

UPTOWN TRAFFIC IMPACT ANALYSIS

This memorandum summarizes the results of the traffic analysis conducted to evaluate the traffic operations of the intersections along Post Oak Boulevard within Uptown Houston in the Year 2018 and Year 2035. The study limits are Richmond Avenue on the south and IH 610 southbound frontage road on the north. The vicinity map of the study area is presented in Figure 1.

The study was conducted with an objective of analyzing the traffic operations under Year 2018 and Year 2035 traffic conditions and developing measures to mitigate the impact of the increased traffic along the roadways that would be generated by planned residential and commercial developments in the core area of Uptown Houston.

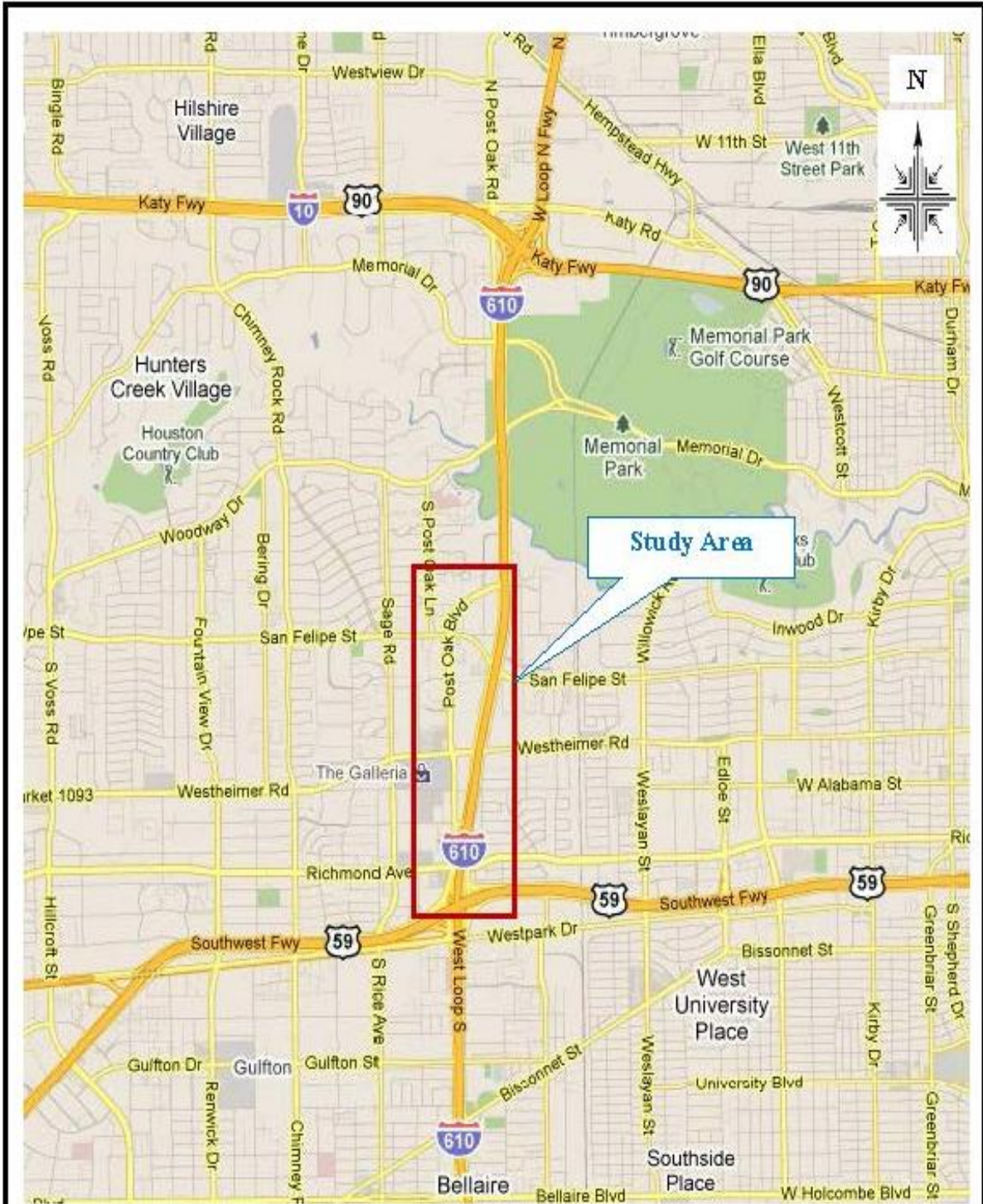
Background


Several commercial and residential establishments are proposed to be developed in the Uptown area. By Year 2018, it is anticipated that 12.7 million square feet of office space and 4.8 million square feet of retail space will be developed in Uptown Houston along the Post Oak Boulevard corridor. By Year 2035, 17.8 million square feet of office space and 5.04 million square feet of retail space will be developed. Additionally, 6,100 units of multi-family residential development and over 6,700 hotel rooms will be developed by 2018, and by 2035, 9,425 units of multi-family residential development and around 8,300 hotel rooms will be developed. The future development information is included in Attachment A of this report.

Existing Conditions

The land use in the study area is a mix of residential and commercial developments. The Post Oak Boulevard corridor from IH 610 on the north to Richmond Avenue on the south constitutes the core area of Uptown Houston. Regional access to the study area is provided by US 59 and IH 610. Westheimer Road, San Felipe Street, and Richmond Avenue are the major thoroughfares providing direct access to the study area.

Figure 1



 <p>GUNDA CORPORATION <i>Engineers, Planners & Managers</i></p>	<p>PROJECT NAME:</p> <p>UPTOWN ADVANCED PLANNING STUDIES</p> <p>UPTOWN TRAFFIC ANALYSIS</p>	<p>SHEET TITLE:</p> <p>VICINITY MAP</p>	
		<p>GUNDA PROJ. NO.:</p> <p>11005-04</p>	<p>SHEET NO.:</p> <p>FIGURE 1</p>
		<p>DATE:</p> <p>MAY, 2014</p>	

Traffic Analysis

Intersection Level of Service (LOS) analyses were performed in accordance with the procedures set forth and recommended by the Highway Capacity Manual (HCM) Level of Service methodologies for evaluation of signalized and unsignalized intersections. Traffic analysis software Synchro was used to evaluate the operation of the study intersections. The Level of Service criteria for signalized and unsignalized intersections are listed below in Table 1. LOS 'A' is considered as best, free-flow condition and LOS 'F' is considered failing conditions. LOS 'D' is considered acceptable during the peak hours by most agencies.

LOS	Signalized Intersection	Unsignalized Intersections
	Delay (sec/veh)	Delay (sec/veh)
A	0-10	0-10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

The SYNCHRO network for the Uptown Area has been utilized for conducting traffic analysis. The traffic volume data for the study network was available for the year 2007. Based on the Houston-Galveston Area Council's (H-GAC) traffic demand model networks for years 2009 and 2025, it was determined that the study area will experience an annual growth rate of 0.75%, which was used to project the traffic volumes to Base Year 2011. Based on the comparison of traffic volumes between AM and PM peak hour, it was determined that PM peak hour represents the highest peak hour.

Utilizing the projected traffic volumes, the Year 2011 weekday peak hour levels of service for the study intersections were evaluated. The existing PM peak hour levels of service of the analysis intersections are summarized in Table 2 (following page). As presented in Table 2, some of the study intersections would operate at levels of service E or F.

Traffic Projection Methodology

Based on the H-GAC's travel demand model networks for years 2009, 2025 and 2035, it was determined that the study area will experience an annual growth rate of 0.75%, between 2011 and 2018, and an annual growth rate of 0.5% between 2018 and 2035. At these rates, the study area will experience a growth of 5.25% between 2011 and 2018, and 8.5% between 2018 and 2035.

The proposed development and employment information for Years 2011, 2018 and 2035 was provided by Uptown Houston for the Traffic Analysis Zones (TAZs) within the Uptown core area. Based on the employment data for Uptown, it has been estimated that the traffic volumes in the study area will increase 15% by Year 2018 and 39% by Year 2035.

Study Intersections		LOS	Delay (Sec/Veh)
1	Richmond Ave. at IH 610 NBFR	D	50.3
2	Post Oak Blvd. at Richmond Ave.	E	61.1
3	Post Oak Blvd. at Fairdale Dr. ^{1,2}	B	12.5
4	Post Oak Blvd. at Hidalgo St.	B	18.7
5	Post Oak Blvd. at W. Alabama St.	C	26.3
6	Post Oak Blvd. at Westheimer Rd.	E	76.7
7	Post Oak Blvd. at Locke Ln. ^{1,2}	A	7.0
8	Post Oak Blvd. at Guilford Ct. ^{1,2}	B	13.7
9	Post Oak Blvd. at Ambassador Way	C	22.5
10	Post Oak Blvd. at BLVD Place	C	34.4
11	Post Oak Blvd. at San Felipe St.	E	67.6
12	Post Oak Blvd. at Westbriar Ln. ^{1,2}	A	7.8
13	Post Oak Blvd. at Four Oaks Pl./Garretson Ln.	B	16.7
14	Post Oak Blvd. at Uptown Park Blvd.	C	32.0
15	Post Oak Blvd. at IH 610 SBFR	F	125.2
16	Post Oak Blvd. at IH 610 NBFR	F	144.6
Notes		1 Unsignalized intersection in 2011	
LOS = Level of service		2 Intersection signalized by 2018	

However, based on the employment data from H-GAC for Year 2035, it has been estimated that the traffic volumes in the study area will increase 22% by Year 2035.

After reviewing the employment data from Uptown Houston and H-GAC, the background (No-Build) condition traffic volumes for the analysis intersections were developed by increasing the Year 2011 volumes by 15% for Year 2018 and 22% for Year 2035.

Background Traffic Conditions

Utilizing the projected traffic data for the study intersections, the Year 2018 and Year 2035 background PM peak hour levels of service for the study intersections were calculated. The background PM peak hour levels of service of the analysis intersections are summarized in Table 3. As presented in Table 3, some of the study intersections would be operating at levels of service E or F under Year 2018 traffic conditions and delays would increase under Year 2035 traffic conditions.

Table 3					
Year 2018 & 2035 Background Traffic Conditions					
LOS and Delay - PM Peak Hour					
Study Intersections		Year 2018		Year 2035	
		LOS	Delay (Veh/Sec)	LOS	Delay (Veh/Sec)
1	Richmond Ave. at IH 610 NBFR	E	78.4	F	85.9
2	Post Oak Blvd. at Richmond Ave.	F	98.5	F	118.1
3	Post Oak Blvd. at Fairdale Dr. ^{1,2}	B	14.7	B	16.5
4	Post Oak Blvd. at Hidalgo St.	C	20.3	C	21.4
5	Post Oak Blvd. at W. Alabama St.	D	37.8	D	46.9
6	Post Oak Blvd. at Westheimer Rd.	F	116.3	F	138.5
7	Post Oak Blvd. at Locke Ln. ^{1,2}	A	7.1	A	8.3
8	Post Oak Blvd. at Guilford Ct. ^{1,2}	B	16.8	B	19.7
9	Post Oak Blvd. at Ambassador Way	C	24.3	C	27.1
10	Post Oak Blvd. at BLVD Place	D	39.1	D	42.4
11	Post Oak Blvd. at San Felipe St.	F	96.3	F	109.2
12	Post Oak Blvd. at Westbriar Ln. ^{1,2}	B	11.1	B	12.4
13	Post Oak Blvd. at Four Oaks Pl./Garretson	C	21.0	C	24.3
14	Post Oak Blvd. at Uptown Park Blvd.	D	48.4	E	63.9
15	Post Oak Blvd. at IH 610 SBFR	F	182.6	F	203.7
16	Post Oak Blvd. at IH 610 NBFR	F	189.6	F	216.8
Note s LOS = Level of service					

Alternative Transportation System Improvements

The existing freeways serving the Uptown Houston area are congested. As indicated in the previous section, major intersections in the core Uptown area are operating at unacceptable levels of service. Also, the existing roadway network

will not be able to provide efficient access to the traffic generated by the new developments.

In order to meet the transportation needs in Uptown Houston, Uptown Development Authority is considering various alternative transportation system improvements, such as, widening of Post Oak Boulevard, construction of Bellaire Uptown Transit Center with shuttle buses, and implementation of high capacity transit in Uptown Houston.

Project (Build) Conditions

Uptown Houston, METRO, the City of Houston, and other stakeholders have long recognized the need for high capacity transit within Uptown Houston. Plans for improved transit options in Uptown have been documented by most of the agencies. In addition to proposed transit improvements, the reconstruction of Post Oak Boulevard has been in the City of Houston Capital Improvement Plan (CIP).

Transit Service along Post Oak Boulevard

Traffic analysis was conducted to evaluate the traffic operations along Post Oak Boulevard between Richmond Avenue and IH 610. The transit buses would circulate between Uptown Intermodal Terminal and Northwest Transit Center at five (5) minute headway, which translates to 12 buses entering and exiting the Bellaire Uptown Transit Center every hour.

The ridership estimates indicated that the proposed transit service, by Year 2018, is estimated to attract approximately 2,150 riders during the PM peak hour, out of which 1,200 are oriented towards the north and the remaining 950 are oriented towards the south. By 2035, it is estimated that the proposed transit service will attract approximately 3,120 riders during the PM peak hour, out of which 1,570 are oriented towards the north and the remaining 1,550 are oriented towards the south.

As a result of the operation of the transit service, there will be a reduction in vehicle trips entering and exiting the Uptown core area. In order to estimate the reduction in vehicle trips, a vehicle occupancy rate of 1.25 passengers per car is assumed. By applying this rate to the number of riders, by 2018 the number of reduced vehicle trips is estimated to be 960 in the northbound direction and 760 in the southbound direction during PM peak hour. By 2035, the number of reduced trips is estimated to be 1,256 in the northbound direction and 1,240 in the southbound direction during PM peak hour.

Utilizing future development information provided by Uptown Houston, the origin of transit trips was estimated. It is estimated that the 50% of the transit trips are generated from the Uptown core area between Richmond Avenue and Westheimer Road, 30% generated between Westheimer Road and San Felipe

Street, and the remaining 20% generated from the Traffic Analysis Zones (TAZs) between San Felipe Street and IH 610 southbound frontage road.

Based on the location and size of the developments in each of the TAZs, the vehicle trips were reduced from Year 2018 and Year 2035 traffic turning movements at the appropriate study intersections along Post Oak Boulevard within the Uptown core area.

A comparison of Year 2018 and Year 2035 no build conditions and build conditions PM peak hour delays and levels of service of the analysis intersections is presented in Table 4.

Table 4
Comparison of Year 2018 & Year 2035 No Build and Build Conditions
LOS and Delay - PM Peak Hour

Study Intersections		Year 2018				% Reduction in Delay	Year 2035				% Reduction in Delay
		No Build		Build			No Build		Build		
		LOS	Delay (Veh/Sec)	LOS	Delay (Veh/Sec)		LOS	Delay (Veh/Sec)	LOS	Delay (Veh/Sec)	
1	Richmond Ave. at IH 610 NBFR	E	78.4	E	76.4	3%	F	85.9	F	84.9	1%
2	Post Oak Blvd. at Richmond Ave.	F	98.5	F	90.7	8%	F	118.1	F	99.7	16%
3	Post Oak Blvd. at Fairdale Dr.	B	14.7	B	12.2	17%	B	16.5	B	12.9	22%
4	Post Oak Blvd. at Hidalgo St.	C	20.3	B	19.9	2%	C	21.4	C	20	7%
5	Post Oak Blvd. at W. Alabama St.	D	37.8	C	25.7	32%	D	46.9	D	36.1	23%
6	Post Oak Blvd. at Westheimer Rd.	F	116.3	F	92.5	20%	F	138.5	F	91.4	34%
7	Post Oak Blvd. at Locke Ln.	A	7.1	A	7.1	0%	A	8.3	A	5.5	34%
8	Post Oak Blvd. at Guilford Ct.	B	16.8	B	16.7	1%	B	19.7	B	13.2	33%
9	Post Oak Blvd. at Ambassador Way	C	24.3	C	21.5	12%	C	27.1	C	24.4	10%
10	Post Oak Blvd. at BLVD Place	D	39.1	D	35.2	10%	D	42.4	D	35.1	17%
11	Post Oak Blvd. at San Felipe St.	F	96.3	E	71.1	26%	F	109.2	E	62.1	43%
12	Post Oak Blvd. at Westbriar Ln.	B	11.1	A	5.2	53%	B	12.4	A	5	60%
13	Post Oak Blvd. at Four Oaks Pl.	C	21	C	20.8	1%	C	24.3	C	22.9	6%
14	Post Oak Blvd. at Uptown Park Blvd.	D	48.4	C	30.5	37%	E	63.9	C	31.2	51%
15	Post Oak Blvd. at IH 610 SBFR	F	182.6	F	141	23%	F	203.7	F	106	48%
16	Post Oak Blvd. at IH 610 NBFR	F	189.6	F	162.7	14%	F	216.8	F	177.4	18%

Notes

LOS = Level of service

Travel Time Comparison

In order to evaluate the effectiveness of the transit service, travel times along the anticipated transit service route between Bellaire Uptown Transit Center and Northwest Transit Center were compared for the no-build and build scenarios and summarized in Table 5. As presented in Table 5, there is a reduction in travel time under the build scenario.

Table 5		
Travel Time Comparison		
Segment	PM	
	No Build	Build
Bellaire Uptown Transit Center - Richmond Avenue	5	2
Post Oak Boulevard – Richmond Avenue to IH 610	17	12
Post Oak Boulevard to Northwest Transit Center	11	5
Total	33	19

Findings

Based on the results of the traffic analysis, the following observations have been made:

- The implementation of transit service in the study area resulted in the reduction of intersection delays in Year 2018 and Year 2035, when compared to no-build conditions.
- In the year 2018, the intersections would experience up to 53% reduction in delay following the implementation of transit service.
- In the Year 2035, the intersections would experience up to 60% reduction in delay following the implementation of transit service.
- The travel time would reduce by 42% following the implementation of transit service.

The results of the analyses conducted for both Year 2018 and 2035 traffic conditions indicate that the implementation of transit service would result in the improved traffic operations at the intersections along Post Oak Boulevard within Uptown Houston.