H-GAC Regional Transit Framework Study – Evaluation of potential High Capacity Transit Corridors

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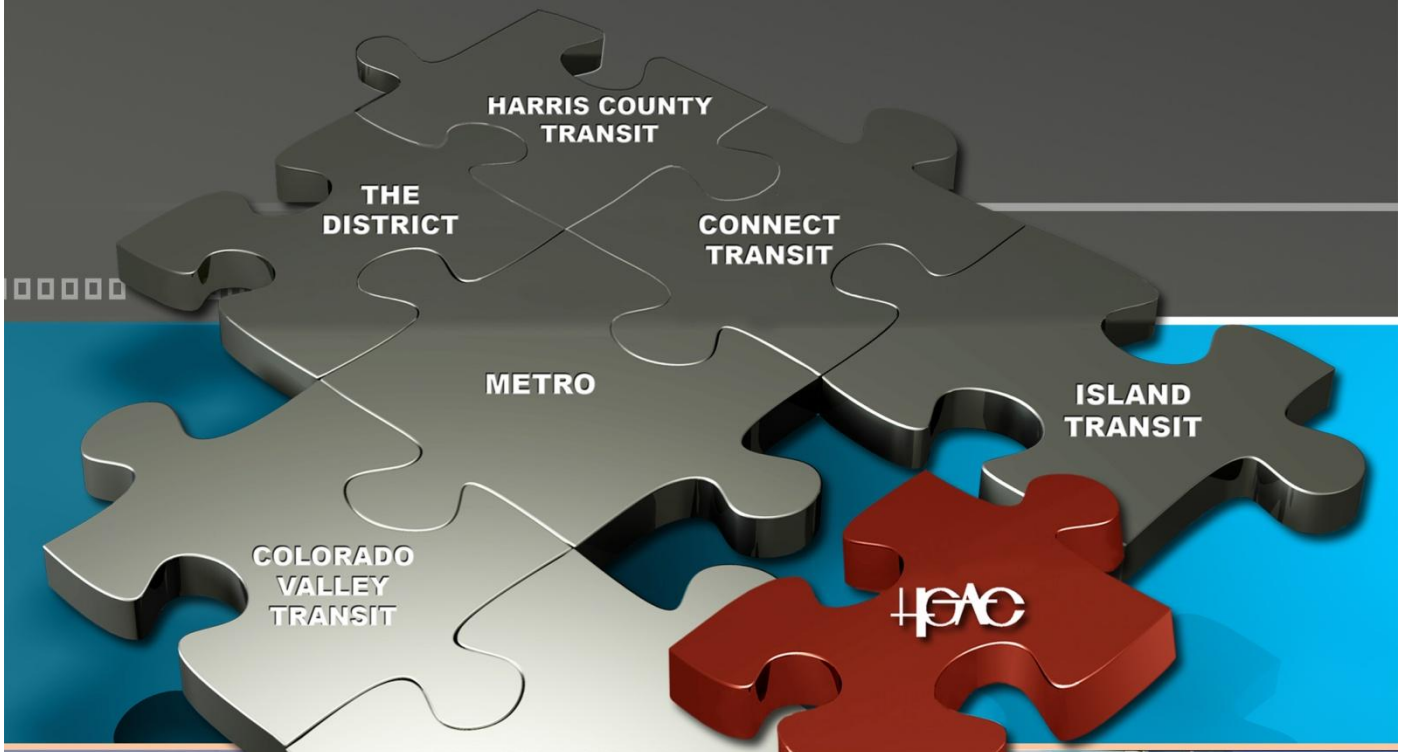

HDR

Regional Transit Framework Study
Evaluation of Potential High Capacity Transit Corridors

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Evaluation of Potential High Capacity Transit Corridors

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1.0 INTRODUCTION

This report includes an evaluation of potential high capacity transit (HCT) corridors to help determine transit investment priorities. An initial screening process was developed to identify corridors with the qualities necessary to support future HCT services. The process included considerations of travel demand, activity centers, population and employment growth, and existing and projected transportation performance (including roadway congestion and transit ridership). The results of the screening process produced 21 potential high capacity transit corridors for further study. This report includes an evaluation of the corridors and provides recommendations for potential HCT investment priorities.

2.0 INITIAL HIGH CAPACITY TRANSIT ANALYSIS CORRIDORS

As outlined in Working Paper #5, *Regional Activity Centers and Potential Transit Corridors*, 21 corridors were identified as potential regional high demand transportation corridors. The corridors are generally defined as areas up to a mile in width that connect activity centers and whose activity levels could potentially support an HCT mode. The initial HCT analysis corridors were identified through available population and employment data, travel demand model results, projected roadway congestion and other data/information.

The connections between activity centers created by the initial HCT analysis corridors should have the potential to attract high ridership and/or significantly increase transit mode share in an existing or planned transportation corridor, thus requiring an HCT mode such as urban light rail, commuter rail, or dedicated guideway bus rapid transit (BRT) to accommodate the potential demand. HCT corridors are intended to serve as the primary arteries for regional transit connections similar to the way in which freeways (high capacity roadways) serve as the region's auto/vehicular arteries.

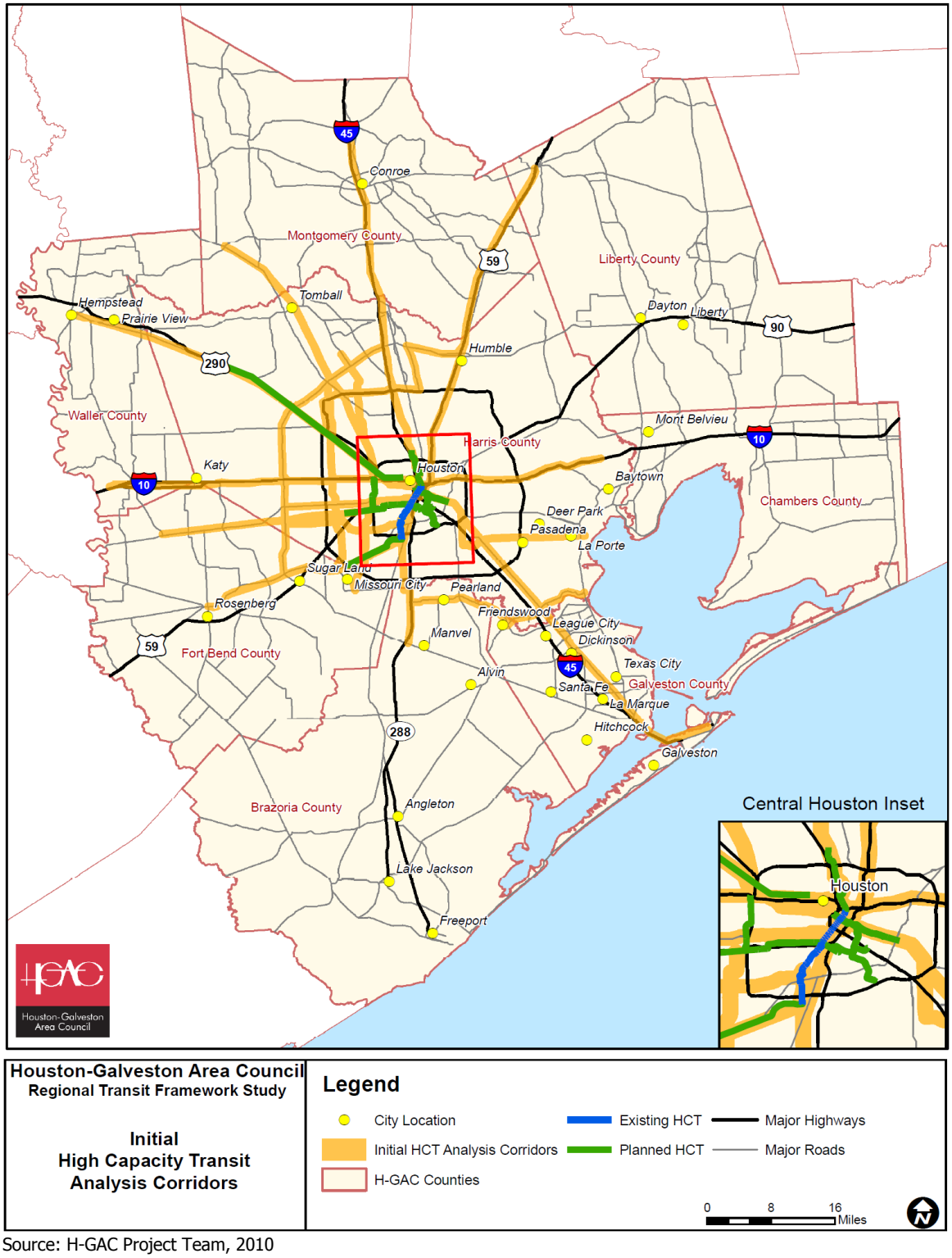
A description of the initial HCT analysis corridors is shown in **Table 1** and depicted in **Figure 1**.

Table 1: Description of the Initial HCT Analysis Corridors

Corridor	General Terminus 1	General Terminus 2
US-59	Downtown Houston	Cleveland (SH-105)
I-45 North	Downtown Houston	Conroe (FM-1097)
SH-249	Downtown Houston	Magnolia (FM-1488)
US-290	Downtown Houston	Hempstead (FM-1488)
FM-1960/SH-6	Cypress Station	Sugar Land (US-90A)
I-10 West	Downtown Houston	East of Waller County (US-90)
Westpark	Near Hillcroft Transit Center	Fulshear (Main St)
US-90A	Texas Medical Center Area	Rosenberg (FM-723)
SH-288	Downtown Houston	Manvel (SH-6)
I-45 South	Downtown Houston	Galveston
I-10 East	Downtown Houston	Baytown
SE Extension	Hobby Airport Area	La Porte via Arpt/Cllg/Spncr
E-W Crosstown (FM-518)	Pearland (SH-288)	Kemah (SH-146)
Uptown Extension (North)	End of Line North	Champions (Cypresswood Dr)
Beltway 8	FM-1960 near Atascocita	Beltway 8 near Hempstead Hwy
Westheimer	SH-6	Downtown Houston
Bellaire	SH-6/Westheimer	Texas Medical Center Area
Gessner	SH-249	US-90A
East End Extension	End of line East End	Hobby Airport Area
Uptown Extension (South)	End of line South End	FM-2234
Inner Katy	Near NW Transit Center	Downtown Houston

Source: H-GAC Project Team, 2010

Figure 1: Initial HCT Analysis Corridors



Source: H-GAC Project Team, 2010

2.1 RELATIONSHIP OF CORRIDORS TO PREVIOUS STUDIES AND PLANS

Many of the initial HCT analysis corridors, in whole or in part, have been identified in previous studies and plans. **Table 2** identifies the initial HCT corridors identified in a previous plan or study.

Table 2: Initial HCT Analysis Corridors Identified in Previous Study or PLan

Corridor	Identified in Previous Study or Plan[1]
US-59	
I-45 North	✓
SH-249	✓
US-290	✓
FM-1960/SH-6	
I-10 West	
Westpark	✓
US-90A	✓
SH-288	✓
I-45 South	✓
I-10 East	
SE Extension	✓
E-W Crosstown (FM-518)	
Uptown Extension (North)	✓
Beltway 8	
Westheimer	
Bellaire	
Gessner	
East End Extension	✓
Uptown Extension (South)	
Inner Katy	✓

Source: H-GAC Project Team, 2010
[1]May include the full corridor or a segment of the corridor

2.2 SUMMARY OF CORRIDOR LEVEL DATA

Quantifiable variables related to existing and future population/employment data, socioeconomic and demographic characteristics, travel demand, and transportation performance were considered during the corridor identification process.

2.2.1 Population and Employment Data

Land use data in the form of population and employment data have been tabulated for 2009 and 2035 for the initial HCT analysis corridors by using a one-half mile wide area on either side of the descriptive transportation facility indentifying the corridor alignment. **Table 3** identifies the projected population and employment for years 2009 and 2035 as well as the projected growth rates. **Table 4** indentifies the population and employment density in each corridor.

The total population/employment and projected population/employment change varies by corridor in part by corridor size. Nonetheless, 6 of 21 corridors are projected to have a population growth of 50 percent or greater, while 3 corridors are projected to grow employment by 50 percent or greater. Two corridors have projected growth of nearly 50 percent or greater for population and employment: I-45 North and SH-288.

Table 3: Population and Employment Change between 2009 and 2035

Corridor	2009 Population	2035 Population	Percent Change	2009 Employment	2035 Employment	Percent Change
US-59	95,112	142,757	50%	203,272	246,943	21%
I-45 North	124,843	183,024	47%	83,813	133,336	59%
SH-249	113,708	152,636	34%	85,534	119,907	40%
US-290	82,910	128,456	55%	112,978	155,837	38%
FM-1960/SH-6	112,473	141,580	26%	46,313	71,666	55%
I-10 West	96,090	122,386	27%	119,198	152,221	28%
Westpark	81,386	103,779	28%	48,747	59,401	22%
US-90A	73,023	99,023	36%	98,994	126,040	27%
SH-288	44,493	73,570	65%	44,388	65,985	49%
I-45 South	142,632	191,544	34%	99,482	142,523	43%
I-10 East	76,260	115,487	51%	137,281	177,591	29%
SE Extension	64,553	82,052	27%	32,075	54,612	70%
E-W Crosstown (FM-518)	58,850	78,550	33%	31,728	39,792	25%
Uptown Extension (North)	90,750	99,140	9%	46,649	60,786	30%
Beltway 8	64,256	101,645	58%	56,621	77,572	37%
Westheimer	144,072	159,199	11%	163,216	186,239	14%
Bellaire	112,686	123,712	10%	85,844	100,179	17%
Gessner	120,460	137,210	14%	72,230	93,517	29%
East End Extension	56,973	62,387	10%	20,099	28,227	40%
Uptown Extension (South)	54,684	61,200	12%	25,682	30,993	21%
Inner Katy	27,581	41,327	50%	146,658	173,126	18%
H-GAC Region	**5,618,528**	**8,683,752**	**55%**	**2,757,548**	**4,069,430**	**48%**

Source: H-GAC, 2010

Table 4: Population and Employment Density – 2009 and 2035

Corridor	2009 Population Density	2035 Population Density	2009 Employment Density	2035 Employment Density
US-59	2,016	3,026	4,309	5,235
I-45 North	2,657	3,895	1,784	2,837
SH-249	2,688	3,608	2,022	2,834
US-290	1,653	2,562	2,253	3,108
FM-1960/SH-6	3,073	3,869	1,266	1,958
I-10 West	2,398	3,054	2,975	3,799
Westpark	3,251	4,145	1,947	2,373
US-90A	2,456	3,330	3,329	4,239
SH-288	2,239	3,703	2,234	3,321
I-45 South	2,757	3,703	1,923	2,755
I-10 East	2,987	4,523	5,377	6,956
SE Extension	3,931	4,996	1,953	3,325
E-W Crosstown (FM-518)	2,311	3,084	1,246	1,562
Uptown Extension (North)	5,162	5,639	2,654	3,458
Beltway 8	2,108	3,334	1,857	2,545
Westheimer	8,416	9,300	9,534	10,879
Bellaire	6,748	7,408	5,140	5,999
Gessner	4,672	5,321	2,801	3,627
East End Extension	8,018	8,780	2,829	3,973
Uptown Extension (South)	4,654	5,209	2,186	2,638
Inner Katy	4,190	6,279	22,282	26,303
H-GAC Region	**640**	**989**	**314**	**464**

Source: H-GAC, 2010

2.2.2 Socioeconomic and Demographic Characteristics

Socioeconomic and demographic characteristics are important to help identify where potential ridership may exist (see transit propensity analysis below) and to help evaluate the equitable impacts of potential regional transit investments. For each of the corridors, variables representing race, age, disability, income, and auto-ownership were identified from the 2000 U.S. Census. These characteristics are summarized in **Table 5**.

Table 5: Socioeconomic and Demographic Data by Corridor

Corridor	Percent Minority	Percent Under Age 15	Percent Over Age 65	Percent Mobility Disabled	Household Income Below $20K	Zero Car Households
US-59	62.4%	23.7%	8.1%	9.5%	32.7%	15.8%
I-45 North	60.4%	23.9%	7.4%	8.1%	25.4%	10.5%
SH-249	52.8%	22.6%	7.5%	6.8%	20.2%	9.1%
US-290	54.8%	23.1%	6.5%	6.7%	21.4%	8.8%
FM-1960/SH-6	44.7%	23.8%	5.8%	5.1%	12.3%	3.5%
I-10 West	42.7%	21.8%	9.1%	5.7%	17.0%	7.6%
Westpark	71.8%	23.7%	4.7%	7.9%	22.2%	9.1%
US-90A	63.0%	23.3%	7.3%	6.3%	20.1%	7.3%
SH-288	55.1%	16.8%	8.8%	6.0%	22.7%	9.4%

Corridor	Percent Minority	Percent Under Age 15	Percent Over Age 65	Percent Mobility Disabled	Household Income Below $20K	Zero Car Households
I-45 South	67.5%	23.8%	7.9%	7.8%	27.5%	12.8%
I-10 East	70.2%	24.6%	7.2%	7.8%	30.7%	14.7%
SE Extension	52.2%	25.4%	8.1%	7.8%	21.4%	7.6%
E-W Crosstown (FM-518)	26.2%	22.2%	8.4%	4.1%	9.9%	3.2%
Uptown Extension (North)	66.8%	24.4%	7.1%	6.6%	20.1%	7.9%
Beltway 8	66.9%	26.7%	4.0%	6.9%	18.6%	7.6%
Westheimer	37.0%	12.9%	8.0%	5.6%	15.9%	7.0%
Bellaire	65.9%	22.4%	8.8%	7.9%	23.6%	9.6%
Gessner	61.2%	22.4%	8.9%	7.4%	19.9%	8.8%
East End Extension	91.6%	28.1%	6.9%	10.0%	35.3%	17.3%
Uptown Extension (South)	58.0%	22.3%	9.3%	6.2%	17.7%	7.6%
Inner Katy	53.7%	13.7%	10.4%	8.4%	24.8%	12.3%
H-GAC Region	**52.0%**	**24.3%**	**7.7%**	**6.7%**	**20.0%**	**7.8%**

Source: U.S. Census Bureau, 2000

Primary observations gleaned from the corridor level socioeconomic and demographic data include:

- Approximately one-fourth of the corridors have high levels of zero car households (at least 10 percent of households or greater have no cars). Of the 21 corridors, 13 are above the H-GAC region average of 7.8 percent.
- In 14 of 21 corridors, 1 out of 5 (or greater) households have an annual income of less than $20,000. Two-thirds of the corridors are above the regional average of 20.0 percent.
- More than 60 percent of the corridors are above the regional average (6.7 percent) for percentage of population with a mobility disability.

Regional Transit Propensity Analysis

Using some of the same socioeconomic data identified in **Table 5**, a transit propensity analysis was completed for the entire 8-county region using historic U.S. Census data (year 2000 census) at the census block group level. The purpose of the propensity analysis is to statistically measure an area's relative ability to potentially support transit service. Year 2000 data helps identify areas of the region, within and outside of the initial HCT analysis corridor boundaries, which may warrant some of level of current or future transit investment regardless of projected growth. Finally, more current U.S. Census data would have been used; however, the most recently available datasets do not contain all of the variables required for a complete propensity analysis.

This analysis relied on attributes that national studies identify as having a relationship to transit patronage. Research that supports the variables selected includes:

- Transit Cooperative Research Program (TCRP) Report 28: Transit Markets of the Future
- TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation

- TCRP Report 27: Building Transit Ridership

The following variables were used for the propensity analysis:

1) Population Density;
2) Percent of Population w/ Mobility Limitations;
3) Percent of Population w/ Employment Disability;
4) Percent of Population that is NOT "White, Non-Hispanic";
5) Percent of Population that is Female;
6) Percent of Households w/ Income under $20,000;
7) Percent of Occupied Housing Units w/o an Auto Available:
8) Percent of Workforce Age 30 or Younger; and
9) Percent of Workforce Age 65 or Older.

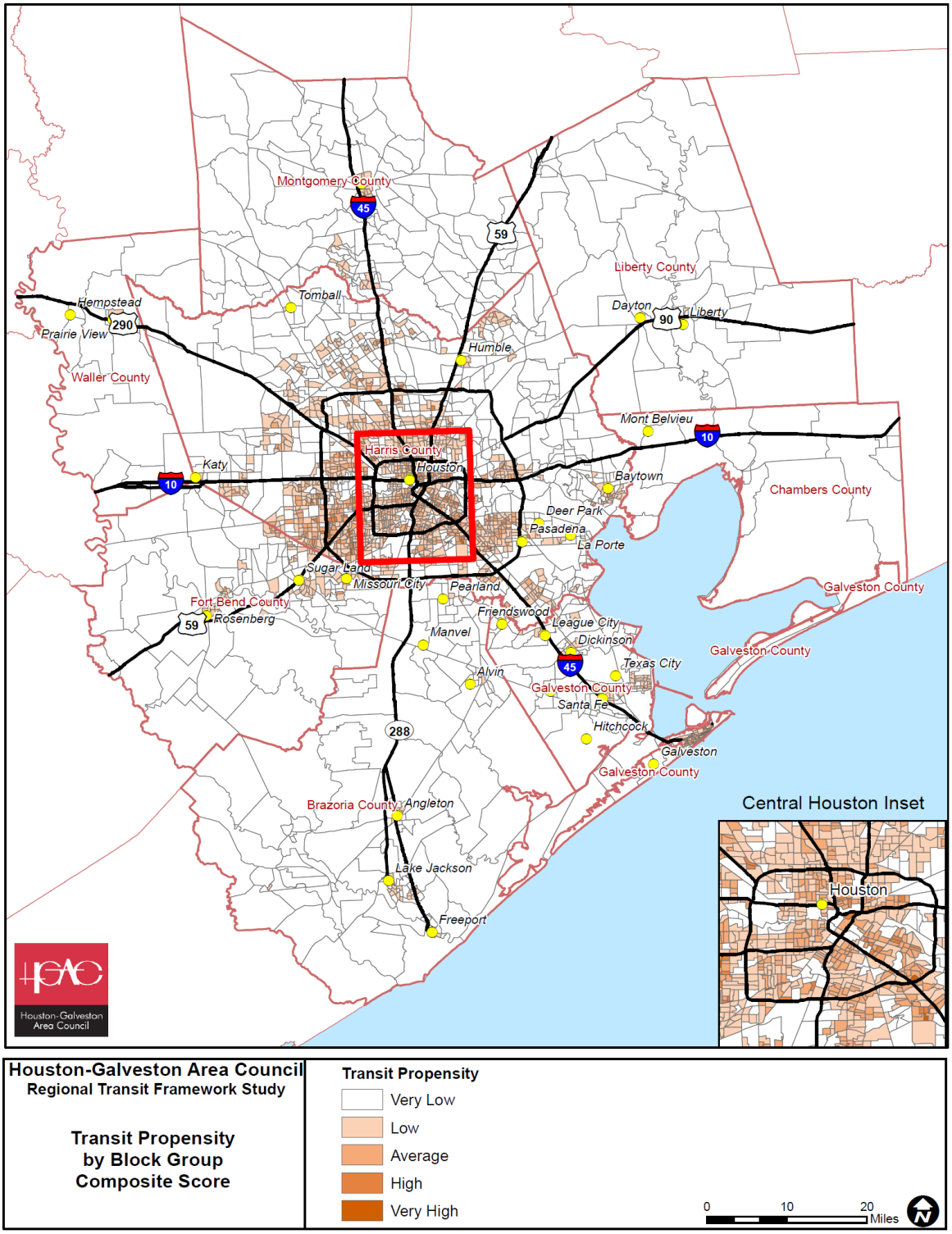
To calculate transit propensity, weights are assigned to each variable at the census block group level. The weights assigned to each variable are primarily based upon findings in TCRP Report 28. An indexed composite score for each block group is developed that shows the relative propensity of each block group to the H-GAC region.

While this data is approximately 10 years old, it represents a pattern confirming the importance of population density to transit demand. The areas of the region indicated as having high or very high transit propensity (see **Figure 2**) are the areas where existing transit service performs well.

Based on the transit propensity analysis shown in **Figure 2**, many areas stand out as showing some level of propensity for transit use. The map clearly indicates that well populated areas of the region such as the City of Houston and Galveston have a high level of transit propensity. While smaller communities in the region do not have as intense of propensity, many stand out as having good potential, including, but not limited to:

- Conroe
- The Woodlands
- Tomball
- FM-1960/SH-6 Corridor
- Humble/Atascocita
- Liberty
- Baytown
- Pasadena
- League City
- Santa Fe
- Dickenson
- Texas City
- Friendswood
- Pearland
- Alvin
- Angleton
- Lake Jackson
- Freeport
- Missouri City
- Sugar Land
- Rosenburg/Richmond
- Katy
- Prairie View/Hempstead

Figure 2: Transit Propensity Analysis



Source: U.S. Census Bureau, 2000

2.2.3 Regional Travel Demand

Travel demand can be measured by the quantity of trips projected to occur between two or more locations in the region. Generally, a high overall travel demand regardless of mode indicates a high overall potential for transit. Travel demand within the initial HCT analysis corridors was measured based on the total projected year 2035 person trips (general purpose trips and commuter trips) and projected home-based work trips (commuter trips). A corridor is considered to have a generally high level of travel demand if at least one Super-District to Super-District pair located within a corridors boundary exceeded more than 110,000 total daily person trips or 20,000 home based work trips. A corridor with potentially high travel demand for home based work trips, but not for total daily person trips may indicate that the corridor could be a potential candidate for commuter based services. **Table 6** identifies which corridor meet the high demand thresholds described above.

Table 6: Travel Demand Data by Corridor

Corridor	2035 Regional Travel Demand	
	High Travel Demand - All Trips[1]	High Travel Demand - Home Based Work Trips[2]
US-59	No	No
I-45 North	Yes	Yes
SH-249	No	No
US-290	No	Yes
FM-1960/SH-6	Yes	Yes
I-10 West	No	Yes
Westpark	No	Yes
US-90A	Yes	Yes
SH-288	No	No
I-45 South	Yes	Yes
I-10 East	Yes	Yes
SE Extension	Yes	Yes
E-W Crosstown (FM-518)	Yes	Yes
Uptown Extension (North)	No	Yes
Beltway 8	Yes	Yes
Westheimer	No	Yes
Bellaire	No	Yes
Gessner	Yes	Yes
East End Extension	No	No
Uptown Extension (South)	Yes	Yes
Inner Katy	No	No

[1]At least one Super-District to Super-District pair greater than 110,000 total person trips
[2]At least one Super-District to Super-District pair greater than 20,000 home-based work trips
Source: H-GAC Travel Demand Model, 2009

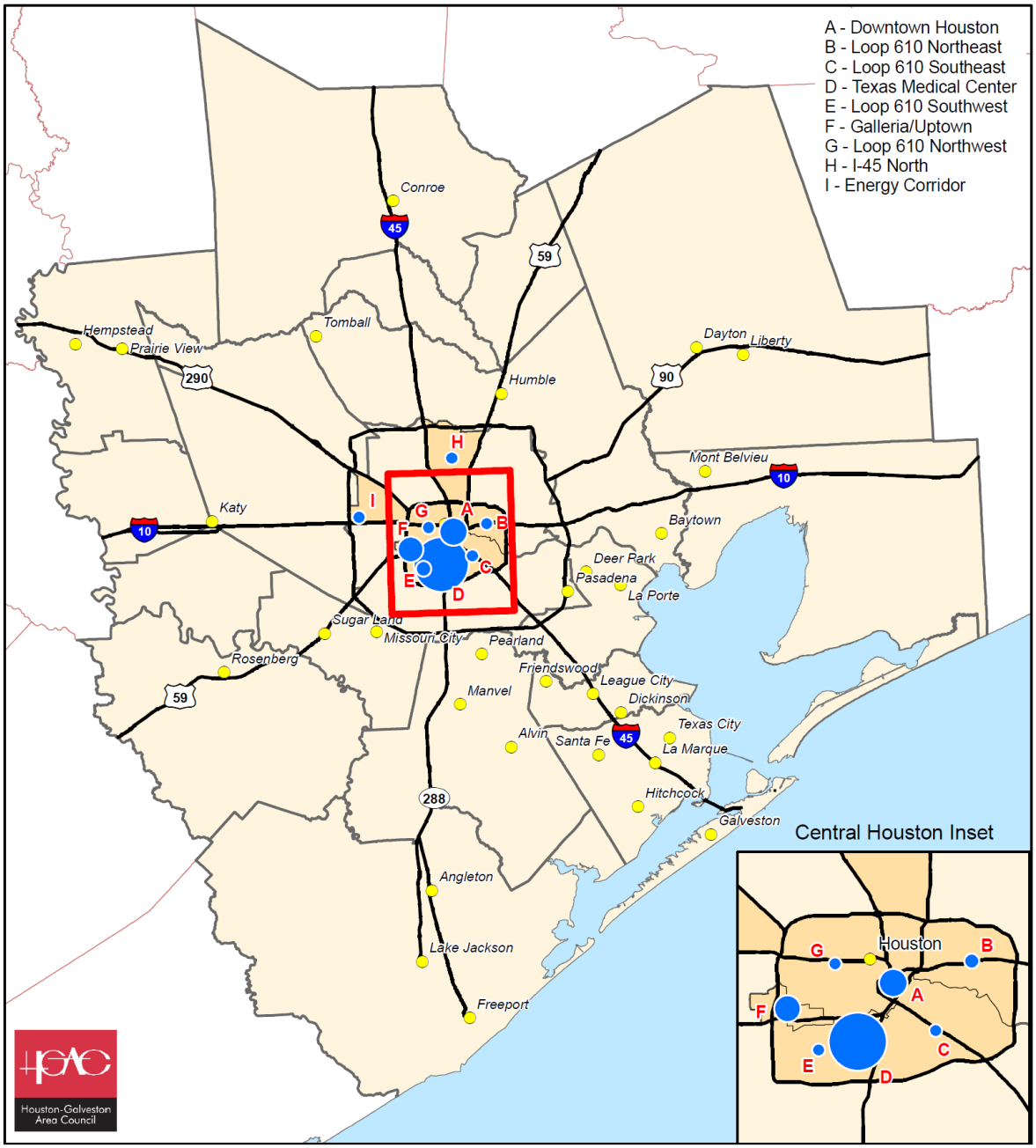
Regional Travel Demand Analysis

The *Analysis of Transit Travel Demand* report identified the overall travel demand in the region using trip production and attraction projections for future travel patterns to assist in the identification of areas and/or corridors that will likely experience high travel demand in the

future. This analysis applied a computer-based model to estimate future regional travel demand in the eight-county H-GAC region. Key findings regarding future travel patterns included:

- The more than 8.6 million people projected to live in the Houston-Galveston area by 2035 will generate more than 29 million trips each day.
- The highest population growth areas in the region are projected to be outside of Beltway 8.
- Growth in employment is projected to occur both within and outside of Beltway 8. While more jobs will be available in more areas of the region, the central employment super-districts such as downtown Houston, Uptown/Galleria and the TMC are projected to remain strong employment centers in the future. Projections indicate that 52 percent of the jobs in 2035 will be inside Beltway 8, while only 30 percent of the population will live within this area. Furthermore, of the 4 million jobs that are projected by 2035 in the H-GAC region, approximately 1.3 million (30 percent) will be located within Loop 610, along the Energy corridor, and along the I-45 North corridor indicating that these areas will remain strong employment centers and that the majority of residents will need to commute (See **Figure 5**: Top Importers of Jobs by Super-District).
- The highest amount of trip activity occurs within the same super-district (intra-district travel).
- Generally, the strongest inter-district relationships exist between neighboring super-districts based on the percent of trips between super-districts and total volume of trips.
- Trip attractions appear to be generally inward bound towards central Houston (including downtown, Uptown/Galleria and the TMC) or western Galveston County including Galveston Island.

Figure 3: Top Importers of Jobs by Super-District



Source: H-GAC Project Team, 2010

2.2.4 Transportation Performance

Transportation performance within the corridors was measured using two sets of variables: projected roadway congestion (year 2035) and existing level of transit ridership. Projected roadway congestion provides a general indication future demand in the corridor, while existing high levels of transit ridership may indicate existing and future demand. **Table 7** summarizes three roadway congestion variables (morning [AM], midday [MD], and afternoon [PM]) and one transit utilization variable.

For each corridor, the roadway congestion variables are assigned one of three indicators:

- Above 1.0 - Indicates that the majority of the corridor vehicle to capacity ratio (VC) is above 1.0
- No - Indicates that the majority of the corridor is below 1.0
- N/A - Indicates that there is not data for a particular corridor

The transit utilization variable is measured with a "no" or "yes" response, based on whether a high ridership route is within or adjacent to a corridor for at least 50 percent of the corridor's length.

The following general observations regarding the projected roadway congestion and existing transit service patronage were identified:

- A majority of the corridors (17 of 21) either have existing high transit ridership or are projected to have high levels of congestion by 2035
- More than 50 percent of the corridors are projected to have a VC ratio of 1.0 or greater during the peak or off-peak period.
- Fourteen of the twenty-one corridors are classified as having a high level of existing transit ridership.

Table 7: Projected Roadway Congestion and Existing Transit

Corridor	2035 Projected Roadway Congestion			2009 Existing Transit Utilization
	Roadway Congestion (AM)[1]	Roadway Congestion (MD)[1]	Roadway Congestion (PM)[1]	Existing Transit Service with High Ridership[3]
US-59	Above 1.0	No	Above 1.0	Yes
I-45 North	Above 1.0	No	Above 1.0	Yes
SH-249	N/A	N/A	No	No
US-290	Above 1.0	No	Above 1.0	Yes
FM-1960/SH-6	No	No	No	No
I-10 West	Above 1.0	No	Above 1.0	Yes
Westpark	N/A	N/A	Above 1.0	Yes
US-90A	N/A	N/A	No	Yes
SH-288	Above 1.0	No	Above 1.0	No
I-45 South	Above 1.0[2]	No	Above 1.0[2]	Yes
I-10 East	Above 1.0	No	Above 1.0	No

Corridor	2035 Projected Roadway Congestion			2009 Existing Transit Utilization
	Roadway Congestion (AM)[1]	Roadway Congestion (MD)[1]	Roadway Congestion (PM)[1]	Existing Transit Service with High Ridership[3]
SE Extension	N/A	N/A	No	Yes
E-W Crosstown (FM-518)	N/A	N/A	No	No
Uptown Extension (North)	N/A	N/A	Above 1.0	No
Beltway 8	N/A	N/A	No	No
Westheimer	N/A	N/A	No	Yes
Bellaire	N/A	N/A	Above 1.0[2]	Yes
Gessner	N/A	N/A	No	Yes
East End Extension	N/A	N/A	No	Yes
Uptown Extension (South)	N/A	N/A	No	Yes
Inner Katy	Above 1.0	No	Above 1.0	Yes

Source: H-GAC Travel Demand Model, 2010 and METRO Ridership Reports, 2010.
[1]Above 1.0-Indicates that the majority of the corridor VC is above 1.0; No-Indicates that the majority of the corridor is below 1.0; N/A-Indicates that there is not data for a particular corridor
[2]At least 50 percent of the corridor VC is above 1.0
[3]Corridor is within or adjacent to an existing high ridership transit route(s) for at least half of the corridor length.

2.3 EMERGING CORRIDORS

Over time, changes in demographics, land use and other variables may create the necessary conditions to support high capacity transit options in other corridors. At the time of the initial screening process, the following corridors lacked the qualities considered desirable for high capacity transit: SH-146, Grand Parkway, US 90E and SH-35. However, these and other corridors may emerge as potential HCT corridors depending on future regional growth trends.

3.0 CORRIDOR EVALUATION

The twenty-one initial analysis HCT corridors identified in the H-GAC region were evaluated using the standards and indicators presented in Working Paper #4. They were compared to one another to determine which HCT corridors would be most likely to perform well and be relatively better investments in terms of ridership, regional and local impact, and fundability among other factors. This chapter presents the evaluation criteria, measurement scale, and the corridor evaluation results.

3.1 CRITERIA

The criteria used to evaluate the corridors were based on information presented in Working Paper #4. Specifically they were:

Customer Choice Centric Standards and Indicators

- **Projected Ridership:** The projected number of transit riders in a day. Generated from the H-GAC 2035 Regional Travel Demand Model. Model run included all corridors and consistent service characteristics (i.e. headways, service span, etc.) for each corridor.
- **Flexibility and Speed/Travel Time:** Peak period projected congestion levels for nearby transportation facilities were used to determine which corridors were likely to have slower auto travel speeds and higher auto travel times. The information derived from the travel demand model expressed congestion in terms of the volume to capacity (v/c) ratio.
- **Accessibility/Availability:** The proximity of the corridor to the places people live and work and how often. Projected population and employment in the one-mile wide corridors (1/2 mile on either side of a corridor's centerline) was determined from the H-GAC 2035 regional population and employment projections.
- **Safety and Security:** The integration of the corridor into the surrounding land uses, the volume of transit riders in the corridor, and the frequency of the service in the corridor. One way to quantitatively measure safety and security is to determine off-peak ridership for each corridor. A corridor with higher off-peak ridership generally has a higher level of all day activity that provides users with a higher perception of safety and security. This concept is supported by Crime Prevention Through Environmental Design (CPTED) principles which have been adopted by the City of Houston, TX Police Department, among others. One of the principles included in CPTED is the concept that places with higher levels of activity have fewer criminal incidents. Schlomo Angel[1], an early pioneer of CPTED, asserts that crime is inversely related to the level of activity on the street

[1] Angel, Schlomo. (1968). *Discouraging Crime Through City Planning*. (Paper No. 75). Berkeley, CA: Center for Planning and Development Research, University of California at Berkeley.

and Oscar Newman's[2] work "Defensible Space – Crime Prevention through Urban Design" states that "defensible space should allow people to see and be seen continuously. Ultimately, this diminishes residents fear because they know that a potential offender can easily be observed, identified, and consequently, apprehended. Second, people must be willing to intervene or report crime when it occurs. By increasing the sense of security in settings where people live and work, it encourages people to take control of the areas and assume a role of ownership. When people feel safe in their neighborhood they are more likely to interact with one another and intervene when crime occurs."

- **Comfort and Convenience:** This category of standards and indicators was quantitatively evaluated by assessing the average load factors and peak load factors for each corridor. Data were derived from the H-GAC Regional Travel Demand Model.

System Compatibility Standards and Indicators

- **Land Use Synergies/Activity Centers/Livable Centers:** Each corridor's relationship to existing and projected locations of activity centers was quantitatively evaluated. The number of Activity Centers (Urban Core, Regional Centers, and Town Centers) and Special Generators served by each corridor were tabulated and corridors were compared to each other.
- **Community Values:** An evaluation of the types of plans and policies in place in the communities along each corridor was performed to determine the relative presence of transit supportive plans and policies along each corridor.
- **Mobility Equity:** The size of the transit dependent population served by each corridor was determined through the aggregation of census block group data in each of the mile wide corridors. They were then compared to each other to determine their relative success in serving those populations.
- **FTA New Starts:** This indicator evaluates a corridor's potential likelihood of meeting funding criteria set by the FTA as a method of comparing corridors to each other. Two of the factors that the FTA take into consideration during the funding decision process include: existing transit ridership in the corridor and projected transit ridership.

[2] Newman, Oscar. (1972). Def*ensible Space: Crime Prevention Through Urban Design. N*ew York: Macmillan. ISBN 0-02-000750-7

Newman, Oscar. (1996). Creating Defensible Space, Institute for Community Design Analysis, Office of Planning and Development Research (PDR), US Department of Housing and Urban Development (HUD), Washington, DC. [2]

3.2 MEASUREMENT SCALE

Each corridor's characteristics under the performance standards and indicators were compiled and placed into a table for comparison. A subjective scale was then applied to the data in each standard and indicator category that reflected each corridors performance in that category relative to the other 21 corridors. In general, a three level scale of good, better, and best was implemented in each category. The exception to this scale was the "FTA New Starts" Indicator which utilizes a yes-no scale based on a cutoff value of approximately 1,000 boardings per corridor mile. Corridors with projected ridership below this level have generally not received federal funding. However, this indicator is not a guaranteed indication of federal fundability, as the federal decision making process considers many other variables.

3.3 CORRIDOR EVALUATION RESULTS

It is important to note that, with the exception of the "FTA New Starts" indicator, all standard and indicator corridor evaluation values are relative to each other and reflect relative projected corridor performance in the H-GAC Region. The goal of the evaluation exercise is to identify those corridors that are more likely to be successful investments for the H-GAC Region. The results of the evaluation of the corridors for the Customer Choice Centric Factors are shown in **Table 8** below. A general description of the corridors is provided in Chapter 2 of this report.

Table 8: Customer Choice Centric Factors Evaluation

Corridor	Ridership	Flexibility/Speed, and Travel Time	Accessibility /Availability	Safety and Security	Comfort and Convenience
Bellaire	Best	Best	Best	Best	Better
Beltway 8	Better	Better	Better	Good	Good
E-W Crosstown (FM-518)	Good	Better	Better	Good	Good
East End Extension	Good	Better	Good	Better	Good
FM-1960/SH-6	Best	Better	Better	Best	Best
Gessner	Best	Better	Best	Best	Best
I-10 East	Better	Best	Best	Better	Better
I-10 West	Best	Best	Best	Best	Best
I-45 North	Best	Best	Best	Good	Best
I-45 South	Best	Best	Best	Good	Best
Inner Katy	Better	Best	Best	Best	Good
SE Extension	Better	Better	Better	Better	Good
SH-249	Best	Better	Best	Better	Best
SH-288	Better	Best	Better	Better	Better
Uptown Extension (North)	Better	Best	Better	Better	Good
Uptown Extension (South)	Better	Better	Good	Best	Good
US-290	Best	Best	Best	Good	Best
US-59	Best	Best	Better	Good	Best
US-90A	Best	Better	Best	Best	Best
Westheimer	Best	Better	Best	Best	Best
Westpark	Better	Best	Better	Better	Good

Source: H-GAC Project Team, 2010

The results of the evaluation of the corridors for the System Compatibility Factors are identified in **Table 9**.

Table 9: System Compatibility Factors Evaluation

Corridor	Corridor Integration w/ Activity Centers	Transit Supportive Plans and Policies in Corridor	Mobility Equity	Likely to Meet Minimum FTA Ridership Funding Threshold	Existing Transit Ridership
Bellaire	Better	Better	Good	Yes	Best
Beltway 8	Good	Good	Good	No	Good
E-W Crosstown (FM-518)	Good	Good	Good	No	Good
East End Extension	Good	Good	Better	No	Best
FM-1960/SH-6	Good	Good	Good	Yes	Better
Gessner	Better	Better	Better	Yes	Best
I-10 East	Better	Good	Best	No	Good
I-10 West	Best	Best	Good	Yes	Best
I-45 North	Best	Best	Better	No	Best
I-45 South	Best	Best	Better	No	Best
Inner Katy	Better	Better	Better	Yes	Best
SE Extension	Good	Good	Better	No	Better
SH-249	Best	Better	Better	No	Good
SH-288	Better	Better	Better	No	Good
Uptown Extension (North)	Good	Good	Better	No	Good
Uptown Extension (South)	Good	Good	Best	Yes	Best
US-290	Best	Better	Better	No	Best
US-59	Better	Better	Best	No	Best
US-90A	Better	Best	Better	Yes	Best
Westheimer	Best	Best	Good	Yes	Best
Westpark	Good	Good	Better	No	Best

Source: H-GAC Project Team, 2010

Each corridor's relative performance in the standard and indicator categories was undertaken to determine which corridors would be most likely to be successful investments in high capacity transit for the H-GAC region. Corridors were placed in one of three categories based on the evaluation results: Tier I, Tier II, and Tier III. Tier I corridors being the most likely to be the highest performing investments for the H-GAC region followed by Tier II and Tier III. Tier I corridors exhibited the best performance over a wide range of criteria relative to the other corridors and could also be key system components to a completed high capacity transit network in the H-GAC region. Each tier of corridors is listed below.

Tier I Corridors in Alphabetical Order:

- Bellaire
- I-10 West
- Inner Katy
- US-90A
- FM-1960/SH-6
- I-45 North
- SH-249
- Westheimer
- Gessner
- I-45 South
- US-290

Tier II Corridors in Alphabetical Order:

- I-10 East
- SH-288
- Uptown Extension (North)
- US-59
- Westpark

Tier III Corridors in Alphabetical Order:

- Beltway 8
- East End Extension
- East/West Crosstown (FM-518)
- SE Extension
- Uptown Extension (South)

3.4 DEVELOPMENT OF TRANSIT SCENARIOS

The results of this evaluation show that all of the corridors exhibit qualities that could potentially lead to successful high capacity transit services. The Tier I corridors represent the region's highest leverage HCT investment opportunities. During the development of the alternative transit scenarios, a higher level of consideration will be placed on Tier I corridors. However, factors including transit network functionality, available resources, and geography will also be considered. All three tiers consist of the top potential regional transit corridors; therefore, all of the corridors will receive consideration for some form of transit investment.