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Potential Transportation Improvements and Land Use Impacts in the Elysian Fields Corridor

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Abstract

This study examines potential transportation improvements in the Elysian Fields Avenue Corridor, and the benefit that these improvements may produce. Data for the study area are compiled and analyzed. Conceptual plans for the implementation of different transit technology alternatives were developed and assessed in terms of user benefits, cost, potential land use impacts, potential economic impacts, and feasibility. Case studies and relevant literature are reviewed. The intent of this thesis is to provide an overview of the study area prior and subsequent to Hurricane Katrina, develop plans for the implementation of transit alternatives in the Elysian Fields Avenue Corridor, and assess potential costs and benefits of the different alternatives developed.

Keywords: New Orleans, Elysian Fields Avenue, Gentilly, Transit, Transportation Planning, Urban Planning, Transit Oriented Development, Streetcar, Light Rail Transit (LRT), Bus Rapid Transit (BRT), Land Use, Economic Development, Redevelopment Planning, Neighborhood Planning.

Chapter 1: Introduction

The City of New Orleans, Louisiana is in a transitory state. The population and urban fabric of the city are constantly changing. An initial, gradual return to the city occurred in the months following Hurricane Katrina. Some of the pre-Katrina population has no intention of returning; others are unable to return due to unsettled or inadequate insurance settlements, the lack of affordable rental housing, inadequate infrastructure, and numerous other barriers. A new population of persons associated with the business of rebuilding has come to the city, the transience or permanence of their residency is unknown. A second exodus from the city is taking place, as residents initially committed to rebuilding the city grow frustrated with the slow pace of rebuilding, high crime rates, and higher rents and energy costs. Meanwhile, the physical rebuilding of the city is occurring in a "patchwork" fashion. In many areas of the city, one or two houses on a block are being repaired, while the rest remain untouched or gutted and boarded. Numerous planning efforts have culminated in a Draft Unified New Orleans Plan, the approval and implementation of which, it is hoped, will accelerate the recovery process.

New Orleans has become a living laboratory for planners, engineers, architects, developers, and civil servants. One of America's greatest cultural resources will be lost if these efforts fail. This study seeks to build upon recent reports chronicling the needs of the city and the "best" way to solve these problems. Continuing a discussion publicly initiated by the Bring New Orleans Back Commission, this study examines the potential for transportation infrastructure improvements to guide and stimulate redevelopment in damaged areas of the city. The Elysian Fields Avenue corridor and alternative transit improvements that could encourage redevelopment in the Gentilly area is the focus of this study.

As concerns increase about the contribution of personal automobiles to global warming and the sustainability of continued dependence on fossil fuels, improvements to mass transit are necessary to plan for a sustainable New Orleans. Improving transit service in the city is both progressive and historically sensitive, as New Orleans has traditionally had a more extensive transit system than most comparable American cities, as well as a larger transit-dependent population.

Prior to August 2005, the Gentilly area was one of the most diverse and stable neighborhoods in New Orleans. Planning District 6, which covers the Gentilly area, had higher household income levels and home-ownership rates than the City of New Orleans as a whole (New Orleans City Planning Commission 1999: 149). The former stability of the neighborhood adds to its attractiveness for redevelopment.

Elysian Fields Avenue is a north-south primary arterial roadway extending approximately five miles from the Mississippi River to Lake Ponchartrain. The southern terminus of Elysian Fields forms the boundary of the historic Vieux Carre (French Quarter) and Faubourg Marigny districts. Elysian Fields Avenue terminates at a traffic circle at Lakeshore Drive, an east-west roadway paralleling Lake Ponchartrain in the Gentilly area of New Orleans.

A number of factors influenced the selection of the Elysian Fields corridor for study. Along the Elysian Fields corridor, the St. Roch and Gentilly areas sustained significant damage from

Hurricane Katrina. However, at the northern and southern termini of Elysian Fields Avenue there are islands of relatively little damage. These two islands, the Vieux Carre/Faubourg Marigny area and the University of New Orleans (UNO), are also major trip generators for a potential transit system. There are several other potential trip generators along the Elysian Fields corridor, including Dillard University, UNO Technology Park, and the Lakefront Arena. The combination of existing major trip generators and large areas in need redevelopment provide an ideal corridor for induced transit-oriented development.

From the river to Gentilly Boulevard, more than half of its length, Elysian Fields Avenue is six lanes. At Gentilly Boulevard, it transitions to four lanes to its terminus at Lakeshore Drive. With the exception of the portion of the route at Interstate 10 (I-10) between North Miro and Abundance Streets, Elysian Fields Avenue has a very wide median (neutral ground). The typical section of Elysian Fields Avenue provides ample right-of-way that could be reconstructed to accommodate other transportation modes.

There is a need for transportation improvements in the Elysian Fields corridor. At this time, public transportation services available in the New Orleans Metropolitan Area have been reduced as a result of Hurricane Katrina. The Regional Transit Authority (RTA) is operating with a fraction of its pre-Katrina budget, fleet, and staff. Prior to Hurricane Katrina, two routes operated on Elysian Fields Avenue, a local route and an express service. Currently, only the local service has been re-established with significantly longer headways.

This study seeks to provide an analysis of transit alternatives and their potential to impact redevelopment in the Elysian Fields Avenue corridor. In order to evaluate the redevelopment potential of the corridor, baseline conditions in the corridor are established in Chapter 2. An overview of existing and historical conditions, including demographics, land uses, community and cultural resources, and transportation infrastructure is provided. Chapter 2 also describes existing and on-going planning efforts in the corridor. Chapter 3 evaluates different transit technologies that could be applied in the corridor, including the characteristics of traditional and express bus service, bus rapid transit (BRT), streetcar, and light rail transit (LRT). A description of alternatives for the application of these transit technologies is also provided in Chapter 3, along with preliminary cost estimates for implementation. Chapter 4 reviews selected literature relevant to the subject. An evaluation of potential land use and economic impacts for each alternative is provided in Chapter 5. This evaluation includes an analysis of station area impacts and transit-oriented development potential.

The following text presents the research question for this thesis, in terms of observations made, the problem identified, the proposed solution to this problem, research questions and hypotheses concerning the outcome of this research.

Observations

It is difficult to use transit to access the University of New Orleans. The author became aware of this difficulty when she decided to enroll in the University of New Orleans, and at the time did not own a vehicle. Even though the trip would have initiated at Canal Street, a major transit hub of the city, in 2001 the approximately 6 mile trip would take a minimum of 40 minutes on the

Elysian Fields Avenue local. Using the express service, travel times were upwards of 20 minutes.

Following the events of August 2005, several neighborhoods along the Elysian Fields Avenue corridor were devastated, but at each end anchors of stability, activity, and relatively little damage remained. The damaged neighborhoods are recovering. Some neighborhoods are recovering more quickly than others. Over two years later, throughout the severely damaged neighborhoods there are homes and businesses that appear to not have been touched since the levees failed. Other structures persist in a state of uncertainty, gutted and boarded up.

The neutral ground of Elysian Fields Avenue is very wide due to the fact that it was formerly the location of a passenger rail line. It would be a good location for a rapid transit line. Rapid transit lines have revitalized deteriorating and economically depressed areas and enhanced conditions in growing markets.

Problem

Although it has been discussed before in several planning documents, no real plan exists for transit improvements in the Elysian Fields Avenue corridor.

Proposed Solution

A conceptual plan for transit improvements in the Elysian Fields Avenue corridor will be developed. The potential social, economic and environmental impacts of different transit technology alternatives in the Elysian Fields Avenue corridor will be assessed.

Research Questions

This thesis attempts to answer several research questions. In terms of physical planning and service strategy, how would premium transit services be implemented on Elysian Fields Avenue? What factors contribute to the development of a transit system that successfully achieves user benefits, increases ridership and enhances land development and economic activities? Do different transit technologies vary in their potential to induce land development and economic impacts? Would the development of a premium transit service be feasible in the Elysian Fields Avenue Corridor?

Hypothesis

Bus Rapid Transit (BRT) is likely to be determined to be the most feasible transit option due to its flexibility and lower capital costs (Levinson, et al. 2003:2). Some form of light rail transit (LRT) will likely be considered the ideal transit technology, because New Orleans has a history with rail, faster travel times would result from the additional exclusive right-of-way required, and the use of these technologies would be consistent with existing plans. However, due to financial and other constraints currently present in New Orleans, it is unlikely that any transit improvements will be deemed feasible at this time.

There is a supposition that trains and streetcars are more attractive than buses (Ben-Akiva and Morikawa: 1). The author challenges the validity of this supposition, particularly when a BRT system includes the critical premium features associated with LRT. There are empirical studies that present evidence to support both views, and these studies are evaluated in the literature review portion of this thesis.

Methodology

To determine the potential benefits that a new rapid transit system may have on the Elysian Fields Avenue corridor, it was first necessary to become familiar with the area. The roadway geometry and land uses were evaluated. The progress of redevelopment and restoration were periodically surveyed between September 2005 and the present. Census 2000 data were gathered and analyzed to provide a demographic profile of the corridor. Because the corridor contains at least twelve distinct and diverse neighborhoods (depending on who you ask), the process for the compilation and presentation of the data needed to be identified.[1]

It was decided that presentation and analysis of the majority of the data for each of the twelve neighborhoods separately, or by tract or block group, would be excessive, difficult to digest, and would not clearly illustrate demographic trends in different portions of the study corridor. Therefore, the individual tracts and block groups were examined, and similar neighborhoods were grouped together, and referred to as "neighborhood areas." For example, the area north of I-610 is often locally referred to collectively as "Gentilly," and is grouped together in this study. Residents of Gentilly may disagree with this grouping due to strong neighborhood identities in the area. The author grants that the portion of Gentilly within the study area contains several diverse neighborhoods with different housing styles and some variance in demographic characteristics. However, the area is often thought of collectively, as evidenced by the formation of the Gentilly Civic Improvement Association and its grouping as Planning District 6. The Lake Oaks neighborhood may be more "upper-middle class" than other Gentilly neighborhoods, and some portions of the Dillard neighborhood may be more "lower-middle class." However, these variances balance out to present an accurate compilation of data for this middle-class inner suburb.

Demographic data are presented by neighborhood area as well as the study area as a whole. These data are compared to data for Orleans Parish, Louisiana, and the United States. An overview of each of the twelve neighborhoods, including a brief history, land uses, community facilities, institutions, and housing statistics was compiled.

The obvious limitation of 2000 Census data is that they are historical, and conditions have changed since 2000, particularly since August 2005. In many areas, these changes are significant. Although many reputable entities such as the Bureau of the Census, the Louisiana Public Health Institute, the United States Postal Service, and GCR and Associates, Inc. have tracked indicators to make current population estimates, these sources were not used. Because the re-population process is dynamic, it was determined to assess the repopulation of

[1] The Gentilly Civic Improvement Association delineates 11 neighborhoods north of I-610 and 13 north of I-10, and includes them all in the definition of Gentilly. The boundaries provided by the City of New Orleans Planning Commission's *Neighborhoods of New Orleans* are used in this study

neighborhoods on a qualitative basis. Visual surveys were periodically conducted to gauge repopulation and redevelopment.

Planning reports for each of the neighborhoods and the city as a whole were consulted. These included plans that existed prior to August 2005, such as the City of New Orleans Planning Commission's *1999 Land-Use Plan*, and the numerous planning reports produced following Hurricane Katrina.

A physical plan for a new transit system was developed. This required a review of technical standards and specifications to evaluate the corridor's physical suitability for the application of various transit technologies and configurations. Case-studies, technical reports, and relevant literature were reviewed and analyzed.

An assessment of land use, economic, and overall impacts for the transit alternatives was developed, and the feasibility of the alternatives is addressed. This assessment is generally qualitative, but some quantitative methods are applied.

Summary

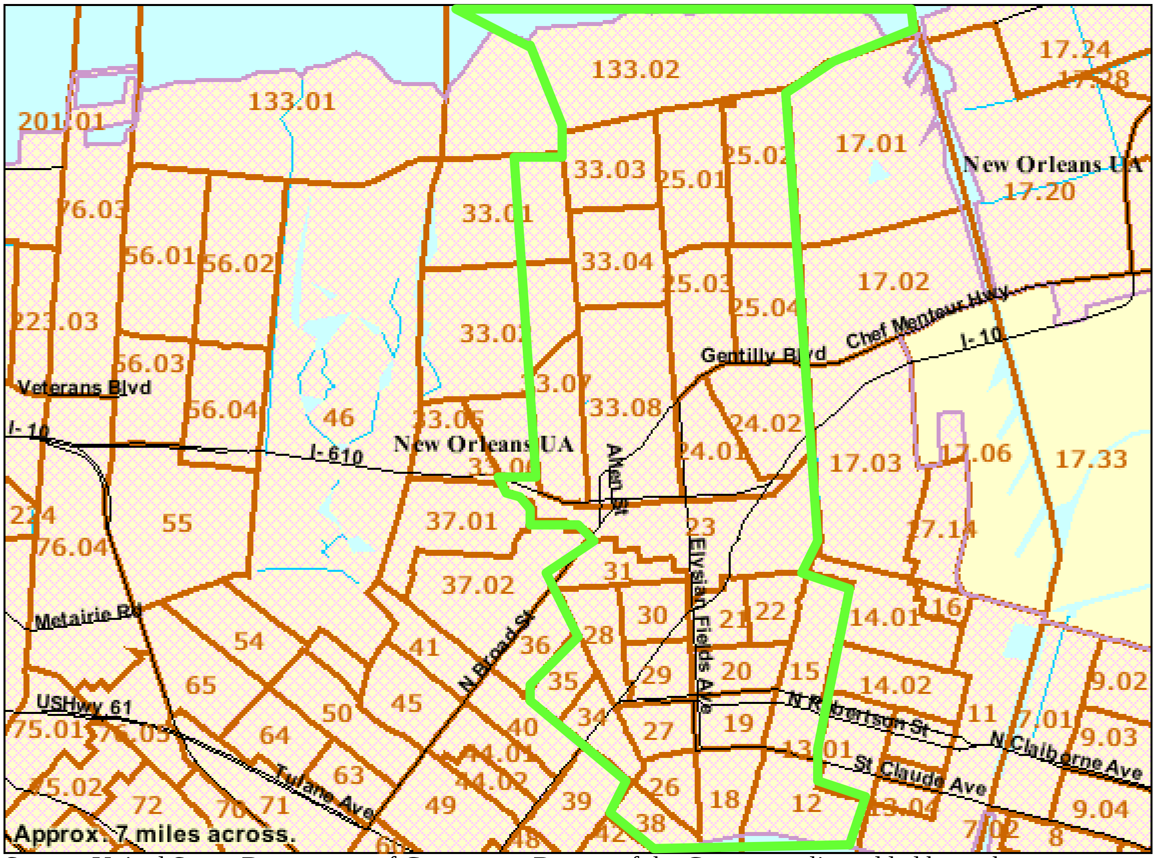
This study intends to provide an overview of the existing and historic characteristics of the Elysian Fields Avenue corridor. The physical, land-use, transportation, and demographic traits of the neighborhoods adjacent to the corridor are documented herein. These data provide a basis for the analysis of the suitability of the corridor for transportation improvements. Alternative transit improvements were developed and evaluated in terms of cost, aesthetics, context-sensitivity, consistency with existing plans, development potential, potential economic benefits, and feasibility. Most of these issues are evaluated qualitatively. Quantitative measures are used in the evaluation of costs, potential economic benefits, and feasibility.

Chapter 2: Existing and Historical Conditions

Demographic Data

The study area is defined as shown on Figure 2-1 below.

Figure 2-1 Study Area



Source: United States Department of Commerce, Bureau of the Census, outline added by author

The area north of Interstate 610 (I-610) is composed of many neighborhoods, including: a portion of Lake Oaks (Census 2000 tract 133.02, block group 1), St. Anthony (Census 2000 tracts 33.03 and 33.04), Milneburg (Census 2000 tracts 25.01 and 25.02), Gentilly Terrace (Census 2000 tracts 24.01, 24.02, 25.03, and 25.04), Dillard (Census tracts 33.07 and 33.08) and a portion of Filmore (Census 2000 tract 33.01, block group 1 and Census 2000 tract 33.02, block group 1). This area is referred to collectively as "Gentilly."

The portion of the study area south of I-610 is composed of the St. Roch neighborhood (Census 2000 tracts 19, 20, 21, 22, and 23), a portion of the Seventh Ward neighborhood (Census 2000 tracts 27, 28, 29, 30, 31, 34 and 35) the Faubourg Marigny (Census 2000 tracts 18 and 26) a portion of the St. Claude neighborhood (Census 2000 tracts 15 and 13.01), a portion of the Bywater neighborhood (Census 2000 tract 12) and a portion of the Vieux Carre/French Quarter (Census 2000 tract 38).

Figure 2-2 Neighborhoods

Source: Greater New Orleans Community Data Center (GNOCDC) 2007

Figure 2-2 provides a map of New Orleans neighborhoods in the vicinity of the study area. These neighborhoods are unique and diverse; therefore, study area data is presented as a whole, as well as by individual neighborhood areas composed of the Census divisions described above.

The New Orleans Metropolitan Area is rebuilding and recovering following Hurricane Katrina. At this time, the rate of repopulation and recovery cannot be quantified within reasonable margins of error in Orleans Parish. The dynamic nature of the recovery precludes reliable population estimates and projections, and it is likely that accurate population figures will not be available until the Census Bureau conducts an enumeration in 2010. Census 2000 data are presented as part of this project, despite significant population changes, due to the lack of statistically reliable demographic data and the varying nature of the population. Careful consideration was given to the data presented, and the most recent, appropriate, and reliable data available were used in the discussion of existing conditions in the study area.

Table 2-1 provides the year 2000 statistics for the total population and racial composition of the United States, the State of Louisiana, Orleans Parish, the entire study area, and the portions of neighborhoods included in the study area, as described on page 6.

The total population of the study area in 2000 was 70,094 persons, which is approximately 14.46% of the total population of Orleans Parish in 2000. As shown in Table 1-1, Orleans Parish, the study area, and the portions of neighborhoods within the study area, have a higher percentage of African-Americans than the state and the nation as a whole. The study area is predominantly black: 75.29% of the total population of the study area in the year 2000 was African-American. However, within the individual neighborhoods the racial composition is more diverse. The Gentilly neighborhoods included in the study area are primarily black (69.28%), but there is a also a large white population (26.24%). The portions of the Faubourg Marigny and the French Quarter in the study area have a much larger white population than the other neighborhoods, composed of 81.77% white. By contrast, the portion of the St. Roch / Seventh Ward neighborhoods included in the study area were 94.61% black in the year 2000.

Compared to the entire nation, there was not a large Hispanic or Latino population in Orleans Parish or the study area in the year 2000. The percentage of persons claiming Hispanic or Latino ethnicity in the United States in the year 2000 was 12.55% (U.S. Bureau of the Census 2000). In 2000, the percentage of Hispanic or Latino persons in Orleans Parish was 3.06%, and the percentage of Hispanic or Latino persons in the study area was 3.26% (U.S. Bureau of the Census 2000).

Table 2-1 Year 2000 Population and Race								
	United States	**Louisiana**	**Orleans Parish**	**Study Area***	**Gentilly***	**St. Roch / Seventh Ward***	**French Quarter / Faubourg Marigny***	**St. Claude / Bywater***
Total Population	**281,421,906**	**4,468,976**	**484,674**	**70,094**	**31,315**	**26,656**	**4,871**	**7,252**
White alone	211,460,626	2,856,161	135,956	14,835	8,216	1,019	3,983	1,617
Percent of Total	**75.14%**	**63.91%**	**28.05%**	**21.16%**	**26.24%**	**3.82%**	**81.77%**	**22.30%**
Black or African American alone	34,658,190	1,451,944	325,947	52,773	21,694	25,020	622	5,464
Percent of Total	**12.32%**	**32.49%**	**67.25%**	**75.29%**	**69.28%**	**93.86%**	**12.77%**	**75.34%**
American Indian and Alaska Native alone	2,475,956	25,477	991	139	51	48	28	12
Percent of Total	**0.88%**	**0.57%**	**0.20%**	**0.20%**	**0.16%**	**0.18%**	**0.57%**	**0.17%**
Asian alone	10,242,998	54,758	10,972	518	400	41	55	22
Percent of Total	**3.64%**	**1.23%**	**2.26%**	**0.74%**	**1.28%**	**0.15%**	**1.13%**	**0.30%**
Native Hawaiian and Other Pacific Islander alone	398,835	1,240	109	17	6	8	2	1
Percent of Total	**0.14%**	**0.03%**	**0.02%**	**0.02%**	**0.02%**	**0.03%**	**0.04%**	**0.01%**
Some other race alone	15,359,073	31,131	4,498	722	389	207	68	58
Percent of Total	**5.46%**	**0.70%**	**0.93%**	**1.03%**	**1.24%**	**0.78%**	**1.40%**	**0.80%**
Two or more races	6,826,228	48,265	6,201	1063	559	313	113	78
Percent of Total	**2.43%**	**0.14%**	**1.28%**	**1.52%**	**1.79%**	**1.17%**	**2.32%**	**1.08%**

Source: U.S. Bureau of the Census, Census 2000, Summary File 1 (SF1) 100-Percent Data, Table P3 Race – Universe: Total Population. Compiled by author, percentages calculated by author.
Notes: * Area composed of Census divisions as described on page 6 of this document.

Statistics for the age of the population in the study area are compared with statistics for the nation, state, and parish in Table 2-2 on the following page. The percentage of children under the age of ten in the study area is slightly less than the percentages for the nation, state, and parish. The statistics for neighborhood areas indicate that the portions of the French Quarter / Faubourg Marigny included in the study area had the lowest percentage of children under ten

(3.12%), while the portions of St. Roch / Seventh Ward included in the study area had a high percentage of children under the age of ten (16.78%).

Table 2-2
Age Distribution in Year 2000

	United States		Louisiana		Orleans Parish		Study Area	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	**281,421,906**	**100.00%**	**4,468,976**	**100.00%**	**484,674**	**100.00%**	**70,094**	**100.00%**
Age								
0-9	39,725,303	14.12%	654,172	14.64%	70,629	14.57%	9,582	13.67%
10-17	32,568,509	11.57%	565,627	12.66%	58,779	12.13%	8,356	11.92%
18-21	16,069,983	5.71%	287,277	6.43%	32,557	6.72%	4,529	6.46%
22-29	30,454,807	10.82%	482,685	10.80%	59,093	12.19%	7,407	10.57%
30-39	43,217,052	15.36%	648,129	14.50%	69,103	14.26%	9,662	13.78%
40-49	42,534,267	15.11%	664,606	14.87%	71,006	14.65%	10,606	15.13%
50-59	31,054,785	11.03%	479,264	10.72%	50,196	10.36%	7,684	10.96%
60-69	20,338,992	7.23%	318,291	7.12%	31,306	6.46%	5,288	7.54%
70-79	16,273,254	5.78%	241,744	5.41%	26,759	5.52%	4,467	6.37%
80+	9,184,954	3.26%	127,181	2.85%	15,246	3.15%	2,513	3.59%
	Gentilly*		**St. Roch / Seventh Ward***		**French Quarter / Faubourg Marigny***		**St. Claude / Bywater***	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	**31,315**	**100.00%**	**26,656**	**100.00%**	**4,871**	**100.00%**	**7,252**	**100.00%**
Age								
0-9	3,861	12.33%	4,473	16.78%	152	3.12%	1,096	15.11%
10-17	3,456	11.04%	3,777	14.17%	139	2.85%	984	13.57%
18-21	2,349	7.50%	1,613	6.05%	133	2.73%	434	5.98%
22-29	3,204	10.23%	2,733	10.25%	676	13.88%	794	10.95%
30-39	4,227	13.50%	3,405	12.77%	972	19.95%	1,058	14.59%
40-49	4,701	15.01%	3,751	14.07%	953	19.56%	1,201	16.56%
50-59	3,490	11.14%	2,576	9.66%	844	17.33%	774	10.67%
60-69	2,397	7.65%	1,985	7.45%	459	9.42%	447	6.16%
70-79	2,304	7.36%	1,523	5.71%	326	6.69%	314	4.33%
80+	1,326	4.23%	820	3.08%	217	4.45%	150	2.07%

Source: U.S. Bureau of the Census, Census 2000, Summary File 1 (SF1) 100-Percent Data, Table P12 Sex by Age – Universe: Total Population. Compiled by author, percentages calculated by author.
Notes: * Area composed of Census divisions as described on page 6 of this document.

Table 2-3 presents median household income for the study area, neighborhood areas, Orleans Parish, the State of Louisiana, and the United States.

Table 2-3 Median Household Income in 1999	
United States	$41,994
Louisiana	$32,566
Orleans Parish	$27,133
Study Area*	$21,380
Gentilly^	$31,932
St. Roch / Seventh Ward *	$16,040
French Quarter / Faubourg Marigny *	$21,981
St. Claude / Bywater*	$20,778

Source: U.S. Bureau of the Census, Census 2000, Summary File 3 (SF3) Sample Data, Table P53 Median Household Income in 1999 (Dollars) – Universe: Households.
Notes: * Median calculated by author by determining the median of the Census tracts included in the geographic area as described on page 1-1 of this document.
^ Median calculated by author by calculating the median of the Census tracts and block groups included in the "Gentilly" geographic area as described on page 6 of this document.

As shown in Table 2-3, median household income in the study area as a whole is lower than the figures for Orleans Parish, Louisiana, and the United States. However, the median household income for the Gentilly area was higher than median household income for Orleans Parish and Louisiana. Median household income in the St. Roch / Seventh Ward portion of the study area was significantly less than the figures for the United States, Louisiana, Orleans Parish, and the entire study area. The range of median household income statistics in the study area suggests there were diverse economic conditions within the study area in 1999.

Per capita income figures for the nation, state, Orleans Parish, the study area and neighborhood areas are presented in Table 2-4.

Table 2-4 Per Capita Household Income in 1999	
United States	$21,587
Louisiana	$16,912
Orleans Parish	$17,258
Study Area*	$17,450
Gentilly^	$18,554
St. Roch / Seventh Ward *	$9,742
French Quarter / Faubourg Marigny *	$31,152
St. Claude / Bywater*	$18,767

Source: U.S. Bureau of the Census, Census 2000, Summary File 3 (SF3) Sample Data, Table P82 Per Capita Income in 1999 (Dollars) – Universe: Total Population.
Notes: * Area composed of Census divisions as described on page 6 of this document.
^ Per capita income for the study area calculated by author by determining the mean of the per capita income figures for each neighborhood area in the study area.
[a] Per capita income calculated by author by determining the mean of the per capita income figures for each Census division included in the neighborhood area.

The range of per capita incomes presented in Table 2-4 also indicates differing economic conditions among the neighborhoods in the study area. Per capita income in the entire study area was slightly higher than the figures for Orleans Parish and Louisiana. Per capita income in the French Quarter / Faubourg Marigny area in 2000 was $31,152, significantly higher than the figures for the study area, parish, state, and the nation. The per capita income statistic for the French Quarter / Faubourg Marigny area is higher than the median household income figure for the same area: generally, median household income statistics are higher than per capita statistics for the same area. This may be explained by the way the two statistics are calculated and the smaller population of persons under the age of 15 living in French Quarter / Faubourg Marigny area .[2]

The Census Bureau uses income thresholds that vary by family size to determine poverty. If the total income of a family is less than the threshold, then that family and every individual in it is considered in poverty (U.S. Census Bureau 2007). Table 2-5 provides poverty statistics for the nation, state, parish, the study area, and the neighborhood areas within the study area.

Table 2-5
Poverty Status in 1999

	Total	**Income in 1999 below poverty level**	**Percent of Total**
United States	273,882,232	33,899,812	12.38%
Louisiana	4,334,094	851,113	19.64%
Orleans Parish	468,453	130,896	27.94%
Study Area	64,321	17,983	27.96%
Gentilly*	30,518	5,042	16.52%
St. Roch / Seventh Ward*	26,408	10,078	38.16%
French Quarter / Faubourg Marigny*	4,680	923	19.72%
St. Claude / Bywater*	7,171	2,940	41.00%

Source: U.S. Department of Commerce, Bureau of the Census, Census 2000, Summary File 3 (SF3) Sample Data, Table P87 Poverty Status in 1999 – Universe: Population for whom Poverty Status is determined. Percentages calculated by author.
Notes: * Area composed of Census divisions as described on page 6 of this document.

The percentage of persons determined to be living in poverty in the study area is similar to the percentage for Orleans Parish as a whole, significantly greater than the state-wide statistic, and over twice as much as the nation-wide figure. The range of the percentage of persons determined to be living in poverty in the study area supports the evidence that there are diverse economic conditions within the study area. All of the neighborhood areas, with the exception of

[2] Median household income is calculated from the sum of annual income received by all household members 15 years old and over. Per capita income is a simple arithmetic mean derived by dividing the total income of all people 15 years old and over by the total population of the area, including persons under 15. The calculation of median household income statistics reduces the effects of outliers (very high or very low incomes), while per capita income statistics can be affected by outliers. Additionally, because there are fewer children living in the French Quarter / Faubourg Marigny area, the divisor includes fewer persons that do not contribute to the dividend, resulting in a higher quotient.

Gentilly, have percentages of persons living in poverty that are greater than both the nation-wide and state-wide figures.

The economic data presented in Tables 2-3, 2-4, and 2-5 provide insight into the complex economic conditions present in the study area in 1999. The French Quarter / Faubourg Marigny area had the highest per capita income and the second highest median household income statistics in the study area 1999. At the same time, it was determined that 19.72% of the population of this area lived in poverty. In this particular neighborhood, individuals with very high-incomes live alongside persons with very low incomes. This is a condition that exists throughout much of the City of New Orleans. There are areas of the city, and the study area, where poverty and wealth are concentrated. Areas of concentration become more apparent when these economic statistics are examined at the block group and block levels. Within the study area, the highest income statistics are found at the northern and southern edges of the study area: adjacent to Lake Ponchartrain in the Lake Terrace and Lake Oaks neighborhoods and in the French Quarter. Conversely, the lowest income areas are concentrated near the interstate facilities (I-10 and I-610) located in the center of the project area in the St. Roch / Seventh Ward neighborhoods.

Table 2-6 presents information on levels of educational attainment for persons over twenty-five years of age for the nation, the state, Orleans Parish, the study area, and the individual neighborhood areas within the study area.

Table 2-6
Educational Attainment for Persons over the Age of 25

	United States		**Louisiana**		**Orleans Parish**		**Study Area**	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	182,211,639		2,775,468		300,568		44,612	
High School or Higher^	146,496,014	80.40%	2,076,416	74.81%	224,486	74.69%	32,656	73.20%
Bachelor's Degree or Higher	44,462,605	24.40%	519,778	18.73%	77,407	25.75%	9,195	20.61%
	Gentilly*		**St. Roch / Seventh Ward ***		**French Quarter / Faubourg Marigny***		**St. Claude / Bywater***	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	20,373		15,626		4,217		4,396	
Completed High School or Higher^	16,618	81.57%	9,499	60.79%	3,711	88.00%	2,828	64.33%
Bachelor's Degree or Higher	5,295	25.99%	1,330	8.51%	1,779	42.19%	791	17.99%

Source: U.S. Department of Commerce, Bureau of the Census, Census 2000, Summary File 3 (SF3) Sample Data, Table P37 Sex by Educational Attainment for the Population 25 Years and Over – Universe: Population 25 years and over. Compiled by author. Percentages calculated by author.
Notes: * Area composed of Census divisions as described on page 6 of this document.
^Includes high school equivalency.

The percentage of persons over the age of twenty-five in the study area that have completed high school or higher education is similar to the percentage for Orleans Parish and the State of Louisiana, but less than the nation-wide percentage. In the study area, the percentage of persons who have obtained a bachelor's degree or higher is less than the parish-wide and nation-wide figures, but greater than the state-wide percentage. Within the study area, the percentages of persons over twenty-five in the Gentilly area who have completed high school or higher and a bachelor's degree or higher is greater than the nation-wide percentages, as well as the state-wide and parish-wide percentages. The high level of educational attainment in the Gentilly area may be explained by the proximity of the area to several institutions of higher learning. The French Quarter / Faubourg Marigny area has the highest levels of educational attainment, with 42.19% of the population over 25 having obtained a Bachelor's degree or higher. This is the highest percentage of all of the neighborhood groups, and is significantly higher than the statistics for the nation, state, parish and study area. By contrast, the level of educational attainment in the St. Roch / Seventh Ward area is significantly lower than the figures for the nation, state, parish and study area.

The large number of persons living in the New Orleans area without access to personal vehicles became apparent to the nation during the 2005 hurricane season. Table 2-7 presents statistics for households without personal vehicles for the nation, state, parish, and the study area (in its entirety and by neighborhood divisions) for the year 2000.

Table 2-7
Zero Vehicle Households in 2000

	United States	Louisiana	Orleans Parish	Study Area	Gentilly*	St. Roch / Seventh Ward	French Quarter / Faubourg Marigny*	St. Claude / Bywater*
Total Occupied Housing Units	105,480,101	1,656,053	188,251	28,414	12,489	10,008	3,133	2,784
Total No Vehicle Housing Units	10,861,067	196,305	51,435	8,442	2,054	4,214	1,174	1,000
Percent of Total	10.30%	11.85%	27.32%	29.71%	16.45%	42.11%	37.47%	35.92%

Source: U.S. Department of Commerce, Bureau of the Census, Census 2000, Summary File 3 (SF3) Sample Data, Table H44 Tenure by Vehicles Available – Universe: Occupied Housing Units. Compiled by author. Percentages calculated by author.
Notes: * Area composed of Census divisions as described on page 6 of this document.

As shown in Table 2-7, nearly 30% of the households in the study area in the year 2000 did not have a vehicle, slightly more than the parish-wide statistic and significantly more than the national and state-wide figures. Within the study area, the Gentilly area had the smallest percentage of zero-vehicle households, at 16.45%, which is still significantly higher than the statewide and national statistics. In the other neighborhood areas, the percentage of zero-vehicle households is high (between 35.92% and 42.11%). The high percentage of zero-vehicle households in the St. Roch / Seventh Ward, French Quarter / Faubourg Marigny, and St. Claude / Bywater areas can be explained by a number of factors. In these older parts of the city, houses are generally built close together with limited space for driveways or garages. The streets are narrow and there are limited on-street parking spaces. In general, these areas of the city are pedestrian- and bicycle-friendly, and prior to Hurricane Katrina, basic transit serviced were available. Therefore, some people who live in these areas may consider it more convenient to walk, bike, and use public transit rather than own a private vehicle. In addition to persons that may consider it more convenient to not own a car, there are many people that cannot afford to purchase and maintain a vehicle, or consider the expenses related to vehicle ownership greater than the benefits. The lower incidence of zero-vehicle households in the Gentilly area may relate to the more suburban nature of the area, which is less pedestrian- and cyclist-oriented.

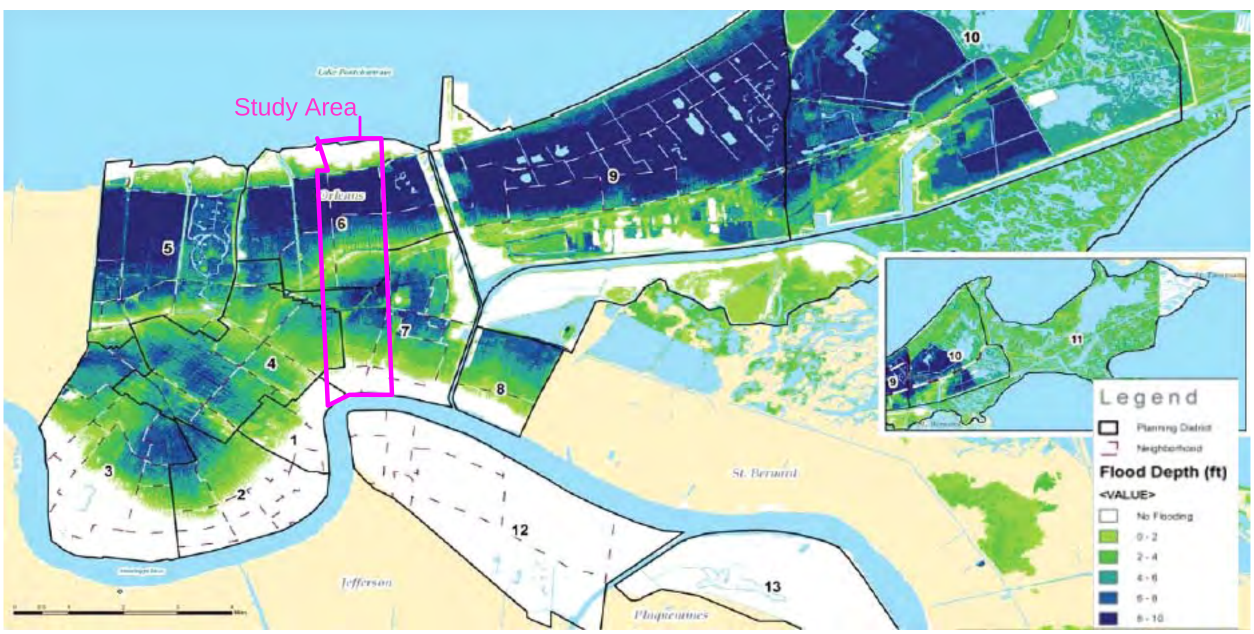
Neighborhoods, Land Use, and Community Facilities

New Orleans is a city composed of neighborhoods, and each neighborhood in the study area is unique. The neighborhoods described in this document are those recognized by the City of New Orleans. This section provides a brief description of each neighborhood, including major land use patterns and community facilities. Community facilities include schools, parks, libraries, hospitals, churches, and similar facilities. Although neighborhood boundaries are often ambiguous and indistinct, the boundaries shown on the City of New Orleans Planning Commission's *Neighborhoods of New Orleans* map were used for purposes of this analysis. Most of these boundaries are consistent with census tract boundaries.

To comprehensively discuss conditions in the study area, conditions prior to Hurricane Katrina as well as existing and emerging conditions are presented.

Figure 2-3 illustrates the flood depths in Orleans Parish subsequent to the levee breaches of 2005. The study area has been outlined to demonstrate the range of damage that occurred in the corridor.

Figure 2-3 Flood Depths August 31, 2005



Source: LSU Atlas and GCR & Associates, Inc. in Unified New Orleans Plan. Study Area added by author.

Gentilly

"Gentilly" is a collective term for the area north of I-610 to Lake Ponchartrain, bounded by Bayou St. John to the west and the Industrial Canal to the east, which composes New Orleans Planning Commission Planning District 6. There are several major activity centers in Gentilly, including: the University of New Orleans (UNO), Southern University at New Orleans (SUNO), Dillard University, and the Baptist Theological Seminary, the University of New Orleans Research and Technology Park, and the Lakefront Arena. Apart from these major activity centers, land use in Gentilly is primarily residential and the urban fabric is typical of a mid-twentieth century inner suburb. Although often referred to collectively, Gentilly is composed of several neighborhoods with distinct characteristics. Each of the Gentilly neighborhoods included in the study area is briefly discussed below.

Lake Oaks

The portion of the Lake Oaks area included in the study area is bounded by Lake Ponchartrain to the north, the London Avenue Canal to the west, Leon C. Simon Boulevard to the south and the Industrial Canal to the east. The UNO campus is the dominant land use in the north-west portion of the study area, and the Lakefront Arena/UNO East Campus is the dominant land use in the eastern portion of the study area. Lake Oaks Park and the UNO Research and Technology Park dominate the north-central portion of the area. There is a commercial area at the intersection of Leon C. Simon Boulevard and Franklin Avenue. The remaining portion of this neighborhood within the study area is composed of the Lake Oaks residential subdivision.

Although the Lake Oaks area is one of the newer sections of the city, the area has an interesting history. The Ponchartrain Railroad (Smokey Mary) was constructed in the 1830's and ran along Elysian Fields Avenue to connect the Faubourg Marigny to the Lake (GNOCDC 2007a). The construction of the rail line and the Milneburg Pier influenced the development of the lakefront as a resort area with fishing camps, bars, restaurants, and dancehalls (Ibid. 2007). Many of the early jazz legends performed at these entertainment venues (Ibid. 2007).

Prior to the 1930's, the land occupied by Lake Oaks was marshland. The land that composes Lake Oaks was reclaimed from the lakeshore through pumping and draining by the New Orleans Levee Board and the Works Progress Administration in the 1930's. The seawall that protects the area from the waters of Lake Ponchartrain and the recreational areas along the lakefront were also constructed during this effort (Ibid. 2007).

Much of the reclaimed land was initially used for the New Orleans Naval Air Station, a training facility, as well as a test site for Higgins boats during World War II (UNO 2007). The Navy abandoned the property after the war and most of the site to the Louisiana State University system, which opened Louisiana State University at New Orleans, now UNO (Ibid.2007). Camp Leroy Johnson, an Army facility half a mile to the east of the New Orleans Naval Air Station was abandoned in the 1960's and has become the UNO East Campus and the site of the Lakefront Arena (Ibid. 2007). The area between the two UNO campuses, now the site of the UNO Research and Technology Park, was a popular amusement park called Ponchartrain Beach between the 1940's and the mid-1980's. The old Milneburg Lighthouse is the oldest existing structure in the Lake Oaks area. The lighthouse was built in the late 1830's on land now occupied by the UNO Research and Technology Park (Ibid. 2007).

Lake Oaks was opened for development in 1964 and is bounded by Elysian Fields Avenue, Music Street and New York Street (GNOCDC 2007a). Homes in Lake Oaks are generally one- and two-storey slab homes on smaller lots. The median year of construction for homes in Lake Oaks is 1967 (U.S. Bureau of the Census 2000: SF3). Lake Oaks had extremely high occupancy and home-ownership rates in 2000 (Ibid. 2000). Of the 325 housing units recorded by the Census, 319, or 98% were occupied (Ibid. 2000). Of the 319 occupied housing units recorded by the Census, 303, or 95% were owner-occupied (Ibid. 2000). All the recorded housing units in the Lake Oaks area were single family, with the exception of a few multi-family developments, and the median value of owner-occupied units in Lake Oaks was $208,500 (Ibid. 2000).

Despite the proximity of Lake Oaks to the London Avenue and the Industrial Canal breaches, there was minimal flooding in the area following Hurricane Katrina because the neighborhood was developed on a man-made ridge. Damage assessments in Lake Oaks generally ranged between twenty and thirty percent, with some homes on the southern edge of the neighborhood assessed as having sustained forty to fifty percent damage (New Orleans City Planning Commission 2006a). The majority of homes in Lake Oaks appear to be repaired, or under repair, and occupied as of October 2007.

Community facilities in the Lake Oaks area include: UNO, Ben Franklin High School, the Lakefront Arena, Lakeshore Park, Lake Oaks Park, Lutheran Church Missouri Synod, and the Chapel of the Holy Comforter Anglican Church. All of these community facilities have re-opened after Hurricane Katrina, with the exception of the Lakefront Arena, which is still being repaired. The Chapel of the Holy Comforter has become an important community facility in post-Katrina Gentilly, serving as a meeting place for various civic functions.

Milneburg

The Milneburg neighborhood is bounded by Elysian Fields Avenue to the west, Filmore Avenue to the south, Leon C. Simon Boulevard to the north and Peoples Avenue to the east. The area is primarily residential, with some commercial parcels located along Elysian Fields Avenue between Leon C. Simon Boulevard and Filmore Avenue, at the intersection of St. Roch and Prentiss Avenues, and Robert E. Lee Boulevard near Franklin Avenue. Institutional uses in the Milneburg neighborhood include the Milne Boys Home, St. Raphael School and Church, Marian Central Catholic Middle School, and Avery Alexander Elementary School.

Most of the Milneburg area was developed after World War II. The median year of construction for housing units in Milneburg is 1954(U.S. Bureau of the Census 2000: SF3). The majority of housing units in the Milneburg area are single family homes: 18.50% of the housing units in Milneburg are duplexes, and 5.08% are in multifamily developments (Ibid. 2000). Home ownership rates in Milneburg were high, 71.29% of homes were owner-occupied in 2000 (Ibid. 2000). The median value of a home in Milneburg in 2000 was $76,800(Ibid. 2000).

The entire Milneburg neighborhood was severely flooded by the levee failures following Hurricane Katrina, with some areas receiving over eight feet of water. Not only were the floodwaters very high in Mineburg, the water remained in the area for several weeks. The Milneburg area has not recovered from the damage caused by the levee failures, and based on visual evidence (the presence of FEMA trailers, visible construction work) a minority of residents have returned to repair their homes. The majority of the houses in Milneburg were constructed on slab, which are difficult and expensive to raise to the new base flood elevation advisories. The City of New Orleans determined that the majority of the structures in Milneburg were more than 50% damaged. Structures determined to be more than 50% damaged are subject to the new base flood elevation guidelines. New elevation requirements, along with insurance settlement issues, and delays in receiving Road Home grants may be affecting the rate of recovery in the Milneburg area (New Orleans City Planning Commission 2006b).

Community facilities in the Milneburg neighborhood include the Milne Boys Home, Miltenberger Playground, and a few churches and schools. The Milne Boys Home began in 1933 as a residential facility for troubled and needy boys under the jurisdiction of the City of New Orleans and the Milne Trust. In 1986 the Home discontinued its residential component, and exclusively offered after school, summer and other community programs for boys (GNOCDC 2007b). The facility has not re-opened since Hurricane Katrina. Avery Alexander Elementary School, a New Orleans Public School, has not re-opened. Marian Central Catholic Middle School has not reopened. St. Raphael Catholic School and Church are under renovation and mass is being held in the gym as of August 2007.

St. Anthony

The St. Anthony neighborhood is bounded by Elysian Fields Avenue, Leon C. Simon Boulevard, Mirabeau Avenue and the London Avenue Canal. The neighborhood was named after St. Anthony Avenue, which runs through the center of the community. St. Anthony Avenue has a wide median with green space and a bike/walking trail. Land use in St. Anthony is primarily residential. Commercial strips are located along Elysian Fields Avenue near the Leon C. Simon Boulevard and Filmore Avenue intersections. There is also a small commercial area located at Mirabeau and St. Anthony Avenues (New Orleans City Planning Commission 2006c).

The St. Anthony area developed between 1930's and 1960's. The median year of construction for housing units in the St. Anthony area is 1953 (U.S. Bureau of the Census 2000: SF3). The St. Anthony area had less single family housing than many other areas in Gentilly: 54.19% of housing units were single family, 32.11% were duplexes, and over 13% of the housing units in St. Anthony were in multifamily complexes (Ibid. 2000). Home ownership rates in St. Anthony were 60.04%, higher than the parish-wide figure of 46.50%, but much lower than most of the surrounding Gentilly neighborhoods. Median home value in St. Anthony was $75,050 in 2000 (U.S. Bureau of the Census 2000: SF3).

An important community facility located in St. Anthony is Our Lady of Lavang Catholic Church (Hoï Ñöùc Meï Lavang) which serves the Vietnamese Catholic community. Our Lady of Lavang was severely damaged in the storm, but has been repaired and reopened. There are three pocket parks in St. Anthony including Eddie Gatto Playground, Filmore Gardens/Dauterive Playspot and Donnelly Playground, which along with the walking trail along St. Anthony provide recreation space for the neighborhood (GNOCDC 2007c).

The eastern London Avenue Canal breech occurred in the St. Anthony neighborhood, leaving it one of the most damaged areas in Gentilly. The entire neighborhood received at least eight feet of water, and the area stayed flooded for several weeks. The City of New Orleans determined that the majority of the structures in St. Anthony were more than 50% damaged (New Orleans City Planning Commission 2006c). Structures determined to be more than 50% damaged are subject to the new base flood elevation guidelines.

As of September 2007, recovery in the St. Anthony neighborhood is slow. A few of the commercial properties near Leon C. Simon Boulevard and Filmore Avenue have re-opened, and some new businesses have moved in, but many of the commercial structures in St. Anthony are vacant or have been razed. Residents have returned, but the majority of residential structures in the neighborhood remain untouched or gutted and boarded-up.

Filmore
The portion of the Filmore area included in the study area is bounded by the London Avenue Canal to the east, Paris Avenue to the west, Robert E. Lee Boulevard to the north and Virgil Boulevard to the south. This area is composed of the Vista Park and Mirabeau Gardens subdivisions. The majority of the Filmore area is residential, with a small commercial areas located on Robert E. Lee Boulevard at Paris Avenue and at the intersection of Paris and Mirabeau Avenues. Francis Gregory Junior High School, which includes a large adjacent green space owned by the City of New Orleans, is located in Mirabeau Gardens as well as Mirabeau Park. Jean Gordon Elementary School and Pratt Park are located in Vista Park.

The median year of construction for housing units in Mirabeau Gardens and Vista Park is 1956 (U.S. Bureau of the Census 2000: SF3). The majority of housing units in the Filmore portion of the study area are single family, at 79.84% (Ibid. 2000). Multi-family housing complexes compose 20.16% of the total housing units in Mirabeau Gardens and Vista Park (Ibid. 2000). Homeownership rates were high in the Filmore portion of the study area in 2000, with 74.63% of housing units being owner-occupied (Ibid. 2000). Median home value in the portion of Filmore in the study area was $126,000 in 2000 (Ibid. 2000).

The Filmore area was severely damaged by extensive flooding caused by a breech on the western side of the London Avenue Canal. As of September 2007, some Filmore residents have returned and started repairs. As with many neighborhoods in Gentilly, the majority of structures were constructed on slab and have damage assessments greater than 50% (New Orleans City Planning Commission 2006d). None of the public schools located in the Filmore portion of the study area have re-opened, and the commercial area at Robert E. Lee and Paris Avenue remains closed.

Gentilly Terrace
Gentilly Terrace is bounded by Filmore Avenue to the north, Elysian Fields Avenue to the west, Peoples Avenue to the east, and Benefit Street to the north. The Gentilly Terrace National Historic District was listed in 1999, and is bounded by Spain Street, Mirabeau Avenue, Eastern Street, and Gentilly Boulevard (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007a). The Historic District is composed of 1600 acres and 544 buildings, and was listed due to its significance in areas of architecture and engineering (Ibid. 2007). The majority of uses in the Gentilly Terrace area are residential. Commercial uses exist along Elysian Fields Avenue at Filmore Avenue and Gentilly Boulevard, and along

Clematis Avenue between Gentilly Boulevard and I-610 in the Lower Gentilly and Edgewood Park subdivisions.

Institutional uses in Gentilly Terrace include: Brother Martin Catholic Junior High School, Capdau Junior High School, St. Joseph Central Catholic School, Stuart Bradley Elementary School, and Gentilly Terrace Creative Arts Elementary School. The New Orleans Baptist Theological Seminary is located just east of the study area boundary. The only designated green space in the Gentilly Terrace neighborhood is Union Playspot located at the intersection of St. Roch Avenue and Humanity Street. There are several churches in the Gentilly Terrace neighborhood including: First Church of Our Lord Jesus Christ, Gideon Christian Fellowship, St. Matthew’s Lutheran Church, and St. James Major Catholic Church.

There are several distinct housing styles throughout the Gentilly Terrace neighborhood. Edgewood Park and Lower Gentilly are generally composed of smaller bungalows and cottages on piers. Within the Gentilly Terrace National Historic District, the architectural styles include: bungalow/craftsman, and colonial revival (Ibid. 2007). Closer to Filmore Avenue many homes are mid-twentieth century slab homes.

The median year of construction for homes in the Gentilly Terrace neighborhood is between 1947 and 1948, although the majority of structures in the Gentilly Terrace Historic District were constructed in the 1930’s (U.S. Bureau of the Census 2000: SF3). Single-family homes constitute 81.71% of the housing units in Gentilly Terrace, 13.71% are duplexes, and the reminder are small multi-family complexes of nine units or less (Ibid. 2000). There is a high rate of home-ownership in Gentilly Terrace, with 69.55% owner-occupied housing units. Median housing value in Gentilly Terrace was $87,350 in 2000 (Ibid. 2000).

The Gentilly Terrace neighborhood did not flood as badly as many other areas of Gentilly, because it is centered on a natural ridge. Additionally, homes in the Gentilly Terrace Historic District are built on small hills. However, the area did receive significant storm damage, and the northern and southern limits of the neighborhood sustained floodwaters greater than eight feet. Gentilly Terrace is recovering, although some areas are recovering faster than others. The current occupancy rate in Gentilly Terrace may not be as high as Lake Oaks, but it is higher than Milneburg and St. Anthony. Some commercial properties at Elysian Fields and Gentilly Boulevard have re-opened. Capdau Junior High School, Brother Martin Catholic Junior High School, and Gentilly Terrace Elementary School have reopened. Edward Hynes Charter School has re-opened at former site of St. James Major School on Gentilly Boulevard. Morton Elementary School is currently operating on Gentilly Boulevard but will eventually move to a new location.

Dillard

The Dillard neighborhood is bounded by Mirabeau Avenue to the north, Elysian Fields Avenue to the east, Benefit Street to the south and Paris Avenue and Pratt Drive to the west. Dillard is a mixed residential, commercial and institutional area, with Dillard University composing a large portion of the neighborhood. Commercial uses are located along Elysian Fields Avenue at Gentilly Boulevard and at I-610 and Elysian Fields Avenue. The commercial area at the intersection of Elysian Fields Avenue and Gentilly Boulevard is referred to as the Gentilly

Shopping Center. Once a vibrant commercial area that included a Gus Mayer department store, the Gentilly Shopping Center has gradually declined since the 1960's. Prior to Hurricane Katrina, the area included Peaches, a locally-owned music store, two national chain drug stores, a national chain video store, various discount stores, a beauty supply store, two fast-food restaurants, a bakery, and various other retail stores and office space.

Dillard University opened in 1930 and moved to its existing site in 1935. In 2003, Dillard University was listed on the National Register of Historic Places due to its significance in the areas of education and African-American history. Two-hundred and thirty (230) acres, 8 buildings and 1 structure are included in the National Historic District listing (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007b).

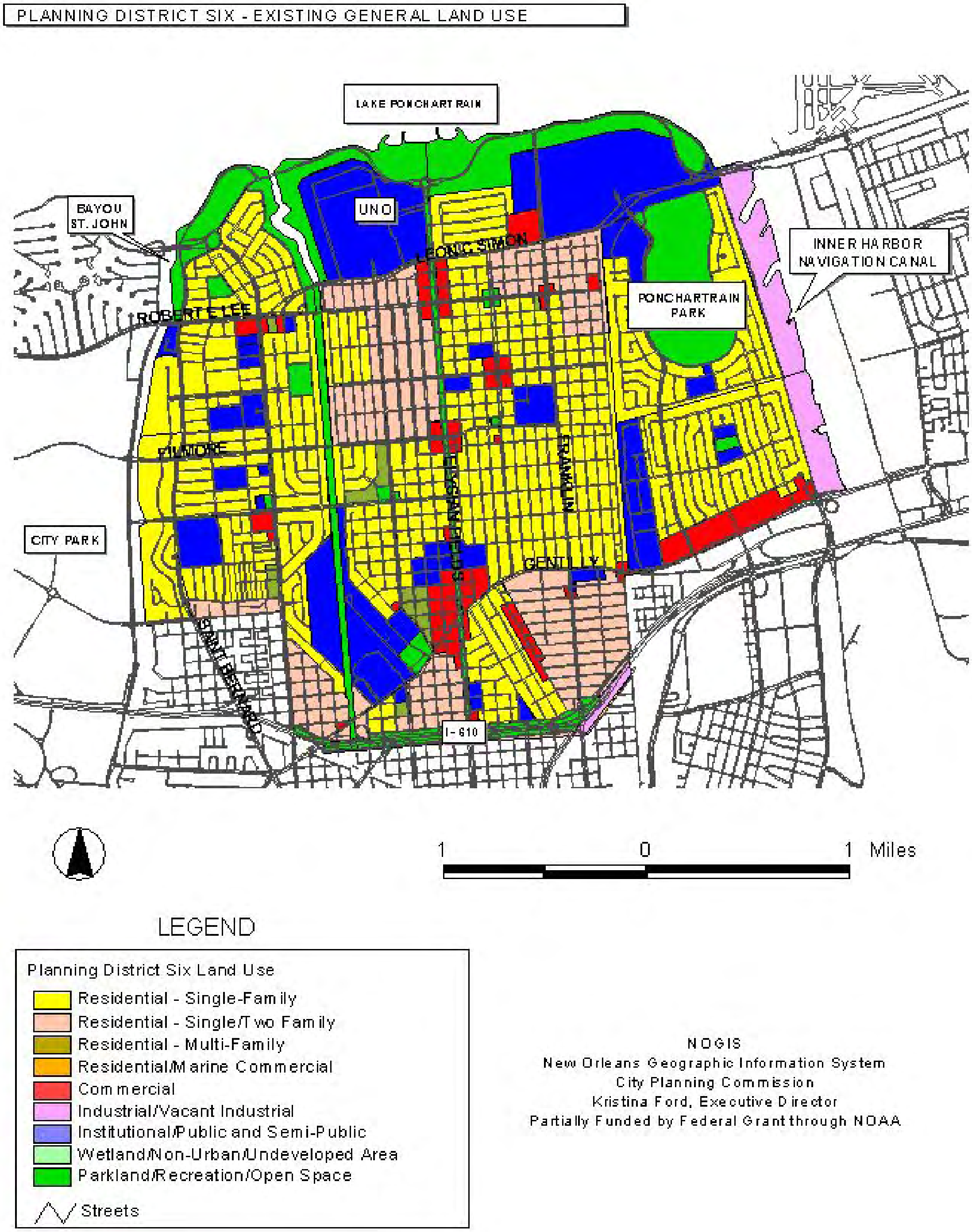
There are two large cemeteries in the Dillard Area, Mount Olivet Cemetery and Mausoleum, located on Norman Mayer Avenue, and Hebrew Rest Cemetery, located along Elysian Fields Avenue north of Gentilly Boulevard. Norman Mayer Public Library, located near the intersection of Elysian Fields and Gentilly Boulevard on Foy Street serves the entire Gentilly area. A United States Post Office is located near the intersection of Elysian Fields Avenue and Gentilly Boulevard on Caton Street. Perry Roehm Park and baseball field is located in the southern area of the Sugar Hill neighborhood. The entrance to Dillard University along Gentilly Boulevard between Norman Mayer Avenue and Virgil Boulevard is maintained as landscaped green space.

The median year of construction for housing units in Dillard is 1954-1955 (U.S. Bureau of the Census 2000: SF3). The majority of homes in Dillard are single family (70.59%), however because of the large number of students residing in the area, 17.05% of housing units in Dillard are part of large multi-family complexes of fifty or more units (Ibid. 2000). Home-ownership rates in Dillard are higher than the parish-wide figure, 56.70% of housing units in Dillard are owner-occupied compared to 46.50% parish-wide (Ibid. 2000). Median housing value in Dillard in 2000 was $71,900 (Ibid. 2000).

Because the Dillard area is located on the Gentilly Ridge, damage in the area due to flooding was less than in surrounding areas. However, the area was significantly damaged and the northern and southern limits of the Dillard area experienced some flooding. Dillard University has re-opened, along with approximately 50% of the retail businesses in the Elysian Fields Avenue/Gentilly Boulevard area. Norman Mayer Public Library sustained severe roof damage and will not re-open in its previous location. The U.S. Post Office has not re-opened, stating that current customer levels do not warrant re-opening the facility at this time.

Figure 2-4 presents the existing land uses in Planning District 6 (Gentilly) in 1999.

Figure 2-4 Existing Land Use District 6 (1999)



Source: New Orleans City Planning Commission 1999.

St. Roch

The boundaries of the St. Roch neighborhood included in this study are Benefit Street to the north, Florida Avenue and one block south of Florida Avenue (Treasure, Abundance, Agriculture, Industry, Duels, and Hope Streets)/Elysian Fields Avenue to the west, St. Claude Avenue to the south, and Almonaster Boulevard/Peoples Avenue to the east. Originally called Faubourg Franklin, the St. Roch neighborhood is included in the New Marigny Historic District, which is roughly bounded by St. Claude Avenue, St. Bernard Avenue, Tonti, and St. Ferdinand Streets and I-10 (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007c). Development in the area began in the 1830’s with the introduction of the Ponchartrian Railroad, and was generally complete by the 1920’s (GNOCDC 2007d). In the Antebellum Period, St. Roch was home to a large number of free people of color (Ibid. 2007). Historically, land uses in St. Roch were mixed, and included blacksmith shops, dairies and small farms (Ibid. 2007). Many jazz musicians lived in this area, as well as Creole and German families (Ibid. 2007). The construction of I-10 and I-610 in the 1960’s caused portions of the neighborhood adjacent to the interstates to decline.

Land use in St. Roch is generally single- and two-family residential. Industrial uses exist along Florida Boulevard and I-10. Commercial parcels are located along St. Claude Avenue, Almonaster Boulevard, Elysian Fields Avenue, and Florida Avenue.

There are several significant older structures in St. Roch, including St. Roch Market, Our Lady Star of the Sea and St. Roch Chapel and Cemetery. St. Roch Chapel and Cemetery is also culturally significant for its importance in the city’s Good Friday celebrations. St. Roch has several green spaces including the McCue Playground, Independence Square and the St. Roch Playground.

The median year of construction for housing units in St. Roch is 1949 (U.S. Bureau of the Census 2000: SF 3). The majority of housing units in St. Roch are in single-family structures (73.60%), 16.87% of structures are duplexes, and the rest are multi-family developments. Home-ownership rates in St. Roch are lower than the parish-wide statistic (46.50%), with 42.09% of occupied housing units occupied by their owners (Ibid. 2000). In 2000, 16.61% of the total housing units in St. Roch were vacant (Ibid. 2000). In St. Roch the median housing value in 2000 was $60,900 (Ibid. 2000).

The northwest portion of the St. Roch neighborhood experienced severe flooding following the levee failures, while the rest of the area received four feet of water or less. Relative to the complete destruction to the north and east, the considerable damage experienced in St. Roch is diminished, although approximately 32% of residential properties were deemed substantially damaged (New Orleans City Planning Commission 2006g).

Residents have returned to St. Roch, although the area is far from recovered. Prior to the storm, a significant number of structures were blighted and/or vacant, and some structures continue in this state. In 2000, approximately 60% of St. Roch residents rented their homes and the lack of affordable, livable rental property following Hurricane Katrina has been a persistent barrier to repopulation (Ibid. 2006). There is some progress in St. Roch, but significant work is still needed. St. Roch Playground is currently serving as a FEMA trailer site. One of the three schools in St. Roch, Colton Junior High (now Colton Academy), has re-opened.

St. Claude

The portion of the St. Claude neighborhood included in the study area is bounded by St. Claude Avenue to the south, Law Street to the north, Franklin Avenue / Almonaster Boulevard to the west, and Montegut Street to the east. Land use in this portion of St. Claude is largely industrial. The Norfolk Southern Railroad and Oliver Yard are located in between St. Ferdinand/Press and Montegut Streets. Commercial uses line St. Claude and Franklin Avenues. Residential development is located adjacent to the industrial and commercial corridors.

St. Claude was primarily swampland until the 1930's, when the area was drained. The majority of residential development in St. Claude was complete by the 1950's. The area between Franklin Avenue and Ferdinand Street is included in the Bywater Historic District. The Desire line, made famous by Tennessee Williams, traversed the St. Claude neighborhood until 1948. Prior to Katrina, feasibility and environmental studies were conducted for the potential return the Desire Streetcar to the area. Currently, these plans are indefinitely on hold.

The median year of construction for residences in the study area portion of St. Claude is 1950-1951 (U.S. Bureau of the Census 2000: SF3). The majority of residences, 71.39%, in this portion of St. Claude are single-family, and 20.07% are duplexes (Ibid 2000). Approximately 39.05% of the occupied housing units in this portion of St. Claude were owner-occupied (Ibid 2000). A high number of housing units in this portion of St. Claude were vacant in 2000, 22.17% (Ibid 2000). Median housing values for owner-occupied units in this portion of St. Claude is $56,400 (Ibid 2000).

In the southern portion of the St. Claude area, flood damages were minimized because water levels were at or below four feet and the majority of residences are raised three or four feet above grade (New Orleans City Planning Commission 2006h). In the northern portion of the neighborhood, flood damage was more extensive, as the water reached depths of eight feet in some areas (Ibid 2006). Recovery is occurring along the St. Claude corridor, but there are fewer visual signs of occupancy and repairs in the southern portion of the neighborhood.

Bywater

The portion of the Bywater neighborhood included in the study area is bounded by St. Claude Avenue to the north, Franklin Avenue to the west, the Mississippi River to the south, and Congress Street to the east. The Bywater Historic District was added to the National Register of Historic Places in 1986, because of its significance in the fields of architecture and engineering. The architectural styles in the Bywater include: Creole cottages, Victorian doubles, Greek Revival and Italianate townhouses, and bungalow/craftsman style cottages (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007d). Within Bywater, St. Vincent De Paul Roman Catholic Church was added to the National Register in 1976 (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007e).

Land uses in the Bywater are a mixture of residential, industrial, and commercial. Industrial uses are concentrated along the river and the railroad tracks. Commercial development is located along St. Claude Avenue, and less-intense neighborhood commercial uses are present throughout the neighborhood. The Bywater is home to the New Orleans Center for Creative Arts, a professional arts secondary school, offering instruction in creative writing, dance, media arts, music, theatre arts, and visual arts.

The majority of residential structures in the Bywater were built prior to 1940 (U.S. Bureau of the Census 2000: SF3). The majority of residences in the Bywater are single family homes: 60.07% of residences of housing units consist of a single structure, and 19.14% are duplexes (Ibid. 2000). The majority of Bywater residents in 2000 were renters; 38.54% of occupied housing units were occupied by their owners(Ibid. 2000). In 2000, 18.83% of housing units in the Bywater were vacant (Ibid. 2000). The median value for owner-occupied housing units in the Bywater was $94,800 (Ibid. 2000).

Located on some of the highest ground in New Orleans, the Bywater did not flood subsequent to the levee failures. There was some damage in the Bywater due to winds; however, in comparison to the surrounding areas, the damage sustained in the Bywater was minimal. The Bywater has recovered from the majority of the hurricane damage it sustained. The majority of residents have returned, repairs are completed or underway, and the majority of businesses and community facilities have re-opened. NOCCA has re-opened, but the Bywater Hospital remains closed.

Marigny

For the purposes of this study, the boundaries of the Faubourg Marigny are Esplanade Avenue to the west, St. Claude Avenue to the north, and Franklin Avenue of the east, the Mississippi River to the south. This area, which is part of the Faubourg Marigny National Historic District, is also referred to as the Marigny Triangle. The Faubourg Marigny was added to the National Register in 1974 for its significance in architecture and engineering (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007f). The architectural styles in the Marigny include: Italianate, Greek Revival, Creole cottages, Victorian, among others (Ibid. 2007).

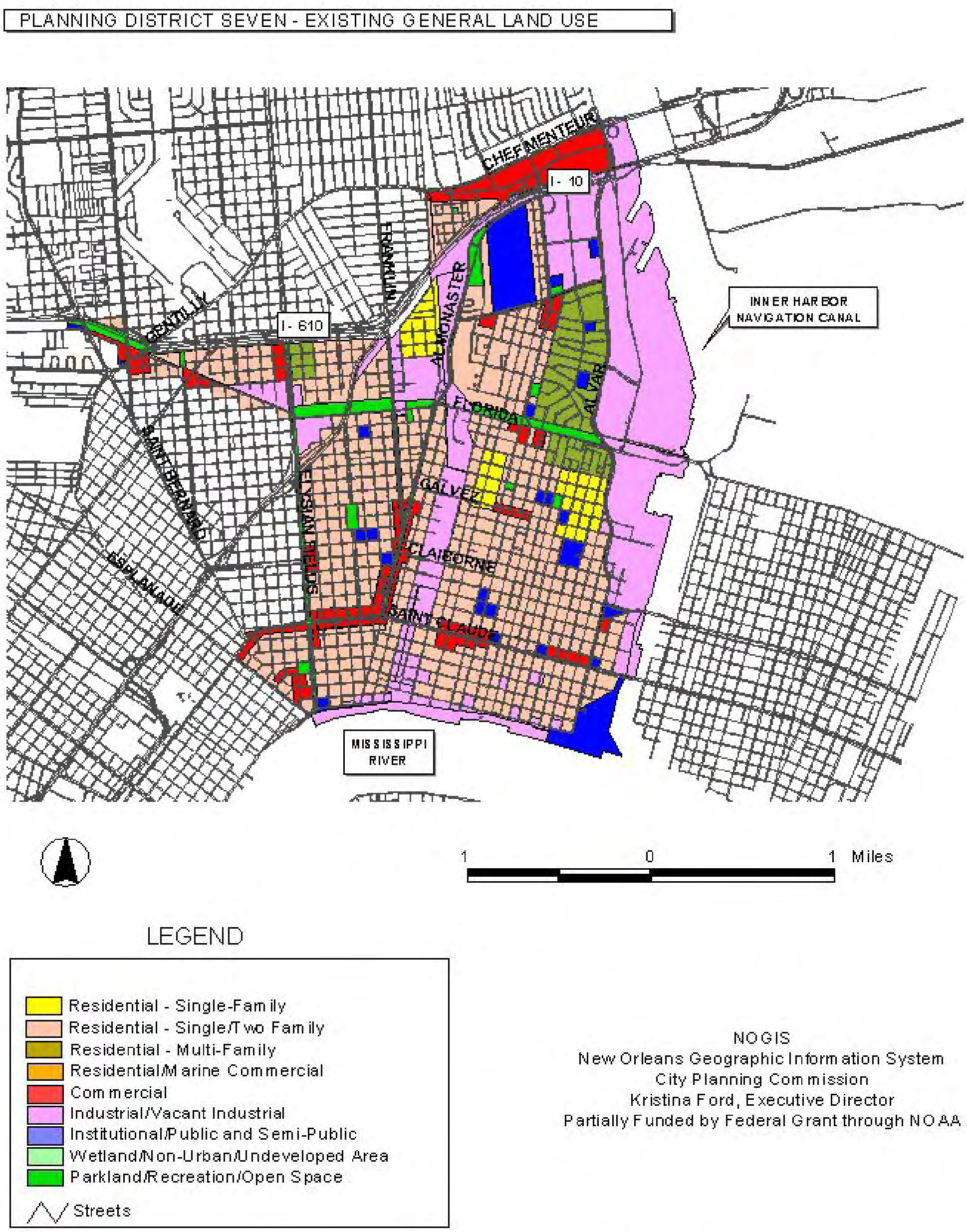
The majority of land uses in the Marigny are residential. Frenchman Street is a mixed-use corridor with restaurants, night clubs, bars, coffee shops, bed and breakfasts and other commercial uses located along side residences. Less-intense neighborhood commercial uses are located throughout the Marigny, and more intense commercial uses are located along Rampart Street and Elysian Fields Avenue. Washington Square Park is a major recreational facility in the neighborhood.

The majority of housing units in the Marigny were constructed prior to 1940 (U.S. Bureau of the Census 2000: SF3). The number of housing units within a structure varies throughout the Marigny; 31.86% are single-family homes, 28.94% are duplexes, and 26.73% of housing units are in structures containing less than ten units (Ibid 2000). The majority of Marigny residents are renters: 33.58% of occupied housing units were owner-occupied in 2000 (Ibid 2000). The median housing value in 2000 in the Marigny was $136,000 (Ibid 2000).

The Faubourg Marigny sustained wind damage from Hurricane Katrina, but did not experience flooding due to its location on the high ground adjacent to the Mississippi River. Businesses and residents returned quickly to the Marigny, and little visual evidence of hurricane damage remains in the neighborhood.

Figure 2-5 presents the existing land uses in Planning District 7 (St. Roch, St. Claude, Marigny, and Bywater) in 1999.

Figure 2-5 Existing Land Use District 7 (1999)



Source: New Orleans City Planning Commission 1999.

Seventh Ward
For the purposes of this study, the Seventh Ward neighborhood is defined as the area bounded by St. Claude Avenue/Rampart Street to the south, one block south of Florida Avenue (Treasure, Abundance, Agriculture, Industry, Duels, and Hope Streets) to the northeast, N. Broad Avenue to the northwest, Elysian Fields Avenue to the east, and Esplanade Avenue to the west. In the Antebellum period, the Seventh Ward was primarily populated by free people of color (GNOCDC 2007e). From the mid-nineteenth century until the mid-twentieth century, one of the most successful African-American business districts in the country was located in the Seventh Ward and neighboring Tremè (Ibid. 2007).

The prosperous business district along Claiborne Avenue in the Seventh Ward was destroyed for the construction of I-10. Rows of live oak trees were removed, and the neighborhood was divided by the interstate facility. The neighborhood steeply declined following the construction of the interstate.

The Seventh Ward was home to several New Orleans jazz musicians from the early twentieth century to the present. Social aid and pleasure clubs are an important component of Seventh Ward culture (Ibid. 2007). The Autocrat Club offers weekly Friday fish fries and Saturday dances. Hunters Field in the Seventh Ward is a traditional Super Sunday meeting place for Mardi Gras Indian tribes, and the area is home to the Seventh Ward Hunters. Corpus Christi Catholic Parish, established in 1915 in the Seventh Ward, is the largest African-American Catholic parish in the United States (Ibid. 2007).

Land use in the Seventh Ward is primarily one- and two-family residential. Commercial corridors are located along Claiborne Avenue, St. Bernard Avenue, and Rampart Street. The southern portion of the Seventh Ward neighborhood, between St. Bernard Avenue, Elysian Fields Avenue, Rampart Street, and Claiborne Avenue, is part of the Marigny Historic District. Portions of the Seventh Ward adjacent to the Esplanade Ridge National Historic District are locally designated as the Esplanade Ridge Historic District (Ibid. 2007).

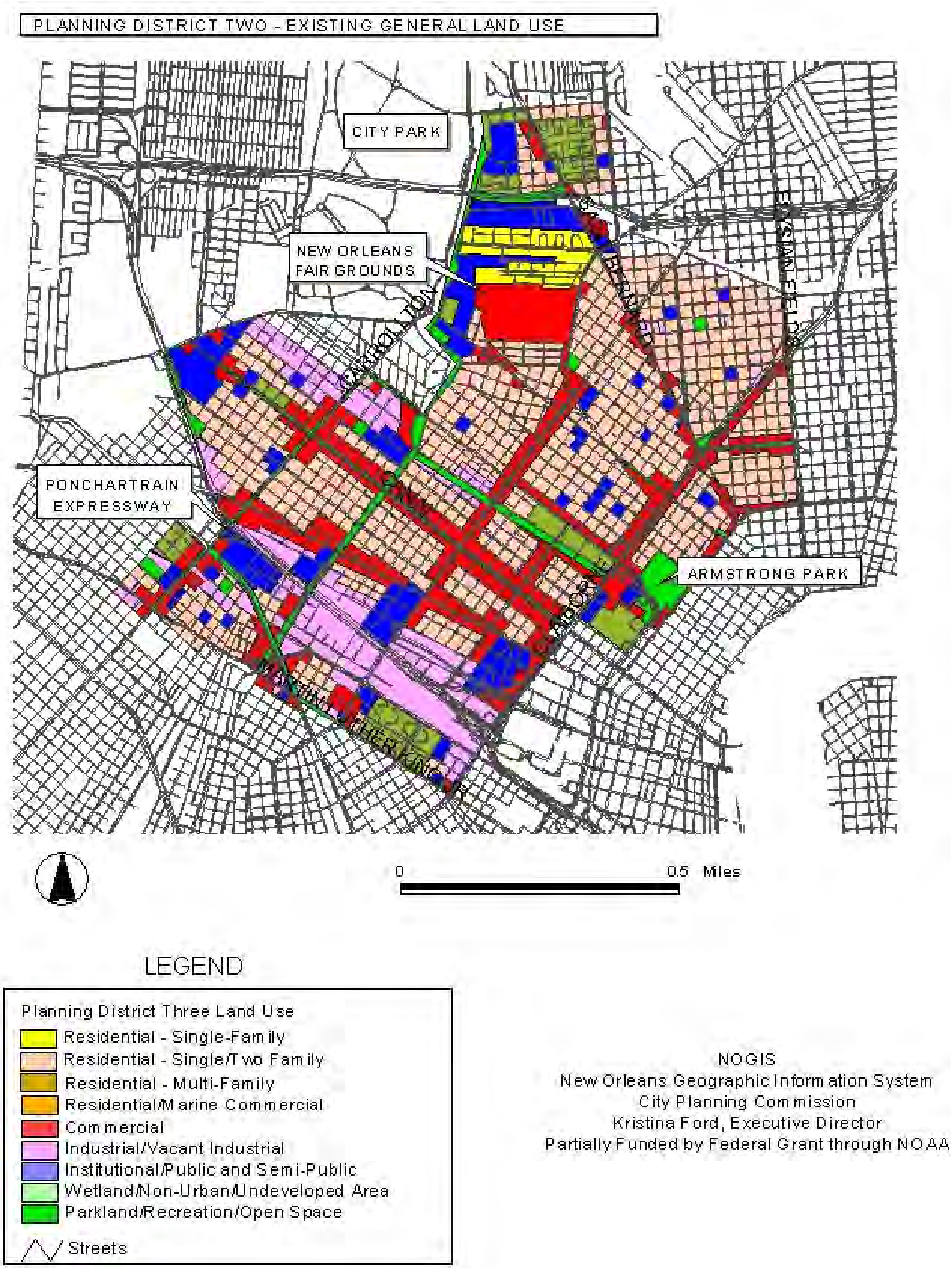
St. Augustine High School is located in the Seventh Ward. The Marching One Hundred, St. Augustine's marching band, is a favorite at Mardi Gras parades. Other schools in the Seventh Ward area include: Epiphany Academy, Jones Elementary, McDonough #42 Elementary, McDonough #35 Senior High School, Tureaud Elementary, and Corpus Christi Catholic School. Parks in the Seventh Ward include: A.P. Tureaud Park and Hardin Park. The Nora Navra Branch of the New Orleans Public Library is located in the Seventh Ward. St. Martin Manor, a housing development for the elderly owned and operated by the New Orleans Archdiocese, is located in the Seventh Ward.

The median year of construction for housing units in the Seventh Ward is 1946 (U.S. Bureau of the Census 2000: SF3). The majority of houses in the Seventh Ward were single-family homes in 2000 (61.31%), and 19.52% were duplexes (Ibid. 2000). Home-ownership rates in the Seventh Ward are lower than the parish-wide statistic with 32.99% of occupied housing units in the Seventh Ward being occupied by their owners, compared to 46.50% for the entire parish (Ibid. 2000). There were a significant number of vacant housing units in the Seventh Ward in 2000, 16.16% of all housing units were vacant (Ibid. 2000). Median housing unit value in the Seventh Ward was $65,800 in 2000 (Ibid. 2000).

The northeast portion of the Seventh Ward sustained significant damage due to flooding. The majority of the southern and western portions of the Seventh Ward were not flooded, but there was extensive damage due to winds, fire, and vandalism throughout the neighborhood (New Orleans City Planning Commission 2006i). A number of Seventh Ward residents have returned, but the neighborhood has not recovered. St. Augustine, McDonough #35, and Tureaud Elementary have re-opened; the rest of the schools in the Seventh Ward remain closed. Hardin Park is currently used for FEMA trailers. The Nora Navra Branch of the New Orleans Public Library and St. Martin Manor remain closed. However, the Autocrat Club has resumed hosting weekly fish fries and dances.

Figure 2-6 presents the existing land uses in Planning District 7 (Seventh Ward and surrounding neighborhoods) in 1999.

Figure 2-6 Existing Land Use District 2 (1999)



Source: New Orleans City Planning Commission 1999.

French Quarter
The portion of the French Quarter included in the study area is bounded by Esplanade Avenue to the east, the Mississippi River to the south, N. Rampart Street to the north, and St. Phillip Street to the west. This area is part of the Vieux Carre Historic District, added to the National Register of Historic Places in 1966 (Louisiana Department of Culture, Recreation and Tourism, Division of Historic Preservation 2007f). There are several buildings in the French Quarter that are listed individually on the Nation Register, including the following buildings that are within the limits of the study area: the French Market (Old Vegetable Market), Gallier House, Lafitte's Blacksmith Shop, LeCarpentier-Beauregard-Keyes House, Madame John's Legacy, Old Ursuline Convent, Jean Louis Rabassa House (also known as McDonough No. 18 School Annex), and the U.S. Mint, New Orleans Branch (Ibid. 2007).

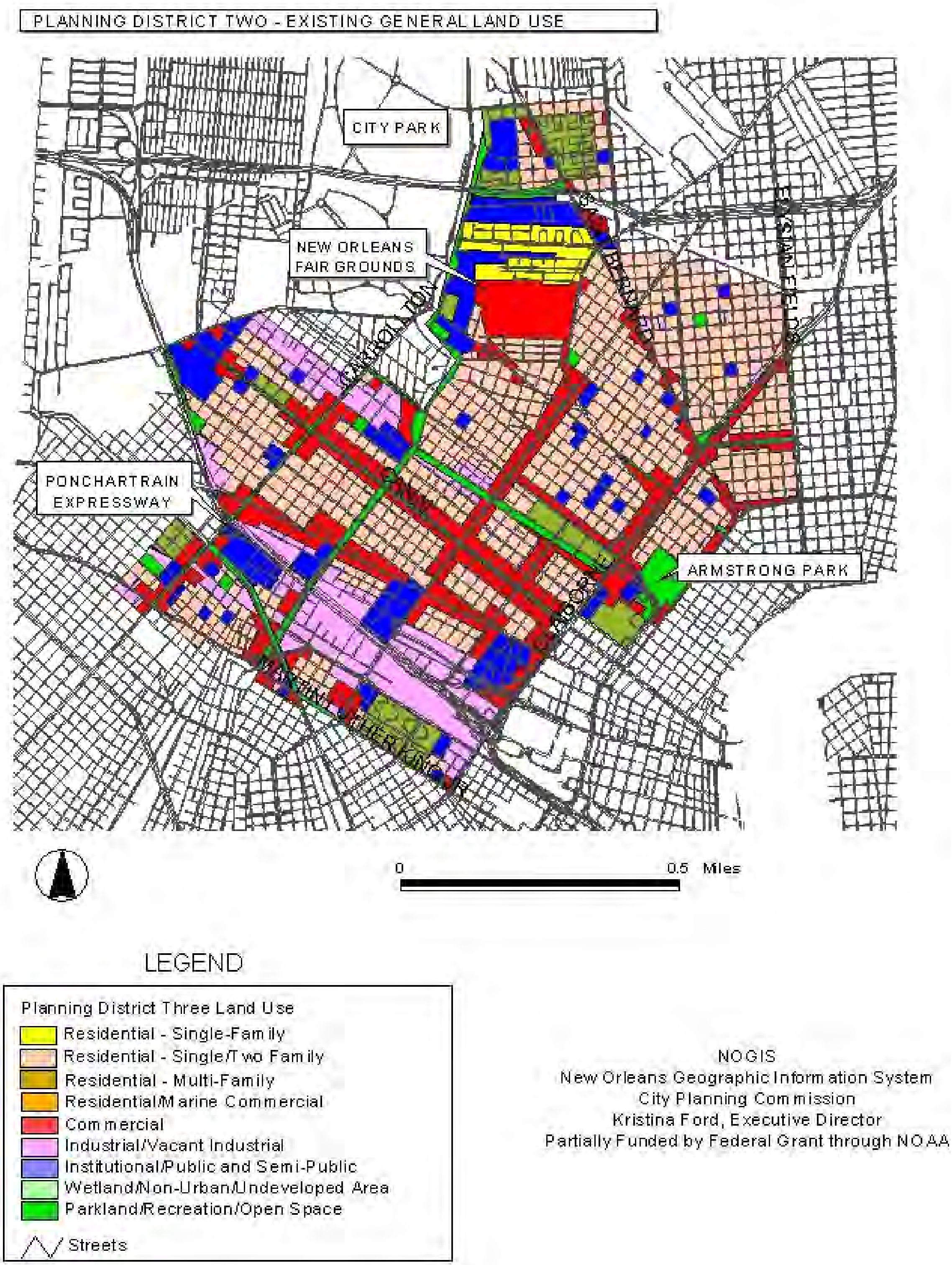
The French Quarter is the original part of the City of New Orleans, founded in 1718 by Jean Baptiste le Moyne, sieur de Bienville (GNCDC 2007f). The French Quarter is a tourist destination and includes restaurants, bars, nightclubs, art galleries, antique stores and other retail establishments and attractions (Ibid. 2007). Land use in the French Quarter is primarily commercial, although the portion included in the study area is largely residential. Along commercial corridors, such as Decatur and Royal Streets, buildings often contain commercial uses on the bottom floor and residences on upper floors.

The majority of existing structures in the French Quarter were constructed after 1794, when fire destroyed most of the original French settlement. Duplexes are typical in the French Quarter: 55.00% of housing units in the portion included in the study area contain two units (U.S. Buresu of the Census 2000: SF3). A minority of housing units are single-family, at 20.71% (Ibid. 2000). Residences containing between three and nine units compose 42.26% of the total housing units, and the remaining portion is composed of multi-family residences containing ten units or more (Ibid. 2000). Most residents of the French Quarter rent, 66.51% of occupied housing units are rented (Ibid. 2000). Median housing value in the French Quarter is $346,000 (Ibid. 2000).

The French Quarter experienced damaging winds that destroyed property, particularly through damage to roofing systems. The majority of damage in the French Quarter has been economic: the commercial establishments in the French Quarter depend on tourism, and tourism levels have not recovered. The majority of businesses in the French Quarter are open; however, many are operating with smaller staffs, and profits have not recovered to pre-Katrina levels.

Figure 2-7 presents the existing land uses in Planning District 1 (French Quarter) in 1999.

Figure 2-7 Existing Land Use District 1 (1999)



Source: New Orleans City Planning Commission 1999.

Overview of Existing Plans

Unified New Orleans Plan

Many plans have been developed in the New Orleans area following Hurricane Katrina. The Unified New Orleans Plan (UNOP) is a major planning effort that has been undertaken in the City of New Orleans at the neighborhood, district and city-wide levels. This effort resulted in thirteen district plans and one city-wide plan. Following approval from the New Orleans City Planning Commission, the New Orleans City Council, and the Mayor's Office, the Unified New Orleans Plan was submitted to the Louisiana Recovery Authority (LRA) and approved. Federal rebuilding funds will be released to the city to implement rebuilding projects based on the UNOP.

Seven main goals are identified in the UNOP city-wide plan. The majority of these goals could be supported through the development of an advanced transit system and associated transit oriented development in the Elysian Fields corridor, namely:

1. Foster remedies to address blighted neighborhood conditions throughout the City.
2. Promote the strengthening and diversification of the economy by retaining key facilities, making strategic investments in workforce development and new infrastructure, and improving the overall quality of life.
3. Ensure an adequate supply of affordable, rental and public housing in an equitable manner.
4. Renew the City's roads, utilities, public transit, and infrastructure in a sustainable and strategic fashion.
5. Make significant, strategic investments in community facilities that will result in substantially enhanced community infrastructure and improved service delivery.
6. Preserve New Orleans' culture, historic architecture and overall aesthetic character to the maximum extent possible while facilitating new development (Citizens of New Orleans, et al. 2007: 57-59).

Transit improvements to the Elysian Fields corridor are included in the UNOP city-wide plan. Specifically, the plan calls for an Elysian Fields streetcar that would "link the district, major institutions, and the lakefront to the rest of the city" and the preparation of an environmental impact statement for a "streetcar or light rail line on Elysian Fields" (Ibid 2007: 3-37) Several neighborhood rebuilding plans also mention the need for transit improvements in the Elysian Fields corridor (New Orleans City Planning Commission 2006, Bring New Orleans Back Commission 2005).

1999 Land Use Plan
Currently, the New Orleans City Planning Commission's *1999 Land Use Plan* is the primary adopted planning document guiding development decisions in the city. The plan was developed with significant public involvement activities. The *1999 Land Use Plan* documents conditions in the city's thirteen planning districts and provides a planning recommendations and a future land use map to guide development.

Gentilly residents have expressed negative views about increasing density and rental units in the area in several neighborhood planning forums. In Planning District 6, which includes the Gentilly area, the *1999 Land Use Plan* documents concerns from residents that include: "declines in the rate of owner-occupancy, reduction in quality or variety of services; evidence of deteriorating housing or increasing densities; and the potential for infill and large new development to be out of character in scale, density or appearance" (New Orleans City Planning Commission 1999: 155). These negative views concerning increased density and rental housing may affect transit oriented development opportunities in the area.

Proposed land uses for the Elysian Fields corridor, as shown in the 1999 Land Use Plan would not support transit oriented development. There are no provisions for increases to density or rental housing, or mixed use developments. Changes to the land use plan and the associated Comprehensive Zoning Ordinance would be required to allow larger scale mixed use developments in the corridor.

Existing Bicycle and Pedestrian Environment

The existing bicycle and pedestrian environment in the study area varies. In the southern portion of the study area (the Faubourg Marigny, French Quarter, St. Claude, Bywater, Seventh Ward, and St. Roch neighborhoods) the bicycle and pedestrian environment is generally better than in the more suburban neighborhoods in Gentilly. Much of the roadway network in the southern portion of the study area was originally constructed prior to the dominance of the automobile, and therefore streets are generally narrower and usually incorporate sidewalks. However, pedestrians and bicyclists will encounter difficulty traveling along major thoroughfares, such as Elysian Fields Avenue, and at crossings. Crossings at major thoroughfares generally include pedestrian signals in the southern portion of the study area.

In the Gentilly area, pedestrians and cyclists may encounter difficulty on major thoroughfares, such as Elysian Fields Avenue and Gentilly Boulevard. Sidewalks are provided on both sides of Elysian Fields Avenue, and there are pedestrian signals at major intersections.

The St. Anthony Avenue bike/walking trail is an exceptional resource for cyclists and pedestrians in Gentilly. The trail is located in the median of St. Anthony Avenue from Mirabeau Avenue to Leon C. Simon Boulevard. This trail is primarily used for recreation, rather than transportation. Pedestrians and cyclists can reach Lakeshore Drive from the St. Anthony trail, although there is no direct pedestrian/bicycle route connecting the two routes. Lakeshore Drive is relatively bicycle and pedestrian friendly, as it is a designated bicycle route and equipped with sidewalks. There are no designated bike trails that connect with the St. Anthony Trail to the south.

Existing and Pre-Katrina Bus Service

At this time, public transportation services available in the New Orleans Metropolitan Area have been reduced as a result of Hurricane Katrina. The Regional Transit Authority (RTA) is operating with a fraction of its pre-Katrina budget, fleet, and staff. Prior to Hurricane Katrina, two routes operated on Elysian Fields Avenue, a local route and an express service. Currently, only the local service has been re-established with significantly longer headways. Monday through Friday, the route operates between 5:20 A.M and 10 P.M., with 33 minute peak period headways and non-peak headways as much as 58 minutes (RTA: 2007). On week-ends, the route only operates between 5:30 A.M. and 6 P.M. with one hour headways (RTA: 2007). The limited hours and long headways associated with the route make using transit inconvenient, and the majority of trips in the corridor are conducted in personal vehicles. Transit dependent persons in the corridor, such as many resident students at UNO and Dillard University, are constrained by the current schedule.

Table 2-8
RTA Routes with the Highest Monthly Ridership Numbers
May 2005

Route Number and Name	Monthly Ridership May 2005
1. 12 St. Charles	310,378
2. 42 Canal/Light Rail	241,881
3. 39 Tulane	158,795
4. 84 Galvez	120,023
5. 97 Broad	103,814
6. 88 St. Claude	99,508
7. 98 Broad	95,523
8. 45-Canal Light Rail	95,007
9. 64 Lake Forest Express	91,124
10. Unclassified	88,590
11. 11 Magazine	86,473
12. 02 Riverfront	85,978
13. 27 Louisiana	82,776
14. 55 Elysian Fields	**79,647**
15. 57 Franklin	**75,544**

Source: RTA 2007. Ranked by author.

Table 2-8 presents monthly RTA ridership data for May 2005. The 55 Elysian Fields had the fourteenth highest monthly ridership of all RTA routes in May 2005. The Franklin route, located seven blocks to the east had the fifteenth highest monthly ridership figure in May 2005. The sum of the monthly ridership in these two corridors in May 2005 is 155,191, which is slightly less than the ridership for the third ranking route in May 2005, the Tulane.

Table 2-9 RTA Routes with the Highest Monthly Ridership Numbers May 2007	
Route Number and Name	**Monthly Ridership May 2007**
1. 12 St. Charles Bus	96,624
2. 42 Canal Light Rail	54,785
3. 42 Canal Buses	46,141
4. 11 Magazine	41,853
5. 88 St. Claude/Barracks	37,618
6. 39 Tulane	35,948
7. 107 General De Gaulle	29,529
8. 94 Broad	28,759
9. 91 Jackson	26,634
10. 55 Elysian Fields	**19,066**
11. 57 Franklin	**18,027**
12. 17 S. Claiborne/Poydras	15,595
13. 52 St. Bernard	14,480
14. 102 General Myers/Whitney	13,910
15. 27 Louisiana	10,583

Source: RTA 2007. Ranked by author.

Table 2-9 presents the fifteen highest ranking routes in terms of ridership numbers for May 2007. These data demonstrate the significant systemwide decrease in transit ridership. The data also indicate population shifts of transit riders in the metropolitan area, as two Westbank routes, the 107 General De Gaulle and 102 General Myers/Whitney ranked in the top fifteen routes. The Westbank area of New Orleans did not experience catastrophic flooding, and sustained relatively minor damage due to Hurricane Katrina.

Table 2-9 also demonstrates that transit ridership is still relatively high in the Elysian Fields Corridor, despite a significant decrease in population throughout the damaged portions of the corridor. Additionally, the 55 Elysian Fields monthly ridership for September 2007 was 21,755, demonstrating a 14% increase between May and September 2007 (RTA 2007).

Chapter 3: Transit Technology Evaluation

Transit technologies can be sorted into several classifications that have particular characteristics to serve a variety of transportation needs. For purposes of this evaluation, the transit technologies will be grouped according to four general technology classifications: Traditional Bus Transit, Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Streetcars. This chapter examines these technologies, their general operating characteristics, and potential application in the Elysian Fields Avenue corridor.

Traditional Bus Transit

Bus transit systems are the most common public transportation mode. The vehicles and operational systems vary greatly among bus transit systems. Typically, vehicles are large, multi-passenger, rubber-tired, and powered by gasoline or diesel propulsion engines. Traditional buses can typically accommodate an average of 40 seated passengers and 30 standing passengers (FTA 2006: 7-8). Traditional bus transit systems operate in mixed traffic according to a fixed schedule. Conventional buses generally require passengers to board the vehicle using steps or low-level platform. Stops range from simple street signs that designate the area as a bus stop to stations with shelters and other amenities.

Existing service on Elysian Fields Avenue is traditional bus transit. Throughout the corridor, RTA signs at street corners designate bus stops. At the University of New Orleans and at the intersection of Gentilly Boulevard and Elysian Fields Avenue, simple shelters are provided. Elysian Fields bus service operates in the outside lane of mixed traffic on a fixed schedule. The Elysian Fields route utilizes a traditional rubber-tired, diesel propulsion vehicle that is typically boarded by stairs; however the vehicle is ADA accessible and employs a hydraulic platform for handicapped boarding.

Figure 3-1 New Orleans RTA Traditional Bus Vehicle

Source: RTA 2007a

Bus Rapid Transit (BRT)

Bus Rapid Transit, or BRT, is a flexible rapid transit mode that combines a variety of physical and operating elements. BRT lacks a precise definition, but a successful BRT system aims to improve transit service by utilizing a combination of strategies to reduce delay. The main elements that distinguish BRT from traditional bus service include: service strategy, running ways, stops/stations, vehicles, intelligent transportation systems, and fare collection (Diaz, et al. 2004: 2-68).

Service Strategy

FTA's *Characteristics of Bus Rapid Transit for Decision-Making* states, "BRT service needs to be frequent, direct, easy to understand, comfortable, reliable, operationally efficient, and above all, rapid" (Ibid. 2004: 2-68). The service strategy of a BRT system is the primary way to achieve these goals. The length of the route, the route structure, the service span and frequency, and station spacing are outlined as some service elements affecting the design of a successful BRT system (Ibid. 2004: 2-68 to 2-76). Additionally, service on the feeder network connecting the route to the larger transportation network needs to be considered.

Running Ways

BRT systems can operate on exclusive running ways, mixed traffic, high occupancy vehicle (HOV) lanes, or a combination of different running ways (Ibid. 2004: 2-4 to 2-5). The degree of exclusivity can affect the reliability and speed of the BRT system (Ibid. 2004: 2-4). Generally, exclusive running ways provide the most reliable service and will contribute to the image of the system as a premium transit service (Ibid. 2004: 2-5).

The physical marking of the running way designates where the BRT service operates. This can be achieved through various techniques: striping (pavement markings), alternative pavement texture or color, and/or raised demarcation borders such as retroreflectors (Ibid. 2004: 2-6). The physical demarcation of the running way affects the efficiency of BRT systems that operate in mixed traffic. BRT systems that operate on exclusive running ways also need to be clearly physically designated to ensure other vehicles do not enter the right-of-way.

Where BRT systems operate in mixed traffic, queue jumps can be utilized to improve the efficiency and travel times of the system (Ibid. 2004: 2-14). Queue jumps consist of a segment of roadway preceding intersections that are designated exclusively for transit vehicles to allow the transit vehicle to bypass congestion at the intersection.

Running ways can also include guidance technology, which includes several concepts for steering or guiding buses through the use of guidance curbs, a guide rail, or a specially-equipped centerline that the bus follows by means of optical, electromagnetic, or mechanical technology (Ibid. 2004: 2-7). Maneuvering in narrow locations and precision docking at stations can be achieved through guidance technology. Guidance systems also reduce right-of-way requirements and may improve operating speeds and reduce dwell times (Ibid. 2004: 2-15).

Stops/Stations
The stations used in BRT systems vary widely from traditional bus stops with little or no shelter to large stations with many amenities. The FTA outlines four types of BRT stations: simple stop, enhanced stop, designated station, and intermodal transportation centers (Ibid. 2004: 2-13).

Existing RTA stops are simple stops. Throughout the corridor, signage designates street corners where the bus stops. The majority of these stops do not provide simple shelters. Simple stops do not offer passenger amenities and do not contribute to the "branding" of the system as a premium transit service. However, simple stops are the least expensive station option and can be easily implemented (Ibid. 2004: 2-14).

Enhanced BRT stops provide more amenities and design features than simple stops. Passenger amenities included in enhanced BRT stops often include enhanced weather protection, benches, and trash cans (Ibid. 2004: 2-15). Enhanced BRT stops include design features to differentiate them from traditional bus stops, contributing to the branding of the BRT system as a premium transit service (Ibid. 2004: 2-15). The costs associated with enhanced stops are greater than those associated with a simple stop (Ibid. 2004: 2-15).

A designated station usually includes a station structure with more passenger amenities than enhanced stops. This may include level boarding platforms, retail service, and parking facilities (Ibid. 2004: 2-16). The capital and maintenance costs associated with a designated station are greater than the costs of simple stops and enhanced stops (Ibid. 2004: 2-15).

An intermodal transportation center includes the amenities associated with designated stations, but also provides access to other forms of transportation. Intermodal transportation centers may include transfers to other public transportation modes and/or park-and-ride facilities (Ibid. 2004: 2-16). Intermodal transportation centers are the most costly BRT station type (Ibid. 2004: 2-16).

Vehicles
The vehicles utilized in BRT systems vary widely. A BRT system can utilize traditional rubber-tired, diesel propulsion vehicles without any enhanced features. Generally, if traditional vehicles are used in a BRT system, the vehicles will employ a distinctive livery to distinguish BRT buses from local buses (Ibid. 2004: 2-29). In most BRT systems, distinctive vehicles with enhanced interior and exteriors are central to the branding strategy that designates the system as a premium transit service. High-capacity articulated BRT vehicles can accommodate over 100 passengers (FTA 2006: 20-22)

Enhancements to passenger movements and comfort can also contribute to the BRT branding strategy (Diaz, et al. 2004: 2-30). These improvements include options such as wider doors, additional doors, alternative seat layouts and level boarding capabilities (Ibid. 2004: 2-30). Advanced propulsion systems, such as overhead catenary electric power, electric-hybrid, or hydrogen fuel cell vehicles, can be used in BRT systems. Advanced propulsion vehicles contribute to the positive image of the BRT system as a premium transit service and an environmentally-sensitive mode of travel (Ibid. 2004: 2-33).

Figure 3-2 Las Vegas MAX BRT Vehicle

Source: FTA, *Las Vegas Metropolitan Area Express MAX*, 2005

Intelligent Transportation Systems (ITS)
ITS technology can be applied to BRT systems to improve the reliability and efficiency of the service (Ibid. 2004: 2-49). One of the most common ITS strategies utilized in BRT systems is signal priority (Ibid. 2004: 2-52). An active signal priority system electronically detects the presence of a transit vehicle and can either give an early green signal or delay an existing green signal to allow the transit vehicle to pass through the intersection (Ibid. 2004: 2-52). Signal priority systems are often used in conjunction with queue jumps (Ibid. 2004: 2-52).

Real time passenger information and automatic vehicle locators (AVL) are other examples of ITS applications in BRT systems. Real-time passenger information can improve the perception of the transit service and improve reliability and efficiency (Ibid. 2004: 2-62). AVL technology can insure that BRT vehicles are managed in the most efficient manner and assist in real-time travel information (Ibid. 2004: 2-55).

Fare Collection
Fare collection techniques can range from traditional pay-as you-board to pre-payment (proof of payment), and electronic payment systems (Ibid. 2004: 2-39). The fare collection method can affect the dwell times, efficiency, convenience, and the reliability of the service (Ibid. 2004: 2-45). Advanced fare collection methods can also contribute to the perception of the service as a premium transit mode (Ibid. 2004: 2-45).

Light Rail Transit (LRT)

Light Rail Transit (LRT) is a premium transportation mode that can operate in a variety of physical settings. As with BRT, LRT combines a variety of physical and operating elements to improve transit service by reducing delay. The main elements of an LRT system that distinguish it from traditional bus service are similar to BRT. With LRT, the vehicles are the major element that distinguishes the service, although service strategy, running ways, stops/stations, intelligent transportation systems, and fare collection are also important components of creating a premium LRT service.

The difference between light rail and heavy rail is how the vehicles are powered. LRT vehicles are usually powered by an overhead catenary system (OCS), while heavy rail vehicles are usually powered from a track-level third rail (APTA 2007). Similar to BRT systems, LRTs can operate in mixed traffic on tracks embedded in the street (like streetcars) or on exclusive right-of-way.

LRT vehicles usually operate on dual rails. Most light rail systems in the U.S. use articulated vehicles that are 70 to 95 feet long, typically 8.5 to 9.5 feet wide (Boorse 2000: 14). Operator cabs at both ends of the vehicle, doors on both sides, and passenger seating arrangements allow for bi-directional operation. Vehicles can operate either as a single car or in multi-car trains. A three-car consist can accommodate approximately 400 passengers (Ibid. 2000: 14). The maximum operating speed of LRT systems generally ranges from 55 to 65 miles per hour, making them suitable for short and medium distance trips (Ibid. 2000: 14-16). Average operating speeds range from 10 miles per hour in center in-street operation with closely spaced stops to 35 miles per hour if operating in exclusive right of way with widely-spaced stops (Korve, Hans et al. 1996: 17-18).

LRT is more limited by physical design than BRT. Because they operate on a fixed guideway, routes cannot be changed once they are in place. Also, LRT systems are limited by geometric constraints. Typical design standards include a ten percent maximum gradient and a minimum 82-foot curve radius (Ibid. 2000: 13).

Figure 3-3 Houston METRO LRT Vehicle

Source: Newberg 2004

Streetcars

Streetcars, also referred to as trolleys, were the main mode of urban public transportation in the U.S. throughout the first half of the twentieth century. Most streetcars were replaced with buses between the late 1940's and mid 1960's (APTA 2007b).

New Orleans has a unique history with streetcars and three currently operating streetcar lines.[1] The oldest continuously operating street railway in the world, the St. Charles Avenue Line, is located in New Orleans (American Society of Mechanical Engineers 1984: 1). While many streetcar lines were replaced with buses, some restoration projects have been completed and others are currently being considered. In 2004, streetcar service returned to Canal Street, 40 years after the service was discontinued. A new Riverfront Streetcar Line was added in 1998. A Draft Environmental Impact Statement has been completed for the renewal of the St. Claude Avenue Line as a new Desire Streetcar Line.

A streetcar is typically either a small single truck design or a larger double truck design (APTA 2007b). Single truck cars seat approximately 25 to 30 passengers and are generally less than 30 feet long (Ibid. 2007). Double truck cars are typically 30- to 50-feet long, seating up to 60 passengers (Ibid. 2007). The minimum curve radius for streetcars varies by the type of car. However, streetcars require shorter curve radii than LRTs, typically between 35 to 50 feet (Ibid. 2007). Like LRT, streetcars are usually electrically powered by an OCS. Streetcars operate in or near city streets. Tracks can be embedded in the street and operate in mixed traffic or operate on exclusive right-of-way adjacent to streets.

The St. Charles Avenue Line operates on partially separate right-of-way for most of its length in the St. Charles Avenue neutral ground between Carrollton and Claiborne Avenues and St. Charles Avenue and Calliope Street. In this area, cars are able to enter the streetcar right-of-way at every street crossing. There is no control of pedestrian access along the route. From Calliope Street to the end of the line at Canal Street, the St. Charles Avenue Streetcar operates in mixed traffic along St. Charles Avenue and Carondelet Street. The Canal Line operates in similar mixed traffic conditions. The Riverfront Line operates primarily adjacent to a heavy rail line. Although it does not operate in the same right-of-way as automobiles for the majority of the line, pedestrian access is not strictly controlled along the line.

[1] The overhead power systems of the St. Charles Avenue Streetcar Line were severely damaged in Hurricane Katrina. At the time of this writing, only a portion of the route is operational.

Figure 3-4 RTA Streetcar Vehicle

Source: RTA 2007a. Note: Streetcar vehicle on right (2000 Series Von Dullen) shown next to a modern style LRT vehicle on left.

Alternatives

The logical termini for this proposed project are Elysian Fields Avenue near its intersection with N. Peters Street and Elysian Fields Avenue at Lakeshore Drive. These termini are optimal for several reasons. Two major areas of attraction, the Lakefront and the Vieux Carre (French Quarter) would be linked by a new transit route between these two termini. Several major trip generators are located along Elysian Fields Avenue between the Vieux Carre and the Lakefront. The Elysian Fields Avenue neutral ground is of sufficient width to accommodate a transit alternative between these two termini, with the exception of a few short distances, and very little additional right-of-way would be required. There are several opportunities for connections to other existing and proposed transportation facilities along Elysian Fields Avenue between these two points. The area between the Lakefront and the Vieux Carre has many opportunities for redevelopment that could be stimulated by the implementation of a new transit investment. While the Vieux Carre has fewer development opportunities, the stability provided by this anchor makes the points in between more attractive for development.

An alignment that provides uninterrupted service through the Vieux Carre to the Central Business District (CBD) would provide greater transportation benefits then the improvements proposed for Elysian Fields Avenue exclusively. However, there are a number of issues associated with extending the line beyond the proposed termini. Transit vehicles are not allowed to operate through the National Historic District, with the exception of the Riverfront Streetcar and the two routes that operate in the N. Peters/Decatur corridor (RTA 2007). In addition, the Riverfront Streetcar Line provides access to several points in the Vieux Carre and CBD and is immediately adjacent to the Elysian Fields/N. Peters terminus. Increased headways on the

Riverfront Streetcar Line are proposed as part of the improvements associated with each alternative. Furthermore, if the new Desire Line is constructed, it will provide an additional connection from the proposed Elysian Fields line to the CBD. The potential for extension of the new transit route beyond the limits of Elysian Fields Avenue is discussed for each alternative as a possible long-term improvement.

Existing Conditions

Prior to Hurricane Katrina, two routes operated on Elysian Fields Avenue, a local route and an express service. Currently, only the local service has been re-established with significantly longer headways. Monday through Friday, the route operates between 5:20 A.M and 10 P.M., with 33 minute peak period headways and non-peak headways as much as one hour. On week-ends, the route operates between 5:30 A.M. and 6 P.M. with one hour headways (RTA 2007b). The limited hours and long headways associated with the route make using transit inconvenient, and the majority of trips in the corridor are conducted in personal vehicles. Transit dependent persons in the corridor, such as many resident students at UNO and Dillard University, are constrained by the current schedule.

Express Bus Alternative

The express bus alternative consists of mainly low-cost operational improvements. As noted above, Route 56 was an Elysian Fields Express route prior to Hurricane Katrina. The Express Bus Alternative evaluated herein consists of a route operating between UNO and Canal Street on the existing 55 Elysian Fields route, which traverses the length of Elysian Fields Avenue, turns on N. Peters Street/Decatur Street to terminate at Canal Street.

The Express Bus Alternative would utilize the outer lane of Elysian Fields Avenue, N. Peters and Decatur, and Canal Streets and would operate with existing RTA buses. The buses and stops would be designated as part of the express service through signage. The Express Bus Alternative would operate with 18 minute headways during peak periods with three buses, and would not operate during off-peak. Stops would be limited to the following:

- Canal Street
- Esplanade Avenue
- St. Claude Avenue
- N. Galvez Street
- I-610
- Gentilly Boulevard
- Robert E. Lee Boulevard
- UNO

These stops were selected because of their proximity to other existing transit routes and major trip generators. Hours of express service are proposed between 6 AM and 10 AM and 3 PM and 9 PM. The extended evening hours are proposed to serve students attending night classes, area employees, and students attending after school activities at area high schools.

By reducing the number of stops, the run time would be decreased. The run time between Canal Street and UNO is approximately 31 minutes on the local 55 Elysian Fields bus during peak periods. It is estimated that by reducing the number of stops, the average speed of the bus would increase to 20 miles per hour (mph), including dwell times at stops. The Express Bus Alternative would be able to make the run between Canal Street and UNO in approximately 18 minutes. Three buses would be required to operate the express service.

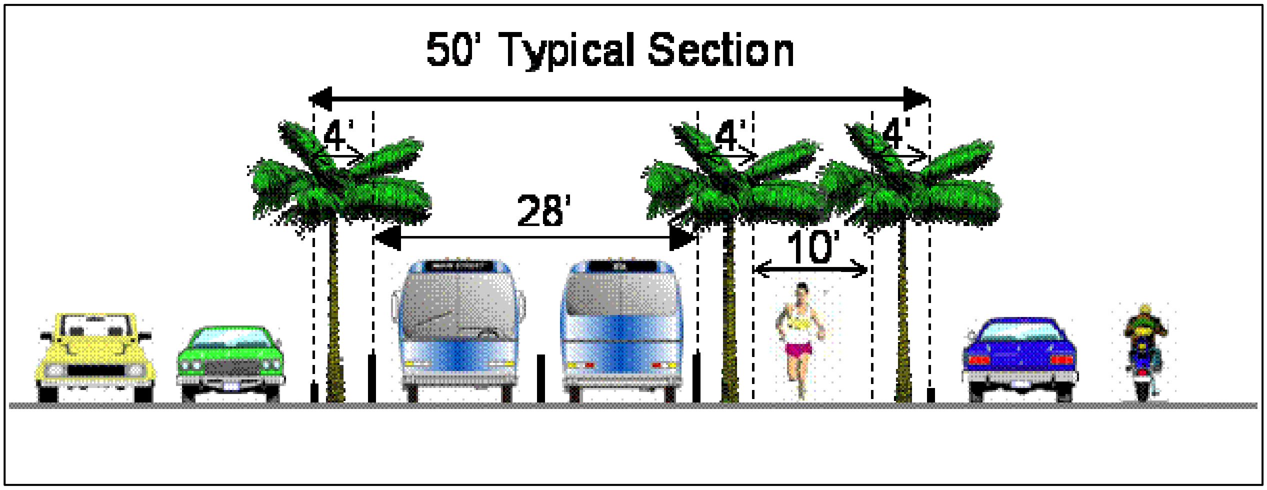
BRT Alternative

The BRT Alternative consists of a premium headway-based transit service operated on primarily exclusive right-of-way along Elysian Fields Avenue. Because Elysian Fields Avenue has a broad neutral ground throughout most of its alignment, there are several physical options for the placement of the exclusive running way. Elysian Fields Avenue could be reconstructed to locate the transit ways in either the inner or outer existing lanes. These options were initially examined, but ultimately it was determined that a median arterial transit way would be the best option for the Elysian Fields Avenue corridor for several reasons.

The median arterial option physically separates the BRT from general traffic, which contributes to the image of the BRT as a premium transit service. The neutral ground location also minimizes the potential for conflicts between buses and automobiles. Because Elysian Fields Avenue has a broad cross section, the neutral ground location allows for the provision of an adjacent multipurpose trail, which would be more difficult to provide with the other options. Vehicular traffic on Elysian Fields Avenue would not be significantly impacted by the neutral ground location while the new line is under construction. In addition, the neutral ground of Elysian Fields was the location of "Smokey Mary," a passenger rail line between the Vieux Carre and the Lakefront. Returning transit service to the neutral ground of Elysian Fields would demonstrate the City's respect for its past while rebuilding for the future.

Figure 3-5 below depicts a typical section for the BRT Alternative. This design provides enough space to safely accommodate a BRT system and multiuse trail. Pedestrian and cyclist improvements are included as part of the BRT Alternative to provide safe access to the system and create a truly multi-modal corridor.

Figure 3-5
BRT Alternative Typical Section



Source: Author

Because Elysian Fields Avenue has such a broad neutral ground, the separation between the BRT and the multiuse trail could be wider and include more extensive landscaping, street furniture, or public art in the following areas:

- Lakeshore Drive to Leon C. Simon Drive, where the neutral ground is approximately 75'
- Just south of Leon C. Simon to Odin Street, where the neutral ground varies between approximately 75' and 100'
- Just south of Odin Street to Mandolin Street, where the neural ground is approximately 75'

From Mandolin Street to the southern terminus of the project, the existing neutral ground is 50' or less, and the typical section illustrated in Figure 2.1 would be applied.

Description of Running Way
The following text describes the BRT Alternative alignment from north to south.

The BRT Alternative consists of constructing a new transit way located primarily in the neutral ground of Elysian Fields Avenue. The proposed northernmost station is at the UNO Technology Park, which is served exclusively by the proposed northbound line. The proposed northbound line exits the Elysian Fields Avenue neutral ground at Lakeshore Drive, and crosses the traffic circle at Lakeshore Drive on a tangent. The internal roadways of the Technology Park would be used to access the station, which would consist of a single side platform located on the north side of the existing access road. Northbound passengers could alight or continue to the UNO station. The UNO Technology Park Station is the northern terminus of the southbound line, and southbound passengers would embark as northbound passengers alight.

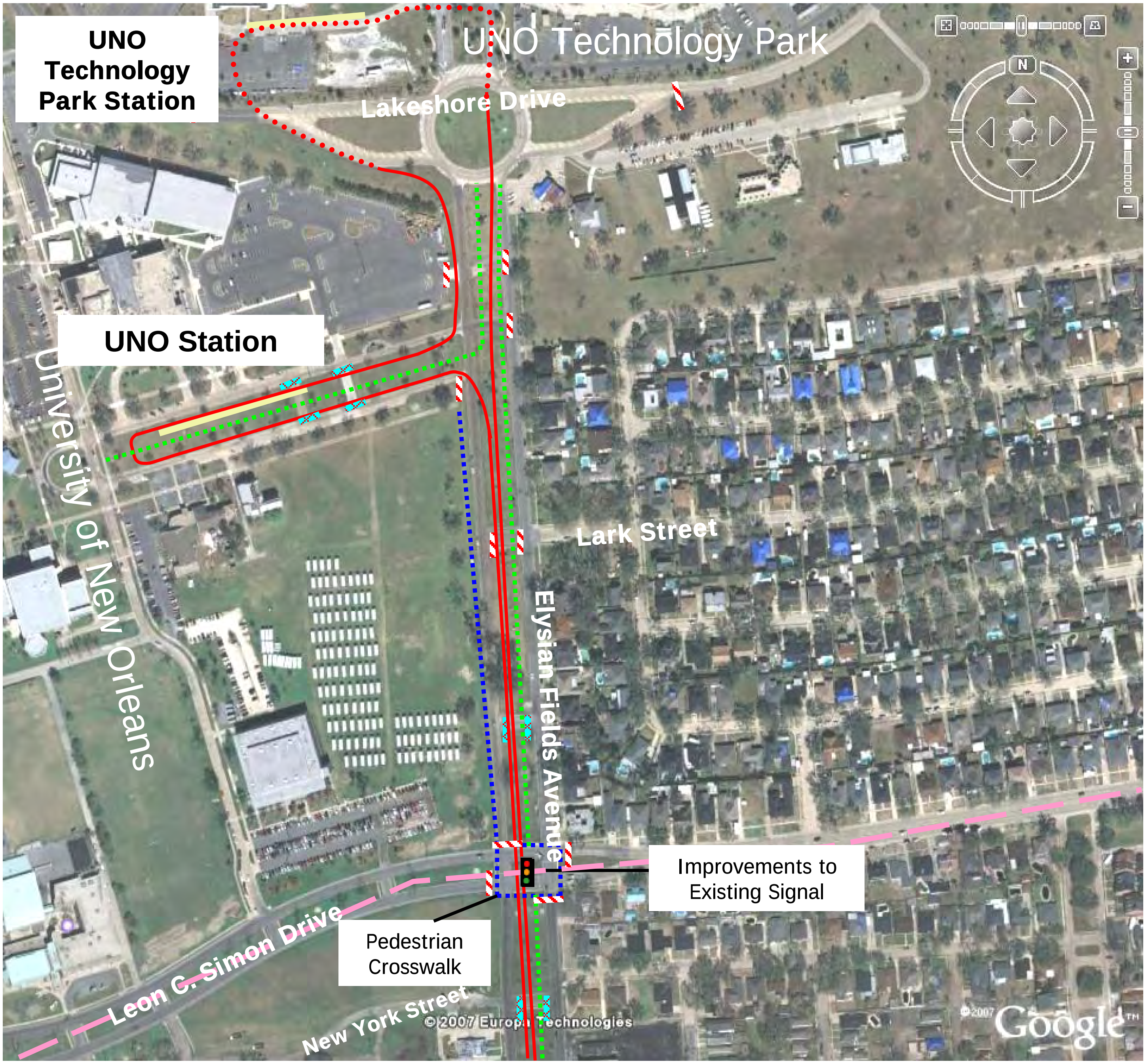
From the UNO Technology Park Station, the proposed BRT line curves across an existing parking lot to enter existing Lakeshore Drive. Crossing gates would be provided to prevent traffic from entering Lakeshore Drive in both directions while the BRT maneuvers into exclusive right-of-way located on UNO property. Crossing gates would also be located at the entrance to the UNO parking lot in the southwest quadrant of Lakeshore Drive, the access point to this lot from northbound Elysian Fields Avenue, and at the northbound access point to Alumni Drive.

The BRT would cross the westbound entrance to Alumni Drive, and enter an exclusive running way located in the Alumni Drive neutral ground. Existing access points across the neutral ground would be removed. The proposed UNO station consists of a single side platform on the south side of the Alumni Drive neutral ground. A multipurpose trail would also be located along the Alumni Drive neutral ground to provide pedestrian and cyclist access to the station. The proposed UNO station would be the last stop on the northbound route.

From the UNO station, the proposed alignment turns around and continues south along the south side of the Alumni Drive neutral ground. Crossing protection would be provided at the exit from Alumni Drive to Elysian Fields Avenue to separate traffic from the BRT as it transitions into the Elysian Fields Avenue right-of-way. Crossing protection would be provided at Lark Street and Leon C. Simon Drive. The neutral ground crossing between Lark Street and Leon C. Simon Drive would be removed to prevent BRT/automobile conflicts. Improvements to the signal at Leon C. Simon Drive, as well as all existing signals in the corridor, are included in the BRT Alternative to provide transit priority, prevent BRT/vehicle conflicts, and provide pedestrian phasing. The proposed improvements between Lakeshore Drive and Leon C. Simon Drive are shown on Figure BRT 1.

BRT 1

BRT Alternative – Lakeshore Drive to Leon C. Simon Drive



Basemap Source: Google Earth

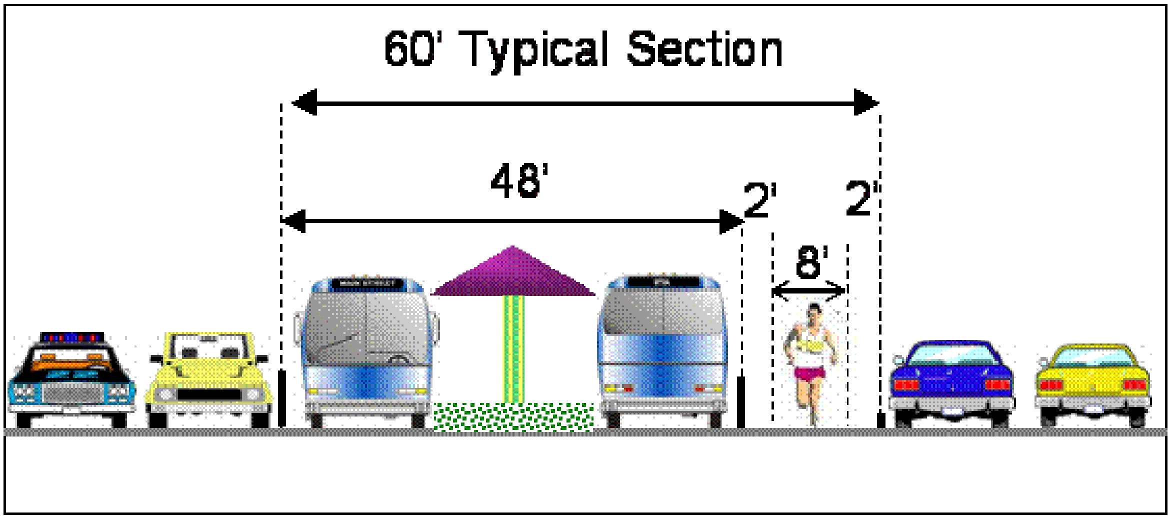
Legend

- Station Platform
- BRT Alignment, Separate ROW
- BRT Alignment, Shared ROW
- Existing Transit Alignment
- Proposed Transit Alignment
- Required Crossing Protection
- Access/Driveway Removal
- Roadway Relocation
- Multipurpose Trail
- Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

The BRT alignment would continue to traverse the neutral ground, with crossing protection provided at all street crossings. The neutral ground crossing at New York Street would be removed, as well as the crossing at Madrid Street. The crossing at Madrid Street would be removed to provide adequate space for the center platform station proposed south of Robert E. Lee Boulevard, referred to herein as Lee Station. See Figure BRT 2 for the location and conceptual layout of Lee Station. Figure 3-6 depicts a typical section at a center platform station.

Figure 3-6
BRT Alternative Center Platform Typical Section



Source: Author

Note that the multiuse trail would need to be decreased to 8 feet at station locations. Additionally, the distance between the transit way and the multiuse trail would be decreased to 2 feet, as well as the distance between the trail and the street curb. These distances meet minimum standards, provided a barrier is included separating motorized vehicular traffic lanes from the multiuse path. Wider spacing is advisable at station locations where the right-of-way is available (American Association of State Highway Transportation Officials 1999: 35-36). Also note in Figure 2.2 that the transit way platform is raised to accommodate level boarding and alighting.

BRT 2

BRT Alternative – Leon C. Simon Drive to Prentiss Avenue

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	BRT Alignment, Separate ROW		Access/Driveway Removal
	BRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

Figure BRT 3 depicts the conceptual alignment of the BRT Alternative in the Elysian Fields Avenue neutral ground between Prentiss Avenue and Mirabeau Avenue. Crossing protection would be provided at all cross streets, and improvements would be made to all existing signals as described above. A center platform station would be provided at Filmore Avenue.

Figure BRT 4 depicts the conceptual alignment between Mirabeau Avenue and Gentilly Boulevard. Crossing protection would be provided at all cross streets, and improvements would be made to all existing signals as described above. There are no stations provided in this section. Note on Figure BRT 4 and BRT 5 that the intersection of Gentilly Boulevard and Elysian Fields Avenue has been named a “target recovery zone” by the Executive Director of Recovery Management for the City of New Orleans (NOLA 2007). As a designated target recovery zone, potential developers are eligible for loans and other incentives to invest in the area.

BRT 3

BRT Alternative – Prentiss Avenue to Mirabeau Avenue

Basemap Source: Google Earth

Legend

Station Platform	Required Crossing Protection
BRT Alignment, Separate ROW	Access/Driveway Removal
BRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

BRT 4

BRT Alternative –Mirabeau Avenue to Gentilly Boulevard

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	BRT Alignment, Separate ROW		Access/Driveway Removal
	BRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

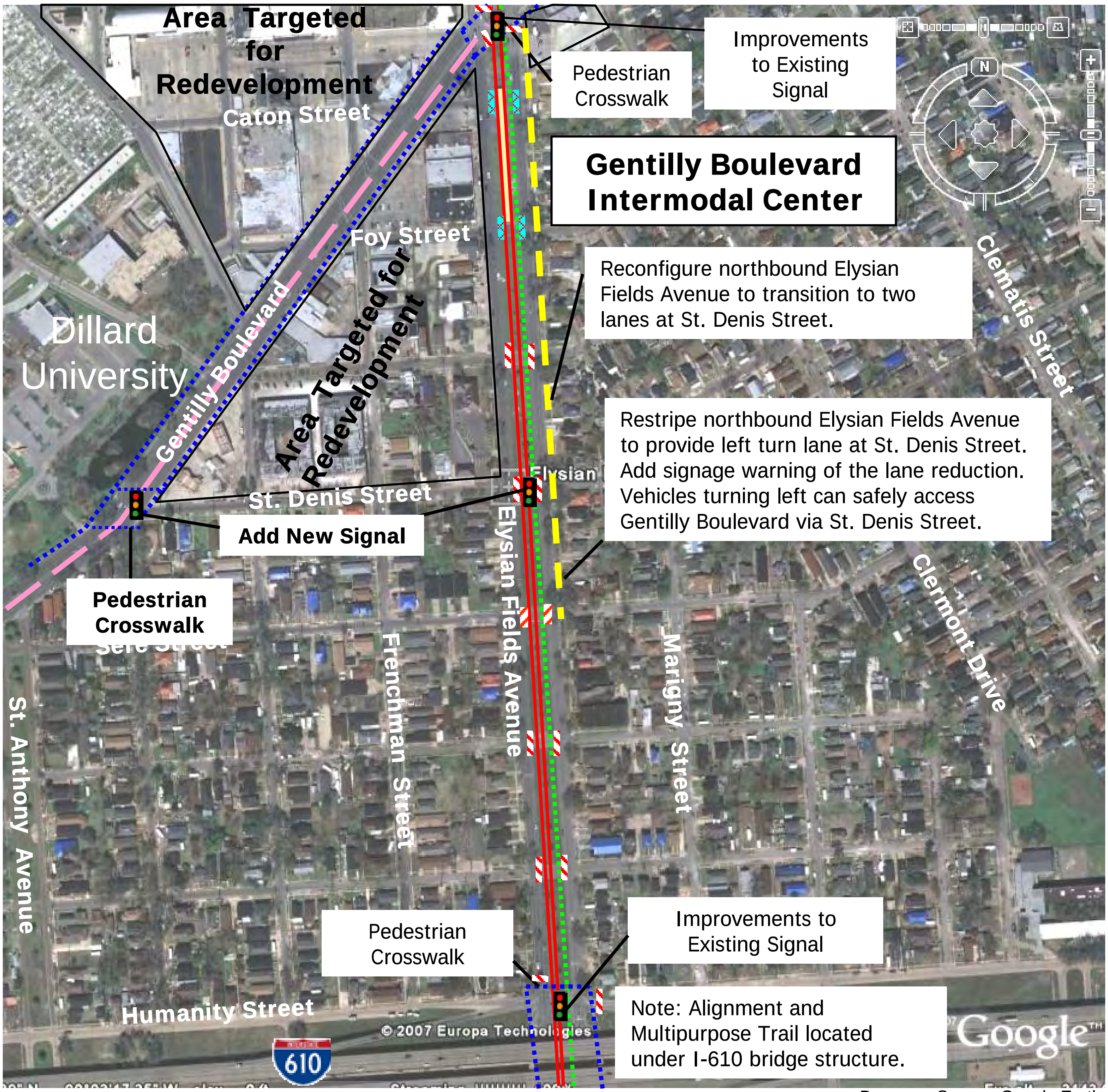
As shown on Figure BRT Alternative 5, an intermodal center is proposed south of the Elysian Fields Avenue/Gentilly Boulevard intersection. This area was considered ideal for an intermodal center because of its central location in the corridor, its history as a transit hub where several bus lines converge, and the designation of the area as a target recovery zone. A center platform station is planned just south of the intersection, requiring the closure of the Caton and Foy Street crossings, and the reconfiguration of the northbound lanes of Elysian Fields Avenue. One of the parcels adjacent to the proposed station could be used to develop a more extensive intermodal center, providing a bus hub to provide connections with the BRT.

The development of a center platform station south of the Elysian Fields Avenue Gentilly Boulevard intersection requires additional right-of-way, as the neutral ground is approximately 50’ in the vicinity. A reconfiguration of the northbound lanes on Elysian Fields is proposed to provide this right-of-way. The roadway geometry at this intersection is very poor, and the reconfiguration would greatly improve vehicular movements. Gentilly Boulevard meets Elysian Fields at a 45 degree angle and abruptly transitions from a six-lane section to a four-lane section north of the intersection.

It is proposed to re-stripe Elysian Fields Avenue between Sere and St. Denis Streets to provide a left turn lane onto St. Denis Street. A signal providing left turn protection would be added to the St. Denis intersection. North of St. Denis Street, Elysian Fields Avenue would be reduced to two lanes. Signage warning that the road reduces to two lanes would be added south of the St. Denis Street/Elysian Fields Avenue intersection. Another signal would be added at the intersection of St. Denis Street and Gentilly Boulevard. These improvements would improve traffic movements, provide direct access to Dillard University via northbound Elysian Fields Avenue, channel traffic past an area targeted for redevelopment, and calm traffic in the redevelopment zone.

BRT 5

BRT Alternative – Gentilly Boulevard to I-610



Basemap Source: Google Earth

Legend

Station Platform	Required Crossing Protection
BRT Alignment, Separate ROW	Access/Driveway Removal
BRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

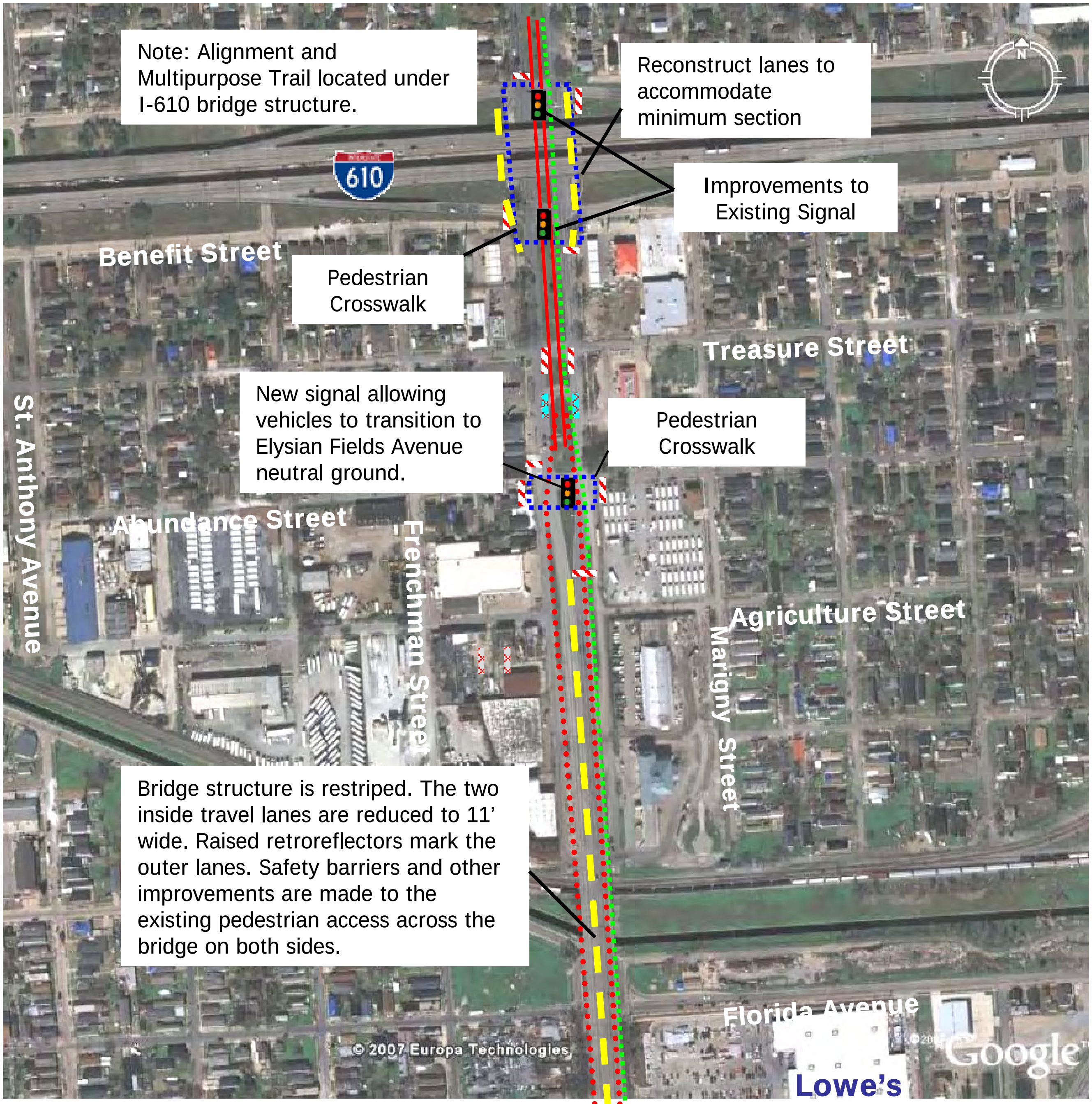
Note: This drawing is conceptual in nature. Not to scale.

Figure BRT 6 provides a conceptual plan for the area between I-610 and Florida Avenue. The outer lanes of Elysian Fields Avenue would be relocated to provide additional right-of-way for the alignment, as the neutral ground is reduced to 30' under the I-610 bridge. The neutral ground widens at Benefit Street to accommodate the 50' section. The crossing south of Treasure Street would be closed to reduce potential BRT/automobile conflicts. Just south of this crossing the BRT system transitions to operate in mixed traffic in the outer lanes of Elysian Fields Avenue. This transition was deemed the most cost effective method of crossing the BRT system over the canal and railroad tracks. A new bridge structure was considered, but ultimately determined to add greater costs than benefits.

A new signal providing protection for the BRT vehicles to transition from mixed traffic from the Elysian Fields Avenue neutral ground would be provided at Abundance Street. The existing bridge structure would be restriped to reduce the two inside travel lanes to 11' wide. Raised retroreflectors would be added to demarcate the outer lanes as BRT lanes. Additional pavement markings would distinguish the lane as a BRT lane. Safety barriers and other improvements would be made to the existing pedestrian access across the bridge on both sides to maintain safe multi-modal access in the corridor.

BRT 6

BRT Alternative – I-610 to Florida Avenue



Basemap Source: Google Earth

Legend

- Station Platform
- BRT Alignment, Separate ROW
- BRT Alignment, Shared ROW
- Existing Transit Alignment
- Proposed Transit Alignment
- Required Crossing Protection
- Access/Driveway Removal
- Roadway Relocation
- Multipurpose Trail
- Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

Figure BRT 7 shows the continuation of the BRT in mixed traffic from Florida Avenue. South of where Elysian Fields returns to grade, improvements would be made to the existing signal south of N. Dorgenois Street to allow the BRT vehicles to transition back to an exclusive right-of-way and protect pedestrian and cyclist movements. The southbound lanes of Elysian Fields Avenue would require relocation to the west to provide enough right-of-way for the BRT system and multimodal trail under the I-10 bridge structure.

Figure BRT 8 depicts the area between N. Galvez Street and N. Claiborne Avenue. The relocation of southbound Elysian Fields continues to just south of N. Johnson Street to provide adequate right-of-way for a center platform station south of N. Galvez Street. From that point, the neutral ground provides adequate right-of-way for the 50’ foot section.

BRT 7

BRT Alternative – Florida Avenue to N. Galvez Street

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	BRT Alignment, Separate ROW		Access/Driveway Removal
	BRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

BRT 8

BRT Alternative – N. Galvez Street to N. Claiborne Avenue

Basemap Source: Google Earth

Legend

Station Platform	Required Crossing Protection
BRT Alignment, Separate ROW	Access/Driveway Removal
BRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

The area between N. Claiborne Avenue and St. Claude Avenue is shown on Figure BRT 9. A center platform station is provided between Urquhart Street and Marais Street. This station is referred to as Desire Station, due to its proximity to the proposed Desire Streetcar Line located along St. Claude Avenue. South of Marais Street, the neutral ground width is reduced to 30 feet. The northbound lanes of Elysian Fields Avenue would need to be reconstructed to accommodate the minimum 50' section.

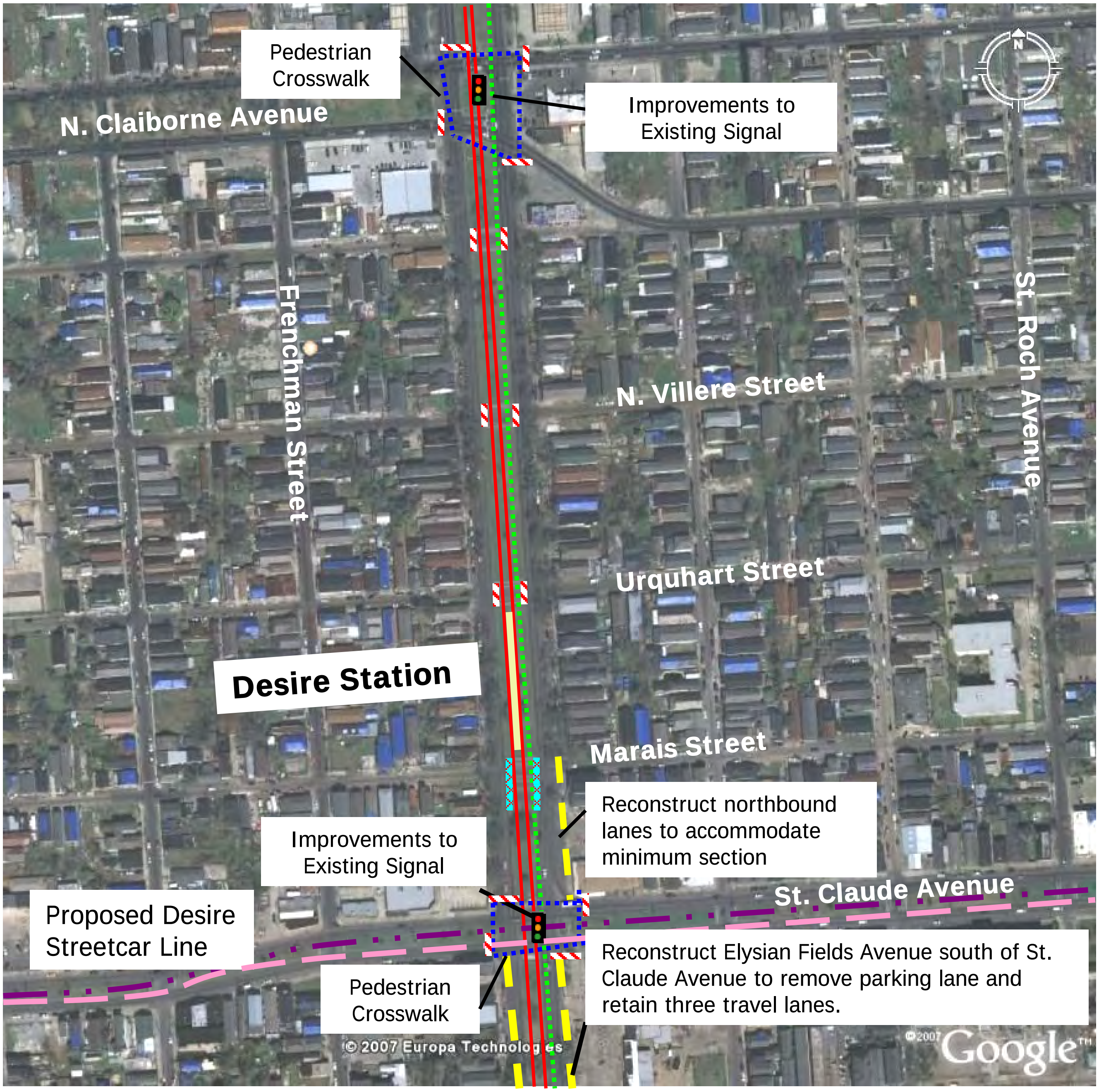
South of St. Claude Avenue, it is proposed that both sides of Elysian Fields Avenue be reconstructed to eliminate the parking lanes to provide the required right-of-way, as shown on Figures BRT 9 and BRT 10. A final center platform station, referred to as Riverfront Station, is provided between N. Peters Street and Decatur Street. The crossing at Decatur Street is removed to provide for the Riverfront Station Platform. Pedestrian improvements to the Riverfront Streetcar Line are provided. The alignment enters mixed traffic on N. Peters Street to turn around utilizing Mandeville, Chartres, Spain and N. Peters Street to turn around.

The proposed yard and maintenance facility is located in the parcels bounded by Mandeville, Chartres, Spain and N. Peters Streets. Vehicles would enter and complete service from this location. This facility would be used for storage, service and maintenance for the fleet of BRT vehicles. BRT staff would also report for work at this location.

The parcels designated on Figure BRT 10 as "Potential Parking Garage Location" are publicly owned surface lots that the City recognized as potential parking garage development locations in the *New Century New Orleans Master Plan Transportation Plan,* adopted in March 2004 (New Orleans City Planning Commission 2004: 247). The development of these parcels into parking garages would not only serve the need for additional parking in the Vieux Carre and Faubourg Marigny, but could also act as a park and ride facility for the BRT system. Potentially, reduced rates could be offered with proof of ridership.

BRT 9

BRT Alternative – N. Claiborne Avenue to St. Claude Avenue



Basemap Source: Google Earth

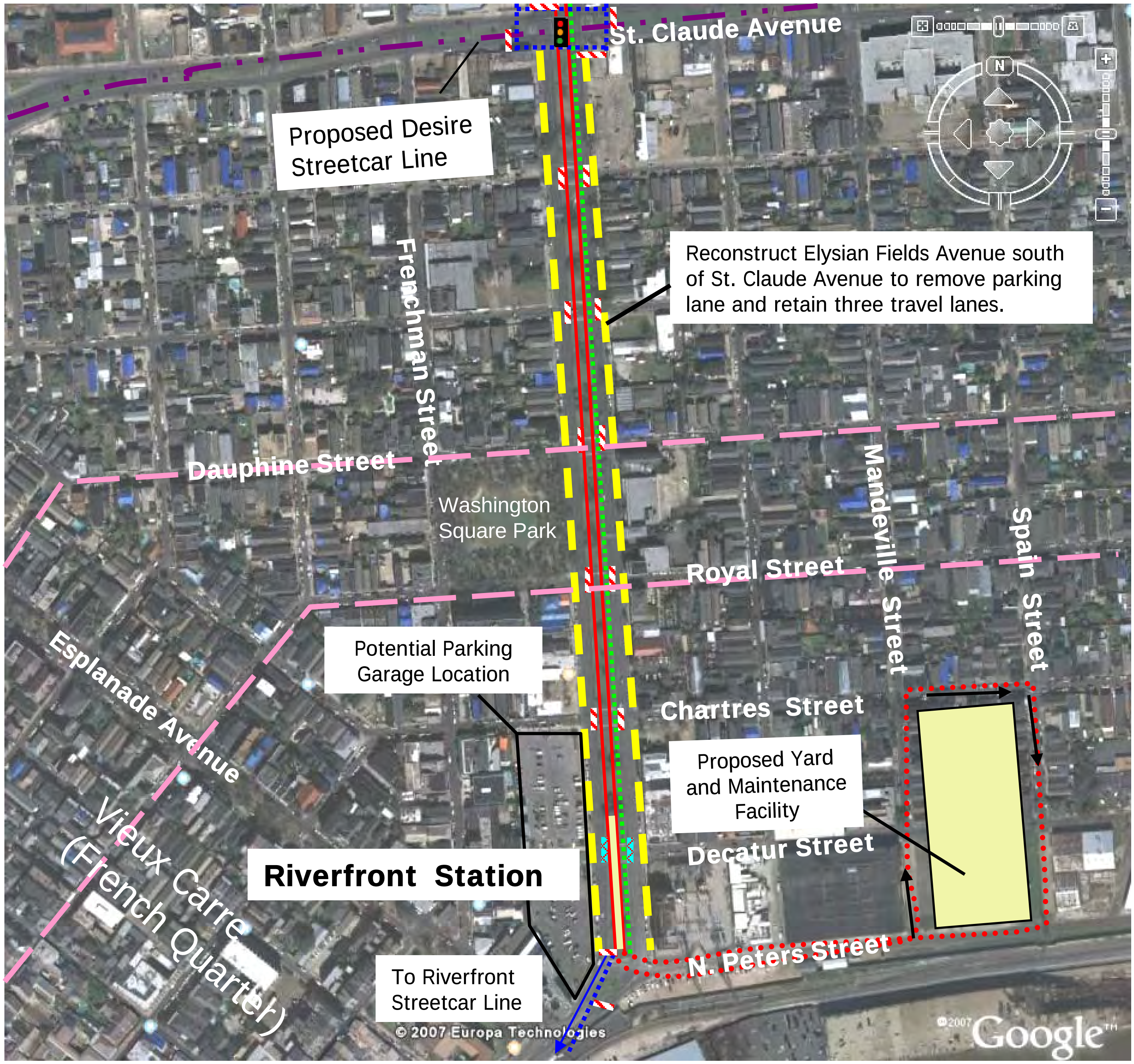
Legend

	Station Platform		Required Crossing Protection
	BRT Alignment, Separate ROW		Access/Driveway Removal
	BRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

BRT 10

BRT Alternative – N. Claiborne Avenue to N. Peters Street



Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	BRT Alignment, Separate ROW		Access/Driveway Removal
	BRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

Stations
Detailed station designs would be developed and reviewed in full cooperation with all stakeholders during the design of the BRT project. For this analysis, station platforms are assumed to be 20 feet wide and at least 65 feet long. The needs of mobility-impaired persons would be considered in the design of the proposed stations and multi-modal improvements. Ramps and other features would be provided at stations, the multi-use trail, and proposed pedestrian improvements.

Service Strategy
As a general service strategy concept, the BRT Alternative consists of a premium headway-based transit service. The BRT is proposed to run from 5 AM to 2 AM, Monday-Saturday and 7 AM to midnight on Sundays. Headways would vary depending on the number of vehicles operating on the route. With two vehicles on the route, 15-minute headways could be achieved (see Table 3-1). With three vehicles, the headways could be reduced to 10 minutes. It is proposed that three vehicles should operate during peak periods, and two vehicles should operate off peak. The standard operating plan would be modified to accommodate special events (e.g. Mardi Gras, French Quarter Festival).

Table 3-1
BRT Running Time Calculations

Segment Limits	Segment Length (Feet)	Segment Length (Miles)	Stations by Segment	Speed (mph)	Segment Travel Time (minutes)	Dwell Time (minutes)	Total Segment Time (minutes)
UNO Station North of Recreation and Fitness Center to north of Filmore Avenue	7,800	1.48	UNO Technology Park, UNO, Lee	35.00	2.53	1.33	3.86
North of Filmore Avenue to North of Gentilly Boulevard	5,000	0.95	Filmore	35.00	1.62	0.33	1.95
North of Gentilly Boulevard to North of Agriculture Street	3,900	0.74	Gentilly Intermodal Center	35.00	1.27	0.33	1.60
North of Agriculture Street to Lowe's Parking lot east of Law Street	3,800	0.72	None	20.00	2.16	0.00	2.16
Lowe's Parking lot to North of N. Galvez	1,900	0.36	None	35.00	0.62	0.00	0.62
North of N. Galvez Street to N. of St. Claude Avenue	4,600	0.87	Galvez, Desire	35.00	1.49	0.67	2.16
North of St. Claude Avenue to the Riverfront	2,600	0.49	Riverfront	35.00	0.84	0.67	1.51
Riverfront Station Turnaround	600	0.11	Riverfront	20.00	0.34	0.00	0.34
Total	**30,200**	**5.72**	**8**	**Total Time**			**14.21**

Source: Author

As part of the service strategy, headways for the Riverfront Streetcar would be increased. Currently, headways for the Riverfront Streetcar are 37 minutes Monday through Friday and 18 minutes during peak periods. As part of the BRT Alternative, the headways for the Riverfront Streetcar would be 18 minutes continually, and service hours would be increased to coincide with the BRT service hours.

As an additional service consideration, buses that once stopped at the Gentilly Boulevard and Elysian Fields Avenue intersection, such as the 90 Carrollton, should be re-instated. Routes that operate in the vicinity, such as the 52 St. Bernard and the 57 Franklin Avenue may be re-rerouted to include a stop at this intersection to stimulate the development of an intermodal center.

Vehicles

As noted in Section 2.3 above, distinctive vehicles are central to the branding strategy that designates the system as a premium transit service. The BRT vehicles for this proposed system would be fully accessible with level boarding from platforms. Interior layouts would include and provisions for wheelchair space. Additional doors are proposed to decrease dwell times at stations. A vehicle that operates with an advanced propulsion systems, such as an electric-hybrid or hydrogen fuel cell, is proposed for the BRT system. The BRT Alternative is conceived as a premium transit service that promotes environmentally-sensitive travel. The use of an advanced propulsion vehicle would contribute to the efforts to rebuild a "green" New Orleans.

ITS

The main ITS technology proposed for the BRT Alternative is an active signal priority system that electronically detects the BRT vehicle approaching. The signal priority component will provide either an early green signal or delay an existing green signal for the BRT vehicle. Additionally, ITS applications would be incorporated into the crossing protection and warning systems.

Fare Collection

A pre-payment system is proposed for the BRT Alternative. Passengers would purchase tickets or passes from fare vending machines located at each station. Passengers would validate tickets prior to boarding the train.

LRT Alternative

The LRT Alternative is also a premium headway-based transit service operated on primarily exclusive right-of-way along Elysian Fields Avenue. Again, due to the wide section provided by Elysian Fields Avenue, there are several physical options for the placement of the running way. However, a median arterial transit way was chosen for the LRT Alternative for the same reasons outlined above for the BRT Alternative.

The typical section for an at-grade, double track LRT alignment would be similar to those provided for the BRT alignment in Figures 2.1 and 2.2 above. Crossovers, to allow trains to cross from the eastbound to the westbound tracks, would be provided rather than turn-arounds. The tracks would be ballasted in the neutral ground and would be embedded at in-street crossings. It is recommended that the tracks utilize a 5' 2-1/2" broad-gauge to be compatible with other New Orleans rail lines.

Description of Running Way

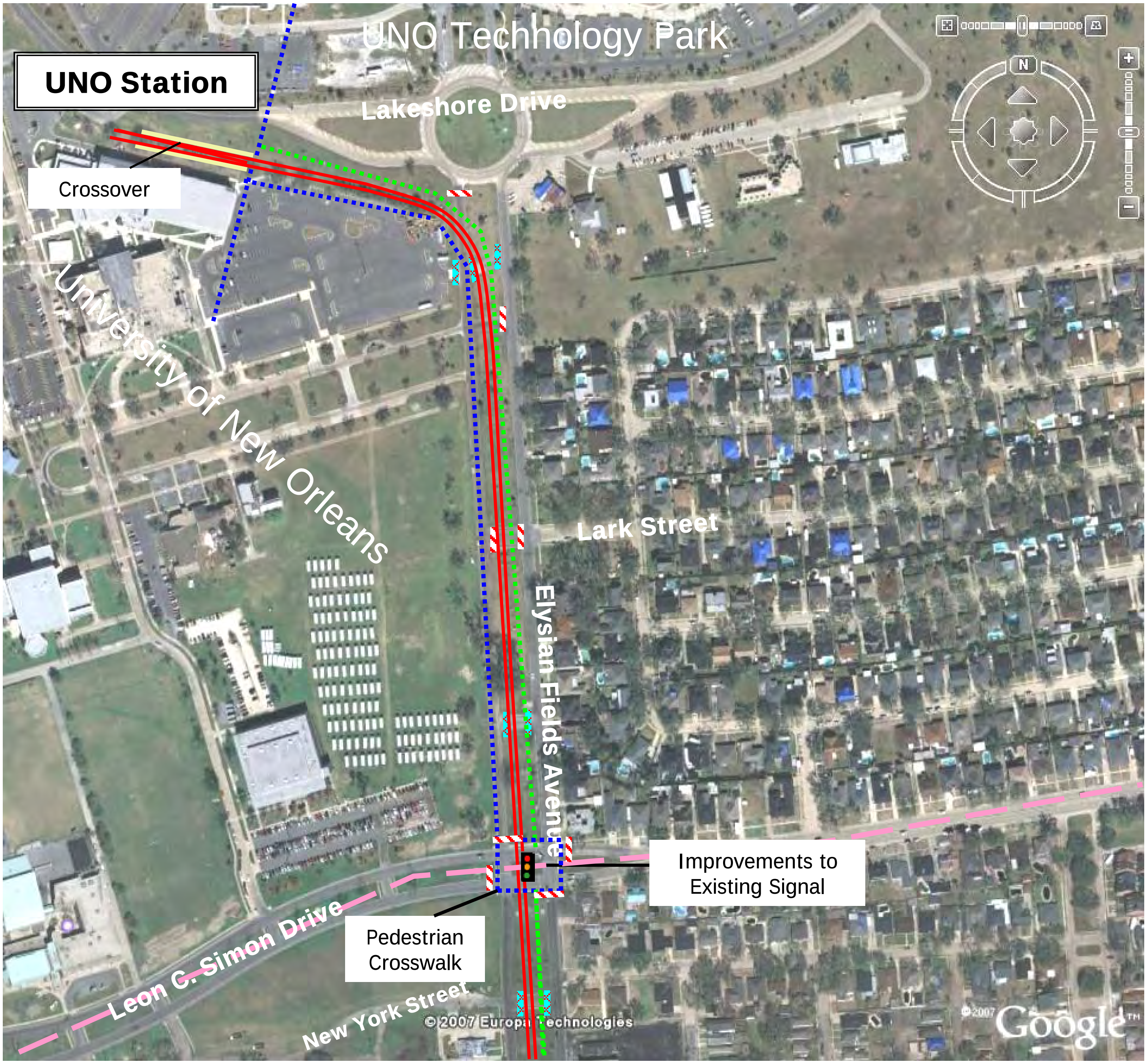
The LRT Alternative follows a very similar alignment to the BRT Alternative: therefore, the following discussion focuses on the difference between the alignments. At the northern terminus, the LRT Alternative does not include a UNO Technology Park Station, as the UNO station has been located in between these two major activity centers. Instead of a turn-around, a crossover is provided at the UNO station, so the bi-directional vehicles can change directions. Rather than providing crossing protection, it is recommended that direct access to the parking lot in the southwest quadrant of Lakeshore Drive from Elysian Fields Avenue be removed.

The next location where there is a difference between the BRT and LRT alignments is illustrated on Figure LRT 6. South of I-610, the LRT Alternative transitions to the east side of the roadway in the vicinity of Treasure Street. From there, additional right-of-way would be required to provide a new bridge structure over the canal and railroad. Figure LRT 7 illustrates where the new bridge would return to grade in the Lowe's parking lot. From there, the LRT Alternative would cross northbound Elysian Fields Avenue to enter the I-10 right-of-way. Crossing gates would be provided to remove the LRT vehicles from other traffic. From this point, the LRT Alternative follows the same alignment as the BRT Alternative to just north of the Riverfront.

The only remaining difference between the LRT Alternative and the BRT Alternative alignments is shown on Figure LRT 10. South of the Riverfront Station, a crossover would be provided to allow vehicles to change directions. Tracks would be provided to allow the LRT vehicles to enter the Riverfront Streetcar tracks. This would allow the LRT to continue to operate on the Riverfront tracks to Canal or Poydras Streets. Additionally, the ability to enter the Riverfront tracks would allow the LRT vehicles to utilize either the existing Canal or Carrollton Barns as a yard and maintenance facility.

LRT 1

LRT Alternative – Lakeshore Drive to Leon C. Simon Drive



Basemap Source: Google Earth

Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 2

LRT Alternative – Leon C. Simon Drive to Prentiss Avenue

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	LRT Alignment, Separate ROW		Access/Driveway Removal
	LRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 3

LRT Alternative – Prentiss Avenue to Mirabeau Avenue

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	LRT Alignment, Separate ROW		Access/Driveway Removal
	LRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 4

LRT Alternative –Mirabeau Avenue to Gentilly Boulevard

Basemap Source: Google Earth

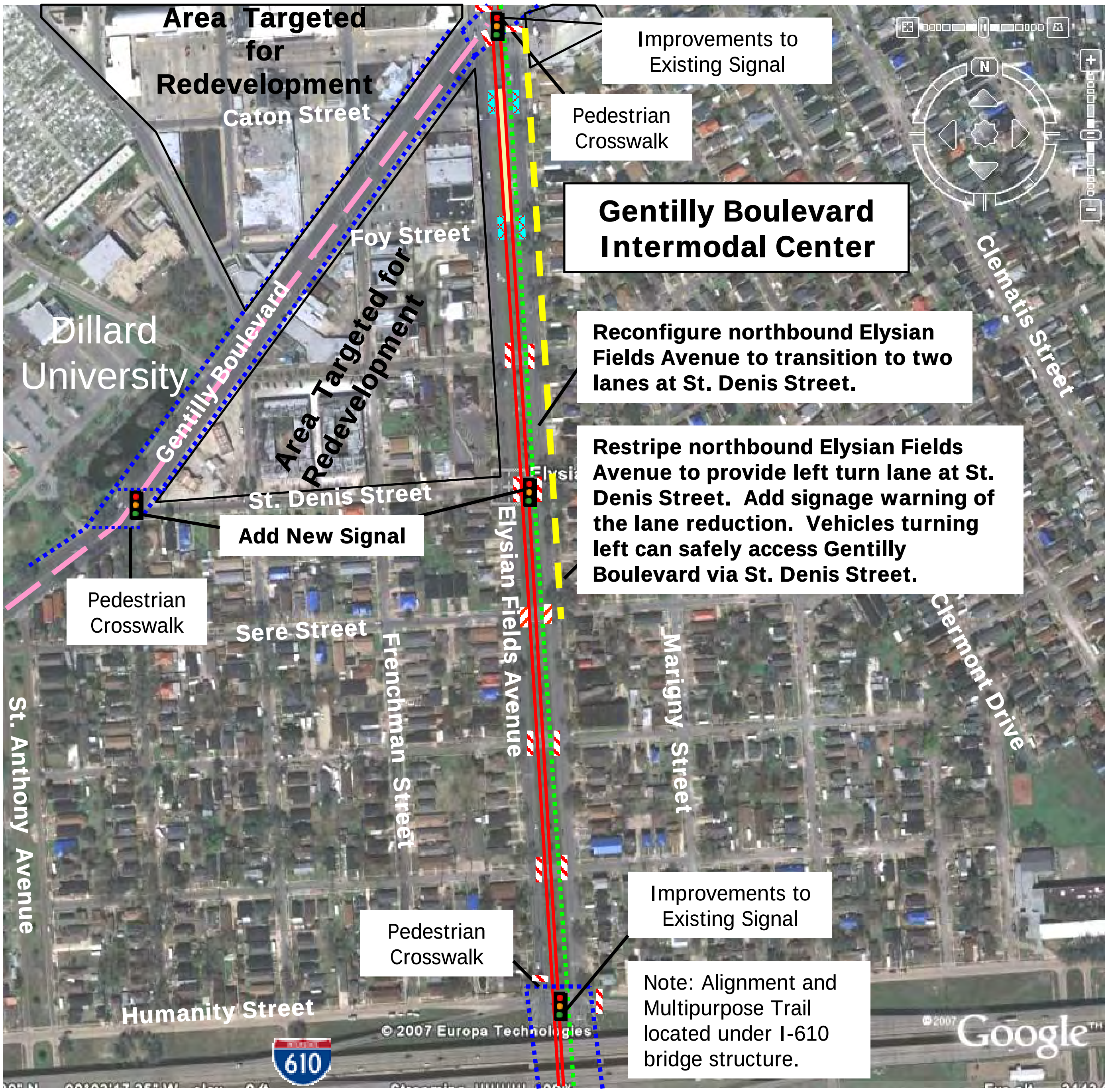
Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 5

LRT Alternative – Gentilly Boulevard to I-610



Basemap Source: Google Earth

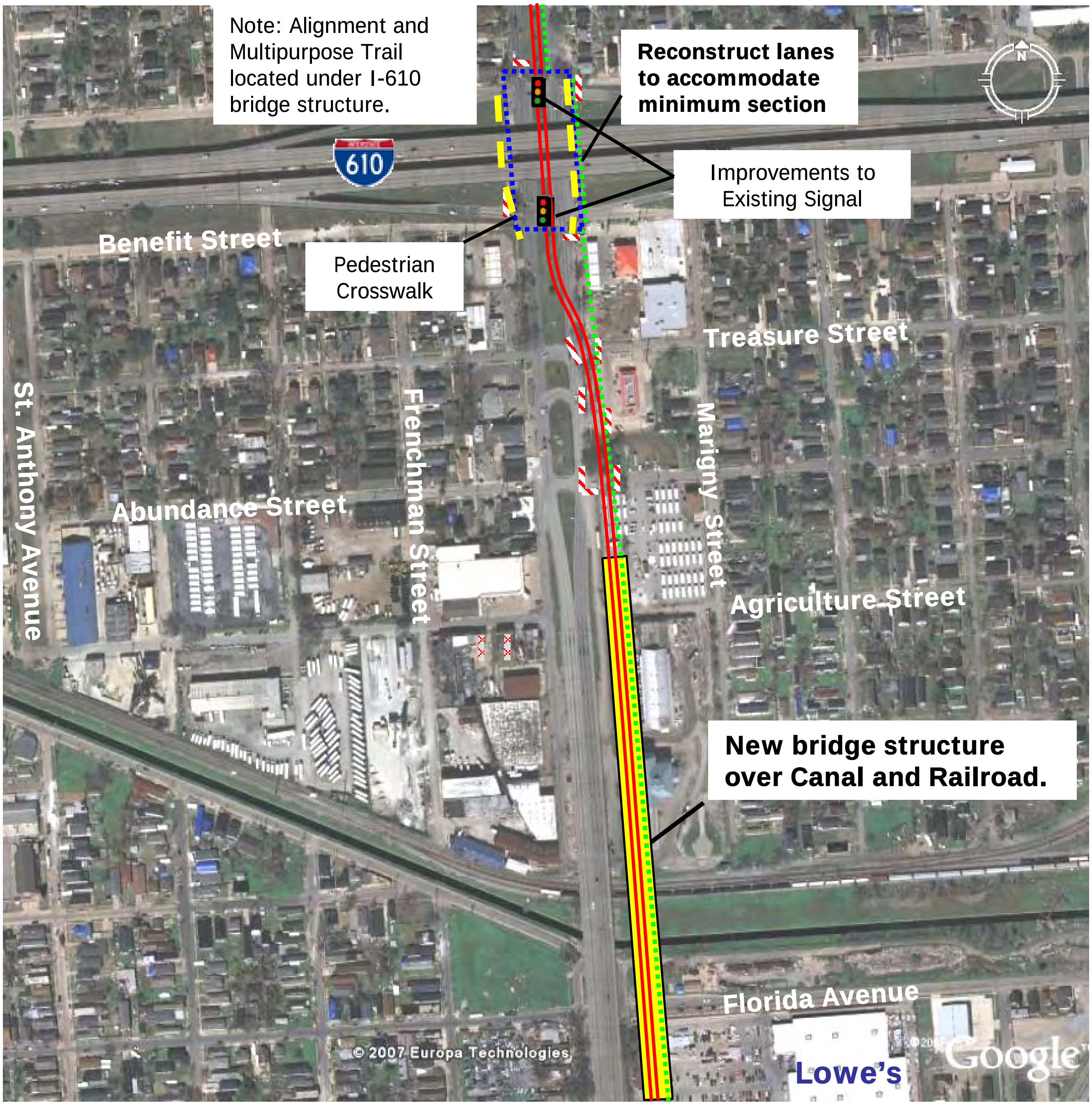
Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 6

LRT Alternative – I-610 to Florida Avenue



Basemap Source: Google Earth

Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 7

LRT Alternative – Florida Avenue to N. Galvez Street

Basemap Source: Google Earth

Legend

	Station Platform		Required Crossing Protection
	LRT Alignment, Separate ROW		Access/Driveway Removal
	LRT Alignment, Shared ROW		Roadway Relocation
	Existing Transit Alignment		Multipurpose Trail
	Proposed Transit Alignment		Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 8

LRT Alternative – N. Galvez Street to N. Claiborne Avenue

Basemap Source: Google Earth

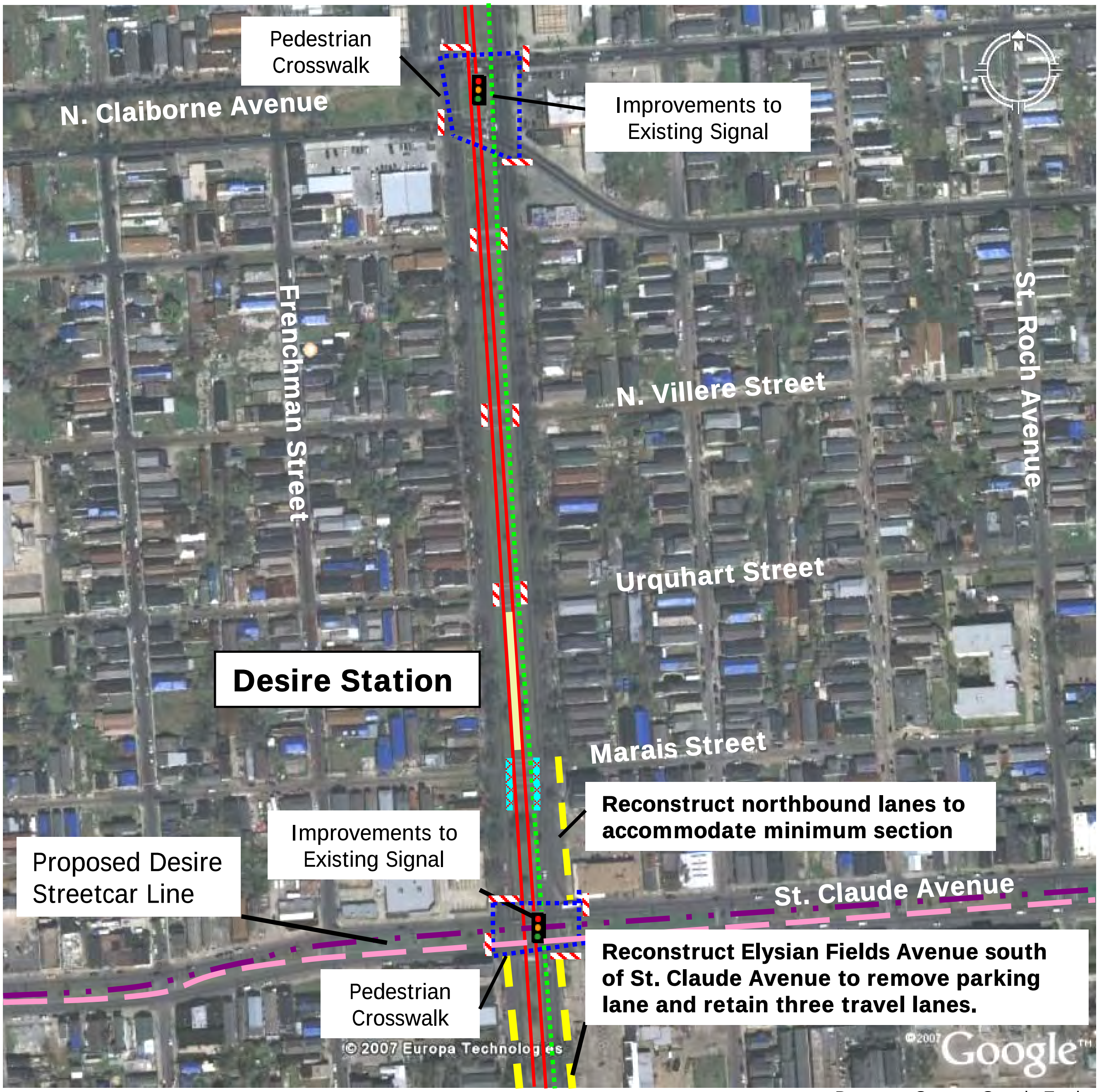
Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 9

LRT Alternative – N. Claiborne Avenue to St. Claude Avenue



Basemap Source: Google Earth

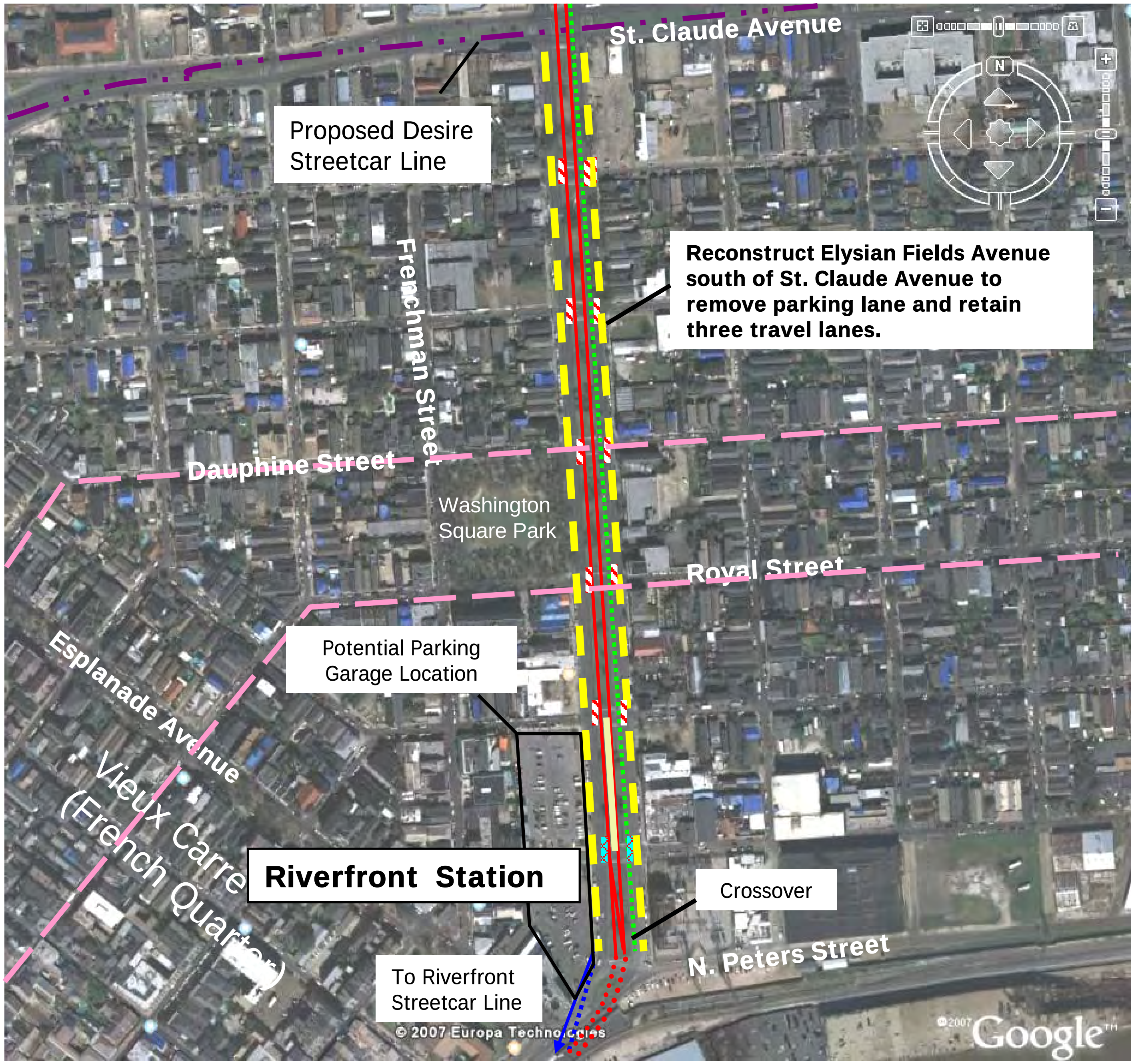
Legend

Station Platform	Required Crossing Protection
LRT Alignment, Separate ROW	Access/Driveway Removal
LRT Alignment, Shared ROW	Roadway Relocation
Existing Transit Alignment	Multipurpose Trail
Proposed Transit Alignment	Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

LRT 10

LRT Alternative – N. Claiborne Avenue to N. Peters Street



Basemap Source: Google Earth

Legend

Station Platform

LRT Alignment, Separate ROW

LRT Alignment, Shared ROW

Existing Transit Alignment

Proposed Transit Alignment

Required Crossing Protection

Access/Driveway Removal

Roadway Relocation

Multipurpose Trail

Sidewalk/Pedestrian Improvements

Note: This drawing is conceptual in nature. Not to scale.

Stations

As with the BRT Alternative, detailed station designs would be developed with all stakeholders during the design of the LRT project. Station platforms are assumed to be 20 feet wide and at least 65 feet long for conceptual design purposes. Traction power substations would need to be located at regular intervals along the proposed LRT line to provide power to the OCS. Most substations would be located near LRT stations.

Service Strategy

The LRT Alternative would have shorter headways than the BRT Alternative, because it includes one less station, the length of the alignment is slightly shorter, and a new bridge structure is included so it does not enter mixed traffic. Headways for the LRT Alternative are estimated at approximately 7 minutes during peak periods, with three vehicles operating and 13 minutes with two vehicles operating during off-peak. If the LRT Alternative were extended to Canal or Poydras Streets, additional vehicles would need to be added or headways would significantly increase. Table 3-2 depicts travel time calculations for the LRT Alternative.

Vehicles

LRT vehicles would be double-ended, articulated cars capable of bi-directional operation as a single or multi-unit train. The LRT vehicles would be fully accessible with level boarding from platforms. Interior layouts would include wheelchair space. Additional doors are proposed to decrease dwell times at stations. An OCS system would likely be used for the LRT Alternative, as this is the most common method of propelling LRT vehicles. Like the BRT Alternative, the LRT Alternative would promote environmentally-sensitive travel and contribute to the efforts to rebuild a “green” New Orleans.

It is proposed that the LRT vehicles be manufactured in New Orleans. The RTA had this capability in the recent past, as they manufactured the streetcars for the Riverfront and Canal Lines. Although it is unlikely that the RTA currently has this capability, the basic infrastructure and “know-how” is still present in the organization. The Carrollton Barn has the basic facilities required to manufacture rail vehicles, although additional resources would need to be acquired. Designing and fabricating LRT vehicles that meet the operating requirements of the proposed system locally would increase the potential local economic effects of the project, discussed in further detail in subsequent chapters. Additionally, local production of the vehicles could potentially increase local “ownership” of the system. Local production of the vehicles could contribute to a positive perception of the project and the City itself, as a demonstration of local creativity and technical ability.

ITS

The LRT Alternative would also employ an active signal priority system and incorporate ITS technology in the design of crossing protection and warning systems.

Fare Collection

A pre-payment system is proposed for the LRT Alternative, as with the BRT Alternative.

Table 3-2 LRT Running Time Calculations							
Segment Limits	**Segment Length (Feet)**	**Segment Length (Miles)**	**Stations by Segment**	**Speed (mph)**	**Segment Travel Time (minutes)**	**Dwell Time (minutes)**	**Total Segment Time (minutes)**
UNO Station North of Recreation and Fitness Center to north of Filmore Avenue	7,400	1.40	UNO, Lee	35.00	2.40	0.67	3.07
North of Filmore Avenue to North of Gentilly Boulevard	5,000	0.95	Filmore	35.00	1.62	0.33	1.95
North of Gentilly Boulevard to North of Agriculture Street	3,900	0.74	Gentilly Intermodal Center	35.00	1.27	0.33	1.60
North of Agriculture Street to Lowe's Parking lot east of Law Street	3,800	0.72	None	35.00	1.23	0.00	1.23
Lowe's Parking lot to North of N. Galvez	1,900	0.36	None	35.00	0.62	0.00	0.62
North of N. Galvez Street to N. of St. Claude Avenue	4,600	0.87	Galvez, Desire	35.00	1.49	0.67	2.16
North of St. Claude Avenue to the Riverfront	2,600	0.49	Riverfront	35.00	0.84	0.67	1.51
Total	**29,200**	**5.53**	**7**	**Total Time**			**12.15**

Source: Author

Streetcar

Because the LRT Alternative proposes the use of 5' 2-1/2" broad-gauge tracks, there is essentially no difference between the LRT Alternative and the Streetcar Alternative. The only differentiating feature of the Streetcar Alternative is the vehicle utilized. The typical conception of a New Orleans "streetcar" is a vehicle aesthetically similar to those used on the St. Charles Avenue, Riverfront and Canal Street Lines. Therefore, the "Streetcar Alternative" is the LRT

Alternative utilizing a vehicle similar in appearance, capacity and interior design to the Canal Streetcars (2000-Series Von Dullen LRV Streetcars). These vehicles would be developed in New Orleans, and would differ from the Canal Streetcars only in their livery, as the 2000-Series Von Dullen LRV Streetcars are capable of meeting the operating requirements of the proposed route.

Estimated Capital Costs

The estimated capital cost of the different transit alternatives were estimated based on similar project costs. Table 3-3 presents the capital costs of BRT, LRT, and streetcar projects in the United States.

Table 3-3
Comparative Capital Costs for Selected BRT, Streetcar, and LRT Systems

Agency	City	Route	Technology	Capital Cost	Route Mileage	Cost per Mile
Greater Cleveland Regional Transit Authority	Cleveland	Euclid Corridor	BRT	$168 million	9.4	$17.9 million
LYNX	Orlando	LYMMO	BRT	$21 million	2.5	$8.4 million
Kansas City Area Transportation Authority	Kansas City	Metro Area Express (MAX)	BRT	$21 million	6	$3.5 million
Regional Transportation Commission of Southern Nevada	Las Vegas	Metropolitan Area Express (MAX)	BRT	$19 million	7.5	$2.5 million
Regional Transit Authority	New Orleans	Canal Streetcar	Streetcar	$161.3 million	5.4	$29.8 million
Portland Streetcar	Portland	Portland Streetcar	Streetcar	$57.04 million	4.6	$12.4 million
Metropolitan Transit Authority of Harris County	Houston	Main Street	LRT	$324 million	7.5	$43.2 million
Metro Transit	Minneapolis	Hiawatha	LRT	$715.3 million	12	$59.6 million
Tri-County Metropolitan Transportation District of Oregon	Portland	Interstate MAX	LRT	$350 million	5.8	$60 million

Sources: Lecher and Yakisan 2004, Campbell 2005, Metrotransit 2007, Trimet 2007 FTA 2007

Capital costs associated with the different technologies vary widely, due to differing project conditions and the range of amenities discussed in Section 2.3. For example, the Cleveland Euclid BRT Corridor involves a reconstruction of the entire Euclid Avenue right-of-way, complete signal replacement, precision docking, real-time arrival information, information kiosks, integrated public art, station architecture, bike routes, landscaping, and premium hybrid-electric vehicles. In the case of LRT systems, the Hiawatha LRT line in Minneapolis includes a twin-bore tunnel in the Minneapolis-St. Paul International Airport. The Canal Streetcar costs were relatively high because there were significant utilities relocation costs associated with the project.

The Express Bus Alternative could be implemented for the cost of additional buses and the associated operating and maintenance (O&M) costs. The capital cost estimate for the Express Bus Alternative is $2 million, which would cover the costs of four new hybrid-electric buses (FTA 2006).

Generally, BRT is the least expensive option, followed by streetcar and LRT as more costly technology alternatives. For the purposes of this evaluation, a cost of $15 million per mile was utilized for the BRT Alternative where it operates in the neutral ground of Elysian Fields Avenue, $1 million per mile for the mixed flow lane improvements on the railroad overpass, and $500,000 per mile for in-street improvements at the Riverfront turn-around. The at-grade transitway per mile figure was derived by inflating the per mile cost of the Lynx LYMMO system from 1995 dollars to 2007 dollars, using the Consumer Price Index Inflation Calculator. This method was deemed appropriate because the Lynx LYMMO system is in the Gulf Coast region and includes similar features to those proposed for the BRT Alternative. A 30% contingency was added to the inflation adjusted costs to account for discrepancies and the fact that construction costs are higher in the Gulf Coast following Hurricanes Katrina and Rita. The in-street improvements were estimated based on similar improvement projects.

These are very rough cost estimates. Distances were estimated by hand scaling from maps and are approximate, further contributing to the approximate nature of the cost estimate. These per mile costs resulted in a total cost of $74.1 million for the BRT Alternative. Table 3-4 on the following page illustrates how the costs were calculated.

Table 3-4
BRT Cost Estimates

Segment Limits	Segment Length (Miles)	Type of Running way	Cost Per Mile (Millions)	Total Segment Cost (Millions)
UNO Station North of Recreation and Fitness Center to north of Filmore Avenue	1.48	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$22.16
North of Filmore Avenue to North of Gentilly Boulevard	0.95	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$14.20
North of Gentilly Boulevard to North of Agriculture Street	0.74	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$11.08
North of Agriculture Street to Lowe's Parking lot east of Law Street	0.72	Mixed Traffic Transit Lanes on Elysian Fields Avenue	$1.00	$0.72
Lowe's Parking lot to North of N. Galvez	0.36	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$5.40
North of N. Galvez Street to N. of St. Claude Avenue	0.87	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$13.07
North of St. Claude Avenue to the Riverfront	0.49	At-Grade Transit way in Elysian Fields Avenue ROW	$15.00	$7.39
Riverfront Station Turnaround	0.11	Mixed Traffic Transit Lanes on Elysian Fields Avenue	$.50	$0.06
Total	**5.72**	**Total**		**$74.07**

Source: Author

For the exclusive at-grade transitway, a cost of $43.7 million per mile was utilized for at-grade construction for the Streetcar and LRT Alternatives. This figure is based on Canal Streetcar costs adjusted from 2003 dollars to 2007 dollars utilizing the Consumer Price Index inflation calculator. A 30% contingency was added to the inflation adjusted figure to account for discrepancies and higher construction costs in the Gulf Coast region. A cost of $78 million per mile was utilized for the new elevated transit way over the railroad and canal. This figure was derived by adding 30% to $60 million, the approximate cost per mile associated with the Hiawatha and Interstate MAX lines, which both included costly structures. This results in a total cost of $266.4 million for the Streetcar and LRT Alternatives. Again, note that these estimates are very rough and based on conceptual design.

Table 3-5
LRT/Streetcar Cost Estimates

Segment Limits	Segment Length (Miles)	Type of Running way	Cost Per Mile (Millions)	Total Segment Cost (Millions)
UNO Station North of Recreation and Fitness Center to north of Filmore Avenue	1.40	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	61.25
North of Filmore Avenue to North of Gentilly Boulevard	0.95	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	41.38
North of Gentilly Boulevard to North of Agriculture Street	0.74	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	32.28
North of Agriculture Street to Lowe's Parking lot east of Law Street	0.72	At-Grade Transit way in Elysian Fields Avenue ROW	78.00	56.14
Lowe's Parking lot to North of N. Galvez	0.36	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	15.73
North of N. Galvez Street to N. of St. Claude Avenue	0.87	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	38.07
North of St. Claude Avenue to the Riverfront	0.49	At-Grade Transit way in Elysian Fields Avenue ROW	43.70	21.52
Total	**5.53**	**Total**		**$266.36**

Source: Author

Estimated Operating and Maintenance (O&M) Costs

The RTA is very financially constrained. All public transit systems are subsidized, but the events of 2005 significantly impacted the RTA's financial situation. Implementation of the proposed system would require financial assistance to the RTA, the assumed operator of the system, for O&M costs.

The unit of measurement generally used to develop O&M cost estimates for a new system is annual cost per vehicle revenue hours. A revenue hour is an hour that a vehicle is in passenger service, and does not include time spent traveling to or from a maintenance facility, etc. The 2004 National Transit Database shows that the RTA's cost per vehicle revenue hour for its streetcar system in 2004 was $117.44 (National Transit Database 2004). As costs have increased since 2004, and additional costs would be incurred for new equipment, 30% was added to the 2004 cost, resulting in a per-vehicle-revenue-hour cost of $152.67.

Chapter 4: Literature Review

Introduction

There is an immense amount of literature on transit-oriented development, transit project case-studies, the benefits and issues with transit improvements. A comprehensive review of the literature on the subjects relevant to the problem identified in this thesis – transit technology applications, transit oriented development, the relationship between transportation and land use, redevelopment, joint-development, and economic development – is too broad to address in this study. This overview of the literature attempts to review empirical research specifically related to the difference between transit technologies in terms of rider preference and potential transportation, land use, redevelopment, and economic benefits. The review of the selected literature is organized around the research questions for this thesis. Literature evaluating the assumed preference of rail to bus is presented, as well as case studies, and a literature review. It should be noted that there are limitations to the evaluation of case studies. Case studies only provide data for the type of technology used for a particular system and do not usually allow for comparison of technologies. Additionally, the benefits of a new transit system are project specific and subjective. A number of case studies are reviewed, however, to present data for various technologies with attention to these limitations.

Literature Review

Do transit technologies vary in their ability to attract riders?

In *Comparing Ridership Attraction of Rail and Bus*, the authors test the hypothesis that rail systems will attract more riders than bus systems, even if they offer similar levels of service (Ben-Akiva and Morikawa 2002: 107). The research is conducted by creating two choice models and analyzing the findings. One choice model analyzes "revealed preference" data, i.e. what people actually do, and the other evaluates "stated preference" data, i.e. what people say they would do (Ibid. 2002: 107).

The revealed preference model uses journey to work data from the 1980 Census for the Washington D.C. area, and travel time and cost data from the Metropolitan Washington Council of Government. The model consists of three main choices: transit, drive alone and shared ride. Within the transit choice, running times were assigned to origin to destination (O-D) pairs by mode categories: rapid transit (Metro), commuter rail, express bus, and local bus.

The model utilized the market share method and the data were assessed by zero vehicle households, one vehicle households, and households with two or more vehicles. For all three market segments the Metro is the most preferred transit mode followed by local bus, express bus, and commuter rail if neither origin nor destination are in the CBD, the Metro trip does not include the low frequency line, an express bus trip does not use an HOV lane, and it is not a low frequency Metro corridor (Ibid. 2002: 112).

Based on the results of corridor specific estimates, the authors find that the preference for Metro travel over express bus and commuter rail travel increases as car availability increases (Ibid. 2002: 112) . The authors also find that “when an express bus uses a highway with an HOV lane, especially when it runs to or from the CBD, its attractiveness increases substantially” (Ibid. 2002: 113).

The finding that the preference for Metro travel over other modes increases with the availability of vehicles suggests that rail may be a more attractive mode to “choice riders.” However, the finding that the use of an HOV substantially increases the attractiveness of the express bus mode suggests that service characteristics are the basis for preference, not the technology utilized.

The data used in the stated preference choice model were the results of surveys to determine if there was a preference for bus or light rail in Boston's southwest corridor. There was previously light rail in this corridor that had been discontinued. At the time of the survey, riders had to take a bus on the corridor and change to the light rail at a transfer point to go to downtown Boston. Respondents ranked four alternatives: two plans that would still require a transfer from bus to rail to get downtown, a rail alternative that would not require a transfer, and the current bus route and existing transfer point in order of preference (Ibid. 2002: 114).

In the authors’ analyses of the estimation results, a seeming contradiction is noted: the all rail alternative with no transfers is the most preferable alternative, but the alternatives that do involve transfers are ranked in descending order relative to decreasing bus service at transfer points. The authors interpret this ranking as an indication of bus over rail preference (Ibid. 2002: 115).

However, the author of this thesis suspects that these results indicate that riders prefer routes that are connected to other routes, even if there is an overall preference for no-transfer trips. What the estimation results seem to indicate most strongly is that transit riders prefer trips without transfers.

The authors conclude that the study indicates that rail and bus services that have similar attributes will attract similar numbers of riders (Ibid. 2002: 116). Additionally, the authors find that transit systems that require multiple transfers and/or low frequency schedules will fail to attract choice riders, and people will be more likely to use automobiles (Ibid. 2002: 116).

This study applies the multinomial logit model on two types of data which produces some statistically significant data to support the authors’ hypothesis. However, in both model estimations a preference for rail is present, although the preference is slight in the stated preference model. In the revealed choice model, the author points out that some of the differences between alternative specific constants are large, suggesting that other omitted factors may play a role in preference (Ibid. 2002: 113). A significant finding of this study is the considerable effect of negative variables such as wait time, low frequency, and number of transfers. The statistically significant effects of these negative variables on modal choice support the authors’ conclusion that rail and bus services with similar service attributes will attract similar numbers of riders.

The finding that certain service attributes will attract riders regardless of the transit technology utilized is central to the hypotheses of this thesis. If BRT can be implemented for significantly less cost and produce the same benefits, it is clear that BRT should be the preferred technology. This study does provide some statistically reliable evidence that levels of service are more important factors in modal choice than technology. However, this study also demonstrates a slight preference for rail. Additionally, this study only focuses exclusively on ridership, and there are other benefits that may be more affected by the technology utilized.

In the Victoria Transport Policy Institute report *Evaluating New Start Transit Program Performance Comparing Rail and Bus*, the authors compare public transportation performance in terms changes in ridership and operating costs per passenger mile. The report also summarizes the findings of other reports that support pro-rail hypotheses. Baum-Snow and Kahn found that although overall transit mode shares declined from 1970 to 1990, the transit declines are much smaller in cities with rail transit than bus only cities (Henry and Litman 2006: 3). Renne found that neighborhoods with rail stations were found to better retain and sometimes increase commute modal shares despite overall transit share declines (Ibid. 2006: 3). Cities with large rail transit systems were found to have 400% higher per capita transit ridership and an 887% higher commute mode split than cities with bus only systems (Ibid.2006: 4). All of these findings are presented to suggest that there is something inherently more attractive about rail than bus.

The “Advantages of Bus” section of the report notes that bus service can serve a greater area and potentially attract more riders than rail (Ibid. 2006: 4). The second and much longer paragraph of this section argues against the conception that rail is inequitable, and makes the unsupported statement that rail attracts more choice riders than bus and therefore produces more secondary benefits.

The data assessed includes cities that have participated in the FTA’s New Starts Program and includes only “new” rail cities to address opponents of new rail systems. The cities evaluated for rail were over one million in population, although most of the bus cities had populations of less than one million. The authors’ note that the size of the urban area is important, as generally overall transit ridership increases with city size, and then this bias is dismissed. The study concludes that rail cities on average significantly outperformed bus only cities (Ibid. 2006: 11).

There are several problems with the approach applied in this study. While the authors may support the hypothesis that “on average” rail cities performed better than bus only cities, there are obvious disparities in the sample sizes and parity of the cities studied. The authors do not even address the disparities in sample size and dismiss the lack of similarity between the two groups of cities studied. A comparison of Montgomery, Alabama (which had a population loss of 6% between 1996 and 2003) and Atlanta, Georgia (which had a 62% population gain between 1996 and 2003) is not exactly an equal comparison.

A more equitable way to look at this data is to consider the population size of the city by comparing the thirteen most populous bus only cities with the thirteen rail cities. The authors state that: “…limiting the study only to cities with rough population parity would reduce the bus-only group to a number so small that comparative results would be questionable on that basis” and that the disparity “is offset by the fact that many of the bus-only cities are growing rapidly and so their transit ridership would probably have grown significantly regardless of what type of transit service were offered" (Ibid. 2006: 6-7).

The author of this thesis compared the population, boardings and O&M costs in constant 1996 dollars between 1996 and 2003 in the thirteen largest bus only cities and the thirteen rail cities between 1996 and 2003 as shown in Table 4-1 on the following page.

When the data are approached in this manner, the findings become slightly different. The thirteen rail cities experienced more growth on average than the bus only cities (an average of 25.0% and 18.9%, respectively). The only bus only city that approached the explosive growth seen in Atlanta and Miami-Ft. Lauderdale was Phoenix. Therefore, in terms of the averages of percent change, despite the authors' claims, the rail cities were growing more than the bus only cities.

In terms of boardings, the bus only cities experienced a lower average percentage increase than the rail cities, but "on average" there was still positive growth. The average percent growth of the bus only cities was 4.1% compared to 11.5% for rail. When compared to the largest bus only cities, the rate of boardings growth is approximately three times greater in rail cities. This is significantly less that the nine times rate that occurs when very small cities are included in the comparison (Ibid. 2006: 9).

The study does not present the data in a manner that allows for easy comparison of the two data sets. Tampa (a bus only city) experienced an 8.9% increase in boardings despite a 7.2% loss in population. Orlando experienced a 44.6% increase in transit boardings, while experiencing a 30.5% population increase. Seven of the largest bus only cities experienced decreases in boardings, as did five of the rail cities. Atlanta experienced the greatest percentage growth of all the rail cities (62.2%), and yet boardings decreased by 1.4%. Phoenix experienced the greatest percentage growth of the bus only cities (44.9%) and experienced a 37.9% increase in boardings. Of the rail cities, the largest per capita growth occurred in Miami-Ft. Lauderdale (1,766,242), and it experienced a 17.4% decline in boardings. Houston, in the period studied, experienced the most per capita growth of the bus only cities (920,658), and experienced a decrease in boardings of 4.2%.

Table 4-1
Comparison of Most Populous Bus Only Cities in 1996 to Rail Cities
Size and Performance Data

Bus Only Cities

City	Population			Boardings			O&M in constant 1996 Dollars (in millions)		
	1996	2003	Percent Change	1996	2003	Percent Change	1996	2003	Percent Change
Memphis	825,193	972,091	17.8%	12.0	13.0	8.3%	24.2	36.9	52.5%
Orlando	887,126	1,157,431	30.5%	15.7	22.7	44.6%	42.5	64.2	51.1%
Tampa	888,530	824,936	-7.2%	9.0	9.8	8.9%	31.4	27.8	-11.5%
Indianapolis	914,761	1,218,919	33.2%	12.1	11.3	-6.6%	25.6	30.6	19.5%
Columbus	945,237	1,133,193	19.9%	17.7	15.8	-10.7%	46.9	55.5	18.3%
San Antonio	1,129,154	1,327,554	17.6%	38.7	40.3	4.1%	75.6	76.8	1.6%
Cincinnati	1,212,675	1,503,262	24.0%	30.2	24.1	-20.2%	64.0	57.6	-10.0%
Milwaukee	1,226,293	1,308,913	6.7%	60.0	58.2	-3.0%	89.5	105.7	18.1%
Kansas City	1,275,315	1,361,744	6.8%	14.4	13.6	-5.6%	38.2	42.0	9.9%
Phoenix	2,006,239	2,907,049	44.9%	32.9	45.2	37.4%	60.1	119.7	99.2%
Minneapolis	2,079,676	2,388,593	14.9%	61.9	72.2	16.6%	130.6	186.9	43.1%
Houston	2,901,851	3,822,509	31.7%	80.8	77.4	-4.2%	191.3	220.3	15.2%
Detroit	3,697,529	3,903,377	5.6%	58.2	48.5	-16.7%	178.9	218.7	22.2%
Average	**1,537,660**	**1,833,044**	**18.9%**	**34.1**	**34.8**	**4.1%**	**76.8**	**95.6**	**25.3%**

Rail Cities

City	Population			Boardings			O&M in constant 1996 Dollars (in millions)		
	1996	2003	Percent Change	1996	2003	Percent Change	1996	2003	Percent Change
Atlanta	2,157,806	3,499,840	62.2%	144.8	142.8	-1.4%	222.5	245.7	10.4%
Baltimore	1,889,873	2,076,354	9.9%	101.2	111.7	10.4%	253.0	283.2	11.9%
Buffalo	954,332	976,703	2.3%	27.6	24.1	-12.7%	66.0	61.9	-6.2%
Dallas	3,198,259	4,145,659	29.6%	48.5	76.5	57.7%	145.8	238.8	63.8%
Denver	1,517,977	1,984,889	30.8%	69.9	78.0	11.6%	158.7	204.5	28.9%
Los Angeles	12,573,142	13,296,303	5.8%	483.6	600.0	24.1%	991.8	1092.1	10.1%
Miami-Ft.Lauderdale	3,152,794	4,919,036	56.0%	106.3	87.8	-17.4%	250.3	278.2	11.1%
Portland	1,172,158	1,583,138	35.1%	71.4	98.5	38.0%	144.8	192.7	33.1%
Sacramento	1,097,005	1,393,498	27.0%	25.2	28.9	14.7%	61.6	86.1	39.8%
St. Louis	1,946,526	2,077,662	6.7%	52.2	48.1	-7.9%	118.7	137.4	15.8%
San Diego	2,348,417	2,674,436	13.9%	66.7	74.5	11.7%	119.2	140.6	18.0%
San Jose	1,435,019	1,851,704	29.0%	49.0	47.5	-3.1%	156.2	243.9	56.1%
Washington	3,363,031	3,933,920	17.0%	319.5	395.2	23.7%	661.5	710.8	7.5%
Average	**2,831,257**	**3,416,396**	**25.0%**	**120.5**	**131.8**	**11.5%**	**257.7**	**301.2**	**23.1%**

Source: Henry and Litman 2006: 14, 17, and 18. Data compiled and percentage and averages calculated by author

The author of this thesis did not conduct this additional analysis of the data merely to refute Henry and Litman's claims. The exercise was found to be more useful in further research than the generalizations provided in the report. Henry and Litman provided statistics that support their claim that *on average,* in terms of ridership and particular O&M statistics, the rail New Starts cities performed better than the bus only New Starts cities. However, the author of this thesis disagrees with Henry and Litman that the population and growth rate of cities are not significant factors when comparing the performance of transit improvements.

The useful data extracted from this article is that both modes have the potential to significantly increase ridership. The data provided in this study indicate that rail has more potential than bus. It is not noted how many of the bus only cities include premium bus services, such as BRT. Therefore, this study only demonstrates that "rail" and "bus" have different impacts on ridership *on average*. The service elements of the systems are not accounted for, and therefore the findings of this article have limited application. The further analysis presented in this study conducted by the author of this thesis reveals that some bus only cities did experience ridership increases that were as significant as those for rail. The implication of this finding is that there must be other factors that contribute to the success of a new transit system.

What factors contribute to the success of new systems that could be applied in the Elysian Fields Corridor?

Baltes presents a statistical analysis of data from two on-board surveys conducted on two BRT systems in Florida: the Miami-Dade Busway and the Orlando Lynx LYMMO (2003: 1). The two systems differ greatly in terms of technology application and the types of service offered. The Busway is an 8-mile corridor that operates on exclusive right-of-way adjacent to a major highway that was instituted to address the need for faster transit service in the area (Baltes 2003: 4). The LYMMO is a 3-mile loop, which operates on-street in dedicated bus lanes, and is intended primarily to serve persons who have traveled to downtown Orlando by personal automobile to various destinations (Ibid. 2003: 6) . On-board surveys were distributed during weekdays on both systems (Ibid.2003: 8). Both surveys asked respondents to rate their perception of different BRT elements using five-point scales and asked respondents to similarly rate their overall satisfaction with the BRT system (Ibid.2003: 9).

The statistical analysis of the survey responses presented in the article consists of an arithmetic mean of response scores of overall customer satisfaction and levels of satisfaction with particular service characteristics and a STEPWISE regression analysis to estimate the importance of each service element (Ibid.2003: 12).

The article concludes that there is a very high level of satisfaction with the services offered by the two systems, because the all of the weighted mean scores fell between "neutral" and "very satisfied" (Ibid. 2003: 12). The regression analysis concludes that "frequency of service, travel time and seat availability" account for 62.7 % of overall customer satisfaction with the Busway (Ibid. 2003: 15). It is concluded that "comfort of vehicles and travel time" account for 65.6 % of overall customer satisfaction on the LYMMO (Ibid. 2003: 16).

The on-board survey method is a good way to determine customer satisfaction with service elements. However, there are some limitations of the method. One threat to internal validity associated with a survey of this nature is selection. Persons who chose to respond may have stronger feelings about the BRT system, or may be in some other way different from persons that did not volunteer to respond.

The analysis of survey responses is flawed, as arithmetic mean is used to measure the central tendency of ordinal data. The median would be a more appropriate measure for the survey responses. Another flaw is that the averages were weighted, but it is never expressly stated how these weights were applied to the data. Similarly, a regression analysis is not appropriate because the ordinal data is not on a uniform scale. Despite these flaws in analysis, the survey responses demonstrate general satisfaction with the service, and the data could be reorganized to better analyze respondents opinions about particular service elements.

The most important factors to riders were found to be frequency of service, travel time, seat availability, and comfort of vehicles. Because the Orlando Lynx LYMMO has had a significantly positive impact on ridership, it is a good model for the development of a new BRT system.

The Lynx LYMMO is a circulator system, which is rather different than the corridor service proposed for the Elysian Fields Avenue; however, the BRT Alternative would incorporate the majority of the service enhancements included in the Lynx LYMMO. In fact, the costs for the Elysian Fields BRT Alternative were developed based on the Lynx LYMMO because the system incorporated the features proposed for the BRT Alternative and the systems are located in the same region. Although the analyses in the article are flawed, common sense suggests that travel times, service frequency, seat availability and comfortable vehicles would contribute to a successful BRT system. These elements were considered in the development of the BRT Alternative.

The FTA’s *Evaluation of Port Authority of Allegheny County's West Busway Bus Rapid Transit Project* evaluates the BRT elements utilized for this system, including: an exclusive busway, enhanced stations, simplified route structure, limited stops, signal priority, high operating speeds, and multi-modal interfaces (FTA 2003: 2).

The report found that the average speed of routes has increased on the busway portion from 19 to 30 mph (Ibid. 2003: 30). Passenger surveys indicate that the majority of riders feel that the chance of getting a seat, convenience of arrival at destination, wait times, travel times, distances to and from the bus stop, adherence to schedule, and the ease of transfers have improved since the implementation of the busway (Ibid. 2003: 31).

Ridership in the corridor increased by 135% between August 2000 (prior to BRT implementation) and October 2002 (Ibid. 2003: 33). The report found that operating costs were less on the busway than for on-street operations (Ibid. 2003: 41). The BRT system resulted in 4,000 less vehicles on adjacent highways (Ibid. 2003: 42). Signal priority was found to contribute to higher bus speeds (Ibid. 2003: 42).

The BRT components cited as contributing to the success of the system include the exclusive busway, signal priority, enhanced stations, free parking at park and rides, limited stops, and community involvement in planning and development (Ibid. 2003: 45). The report suggests that the use of specially designed alternatively fueled vehicles may add to the success of a new BRT system in other locales (Ibid. 2003: 45).

This report provides further evidence of the potential benefits that can be realized by a new BRT system. The particular elements that are perceived to contribute to the success of the project provide guidance for the development of new BRT systems. Particularly, the importance of the exclusive busway, enhanced stations, and community involvement underscore the findings of other reports. The BRT Alternative for the Elysian Fields Corridor includes most of the elements cited as factors in the success of the West Busway.

The Transit Cooperative Research Program (TCRP) *Report 90 Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit* provides case studies of BRT systems in twenty-six cities in North America, Australia, Europe, and South America. The case studies show that implementing BRT rather than rail transit can be preferable due to lower costs and greater flexibility (Levinson, et al. 2003:2). Successful BRT systems include as many enhanced features as rail, and dedicated right-of-way can improve the reliability and perception of the system (Ibid. 2003:8-9).

It was noted in the findings that the performance of the BRT system, measured by passengers serviced and travel speeds, are dependant on variables such as facility location, size of urban area, and type of facility. Systems integration is found to be an important success factor (Ibid. 2003: 28). Larger urban areas with demonstrated transit markets produce successful BRT systems (Ibid. 2003: 27). The report finds that BRT can attract new riders and induce transit-oriented land use and economic development in a variety of environments (Ibid. 2003: 31). BRT systems were found to achieve benefits such as travel time savings, increased ridership, improved safety, and land development (Ibid. 2003: 23-24).

The need for integrated land use planning concurrent with BRT planning was determined to significantly impact the development and economic effects of a BRT system (Ibid. 2003: 27). Transit overlay zones, density bonuses, and coordination with private developers were noted as potential strategies to increase the development and economic impacts of a BRT system (Ibid. 2003: 27). The report notes that Adelaide, Brisbane, Ottawa, Pittsburgh, and Curitiba have all achieved development benefits similar to those produced by rail transit (Ibid. 2003: 27).

The report found that community support and agency coordination are important to the successful planning and implementation of a BRT (Ibid. 2003: 26). Because BRT can be implemented incrementally, planning and implementation may be easier (Ibid. 2003: 27). The need for the appropriate amount of parking to serve busways was identified as a factor influencing system performance (Ibid. 2003: 27).

This report provides a general overview of several BRT case studies and elements that are perceived as factors for success. The report provides useful statistics for specific projects that can be used to support the hypothesis that BRT can achieve similar transportation, development, and economic benefits as rail transit.

Do different transit technologies vary in their potential to induce land development and economic impacts?

BRT

The FTA's *Boston Silver Line Washington Street Bus Rapid Transit (BRT) Demonstration Project Evaluation* finds that the Silver Line Washington Street BRT demonstrates that a comprehensive systems approach to BRT can result in higher ridership, reduced travel time, enhanced safety and security, higher customer satisfaction, and land development benefits.

Prior to the implementation of the Silver Line, the South End included many vacant buildings and little commercial activity. Between 1997 (when the Silver Line was in planning) and 2004, the following land use changes occurred in the district:

- $250 million in new real estate construction and $93 million in rehabilitation;
- 1,731 new or rehabilitated housing units, 900 designated as "affordable";
- 128,000 square feet of new or renovated retail space;
- $7 million in improvements to commercial spaces (FTA 2005: 56).

The total amount of real estate investments made adjacent to the Silver Line total $1,218,758,000 (Ibid. 2005: 58).

This report provides further evidence that a BRT system can increase ridership, attract choice riders, and stimulate land development (Ibid. 2005: 60-62). One of the significant findings of this report particularly applicable to the Elysian Fields Corridor is the evidence of the economic and development impacts of the BRT system in a previously depressed area.

The TCRP *Report 90 Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit* provides data that supports the hypothesis that BRT can produce similar land development impacts to rail investments. The Pittsburgh East Busway experienced 59 new developments within a 1,500-foot radius of stations (Levinson et al. 2003: 24). $302 million in land development benefits were related to the development of the BRT in Pittsburgh (Ibid. 2003: 24). Eighty percent of the development is clustered at stations in Pittsburgh (Ibid. 2003: 24). Ottawa experienced $1 billion in Canadian dollars in new construction at stations following the implementation of BRT (Ibid. 2003: 24). In Brisbane it was found that gains in property values near the BRT were up to 20% (Ibid. 2003: 24). Property values grew two to three times faster within six miles of the busway in Brisbane than those farther away (Ibid. 2003: 25).

The *2006 Evaluation of the Las Vegas Metropolitan Area Express (Max) Bus Rapid Transit Project*, summarizes the impacts of the various BRT elements in terms of travel time savings, reliability, and passenger acceptance (FTA 2006: 78). The following elements ranked high in all applicable categories:

- Vehicles (MAX utilizes the Irisbus CIVIS, an electric-hybrid, low-floored, high-capacity, multiple-door vehicle with a center drive position and optical guidance features).
- Proof of payment system
- Ticket vending machines
- Stations
- Service frequency
- Branding

Property acquisition in an area targeted for TOD is programmed in the City of North Las Vegas's 2006-2010 Capital Improvement Program. The City of North Las Vegas has proposed an ordinance that will allow mixed-use and transit-oriented development. North Las Vegas is also developing a new Comprehensive Master Plan. The draft plan calls for mixed-use zones along Las Vegas Boulevard North, due to its proximity to BRT. Although there are plans for development, no significant new development or re-development has taken place adjacent to the BRT corridor at the time the report was published.

The Max Evaluation supports the findings of other similar reports: BRT implementation can increase ridership and attract choice riders (FTA 2006: 58-61). The fact that no significant development impacts have occurred adjacent to the MAX corridor, despite increased ridership and the attraction of choice riders underscores the need to coordinate land use planning with the development of the new transit system (see Levinson et al. 2003: 27, and TCRP 2004). Land use and development planning that provides for transit supportive uses is currently occurring, and these efforts may result in development benefits. The lack of existing development impacts in a rapidly growing city such as Las Vegas highlights the need to have transit supportive policies in place prior to the implementation of the system.

The importance of the unique, alternatively-fueled vehicles in the marketing and branding of the system appears to contribute significantly to its positive perception (FTA 2006: 45). The importance of the vehicles agrees with the findings of the West Busway study: that enhanced vehicles may contribute to the success of a BRT system in other locations (see FTA 2003: 45).

Streetcar

Portland Streetcar Development Oriented Transit, evaluates the development impacts of the Portland streetcar. The Portland Streetcar was developed to connect two major redevelopment sites (Office of Transportation and Portland Streetcar, Inc. 2006: 1). The report found that between 1997 and 2006 over $2.28 billion dollars has been invested within two blocks of the streetcar, including housing office, institutional, commercial, and hotel development (Ibid. 2006: 1).

A Streetcar Local Improvement District was implemented that helped fund the streetcar and other investments in the area (Ibid. 2006: 4). The report finds that stakeholder involvement was critical to the success of the streetcar (Ibid. 2006:4). Public support for the project was found to be important, as well as agreements with developers that include joint obligations (Ibid. 2006:4).

The City of Portland owns the streetcar, but Portland Streetcar, Inc., a nonprofit organization is responsible for the design, management, construction, and operation of the system (Ibid. 2006: 5). The board of this organization is made up of representatives of citizens, city agencies, and property-owners along the alignment. The report finds that this organization creates an environment for consensus-building and meeting diverse needs Ibid. 2006:5).

The coordinated planning undertaken prior to the implementation of the new transit system appears to have been successful in the Portland Streetcar project. The cooperation of various stakeholders appears to have been effective in producing several different benefits.

This report focuses on the development benefits of the project and describes various tools that could be applied in other places. For instance the implementation of a local improvement district may be a useful funding tool in some locations. Although due to the current situation in the Elysian Fields Corridor, additional taxation to support a new transit system is probably not feasible. The development of a non-profit organization to design, manage, construct, and operate the system is an innovation that may warrant further investigation for the Elysian Fields Corridor, due to current conditions at the RTA.

LRT

There are several studies that indicate that proximity to rail stations can increase land values and promote development. Few transit projects have had economic and development impacts comparable to the integrated Dallas Area Rapid Transit system, which includes both LRT and BRT. In this article, the authors focus on the light rail system (Clower and Weinstein 2005: 1). This article reviews the authors' findings from other reports and provides additional data to support their thesis that close proximity to DART LRT stations induces development and raises property values.

In 1999, the authors found that property values were approximately 25% higher near DART stations than in control neighborhoods (Ibid. 2005: 1). The authors found that the median values of residential properties increased 32.1% near stations between 1997 and 2001 compared to 19.5% in control areas (Ibid. 2005: 1). In the same period, the increase for office space was 24.7% for areas near stations and 11.5% for office space that was not located near stations (Ibid. 2005: 1).

In this study, the authors find that the total value of investments near DART LRT stations since 1999 is in excess of $3.3 billion (Ibid. 2005: 1). The authors found that proximity to the DART station was one of the factors of site selection for the majority of projects (Ibid.2005: 2).

This article very briefly provides the above statistics and supporting evidence is provided in the appendix. The statistics support the hypothesis that location near DART LRT stations has some statistically significant relationship to development activities.

In *Do Economist Reach a Conclusion on Rail Transit?*, the authors review the opinions of economists concerning the economic merits of rail transit (Balaker and Kim 2006: 551). The authors review economists' findings of bias in ridership and cost projections, both against rail transit and in favor of it (Ibid. 2006: 556-562).

In simple economic terms, benefits must outweigh costs to justify a policy. The authors conclude that when determining whether rail transit is the best policy, little attention is given to opportunity costs, and there is a lack of agreement on what goals rail transit is meant to achieve (Ibid. 2006: 595). As evidenced in this article, economists do not reach a conclusion on rail transit, although economists are more likely to be optimistic about the positive economic impacts of rail transit, particularly residential housing values, than other perceived benefits (Ibid. 2006: 595). The authors also conclude that of economists that offer an opinion of rail transit in general, the majority find that rail costs exceed its benefits (Ibid. 2006: 596).

This article provides a useful overview of the complications of determining the costs and benefits of new transit systems, particularly when stakeholders disagree about what constitutes a benefit or a cost. Quantifying qualitative projected benefits and costs is a difficult and imprecise task subject to bias and qualitative value judgments. The review of criticisms of ridership and cost projections presents a balanced and valid criticism of the practice: rarely do ridership projections for any transit system meet their mark, and cost estimates for all kinds of transportation projects are often much less than actual costs.

Although this article focuses on rail transit projects, many of the arguments that question the methods of measuring cost-effectiveness can be applied to many major infrastructure improvements. This article emphasizes purely economic reason, which is often overlooked by policy-makers and stakeholders: the best choice is the one that achieves the most benefits with the least costs.

When considering rail transit, stakeholders often do not consider opportunity costs, which can be used generally to argue against LRT in favor of BRT. If an unsuccessful LRT is implemented, the costs expended on physical infrastructure cannot be recaptured, and the infrastructure cannot be easily modified. BRT generally costs less, and therefore if a system is unsuccessful, the overall costs are less. Further, if a BRT system is unsuccessful, it can more easily be modified to improve the system. Most significantly, the opportunity costs of implementing a BRT are significantly less, because the implementation of BRT does not preclude, and in fact can facilitate, the future implementation of rail. However, the article also finds that economists generally agree that rail transit can produce land development benefits.

In *The Value of Access to Highways and Light Rail Transit: Evidence for Industrial and Office Firms* the significance of access to LRT and highway systems as a predictor of office and industrial property rents in the San Diego are between 1986 and 1995 are evaluated (Ryan 2004: 751). Several independent variables were examined, including building characteristics, different office land use types, type of lease, neighborhood characteristics, and measures of access (Ryan 2004: 755). The study finds that freeway access has a consistent relationship with office rents, but light rail transit does not demonstrate a statistically significant relationship to office rents (Ryan 2004: 763).

This study provides empirical evidence that LRT does not significantly affect office rent prices, suggesting that location near LRT is not a significant consideration for office location in the San Diego area. The results of this study differ from other findings, such as those for Atlanta's MARTA system (see Cervero et al. 2004). This study demonstrates that the economic effects of LRT are project specific and can vary widely.

What factors contribute to the potential for Transit Oriented Development (TOD)?

Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects (2004) comprehensively evaluates TOD and joint development in the U.S. The following is an overview of selected facts and observations about TOD contained in the study.

In the first chapter provides an overview of transit-oriented development (Cervero et al. 2004:1-7). The study states that "there is no universally accepted definition of TOD because development that would be considered dense, pedestrian-friendly, and transit-supportive in a middle-size city in the Midwest would be viewed quite differently in the heart of Manhattan or the District of Columbia" (Ibid. 2004: 5). Several transit agencies' formal definitions of TOD are provided (Ibid. 2004: 6). These definitions describe TOD as near transit stops and pedestrian and bicycle friendly. Many, but not all, of the descriptions incorporate the concepts of mixed uses, decreased dependency on the automobile, high-quality development, high-density, economic viability, and sustainability. It is noted that TOD is often considered "neo-traditional" (Ibid. 2004: 7-8).

Joint development is defined in the report as a subset of TOD, "specifically a form of TOD that is project specific and takes place either on or adjacent to transit-agency land" (Ibid. 2004: 8).

According to responses from public stakeholder groups the primary goals of TOD are to promote economic development and increase ridership and revenues. Community development, enhanced livability, wider housing choices, and environmental concerns are secondary considered secondary objectives (Ibid. 2004: 9-10).

The majority of existing TODs evaluated were served by heavy rail (37.4%), followed by LRT (31.3%), commuter rail (21.8%), bus (7.8%), and ferry (1.7%) (Ibid. 2004: 17). This suggests a preference for rail, although the report notes that "a fair number of predominately bus-based TODs were identified by respondents from smaller communities" (Ibid. 2004: 17).

Most existing joint development projects are located in rapidly growing areas (TCRP 2004: 20). Most existing transit joint development projects in the U.S. are commercial developments (TCRP 2004: 21-24). Rail transit joint developments (TJD) are generally large-scale mixed-use projects (Ibid. 2004: 29). Bus TJDs were more likely to be mixed commercial or specialized uses like sports facilities or entertainment centers (Ibid. 2004: 29).

The institutional setting of TOD is often complex. There are often many players involved in TOD: local municipalities, transit agencies, metropolitan planning organizations, state departments of transportation and other state entities, the FTA, other federal agencies, developers, neighborhood organizations, building associations, construction firms, public and private lenders, bicycle coalitions, and other advocacy groups. Involving all stakeholders is vital to the success of a TOD, but can also complicate reaching consensus and delay implementation (Ibid. 2004: 58).

It is found that TOD-friendly zoning, policy incentives, and regulations need to be in place prior to the development of the TOD (Ibid. 2004: 81). Overlay zones are a common tool for TOD development (Ibid. 2004: 81). Funding for station area planning and ancillary capital tools are also noted as common tools to influence TOD (Ibid. 2004: 81). Land-based tools such as land purchases and assistance with land assemblage have been used primarily by redevelopment agencies, mainly in depressed and blighted neighborhoods (Ibid. 2004: 81). Money, for infrastructure, strategic station planning, and ancillary improvements, is the greatest impediment to TOD, according to the respondents of the survey (Ibid. 2004: 81).

Interviews suggest that developers have a positive view of TOD as a viable investment (Ibid. 2004: 96). Most developers expressed that they viewed location near transit stops as advantageous in terms of rent premiums and the ability to obtain equity financing (Ibid. 2004: 97). Enhanced connections from a parcel to a station and a strong degree of public commitment backed by infrastructure improvements were found to make TODs more attractive to lenders (Ibid. 2004: 97). Joint development projects were found to be more difficult to finance because the project is tied to transit and therefore tied to bureaucratic government agencies that are not always driven by profit (Ibid. 2004: 97).

There are fiscal constraints to TOD: mid-rise buildings and infill development incur greater construction costs than single-story on greenfields; parking structures that often accompany TODs are very expensive to construct, obtaining financing for TODs in economically depressed areas is difficult, and municipalities may zone land for uses that will provide more sales and property tax revenues (Ibid. 2004: 99-101). Political barriers include NIMBY resistance due to negative perceptions of "high-density" development (Ibid. 2004: 102). The difficulty of coordinating the efforts of all stakeholders can lead to organizational barriers (Ibid. 2004: 102-103).

A case study of the San Francisco Bay Area is presented in Chapter 8. A regression analysis was performed to evaluate how transit commute correlate with "the three Ds – density, diversity, and design" (Cervero and Kockelman 1997 in TCRP 2004: 148). A strong positive relationship was exhibited between shares of commutes by transit and these three variables (TCRP 2004: 148-151).

The report notes that research indicates that development near transit stops benefits from land value premiums, particularly residential development (Ibid. 2004: 176). The report notes that generally two conditions must be present for these benefits to be realized: a growing economy that has an existing demand for real estate and increased traffic congestion (Ibid. 2004: 176). It is also noted that pro-development policies influence land development impacts (Ibid. 2004:

176). "Neighborhoods free from signs of stagnation and distress" are found to experience greater land development impacts (Ibid. 2004: 176).

Findings

The reports and articles reviewed above prove hypotheses and provide evidence applicable to the general subject of this thesis.

1. BRT can produce benefits similar to LRT if similar attributes are present, including exclusive right-of-way, headway based schedules, enhanced stations, and advanced vehicles. A slight bias towards rail systems does appear to exist.

2. Land development and economic impacts are not guaranteed despite the transit technology used. Several other factors affect development and economic growth.

3. It is difficult to accurately project ridership increases, capital expenditures, and operating costs. It is even more difficult to accurately balance these benefits and costs with qualitative benefits and costs to produce a true cost/benefit analysis.

4. Transit-friendly zoning and pro-development policies need to be in place prior to the implementation of the new transit system.

5. Collaboration between public and private stakeholders is essential. There must be public support for the project.

Findings extracted from the articles above that relate to the specific subject of this thesis include:

1. The size of the urban area affects the benefits of a new transit system.

2. Land development benefits are more likely to occur in growing areas with expanding economies and existing real estate demand.

3. The implementation of a new transit system requires significant funds. Funding for infrastructure, strategic planning, and ancillary improvements, are also needed to successfully implement a new fixed guideway transit system and TOD.

4. Density, mixed uses, and good design are important factors in the success of TOD.

5. Developers recognize the potential benefits of TOD. Developers are also driven by profits and are weary of risks and involvement with bureaucracies.

These findings have several implications regarding the feasibility of implementing a new transit system in the Elysian Fields Corridor, as discussed in Chapter 5.

Chapter 5: Land Use and Economic Impact Analysis and Conclusion

Introduction

The purpose of this study is to examine the potential for transportation infrastructure improvements to guide and stimulate redevelopment in the Elysian Fields Avenue Corridor. Thus far, this study has developed a basis for assessing redevelopment potential by reviewing the historical and existing conditions of the corridor, developing conceptual alternatives, and reviewing selected relevant literature on the topic. The historical conditions of the corridor suggest that there was a significant demand for transit services in the corridor prior to Hurricane Katrina, and existing conditions indicate that there continues to be a significant demand for transit services in the corridor, despite a considerable decrease in population and systemwide decreased demand.

The existing land use and zoning does not support mixed-use, higher density transit supportive development. The following analysis of potential land use impacts assumes that transit supportive zoning would be implemented prior to the construction of a new rapid transit system. This may be an unrealistic assumption. Residents of the Gentilly neighborhood have repeatedly expressed opposition to higher density development or new rental property development both prior and subsequent to Hurricane Katrina (New Orleans City Planning Commission 1999: 155, Capstone 2006). However, in order to assess the full redevelopment potential of a new transit system, one has to assume that redevelopment not only will be permitted; it will be encouraged to occur.

The conceptual alternatives for new rapid transit services in the corridor provide comparable levels of service throughout the corridor, and except at the northern terminus, there is no difference in the proposed station locations. The station area analysis discusses the development potential adjacent to each station location without reference to alternative.

As the literature demonstrates, both LRT and BRT can have significant impacts on land use and development. There are empirical studies that “prove” that one mode is better than the other for accomplishing various benefits including land development. The author accepts that there are several case studies that document the impact that rail projects have had on land development in several areas. There are fewer studies that indicate that BRT can accomplish the same effects as rail, although this is a difficult hypothesis to prove. When a BRT project has been implemented and development impacts occur, how does one determine if greater benefits would have been realized if rail technology had been utilized? If BRT has been implemented and no development impacts occur, how can assess that such impacts would have occurred if LRT had been implemented? Furthermore, when LRT projects stimulate development benefits, how can one prove that similar impacts would not have occurred if BRT had been implemented?

BRT is a relatively new concept in the U.S. and therefore there are fewer cases to evaluate. American transit planners are still in the learning stages with regard to the appropriate application of the technology and service concepts. Some recent BRT projects may not have yet realized all of their benefits, due to the infancy of the system or a lack of transit supportive zoning and/or infrastructure. Some recent BRT projects, such as the Boston Silverline, have produced tremendous land development impacts that are comparable in magnitude to successful LRT projects.

One of the reoccurring themes that one can draw from the literature is that there are factors that lead to the success or failure of any rapid transit system, regardless of the technology. Why is the Dallas Area Rapid Transit system so successful, and the Metropolitan Atlanta Rapid Transit Authority system so marginal? Transit planners must look at the factors that influence success and apply them appropriately, regardless of the type of vehicle that is utilized.

The significance of site specific factors cannot be over-emphasized. What worked in Boston may not work in another location. There is no place like New Orleans. There is no case that provides a truly comparable environment, particularly following the levee failures of 2005. The following analysis applies historical data and unique situations where appropriate. Where differences between BRT and LRT can be quantified, the following analysis applies the appropriate analytic methods.

Station Location Selection

The station locations were selected primarily to serve populations at trip origins and destinations. Station locations were considered at major employment and population centers, major north-south intersections that provide direct bus, vehicle and/or pedestrian access to major activity and population centers, and major public and private institutions and special event centers. Some stations, such as Lee Station and the Filmore Avenue Station, are not located near existing major trip generators or transportation facilities. These two stations were selected purely to induce redevelopment in these currently economically depressed areas significantly damaged by Hurricane Katrina. However, their proximity to existing activity centers makes them more attractive for redevelopment if a new transit system were to be developed.

Connections between the proposed transit system and existing bus and streetcar routes were also considered. Convenient transit connections would enable bus and streetcar riders with origins in northern portion of the corridor to commute between jobs and destinations in the French Quarter, CBD, and other locations throughout the city. Similarly, the connections would facilitate south to north commuting within the corridor.

Station Area Impact Analysis

A land use pattern that creates opportunities for transit trip generation and an urban form that provides a quality pedestrian environment focused on the transit station is conducive to transit oriented development (TOD). The following station area impact analysis focuses on the immediate area around each proposed station, defined by a five-minute walk radius (approximately one-quarter mile). Within this radius, transit stations concentrate pedestrian activity and increase pedestrian accessibility to the adjacent properties. Each station was evaluated for its development/redevelopment potential considering existing conditions and potential future conditions. Several factors were examined including existing land use, urban form and access, existing major trip generators, potential trip generators, and existing redevelopment incentives.

Throughout this analysis transit stations are considered an amenity that enhances the marketability of the site: it cannot be assumed that the presence of a rapid transit station will change the basic market demand at the site. A rapid transit system can change market demand, and this analysis is generally optimistic about its potential to do so in this particular corridor. However, New Orleans is economically depressed. The following analysis is biased by an underlying optimism regarding the potential to replicate the successes of a Boston Silverline or Portland Streetcar, when these expectations may be unrealistic. To temper this optimism, feasibility is considered at the end of this chapter, and “real-world” barriers to implementation and success are reviewed.

UNO Technology Park Station

The UNO Technology Park Station, proposed as part of the BRT Alternative, is located at a major trip generator in the corridor, the UNO Research and Technology Park. The Research and Technology Park consists of three mid-rise office buildings housing several companies and joint ventures between UNO and tenants, and is therefore also a major employment center. The urban form of the Technology Park is currently organized to serve primarily vehicular access needs.

The University of New Orleans Research and Technology Foundation is studying the feasibility of constructing a new hotel adjacent to the Lindy Claiborne Boggs International Conference Center (University of New Orleans Research and Technology Foundation 2007). The introduction of a new rapid transit line with a station at the Technology Park may add to the feasibility of this proposed development.

The UNO Technology Park Station is a good potential location for infill development because it is already a major activity and employment center, and there is some space for expansion. In addition, the existing facilities could likely accommodate new tenants. Because there is a little vacant land available for infill development, the TOD potential of the UNO Technology Park Station is medium.

UNO Station

The land adjacent to the UNO stations is dedicated for University operations, and therefore there is little potential for development around the UNO station, except at the adjacent Technology Park discussed above. However, UNO could redevelop some of their adjacent property for new uses. Overall, the potential for development and redevelopment adjacent to the UNO Station is low.

Lee Station
The area around Lee Station currently consists of commercial and residential uses. Some of these uses are occupied but the majority remains abandoned. There are no major trip generators or employment centers at this location. Despite the lack of existing trip generators, the redevelopment potential in the vicinity of Lee Station is high.

Because the station is located near UNO, the Lakefront, and the UNO Research and Technology Park, it is an attractive location for redevelopment. Mid-rise developments would not be out of context in the area fronting Elysian Fields Avenue, as there are a few existing mid-rise buildings in the vicinity. Mixed-use development that includes a variety of housing options would benefit the both the local area and the region, by addressing the current shortage of affordable housing throughout the city. Additional commercial services are also needed in the area, as currently there are few active retail and service establishments.

Parcel assembly could be assisted by the New Orleans Redevelopment Authority, an agency with considerable authority to acquire and sell blighted property. Although several commercial properties in the area are active and currently providing needed services in the area, the New Orleans Redevelopment Authority is authorized to acquire non-blighted properties in certain situations (NORA 2007). Additionally, although it may seem callous and unfair to relocate residents that have gone through the onerous process of rebuilding their homes, it may be deemed to be in the best long-term interest of the neighborhood to do so. All relocations require compensation for the fair market value of the property. However, it would be very difficult to determine “fair” compensation values for residents that have rebuilt and returned.

Filmore Avenue Station
The existing situation in the vicinity of Filmore Avenue Station is similar to Lee Station. Commercial establishments existed at the intersection of Filmore and Elysian Fields Avenues, however, only a few businesses in the southwest quadrant are currently active. Residential renovation and occupation in the vicinity is low.

The current urban form of the area is suburban and automobile oriented. More dense, mixed-use development would alter the existing urban form of the area, but context sensitive development could be achieved that could serve existing local and city-wide needs, while maintaining some of the former character of the neighborhood.

As with Lee Station, the area around the Filmore Avenue Station is seen as a good location for redevelopment because of its proximity to existing major trip generators and stable neighborhoods. Overall the redevelopment potential near the Filmore Avenue Station is high due to the availability of land for redevelopment.

Gentilly Intermodal Center
The proposed Gentilly Intermodal Center is located within walking distance of two existing major trip generators: Dillard University and Brother Martin Junior and Senior High School. Dillard University is also a major employment center in the area. Many of the former commercial establishments in the vicinity have re-opened, although many buildings remain

vacant. Former community facilities in the area, such as the Norman Meyer Branch of the Public Library and Post Office remain unoccupied.

Aesthetic values are subjective and depend upon the response of the viewer. That being said, the Elysian Fields Avenue/Gentilly Boulevard intersection, particularly on the west side between Milton and Senate Streets, is aesthetically challenged. There is value in restoring and preserving some elements in this area, such as Peaches, a music store with a long history in the area. Also, the commercial establishments open in this area are supplying desperately needed goods and services to the area. However, a large, coordinated redevelopment project is considered necessary for the area bounded roughly by Milton Street, Norman Meyer Avenue, Senate Street and Elysian Fields Avenue. It is the author's strong opinion that the Gentilly neighborhood will not truly recover until this key intersection has been rehabilitated.

Dillard University is a very aesthetically pleasing campus and contributes significantly to the visual environment and urban form of the area. The adjacent neighborhood streetscapes also have aesthetic value. The urban form of the area is suburban and vehicle oriented, despite the transit activities in the area and the related pedestrian activity.

The area has significant potential for redevelopment. The intersection used to have several bus routes that stopped in this location, and a few of these lines continue to stop at the intersection. The area has been named one of the City's target redevelopment zones, with financial incentives available for businesses to develop in the area.

There are some physical constraints to redevelopment in the area. Several cemeteries are located in the vicinity, as well as an electric substation. The street network in this area is very poor geometrically, because Gentilly Boulevard meets Elysian Fields Avenue at a 45 degree angle. Residential properties along the east side of Elysian Fields Avenue south of Gentilly Boulevard sustained little to no flood damage and many of these properties have been rehabilitated and re-occupied. Despite these physical constraints, the development potential in the vicinity of the Gentilly Intermodal Center is high.

Galvez Station

The land use immediately adjacent to the Galvez Station is primarily residential, with some commercial developments and a fire station. Immediately north of the Galvez Station, on the other side of I-10, is the Lowe's Home Improvement store. The Lowe's store is currently a major trip generator and employment center in the area, although the significance of the Lowe's will likely diminish over time as the demand for home improvement items reduces.

The urban form of the area in the vicinity of the Galvez Station is more pedestrian friendly than on the north side of I-10, and the station is adjacent to a bus route with high ridership performance.

The area has potential for redevelopment, as many of the residential structures on both sides of I-10 are blighted and abandoned. It is likely that redevelopment in this area would be primarily commercial in nature, particularly on the north side of I-10. Access and visibility from the interstate is traditionally considered an asset for commercial developments and a disadvantage for residential development. Overall the redevelopment potential in the vicinity of the Galvez Station is high.

Desire Station

The existing land use adjacent to the Desire station is a mix of residential and commercial uses. There are no major trip generators adjacent to the Desire Station, but it is located just north of the proposed Desire Streetcar Line and the existing St. Claude Avenue bus, which has high ridership performance.

The form of the area is more urban in nature, although along the two major thoroughfares activity is vehicle oriented. Existing commercial parcels in the northeast and northwest quadrants of the intersection are potential locations for small-scale higher-density redevelopment projects.

The proposed Desire Station is located in the St. Roch neighborhood, which is included in the New Marigny Historic District, which would affect the type of development that could occur within the historic district boundaries. Several properties in the vicinity of the Desire Station are blighted, abandoned, or in need of repairs and aesthetic improvements. The Preservation Resource Center's (PRC) preservation easement program, which provides tax benefits to owners of historic structures that donate control of the façade to the PRC, may be a useful tool in revitalizing the aesthetic quality of the area (PRCNO 2007).

Overall, redevelopment potential in the vicinity of the proposed Desire Station is medium.

Riverfront Station

Existing land uses adjacent to the Riverfront Station include commercial and retail establishments, entertainment venues, cultural institutions, and industrial uses along N. Peters Street on the east side of Elysian Fields Avenue. The area is urban in nature and pedestrian friendly. On the west side of the proposed station, there are existing surface parking lots, which the city has suggested may be developed into parking garages. Washington Square Park, one of the major passive recreational green spaces in the Marigny neighborhood is located to the northwest of the proposed station.

The Marigny and French Quarter are major trip generators because they are regional cultural and entertainment centers. These areas are also a major employment centers.

There is some redevelopment potential in the area, however much of the area is built-out and includes historical structures. On the west side of the proposed station, there are existing surface parking lots, which the city has suggested may be developed into parking garages. Some of the industrial parcels in the Marigny may be redeveloped for residential or commercial uses. Overall, development potential at the Riverfront station is considered medium, due to the scarcity of developable parcels.

General Discussion of Potential Economic Effects

Potential economic effects of the proposed transit alternatives include temporary and long-term effects that can be further defined as direct, indirect, and induced effects (Weisbrod and Weisbrod 1997: 6) that are related to the construction of the project. The potential economic impacts of a transportation project can also be described as generative, redistributive, and financial transfers (Cervero, Robert, et al. 1998: 3-1).

Direct temporary effects would result from the introduction of project funds to the local economy. These direct temporary effects are considered "financial transfer impacts" (Ibid. 1998: 3-1). Direct effects associated with construction include labor and materials. To some extent, "leaks" from the local economy would occur, i.e. some labor and materials would originate elsewhere.

Support activities are considered indirect effects and are not as site-specific. Examples of indirect effects are increased security patrol details at work sites and business growth for suppliers (Weisbrod and Weisbrod 1997: 5). These support activities are indirectly related to introduction of project funds and can also be described as "financial transfer impacts" (Cervero, Robert, et al. 1998: 3-1).

Induced effects are a direct result of construction spending and result from the "multiplier effect" of both direct and indirect effects (Weisbrod and Weisbrod 1997: 6). Such effects are largely off-site. Increased spending by construction workers on food, shelter, clothes and leisure activities are examples of induced effects. However, induced effects can represent shifts from within the regional and local economies and shifts should be recognized separately from new activities (Ibid. 1997: 6-7). Additionally, because of the interrelated nature of these effects, careful accounting of impacts is needed to avoid "double counting" (Ibid. 1997:6).

The magnitude of economic effects produced by a transportation project is dependent upon an area's economic self-sufficiency. Access to materials, qualified labor, equipment, and markets in conjunction with the transportation project create a favorable environment for economic growth (Ibid. 1997: 8). In terms of construction, the New Orleans Metropolitan Statistical Area (MSA) is highly self-sufficient, with local vendors for fill, concrete, structural steel and other construction materials. Heavy roadway and related construction labor is available and would likely not require non-local labor.

Ideally, an economic model, such as RIMS-II, is used to determine the projected economic effects of major transportation infrastructure investments. However, applicable multipliers do not exist for the region due to the events of 2005. Some general statements can be made about the economic impacts of construction, however.

In all categories (direct, indirect, and induced) the benefits are projected by applying an input/output model to the cost of construction. Therefore, the most expensive alternative will always have the greatest economic benefits due to construction. The LRT and Streetcar Alternatives would have the greatest economic impacts due to construction, followed by the BRT Alternative and the Express Bus Alternative. Additionally, the LRT and Streetcar Alternatives include the manufacture of vehicles in New Orleans, and therefore prevent the leak of vehicle procurement associated with the BRT and Express Bus Alternatives.

Operation and Maintenance (O&M) costs would also have direct, indirect and induce economic effects. These effects are considered generative effects (Cervero, Robert, et al. 1998: 3-1). Generative effects result from the utilization of previously underused resources or using resources more efficiently (Ibid. 1998: 3-2). It is assumed that there would be few leaks associated with labor costs, as most of the salaries paid to transit workers would be kept in the New Orleans MSA, if not primarily in Orleans Parish. Again, due to the inclusion of local manufacture, the LRT and Streetcar Alternatives would have fewer leaks associated with direct maintenance costs. Generally, the effects of O&M costs would be similar among the LRT, Streetcar, and BRT Alternatives, with the LRT and Streetcar Alternatives having a slight advantage over the BRT Alternative. The LRT, Streetcar, and BRT Alternative would produce significantly more O&M multiplier effects than the Express Bus Alternative.

Generally, in the current state of the practice, simple cost benefit analyses are not applied to new transportation investment (Eberts 1999: 3-4). However, it should be noted that the potential input/output benefits of a new transportation system must be weighed against the higher costs. Therefore, assuming input/output models are an appropriate way to assess direct economic benefits, a high cost alternative and a lower cost alternative have the same b/c ratio when only construction costs are examined.

The primary economic goal of the proposed project – to induce redevelopment in the damaged neighborhoods – is more difficult to predict and quantify even in general terms. If any of the alternatives were implemented, based on the evidence provided in case studies it seems likely that some induced redevelopment would occur. However, as noted in the findings of Chapter 4, a new transit system will not automatically induce land development or economic benefits.

Land development and economic benefits are generally considered “redistributive effects,” that is, these impacts are generally assumed to be locational shifts of activities that would have occurred in another location if the transit system were not built (Cervero, Robert, et al. 1998: 3-5). One of the aims of the proposed transit improvements in the Elysian Fields Corridor is to not only induce redistributive development effects, but to achieve generative development and economic effects. The existing analytic approaches to predicting the benefits of transportation projects in depressed areas have been described as “primitive” (Eberts 1999: 3-4). There are several statistical models that can be applied to conduct modal comparisons. Most of these models require expensive software packages such as TRANSCAD and TRANPLAN. These models also require data that does not currently exist. The regional travel demand model for the area is currently being updated to reflect post-Katrina conditions, which is a difficult task due to the continuing changes in the area.

All of the alternatives, with the exception of the Express Bus Alternative, are likely to produce significant beneficial impacts in terms of redevelopment and economic growth. The benefits associated with the Express Bus Alternative would be confined to travel times savings and other user benefits.

It is possible that the LRT or Streetcar Alternatives would produce a slightly greater impact, because it is generally assumed that choice riders exhibit a bias for rail technology. However, the new stylized BRT vehicles have only recently been introduced in this country. It is the author's opinion that this assumed bias is based on aesthetic values, perceived comfort, and other difficult to isolate subjective conceptions. The new generation of BRT vehicles may address some of the factors that contribute to this assumed bias. It is possible that rail technology may produce more induced impacts than BRT technology, but based on the findings in the literature it is also possible that BRT can produce equal or greater effects.

There are a few instances where the impact of the LRT and Streetcar Alternatives are quantifiably superior to the BRT Alternative. First, due to the proposed local manufacture of vehicles, the LRT and Streetcar Alternatives would not leak vehicle manufacture benefits. There are also some intangible qualitative benefits of local manufacture such as civic pride. Secondly, because the LRT and Streetcar Alternatives would cost more than the BRT Alternative, the direct economic effects in terms of simple multipliers would be greater than the BRT Alternative. However, if similar benefits could be achieved by the BRT Alternative at a lower cost, the effect of these multipliers would be diminished.

Demand

In September 2007, daily ridership on the 55 Elysian Fields ranged from a low of 211 on a Sunday to 1,141 on a Wednesday (RTA 2007). Given the current 17.5-hour weekday operating schedule, peak current demand could be estimated as 65 passengers per hour during weekdays. However, this average does not accurately assess current demand, as most travel occurs at peak periods. Assuming that 70% of travel occurs between peak periods of 7 AM to 10 AM and 3 PM and 6PM, and 100% of these trips are origin/destination pairs, peak demand would be estimated at 266 passengers per peak period hour. Given these assumptions, and adding the assumption that off-peak demand occurs on an average basis and 100% of off-peak travel is part of an origin/destination pair, current off-peak demand could be estimated as 15 passengers per hour for the remaining 11.5 hours of the operating schedule.

Current ridership numbers do not justify the use of a high capacity vehicle, such as a multiple car LRT or articulated BRT vehicle. A single car LRT, streetcar or traditional sized BRT vehicle would be the best option for current ridership demand. However, a three vehicle fleet of vehicles accommodating between 60 and 90 passengers would not provide enough capacity for the very rough estimates for current peak hour demand. With any of these vehicles, additional vehicles could be added to the fleet as needed. The LRT Alternative has a slight advantage in this respect, as it is the only option that would allow additional capacity to be added to an existing vehicle.

The rough estimates of existing off-peak ridership would not justify the development of a new fixed-guideway transit system. However, one of the goals of introducing premium transit service is to attract choice riders. The existing 55 Elysian Fields, with its constrained schedule and inconvenient headways, is unlikely to be patronized by persons who have alternatives to public transit. As demonstrated in the case studies presented in Chapter 4, premium transit services will attract choice riders and increase ridership.

Additionally, the 57 Franklin Avenue is a high performance route located approximately one-half mile to the east of Elysian Fields Avenue. It is likely that some 57 Franklin Avenue riders could be attracted to the premium transit service provided by the LRT, Streetcar, and BRT Alternatives. Although this shift would not change system-wide ridership numbers, any riders choosing to utilize a new service on Elysian Fields Avenue rather than Franklin Avenue would increase ridership in the corridor.

Feasibility Analysis

The above analysis finds that a new transit system on Elysian Fields is likely to be beneficial in terms of user benefits, economic growth, and induced redevelopment. However, transportation investments must be considered in terms of priority, likelihood of funding, overall costs, and the probability of achieving the goals of the project.

The following findings were construed from the literature reviewed, and present significant barriers to the feasibility of the proposed project.

1. The size of the urban area affects the benefits of a new transit system.

Orleans Parish had a population of 484,674 in 2000 (U.S. Bureau of the Census 2000). As of July, 2007, GCR & Associates, Inc. estimated the population of Orleans Parish as 273,600 (GCR 2007). New Orleans was never a very large city, and it currently a small city. If it is assumed that the size of an urban area has a positive impact on the benefits of a new transit system, fewer benefits would result from a new transit system in New Orleans than in a large urban area such as Boston or Dallas.

2. Land development benefits are more likely to occur in growing areas with expanding economies and existing real estate demand.

The population of the City of New Orleans has steadily declined with every decennial census since 1970 (U.S. Bureau of the Census 1960 to 2000). There was the obvious significant decrease that occurred in 2005. While the population is slowly increasing, current population estimates are far from 2000 figures. Repopulation is not analogous to "growing."

The local economy may be considered to be rebounding, but clearly is not expanding. Total sales tax revenues collected in the City of New Orleans were $11,467,082 in May 2007, compared to $13,870,060 in May 2005 (City of New Orleans Finance Department in Liu and Plyer 2007). However, there has been a significant loss of employers in Orleans Parish: from 9,592 in the second quarter of 2005 to 7,039 in the second quarter of 2007 (Louisiana State University, Louisiana Recovery Authority, Louisiana Economic Development, Louisiana Department of Labor in Liu and Plyer 2007: 352007). Eleven publicly traded companies and a single Fortune Five Hundred company remain in New Orleans as of October 2007 (City Business 2007).

One major barrier to economic development is that federally allocated funds have not been paid to applicants. The introduction of these funds into the local economy could have substantial financial transfer impacts and multiplier effects. The following table is copied from the Brookings Institute's *New Orleans Index Second Anniversary Special Edition*.

Table 5-1
Status of FEMA Public Assistance Grants for Louisiana as of June 1, 2007

				Total funds NOT paid to applicants	
Applicants	FEMA funds allocated	FEMA payout to state	State payout to applicants	Dollars	Percent of allocated funds that has not been paid to applicants
Orleans*	$1,840,000,000	1,210,000,000	459,000,000	1,381,000,000	75.1%
Jefferson	289,000,000	243,000,000	147,000,000	142,000,000	49.1%
Plaquemines	334,000,000	232,000,000	79,000,000	255,000,000	76.3%
St. Bernard	844,000,000	713,000,000	329,000,000	515,000,000	61.0%
St. Tammany	361,000,000	323,000,000	218,000,000	143,000,000	39.6%
Balance of state**	2,633,900,000	1,896,178,020	1,184,955,720	1,448,944,280	55.0%
Total	6,301,900,000	4,617,178,020	2,416,955,720	3,884,944,280	61.6%

Source: FEMA

*Includes City of New Orleans, Recovery School District, Charity Hospital, NO Airport and the NO Convention Center.

**Includes all other parishes and state agencies.

Source: Liu and Plyer 2007: 37

New Orleans could potentially become a growing economy if the monies allocated for recovery were received. However, as the table demonstrates, over 75% of allocated funds have not reached their designees as of June 1, 2007.

There is an existing demand for real estate – in the form of affordable housing. The demand for quality affordable housing has induced some development (U.S. Bureau of the Census, Liu and Plyer 2007: 12). However, there is a surplus of homes for sale in New Orleans. In June 2007, there were approximately 4,038 houses for sale on the Eastbank of Orleans Parish and 246 houses were purchased (New Orleans Metropolitan Association of Realtors in Liu and Plyer 2007: 35). Many of the homes for sale are likely uninhabitable. The average sale price of houses in Orleans Parish was $226,761 in June 2007, compared to $273,032 in June 2005 (Liu and Plyer 2007: 35). The mean may not be the best measure of central tendency for housing prices, because many of the houses on the market are in need of significant renovation and sell at lower prices and new, renovated, or undamaged home prices are currently well above the stated average.

3. The implementation of a new transit system requires significant funds. Funding for infrastructure, strategic planning, and ancillary improvements, are also needed to successfully implement a new fixed guideway transit system and TOD.

As noted in the previous section, although sales tax revenues are recovering, the City was pledged millions of dollars that it has yet to receive. Currently, the city has difficulty covering the cost of basic civic services.

It should be noted that public-private partnerships are the latest trend in transportation funding. It is possible that this avenue of funding could be pursued for the proposed project. However, other barriers to feasibility discussed herein would need to be addressed before any meaningful analysis of this funding possibility could be conducted.

4. Density, mixed uses, and good design are important factors in the success of TOD.

The citizens of Gentilly have repeatedly expressed opposition to density, mixed uses, and the development of multifamily and rental housing (New Orleans City Planning Commission 1999: 155, Capstone 2006). The public may be persuaded to think differently about these issues, but subjective opinions are difficult to change. The City could choose to impose these practices against the public's expressed will, but that would defeat the goals of consensus-building and gaining public support for the project.

5. Developers recognize the potential benefits of TOD. Developers are also driven by profits and are weary of risks and involvement with bureaucracies.

New Orleans has a serious image problem. Prior to Hurricane Katrina, New Orleans had a reputation as a bad place to do business (McCulley 2007). Despite many federal, state and local incentives, companies are fleeing the city, rather than flocking to it (Louisiana State University, Louisiana Recovery Authority, Louisiana Economic Development, Louisiana Department of Labor in Liu and Plyer 2007: 21). At all levels of government, corruption has been exposed: a former governor in federal prison, an indicted congressman, a councilman has admitted accepting bribes, a corrupt school board member convicted of corruption, and, unfortunately the list goes on. Although the more optimistic citizens of New Orleans may convince themselves that it is just "a few bad apples," criminals in public office "spoil the bunch" in the larger public eye. If developers are weary of risk and dealing with bureaucracies in general, there is little hope that they would even consider large scale investments in the City.

Crime is another serious issue in attracting employers and developers to the City. As gruesome crime statistics continue to be published – such as a murder every 1.8 days in the first quarter of 2007 – the City will continue to be seen as a dangerous place and a risky place to invest McCarthy 2007: 1). The City has earned the title "Murder Capital of America" several times. The inability to prevent crime and prosecute criminals is not an assuring factor when evaluating investment risks.

Another obvious risk that potential developers would consider is the possibility of another levee failure. This is likely to weigh heavily against the probability of new developers investing in the city.

Priority

The City has many public transportation needs at the current time. As of July 2007, the RTA was operating 50% of its pre-Katrina routes with 19% of its pre-Katrina fleet (RTA in Liu and Plyer 2007: 33). Average daily ridership in September 2007 was 19,662 compared to 71,543 in July 2005 (RTA 2007, calculated by author). Although average daily ridership numbers in

September 2007 are only 27% of July 2005 ridership numbers, it is remarkable that the RTA has managed to reinstate 50% of its routes with 19% of its former fleet.

A new fixed guideway service on Elysian Fields Avenue, or anywhere else in the City, is simply not a priority. The RTA needs to rebuild its fleet to increase levels of service on existing routes. This is the case in many American cities, as transit is not profitable and is generally subsidized. Unless the RTA receives funds specifically earmarked for a fixed-guideway demonstration project, consideration of the proposed project is unreasonable when compared to other current needs.

In some respects, it may be easier for the RTA to receive funds to build a new system than to provide better levels of service on existing routes. The New Orleans Regional Planning Commission and the RTA could decide to seek FTA "New Starts" funds for the project. Currently, this program provides 80% of the funds to build new transit systems, and the locality provides a 20% match. However, this program is nationally competitive, and even if a New Starts Application was chosen for funding, the City would likely have difficulty raising the funds for the 20% match.

Summary of Findings

Physically, the Elysian Fields Avenue corridor is a good location for a fixed guideway transit system. The wide neutral ground provides ample right-of-way that would not need to be purchased. The corridor is anchored by two stable major trip generators: the Lakefront and the French Quarter. The Lakefront contains the University of New Orleans campuses, the UNO Research and Technology Park, the Lakefront Arena, and Lakeshore Park. The French Quarter and adjacent Faubourg Marigny neighborhoods are major cultural, entertainment, and employment centers. The corridor contains other major trip generators throughout, including Dillard University, Brother Martin Junior and Senior High School, various schools and churches, and the Lowe's Home Improvement Store.

Existing ridership statistics indicate that there continues to be a significant demand for transit services in the corridor, despite a considerable decrease in population and systemwide decreased demand.

The conceptual alternatives for new rapid transit services in the corridor provide comparable levels of service throughout the corridor. All alternatives evaluated, including the Express Bus Alternative would result in user benefits.

Transit supportive zoning would need to be implemented prior to the construction of a new rapid transit system. This may be a difficult task, as the residents of the Gentilly neighborhood have expressed opposition to higher density development or new rental property development both prior and subsequent to Hurricane Katrina (New Orleans City Planning Commission 1999: 155, Capstone 2006).

All of the alternatives, with the exception of the Express Bus Alternative, are likely to produce significant beneficial impacts in terms of redevelopment and economic growth. It is possible that the LRT or Streetcar Alternatives would produce a slightly greater impact, because it is generally assumed that choice riders exhibit a bias for rail technology. This assumed bias may be based on aesthetic values, perceived comfort, and other difficult to isolate subjective conceptions that new BRT vehicles may address. It is the assertion of this thesis that based on the findings in the literature, BRT systems can produce land development and economic effects comparable to those associated with LRT and streetcar systems.

The proposed local manufacture of vehicles for the LRT and Streetcar Alternatives would not result in an economic "leak" from the local economy, with respect to vehicle manufacture and maintenance benefits. There also may be some intangible qualitative benefits of local manufacture, such as civic pride. Because the LRT and Streetcar Alternatives would cost more than the BRT Alternative, the direct economic effects in terms of simple multipliers would be greater than the BRT Alternative. However, if similar benefits could be achieved by the BRT Alternative at a lower cost, the effect of these multipliers would be diminished in a simple cost/benefit analysis.

This thesis concludes that some form of improved transit service is needed in the Elysian Fields corridor. The corridor is a good candidate for fixed guideway service, and it is likely that the introduction of a premium fixed guideway transit service operating on a headway-based schedule would result in beneficial land development and economic impacts. Due to the City's history with streetcars, it is likely that public opinion would favor streetcar technology. New Orleans is capable of manufacturing streetcars that can meet the needs of the conceptual system. BRT may be a more cost effective technology to improve transportation conditions in the corridor, but locally produced streetcars may produce more unquantifiable benefits such as civic pride and morale.

Ultimately, it is immaterial which transit technology is "better," garner more public support, or induce more land development or economic impacts. At this time, none of the conceptual alternatives, including the Express Bus Alternative, are feasible due to several "real-world" factors.

The City has considerable gaps in the public transportation network that are more significant than decreasing the daunting wait times for the 55 Elysian Fields. Any funds that can be obtained for public transportation improvements need to be used to address the gaps in the existing system. If enough funds can be allocated for transit improvements in the future, perhaps the headways on the 55 Elysian Fields can be addressed.

While there is existing demand, the city has lost a large portion of its population. It seems likely that when the 2010 Census is conducted it will be discovered that New Orleans has a significantly smaller transit dependent population than it did prior to the levee failures. The author makes this prediction based on the fact that it is considerably more difficult to live without a car in the City than it was in August 2005. It is also practically and physically harder to return to the City without a car. Thousands of persons were bused out several days after the levee failures and "set up" in new cities: these persons may have physical, practical and psychological barriers to return.

Finally, the economy of New Orleans is not expanding; it is recovering. The status of the economic "recovery" is debatable. The City has several internal problems which in actuality or perception make it a risky and difficult place to conduct business. Business retention and attraction are significant problems that need to be addressed to achieve an economic recovery that would enable New Orleans to fund major transit improvements. Houston – the new home of so many former New Orleanians, the location of so many of formerly New Orleans-based companies – built a new 7.5-mile light rail line with local money; without raising fares or taxes, taking on debt, or decreasing existing bus service. But really, who *wants* to live in Houston?

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Vita

Caroline Elizabeth Lanford possesses a bachelor's degree from Newcomb College, Tulane University in English and Classical Studies in addition to a Master of Urban and Regional Planning from the University of New Orleans. In her professional career, Ms. Lanford primarily works in the field of transportation planning. She was honored to be chosen as a National Parks Transportation Scholar in 2004; and spent six months at Big Thicket National Preserve, assisting the Preserve with transportation issues affecting Preserve lands. Ms. Lanford is currently employed as a transportation planning consultant, working with state and local agencies in Louisiana, Mississippi, and Arkansas.

Throughout her childhood, Ms. Lanford lived in Houston, Texas. Between August 1996 and August 2005, Ms. Lanford and her partner, Mr. Creighton Thompson, resided in Carrollton. They currently reside in the Garden District. New Orleans is her home and heart.