles (#)	0	0		0	0	0	0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Offset: 20 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 3.60	
Intersection Signal Delay: 243.3	Intersection LOS: F
Intersection Capacity Utilization 166.9%	ICU Level of Service H
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 3: Greens & Greenspoint



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4781	0	1770	5085	1583	1610	3031	0	1770	3154	0
Flt Permitted	0.950			0.950			0.950	0.670		0.950		
Satd. Flow (perm)	1737	4781	0	1769	5085	1583	1549	2044	0	1749	3154	0
Satd. Flow (RTOR)		148				40		134			24	
Volume (vph)	55	1401	597	86	640	37	206	14	123	64	19	22
Lane Group Flow (vph)	60	2172	0	93	696	40	112	261	0	70	45	0
Turn Type	Prot			Prot		Prot	Prot			Prot		
Protected Phases	5	2		1	6	6	3	8		7	4	
Permitted Phases												
Total Split (s)	15.0	32.0	0.0	15.0	32.0	32.0	15.0	24.0	0.0	9.0	18.0	0.0
Act Effct Green (s)	11.0	28.0		11.0	28.0	28.0	11.0	20.0		5.0	14.0	
Actuated g/C Ratio	0.14	0.35		0.14	0.35	0.35	0.14	0.25		0.06	0.18	
v/c Ratio	0.25	1.23		0.38	0.39	0.07	0.51	0.40		0.63	0.08	
Uniform Delay, d1	30.8	23.8		31.4	19.6	0.0	32.0	11.4		36.6	12.8	
Delay	31.4	120.6		32.1	19.7	6.2	32.7	12.0		49.8	16.9	
LOS	C	F		C	B	A	C	B		D	B	
Approach Delay		118.2			20.5			18.2			37.0	
Approach LOS		F			C			B			D	
Stops (vph)	50	4620		77	459	13	94	97		64	21	
Fuel Used(gal)	1	104		2	14	1	3	5		2	1	
CO Emmisions (g/hr)	100	7269		148	949	42	191	327		131	57	
NOx Emmisions (g/hr)	20	1414		29	185	8	37	64		25	11	
VOC Emmisions (g/hr)	23	1685		34	220	10	44	76		30	13	
Dilemma Vehicles (#)	0	0		0	0	0	0	0		0	0	

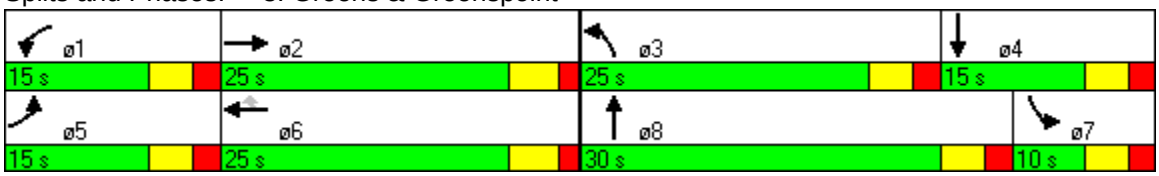
Intersection Summary	
Cycle Length: 80	
Offset: 20 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 82.2	Intersection LOS: F
Intersection Capacity Utilization 89.9%	ICU Level of Service D

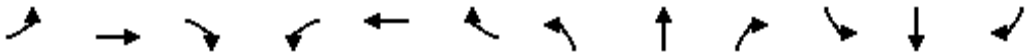
Splits and Phases: 3: Greens & Greenspoint

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4894	0	1770	5085	1583	1610	3159	0	1770	3210	0
Flt Permitted	0.950			0.950			0.950	0.872		0.950		
Satd. Flow (perm)	1769	4894	0	1767	5085	1560	1604	2823	0	1767	3210	0
Satd. Flow (RTOR)		89				125		59			50	
Volume (vph)	76	742	217	111	1320	115	522	98	125	41	34	46
Lane Group Flow (vph)	83	1043	0	121	1435	125	284	526	0	45	87	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Total Split (s)	15.0	25.0	0.0	15.0	25.0	25.0	25.0	30.0	0.0	10.0	15.0	0.0
Act Effct Green (s)	11.0	21.0		11.0	21.0	21.0	21.0	26.0		6.0	11.0	
Actuated g/C Ratio	0.14	0.26		0.14	0.26	0.26	0.26	0.33		0.08	0.14	
v/c Ratio	0.34	0.77		0.50	1.07	0.25	0.67	0.55		0.34	0.18	
Uniform Delay, d1	31.2	24.8		31.9	29.5	0.0	26.4	19.0		35.1	12.8	
Delay	31.9	25.1		32.6	72.3	5.0	27.7	19.4		35.7	16.0	
LOS	C	C		C	E	A	C	B		D	B	
Approach Delay		25.6			64.4			22.3			22.8	
Approach LOS		C			E			C			C	
Stops (vph)	67	1258		100	1805	29	230	356		40	36	
Fuel Used(gal)	2	26		3	47	2	7	11		1	2	
CO Emmisions (g/hr)	139	1817		193	3275	126	463	773		75	108	
NOx Emmisions (g/hr)	27	354		38	637	24	90	150		15	21	
VOC Emmisions (g/hr)	32	421		45	759	29	107	179		17	25	
Dilemma Vehicles (#)	0	0		0	0	0	0	0		0	0	

Intersection Summary	
Cycle Length: 80	
Offset: 20 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 42.2	Intersection LOS: D
Intersection Capacity Utilization 64.7%	ICU Level of Service B

Splits and Phases: 3: Greens & Greenspoint

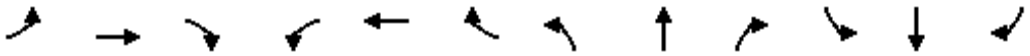




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	0	0	0	4688	0	1770	3539	0	0	3351	0
Flt Permitted					0.987		0.950					
Satd. Flow (perm)	0	0	0	0	4688	0	1769	3539	0	0	3351	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					52						105	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1808			1984			632			1232	
Travel Time (s)		41.1			45.1			14.4			28.0	
Volume (vph)	0	0	0	381	434	633	332	1515	0	0	948	458
Lane Group Flow (vph)	0	0	0	0	1574	0	361	1647	0	0	1528	0
Turn Type				Perm			Prot					
Protected Phases					8		5	2			6	
Permitted Phases				8								
Total Split (s)	0.0	0.0	0.0	18.0	18.0	0.0	34.0	62.0	0.0	0.0	28.0	0.0
Act Effct Green (s)					14.0		30.0	58.0			24.0	
Actuated g/C Ratio					0.18		0.38	0.73			0.30	
v/c Ratio					2.12dr		0.54	0.64			1.42	
Uniform Delay, d1					31.0		19.6	5.7			25.3	
Delay					257.8		17.6	11.6			177.0	
LOS					F		B	B			F	
Approach Delay					257.8			12.7			177.0	
Approach LOS					F			B			F	
Stops (vph)					5327		287	1110			3506	
Fuel Used(gal)					128		4	17			84	
CO Emmisions (g/hr)					8935		308	1201			5839	
NOx Emmisions (g/hr)					1738		60	234			1136	
VOC Emmisions (g/hr)					2071		71	278			1353	
Dilemma Vehicles (#)					0		0	0			0	

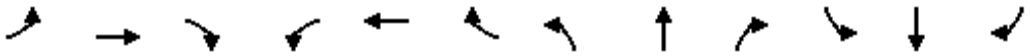
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 1.82			
Intersection Signal Delay: 137.3		Intersection LOS: F	
Intersection Capacity Utilization 107.4%		ICU Level of Service F	

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



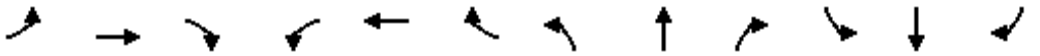
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50						50		50	50	
Trailing Detector (ft)	0	0						0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1610	3214	0	0	0	0	0	3322	0	1770	3539	0
Flt Permitted	0.950	0.998								0.950		
Satd. Flow (perm)	1608	3214	0	0	0	0	0	3322	0	1769	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62						148				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1744			1840			2488			632	
Travel Time (s)		39.6			41.8			56.5			14.4	
Volume (vph)	589	733	350	0	0	0	0	926	558	314	1329	0
Lane Group Flow (vph)	581	1236	0	0	0	0	0	1614	0	341	1445	0
Turn Type	Perm									Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4											
Total Split (s)	22.0	22.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	28.0	58.0	0.0
Act Effct Green (s)	18.0	18.0						26.0		24.0	54.0	
Actuated g/C Ratio	0.23	0.23						0.33		0.30	0.68	
v/c Ratio	1.60	1.60						1.37		0.64	0.60	
Uniform Delay, d1	31.0	28.5						23.6		24.3	7.1	
Delay	221.0	219.7						163.4		26.7	13.1	
LOS	F	F						F		C	B	
Approach Delay		220.1						163.4			15.7	
Approach LOS		F						F			B	
Stops (vph)	1623	3683						3473		303	839	
Fuel Used(gal)	40	87						97		5	15	
CO Emmisions (g/hr)	2818	6058						6809		344	1031	
NOx Emmisions (g/hr)	548	1179						1325		67	201	
VOC Emmisions (g/hr)	653	1404						1578		80	239	
Dilemma Vehicles (#)	0	0						0		0	0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 1.60			
Intersection Signal Delay: 132.6		Intersection LOS: F	
Intersection Capacity Utilization 111.5%		ICU Level of Service G	



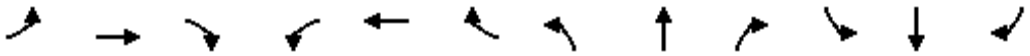
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	0	0	0	4829	0	1770	3539	0	0	3401	0
Flt Permitted					0.986		0.950					
Satd. Flow (perm)	0	0	0	0	4829	0	1769	3539	0	0	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					106						55	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1808			1984			632			1232	
Travel Time (s)		41.1			45.1			14.4			28.0	
Volume (vph)	0	0	0	210	357	184	140	354	0	0	691	220
Lane Group Flow (vph)	0	0	0	0	816	0	152	385	0	0	990	0
Turn Type				Perm			Prot					
Protected Phases					8		5	2			6	
Permitted Phases				8								
Total Split (s)	0.0	0.0	0.0	19.0	19.0	0.0	32.0	51.0	0.0	0.0	19.0	0.0
Act Effct Green (s)					15.0		28.0	47.0			15.0	
Actuated g/C Ratio					0.21		0.40	0.67			0.21	
v/c Ratio					0.73		0.21	0.16			1.28	
Uniform Delay, d1					22.1		13.8	4.2			25.5	
Delay					22.4		12.3	10.2			134.9	
LOS					C		B	B			F	
Approach Delay					22.4			10.8			134.9	
Approach LOS					C			B			F	
Stops (vph)					930		88	199			2007	
Fuel Used(gal)					20		2	4			45	
CO Emmisions (g/hr)					1411		107	250			3136	
NOx Emmisions (g/hr)					274		21	49			610	
VOC Emmisions (g/hr)					327		25	58			727	
Dilemma Vehicles (#)					0		0	0			0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 1.28			
Intersection Signal Delay: 67.3		Intersection LOS: E	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	



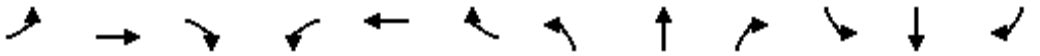
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50						50		50	50	
Trailing Detector (ft)	0	0						0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1610	3132	0	0	0	0	0	3388	0	1770	3539	0
Flt Permitted	0.950	0.996								0.950		
Satd. Flow (perm)	1608	3131	0	0	0	0	0	3388	0	1767	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		168						73				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1744			1840			2488			632	
Travel Time (s)		39.6			41.8			56.5			14.4	
Volume (vph)	186	160	155	0	0	0	0	308	108	143	758	0
Lane Group Flow (vph)	170	374	0	0	0	0	0	452	0	155	824	0
Turn Type	Perm									Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4											
Total Split (s)	24.0	24.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	20.0	46.0	0.0
Act Effct Green (s)	20.0	20.0						22.0		16.0	42.0	
Actuated g/C Ratio	0.29	0.29						0.31		0.23	0.60	
v/c Ratio	0.37	0.37						0.41		0.38	0.39	
Uniform Delay, d1	20.0	10.6						15.6		22.8	7.3	
Delay	20.6	10.9						15.8		27.6	14.3	
LOS	C	B						B		C	B	
Approach Delay		13.9						15.8			16.4	
Approach LOS		B						B			B	
Stops (vph)	122	199						248		140	452	
Fuel Used(gal)	3	7						11		2	8	
CO Emmisions (g/hr)	241	457						754		160	590	
NOx Emmisions (g/hr)	47	89						147		31	115	
VOC Emmisions (g/hr)	56	106						175		37	137	
Dilemma Vehicles (#)	0	0						0		0	0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 45.3%		ICU Level of Service A	



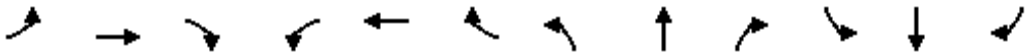
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50		50	50	
Trailing Detector (ft)				0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	0	0	0	4688	0	1770	3539	0	0	4882	0
Flt Permitted					0.987		0.950					
Satd. Flow (perm)	0	0	0	0	4688	0	1770	3539	0	0	4882	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					254						119	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1808			1984			632			1232	
Travel Time (s)		41.1			45.1			14.4			28.0	
Volume (vph)	0	0	0	172	196	286	150	684	0	0	570	207
Lane Group Flow (vph)	0	0	0	0	711	0	163	743	0	0	845	0
Turn Type				Perm			Prot			Perm		
Protected Phases					4		1	1 2			2	
Permitted Phases				4						2		
Total Split (s)	0.0	0.0	0.0	19.0	19.0	0.0	32.0	51.0	0.0	19.0	19.0	0.0
Act Effct Green (s)					15.0		28.0	47.0			15.0	
Actuated g/C Ratio					0.21		0.40	0.67			0.21	
v/c Ratio					0.59		0.23	0.31			0.74	
Uniform Delay, d1					15.5		13.9	4.8			21.9	
Delay					15.7		11.6	12.9			22.2	
LOS					B		B	B			C	
Approach Delay					15.7			12.6			22.2	
Approach LOS					B			B			C	
Stops (vph)					573		103	549			575	
Fuel Used(gal)					15		2	8			14	
CO Emmisions (g/hr)					1075		116	573			989	
NOx Emmisions (g/hr)					209		23	112			192	
VOC Emmisions (g/hr)					249		27	133			229	
Dilemma Vehicles (#)					0		0	0			0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 62.4%		ICU Level of Service B	



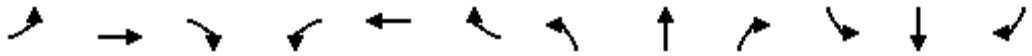
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50						50		50	50	
Trailing Detector (ft)	0	0						0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1610	3211	0	0	0	0	0	3381	0	1770	3539	0
Flt Permitted	0.950	0.998								0.950		
Satd. Flow (perm)	1608	3211	0	0	0	0	0	3381	0	1768	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		96						80				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1744			1840			2488			632	
Travel Time (s)		39.6			41.8			56.5			14.4	
Volume (vph)	266	331	158	0	0	0	0	568	212	142	600	0
Lane Group Flow (vph)	267	554	0	0	0	0	0	847	0	154	652	0
Turn Type	Perm									Prot		
Protected Phases		4						2		1	1 2	
Permitted Phases	4											
Total Split (s)	25.0	25.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	19.0	45.0	0.0
Act Effct Green (s)	21.0	21.0						22.0		15.0	41.0	
Actuated g/C Ratio	0.30	0.30						0.31		0.21	0.59	
v/c Ratio	0.55	0.54						0.76		0.41	0.31	
Uniform Delay, d1	20.5	16.6						19.4		23.6	7.4	
Delay	21.3	17.0						19.8		29.8	10.1	
LOS	C	B						B		C	B	
Approach Delay		18.4						19.8			13.9	
Approach LOS		B						B			B	
Stops (vph)	201	465						582		137	268	
Fuel Used(gal)	6	11						21		2	6	
CO Emmisions (g/hr)	386	787						1501		162	397	
NOx Emmisions (g/hr)	75	153						292		32	77	
VOC Emmisions (g/hr)	89	183						348		38	92	
Dilemma Vehicles (#)	0	0						0		0	0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 59.0%		ICU Level of Service A	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50			50			50	
Trailing Detector (ft)	0	0		0	0			0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	3279	0	0	3336	0	0	4884	0	0	4886	0
Flt Permitted		0.915			0.768							
Satd. Flow (perm)	0	3003	0	0	2600	0	0	4884	0	0	4886	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		137			72			155			108	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1856			2240			2408			1992	
Travel Time (s)		42.2			50.9			54.7			45.3	
Volume (vph)	31	222	126	77	119	66	0	447	143	0	444	99
Lane Group Flow (vph)	0	412	0	0	285	0	0	641	0	0	591	0
Turn Type	Perm			Perm								
Protected Phases		2			6			8			4	
Permitted Phases	2			6								
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	0.0	31.0	0.0	0.0	31.0	0.0
Act Effct Green (s)		25.0			25.0			27.0			27.0	
Actuated g/C Ratio		0.42			0.42			0.45			0.45	
v/c Ratio		0.31			0.25			0.28			0.26	
Uniform Delay, d1		7.5			8.3			7.7			8.2	
Delay		7.7			8.6			7.8			8.4	
LOS		A			A			A			A	
Approach Delay		7.7			8.6			7.8			8.4	
Approach LOS		A			A			A			A	
Stops (vph)		162			122			251			249	
Fuel Used(gal)		7			6			13			11	
CO Emmisions (g/hr)		488			399			937			751	
NOx Emmisions (g/hr)		95			78			182			146	
VOC Emmisions (g/hr)		113			92			217			174	
Dilemma Vehicles (#)		0			0			0			0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Offset: 29 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 50.0%		ICU Level of Service A	



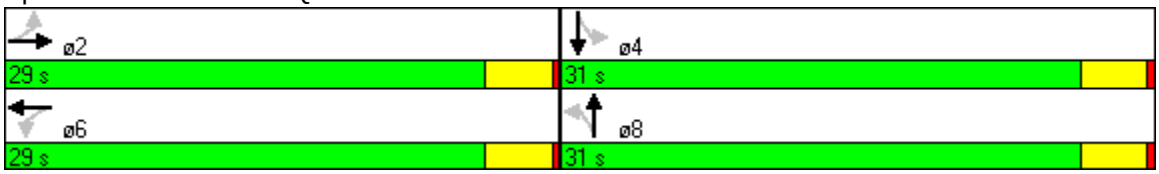
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50			50			50	
Trailing Detector (ft)	0	0		0	0			0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	3279	0	0	3336	0	0	4884	0	0	4886	0
Flt Permitted		0.915			0.768							
Satd. Flow (perm)	0	3003	0	0	2600	0	0	4884	0	0	4886	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		137			72			155			108	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1856			2240			2408			1992	
Travel Time (s)		42.2			50.9			54.7			45.3	
Volume (vph)	31	222	126	77	119	66	0	447	143	0	444	99
Lane Group Flow (vph)	0	412	0	0	285	0	0	641	0	0	591	0
Turn Type	Perm			Perm								
Protected Phases		2			6			8			4	
Permitted Phases	2			6								
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	0.0	31.0	0.0	0.0	31.0	0.0
Act Effct Green (s)		25.0			25.0			27.0			27.0	
Actuated g/C Ratio		0.42			0.42			0.45			0.45	
v/c Ratio		0.31			0.25			0.28			0.26	
Uniform Delay, d1		7.5			8.3			7.7			8.2	
Delay		7.7			8.6			7.8			8.4	
LOS		A			A			A			A	
Approach Delay		7.7			8.6			7.8			8.4	
Approach LOS		A			A			A			A	
Stops (vph)		162			122			251			249	
Fuel Used(gal)		7			6			13			11	
CO Emmisions (g/hr)		488			399			937			751	
NOx Emmisions (g/hr)		95			78			182			146	
VOC Emmisions (g/hr)		113			92			217			174	
Dilemma Vehicles (#)		0			0			0			0	

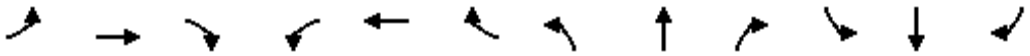
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Offset: 29 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 50.0%		ICU Level of Service A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	3255	0	0	3421	0	0	4853	0	0	4971	0
Flt Permitted		0.920			0.827			0.771			0.868	
Satd. Flow (perm)	0	2999	0	0	2859	0	0	3765	0	0	4334	0
Satd. Flow (RTOR)		97			35			83			32	
Volume (vph)	18	136	89	78	216	46	79	208	76	56	461	47
Lane Group Flow (vph)	0	265	0	0	370	0	0	395	0	0	613	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Act Effct Green (s)		25.0			25.0			27.0			27.0	
Actuated g/C Ratio		0.42			0.42			0.45			0.45	
v/c Ratio		0.20			0.31			0.23			0.31	
Uniform Delay, d1		6.9			10.5			7.8			9.9	
Delay		7.0			10.7			8.0			10.1	
LOS		A			B			A			B	
Approach Delay		7.0			10.7			8.0			10.1	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 60	
Offset: 29 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.31	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 66.7%	ICU Level of Service B

Splits and Phases: 3: Quitman & N Main



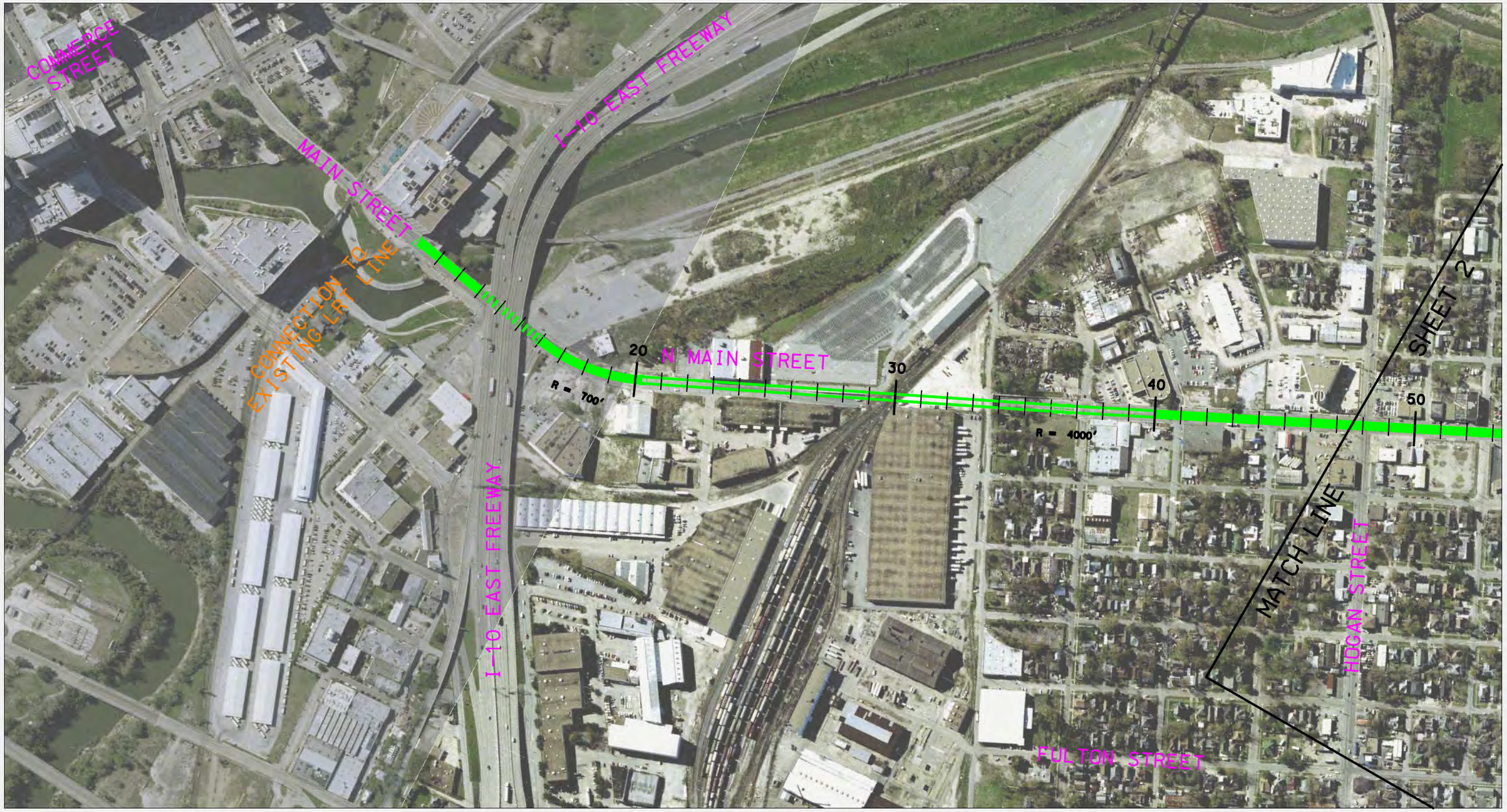


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	0	3332	0	0	3357	0	0	4939	0	0	5017	0
Flt Permitted		0.919			0.789			0.825			0.830	
Satd. Flow (perm)	0	3074	0	0	2686	0	0	4106	0	0	4193	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		117			62			68			12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1856			2240			2408			1992	
Travel Time (s)		42.2			50.9			54.7			45.3	
Volume (vph)	27	190	108	66	102	57	70	313	63	58	322	15
Lane Group Flow (vph)	0	353	0	0	245	0	0	484	0	0	429	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Act Effct Green (s)		25.0			25.0			27.0			27.0	
Actuated g/C Ratio		0.42			0.42			0.45			0.45	
v/c Ratio		0.26			0.21			0.26			0.23	
Uniform Delay, d1		7.4			8.2			8.7			9.8	
Delay		7.6			8.4			8.8			9.9	
LOS		A			A			A			A	
Approach Delay		7.6			8.4			8.8			9.9	
Approach LOS		A			A			A			A	
Stops (vph)		136			103			215			214	
Fuel Used(gal)		6			5			10			8	
CO Emmisions (g/hr)		416			341			723			567	
NOx Emmisions (g/hr)		81			66			141			110	
VOC Emmisions (g/hr)		97			79			168			131	
Dilemma Vehicles (#)		0			0			0			0	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Offset: 29 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Pretimed			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 56.8%		ICU Level of Service A	

APPENDIX J

LPIS: ALL



LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 01

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 02

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 03

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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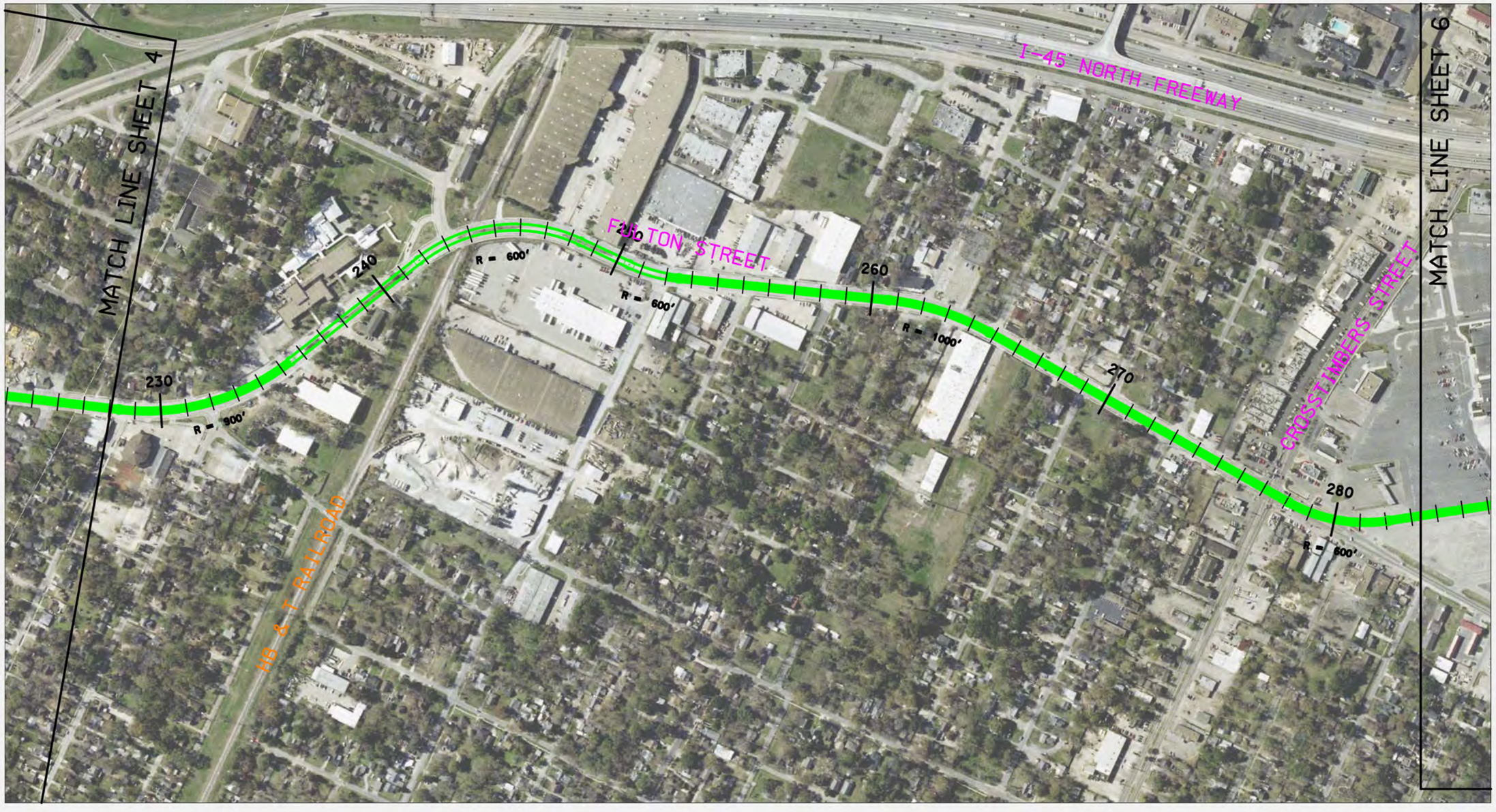
North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 04



LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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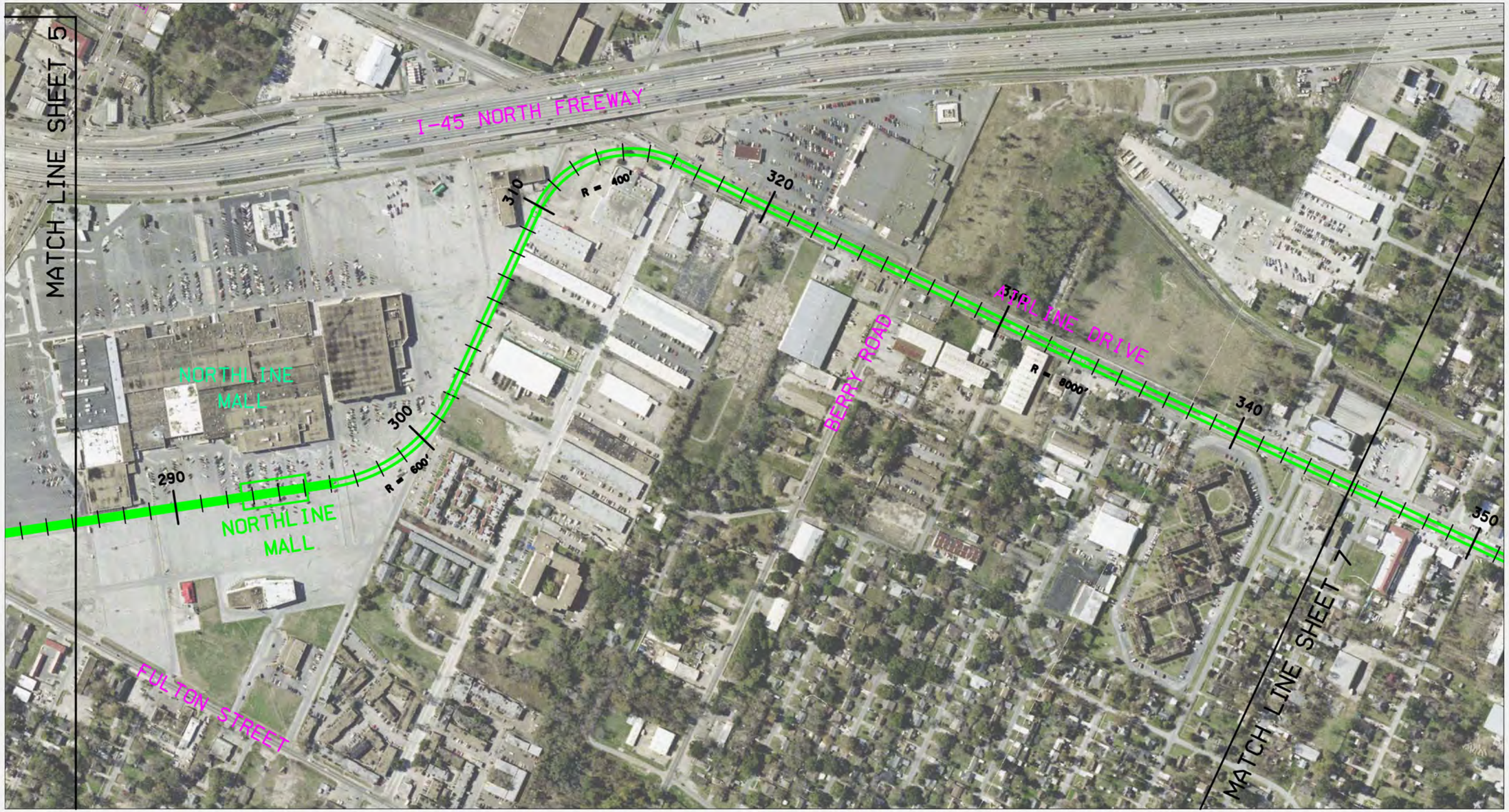

LEGEND

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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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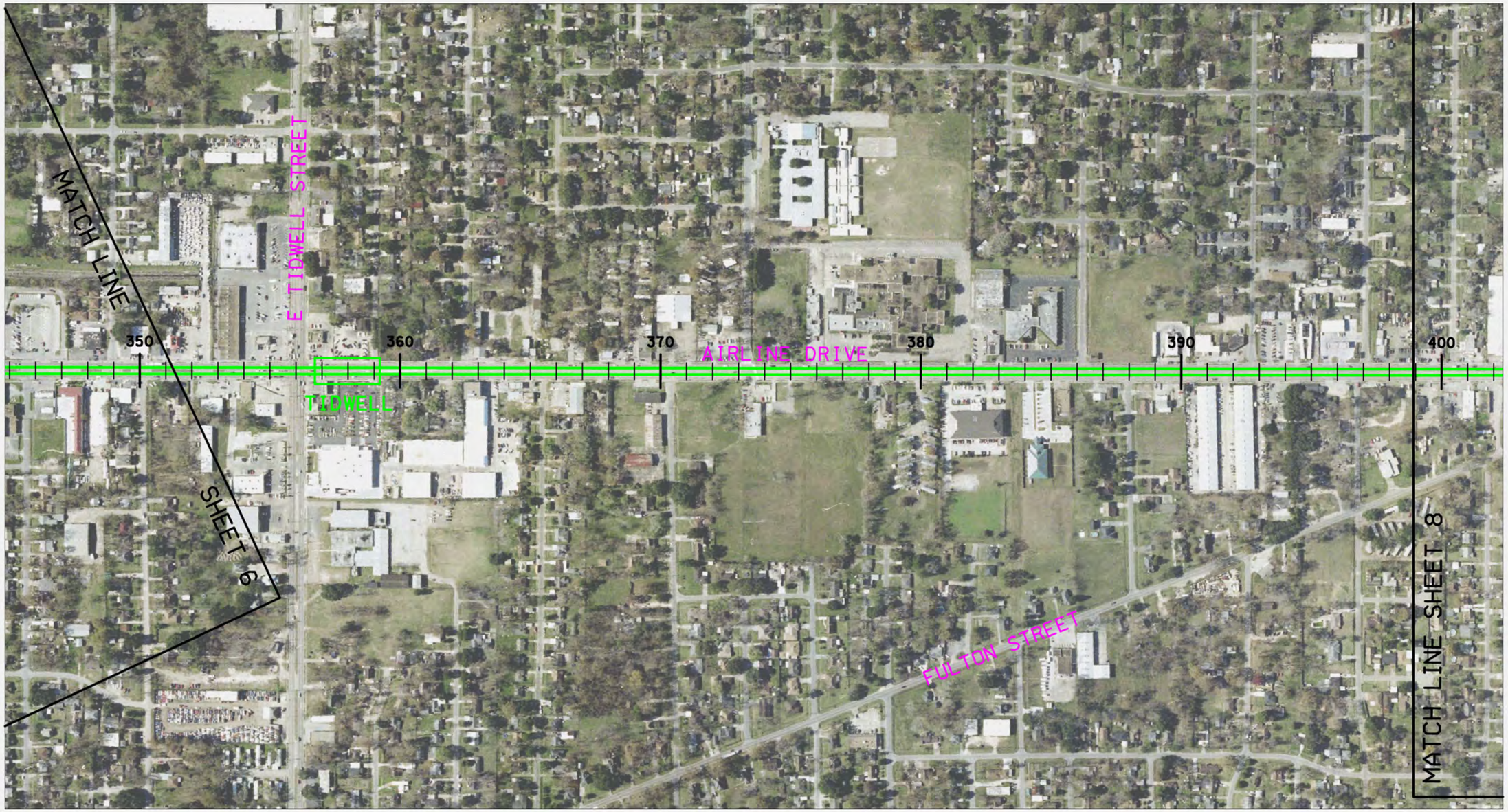

LEGEND

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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

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Prepared By:

STV Incorporated

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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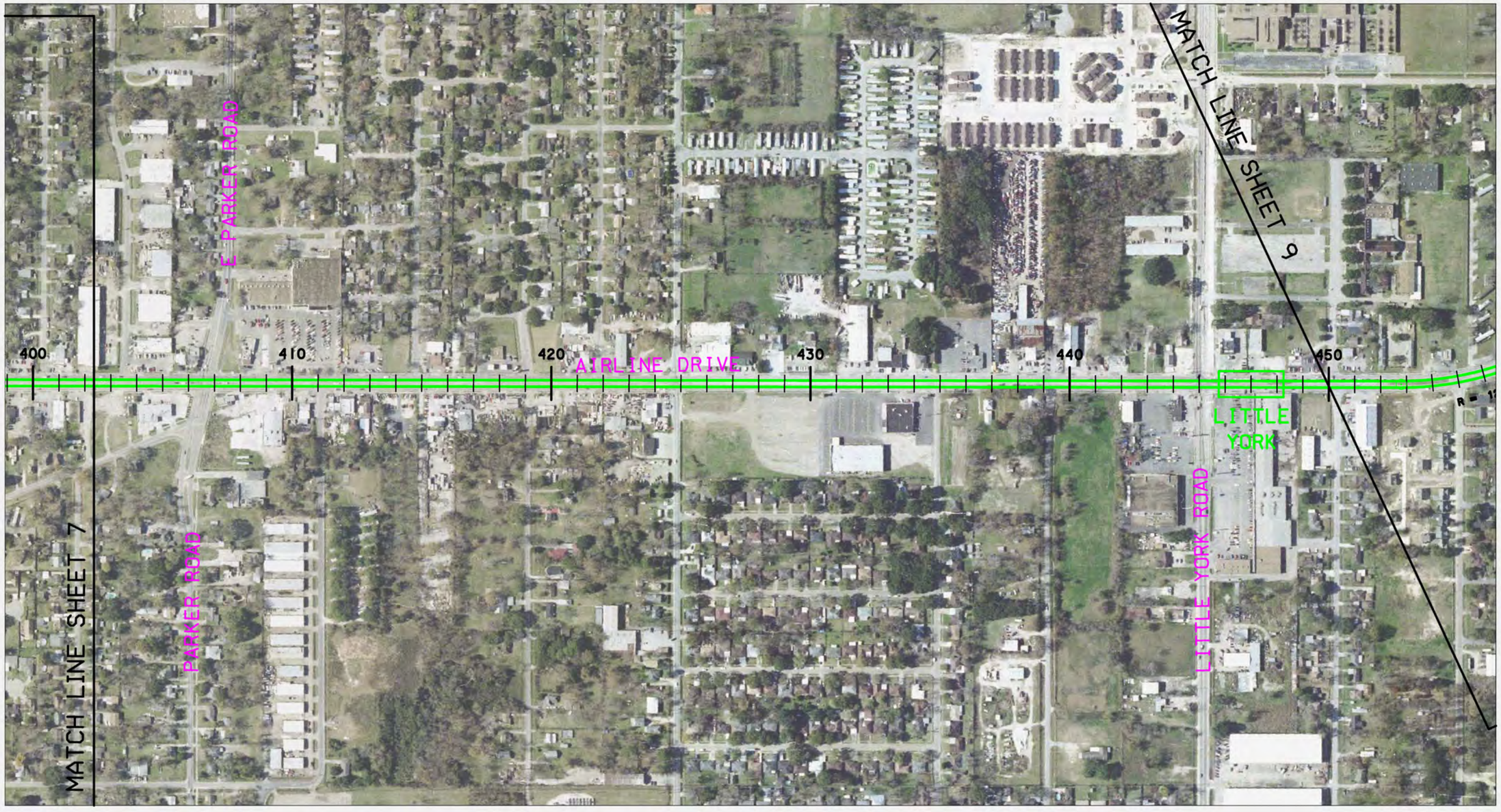

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 08

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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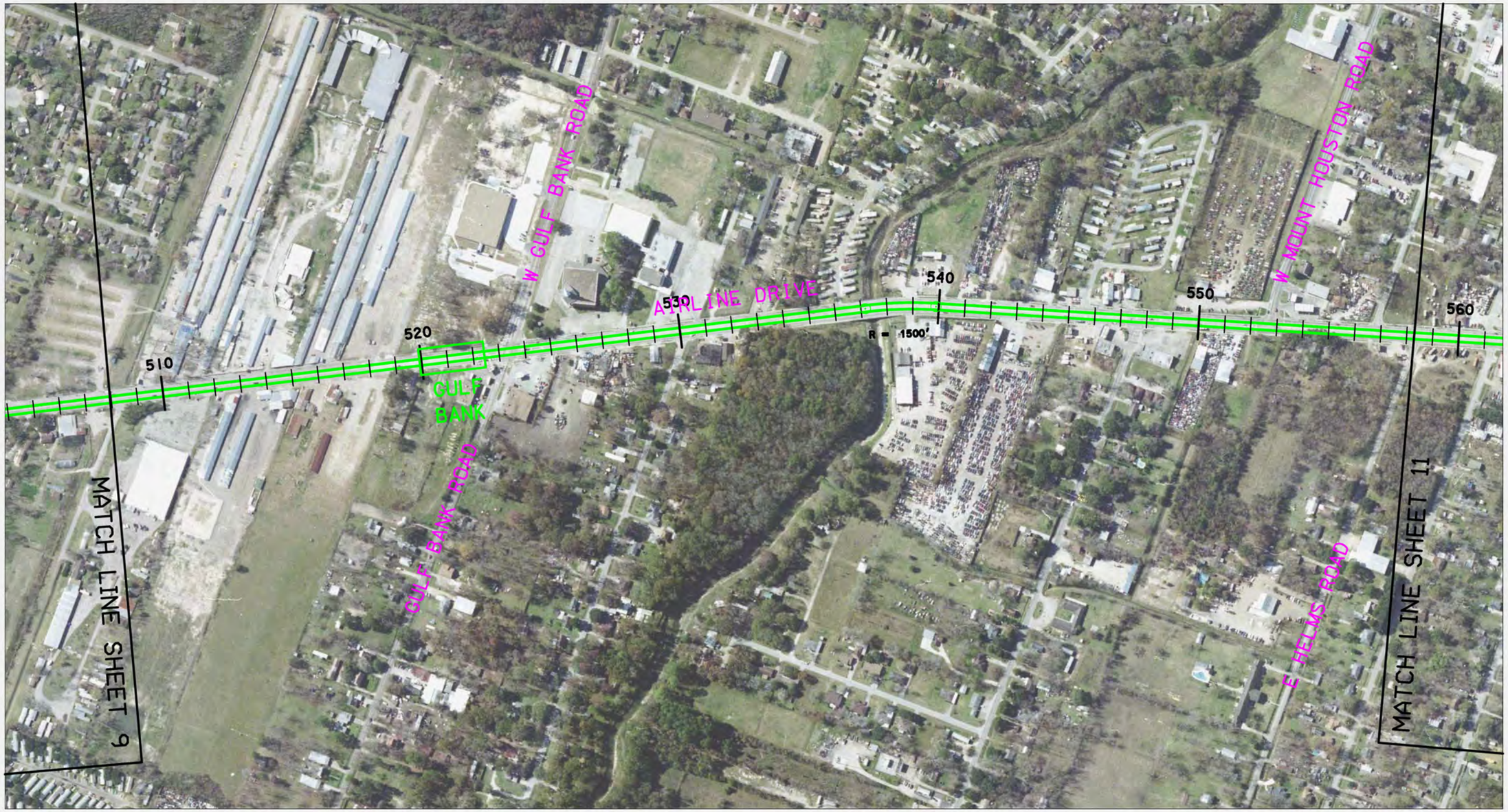

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 10

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 11

LEGEND

AT GRADE

AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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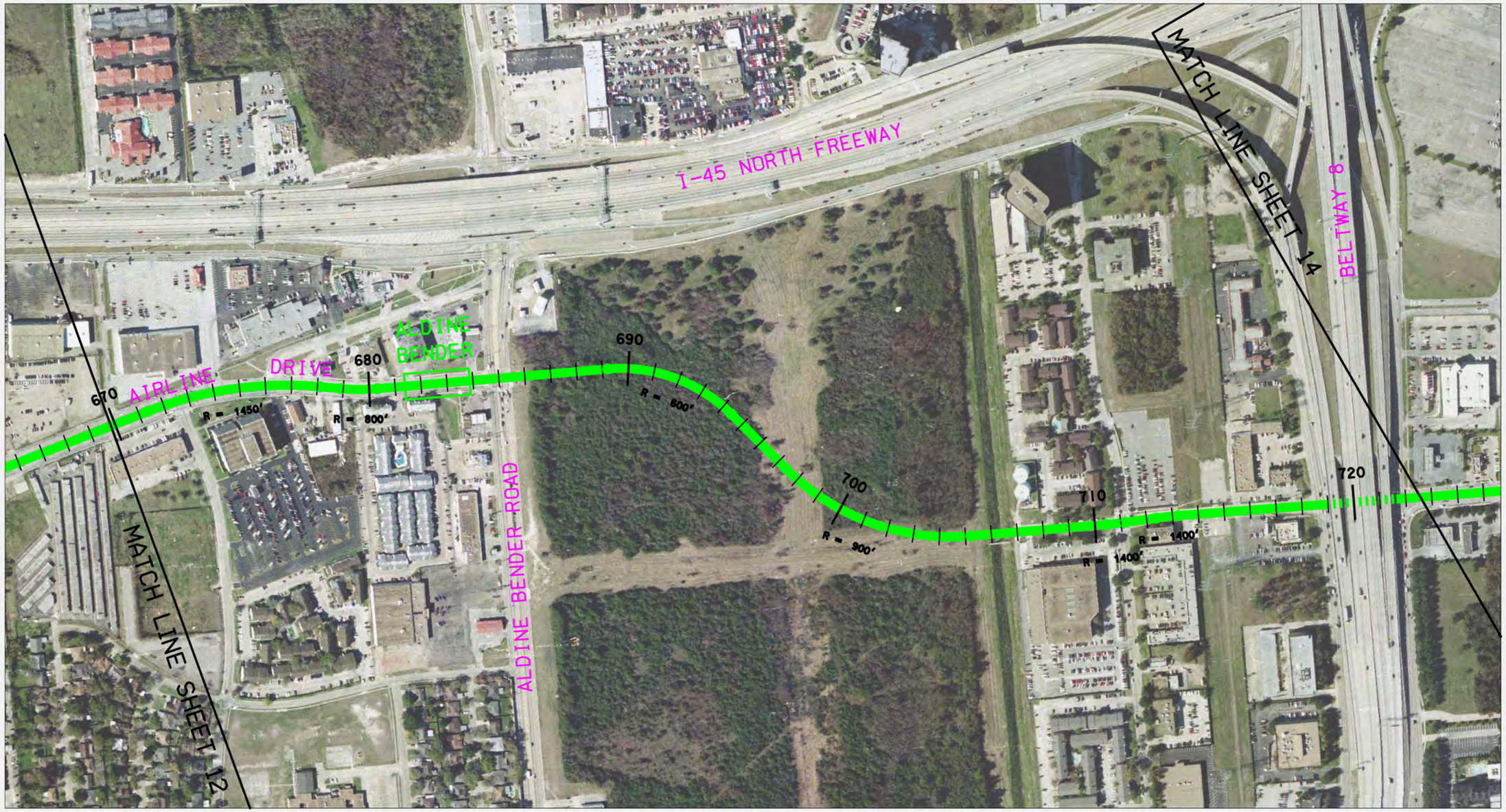
North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 12



LEGEND

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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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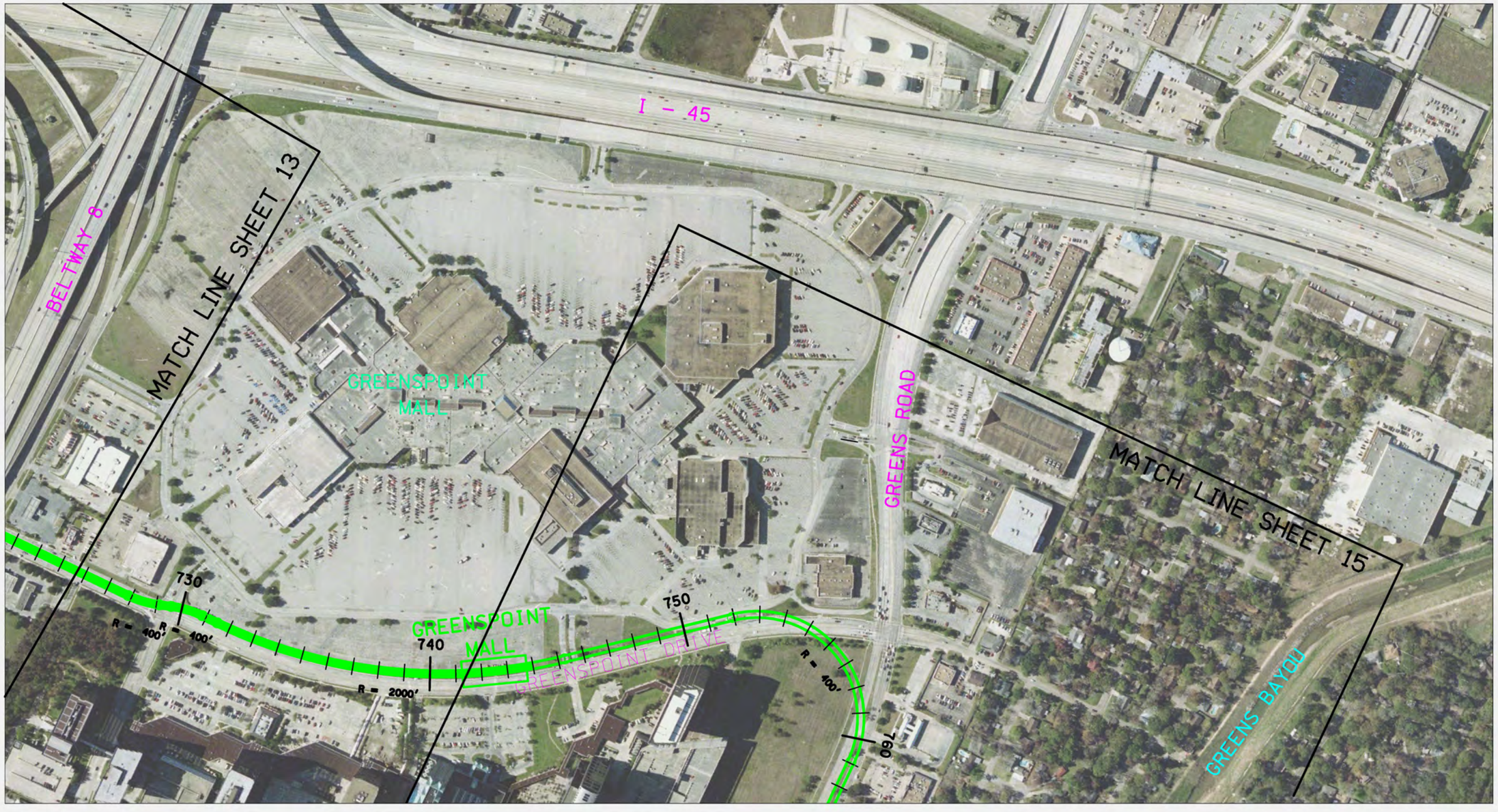

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STATION LOCATION

GRAPHIC SCALE

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Prepared By:

STV Incorporated

Engineers / Architects / Planners / Construction Managers

North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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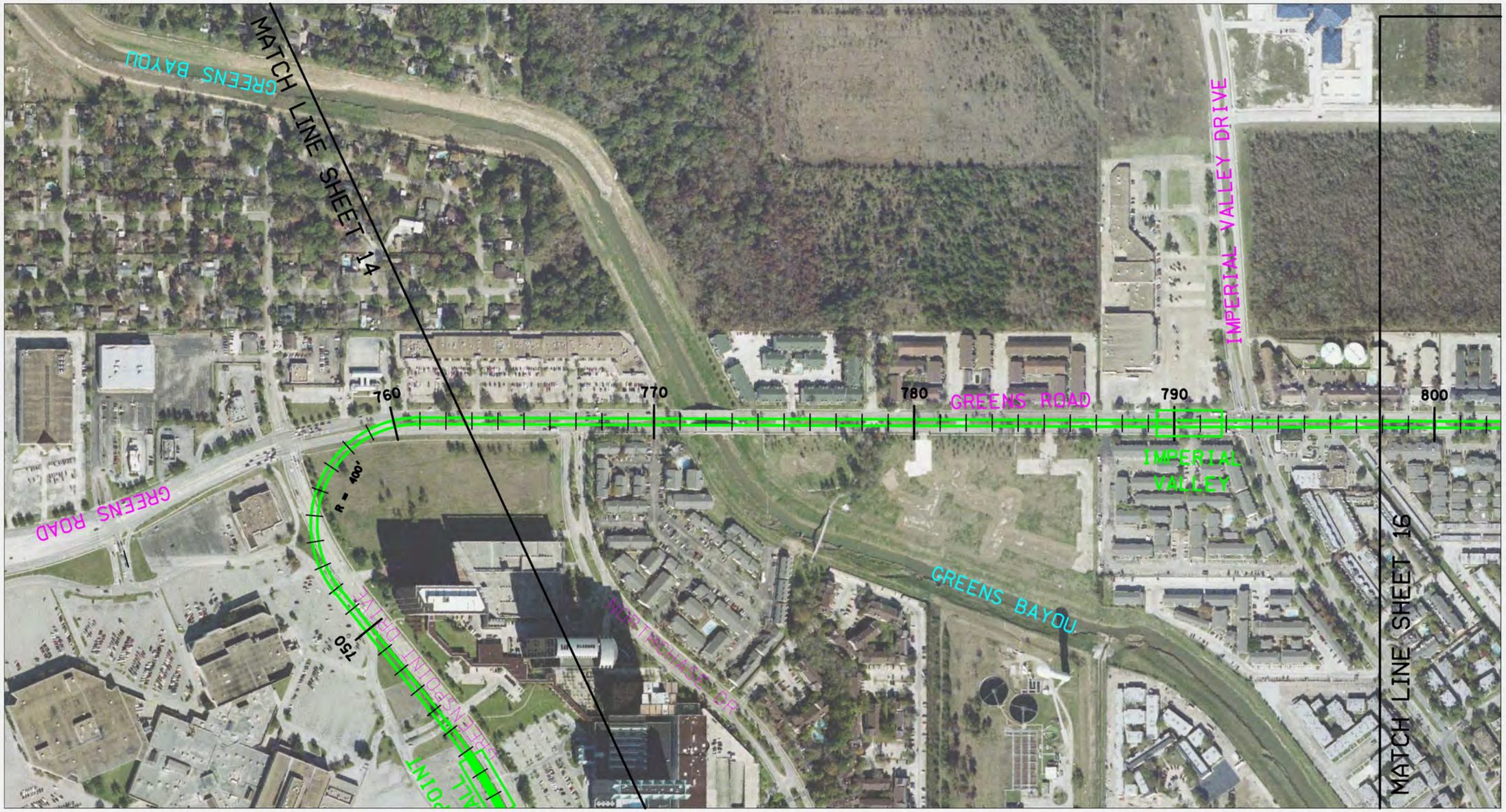

LEGEND

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

STV Incorporated

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North Hardy planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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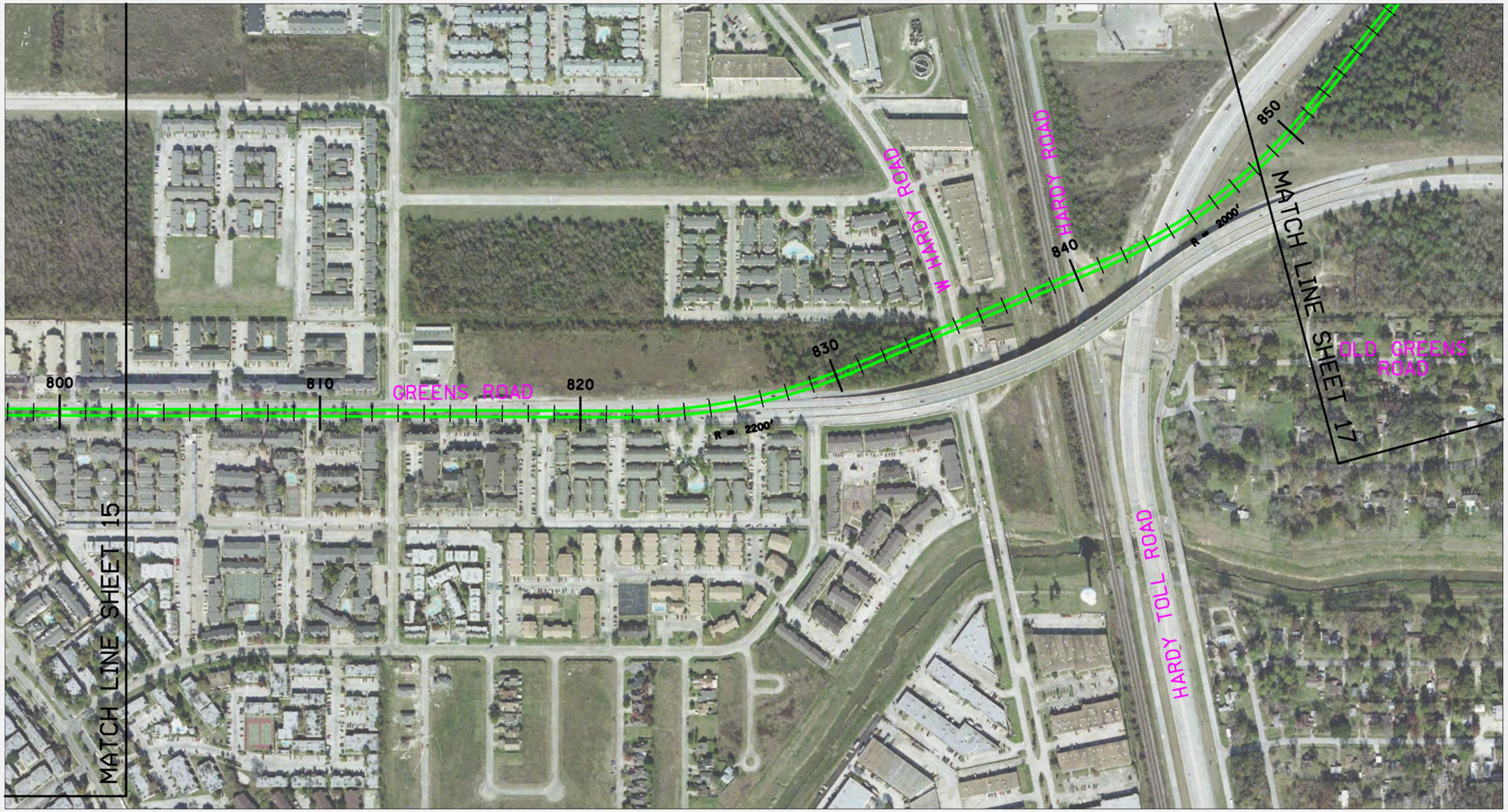

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AERIAL

AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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LPIS
RAIL LINE

DATE 3 OCT. 2003

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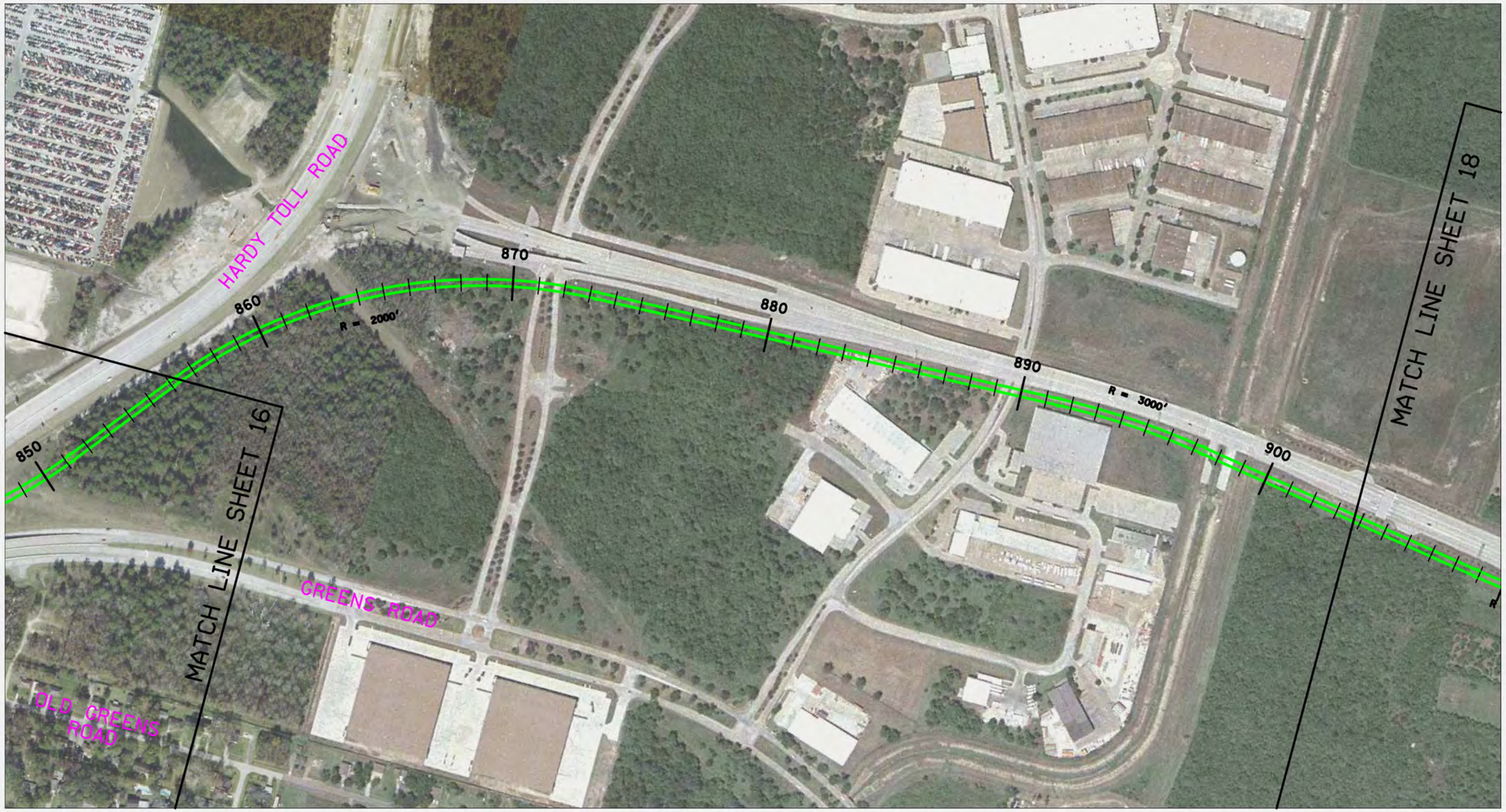

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

Prepared By:

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LPIS
RAIL LINE

DATE 3 OCT. 2003

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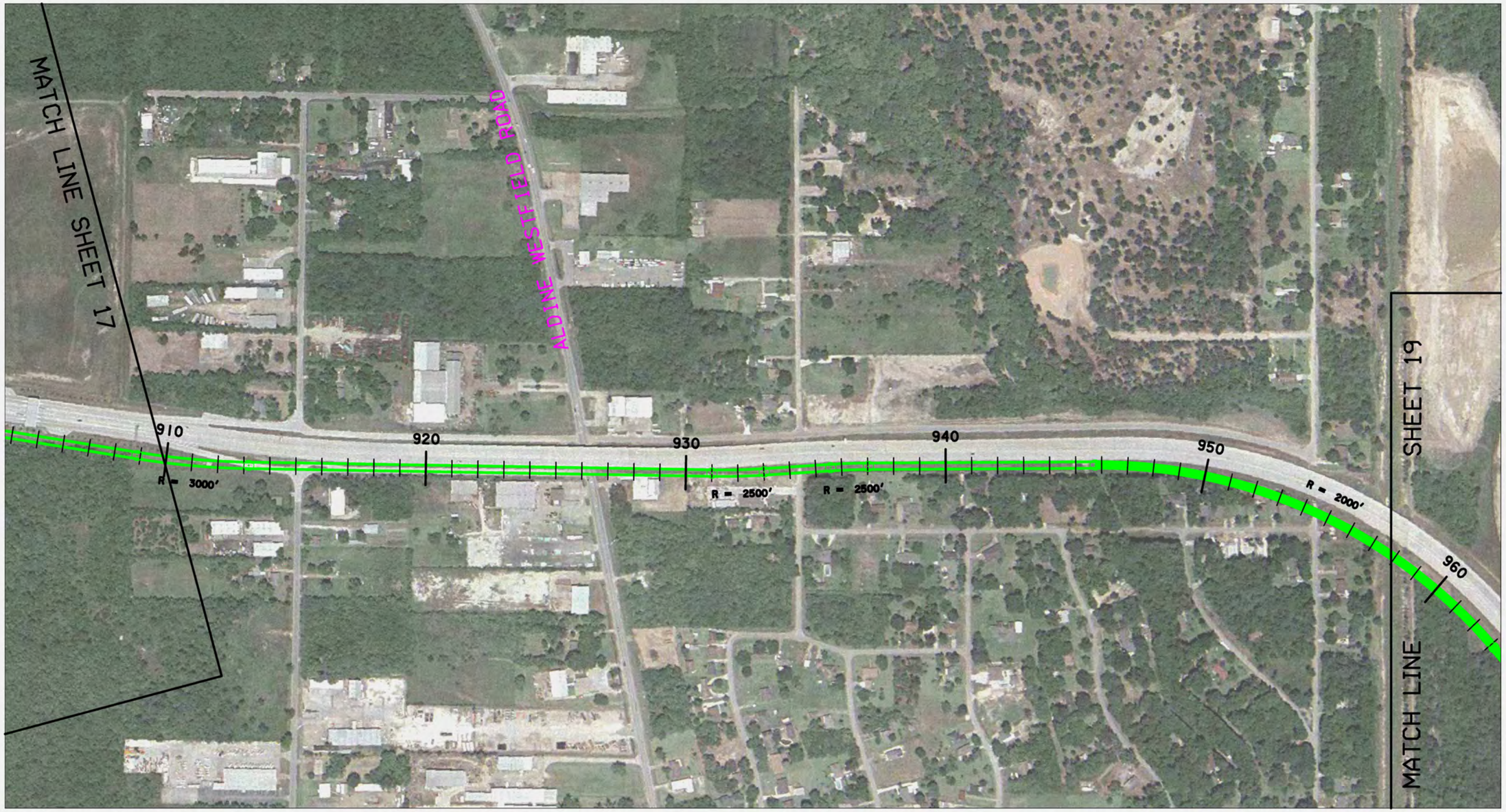

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STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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RAIL LINE

DATE 3 OCT. 2003

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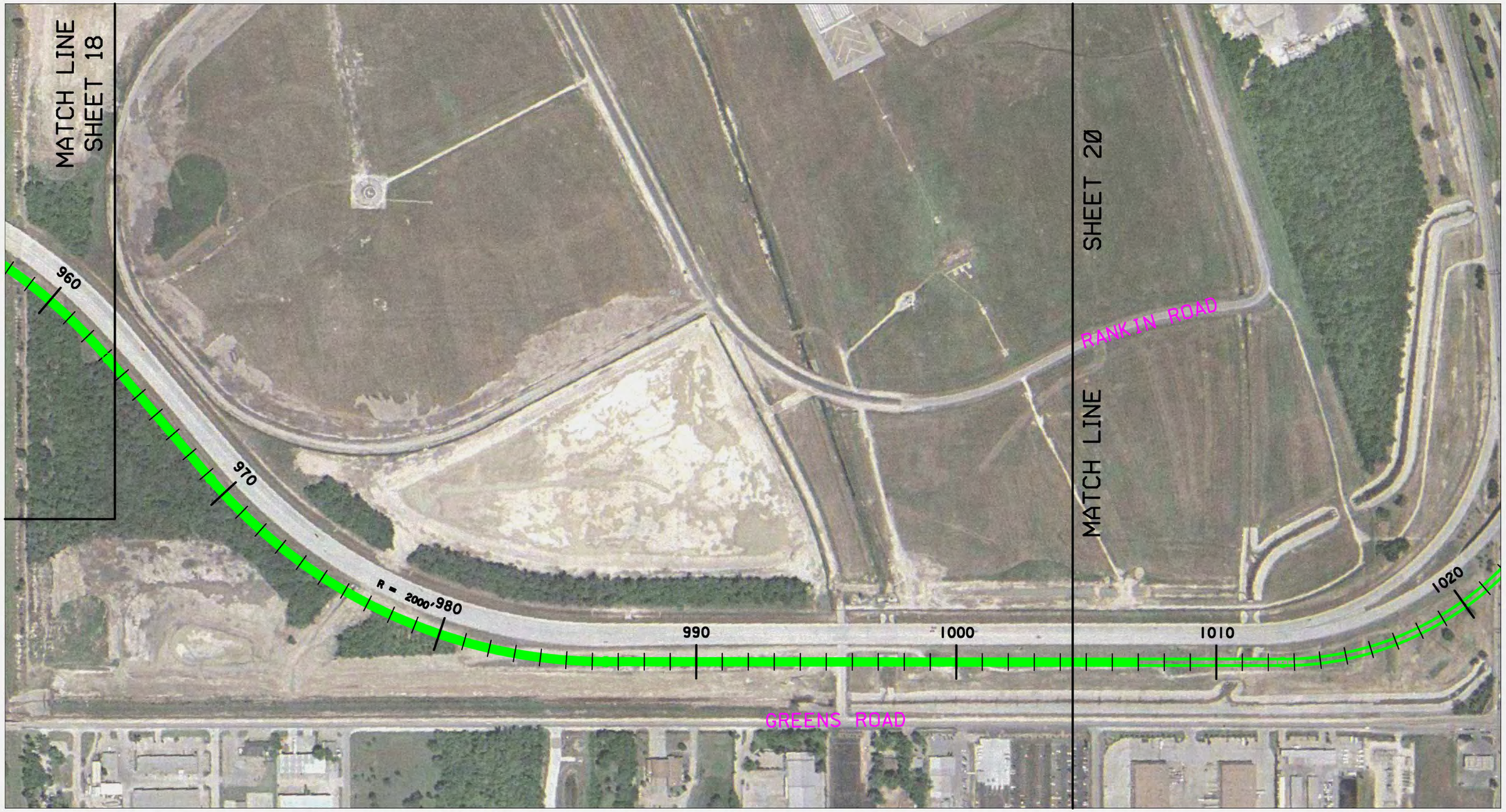

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STATION LOCATION

GRAPHIC SCALE

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LPIS
RAIL LINE

DATE 3 OCT. 2003

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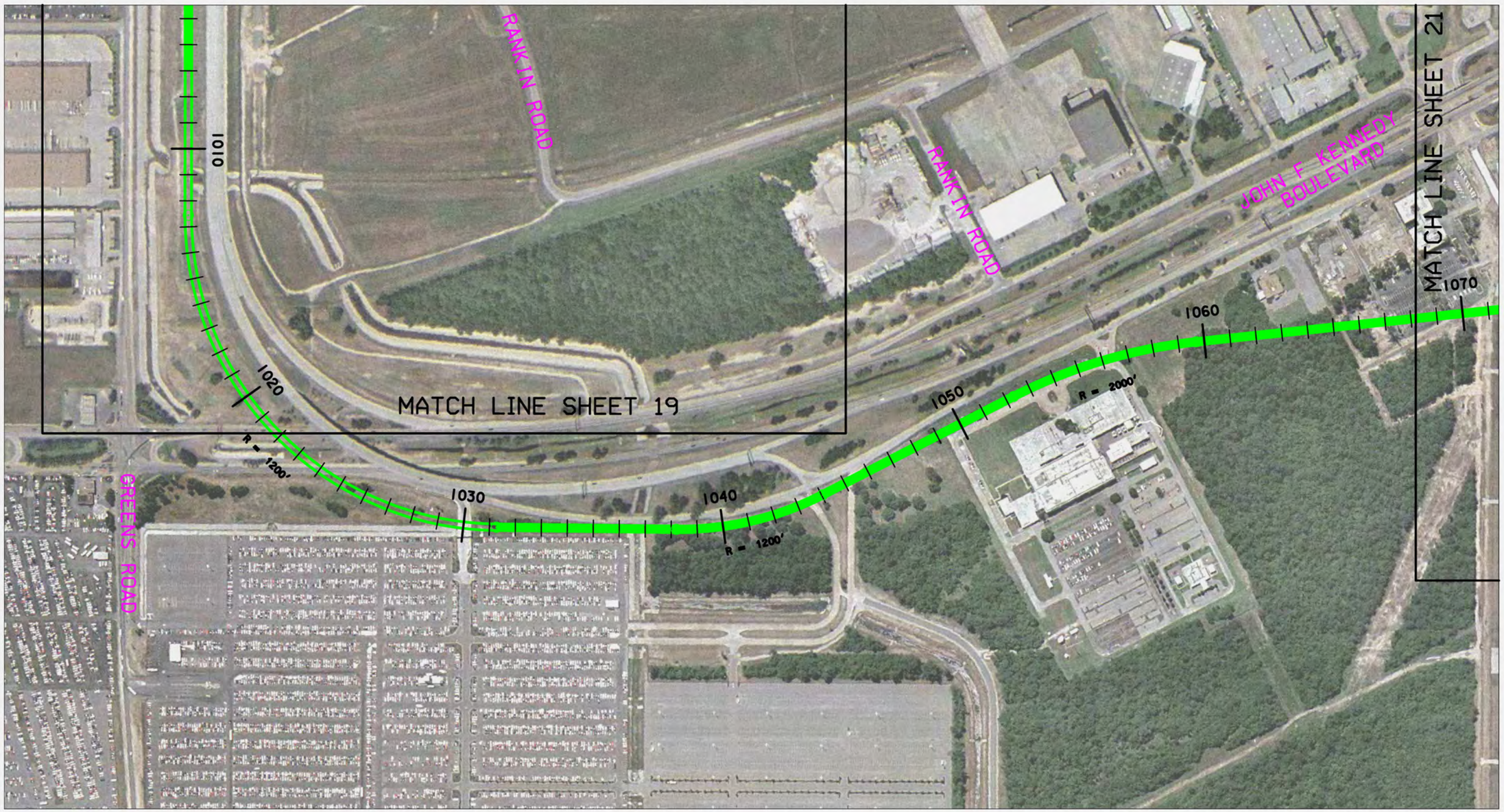

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STATION LOCATION

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LPIS
RAIL LINE

DATE 3 OCT. 2003

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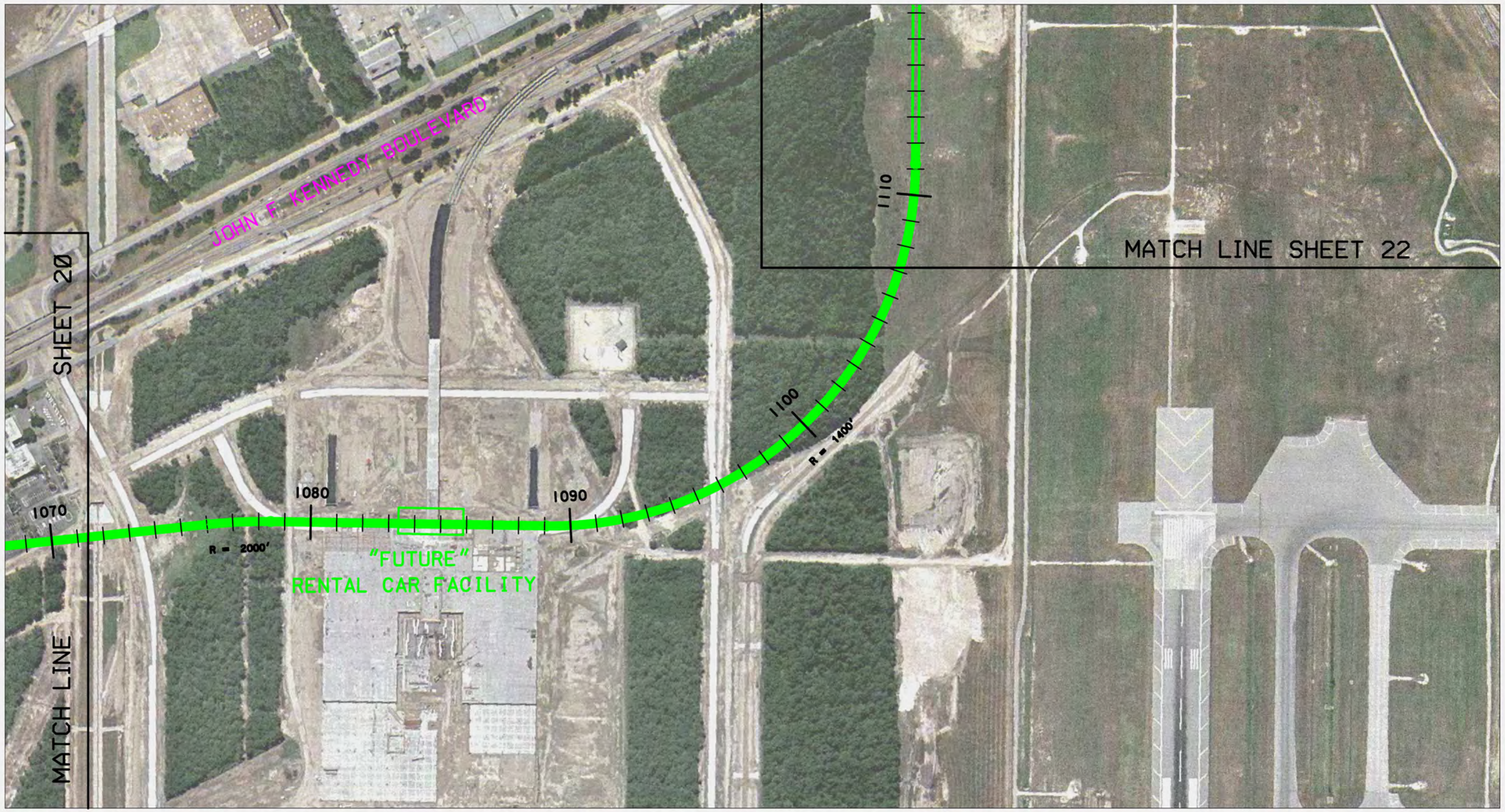

LEGEND
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STATION LOCATION

GRAPHIC SCALE
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Prepared By:
STV Incorporated
Engineers / Architects / Planners / Construction Managers

North Hardy
planning studies

LPIS
RAIL LINE

DATE 3 OCT. 2003

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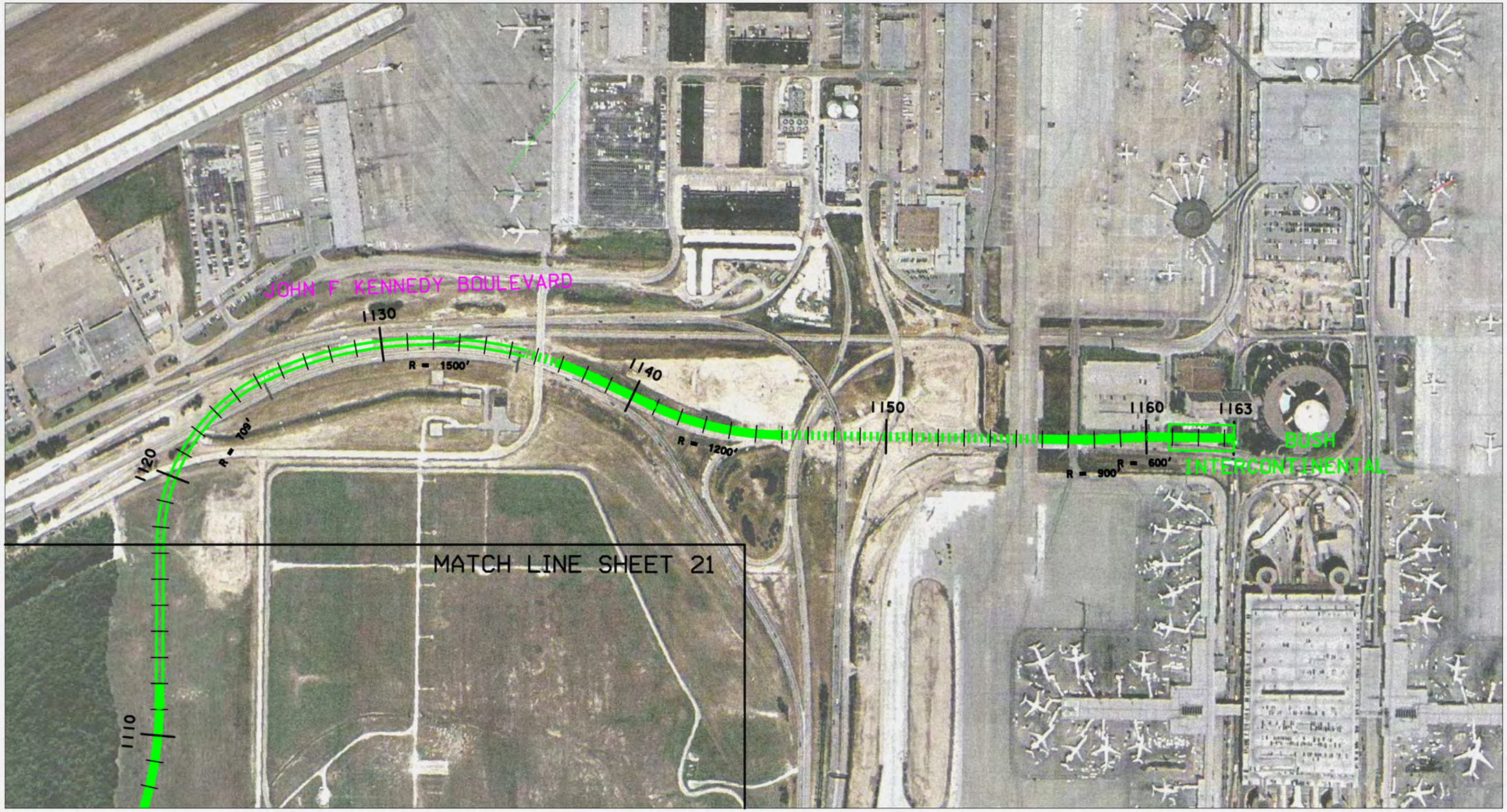

LEGEND

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AT GRADE BELOW STRUCTURE

STATION LOCATION

GRAPHIC SCALE

400' 0 400'

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LPIS
RAIL LINE

DATE 3 OCT. 2003

SHEET NO. LPIS - 22

Appendix H:

Economic Development Summary of Academic Research and Experience in Other Cities

Summary of Academic Research and Experience in Other Cities

Numerous studies have examined the economic development impact of transit on land near stations. Historically, these studies have focused on heavy rail or rapid transit systems such as are found in cities such as Chicago, Washington, New York, and San Francisco/Oakland. Because of the differences in the physical nature of these transit systems, the transportation service they provide, and the land use characteristics of their host cities from the proposed light rail or bus rapid transit service for the North-Hardy corridor, these studies were not considered.

Fortunately, with the increasing implementation of light rail transit in recent high-growth, low-density cities such as San Diego, Denver, Portland, Dallas, and elsewhere, there are now studies that are more relevant to an assessment of the economic development potential in the North-Hardy corridor. The conclusions of several of these studies have been reviewed for this analysis, taking into account differences between the characteristics of the North-Hardy alignments and the subject transit systems and cities.

1. Regional Impacts of Advanced High-Capacity Transit

No academic research was uncovered during the course of this study that conclusively indicated that the implementation of advanced high-capacity transit did or did not have a significant impact on the economy of a metropolitan area. There have been anecdotal cases of companies relocating to a region and desiring locations served by advanced high-capacity transit. In Dallas, for example, the entertainment corporation Blockbuster chose a headquarters location downtown, a decision that was reportedly influenced by the availability of Dallas Area Rapid Transit (DART) rail service. However, the relative influence of transit availability compared to other factors is unknown, let alone whether advanced high-capacity transit was an absolute requirement to make a metropolitan area eligible.

It can be surmised that companies relocating from transit-dependent cities in the Northeast or Midwest, where employees are accustomed to taking transit to work, may place a stronger priority on transit access in their relocation decisions. Also, some recent research indicates that well-educated young "knowledge" workers may prefer metropolitan areas with mass transportation systems, meaning that an LRT/BRT investment could make Houston more appealing to a wider, improved labor pool at the national level[1].

Counter to this idea, however, is the history of metropolitan area growth since World War II in the United States. Metropolitan economies in the Sunbelt and Western states have generally outpaced those in the Midwest and Northeast. Most Sunbelt and Western cities had no advanced high-capacity transit services during this period of growth, and most of

[1] Florida, Richard. Competing in the Age of Talent: Quality of Place and the New Economy. Prepared for the R.K. Mellon Foundation, Heinz Endowments, and Sustainable Pittsburgh. January 2000.

had no advanced high-capacity transit services during this period of growth, and most of those with such services have implemented them since the mid-1980s (several only since the mid-1990s), with metropolitan coverage that is limited at best. This would seem to indicate that advanced high-capacity transit by itself has very little effect on the economic attractiveness of a region.

2. Station-Area Impacts

Most academic research regarding the effect of light rail on economic development has focused on its impacts on land values. In theory, land values could generally serve as a proxy for development potential. As the real estate market perceives that transit provides incremental development value for those properties with good accessibility versus those without it, underlying land values for transit-accessible properties should rise relative to less-accessible nearby land.

However, it is important to remember that such an increase should only happen if the market perceives that uses which would benefit from light rail access are appropriate in a particular location. Residential, office, and sometimes retail uses are the most likely to benefit from transit access; if the market perceives that the land around a transit station is more appropriate for factories or golf courses, land values may not be affected significantly. Land use regulation through zoning thus also affects land value impacts where it is used; obviously this will not be a factor in the North-Hardy corridor except in the form of deed restrictions.

2.1 Commercial Property Value Impacts of LRT

Relatively few studies have indicated impacts on non-residential land uses such as office and retail. It has been theorized that light rail's commercial property value impacts will be less strong than those due to rapid or heavy rail (subways, elevated trains, commuter rail, etc.) because the relative accessibility impact is less. Some studies have borne this out. A 1995 study of San Diego properties indicated no impact of light rail on commercial values.[2]

Three other recent studies, however, have found positive impacts on commercial property values. One of the most often-cited studies in recent years examined property values near light rail stations in Dallas. Published in 1999, three years after the opening of the light rail "starter" system, the study indicated that a 25 percent greater increase in commercial property values for properties within a one quarter-mile radius of light rail stations than for non-station-area properties. The sharpest gains occurred in affluent areas just to the north of downtown Dallas. The study also examined the impacts of transit access on

commercial occupancies and rents. It showed that all classes of office buildings near rail stations averaged significant gains in occupancies and rental rates. Most types of retail properties, but particularly strip centers, posted gains in occupancies and rents as well. Unfortunately, occupancies and rents were not compared to a control group of properties

[2] The Effect of Rail Transit on Property Values: A Summary of Studies (draft). Prepared by Parsons-Brinckerhoff for NEORail II, Cleveland, OH. February, 2001.

without rail access, so the impacts of a strongly recovering real estate market in the Dallas area during the mid-1990s were not separated out from the actual rail impacts. However, the authors note that Class A office properties near stations showed an 8 percent occupancy gain versus a one percent citywide average gain. These office properties also had slightly higher average occupancies and similar rents compared to citywide averages. Finally, the study contained quotes from interviews with real estate professionals in Dallas that indicated a generally positive view of light rail's effects on nearby commercial real estate.[3]

The same researchers who compiled the first Dallas study conducted a modified update in 2002. This time, control properties were used to better differentiate the impacts of light rail proximity. Only properties outside the central business district were examined. They found that the median values of office properties within a ¼-mile radius of light rail stations increased 53 percent more than those outside station areas. Proximity to DART rail did not appear to have a significant differential impact on retail and appeared to actually lower industrial property valuations. The study authors theorize that the positive impacts for residences and offices result from the light rail system's accessibility benefits for the home-to-work trip. The authors also found that the impacts were limited to the ¼-mile radius area, since some of the control properties were only a few hundred feet beyond this distance.[4]

A 2001 study of property values in Santa Clara County (San Jose and environs, California) found that the benefits of light rail accessibility were capitalized into commercial land values, but only for properties within a one quarter-mile walk of a station. Statistical results indicated a $4 per square foot benefit for LRT station proximity. The study's authors theorize that commercial properties receive proportional benefits from the relative increases in accessibility to areas of affordable housing, because Santa Clara County has notoriously expensive housing and severe traffic congestion.[5]

2.2 Residential Property Value Impacts of LRT

Numerous studies of residential property value impacts of light rail have been conducted since 1990, with mixed results. In Portland, Oregon, several studies have shown that residential values drop with distance from light rail stations. In 1993, houses within a quarter-mile walk were shown to sell for $663 more for every 100 feet of nearness to stations.[6] A 1998 paper indicated that, starting 100 meters away from the station, each additional meter of distance dropped average house price by $32.20.[7] A study from 1995 of typical homes in San Diego, Santa Clara County, and Sacramento, California, showed

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[3] Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. The Initial Economic Impacts of the DART LRT System. Denton, TX: University of North Texas, July 1999.

[4] Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. DART Light Rail's Effect on Taxable Property Valuations and Transit-Oriented Development. Denton, TX: University of North Texas, January 2003.

[5] Cervero, Robert and Michael Duncan. Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values. Berkeley, CA: University of California, Berkeley, November 2001.

[6] The Effect of Rail Transit on Property Values: A Summary of Studies (draft). Prepared by Parsons-Brinckerhoff for NEORail II, Cleveland, OH. February, 2001.

[7] ibid.

a $272 *greater* selling price for every 100 meters closer to a station in San Diego, $197 *lower* price for every 100 meters closer to stations in Santa Clara County, and *no impact* for homes in Sacramento. Authors of this study speculate that the negation of property value premiums from transit accessibility can result from location of alignments in industrial corridors or existing low-income neighborhoods.[8]

The most recent study showing positive impacts on residential property values is the 2002 update of the 1999 DART light rail property impact study. Using the median appraised values of residential properties within a ¼-mile radius of stations from 1997 to 2001 and comparing them to control groups of properties nearby but outside of that radius, the authors found that station-area properties increased in median value 39 percent more than the control properties. As with office properties, the authors theorize that the rail system provides accessibility benefits in the home-to-work trip resulting in the increased values.[9]

2.3 New Development Around LRT

Beyond the effects on property values, a measurement of economic development impacts of light rail that would be meaningful in the context of this study is the extent of new development induced by proximity to non-downtown stations. Until the mid-to-late 1990s, private investment in new development that could be specifically related to light-rail access was sparse in the United States, although there were several examples of significant public investments. In the last few years, coinciding with a resurgence in urban lifestyles, increasing traffic congestion, and strong metropolitan residential real estate markets, new transit-friendly projects have begun to appear in more significant numbers in cities with light rail. Several such cities in the western and southwestern United States are discussed below.

2.3.1 Portland

Portland is well known as a city that has strongly promoted light rail as a core transportation mode. It currently has two main lines heading east and west from downtown. The 15-mile Eastside MAX line runs through existing developed urban areas to the suburb of Gresham. The 18-mile Westside MAX line runs through several growing suburbs and undeveloped "greenfield" areas to the suburb of Hillsboro. There is also a spur from the Eastside MAX line to Portland International Airport. The system has a total of 55 stations. The trains run every 6 to 10 minutes during peak times and every 10 to 15 minutes the remainder of the day. To travel from Gresham to Pioneer Square in downtown Portland takes 46 minutes and from Hillsboro to Pioneer Square takes 50 minutes,[10] so the system is not especially fast compared to auto travel.

Portland is a good example where private development was slow to take hold. Although Eastside MAX opened in 1986, new development along the line was primarily in the form of major public or quasi-public projects such as a sports arena and a convention

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[8] ibid.

[9] Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. DART Light Rail's Effect on Taxable Property Valuations and Transit-Oriented Development. Denton, TX: University of North Texas, January 2003.

[10] From www.tri-met.org.

center. This was partly due to a slow regional economy. However, in the 1990s, economic conditions improved and local governments readjusted land use policies. The regional government now requires local governments to direct new development around light rail stations and within a metropolitan urban growth boundary. Most of this development has been higher-density residential, such as multifamily, townhomes, or seniors housing, but there have also been some commercial projects such as a pedestrian-friendly retail "power center" constructed around a planned station in the suburb of Gresham.

Portland's Westside Light Rail line, which opened in 1998, is somewhat unique because it travels through some largely undeveloped areas. The most significant development that has occurred in response is the 190-acre Orenco Station project, featuring a variety of residential housing types totaling 1,850 units plus associated neighborhood retail. It should be noted again that the aforementioned land use policies and public financial incentives for transit-oriented development are important factors in the location of private real estate investments in the Portland area.

2.3.2 San Diego

In San Diego has the oldest of the modern light rail systems in the United States, having opened its first line in 1981. Its system currently consists of two lines totaling 48 miles: the Blue Line running from the Mexican border north through downtown and then east through Mission Valley, and the Orange Line running east and northeast from downtown to the suburb of Santee. The Blue Line is currently being extended to connect with the Orange Line near the suburb of La Mesa, so there will be a complete light rail loop. Travel times from the Mexican border to downtown on the Blue Line are 30 to 35 minutes over about 15 miles. The Mission Valley portion of the Blue Line travels a fairly long, circuitous route to downtown compared to local freeways, taking about 30 minutes to reach downtown whereas an automobile route is about nine miles in distance and would likely take considerably less time, barring excessive congestion. The Orange Line takes about 45 minutes from Santee to downtown, a distance of 17 miles on local freeways. Headways are every fifteen minutes from most locations on either line, although only every 30 minutes from Santee. As of 2000, ridership was about 83,000 daily.[11]

Development around stations outside of the downtown core has been primarily multifamily residential or mixed use in nature. New development has occurred around at least nine stations outside of downtown. Most projects have been the result of publicly-driven redevelopment efforts. The results include the Mercado, an affordable 144-unit housing complex in the low-income Barrio Logan neighborhood; Villages of La Mesa, a 384-unit apartment complex; La Mesa Village Plaza, a mixed-use development that includes 99 condominiums, and about 95,000 square feet of commercial space; and Rio Vista West, a large mixed-use project that will include over 1,000 residential units and a retail power center. The Grossmont Trolley Center, a large retail center, was developed near a station in La Mesa but is primarily auto-oriented. Other transit-related projects are planned or under construction. The Santee Trolley Square, another publicly-backed

[11] From www.sdcommute.com.

project, opened in fall 2002 with 440,000 square feet of primarily auto-oriented retail space.

2.3.3 Denver

Until 2000 when its extension into the southwest suburbs opened, Denver's light rail system was less comparable to the North-Hardy corridor in that it exclusively served the urban core with a 5.3 mile original alignment. In 2000, a nine-mile extension opened to Littleton, and a 1.8-mile spur to the Lower Downtown entertainment district opened in 2002. Travel from the end station in Littleton to downtown Denver's 16th Street Mall takes about 26 minutes over a distance of about 13 miles. The system now has a total of 21 stations. Ridership has been strong, especially since the suburban extension opened, with trains often running at full capacity.

The older central segment has mainly served to re-energize the CBD, coinciding with a surging interest in urban living in Denver. However, the historic but economically challenged Five Points neighborhood just outside downtown is providing examples of infill residential and mixed-use projects near the rail line that could be applicable to the Near Northside in Houston. Helped by city zoning changes and economic development policies, plus the encouragement of the local community, new projects tend to be pedestrian-oriented and sometimes have ground-floor retail. Several have been aided by special programs for affordable housing inclusion, including partnerships with nonprofits. Several condominium and apartment projects mix affordable housing with market-rate units that are able to draw spillover demand from downtown's booming residential market.

One other project of note is the City Center Englewood project, initiated by the suburban City of Englewood. After purchasing the site of a dead mall, the city sought out developers for a mixed-use project next to a major thoroughfare and a light rail station that would soon open. The site now includes urban-style apartments, some street-oriented shop space, a primarily auto-oriented retail center with Wal-Mart, a public plaza, and a new city hall and sculpture museum.

2.3.4 Dallas

Of greatest significance for Houston are the examples Dallas provides for development around light rail stations. Dallas' system, operated by Dallas Area Rapid Transit (DART) first opened in 1996 with a 20-mile, 20-station starter system on two lines. A major expansion occurred in 2001 and 2002 with extension of each line into the suburbs and the addition of thirteen new stations. Ridership, at 40,000 per day before the expansion and considerably higher since, has exceeded expectations.

DART's Red Line between Plano and the south side of Dallas has been the focus of the major private development projects that have taken place around stations. The Southside on Lamar development, a block from Cedars station on the southern outskirts of downtown Dallas, consists of a residential conversion of a historic Sears catalogue building. While the project did obtain special financing through government programs, it

was privately initiated. It is being aided by public improvements to the surrounding environment near the light rail station.

All of the remaining developments are located along the Red Line's northern section that stretches out to Plano. The alignment here has its own right of way, in contrast to the south Dallas section that is mostly within the right of way of major thoroughfares. The northern section confers reasonable accessibility benefits, with service between downtown and the northern terminus taking approximately 37 minutes to cover a distance that is approximately 19 miles by car. Headways are as little as four to five minutes during peak hours and ten to twenty minutes other times[12]. The alignment also passes through affluent, economically thriving areas with a positive real estate market image and a recent history of new development, including the Telecom Corridor north of the I-635 freeway. Three stations have generated new transit-oriented development along this line.

The successful, all-privately-financed Mockingbird Station project mixes residential, retail, and office uses and takes advantage of direct station access (also served by DART's Blue Line light rail) as well as freeway and major thoroughfare frontage. In suburban Richardson, a development company partnered with the City of Richardson to create Galatyn Park, containing a public plaza, a first class hotel, and a municipal performing arts center fronting a light rail station. Future office and possibly residential components are planned. Finally, the City of Plano proactively worked with DART to acquire land next to a station in its historic downtown and find a developer to create an apartment complex with ground floor retail called Eastside Village. Other development has reportedly taken place near stations in long-depressed South Dallas.

The most important point about the Dallas case, besides the similarity of its environment to Houston, is that in several cases private developers initiated transit-related projects. In contrast, much of the new development in Portland, Denver, and San Diego required strong public land use policies and proactive efforts by local governments. It should be noted that light rail service by itself has not historically been sufficient to induce new private development; regional and neighborhood economic and demographic conditions must also be conducive to investment.

2.4 New Development Around BRT

Currently, large-scale bus rapid transit facilities that approximate METRO's definition of the mode and that serve districts outside a downtown area exist in just four North American metropolitan areas: Pittsburgh, Miami, Ottawa, and Boston. Other cities, most notably Los Angeles, are implementing "rapid bus" service using prioritized traffic signals, enhanced bus stop areas, and limited stop service, but not a separated guideway or off-board fare collection.

Though several bus rapid transit projects either have recently opened or are planned in North America, BRT's limited public and academic historical prominence outside of the few cities where it has been implemented results in little existing academic research into land use impacts. Instead, interviews with transit professionals were performed to obtain

[12] From www.dart.org.

both a more qualitative assessment of BRT's impacts where it is operational and opinions on the potential for BRT to generate economic development. In concept, transit experts agree that a BRT system that fits METRO's definition would likely be capable of generating similar economic impacts to an LRT system with comparable service. This is because the infrastructure of a separate, fixed guideway and amenitized stations with off-board fare collection carries the same image of permanence, as does LRT infrastructure.

2.4.1 Pittsburgh

Pittsburgh currently has three dedicated busways stretching from the core of the city to surrounding residential and commercial areas. Current total daily busway ridership is about 43,028.[13] One of the three lines is the 6.8-mile Martin Luther King, Jr. East Busway, which extends from downtown Pittsburgh to the inner suburb of Wilkinsburg and has six stations. A 1996 study of development along the East Busway showed that 57 properties with a total value of over $300 million had been developed along the line either through new construction or renovation of existing structures since the facility opened in 1983. A total of 44 of these properties worth $176 million were within 1,500 feet of stations. Typical development included apartments, convenience and neighborhood-level retail, and medical/professional office buildings. Some development of a more regional nature also occurred, such as warehouses, general office buildings, and a farmers market. Factors cited by the study that influenced development included development trends in each neighborhood served by the busway, natural topography, and the use of special public financing tools such as tax increment financing. No development was identified as specifically induced by the busway, though there does appear to be significant concentrations near certain busway stations.[14]

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[13] Based on March 2003 weekday ridership counts. Source: Gary Antonella, Port Authority of Allegheny County.

[14] Wohlwill, David E. Development Along a Busway: A Case Study of Development Along the Martin Luther King, Jr. East Busway in Pittsburgh, Pennsylvania. Pittsburgh, PA: The Port Authority of Allegheny County, 1996.

2.4.2 Miami

Miami's busway operates as a feeder route to its rapid rail system. It stretches south from the rail line's terminus for 8.2 miles. It opened in 1997 and currently has approximately 2,100 average daily boardings.[15] The busway runs adjacent to a major arterial, U.S. Highway 1. One side of the busway consists primarily of developed industrial and residential areas; the other, across U.S 1, is heavily commercialized with highway-oriented uses, some of which were partially or totally damaged during Hurricane Andrew in 1992. The Miami-Dade Transit agency reports that, although redevelopment due to hurricane damage has occurred since the busway opened, none was oriented to busway stops. The agency attributes this primarily to the lack of developable property on one side and the difficulty of pedestrian travel across U.S. 1, plus the overwhelming dominance of the highway in influencing development.

2.4.3 Ottawa

The Canadian capital of Ottawa has operated busways for nearly 20 years and they are among the most heavily used transit facilities of any mid-sized city in North America. Daily boardings for the BRT system are currently about 350,000.[16] Two main bus routes occupy the busways, which extend from downtown to four separate suburban areas. Significant station-area development has occurred during the busways' existence. This development has been significantly influenced by the region's public policies. Station-area projects have included regional retail centers, which the local government has encouraged to locate along the busway through incentive-based land use policies, choice of busway alignments, and at least one instance of joint development. Other significant developments including office, institutional, and residential uses have also clustered around stations as a result of these incentives combined with densification occurring from the government's policy of not extending public infrastructure any further into undeveloped areas at the urban fringe. Also, the transit agency put parking lots only at terminal stations, providing more opportunities for development around other stations. Finally, the Ottawa region has a "Transit First" policy, under which transit infrastructure takes priority over highways, so commercial developers are likely to find transit access to be as important as highway access as they make investment decisions.

Since opening, the combination of transit accessibility and public policies has had a strong influence on the location of high-density growth in the region. During a boom period from 1988 to 1996, an estimated 649.8 million dollars (CDN) worth of development, including 4.7 million square feet of commercial space and 3,211 residential units, was added or under construction within 800-meter walk of the transitway.[17] Another recent inventory by the City of Ottawa found 2.5 million square feet of commercial or institutional projects and over 1,800 residential units developed around busway stations in just five years from 1997 to 2001.

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[15] Source: Elane Ramirez, Miami Dade Transit Agency

[16] Daily boardings based on fare revenues. Source: Goel Cohfman, Ottawa Carleton Regional Transit Commission.

[17] "Land Development Activity in the Vicinity of Transitway Stations: 1994-1996 Update." Ottawa: Regional Municipality of Ottawa-Carleton, 1997.

2.4.4 Boston

Several rail transit lines have been operating in Boston since the early twentieth century. In summer of 2002, its first BRT project, the Silver Line, opened. Further expansion is under construction. Current daily boarding are approximately 13,000.[18] The Silver Line uses dedicated bus lanes and bus-only tunnels. Since the project was announced, about three billion dollars worth of new public and private development has been made along the route. The area through which the line travels is older, dense and highly transit-dependent. Several developers discussed explicit station connections with the transit agency.

2.4.5 Los Angeles

The Rapid Bus program in Los Angeles, while not equivalent to BRT as defined for the purposes of this study, is significant in that it provides considerably faster than average bus service over a long distance and connects the central business district with other activity centers along heavily commercial corridors. The program does not use a separate right of way or marked lane. Instead, it also provides distinctively red low-floor buses that use compressed natural gas, features special bus stops (which the transit agency calls "stations" although fare collection is on-board) spaced only every 0.8 miles, announces the next bus wait time to patrons via electronic signs, and runs buses frequently enough for random passenger arrivals. Opened in 2000, the lines have generated a 40 percent increase in their corridor's ridership. Economic development impacts have been subtle. Some restaurants have begun to change their facades to serve pedestrians with "to-go" windows. Businesses in locations where bus stops are smaller and less amenitized than other Rapid Bus stops have requested to receive larger stations. Most significantly, average income of riders increased, with the proportion of riders with incomes over $50,000 per year approximately doubling to about 13 percent, much higher than other transit lines in Los Angeles.[19] This implies that higher-speed bus service not only appeals more to white-collar office workers, but also that the spending power of bus patrons increases with improved speed.

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[18] As of April 2003. Source: David Carney, Massachusetts Bay Transportation Authority.

[19] Final Report: Los Angeles Metro *Rapid* Demonstration Program. Prepared by Transportation Management & Design, Inc. February 2002.

3. Findings

As shown above, the experience of different cities regarding economic development impacts of LRT/BRT systems has varied considerably in terms of both land value impacts and new development. Several observations that are likely to be relevant to the economic development potential of such a facility in Houston include:

- Economic development impacts resulting from an advanced high-capacity transit investment will be strongly affected by regional economic conditions.
- Impacts are likely to be concentrated within a one-quarter mile walk of a station.
- Residential development, especially apartments, is a primary outcome of the impacts in suburban station-areas.
- The level of impact will be strongly related to the amount of accessibility benefit the transit service is perceived as bringing to the area.
- Frontage on a freeway or major thoroughfare can help increase the prospect for LRT development impacts if it is favorably situated around sites. Conversely, it can also impede transit-related development because of reduced pedestrian access or switch development focus from transit to auto-related development.
- In many places, station-area development has been strongly influenced by public policies that direct development to transit, redevelopment plans, and non-profit or public financial incentive or partnership programs.
- Both BRT and LRT have the potential to generate positive economic development impacts under favorable circumstances.

Classification of H-CAD Land Use Codes

Vacant/Underutilized
Residential vacant land
Unsound residential structure
Large vacant tracts with unknown potential
Agricultural/horticultural/forest vacant land
Agricultural/horticultural/forest – with dwelling
Agricultural/horticultural/forest with auxiliary buildings
Apartment vacant land
Residential structure on apartment value land
General commercial vacant land
Residential structure on commercial value land
Excavation pit, sand pit
Landfill
Unsound commercial structure
Food stand
Used car lot
Parking miscellaneous
Lumber storage
Auto salvage yard
Vacant industrial
Dwelling on industrial land
Junkyard
Auto salvage
Used auto dealer
Sand pit
Sold waste disposal
Hazardous waste decontaminated site
Vacant exempt land
Government parking lot
Religious parking
Religious vacant
Abandoned exempt
Telephone vacant land
Utility district, vacant land
Gas company, vacant land
Electric company, vacant land
Railroad, vacant land
Pipeline, vacant land
Undeveloped
Agricultural production

Restricted/Unclassified
Residential 1 family
Cemetery
Wetlands
Water well
Lift or pump station
Pressure reducing station
Water treatment plant/storage tank
Waster water treatment plant
Solid waster transfer station
Recreational/health/YMCA/school stadium
Library
School
Colleges & universities
Post office
Harris County Flood Control
Police or fire station
Police station
Fire station
Correctional
Post office
Multi-service center
City health center
Miscellaneous government building
Telephone distribution system (R.O.W.)
Telephone improved, operating
Telephone improved, non-operating
Telephone equipment building
Telephone transmitter/microwave station
Radio communications facility
Telephone work center/service garage
Radio/TV transmitter facility
Utility district, pumping/storage site
Utility district, other operating improved
Utility district, non-operating improved
Gas company, distribution system (R.O.W.)
Gas company, plant (mfg.)
Gas company, measuring/pumping station
Gas company, improved, operating
Gas company, improved, non-operating

Restricted/Unclassified (con't.)
Electric company, distribution systems (R.O.W.)
Electric company, generating plant
Electric company, substation
Electric company, work center complex
Electric company, improved, operating
Electric company, improved, non-operating
Railroad, R.O.W.
Railroad, improved, non-operating
Railroad, operating with leased improvements
Pipeline, distribution system (R.O.W.)
Pipeline, pumping stations
Pipeline, storage
Pipeline, improved, operating
Pipeline, improved, non-operating
Utility, new construction
Single family
Public and institutional
Transportation and utilities
Park and open space
Public park
Public open space/ fresh water canal
Open water
School park

Other Potential Opportunities
Residential 2 family
Residential 3 family
Residential 4 family or more
Mixed residential/commercial
Condominium (common element)
Condominium (fee simple)
Mobile home
Auxiliary improvements
Church use in residential structure
Residential 4 family or more (common element)
New construction
Apartment structure (4 to 9 units)
Apartment garden (3 story and under)
High rise apartment
Mobile home park
Subsidized housing
Apartment structure under construction
Dormitories
Hotel/motel, high rise (4 stories or higher)

Other Potential Opportunities (con't.)
Hotel/motel, low rise (3 stories or lower)
Nursing home
Retirement home
Boarding and rooming house
Mixed commercial/residential
Restaurant
Convenience mart with gas pumps and other uses
Fast food
Ice house
Bar/lounge
Night club/dinner theater
Specialized auto use
Auto dealer full service
Auto service garage
Service station (full)
Service station (self)
Truck stop
Car wash (manual)
Car wash (automatic)
Parking garage/deck
Regional shopping mall
Community shopping center
Neighborhood shopping center
Strip shopping center
Discount department stores
Department stores
Supermarkets
Convenience food market
Medical office
Drive through bank
Bank
Savings institution
Office building low rise 1-4 stories
Office building high rise 5+ stories
Office condominium
Retail condominium
Medical condominium
Funeral home
Veterinary clinic
Legitimate theater
Motion picture theater
Cinema/theater
Radio, TV or motion picture studio
Social/fraternal hall

Other Potential Opportunities (con't.)

Hangar
Day care center
Greenhouse/florist
Downtown row
Retail-single-occupancy
Retail-multi-occupancy
Retail miscellaneous use
Bowling alley
Skating rink
Health spa
Swimming – indoor pool
Tennis club – indoor/outdoor
Racket club – indoor/outdoor
Country club (w/o golf course)
Club house
Country club (with golf course)
Amusement park
Cold storage facility
Auxiliary improvement
Truck terminal
Mini warehouse
Office warehouse
Warehouse
Warehouse, prefab
Manufacturing processing
Research & development
Products recovered from natural gas
Food & kindred products
Apparel & finished products – like materials
Lumber & wood products
Furniture & fixtures
Paper & allied products
Chemicals & allied products
Petroleum refining & related industries
Rubber & miscellaneous
Concrete products
Primary metal industries
Metal fabricating
Machinery & transportation equipment
Maritime shipping
Miscellaneous manufacturing
Miscellaneous auxiliary structures
Recycling facility
Industrial structure under construction

Other Potential Opportunities (con't.)
Retention pond
Hazardous waste storage site
Private street
Directors' lots
Drill site
Exempt office
Other exempt property
Religious
Religious residential
Religious school
Religion owned single house
Auditorium
Hospitals
Cultural facilities
Rail/bus/air terminal
Rail yard, improved, operating
Multifamily
Commercial
Office
Industrial
Open water
Private park
Private open space
Possessory int (commercial improved)
Commercial improved

Source: Knudson & Associates, based on Harris County Appraisal District land use codes, 2000.

Detailed Profile of Each Alignment

Blue Line

Blue Line Segment	West Side	East Side	Comments
N. Main			
from U of H Downtown to Burnett	▪ Buffalo Bayou floodplain ▪ Rail yards ▪ Older industrial properties	▪ Rail yards ▪ Older industrial properties	▪ Limited recent development in the area though interest is building ▪ Potential large "stimulus" projects with transit focus - mixed-use redevelopments of Hardy Rail Yard and Wilson-Downhole tracts ▪ Olajuwon tract on White Oak Bayou ▪ Strong neighborhood orientation, with small neighborhood-scale, transit-oriented commercial redevelopment opportunities along North Main, Quitman, and Hogan ▪ Single family development opportunities on vacant home lots ▪ Northside Village Economic Revitalization Plan (2002) provides guide for redevelopment efforts ▪ Within Greater Northside Management District ▪ Buffalo Bayou improvement/enhancement proposals ▪ Hardy Toll Road to be extended immediately to east of neighborhood ▪ Historic preservation concerns for older buildings and homes ▪ Challenges: small lots, residential neighborhood protection, relatively low income base, lack of side street sidewalks
from Burnett to Boundary	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	

Blue Line Segment	West Side	East Side	Comments
N. Main (con't.)			
from Boundary to I-45	▪ Little White Oak Bayou ▪ Small neighborhood commerce ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Little White Oak Bayou ▪ Small neighborhood commerce ▪ Older single-family homes ▪ Cemeteries ▪ Scattered, small vacant lots	▪ Middle-income population ▪ Constraints: East of I-45 – Little White Oak Bayou floodway, cemeteries; West of I-45 – neighborhood protection and historic preservation issues (historic district in area) ▪ Challenges: small population, small lots; few apparent redevelopment opportunities ▪ Within Greater Northside Management District
from I-45 to Airline	▪ Small neighborhood commerce ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	▪ Small neighborhood commerce ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	
Airline			
from N. Main to IH-610 Loop	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Small commercial establishments ▪ Large market facility ▪ Community facilities ▪ Older apartment complexes ▪ Older single-family homes	▪ Neighborhood anchored by farmer's market (regional destination) ▪ Challenges: Low to moderate income population, small lots ▪ Within Greater Northside Management District
from IH-610 Loop to Stokes	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Few vacant/redevelopable parcels ▪ Within Greater Northside Management District

Blue Line Segment	West Side	East Side	Comments
Airline (con't.) *from Stokes to Crosstimbers*	▪ Industrial establishments ▪ Older single-family homes ▪ Small neighborhood commerce ▪ Scattered, small vacant lots	▪ Industrial establishments ▪ Highway-oriented commerce (towards I-45) ▪ Small neighborhood commerce (near Airline) ▪ Older single-family homes	▪ Industrial park just north of Stokes ▪ Within Greater Northside Management District
from Crosstimbers to I-45	▪ Small neighborhood commerce ▪ Scattered, small vacant lots ▪ Older single-family homes	▪ Highway-oriented commerce (portions near I-45) ▪ Older single-family homes	▪ Larger vacant/underutilized parcels near I-45 with freeway frontage ▪ Within Greater Northside Management District
I-45 from Airline to N. Shepherd	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Apartment complexes ▪ Neighborhood community facilities ▪ Scattered vacant tracts and lots	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Apartment complexes ▪ Neighborhood community facilities ▪ Scattered vacant tracts and lots	▪ Alignment passes through Northline Mall site – major redevelopment opportunity ▪ Large vacant/underutilized tracts with freeway frontage just north of Airline/I-45 intersection ▪ Strong highway orientation to commercial properties ▪ Most commercial properties older and lower-value ▪ Several large vacant/underutilized parcels (not always adjacent to freeway) between Parker and Shepherd ▪ Within Greater Northside Management District (up to Parker)

Blue Line Segment	West Side	East Side	Comments
I-45 (con't.)			
from N. Shepherd to Blue Bell	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Neighborhood community facilities ▪ Scattered vacant tracts	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Neighborhood community facilities ▪ Scattered vacant tracts	▪ Large vacant tracts not adjacent to freeway between Shepherd and Gulf Bank ▪ Single family subdivisions behind highway commercial properties on either side of freeway between Gulf Bank and W. Mount Houston
from Blue Bell to Aldine Bender	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Neighborhood community facilities ▪ Large apartment complexes ▪ Large tracts of vacant land	▪ Highway-oriented commercial establishments and centers ▪ Highway-oriented industrial properties ▪ Single-family homes ▪ Neighborhood community facilities ▪ Large apartment complexes	▪ Newer big-box commercial ▪ Significant large vacant tracts with freeway frontage, especially west side of I-45 between West Rd. and Aldine-Bender ▪ High school and stadium, northeast corner of I-45 and West Rd. ▪ West side of I-45 north of Blue Bell may require City of Houston annexation for service provision ▪ Both sides of I-45 north of West Rd. in Greater Greenspoint Management Dist. ▪ East side of I-45 north of West Rd. in Greenspoint TIRZ

Blue Line Segment	West Side	East Side	Comments
Loop through Greenspoint Area			
From Aldine Bender to Greens	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Commercial and office buildings ▪ Greenspoint Mall	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Commercial and office buildings	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ ▪ Passes through large vacant tract that includes freeway and Aldine Bender frontage ▪ Area north of Beltway 8 dominated by Greenspoint Mall site, projected for near to mid-term major redevelopment, incl. convention ctr., transit ctr., and retail ▪ Existing high-density Class A high-rise office and hotel complex across street from mall ▪ Commercial property owners very receptive to transit ▪ Community prefers direct transit connection to airport and downtown
From Greens to I-45	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou ▪ Industrial properties	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou	

Blue Line Segment	North or West Side	South or East Side	Comments
I-45 From Greens Bayou to Kuykendahl Park & Ride	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Single-family neighborhoods ▪ Highway-oriented commercial and industrial buildings and facilities ▪ Community facilities (e.g., large school buildings)	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Single-family neighborhoods ▪ Highway-oriented commercial and industrial buildings and facilities ▪ Community facilities (e.g., large school buildings)	▪ Single family neighborhood and cemetery just north of Greens Bayou ▪ Very large vacant tract SEC Rankin and I-45, potentially new single family subdivision ▪ Large vacant tract across I-45 from Park & Ride; may have wetlands
I-45 (con't.) From Kuykendahl Park & Ride to Montgomery County line	▪ Large vacant tracts ▪ Large apartment complexes ▪ Scattered light industrial uses ▪ Highway-oriented commercial uses ▪ Single-family subdivisions	▪ Large vacant tracts ▪ Large apartment complexes ▪ Scattered light industrial uses ▪ Highway-oriented commercial uses ▪ Single-family subdivisions ▪ Spring High School campus	▪ Most of vacant land planned for specific highway-oriented uses ▪ Challenge: several areas north of Cypresswood not in MUDs

Blue Line Segment	North or West Side	South or East Side	Comments
I-45 (con't.) From Montgomery County line to SH 242 (incl. Woodlands Town Center deviation)	▪ Large vacant tracts ▪ Strip retail centers ▪ Medical/professional uses ▪ Low-rise office/research ▪ Light industrial uses ▪ Single family subdivisions ▪ Large apartment complexes	▪ Large vacant tracts ▪ Highway-oriented retail/commercial uses ▪ Light industrial uses ▪ Single family subdivisions ▪ Large apartment complexes	▪ Very large vacant/underutilized tracts immediately north of county line adjacent to I-45 ▪ Neighborhood/community level retail centers attracted to Sawdust Rd. ▪ Highway-oriented commercial along I-45 with multifamily behind ▪ Highway frontage parcels become smaller and shallower in Oak Ridge North with single family behind; east side is incorporated ▪ Vacant Builder's Square site on west side of I-45 ▪ The Woodlands masterplanning jurisdiction begins highway frontage at Woodlands Parkway ▪ Woodlands Town Center on west side of I-45 – planned mixed-use pedestrian-friendly, new retail, dense multifamily, and office development ongoing ▪ West side of alignment between Woodlands Parkway and Medical Plaza Drive in Town Center Improvement District ▪ City of Shenandoah frontage on both sides of I-45 north of Town Center – large vacant parcels ▪ The Woodlands frontage on I-45 (both sides) around SH 242 with substantial vacant parcels ▪ Medical and highway-oriented retail planned and under construction on west side of I-45 at SH 242
Blue Line Segment	**North or West Side**	**South or East Side**	**Comments**

Spur to George Bush Intercontinental Airport			
Greens Rd. from Greenspoint Drive to Central Greens Blvd.	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ (west of Hardy Toll Road) ▪ Many apartments recently refurbished ▪ West of Hardy Toll Road – some vacant tracts on north side of Greens ▪ East of Hardy Toll Road – vacant tracts on both sides; surrounded by industrial and unrestricted single family
Central Greens Blvd. from Greens Rd. to Hardy Airport Connector	▪ Large tracts of vacant land	▪ Large tracts of vacant land ▪ Industrial properties	▪ Challenge: vacant land generally surrounded by industrial uses
Hardy Airport Connector from Central Greens Blvd. to JFK Blvd.	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ West of Aldine-Westfield – several large vacant tracts ▪ East of Aldine-Westfield – smaller industrial tracts, vacant lots, and unrestricted single family ▪ Challenge: vacant land generally surrounded by industrial uses; little impetus for non-industrial development
JFK Blvd. from Hardy Airport Connector to Terminal C	Airport lands and facilities	▪ Airport lands and facilities	▪ Controlled by Houston Airport System

Red Line

Red Line Segment	West Side	East Side	Comments
N. Main			
from U of H Downtown to Burnett	▪ Buffalo Bayou floodplain ▪ Rail yards ▪ Older industrial properties	▪ Rail yards ▪ Older industrial properties	▪ Limited recent development in the area though interest is building ▪ Potential large "stimulus" projects with transit focus - mixed-use redevelopments of Hardy Rail Yard and Wilson-Downhole tracts ▪ Olajuwon tract on White Oak Bayou ▪ Strong neighborhood orientation, with small neighborhood-scale, transit-oriented commercial redevelopment opportunities along North Main, Quitman, and Hogan ▪ Single family development opportunities on vacant home lots ▪ Northside Village Economic Revitalization Plan (2002) provides guide for redevelopment efforts ▪ Within Greater Northside Mgmt. District ▪ Buffalo Bayou improvement/enhancement proposals ▪ Hardy Toll Road to be extended immediately to east of neighborhood ▪ Historic preservation concerns for older buildings and homes ▪ Challenges: small lots, residential neighborhood protection, relatively low income base, lack of side street sidewalks
from Burnett to Boundary	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	

Red Line Segment	West Side	East Side	Comments
Little White Oak Bayou from Boundary to Fulton	▪ Little White Oak Bayou drainage right of way ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Little White Oak Bayou drainage right of way ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Challenges: flood/drainage zone, residential neighborhood protection, lack of potential development parcels ▪ Within Greater Northside Mgmt. District
Fulton from Hays to Bigelow	▪ Community park (Moody Park)	▪ Elementary school	▪ Within Greater Northside Mgmt. District
Irvington from Bigelow to IH-610 Loop	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Potential community-supported redevelopment of existing trucking terminal at Patton St. – large site ▪ Lindale Park neighborhood (Cavalcade/Fulton/Robertson/ IH-610 Loop) deed restricted to single family residential; includes portions of Irvington ▪ High demand for senior living complex at Salvation Army facility ▪ Within Greater Northside Mgmt. District

Red Line Segment	West Side	East Side	Comments
Irvington			
from IH-610 Loop to Hardy Toll Rd.	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Small apartment buildings ▪ Continuous street grid with long blocks and small lots	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Small apartment buildings ▪ Continuous street grid with long blocks and small lots	▪ Limited development opportunities between Frisco and IH-610 Loop ▪ Large vacant and industrial tracts between Frisco and Bennington ▪ Mostly shallow commercial properties backed by single family residential between Bennington and Tidwell ▪ Large vacant tract SE corner of Tidwell ▪ Within Greater Northside Mgmt. District
Hardy Rd.			
from Irvington to Parker	▪ Single-family homes ▪ Small neighborhood commercial centers and community facilities ▪ Scattered, small vacant lots ▪ Small apartment buildings ▪ Continuous street grid with long blocks and small lots	▪ Single-family homes ▪ Small neighborhood commercial centers and community facilities ▪ Scattered, small vacant lots ▪ Small apartment buildings ▪ Continuous street grid with long blocks and small lots	▪ Few development/redevelopment opportunities with Hardy corridor frontage ▪ West side of corridor in Greater Northside Mgmt. District
from Parker to Castledale Dr.	▪ Single-family homes ▪ Small neighborhood commercial centers and community facilities ▪ Scattered, small vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Single family homes on large lots ▪ Scattered, large, vacant single family lots ▪ Community facilities along Hardy ▪ Commercial centers along Hardy ▪ Semi-rural development, with large blocks and lots	▪ Some medium and larger sized vacant lots just off of Toll Road frontage ▪ Challenge: east side of ½ mile band, north of Little York, primarily outside of City of Houston and lacking MUD

Red Line Segment	West Side	East Side	Comments
Hardy Road (con't.)			
from Castledale to Beltway 8	▪ Single family homes on large lots ▪ Scattered, large, vacant tracts ▪ Industrial facilities ▪ Mobile home parks ▪ Rural-style development with large lots and tracts, and widely-spaced roads	▪ Single family homes on large lots ▪ Scattered, large, vacant tracts ▪ Industrial facilities ▪ Mobile home parks ▪ Rural-style development with large lots and tracts, and widely-spaced roads	▪ Numerous medium and large vacant tracts between Gulf Bank and Aldine Bender ▪ Challenge: most of alignment between Gulf Bank and Aldine Bender not within City of Houston and lacking MUD ▪ Challenge: occasional heavy industrial facilities may discourage residential development ▪ Challenge: limited number of on/off ramps for Toll Road limit development potential for larger-scale commercial development ▪ Very large vacant tract on west side between Aldine Bender and BW8, within City of Houston, Greenspoint TIRZ, and Greater Greenspoint Management District
from Beltway 8 to Greens Rd.	▪ Light industrial complexes ▪ Large vacant tracts ▪ Large apartment complexes ▪ Large, separate residential and commercial/industrial developments interspersed with vacant tracts	▪ Single family subdivisions ▪ Light industrial complexes ▪ Large vacant tracts ▪ Large, separate residential and commercial/industrial developments interspersed with vacant tracts	▪ Large tracts of vacant or underdeveloped land just north of BW8 ▪ Challenge: east side between BW8 and Greens outside City of Houston and lacking MUD ▪ West side in Greenspoint TIRZ, Greater Greenspoint Management District, and City of Houston between BW8 and Greens ▪ Challenge: industrial properties discourage residential development

Red Line Segment	West Side	East Side	Comments
Hardy Rd. (con't.)			
from Greens Rd. to Rankin	▪ Light industrial complexes ▪ Large vacant tracts ▪ Large apartment complexes ▪ Large, separate residential and commercial/industrial developments interspersed with vacant tracts	▪ Light industrial complexes ▪ Large vacant tracts ▪ Large, separate residential and commercial/industrial developments interspersed with vacant tracts	▪ Several large vacant tracts on west side between Greens and Rankin ▪ Challenge: industrial properties discourage residential development ▪ Challenge: limited access to/from Toll Road and lack of continuous frontage roads discourages large-scale commercial development ▪ In Greater Greenspoint Management District between Greens and Rankin
from Rankin to Cypresswood	▪ Large vacant tracts ▪ Single family subdivisions ▪ Commercial/light industrial complexes ▪ Large sections of vacant land containing smaller, isolated residential and commercial/industrial developments	▪ Large vacant tracts ▪ Single family subdivisions ▪ Commercial/light industrial complexes ▪ Rail yards ▪ Large sections of vacant land containing smaller, isolated residential and commercial/industrial developments	▪ Most frontage between Rankin and Cypresswood is large vacant tracts ▪ Potential masterplanned areas to the west between Rankin and Bammel Road ▪ Challenge: east side between Rankin and Richey primarily outside MUDs ▪ Challenge: limited access to/from Toll Road and lack of continuous frontage roads discourages commercial development ▪ Challenge: at-grade rail crossings with frequent trains impede access and pose pedestrian safety risk ▪ Challenge: heavier industrial uses discourage residential development

Red Line Segment	North or West Side	South or East Side	Comments
Hardy Rd. (con't.) from Cypresswood to Montgomery County line	▪ Small and large vacant tracts ▪ Single family subdivisions ▪ Old Town Spring retail	▪ Small and large vacant tracts ▪ Low-density residential/commercial mixed-use	▪ Gated subdivision on 250 acres under construction at Lexington and Louetta, plus 30 acres set aside for commercial uses ▪ Unique opportunity at Old Town Spring with existing pedestrian-oriented commercial area and Old Town Spring Improvement District ▪ Future improvements to Riley-Fuzzel with Toll Road ramps and residential development planned across Spring Creek will greatly increase nearby population ▪ Potentially masterplanned area in Northgate Crossing on west side ▪ Challenge: much of obth west and east sides lacking MUDs ▪ Challenge: at-grade rail crossings at some points with frequent trains impede access and pose pedestrian safety risk
UP RR right of way from Montgomery County line to Robinson Rd.	▪ Large vacant tracts ▪ Single family subdivisions ▪ Borrow pit ▪ Scattered small-to-mid scale industrial properties	▪ Large vacant tracts ▪ Single family subdivisions ▪ Unrestricted mixed-use semi-rural residential ▪ Scattered small-to-mid scale industrial properties	▪ Challenge: portions of frontage lack direct road access

Red Line Segment	North or West Side	South or East Side	Comments
Robinson Rd. or new alignment			
UP RR to Woodlands Mall	▪ Single family subdivisions ▪ Small light industrial properties ▪ Highway-oriented retail centers	▪ Single family subdivisions ▪ Small light industrial properties ▪ Highway-oriented retail centers	▪ Only development opportunities east of I-45 are small tracts east of Lana ▪ Woodlands Town Center on west side of I-45 – planned mixed-use pedestrian-friendly, new retail, dense multifamily, and office development ongoing
I-45			
From Woodlands Mall to SH 242	▪ Large vacant tracts ▪ Strip retail centers ▪ Medical/professional uses ▪ Low-rise office/research	▪ Large vacant tracts ▪ Highway-oriented retail/commercial uses	▪ The Woodlands masterplanning jurisdiction begins highway frontage at Woodlands Parkway ▪ West side of alignment between Woodlands Pkwy. and Medical Plaza Drive in Town Center Improvement District ▪ City of Shenandoah frontage on both sides of I-45 north of Town Center – large vacant parcels ▪ The Woodlands frontage on I-45 (both sides) around SH 242 with substantial vacant parcels ▪ Medical and highway-oriented retail planned and under construction on west side of I-45 at SH 242

Red Line Segment	North or West Side	South or East Side	Comments
Spur to George Bush Intercontinental Airport			
Hardy Airport Connector from Hardy Toll Rd. to JFK Blvd.	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ West of Aldine-Westfield – several large vacant tracts ▪ East of Aldine-Westfield – smaller industrial tracts, vacant lots, and unrestricted single family ▪ Challenge: vacant land generally surrounded by industrial uses; little impetus for non-industrial development
JFK Blvd. from Hardy Airport Connector to Terminal C	▪ Airport lands and facilities	▪ Airport lands and facilities	▪ Controlled by Houston Airport System

Red Line Segment	North or West Side	South or East Side	Comments
Spur to Greenspoint and Kuykendahl P&R			
Greens Rd. from Hardy Toll Rd. to Greenspoint Mall	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ (west of Hardy Toll Road) ▪ Many apartments recently refurbished ▪ Some vacant tracts on north side of Greens
Greens Bayou or new alignment from Greenspoint Mall to Kuykendahl Park & Ride	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou ▪ Industrial properties	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou	▪ Single family neighborhood and cemetery just north of Greens Bayou ▪ Very large vacant tract SEC Rankin and I-45, potentially new single family subdivision ▪ Large vacant tract across I-45 from Park & Ride; may have wetlands

Green Line

Green Line Segment	West Side	East Side	Comments
N. Main			
from U of H Downtown to Burnett	▪ Buffalo Bayou floodplain ▪ Rail yards ▪ Older industrial properties	▪ Rail yards ▪ Older industrial properties	▪ Limited recent development in the area though interest is building ▪ Potential large "stimulus" projects with transit focus - mixed-use redevelopments of Hardy Rail Yard and Wilson-Downhole tracts ▪ Olajuwon tract on White Oak Bayou ▪ Strong neighborhood orientation, with small neighborhood-scale, transit-oriented commercial redevelopment opportunities along North Main, Quitman, and Hogan ▪ Single family development opportunities on vacant home lots ▪ Northside Village Economic Revitalization Plan (2002) provides guide for redevelopment efforts ▪ Within Greater Northside Mgmt. District ▪ Buffalo Bayou improvement/enhancement proposals ▪ Hardy Toll Road to be extended immediately to east of neighborhood ▪ Historic preservation concerns for older buildings and homes ▪ Challenges: small lots, residential neighborhood protection, relatively low income base, lack of side street sidewalks
from Burnett to Boundary	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	▪ Small neighborhood commerce and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with small blocks and lots	

Green Line Segment	West Side	East Side	Comments
Little White Oak Bayou from Boundary to Fulton	▪ Little White Oak Bayou drainage right of way ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Little White Oak Bayou drainage right of way ▪ Older single-family homes ▪ Scattered, small vacant lots	▪ Challenges: flood/drainage zone, residential neighborhood protection, lack of potential development parcels ▪ Within Greater Northside Mgmt. District
Fulton from Hays to Bigelow	▪ Community park (Moody Park)	▪ Elementary school	▪ Within Greater Northside Mgmt. District
Irvington from Bigelow to Cavalcade	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Small neighborhood commercial centers and community facilities ▪ Older single-family homes ▪ Scattered, small vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Potential community-supported redevelopment of existing trucking terminal at Patton St. – large site ▪ Lindale Park neighborhood (Cavalcade/Robertson/Robertson/ IH-610 Loop) deed restricted to single family residential; includes portions of Irvington ▪ High demand for senior living complex at Salvation Army facility ▪ Within Greater Northside Mgmt. District
Cavalcade from Irvington to Fulton	▪ Older single-family homes ▪ Small neighborhood commercial centers and community facilities ▪ Scattered vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Older single-family homes ▪ Small neighborhood commercial centers and community facilities ▪ Scattered vacant lots ▪ Continuous street grid with long blocks and small lots	▪ Lindale Park neighborhood (Cavalcade/Fulton/Robertson/ IH-610 Loop) deed restricted to single family residential ▪ Within Greater Northside Mgmt. District

Green Line Segment	West Side	East Side	Comments
Fulton From Cavalcade to Northline Mall	▪ Older single-family homes ▪ Small neighborhood commercial centers and establishments ▪ Community facilities ▪ Continuous street grid with long blocks and small lots	▪ Older single-family homes ▪ Small neighborhood commercial centers and establishments ▪ Community facilities ▪ Continuous street grid with long blocks and small lots	▪ Existing commercial along Fulton just north of Cavalcade ▪ North Lindale neighborhood (north of IH-610 Loop) desires to preserve single family residential character ▪ Existing industrial/warehouse properties at Bennington may discourage residential development but present long-term redevelopment opportunity ▪ Potential large-scale redevelopment site at Northline Mall with central transit stop, freeway and arterial frontage ▪ Within Greater Northside Mgmt. District
Airline from Northline Mall to Tidwell	▪ Small neighborhood commercial centers and establishments ▪ Highway-oriented commercial buildings ▪ Older single-family homes ▪ Industrial establishments ▪ Scattered, vacant tracts and lots ▪ Community facilities ▪ Small apartment buildings ▪ Irregular street grid with different-sized lots and tracts	▪ Small neighborhood commercial centers and establishments ▪ Older single-family homes ▪ Industrial establishments ▪ Scattered, vacant tracts and lots ▪ Community facilities ▪ Small apartment buildings ▪ Irregular street grid with different-sized lots and tracts	▪ Large vacant tract on west side of Airline with access to I-45 ▪ Within Greater Northside Mgmt. District

Green Line Segment	West Side	East Side	Comments
Airline (con't.) from Tidwell to West	▪ Small neighborhood-level commercial buildings ▪ Single family subdivisions ▪ Scattered industrial/warehouse properties ▪ Occasional small to mid-size vacant and underutilized tracts	▪ Small neighborhood-level commercial buildings ▪ Single family subdivisions ▪ Unrestricted semi-rural residential ▪ Scattered industrial/warehouse properties ▪ Occasional small to mid-size vacant and underutilized tracts	▪ Numerous vacant or underutilized tracts between Tidwell and Parker ▪ Scattered new retail activity south of Little York ▪ Concentration of vacant and underutilized commercial tracts around Airline and Little York ▪ Low density of development along Airline between Little York and Gulf Bank; many vacant and underutilized tracts ▪ Large flea market site on west side of Airline just south of Gulf Bank ▪ Within Greater Northside Mgmt. District – both sides of Airline south of Parker, east side from Parker to Houston city limit ▪ Concentration of vacant and underutilized tracts just south of West Road ▪ Challenges: very low population density from Little York to West; scattered industrial uses deter residential

Green Line Segment	West Side	East Side	Comments

Airline (con't.) from West to Aldine Bender	▪ School ▪ Highway-oriented commercial development ▪ Large apartment complexes	▪ Commercial centers and establishments ▪ Large apartment complexes ▪ Single family homes	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ ▪ Almost $30 million of capital improvements planned for Airline in this segment, incl. street, pedestrian, landscape, utilities, community ctr. ▪ Redevelopment of apt. complex into school ▪ Redevelopment opportunities on commercial parcels between Airline and I-45 just south of Aldine-Bender; could have access from both freeway and Airline ▪ YMCA ($8 million) planned
Greenspoint Dr. ***(includes future extension)*** From Aldine Bender to Greens	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Commercial and office buildings ▪ Greenspoint Mall	▪ Large tracts of vacant land ▪ Large apartment complexes ▪ Commercial and office buildings	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ ▪ Passes through large vacant tract with I-45 and Aldine Bender frontage ▪ Area north of Beltway 8 dominated by Greenspoint Mall site, projected for near to mid-term major redevelopment, incl. convention ctr., transit ctr., and retail ▪ Existing high-density Class A high-rise office and hotel complex across street from mall ▪ Commercial property owners very receptive to transit ▪ Community prefers direct transit connection to airport and downtown
Green Line Segment	**West Side**	**East Side**	**Comments**

Greens Bayou or new alignment from Greens to Kuykendahl Park & Ride	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou ▪ Industrial properties	▪ Commercial and office buildings ▪ Single-family homes ▪ Greens Bayou	▪ Single family neighborhood and cemetery just north of Greens Bayou ▪ Very large vacant tract SEC Rankin and I-45, potentially new single family subdivision ▪ Large vacant tract across I-45 from Park & Ride; may have wetlands
Spur to George Bush Intercontinental Airport			
Greens Rd. from Greenspoint Drive to Central Greens Blvd.	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ Large apartment complexes ▪ Commercial and office buildings ▪ Single-family neighborhoods ▪ Scattered vacant tracts	▪ In Greater Greenspoint Mgmt. District. and Greenspoint TIRZ (west of Hardy Toll Road) ▪ Many apartments recently refurbished ▪ West of Hardy Toll Road – some vacant tracts on north side of Greens ▪ East of Hardy Toll Road – vacant tracts on both sides; surrounded by industrial and unrestricted single family
Central Greens Blvd. From Greens Rd. to Hardy Airport Connector	▪ Large tracts of vacant land	▪ Large tracts of vacant land ▪ Industrial buildings and facilities	▪ Challenge: vacant land generally surrounded by industrial uses; little impetus for non-industrial development

Green Line Segment	North or West Side	South or East Side	Comments
Hardy Airport Connector from Central Greens Blvd. to JFK Blvd.	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ Single-family neighborhoods ▪ Scattered vacant tracts and lots ▪ Industrial buildings and facilities ▪ Airport lands and facilities	▪ West of Aldine-Westfield – several large vacant tracts ▪ East of Aldine-Westfield – smaller industrial tracts, vacant lots, and unrestricted single family ▪ Challenge: vacant land generally surrounded by industrial uses; little impetus for non-industrial development
JFK Blvd. from Hardy Airport Connector to Terminal C	▪ Airport lands and facilities	▪ Airport lands and facilities	▪ Controlled by Houston Airport System

Projected 2025 Transit and IH-45 Travel Times

Corridor Segment	Travel Time in Minutes				
	Blue Line	Red Line	Green Line	Green Line HOV	I-45 Main Lanes
The Woodlands to CBD	58	54	--	40	70
The Woodlands to Greenspoint	24	31*	--	--	38
Greenspoint to CBD	35	39	36	–	32

* Requires transfer.

Source: Carter-Burgess.

List of People Interviewed

Interviews were conducted with the following people in the Houston area regarding economic development trends and future potential in the North-Hardy study corridor:

Kent Dussair	CDS Market Research
Ray Lawrence	CDS Market Research
Sally Dwyer	Dwyer-Williams
Vance Fellers	Old Town Spring Improvement District
Mike Inselmann	METRO/STUDY Corp.
Ed Reyes	City of Houston Super Neighborhood 51
Jimmy Pappas	Midway Construction
Kelly Parker	Cushman and Wakefield
Jack Drake	Greater Greenspoint Management District
Tina Araujo	Greater Greenspoint Management District
John Cornett	Aldine ISD
Seth Sharr	Greenspoint TIRZ
Robert Heineman	The Woodlands Operating Co.
DeLora Wilkinson	Houston Northwest Chamber of Commerce
Jack Searcy	Houston Northwest Chamber of Commerce
Jim McAllister	McAllister & Associates
Sue Pellegrino	Sue Pellegrino Real Estate

In addition, telephone interviews were conducted with the following people outside of the Houston region for information about LRT/BRT systems in other cities, and experience regarding the potential economic development impacts of LRT/BRT:

Sam Zimmerman	DMJM-Harris (BRT)
Robert Cervero	U.C. Berkeley
John Bonsall	McCormick-Rankin
Carol Christensen	City of Ottawa
Goel Cohfman	Ottawa Carleton Regional Transit Commission
Steve Barang	Massachusetts Bay Transportation Authority
David Carney	Massachusetts Bay Transportation Authority
Vivi Chi	City of Ottawa
Mario Garcia	Miami-Dade Transit
Elane Ramirez	Miami-Dade Transit
Claudette Hinton	Miami-Dade Transit
Rex Gebhart	Los Angeles County Metro Transport Authority
Hammond Perot	City of Dallas, Economic Development Department
Gary Antonella	Port Authority of Allegheny County (Pittsburgh)

Transportation Research Board. Report 16: Transit and Urban Form. Volume 2. Washington, DC: National Academy Press, 1996.

"TRIP 2000: Travel Rate Improvement Program for the Houston Area Preserving Mobility in the 21st Century." Greater Houston Partnership, 2000.

Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. The Initial Economic Impacts of the DART LRT System. Denton, TX: University of North Texas, July 1999.

Weinstein, Bernard L., Ph.D. and Terry L. Clower, Ph.D. DART Light Rail's Effect on Taxable Property Valuations and Transit-Oriented Development. Denton, TX: University of North Texas, January 2003.

Wohlwill, David E. Development Along a Busway: A Case Study of Development Along the Martin Luther King, Jr. East Busway in Pittsburgh, Pennsylvania. Pittsburgh, PA: The Port Authority of Allegheny County, 1996.

Zimmerman, Samuel, et al. Bus Rapid Transit: An Overview: Some Initial Findings of the U.S. Transportation Research Board's Transit Cooperative Research Program Project "Development of Bus Rapid Transit Planning and Implementation Guidelines." Prepared by DMJM+Harris, November 2001.

Web sites:

www.dart.org
www.rtd-denver.com
www.sdcommute.com
www.tri-met.org

APPENDIX I

Printed Materials

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
	Ken/Peggy Lindow	02/06/2002		Written (Public Me	**Comment**	RESPONSES TO 2/6/2 SCOPING MEETING QUESTIONNAIRE --Needs: IAH to Downtown needs a high speed direct connection, more restrictions on land usage on freeways --Would like to see more double decker freeways for long distance. --Now sure I know how it was done. --Minimum condemnation of private property. Condemnation ruins neighborhoods, years in advance of construction. --Traffic and Circulation, Land Use, Neighborhood/Community Cohesion, Historic and Archeological Resources, Water Resources --Please keep in mind that economic development is not necessarily the most desirable goal. In boosting economic development residential neighborhoods may "go commercial." There are plenty of commercial areas of town. Be careful in dealing with homeowners and small business owners. --BLANK
					Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
MM0231 b-2	Anonymous Anonymous	06/06/2002	A	Alignments - in corridor	Oral (Public Meetin	**Comment**	North-Hardy Public Meeting South of the Bayou June 6, 2002 Concerns: Construction related displacement of businesses Residential displacement Neighborhood division Air quality in vicinity Air borne particulate matter resulting from demolition of highways. Condemnation will weaken neighborhoods Don't forget the bus riders Construction related flooding: depressed sections of higway will create flooding problem. Pumps are necessary. Sound proofing is needed but watch the visual impacts. Don't have to have property taken to have adverse impacts. Proposed Suggestions: Remove tolls from Hardy Toll Road to take pressure off IH-45 Add 4 lanes to Pierce Elevated Adding capacity to freeways causes people to stop carpooling or stop using transit. Use diamond lanes rather than barrier separated lanes (added lanes) Block "rubberneckers" view; incident management (ITS) Close or redesign some entrance ramps onto Pierce Elevated Provide more Park and Ride lots at IH-610 with a streamlined, fast transportation link into downtown. Divert thru traffic around downtown using IH-610, BW8, Grand Parkway. Signal progression improvements! ITS to help divert traffic. Super Streets- maybe Houston Ave. (watch schools, parks and ROW takings) (too narrow north of White Oak Bayou.) Include SH 288 in super street concept Understand travel patterns before proposing solutions. (check travel models.) Truck traffic (thru movement) contributes to problem. Need shoulders for safety Telecommuting will reduce traffic demand. North of Buffalo Bayou elevated lanes on IH-45 with effective sound walls. Add lighting under Pierce Elevated Look at other uses for area under elevated freeways No cul-de-sacs. **Response:**

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
MM0231-2	Ms. Tina Araujo	07/30/2002	A	Alignments - in corridor	Oral (Public Meetin	**Comment**	I have nothing to say about this.
						Response:	Neither do we.
NH0511a-2	Mr. Garnet Coleman	06/03/2002	A	Alignments - in corridor	Oral (Public Meetin	**Comment**	Does not wish to have anything else doen to Almeda. Feels left out of study and unaware of the process. Would like to have Gary Triesche call him.
						Response:	
MM0690-1	June Giacina	11/11/2003	A	Alignments - in corridor	E-mail	**Comment**	Ms. Giacona and fer family own multiple properties on N. Main, Cosmos, and Marigold and operate a plumbing company out of that area. She is concerned about impacts to those properties and the Hollywood cemetery.
						Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
MM0231 c-2	Anonymous Anonymous	06/15/2002	A	Alignments and Priority areas	Oral (Public Meetin	**Comment**	North-Hardy Notes from Public Meeting June 15, 2002 Group facilitated by Stella Gustavson Consensus was reached within the group on the following points: ·□The group was reluctant to comment specifically (yes/no) on the proposed alternatives, or on the DO's and DONT's. They felt that the consequences of the options have not been identified in enough detail to enable them to make informed comments. They requested that at the next round of meetings, maps showing the extent of current the right-of-way be provided. ·□Issue – Right-of-way / neighborhood impact: o□Do not go beyond current right-of-way on highway or arterial roads* – in fact, stay within existing "curb-to-curb". Concern is that if the highway, or arterial roads, are widened beyond the existing curb line, that this will impact neighboring homes – people are concerned that TxDOT will not stay within the right-of-way. Also that it will use its powers of eminent domain to take properties – even if it is just for a buffer area. Mike Tello explained that TxDOT only works within a given right-of-way, but the impact beyond right-of-way remained an issue. o□Like the idea of improving HOV / carpooling lanes on I-45, as long as this stays within current right-of-way and environmental impacts – such as flooding, noise and pollution – are avoided. o□Integrate suburban / city central issues on referendum and plans. o□Respect neighborhood "closer in", when planning transit for those who live "further out". o□* Specific arterials mentioned for staying between curb-to-curb – Houston Avenue, North Main, Airline (Gabe Vasquez) ·□Issue – Shifting people's travel habits: o□As long as people CAN drive they WILL drive. o□Don't make it so easy for people to continue to drive (with only one person per car). o□People are not going to take transit unless it is easier or better in some way from taking their own car. o□Make it easier to take transit and harder to drive. o□Ensure that the transit (and road) improvements in this corridor connect to something at the downtown end – can't just dump people off the train downtown and then not be able to get around. This needs to be part of a bigger

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
						functioning system – need a transit system plan and a development plan. ·□Issue – Shifting planning/construction dollars from roads to transit: o□Can't believe that we are still pouring money into highway construction. o□Cost of expanding highway system could be spent on transit o□Should be coordination of highway and transit funds (rather than competing for the dollars) ·□Issue – Fuel sources: o□Alternative fuel sources (other than fossil fuels) should be investigated for BRT ·□Issue – Construction Schedule: o□Do not use "incentive based" construction schedules o□Respect residents and businesses in their need to use the streets during construction Other issues: ·□Integrate mass transit and I-45 safety improvements ·□Make sure that in all future communications of meetings and issues that there is a representative from owners/neighborhood groups present (i.e. let them know when there will be presentations to the Client) – concern is that their views will not be correctly conveyed – they wish to track the communication of the citizen input so that they know it is being accurately depicted. ·□The City of Houston is seeing a shift in its growth patterns – more people (and especially young people) have a desire to move closer to the interior of the city, not to the suburbs. Transit planning to provide for this. General agreement was reached on the following DON'T points: 1.□Agree – no more ROW to be taken 2.□Agree – elevated lanes 3.□Consensus was not reached regarding constructing transit at-grade vs. elevated
					Response:	
NH0517-1	Commissioner Chance	05/17/2002	A Alignments and Priority areas	Oral (Public Meetin	**Comment**	Hardy is best alignment. Development of Gosling could be a problem because of the heavy residential area that surrounds it.
					Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
NH1024-1	Manuel Cuevas	10/24/2003	A	Alignments and Priority areas	E-mail	**Comment**	"My home is located I block from IH-45 and 3 blocks from Fulton on Link. What impact is this going to create for my neighborhood?
						Response:	
NH0615-1	Mrs. Rachel Dvoretzky	06/15/2002	A	Alignments and Priority areas	Written (Public Me	**Comment**	Do improve inner loop mobility through LRT on existing COMMERCIAL arteries. Do improve suburban mobility within Woodlands, 1960 area. Re: Metropolitan mobility: Do use 59/Hardy corridor to carry commuters in MASS TRANSIT. Build links from built-up areas west of IH-45 to Hardy/59 Access. Do not expand IH-45 beyond current contours except to bring to modern safety standards. Widen a la 59 between Montrose and Shepherd. Consider value of quality of neighborhoods with COST of mobility projects. Consider goals of improved air quality for METRO region, consider COSTS of increasing vehicle traffic, consider COSTS of damaging existing neighborhoods to benefit new or not yet built. Balance evacuation needs with VISION to prevent METRO area from being doomed to ever-increasing vehicular congestion.
						Response:	
NH1003-1	David Eisenbaum	10/07/2003	A	Alignments and Priority areas	Telephone	**Comment**	Mr. Eisenbaum represents Jacob's Fan Mfg Company at 407 Main. He is concerned about impacts of the alignment on their property.
						Response:	
NH1125-1	Mr. Kim Wratten	11/25/2003	A	Alignments and Priority areas	E-mail	**Comment**	I would like information about exactly where this project would occur in my area. It seems that it will be located immediately across the street from where my house is located.
						Response:	
MM0001-2	X Anonymous	12/06/2001	C	Joint Development	Written (Public Me	**Comment**	Economic development initiatives on North-Hardy corridor
						Response:	
MM0017-1	X Anonymous	12/06/2001	E	Alternative fuels	Written (Public Me	**Comment**	Change fleet bus fuel from diesel to more environmentally sensitive fuel.
						Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
NH0518-1	Anonymous Anonymous	05/18/2002	E	Construction Issues	Oral (Public Meetin	**Comment**	Concerns over community disruptions during construction. As wellas constructon in parrallel alignment- Airline and IH-45 at the same time.
						Response:	
NH00511-2	Anonymous Anonymous	06/03/2002	E	Construction Issues	Oral (Public Meetin	**Comment**	There is a problem but solving the problem encompasses several issues. Suggest that the design issue centered on Spur. Group would like a design that is similar to Allen Parkway. Design Brazos and Bagbyto not constrain east to west traffi. Bottlenecks occur when the east to west connections are not available. Other possibility is to depress Hwy 59 north of Main Street.
						Response:	
NH00511-1	Anonymous Anonymous	06/03/2002	E	Construction Issues	Oral (Public Meetin	**Comment**	Tunnel IH-45 from the west end of town to Midtown.
						Response:	
NH0519-4	Anonymous Anonymous	06/15/2002	E	Construction Issues	Oral (Public Meetin	**Comment**	·□Issue – Construction Schedule: o□Do not use "incentive based" construction schedules o□Respect residents and businesses in their need to use the streets during construction
						Response:	
NH0519-2	Anonymous Anonymous	06/15/2002	E	Construction Issues	Oral (Public Meetin	**Comment**	Issue – Right-of-way / neighborhood impact: Do not go beyond current right-of-way on highway or arterial roads* – in fact, stay within existing "curb-to-curb". Concern is that if the highway, or arterial roads, are widened beyond the existing curb line, that this will impact neighboring homes – people are concerned that TxDOT will not stay within the right-of-way. Also that it will use its powers of eminent domain to take properties – even if it is just for a buffer area. Mike Tello explained that TxDOT only works within a given right-of-way, but the impact beyond right-of-way remained an issue. Like the idea of improving HOV / carpooling lanes on I-45, as long as this stays within current right-of-way and environmental impacts – such as flooding, noise and pollution – are avoided. Integrate suburban / city central issues on referendum and plans. Respect neighborhood "closer in", when planning transit for those who live "further out". * Specific arterials mentioned for staying between curb-to-curb – Houston Avenue, North Main, Airline (Gabe Vasquez)
						Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
NH00511-3	Anonymous Anonymous	06/03/2002	E Neighborhood Preservation	Oral (Public Meetin	**Comment**	Why are we adding more highways to the central business district when other cities are cutting and removing highways. Can we implement congestion pricing?
					Response:	
NH0530-2	Anonymous Anonymous	05/30/2002	M HOV	Oral (Public Meetin	**Comment**	Two-Way HOV on IH-45 It's a "band-aid" solution It does not represent progress in terms of transit investment The group decided to reject the scenario.
					Response:	
NH0530-1	Anonymous Anonymous	05/30/2002	M Light rail	Oral (Public Meetin	**Comment**	Scenario 1 LRT/BRT on IH-45 LRT is the preferred technology We like it being an express service There should be a stop at Greens Rd. and Greenspoint Dr. There should be another stop at Kuykendahl Park & Ride The connection to IAH should be LRT and should go all the way to the terminals The trip from Downtown to IAH should not invlove a transfer. The same train should go directly from Downtown to Greenspoint to IAH. People going from downtown to The Woodlands should not have to transfer. Some trains would continue north while others would make the IAH loop. Coming south from The Woodlands should work the same way.
					Response:	
NH0530-4	Anonymous Anonymous	05/30/2002	M Light rail	Oral (Public Meetin	**Comment**	Scenario 4 LRT/BRT on Hardy This scenario looks like #1 (LRT/BRT on IH-45) but without its virtues. No one lives along Hardy. An LRT on IH-45 is much preferable. The group does not like the scenario. IT was mentioned that when the Hardy Toll Road was built, an agreement was signed with the railroad that allowed the use of ROW for transit. Apparently, that agreement has been forgotten given the current reluctance of the railroad to collaborate. Someone should look into this.
					Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
NH0530-3	Anonymous Anonymous	05/30/2002	M Light rail	Oral (Public Meetin	**Comment**	Scenario 3 LRT/BRT on Airline This is a good choice scenario after LRT/BRT on IH-45. LRT is preferred, but BRT is a good choice too, since the large amount of current transit riders along Airline already rides buses. The scenario should address the demand for local service along Airline and Greens. Many people ride transit to Greenspoint jobs and to IAH jobs from Greenspoint. A local service is needed along Airline and Greens, regardless of the scenario selected. Procees north on Kuykendahl, since this would continue the local-service character. There was concern about the disruptions that a transit line construction would produce along Airline
					Response:	
MM0016-1	X Anonymous	12/06/2001	M Light rail	Written (Public Me	**Comment**	Get LR to IAH
					Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
-	Mr. R. Skiles Kelley	02/05/2002	M Light rail	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --I am against any expansion of I45 between 610 and downtown. As a resident I know all traffic problems are caused by the bottleneck created by cars going to downtown locations and south. Accidents to the north will not be lessened by expanding capacity between 610 and downtown. --Expand rail, more car traffic is not needed. Create a corridor by expanding Shepherd to lessen traffic through downtown. --Public not well informed of meetings and studies in progress or planned. --Do not take away park land or neighborhoods to expand I45 between 610 loop and downtown. Traffic problems caused south and north of the area will not improve by increasing I45 capacity at this point. --Historic and Archeological Resources, Parklands, Air Quality, Noise/Vibration --Flooding is a major problem in the area of I45 between 610 loop and downtown. Expansion of I-45 in this area would worsen this. Noise and Pollution are at a very high level and would also be made worse. --BLANK
					Response:	
MM0226-7	Mr. F. Richard Olenchak	03/27/2002	M Light rail	E-mail	**Comment**	"If the politicians west of Houston don't want light rail, please consider your next route northward toward The Woodlands. Even if you only built a light rail line from downtown Houston to IAH, you might be pleasantly surprised at the great useage it would get. Many, many of the residents of the residents of The Woodlands are transplants from cities that already have light rail, and as a result, we would be likely to use such a system. Let the myopic natives out in Katy have their 24 lane freeway (Just what this area needs- more lanes of traffic!). Please concentrate your attention on the area north of Houston. After all, that is where the big airport is located; it isn't in Katy!"
					Response:	
MM0001-1	X Anonymous	12/06/2001	M Modes & Technologies	Written (Public Me	**Comment**	Grade separations ---freight •1960/Willowbrook Mall area
					Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-	Mr. James A. Drake	02/06/2002	M	Modes & Technologies	Written (Public Me	**Comment**	RESPONSES TO 2/6/2 SCOPING MEETING QUESTIONNAIRE --The housemoving industry in Houston moves 600-800 house in Houston per year including temporary class rooms for school district (100-150). We need a 22' height for truck routes through Houston. --We need 3 lane feeders on all freeways and tollroads --BLANK --BLANK --NONE SELECTED --Brick mail boxes being built on city and county roads in right of ways (no permits) --All overpasses need to be 19' tall or taller.
						Response:	
-1	B. Kelley Parker, III, SIOR	02/05/2002	M	Modes & Technologies	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --There needs to be more street access from the Near Northside to the CBD - such as extension of Fulton to San Jacinto. Main Street tunnel under RR must be redone to increase mobilityand promote economic development. --Need to develop better mass transit in near northside especially to tie into light rail on Main St, Hardy Toll Road needs to be extended to CBD. --BLANK --Need to serve residence in the near northside better and provide easier ways to the north. --Economice Development, Neighborhood/Community Cohesion --The Hardy Rail Yard should be environmentally remediated within 18-24 months to qualify for residential construction. There may be 3000 living units in this project. --The Hardy Yard project will go to the land planner this month. We think there are great development opportunities to benefit the neighborhood as well as transit utilizing this property. The consultants and I are ready to discuss all concepts and ???of METRO. As Agent for Hardy Street Partners.
						Response:	
MM0018-1	X Anonymous	12/06/2001	M	Park & Ride	Written (Public Me	**Comment**	Run express buses from Park & Ride facilities non-stop to IAH & Hou. People will use to save on parking at $10.00/day
						Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
NH0530-5	Anonymous Anonymous	05/30/2002	M	Rail, other or unspecified	Oral (Public Meetin	**Comment**	Scenario 5: Commuter Rail on Hardy This should become eventually a high-speed service to Dallas and other Texas cities. The connections to Greenspoint and IAH should consist of transfers to LRT lines Scenario 1 would still be preferable for people going from Downtown to Greenspoint or IAH.
						Response:	
NH0519-3	Anonymous Anonymous	06/15/2002	M	Rail, other or unspecified	Oral (Public Meetin	**Comment**	As long as people CAN drive they WILL drive. Don't make it so easy for people to continue to drive (with only one person per car). People are not going to take transit unless it is easier or better in some way from taking their own car. Make it easier to take transit and harder to drive. Ensure that the transit (and road) improvements in this corridor connect to something at the downtown end – can't just dump people off the train downtown and then not be able to get around. This needs to be part of a bigger functioning system – need a transit system plan and a development plan.
						Response:	
-1	Mrs. Maria George	02/05/2002	O	Other - unrelated to study	Written (Public Me	**Comment**	We have signed up previously for mailings but have NEVER yet received one!
						Response:	
NH0519-1	Anonymous Anonymous	06/15/2002	P	Project process / methodology	Oral (Public Meetin	**Comment**	The group was reluctant to comment specifically (yes/no) on the proposed alternatives, or on the DO's and DONT's. They felt that the consequences of the options have not been identified in enough detail to enable them to make informed comments. They requested that at the next round of meetings, maps showing the extent of current the right-of-way be provided.
						Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
NH0519-5	Anonymous Anonymous	06/15/2002	P	Public outreach	Oral (Public Meetin	**Comment**	·□Make sure that in all future communications of meetings and issues that there is a representative from owners/neighborhood groups present (i.e. let them know when there will be presentations to the Client) – concern is that their views will not be correctly conveyed – they wish to track the communication of the citizen input so that they know it is being accurately depicted.
						Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
MM0231 c-1	Anonymous Anonymous	06/15/2002	P	Study/Planning/ Decision Process	Oral (Public Meetin	**Comment**	North-Hardy Notes from Public Meeting June 15, 2002 Group facilitated by Ariel Espino Consensus was reached within the group on the following points: ·□LRT was the preferred technology. ·□An LRT local service is a good idea, and would be used by the community. ·□The preffered alignment for this local LRT is N. Main/Airline. Irvington was rejected as an alignment; people thought an LRT on Irvington would spoil the boulevard. ·□I-45 can be improved as needed (HOV, lanes, commuter system), as long as: o□The ROW is not widened o□There is no double-decking ·□There was a general concern about widening roads/highways and pouring more concrete to solve congestion problems. The group thought that other options should be studied: o□Manage traffic, especially truck traffic, so that it doesn't congest I-45. Truck traffic crossing the Houston area should be diverted (using the Beltway and/or the Loop) so that it doesn't have to go through Downtown. o□Use existing freight rail ROWs. Houston is criss-crossed by them, and we're not using them. o□Think about using Highway 249. It lies west, where most of the market is. o□Implement incentives and regulations that would increase the use of transit (transit subsidies, restrictions on automobile use, high-priced parking) o□Improve existing METRO services. Currently, many routes have only peak-hour service and numerous transfers are common. Security should also be improved. The group wondered if the current transit system was being used at capacity, and what guarantees there were that a future high-capacity system would not be underutilized as well. Other comments: ·□Improve the existing transit service. Use what we have now. ·□Make rail corridors beautiful. Pay attention to green

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
							spaces and trees. ·□Stagger work schedules. ·□Make Hardy Toll Road free. ·□Do not widen Houston Ave. ·□Consider Crosstimbers as a potential east-west corridor. ·□EPA must study all recommendations.
						Response:	
NH0518-2	Anonymous Anonymous	05/18/2002	T	ADA, Elderly & Disabled issues	Oral (Public Meetin	**Comment**	Area has a large geriatric population. Many are interested in a fast trip into downtown especially to the Medical Center.
						Response:	
MM0006-1	X Anonymous	12/06/2001	T	Connectivity	Written (Public Me	**Comment**	Need to improve connectivity to airports and universities
						Response:	
NH0518-3	Anonymous Anonymous	05/18/2002	T	Traffic congestion / mobility	Oral (Public Meetin	**Comment**	Airline neede to maintain 4 lanes of traffic. Group supported widening HOV to 2 lanes.
						Response:	
NH00511-4	Anonymous Anonymous	06/03/2002	T	Traffic congestion / mobility	Oral (Public Meetin	**Comment**	Three options for Pierce elevated: Burry it Trench it (like what was done at HWY 59 and Shepherd) Leave it elevated and let other work aleviate problem.
						Response:	
-1	X Anonymous	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --NO EXPANSION OF I-45. GET SOME OF THE CARS OFF THE FREEWAY TOO MUCH POLLUTION. --BLANK --BETTER THAN TxDOT --BLANK --Visula Quality and Aesthetics, Historic and Archeological Resources, Parklands, Air Quality, Noise/Vibration. --WOODLAND PARK, HISTORIC HOMES IN WOODLAND HEIGHTS, AIR QUALITY TODAY IS NOT GOOD. --BLANK
						Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
-1	X Anonymous	02/05/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	COMMENTS: ---Ride your bike! ---Northside has the second highest ridership, we need rail! ---Any chance that METRO ---I am for the light rail transit 100% ---Too many trains and toxic chemicals and cars already on Hardy ---Build high speed rail from woodlands to Greenspoint to Downtown ---Please don't displace the Woodland Heights!
					Response:	
-	X Anonymous	02/06/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/6/2 SCOPING MEETING QUESTIONNAIRE --BLANK --1. Use double decking instead of leaving existing right of way. 2. Use diamond lanes instead of contra flows 3. Join Hardy to I-45 north of downtown 4. Make the toll road free to increase usage --Better than Parsons group did two years ago --Do not ruin existing neighborhoods. Keep inside your existing right of ways. Do away with contra flow and use diamond lanes. --Neighborhood and Community Cohesion, Historic and Archaeological Resources, Parklands, Threatened and Endangered Species, Water Resources --BLANK --They studies by HGAC are biased, use an independent firm.
					Response:	
-	X Anonymous	02/20/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/20/02 COMMENT FORM --The corridor from downtown to the woodland connecting the airport should be the first priority. The light rail transit will be a good choice. -- --We like it and we hope one day all the corridors will be approved. The city is an emergency need of these improvements/ -- --Traffic Congestion, Safety, Neighbprhood Cohesion, Air Quality, Economic Development -- --
					Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-	Mr. Juan Arriaga	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	Remove vehicular traffic from freeways by installing a high speed rail system with one pickup @greenspoint (starting @ the woodlands) connecting to the rail @ UHD. Use the existing ROW at the Hardy Toll Road. Double Stack Rail inside 610 to eliminate increasing ROW (& losing our homes) --High speed rail to connect the woodlands to downtown Houston. Use a different system- maybe commuter rail in the high bus ridership areas. --Try to ask the people in the woodlands where they travel to on a daily basis. --Don't increase ROW, increase speed in order to decrease travel time. --Neighborhood/Community Cohesion, Land Use, Historic and Archeological Resources, Visual Quality and Aesthetics, Safety. --Air Quality & Noise/Vibration pollution, design systems to address these problems. --Plan for future. Realize Houston will always grow. Let's do it right the 1st time. Communicate with other parties involved with transportation & City growth. Eliminate another 20 plus lane highway.
						Response:	
-1	Mr. Rufus Brown	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --You all are planning what you want to plan. Metro has not planned with the community from which its taxes come from. We have no input on deciding where we want a study done. Travel problems are plenty. I don't have enough room to write it down on this paper. I have a problem with y'all trying to make decisions that need to be made community, not your board. --No. Your corridor does not include an African-American community. It does not address the transportation needs of our community. --This is not a meeting. This is a showing. All METRO is doing is showing us what they want to do. I'll bet you half the staff doesn't live in the region. --Consider studying Acres Homes, Settegast, Fifth Ward, Scenic Woods, Studewood, Kashmere Gardens, Trinity Gardens, South Park and Sunnyside. --Public Transportation, Traffic and Circulation, Economic Development, Neighborhood/Community Cohesion, Employment. --Too many trains and toxic chemicals on Hardy. --We won't support projects that don't include us.
						Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-1	Ms. Marita Burns	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --Efficient and Attractive mass transportation with rail or light rail alon I-45 N is the only alternative to widening existing freeway and choking out existing historic neighborhoods, historic parks and cemetaries. --Rail along Hardy since right-of-way already exists would seem obviuos. --Better than previous TxDOT meetings. Previous input obviously put to use. --There should be avoidance of creating a concrete collar around downtown. With all the efforts to create a livable downtown, estetic and quality of life issues are finally being recognized. --Parklands, Air Quality, Noise/Vibration --Noise and Air pollution next to I-45 between N. Main and Quitman is brutal. Half of Woodland Park (City) is unusable because of the constant pounding from I-45. --We need a soundwall in the worst way, we have truck traffic with hazardous materials moving at high speeds only feet froms residences, again between N. Main and Quitman along I-45.
						Response:	
-1	Mr. Cesar & Jessica Cazares	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --610 from 59 to 290 is a nightmare. 45 N in the afternoon runs pretty well unless the are accidents. Coming in the morning 45S from Crosstimbers to town is a pretty steady flow, unless there is an accident. --As said above, the 45 runs smoothly in the mornings & afternoons. There is slight congestion at the 610 interchange. It's fine, try it out for yourself. --Drive it yourself, time it, collect data. --I was at an earlier meeting about light rail through the near northside. The presentation stopped down Irvington @ Cavalcade. Beyond Cavalcade, Irvington is residential & should remain so. Before Cavalcade the proposed route is mostly if not all commercial. We need to revitalize the Near Northside. It has such potential! --Land Use, Economic Development, Air Quality, Threatened and endangered species. --We need cleaner air. Keep Irvington @ Cavalcade to 610 residential. I think Hardy is an option if we preserve the residents along the way. --BLANK
						Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
NH0517-2	Commissioner Chance	05/17/2002	T	Traffic congestion / mobility	Oral (Public Meetin	**Comment**	HOV is the most practicle, low-cost for express trips. Upgrade the Grand parkway just north of powerline. Remember to show existing P&R's.
						Response:	
NH0511a-1	Mr. Garnet Coleman	06/03/2002	T	Traffic congestion / mobility	Oral (Public Meetin	**Comment**	Suggests that construction on Spur 527 be done below grade or find another corridor to do construction.
						Response:	
-1	Virginia Duke	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --Mass Transit vs. Freeway Widening: Keep within current right of way - don't destroy the neighborhoods for the suburbs convenience. HOV is for getting cars off the road, not parents taking their children to day care or school. --Light Rail: Mini Bus from neighborhood to work center: takes 45 minutes from inside loop to downtown, longer than Woodlands to work center. --BLANK --Keep within current right of way. Get rid of billboards, don't relocate, you move people away, pay for billboard removal. Mass Transit. --Land Use, Neighborhood/Community Cohesion, Historic and Archeological Resources, Noise/Vibration. --Don't flood the neighborhoods by pouring more concrete. --Let us know that this is a come and presentation. Keep the previous TxDOT MIS data in this proposal. Landscaping
						Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-	Ivon DuPont	02/05/2002	T	Traffic congestion / mobility	Letter	**Comment**	THESE COMMENTS WERE ALSO GIVEN TO THE COURT REPORTER AT THE 2/5/2 PUBLIC SCOPING MEETINGS. Two years ago the Texas Dept. of Transportation (TxDOT) started studying the expansion of I-45. Our elected officials had them suspend that project due to the public outcry over their aggressive approach. The Major Investment Study (MIS) is getting ready to start up again. This time around METRO (better known for the local bus system) is sponsoring the MIS with the Houston Galveston Area Council (HGAC, area coordinator of major regional transportation projects) and TxDOT as partners. They have scheduled some meetings to gather information from the public regarding our concerns. Recently you may have received a black flyer listing the time and locations of the meetings. It's a little disappointing that they didn't give us much notice to get the word out and the flyer was vague and easily confused as junk mail., The first series of Public Meetings are at 4:30 p.m. to 7:30 p.m. on: - Feb. 5, Wesley Community Center, Social Hall, 1410 Lee 77009 (go east on Quitman, a couple of blocks east of Fulton take a right on Terry heading south about 4 or 5 blocks) - Feb 6, Northline Mall Community Room, Rm 316, 77022 - Feb 13, NHMCC, Student Center S. Dining Rm., 2700 WW Thorne Dr. 77073 - Feb 20, HCC, System Admin. Aud., 3100 Main St @ Elgin, 77002 It's very important that we have many residents attend these meetings and express concerns to the consultants. The more times the consultants hear the concerns the better. Some of those issues might include: NOTE <> INDICATE BOLD WORDS - <Don't expand the existing I-45 Roght of Way> (don't acquire neighborhood or parkland property) - Fully <consider of methods of transit> besides cars - Don't increase but instead <decrease our flooding> woes - Maintain in <improve quality of life> including view (no double deck freeways), noise (reduce it including consideration of soundwalls), air (make it better). Greenspace, etc. - Re-engineer <outdated and dangerous interchanges and ramps>; - Use the space below and on back to <list other concerns

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
						you might have and hand this paper to the consultant> at the meeting:
					Response:	
-	Mrs. Maria George	02/05/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	Regarding the intersection at Quitman and White Oak. There is a 3 way stop
					Response:	
-1	Mr. R. Skiles Kelley	02/05/2002	T Traffic congestion / mobility	Letter	**Comment**	DROPPED OFF AT THE 2/5/2 PUBLIC SCOPING MEETING As a property owner I am AGAINST any expansion of I-45 all traffic congestion occurs past 610 Loop to the North and South where 45 goes through downtown. I don't want any neighborhood or park property acquired for this. The noise and pollution problem is already bad enough other methods should be considered. A sound wall should be constructed along I45 as TxDOT has in other neighborhoods. As Tropical Storm Allison showed, flooding is a major problem in our area and an expansion of I-45 would worsen that. As a taxpayer of two properties I don't want my neighborhood negatively impacted by an ill conceived expansion of I-45. Yours truly, R.S. Kelley
					Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-	Mr. Randy Schulze	02/13/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/13/2 SCOPING MEETING QUESTIONNAIRE --Any mode that has repeatable travel times would be an improvement & commute times are not repeatable on IH 45 due to incidents. Even the HOV lanes have their own incidents. Even a longer trip time may be acceptable if the travel time is more dependable. --Given the low volume of long-haul trips. Rubber tire transit is probably the only practical solution for the corridor. I personally don't use the bus because making connections from downtown to where I work would take too long. --Graphics were good. There were plenty of people to answer questions. --Cost. Accuracy of forecasts. Extent of corridors. Political boundaries. Need to extend METRO's service area to include all the poplutated areas (such as Conroe) in the region. --Public Transportation, Economic Development, Employment, Air Quality --BLANK --A lot of development is going on in the Conroe area. I suggest this area also be considered in making long range decisions.
						Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
-1	Jack Searcy, Jr.	02/20/2002	T Traffic congestion / mobility	E-mail	**Comment**	Please accept my apology for not attending the Feb. 17 meeting of the Stakeholder Advisory Committee at Greenspoint. Had other prior commitment. Study should cover the spur to Bush IAH. This spur should go east to east edge of airport or further to entice the Humble/Kingwood residents to use whatever form of mass transit we develop. Prohibitive cost of another system on US 59 corridor precludes early development there. We could use their ridership to help justify the system in the North Corridor. North of the Beltway 8, the bulk of your residents are west of the corridor. They are also prone to vote in larger percentages than many other areas of Harris County. The study should cover how to facilitate their use of the transit system that is developed either by doing a feeder system in the FM 1960 area or perhaps by moving the system west of the Hardy/I-45 corridor north of Greenspoint. In any event, they must be educated to see the advantage to them of this project in the overall 2025 plan or they will vote negatively when the election is held. I do think there is substantial support for some form of mass transit in the Champions - 1960 area but to galvanize it we must make the project appeal to the residents.
					Response:	
-1	Mr. Rajan Sedalia	02/05/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --First, why do people live 45 minutes from work? That's why we have traffic problems in the first place. Urban Sprawl - Eliminate the causes of the traffic problems and we won't need a remedy > (Rails, Hway, etc.) --Bike lanes - once people see their friends riding their bike to work from the woodlands. They'll ditch their Navigator and join the ride! --Speculative, but I realize that nothing is certain yet. --If possible, less highway and more rail. --TOP 5 ENVIRONEMENTAL ISSUES: They are all important! --It's too late. --BLANK
					Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
-1	Mr. Brad Shumway	02/05/2002	T Traffic congestion / mobility	Letter	**Comment**	I have worked very hard in the past trying to get a sound wall on the west side of I-45 between North Main and I-10. Why are we unable to do something that woulf be beneficial to the home owner rather than making plans for unhealthy additions for our neighborhood. Our neighborhood is primarily single family homes that are approximately ninety five years old we need to protection not abuse. Brad Shumway Home Owner 112 Payne Houston, TX 77009
					Response:	
-1	Mrs. DAWN L SHUMWAY	02/05/2002	T Traffic congestion / mobility	Letter	**Comment**	No expansion of I-45 Right of Way Improve Quality of Life 1. Reduce dust and black soot (we are breathing this stuff now, don't increase it. 2. Reduce Noise (give us a soundwall) 3. No Double Deck Freeways (like METRO did on HOV lane on I-10) 4. Reduce air pollution (You are killing us with bad air) 5. Decrease flooding (the more you concrete the faster and quicker we flood) CONSIDER OTHER METHODS OF TRANSPORTATION Dawn Shumway
					Response:	

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-1	ROBERT B SHUMWAY	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --My main concern is that whatever improvement are made to I45, that the right-of-way is no made wider in the area from Quitman north to 610. There is also a desparate need for a sound wall on the west side of I-45 from Quitman to North Main. --I think that the HOV lane should be utilized for Mass Transit only. I feel many more people could be moved this way. They would eventually utilize it if it was adequate for load and convenient. Need to encourage people not to bring cars downtown. --I like this. Why has it been so long coming. --Equipment with a source that does not increase or reduce the hydro carbon and noise polution in the inner city (electric fuel cell). --Public Transportation, Land Use, Neighborhood/Community Cohesion/ Air Quality/ Noise Vibration --Sound: I-45 My area I-10 to 610 North, air pollution in same area --We have been told that sound walls are not built along freeways except in conjunction with other improvements. I feel that completing the Hardy Toll Road from 610 to downtown would make more sense than expanding I-45. Also need to subsidize toll fees to lower the fee and encourage usage.
						Response:	
-1	ROBERT B SHUMWAY	02/05/2002	T	Traffic congestion / mobility	Letter	**Comment**	DELIVERED TO THE 2/5/2 PUBLIC SCOPING MEETING Find another traffic mover rail Give us a sound wall with no expansion of I-45
						Response:	

Comments/Responses Report

#	Name of Commentor	Date	Issue	Comment Method		Comments/Response
part 1-	Mr. Eric Slotboom	02/06/2002	T Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/6/2 SCOPING MEETING QUESTIONNAIRE --There are numerous problem areas in this corridor (see part 2 for itemized list). For the preliminary options, all possibilities should be on the table, including extending 527 to I-45, building elevated connectors over the 59/288 trench and widening pierce elevated. --Rail is not suitable for this corridor. (Too Expensive) We have a good HOV infrastructure, so lets build on it. The number one purpose should be to increase general purpose capacity. --There were no firm options or details at this point. However, I am against rail. Improvements should include general purpose capacity and HOV. --Most important: increase genral purpose vehicle capacity. The alternatives should clearly state how much capacity is being added. Also important: cost. --DID NOT SELECT 5 --Visual Quality: I-45 north is very ugly due to all the bill boards, low grade commercial establishments and some decay. Acquiring right-of-way on I-45 between 610 and Shepherd will improve the appearance of this corridor, just as 59 north was improved in the 1990's. --Attached is a comprehensive list. There ia a HUGE number of serious issues in this corridor.
					Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-1	Ms. Debbie Tesar	02/05/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/5/2 SCOPING MEETING QUESTIONNAIRE --My comments are similar to those voiced all over the Houston area. Traffic is horrendous. There is too much congestion. Too many people in too many cars. --Although your suggestions are great why not come up with non-road constructions solutions. For example, ask major downtown employers to change hours of operations. Ask that 30% of employees arrive at 7:00 and leave at 3:00, 30% arrive at 8:00 and leave at 4:00... Have more people work from home. Financial incentive for car/van pools. --Very informative. The mail out seemed effective. Multiple locations for public involvement is good. --Neighborhood preservation, combined commuter and light rail. Commuter outside the loop and light rail inside the loop. --Public Transportation, Safety, Land Use, Neighborhood/Community Cohesion, Air Quality --Hogg Park @ I-45 and Quitman. The building currently housing Robert E. Lee Elementary School. Hollywood Cemetary. --1. Extend Fulton to Downtown. 2. Commuter Rail outside the loop and change to light rail inside the loop. 3. Do not widen I-45 inside the loop.
						Response:	
-1	Ms. Heather Westerlage	02/05/2002	T	Traffic congestion / mobility	Letter	**Comment**	LETTER GIVEN AT 2/5/2 PUBLIC SCOPING MEETING To Whom It May Concern: As a homeowner of a house next to I-45 I object to the idea of widening the freeway, possibly taking my property. I specifically bought the house so that it would be close to downtown-short drive time, as well as my desire to live in a historic neighborhood. It would be terrible to think that my 100-year-old house would be a casualty to I-45 to accomodateall of those people unwilling to live in the inner city. Perhaps stronger incentives for those who carpool and use HOV lanes would assist in the congestion. What about the rail system-isn't that supposed to reduce traffic? Please consider alternative solutions to destroying our historic neighborhoods that we have all worked so hard to preserve. Heather Westerlage 121 Alma Houston, TX 77009 (713) 222-7252
						Response:	

Comments/Responses Report

#	Name of Commentor	Date		Issue	Comment Method		Comments/Response
-	Mr. Jim Wooten	02/06/2002	T	Traffic congestion / mobility	Written (Public Me	**Comment**	RESPONSES TO 2/6/2 SCOPING MEETING QUESTIONNAIRE --Myself and several others move houses in, around and through Houston. In the past we have been able to find enough wide and tall street right of ways. At present there have been added along these routes low arm lights, trees in esplanades, brick mail bixes and other structures that encroach on these routes. --Routes and or right of ways to cross over or under future roads built in Houston and adjoining areas. --BLANK --BLANK --Traffic and Circulation, Safety, Energy, Employment --BLANK --I would like to be informed of any future obstructions along our moving routes that would stop us from exiting Houston with oversize loads.
						Response:	

North Hardy
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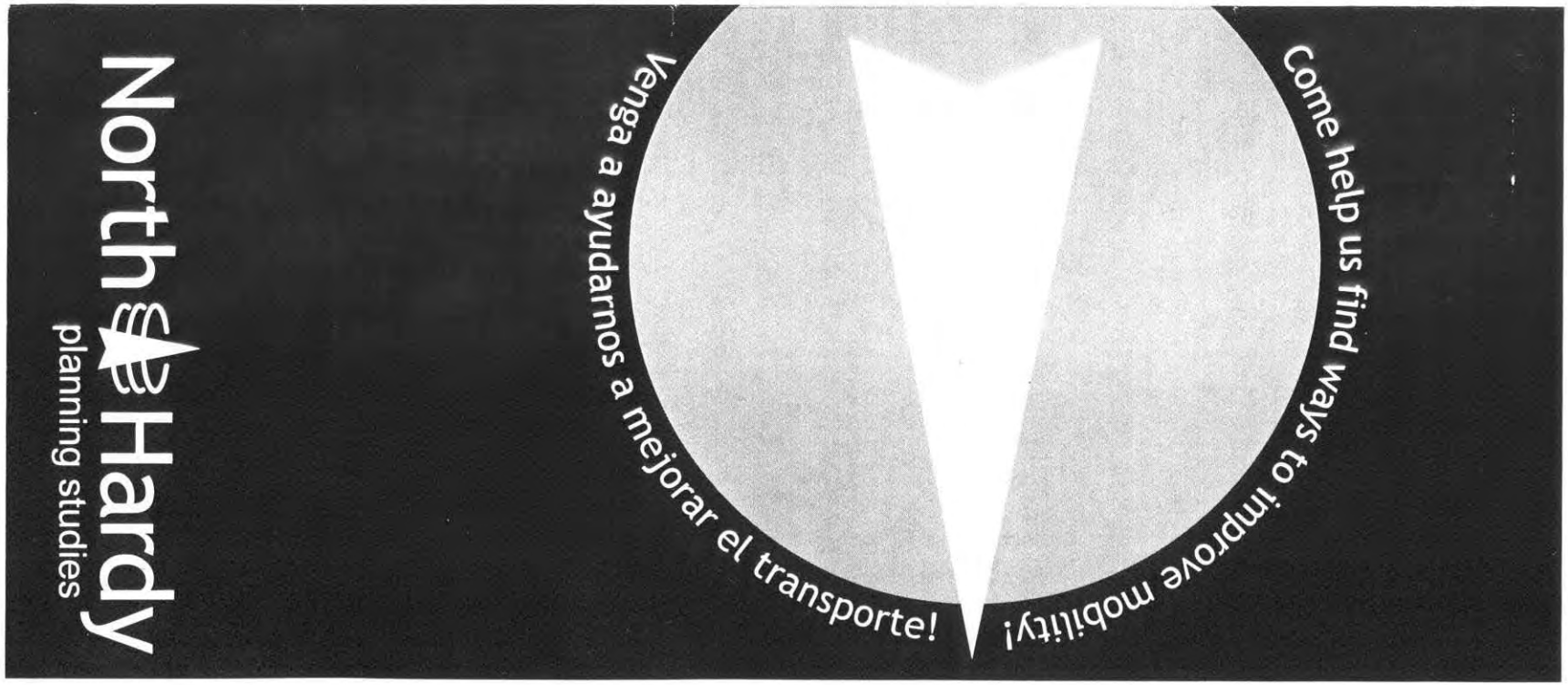
METRO Mobility 2025
Room 21034
PO Box 61429
Houston, TX 77208-1429

e-mail:
north-hardy@ridemetro.org
or call:
713-739-6049



North Hardy
planning studies

On behalf of METRO, the Texas Department of Transportation and the Houston-Galveston Area Council, Carter-Burgess is conducting in-depth planning studies to determine how best to improve mobility in the North-Hardy Corridor. Carter-Burgess is hosting Open House meetings to take your questions and ideas about transportation issues and solutions.

February 5
4:30 - 7:30 p.m.
Wesley Community Center, Social Hall
1410 Lee

February 6
4:30 - 7:30 p.m.
Northline Mall, Community Room 316
I-45 @ Crosstimbers

February 13
4:30 - 7:30 p.m.
North-Harris Montgomery Community College
Student Center, South Dining Room
2700 W. Thorne

February 20
4:30 - 7:30 p.m.
Houston Community College System
Administration Auditorium
3100 Main St. @ Elgin

February 27
Houston-Galveston Area Council
3555 Timmons Lane
Agency Meeting
3:00 - 5:00 p.m.
Second Floor Conference Room A
Public Open House
5:00 - 7:00 p.m.
Second Floor Conference Room B

Any person who requires language interpretation or special communication accommodations is encouraged to contact the project's public participation coordinator at 713-739-6049 at least 72 hours prior to the meeting. Every reasonable effort will be made to meet your needs.

For information on bus routes to get to the meetings, call 713-635-4000 or log on to the METRO web site at ridemetro.org.

Texas Department of Transportation

H-GAC

Carter :: Burgess

Carter-Burgess está llevando a cabo estudios de planificación para METRO, el Departamento de Transporte y el Consejo del Área Houston-Galveston para mejorar el transporte y el tráfico vehicular en el Corredor North-Hardy. Carter-Burgess está organizando reuniones públicas para contestar sus preguntas y discutir sus ideas sobre los problemas del transporte y las posibles soluciones.

5 de febrero
4:30 a 7:30 de la tarde
Wesley Community Center, Social Hall
1410 Lee

6 de febrero
4:30 a 7:30 de la tarde
Northline Mall, Community Room 316
I-45 @ Crosstimbers

13 de febrero
4:30 a 7:30 de la tarde
North-Harris Montgomery Community College
Student Center, South Dining Room
2700 W. Thorne

20 de febrero
4:30 a 7:30 de la tarde
Houston Community College System
Administration Auditorium
3100 Main Street @ Elgin

27 de febrero
Houston-Galveston Area Council
3555 Timmons Lane
Agency Meeting
3:00 a 5:00 de la tarde
Second Floor Conference Room A
Public Open House
5:00 a 7:00 de la tarde
Second Floor Conference Room B

Se solicita a las personas que necesiten interpretación de idiomas o formas especiales de comunicación que se pongan en contacto con nuestro coordinador de participación publica al 713-739-6049, por lo menos 72 horas antes de la reunión. Haremos un esfuerzo razonable para satisfacer sus necesidades.

Llame al 713-635-4000 o vaya al sitio de METRO en el internet, ridemetro.org, si desea obtener información sobre rutas para tomar el autobús a las reuniones.

METROMOBILITY 2025

North Hardy planning studies

Initial Alternatives

1. Outer Corridor (FM 1960 to SH 242)

- Add Park & Ride in vicinity of SH 242
- Light Rail or Bus Rapid Transit
  - On IH-45
  - On Woodlands Parkway
  - On Kuykendahl/Gosling
  - On Hardy/Union Pacific RR
- Commuter Rail
  - On Union Pacific RR
- Highway Improvements on IH-45
  - Develop a one-way HOV
  - Develop a two-way HOV

2. Mid-Corridor (Gulfbank to FM 1960)

- Light Rail or Bus Rapid Transit
  - On IH-45
  - On Hardy
  - On Greens Road & Greens Bayou
  - On Kuykendahl
  - On Airline
- Commuter Rail
  - On Hardy
- People Mover
  - On Greens Road & Greens Bayou
- Highway Improvements on IH-45
  - Upgrade one-way HOV to standards
  - Convert to two-way HOV

3. Inner Corridor (Downtown to Gulfbank)

- Highway improvements on IH-45
  - Bring up to standards (shoulders, lane widths, ramps, etc.)
  - Add a lane in each direction
  - Add two lanes in each direction
  - Add managed lanes (toll lanes with discount for HOV)
  - Upgrade one-way HOV to standards
  - Convert existing one-way HOV to two-way HOV
- Improve interchange
  - IH-45 @ IH-610
  - IH-45 @ IH-10
- Arterial Connection
  - Between Fulton & San Jacinto
- Light Rail or Bus Rapid Transit
  - On North Main
  - On IH-45
  - On Hardy
  - On Airline
  - On Irvington
  - On Utility/RR property near IH-610 between Irvington & IH-45
  - Bus Rapid Transit connection to Smith & Louisiana along IH-45
- Commuter Rail
  - On Union Pacific RR
- Intermodal Center (for future consideration)

South of the Bayou

- Highway improvements on IH-45
  - Bring up to standards (ramps, shoulders, lane widths, etc.)
  - Add a lane in each direction
  - Add managed lanes (toll lanes with discount for HOV)
  - Moveable center barrier to respond to peak traffic flows
- Improve interchange
  - IH-45 between IH-10 & W. Dallas
  - IH-45 @ US 59
- Arterial Connection
  - Between Spur 527 & IH-45

Note: transit improvements under construction (METRORail and Downtown/Midtown Streets Project)

Legend

- Existing Highways
- Proposed Improvements
- Proposed Park & Ride
- Proposed Intermodal Center

Lectores de habla Hispana: Por favor vea la página numero 6 para descripcion del mapa en espanol

N

Miles

0 1.5 3

Acompáñenos en una sesión de trabajo!

Mejoras
al norte de Buffalo Bayou

4 de junio, 4:30-7:30 pm
Centro Comercial Greenspoint
Salón de la Comunidad
12300 North Freeway

Entre al centro comercial por el letrero "Eclipse" en la calle Greenspoint Drive. Pase el area de los puestos de comida.

15 de junio, 8:30-11:30 am
Iglesia Católica St. Patrick
Salón Principal
4918 Cochran

La iglesia está localizada al noreste de la intersección de las calles Irvington y Cavalcade. El salón esta detrás de la iglesia.

Mejoras
al sur de Buffalo Bayou

6 de junio, 4:30-7:30 pm
Iglesia Bautista de South Main
Salón LB204 del edificio Loessner
4100 South Main

Cerca de la calle West Alabama

En las sesiones se evaluarán las alternativas iniciales usando una lista de criterios que reflejan las consideraciones y preocupaciones de la comunidad acerca del corredor. Por favor confirme su asistencia al teléfono 713-803-2076 (Rachel Spencer).

North Hardy
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www.north-hardy.org
north-hardy@ridemetro.org

1.
Sección exterior (Desde FM 1960 a SH 242)

- Construir parqueo con paradero (Park & Ride) en SH 242
- Tren ligero o autobús de alta capacidad
  - En IH-45
  - En Woodlands Parkway
  - En Kuykendahl/Gosling
  - En Hardy/ferrocarril Union Pacific
- Tren regional
  - En ferrocarril Union Pacific
- Mejoras a la autopista IH-45
  - Construir carriles exclusivos de una dirección para vehículos con múltiples pasajeros (HOV)
  - Construir carriles exclusivos de dos direcciones para vehículos con múltiples pasajeros (HOV)

2.
Sección Media (Desde Gulfbank a FM 1960)

- Tren ligero o autobús de alta capacidad
  - En IH-45
  - En Hardy
  - En Greens Road y Greens Bayou
  - En Kuykendahl
  - En Airline
- Tren regional
  - En Hardy
- Monorriel
  - En Greens Road y Greens Bayou
- Mejoras a la autopista IH-45
  - Mejorar carriles exclusivos de una dirección para que cumplan con los estándares
  - Cambiar a carriles exclusivos (HOV) de dos direcciones

Sección al sur de Buffalo Bayou

- Mejoras a la autopista IH-45
  - Mejorar la autopista para que cumpla con los estándares (hombros, ancho de carriles, rampas, etc.)
  - Añadir un carril en cada dirección
  - Añadir carriles de uso flexible (carriles de peaje con descuentos para vehículos con múltiples pasajeros)
  - Instalar barrera movible para ajustar según dirección del tráfico de horas punta
- Mejorar las intersecciones
  - IH-45 entre IH-10 y W. Dallas
  - IH-45 y US 59
- Conexión arterial
  - Entre Spur 527 y IH-45

Nota: Inversiones de transporte público bajo construcción (tren ligero de METRO y mejoras a las calles de Downtown y Midtown)

3.
Sección Interna (Desde Downtown hasta Gulfbank)

- Mejoras a la autopista IH-45
  - Mejorar la autopista para que cumpla con los estándares (hombros, ancho de carriles, rampas, etc.)
  - Añadir un carril en cada dirección
  - Añadir dos carriles en cada dirección
  - Añadir carriles de uso flexible (carriles de peaje con descuentos para vehículos con múltiples pasajeros)
  - Mejorar carriles exclusivos (HOV) de una via para que cumplan con los estándares
  - Convertir carriles exclusivos actuales (HOV) de una dirección a carriles exclusivos (HOV) de dos direcciones
- Mejorar las intersecciones
  - IH-45 y IH-610
  - IH-45 y IH-10
- Conexión arterial
  - Entre las calles Fulton y San Jacinto
- Tren ligero o autobús de alta capacidad
  - En North Main
  - En IH-45
  - En Hardy
  - En Airline
  - En Irvington
  - En la servidumbre y propiedad del ferrocarril cerca de IH-610 entre Irvington y IH-45
  - Conexión de autobús de alta capacidad a las calles Smith y Louisiana a lo largo de IH-45
- Tren regional
  - En el ferrocarril Union Pacific
- Centro de transferencia intermodal (será considerado en el futuro)

Informe sobre los Estudios de Planificación Hardy-Norte

Así como crece la población y la economía de Houston, así también crece el tráfico. Dado que hay pronósticos de crecimiento vigoroso y sostenido para el área de Houston, las agencias locales están trabajando juntas para planificar mejoras al transporte que puedan responder a este crecimiento y ofrecer opciones de transporte para viajes de trabajo, compras, escuela, y recreación.

Trabajando juntos para ofrecer opciones de transporte para viajes de trabajo, compras, escuela, y recreación

Un equipo conformado por nuestras agencias públicas locales (METRO, TxDOT, y HGAC) está llevando a cabo estudios detallados de nuestras necesidades futuras de transporte y de las posibles soluciones para el Corredor Hardy-Norte. La agencia federal de tránsito (Federal Transit Administration) y la agencia federal de autopistas (Federal Highway Administration) tomarán parte en los estudios para asegurar que cualquier mejora propuesta tenga posibilidades de financiamiento federal.

Los Estudios de Planificación del Corredor Hardy-Norte considerarán y analizarán una variedad de posibles mejoras de transporte en el Corredor Hardy-Norte. Por ejemplo, mucha gente en el corredor favorece el uso de transporte público de alta capacidad como una manera de remediar el crecimiento del tráfico. Por lo tanto, estamos estudiando maneras de aumentar la capacidad vehicular de la autopista IH-45 y de añadir transporte público de alta capacidad a lo largo de una buena parte del corredor.

El area de estudio del Corredor Hardy-Norte incluye varios centros importantes de actividad y comunidades residenciales, y cubre desde los suburbios en el norte, que se han estado expandiendo con rapidez, hasta los vecindarios del Near Northside, cerca del Downtown, que están viendo nueva inversión. Si usted observa el mapa (vea páginas 4-5), verá que el área se extiende al norte desde el Downtown, e incluye los vecindarios del Near Northside Village, el área del Northline Mall, el área de Aldine, el área de FM 1960 y Spring, y el área de The Woodlands y la sección sur de Condado de Montgomery.

El área de estudio del Corredor Hardy-Norte también incluye un área al sur de Buffalo Bayou, que incluye el Downtown y el área de Midtown. En el área al sur del Buffalo Bayou, que se extiende hasta el Spur 527 (vea el mapa en la página 5), el departamento de transporte de Texas (TxDOT) está estudiando mejoras para las autopistas IH-45 y US 59. Los proyectos de transporte público para esta área (el tren urbano de METRO y las mejoras a las calles en Downtown y Midtown) ya fueron aprobados y están bajo construcción.

Estamos estudiando maneras de aumentar la capacidad vehicular y de añadir transporte público de alta capacidad a lo largo del corredor

En enero de 2002, METRO y TxDOT anunciaron, juntamente con el plan Mobility 2025 de METRO *(el plan de largo plazo de METRO para mejorar la eficiencia y eficacia del transporte a lo largo del área de Houston)*, sus planes de preparar estudios de impacto ambiental para las inversiones de transporte que surjan de los Estudios de Planificación Hardy-Norte. El proceso federal de estudios ambientales exige que estos estudios se inicien con un esfuerzo de consulta pública llamado "scoping," que tiene el propósito de solicitar comentarios del público y de otras

*continuacion, vea **INFORME** en la página 7*

Los problemas de transporte en el area de estudio

- Al norte de Buffalo Bayou
  - Hay mucho tráfico en la autopista IH-45, especialmente en las secciones más antiguas localizadas inmediatamente al norte de Downtown
  - Hay pocas alternativas al uso del automóvil para muchos viajes hacia o a lo largo del corredor
  - Actualmente, el servicio de transporte público de alta capacidad sólo funciona durante las horas punta y en la dirección punta, lo cual puede significar un servicio deficiente para los centros de actividad del corredor
- Al sur de Buffalo Bayou
  - Hay mucho tráfico en las autopistas IH-45 y US 59 al sur de Buffalo Bayou
- Se necesita un incremeto en el grado de movilidad y acceso para poder facilitar el desarrollo económico y la inversión
- Se espera que el crecimiento de la población y el empleo empeoren los problemas señalados arriba

Reciba noticias del proyecto y mándenos sus comentarios a través del internet!

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north-hardy@ridemetro.org

Transportation issues and concerns for the study area

- North of Buffalo Bayou
  - Congestion on IH-45, particularly on the older segments immediately north of Downtown
  - For many trips within and to the corridor, there are few viable alternatives to the private auto
  - High capacity transit service is currently peak period/peak direction only, and therefore may not adequately serve suburban activity centers
- South of Buffalo Bayou
  - Congestion on IH-45 and US 59
- Increased access and mobility is needed to facilitate economic development and redevelopment
- Population and employment growth is expected to worsen the problems listed above

Get project updates and send comments online! www.north-hardy.org

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www.north-hardy.org
north-hardy@ridemetro.org

UPDATE

continued from pg. 1

area south of Buffalo Bayou, covering Downtown and the Midtown area. South of Buffalo Bayou to Spur 527 (see map page 5), TxDOT is considering highway improvements for IH-45 and US 59. Transit projects for this area (METRORail and the Downtown/Midtown Streets Project) have already been approved and are under construction.

We are studying ways to increase traffic-carrying capacity and add high capacity transit throughout the corridor

In conjunction with METRO Mobility 2025 *(METRO's long term transit plan to improve transportation efficiency and effectiveness throughout the Houston region)*, METRO and TxDOT announced their plans in January 2002 to prepare environmental impact statements for transportation improvements that emerge from the North-Hardy Planning Studies. The Federal environmental process directs that the study process begin with an outreach effort called scoping to solicit agency and public comments on transportation issues and alternatives.

Scoping began in January 2002 when the general public was invited to a series of meetings which described the planning studies and solicited public input. Local, State and Federal regulatory agencies were invited to comment at a special Agency Scoping meeting. The goal of the scoping process was to distribute information about the studies and gather information about the public's concerns and transportation preferences.

Public involvement is extremely important to METRO, TxDOT and H-GAC. Following the study, METRO's Board of Directors will select transit projects for environmental study and implementation. In making this decision, the Board will consider public and agency input provided through these studies. Similarly, TxDOT will consider public and agency input as they select the highway improvements.

From their preliminary work and the scoping meeting comments, the planning team has compiled a preliminary list of transportation issues and concerns for the study area (see list in left margin).

Public involvement is extremely important...

In response to these concerns, a set of initial highway and transit alternatives has been developed. These initial alternatives are conceptual but will serve to focus the public discussion during May and June 2002 on which transportation investments make the most sense for the North-Hardy Corridor.
A number of public work sessions are planned to discuss the pros and cons of each alternative.

The planning team invites you to participate in a public work session in which we will discuss the pros and cons of each alternative.

The planning team invites you to participate in a public work session

North of Buffalo Bayou

June 4, 4:30-7:30 pm
Greenspoint Mall
Community Room
12300 North Freeway

June 15, 8:30-11:30 am
St. Patrick's Catholic Church
Parish Hall
4918 Cochran

South of Buffalo Bayou

June 6, 4:30-7:30 pm
South Main Baptist Church
Loessner Building, Rm LB204
4100 South Main

Reserve your seat at a session of choice by calling 713-803-2076

The planning team invites you to participate in a public work session on June 4 or 15 (study north of Buffalo Bayou) or on June 6 (study south of Buffalo Bayou). The discussions will evaluate the initial alternatives using a list of criteria that reflects the issues and concerns we have identified and heard from the public. While we hope that many people will take part, the sessions will be facilitated in small working groups to provide more active participation and ensure that all points of view are heard. Therefore, it is necessary to reserve your place so we can adequately staff these meetings.

INFORME

continuacion del de la página 3

agencias sobre las alternativas y los problemas del transporte bajo consideración.

El proceso de consulta pública (scoping) se inició en enero de 2002 cuando el público fue invitado a una serie de reuniones donde se mostraron los estudios de planificación y se solicitó el aporte del público. Las agencias locales, estatales, y federales fueron invitadas a una reunión especial para agencias. El objetivo de las reuniones públicas fue distribuir información acerca de los estudios y obtener información acerca de las preferencias y consideraciones del público sobre el transporte.

La participación del público es extremadamente importante para METRO, TxDOT y HGAC. Una vez terminado el estudio, la junta directiva de METRO eligirá los proyectos de transporte público que serán sometidos a estudios de impacto ambiental y que serán llevados a cabo. A la hora de tomar esta decisión, la junta directiva de METRO tomará en cuenta los aportes del público y de las agencias que participaron en las reuniones. De igual manera, TxDOT tomará en cuenta los aportes del público y de las agencias a la hora de elegir las mejoras a las autopistas.

La participación del público es extremadamente importante.

En base al trabajo preliminar y los comentarios del público, el equipo de planificación ha compilado una lista preliminar de problemas y consideraciones de transporte para el área de estudio (vea la lista en la página 3).

En respuesta a estas consideraciones, se ha elaborado un conjunto de alternativas iniciales para las autopistas y el transporte público. Estas alternativas iniciales son de carácter conceptual, pero servirán para centrar la discusion del público durante mayo y junio de 2002 sobre las inversiones que tienen más sentido para el Corredor Hardy-Norte. Un número de talleres públicos han sido planeados para discutir los pros y los contras de cada alternativa.

El equipo de planificación lo invita a participar en las sesiones de trabajo detallado que tendrán lugar el 4 de junio o el 15 de junio (para el área al norte de Buffalo Bayou) o el 6 de junio (para el área al sur de Buffalo Bayou). En las discusiones se evaluarán las alternativas iniciales usando una lista de criterios que reflejan las consideraciones y preocupaciones que hemos identificado y escuchado del público. Aunque esperamos que mucha gente participe, las sesiones van a ser divididas en pequeños grupos de trabajo para facilitar la participación y asegurar que todos los puntos de vista sean escuchados. Por lo tanto, es necesario que usted reserve su lugar de antemano. De esta manera podremos proveer suficiente personal para las reuniones.

El equipo de planificación lo invita a participar en una de las sesiones de trabajo *(vea página 6)*. Reserve su puesto en la sesión de trabajo de su preferencia llamándonos al 713-803-2076.

Unas palabras del director del proyecto

En febrero llevamos a cabo varias reuniones públicas en el Corredor Hardy-Norte para presentar información acerca del estudio y su calendario, y escuchar la opinión de ciudadanos como usted. Tambien nos reunimos con muchas organizaciones cívicas y de la comunidad para escuchar sus preocupaciones y sus esperanzas de mejorar las opciones de transporte en el futuro. Muchos cuidadanos asistieron a las reuniones y nos dieron su opinión.

Por favor preste atención al mapa en el interior de este boletín. El mapa muestra el área de planificación del Corredor Hardy-Norte y las alternativas iniciales que estamos considerando para las autopistas y el transporte público en cada sección. Las propuestas escritas al lado de cada sección del corredor reflejan las sugerencias de los ciudadanos que asistieron a la ronda previa de reuniones públicas.

Ahora que el proceso oficial de consulta pública (scoping) ha concluido, estamos listos para entrar en la siguiente fase del estudio (vea la gráfica en la pagina 3). En las próximas dos semanas, usted tendrá la oportunidad de participar en sesiones de trabajo que tienen como propósito reducir la lista de alternativas que serán sometidas a estudios más detallados. Las fechas y lugares de estas reuniones están descritas en la página 6. Esperamos que usted decida tomar parte en estas discusiones.

Estas reuniones se dividirán en pequeños grupos de discusión, cada uno con un facilitador. Cada reunión durará aproximadamente tres horas. Sin embargo, trataremos de facilitarlas en forma rápida, de manera que todos puedan expresar sus ideas. Esperamos que usted participe en estas sesiones de trabajo.

Este proceso tendrá mejores resultados si todos participan. Por favor llame al 713-803-2076 para reservar su puesto.

Atentamente,

Rod

Rod Smith

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Join Us for a Work Session!
Details Inside

June 4
June 6
June 15

Acompáñenos en una sesión de trabajo!
Vea los detalles dentro

A Word From the Project Manager

In February we hosted several public meetings in the North-Hardy Corridor to present information about the study process/schedule and hear from citizens like you. We also met with many civic and community organizations to hear their concerns and their hopes for improving our transportation options in the future. Many citizens attended these meetings and gave us their opinions.

Please take a moment to look at the map on the inside pages of this newsletter. It shows the North-Hardy Planning Studies Corridor and the initial transit and highway alternatives being discussed for each area.

The ideas noted next to each section of the corridor reflect the suggestions generated by the citizens who attended the previous round of public meetings.

With the official Scoping process behind us, we are now ready to enter the next phase of the study (see the graphic on page 1). In the next few weeks, you have the opportunity to participate in work sessions to narrow the list of alternatives that will undergo detailed analysis. The dates and locations for these meetings are noted on page 1. It is our hope that you will plan to be a part of those discussions.

These meetings will be broken up into small group discussions, each with a facilitator. Each meeting will take approximately three hours. However, we will facilitate them to move quickly so that everyone's ideas can be heard. I hope you will participate in one of these work sessions.

This process will be much better if everyone participates. Please call 713-803-2076 to reserve your space.

Sincerely,

Rod

Rod Smith

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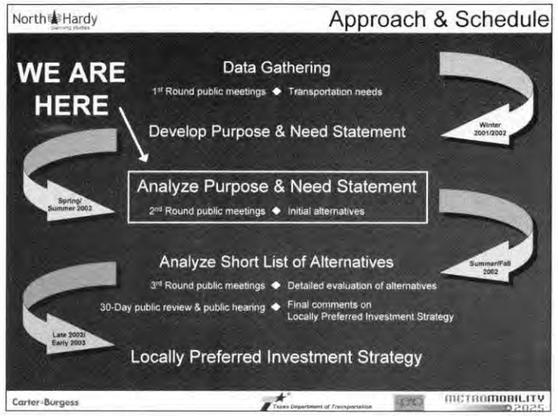
Directions

news from the North-Hardy planning studies • spring 2002



Update on the North Hardy Planning Studies

As our population and economy continue to grow in the Houston area, so does our traffic congestion. With forecasts for continued strong growth, local agencies are working together to effectively plan transportation improvements that respond to this growth and provide choices for traveling to jobs, schools, shopping and entertainment.

A team of our local public agencies (METRO, TxDOT & H-GAC) is conducting detailed studies of our future transportation needs and potential mobility solutions for the North-Hardy Corridor. The Federal Transit Administration and Federal Highway Administration will be active partners in these studies to ensure the potential for federal funding of any proposed improvements.

> Working together to provide choices for traveling to jobs, schools, shopping and entertainment

The North-Hardy Planning Studies will consider and analyze a variety of possible transportation improvements in the North-Hardy Corridor. For example, many people within the corridor are in favor of high capacity transit alternatives to remedy the increase in traffic congestion. Therefore, we are studying ways to increase the traffic carrying capacity of IH-45 and adding high capacity transit throughout much of the corridor.

The North-Hardy study area includes several major activity centers and residential communities, covering the rapidly growing northern suburbs to the redeveloping neighborhoods on the near northside of Downtown. As you look at the map (see pages 4-5), you will see that this area goes north from Downtown to include the Northside Village Neighborhoods, the Northline Mall area, the Aldine area, the Greenspoint area, Bush Intercontinental Airport, the FM 1960/Spring area and The Woodlands/South Montgomery County.

The North-Hardy Corridor study area also includes an

*continued, see **UPDATE** on pg. 2*

Carter Burgess · Texas Department of Transportation · H-GAC · METROMOBILITY 2025

Join Us for a Work Session!

Improvements
North of Buffalo Bayou

June 4, 4:30-7:30 pm
Greenspoint Mall
Community Room
12300 North Freeway
Enter the mall at "Eclipse" sign off Greenspoint Drive. Proceed past food court.

June 15, 8:30-11:30 am
St. Patrick's Catholic Church
Parish Hall
4918 Cochran
Northeast of Irvington and Cavalcade, behind the church

Improvements
South of Buffalo Bayou

June 6, 4:30-7:30 pm
South Main Baptist Church
Loessner Building, Rm LB204
4100 South Main
near W. Alabama

The discussions will evaluate the initial alternatives using a list of criteria that reflect community issues and concerns about the corridor. Please RSVP by calling 713-803-2076 (Rachel Spencer).

Lectores de habla Hispana: Por favor busquen la traducción dentro

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Short List of Alternatives

Transit Alignment 1

Both Light Rail Transit and Bus Rapid Transit will be considered for this alignment (Express and Local Service from the new light rail station at UH Downtown).

- Follow N. Main St. north
- Continue northwest on N. Main St. to Airline
- Continue northwest on Airline to IH-45
- Continue northwest on IH-45 to Fallbrook/Aldine Bender
- Continue northeast to Greenspoint Mall
- Continue northwest to Kuykendahl Park & Ride lot
- Continue north on IH-45 to SH 242

Spur to Bush IAH

- From Greenspoint Mall, continue east on Greens Rd. to Central Greens Rd.
- Continue north on Central Greens Rd. to Hardy Airport Connector
- Continue east along Hardy Airport Connector to JFK Blvd.
- Continue north on JFK Blvd. to Terminal C

Transit Alignment 2

Both Light Rail and Bus Rapid Transit will be considered for this alignment (Express and Local Service from the new light rail station at UH Downtown).

- Follow N. Main St. north
- Continue northwest on N. Main St. to Boundary
- Continue northeast to Fulton
- Continue north on Fulton to Irvington
- Continue north on Irvington to Hardy Toll Rd.
- Continue north along Hardy Toll Rd. and IH-45 to SH 242

Spur to Greenspoint and Kuykendahl Park & Ride Lot

- From Hardy Toll Rd. at Greens Rd., follow Greens Rd. west to Greenspoint Mall
- Continue northwest to Kuykendahl Park & Ride lot

Spur to Bush IAH

- From Hardy Toll Rd. at Hardy Airport Connector, follow along Hardy Airport Connector east to JFK Blvd.
- Continue north on JFK Blvd. to Terminal C

Transit Alignment 3

Both Light Rail and Bus Rapid Transit will be considered for this alignment (Express and Local Service from the new light rail station at UH Downtown). This alternative uses High Occupancy Vehicle (HOV) facilities on IH-45 to provide express connections to areas outside Beltway 8.

- Follow N. Main St. north
- Continue northwest on N. Main St. to Boundary
- Continue northeast to Fulton
- Continue north on Fulton to Irvington
- Continue north on Irvington to Cavalcade
- Continue west on Cavalcade to Fulton
- Continue north on Fulton to Northline Mall
- Continue northwest on Fulton to Airline
- Continue north on Airline to Aldine Bender
- Continue north to Greenspoint Mall
- Continue east on Greens Rd. to Central Greens Rd.
- Continue north on Central Greens Rd. to Hardy Airport Connector
- Continue east along Hardy Airport Connector to JFK Blvd.
- Continue north on JFK Blvd. to Terminal C

Spur to Greenspoint and Kuykendahl Park & Ride Lot

- From Greenspoint Mall, continue northwest to Kuykendahl Park & Ride lot

HOV to North

- Modify existing HOV lanes to provide high-speed transit service from north of Beltway 8 to Downtown

Highway Alternatives

IH-45 Additional Capacity

- Bring highway up to current design standards
- Investigate adding general purpose lanes and/or managed lanes and HOV lanes to increase capacity 50% within the right of way

Arterial Upgrades

- Study arterial upgrades as diversions for traffic from IH-45 (Fulton/San Jacinto, Airline, N. Main, Shepherd)

Study Narrowest Section of IH-45

- Add 50% capacity within right of way
- Raise lanes above flood level

Maximize Hardy Toll Road Extension

Legend

- LRT/BRT Alignment 1
- LRT/BRT Alignment 2
- LRT/BRT Alignment 3
- HOV Alignment 3
- Reserve Right of Way for Future Transit
- Hardy Toll Road Extension
- Arterial Upgrades
- IH-45 Additional Capacity (Narrowest Section)
- Existing Park & Ride
- Light Rail - Downtown to Reliant Park

0 0.5 1 2 3 Miles

Lectores de habla Hispana: Por favor vea la página numero 8 para descripcion del mapa en espanol

Ruta #1 para Transporte Público

Tanto el tren ligero como el autobús de alta capacidad se considerarán para esta ruta (servicio local y rápido desde la nueva estación de tren ligero en la Universidad de Houston-Downtown).

- Tomando hacia el norte por N. Main St.
- Continúa hacia el noroeste en N. Main St. hacia Airline
- Continúa hacia el noroeste por Airline hasta IH-45
- Continúa hacia el noroeste por la IH-45 hasta Fallbrook/Aldine Bender
- Continúa hacia el noreste hasta el Greenspoint Mall
- Continúa hacia el noroeste hasta el estacionamiento de METRO en Kuykendahl
- Continúa hacia el norte por la IH-45 hasta la SH 242

Ramal hacia el Aeropuerto Intercontinental Bush

- Desde el Greenspoint Mall, continúa por el este en Greens Rd. hasta Central Greens Rd.
- Continúa hacia el norte tomando por Central Greens Rd. hasta el Hardy Airport Connector
- Continúa hacia el este a lo largo del Hardy Airport Connector hasta JFK Blvd.
- Continúa hacia el norte por JFK Blvd. hasta la Terminal C

Ruta #2 para Transporte Público

Tanto el tren ligero como el autobús de alta capacidad se considerarán para esta ruta (servicio local y rápido desde la nueva estación de tren ligero en la Universidad de Houston-Downtown).

- Siguiendo hacia el norte por N. Main St.
- Continúa hacia el noroeste por Main St. Norte hasta Boundary
- Continúa hacia el noreste hasta Fulton
- Continúa hacia el norte por Fulton hasta Irvington
- Continúa hacia el norte por Irvington hasta el Hardy Toll Rd.
- Continúa hacia el norte a lo largo del Hardy Toll Rd. y IH-45 hasta SH 242

Ramal hasta Greenspoint y el estacionamiento de METRO en Kuykendahl

- Desde el Hardy Toll Rd. en Greens Rd., sigue Greens Rd. hacia el oeste hasta Greenspoint Mall
- Continúa hacia el noroeste hasta el estacionamiento de METRO en Kuykendahl

Ramal hacia el Aeropuerto Intercontinental Bush

- Desde Hardy Toll Rd. a la altura del Hardy Airport Connector, siguiendo por el Hardy Airport Connector hacia el oeste hasta JFK Blvd.
- Continúa hacia el norte por JFK Blvd. hasta la Terminal C

Ruta #3 para Transporte Público

Tanto el tren ligero como el autobús de alta capacidad se considerarán para esta ruta (Servicio local y rápido desde la nueva estación de tren ligero en la Universidad de Houston-Downtown). Esta alternativa incluye carriles de peaje con descuentos para vehículos con múltiples pasajeros (HOV) en la IH-45 para ofrecer conexiones rápidas a áreas mas allá del Beltway 8.

- Tomando hacia el norte por N. Main St.
- Continúa hacia el noroeste por N. Main St. hasta Boundary
- Continúa hacia el noreste hasta Fulton
- Continúa hacia el norte por Fulton hasta Irvington
- Continúa hacia el norte por Irvington hasta Cavalcade
- Continúa hacia el oeste por Cavalcade hasta Fulton
- Continúa hacia el norte por Fulton hasta Northline Mall
- Continúa hacia el noroeste por Fulton hasta Airline
- Continúa hacia el norte por Airline hasta Aldine Bender
- Continúa hacia el norte hasta Greenspoint Mall
- Continúa por el este en Greens Rd. hasta Central Greens Rd.
- Continúa hacia el norte en Central Greens Rd. hasta Hardy Airport Connector
- Continúa hacia el este por Hardy Airport Connector hasta JFK Blvd.
- Continúa hacia el norte por JFK Blvd. hasta la Terminal C

Ramal hacia Greenspoint Mall y estacionamiento de METRO en Kuykendahl

- Desde Greenspoint Mall, continúa hacia el noroeste hasta el estacionamiento de METRO en Kuykendahl

Carriles exclusivos para vehículos de múltiples pasajeros (HOV) hacia el norte

- Modificar los carriles exclusivos (HOV) existentes para ofrecer servicio de autobús rápido desde el área al norte del Beltway 8 hasta el Downtown

Alternativas para las Autopistas

Capacidad adicional para IH-45

- Mejorar la autopista para que cumpla con los estándares actuales de diseño
- Investigar la manera de añadir carriles regulares, carriles de uso flexible, o carriles exclusivos para vehículos de múltiples pasajeros (HOV) para incrementar la capacidad en un 50% dentro del actual ancho de vía

Mejoras a las vías principales

- Evaluar mejoras a ciertas vías principales para que absorban tráfico de IH-45 (Fulton/San Jacinto, Airline, N. Main, Shepherd)

Evaluar la sección más angosta de IH-45

- Añadir 50% de capacidad dentro del ancho de vía actual
- Elevar los carriles por encima del nivel actual de inundación

Maximizar la capacidad de la extensión del Hardy Toll Road

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Estudio de Planificación Avanza a la Etapa de Lista Corta de Alternativas

El estudio de las necesidades futuras de transporte y de las soluciones potenciales para la movilidad en el corredor Hardy-Norte está progresando a medida que nuestras agencias públicas locales (METRO, TxDOT & H-GAC) continúan trabajando con distintas organizaciones a lo largo del corredor y con el público en general.

Residentes del Northside Village estudian mapas que muestran las alternativas

El corredor forma parte del plan de largo plazo de METRO para mejorar la eficiencia y eficacia del transporte

El area de estudio del Corredor Hardy-Norte incluye varios centros importantes de actividad y comunidades residenciales, y cubre desde los suburbios en el norte, que se han estado expandiendo con rapidez, hasta los vecindarios del Near Northside, cerca del Downtown, que están viendo nueva inversión. Si usted observa el mapa (vea páginas 6-7), verá que el área se extiende al norte desde el Downtown, e incluye los vecindarios del Near Northside Village, el área del Northline Mall, el área de Aldine, el área de Greenspoint, Aeropuerto Intercontinental Bush, el área de FM 1960 y Spring, y el área de The Woodlands y la sección sur del Condado de Montgomery. El área de estudio del Corredor Hardy-Norte también incluye un área al sur del Buffalo Bayou, que incluye el Downtown y el área de Midtown. En el área al sur del Buffalo Bayou, que se extiende hasta el Spur 527, el departamento de transporte de Texas (TxDOT) está estudiando mejoras para las autopistas IH-45 y US 59. Los proyectos de transporte público para esta área (el tren urbano de METRO y las mejoras a las calles en Downtown y Midtown) ya fueron aprobados y están bajo construcción.

El corredor forma parte del plan Mobility 2025 de METRO (el plan de largo plazo de METRO para mejorar la eficiencia y eficacia del transporte en el área de Houston) y está avanzando conforme al proceso a través del cual funcionarios locales, estatales y federales toman decisiones sobre inversiones de transporte (vea la gráfica de Enfoque y Calendario en la página 9).

Dueños de negocios, propietarios, e individuos con intereses personales o de otro tipo forman parte de este estudio

Dueños de negocios, propietarios, e individuos con intereses personales o de otro tipo forman parte de este estudio, y muchos han trabajado juntos para suministrar información al equipo técnico. Un número de organizaciones representando a los seis sectores del corredor participaron en reuniones para discutir alternativas de transporte y mejoras al área. Adicionalmente, se organizaron tres reuniones públicas que aportaron información extremadamente útil al equipo técnico. El equipo técnico agradece a los grupos que nos ayudaron a organizar estas reuniones y a garantizar que todos los puntos de vista fueran escuchados.

Tres reuniones públicas aportaron información extremadamente útil al equipo técnico

Reciba noticias del proyecto y mándenos sus comentarios a través del internet!

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A work session for the study area north of Buffalo Bayou was held in June

What People Told Us

DO:

- Maximize use of Hardy Toll Road and maximize opportunity for transit (before widening IH-45)
- Add sound walls and landscaping to IH-45 and reduce air and visual pollution
- Improve interchanges and ramps on IH-45
- Light rail transit (LRT) on Main/Airline and Main/Irvington (Fulton) - local service*
- High-speed LRT long distance commute trips between Downtown, Greenspoint, Bush Intercontinental Airport, and The Woodlands
- East-west transit connections to Inner Katy Corridor
- High-speed LRT or bus rapid transit (BRT) on Hardy Toll Road alignment north of Tidwell
- LRT/BRT on IH-45 built in conjunction with freeway expansion
- Local LRT/BRT service on Airline using elevated structures*
- Combine high-speed and local LRT/BRT service within the same alignment (especially along Airline)*
- Improve north-south arterial street connections
- Improve east-west arterial street connections
- LRT service between Greenspoint and Bush Intercontinental Airport
- High-speed LRT service on IH-45 from The Woodlands to Downtown*
- Local LRT/BRT service on Kuykendahl*
- Extend study area and service considerations to Conroe and western Montgomery County
- Extend Hardy Toll Road to Conroe

SUMMARY: Provide quality inner city transit service and high-speed transit service for the long-distance commute.

DON'T:

- Widen IH-45 beyond current right of way inside IH-610
- Build elevated lanes on IH-45 inside IH-610
- Build LRT/BRT at-grade on Airline*
- Build LRT/BRT on IH-45 outside Beltway 8*
- Build LRT on Kuykendahl (in the short run)*
- Build LRT/BRT on Woodlands Parkway or Gosling Road
- Build new crossings over Spring Creek

SUMMARY: Don't disrupt established neighborhoods.

**Some community recommendations conflict with one another.*

Light Rail/BRT Similarities

- Unique, attractive vehicles
- Operates on its own guideway or dedicated street right of way
- Guideway/dedicated street right of way is permanent and easily recognizable
- Low-floor vehicles for easy platform level boarding
- Would receive priority signal treatment
- Faster boarding (off-vehicle fare collection and more entrance/exit doors)
- Limited-stop service at specified stations
- Station spacing from 1500 feet to several miles apart
- Interfaces with regional bus route network

Light Rail

- Utilizes light rail vehicles running on steel tracks
- Powered by overhead electric
- Vehicle life span of 30 years
- Capacity of 200 people/car; cars can be coupled together
- LRT becomes more cost-efficient as demand grows

Bus Rapid Transit

- Utilizes rubber-tired buses
- Diesel or alternative fuel
- Can leave guideway to provide local service
- Vehicle life span of 12 years
- Capacity of 70 people/bus
- BRT more cost-effective with moderate demand, less as demand increases

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Unas Palabras del Director de los Estudios de Planificación Hardy-Norte

Para ponerle al día sobre los asuntos discutidos en las reuniones públicas de mayo y junio, y sobre el proceso llevado a cabo para este estudio hasta la fecha, hemos reunido las respuestas a las preguntas más frequentes.

Por favor preste atención al artículo que se encuentra debajo de estas líneas y visite después nuestro sitio en el internet (www.north-hardy.org) para aprender más sobre el estudio.

Atentamente,

Rod Smith

Preguntas Frequentes sobre los Estudios de Planificación Hardy-Norte

Quien ha estado involucrado en el proceso de evaluación

El proceso de selección de las alternativas iniciales incluyó una serie de sesiones de trabajo con organizaciones participantes, grupos organizados y el público en general. La serie de sesiones de trabajo fue conducida en la secuencia siguiente:

- **Revision técnica** con organizaciones participantes, el municipio de Houston y expertos de tráfico y transporte del condado de Harris – incluyó más de 35 personas
- Seis **reuniones con grupos organizados del corredor** – incluyó más de 180 personas
- Tres **reuniones públicas** – incluyó más de 160 personas
- Reunión del **Comité Asesor de la Comunidad**

Un diagrama del proceso del estudio muestra que en estos momentos estamos analizando la lista corta de alternativas

Que ha sucedido hasta el momento

1 Una sesión técnica de trabajo fue llevada a cabo en mayo de 2002 con el equipo de consultores y las organizaciones participantes: METRO, TxDOT y personal de HGAC.

2 El proceso de revisión pública que se llevó a cabo durante mayo y junio de 2002 incluyó sesiones de trabajo con seis grupos de organizaciones del corredor y tres reuniones para el público en general. Los líderes de los grupos organizados entregaron las invitaciones para las sesiones de trabajo con las organizaciones. Las reuniones públicas tuvieron el mismo formato que las reuniones de las organizaciones, pero en este caso el equipo técnico invitó a los participantes a través del boletín, el sitio del internet, y anuncios públicos.

Cada sesión de trabajo comenzó con la misma presentación general, en la cual se describieron

continúa, vea ***PREGUNTAS MÁS FREQUENTES*** *en la página 10*

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PREGUNTAS MÁS FRECUENTES

Continuación de la página 9

las alternativas, los criterios de la evaluación, la información técnica disponible, y lo aprendido en las reuniones anteriores. Seguidamente, se dividieron a los asistentes en grupos pequeños de 10 a 15 personas para permitir la discusión detallada de las alternativas iniciales. A los grupos pequeños se les encargó la tarea de discutir pros y contras específicos sobre cada una de las alternativas a la luz de los criterios de evaluación descritos anteriormente o cualesquiera otros criterios o preocupaciones que ellos consideraran de importancia. Al final de la sesión de trabajo, cada grupo pequeño reportó sus resultados al pleno.

3 El Comité Asesor de la Comunidad se reunió el 17 de junio de 2002.

Las funciones del Comité Asesor de la Comunidad eran las siguientes:

- revisión a profundidad de las recomendaciones de las reuniones previas y
- conversión de estas recomendaciones en una evaluación consolidada para esta fase del proyecto.

Grupos organizados se reúnen en la Cámara de Comercio del Noroeste en una sesión de trabajo para discutir las alternativas

A cada grupo se le pidió que documentara los pros y contras de cada alternativa tal como eran percibidos, y tomando en cuenta los criterios de evaluación y los datos técnicos preliminares disponibles. El proceso de evaluación dio como resultado una recomendación para cada alternativa: ser escogida para una evaluación más detallada o ser descartada.

4 Después de una revisión detallada de los resultados de las sesiones técnicas de trabajo y de las sesiones con los grupos organizados, el Comité Asesor de la Comunidad ofreció ase soramiento sobre cuáles alternativas debían ser tomadas en cuenta para la siguiente fase del estudio.

Debido a que los distintos barrios y sectores expresaron differentes intereses y preocupaciones, la lista corta de alternativas representa nuestro mejor intento de tomar en cuenta todos los puntos de vista.

La revisión final con METRO y el equipo de TxDOT produjo una lista corta de alternativas propuestas.

Como compararon las alternativas el equipo técnico y las agrupaciones del público

Para establecer una base común de comparación para todas las alternativas, los grupos organizados del Estudio Hardy-Norte y el equipo técnico desarrolló los siguientes criterios evaluativos:

- Potencial para desarrollo económico
- Apoyo de la comunidad
- Costo de la inversión
- Perspectiva regional
- Impactos ambientales
- Impactos a comunidades
- Efectos sobre el nivel de movilidad
- Facilidad de implementación

Gente de negocios y residentes participan en una sesión de obras públicas para evaluar alternativas preliminares para el área al sur del Buffalo Bayou

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FAQ

continued from pg. 2

alternatives, the evaluation criteria, the available technical data, and insight from the previous meeting(s). Each meeting was divided into small groups of 10 to 15 people to allow detailed discussion of each of the initial alternatives. The small groups were charged with the task of providing specific pros and cons on each of the alternatives in light of the evaluation criteria and any other criteria or concerns they determined to be important. At the end of the work session, each small group reported its findings to the large group as a whole.

3 The Stakeholder Advisory Committee (SAC) met on June 17, 2002.

The Stakeholder Advisory Committee was assigned the tasks of:

- in-depth review of the recommendations from the previous meetings and
- consideration of these recommendations in a consolidated evaluation for this phase of the project.

Stakeholders convene at the Northwest Chamber of Commerce for a work session to discuss alternatives

Given the evaluation criteria and the preliminary technical data available, each group was asked to document the perceived pros and cons of each alternative. The evaluation process resulted in a recommendation for each alternative — either to be included for further evaluation or dropped from consideration.

4 After in-depth review of the results of the technical and stakeholder work sessions and the public meetings, the SAC offered advice on which initial alternatives should be carried into the next phase of the study.

Because there are differences in the issues and interests expressed by the various neighborhoods, the short list of alternatives is our best effort to accommodate every concern.

Final review with METRO and TxDOT staff produced a proposed short list of alternatives.

How did the study team and the public groups compare the alternatives

To establish a common basis of comparison for all alternatives, the North-Hardy Study stakeholders and study team developed the following evaluation criteria:

- Economic development potential
- Community support
- Capital cost
- Regional perspective
- Environmental impacts
- Community impacts
- Mobility impacts
- Ease of implementation

Business people and residents participate in a public work session to evaluate initial alternatives for the study area south of Buffalo Bayou

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A Word from the Project Manager of the North-Hardy Planning Studies

In order to bring you fully up to date on the issues discussed at the public meetings held in May and June, and the process undertaken for this study so far, we've compiled answers to our most frequently asked questions.

Please take a moment to review the article below, then log on to our Web site (www.north-hardy.org) to learn more about the study.

Sincerely,

Rod Smith

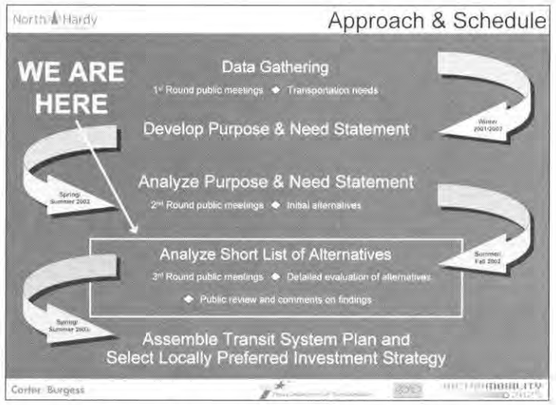
Rod Smith

Frequently-Asked Questions about the North-Hardy Planning Studies

Who has been involved in the evaluation process

The process of screening the initial alternatives involved conducting a series of facilitated working sessions with study partners, stakeholder groups and the general public. The series of work sessions was conducted in the following sequence:

- **Technical review** with study partners, City of Houston and Harris County traffic/transportation staff included more than 35 people
- Six **meetings with groups of stakeholders** included over 180 people
- Three **public meetings** involved over 160 people
- **Stakeholder Advisory Committee** meeting



A diagram of the study process shows we are currently analyzing the short list of alternatives for the study area

What has taken place

1 A technical work session was held in May 2002 with the consultant team and study partners: METRO, TxDOT and H-GAC staff.

2 The public review process during May and June 2002 involved work sessions with six stakeholder groups and three general public meetings. The leadership of the individual stakeholder groups handled invitations to the stakeholder work sessions. The public meetings had the same basic format as the stakeholder work sessions, however, the study team invited people via newsletter, Web site and public notice.

Each work session started with the same overview presentation describing the

continued, see FAQ on pg. 3

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Lo que nos Dijo la Gente

Hagan lo siguiente:

- Maximizen el uso del Hardy Toll Road y las oportunidades para transporte público (antes de ampliar la autopista IH-45)
- Añadan barreras contra el ruido y áreas verdes a la autopista IH-45 y reduzcan la contaminación visual y del aire
- Mejoren las intersecciones y rampas de la autopista IH-45
- Tren ligero (LRT) en las calles Main/Airline y Main/Irvington (Fulton) - servicio local*
- Tren ligero de alta velocidad para viajes de larga distancia entre el Downtown, Greenspoint, Aeropuerto Intercontinental Bush y The Woodlands
- Conecciones Este-Oeste con el corredor Inner Katy
- Tren ligero de alta velocidad o autobús de alta capacidad en Hardy Toll Road al norte de Tidwell
- Tren ligero o autobús de alta capacidad en la autopista IH-45 construido conjuntamente con la ampliación de la autopista
- Tren ligero o autobús de alta capacidad en la calle Airline usando una estructura elevada
- Combinar servicio local y de alta velocidad de tren ligero o autobús en la misma ruta (especialmente a lo largo de la calle Airline)*
- Mejorar las conecciones de vías principales norte-sur
- Mejorar las conecciones de vías principales este-oeste
- Servicio de tren ligero entre Greenspoint y Aeropuerto Intercontinental Bush
- Tren ligero de alta velocidad en la autopista I-45 de The Woodlands hasta el Downtown*
- Servicio local de tren ligero o autobús de alta capacidad en la calle Kuykendahl*
- Extender el área de estudio y consideraciones de servicio a Conroe y el oeste del condado de Montgomery
- Extender el Hardy Toll Road hasta Conroe

RESUMEN: Proveer un servicio de transporte público de calidad en las áreas centrales y un servicio rápido para viajes largos desde las afueras.

NO hagan lo siguiente:

- Amplíen la autopista IH-45 más allá del ancho de vía actual dentro de la IH-610
- Construir carriles elevados en la autopista IH-45 dentro de la IH-610
- Construir tren ligero o autobús de alta capacidad a nivel de calle en Airline*
- Construir tren ligero o autobús de alta capacidad fuera del Beltway 8*
- Construir tren ligero en Kuykendahl (a corto plazo)*
- Construir tren ligero o autobús de alta capacidad en Woodlands Parkway o en la calle Gosling
- Construir cruces nuevos sobre Spring Creek

RESUMEN: No afecten de forma negativa a los vecindarios existentes.

**Algunas recomendaciones se contradicen entre si*

Características Comunes del Tren Ligero y Autobús de alta Capacidad

- Vehículos atractivos
- Operan en un carril exclusivo
- El carril exclusivo es permanente y se reconoze fácilmente
- Vehículos con pisos bajos para facilitar la entrada y salida
- Tendrían prioridad de paso en los semáforos
- Entrada y salida rápida (compra de tiquetes se hace fuera del vehículo y tienen puertas más grandes)
- El servicio rápido sólo se detienen en ciertas paradas
- La separación entre paradas varía entre 1,500 pies y varias millas
- Interacciona con el servicio regional de autobuses

Tren Ligero

- Utiliza vehículos que andan sobre rieles de acero
- Movidos por cables eléctricos sobre el tren
- 30 años de vida útil de los vehículos
- Capacidad de 200 personas por carro; los carros pueden acoplarse
- El tren ligero es más eficiente en términos económicos a medida que crece la demanda

Bus de alta capacidad

- Utiliza buses sobre ruedas de caucho
- Diesel o combustibles alternativos
- Puede abandonar el carril exclusivo para ofrecer servicio local
- Vida útil de los vehículos de 12 años
- Capacidad de 70 personas por bus
- Es más eficiente en terminos económicos con demanda moderada; disminuye la eficiencia a medida que crece la demanda

En junio se llevó a cabo una sesión de trabajo para el área al norte del Buffalo Bayou

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STUDY ADVANCES

continued from pg. 1

The corridor is part of the METRO Mobility 2025 Plan (METRO's long term transit plan to improve transportation efficiency and effectiveness throughout the Houston region) and is moving through the process by which Federal, State and local officials make decisions regarding transportation investments (see Approach and Schedule graphic, pg. 2).

Individuals with business, property, personal or other interests in the areas are stakeholders in this process, and many of them have worked together to provide information to the study team. Organizations representing the corridor's six segments participated in meetings to discuss transportation alternatives and improvements for this area. In addition, three public meetings provided extremely useful information for the study team. The study team is very grateful to the area stakeholders and organizations that helped us organize these meetings for ensuring all issues of concern were heard.

> Three public meetings provided extremely useful information for the study team

If your name is not on the mailing label of this newsletter, please visit www.north-hardy.org to add your name to our mailing list.

Si su nombre no está en la etiqueta de correo de este boletín, por favor visite el sitio www.north-hardy.org para añadir su nombre a nuestra lista de correo.

Directions

news from the North-Hardy planning studies • issue 2 • fall 2002

Planning Study Advances to Short List of Transportation Alternatives

As the team of our local public agencies (METRO, TxDOT & H-GAC) continues to work with the public and corridor stakeholders, the study of future transportation needs and potential mobility solutions for the North-Hardy Corridor is making progress.

Northside Village stakeholders examine maps showing study alternatives

> The corridor is part of METRO's long-term transit plan to improve transportation efficiency and effectiveness

The North-Hardy study area includes several major activity centers and residential communities, covering the rapidly growing northern suburbs to the redeveloping neighborhoods on the near north side of Downtown. As you look at the map (pages 6-7) you will see this area goes north from Downtown to include the Northside Village Neighborhoods, the Northline Mall area, the Aldine area, the Greenspoint area, Bush Intercontinental Airport, the FM 1960/Spring area and The Woodlands/South Montgomery County. The North-Hardy Corridor study area also includes an area south of Buffalo Bayou, covering Downtown and the Midtown area. South of Buffalo Bayou to Spur 527, TxDOT is considering highway improvements for IH-45 and U.S. 59. Transit projects for this area (METRORail and the Downtown/Midtown Transit Streets Project) have already been approved and are under construction.

> Individuals with business, property, personal or other interests in the areas are stakeholders in this process

*continued, see **STUDY ADVANCES** on pg. 12*

Carter Burgess · Texas Department of Transportation · HGAC · METROMOBILITY 2025

This publication provides many opportunities for you to learn about the study process and the options under consideration.

In this issue:

En este número:

Lectores de habla Hispana: Por favor busquen la traducción dentro

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Light rail transit and bus rapid transit data:

- Length in miles: 42.6
- Number of stations: 24
- Estimated average speed: 33 mph

Información sobre sistema de tren ligero y autobús de alta capacidad:

- Longitud en millas: 42.6
- Número de estaciones: 24
- Velocidad promedio estimada: 33 mph

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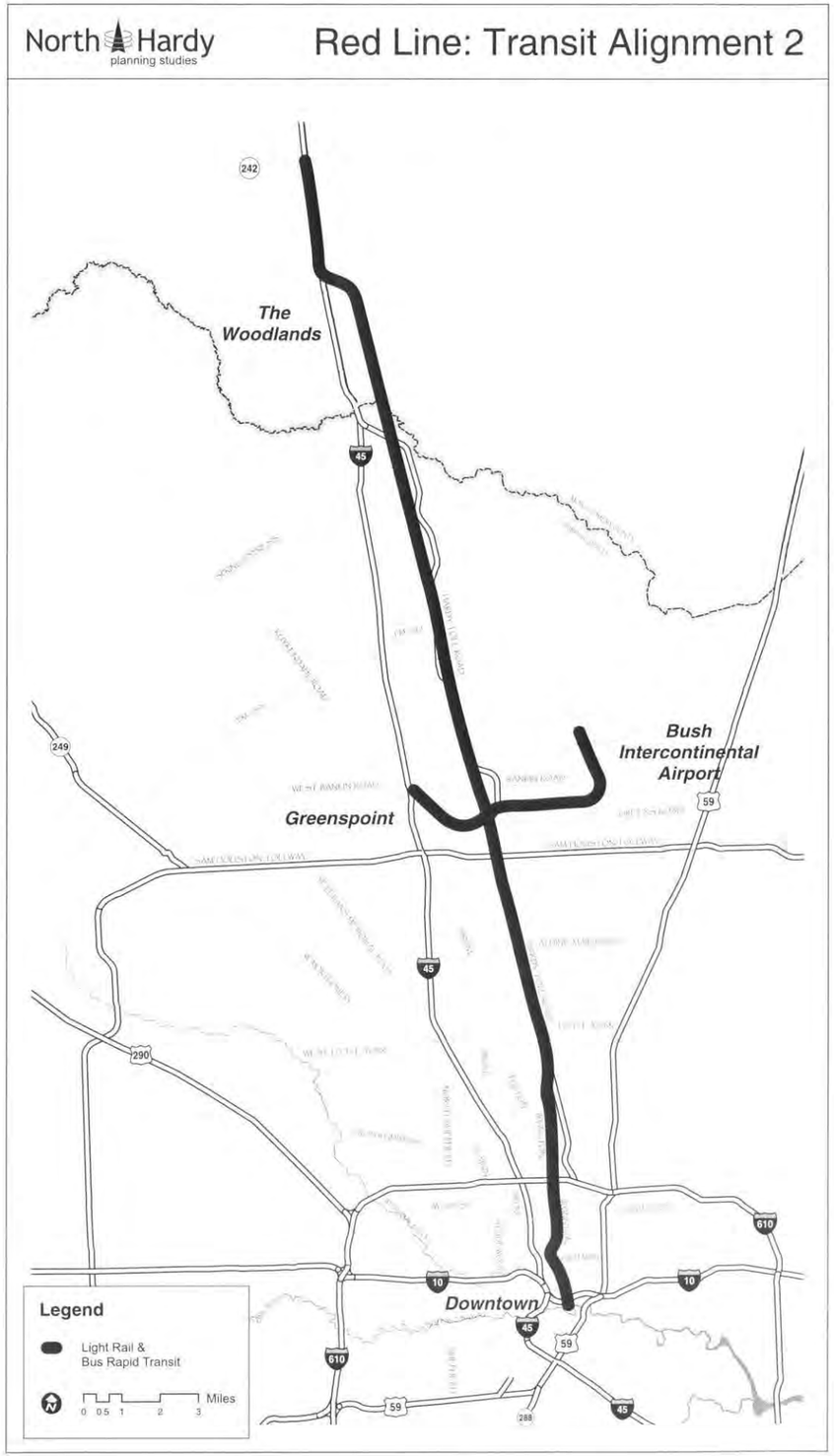

Transit Alignment 2

Both light rail and bus rapid transit will be considered for this alignment (express and local service from new light rail station at UH Downtown).

- Northern Branch
  - UPRR to The Woodlands
- Western Branch
  - Greens to Greenspoint and Kuykendahl Park & Ride
- Eastern Branch
  - Toll Road Extension
  - JFK to IAH
- Hardy
- Irvington
- Little White Oak Bayou
- N. Main

REPORT CARD: ***Transit Alignment 2***

Helps Others *Mobility Improvements*	F
Uses Time and Materials Wisely *Overall Costs*	B
Plays Well with Others *Regional Connectivity*	C
Finishes Work Promptly and Without Difficulty *Ease of Implementation*	B
Grows Big and Strong *Economic Development Potential*	C
Shows Consideration for Others *Community Impact*	B
Respects Property of Others *Environmental Impacts*	B
Listens Attentively and Waits Turn to Speak *Community Support*	F
Overall	D

Date *Citizen Signature*

Ruta #2 para Transporte Público

Tanto tren ligero como autobús de alta capacidad se estudiarán para esta ruta (servicio expreso y local desde la estación nueva de tren ligero en la UH Downtown).

- Ramal Norte
  - UPRR hasta The Woodlands
- Ramal Oeste
  - Desde Greens hasta Greenspoint y Kuykendahl Park & Ride
- Ramal Este
  - Extensión del Toll Road
  - Desde JFK hasta IAH
- Hardy
- Irvington
- Little White Oak Bayou
- N. Main

LIBRETA DE CALIFICACIONES: ***Ruta 2***

Ayuda a Otros *Mejorías a la Movilidad*	F
Utiliza Bien el Tiempo y los Materiales *Costos Totales*	B
Juega Bien con Otros *Conectividad Regional*	C
Termina su Trabajo a Tiempo y sin Dificultades *Facilidad de Puesta en Práctica*	B
Crece Grande y Fuerte *Potencial de Desarrollo Económico*	C
Muestra Consideración por los Demás *Impactos a la Comunidad*	B
Respeta la Propiedad de Otros *Impactos Ambientales*	B
Escucha y Espera su Turno para Hablar *Apoyo de la Comunidad*	F
Total	D

Fecha *Firma del Ciudadano*

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Light rail transit and bus rapid transit data:

- Length in miles: 23.9 (43.5)*
- Number of stations: 21 (24)*
- Estimated average speed: 25 mph (34 mph)*

* With 2-way HOV facility

Información sobre sistema de tren ligero y autobús de alta capacidad:

- Longitud en millas: 23.9 (43.5)*
- Número de estaciones: 21 (24)*
- Velocidad promedio estimada: 25 mph (34 mph)*

* Incluyendo HOV en dos direcciones

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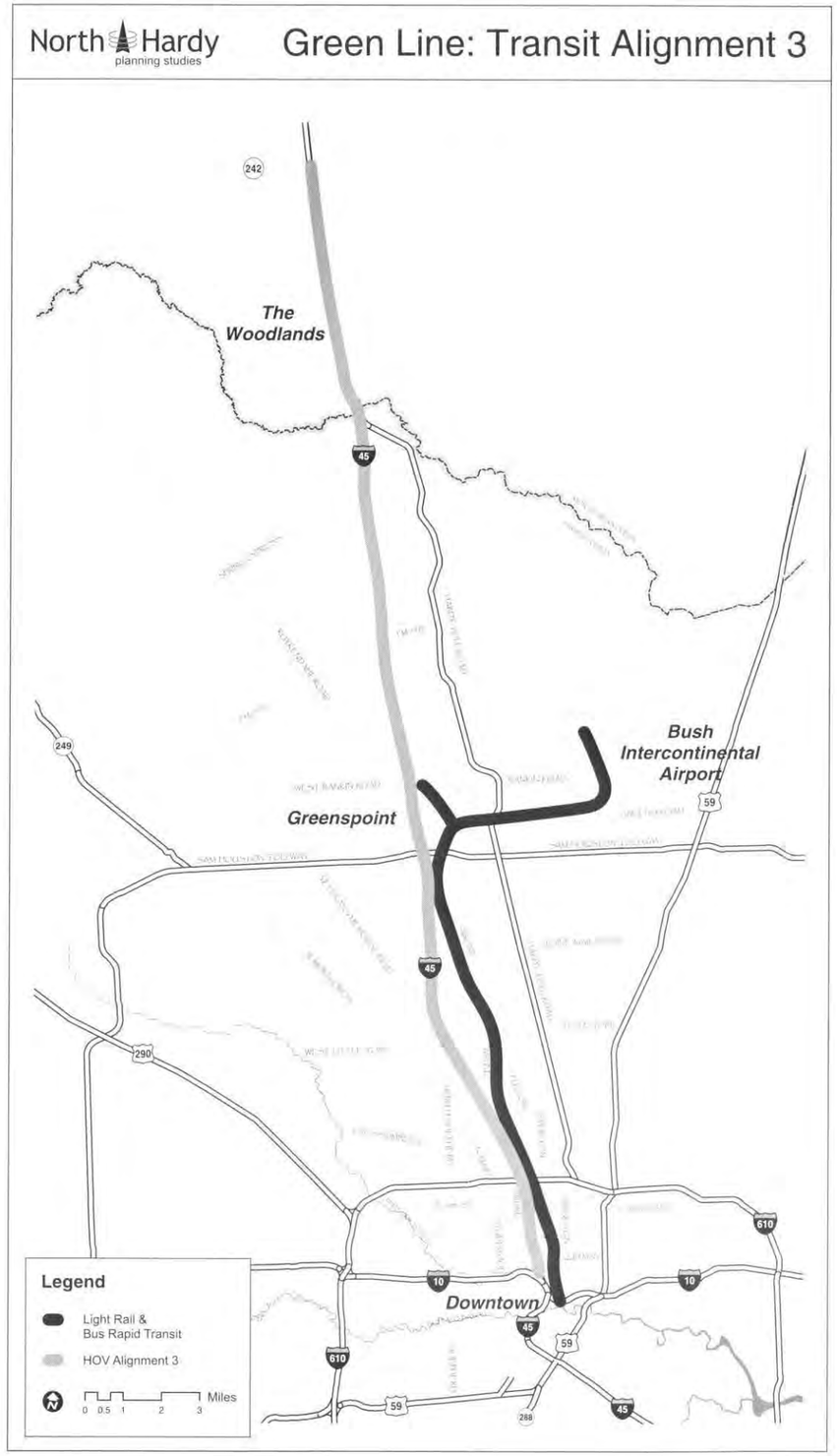

Transit Alignment 1

Both light rail and bus rapid transit will be considered for this alignment (express and local service from new light rail station at UH Downtown).

- Northern Branch
  - IH-45 to The Woodlands
- Eastern Branch
  - Greens
  - Toll Road Extension
  - JFK to IAH
- Airline
- N. Main

REPORT CARD: ***Transit Alignment 1***

Helps Others *Mobility Improvements*	A
Uses Time and Materials Wisely *Overall Costs*	D
Plays Well with Others *Regional Connectivity*	A
Finishes Work Promptly and Without Difficulty *Ease of Implementation*	C
Grows Big and Strong *Economic Development Potential*	C
Shows Consideration for Others *Community Impact*	B
Respects Property of Others *Environmental Impacts*	B
Listens Attentively and Waits Turn to Speak *Community Support*	B-
Overall	B-

Dat e *Citizen Signature*

Ruta #1 para Transporte Público

Tanto tren ligero como autobús de alta capacidad se estudiarán para esta ruta (servicio expreso y local desde la estación nueva de tren ligero en la UH Downtown).

- Ramal Norte
  - Desde IH-45 hasta The Woodlands
- Ramal Este
  - Greens
  - Extensión del Toll Road
  - Desde JFK hasta IAH
- Airline
- N. Main

LIBRETA DE CALIFICACIONES: ***Ruta 1***

Ayuda a Otros *Mejorías a la Movilidad*	A
Utiliza Bien el Tiempo y los Materiales *Costos Totales*	D
Juega Bien con Otros *Conectividad Regional*	A
Termina su Trabajo a Tiempo y sin Dificultades *Facilidad de Puesta en Práctica*	C
Crece Grande y Fuerte *Potencial de Desarrollo Económico*	C
Muestra Consideración por los Demás *Impactos a la Comunidad*	B
Respeta la Propiedad de Otros *Impactos Ambientales*	B
Escucha y Espera su Turno para Hablar *Apoyo de la Comunidad*	B-
Total	B-

Fecha *Firma del Ciudadano*

Reciba noticias del proyecto y mándenos sus comentarios a través del internet!

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Light rail transit and bus rapid transit data:

- Length in miles: 40.3
- Number of stations: 25
- Estimated average speed: 31 mph

Información sobre sistema de tren ligero y autobús de alta capacidad:

- Longitud en millas: 40.3
- Número de estaciones: 25
- Velocidad promedio estimada: 31 mph

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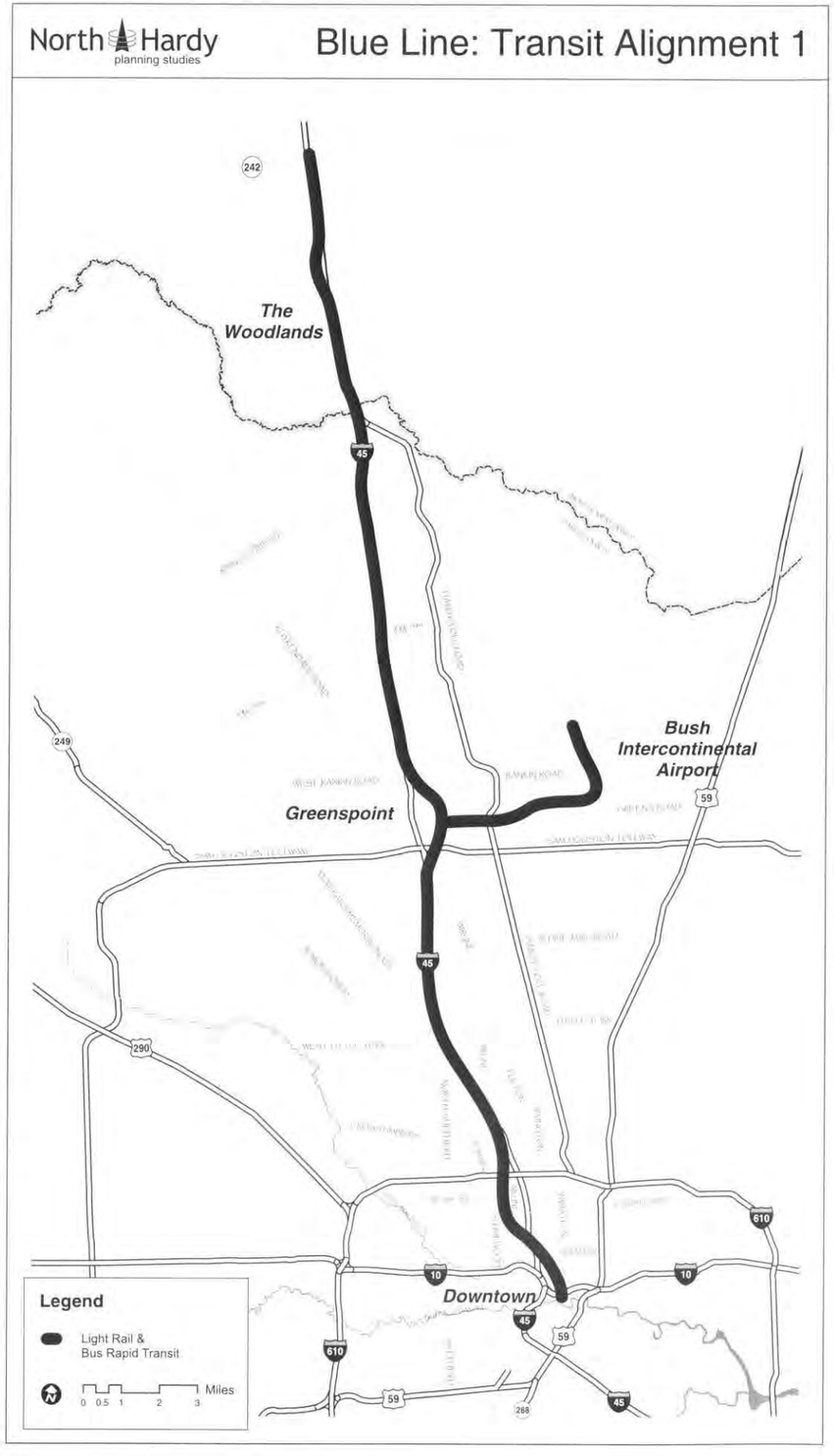
Blue Line: Transit Alignment 1



Transit Alignment 3

Both light rail and bus rapid transit will be considered for this alignment (express and local service from new light rail station at UH Downtown). This alternative uses High Occupancy Vehicle (HOV) facilities on IH-45 to provide express connections to areas outside Beltway 8.

- IH-45 HOV Downtown to The Woodlands
- East/West Connection
  - Greens
  - Toll Road Extension
  - JFK to IAH
- Airline
- Fulton
- Cavalcade
- Irvington
- Little White Oak Bayou
- N. Main

REPORT CARD: ***Transit Alignment 3***

Helps Others *Mobility Improvements*	A
Uses Time and Materials Wisely *Overall Costs*	B
Plays Well with Others *Regional Connectivity*	A
Finishes Work Promptly and Without Difficulty *Ease of Implementation*	C
Grows Big and Strong *Economic Development Potential*	B
Shows Consideration for Others *Community Impact*	B
Respects Property of Others *Environmental Impacts*	B
Listens Attentively and Waits Turn to Speak *Community Support*	A
Overall	B+

Date *Citizen Signature*

Note:

The community asked that Transit Alignment 3 include a future phase extending light rail to The Woodlands

Ruta #3 para Transporte Público

Tanto tren ligero como autobús de alta capacidad se estudiarán para esta ruta (servicio expreso y local desde la estación nueva de tren ligero en la UH Downtown). Esta opción utiliza carriles para vehículos con múltiples pasajeros (HOV) en IH-45 para proporcionar conexiones rápidas a las áreas localizadas mas allá del Beltway 8.

- Desde el HOV de IH-45 en el Downtown hasta The Woodlands
- Conexión Este/Oeste
  - Greens
  - Extensión del Toll Road
  - Desde JFK hasta IAH
- Airline
- Fulton
- Cavalcade
- Irvington
- Little White Oak Bayou
- N. Main

LIBRETA DE CALIFICACIONES: ***Ruta 3***

Ayuda a Otros *Mejorías a la Movilidad*	A
Utiliza Bien el Tiempo y los Materiales *Costos Totales*	B
Juega Bien con Otros *Conectividad Regional*	A
Termina su Trabajo a Tiempo y sin Dificultades *Facilidad de Puesta en Práctica*	C
Crece Grande y Fuerte *Potencial de Desarrollo Económico*	B
Muestra Consideración por los Demás *Impactos a la Comunidad*	B
Respeta la Propiedad de Otros *Impactos Ambientales*	B
Escucha y Espera su Turno para Hablar *Apoyo de la Comunidad*	A
Total	B+

Fecha *Firma del Ciudadano*

La comunidad solicitó que la Ruta 3 incluyera una etapa futura que extendiera el tren ligero hasta The Woodlands

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CONFERENCIAS

continuación de pág. 1

Reunión con miembros de la Coalición del Corredor Norte (North Corridor Coalition)

Reunión pública en la escuela Davis (Davis High School)

sido estudiadas a fondo. Esta área incluye varios centros de actividad y comunidades residenciales, y cubre desde los suburbios de rápido crecimiento en el norte, hasta los vecindarios en proceso de remodelación al norte del Downtown. Específicamente, el área incluye los vecindarios del Near Northside Village, el área del Mall de Northline, el área de Aldine, el área de Greenspoint, el Aeropuerto Intercontinental Bush, el área de FM 1960/Springfield, y el área sur del condado de Montgomery/The Woodlands.

En el primer estudio, las opciones están siendo analizadas a lo largo de tres rutas distintas. Para cada una de estas rutas, las opciones de tren ligero y autobús de alta capacidad fueron consideradas. El estudio de uno de las rutas (la ruta verde) incluye mejoras al sistema HOV de la autopista IH-45.

La segunda área de estudio va desde Buffalo Bayou hasta el Spur 527 (la salida de Louisiana desde la autopista SW) a lo largo de U.S. 59. En esta área, se estudiará la demanda futura de mejoras a la autopista. TxDOT está estudiando mejoras a las autopistas IH-45 y U.S. 59 al sur de Buffalo Bayou, cubriendo el área de Downtown y Midtown. Los proyectos de transporte público del área (METRO-Rail y el proyecto de mejoras a las calles de Downtown/ Midtown) ya fueron aprobados y están en construcción.

Este boletín contiene un mapa y la libreta de calificaciones correspondiente para cada ruta de transporte público. Las calificaciones mostradas en esta libreta de calificaciones fueron asignadas por el equipo técnico del North-Hardy, así como también por miembros de la comunidad, en base a los criterios antes señalados.

El siguiente paso en el proceso es la elaboración de un Plan del Sistema de Transporte Público

Las calificaciones fueron asignadas por el equipo técnico y miembros de la comunidad en base a los criterios antes señalados

Muchos individuos con negocios, propiedades, o intereses personales o de otro tipo en el área han trabajado juntos para aconsejar al equipo técnico. Las calificaciones asignadas a cada ruta reflejan los resultados tanto de una evaluación técnica como del aporte de la comunidad. Estos resultados fueron presentatdos a la junta directiva de METRO en febrero.

continúa, ver ***CONFERENCIAS*** *el la pág. 11*

Reunión con miembros de la comunidad en el área de FM 1960

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El equipo técnico del North-Hardy organiza reuniones como las que llevan a cabo maestros y padres de familia en las escuelas para revisar las calificaciones obtenidas

Vea la libreta de calificaciones sobre las alternativas de transporte público de North-Hardy

Reunión con miembros de la comunidad en el área de FM 1960

Después de haber escuchado al público y a los líderes del corredor North-Hardy, METRO, TxDOT, y H-GAC han seguido adelante con el estudio de las necesidades futuras de transporte del corredor y sus posibles soluciones. METRO incorporará los resultados del estudio North-Hardy a su borrador del plan del sistema de transporte público, el cual será presentado a la junta directiva de METRO en abril de 2003. Usted tendrá la oportunidad de comentar sobre el borrador del plan antes de la aprobación de una versión final por parte de la junta directiva. Este verano, METRO escogerá una de las tres rutas como su Estrategia de Inversión Local Preferida.

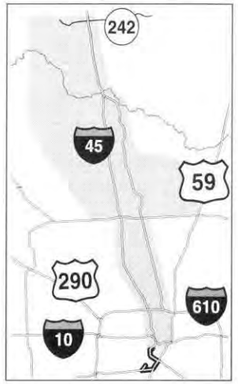
Las recientes reuniones públicas le dieron la oportunidad a la comunidad de "calificar" los resultados iniciales del estudio de transporte público. Los participantes de la comunidad revisaron las alternativas en consideración durante dos reuniones llevadas a cabo en febrero (una en el área de Greenspoint y otra en el Near Northside). También tuvieron la oportunidad de revisar las opciones de transporte público (autobús de alta capacidad y tren ligero) y considerar los impactos económicos y los impactos a los vecindarios. En cuanto a opciones de transporte público, la comunidad expresó una preferencia abrumadora por el tren ligero, por lo que las calificaciones en las siguientes páginas se refieren sólo a la opción del tren ligero. En total, mas de 300 personas participaron en las reuniones públicas del corredor.

Las mejoras a las autopistas se estudiarán sólo después de que se hayan explorado a fondo las opciones de transporte público de alta capacidad

A solicitud de la comunidad, las mejoras a las autopistas se analizarán solo después de que se hayan explorado a fondo las opciones de transporte público de alta capacidad. Por lo tanto, esta ronda de reuniones públicas se limitará a las alternativas de transporte público.

La primera área de estudio va desde Buffalo Bayou hasta SH 242 (The Woodlands), a lo largo y entre IH-45 y Hardy Toll Road. Para esta área, se están considerando tanto opciones de transporte público como de autopista. Sin embargo, debido a ciertas inquietudes de la comunidad, el análisis de TxDOT de las posibles mejoras a las autopistas se llevará a cabo solo después de que las opciones de transporte público hayan

continúa, ver ***CONFERENCIAS*** *el la pág. 10*



Los Estudios de Planificación North-Hardy incluyen dos áreas de estudio distintas

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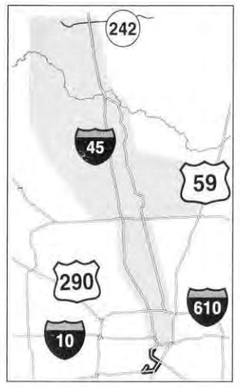
CONFERENCES

continued from pg. 1

At the community's request, highway improvements will be considered only after advanced high-capacity transit options have been thoroughly explored. As a result, this round of public meetings addressed transit alternatives only.

The first study area is from Buffalo Bayou to SH 242 (The Woodlands), along and between IH-45 and the Hardy Toll Road. Transit and highway options are being considered in this area. Because of community concerns, however, TxDOT's consideration of highway improvements will take place only after advanced high-capacity transit options have thoroughly been examined. This area includes several major activity centers and residential communities, covering the rapidly-growing northern suburbs to the redeveloping neighborhoods on the near north side of Downtown. Specifically, the area includes the Northside Village Neighborhoods, the Northline Mall area, the Aldine area, the Greenspoint area, Bush Intercontinental Airport, the FM 1960/Spring area and The Woodlands/ South Montgomery County.



The North-Hardy Planning Studies include two distinct study areas

Stakeholder meeting in the FM 1960 area

In the first study, transit options are being considered along three different routes or alignments. Light rail transit and bus rapid transit options were considered for each. One line (the Green Line) is being studied in conjunction with HOV improvements on IH-45.

The second study area is from Buffalo Bayou to Spur 527 (the Louisiana exit from SW Freeway) along U.S. 59. Here, future demand for highway improvements will be defined. TxDOT is considering highway improvements for IH-45 and U.S. 59 south of Buffalo Bayou, covering Downtown and the Midtown area. Transit projects (METRORail and the Downtown/Midtown Transit Streets Project) have already been approved for this area and are under construction.

This newsletter contains a map and corresponding report card for each transit alignment. The grades shown on the report card were assigned by the North-Hardy study team and community participants based on the previously outlined criteria.

Grades were assigned by the study team and community participants based on the previously outlined criteria

Many individuals with business, property, personal or other interests in the area have worked together to provide advice to the study team. The grades assigned to each alignment reflect both technical evaluation and community input. These findings were reported to the METRO Board of Directors in February.

continued, see **CONFERENCES** on pg. 11

North Corridor Coalition stakeholder meeting

A public meeting at Davis High School

North Hardy planning studies

www.north-hardy.org
north-hardy@ridemetro.org

Unas Palabras del Director de los Estudios de Planificación Hardy-Norte

En este momento, en nuestros Estudios de Planificación North-Hardy se está terminando el análisis detallado de las opciones de transporte público. A finales de febrero, nosotros reportamos los resultados preliminares sobre transporte público junto con las respuestas y comentarios de la comunidad a la junta directiva de METRO. En estos momentos, METRO está elaborando un Plan del Sistema de Transporte Público. La información sobre el plan será enviada por correo a los miembros de las comunidades del corredor North-Hardy.

Debido a que hemos pospuesto, a petición de la comunidad, el análisis de las mejoras a las autopistas, no someteremos estas opciones a revisión hasta mayo y junio de este año. Estamos interesados, sin embargo, en escuchar sus opiniones sobre las mejoras a las autopistas que se están considerarando. Por favor haga planes para participar en las reuniones públicas de mayo y junio de manera que sus aportes puedan formar parte del proceso de toma de decisiones. Los detalles concernientes a estas reuniones públicas se pondrán en el sitio www.north-hardy.org una vez se establezcan los locales donde se llevarán a cabo. El lugar y hora de las reuniones también se pueden obtener llamando al (713) 739-6049.

Atentamente,

Janet Kennison

Las opciones de mejoras a las autopistas para la primera área de estudio se analizarán sólo después que se hayan revisado a fondo las opciones de transporte público. Por lo tanto, las opciones de mejoras a las autopistas serán discutidas en las reuniones de mayo y junio de este año, pero no antes. Las reuniones públicas para la segunda área de estudio (al sur de Buffalo Bayou) están planeadas para finales del verano. Esté atento al correo o visite nuestro sitio en el internet: www.north-hardy.org para mas información.

CONFERENCIAS

continuación de pág. 10

Ahora que los resultados del análisis de transporte público han sido presentados, los equipos técnicos encargados de estudiar este y otros corredores de transporte en la región prepararán un Plan del Sistema de Transporte Público. METRO revisará los resultados técnicos y el aporte del público y determinará qué alineamiento y opción de transporte público constituye la mejor elección para el Corredor North-Hardy.

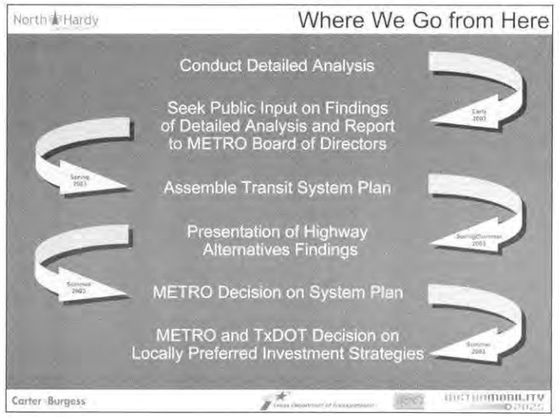
El Corredor North-Hardy es parte del Plan de Movilidad de METRO (el plan a largo plazo de transporte público para mejorar la eficiencia del transporte a lo largo del área de Houston) y continúa el proceso establecido a través del cual los funcionarios Federales, Estatales, y locales toman decisiones sobre inversiones de transporte.

CONFERENCES

continued from pg. 2

Now that transit findings have been presented, the teams studying this and other transportation corridors in the region will assemble a Transit System Plan. METRO will review technical results and public input and determine which alignment and transit option is the best choice for the North-Hardy Corridor.

The North-Hardy Corridor is part of the METRO Mobility Plan (METRO's long term transit plan to improve transportation efficiency and effectiveness throughout the Houston region) and is moving through the process by which Federal, State, and local officials make decisions regarding transportation investments.



The next step in the process is assembly of a Transit System Plan

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METRO Mobility 2025
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PO Box 61429
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north-hardy@ridemetro.org

Get project updates and send comments online!

•

Reciba noticias del proyecto y mándenos sus comentarios a través del internet!

A Word from the Project Manager of the North-Hardy Planning Studies

At this point, our North-Hardy Planning Studies are wrapping up the detailed analysis of transit options. We reported the preliminary transit findings along with the community's response and comments to the METRO Board of Directors in late February. METRO is now assembling a Transit System Plan. Information on the draft System Plan will be mailed to the North-Hardy stakeholders.

Because we have delayed the analysis of highway improvement options at the community's request, we will not present those options for review until May and June of this year. We are interested, however, in hearing your opinions about highway improvements to be considered. Please plan to participate in the May and June public meetings so your feedback will be included in the decision-making process. Details regarding these public meetings will be posted at www.north-hardy.org as soon as locations are identified. Meeting times and locations can also be obtained by calling (713) 739-6049.

Sincerely,

Janet A. Kennison

Janet Kennison

Highway improvement options for the first study area will be analyzed only after transit options have been thoroughly reviewed. Therefore, highway improvement options will not be discussed until the stakeholder and public meetings scheduled for May and June of this year. Public meetings for the second study area (South of Buffalo Bayou) are planned for late summer. Watch your mailbox or log on to our Web site: www.north-hardy.org for details.

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north-hardy@ridemetro.org

Directions

news from the North-Hardy planning studies • issue 3 • spring 2003

North-Hardy Team Hosts Parent-Teacher-Style Conferences to Review Grades

See Report Card on North-Hardy Transit Alternatives

Stakeholder meeting in the FM 1960 area

After hearing from the public and North-Hardy Corridor stakeholders, METRO, TxDOT & H-GAC are moving forward with the study of future transportation needs and potential mobility solutions for the corridor. METRO will be incorporating findings from the North-Hardy Study into its draft system plan which will be presented to METRO's Board in April 2003. You'll have a chance to comment on the draft plan before the Board adopts a final plan. This summer, METRO will select one of the three North-Hardy Corridor alignment options as the Locally-Preferred Transit Investment Strategy.

Highway improvements will be considered only after high-capacity transit options have been thoroughly explored

Recent public meetings provided the public an opportunity to "grade" the initial transit findings of the in-depth transportation study. Community participants at two public meetings held in February (one in the Greenspoint area and one in the Near Northside) reviewed the alternative alignments that are under consideration. They also looked at transit options (bus rapid transit and light rail transit) and considered the resulting neighborhood and economic impacts. As far as transit options were concerned, the community expressed an *overwhelming* preference for light rail transit, so the grades on the report cards (see following pages) are for light rail transit only. In all, more than 300 people have participated in stakeholder and public meetings in the corridor.

continued, see ***CONFERENCES*** *on pg. 2*

This publication provides many opportunities for you to learn about the study process and the options under consideration.

In this issue:

En este número:

North Hardy
planning studies

www.north-hardy.org
north-hardy@ridemetro.org

Carter Burgess · Texas Department of Transportation · H-GAC · METRO MOBILITY

Juntos podemos ganar una buena nota! METRO te invita a evaluar las opciones de transporte público del Corredor Hardy-Norte

Estudios del Corredor Hardy-Norte: Mejoras al transporte público al norte de Buffalo Bayou

4 de febrero
4:30 - 7:30 pm
(La presentación empezará a las 4:45)
Greenspoint Mall
Salón de la Comunidad
12300 North Freeway

Entre al centro comercial por el letrero de "Eclipse" desde Greenspoint Drive. Proceda hacia el fondo, después de los puestos de comida.

8 de febrero
9:00 am - 12:00 pm
(La presentación empezará a las 9:15)
Davis High School
Área Común
1101 Quitman

Por Quitman, girar a la izquierda en Tackaberry. El estacionamiento está a la mano derecha. Entre por la entrada principal. El área común está a un lado de la cafetería, a la mano derecha.

Cualquier persona que requiera traducción o servicios especiales de comunicación debe contactar a la oficina de Community Outreach de METRO al teléfono 713-739-4018 al menos dos días antes del evento. Se hará todo lo posible por satisfacer sus necesidades.

Para información sobre rutas y horarios de buses, llame al 713-635-4000 o visite la página de METRO en el internet: www.ridemetro.org

North-Hardy Corridor Studies: Transit Improvements North of Buffalo Bayou

February 4
4:30 - 7:30 pm
(The presentation will start at 4:45)
Greenspoint Mall
Community Room
12300 North Freeway

Enter the mall at "Eclipse" sign off Greenspoint Drive. Proceed past food court.

February 8
9:00 am - 12:00 pm
(The presentation will start at 9:15)
Davis High School
Commons Area
1101 Quitman

From Quitman, turn left onto Tackaberry. Parking lot is on right hand side. Enter through main entrance. The Commons is adjacent to the Cafeteria on the right hand side.

Any person who requires language interpretation or special communication accommodations is encouraged to contact METRO Community Outreach at 713-739-4018 at least two days prior to the meeting. Every reasonable effort will be made to meet your needs.

For route and schedule information, call 713-635-4000 or log on to the METRO web site: www.ridemetro.org

Together We Can Make the Grade! METRO Invites You to Evaluate North-Hardy Transit Options

Community Wants Transit Options Considered First

Carter-Burgess is hosting public meetings so you'll have the opportunity to help us "grade" the initial findings of METRO's in-depth transportation study of the North-Hardy Corridor. At the request of the community, highway improvements will be considered only after advanced high-capacity transit options are thoroughly explored. Consequently, this round of public meetings will address transit alternatives only.

All of the options have been designed with participation from neighborhood and business leaders in the North-Hardy Corridor. Your assessment of these transit alternatives is important to us!

By attending, you'll have the chance to review:

- alternative alignments
- transit options (bus rapid transit and light rail transit)
- neighborhood and economic impacts

Your feedback is an important part of the study process, and we encourage you to participate!

La comunidad quiere que se evalúen las opciones de transporte público primero

Carter-Burgess está organizando reuniones públicas para que usted tenga la oportunidad de ayudarnos a ponerle una "nota" a los resultados iniciales de los estudios de transporte de METRO del Corredor Hardy-Norte. A solicitud de la comunidad, las mejoras a las autopistas se estudiarán sólo después de haberse explorado en detalle las opciones de transporte público de alta capacidad. Por lo tanto, esta ronda de reuniones públicas estará dedicada únicamente a las alternativas de transporte público.

Todas las opciones han sido diseñadas con la participación de líderes de las comunidades y líderes empresariales del Corredor Hardy-Norte. Su evaluación de estas alternativas es importante para nosotros.

Al asistir, usted tendrá la oportunidad de revisar:

- las rutas de las alternativas
- las opciones de transporte público (autobús de alta capacidad y tren ligero)
- impactos a los vecindarios e impactos económicos

Su aporte es una parte importante del estudio y lo exhortamos a participar!

Carter Burgess · Texas Department of Transportation · HOC · METRO

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METRO Mobility
Room 21034
PO Box 61429
Houston, TX 77208-1429

North-Hardy Corridor Study Public Meeting
June 4, 2002- Greenspoint Mall

Name:	CHARLES TOLLER	Name:	
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Phone Number:	713 991-6881	Phone Number:	

Name:	KEITH HILL	Name:	
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Address:	1201 LOUISIANA 21023	Address:	
City, State and Zip:	HOUSTON	City, State and Zip:	
Phone Number:	832-578-2172	Phone Number:	

Name:	PERRY KING	Name:	
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Address:	1150 RICHCREST DR	Address:	
City, State and Zip:	HOUSTON TX 77066	City, State and Zip:	
Phone Number:	281-999-9961	Phone Number:	

Name:	Kathy Guenther	Name:	
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Address:	22540 Aldine Westfield	Address:	
City, State and Zip:	SPRING, TX 77373	City, State and Zip:	
Phone Number:	(281) 353-8100	Phone Number:	

Name:		Name:	
Community/Business Affiliation/Agency		Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

North-Hardy Corridor Study Public Meeting
June 4, 2002- Greenspoint Mall

Name:	RAY ANDERSON
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City, State and Zip:	KINGWOOD TX 77339
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Name:	ART MURRILLO
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City, State and Zip:	
Phone Number:	

Name:	Ethan Ferguson / Tommy Smith
Community/Business Affiliation/Agency	EAST PACK LTD
Address:	5100 Greens Rd
City, State and Zip:	Houston TX 77032
Phone Number:	713 932 9444

Name:	
Community/Business Affiliation/Agency	Fax me a copy Project list
Address:	Fax # 713 932 9451
City, State and Zip:	
Phone Number:	

Name:	Allen Stephenson
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City, State and Zip:	Houston, TX 77007
Phone Number:	713-803-2365

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Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

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Phone Number:	713-739-3891

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	GARY MONTGOMERY
Community/Business Affiliation/Agency	MONTGOMERY + ASSOC.
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City, State and Zip:	HOUSTON, TX 77060
Phone Number:	281-260-8051

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
June 6, 2002 South Main Baptist Church

Name:	F. Charles LeBlanc
Community/Business Affiliation/Agency	Midtown Red Auth
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City, State and Zip:	City 77002
Phone Number:	713-526-7577

Name:	Katy Fruiterwick
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City, State and Zip:	77030
Phone Number:	7/790 1020

Send info Name:	Kelvin Elon Williams
Community/Business Affiliation/Agency	Southwood Civic Club
on S.E Address:	3341 Southmore Blvd.
Meetings City, State and Zip:	Houston, Texas 77004
Phone Number:	(713) 524-2114

Name:	Susan Young
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City, State and Zip:	Hou 77030
Phone Number:	7/790 1020

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Phone Number:	281 597 - 9300

Name:	Ramesh Gunda
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Phone Number:	

Name:	Israel Crowe
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Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
June 6, 2002 South Main Baptist Church

Name:	KEN LINDOW	Name:	
Community/Business Affiliation/Agency	Woodland Hieghts	Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

Name:	Peggy LINDOW	Name:	
Community/Business Affiliation/Agency	WOODLAND HIEGHTS	Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

Name:		Name:	
Community/Business Affiliation/Agency		Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

Name:		Name:	
Community/Business Affiliation/Agency		Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

Name:		Name:	
Community/Business Affiliation/Agency		Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

North-Hardy Corridor Study Public Meeting
June 6, 2002 South Main Baptist Church

Name:	KAJAN SEDALIA	Name:	
Community/Business Affiliation/Agency	Artjar	Community/Business Affiliation/Agency	
Address:	1509 Harman St.	Address:	
City, State and Zip:	Houston, TX 77004-	City, State and Zip:	
Phone Number:	713-291-9889	Phone Number:	

Name:	[illegible]	Name:	
Community/Business Affiliation/Agency	SMCA	Community/Business Affiliation/Agency	
Address:	1020 Waltonwood 1800	Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

Name:	GUY HAGSTETTE	Name:	
Community/Business Affiliation/Agency	DOWNTOWN DISTRICT	Community/Business Affiliation/Agency	
Address:	909 FANNIN #1050	Address:	
City, State and Zip:	HOUSTON 77010	City, State and Zip:	
Phone Number:	713 650-3022	Phone Number:	

Name:	Ross Frank	Name:	
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Address:	1201 Louisiana	Address:	
City, State and Zip:	Hou, TX 77208	City, State and Zip:	
Phone Number:		Phone Number:	

Name:		Name:	
Community/Business Affiliation/Agency		Community/Business Affiliation/Agency	
Address:		Address:	
City, State and Zip:		City, State and Zip:	
Phone Number:		Phone Number:	

North Hardy
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Agenda

North-Hardy Planning Studies
Public Meeting
June 15, 2002
8:30 am – 11:30 am

Welcome and Overview of the North-Hardy Studies – **Rod Smith**

Presentation of Initial Alternatives - **Janet Kennison**

What We Have Heard - **Rod Smith**

Break into Small Groups

Review of DOs and DON'Ts Lists

Evaluation of initial alternatives

Report from each small group

Large group discussion on similarities and differences

Conclusion, next steps, and wrap-up

North-Hardy Corridor Study Public Meeting
June 15, 2002 Inner Corridor

Name:	Allison Cowan
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Name:	Jon Derry
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Name:	Ann Linville
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Name:	John McCagh
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Name:	Allison Wilt
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Name:	GERALD A. HOFF
Community/Business Affiliation/Agency	
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Phone Number:	713-862-3051

Name:	James Wilt
Community/Business Affiliation/Agency	Woodland Heights resident
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Phone Number:	713-868-5056

Name:	Frances Hernandez
Community/Business Affiliation/Agency	~~Z8~~ Coldwell Banker
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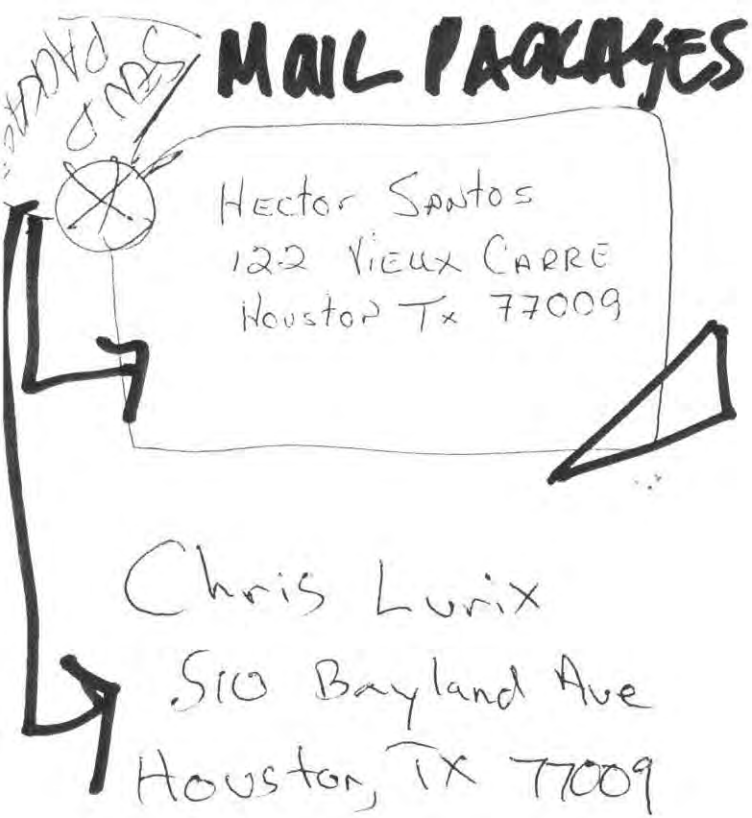
Phone Number:	281-650-7064



Chris Lurix
510 Bayland Ave
Houston, TX 77009

Angela Ruiz
Omar Holguin
3108 Beauchamp
Houston 77009

North-Hardy Corridor Study Public Meeting
June 15, 2002 Inner Corridor

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Name:	Joseph Fischer
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Name:	Anne Shepard
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Name:	Scott McCready
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Phone Number:	713-861-1241

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Brady Boudreaux	2401 Maufferd St, 77009	713-864-4681
ress DeSennett	608 Byrne 77009	713 861-2838
Adrian Duron	3407 Morrison St 77009	713 862-3097
Clissa Nelson	1404 Wrightwood 77009	713 864-2032
WALTER WORKMAN	205 E. Woodland 77009	713 861-7801
Sergio Aguirre	205 E. Woodland 77009	713 861-7801
Esperanza Aguirre	2805 Morrison Ave 77009	713-880-9151
Alan Daughtry	12800 BRIAR FOREST HOUSE #154 77077	281 496-0752
Mike O'Brien	218 JOYCE 77009	713 753-3715
ED REYES	2911 Morrison 77009	713 869-1117
BARCLAY ARMSTRONG	3004 MORRISON 77009	713 ~~861~~ 880-3376
ALICE GAYLORD	3004 MORRISON 77009	713 880-3376
DOUG LAGUARTA	3008 MORRISON 77009	713 868-2771
JOHN FARAGUNA	3000 MORRISON 77009	
TERRY GRAHAM	3007 MORRISON 77009	
LIZ MARSINIAK	615 EUCLID 77009	
CONNIE ELLIOTT	3405 Morrison 77009	

North-Hardy Corridor Study Public Meeting
June 15, 2002 Inner Corridor

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North-Hardy Corridor Study Public Meeting
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North-Hardy Corridor Study Public Meeting
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North-Hardy Corridor Study Public Meeting
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North-Hardy Corridor Study Public Meeting
June 15, 2002 Inner Corridor

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IH-45	Greenspoint to SH 242	The HOV lane would be increased by 1' to bring this facility up to full HOV standards. The main lanes, shoulders, etc. would be adjusted accordingly. Portions currently proposed as non-separated HOV lanes would be converted into a 1-way separated HOV.
		The HOV lane would be increased by 27' to provide sufficient width to permit two-way operation. The HOV facility would consist of two 12' HOV lanes plus shoulders. The main lanes, shoulders, etc. would be adjusted accordingly. The existing HOV access ramps would be modified as needed.

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North-Hardy Planning Studies

SIGN-IN SHEET

Greenspoint Public Meeting

February 4, 2003

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North-Hardy Planning Studies

SIGN-IN SHEET

Greenspoint Public Meeting

February 4, 2003

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North-Hardy Planning Studies

SIGN-IN SHEET

Greenspoint Public Meeting

February 4, 2003

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E- Mail Address:	hroth@otton.com

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	LARRY S. MARR
Business/Civic Club/Association:	Engineer
Address:	2915 Blue Glen
City, State and Zip:	Houston TX 77073
Phone Number:	281-443-6814
Fax Number:	—
E- Mail Address:	lmarr@flash.net

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

North-Hardy Planning Studies

SIGN-IN SHEET

Davis High School Public Meeting

February 8, 2003

Name:	Deborah Tesar
Business/Civic Club/Association:	Near Northside C.D.N.D
Address:	305 Morris
City, State and Zip:	Houston, TX 77009
Phone Number:	1-223-4833
Fax Number:	7- [redacted] 1231-8441
E- Mail Address:	DTESAR@HHSI.COM

Name:	Alex Rigsby
Business/Civic Club/Association:	Lindale Park
Address:	512 Ave of Oaks
City, State and Zip:	Houston, Tx 77009
Phone Number:	713-694-1665
Fax Number:	N/A
E- Mail Address:	arigsby@swbell.net

Name:	ED Reyes
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Wants to have meeting. reservation?

Name:	MARC TERRY
Business/Civic Club/Association:	First Ward
Address:	1619 Weber
City, State and Zip:	Houston TX 77007
Phone Number:	713-863-9773
Fax Number:	713 862 3839
E- Mail Address:	txsparkle@aol.com

Name:	Michelle Peavy
Business/Civic Club/Association:	Asst Superintendent HISD Superneighborhood #13
Address:	1118 Cottage Oak Ln
City, State and Zip:	Hou, TX 77091
Phone Number:	713-290-9715
Fax Number:	713-859-1115 cell
E- Mail Address:	jxpeavy@msn.com

Name:	WILLIAM WEBER
Business/Civic Club/Association:	
Address:	3007 CANDLE LT. DR.
City, State and Zip:	SPRING TX 77388
Phone Number:	713-304-2531
Fax Number:	281-581-2259
E- Mail Address:	WCWEBER@ATTGLOBAL.NET

Name:	Greg Siptak
Business/Civic Club/Association:	
Address:	704 Graceland
City, State and Zip:	Houston TX 77009
Phone Number:	713-694-9071
Fax Number:	
E- Mail Address:	

Name:	JODI BOBROVSKY
Business/Civic Club/Association:	NORTH-CENTRAL
Address:	4017 GANO
City, State and Zip:	HOUSTON TX 77009
Phone Number:	713 694-5196
Fax Number:	
E- Mail Address:	JODIBOB@EARTHLINK.NET

North-Hardy Planning Studies

SIGN-IN SHEET

Davis High School Public Meeting

February 8, 2003

Name:	Kerry Hamilton
Business/Civic Club/Association:	
Address:	1814 Clover Springs
City, State and Zip:	Hou, TX 77339
Phone Number:	(281) 358-1548
Fax Number:	
E- Mail Address:	

Name:	ROBERT PROCTOR
Business/Civic Club/Association:	WOODLAND HEIGHTS
Address:	402 BYRNE ST
City, State and Zip:	H TX 009
Phone Number:	713 426 0191
Fax Number:	
E- Mail Address:	wpfineart@msn.com

Name:	Zach Teague
Business/Civic Club/Association:	
Address:	911 Omar St.
City, State and Zip:	Houston, TX 77007
Phone Number:	713-862-1887
Fax Number:	
E- Mail Address:	zteague@hotmail.com

Name:	Jennifer Ostlind
Business/Civic Club/Association:	City of Houston Planning
Address:	611 Walker St 6th Floor
City, State and Zip:	Houston TX 77002
Phone Number:	713-837-7871
Fax Number:	713-837-7996
E- Mail Address:	Jennifer.Ostlind@cityofhouston.net

Name:	Kevin Hoffman
Business/Civic Club/Association:	Lindale Park CC
Address:	516 Ave of Oaks
City, State and Zip:	Houston, TX
Phone Number:	713 694-0593
Fax Number:	
E- Mail Address:	KJHman12002@yahoo.com

Name:	GONZALO COMACHO.
Business/Civic Club/Association:	WOODLAND HEIGHTS
Address:	230?
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	STACY PERRY
Business/Civic Club/Association:	
Address:	1834 FOREST ELMS
City, State and Zip:	SPRING TX 77388
Phone Number:	713-922-4920
Fax Number:	281 353-3988
E- Mail Address:	

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

North-Hardy Planning Studies

SIGN-IN SHEET

Davis High School Public Meeting

February 8, 2003

Name:	Rachel Mendoza
Business/Civic Club/Association:	Jeff Davis H.S.
Address:	7310 Dillon
City, State and Zip:	Houston, Tx.
Phone Number:	713-649-8865
Fax Number:	
E- Mail Address:	

Name:	Jill Whitten
Business/Civic Club/Association:	Woodland Heights
Address:	402 Byron St.
City, State and Zip:	Houston 77007
Phone Number:	713.426-0191
Fax Number:	
E- Mail Address:	JWhitten@main.com

Name:	David K. Wasson
Business/Civic Club/Association:	South Belt-Ellington Chamber
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City, State and Zip:	Houston TX 77275-2089
Phone Number:	281-485-8623
Fax Number:	281-485-3666
E- Mail Address:	DavidKWasson@aol.com

Name:	FRANK BLAKE
Business/Civic Club/Association:	SIERRA CLUB
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City, State and Zip:	HOUSTON, TX. 77006
Phone Number:	713-528 2896
Fax Number:	
E- Mail Address:	FRANKBLAKE@JUNO.COM

Name:	FRANK B. VALOUCH
Business/Civic Club/Association:	NONE
Address:	2323 TRACKABERRY
City, State and Zip:	HOUSTON TEXAS
Phone Number:	713 223 0488
Fax Number:	—
E- Mail Address:	—

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	Michael Post
Business/Civic Club/Association:	
Address:	512 Ave of Oaks
City, State and Zip:	Houston TX 77009
Phone Number:	713 695 1515
Fax Number:	
E- Mail Address:	

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

North Hardy
planning studies

NORTH-HARDY CORRIDOR
STAKEHOLDER ADVISORY COMMITTEE

MEETING #1
FEBRUARY 19, 2002

AGENDA

PURPOSE OF THE MEETING:

To acquaint the Committee with information on the corridor and to solicit input on preliminary transportation alternatives

WELCOME & CHARGE TO COMMITTEE	METRO 4:00 to 4:15 p.m.
SELF INTRODUCTIONS	Rod Smith, Carter Burgess 4:15 to 4:30.m.
STUDY PROCESS	Rod Smith, Carter Burgess 4:30 to 4:35 p.m.

Facilitated Work Session:

REVIEW ISSUES AND CHALLENGES What the data shows What we have heard from the public Committee's input	Patti Joiner, Knudson Associates 4:35 to 5:00 p.m.
PRELIMINARY ALTERNATIVE SOLUTIONS What we have heard from the public Committee's input	Janet Kennison, Carter Burgess 5:00 to 5:30 p.m.
OTHER ISSUES What else should we keep in mind?	Janet Kennison, Carter Burgess 5:30 to 5:45 p.m.
NEXT STEPS	Rod Smith, Carter Burgess 5:45 to 6:00 p.m.

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Agenda

North-Hardy Planning Studies
Stakeholder Advisory Committee Meeting
June 17, 2002
4:30 pm – 7:00 pm

Welcome and Overview of the North-Hardy Studies –	**Rod Smith**
Presentation of Initial Alternatives -	**Janet Kennison**
What We Have Heard -	**Rod Smith**

Review of DOs and DON'Ts Lists

Evaluate Initial Alternatives

Develop Consensus Recommendation on Initial Alternatives

Conclusion, next steps, and wrap-up

North-Hardy Corridor Study Stakeholder Advisory Committee
June 17, 2002 4:30pm to 7:00pm

✓	Name:	Jack C. Searcy Jr.
	Community/Business Affiliation/Agency	Houston NW Chamber of Commerce
	Address:	12307 Vintage Wood Ln
	City, State and Zip:	Spring TX 77379
	Phone Number:	281.376-5538

✓	Name:	GARY MONTGOMERY
	Community/Business Affiliation/Agency	MONTGOMERY & ASSOC.
	Address:	450 NORTH BELT, Ste 100
	City, State and Zip:	HOUSTON, TX 77060
	Phone Number:	281-260-8831

✓	Name:	JOE MICHELS
	Community/Business Affiliation/Agency	South Montgy/Woodlands Chamber
	Address:	25025 I-45 North, Suite 525
	City, State and Zip:	The Woodlands, Tx 77380
	Phone Number:	281-364-6940

✓	Name:	TINA ARAUJO
	Community/Business Affiliation/Agency	GCMD
	Address:	16945 GP Dr.
	City, State and Zip:	HOU TX 77060
	Phone Number:	2-874-2137

✓	Name:	ED REYES
	Community/Business Affiliation/Agency	Northside Village SNC #51
	Address:	219 JOYCE
	City, State and Zip:	Houston, TEXAS 77009
	Phone Number:	713 753-3715

✓	Name:	Tina Nelson
	Community/Business Affiliation/Agency	North Houston Assoc
	Address:	16825 Northchase Dr
	City, State and Zip:	Houston, TX. 77060
	Phone Number:	281-875-0660

✓	Name:	John W. Jackson, Jr.
	Community/Business Affiliation/Agency	Houston Airport System
	Address:	16930 JFK Blvd.
	City, State and Zip:	Houston Tx 77032
	Phone Number:	281/233-1842

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

✓	Name:	Ellen Lapointe
	Community/Business Affiliation/Agency	Continental Airlines
	Address:	1600 Smith St., HQSEO
	City, State and Zip:	Houston, TX 77002
	Phone Number:	713 324 2926

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

North-Hardy Corridor Study Stakeholder Advisory Committee
June 17, 2002 4:30pm to 7:00pm

✓	Name:	Marci Kerry
	Community/Business Affiliation/Agency	First Ward
	Address:	1619 Weber
	City, State and Zip:	77007
	Phone Number:	713-8639773

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

✓	Name:	Guy Hagstette
	Community/Business Affiliation/Agency	HOMA
	Address:	~~214 Travis~~ 909 Fannin
	City, State and Zip:	Houston TX 77010
	Phone Number:	713 650-3022

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

	Name:	John Sedlak
	Community/Business Affiliation/Agency	METRO
	Address:	1201 Louisiana ST
	City, State and Zip:	
	Phone Number:	713-739-4600

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

	Name:	Jack Drake
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

✓	Name:	Deidre Taylor
	Community/Business Affiliation/Agency	Berper Neighborhood #42
	Address:	19225 Sears
	City, State and Zip:	Humble TX 77338
	Phone Number:	281-540-9083

	Name:	
	Community/Business Affiliation/Agency	
	Address:	
	City, State and Zip:	
	Phone Number:	

North Hardy
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NORTH-HARDY CORRIDOR
STAKEHOLDER ADVISORY COMMITTEE

MEETING #3
JANUARY 9, 2003

AGENDA

PURPOSE OF THE MEETING:

To present the Committee with the findings from the short list of alternatives

WELCOME & INTRODUCTIONS	3:00 to 3:10 p.m.
STUDY SUMMARY Study progress to date	3:10 to 3:30 p.m.

Facilitated Work Session:

REVIEW OF PRELIMINARY FINDINGS	3:30 to 5:30 p.m.
Blue Alignment	
Red Alignment	
Green Alignment	
CONSENSUS "REPORT CARDS"	
Blue Alignment	5:30 to 5:35 p.m.
Red Alignment	5:35 to 5:40 p.m.
Green Alignment	5:40 to 5:45 p.m.
Next Steps	5:45 to 6:00 p.m.

North-Hardy Stakeholder Advisory Committee Meeting

SIGN-IN SHEET
January 9, 2003

Name:	Marilyn Bayless
Business/Civic Club/Association:	N. Houston Greenspoint Chamber
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City, State and Zip:	Houston, TX 77060
Phone Number:	281 872-8700
Fax Number:	281 872-8095
E- Mail Address:	mbayless@nhgcc.org

Name:	Tina Nelson
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City, State and Zip:	Houston, TX 77060
Phone Number:	281-875-0660
Fax Number:	281-875-0663
E- Mail Address:	Tina.Nelson@north-Houston.com

Name:	John Jackson
Business/Civic Club/Association:	Houston Airport System
Address:	16930 J.F.K. Blvd.
City, State and Zip:	Houston 77032
Phone Number:	281/233-1842
Fax Number:	281/233-1895
E- Mail Address:	john.jackson@cityofHoustontx.net

Name:	GUY HOBSTETTE
Business/Civic Club/Association:	HOMD
Address:	~~214 [illegible]~~ 909 FANNIN #1650
City, State and Zip:	HOUSTON TX 77010
Phone Number:	713 650 3022
Fax Number:	713 650 1489
E- Mail Address:	guy@downtowndistrict.org

Name:	Sherman Yehl
Business/Civic Club/Association:	Community Associations of the Woodlands
Address:	2201 Lake Woodlands Dr
City, State and Zip:	The Woodlands, TX [illegible]
Phone Number:	281-210-3801
Fax Number:	
E- Mail Address:	[illegible]

Name:	GARY MONTGOMERY
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

North-Hardy Stakeholder Advisory Committee Meeting

SIGN-IN SHEET
January 9, 2003

Name:	Robert Heineman
Business/Civic Club/Association:	The Woodlands Operating Co
Address:	2201 Timberloch Pl.
City, State and Zip:	The Woodlands, TX 77381
Phone Number:	281-719-6113
Fax Number:	281-719-6154
E- Mail Address:	rheineman@thewoodlands.com

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	Tina Calvaye
Business/Civic Club/Association:	GCMD
Address:	16945 Northchase
City, State and Zip:	Houston TX 77060
Phone Number:	281-874-2137
Fax Number:	281-874-2151
E- Mail Address:	tarwaje@greensprint.org

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	Michael Terco
Business/Civic Club/Association:	TxDOT
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

North-Hardy Stakeholder Advisory Committee Meeting

SIGN-IN SHEET
January 9, 2003

Name:	Deidre Taylor
Business/Civic Club/Association:	SNC #42 Bush
Address:	19225 Sears
City, State and Zip:	Humble
Phone Number:	281-540-9083
Fax Number:	281 618-5492
E- Mail Address:	deirdre.Taylor@nhmccd.edu

Name:	
Business/Civic Club/Association:	
Address:	
City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

Name:	
Business/Civic Club/Association:	
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Business/Civic Club/Association:	
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Business/Civic Club/Association:	
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City, State and Zip:	
Phone Number:	
Fax Number:	
E- Mail Address:	

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North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

FIRST, WHY DO PEOPLE LIVE 45 MIN. from WORK? THAT'S WHY WE HAVE TRAFFIC PROBLEMS IN THE FIRST PLACE. URBAN SPRAWL - ELIMINATE THE CAUSES of the TRAFFIC PROBLEMS AND WE WON'T NEED A REMEDY → (RAILS, HWAY, etc.)

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

BIKE LANES - ONCE PEOPLE SEE THEIR FRIENDS RIDING THEIR BIKE TO WORK FROM THE WOODLANDS, THEY'LL DITCH THEIR NAVIGATOR AND JOIN THE RIDE!

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

SPECULATIVE, BUT I REALIZE NOTHING IS CERTAIN YET.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

IF POSSIBLE, LESS HIGHWAY AND MORE RAIL.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

THEY ARE ALL IMPORTANT!

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

IT'S TOO LATE.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: RAJAN SEDALIA	Title: ARTIST
Organization: ARTJAR	Address: 1909 Hannah St.
Telephone: 713-942-9992	E-mail: www.artjar.com artjar@msn.com

North Hardy
planning studies

(2)

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

- I am against any expansion of I-45 between 610 and downtown. As a resident I know all traffic problems are caused by the bottleneck created by cars going to downtown locations and south of. Accidents to the north will not be lessened by expanding capacity between 610 & Downtown

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Expand rail. more car traffic is not needed, create a corridor by expanding Shepherd to lessen traffic thru downtown areas

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

- Public not well informed of meetings and studies in progress or planned.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Do not take away park land or neighborhoods to expand I-45 between 610 loop and downtown. Traffic problems caused south and north of this area will not improve by increasing I-45 capacity at this point

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☒ Historic and Archaeological Resources
- ☒ Parklands
- ☒ Air Quality
- ☒ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Flooding is a major problem in the area of I-45 between 610 Loop & Downtown. Expansion of I-45 in this area would worsen this. Noise & Pollution are at a very high level and would also be made worse

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: R. S. Kelley	Title:
Organization:	Address: 128 Payne Houston 77009
Telephone: 713 869-1522	E-mail:

North Hardy
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(3)

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

There needs to be more street access from Near northside to the CBD. - such as extension of Fulton to SAN JACINTO ~~and/or McKee/Hardy extended~~ MAIN STREET TUNNEL UNDER RR must be redone to increase mobility and promote economic development.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

NEED TO DEVELOPE BETTER MASS TRANSIT IN NEAR NORTHSIDE especially to tie into Light Rail on main Street.

Hardy Toll Rd needs to be extended to CBD.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Good

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

NEED TO SERVE residence in the NEAR northside better and provide easier access ways to the NORTH.

Carter•Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☒ Economic Development
- ☒ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

The Handy rail yard should be environmentaly remediated within 18 to 24 months to qualify for residential construction. There may be 3000 living units in this redevelopment project.

Please give any other comments you would like to make.

The Handy Yard project will go to Council Planning this month. We think there are great development opportunities to benefit the neighborhood as well as transit utilizing this property. The Consultants and I are ready to discuss all concepts and ideas of METRO.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

AS AGENT FOR HANDY STREET PARTNERS.

Name: Kelley Parker	Title: Sr. Director
Organization: Cushman & Wakefield	Address: 2929 Allen Parkway #2100
Telephone: 713-963-2896	E-mail: kparker@cushwake.com

North Hardy
planning studies

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

Mass Transit VS Freeway Widening
Keep within current right of way - don't destroy inter city neighborhoods for the subs convience.
HOV for getting cars off road - not parnet taking their children to day care / school

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Light Rail
Mini Bus from Neighborhood to Work Center -
takes 45" from inside loop to downtown, longer
then Woodlands to Work center

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Keep within current right of way
Get rid of billboard, don't relocate, you move
people away, pay for billboard removal
Mass Transit

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

For 102

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☑ Land Use
- ☐ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☑ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☑ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Don't flood the neighborhoods by pouring more concrete

Please give any other comments you would like to make.

Let us know this is a come & go presentation –
Keep the previous TX DOT MIS data in this proposal –
Landscaping –

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Virginia Duke	Title:
Organization: Lindale Park	Address: 211 Eleanor 77009-1323
Telephone: 713 695 3198	E-mail:

North Hardy
planning studies

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

EFFICIENT AND ATTRACTIVE MASS TRANSPORTATION WITH RAIL OR LIGHT RAIL ALONG I-45N IS ONLY ALTERNATIVE TO WIDENING EXISTING FREEWAY AND CHOKING OUT HISTORIC NEIGHBORHOODS, HISTORIC PARKS AND CEMETERIES.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

RAIL ALONG HARDY SINCE RIGHT-OF-WAY ALREADY EXISTS WOULD SEEM OBVIOUS.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

BETTER THAN PREVIOUS TXDOT MEETINGS. PREVIOUS INPUT OBVIOUSLY PUT TO USE.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

THERE SHOULD BE AVOIDANCE OF CREATING A CONCRETE COLLAR AROUND DOWNTOWN. WITH ALL EFFORTS TO CREATE A LIVABLE DOWNTOWN, ESTETIC AND QUALITY-OF-LIFE ISSUES ARE FINALLY BEING RECOGNIZED.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☒ Neighborhood/Community Cohesion
- ☐ Employment
- ☒ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☒ Parklands
- ☒ Air Quality
- ☒ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

NOISE AND AIR POLLUTION NEXT TO I-45 BETWEEN N. MAIN AND QUITMAN IS BRUTAL. HALF OF WOODLAND PARK (CITY) IS UNUSABLE BECAUSE OF THE CONSTANT POUNDING FROM I-45.

Please give any other comments you would like to make.

WE NEED A SOUNDWALL IN THE WORST WAY. WE HAVE TRUCK TRAFFIC WITH HAZARDOUS MATERIALS MOVING AT HIGH SPEEDS ONLY FEET FROM RESIDENCES. AGAIN BETWEEN N. MAIN AND QUITMAN ALONG I-45.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: MARITA BURNS	Title:
Organization: WOODLAND HTS. CIVIC ASSN.	Address: 213 PARKVIEW 77009
Telephone: 713 861-9800	E-mail:

North Hardy
planning studies

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

MY MAIN CONCERN IS THAT WHAT EVER IMPROVEMENT ARE MADE TO I 45, THAT THE RIGHT-A-WAY IS NO MADE WIDER IN THE AREA FROM QUITMAN NORTH TO 610. THERE IS ALSO A DESPERATE NEED FOR A SOUND WALL ON THE WEST SIDE OF I 45 FROM QUITMAN TO NORTH MAIN

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

I THINK THAT THE HOV LANE SHOULD BE UTILIZED FOR MASS TRANSIT ONLY. I FEEL MANY MORE PEOPLE COULD BE MOVED THIS WAY. THE WOULD EVETUALLY UTILIZE IT IF IT WAS ADEQUT FOR LOAD AND CONVINANCE NEED TO INCOURAGE PEOPLE NO TO BRING CARS DOWN TOWN

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

I LIKE THIS. WHY HAS IT BEEN SO LONG COMING

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

~~THE~~ POWER THE EQUIPMENT WITH A SOURCE THAT DOES NOT INCREASE OR REDUCES THE HYDRO CARBON AND NOISE POLUTION IN THE INTER CITY (ELECTRIC FUEL CELL)

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- [x] Public Transportation
- [ ] Traffic and Circulation
- [ ] Parking
- [ ] Safety
- [x] Land Use
- [ ] Economic Development
- [x] Neighborhood/Community Cohesion
- [ ] Employment
- [ ] Toxic and Hazardous Materials
- [ ] Visual Quality and Aesthetics
- [ ] Historic and Archaeological Resources
- [ ] Parklands
- [x] Air Quality
- [x] Noise/Vibration
- [ ] Threatened and Endangered Species
- [ ] Energy
- [ ] Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

SOUND - I-45 MY AREA I10 TO 610 NORTH

AIR POLUTION SAME AREA

Please give any other comments you would like to make.

WE HAVE BEEN TOLD THAT SOUND WALLS ARE NOT BUILT ALONG FREEWAYS EXCEPT IN CONJUNCTION WITH OTHER IMPROVEMENTS

I FEEL THAT COMPLETING THE HARDY TOL ROAD FROM 610 TO DOWNTOWN ~~TO TRANSIT~~ WOULD MAKE MORE SENSE THAN EXPANDING I 45. ALSO NEED TO SUBSADIZE TOL FEES TO LOWER THE FEE AN INCOURAGE USAGE

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: ROBERT B. SHUMWAY	Title: HOME OWNER
Organization: WOODLAND HEIGHTS CIVIC ASSOC	Address: 213 E. WOODLAND
Telephone: 713-869-7275	E-mail: ~~SHUMWAYRB~~ SHUMWAYRB@JUNO.COM

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

610 from 59-TO 290 is a nightmare!
45 North in the afternoons runs pretty well unless there are accidents.
Coming in in the morning 45S FROM CROSSTIMBER'S TO TOWN is a pretty steady flow, unless there is an accident.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

As said above, the 45 runs smoothly in the mornings + afternoons. There is slight congestion at the 610 interchange. Its fine. Try it out for yourself.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Drive it yourself. Time it. Collect data.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

I was at an earlier meeting about light rail through the near Northside. The presentation stopped down Irvington @ Cavalcade. Beyond Cavalcade, Irvington is residential + should remain so. ~~The~~ Before Cavalcade the proposed route is mostly if not all commercial.

Carter-Burgess

Texas Department of Transportation

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We need to revitalize the Near Northside.

Feb 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☑ Land Use
- ☐ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☐ Employment
- ☑ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ Noise/Vibration
- ☑ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

We need Clean air.
Keep Irvington @ Cavalcade to 610 residential.
I think Hardy is an option if we preserve the residents along the way.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name:	Jessica Cazares	Title:	resident
Organization:	Lindale Park Civic Club	Address:	205 Milwaukee
Telephone:	7136975992	E-mail:	JMC38K@aol.com

North Hardy
planning studies

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

My comments are similar to those voiced all over the Houston area. Traffic is horrendous. There is too much congestion. Too many people in too many cars.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Although your suggestions are great why not come up with non-road construction solutions. for example, ask major downtown employers to change hours of operation. ASK that 30% of employees arrive at 7:00 and leave at 3:00, 30% arrive @ 8:00 and leave @ 4:00.. Have more people work from home. Financial incentive for car/

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Very informative. The mail out seemed effective. Multiple locations for public involvement is good.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Neighborhood preservation. Combined commuter and lightrail. Commuter outside the loop and light inside the loop.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5 '07

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☑ Public Transportation
- ☐ Traffic and Circulation
- ☐ ~~Parking~~
- ☑ Safety
- ☑ Land Use
- ☐ ~~Economic Development~~
- ☑ Neighborhood/Community Cohesion
- ☐ ~~Employment~~
- ☐ Toxic and Hazardous Materials
- ☐ ~~Visual Quality and Aesthetics~~
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ ~~Noise/Vibration~~
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources / 1ST runner up

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Hogg Park @ I-45 and Quitman, the building currently housing Robert E Lee Elementary School Hollywood Cemetary.

Please give any other comments you would like to make.

~~Open~~ 1. Extend Fulton to downtown
2. Commuter Rail outside the loop and change to light Rail inside the loop.
3. DO NOT WIDEN I-45 inside the loop.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Deborah T Cesar	Title:		
Organization: Near Northside BOND	Address:	305 Morris Houston, TX 77009	
Telephone: 713-223-4833	E-mail:	DTESAR@HHSI.COM	

North Hardy
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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

~~Texas Needs:~~ Remove vehicular traffic from freeway by installing a high speed rail system with one pickup @ Greenspoint (starting @ the Woodlands) & ~~terminating~~ connecting to the rail @ UHD. Use the existing ROW at the Hardy Toll Rd. DOUBLE STACK Rail inside of 610 — to Eliminate increasing the ROW (+ losing our homes).

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

High speed ~~Rail~~ to connect the Woodlands w/ downtown Houston. Use a different system — maybe commuter rail in the ~~highly populated~~ high bus ridership areas.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Try to ask the people in the woodlands where they travel to on a daily basis.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

~~Make~~ Don't increase ROW, increase speed in order to decrease travel time.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/07

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- 5 ☒ Safety
- 2 ☒ Land Use
- ☐ Economic Development
- 1 ☒ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- 4 ☒ Visual Quality and Aesthetics
- 3 ☒ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Air Quality & Noise/Vibration pollution, design systems to address these problems

Please give any other comments you would like to make.

PLAN For Future. Realize Houston will always grow. Lets do it right the 1st time. Communicate with other parties involved with transportation & city growth. Eliminate ANOTHER 20 plus lane highways.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: JUAN ARRIAGA	Title: —
Organization: West End Civic Club	Address: 4302 Koehler
Telephone: 713-863-7521 HM 713-889-0651 Cell	E-mail: ja301142@EU1.net

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

Em 5/02

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Maria George	Title:
Organization: home owner	Address: 110 Payne St. Houston TX. 77009
Telephone: 713 869-6746	E-mail:

We have signed up previously for mailings but have never yet received one!

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planning studies

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SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

You all are changing what you want to plan. Metro has not planned with the community from which its taxes come from. We have no input on deciding where we want a study done. Travel problems are plenty. I don't have enough room to write it down on this paper. I have a problem with you trying to make decisions that need to be made by the community not your boss.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

No. Your corridors does not include a African American community. It does not address the transportation needs of our community.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

This is not a meeting. This is a showing. All Metro is doing is showing us what they want to do. I'll bet you half the staff doesn't live in the region.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Consider studying Acres Homes, Settegast, Fifth Ward, Scenic Woods, Sterling Ridge, Kashmere Gardens, Trinity Gardens, South Park, and Sunnyside.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Feb 5/05

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☑ Public Transportation
- ☑ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☑ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☑ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

To many trains and toxic chemicals on Hardy.

Please give any other comments you would like to make.

We won't support projects that don't include us.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Ruthie Brown	Title: RESIDENT
Organization: BLACK MEN of AMERICA	Address: 902 MIDDLETON
Telephone: 281-260 9402	E-mail:

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Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☑ Visual Quality and Aesthetics
- ☑ Historic and Archaeological Resources
- ☑ Parklands
- ☑ Air Quality
- ☑ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Woodland PARK
Historic Houses in Woodland Heights
Air quality today is Not Good

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name:	Title:
Organization:	Address:
Telephone:	E-mail:

Feb 5/02

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

NO EXPANSION OF I-45

Get SOME OF the CARS off the Freeway too MUCH polution

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Better than Tx Dot

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

(13)

R. S. Kelley
928 Payne St
Houston Tx

To whom it may concern

As a property owner I am against any expansion of I-45 all traffic congestion occurs past 610 Loop to the North and South where 45 goes through downtown.

I do not want any neighborhood or park property acquired for this.

The noise and pollution problem is already bad enough other methods should be considered. A sound wall should be constructed along I45 as Tx DoT has in other neighborhoods.

As Tropical Storm Allisson showed flooding is a major problem in our area and an expansion of I-45 would worsen that.

As a tax payer of two properties I do not want my neighborhood negatively impacted by an ill conceived

Feb 5/or

(14)

RESPONSE TO THE NORTH-HARDY CORRIDOR PLANS

To Whom It May Concern:

As a homeowner of a house next to I-45 I object to the idea of widening the freeway, possibly taking in my property. I specifically bought that house so that it would be close to downtown-short drive time, as well as my desire to live in a historic neighborhood. It would be terrible to think that my 100-year-old house would be a casualty to I-45 to accommodate all of those people unwilling to live in the inner city. Perhaps stronger incentives for those who carpool and use the HOV lane would assist in the congestion. What about the rail system-isn't that supposed to reduce traffic? Please consider alternative solutions to destroying our historic neighborhoods that we have all worked so hard to preserve.

Heather Westerlage

Heather Westerlage
121 Alma
Houston, TX 77009
(713) 222-7252

Feb 5/02

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METRO 1-45 STUDY

FIND ANOTHER TRAFFIC MOVER RAIL

GIVE US A SOUND WALL WITH NO EXPANSION OF I-45

ROBERT SHUMWAY
211 /213 EAST WOODLAND
OWNER
713-868-8000
HOUSTON, TEXAS 77009

Feb 5/02

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I-45 STUDY
FEBRUARY 3,2002

NO EXPANSION OF I-45 RIGHT OF WAY

IMPROVE QUALITY OF LIFE
1. REDUCE DUST & BLACK SOOT (we are breathing this stuff now, dont increase it)
2. REDUCE NOISE (give us a sound wall)
3. NO DOUBLE DECK FREEWAYS (like METRO did on HOV LANE on I-10)
4. REDUCE AIR POLLUTION (you are killing us with bad air)
5. DECREASE FLOODING (the more you concrete the faster and quicker we flood)

CONSIDER OTHER METHODS OF TRANSPORTATION

DAWN SHUMWAY
OWNER
713-868-8000/ home 713-8697275
211 EAST WOODLAND
HOUSTON, TEXAS 77009

Feb 5/02

(17)

FEBRUARY 4,2002

I HAVE WORKED VERY HARD IN THE PAST TRYING TO GET A SOUND WALL ON THE WEST SIDE OF I-45 BETWEEN NORTH MAIN AND I-10. WHY ARE WE UNABLE TO DO SOMETHING THAT WOULD BE BENEFICIAL TO THE HOME OWNER RATHER THAN MAKING PLANS FOR UNHEALTHY ADDITIONS FOR OUR NEIGHBORHOOD. OUR NEIGHBORHOOD IS PRIMARILY SINGLE FAMILY HOMES THAT ARE APPROXIMATELY NINETY FIVE YEARS OLD WE NEED PROTECTION NOT ABUSE.

Brad Shumway

BRAD SHUMWAY
HOME OWNER
112 PAYNE
HOUSTON, TEXAS 77009

Feb 5/02

Entered by Court Reporter Feb 13/02.

Ray Anderson
2819 Golden Leaf Drive
Kingwood, TX 77339-1995
Tel. 281-359-3744 E-mail - rayfran@ev1.net

February 13, 2002

Public Meeting
NHMCC Student Center
South Dining Room
27 W W Thorne Dr.
Houston, TX 77073

SUBJECT: Major Investment Study - I-45 Expansion Study

Gentlemen:

I would like to express my opinion, and that of a growing number of concerned citizens regarding the potential expansion of I-45. The following are serious concerns that affect the quality of life for all residents of the area.

* Do not acquire any additional Right of Way bordering I-45. Keep existing neighborhoods intact and preserve existing green areas for the future enjoyment of all Texans.

* Additional concrete roadways lessens the ability of the soil to absorb rain fall that causes downstream flooding.

* Consider Rapid Transit (Rail) to move people rather than freeways.

* Reduce current freeway noise using "Soundwalls" to muffle traffic sounds that disturb neighborhoods.

* Re-engineer dangerous "off and on" ramps and intersections.

* Provide additional automated signage to alert drivers to enable them to escape traffic congestion.

Thank you for allowing my views to be heard.

Sincerely,

Ray Anderson

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

(1) USE DOUBLE DECKING INSTEAD OF LEAVING EXISTING RIGHT OF WAY
(2) USE DIAMOND LANES INSTEAD OF CONTRAFLOW
(3) JOIN HARDY TO I-45 NORTH OF DOWNTOWN
(4) MAKE THE TOLL ROAD FREE TO INCREASE USAGE

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

BETTER THAN THE PARSONS GROUP DID 2 YEARS AGO!

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

DO NOT RUIN EXISTING NEIGHBORHOODS
KEEP INSIDE YOUR EXISTING RIGHT OF WAYS
DO AWAY WITH CONTRAFLOW & USE DIAMOND LANE

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☑ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ Noise/Vibration
- ☑ Threatened and Endangered Species
- ☐ Energy
- ☑ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

THE STUDIES BY HGAC ARE BIASED, USE AN INDEPENDENT FIRM

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name:	Title:
Organization:	Address:
Telephone:	E-mail:

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

Needs – IAH to Downtown needs a high speed direct connection.
~~Need~~ – more restrictions on lane usage on freeways

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

would like to see more double-decker freeways for long distance travel.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Not sure I know how it was done.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Minimum condemnation of private property. Condemnation ruins neighborhoods, years in advance of construction.

Carter=Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☒ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☒ Land Use
- ☐ Economic Development
- ☒ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☒ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☒ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please keep in mind that Economic Development is not necessarily the most desirable goal. In boosting Economic Development, residential neighborhoods may "go commercial." There are plenty of commercial areas of town. Be careful in dealing with homeowners and small business owners.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name:	Peggy Lindow	Title:	
Organization:	Woodland Heights	Address:	
Telephone:		E-mail:	plindow@texoil.com

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

The Horsemen Industry in Houston moves 600-800 homes in Houston per year includes temporary classrooms for school district 100-150 per year
We need a 22' Truck Route Thru Houston North & South & East & West.
↑ Height

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

We need 3 lane feeder on all freeways & Toll Road

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Brick mail boxes being built on city + County roads in right of way (no permit)

Please give any other comments you would like to make.

all over passes need to be 19' tall or taller

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: James A Drake	Title: President
Organization: Drake Housemoving	Address: 3621 Trout St
Telephone: 713-694-0301	E-mail:

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

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Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: ARETHA LAKEY	Title:
Organization:	Address: 940 St. Clair
Telephone: 281-448-1645	E-mail:

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

MYSELF AND SEVERAL OTHERS MOVE HOUSES IN, AROUND AND THROUGH HOUSTON. IN THE PAST WE HAVE BEEN ABLE TO FIND ENOUGH WIDE AND TALL STREET RIGHT OF WAYS AT PRESENT THERE HAVE BEEN ADDED ALONG THESE ROUTES LOW ARM LIGHTS, TREES IN ESPLANADE, BRICK MAIL BOXES AND OTHER STRUCTURES THAT ENCROCH ON THESE ROUTES

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

ROUTES AND OR RIGHT OF WAYS TO CROSS OVER OR UNDER FUTURE ROADS BUILT IN HOUSTON AND ADJOINING AREAS

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☑ Traffic and Circulation
- ☐ Parking
- ☑ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☑ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☑ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

I WOULD LIKE TO BE INFORMED OF ANY FUTURE OBSTRUCTIONS ALONG OUR MOVING ROUTES THAT WOULD STOP US FROM EXITING HOUSTON WITH OVERSIZE LOADS

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: JIM WOOTEN	Title: ESTIMATOR
Organization: CHERRY MOVING	Address: 9235 EDGEBROOK
Telephone: 713 941 2924	E-mail: WWW.CHERRYHOUSEMOVING.COM

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

I think that it is a Great Idea
But it is not for me Because I live in the
Fifth Ward

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Rail and Buses together

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

The presentation was very good and
informative

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

To address the drain problem in the
Fifth Ward

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☑ Public Transportation
- ☑ Traffic and Circulation
- ☐ Parking
- ☑ Safety
- ☐ Land Use
- ☐ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

the flood Plain

Please give any other comments you would like to make.

I think that Rail will work in Houston but not for me and I will not be using it at all

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Colette K. Windom	Title: Citizen
Organization:	Address: 1705 West
Telephone: 713-224-1425	E-mail:

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

The corridor from downtown to Woodlands connecting the Int. Airport should be first priority.
The light rail transit will be a good choice.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

We like it and we hope one day all the corridors will be improved.
This city is an emergency need of these improvements.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Carter-Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☑ Traffic and Circulation
- ☐ Parking
- ☑ Safety
- ☐ Land Use
- ☑ Economic Development
- ☑ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name:	Title:
Organization:	Address:
Telephone:	E-mail:

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

Any mode that has repeatable travel times would be an improvement. & Commute times are not repeatable on IH 45 due to incidents. Even the HOV lanes have their own incidents. Even a longer average trip time may be acceptable if the travel time is more dependable.

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Given the low volume of long-haul trips, rubber tire transit is probably the only practical solution for this corridor. I personally don't use the bus because making connections from downtown to where I work would take too long.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

Graphics were good. There were plenty of people to answer questions.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Cost. accuracy of forecasts. Definition Extent of corridors. Political boundaries. Need to extend METRO's service area to include all the populated areas (such as Conroe) in the region.

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☑ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☑ Safety
- ☐ Land Use
- ☑ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☑ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☑ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Please give any other comments you would like to make.

(1) A lot of development is going on in the Conroe area. I suggest this area also be considered in making long range decisions.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Randy Schulze	Title: Sr. Assoc.
Organization: Walter P. Moore & Assoc	Address: 3131 Eastside 2nd floor
Telephone: 713 630 7456	E-mail: rschulze@walterpmoore.com

North Hardy
planning studies

SCOPING MEETING COMMENT FORM

This planning study is all about improving mobility in the corridor and in the region. Give us your comments on transportation needs/mobility deficiencies/travel problems you would like to bring to our attention.

There are numerous problem areas in this corridor
See attached sheet for the itemized list

For the preliminary options, all possibilities should be on the table, including extending 527 to I-45, building ~~evelat~~ elevate connectors over the 59/288 treth, ~~or~~ and widening Pierce elevated

A range of new transportation alternatives to be considered in the corridor was presented at the scoping meetings. Give us your comments as to whether those transportation alternatives adequately address the transportation needs/mobility deficiencies/travel problems that exist in the corridor. If not, please list the additional alternatives you would like to be addressed.

Rail is not suitable for this corridor. (Too expensive.)
We have a good HOV infrastructure, so let's build on it.

The number one objective should be to increase general purpose capacity.

Give us your comments on the approach to conducting the corridor study that was presented at the scoping meeting.

There were no firm options or details at this point.
However, I am against rail.
Improvements should include general purpose capacity and HOV.

During the planning study we will be developing and evaluating transportation alternatives. Give us your comments on what information would be most important to consider in making a decision among the options presented.

Most important: increase ~~capacity (ie. informa~~ general-purpose capacity (the alternatives should clearly state how much capacity is being added.)
Also important: cost

Carter Burgess

Texas Department of Transportation

METROMOBILITY 2025

Give us your comments on the importance of the top 5 environmental issues as they relate to the alternatives being considered.

- ☐ Public Transportation
- ☐ Traffic and Circulation
- ☐ Parking
- ☐ Safety
- ☐ Land Use
- ☐ Economic Development
- ☐ Neighborhood/Community Cohesion
- ☐ Employment
- ☐ Toxic and Hazardous Materials
- ☐ Visual Quality and Aesthetics
- ☐ Historic and Archaeological Resources
- ☐ Parklands
- ☐ Air Quality
- ☐ Noise/Vibration
- ☐ Threatened and Endangered Species
- ☐ Energy
- ☐ Water Resources

Give us your comments on any specific environmental concerns and/or locations that we should be aware of.

Visual Quality: I-45 north is very ugly due to all the hill boards, low grade commericial establishments, and some decay. Acquiring right-of-way on I-45 between 610 and Shepherd will improve the appearance of this corridor, just as 59 north was improved in the 1990's.

Please give any other comments you would like to make.

Attached is a comprehensive list.

There is a HUGE number of serious issues in this corridor.

If you would like to receive future notification of corridor meetings and/or receive corridor newsletters please provide the following information:

Name: Erik Slotboom	Title:
Organization: Motorist	Address:
Telephone: 512 794 0154	E-mail: eslotboom @ hotmail.com

Itemized list for Erik Slotboom
Comments start at the south end of corridor

1. 59 / 527 split
Consideration should be given to extending 527 to I-45. This should be in a trench ~~we~~ east of Brazos. Most of this right-of-way is clear of structures. HOV vehicles would exit into downtown. General purpose vehicles would make connections to 45 north. General purpose vehicles from southbound 45 to Southbound 59 would also use this connector.

2. 59, 527 to 288
~~I~~ 59 northbound should have at least 4 lanes and preferably 5. Southbound 59 should also be widened, but could bottleneck at 527 so ~~4~~ 4 lanes total should be enough.

3. 59 northbound to 45 southbound Connector
Consideration should be given to a new elevated ramp starting west of 288, proceeding over the entire 59/288 merge zone, and connecting to the I-45 upper deck southbound.

4. ~~45 northboun~~

Connections to ~~45~~ 59 southbound between I-45 and 288 (in the trench)

This merging zone causes big problems. (Huge problems, in fact since so many vehicles are trying to get on 59 southbound. At least one of the traffic flows should have a new elevated ramp, going over the whole merge zone. Most likely, ~~the~~ the 45 NB to 59 SB should have this new elevated ramp.

5. I-45 pierce elevated

Should be widened to 10 lanes total (continuous) with extra merging lanes for traffic coming off 288 and 59.

6. I-45 West of downtown

Main lanes should be widened to 5 in each direction, and emergency shoulders should be added.

7. I-45, 10 to 610

10 general purpose main lanes plus 2 HOV (two reversible, both in same direction.)

8. I-45, 610 to Shepherd.
The right-of-way should be substantially widened, to about 400 feet.
12 General purpose main lanes
2 reversible HOV
ADD INTERIOR SHOULDERS!

9. I-45, Shepherd to BW8
The existing ~~row~~ ROW may be able to accommodate increased capacity.
10 general purpose lanes.
2 reversible HOV
Widen ROW as needed.

10. 610-45 interchange
Eliminate left exits ~~of~~ on 610;
replace with right-side exits that meet modern standards.

General issue: corridor aesthetics
This corridor is very ~~f~~ blighted (visually), and this makes a bad impression to visitors ~~from~~ arriving in Houston. Between 610 and BW8 (and especially between 610 and Shepherd), acquiring substantial right-of-way (for a minimum 400 foot wide corridor) will be in the best ~~int~~ interests of Houston.
A wide, modern transportation corridor will be good for ~~tan~~ transportation and for Houston's
Widening will eliminate a lot of the →

clutter along the corridor.

North-Hardy Corridor Study Public Meeting
February 5, 2002

TOTAL ATTENDANCE: 38

Name:	NICK LITINAS
Community/Business Affiliation/Agency	
Address:	4715 FANNIN St.
City, State and Zip:	Hou. TX, 77004
Phone Number:	713-521-2012

Name:	ROBERT FIEDERLEIN
Community/Business Affiliation/Agency	COH
Address:	P.O. Box 1562
City, State and Zip:	Houston, TX 77251
Phone Number:	713.247.2195

Name:	Kelley Parker
Community/Business Affiliation/Agency	Cushman & Wakefield
Address:	2929 Allen Parkway #2100
City, State and Zip:	Hou 77019
Phone Number:	713-963-2886

Name:	DAWN SHUMWAY
Community/Business Affiliation/Agency	
Address:	211/13 E Woodland
City, State and Zip:	Houston TX 77009
Phone Number:	713-868-8000

Name:	Shanna Barnstone
Community/Business Affiliation/Agency	Silverdale Civic Club
Address:	3923 Baden
City, State and Zip:	Houston 77009
Phone Number:	713-691-1583

Name:	ART CARRANZA
Community/Business Affiliation/Agency	PRIMIS CORP
Address:	5210 ROBERTSON
City, State and Zip:	HOUSTON, TX 77009
Phone Number:	713 8759189

Name:	Virginia Duke
Community/Business Affiliation/Agency	Lindale Park
Address:	211 Eleanor
City, State and Zip:	77009-1323
Phone Number:	713 695 3198

Name:	Donald Holliday
Community/Business Affiliation/Agency	
Address:	13921 Rock Road
City, State and Zip:	CONROE TX 77306
Phone Number:	936-231-3261

Name:	R. Skiles Kelley
Community/Business Affiliation/Agency	Home owner
Address:	128 Payne ST
City, State and Zip:	Houston TX 77009
Phone Number:	713-869-1522

Name:	Juan Arriaga
Community/Business Affiliation/Agency	West End Civic Club
Address:	4302 Koehler
City, State and Zip:	Hou, TX 77007
Phone Number:	713-863-7521

North-Hardy Corridor Study Public Meeting
February 5, 2002

Name:	Officer A. G. Jasso
Community/Business Affiliation/Agency	HPD
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City, State and Zip:	Hou Tx 77009
Phone Number:	713-222-5408

Name:	Dea Sanchez
Community/Business Affiliation/Agency	Silverdale Civic Club
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City, State and Zip:	Hous, TX 77009
Phone Number:	713 699 9130

Name:	Rajan Sedalia
Community/Business Affiliation/Agency	ARTJAR
Address:	1509 Holman
City, State and Zip:	Houston, Tx 77004
Phone Number:	713-942-9992

Name:	R. Brad Shumway
Community/Business Affiliation/Agency	WHCA.
Address:	112 Payne St.
City, State and Zip:	Houston TX 77009.
Phone Number:	713 868-8000.

Name:	H. Moreno
Community/Business Affiliation/Agency	Metro PD
Address:	810 N. San Jacinto
City, State and Zip:	Hou, TX 77002
Phone Number:	(713) 615-6400

Name:	Marita Burns
Community/Business Affiliation/Agency	Woodland Hts Civic Assn.
Address:	213 Parkview
City, State and Zip:	Houston, TX 77009
Phone Number:	713 861-9800

Name:	Robert Shumway
Community/Business Affiliation/Agency	
Address:	215 E. Woodland
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Phone Number:	713-869-7275

Name:	T. Hallgren
Community/Business Affiliation/Agency	Woodland Hts Civic Assn.
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Phone Number:	713 861-9800

Name:	Dominic Del Toro
Community/Business Affiliation/Agency	
Address:	716 Joyce
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Phone Number:	713 884-1579

Name:	Richard Olson
Community/Business Affiliation/Agency	→
Address:	
City, State and Zip:	
Phone Number:	281-265-9622

North-Hardy Corridor Study Public Meeting
February 5, 2002

Name:	Sally Klein
Community/Business Affiliation/Agency	Houston Property Rights Assn.
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Phone Number:	713-224-4144

Name:	Rufus Brown
Community/Business Affiliation/Agency	Black Men of America
Address:	906 Marcolen
City, State and Zip:	Houston TX 77088
Phone Number:	281 260-9493

Name:	ED REYES
Community/Business Affiliation/Agency	LINDALE PARK
Address:	218 JOYCE
City, State and Zip:	HOUS. TX 77009
Phone Number:	713 753. 3715

Name:	Weatherly
Community/Business Affiliation/Agency	First Ward
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City, State and Zip:	Houston TX 77007
Phone Number:	713-863-9773

Name:	EDWARD JACKSON
Community/Business Affiliation/Agency	
Address:	4003 MAURY
City, State and Zip:	HOUSTON TX. 77009
Phone Number:	713 695-8040

Name:	Cesar & Jessica Cazares
Community/Business Affiliation/Agency	Lindale Park
Address:	205 Milwaukee
City, State and Zip:	Hou TX 77009
Phone Number:	713697-5992

Name:	F. CISNEROS
Community/Business Affiliation/Agency	NORTH CENTRAL CIVIC
Address:	3804 ROBERTSON
City, State and Zip:	HOU. TX 77009
Phone Number:	713-691-0757

Name:	Ivon DuPont
Community/Business Affiliation/Agency	WHCA NCC
Address:	3324 Morrison
City, State and Zip:	Houston 77009
Phone Number:	713 864 9643

Name:	Maria & Peter George
Community/Business Affiliation/Agency	homeowner
Address:	110 Payne St.
City, State and Zip:	Houston TX. 77009
Phone Number:	713 869-6746

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 5, 2002

Name:	Ruth Palmer
Community/Business Affiliation/Agency	Wesley Community Center
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City, State and Zip:	Houston, Tx 77009
Phone Number:	713-223-8131

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	HEATHER WESTERAGE
Community/Business Affiliation/Agency	
Address:	420 WALKER
City, State and Zip:	HOUSTON, TX 77023
Phone Number:	713/222-7252

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Deborah Tesar
Community/Business Affiliation/Agency	BONID.
Address:	305 Morris
City, State and Zip:	Houston, TX 77009
Phone Number:	713-223-4833

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Ruth Henshall
Community/Business Affiliation/Agency	The Lentz Group
Address:	2600 Citadel Plaza Dr #115
City, State and Zip:	Houston TX 77008
Phone Number:	713/864-2623

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	TOM HELM
Community/Business Affiliation/Agency	WOODLAND HEIGHTS
Address:	1528 WHITE OAK DR.
City, State and Zip:	HOUSTON TX 77009
Phone Number:	713 426 3071

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 5, 2002

Name:	AVI RON
Community/Business Affiliation/Agency	
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City, State and Zip:	HOUSTON TX 77007
Phone Number:	713-869-4815

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Henry Barbee
Community/Business Affiliation/Agency	
Address:	4 Asbury Pl
City, State and Zip:	Houston, TX 77007
Phone Number:	713-869-4815

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Carolyn Bolden
Community/Business Affiliation/Agency	Wesley Community Center
Address:	1410 Lee
City, State and Zip:	Houston, TX 77009
Phone Number:	(713) 223-8131

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 6, 2002 - Northline Mall

Name:	Josh Carmona
Community/Business Affiliation/Agency	Hot 97.1fm / Cox Radio
Address:	PO Box 90014
City, State and Zip:	Houston, TX 77290
Phone Number:	7)334-0740

Name:	Gary Montgomery
Community/Business Affiliation/Agency	North Corridor Coalition
Address:	GGMD
City, State and Zip:	
Phone Number:	281-260-8031

Name:	C.L. Kemp & Wife
Community/Business Affiliation/Agency	Resident
Address:	175 Hankla
City, State and Zip:	Howl. Tx, 77076
Phone Number:	713-692-1581

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Armando Walle
Community/Business Affiliation/Agency	U.S. Rep. Gene Green
Address:	256 N San Houston Pkwy E. #29
City, State and Zip:	Houston, TX ~~77073~~ 77060
Phone Number:	(281) 999-5879

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Doug Jones
Community/Business Affiliation/Agency	J. C. Jones Foundation
Address:	2218 Rosedale
City, State and Zip:	Houston, Tx 77004
Phone Number:	(713) 779-0448

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Ken + Peggy Lindow
Community/Business Affiliation/Agency	Woodland Heights
Address:	on mailing list already
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 6, 2002 - Northline Mall

Name:	Jerry BEE
Community/Business Affiliation/Agency	
Address:	P.O. Box 16007
City, State and Zip:	Hou - Tx - 77022
Phone Number:	

Name:	Erik Slotboom
Community/Business Affiliation/Agency	
Address:	6000 Shepherd Mountain
City, State and Zip:	Cove #2202 Austin TX 78730
Phone Number:	512 794 0154

Name:	C. Chuck Wilcox
Community/Business Affiliation/Agency	Harris County Precinct 1
Address:	6702 Wilcrest
City, State and Zip:	Houston TX 77048
Phone Number:	713-991-6889

Name:	Jim A Drake
Community/Business Affiliation/Agency	DRAKE HOUSEMOVING
Address:	3621 TROUT
City, State and Zip:	HOUSTON, TEXAS 77093
Phone Number:	713-694-0301

Name:	MARK CARPENTER
Community/Business Affiliation/Agency	
Address:	14822 SANDY CREEK DR
City, State and Zip:	HOUSTON TX 77070
Phone Number:	281-370-2548

Name:	Jim Watkins
Community/Business Affiliation/Agency	CHERRY MOVING
Address:	9235 EDGEBROOK
City, State and Zip:	HOUSTON TX
Phone Number:	713 9412924

Name:	ARETHA LAKEY
Community/Business Affiliation/Agency	
Address:	940 St. Clair
City, State and Zip:	Houston Texas 77088
Phone Number:	281-448-1645

Name:	RODOLFO RUIZ
Community/Business Affiliation/Agency	HOMEOWNER
Address:	2313 EVERETT
City, State and Zip:	~~2313~~ Hou. TX 77009
Phone Number:	713 222 0448

Name:	Mary L. Garcia
Community/Business Affiliation/Agency	
Address:	417 Canadian
City, State and Zip:	Houston TX 77009
Phone Number:	713-692-0987

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 6, 2002 - Northline Mall

Name:	John A Branch
Community/Business Affiliation/Agency	Super Neighborhood 13 VP
Address:	4430 Castor
City, State and Zip:	Houston Tex 77022
Phone Number:	713 699 1942

Name:	Brandt Mannchen
Community/Business Affiliation/Agency	self
Address:	5115 Maple
City, State and Zip:	Bellaire, Tx. 77401
Phone Number:	713-664-5962

Name:	a. Kieffer
Community/Business Affiliation/Agency	
Address:	215 Bayland
City, State and Zip:	Houston, Tx 77009
Phone Number:	(713) 248-9876

Name:	Gwen Neatherlin
Community/Business Affiliation/Agency	Neatherlin Assoc Mgmt
Address:	6805 N Shepherd
City, State and Zip:	Hou
Phone Number:	936 931-2429

Name:	Paula Parshall
Community/Business Affiliation/Agency	Northside/Northline Super Neighborhood
Address:	11316 Glosser Drive
City, State and Zip:	Houston, TX 77076-2404
Phone Number:	(713) 692-7968

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Abel Garza
Community/Business Affiliation/Agency	State Senator Gallegos
Address:	3411 Irvington Blvd
City, State and Zip:	Hou, TX 77009
Phone Number:	713-227-0607

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Tina Araujo
Community/Business Affiliation/Agency	Greater Greenspoint Ass't
Address:	10825 Northchase #720
City, State and Zip:	Hou TX 77060
Phone Number:	2-874-2137

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 13, 2002 - North-Harris Montgomery Communtiy College

Name:	WILLIAM J. NEILL
Community/Business Affiliation/Agency	RETIRED
Address:	2411 COACHLIGHT LANE
City, State and Zip:	CONROE, TX 77384-3348
Phone Number:	(936) 321-6580

Name:	Reid K. Mrany, PE
Community/Business Affiliation/Agency	Montgomery & Associates
Address:	480 N. Sam Houston. Pkwy, East 100
City, State and Zip:	Houston, TX 77060
Phone Number:	(281) 260-8031

Name:	RAY ANDERSON
Community/Business Affiliation/Agency	
Address:	2819 GOLDEN LEAF DR
City, State and Zip:	KINGWOOD TX 77339
Phone Number:	281-359-3744

Name:	Bill Halpin
Community/Business Affiliation/Agency	
Address:	16214 GREEN SHADOW DR
City, State and Zip:	Houston, TX 77090
Phone Number:	281-895-6774

Name:	Jeff Daggs
Community/Business Affiliation/Agency	
Address:	159 Garth
City, State and Zip:	Freeport, TX 77541
Phone Number:	979-233-6468

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	David Skweres
Community/Business Affiliation/Agency	
Address:	4225 Margum #30
City, State and Zip:	Hou 77092
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	D. WYANT
Community/Business Affiliation/Agency	
Address:	10322 SWEETBROOK
City, State and Zip:	HOUSTON, TX 77038
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 13, 2002 - North-Harris Montgomery Community College

Name:	Carolyn Hargrave
Community/Business Affiliation/Agency	H-GAC
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Kim Canon
Community/Business Affiliation/Agency	Arnold P
Address:	801 Texas Ave
City, State and Zip:	Houston, TX 77002
Phone Number:	(713) 220-2790

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	CHRIS McCALL
Community/Business Affiliation/Agency	HOME OWNER
Address:	742 MERRIMAC
City, State and Zip:	SPRING, TEXAS 77373
Phone Number:	281.355.8994

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 13, 2002 - North-Harris Montgomery Communtiy College

Name:	Carolyn Bednar-Wood
Community/Business Affiliation/Agency	TxDOT
Address:	7721 Washington
City, State and Zip:	Houston, TX 77007
Phone Number:	713-802-5312

Name:	Pamela Rocchi
Community/Business Affiliation/Agency	Harris County Precinct Four
Address:	22540 Aldine Westfield
City, State and Zip:	Spring TX 77373
Phone Number:	(281)353-8100

Name:	Sharon Moses
Community/Business Affiliation/Agency	Greater Houston Partnership
Address:	1200 Smith St.
City, State and Zip:	Hou-TX- 77002
Phone Number:	713 844-3633

Name:	Rob Maxwell
Community/Business Affiliation/Agency	
Address:	100 Glenborough Ste 1300
City, State and Zip:	Houston TX 77067
Phone Number:	832-601-2034

Name:	Randy Schulze
Community/Business Affiliation/Agency	Walter P. Moore & Assoc
Address:	3131 Eastside
City, State and Zip:	Houston TX 77098
Phone Number:	713 630 7456

Name:	Barbara Castille
Community/Business Affiliation/Agency	
Address:	100 Glenborough Ste 1300
City, State and Zip:	Houston, TX 77067
Phone Number:	832-601-2012

Name:	Pat Wisniewski
Community/Business Affiliation/Agency	Senator Lindsay
Address:	15531 Kuykendahl #251
City, State and Zip:	Houston, TX 77090
Phone Number:	281.583.1011

Name:	Donn Van Skike
Community/Business Affiliation/Agency	Follett Book Store
Address:	23515 Verngate
City, State and Zip:	Spring TX 77373
Phone Number:	281-288-4911

Name:	Laura Hyser
Community/Business Affiliation/Agency	Vesta Rea & Assoc.
Address:	P.O. Box 73643
City, State and Zip:	Houston, TX 77273
Phone Number:	281-376-4202

Name:	Leighton Courville
Community/Business Affiliation/Agency	Excalibar Minerals Inc.
Address:	16706 Capewood Dr.
City, State and Zip:	Humble Tx. 77396
Phone Number:	281-812-3732

North-Hardy Corridor Study Public Meeting
February 20, 2002 - Houston Community College

Name:	Gianeca Cross
Community/Business Affiliation/Agency	
Address:	15775 FM 244
City, State and Zip:	Tola TX 77861
Phone Number:	936-394-8116

Name:	Janis Scott
Community/Business Affiliation/Agency	Metro Rider
Address:	304 De Haven St.
City, State and Zip:	Houston TX 77029
Phone Number:	713-674-4785

Name:	Celeste Jesse Amenedo
Community/Business Affiliation/Agency	
Address:	300 Kelley Dr.
City, State and Zip:	Hou. TX 77009-1344
Phone Number:	713-694 9933

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	E Charles LeBlanc
Community/Business Affiliation/Agency	Midtown Redevelopment Auth.
Address:	3401 Louisiana - Suite 355
City, State and Zip:	Houston 77002
Phone Number:	713-526-7577

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	GAYATRI ANOO
Community/Business Affiliation/Agency	COH Planning & Development
Address:	611 Walker, 6th Floor
City, State and Zip:	Houston TX 77002
Phone Number:	713-837-7759

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	GUY HAOSTETTE
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 20, 2002 - Houston Community College

Name:	Colette C Whitson
Community/Business Affiliation/Agency	
Address:	705 West
City, State and Zip:	Houston, Tex. 77026
Phone Number:	713-224-1625

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

SK

Name:	Praveen Jones
Community/Business Affiliation/Agency	Congresswoman Sheila J. Lee
Address:	1919 Smith
City, State and Zip:	Houston, TX 77002
Phone Number:	713-655-0050

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Alita Gail Hall
Community/Business Affiliation/Agency	Midtown Magnet District
Address:	4120 Austin St
City, State and Zip:	Hou TX 77004
Phone Number:	713 522 7555

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Emily Jolly
Community/Business Affiliation/Agency	Rice University
Address:	7315 Brompton
City, State and Zip:	Houston, TX 77025
Phone Number:	713.665.9870

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	FRANK BLAKE
Community/Business Affiliation/Agency	SIERRA CLUB
Address:	1010 PEDEN #3
City, State and Zip:	HOUSTON TX. 77006
Phone Number:	713-528-2896

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

North-Hardy Corridor Study Public Meeting
February 20, 2002 - Houston Community College

Name:	Dorothy Finazzo
Community/Business Affiliation/Agency	
Address:	405 Joyce
City, State and Zip:	Houston, TX 77009
Phone Number:	713-695-4354

Name:	X
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	John Wilson
Community/Business Affiliation/Agency	GHASP / WHCA
Address:	518 Woodland
City, State and Zip:	Houston 77009
Phone Number:	713-868-2601

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	Elizabeth Chouinard-Grandich
Community/Business Affiliation/Agency	Midtown Civic Club
Address:	P.O. Box 88101
City, State and Zip:	Houston, TX 77288-0101
Phone Number:	9137523-1158

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	X
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	X
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

Name:	
Community/Business Affiliation/Agency	
Address:	
City, State and Zip:	
Phone Number:	

METROMOBILITY 2025 PLAN HEARING

WEDNESDAY, FEBRUARY 20, 2002

HOUSTON COMMUNITY COLLEGE

ADMINISTRATION AUDITORIUM

3100 MAIN STREET

HOUSTON, TEXAS

4:30 P.M. - 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

(281) 684-8973

marbryantrmr@evl.net

PROCEEDINGS

PUBLIC COMMENT:

MS. ALITA HALL

4120 AUSTIN STREET

HOUSTON, TEXAS 77004

>> MS. HALL: 59 NORTH WHERE IT MERGES WITH 288 AND THEN THERE IS THE 45 NORTH AND SOUTH CUTOFF, THEY CHANGED IT -- I DON'T KNOW HOW YOU CAN WORD THIS -- BUT THEY CHANGED IT FROM TWO LANES FEEDING INTO 45 NORTH OR SOUTH TO ONE LANE FEEDING INTO 45 NORTH OR SOUTH A YEAR AND A HALF OR TWO YEARS AGO. THE MINUTE THEY DID, THE FREEWAY -- 59 AND 288 BOTH STARTED HAVING -- YOU JUST SIT THERE SOMETHING FIERCE. AIR QUALITY OVERNIGHT, THE NUMBER OF PEOPLE SITTING THERE QUADRUPLED. FROM MY HOME I CAN SEE THE FREEWAY AND THEM SITTING THERE.

IF THEY WOULD CONTEMPLATE, LOOK AT, VISIT, ALLOWING HOUSTONIANS TO MERGE AGAIN UP AT THAT 45 POINT -- ONE THING THAT HAPPENED MAYBE THEY'RE NOT THINKING ABOUT IS ALL THOSE PEOPLE MOVED TO PEARLAND DURING THE LAST YEAR AND NOW 288 BACKS UP IN THE EVENING, BACKS UP IN THE MORNING, SO THAT FLOW GOING NORTH THAT'S NOW MERGING WITH 59 NORTH THAT'S HEADED UP TO SPLIT OFF ON 45 EITHER WAY, NEEDS ITS TWO LANES BACK. THE ONE LANE WAITING THING IS JUST NOT HAPPENING. IF THEY WOULD FLY OVER THAT WITH A HELICOPTER ONE MORNING OR ONE EVENING,

THEY WOULD SEE, "OH, NO, WHAT HAVE WE DONE?" THEY NEED TO GO AHEAD AND GIVE US OUR LICENSE TO MERGE BACK. THAT'S IT. I THINK THAT WOULD BE A SHORT TINY HELP.

OH, IMPORTANT TO NOTE, 45 HAD BEEN BACKING UP AND THAT WAS THE REASON THAT THEY DID THAT OR MAYBE SOMEBODY HAD A MAJOR ACCIDENT, I'M NOT SURE. I THINK IT WAS THE 45 FLOW. WELL, THAT FLOW WAS MOSTLY COMMERCIAL. WHERE 288 AND 59 IS BACKING UP, THAT'S RESIDENTIAL, AND, YOU KNOW, WE GO OUT IN OUR FRONT YARD AND WE NEED A MASK WHERE I'M AT AT THE EDGE OF MIDTOWN. IT'S JUST BAD. I'M GOING TO HAVE TO TURN MY RESIDENCE COMMERCIAL IF THEY DON'T FIX 59 RIGHT THERE PRETTY SOON. AND THAT'S NOT PART OF WHAT'S FIXING TO BE LOWERED, THAT'S LIKE NORTH OF WHERE YOU'RE LOWERING THE FREEWAY ALL THE WAY TO MONTROSE AND THAT PART IS ALWAYS GOING TO BE RAISED THUS FAR ON THE PLANNING, BUT SO IT NEEDS TO FLOW BETTER. IT'S THE RESIDENCES AND WE'RE GASPING AND CAN'T BREATHE. NOT THAT I WANT TO HURT 45 MORE, BUT YOU KNOW, IT WAS BETTER BEFORE.

MS. ANNE VIGUERIE

306 DENNIS

HOUSTON, TEXAS 770056

>> MS. VIGUERIE: I WORK IN THIS BUILDING AND I LIVE 10 BLOCKS AWAY, AND WHAT I WAS MENTIONING TO HIM IS THAT I WOULD NOT LIKE TO SEE SPUR 527

TURNED INTO A FREEWAY, NATURALLY, AND I IMAGINE IF YOU TOOK A POLL OF THE PEOPLE WHO LIVED AND WORKED IN THIS AREA, THEY WOULD PROBABLY SAY THE SAME THING.

MS. MARIA GEORGE

110 PAYNE STREET

HOUSTON, TEXAS 77006

>> MS. GEORGE: THIS CONCERNS THE AREA BORDERED BY I-45 ON THE EAST, HOUSTON AVENUE ON THE WEST, WHITE OAK/QUITMAN ON THE SOUTH, AND NORTH MAIN ON THE NORTH.

THIS SPECIFIC AREA IS COLORED PALE GREEN ON YOUR CHART TITLED "WHERE PEOPLE LIVE AND WORK," UNDER THE SECTION ON POPULATION 2000. ACCORDING TO THE LEGEND, PALE GREEN REPRESENTS A POPULATION OF BETWEEN 0 AND 50 PEOPLE. SINCE I LIVE IN THIS NEIGHBORHOOD, I CAN ASSURE YOU THAT THIS FIGURE IS GROSSLY UNDERESTIMATED. AT THE VERY LEAST, 190 PEOPLE CALL THIS AREA HOME. FEEL FREE TO CONTACT ME AT (713)-869-6746 FOR FURTHER DOCUMENTATION.

(END OF PUBLIC COMMENT)

THE STATE OF TEXAS:

COUNTY OF HARRIS:

I, LYNDA MARIE BRYANT, CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF TEXAS, DO HEREBY CERTIFY THAT PROCEEDINGS WERE TAKEN BY ME IN MACHINE SHORTHAND AND LATER TRANSCRIBED FROM MACHINE SHORTHAND TO TYPEWRITTEN FORM BY ME.

I FURTHER CERTIFY THAT THE ABOVE AND FOREGOING TRANSCRIPTION, AS SET FORTH IN TYPEWRITING, IS A FULL, TRUE AND CORRECT TRANSCRIPT OF THE PROCEEDINGS.

GIVEN UNDER MY HAND AND SEAL OF OFFICE ON THIS, THE 25TH DAY OF FEBRUARY, 2002.

Lynda Marie Bryant

LYNDA MARIE BRYANT, RPR, RMR

CSR NO. 2756

EXPIRATION: 12/31/03

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

281-684-8973

METROMOBILITY 2025 PLAN HEARING

WEDNESDAY, FEBRUARY 20, 2002

HOUSTON COMMUNITY COLLEGE

ADMINISTRATION AUDITORIUM

3100 MAIN STREET

HOUSTON, TEXAS

4:30 P.M. - 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

(281) 684-8973

marbryantrmr@ev1.net

PROCEEDINGS

PUBLIC COMMENT:

MS. ALITA HALL

4120 AUSTIN STREET

HOUSTON, TEXAS 77004

>> MS. HALL: 59 NORTH WHERE IT MERGES WITH 288 AND THEN THERE IS THE 45 NORTH AND SOUTH CUTOFF, THEY CHANGED IT -- I DON'T KNOW HOW YOU CAN WORD THIS -- BUT THEY CHANGED IT FROM TWO LANES FEEDING INTO 45 NORTH OR SOUTH TO ONE LANE FEEDING INTO 45 NORTH OR SOUTH A YEAR AND A HALF OR TWO YEARS AGO. THE MINUTE THEY DID, THE FREEWAY -- 59 AND 288 BOTH STARTED HAVING -- YOU JUST SIT THERE SOMETHING FIERCE. AIR QUALITY OVERNIGHT, THE NUMBER OF PEOPLE SITTING THERE QUADRUPLED. FROM MY HOME I CAN SEE THE FREEWAY AND THEM SITTING THERE.

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OH, IMPORTANT TO NOTE, 45 HAD BEEN BACKING UP AND THAT WAS THE REASON THAT THEY DID THAT OR MAYBE SOMEBODY HAD A MAJOR ACCIDENT, I'M NOT SURE. I THINK IT WAS THE 45 FLOW. WELL, THAT FLOW WAS MOSTLY COMMERCIAL. WHERE 288 AND 59 IS BACKING UP, THAT'S RESIDENTIAL, AND, YOU KNOW, WE GO OUT IN OUR FRONT YARD AND WE NEED A MASK WHERE I'M AT AT THE EDGE OF MIDTOWN. IT'S JUST BAD. I'M GOING TO HAVE TO TURN MY RESIDENCE COMMERCIAL IF THEY DON'T FIX 59 RIGHT THERE PRETTY SOON. AND THAT'S NOT PART OF WHAT'S FIXING TO BE LOWERED, THAT'S LIKE NORTH OF WHERE YOU'RE LOWERING THE FREEWAY ALL THE WAY TO MONTROSE AND THAT PART IS ALWAYS GOING TO BE RAISED THUS FAR ON THE PLANNING, BUT SO IT NEEDS TO FLOW BETTER. IT'S THE RESIDENCES AND WE'RE GASPING AND CAN'T BREATHE. NOT THAT I WANT TO HURT 45 MORE, BUT YOU KNOW, IT WAS BETTER BEFORE.

MS. ANNE VIGUERIE

306 DENNIS

HOUSTON, TEXAS 770056

>> MS. VIGUERIE: I WORK IN THIS BUILDING AND I LIVE 10 BLOCKS AWAY, AND WHAT I WAS MENTIONING TO HIM IS THAT I WOULD NOT LIKE TO SEE SPUR 527

TURNED INTO A FREEWAY, NATURALLY, AND I IMAGINE IF YOU TOOK A POLL OF THE PEOPLE WHO LIVED AND WORKED IN THIS AREA, THEY WOULD PROBABLY SAY THE SAME THING.

MS. MARIA GEORGE

110 PAYNE STREET

HOUSTON, TEXAS 77006

>> MS. GEORGE: THIS CONCERNS THE AREA BORDERED BY I-45 ON THE EAST, HOUSTON AVENUE ON THE WEST, WHITE OAK/QUITMAN ON THE SOUTH, AND NORTH MAIN ON THE NORTH.

THIS SPECIFIC AREA IS COLORED PALE GREEN ON YOUR CHART TITLED "WHERE PEOPLE LIVE AND WORK," UNDER THE SECTION ON POPULATION 2000. ACCORDING TO THE LEGEND, PALE GREEN REPRESENTS A POPULATION OF BETWEEN 0 AND 50 PEOPLE. SINCE I LIVE IN THIS NEIGHBORHOOD, I CAN ASSURE YOU THAT THIS FIGURE IS GROSSLY UNDERESTIMATED. AT THE VERY LEAST, 190 PEOPLE CALL THIS AREA HOME. FEEL FREE TO CONTACT ME AT (713)-869-6746 FOR FURTHER DOCUMENTATION.

(END OF PUBLIC COMMENT)

THE STATE OF TEXAS:

COUNTY OF HARRIS:

I, LYNDA MARIE BRYANT, CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF TEXAS, DO HEREBY CERTIFY THAT PROCEEDINGS WERE TAKEN BY ME IN MACHINE SHORTHAND AND LATER TRANSCRIBED FROM MACHINE SHORTHAND TO TYPEWRITTEN FORM BY ME.

I FURTHER CERTIFY THAT THE ABOVE AND FOREGOING TRANSCRIPTION, AS SET FORTH IN TYPEWRITING, IS A FULL, TRUE AND CORRECT TRANSCRIPT OF THE PROCEEDINGS.

GIVEN UNDER MY HAND AND SEAL OF OFFICE ON THIS, THE 25TH DAY OF FEBRUARY, 2002.

Lynda Marie Bryant

LYNDA MARIE BRYANT, RPR, RMR

CSR NO. 2756

EXPIRATION: 12/31/03

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

281-684-8973

METROMOBILITY 2025 PLAN HEARING

WEDNESDAY, FEBRUARY 13, 2002

NORTH HARRIS COMMUNITY COLLEGE

STUDENT CENTER -- SOUTH DINING HALL

HOUSTON, TEXAS

4:30 P.M. – 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

(281) 684-8973

marbryantrmr@ev1.net

PROCEEDINGS

PUBLIC COMMENT:

RAY ANDERSON

2819 GOLDEN LEAF DRIVE

KINGWOOD, TEXAS 77339-1995

(HAND-DELIVERED WRITTEN STATEMENT)

"FEBRUARY 13, 2002

PUBLIC MEETING

NHMCC STUDENT CENTER

SOUTH DINING ROOM

27 W. W. THORNE DRIVE

HOUSTON, TEXAS 77073

SUBJECT: MAJOR INVESTMENT STUDY -- I-45 EXPANSION STUDY.

GENTLEMEN: I WOULD LIKE TO EXPRESS MY OPINION, AND THAT OF A GROWING NUMBER OF CONCERNED CITIZENS REGARDING THE POTENTIAL EXPANSION OF I-45. THE FOLLOWING ARE SERIOUS CONCERNS THAT AFFECT THE QUALITY OF LIFE FOR ALL RESIDENTS OF THE AREA.

DO NOT ACQUIRE ANY ADDITIONAL RIGHT OF WAY BORDERING I-45. KEEP EXISTING NEIGHBORHOODS INTACT AND PRESERVE EXISTING GREEN AREAS FOR THE FUTURE ENJOYMENT OF ALL TEXANS.

INTERSECTION OF HARDY TOLL ROAD AND INTERSTATE 45. AND I'D LIKE TO SEE MAYBE SOME TYPE OF A TRANSPORTATION NODE AT THE INTERSECTION OF HARDY, 45 AND WITH THAT GRAND PARKWAY REALIGNMENT, ALL THREE, JUST SOUTH OF THE WOODLANDS. THAT'S IT. THE REST OF IT LOOKS GOOD.

I LIKE RIDING TRAINS. I CAN HANDLE THAT.

(END OF PUBLIC COMMENTS)

THE STATE OF TEXAS:

COUNTY OF HARRIS:

I, LYNDA MARIE BRYANT, CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF TEXAS, DO HEREBY CERTIFY THAT PROCEEDINGS WERE TAKEN BY ME IN MACHINE SHORTHAND AND LATER TRANSCRIBED FROM MACHINE SHORTHAND TO TYPEWRITTEN FORM BY ME.

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GIVEN UNDER MY HAND AND SEAL OF OFFICE ON THIS, THE 25TH DAY OF FEBRUARY, 2002.

Lynda Marie Bryant

LYNDA MARIE BRYANT, RPR, RMR

CSR NO. 2756

EXPIRATION: 12/31/03

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

281-684-8973

METROMOBILITY 2025 PLAN HEARING

WEDNESDAY, FEBRUARY 13, 2002

NORTH HARRIS COMMUNITY COLLEGE

STUDENT CENTER -- SOUTH DINING HALL

HOUSTON, TEXAS

4:30 P.M. – 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

(281) 684-8973

marbryantrmr@ev1.net

PROCEEDINGS

PUBLIC COMMENT:

RAY ANDERSON

2819 GOLDEN LEAF DRIVE

KINGWOOD, TEXAS 77339-1995

(HAND-DELIVERED WRITTEN STATEMENT)

"FEBRUARY 13, 2002

PUBLIC MEETING

NHMCC STUDENT CENTER

SOUTH DINING ROOM

27 W. W. THORNE DRIVE

HOUSTON, TEXAS 77073

SUBJECT: MAJOR INVESTMENT STUDY -- I-45 EXPANSION STUDY.

GENTLEMEN: I WOULD LIKE TO EXPRESS MY OPINION, AND THAT OF A GROWING NUMBER OF CONCERNED CITIZENS REGARDING THE POTENTIAL EXPANSION OF I-45. THE FOLLOWING ARE SERIOUS CONCERNS THAT AFFECT THE QUALITY OF LIFE FOR ALL RESIDENTS OF THE AREA.

DO NOT ACQUIRE ANY ADDITIONAL RIGHT OF WAY BORDERING I-45. KEEP EXISTING NEIGHBORHOODS INTACT AND PRESERVE EXISTING GREEN AREAS FOR THE FUTURE ENJOYMENT OF ALL TEXANS.

ADDITIONAL CONCRETE ROADWAYS LESSEN THE ABILITY OF THE SOIL TO ABSORB RAINFALL THAT CAUSES DOWNSTREAM FLOODING.

CONSIDER RAPID TRANSIT (RAIL) TO MOVE PEOPLE RATHER THAN FREEWAYS.

REDUCE CURRENT FREEWAY NOISE USING "SOUNDWALLS" TO MUFFLE TRAFFIC SOUNDS THAT DISTURB NEIGHBORHOODS.

RE-ENGINEER DANGEROUS "OFF AND ON" RAMPS AND INTERSECTIONS.

PROVIDE ADDITIONAL AUTOMATED SIGNAGE TO ALERT DRIVERS TO ENABLE THEM TO ESCAPE TRAFFIC CONGESTION.

THANK YOU FOR ALLOWING MY VIEWS TO BE HEARD.

SINCERELY,

RAY ANDERSON"

MR. CHRIS MCCALL

742 MERRIMAC RIDGE

SPRING, TEXAS 77373

>> MR. MCCALL: IN THE DOWNTOWN AREA, THE CONNECTIONS AROUND UH-DOWNTOWN AND NORTH MAIN, I'M SUPPORTIVE OF THOSE CONNECTIONS. I'M SUPPORTIVE OF EXTENDING THE LIGHT RAIL INTO THE NEAR NORTH SIDE NEIGHBORHOOD. AND THEN AT THE FURTHER END UP AT THE WOODLANDS AREA, I'D LIKE TO SEE A REALIGNMENT CHANGE WITH THE GRAND PARKWAY AT THE

INTERSECTION OF HARDY TOLL ROAD AND INTERSTATE 45. AND I'D LIKE TO SEE MAYBE SOME TYPE OF A TRANSPORTATION NODE AT THE INTERSECTION OF HARDY, 45 AND WITH THAT GRAND PARKWAY REALIGNMENT, ALL THREE, JUST SOUTH OF THE WOODLANDS. THAT'S IT. THE REST OF IT LOOKS GOOD.

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WEDNESDAY, FEBRUARY 6, 2002

NORTHLINE MALL COMMUNITY ROOM

ROOM 316

HOUSTON, TEXAS

4:30 P.M. – 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

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PROCEEDINGS

PUBLIC COMMENT:

MR. JOSH CARMONA

2815 GREENRIDGE

HOUSTON, TEXAS 77057

>> MR. CARMONA: THEY SOUND LIKE GOOD IDEAS, BUT THEY SEEM LIKE REALLY COSTLY, YOU KNOW. SO WHATEVER ONE IS CHOSEN PROBABLY WILL HAVE TO BE LIKE ECONOMICAL, BUT -- THIS IS STUFF YOU GUYS ALREADY KNOW -- ECONOMICAL BUT MAKES SENSE TO THE PEOPLE I GUESS -- THAT SUITS EVERYBODY AND ALL NEIGHBORHOODS.

I GUESS JUST THE MAIN CONCERN AS FAR AS THE BIG HIGHWAYS, AND I GUESS TO GET THE PEOPLE FROM DOWNTOWN TO THE AIRPORT -- RIGHT, THAT'S ONE OF THE CONCERNS, DOWNTOWN TO THE AIRPORT -- JUST TO MAKE IT -- KIND OF MAKE IT LIKE IN NEW YORK LIKE HOW YOU CATCH SUBWAYS, BUT DO THAT FOR LIKE THE LIGHT RAIL OR WHATEVER. YOU HAVE TO CATCH THAT 9 TO THE 7 AND THE Q. TO WHATEVER. I GUESS THAT'S REALLY IT. I DON'T KNOW. I'M USED TO ANSWERING QUESTIONS.

MR. JOHN A. BRANCH

4430 CASTOR

HOUSTON, TEXAS 77022

>> MR. BRANCH: I WOULD JUST LIKE TO SEE SOMETHING THAT'S GOING TO GO THROUGH AND PICK UP LOCAL TRAFFIC FROM TOWN TO, SAY, AIRLINE AND 45. WHEREAS ANYTHING GOING STRAIGHT UP WILL ONLY BENEFIT THOSE THAT STAY OUT TOWARDS THE WOODLANDS OR 1960, AND IT'S GOING TO BE SHOOTING CLOSE TO MY NEIGHBORHOOD; BUT, YOU KNOW, IT'S NOT GOING TO SERVE ME ANY PURPOSE. SO I WANTED TO SEE SOMETHING ON AIRLINE OR THE 45 CORRIDOR THAT WILL ACTUALLY SERVICE THE LOCAL PEOPLE WITHIN THAT AREA BECAUSE OTHERWISE THERE IS NO USE TO ME UNLESS I MOVE OUT TO THE WOODLANDS. THAT'S PRETTY MUCH IT.

THAT'S WHAT I WOULD LIKE LOOKED AT, AND I'M FROM THE SUPER NEIGHBORHOOD 13. I'M THE VICE-PRESIDENT OF IT, AND THAT DISCUSSION WAS RAISED YESTERDAY IN OUR MEETING, AND THAT'S WHAT WE WANT. IF IT'S NOT GOING TO SERVICE US, WE COULD CARE LESS ABOUT IT ESPECIALLY SINCE WE'RE -- WE GOT A LOT OF NEIGHBORHOODS AND THAT WOULD BE A LARGER RIDERSHIP, AND RATHER THAN SERVICE ONE GROUP OF PEOPLE, SERVICE THE ENTIRE CITY COMPARED TO ONLY SERVICING ONE GROUP OF PEOPLE.

TO ME, THAT'S DISCRIMINATION TO A CERTAIN EXTENT, YOU ONLY SERVICE ONE PEOPLE AND CUT OUT THOSE IN BETWEEN BECAUSE THEY DID THAT WITH THE COUNTY FOUR-LANE AWHILE BACK. IT WAS EVERYTHING NORTH, BUT IT CAME THROUGH OUR NEIGHBORHOOD AND 45, AND FINALLY WE GOT AN EXIT PUT IN, AND IT'S BEING SERVICED VERY WELL AND UTILIZED VERY

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AND OTHER SPECTACULAR SIGNAGE. NO. 4, LET'S SEE, THE RECOMMENDED LIGHT RAIL CORRIDOR IS IRVINGTON/FULTON, TO BRING MUCH NEEDED SERVICES AND UPGRADES TO THE NORTH SIDE AS WELL AS ECONOMIC REDEVELOPMENT. NO. 5 IS COMMUTER RAIL DOWN HARDY SHOULD BE SENSITIVE TO THE NEEDS OF THE RYAN RESIDENTIAL COMMUNITY INSIDE THE LOOP. AND THEN LAST, ANY MASS TRANSIT PLAN SHOULD CONSIDER THE ADDITION OF LATERAL TRANSPORTATION LINES SUCH AS TROLLEYS TO MAKE ACCESS TO THE ROUTES EASIER. AND THAT'S IT REALLY. I JUST DON'T WANT TO LOSE MY HOME.

MR. DAVE JONES

9501 WEST SAM HOUSTON PARKWAY

SUITE 511

HOUSTON, TEXAS 77099

>> MR. JONES: THE INNOVATIONS IN TODAY'S TECHNOLOGY HAS LAUNCHED THE EVOLUTION INTO TODAY'S ALTERNATIVE TRANSPORT. THE FIELD OF HUMAN TRANSPORTS BRINGS ABOUT SOLUTIONS TO MANY OF OUR SOCIETY'S PROBLEMS: CONGESTED HIGHWAYS AND STREETS, AIR POLLUTION, COSTLY HIGHWAY AND STREET AND MAINTENANCE, LOW PUBLIC TRANSPORTATION USAGE, TO NAME A FEW.

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ASTP HIGHWAYS AND STREETS ARE CURRENTLY BEING BUILT BY CITY OF HOUSTON, TXDOT AND OTHER ORGANIZATIONS. A TRANSPORTATION MANAGEMENT SYSTEM NEEDS TO BE DEVELOPED TO EXAMINE ASTP BENEFITS AND THE SOLUTIONS THEY CAN BRING TO MANY OF OUR TRANSPORTATION PROBLEMS: ZERO PERCENT EMISSIONS, CONGESTED HIGHWAYS AND STREETS, HIGHER PUBLIC TRANSPORTATION USAGE, NEW JOBS, NEW BUSINESSES.

MR. JIM WOOTEN

9235 EDGEBROOK

HOUSTON, TEXAS 77075

>> MR. WOOTON: ALL RIGHT, WHAT WE'RE TRYING TO DISCUSS HERE IS THAT WE MOVE HOUSES, ACTUALLY HOUSES YOU KNOW LIKE 30 FEET WIDE, YOU KNOW, 15, 18, 20 FEET TALL. OKAY, SO THEREFORE WE NEED A ROUTE. WITH THIS EXTENSION OF THE HARDY TOLL ROAD, THIS IS PROBABLY GOING TO CAP OFF HARDY STREET LIKE THE HARDY TOLL ROAD -- THERE IS NOT ANYPLACE TO GET ACROSS THE HARDY TOLL ROAD BETWEEN 525 AND 610. WELL, WE CARRY A LOT OF HOUSES UNDER 610 THAT'S 22 FEET. WE COME OUT OF TOWN. WE ARE PROBABLY ABOUT 200 HOUSES A YEAR IN THE INDUSTRY OUT OF HOUSTON OUT HARDY STREET. AND IF THEY BLOCK IN THE FEEDER LANES LIKE THEY HAVE

ON OUT PAST, YOU KNOW, PAST 610, YOU KNOW, YOUR FEEDER LANES ARE CUT DOWN TO LIKE TWO LANES, 24 FEET WIDE, YOU'RE UNABLE TO MOVE HOUSES THEN. SO THAT'S WHAT WE'RE JUST TRYING TO MAKE SURE THAT WE DON'T GET CUT OFF COMPLETELY FROM THE MOVING ROUTE. SO THAT'S BASICALLY WHAT -- THAT'S OUR CONSIDERATION IS WHAT WE'D LIKE TO GET INTO.

AND I'VE GOT TWO OTHER MOVERS HERE TONIGHT ALSO. THEY WOULD PROBABLY LIKE TO PUT SOME INPUT IN ALSO. THAT'S BASICALLY WHAT I'VE GOT. WE JUST DON'T WANT TO BE SHUT OFF. WE'D LIKE TO HAVE AN AREA WHERE WE COULD -- WHERE THE FREEWAY WOULD BE, SAY, 22 FEET TALL, SOMETHING LIKE THAT, THE TOLL ROAD OR A BRIDGE ACROSS IT THREE LANES WIDE. THAT WOULD BE A CROSSING OVER THE TOP THREE LANES WIDE WOULD SUFFICE US. IF YOU JUST WENT AS IS AS THE HARDY TOLL ROAD IS NOW ON INTO TOWN, IT WOULD COMPLETELY ISOLATE EVERYTHING. IT WOULD KILL US ON A MOVING ROUTE. I CERTAINLY THANK YOU VERY MUCH.

MR. JAMES A. DRAKE

3621 TROUT

HOUSTON, TEXAS 77093

>> MR. DRAKE: I WOULD LIKE TO HAVE INPUT ON THE DESIGN OF A TRUCK ROUTE THROUGH HOUSTON, NORTH, SOUTH, EAST AND WEST. WE NEED A TRUCK ROUTE WITH 22 FOOT CLEARANCES, AND IF THEY EXTEND THE HARDY TOLL ROAD DOWN TO LESION AND HARDY STREET, THAT IS ONE OF OUR MAJOR

HOUSE MOVING ROUTES IN HOUSTON. WE MOVE APPROXIMATELY 200 HOUSES DOWN THE HARDY AND LESION ROADS BECAUSE THE HARDY STREET OVERPASS AT 610 IS 22 FOOT HIGH. THAT'S OUR MAJOR EXIT GETTING OUT OF HOUSTON GOING NORTH. AND IF THEY EXTEND THE HARDY TOLL ROAD DOWN INTO TOWN, THAT'S GOING TO AFFECT US BEING ABLE TO GET UNDERNEATH THE 610 OVERPASSES, 610 LOOP. AND WE NEED SOME INPUT BECAUSE YOU'RE GETTING READY TO CUT OUR THROATS. AND NOT ONLY IS IT GOING TO AFFECT THE HOUSE MOVING INDUSTRY, BUT THE HEAVY HAULERS THAT'S MOVING OVERSIZED AND OVERWIDTH LOADS THROUGH HOUSTON. AND BEING THIS IS A PORT CITY, WE NEED A TRUCK ROUTE.

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EXPIRATION: 12/31/03

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

281-684-8973

METROMOBILITY 2025 PLAN HEARING

WEDNESDAY, FEBRUARY 6, 2002

NORTHLINE MALL COMMUNITY ROOM

ROOM 316

HOUSTON, TEXAS

4:30 P.M. – 7:30 P.M.

OPEN HOUSE – PUBLIC COMMENT FORUM

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

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PROCEEDINGS

PUBLIC COMMENT:

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2815 GREENRIDGE

HOUSTON, TEXAS 77057

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THE STATE OF TEXAS:

COUNTY OF HARRIS:

I, LYNDA MARIE BRYANT, CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF TEXAS, DO HEREBY CERTIFY THAT PROCEEDINGS WERE TAKEN BY ME IN MACHINE SHORTHAND AND LATER TRANSCRIBED FROM MACHINE SHORTHAND TO TYPEWRITTEN FORM BY ME.

I FURTHER CERTIFY THAT THE ABOVE AND FOREGOING TRANSCRIPTION, AS SET FORTH IN TYPEWRITING, IS A FULL, TRUE AND CORRECT TRANSCRIPT OF THE PROCEEDINGS.

GIVEN UNDER MY HAND AND SEAL OF OFFICE ON THIS, THE 25TH DAY OF FEBRUARY, 2002.

Lynda Marie Bryant

LYNDA MARIE BRYANT, RPR, RMR

CSR NO. 2756

EXPIRATION: 12/31/03

THE CAPTIONING COMPANY

P. O. BOX 441179

HOUSTON, TEXAS 77244-1179

281-684-8973

North Hardy
planning studies

On behalf of the

METRO

Texas Department of Transportation

Houston-Galveston Area Council

Welcome

to the

Public Scoping Meeting

for the

North-Hardy Planning Studies

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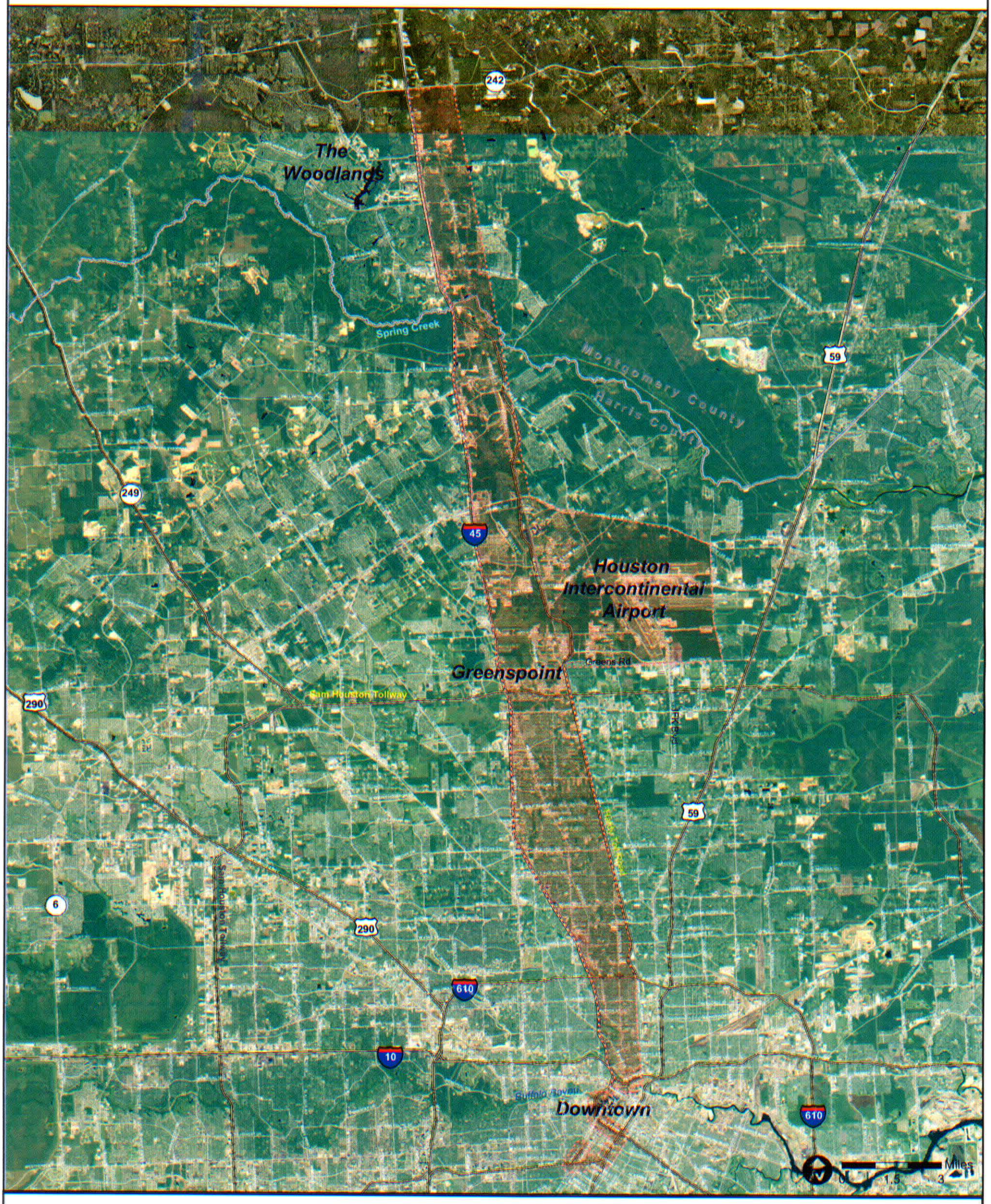
Where Do You Live & Work?



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Boundaries of the Studies

The Woodlands

Spring Creek

Montgomery County

Harris County

Houston Intercontinental Airport

Greenspoint

Greens Rd

Sam Houston Tollway

Hardy Toll Road

FK Blvd

Buffalo Bayou

Downtown

242 45 59 290 6 610 10

Legend

- Planning Studies
- Alternatives Analysis
- Hardy Toll Rd. Extension

City of Houston 2001 Major Thoroughfare Plan

- Sufficient Width
- To Be Widened
- To Be Acquired
- FWY-Sufficient Width
- FWY-To Be Widened
- FWY-To Be Acquired
- Grand Pkwy/Mykawa
- Misc. Road

Source: City of Houston

N

0 2 4 Miles

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Approach & Schedule

WE ARE HERE

Data Gathering

1st Round public meetings ◆ Transportation needs

Winter 2001/2002

Develop Purpose & Need Statement

Spring/ Summer 2002

Analyze Purpose & Need Statement

2nd Round public meetings ◆ Initial alternatives

Summer/ Fall 2002

Analyze Short List of Alternatives

Late 2002/ Early 2003

3rd Round public meetings ◆ Short list of alternatives

30-Day public review & public meeting ◆ Final comments on Locally Preferred Investment Strategy

Locally Preferred Investment Strategy

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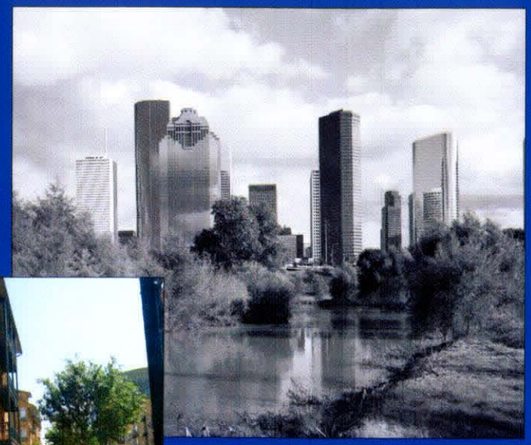
What Are the Main Issues?

One Study Area – Two Planning Studies

Alternatives Analysis - Buffalo Bayou to North of The Woodlands

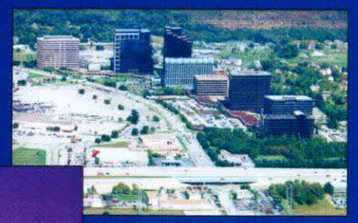
Planning Study - Buffalo Bayou to Spur 527



Numerous Stakeholders to be Involved

Many Major Activity Centers

Business, residential & recreational



Diverse Travel Needs

Long distance commuter

high speeds, few stops

Local traveler

more frequent stops

Environmental & Social Issues

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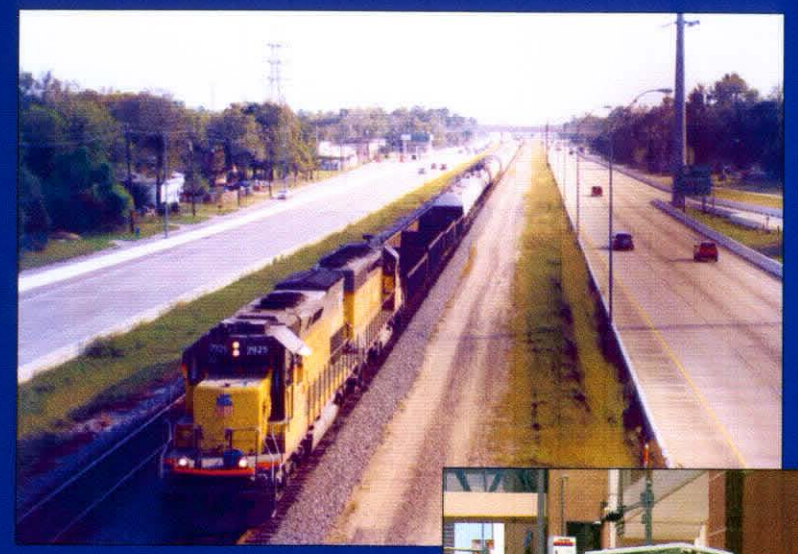
What Are the Main Issues?



Transportation Opportunities

Hardy Toll Road underutilized

Existing grade-separated rail right-of-way

Transportation Deficiencies

I-45 capacity & safety concerns

Lack of continuous major thoroughfares

Right-of-way constraints

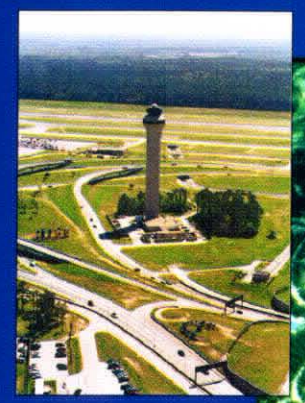
High capacity transit one-way only

Development Issues

Significant population growth projected

Major opportunities for redevelopment

Avoid disruption of neighborhood & historic areas



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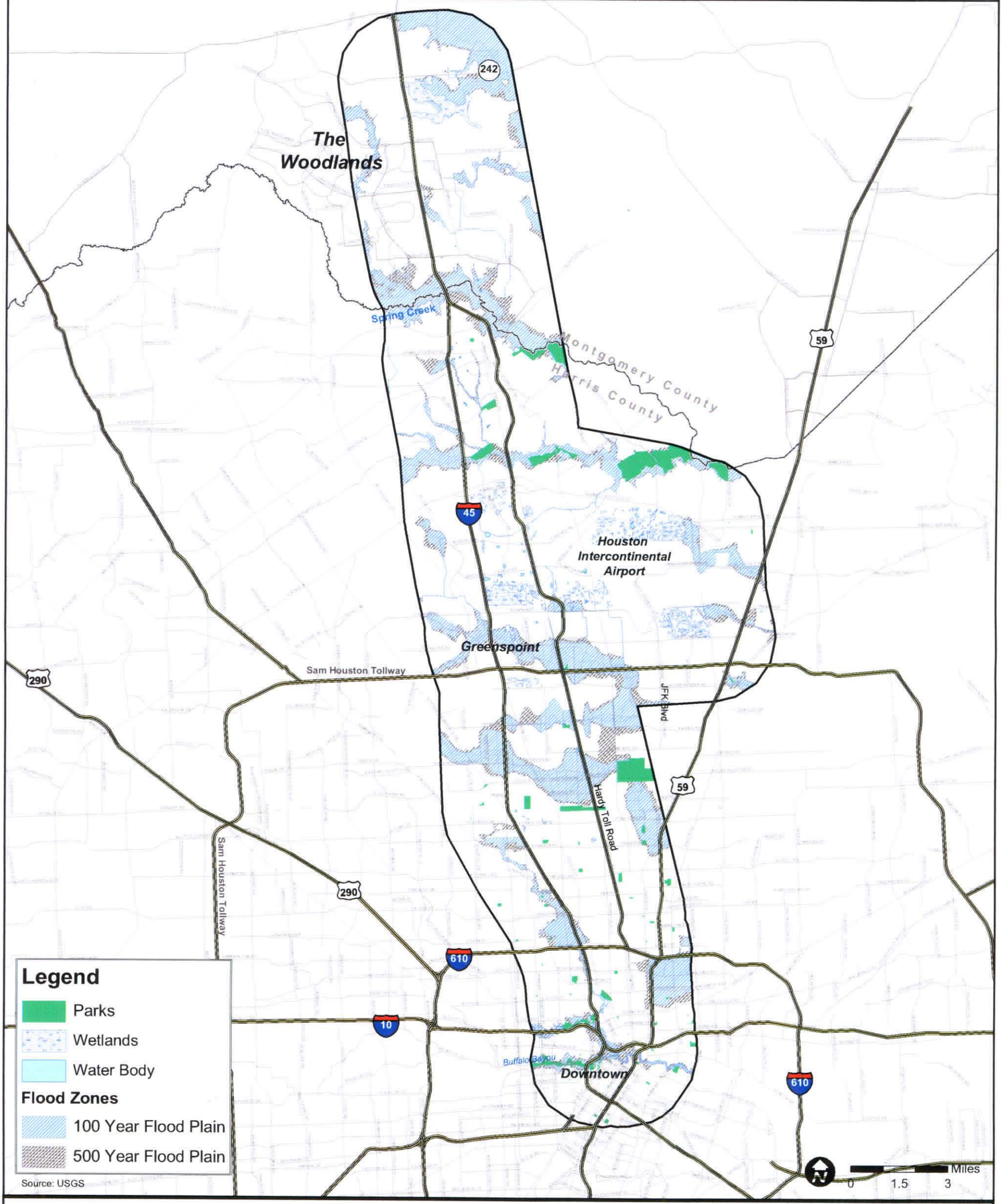
Environmental Conditions



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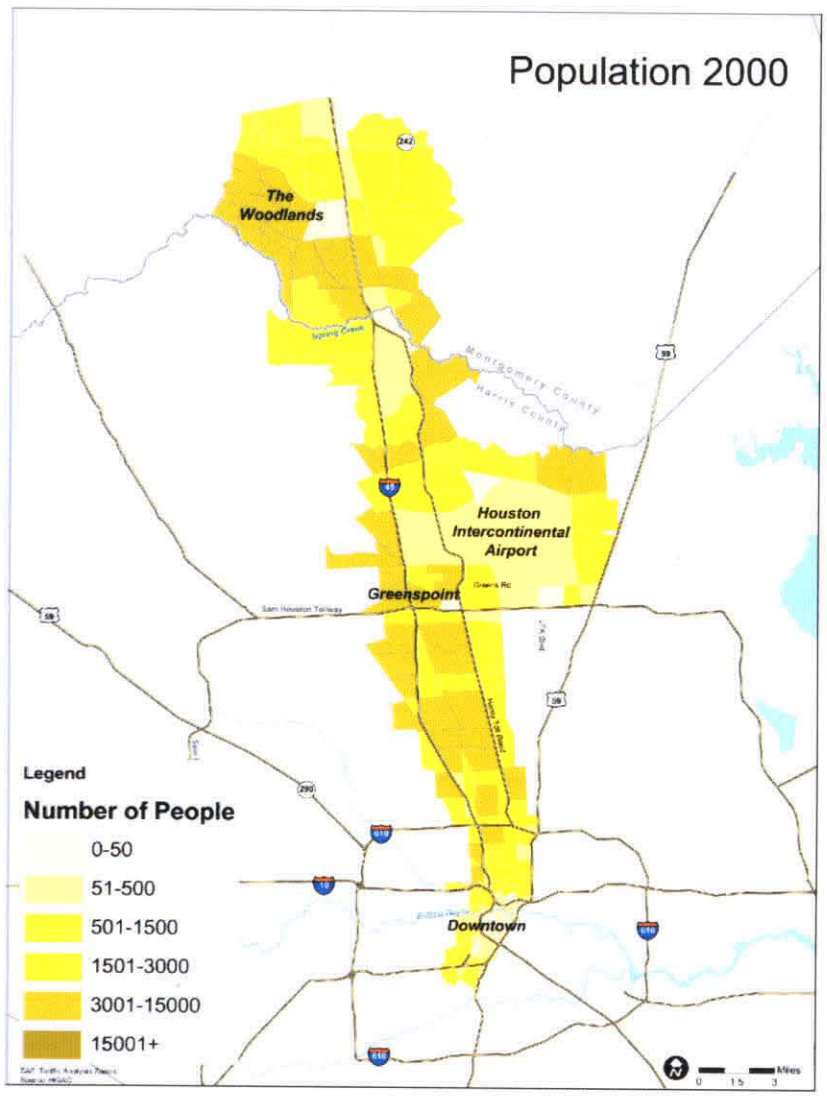
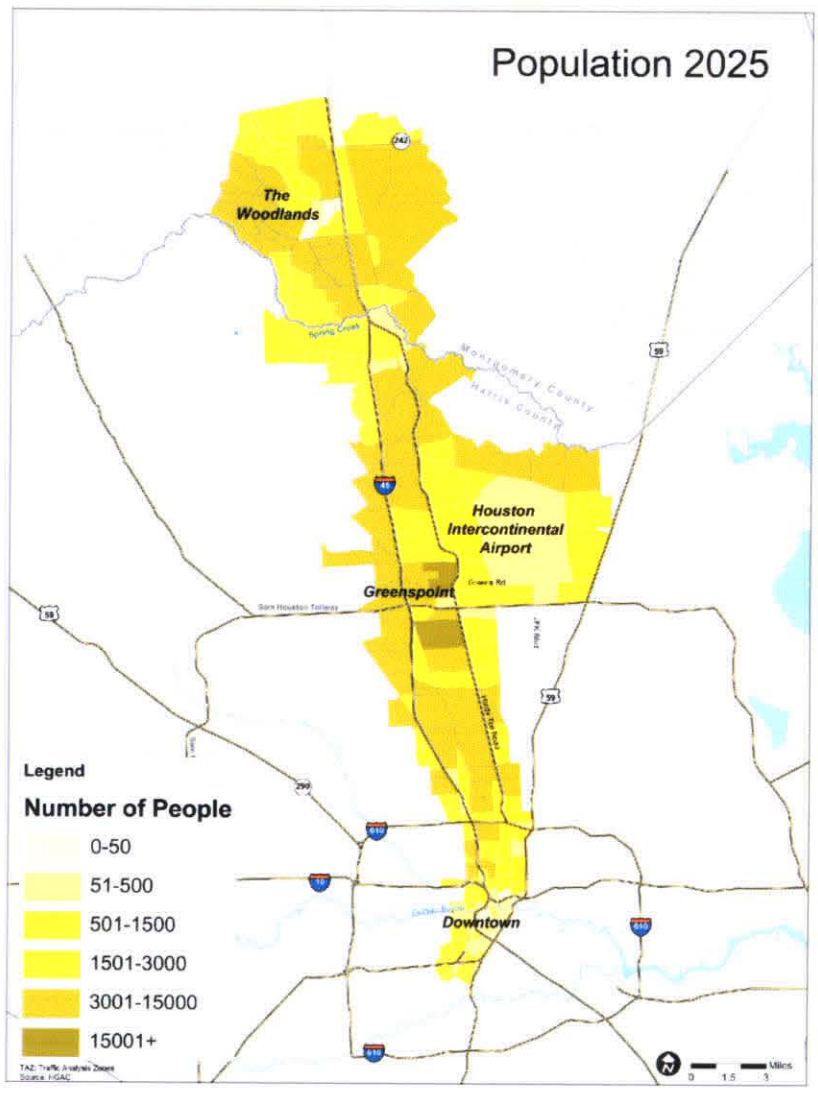
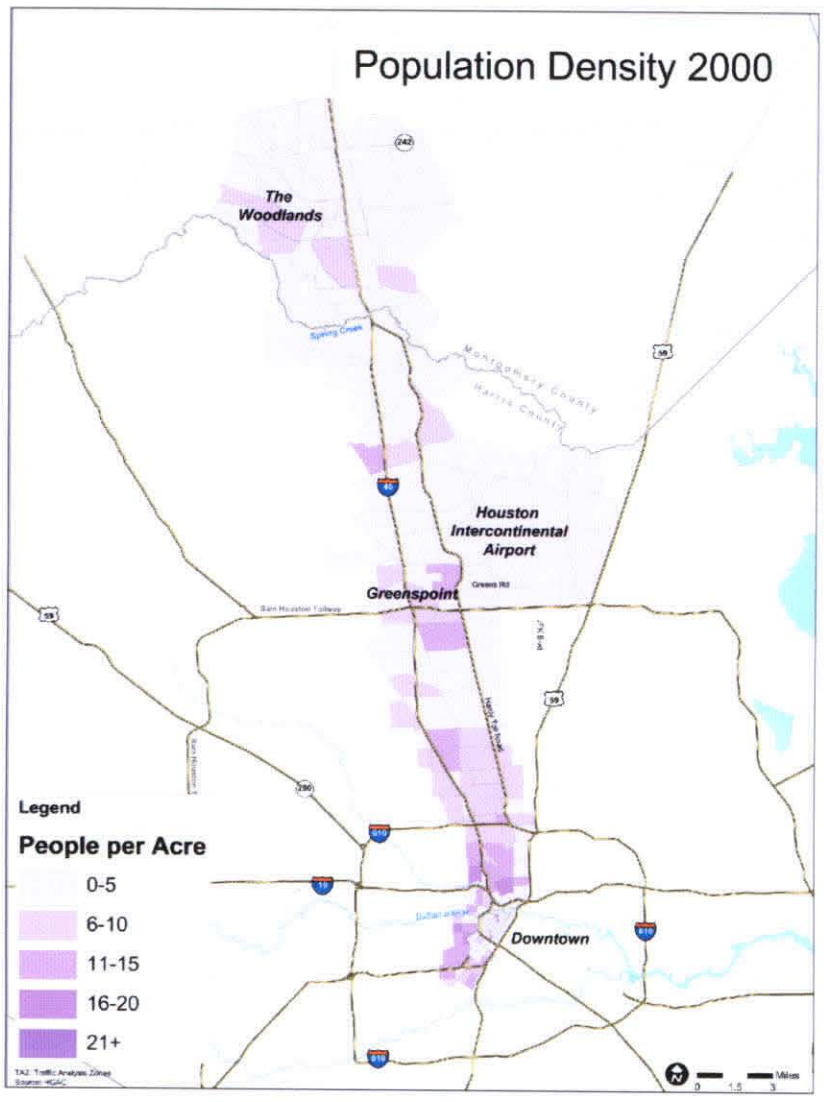
Where Will People Live?

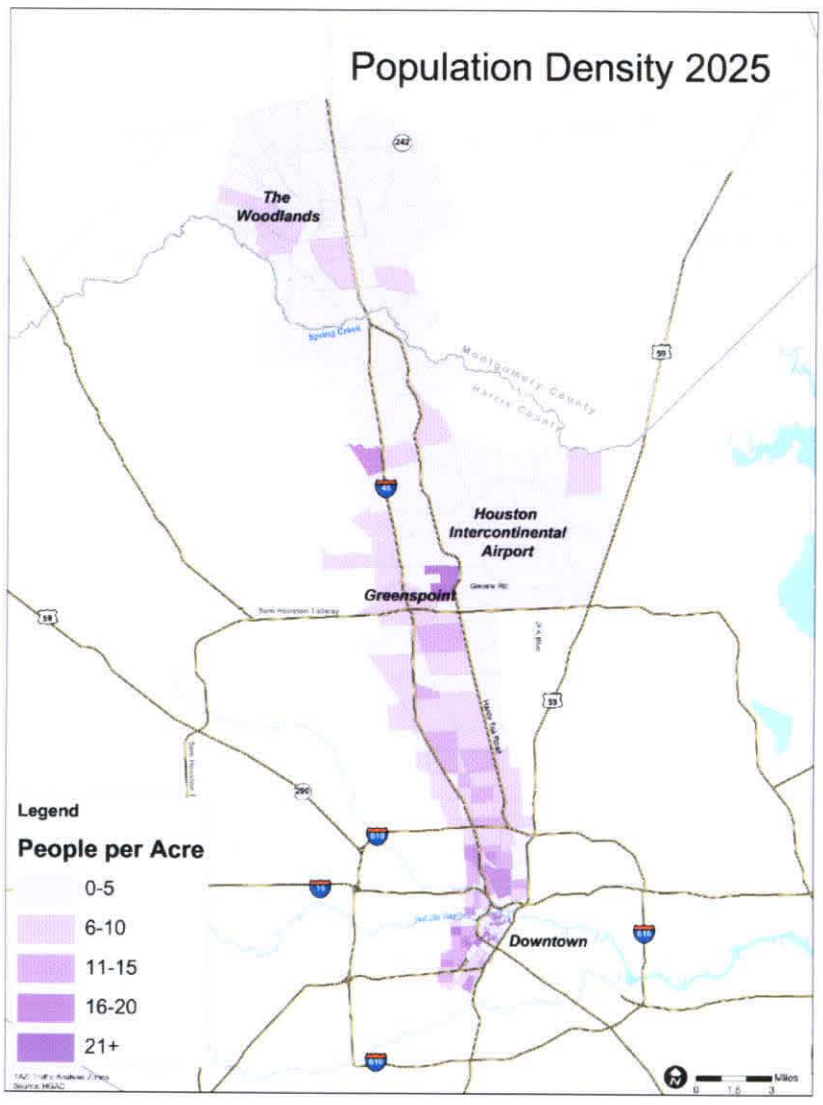




NOW

IN 25 YEARS





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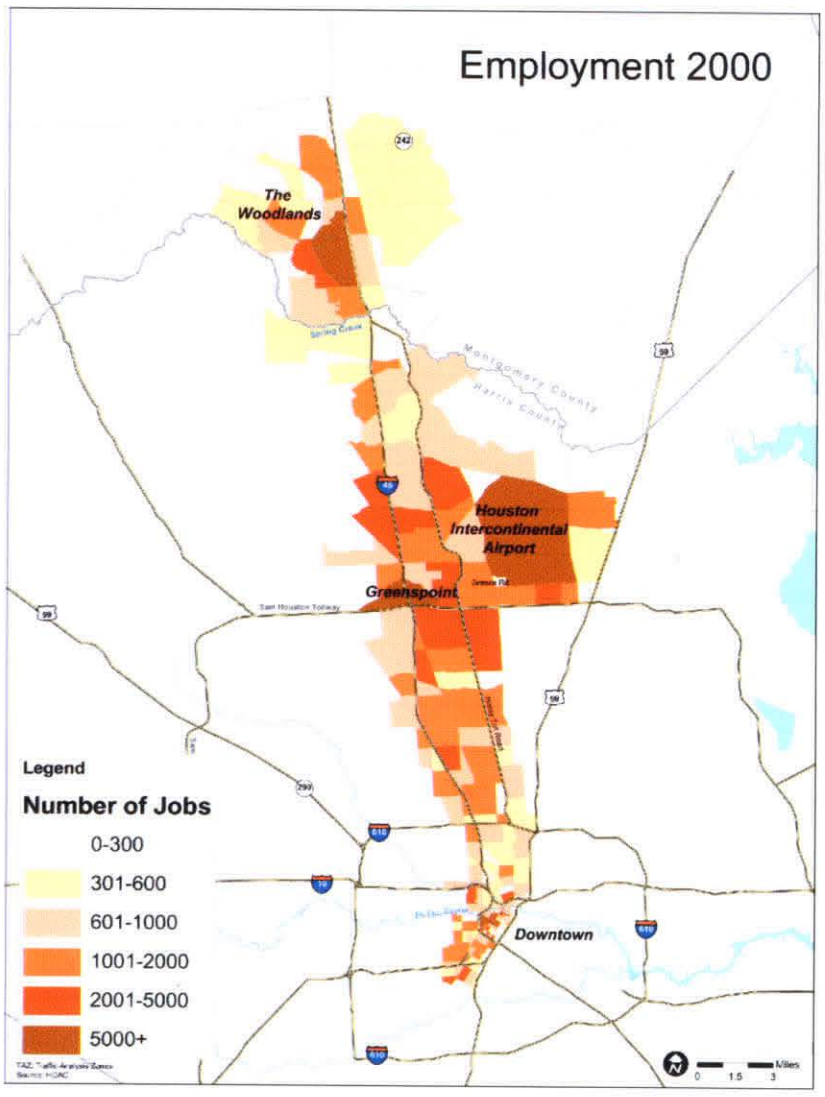
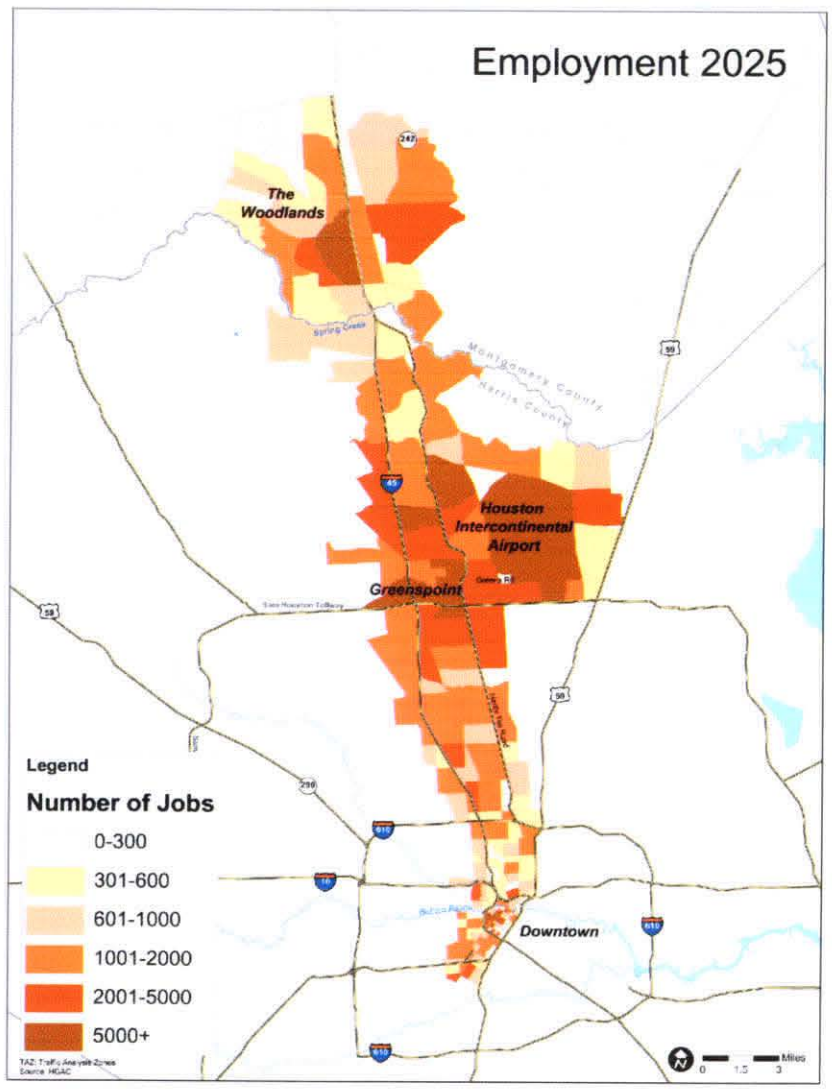
Where Will People Work?





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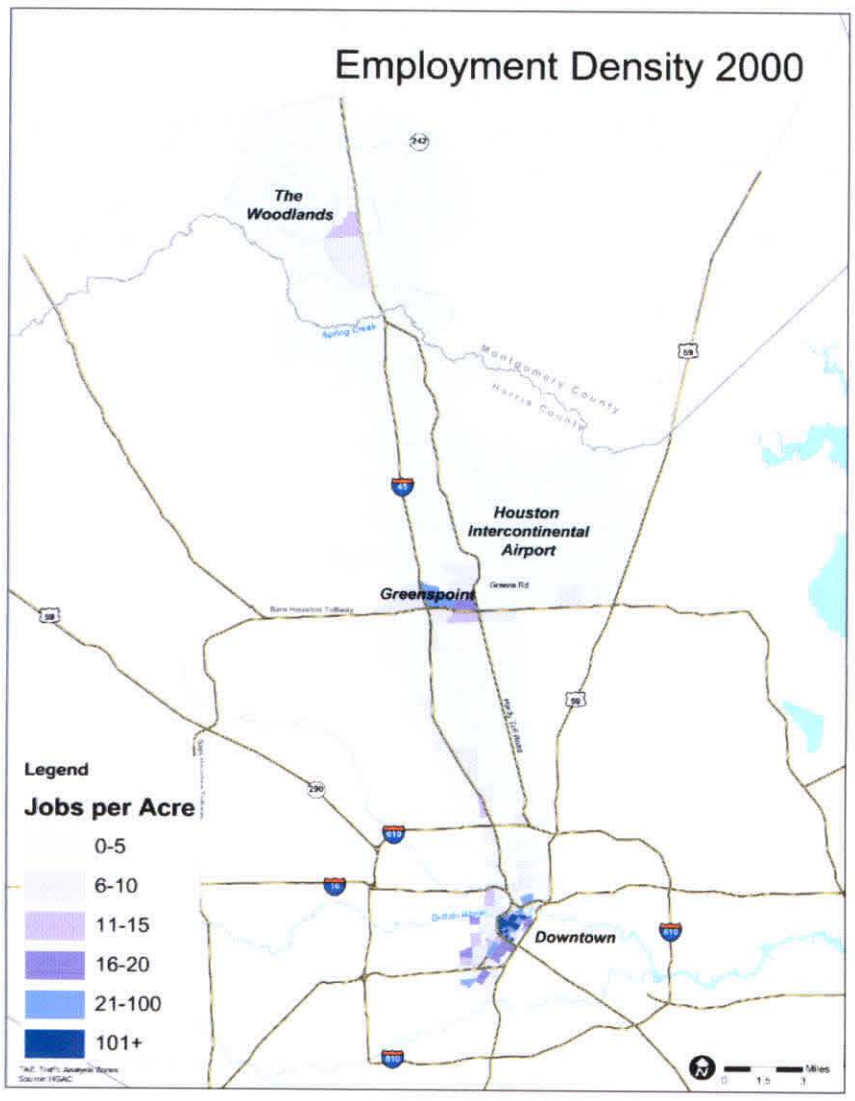

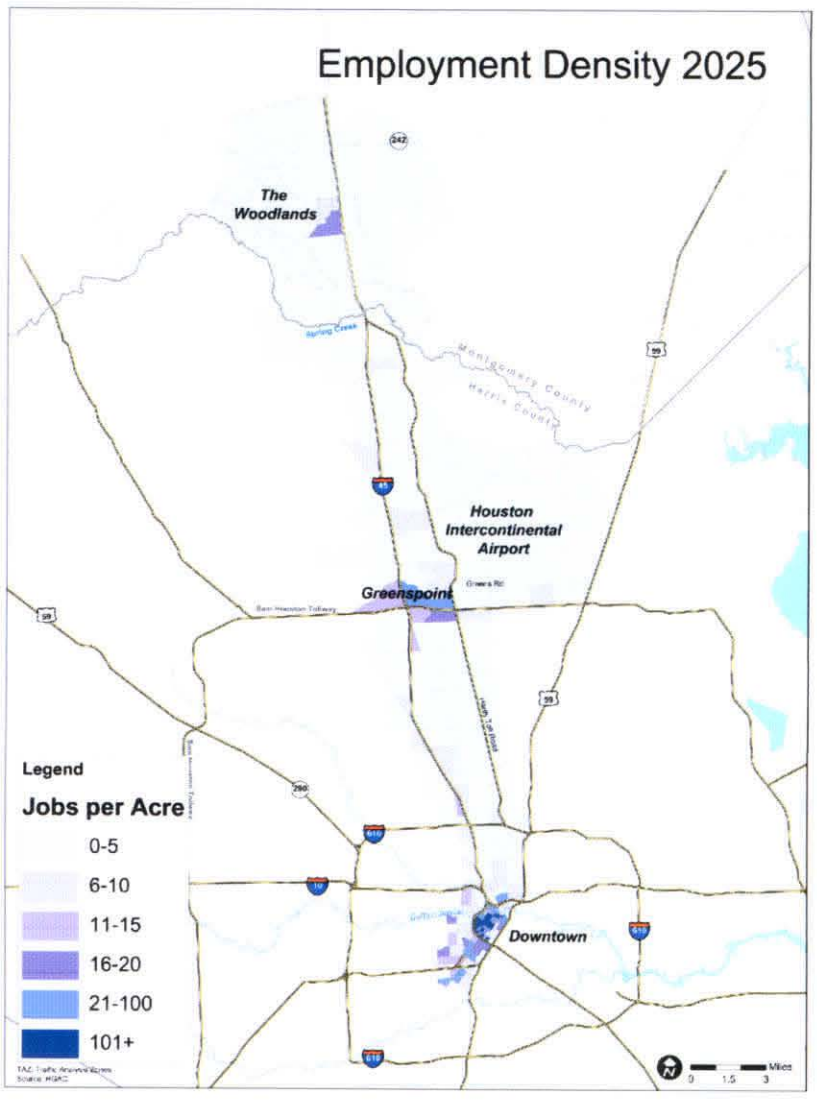

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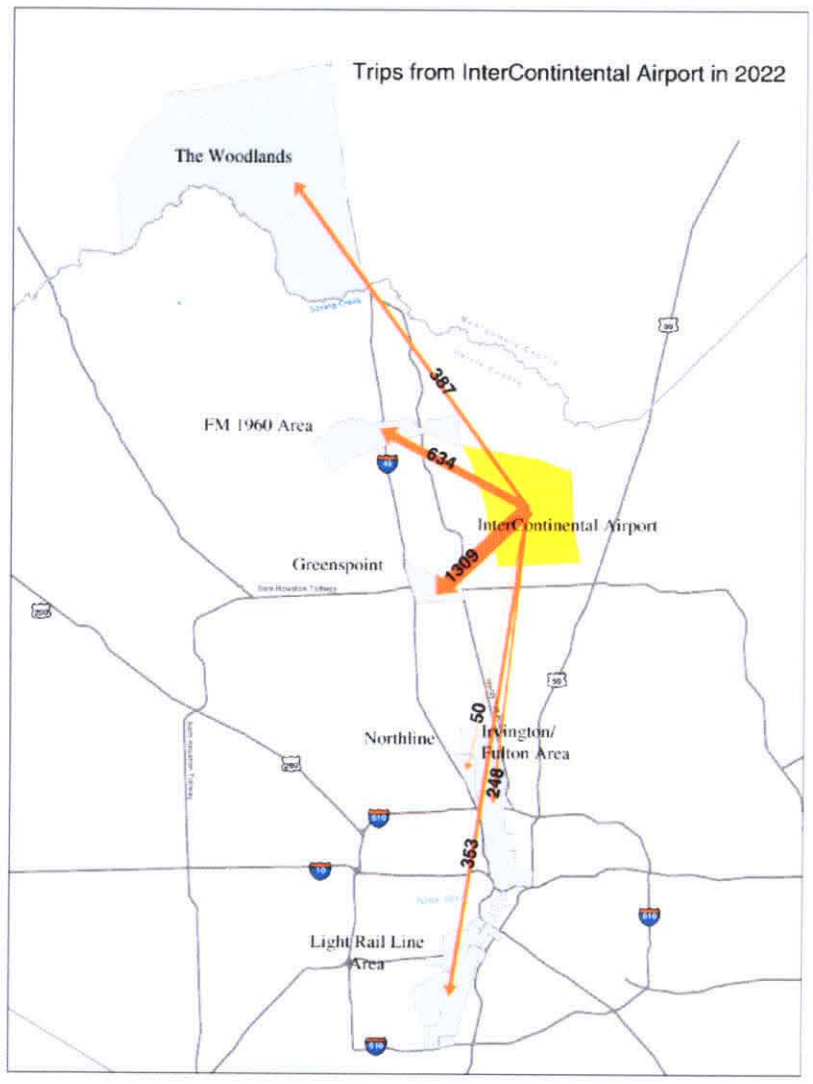
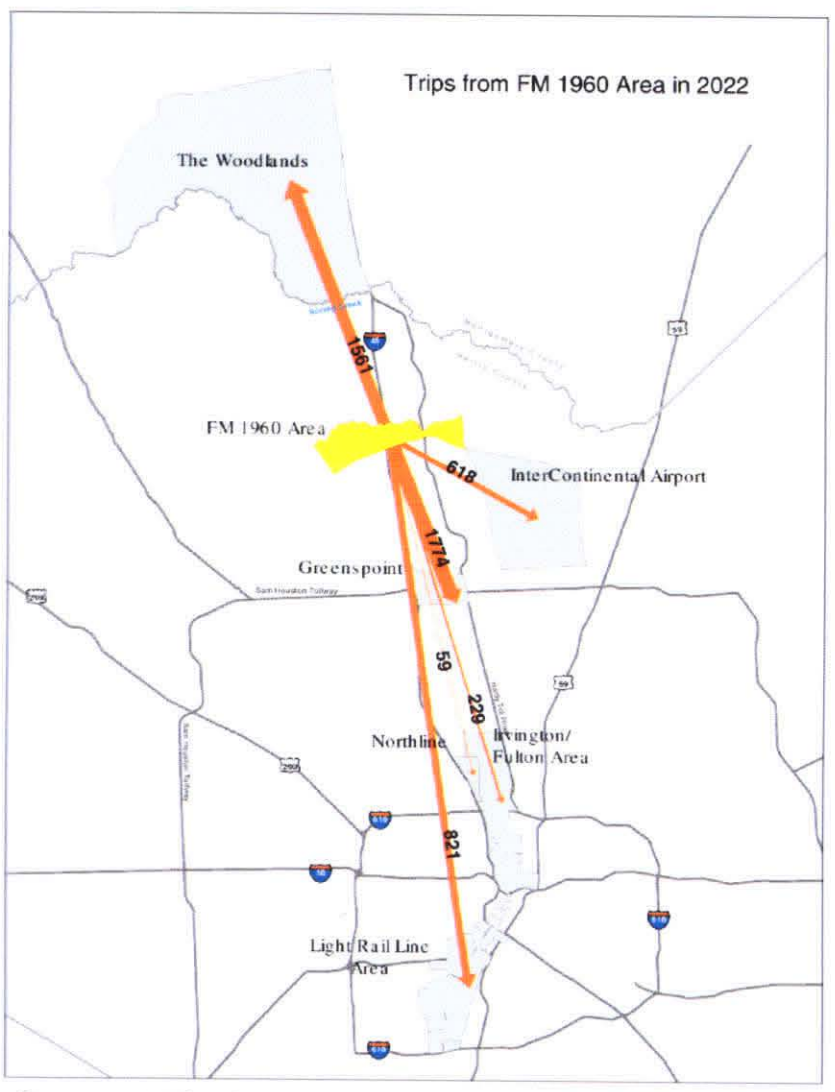
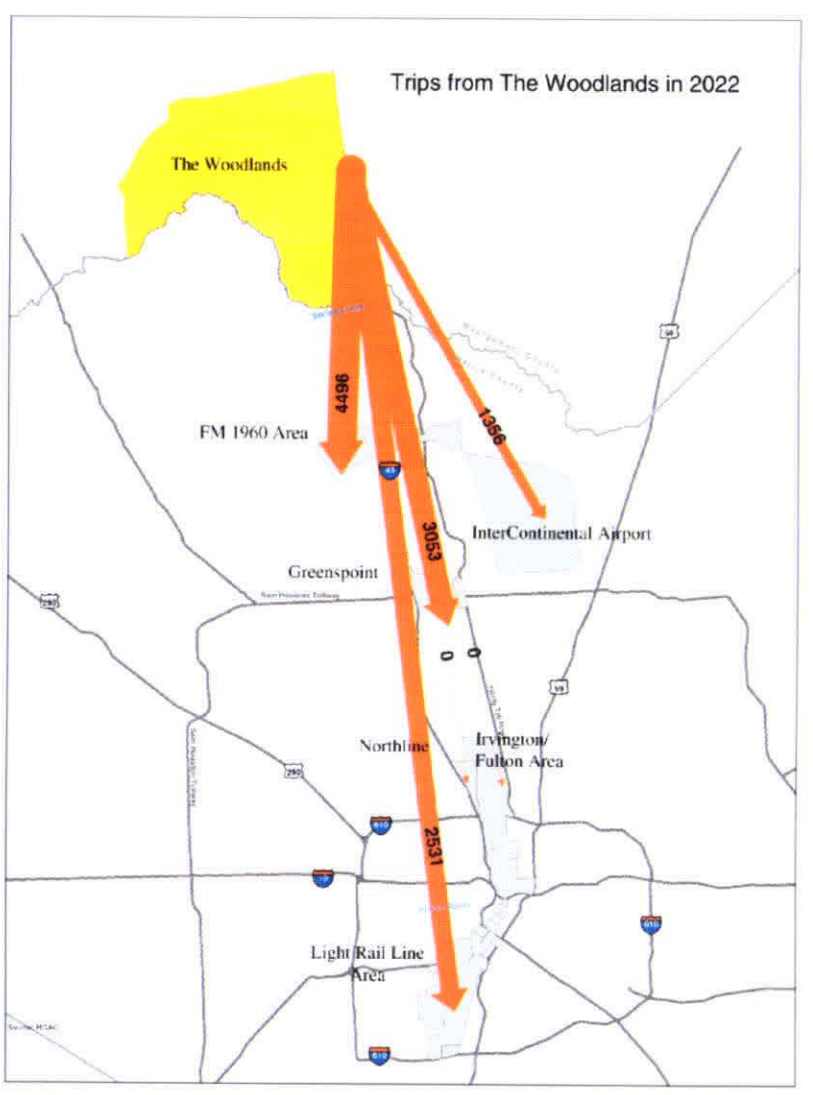
Where Will People Go?







Source: HGAC

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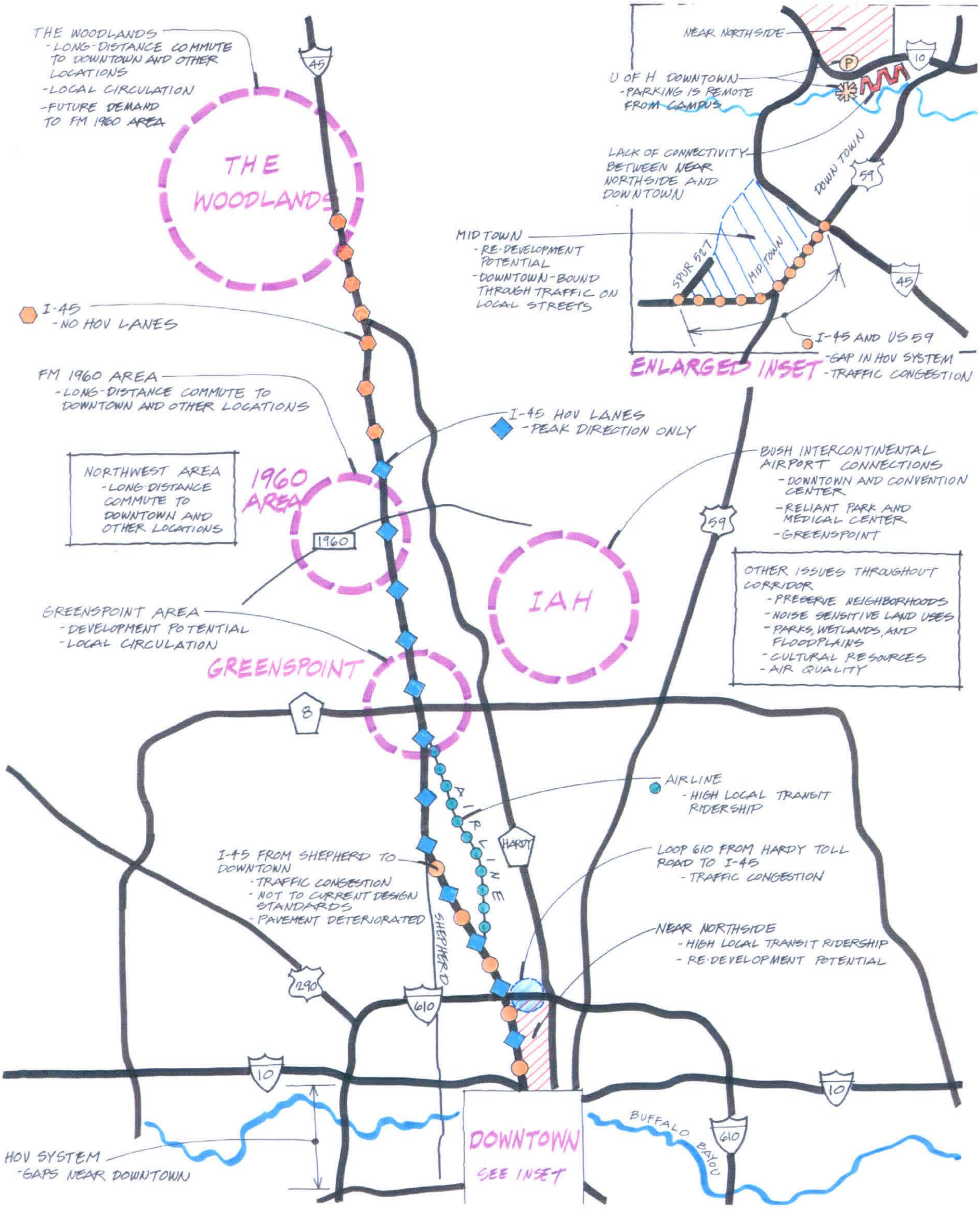
Problems: What We've Heard So Far



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Transit Technologies Being Considered

Light Rail Transit (LRT)

Intermediate-to-high capacity transit operating on tracks. LRT operates on city streets, medians, or dedicated rights-of-way, such as railroads, elevated structures, and tunnels. Light rail vehicles (LRVs) are typically electrically powered from overhead wires and can operate at speeds of up to 65 mph in dedicated rights-of-way. Typically provides frequent service (5-15 minutes during peak hours). Stations include platforms, shelters and other amenities and are spaced as needed (1500 ft. – several miles). Light rail cannot operate simultaneously with freight trains on the same track.

Commuter Rail (CR)

Longer-distance commuter-oriented transit operating on tracks of the general railroad system. CR uses conventional diesel locomotives and passenger cars are similar to intercity trains. It can share tracks with freight trains and typically provides service during peak periods and in the peak direction. Service is less frequent than for light rail and stations are typically spaced further apart. The maximum speed is dependent on track and on freight operations but is typically 60 mph or higher. Stations include platforms and shelters and are usually heavily oriented toward park-&-ride access.

High Occupancy Vehicle (HOV) Bus

HOV lanes provide improved travel speed for transit buses and carpools. HOV lanes are typically constructed on freeways, although they also exist on major arterials. Bus service on HOV lanes operates in mixed-traffic with other "high-occupancy" users, and typically provides frequent service, though oriented toward the peak period and peak direction of travel (especially for a single lane, reversible HOV facility). Stations are constructed in combination with major park-&-ride facilities and are often spaced several miles apart. Bus service operating "express" in the HOV section at maximum speeds between 55 and 65 mph can provide local service at either end of the HOV facility.

Bus Rapid Transit (BRT)

Rubber-tired transit that provides speed and utility associated with rail transit. It operates in exclusive rights-of-way, such as street medians or a separate facility ("busway"), with frequent service and stations spaced as needed. BRT typically uses state-of-the-art buses. It offers improved speed and reliability of an exclusive facility and flexibility to operate on-the-street, like traditional bus service, providing greater service coverage at either end of the service.

People Mover

People mover transit includes automated guideway transit (AGT) and monorail systems most typically used as circulators and shuttles within or connecting major activity centers (i.e. airports). Capacity and speed is lower than other rail systems (40 mph max. speed). They require an exclusive, fully separated guideway consisting of elevated structures or tunnels. In most cases, they are fully automated and provide very frequent service. They are electrically powered and usually have stations spaced at 1500 ft or more.

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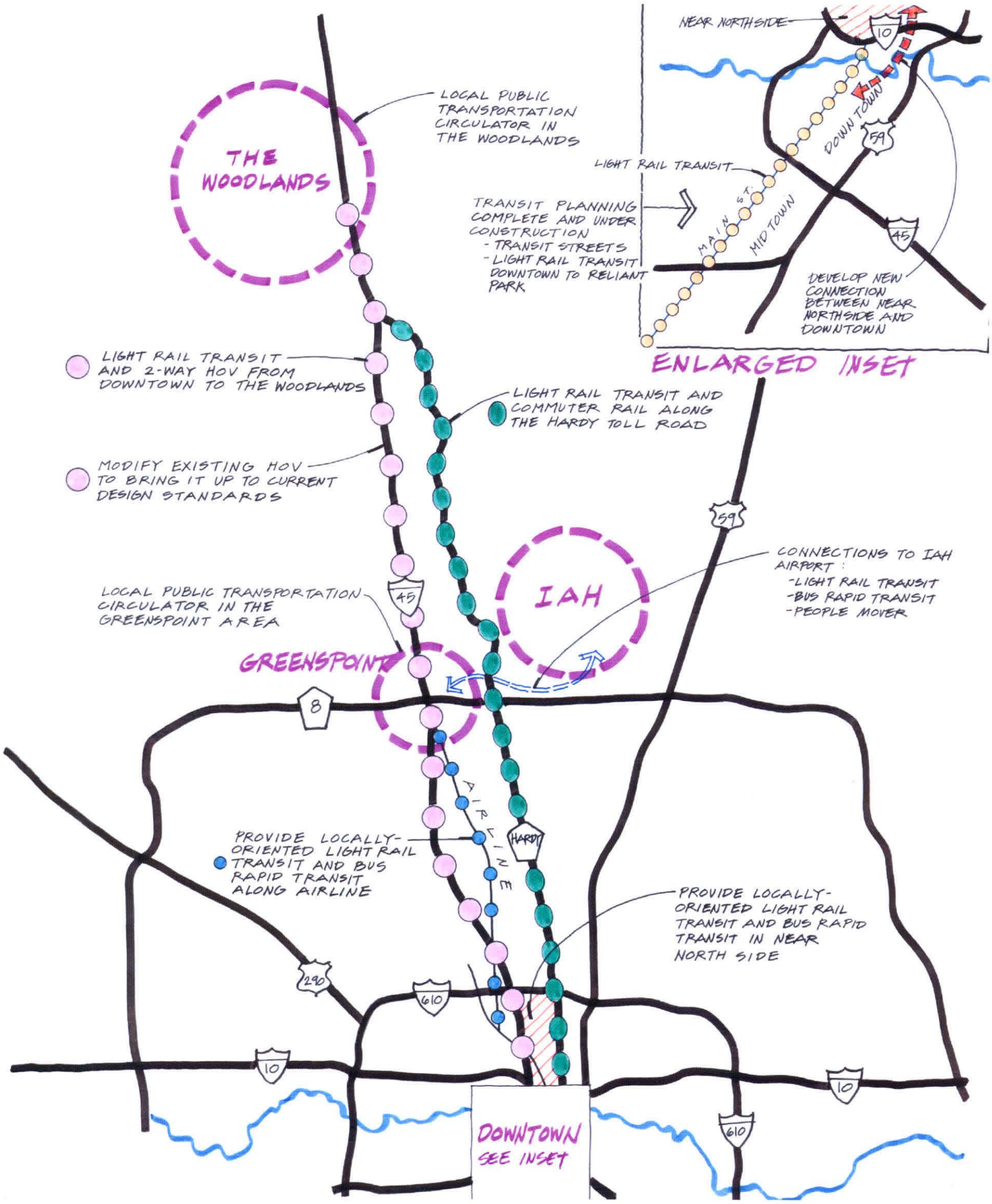
Transit Ideas: What We've Heard So Far



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Highway Ideas: What We've Heard So Far

THE WOODLANDS

PLANNING FOR ADDED CAPACITY COMPLETE AND UNDER CONSTRUCTION

CONNECT I-45 AND U.S. 59 HOV LANES

CREATE A DIRECT CONNECTION BETWEEN SPUR 527 AND I-45

ADD HIGHWAY CAPACITY TO I-45

ADD CAPACITY AND IMPROVE INTERCHANGES ON LOOP 610

PLANNED EXTENSION BY HARRIS COUNTY TOLL ROAD AUTHORITY

ADD CAPACITY TO U.S. 59

ENLARGED INSET

DOWNTOWN SEE INSET

10 59 45 8 HARDY 290 610 SPUR 527 BUFFALO BAYOU

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What Are the Next Steps?

- We will:
  - Gather and compile public input
  - Develop alternative solutions
  - Hold public meetings to review alternatives Spring/Summer 2002.
- Please fill out a questionnaire
- Do we have your mailing address?
- For more information:
  - See a study team member
  - Go to www.north-hardy.org

Thank you for taking the time to attend this meeting and for providing us with your ideas!

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