NASA Area Management District LIVABLE CENTERS STUDY FINAL VISION REPORT



PREPARED FOR:

HOUSTON-GALVESTON AREA COUNCIL NASA AREA MANAGEMENT DISTRICT



Houston-Galveston Area Council



COMPLETED: SEPTEMBER 7, 2012

PREPARED BY: SWA GROUP TRAFFIC ENGINEERS INC. CDS MARKET RESEARCH | SPILLETTE CONSULTING DANNENBAUM ENGINEERING CORPORATION







DANNENBAUM ENGINEERING CORPORATION

TABLE OF CONTENTS

SUMMARY	05
THE PROGRAM AND PROJECT GOALS	
HISTORY, LOCATION, CONTEXT	
PREVIOUS STUDIES	
STUDY HIGHLIGHTS	
 EXISTING CONDITIONS	17
PLANNING AND LAND USE	
MARKET OVERVIEW	
CITY FRAMEWORK	
CHARACTER	
PUBLIC ENGAGEMENT	37
OBJECTIVES	
OUTREACH METHODS	

WORKSHOP FORMAT

TRANSPORTATION URBAN DESIGN GENERAL DEVELOPMENT IMPLEMENTATION SUMMARY PROJECT TASK MATRIX APPENDIX 95 TRANSPORTATION ANALYSIS DEMOGRAPHIC AND ECONOMIC ANALYSIS

DESIGN AND PLANNING PROCESS

COST ESTIMATES

43

RECOMMENDATIONS

VISION PLAN

SUMMARY









THE PROGRAM

The Livable Centers Program, funded through the Houston-Galveston Area Council (H-GAC), is designed to address projected growth for the Houston-Galveston region and the related urban planning issues associated with population increase. The goal of a Livable Centers Study is to propose implementable ideas that create or further enhance communities people perceive as safe, convenient and desirable. Population growth in the Houston-Galveston area is expected to add 3.5 million people by 2035. Both new and current residents will need desirable communities to live in and low cost transportation to move them around. Currently, the Houston-Galveston Area depends heavily on automobiles for mobility, and the majority of them are in single-occupancy vehicles. By creating communities in which people can happily live and work, with easy access to public transportation, the strain on urban resources created by population growth can be better managed.

For this reason, a major point of focus within the Livable Center ideals is providing options for mobility that gets people out of their cars. The ideal Livable Center works to curb traffic congestion by reducing vehicle miles traveled (VMT), single-occupant vehicle trips and offering attractive alternatives through promoting walking, cycling and public transportation. Other points of consideration which compose a Livable Center include:

- Improved environmental quality.
- Stronger sense of community.
- Continued economic development.

Each community that is part of a Livable Centers Study possess its own mix of opportunities and issues, and each one requires their own tailored plan to become a Livable Center. The checklist for policies and standards a Livable Center are:

- Encourage mixed but complementary uses.
- Promote physical integration of urban development, either vertically or horizontally.
- Encourage appropriate levels of density depending on district size and context.
- Allow people to move between destinations without having to use vehicles.
- Provide multi-modal transportation options.
- Provide adequate parking without creating oversupply.
- Promote activity throughout the day, creating balanced transit ridership.



Source: Livable Centers Brochure

PROJECT PROCESS

Sponsored by H-GAC and the NASA Area Management District, this study is designed to further the goals of the Livable Centers Program by providing a vision for future growth and development in Nassau Bay. The NASA Area Management District Livable Centers Study evaluates existing demographic, land use, market, connectivity, open space and community development conditions to identify opportunities for mixed-use development, multi-modal connectivity and public realm strategies and make recommendations for detailed design implementation. Design recommendations address streetscapes and signage, mixed-use development, gateway opportunities and open space connectivity with a special focus on the safety and guality of the pedestrian experience. Projects and recommendations build upon and integrate past studies with an emphasis on achievable projects enabled through customized implementation strategies. The Study is divided into three main tasks:

- Task 1 Needs Assessment.
- Task 2 Concept Development.
- Task 3 Implementation.

Each of these tasks included a workshop involving the principal stakeholders: Nassau Bay residents, the

Management District and an Advisory Committee for the Livable Center Study. The Advisory Committee is composed of community members committed to Nassau Bay's future with the ability to represent the residents' point of view. Throughout the design process, this committee met multiple times to evaluate the Study Team's progress and ensure that recommendations are consistent with the City's goals. A kick-off meeting initiated Task 1, the Needs Assessment. Due to the size and context of Nassau Bay and the NASA Area Management District, this phase included a golf cart site tour. The first site tour gave consultants and the Advisory Committee an opportunity to interact and experience Nassau Bay "on the ground". A summary of findings from the tour was combined with a memo documenting all of the existing conditions research. These were presented at the first workshop.

Following the initial Needs Assessment, projects for improving the quality of life in Nassau Bay were developed for review by the Advisory Committee. At the second workshop, the initial recommendations were presented for review and discussion and were then refined and developed by the Consultant Team into final recommendations.

The third workshop concluded the study with a comprehensive presentation of projects proposed for the Management District including costs and sources of funds.



Photo from Golf Cart Tour, 28 January, 2012

HISTORY



HISTORY

From the early Gemini, Apollo and Skylab projects to the Space Shuttle, International Space Station (ISS) and Exploration programs, JSC has been the headquarters for NASA's efforts in the field of human space exploration.

Nassau Bay's History is deeply rooted in the American Space Program.



Originally a ranch in an unincorporated area of southern Harris County, Nassau Bay was planned in 1962 to provide housing and commercial building space in support of the Manned Space Center (now JSC) which began operation in 1963. Colonel Pearson's 1776 Ranch, as it was formerly called, was incorporated as a city in 1970 and officially named Nassau Bay because of its tropical character.

NASA currently employs 3,400 people, most of who are professional engineers and scientists, including 110 astronauts. Space Center Houston, JSC's public visitors center, employs 150 people.

For years, Nassau Bay has been developing tools to encourage investment, redevelopment and attract spending. In 1998, the City added a 0.5 cent 4B sales tax to fund an Economic Development Corporation (EDC). In 2007, the Texas Legislature created the NASA Area Management District, with support from the City of Nassau Bay, as part of a plan to revitalize the dated commercial areas of Nassau Bay. To further facilitate revitalization, the City created Tax Reinvestment Zone Number 1 in 2008.

Completion of the NASA Parkway Bypass and the ongoing Nassau Bay Town Square Project have stimulated economic growth in a community previously experiencing a declining commercial tax base.

LOCATION



AERIAL PHOTO HOUSTON REGION

- 30 MIles South of Houston.
- Adjacent to JSC.
- Suburban Community.
- Covers two square miles.
- Less than five miles from the Kemah Boardwalk.



- 485 acres of commerical, retail, industrial and multi-family residential.
- Excludes single family residential land use.

CONTEXT



REGIONAL CONTEXT

Nassau Bay lies within the larger Clear Lake Area. Surrounded by water on three sides, Nassau Bay is a quaint, waterfront community situated along a series of waterways that lead to Galveston Bay. It is also situated on I-45, a major travel route between Houston and Galveston. The City is located directly across from Space Center Houston, one of the Top 10 paid tourist attractions in the Greater Houston Area. Nassau Bay is located within minutes of numerous regional wildlife attractions, trails and parks.

The Study Area encompasses the commercial area of Nassau Bay, identified as the NASA Area Management District.



LOCAL CONTEXT

The City is bound to the North by NASA Parkway (approximately 1.5 miles of its northern border) and NASA 1 Bypass, (0.5 miles of the northern border), and all other perimeters are bound by water. Nearly 75% of Nassau Bay (or approximately 6 miles) can be considered waterfront with some waterfront areas earning the designation, "coastal."

The Study Area boundary reaches southwest to include the Nassau Bay Yacht Club as well as the Nassau Bay Peninsula to the south and extends east to include the Hilton Hotel.

PREVIOUS STUDIES

Common themes from prior studies include: a desire to promote waterfront living, facilitate investment, enhance revenue by attracting services and new citizens, provide open space opportunites and maintain and showcase the small-town feel while supporting the overriding theme of bettering the quality of life for all residents.

DEVELOPMENT PRINCIPLES (2004)

THEMES

- Capitalize on waterfront location.
- Consider using arts as a cultural theme.
- Emphasize small-town feel.
- Leverage historic association with space program.
- COMMUNITY DEVELOPMENT
 - Create a walkable, mixed-use community.
- Develop urban waterfront housing.
- Focus development on a variety of open public spaces.

RETAIL DEVELOPMENT

- Atrract services and boutique retail to provide shopping experiences for residents.
- Create gateways along NASA parkway to increase awareness and draw in visitors.
- Provide infrastructure that will attract entertainment development.

NASA AREA MANAGEMENT DISTRICT (2007)

- Promote commercial sustainability by creating a unique sense of place inclusive of residential, retail, commercial and waterfront development.
- Address landscape, streetscape, signage, lighting, pedestrian ways, traffic signals and public art.
- Focus efforts in three main service areas:
 - 1. Planning and Urban Design.
 - 2. Marketing (Public and Governmental).
 - 3. Safety and Security.

TAX INCREMENT REINVESTMENT ZONE #1 (2008)

- Develop a proactive approach to redevelopment as opposed to inaction or a reactive approach.
- Generate revenue in the form of sales tax and/or increased ad valorem tax to offer long-term property tax relief to residents through the revitalization of the waterfront and gateway retail areas.
- Continue and enhance the small-town, family/community atmosphere, while improving the urban design and aesthetic appeal of the City.
- Promote quality, high-end development, especially on the waterfront.
- Facilitate investment and re-investment by residents and visitors.

NASSAU BAY COMPREHENSIVE PLAN UPDATE (2010)

GROWTH & DEVELOPMENT

- Focus on waterfront and multifamily redevelopment.
- Expand on non-residential tax base.
- Eliminate vacant retail.
- Promote investment in nonresidential areas.
- Promote housing variety.

AMENITIES

- Capitalize on waterfront location and views.
- Maintain focus on quality of life by creating additional amenities.
- Focus on family-friendly community that appeals to seniors.
- Provide more public access to waterfront.
- Optimize use of City's existing parkland.
- Support healthy community lifestyles through amenities.

INFRASTRUCTURE

- Commit to significant, overdue upgrades.
- Emphasize public safety from basic police and fire to pedestrian and bicycle safety.
- Maintain preparedness for emergencies and disaster response.

PREVIOUS STUDIES

NASSAU BAY REVITALIZATION PLAN



NASSAU BAY TOWN SQUARE



GOALS

- Redevelop and revitalize a portion of the City's underutilized commercial area.
- Increase property and sales taxes.
 - Create additional residential development to increase local spending. Restore economic and
 - Restore economic and architectural vitality.

STUDY HIGHLIGHTS

The Livable Centers Study builds upon past studies and efforts in and around the Nassau Bay community to develop a framework for ongoing development that reflects values of the community and promotes uses and projects that can be supported by its population.

Evaluation of the 2010 Comprehensive Plan, the 2004 Development Principles and the Nassau Bay Town Square Project, alongside the goals of H-GAC's Livable Centers Program can be summarized in 10 design principles to guide the planning process.

RECOMMENDATIONS

The Design Team examined the 10 design principles and their relationship to the wants and needs of the current population and future growth of Nassau Bay when determining project recommendations. In particular, it became evident that the current community ambience was of utmost importance to the citizenry. The recommended projects contain inherent qualities which are in concert with the design principles.

Together, these recommendations will improve mobility, accessibility and safety, create awareness and spark development and revenue.

DEFINITIONS

(T) Transporation: projects related to street improvements, pedestrian mobility and safety and decreased reliance on the automobile (Represented as T.1, etc).

(U) Urban Design: projects related to identity, branding, awareness and historical connections (Represented as U.1, etc).

(D) General Development: projets related to zoning, planning and public open space (Represented as D.1, etc).

DESIGN PRINCIPLES

- 1. Preserve Small-town Feel.
- 2. More walkable/bikeable.
- 3. Art as a Cultural Theme.
- 4. Develop Commercial/Retail Vacancies.
- 5. History of Space Program.
- 6. Gateway and Branding.
- 7. Destinations/Amenities.
- 8. Waterfront Development.
- 9. Housing Choices.
- 10. Open Space Opportunities.

The key issues to be addressed were determined through meetings with the Advisory Committee, NASA Area Management District members and public engagement meetings. The recommendations fall within the following categories:

- Transporation.
- Urban Design.
- General Development.

STUDY HIGHLIGHTS

IMPLEMENTATION TIMELINE

	TRANSPORTATION							URBAN DESIGN				N	GENERAL DEVELOPMENT							
SHORT TERM 1-5 YEARS	T.1 SPACE PARK DRIVE (NORTH) IMPROVEMENTS	T.2 SATURN LANE IMPROVEMENTS	T.3 UPPER BAY ROAD IMPROVEMENTS	T.4 BICYCLE/PEDESTRIAN BRIDGE OVER COW BAYOU	T.S NASA PARKWAY IMPROVEMENTS				ULT GATEWAY INSTALLATION @ NASA PARKWAY AND SATURN DRIVE	U.2. COMMERCIAL INTERSECTION BRANDING								D.1 ZONING AND PLANNING		
LONG TERM 5+ YEARS						T.6 SPACE PARK DRIVE (SOUTH) IMPROVEMENTS	T.7 LOOKOUT POINT DRIVE IMPROVEMENTS	T.8 NASSAU BAY DRIVE IMPROVEMENTS			U.3 GATEWAY BRANDING AT NASA PKWY AND UPPER BAY RD	U.4 GATEWAY BRANDING AT NASA PARKWAY AND POINT LOOKOUT DRIVE	U.S GATEWAY BRANDING AT NASA PARKWAY AT SPACE CENTER BOULEVARD	U.6 BRANDING WATERFRONT DISTRICT	U.7 NEIGHBORHOOD BRANDING AT NEIGHBORHOOD ENTRIES	U.8 NEIGHBORHOOD STREET SIGNS			D.2 WATERFRONT IMPROVEMENT-NORTHERN SHORE OF CLEAR LAKE	

EXISTING CONDITIONS





CURRENT ZONING

EXISTING LAND USE

Commercial corridors include NASA Parkway, Space Park Drive, Upper Bay Road (south to Howard L. Ward Park), Point Lookout Drive (south to Voyager), Saturn Lane and Nassau Bay Drive (south to Saxony Apartments).

NASA Parkway's land uses consist primarily of retail, while Space Park Drive features a combination of retail and office space. Institutional and multi-family uses are interspersed between residential and commercial areas. The new Town Square development fronts NASA Parkway and will feature a hotel, conference center, restaurants, office buildings, retail, apartments and City Hall. While the Study Area excludes single family residential property, its relationship to the Study Area is vital. The largest residential neighborhood within Nassau Bay is south of Space Park Dr between Cow Bayou and Upper Bay Road. To the east of the Study Area is another residential community separated from the primary residential neighborhood by commercial and institutional uses.



PUBLIC & INSTITUTIONAL DESTINATIONS

OPEN SPACE

Open space and park space existing within the Study Area include Howard L. Ward and the Nassau Bay Peninsula, both of which occupy prime waterfront property. Howard Ward features a walking trail, gazebo, play equipment and open recreational space. As a wetlands conservation area, access to the Nassau Bay Peninsula is currently restricted, though a proposed trail will increase use of this beautiful resource. Also within the Study Area is the Upper Bay Rd Boardwalk, which runs 1,020 feet along the waterfront.

The City has above average per capita acreage of park space with 25 acres per 1,000 people.

OPEN SPACE CONSTRAINTS

- Parks lack successful programming and are underutilized by residents.
- No trails and few sidewalks exist to connect parks, leaving the parks isolated.

OPEN SPACE STRENGTHS

- Abundant park space for the population.
- All but one park is suitably located near water.
- All parks contain internal trails.

Vacant properties offer opportunities for additional park space with diverse programming and the creation of a park network.



EXISTING LOCAL BICYCLE / PEDESTRIAN MOBILITY & OPEN SPACE

Although NASA Parkway contains a bike lane and ample sidewalks, which provide access to regional amenities, the Study Area lacks strong links to the City's open space amenities. Vacant land within the Study Area can be utilized to create a variety of open space opportunities.



EXISTING REGIONAL BICYCLE / PEDESTRIAN MOBILITY & OPEN SPACE

On a regional level, Nassau Bay lies in close proximity to several large parks including the Challenger 7 Memorial Park and the Armand Bayou Nature Center. Implementation of the Clear Lake Bicycle/Pedestrian Study will connect Nassau Bay to these and other amenities.

COMPETITIVE MARKET AREA



The Study Area has a land mass of 1.77 square miles and falls within the zip code 77058. The Competitive Market Area (CMA) is highlighted in red.

DEMOGRAPHIC / ECONOMIC TRENDS

The demographic and economic trends in and around the Study Area are both a reflection and a driver of residential and retail uses. Characteristics of the population size and income levels, along with the increased daytime population, determine the support for additional retail. For purposes of analysis and comparison, the demographics will be illustrated by the Study Area boundary and the city limits.



- The population of Nassau Bay is 4,002 with 1,925 households (2010 U.S. Census Bureau). 30% of the population and households lie within the Study Area.
- Both population and households have decreased slightly from the 2000 Census in Nassau Bay and at a much greater percentage within the Study Area. The Tax Increment Reinvestment Zone is stagnant but is surrounded by population growth.
- The Competitive Market Area, CMA, (Zip codes 77058, 77062, 77598 and 77573) show population growth, a vital contributor to job growth. The increase in population and households expected in the CMA bode well for commercial uses such as industrial, office and retail.

STUDY AREA POPULATION TRENDS

Population	NB TIRZ 1 Study Area	Nassau Bay	77058 / 77062 / 77598 CMA	77573 (League City)
2010 Census	1,158	4,002	64,617	71,580
2000 Census	1,622	4,170	60,535	42,289
1990 Census	1,646	4,320	49,808	28,235
Ann. Growth Rate 2000-2010	-3.31%	-0.41%	0.65%	5.40%
Ann. Growth Rate 1990-2000	-0.15%	-0.35%	1.97%	4.12%

HOUSEHOLD TRENDS

Households	NB TIRZ 1 Study Area	Nassau Bay	77058 / 77062 / 77598	77573 (League City)
2010 Census	590	1,925	28,581	25,444
2000 Census	871	2,049	25,891	14,949
1990 Census	895	2,081	21,698	9,874
Ann. Growth Rate 2000-2010	-3.82%	-0.62%	0.99%	5.46%
Ann. Growth Rate 1990-2000	-0.27%	-0.15%	1.78%	4.23%

Sources: U.S. Census, ACS, PCensus, CDS I Spillette

AGE AND ETHNITICTY TRENDS

- The population within the NASA Area Management District and the City of Nassau Bay is largely older when compared to the CMA. Within the Study Area, 54% of the population is over 45 years of age while Nassau Bay has 56% of residents over 45 years of age. The CMA, comparatively, shows that residents over 45 comprise only 36% of the population.
- The population is evenly distributed between male and female.
- Over 80% of the population within the Study Area are white with the second largest group, Hispanic, making up 17% in the Study Area and 14% in the City Limits. The Asian and African American population account for less than 10% of the population.

HOUSING

- The majority of households are one and two person households.
- The average household size is 1.16 individuals per household.
- The majority of housing units in the City of Nassau Bay are single family residences or townhomes.
- 37% of the housing units are multi-family. The majority of that percentage lies within the Study Area.
- The median year of home construction completion in the City is 1968. The median housing age is 1970, and the majority of homes were constructed

INCOME

- Nearly 39% of the households in Nassau Bay have annual salaries of \$100,000 or greater.
- The median household income is \$73,368 and is significantly higher than that of Harris County, \$51,444.

EMPLOYMENT

- 85% of workers in Nassau Bay are considered "white collar".
- Workers are employed by a diverse mix of companies in the aerospace industries located in the region.

EDUCATION

- 44% of the Study Area has a college degree or higher.
- Only 3% have no high school diploma.

The average length of residency within the Study Area is 13 years for owner occupied and 8 years for

between 1960 - 1969.

- Area is 13 years for owner occupied and 8 years for renter occupied. The Study Area consists of 47% renter occupied units
- while the City includes only 36% renter occupied units In comparison, the CMA has 55%, a much larger population of renters.

 Nassau Bay has a greater number of households with incomes of greater than \$200,000 (10.9%) and \$100,000 to \$149,999 (21.5%) than both the CMA and the County.

COMMERICAL MARKETS

RETAIL

- A total of 14 developments including seven strip centers, three neighborhood centers and four restaurants totaling 360,233 square feet.
- Total occupancy is 69.1% while buildings constructed prior to 1980 have occupancies of 48.7%, and those constructed after 2000 have occupancy rates of 89.5%
- Average rent is \$1.12 / sf.
- All retail is located within the Study Area.
- 15,375 sf at 2323 Nasa Road 1 is vacant.
- Nassau Bay Village is in need of renovation and leased less than 50%, where the newly constructed Town Square is 100% leased at \$2.25/sf.

HOSPITALITY

- Current hotels: Marriott Courtyard, Homewood Nine hotels are located in the greater Nassau Bay • Suites, Hilton Nassau Bay, Residence Inn, area (77058) consisting of 1,024 rooms. Townplace Suites, Candlewood Suites, Extended Revenue decreased from 2010 to 2011 by Stay, Super 8, Microtel, and Econolodge. \$1,326,342. Only three hotels reside within the Study Area: The Hilton, located at the Northeast corner of the Hilton, Extended Stay and Microtel (total 420 Study Area is the largest revenue generating hotel rooms). in the 77058 zip code. OFFICE 1,198,388 square feet of office space in 21 buildings Rent is \$17.54/sf. • lie within the NASA Area Management District. Most office space was constructed within the The majority of the space is multi-tenant with an 1970s and 1980s and is considered Class B or C. average occupancy of 72%. MEDICAL OFFICE / HOSPITAL Anderson opened an on-site radiation treatment 5 medical offices are located within the Study Area facility. surrounding Cristus St. Johns Hospital. 80,000 square feet of additional expansion to The hospital is faith-based (Catholic), and
- includes 260,946 square feet with 178 beds and 400 physicians. It is an acute-care hospital. MD

INDUSTRIAL

• 38,316 sf of industrial property is located along Point Lookout Drive within the Study Area. It was

MIXED-USE

• Town Square is a 31-acre development currently under construction. At completion, it will consist of 500,000 sf of office, 313-unit muti-family residential, 125 room Marriott Courtyard, 73,000 square feet of retail (Phase 1 is 100% leased), a 27,000 sf conference center and Nassau Bay City Hall. constructed in the late 1960s and is categorized as office/warehouse.

- Saturn One (91% current occupancy), constructed in 2010/2011 is considered Class A and sits within Town Square.
- The Voyager Apartments are 93% occupied.

Christus St. John's has been planned.

LOCAL DESTINATIONS & CRITICAL ROADWAY NETWORK

The existing roadway network of collectors and local roads in Nassau Bay serves local destinations such as Town Square, Christus St. John Hospital, City Hall, the city parks and waterfront. These roadways include:

NASSAU BAY DRIVE POINT LOOKOUT DRIVE SATURN LANE UPPER BAY ROAD ST. JOHN DRIVE LAKESIDE LANE SPACE PARK DRIVE BAYCREST DRIVE LAZY LAKE DRIVE SAILBOAT DRIVE



NETWORK STRENGTHS

- North-south roadways provide excellent access between the residential and commercial areas.
- NASA Parkway, the major arterial, provides connections between Nassau Bay and regional destinations.
- A good number of connections between the north-south collectors and NASA Parkway disperse traffic and lower traffic volumes on connectors.

NETWORK CONSTRAINTS

- Large uninterrupted blocks in the commercial area create a barrier to east-west trips.
- The width of NASA Parkway presents a challenge to pedestrians and cyclists when trying to cross 8 and 12 lane widths at intersections throughout the City
- Limited access to the City's major asset, the waterfront.

As the form and type of waterfront access is further defined, access for all modes of transportation should be a primary consideration. Also, as redevelopment occurs throughout the commercial areas in the City, opportunities for improved multi-modal, east-west circulation should be explored.

ROADWAY CHARACTERISTICS

Pertinent information was compiled for all collectors in Nassau Bay. Representative information is shown below for Upper Bay Road (see Appendix for remaining collector roadway information).

The speed limit on all streets within Nassau Bay is 25 mph unless otherwise posted, and many intersections in the City are all-way stop controlled.

The majority of the streets within the residential area are 26 feet wide, with the primary exception being Upper Bay Road, which is 40 feet wide. Streets in the commercial areas are typically 40 feet wide (two-lanes) or four-lane divided roads.



UPPER BAY ROAD

STUDY AREA TRAFFIC VOLUMES



Source: TxDOT / Traffic Engineers, Inc.

2006 BIDIRECTIONAL, DAILY TRAFFIC VOLUMES

The 24-hour volumes range from under 1,000 vehicles per day in the single family residential sections to nearly 8,000 vehicles per day in the commercial areas. Many of the trips to the office areas within Nassau Bay are related to services in support of the JSC and NASA, and changes in the economy and the investment at NASA will create variation of traffic volumes at some locations, particularly in the commercial/office areas. Additionally, the redevelopment of the area bound by NASA Parkway, Space Park Drive, Point Lookout Drive and Upper Bay Road from office buildings to the Nassau Bay Town Square resulted in fundamental changes in the traffic patterns. Prior to the development of Town Square, Saturn Lane was nonexistent between NASA Parkway and Space Park Drive and there was no median opening present on NASA Parkway between Point Lookout Drive and Upper Bay Road.

2012 bidirectional, daily traffic volumes were estimated on Nassau Bay Drive, Point Lookout Drive, Saturn Lane and Upper Bay Road, south of NASA Parkway.

CURRENT MODAL SPLIT

- The size and scale of the City supports the use of alternative modes of transportation within the City.
- The high number of individuals who work locally or from home provide opportunities to increase the number of people who travel to work via modes other than the single passenger vehicle (see Appendix).

PARKING AND PARKING RESTRICTIONS



NETWORK STRENGTHS

- Ample off-street parking, with the majority being surface parking.
- Parking areas provide opportunities for shared parking and redevelopment.
- On-street parking in Town Square on Space Park Drive and Saturn Lane (head-in).
- Striped parallel parking on St. John Drive.

NETWORK CONSTRAINTS

- "No Parking" signs installed on the majority of the streets in the commercial areas.
- "No Parking" signs installed on some of the residential streets.
- Head-in parking can be less safe for cyclists on shared-use roads.

PEDESTRIAN ENVIRONMENT



Source: Traffic Engineers, Inc.

NETWORK STRENGTHS

- Multiple marked crosswalks.
- Upgrades to sidewalks completed on NASA Parkway allow pedestrian mobility into Nassau Bay.
- The right-of-way is available on many streets for the construction of sidewalks in the commercial areas.
- "Last-mile" connections (pedestrian paths across parking lots) are in place and set a precedent for pedestrian safety in the Town Square development.

NETWORK CONSTRAINTS

- Discontinuous sidewalk and trail network within the Study Area.
- Some sidewalks are less than five feet wide (below the recommeded width found in design guidelines).
- Residents feel safe walking in the street in residential areas and therefore community support for sidewalks is low.
- Gaps in sidewalks in the commercial areas present a safety hazard and force pedestrians to walk in the street.
- Many of the marked crosswalks do not have ADA compliant ramps or signage.
- Physical obstacles such as trees and utility poles are often located where sidewalks would be constructed.

BICYCLE ENVIRONMENT

Suitability is a way to determine how hospitable a roadway network is for cyclists. Bicycle suitability in Nassau Bay is based on: traffic volumes, vehicle

speed, pavement width and quality and existing bike infrastructure such as bicycle lanes.



NETWORK STRENGTHS

- Upgrades to NASA Parkway provide bike lanes and access into Nassau Bay for the cyclist.
- All local streets have high bicycle suitability due to the low traffic volume, street widths and 25 mph speed limit.
- Improvements are planned to the regional bicycle/ pedestrian network, some of which will provide connections to Nassau Bay.
- Existing characteristics of the City's roadway network in the commercial areas are conducive to creating a highly suitable bicycle environment.

NETWORK CONSTRAINTS

- Bicycle suitability decreases from High to Medium in commercial areas due to higher traffic volumes and the lack of dedicated facilities.
- Some areas of low suitability are found within the commercial area due to higher traffic volume and on-street parking with insufficient space to allow for cyclist safety.

*See Appendix for additional information and Roadway Safety Assessments

CHARACTER

UNIQUELY NASSAU BAY

Nassau Bay was developed in support of the JSC and has been home to astronauts and scientists for many years. Clear Lake is home to the third largest concentration of pleasure boats in the United States with numerous yacht clubs, piers and boat ramps in the area.

The City's waterfront culture and association with NASA remain an important part of Nassau Bay's culture. This culture is reflected in the community's physical form. The compass rose logo reminds visitors of its seaside context. Palm trees line wide suburban streets which open to views of Clear Lake and wetland landscapes.

Apart from the colorful and contemporary new Town Square development, 1970's architecture dominates the commercial district while one-story, ranch-style homes line most residential streets. Closer to the water, houses are elevated in response to the storms common in this area. Boats are parked in backyard slips.

While the community has a pleasant and comfortable small-town feel, there is little to provide a strong identity or sense of arrival both within Nassau Bay or along NASA Parkway.



CHARACTER

TOURISM



The city was established to accommodate Johnson Space Center and provide a community for astronauts, space professionals, and their families. Today, more than 60 Nassau Bay residents have visited space, and a few have walked the moon. In 2005, the city dedicated a serpentine wall of black granite featuring the flags of the nations participating in the International Space Station. The striking monument is on NASA Parkway in the median between NASA and the city.

The city of Nassau Bay has blossomed into a major tourist destination with an estimated 2,500 people participating in a plethora of activities taking place at any given time. Located across the street from Johnson Space Center and Space Center Houston, Nassau Bay has it all: space and science adventure, fun, sun and water. The Clear Lake recreation area is the third largest boating center in the United States. Nassau Bay has numerous marinas with pleasure boats docked along our waterfront, in addition to yacht clubs, piers, and boat ramps. The city's hotels offer a variety of accommodations with more than 600 rooms. October brings the annual Wings over Houston Airshow at nearby Ellington Field. Ballunar Liftoff Festival, held across the street on the grounds of JSC, hosts more than 100 hot air balloons each November



NASA / JOHNSON SPACE CENTER

Space Center Houston is America's gateway to the universe! As the Official Visitor Center for NASA's Johnson Space Center, Space Center Houston is the only place on Earth that gives guests an out-of-this-world journey through human adventures in space.

Since 1992, this \$75 million, 180,000 square foot, "edutainment" complex has entertained and informed more than11 million star-struck guests from every corner of the globe. Space Center Houston features a multitude of permanent exhibits, attractions and theatres. In addition, the venue presents an amazing array of traveling exhibits and astounding events created exclusively by Space Center Houston's own creative exhibit team. Space Center Houston always has a new exhibit or attraction to enjoy.

Attractions & Exhibits:

- > Space Center Houston Theater
- > Blast Off Theatre
- > NASA Tour
- > Astronaut Gallery Tour
- > Feel of Space
- > Starship Gallery
- > Kids Space Place
- > Meet An Astronaut Fridays

Education Programs:

- > Space School
- > NASA Day Camps
- > NASA Scout Camp-ins

CHARACTER

TOURISM

Visitors to the region come primarily from a 300-mile radius, which includes Texas and Louisiana. The average party size is between 2 and 3 people, and parties generally drive in personal cars rather than plane or bus. Nassau Bay visitors normally have a bachelor's degree or higher, are employed full-time, and have a household income of \$100,000 or greater. Visiting parties average 3.66 days and \$1,000 per visit In addition to providing unique activities and attractions for visitors, Nassau Bay is also well-positioned to serve as a base for people vacationing in the greater region. The city's position between Downtown Houston and Galveston beaches as well as its close proximity to Johnson Space Center and the Kemah Boardwalk, demonstrate a potential for additional tourism-related development in Nassau Bay.




PUBLIC ENGAGEMENT



OBJECTIVES

Based on the principles of public engagement, the Consultant Team targeted diversity among the informational sources and hoped to understand a variety of perspectives from participants.

The involvement of the community members and invested stakeholders in any planning process is critical to obtaining a shared vision. It is important to have a strategy that makes it not only as convenient as possible for members of the community to involve themselves in the planning and decision making process, but also as educational as possible for those who may lack knowledge of the process to feel comfortable voicing opinions and contributing ideas. The public engagement process identifies potential hurdles that may hinder the project's utlimate success. These types of barriers to long-term visionsary projects must be overcome early in the process to prevent misconceptions about the project goals and community fears about the types of changes the community will undergo. Being mindful of a public engagement plan that incorporates the culture and desires of all involved serves to alleviate potential resistance.

What creates a well-facilitated public engagement process?

- Identification of those individuals who can create a solid foundation for and encourage implementation.
- A project team with a deep understanding of community issues and needs.
- A project and stakeholder team with a good relationship with the community.

OBJECTIVE 1

Create a panel of area representatives and specialists that provide an accurate representation of the community interests that are committed to the long-term success of a project.

OBJECTIVE 2

Implement strategies for community outreach that take into account the unique culture of the Study Area in order to obtain a high participation level at public meetings and workshops.

OBJECTIVE 3

Establish trust in the community in order to inspire dialogue that is open, civil and thoughtful.

OBJECTIVE 4

Engage, inform, and educate about the intent of The Study through outreach in order to ignite participation as well as to overcome misconceptions.

OBJECTIVE 5

Develop a vision for the Study Area in conjunction with the board and community members.

OUTREACH METHODS

MEETING TYPE DATE	INVITED PARTICIPANT GROUPS	METHOD OF ANNOUNCEMENT (FLYER SIGNS)		
CLIENT + ADVISORY COMMITTEE 12-07-2011	Consultant Team, Advisory Committee, NASA Area Management District	Town Social Media Website, Town Newsletter, E-mail Distribution List		
CLIENT + ADVISORY COMMITTEE 01-25-2012	Consultant Team, Advisory Committee, NASA Area Management District	Town Social Media Website, Town Newsletter, E-mail Distribution List		
GOLF CART TOUR 01-28-2012	Consultant Team, Advisory Committee, NASA Area Management District	Town Social Media Website, Town Newsletter, E-mail Distribution List		
VISIONING WORKSHOP 02-22-2012	Consultant Team, Advisory Committee, NASA Area Management District, General Public	Town Social Media Website, Town Newsletter, E-mail Distribution List, Sign Posting in Medians.		
DESIGN WORKSHOP 03-28-2012	Consultant Team, Advisory Committee, NASA Area Management District, General Public	Town Social Media Website, Town Newsletter, E-mail Distribution List, Sign Posting in Medians.		
NEIGHBORHOOD IDENTITY PRESENTATION 04-30-2012	Consultant Team, Home Owner's Associations , NASA Area Management District	Town Social Media Website, Town Newsletter, E-mail Distribution List, Phone Calls		
NASA AREA MANAGEMENT DISTRICT 05-15-2012	Consultant Team, NASA Area Management District	E-mail Distribution List		
CLIENT + ADVISORY COMMITTEE 05-23-2012	Consultant Team, Advisory Committee, NASA Area Management District	Town Social Media Website, Town Newsletter, E-mail Distribution List		
FINAL PRESENTATION WORKSHOP 06-28-2012	Consultant Team, Advisory Committee, NASA Area Management District, General Public	Town Social Media Website, Town Newsletter, E-mail Distribution List, Sign Posting in Medians, Door-to- Door Flyer Distribution		

WORKSHOP FORMAT

What is the importance and role of the Advisory Committee?

- To be a voice for the community for whom they represent.
- To serve as vounteer members who ensure interest and long-term committment to the vision.
- To aid the team in informed decision-making.

WORKSHOP 1

WORKSHOP 2

GOAL

Present needs assessment and initial ideas to the general public. Collect information from the public regarding their concerns and desires for the Study Area.

METHOD

Powerpoint presentation, presentation boards, computer survey station, community mapping station, visual survey station and conversation with consultants.

Present conceptual ideas to the Advisory Committee for comment.

Present comments to the public for additional thoughts.

METHOD

GOAL

Session 1 - One display table for presentation and one work table with markers and tracing paper for recording comments.

Session 2 - presentation poards divided into 3 topics:

- 1. Land Use / Zoning
- 2. Streetscape & Identity
- 3. Overall Vision Plan

WORKSHOP 3

GOAL

Present overall vision recommendations and implementation strategies to the general public.

METHOD

Powerpoint presentation and printed boards in triplicate set up in three stations for public questions immediately following the Consultant Team presentation of Final Vision.

*See Appendix for Workshop Results



RECOMMENDATIONS



VISION PLAN

The Vision Plan represents the collaborative effort encouraged by the principles of the Livable Centers Studies.

Through discussions with the Advisory Committee and engagement with the community, preliminary concepts and initial diagrams were developed to establish a Vision Plan demonstrating an image of the City incorporating all recommended projects and foreseeable results of their implementation.

The Plan proposes urban open space nodes to provide a setting for special events, gatherings and iconic architecture. The first of these nodes is an urban plaza along Upper Bay Road at Space Park Drive (north). This urban destination creates a civic center for activity, events and celebration. The second open space node takes place along the waterfront, transforming an underutilized space into a unique amenity for residents. Improving access to the waterfront provides an opportunity for recreation, physical connections between residential neighborhoods and visual connections to Clear Lake and the Nassau Bay Peninsula. Improved streets throughout the Management District create a sense of place and encourage pedestrian and bicycle circulation between nodes and other important destinations in Nassau Bay. Vehicular roundabouts proposed at major entry streets slow traffic and provide landscape/art opportunities.

Land use provisions and architectural guidelines promote pedestrian-oriented development and foster a distinctive character, which is compatible with the goals of the community. New vehicular connections shorten block lengths and improve access between districts. A proposed bridge over Cow Bayou further facilitates multi-modal transport by connecting Nassau Bay to new bicycle and pedestrian facilities and to adjacent attractions and neighborhoods. Gateway elements punctuate the experience along NASA Parkway to signal arrival and reveal the history of Nassau Bay while other branding and wayfinding elements further instill the city's spirit.

VISION PLAN



RECOMMENDED PROJECTS

SHORT-TERM PROJECTS (S)



LONG-TERM PROJECTS (L)



RECOMMENDED PROJECTS

- **t.1(s)** Space Park Drive Improvements
- **t.2(s)** Saturn Lane Improvements
- t.3(s) Upper Bay Road Improvements
- t.4(S) Bike / Ped Bridge over Cow Bayou
- **U.1(S)** Branding Element (Gateway)
- **U.2 (S)** Branding at Commercial Intersections
- t.5(S) NASA Parkway Improvements
- d.2(S) Restaurant at Waterfront

†. **1** () Space Park Drive (West) Improvements

- **†.6()** Space Park Drive (East) Improvements
- t. 3 () Upper Bay Road Improvements
- t.5() NASA Parkway Improvements
- **†.7()** Point Lookout Drive Improvements
- **t.8()** Nassau Bay Drive Improvements
- **U.3-5()** Branding Elements along NASA Parkway
 - **U.6()** Branding Elements along the Waterfront
 - **U.7()** Branding Elements at Neighborhood Entries
 - d.2(1) Waterfront Improvements

Great streets play a key role in making strong, livable communities and great places. Great streets connect people to a variety of activities and provide attractive outdoor areas. Streets include sidewalks, pedestrians, bicycles, parking, trees and the buildings which dictate its shape and form. People are what make a street successful, and therefore, streets must be designed to attract and engage people in order to be maxmize potential.

INGREDIENTS OF WALKABLE STREETS

- 1. Residential Densities.
- 2. Pedestrian-scaled Dimensions & Lighting.
- 3. Diverse Retail.
- 4. On-Street Parking.
- 5. 24-Hour Activity.
- 6. Narrow Lot Size.
- 7. Weather Protection.
- 8. Ample Sidewalks.
- 9. Active Building Fronts.
- 10. Modest Crossing Distances.
- 11. Proximity to Destinations.
- 12. Short Block Lengths.
- 13. Vista Termination/Focal Points.
- 14. Pedestrian-Appropriate Businesses.

PRIORITY PROJECTS

The street right-of-way on Upper Bay Road, Point Lookout Drive, Nassau Bay Drive and Space Park Drive is the defining factor in designing the streetscape. Cross-sections for the various rights-of-way have been developed to combine improvements for vehicular transporation as well as for pedestrian and bicyclist mobility. Special design consideration will be needed at the civic spaces on Upper Bay Road to allow for safe pedestrian movement.

100'-80' R.O.W.



Major suggested improvements within the commercial areas of Nassau Bay designed to create great, walkable streets include shared use (vehicle/bicycle) lanes or separate bike lanes, an improved pedestrian realm with minimum 6 to 10 foot sidewalks, additional landscaping and street amenities such as lighting and wayfinding elements, to create a sense of identity. They also include on-street parking (where appropriate) to allow people to access their destination, while providing a protective buffer from vehicles on the road.

Improvements are recommended on Upper Bay Road, Point Lookout Drive and Nassau Bay Drive because these northsouth streets (80' R.O.W.) provide connectivity between the residential and the commercial, office and retail areas, as well as to regional destinations. Improvements are also recommended on Space Park Drive (60' R.O.W.) to provide better connections to destinations within Nassau Bay and circulation within the City. The transformation of these streets to "great" streets will typically require reconstruction. Minimal streetscape modifications are recommended in the Town Square area because the area has been developed with its own unique identity. For some streets, the recommended improvements will reduce the number of travel lanes. The traffic volumes on the streets can be accommodated within the recommended travel lanes and additional capacity (turn lanes) will be provided at intersections. Capacity issues typically occur at intersections, not at midblock locations. Excess capacity can lead to higher travel speeds which are not appropriate for the character of the streets in Nassau Bay.

The recommended streetscape improvements are designed to address stakeholders and residents' expressed desire for a safer, more diverse transportation network that will accommodate and encourage travel by all modes of transportation, including pedestrians, bicycles, passenger vehicles and golf carts, as well as meet the needs of all residents, both young and old, and all levels of ability and mobility. Residents want to feel as comfortable walking and biking in the nonresidential areas of Nassau Bay as in the residential areas. Implementation of the streetscape improvements will support and encourage the redevelopment of the commercial area of Nassau Bay.





t.1(S) Space Park Drive Improvements

Recommendations for Space Park Drive between Nassau Bay Drive and Point Lookout Drive include restriping the existing pavement with two, 14-foot shared use lanes (sharrows) and a continuous two-way, left-turn lane, as shown in the 60-foot ROW streetscape figure. A landscape area will separate sidewalks from the sharrows. The streetscape in the section of Space Park Drive between Point Lookout and Upper Bay Road was designed in conjunction with Town Square and will continue to be implemented as Town Square is developed. Improvements to Space Park Drive from Upper Bay Drive to Surf Court will consist of the construction of six-foot sidewalks and signing the street as a bike route.

t.2(s) Saturn Lane Improvements

Saturn Lane was constructed with the development of Town Square as a four-lane divided road with a wide median; a sidewalk and landscaping are provided in

the median. The only recommendation to modify the existing cross-section is to restripe the main lanes to provide a shared use lane for bicyclists.

t.3(s) Upper Bay Road Improvements

Between NASA Parkway and Space Park Drive (north), Upper Bay Road has a 100-foot ROW. The proposed cross-section within these limits includes a four-lane, divided street with bike lanes and landscaping separating the bike lanes from an eight-foot wide sidewalk, as depicted in the streetscape figure for 100-foot ROW (pg 48). Upper Bay Road between Space Park Drive (north) and Space Park Drive (south) is recommended for construction as a two-lane, divided roadway with bike lanes and parallel parking; landscaping will be provided within the 10-foot wide pedestrian realm (see streetscape figure for 80-foot ROW). South of Space Park Drive (south), Upper Bay Road can be striped with a bike lane, and a roundabout is proposed at the intersections of Upper Bay Road at Space Park Drive (south). The plaza at Space Park Drive (north) will be larger than the roundabout at Space Park Drive (south) and will serve as a civic gathering space.



T.3 (S) (L) - View of Upper Bay Road looking North to NASA Parkway Gateway Element, U.3 (L)

VEHICULAR ROUNDABOUTS

Roundabouts, a type of circular intersection, are designed to improve traffic flow and safety. A roundabout can eliminate the need for a traffic signal or all-way stop control. Due to the efficient movement of traffic, less capacity and thus fewer travel lanes are needed with a roundabout. In addition to improving traffic flow, roundabouts slow vehicular traffic, increase safety of pedestrian crossings, provide opportunity for landscaping, branding, public art and create a transition between districts or neighborhoods.

The Consultant Team has identified opportunities for three roundabouts at transitions from commercial to neighborhood districts along primary north-south streets, as well as one larger urban plaza that will function as a civic gathering space along Upper Bay Road.



Public art in roundabouts











T.3 (S) (L) - Enhanced Roundabout Civic Space at Upper Bay Road and Space Park Drive.

t.4(S) Bicycle | Pedestrian Bridge Over Cow Bayou



NASA Parkway provides the sole access to regional destinations for Nassau Bay residents. It is also the only access for visitors coming to the City. Because of the wide expanse of the road, the traffic volumes and the high speeds on NASA Parkway, travel to and from Nassau Bay is a challenge, particularly for pedestrians and bicyclists.

A pedestrian/bicycle bridge is proposed over Cow Bayou to provide a safer, more inviting and easily accessible route to travel to and from Nassau Bay for both residents and visitors. The bridge will connect to a future shared bike path to be constructed along FM 270 by the Texas Department of Transportation (TxDOT) and provide Nassau Bay residents with access to other regional destinations, such as planned bike facilities in League City. This bridge might also serve golf cart users.

Embedded in each Transporation Project are many of the integral design components necessary to create successful walkable streets.

BICYCLE PLAN

The Bicycle Plan identifies a network of bicycle facilities within Nassau Bay, which also provide connections to regional corridors for recreation and utility purposes. There are opportunities to create a bike network in the short-term by striping existing streets with shared use lanes. A long-term approach, to be implemented with streetscape improvements, would create separate bike lanes where space permits, shared use lanes where the right-of-way is limited, and signed bicycle routes where other bike facilities are not feasible or warranted.



Bike Plan Vision



SHARED-USE LANES OR SEPARATE BIKE LANES

To encourage residents to ride bikes in the nonresidential areas of Nassau Bay, either shared-use lanes (sharrows) or bike lanes are proposed. Shared-use lanes are typically 14 feet wide, which provide adequate space for a vehicle and most bicyclists to feel safe in sharing a travel lane. Sharrows are recommended on streets with right-of-way constraints or as an intermediate improvement prior to reconstruction. The existing pavement width is adequate to restripe the outside lane as a sharrow, but not wide enough to stripe a bike lane.

Striped bike lanes are recommended in conjunction with the reconstruction of the streets. The recommended striped bike lane width is six feet so that there is an adequate buffer between vehicles and the bicyclist. Bicyclists of all ages and ability levels should feel safe riding a bike in the commercial areas of the City. Also, the six-foot width will enable a bike rider to stay away from the street gutter, where debris collects. As a point of reference, the existing bike lanes on NASA Parkway are four feet wide.

Signing a street as a Bike Route is recommended when sharrows or bike lanes are not practical or feasible because of inadequate right-of-way or traffic volumes and/or vehicular travel speeds are not expected to warrant another type of bicycle facility. These serve as wayfinding devices indicating to bicyclists that a particular route is attractive for their use.

SIDEWALKS

There are sidewalks in the Town Square area; however, most residents do not feel comfortable walking to Town Square because of the lack of sidewalks linking the residential area to Town Square. Sidewalks should be provided on both sides of streets within the commercial area. The recommended sidewalk width on these streets, a function of right-of-way width, is between 6 and 10 feet. A six-foot sidewalk comfortably accommodates two people walking side-by-side or two people passing each other. Wide sidewalks (8 to 10 feet) are needed where the right-of-way is available to encourage and support desired redevelopment patterns.

PEDESTRIAN CROSSINGS WITH RAMPS

In addition to the residents' need to feel safe walking along a street in the commercial area, they also need to feel safe crossing a street. The all-way stop control provided at most intersections within the commercial area provides for safe crossing of the streets. To alert motorists that pedestrians will be crossing at an intersection, crosswalks are recommended at all stop-controlled approaches at the intersections in the nonresidential area. Construction of wheelchair ramps in compliance with the Americans with Disabilities Act (ADA) is recommended to provide access between the sidewalks and the crosswalks. The ramps provide a safer and easier crossing for all residents, not only the disabled; for example, families pushing a stroller would find a ramp helpful in accessing a crosswalk.

PARALLEL PARKING

On-street parking will enhance the access to new architectural forms which will posess inviting facades close to the street. Additionally, the safety of the corridor can be improved. The parked cars serve to calm traffic and buffer pedestrians on the sidewalks from moving vehicles.

One concern with parallel parking is that bicyclists can be "doored" as motorists are getting out of their vehicle. The potential of a bicyclist running into a car door as it is being opened is minimized if the width of the parking space is adequate (8 feet wide) and an adequate width is also provided for the bike lane. A driver exiting a parallel parking space typically has a better view of approaching bicyclists than does a driver exiting a head-in parking space.

LANDSCAPING

The Landscape is a critical element in creating walkable streets. Trees provide shade and a cooler environment for walking and riding a bike. Trees can also provide shade for parked cars and serve to enhance the attractiveness of the corridor, benefiting property values and attracting new businesses. In addition to creating aesthetically pleasing surroundings that residents will want to experience as pedestrians, plantings provide a safer pedestrian environment by serving as a buffer from moving vehicles.

The tree canopy should be high enough for all vehicles to clear. Landscape elements should not obstruct the visibility of pedestrians from the street or create places for people to hide.





LIGHTING

Pedestrian lighting is recommended to encourage pedestrian activity after dark. Pedestrian lights supplement street lights, increasing the illumination of sidewalk areas; thus, creating a safe pedestrian environment during the evening hours. Pedestrian lights should be positioned above the sidewalk, rather than the street, at 12 to 15 feet tall. Pedestrian-scale pole heights and minimum lighting levels create a safe and attractive ambiance. Light fixtures can be integrated in the overall wayfinding strategy for the area.

WAYFINDING ELEMENTS

Design of the streetscape should include the development of a wayfinding system to improve the pedestrian and bicycle environment, particularly for people who are not residents of Nassau Bay. Wayfinding can assist pedestrians and bicyclists in determining the best route to a destination, recognizing their destination when they arrive and getting them to another destination. Multiple branding and wayfinding strategies exist in Nassau Bay and greater consistency will increase understanding and usefulness.



LONG-TERM PROJECTS

NASA Parkway is an eight-lane divided roadway from the NASA Road Bypass to east of Upper Bay Road where it transitions to a six-lane divided roadway. Additionally, there are multiple turn lanes on NASA Parkway at intersections within the eight-lane section. The posted speed limit is 45 MPH. Motorists traveling on NASA Parkway can easily drive by Nassau Bay without knowing it due to the speed of travel and the lack of visual cues indicating the arrival at Nassau Bay.

NASA Parkway is not a destination for bicyclists and pedestrians, although it does have striped bike lanes and sidewalks. Only experienced cyclists feel comfortable riding in the four-foot bike lanes. Bike riders have been observed riding on the sidewalk along NASA Parkway and often on the wrong side of the street. The width of the roadway creates challenges for bicyclists and pedestrians trying to cross NASA Parkway.

A long-range transportation project, identified during the course of this study is to modify the streetscape on NASA Parkway, **t.5(1)**, creating a more walkable, context sensitive street at the "front door" of Nassau Bay. The recommended cross-section includes a six-lane divided road with six-foot bike lanes and a four foot buffer between the bike lanes and the travel lanes. The pedestrian realm would include 20-foot landscaped areas separating the 12-foot wide sidewalks from the bike lanes. The right-of-way on NASA Parkway is variable; the width of the median would be dependent upon the number of turn lanes and the right-of-way width.

The reduction in the number of travel lanes should not compromise traffic operations on NASA Parkway; the same number of turn lanes as currently exist could be provided at intersections, which is where the capacity is needed. The new six-lane section would be a continuation of the six-lane section east of Upper Bay Road; east of the City, NASA Parkway transitions to a four-lane divided roadway.

Although this is a long-range project, there are tasks that can be conducted in the short-term toward implementation. For instance, the City of Nassau Bay should begin dialogue with TxDOT concerning the reduction in number of lanes on NASA Parkway and change to the look and feel of the street.



AIR QUALITY BENEFITS

Implementation of the recommendations outlined in the Nassau Bay Livable Centers Plan is expected to improve air quality by reducing emissions of pollutants such as Nitrogen Oxides (NOx), Volatile Organic Compounds (VOC) and Carbon Monoxide (CO). These improvements will be realized by people living and working in Nassau Bay shifting trips from automobile to walking or bicycling and by reducing the length of some vehicular trips as more local destinations are developed. The methodology used to calculate the potential reduction in vehicle emissions is provided in the Appendix.

MODE SHIFT CHANGES

Air quality benefits will result from transportation improvements and local developments that accommodate and encourage all travel modes. Improvements such as bicycle facilities and sidewalk improvements recommended along major corridors in the Study Area, the construction of the bicycle/pedestrian bridge across Cow Bayou, and increased local retail and commercial destinations such as those proposed along Upper Bay Drive will make it easier for residents to walk or bike. These improvements should result in mode shift changes for home and work based trips by Nassau Bay residents. The increase in the number of trips made by bicycle or on foot translates to a reduction in vehicle miles traveled (VMT) and, thus, a reduction in vehicle emissions. Built environment improvements such as increasing the tree canopy, better wayfinding and the other streetscape improvements proposed in conjunction with the roadway improvements can also influence the mode split; people will want to walk and bike if a shady, safe and pleasant environment is provided.

Changes in the City's policies and design standards can further encourage mode shift changes. The mixeduse land use classification proposed for addition to the Nassau Bay Zoning and Planning Map will facilitate development that can increase the number of pedestrian trips and decrease the number of automobile trips. For example, having multiple destinations within a walkable development allows people to avoid getting into their car to go from store to store, and instead, allows them to combine trips and walk. Providing a mixture of land uses also has the potential to increase the duration of pedestrian and bicycle activity throughout the day and evening. The promotion of "walkable" architecture through changes in the City's development design standards (e.g. requiring minimal building setbacks and limiting large parking areas in front of buildings) can also increase pedestrian and bicycle trips by making access to destinations feel safer and easier.

REDUCTION IN TRIP LENGTHS

Residents currently have limited opportunities to eat and especially shop in Nassau Bay. As new development occurs, like Nassau Bay Town Square, residents will have increased opportunities to patronize local restaurants, shops and services. Currently many of these trips are made to destinations in areas such as Clear Lake and Webster. Because residents will not have to drive as far for these trips, new development in Nassau Bay can effectively reduce the vehicle miles traveled for some nonwork trips.

CALCULATION OF EMISSION REDUCTIONS

The potential air quality benefits from the implementation of the recommended Nassau Bay Livable Centers Transportation and General Development Projects have been estimated based on an expected 1% mode share shift of the total trips generated by Nassau Bay residents from automobile trips to bicycle and pedestrian trips. Current mode share for walking and bicycling commuting trips in Nassau Bay is 2.8% which serves as a proxy for total trips in the area. A 1% mode share increase to 3.8% would represent a 35% increase in the amount of walking and biking trips in the area. Actual mode share shifts will be dependent on the actual implementation of the recommended improvements.

In addition to mode shifts, the trip lengths of an estimated 5% of the household trips generated in Nassau Bay were assumed to be reduced by 80% to reflect the reduction in vehicle emissions expected to occur because of trip diverted to new development in the City that previously traveled much farther distances. The resultant annual reductions in vehicle emissions due to mode share shift and trip length reductions are shown in the table below.

VEHICLE EMISSION REDUCTION (KG/YEAR)		VOC	СО
Mode Shift Share	152.57	200.76	2,378.59
Trip Length Reduction		502.36	5,951.83
Total Reduction	534.33	703.12	8,330.42

ESTIMATED ANNUAL VEHICLE EMISSION REDUCTION

BRANDING | IDENTITY

The City of Nassau Bay has its own rich and unique history. Sharing a moniker with the great port city of the Bahamas, the town intended to evoke a certain relaxed, coastal milieu. While Nassau Bay is a cozy sailing and boating community, it is also intimately linked to the great history of the National Aeronautical and Space Administration located across NASA Parkway. The Design Team understands that the City would like to provide a link to JSC while maintaining its distinctive character.

The story of the Nassau Bay brand should evoke the spirit of the commonalities between the two entities – the town and NASA. "Navigation" is a common root of the nautical/boating history of the town as well as the focus of the JSC. When developing a concept that epitomizes the identity of the place, the theme of navigation became an obvious choice, and can be expressed in the design of the gateway monuments, signage and other public realm elements to reinforce the image of the District.

Aeronautical and nautical travels rely on both modern technology which has its roots in navigation by mapping and locating the stars. One of the devices used to aid in these kinds of navigation – both on the water and in the air – is the gyroscope.

The physical form of the public realm elements in the Downtown District that reinforce the identity could be derived from the form of the gyroscope as well as from the stars themselves. Abstracted and artful creations take shape to become the elements that define the edges of the District and create a language for the common thread that extends through Nassau Bay.

Either the gyroscope or star concept will establish a "family" of physical elements which are scalable, from large gateway monuments to street lights with community identifiers, to wayfinding signs. These elements will be placed strategically along city intersections and streets to support the creation and understanding of a particular district and its edges.

BRANDING CONCEPT 1: GYROSCOPE



NASA PARKWAY GATEWAY DESIGN, "GYROSCOPE" CONCEPT

υ.1(s)

BRANDING | IDENTITY LOCATION DIAGRAM



BRANDING CONCEPT 1: GYROSCOPE



u.2(s) COMMERCIAL INTERSECTIONS



WATERFRONT

υ.6(l)



NEIGHBORHOOD ENTRIES

u.7(l)

STREET SIGNS

υ.8(Ι)

In the first concept, the physical form is created by abstracting the shape of the gyroscope as a recurring theme throughout the family. It contains a large central "spin axis" and a "gimbal" that creates an arc around the spin axis. The grand gesture of the gateway monuments along NASA Parkway will announce the arrival and edges of the Downtown District while providing a reference to JSC.

BRANDING CONCEPT 2: NAVIGATION BY STARS

Nearly 60 constellations have been identified as navigable tools. In this second branding concept, the stars will aid in creating a common identity throughout the City. Large steel structures will announce the arrival to the City and will contain artful lighting at night. Additionally, these structures and those throughout the City will project these "navigational constellation patterns" onto the City streets and sidewalks providing a unique aesthetic pattern and safety lighting experience.



NASA PARKWAY GATEWAY DESIGN, "NAVIGATION BY STARS" CONCEPT

u.1(s)



COMMERCIAL INTERSECTIONS U.2(S)

BRANDING CONCEPT 2: NAVIGATION BY STARS



WATERFRONT

u.6(l)



NEIGHBORHOOD ENTRIES



υ.7(Ι)









COMPACT AND MIXED USES

In order to increase retail demand in the NASA Area Management District, steps should be taken to attract new residents. In accordance with community goals, the Consultant Team recommends the addition of a "mixed" land use category to the Nassau Bay Zoning Map. This designation will increase residential units as well as the commercial/retail mix and suggests a higher density than the current, auto-oriented condition. The mixed-use model encourages the concentration and integration of mixed but complimentary uses to promote walkability and reduce the need for vehicular trips. Mixed-use buildings often feature active retail on the ground floor with housing above. Residents have the luxury of walking to the grocery store or an ice cream parlor, and retailers have the assurance of nearby customers. By encouraging a variety of uses, a synergistic relationship is established and spaces are activated throughout the day, night and week, improving pedestrian safety along the street and

creating opportunities for shared parking and balanced transit ridership.

This transition from primarily commercial uses to a mixed development type is suggested along Upper Bay Road from NASA Parkway to Howard Ward Park and Space Park Drive from Point Lookout Drive to NASA Parkway. This new development type will activate important connections from the JSC to the Clear Lake waterfront and from Cow Bayou to the new Town Square development, appropriately positioning Town Square at the junction of the city's activity. Though Nassau Bay is built out, with little remaining land for new development, the Upper Bay Road and Space Park Drive corridors feature vacant parcels and many structures in decline. Proper planning can ensure productive and responsible development as these properties approach turnover.



DISTRICT RECOMMENDATION



These diagrams evaluate the existing conditions to create compact and mixed uses in addition to further defining edges to create stronger identity. In turn, the districting will alleviate conflict points for tourists visiting Nassau Bay.

DECLINING STRUCTURES AND VACANT LAND



WALKABLE ARCHITECTURE

Essential to the success of a mixed land use development, is quality architectural design. The buildings adjacent to the street can have a profound impact on the pedestrian experience. Architectural guidelines which reflect goals of Nassau Bay residents and Livable Centers Initiatives can guide design and construction of pedestrianfriendly buildings. Simple guidelines can ensure that buildings are compatible with their context, establish a healthy relationship between public and private uses, and foster a unique sense of place.

USES WITHIN A BUILDING

As previously mentioned, a diversity of uses will increase the longevity of activity along a street, making it a safer and more interesting place. Residential uses promote after-hour activities as residents come and go throughout the day and night, but street level units should be occupied by retail or office, with residential above, as these uses provide more activity during daytime hours. The layout and distribution of uses within a building also substantially influence the vitality of the street.

POSITION WITHIN A PARCEL

Building setbacks should be limited to create a pleasant sense of enclosure, provide climatic protection and encourage "eyes on the street" for safety. Setbacks should facilitate ample sidewalk and public space in front of the building. Surface parking should be located behind the building so that it does not interrupt pedestrian flow and the continuous street wall created by the buildings. Parking should, though, be accessible to encourage use by those arriving by car. The location and number of pedestrian access points is also important. Mid-block walkways increase urban "permeability" and shorten the perceived block length.

CONFIGURATION OF THE FACADE

Buildings along walkable streets should be more than two but less than five stories in height to create a pleasant sense of enclosure along the street. Buildings should be oriented toward the street with frequent doors and windows on the ground floor to create transparency and interaction with pedestrians on the street. Porches and awnings bring activity from within buildings out to the street. In addition to activating the sidewalk, architectural overhangs provide protection from the elements and a sense of enclosure for pedestrians. Articulation of the facade, guality materials and unique signage add interest to otherwise blank walls. Materials should respond to the character and climate of Nassau Bay.



Suggested Building Set-Backs



d.2(1) Waterfront Improvements

As the waterfront is a significant part of the culture of Nassau Bay, an important project associated with the Vision Plan, is the activation of this natural asset. The vacant strip of land adjacent to the Balboa Apartments occupies an undesireable elevation within the floodplain and is, therefore, unsuitable for development. It is proposed that a public access easement, **d.1(s)**, along the waterfront be implemented on this underutilized plot to provide public access to an important amenity where currently, access is limited.

This provision can facilitate the creation of an important recreational destination proposed along the city's shoreline. A civic waterfront park will support a variety of activities including fishing, biking, jogging and walking, while providing a flexible armature for various special uses such as farmers markets and art events. This public amenity would become an important destination and landmark in Nassau Bay, stimulating mixed-use waterfront development. A promenade along the water's edge would connect currently disjointed residential neighborhoods within Nassau Bay, by extending the isolated boardwalk on Upper Bay Rd to Surf Ct, and thus prompting the development of a more extensive trail system. Improved connectivity to Howard Ward Park would boost activity in this underutilized space.









d.2(s)(l) Waterfront Restaurant

Established as an early-win project and one that received significant support, is the campaign for a privately developed waterfront restaurant.

A waterfront restaurant would provide an anchor and catalyst for additional mixed-use development along the public easement. Available land and ample surface parking near by provide a large portion of the required



infrastructure. A waterfront restaurant would benefit not only the community, but also visitors to Nassau Bay by providing a destination to which it is exciting to return. The recommendation of a future mixed-use development coupled with the restaurant will activate the waterfront, create destination space and link the two residential neighborhoods currently separated by commercial, office and medical office buildings.





View Looking Northeast at proposed Waterfront Park




IMPLEMENTATION



PROJECTS AND FUNDING

The Nassau Bay community has been very forwardthinking in its creation of a set of local tools to aid redevelopment and implementation of a new vision.

KEY LOCAL AGENCIES

While state and federal funding could play important roles in carrying out certain projects, the most important success factor will be the gathering of local funding and organizational commitments for each element of the plan. In the current and likely future environment of constrained and unpredictable federal and state resources and programs, the surest future of the plan's implementation comes from support from local sources. Because funding for several of those sources is closely tied to the value and productivity of development, plan implementation will be linked with the pace of private economic investment in the Study Area.

NASA AREA MANAGEMENT DISTRICT

The local sponsor for this Livable Center Study, the NASA Area Management District, will play a role that is fiscally limited but central in terms of coordination. The District's annual revenues are raised from a ¼ cent sales tax on transactions within its boundaries. Total collections are estimated to be only \$75,000 - \$80,000 at the present year. Therefore its implementation capacity will be largely restricted to funding design and engineering, coordinating the more fiscally endowed local agencies, and spearheading outreach with commercial property owners. The Management District will also play a role in ongoing maintenance of public areas (landscaping, litter control, etc.).

As redevelopment occurs, new retail space is constructed and that space is filled with tenants, the Management District will receive more revenue and have greater capacity to undertake implementation tasks. These local tools, plus the commitment of the City of Nassau Bay, will provide the foundation for funding and building the projects recommended in this plan.

NASSAU BAY EDC

The City of Nassau Bay has levied a ½ cent 4B economic development sales tax since 1998. These sales tax revenues fund the City's Economic Development Corporation (EDC), which as a local government corporation may spend and issue debt separately from the City's General Fund and Debt Service budgets. The City Council does approve the EDC's budget, however.

The EDC's 2011-12 budget called for spending approximately \$268,000 on revenues of approximately \$205,000 plus unspent prior year balance. According to City of Nassau Bay staff, the EDC's spending priorities have been economic development and tourism. The projects in this plan directly support these priorities, as they are aimed at generating new, higher value development, retail activity and increased visitation. Therefore, the EDC can play a role in funding design and engineering work and assisting in the provision of local funding match to future federal grants. Still, its budget will be too limited to construct large-scale capital improvements on its own.

In the near term, the EDC's budget flexibility is constrained with obligations to service debt and cover administrative costs for the City of Nassau Bay. However, these constraints will be easing starting after 2013. As with the Management District, the EDC's implementation capacity will also benefit from retail development, increased occupancy, and greater sales productivity.

TAX INCREMENT REINVESTMENT ZONE #1

The City of Nassau Bay created Tax Increment Reinvestment Zone #1 (TIRZ #1) over what later became the Livable Center Study Area in 2007. This created a funding source by dictating that 90% of the increases

in property tax generated by increases in property value over the 2007 base year value will be set aside to fund improvements within the Zone. The remaining 10% of the increased revenue goes to the City's General Fund. The Zone was created to have up to a 30-year life.

The TIRZ has the ability to make agreements with developers to make reimbursements for public improvements that the developers have fronted. Alternatively, if the TIRZ has sufficient cash flow from increased values, it can proactively pay for improvements itself, in advance of development. Any public infrastructure or amenities within the zone are eligible for funding. State law also allows for TIRZ funding assistance for demolition of private properties, especially when environmental remediation may be involved, such as asbestos abatement. Off-street parking may also be subsidized by the TIRZ if it is being made available for use by the general public.

The TIRZ will have much greater funding capacity to undertake larger capital improvement projects such as street reconstruction. It can also leverage its funds by providing local match for grants from higher levels of government, such as federal transportation funds. Planning, design and engineering costs are eligible uses for funding as well as construction costs.

CITY OF NASSAU BAY

While the array of specialized funding and implementation tools already in place will be essential to moving the Livable Center Vision Plan forward, the City may need to play a funding and administrative role as well. The Public Works Department will need to be heavily involved in planning for reconstructed streets and could undertake some design and engineering tasks if appropriate. Because the City's General Fund will benefit from both increased sales tax generation and a portion of the property tax increase within the TIRZ, it could be appropriate for the City to assist in implementation funding for certain projects if the other entities do not have the immediate fiscal or organizational capacity to do so.

The City has a Tourism Fund, separate from the General Fund, which receives revenue generated by the City's hotel occupancy tax (7%). An eligible use of these funds is for public art and activities intended to increase tourism visitation. The fund's revenue should be increasing over the next several years due to the new Marriott Courtyard opening (though the competition may initially decrease taxable receipts at the three other Nassau Bay hotels). However, the City made an incentive agreement with the hotel to rebate 85% of the hotel occupancy tax revenue generated during the first five years, so the net positive effect to revenue will be limited at first. Still, the Tourism Fund's budget has had a portion devoted to arts and events (12% in recent budgets) and advertising and promotion (41%). In 2011, the revenue available for these two budget categories was over \$250,000.

PROJECT PRIORITIZATION & TASK SUBDIVISION

A prioritization hierarchy has been recommended for the implementation of the project list. The hierarchy levels are short-term (estimated one to five years), and long -term (six years and beyond). This recommended prioritization reflects the judgment of the Livable Center Consultant Team based on feedback from the Advisory Committee. It is recognized that within each level, the limited resources (both funding and organizational/staffing) of the various implementation agencies may force a winnowing of the list, with some projects pushed further into the future.

Recognizing that most projects have different stages of implementation that could potentially be funded and managed by different entities, the Livable Center Consultant Team has segmented each project into different tasks as applicable. For example, construction projects generally have a design and engineering component, site or right-of-way acquisition, construction and operation/maintenance stages with associated costs. The lead organizations and funding sources could be different for each stage.

MULTI-MODAL TRANSPORTATION PROJECTS

The plan contains several projects related to multimodal transporation improvements in the Study Area – reconstructing public rights-of-way so they better facilitate pedestrian and bicycle mobility and safety as well as motor vehicles. Some projects may be

FEDERAL FUNDING

At the time of the completion of this study, Congress had just passed a new funding authorization for the federal Department of Transportation (USDOT). The new authorization, called MAP-21, is considerably shorter than earlier ones and will expire September 30, 2014. The bill has less guaranteed funding for projects to improve pedestrian and bicycle mobility. Programs such as Congestion Mitigation/Air Quality (CMAQ) and Transportation Enhancements, both of which are intended to consider such improvements, have continued from the previous authorization with perhaps modestly less funding. However, more discretion is given to state-level departments of transportation for these programs than was previously the case, so good relationships with state legislators and members of the Texas Transportation Commission will be very important to assure that such funding can be made available for the projects in this plan.

Since a new authorization will be needed (barring a long series of temporary extensions for the previous authorization such as what happened from 2009 to 2012) prior to most of this plan's projects being ready to seek federal funding, this report will not dwell on specific federal transportation programs but instead provide general guidance as to how the local implementation agencies should approach each street and transit project with regards to leveraging federal funds through the TIP process.

It should be noted that H-GAC provides its own scoring system for Livable Center-related projects that can aid a project's placement in the TIP. This scoring might be eligible for inclusion in H-GAC's long-term Regional Transportation Plan (RTP) and the short term (fouryear) Transportation Improvement Program (TIP). Any project receiving federally sourced transportation funding must be included in the TIP.

in addition to other evaluation and scoring that may be required for allocation of funding under the specific federally authorized funding programs. Still, the Livable Centers scoring could enhance the chances for the projects in this plan to be included.

Lastly, H-GAC emphasizes that any project seeking inclusion in the TIP need to have achieved a strong level of "readiness." This includes the following:

- Having substantial progress on design and engineering.
- Environmental clearances obtained (per the National Environmental Policy Act NEPA).
- Right-of-way largely obtained.
- Utility relocation or adjustments coordinated and funding identified.
- Conformity with the region's air quality planning,.
- Local funding commitment (for required local match on most federal programs – usually minimum 20%).

The current presidential administration has placed emphasis on the sustainability and multi-modalism in federal spending projects not only in transportation but through the Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA). These three agencies have joined in a partnership for Sustainable Communities. The District and Precinct 1 should emphasize the Livable Centers ideals of sustainability and multi-modalism when seeking not only transportation funds but also grants and support through these other agencies.

STREET RECONSTRUCTION

Projects to remake the public streets in the heart of Nassau Bay's commercial and mixed-use area to be more accommodating to multiple modes of travel and more livable through enhancements to public space form the heart of the vision expressed in this Livable Center plan.

NASA AREA MANAGEMENT DISTRICT AND NASSAU BAY EDC

The Management District and EDC roles in implementing the street makeover projects primarily involve funding project design and engineering, and particularly in the case of the Management District, coordinating the planning process with affected property owners and community members. Some projects (Upper Bay Road, for example) may have design and engineering costs that are still too large for these two entities to fund on their own.

Very small capital projects, such as short sections of sidewalk, may be within the funding constraints of these two agencies so that they could consider funding actual construction.

TIRZ #1 AND ADJACENT PROPERTY OWNERS /DEVELOPERS

TIRZ #1 will likely have a much higher funding capacity for project implementation, assuming significant levels of redevelopment (see scenario projections below). However, due to the timing of cash flows to the TIRZ, which lag behind the construction of private development (the development must be essentially complete before its incremental assessed value can be realized the following January 1), it may be necessary to ask private developers to pay upfront for the street improvements adjacent to their projects - or even off-site, as a single portion of a street remade has less market appeal than doing a longer segment. The City can execute a development agreement for the TIRZ to reimburse the developer, possibly with interest, once incremental tax revenues begin to flow. While aesthetic enhancements will be an essential part of these makeovers, they are primarily transportation projects. The projects' implementation will improve walkability and bicycle-friendliness while adequately accommodating the needs of motor vehicles.

If the TIRZ has sufficient cash available, it may also help fund the design and engineering costs for the larger projects such as Upper Bay Road. Such costs are less likely to be fronted by a developer than construction costs.

CITY OF NASSAU BAY

When cash flow or overall funding gaps exists for particular projects, the City can consider stepping in to contribute funds; this would be appropriate as the City will be the ultimate owner of the street infrastructure, the sales taxes for the General Fund and street repair should increase, and the residents outside the Management District and TIRZ will also benefit from better streets. The upfront design and engineering costs for the large projects could be a task where the City should consider contributing General Fund assistance if the TIRZ and the other entities do not have the available cash reserves; however, the TIRZ should be the first choice to fund actual construction.

FEDERAL TRANSPORTATION FUNDS

Projects to improve Nassau Bay's streets to create a Livable Center may meet criteria for federal funding assistance through the TIP. As the front door to the region's major unique tourist attraction, Space Center Houston/NASA, a package of street makeovers may qualify as a project of regional significance, which could help pull in discretionary grants similar to the TIGER grants of the last few years. The various local implementation agencies can take the lead by funding design and engineering and committing local match (usually 20%).

BICYCLE BRIDGE

The bicycle pathway bridge over Cow Bayou is a less appropriate project for TIRZ #1 because it is less directly connected to potential redevelopment. The Management District should help implementation by assisting with design and coordination between the City of Nassau Bay, the Texas Department of Transportation, the Harris County Flood Control District, and the City of Webster. The District can also seek technical assistance from the National Parks Service, which provides such assistance to local communities seeking to improve trails systems. The City of Nassau Bay is likely the most appropriate local agency to fund construction of the bridge; it can seek funding assistance from the City of Webster and possibly applying for federal transportation assistance (the Transportation Enhancement Program in particular, though its funding is somewhat diminished in the new authorization).

BRANDING AND PUBLIC AMENITIES

A distinctive set of projects proposed in this plan include the addition of special public realm branding elements that will not only better identify the City of Nassau Bay within its regional and greater Bay Area context but also act to draw in visitors who are passing by on their way to Space Center Houston or the Kemah/Seabrook area. Having visual cues for leisure visitors to come south of NASA Parkway into the heart of the Study Area is essential if successful retail is to reach beyond NASA Parkway frontage in any significant quantity.

BRANDING ELEMENTS

The vertical branding elements along significant streets and at major intersections are typically projects for special districts or special purpose agencies such as the Management District and the EDC. Since these projects are clearly area enhancements with an economic development purpose that represent improvements above the standard municipal level of service, it is recommended that these agencies be primarily responsible for these projects. The Management District should lead in the design process and coordination with property owners. The EDC, due to larger fiscal capacity, would likely be more appropriate to fund construction. Once budgetary capacity for new debt service is increased, the EDC could consider debt issuance to fund construction costs. The City's Tourism Fund could also consider contributing assistance, as these elements could gualify as public art and are designed to increase tourism visitation.

RIGHT OF WAY LANDSCAPING AND PUBLIC ART

Aesthetically pleasing landscaping, decorative hardscape elements, shade trees and public art will be critical to the success of the remade streets from both a transportation and economic perspective. Certain elements - shade trees, crosswalk markings, etc. – would be considered as part of transportation infrastructure since they are needed for pedestrian comfort and safety. Thus, they could be part of the costs funded by federal transportation grants. Additional funding could come from H-GAC's Downtown Public Spaces Improvements Program, which will match capital dollars for 50% of total cost, up to \$25,000 for enhancements to key gateway areas such as the northern segment of Upper Bay Road.

Otherwise, aesthetic enhancements will be the responsibility of local agencies, especially the Management District and the EDC. The City's Tourism Fund can contribute to the public art elements. As landscaping will require maintenance, the Management District will need to consider its capacity to maintain these improvements. It is possible that adjacent property owners may be willing to assume responsibility for adequate maintenance behind the outside curbs of the streets; however, maintenance of enhancements within roundabouts or medians will likely fall under purview of the Management District.

Local public agencies could consider a private fundraising campaign among area residents and businesses if available tax revenues appear insufficient to accomplish the improvements within an acceptable time frame.

WATERFRONT

The waterfront improvements are similar to other aesthetic enhancements in that all funding will need to be locally raised and that they are also improvements intended to increase nonresident visitation and help drive retail sales. Design and engineering costs could be primarily funded by the Management District and EDC. The TIRZ would be the first choice vehicle for funding construction.

PRIVATE DEVELOPMENT

While the projects proposed in this plan will improve mobility by enhancing the practicality, safety and enjoyment of walking and biking, they are equally targeted at helping to spur appropriate mixed-use development. As has been noted in the market analysis, much of the Study Area, especially along Upper Bay Road and Space Park Drive, comprises aging, low value commercial structures. These sites are suitable for redevelopment.

The City of Nassau Bay, both directly and through TIRZ #1, can help to influence the rapidity and style of development. This would be done through modification of development regulations and incentives.

DEVELOPMENT REGULATIONS

The City of Nassau Bay has been revising its Comprehensive Plan and is examining its zoning ordinance. This Livable Centers Study provides an opportunity for the City to ensure that the regulations which apply to key portions of the Study Area – such as along Upper Bay Road and the western portion of Space Park Drive – are in alignment with the envisioned style of development. This would include allowing the vertical and horizontal mixing of uses, sharing of onsite parking facilities, consideration of on-street and nearby public parking in determining requirements, and reductions of building setbacks. It is important that developers seeking to build pedestrianfriendly, urban-village quality projects do not have to deal with the uncertainty of variances. The City could also consider requiring certain urban design standards in these locations, such as "build-to" lines, maximum blank wall coverage, location of public entrances, etc.

INCENTIVES AND DEVELOPMENT AGREEMENTS

Another way to speed up desired redevelopment is to offer a program of development incentives. Not only would they help attract developers, they would also give the City leverage in obtaining desired features of the development.

TIRZ #1 REIMBURSEMENTS

The most straightforward incentive, given that a TIRZ is in place today, is to craft a policy of TIRZ reimbursements to developers who front the cost of public facilities and improvements, such as rebuilt roadways, streetscapes and public parking. The TIRZ could also assist in building demolition, especially where asbestos abatement is required. As noted above, this helps address some cash flow timing issues by requiring the TIRZ to pay out only after it has started receiving the tax revenues resulting from redevelopment.

The reimbursement arrangements would be detailed in development agreements approved by the TIRZ Board and possibly City Council. In these agreements the City could require the development to meet certain requirements, such as urban design standards, as a condition of reimbursement.

PARKING

Providing onsite parking can be a significant cost to a developer. If the City is willing to lower onsite requirements for developments that meet the quality standards sought, it could spur investment as well as helping to minimize interference with walkability. Possibilities include shared parking policies between different land uses, counting of adjacent on-street spaces toward on site requirements, and discounts for proximity to off-street parking available to the general public. The TIRZ could also reimburse developers for providing parking facilities that are available to the general public.

LAND WRITE DOWNS

If the TIRZ has sufficient cash on hand and key properties become available, it could consider acquiring those properties for future conveyance to a developer at a reduced cost, with quality and design standards included in the conveyance agreement.

CHAPTER 380 AGREEMENTS

Chapter 380 of the State of Texas Local Government Code allows a wide variety of economic development agreements between private developers or businesses and municipalities or special districts. Often such agreements are based on the increment of taxes generated from the development. In the case of the Livable Centers Study Area, it is important that the property tax increment be used for TIRZ funding and that the Management District and EDC (4B) sales tax increments remain flowing to their respective agencies, as that will fund additional Livable Center implementation activities. However, the City of Nassau Bay could consider using Chapter 380 agreements based on impact or permit fees or the General Fund sales tax.

LOCAL FUNDING SCENARIO

As described above, the increment property tax and sales tax revenues to local agencies generated by new development is very important to implementation of the recommended Livable Center Projects. Therefore a projected funding scenario was prepared to examine the likelihood of sufficient local funding to carry out the implementation tasks. The following table shows the projected incremental property and sales tax revenues generated by new Study Area development as projected in the Market Forecasts (see Section X). It addresses incremental revenues to the City, TIRZ #1, the EDC (4B) and the Management District. This represents potential development assuming the City, Management District and the associated implementation agencies are actively pursuing implementation of Livable Center improvements.

Annual Incremental Tax Revenue Streams

Livable Center Study Area

Property Value	Enc	l of Year 5	End	of Year 10
Apartments	\$	30,000,000	\$	35,000,000
Senior apartments			\$	30,000,000
Office			\$	31,400,000
Townhomes	Ş	7,500,000	Ş	7,500,000
Retail / commercial	<u>\$</u>	7,600,000	<u>\$</u>	7,600,000
TOTAL	\$	45,100,000	Ş	111,500,000
cumulative	Ş	45,100,000	\$	156,600,000
Annual city General Fund property tax	Ş	31,215	Ş	108,386
Annual TIRZ revenue (90%)	\$	280,932	\$	975,474
Annual TIRZ revenue (90%) Annual sales tax	Ş Enc	280,932 I of Year 5	Ş End	975,474 l of Year 10
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years	Ş Enc	280,932 I of Year 5 50,000	Ş End	975,474 l of Year 10 50,000
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years Cumulative space added	Ş Enc	280,932 l of Year 5 50,000 50,000	Ş End	975,474 l of Year 10 50,000 100,000
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years Cumulative space added Taxable activity occ. %	Ş Enc	280,932 l of Year 5 50,000 50,000 75%	Ş End	975,474 l of Year 10 50,000 100,000 75%
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years Cumulative space added Taxable activity occ. % Average sales / sq.ft.	Ş Enc	280,932 1 of Year 5 50,000 50,000 75% 300	Ş End Ş	975,474 l of Year 10 50,000 100,000 75% 300
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years Cumulative space added Taxable activity occ. % Average sales / sq.ft. Nassau Bay General Fund (excl. street repair)	\$ Enc \$ \$	280,932 1 of Year 5 50,000 50,000 75% 300 112,500	\$ End \$	975,474 l of Year 10 50,000 100,000 75% 300 225,000
Annual TIRZ revenue (90%) Annual sales tax Space added per 5 years Cumulative space added Taxable activity occ. % Average sales / sq.ft. Nassau Bay General Fund (excl. street repair) Nassau Bay 4B	\$ Enc \$ \$ \$ \$	280,932 1 of Year 5 50,000 50,000 75% 300 112,500 56,250	\$ End \$ \$ \$	975,474 1 of Year 10 50,000 100,000 75% 300 225,000 112,500

Source: CDS | Spillette

As the figures in the table above illustrate, the annual increments of property and sales tax revenues generated by the end of the 5th and 10th years are substantial.

The following two tables (following page) illustrate how these incremental revenues match up against the estimated costs of the priority projects identified in the Implementation Matrix. The projected revenues assume that the annual increment of revenue for the two, fiveyear periods is equal to the average of the revenue at the beginning of each period and at the end.

Great implementation progress could be accomplished solely with cash on hand at the local implementation agencies. What is not shown is that considerably more improvements could be funded through the issuance of debt by the agencies receiving these incremental cash flow streams. An annual increment of \$100,000 could provide the debt service for \$8 - \$10 million in debt to pay for capital improvements. Thus, under the given market projections, the Livable Center implementation program is ambitious but not unrealistic.

	Years 1 - 5		
USES – priority projects	Design	Construction	Total
Space Park Drive	\$ 7,680	\$ 50,806	\$ 58,486
Saturn Lane	7,600	38,000	45,600
Upper Bay Road	324,495	2	324 <mark>,4</mark> 95
Cow Bayou bike bridge	(.	321, <mark>00</mark> 0	321,000
Branding gateway NASA Pkwy / Saturn Lane	35,000	350,000	385,000
Branding intersections	NA	NA	NA
TOTAL	\$ 374,775	\$ 75 <mark>9,80</mark> 6	\$ 1,134,581
SOURCES (local)			E Voor Cumulativo
Tax increment - Management District			\$ 70.313
Taxino cinene in anagement of strice			¢ ,0,015
Taxincrement - 4B			\$ 140,625
Tax increment - TIRZ			<u>\$ 702,329</u>
Total economic development funds			\$ 913,266
Tax increment - General Fund sales tax			\$ 281,250
Taxincrement - General Fund property tax			<u>\$ 78,037</u>
Total other City of Nassau Bay funds			\$ 359,287

Sources and Uses of Local Implementation Funds

Source: CDS | Spillette

Sources and Uses of Local Implementation Funds

Years 6 - 10

USES – priority projects	Design	Construction	Total
Space Park Drive west	\$ 92,308	\$ 564,387	\$ 656,695
Upper Bay Road		1,324,612	1,324,612
Space Park Drive east	146,988	944,262	1,091,250
Point Lookout Drive	321,959	1,770,414	2,092,373
Nassau Bay Drive	387, <mark>01</mark> 6	<mark>2,146,11</mark> 3	2, <mark>533,12</mark> 9
Branding gateways NASA Pkwy / 3 locations	105,000	1,050,000	1,155,000
Branding waterfront	NA	NA	NA
Branding street signs	NA	NA	<u>_NA</u>
TOTAL	\$ 1,053,271	\$ 7,799,788	\$ 8,853,059
SOURCES (local)			5-Year Cumulative
Taxincrement - Management District			\$ 140,625
Tax increment - 4B			\$ 281,250
Tax increment - TIRZ			<u>\$ 2,438,685</u>
Total economic development funds			\$ 2,860,560
Tax increment - General Fund sales tax			\$ 562,500
Taxincrement - General Fund property tax			<u>\$ 270,965</u>
Total other City of Nassau Bay funds			\$ 833,465
Potential federal transportation grants (80%)			\$ 4,890,771

The diagrams shown below and on the following page illustrate the geographic location of each project by implementation task number. These task numbers correlate directly to the Implementation Matrix included on the following pages.

SHORT-TERM PROJECTS



The matrix on the following pages indicates the sequence and costs of projects by task. Each project has been identified as a "Priority Project" or "Other Project." "Priority Projects" refer to recommended projects favored by the Advisory Committee and easily executed by a limited number of partners, while "Other Projects" indicate desirable projects requiring the

cooperation and involvement of multiple parties and/ or private investment. These were then subdivided into manageable tasks to better ensure implementation. The matrix reads from left to right and describes the tasks, project phases, estimated costs of construction and design, estimated costs of annual operation, the project initiating group and potential sources of funding.



LONG-TERM PROJECTS

PRIORITY PROJECTS PRIORITY PROJECTS - SHORT TERM T.1 (S) - Space Park Drive Improvements Task 1 Task 2 Task 3 Task 4 T.2 (S) - Saturn Lane Improvements Task 1 Task 2 T.3 (S) - Upper Bay Road Improvements Task 1 Task 2 T	Point Lookout Dr. to Surf Court.: Install painted bike route signs. Point Lookout Dr. to Upper Bay Rd.: Construct 6 foot sidewalks along Space Park Drive in conjunction with Town Squure development. Prepare design plans and construct a 6 foot sidewalk on north side between Upper Bay Rd. and Town Square development. Prepare design plans and construct all planting, irrigation, Street furnishings, and street lighting associated with new street improvements between Upper Bay Rd. and Town Square development. Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 1: Construction Phase 1: Construction Phase 1: Design Phase 2: Construction Phase 1: Design Phase 2: Construction Phase 1: Construction
T.1 (S) - Space Park Drive Improvements ask 1 ask 2 ask 3 ask 4 T.2 (S) - Saturn Lane Improvements ask 1 ask 2 T.3 (S) - Upper Bay Road Improvements ask 1 ask 2 T.3 (S) - Upper Bay Road Improvements ask 1	Point Lookout Dr. to Surf Court.: Install painted bike route signs. Point Lookout Dr. to Upper Bay Rd.: Construct 6 foot sidewalks along Space Park Drive in conjunction with Town Squure development. Prepare design plans and construct a 6 foot sidewalk on north side between Upper Bay Rd. and Town Square development. Prepare design plans and construct all planting, irrigation, Street furnishings, and street lighting associated with new street improvements between Upper Bay Rd. and Town Square development. Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 1: Construction Phase 1: Construction Phase 1: Design Phase 2: Construction Phase 1: Design Phase 2: Construction Phase 1: Construction
ask 1 ask 3 ask 4 I T.2 (S) - Saturn Lane Improvements ask 1 ask 1 I T.3 (S) - Upper Bay Road Improvements ask 1 I T.3 (S) - Upper Bay Road Improvements ask 1 I T.3 (S) - Biovele / Pedestrian Bridge over Cow Bayou	Point Lookout Dr. to Upper Bay Rd. Construct 6 foot sidewalks along Space Park Drive in conjunction with Town Sqaure development. Prepare design plans and construct a 6 foot sidewalk on north side between Upper Bay Rd. and Town Square development. Prepare design plans and construct all planting, irrigation, street furnishings, and street lighting associated with new street improvements between Upper Bay Rd. and Town Square development. Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 1: Construction Phase 1: Design Phase 2: Construction Phase 1: Design Phase 2: Construction Phase 1: Construction
ask 3 ask 4 T.2 (S) - Saturn Lane Improvements ask 1 T.3 (S) - Upper Bay Road Improvements ask 1 ask 2 T.4 (S) - Bicycle / Pedestrian Bridge over Cow Bayou	development. Prepare design plans and construct a 6 foot sidewalk on north side between Upper Bay Rd. and Town Square development. Prepare design plans and construct all planting, irrigation, street furnishings, and street lighting associated with new street improvements between Upper Bay Rd. and Town Square development. Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 1: Design Phase 2: Construction Phase 1: Design Phase 2: Construction Phase 1: Construction
isk 4 T.2 (S) - Saturn Lane Improvements sk 1 sk 2 T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Birucle / Perfectrian Bridge over Cow Bayes	side between Upper Bay Rd. and Town Square development. Prepare design plans and construct all planting, irrigation, street furnishings, and street lighting associated with new street improvements between Upper Bay Rd. and Town Square development. Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 2: Construction Phase 1: Design Phase 2: Construction Phase 1: Construction
T.2 (S) - Saturn Lane Improvements sk 1 sk 2 T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Birucle / Perfectrian Bridge over Cow Bayes	Incluse Construction of the construction of th	Phase 1: Construction
T.2 (S) - Saturn Lane Improvements sk 1 T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Bicycle / Pedestrian Bridge over Cow Bayes	Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows.	Phase 1: Construction
sk 1 T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Birgerle / Pedestrian Bridge over Cow Bayesu	Implement Town Square sidewalk plan. Prepare striping plans and restripe Saturn Lane with sharrows. NACA Deduces to Cases Dedi De (asste), Deserve design plans for	Phase 1: Construction
sk 2 T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Bicycle / Pedestrian Bridge over Cow Bayou	Prepare striping plans and restripe Saturn Lane with sharrows.	
T.3 (S) - Upper Bay Road Improvements sk 1 sk 2 T.4 (S) - Bicycle / Pedestrian Bridge over Cow Bayou	NACA Destruction for an Destruction of a state of the sta	Phase 1: Design Phase 2: Construction
k 1 k 2 T 4 (S) - Ricycle / Pedestrian Bridge over Cow Ravou	NIACA Devices the Canada Device Devices the Second Angle of the Second S	
sk 2	reconstruction with improved cross-section, e.g., bike lanes,	Phase 1: Design
T 4 (S) - Ricycle / Pedestrian Bridge over Cow Revou	parallel parking, sidewalks and roundabout.	Dhace 1: Desire
T 4 (S) - Bicycle / Pedestrian Bridge over Cow Bayou	NASA Parkway to Space Park Dr. (south): Prepare design plans for planting in median, irrigation, street trees, specialty paving at cross walks,	Phase 1: Design
The second secon	Istreet iurnisnings, lighting, and design for roundabout civic space.	
sk 1	Identify location of easement / ROW for shared use path between	Phase 1: Coordination
	proposed FM270 shared use path based on discussions with	
sk 2	private landowners / City of Nassau Bay / City of Webster / TxDOT / HCFCD.	Phase 2: Construction
	over Cow Bayou.	
U.1 (S) - Branding Element (Gateway) Installation at NASA	A Parkway and Saturn Drive Intersection	Phase 1: Design
	Intersection.	Phase 1: Construction
U.2 (S) - Branding Element (Commercial Intersections)	Prenare design plans for and install commercial intersection branding	Phase 1: Design
	elements along Upper Bay Road and Space Park Drive.	Phase 1: Construction
D.1 (S) - Zoning and Planning	Create new zoning category for "Mixed-Use" and provision for	Phase 1: Action
54 1	public access easements along waterfront property.	Flase 1. Action
THER PROJECTS - SHORT TERM		
T.5 (S) - NASA Parkway Improvements		
SK 1	NASA Rd. Bypass to eastern city limits.	Phase 1: Action
D.2 (S) - Restaurant at Waterfront sk 1	Initiate discussion with potential (well-known) restaurant investor /	Phase 1: Action
	operations for Nassau Bay location along south eastern	
IORITY PROJECTS - LONG TERM	waterront on vacant property south of Space Park Dr.	
T.1 (L) - Space Park Drive (West) Improvements		
sk 1	Nassau Bay Dr. to Point Lookout Dr.: prepare design plans and stripe / construct 3-lane street with two sharrows and continuous left-turn lane	Phase 1: Design Phase 2: Construction
sk 2	and 6-toot sidewalks. Nassau Bay Dr. to Point Lookout Dr.: prepare design plans and install	Phase 1: Design
	specialty paving at crosswalks, street furnishings, lighting, planting and irritation associated with street improvements.	Phase 2: Construction
T.3 (L) - Upper Bay Road Improvements		
SK 1	Space Park Dr. (north) to Space Park Dr. (south): reconstruct as 2-lane divided roadway with bike lanes, parallel parking, sidewalks and	Phase 2: Construction
	large roundabout at Space Park Dr. (south) as designed in T.3 (S), Task 1.	Dhase 2. Country of
sk 2	Space Park Dr. (north) to Space Park Dr. (south): construct associated planting in median, irrigation, street trees, specialty paving at cross walks,	Phase 2: Construction
sk 3	roundabout civic space, lighting, and street furnishings. NASA Parkway to Space Park Dr. (north): Reconstruct as 4-lane divided roadway.	Phase 2: Construction
T.6 (L) - Space Park Drive (East) Improvements		[
sk 1	Upper Bay Rd. to Surf Court: prepare design plans and construct 6-foot sidewalk.	Phase 1: Design Phase 2: Construction
sk 2	Upper Bay Rd to Surf Court: prepare design plans and construct specialty	Phase 1: Design
	paving at crosswaiks, street furnishings, and lighting, planting and irrigation associated with street improvements.	Phase 2: Construction
T.7 (L) - Point Lookout Drive Improvements	NASA Dadway to Sayony Les Dresses desire alors a diversation des	Dhace 2: Dector
5K 1	PRASA Parkway to Saxony Ln.: Prepare design plans and reconstruct as a 2-lane divided roadway with improved cross-section, e.g., bike lanes,	Phase 3: Design Phase 4: Construction
sk 2	sidewaiks, and roundabout at Saxony Lane. NASA Parkway to Saxony Ln.: Prepare design plans and construct	Phase 3: Design
	associated planting in median, irrigation, street trees, specialty paving at	Phase 4: Construction
	pross waiks, roundabout planting, ignting, and street furnishings.	
T.8 (L) - Nassau Bay Drive Improvements	NASA Parkway to Saxony Ln.: Prepare design plans and reconstruct as a	Phase 3: Design
T.8 (L) - Nassau Bay Drive Improvements ik 1	2-lane ulvideu loadway with inibioved closs-section. e.e., tike lanes.	Phase 4: Construction
T.8 (L) - Nassau Bay Drive Improvements sk 1	sidewalks, and roundabout at Space Park Drive.	Phase 4: Construction

(L) = Projects 5+ years (S) = Projects 1- 5 years					
	Estimated Annual				
Estimated Cost	Operating	Implementing Agency	Approvals Required	Funding Sources and Partners	
	Cost				
\$1,700	\$200	Management District	City of Nassau Bay	Management District	
N/A	\$700	Private Sector	City of Nassau Bay	Property owner; TIRZ	
Design: \$1 200	\$100	City of Nassau Bay	City of Nassau Bay	Management District: property owner: TIRZ	
Construction: \$6,000	\$100	Management District			
Design: \$7,600 Construction: \$51,000	\$3,000	City of Nassau Bay, Management District	City of Nassau Bay	Management District; TIRZ	
N/A	N/A	Private Sector	City of Nassau Bay	Property owner; TIRZ	
Design: \$7,600 Construction: \$38,000	\$900	City of Nassau Bay, Management District	City of Nassau Bay	Management District; City of Nassau Bay	
\$262,000	N/A	City of Nassau Bay	City of Nassau Bay	TIR7: EDC: City of Nassau Bay:	
\$202,000	N/A	Management District		Downtown Public Spaces Improvement Grants	
\$92,000	N/A	City of Nassau Bay, Management District	City of Nassau Bay	TIRZ; EDC; City of Nassau Bay; Downtown Public Spaces Improvement Grants	
N/A	N/A	City of Nassau Bay /	City of Nassau Bay, TxDOT,	Management District; City of Nassau Bay;	
		Management District	HCFCD, other inter-agency coordination	National Park Service; City of Webster	
\$320,000	\$4,600	Management District	City Of Nassau Bay, TxDOT, HCFCD, other inter-agency coordination	Management District; City of Nassau Bay; H-GAC TIP	
	5000/	C'			
Construction: \$350,000	5800/ea	Management District, EDC	City of Nassau Bay, IXDOI	Management District; EDC; Tourism Fund	
Design: \$5,500 Construction: \$35,000/ea	200/ea	City of Nassau Bay, Management District, EDC	City of Nassau Bay, Private Sector	Management District; EDC; Tourism Fund	
N/A	N/A	City of Nassau Bay,	City of Nassau Bay	Management District; City of Nassau Bay	
		Management District Planning and Zoning Comm.	Planning and Zoning Comm.		
N/A	N/A	City of Nassau Bay	City of Nassau Bay, TxDOT	City of Nassau Bay; Management District	
N/A	N/A	City of Nassau Bay; Management	City of Nassau Bay, Management	City of Nassau Bay; Management District; EDC	
		District	District, Private Sector		
			·		
Design: \$31,000 Construction: \$153,000	\$8,800	City of Nassau Bay, Management District	City of Nassau Bay	Management District; EDC; City of Nassau Bay; H-GAC TIP	
Design: \$76,000	\$7,000	City of Nassau Bay,	City of Nassau Bay	Management District; EDC; TIRZ	
Construction: \$506,000		Management District			
\$904.000	\$5.300	City of Nassau Bay.	City of Nassau Bay	Management District: EDC: TIR7	
1,000	25,555	Management District			
\$609,000	\$4,000	City of Nassau Bay, Management District	City of Nassau Bay	TIRZ; EDC; City of Nassau Bay; Tourism Fund; H-GAC TIP	
\$403,000	\$2,900	City of Nassau Bay	City of Nassau Bay	TIRZ; EDC; City of Nassau Bay; Tourism Fund; H-GAC TIP	
Deisgn: \$22,000	\$800	City of Nassau Bay	City of Nassau Bay	TIRZ; EDC; City of Nassau Bay; H-GAC TIP	
Construction: \$111,000	\$5.600	City of Nassau Bay	City of Nassau Bay	Management District: EDC: TIR7: H-GAC TIP	
Construction: \$633,000	<i>93,000</i>	Management District			
Design: \$226,000 Construction: \$1,128,000	\$8,000	City of Nassau Bay, Management District	City of Nassau Bay	Management District; EDC; TIRZ	
Design: \$142,000 Construction: \$942,000	\$5,000	City of Nassau Bay, Management District	City of Nassau Bay	Management District; EDC; TIRZ; H-GAC TIP	
1				1	
Design: \$261,000 Construction: \$1,302,000	\$8,000	City of Nassau Bay, Management District	City of Nassau Bay	Management District; EDC; TIRZ; H-GAC TIP	
Design: \$140,000 Construction: \$928,000	\$7,000	City of Nassau Bay, Management District	City of Nassau Bay	Management District; EDC; TIRZ; H-GAC TIP	

U.3 (L) - Branding Element (Gatewa	ay) Installation at NASA Parkway and Upper Bay Road	
Task 1	Install gateway element at NASA Parkway /Upper Bay Rd.	Phase 2: Design
	Intersection.	Phase 3: Construction
U.4 (L) - Branding Element (Gatewa	ay) Installation at NASA Parkway and Point Lookout Drive	
Task 1	Install gateway element at NASA Parkway / Space Park Dr.	Phase 2: Design
	Intersection.	Phase 3: Construction
U.5 (L) - Branding Element (Gatewa	ay) Installation at NASA Parkway at Space Center Boulevard	
Task 1	Install gateway element at NASA Parkway / Space Center Blvd.	Phase 2: Design
	Intersection.	Phase 3: Construction
U.6 (L) - Branding Element (Waterfi	ront District) Installation at Upper Bay Road and along Waterfront	
Task 1	Create design plans for and construct waterfront branding elements.	Phase 2: Design
U.7 (L) - Branding Element (Neighb	orhood) Installation at Neighborhood Entries	
Task 1	Create design plans for and install neighborhood marker signage at all	Phase 2: Design
	intersections abutting commercial roads.	Phase 3: Construction
U.8 (L) - Branding Element (Street S	Sign) Installation at Neighborhood Intersections	
Task 1	Create design drawings and install new street signs at all street corners.	Phase 2: Design
		Phase 3: Construction
DTHER PROJECTS - LONG TERM		
T.5 (L) - NASA Parkway Improveme	nts	
Task 1	NASA Rd. Bypass to Eastern City Limits: Prepare design plans for	Phase 2: Design
	reconstruction of NASA Parkway with improved cross-section, e.g., bike	
	lane buffers, bike lanes and shared use paths.	
Task 2	NASA Rd. Bypass to Easter City Limits: Reconstruct NASA Parkway as	Phase 3: Construction
	6-lane roadway with bike lane buffers, bike lanes and shared use paths.	
D.2 (L) - Waterfront Improvement -	- Northern Shore of Clear Lake	
Task 1	Prepare design plans for new public access easement along the northern	Phase 2: Design
	shore of Clear Lake from Upper Bay to restaurant lot, e.g., boardwalk, lawn	
	terracing, planting, piers, irrigation, lighting, site furnishings and Coastal	
	Resilience Strategies.	
Task 2	Construct amenities for new public access easement along the norhtern	Phase 3: Construction
	shore of Clear Lake from Upper Bay to restaurant lot to include, boardwalk,	

Design: \$35,000	\$1000/ea	City of Nassau Bay,	City of Nassau Bay, TxDOT	Management District; EDC; TIRZ; H-GAC TIP
Construction: \$350,000/ea		Management District		
Design: \$35,000	\$1000/ea	City of Nassau Bay,	City of Nassau Bay, TxDOT	Management District; EDC; Tourism Fund
Construction: \$350,000/ea		Management District		
Decign: \$25,000	\$1000/02		City of Nassau Bay, other inter-agency	
Jesign. 200,000	\$1000/69		coordination	Management District; EDC; Tourism Fund
Construction: \$350,000/ea		City of Nassau Bay, Management District		
Design: \$3,000	\$400/ea		City of Nassau Bay, other inter-agency	Management District; EDC; Tourism Fund
Unit: \$15,000		City of Nassau Bay, Management District	coordination	
Design: \$3,000	\$400/ea	City of Nassau Bay,	City of Nassau Bay,	Management District; EDC; Tourism Fund
Unit: \$15,000		Individual HOAs	Individual HOAs	
Design: \$1,000	\$400/ea	City of Nassau Bay,	City of Nassau Bay	Management District; individual HOAs
Construction: \$3,300		Individual HOAs	Individual HOAs	
Costs dependent on scope of	N/A	City of Nassau Bay	TxDOT	City of Nassau Bay; EDC; TIRZ; Management
work at time of project.		Management District		District
Costs dependent on scope of	N/A	City of Nassau Bay/TxDOT	TxDOT	TxDOT; City of Nassau Bay; TIRZ; H-GAC TIP
work at time of project.			<u> </u>	
\$828,000	N/A	City of Nassau Bay	City of Nassau Bay, Management	TIRZ; Management District; EDC
1		Management District	District, Private Sector, Other Inter-	
1			Agency Coordination	
\$5,516,000	\$33,000	City of Nassau Bay	City of Nassau Bay, Management	TIRZ; Management District; EDC; Tourism Fund
	1	Management District	District, Private Sector, Other Inter-	





A P P E N D I X



PEDESTRIAN | BICYCLE CRASH DENSITY (2006-2010)



OVERALL CRASH DENSITY (2006-2010)



ROADWAY SAFETY ASSESSMENTS

Historical crash data from TxDOT's Crash Record Information System (CRIS) was obtained for NASA Parkway and collector roads within the Nassau Bay City Limits for years 2006 - 2010. This data was used to identify safety "hotspots" where particular safety issues could be found. The highest concentration of crashes is located near the NASA Parkway and Nassau Bay Drive intersection. This is most likely a result of the NASA Bypass terminating just west of the Nassau Bay City Limit. The majority of crashes in the Study Area are concentrated along NASA Parkway and in the commercial areas south of NASA Parkway where traffic volumes are higher than in the residential areas. The large number of crashes along NASA Parkway reinforces the fact that the roadyway itself presents a barrier between Nassau Bay and regional bicycle, pedestrian and transit connections.

Pedestrian and bicycle crashes are only a small portion of the total collisions within the City Limit and are also located within the commerical areas of Nassau Bay. While pedestrian and bicycle crashes make up only 4% of the total collisions in the Study Area, they make up 14% of all crashes resulting in an injury, highlighting the vulnerability of pedestrians and bicyclists. The diagrams on the previous page graphically illustrate Nassau Bay's crash density.

CURRENT MODAL SPLIT

The size and scale of Nassau Bay supports the use of alternative modes of transportation for circulation within the City. Although data is not available regarding the modes of transporation used for non-work trips, the 2010 Census provides information regarding the modal split for the work trip of residents in the Nassau Bay area (Census Tract 3412.02). This census tract includes all of Nassau Bay and a small portio of Webster that has primarily nonresidential land uses. The majority of residents in the census tract either drive alone or carpoool to work in private vehicles. The combined use of other modes of transportation utilized for work travel is 5.3%, with walkers comprising over half of those trips and transit riders making up less than 1% of that total. Bike trips to work were not identified. A high number of residents work from home. Compared to Harris County residents and Texas residents as a whole, Nassau Bay residents are more likely to walk to work but less likely to take transit or ride a bicycle.

Analyses of 2000 Census data regarding where Nassau Bay residents worked, indicate that the majority of residents worked locally in the City, Webster, Clear Lake or Seabrook areas. A significant portion of residents who worked in Nassau Bay likely represent the residents in the 2010 Census who indicated that they work from home. The major work destination for residents outside of the area was in Downtown Houston. Also, the majority of people working in Nassau Bay live locally and in Clear Lake, Seabrook and League City areas. This localized nature of work trips provides opportunity for increased modes of transportation for travel to work.

Statistics	Study Area ¹	Harris County, Texas	Texas
Population ¹			
Total Population	4,833	4,092,459	25,145,561
Households	2,412	1,435,155	8,922,933
Average Household Size	2	2.82	2.75
Commute Trip ²			
Drive Alone	77.2%	77.4%	79.1%
Carpool	10.3%	12.6%	11.9%
Transit	0.6%	4.1%	1.9%
Bike	0.0%	0.3%	0.2%
Walk	2.8%	1.6%	1.8%
Taxicab, motorcycle, or other means	1.9%	1.7%	1.6%
Worked at home	7.2%	3.1%	3.8%

¹ Census Tract 3412.02

² Source: US Census Bureau, 2010 Census

^a Source: U.S. Census Bureau, 2006 -2010 American Community Survey

DAILY COMMUTE FROM THE NASSAU BAY AREA



STATISTICS	CENSUS TRACT 3412.02	HARRIS COUNTY	TEXAS
Population			
Total Population	4,833	4,092,459	25,145,561
Households	2,412	1,435,155	8,922,933
Average Household Size	2	2.82	2.75
Commute Trip			
Drive Alone	77.2%	77.4%	79.1%
Carpool	10.3%	12.6%	11.9%
Transit	0.6%	4.1%	1.9%
Bike	0.0%	0.3%	0.2%
Walk	2.8%	1.6%	1.8%
Taxicab, motorcycle, or other means	1.9%	1.7%	1.6%
Worked at home	7.2%	3.1%	3.8%

Source: U.S. Census Bureau, 2010 Census

Source: U.S. Census Bureau, 2006 - 2010 American Community Survey

DAILY COMMUTE TO THE NASSAU BAY AREA



The charts on the previous page and above graphically describe commutership to and from the Nassau Bay area, further supporting the case for multi-modal transporation and decreased reliance on private vehicular transportation.



NASA PARKWAY

	Space Park Driv	E TO 1354 NASA PRWY	Upper Bay Dri	VE TO SAINT JOHN DRIVE	BAL HARBOUR DR	IVE TO SPACE CENTER BLV
	ROW	200 feet	ROW	200 feet	ROW	200 feet
F	Travel Lanes	8	Travel Lanes	7	Travel Lanes	6
	Posted Speed Limit	45 mph	Posted Speed Limit	45 mph	Posted Speed Limit	45 mph
ř	Roadway Width	112 feet	Roadway Width	140 feet	Roadway Width	90 feet
A	Median	15 feet	Median	50 feet	Median	16 feet
7	1354 Nasa Priv	AY TO UPPER BAY ROAD	SAINT JOHN DRIV	E TO BAL HARBOUR DRIVE		
ò	ROW	200 feet	ROW	200 feet		
Ĺ	Travel Lanes	8	Travel Lanes	6		
_	Posted Speed Limit	45 mph	Posted Speed Limit	45 mph		
	Roadway Width	152 feet	Roadway Width	130 feet		
	Median	30 feel	Median	50 feel		



NASSAU BAY DRIVE











Nassau	BAY DRIVE
Classification	Collector
NASA PARKW	ay to Saxony Lane
ROW	80 feet
Travel Lanes	4
Posted Speed Limit	25 mph
Roadway Width	60 feet
Median	12 feet
SAXONY LANE TO	CAPE BAHAMAS LANE
ROW	60 feet
Travel Lanes	2
Posted Speed Limit	25 mph
Roadway Width	40 feet
Median	n/a

POINT LOOKOUT DRIVE





NASA 1 and Point Lookout Drive Intersection	
Southbound Approach to Space Park Drive Int	
	THE A VEL CONTRACTOR OF THE OWNER.

POINT LOOKOUT DRIVE

Classification	Collector
NASA PARKW	ay to Saxony Lane
ROW	80 feet
Travel Lanes	4
Posted Speed Limit	25 mph
Roadway Width	60 feet
Median	12 feet
SAXONY LANE TO	CAPE BAHAMAS LANE
ROW	60 feet
Travel Lanes	2
Posted Speed Limit	25 mph
Roadway Width	40 feet
Median	n/a
SAXONY LANE TO	SAN SEBASTIAN LANE
ROW	60 feet
Travel Lanes	2
Posted Speed Limit	25 mph
Roadway Width	40 feet
Median	n/a
SAN SEBASTIAN L	ANE TO PEARSON PARK
ROW	60 feet
Travel Lanes	2
Posted Speed Limit	25 mph
Roadway Width	26 feet
Median	n/a

SATURN LANE





	-
T	7
	- alala
Mediamon Saturn Larre	

SATURN LANE			
Classification	Collector		
NASA PARKWAY T	O SPACE PARK DRIVE		
ROW	120 feet		
Travel Lanes	4		
Posted Speed Limit	25 mph		
Roadway Width	97 feet		
Median	49 feet		



SPACE PARK DRIVE





SPACE PARK DRIVE

ROW Travel Lanes 60 feet ROW 60 feet ROW 60 feet Travel Lanes Travel Lanes Posted Speed Limit 25 mph 25 mph Posted Speed Limit 25 mph Posted Speed Limit Roadway Width 40 feet Roadway Width 26 feet Roadway Width 40 feet Median n/a Median Partial medians at INTs Median n/a NAS POINT L ROW ROW 60 feet ROW 60 feet 60 feet Travel Lanes Travel Lanes Travel Lanes Posted Speed Limit 25 mph Posted Speed Limit 25 mph Posted Speed Limit 25 mph Roadway Width 40 feel Roadway Width 30 feet Roadway Width 45 feet Median Median Median 5 feet n/a n'a

LAZY LAKE DRIVE | SAILBOAT DRIVE





ш	SURF COURT	T TO SANDY COVE	
RIV	Classification	Local	
\Box	ROW	60 feet	
¥	Travel Lanes	2	
4	Posted Speed Limit	25 mph	
à	Roadway Width	25 feet	
	Median	n/a	

	SANDY COVE	TO LAKESIDE LANE	
SIVE SI	Classification	Local	
SAILBOAT DF	ROW	60 feet	
	Travel Lanes	2	
	Posted Speed Limit	25 mph	
	Roadway Width	26 feet	
	Median	n/a	

UPPER BAY ROAD





UPPER BAY ROAD

Classification	Collector
NASA PARKWAY TO S	PACE PARK DRIVE (NORTH)
ROW	120 feet
Travel Lanes	4
Posted Speed Limit	25 mph
Roadway Width	77 feet
Median	19 feet
SPACE PARK DRIVE (1	NORTH) TO SAN SEBASTIAN
ROW	80 feet
Travel Lanes	4
Posted Speed Limit	25 mph
Roadway Width	58 feet
Median	10 feet
SAN SEBASTIAN TO	NASSAU BAY CITY PARK
ROW	80 feet
Travel Lanes	2
Posted Speed Limit	25 mph
Roadway Width	40 feet
Median	n/a

SAINT JOHN DRIVE







Classification	Collector	
NASA PARKWAY 1	O SPACE PARK DRIVE	
ROW	60 feet	
Travel Lanes	2	
Posted Speed Limit	25 mph	
Roadway Width	40 feet	
Median	n/a	

SAINT JOHN DRIVE





SUMMARY OF KEY TRANSPORTATION FINDINGS

Nassau Bay's roadway network is designed to provide vehicular connections both within Nassau Bay and to/ from regional destinations. The existing pedestrian and bicycle network is underdeveloped, and the existing transit services in the area serve regional transit needs only. Analyses of existing conditions in the Study Area resulted in the identification of four key transportation opportunities:

- Improve multimodal connectivity.
 - -North-south connection between residential and commercial areas within Nassau Bay. -East-west connection within Nassau Bay between activity nodes.
- Enhance access to waterfront, parks and green space.
- Address NASA Parkway as a barrier to regional bike, pedestrian and transit connectivity or identify alternate routes.
- Define the role of transit to provide an appropriate level of service for the community.
POPULATION AND HOUSEHOLD TRENDS

The U.S. Census Bureau placed the 2010 population of Nassau Bay at 4,002 with 1,925 households. Approximately 30% of the population and households in Nassau Bay are within the Study Area. The demographic data presented on the following pages are from the 2010 Census; PCensus (reseller of the Nielsen/Claritas demographic data), which estimates population, households, and housing units for 2011 and 2016 and American Community Surveys (ACS). A surrounding Competitive Market Area (CMA) consisting of ZIP codes 77058, 77062 and 77598 and the League City ZIP code 77573 are shown for comparison purposes.

Population and households have decreased slightly from the 2000 Census in Nassau Bay and at a much greater percentage in the Study Area. The TIRZ/Nassau Bay is stagnant but surrounded by growth. As seen in the following tables, the population in the trade area is largely older. As illustrated, 54% of the Study Area population is 45 or over while 56% of Nassau Bay is in this age range. Comparatively, 36% of the CMA and only 33% of League City are over the age of 45. The median age is 47.9 in the Study Area and 49.3 in Nassau Bay. The population is evenly distributed between males and females.

Over 80% of the population in Nassau Bay and the Study Area are White, with an Hispanic population of 17% in the Study Area and 14% in Nassau Bay. The Asian and African American population account for less than 10% of the population as illustrated in the table on the following page.

Population	NB TIRZ 1 Study Area	Nassau Bay	77058 / 77062 / 77598 CMA	77573 (League City)
2010 Census	1,158	4,002	64,617	71,580
2000 Census	1,622	4,170	60,535	42,289
1990 Census	1,646	4,320	49,808	28,235
Ann. Growth Rate 2000-2010	-3.31%	-0.41%	0.65%	5.40%
Ann. Growth Rate 1990-2000	-0.15%	-0.35%	1.97%	4.12%

Study Area Population Trends

Household Trends

Households	NB TIRZ 1 Study Area	Nassau Bay	77058 / 77062 / 77598	77573 (League City)
2010 Census	590	1,925	28,581	25,444
2000 Census	871	2,049	25,891	14,949
1990 Census	895	2,081	21,698	9,874
Ann. Growth Rate 2000-2010	-3.82%	-0.62%	0.99%	5.46%
Ann. Growth Rate 1990-2000	-0.27%	-0.15%	1.78%	4.23%

Sources: U.S. Census, ACS, PCensus; CDS | Spillette;

AGE AND ETHNICITY TRENDS

Population growth is a vital contributor to job growth, particularly in the Houston MSA. Jobs and office buildings tend to follow population growth and retail land uses need households (rooftops) to succeed in their business. Therefore, the increase in population and households which is expected in the CMA bode well for commercial uses such as industrial, office and retail.

Age Range	NB TIRZ 1 Study Area		Nassa	au Bay	77058 / 7 7759 CM	7062 / 98 A	77573 (Lea	gue City)
Under 5 years	67	5.8%	209	5.2%	4,184	6.5%	5,401	7.5%
5 to 17 years	113	9.8%	438	10.9%	9,802	15.2%	15,248	21.3%
18 to 24 years	87	7.5%	252	6.3%	7,130	11.0%	5,084	7.1%
25 to 34 years	136	11.7%	404	10.1%	11,668	18.1%	10,142	14.2%
35 to 44 years	124	10.7%	439	11.0%	8,567	13.3%	11,990	16.8%
45 to 54 years	207	17.9%	694	17.3%	9,565	14.8%	11,299	15.8%
55 to 64 years	227	19.6%	699	17.5%	7,073	10.9%	7,152	10.0%
65 to 74 years	137	11.8%	501	12.5%	3,908	6.0%	3,322	4.6%
75 years and over	60	5.2%	366	9.1%	2,720	4.2%	1,942	2.7%

Population by Age

Sources: U.S. Census, ACS, PCensus; CDS | Spillette;

Population by Ethnicity

	NB TIRZ 1			
	Study Ar	ea	Nassau	Bay
Population By Race/Hispanic Origin	1,158		4,002	
One Race	1,120	97%	3,875	97%
White	965	83%	3,438	86%
Black or African American	54	5%	138	3%
American Indian and Alaska Native	13	1%	31	1%
Asian	42	4%	142	4%
Native Hawaiian and Other Pacific Islander	1	0%	7	0%
Other Race	45	4%	119	3%
Two or More Races	38	3%	127	3%
Hispanic or Latino:	195	17%	572	14%
Not Hispanic or Latino	963	83%	3,430	86%
White alone	835	72%	3,044	76%

Source: U.S. Census 2010

HOUSING

The vast majority of households are one and two-person households as seen in the following chart. The average household size is 1.16.

The majority of housing units in Nassau Bay are single family residences or townhomes. Approximately 37% of the housing units are multi-family and the majority are located within the Study Area. The median year built of housing in Nassau Bay is 1968. The average length of residence in the Study Area is 13 years for owner-occupied and eight years for renter-occupied.

Household Size

Household Size	NB TIRZ 1 Study Area		NB TIRZ 1 usehold Size Study Area N		NB TIRZ 1 NB TIRZ 1 hold Size Study Area Nassau Bay		77058 / 7 7759 CM/	7062 / 8 A	77573 (League City)	
1 person	242	41.0%	691	35.9%	10,272	35.9%	4,909	19.3%		
2 persons	218	36.9%	760	39.5%	9,045	31.6%	7,858	30.9%		
3 persons	72	12.2%	243	12.6%	4,181	14.6%	4,776	18.8%		
4 persons	37	6.3%	149	7.7%	3,128	10.9%	4,839	19.0%		
5 persons	13	2.2%	50	2.6%	1,237	4.3%	2,073	8.1%		
6 persons	5	0.8%	23	1.2%	452	1.6%	695	2.7%		
7 persons	3	0.5%	9	0.5%	266	0.9%	294	1.2%		

Sources: U.S. Census, ACS, PCensus; CDS | Spillette;

Nassau day 2010 Estimated Housing Onits

	Total		Vacant		Owner O	ccupied	Renter Occupied	
Total Units	2,250		345		1,274		631	
1 Unit Attached	1114	49.5%	84	7.5%	966	86.7%	64	5.7%
1 Unit Detached	295	13.1%	12	4.1%	258	87.5%	25	8.5%
2 Units	0	0.0%	0	NA	0	NA	0	NA
3 to 4 Units	71	3.2%	42	59.2%	0	0.0%	29	40.8%
5 to 19 Units	123	5.5%	20	16.3%	0	0.0%	103	83.7%
20 to 49 Units	152	6.8%	99	65.1%	0	0.0%	53	34.9%
50 or More Units	170	7.6%	61	35.9%	50	29.4%	59	34.7%
Mobile Home or Trailer	325	14.4%	27	8.3%	0	0.0%	298	91.7%
Boat, RV, Van, etc.	0	49.5%	0	7.5%	0	86.7%	0	5.7%

by Units in Structure

Sources: U.S. Census

Housing

Tenure Status	NB TIRZ 1	Nassau Bay	77058 / 77062 / 77598	77573 (League City)
Owner Occupied	52.9%	63.6%	44.6%	76.6%
Renter Occupied	47.1%	36.4%	55.4%	23.4%

Sources: U.S. Census, ACS, PCensus; CDS | Spillette;

HOUSING

Most housing units in Nassau Bay are of the same era. The median housing unit age is 1970 with the majority of homes built between 1960 and 1969.

As seen below, median home values are relatively high in Nassau Bay. The majority of homes are valued from \$100,000 to \$400,000.

Construction Period	Number	Percent
1939 or earlier	21	0.9%
1940 to 1949	13	0.6%
1950 to 1959	139	6.2%
1960 to 1969	1217	54.1%
1970 to 1979	554	24.6%
1980 to 1989	142	6.3%
1990 to 1999	94	4.2%
2000 and after	70	3.1%

	Nassau Bay		
Units by Value	1,205		
Less than \$20,000	0	0.00%	
\$20,000 to \$39,999	0	0.00%	
\$40,000 to \$59,999	0	0.00%	
\$60,000 to \$79,999	4	0.33%	
\$80,000 to \$99,999	3	0.25%	
\$100,000 to \$149,999	150	12.45%	
\$150,000 to \$199,999	289	23.98%	
\$200,000 to \$299,999	477	39.59%	
\$300,000 to \$399,999	125	10.37%	
\$400,000 to \$499,999	54	4.48%	
\$500,000 to \$749,999	99	8.22%	
\$750,000 to \$999,999	4	0.33%	
\$1,000,000 or more	0	0.00%	
2010 Estimated Median			
Owner-Occupied Housing			
Unit Value	\$232,809		

Source: PCensus for Map Info 2010

EDUCATION

Educational attainment is represented in the table above, which indicates 44% of the Study Area has a college degree or higher education. Less than 3% have no high school diploma.



Source: PCensus for Map Info, Version 8.05, Tetrad Computer Applications, Inc., 2010

INCOME

Approximately 39% of the households in Nassau Bay earn \$100,000 or more per year. The median household income is \$76,348 and is significantly higher than that of Harris County at \$51,444. As shown in the chart below, Nassau Bay has a much greater number of households (10.9%) with incomes of \$200,000 or more and \$100,000 to \$149,999 (21.5%) than both the CMA and the County

The following table illustrates the largest employers in the Nassau Bay area. Area Houstonians work for a diverse mix of companies in the aerospace industries located in this area.



Income Trends

Source: ACS, 2011

EMPLOYMENT

Given the high rate of educational attainment and average income, it is not unreasonable that 85% of the workers in the Nassau Bay area are white collar.

Trade Area Employment

	Nassa	au Bay
	2,294	
Blue Collar	163	7.1%
White Collar	1,951	85.0%
Service & Farm	180	7.8%
Top 5 Industries		
Sales and related		14.1%
Office and Administrative		11.7%
Business and Financial Operations		11.3%
Management		10.4%
Architecture and Engineering		8.5%

Source: PCensus for Map Info, Version 8.05, Tetrad Computer Applications, Inc., 2010

EMPLOYMENT

Company Name	Industry	City	Number of Employees
Lockheed Martin Mission Services	Aerospace	Houston	5,000 to 9,999
Bayshore Medical Center	Medical	Pasadena	1,000 to 4,999
Boeing	Aerospace	Houston	1,000 to 4,999
Clear Creek ISD	Education	League City	1,000 to 4,999
Clear Lake Regional Med Center	Medical	Webster	1,000 to 4,999
Equistar Chemicals	Specialty Chemical	La Porte	1,000 to 4,999
Industrial Specialist Inc	Manufacturing	Dickinson	1,000 to 4,999
Jacobs Engineering	Aerospace	Houston	1,000 to 4,999
Kemah Boardwalk	Tourism	Kemah	1,000 to 4,999
Lyndon B Johnson Space Center	Federal	Houston	1,000 to 4,999
Pasadena City Hall	Municipal	Pasadena	1,000 to 4,999
Pasadena ISD	Education	Pasadena	1,000 to 4,999
San Jacinto College	Education Pasadena		1,000 to 4,999
United Space Alliance	Education	Houston	1,000 to 4,999
University of Houston-Clear Lake	Education Houstor		1,000 to 4,999
Wyle Life Sciences	Bioscience	Houston	1,000 to 4,999
Chevron Phillips Chemical	Specialty Chemical	Pasadena	500 to 999
Christus St John Hospital	Medical	Houston	500 to 999
Du Pont	Specialty Chemical	La Porte	500 to 999
Jacobs	Aerospace	Kemah	500 to 999
Protherm Services Group	Manufacturing	Pasadena	500 to 999
Schwan Food Corp.	Manufacturing Pasaden		500 to 999
Walmart Supercenter	Retail	Friendswood	500 to 999
Albemarle Catalyst	Specialty Chemical	Pasadena	250 to 499
Celanese Chemicals	Specialty Chemical	Pasadena	250 to 499

Nassau Bay Area Major Employers

Source: BAHEP; City of Nassau Bay

JOHNSON SPACE CENTER OUTOOK

JSC's Mission Control expanded facilities to now include the International Space Station Flight Control Room, a Training Flight Control Room used to practice simulated spaceflights, a Life Sciences Control Room used to oversee experiments and an Exploration Planning Operations Center used to test new concepts for operations beyond low-Earth orbit. Additionally, Manufacturing of Orion will take place in Texas, Louisiana and Florida with manned launch planned for no later than 2014. The 2011 budget launched a new Flagship Technology Demonstration Program that demonstrates critical space exploration technologies primarily through flight tests in space. Three demonstrations were scheduled in 2011. JSC leverages its existing expertise in its Commercial Crew/ Cargo Program Office (C3PO) which manages, and will continue to manage, the commercial development of cargo services for the ISS and the Commercial Crew Development (CCDev) Space Act agreements to enable this new program.

The Human Research Program, managed at JSC, received a 42% increase in the President's FY 2011 Budget to continue to address human health and performance risks, as endorsed by the National Research Council and Institute of Medicine, for space exploration missions. The program, funded with \$317 million from 2011-2015, will address critical areas of human health risks with a focus on biomedical technology, space radiation and behavioral health. Of this increase, 85% will be used to competitively solicit new research content through broad agency research announcements. The FY 2011 President's Budget extended the lifetime of the ISS, which is managed at JSC, to 2020 and perhaps beyond. More recently NASA laid off 3,800 workers (employees and contractors) due to the Space Shuttle discontinuation. Of these, 1,000 have been placed in other jobs around the country. No other job losses are expected.

COMMERCIAL MARKETS

RETAIL

Currently, there are 14 developments including seven strip centers, three neighborhood centers, and four restaurants with 360,233 square feet. The average occupancy is 69.1% with rents at \$1.12/sf. The majority of the retail development in the area was completed prior to 1980, with three centers having been built since 2000. Buildings constructed prior to 1980 have average occupancies of 48.7% while those constructed from 2000 to present have occupancy rates significantly higher (89.5%).

All of the retail is located within the Study Area boundaries. The property at 2323 Nasa Rd 1 is vacant (15,375 square feet, formerly boat sales). Nassau Bay Village (Tudor-style retail center) is in need of renovation with current occupancy of 46%; the 2nd floor of this center includes office space available (4,200 square feet) for lease at \$1/sf per month and retail space at \$1 to \$1.50/sf.

Town Square is currently 100% leased with pre-leasing Phase II (35,000 square feet) at \$27/sf per year or \$2.25/ sf to be available at year-end 2012.

HOSPITALITY

There are Nine hotels in the Nassau Bay area (77058 zip code) consisting of 1,024 rooms with revenues of \$16,641,400 in 2011, down from \$17,967,742 in 2010. The REVPAR in 2010 was \$48.40 and \$44.52 in 2011. The Hilton is the largest revenue generating hotel in the 77058 zip code. Current hotels consist of the new Courtyard by Marriott, Homewood Suites, Hilton Nassau Bay, Residence Inn, Townplace Suites, Candlewood Suites, Extended Stay, Super 8, Microtel and EconoLodge.

Only four of the hotels are located in the Study Area (Courtyard, Hilton, Extended Stay and Microtel). Prior to the opening of the new Courtyard by Marriott, there were 420 rooms in the Study Area. Room Revenues

were \$8,073,374 in 2010 and \$7,630,531 in 2011. The average REVPAR in 2010 was \$40.10 and \$37.68 in 2011. The average occupancy was 52.4% in 2011. The Hilton's estimated 12-month occupancy in 2010 was 56.2%, dropping to 51.6% for 2011. However, it rose to 58.7% during the 1st Quarter 2012.

OFFICE

Nassau Bay includes 1,198,388 square feet of office space in 21 office buildings, all of which the Study Area encompasses. The average occupancy is 72% with rents at \$17.54 psf. The majority of the space is multi-tenant and was built in the 1970s and 1980s. The office space is considered to be Class B/C, with the exception of Saturn One at Town Square which is a Class A space built in 2010/11. The current occupancy is 91% with quoted rents at \$17.00psf.

MEDICAL OFFICE/HOSPITAL

Medical office buildings are prominent in the Study Area surrounding Christus St. Johns Hospital. This space leases for \$21.00/sf to \$23.00/sf. The area includes five medical office buildings (included in office square feet).

Christus St. Johns is a faith-based, Catholic health care facility. The hospital includes a 260,946 square foot facility with 178 beds and 400 physicians in a full-service, acute-care hospital. MD Anderson has opened a radiation treatment facility on site. The center is in line with Christus St. John's expansion projects including nearly 80,000 square feet of additional space, which includes a new ICU, medical-surgical beds and admitting area.

INDUSTRIAL

The Study Area includes one industrial property with 38,316 square feet located along Point Lookout Drive. The building was constructed in the late 1960s and is considered office/warehouse space.

RESIDENTIAL MARKETS

There are 2,250 housing units in Nassau Bay which include both single family and multi-family units. Approximately 64% are single family residences.

SINGLE FAMILY

The median age of homes in the area is 1970 with the majority of homes built between 1960 and 1969. According to the 2010 information from PCensus, the median home value is \$232,809.

SINGLE FAMILY SALES PERFORMANCE

Due to the nature of single family development and neighborhood cohesion, the single family sales data and statistics have been compiled using the City of Nassau Bay, compared with the CMA and the City of Houston. This allows for more data points and a more accurate representation of the true single family market.

Historical sales statistics for the area's single family residences are highlighted in the table below. Sales volume and pricing fluctuations track closely with the City of Houston and the entire Houston MSA over the same period. The median Consecutive Days on Market (CDOM) tracked longer over the historical period.

The most noteworthy comparison between the historical performance of single family in Nassau Bay, CMA and the City of Houston is in the price per square foot for homes sold. This measure allows a comparison of market-established value. These price trends track

relatively close over the past seven years, as seen in the graph on the following page. However, Nassau Bay subdivisions have been consistently higher priced than the median values for the City of Houston and CMA overall.

The ZIP seems to be bouncing back from the economic downturn at a faster pace than Nassau Bay and the City with medican sales at \$80.03/sf compared to \$75.01 for Nassau Bay and \$63.45 for the City of Houston.

TOWNHOME/CONDO SALES

Comparing the townhome/condo sales in Nassau Bay with that of the CMA overall, we see that Nassau Bay outperforms the CMA with significantly higher prices per square foot. In 2011 the ZIP had median sales of \$58.47/sf while Nassau Bay was at \$81.06. Clearly, the townhome/ condo market is strong in Nassau Bay.

MULTI-FAMILY RESIDENTIAL

There are seven complexes in the Nassau Bay area, which the district encompasses. Total units are 1,164. The Class C units total 851 with a 78% occupancy rate and average rents at \$0.79/sf, excluding the Class A Voyager. The complexes were built in the 1960s.

The newest apartments are the Voyager at Town Square, built in 2009. This 313-unit complex is 93% occupied with average rents at \$1.41/sf.

Year	Total Sales	Median Sq Ft	Median Beds	Median Full Baths	Median SP/Sq Ft	Median Sale Price	Median SP/LP %	Median CDOM	Median Year Built
2005	40	2146	3	2	\$79.65	\$180,000	97%	115	1978
2006	31	2151	3	2	\$74.77	\$145,000	97%	105	1978
2007	29	2046	3	2	\$105.03	\$200,000	97%	77	1982
2008	23	2157	2	2	\$100.55	\$189,000	97%	111	1978
2009	7	2450	2	2	\$81.65	\$190,000	95%	90	1983
2010	12	2081	3	2	\$90.49	\$177,500	97%	112	1988
2011	8	2116	3	2	\$81.06	\$184,900	93%	140	1983
Total/									
Average	150	2164	3	2	\$87.60	\$180,914	96.1%	107	1981

Historical Townhome/Condo Performance

City of Nassau Bay

Source: Multiple Listing Service, CDS | Spillette

RESIDENTIAL MARKETS

HISTORICAL HOME SALES PRICE / SF FT TRENDS





HISTORICAL CONDO / TOWNHOME PERFORMANCE

Year	Total Sales	Median Sq Ft	Median Beds	Median Full Baths	Median SP/Sq Ft	Median Sale Price	Median SP/LP %	Median CDOM	Median Year Built
2005	39	2146	3	2	\$79.18	\$180,000	97%	115	1978
2006	31	2151	3	2	\$74.77	\$145,000	97%	105	1978
2007	29	2046	3	2	\$105.03	\$200,000	97%	77	1982
2008	23	2157	2	2	\$100.55	\$189,000	97%	111	1978
2009	7	2450	2	2	\$81.65	\$190,000	95%	90	1983
2010	12	2081	3	2	\$90.49	\$177,500	97%	112	1988
2011	8	2116	3	2	\$81.06	\$184,900	93%	140	1983
Total/									
Average	149	2164	3	2	\$87.53	\$180,914	96.1%	107	1981

City of Nassau Bay

Source: Multiple Listing Service, CDS | Spillette

NEW MIXED-USE DEVELOPMENT

Nassau Bay Town Square is a 31-acre mixed-use development located at the intersection of NASA Parkway and Saturn Lane. When complete, the development will consist of three office buildings (500,000 square feet), a 313-unit multi-family project, a 125-room Marriott Courtyard, approximately 73,000 square feet of retail, a 27,000 square foot conference center and Nassau Bay City Hall. The first office building opened in October 2011 and is 91% leased. Construction will start on Saturn II in 2012. The Voyager Apartments opened January 2010 and are 92% occupied. Retail Phase I is complete and 100% leased with Phase II having begun May 2012 (35,000 square feet). Construction of the hotel began mid 2011 and has opened with good initial occupancy rates The Norris Conference Center is in the planning stage.

MULTI-FAMILY RESIDENTIAL

In order to fully understand the multi-family residential market, CDS | Spillette has used the CMA (competitive market area) to gauge overall market conditions for the Nassau Bay Livable Centers Area.

The CMA boundary includes 61 properties and 14,913 units. Given that the H-GAC Study Area includes seven multi-family properties, the inclusion of the submarket properties allows for a better understanding of the multi-family market affecting the Study Area. The highlighted properties are within the Study Area boundaries.

				Avg	Avg				
	Cla	Total		Rent/	Rent/	Avg		Ren	Prop
Complex	SS	Units	Occ	SF	Unit	SF	Built	ov	Туре
Armand Place	В	157	91.00%	\$0.81	\$847	1056	1978	1991	Conventional
Balboa	В	248	96.00%	\$0.77	\$717	926	1967	1993	Conventional
Bay Crest Village (Bay Place Ph II)	В	96	71.00%	\$0.90	\$772	854	1978	2008	Conventional
Bay House	С	190	93.00%	\$0.75	\$640	875	1965	2000	Conventional
Bay Place	В	193	71.00%	\$0.78	\$704	906	1968	2008	Conventional
Baybrook Park Retirement Center	В	100	84.00%	\$1.13	\$824	746	2007	N/A	Sr Tax Credit
Baybrook Village I	В	184	89.00%	\$0.74	\$601	817	1980	1998	Conventional
Baybrook Village II	В	128	89.00%	\$0.76	\$723	955	1980	1989	Conventional
Baybrook Village III	В	528	89.00%	\$0.82	\$622	773	1980	1998	Conventional
Baypointe	В	236	88.00%	\$0.84	\$781	941	2007	N/A	Tax Credit
Baystone	В	290	93.00%	\$0.74	\$702	969	1966	1992	Conventional
Bradford Ph I, The	Α	360	96.00%	\$0.90	\$733	833	1989	N/A	Conventional
Bradford Ph II, The	Α	372	96.00%	\$1.05	\$892	839	1991	N/A	Conventional
Capital Estates	В	86	90.00%	\$0.74	\$614	837	1965	N/A	Conventional
Chatham Village	В	210	96.00%	\$0.92	\$805	889	1984	N/A	Sub. housing
Clear Lake Condominiums	U	204	90.00%	\$0.75	\$614	821	1984	N/A	Conventional
Clear Lake Falls Townhomes	В	90	96.00%	\$0.78	\$920	1168	1980	N/A	Condo
Clear Lake Village	В	174	91.00%	\$0.77	\$520	686	1977	1999	Conventional
Clear Lake Village South	В	168	91.00%	\$0.74	\$500	687	1977	1999	Conventional
Colony Oaks By the Bay	В	162	84.00%	\$0.66	\$651	1008	1968	1991	Conventional
Coopers Mill	В	366	86.00%	\$0.85	\$603	715	1981	1993	Conventional
Cove, The	В	308	93.00%	\$0.84	\$594	720	1979	2003	Conventional
Crystal Bay	В	320	82.00%	\$0.89	\$666	780	1982	2006	Conventional
El Dorado View	В	244	90.00%	\$0.82	\$610	742	1980	N/A	Conventional
Falls at Clearlake, The	В	400	91.00%	\$0.83	\$645	787	1983	1999	Conventional

Market Area Inventory

MULTI-FAMILY RESIDENTIAL, (continued)

	_			Avg Rent/	Avg Rent/	Avg		_	Prop
Complex	Cla	Total	0.00	SE	Unit	SE	Built	Ren	Туре
Gardens at Challenger Park, The	A	0	94.00%	N/A	N/A	N/A	2009	N/A	Conventional
Green Oaks Ph I	В	272	93.60%	\$0.80	\$615	776	1985	2006	Conventional
Green Oaks Ph II	В	440	93.60%	\$0.84	\$594	721	1985	2006	Conventional
Hamptons, The	В	169	90.00%	\$0.78	\$742	946	1975	2008	Conventional
Hamptons, The II	В	178	91.00%	\$0.85	\$805	956	1977	2008	Conventional
Harbortree	В	151	98.70%	\$0.86	\$691	832	1973	N/A	Conventional
Hidden Lake	Α	440	90.00%	\$1.24	\$883	724	1986	2005	Conventional
Huntley, The	Α	214	97.00%	\$1.06	\$803	772	1985	2007	Conventional
Lakeshire Place	В	304	90.00%	\$0.84	\$593	712	1979	2001	Affordable Housing
Landings at Clear Lake, The	Α	364	92.00%	\$1.15	\$1,054	928	2006	N/A	Conventional
Las Brisas	В	202	91.00%	\$0.77	\$668	884	1980	N/A	Conventional
Las Palmas	Α	360	88.00%	\$1.31	\$1,325	1026	1993	N/A	Conventional
`Lodge on El Dorado, The	В	324	93.00%	\$0.86	\$602	708	1980	2009	Conventional
Nassau Bay Villa	В	66	100.00%	\$1.09	\$552	544	1963	1992	Conventional
Nassau Bay Village	С	126	95.00%	\$0.70	\$623	894	1969	N/A	Conventional
Newport at Clearlake	С	144	92.00%	\$0.89	\$649	730	1978	N/A	Conventional
Palms at Clear Lake, The	Α	240	92.00%	\$1.06	\$977	927	1999	N/A	Conventional
Park at Armand Bayou Ph I, The	Α	270	89.00%	\$1.16	\$1,215	1046	1996	N/A	Conventional
Park at Armand Bayou Ph II, The	Α	131	89.00%	\$1.15	\$1,200	1045	1999	N/A	Conventional
Piper's Cove	В	164	96.00%	\$0.88	\$653	740	1981	N/A	Conventional
Preserve, The	Α	530	95.00%	\$1.12	\$916	825	1990	2011	Conventional
Presidio at Clear Lake, The	В	317	92.00%	\$0.77	\$690	901	1968	1996	Conventional
Quail Walk	С	156	N/A	\$0.68	\$554	818	1978	N/A	Conventional
Regatta Ph I, II & III, The	В	490	87.00%	\$0.94	\$799	861	1968	1997	Conventional
Retreat Of Clear Lake	В	232	91.00%	\$0.93	\$690	750	1978	2005	Conventional
Seven Palms	Α	357	92.00%	\$1.10	\$957	884	1999	N/A	Conventional
Skylar Pointe I	В	256	93.00%	\$0.70	\$626	917	1979	2000	Conventional
Skylar Pointe II	В	193	93.00%	\$0.64	Ş618	970	1983	2000	Conventional
Solano	С	262	95.00%	\$0.88	\$788	900	1965	2008	Conventional
Space Colony	в	32	100.00%	\$0.85	\$600	713	1964	1990	Conventional
Taylorcrest Condos	0	201	62.00%	\$0.78	\$755	964	1978	N/A	Conventional
Terrace at Clear Lake	U	10	93.00%	\$2.94	\$2,595	879	2000	N/A	Conventional
Tiffany Bay	В	46	98.00%	\$0.75	\$940	1248	1980	N/A	Conventional
Towers at Clear Lake North	В	108	89.70%	\$0.82	\$941	1157	1984	N/A	Conventional
Towers at Clear Lake South Condos	В	87	89.70%	\$0.82	\$950	1174	1984	N/A	Condominiu m
University Forest	U	136	100.00%	\$1.54	\$941	605	1995	N/A	Student Housing
University Green	В	194	97.90%	\$0.87	\$596	702	1977	N/A	Conventional
Village on the Lake	Α	388	91.00%	\$1.19	\$1,288	1093	2000	N/A	Conventional
Village on the Lake Ph II	Α	0	89.00%	N/A	N/A	N/A	2006	N/A	Conventional
Voyager at the Space Center	А	313	93.00%	\$1.45	\$1,304	909	2010	N/A	Conventional
WolfCreek	В	232	91.00%	\$0.87	\$673	783	1979	N/A	Conventional
Totals/Averages		14913	90.91%	\$0.93	\$793	\$864	1983		

Source: O'Connor and Associates, CDS Market Research, January 2011.

The Victoria Lake Apartments (59 units in the district) are not included in the above table.

EXISTING PROPERTY PERFORMANCE - RESIDENTIAL

There is a large concentration of multi-family complexes in the CMA. There are a total of 14,913 units in the 61 conventional complexes for which CDS | Spillette has been able to identify and gather data. Of this total, there is an overall weighted average occupancy rate of 90% compared to the Houston Area average of 88%.

Rental rates, according to O'Connor and Associates data, range from \$0.64 to \$1.54/sf with an overall weighted average of \$0.92/psf compared to the Houston overall \$0.89/sf.

Historical multi-family absorption has fluctuated significantly. The Market Area has gained occupancy of 559 units within the last two-year period and has increased 1,142 units over the last five-year period ending in December of 2011. The trend in the Market Area is of positive absorption.

Market Area Historical Multifamily Occupancy

Survey Period	А	В	С	D	Overall
1999	86.88%	91.89%	98.60%	N/A	90.64%
2000	92.27%	92.84%	95.41%	N/A	92.75%
2001	93.78%	95.49%	98.60%	N/A	95.04%
2002	93.30%	92.75%	98.60%	N/A	93.08%
2003	91.33%	89.98%	84.17%	N/A	90.24%
2004	92.23%	87.26%	86.59%	N/A	88.77%
2005	92.58%	91.01%	81.16%	N/A	91.21%
2006	90.19%	88.96%	85.58%	N/A	89.22%
2007	92.16%	87.08%	95.19%	N/A	88.82%
2008	87.05%	93.58%	96.00%	N/A	91.52%
2009	85.26%	88.99%	90.78%	N/A	87.85%
2010	87.75%	90.57%	89.89%	N/A	89.63%
2011	92.09%	90.46%	92.79%	N/A	91.11%

Source: O'Connor & Associates, CDS | Spillette

The table below highlights the rent trends for multi-family complexes in the Market Area. Rents in the Market Area have been steadily increasing over the past years, despite the economic downturn.

Survey Period	А	в	с	D	Overall
1999	118	-118	0	N/A	-1
2000	178	58	-10	N/A	226
2001	41	209	10	N/A	260
2002	-18	-216	0	N/A	-234
2003	-73	-226	-46	N/A	-344
2004	33	-231	8	N/A	-190
2005	23	391	-17	N/A	397
2006	-88	-122	14	N/A	-196
2007	95	5	30	N/A	131
2008	193	601	3	N/A	796
2009	-110	-217	-16	N/A	-344
2010	372	151	-3	N/A	520
2011	192	-189	36	N/A	39

Market Area Historical Multifamily Absorption

Source: O'Connor & Associates, CDS | Spillette

Occupancy has remained steady in the market with averages around 90%. 2011 showed an increase in occupancy to 91% which is the highest in several years (shown top right).

Market Area Historical Rent/sf

Survey Period	А	В	С	D	Overall
1999	\$0.93	\$0.73	\$0.62	N/A	\$0.78
2000	\$0.94	\$0.74	\$0.63	N/A	\$0.80
2001	\$0.96	\$0.76	\$0.63	N/A	\$0.82
2002	\$1.00	\$0.78	\$0.63	N/A	\$0.85
2003	\$0.99	\$0.79	\$0.72	N/A	\$0.85
2004	\$1.00	\$0.80	\$0.68	N/A	\$0.86
2005	\$1.03	\$0.81	\$0.71	N/A	\$0.87
2006	\$1.03	\$0.82	\$0.73	N/A	\$0.88
2007	\$1.08	\$0.84	\$0.71	N/A	\$0.91
2008	\$1.12	\$0.84	\$0.76	N/A	\$0.92
2009	\$1.15	\$0.85	\$0.76	N/A	\$0.93
2010	\$1.15	\$0.83	\$0.74	N/A	\$0.93
2011	\$1.15	\$0.83	\$0.82	N/A	\$0.92

Source: O'Connor & Associates, CDS | Spillette

AGE OF PROPERTIES

A total of 16% of the units in the Market Area were built in the 1960s and 1970s and an additional 33% in the 1980s. Many of the complexes have been renovated, as mentioned in the previous inventory table. However, the vast majority of the apartments within the district remain in need of renovation. The effects of physical deterioration are clearly visible at some properties.

Interestingly, 37% of the most recent construction in the area from 2000 to 2011 has been tax-credit, senior-housing with 84% to 92% current occupancies.

RECENT APARTMENT DEVELOPMENT

The most recent construction in the CMA has occurred within the NASA Area Management District/TIRZ 1 or Study Area. The Voyager opened in 2010 and currently has a 93% occupancy rate. One, two and three bedroom units are offered with amenities including pool, Jacuzzi, clubhouse, business center, access gates, ceiling fans, island kitchens with granite counters and stainless appliances, wood floors, 10 foot ceilings, latte lounge, game lounge, 24 hr fitness, outdoor fire pit and assigned garage parking.

MULTI-FAMILY RESIDENTIAL MARKET OUTLOOK

The most recently built property in the Market Area is centrally located in the Study Area and is well-occupied. The wide range of employers both north and south of the Study Area including NASA, and many office and retail establishments, likely generate strong demand for rental housing within and around the Study Area. Supportable rent levels are currently sufficient to warrant new construction.

It is notable that recently built properties in the nearby area have had success in leasing and obtaining abovemarket rents. Such is likely to be the case in the near to middle term in the Study Area, especially with the age of competing properties in the immediate area. Clearly, young professionals prefer the newer properties with upgrades and amenities.

Market Area Historical Multifamily Construction

Decade	Complexes
1960's	12
1970's	16
1980's	22
1990's	8
2000's	6

Source: O'Connor & Associates, CDS | Spillette

EXISTING PROPERTY PERFORMANCE - RETAIL

The primary retail Market Area for the H-GAC Study Area is the 77058, 77062 and 77598 ZIP code areas. Within the ZIP code, there is 5,342,610 square feet of retail space in 29 neighborhood retail centers, 31 strip centers and 15 others (single users).

Within the NASA Area Management District boundaries, there are 10 operating retail centers, which are included in the overall market. There are also four restaurants which are not included in the square footage.

Recently, there has been an additional 24,220 square feet of space constructed in the Market Area as shown in the table below, which represents development in the Management District (Town Square). As seen, the majority of the space was built in 1970s to 1980s. The development of 22 centers in the 2000s and one proposed center signifies growth in the Market Area.

Decade	Centers	SF	Occupancy
1960's	3	222,564	77.7%
1970's	14	559,433	86.1%
1980's	26	2,291,793	83.7%
1990's	9	947,756	80.03%
2000's	22	1,300,939	93.5%
2010	1	24,220	100.0%
Proposed	1	10,000	
Total	76	5,342,610	86.2%

Market Area Historical Retail Construction

Source: O'Connor & Associates, CDS | Spillette

Market Area Retail

Decade	Centers	SF	Occupancy	Mean Rent
Strip center	31	519,302	88.1%	\$1.41
Neighborhood	29	2,033,861	80.9%	\$1.28
Community/single	15	2,685,077	89.9%	\$1.45
tenant				
Total	75	5,238240	86.2%	\$1.36

Source: O'Connor & Associates. CDS | Spillette

As illustrated in the above table, the majority of the retail space is classified as community centers and/or single-tenant space.

The table on the following 2 pages is a list of the retail properties in the CMA including those located directly in the Management District which are highlighted in yellow.

EXISTING PROPERTY PERFORMANCE - RETAIL

Market Area Retail

	Occu-						
	pancy	Gross	Rent		Building Type	Year	Yr
Building Name	%	SF	Avg	STMT	Name	Built	Renov
Baybrook Court	100	12000	\$1.08	Multi Tenant	Strip Center	1982	0
El Dorado Blvd Shopping Ctr	82.91	15350	\$1.72	Multi Tenant	Strip Center	1978	0
Clear Lake Center	100	19000	\$0.79	Multi Tenant	Strip Center	2000	0
Clear Lake Camino South	86.98	101458	\$1.50	Multi Tenant	Neighborhood	1964	1992
The Boulevard	85.91	41250	\$2.00	Multi Tenant	Neighborhood	1984	1999
Bay Area Square	73.96	78037	\$1.58	Multi Tenant	Neighborhood	1982	1998
Webster Square	100	63000	\$0.63	Multi Tenant	Neighborhood	1984	0
Point Nasa Shopping Center	51.65	175405	\$1.29	Multi Tenant	Community	1986	0
Bayway Village I	70.76	70375	\$0.89	Multi Tenant	Neighborhood	1980	0
Pineloch Center	78.62	52061	\$1.50	Multi Tenant	Neighborhood	1990	0
Bay Area Center	74.89	45902	\$1.50	Multi Tenant	Neighborhood	1992	0
907 El Dorado Blvd	100	10000	\$0.70	Multi Tenant	Strip Center	1985	0
Baybrook Center	100	25540	\$0.83	Multi Tenant	Neighborhood	1983	0
Barringer Knoll Plaza	95.62	18250	\$1.25	Multi Tenant	Strip Center	1985	0
Webster - Nasa Parkway	82.46	24800	\$0.75	Multi Tenant	Strip Center	1970	0
Baybrook Gateway Center	68.71	250000	\$1.25	Multi Tenant	Community	1995	1999
Fry's Electronics	100	145500	n/a	Single Tenant	Single Tenant	2004	0
20009 Gulf Frwy	100	10000	\$1.00	Single Tenant	Single Tenant	1989	0
Sterling Knoll Plaza	84.51	30210	\$1.38	Multi Tenant	Neighborhood	1983	0
El Dorado Square	93.41	22330	\$1.54	Multi Tenant	Strip Center	1981	0
El Dorado Center	96.78	125000	\$1.83	Multi Tenant	Neighborhood	1984	0
Village Real Shopping Center	72.98	94277	\$1.42	Multi Tenant	Neighborhood	1977	0
1600 Clear Lake City Blvd	43.98	10721	\$2.00	Multi Tenant	Strip Center	1997	0
Baybrook Passage	78.45	180000	\$2.08	Multi Tenant	Community	2005	2008
Target Supercenter	100	174745	\$2.21	Single Tenant	Single Tenant	2003	0
Bay Area Plaza	93.38	21140	\$1.20	Multi Tenant	Strip Center	1977	2006
Bay Area Shopping Center	100	16000	\$1.50	Multi Tenant	Strip Center	1985	0
Centre @ Baybrook	96.61	464165	\$1.01	Multi Tenant	Community	1984	2005
Baybrook Square	97.59	319167	\$2.00	Multi Tenant	Community	1983	2010
Webster Point	100	26060	\$0.88	Multi Tenant	Neighborhood	1985	0
201 Nasa Rd 1	93.66	26492	\$0.84	Multi Tenant	Neighborhood	1979	0
Baybrook Village	96.81	224572	\$1.58	Multi Tenant	Community	1991	2007
Pineloch Center	100	25000	\$1.30	Multi Tenant	Neighborhood	1990	0
Bayway Village Ii	60.89	134500	\$1.25	Multi Tenant	Neighborhood	1990	0
Clear Lake Center	93.21	392854	\$1.67	Multi Tenant	Community	1989	0
Ellington Park Plaza	100	20420	\$0.88	Multi Tenant	Strip Center	1984	0
Bay Pointe Shopping Center	100	100000	\$1.70	Multi Tenant	Neighborhood	1994	0
Challenger Plaza	38.77	75979	\$1.42	Multi Tenant	Neighborhood	1984	0
Webster Town Center	98.87	133344	n/a	Multi Tenant	Neighborhood	2008	0
Clear Lake Two	87.48	80851	\$0.98	Multi Tenant	Neighborhood	1986	0

EXISTING PROPERTY PERFORMANCE - RETAIL

	Occu-	_					
	pancy	Gross	Rent		Building Type	Year	Yr
Building Name	%	SF	Avg	STMT	Name	Built	Renov
Clear Lake Crossing	100	14365	\$2.00	Multi Tenant	Strip Center	2006	0
500 W Nasa Rd 1	45.43	18932	\$1.27	Multi Tenant	Strip Center	1980	0
Webster Plaza	100	23916	\$2.17	Multi Tenant	Strip Center	2005	0
Autumn Creek Ph li		10000	n/a	unknown			
Academy Sports	100	108000	n/a	Single Tenant	Single Tenant	2006	
Cvs Pharmacy	100	12126	n/a	Single Tenant	Single Tenant	2003	
1080 Clear Lake City Blvd	100	12662	n/a	Multi Tenant	Strip Center	2000	
1105 Clear Lake City Blvd	100	20256	n/a	Single Tenant	Single Tenant	2002	
Shops At The Bay	100	20250	\$2.42	Multi Tenant	Strip Center	2007	
Shops At Clear Lake	85.75	10530	\$2.00	Multi Tenant	Strip Center	2008	
Nasa One Business Center	83.26	110025	\$0.63	Multi Tenant	Neighborhood	1979	1992
Texas Citizens Bank	67.06	18150	\$2.08	Multi Tenant	Strip Center	2008	
Baybrook Center	94.55	220000	n/a	Multi Tenant	Community	2008	
Baybrook Marketplace	73.27	13100	\$2.20	Multi Tenant	Strip Center	2003	
Bay Forest.	100	71289	\$1.35	Multi Tenant	Neighborhood	1980	1988
13914 State Hwy	100	10530	n/a	Multi Tenant	Strip Center	2008	2008
Star Plaza	86.09	75722	\$2.03	Multi Tenant	Neighborhood	1977	1993
Marina Gate	64.71	85000	\$1.18	Multi Tenant	Neighborhood	1985	
Nassau Bay Village	46.34	101028	\$1.00	Multi Tenant	Neighborhood	1964	
University Plaza	51.53	96475	\$1.33	Multi Tenant	Neighborhood	1979	1985
HEB Clear Lake	96.42	105000	\$1.83	Multi Tenant	Neighborhood	1997	
Space Center Plaza	92.16	25525	\$1.54	Multi Tenant	Neighborhood	2004	2005
Nassau Bay Town Square		73000	\$2.25	Multi Tenant	Neighborhood	2009	
El Camino Service Center	90.94	25600	\$1.00	Multi Tenant	Neighborhood	1978	2004
Village South Shops	100	15724	\$0.55	Multi Tenant	Strip Center	1970	
El Camino Village	93.63	18828	\$1.10	Multi Tenant	Strip Center	1979	
Town Square li	100	10125	\$0.85	Multi Tenant	Strip Center	1975	
Kings Court Shopping Center	100	11532	\$1.66	Multi Tenant	Strip Center	2004	
University Square	89.7	20000	\$1.33	Multi Tenant	Strip Center	1979	2005
Village Green	100	24304	\$1.05	Multi Tenant	Strip Center	1988	
Clear Lake Center	100	20078	\$1.70	Multi Tenant	Strip Center	1966	1994
Midtown Center	68.77	15691	\$1.70	Multi Tenant	Strip Center	2000	
Nassau Bay Town Square	100	24220	\$2.17	Multi Tenant	Strip Center	2010	
2332 Nasa Parkway	0	15375	\$0.97	Multi Tenant	Strip Center	1980	
Walgreens	100	14497	n/a	Single Tenant	Single Tenant	2002	
TOTAL/AVERAGES	86.6%	5,342,610	\$1.40			1989	1999

Source: O'Connor and Assoc; CDS | Spillette yellow=within District boundaries *includes properties over 10,000sf

EXISTING PROPERTY PERFORMANCE - RETAIL

Retail space is typically classified and compared by class or type. The following two tables highlight the historical absorption and correlated occupancy of retail by both class and type for a 10-year period. Although there have been significant swings in occupied space throughout the period, the overall average occupancy is 86.3%. The ability for the Market Area to sustain support for a somewhat consistent quantity of retail is a positive. Higher levels of occupancy near 85% to 90% indicate a healthy Market Area that has community support. The best performing space by class has been unanchored with positive absorption, while community centers have outperformed the neighborhood and strip retail in occupancy levels.

	Overall		Class		Туре			
Year	Total	Anchored	Un- Anchored	Grocery Anchored	Single Tenant	Strip Center	Neighborhood	Community
2011	50,174	60,702	-5,026	-5,502		-30,903	5,260	51,817
2010	-104,877	-23,378	-78,499	-3,000		-50,151	-38,216	7,490
2009	-424,717	-129,912	344,177	49,372	-45,473	-45,470	-25,869	-307,906
2008	152,761	7,867	162,858	-17,964		10,644	-24,727	166,844
2007	-60,076	-10,900	-58,229	9,053	-26,623	-42,435	18,628	-9,647
2006	-362,966	-328,993	-33,632	-341	-3,000	9,984	-166,533	-95,417
2005	15,188	-37,754	4,642	48,300	-112,500	-38,252	93,004	-35,065
2004	-260,712	-158,852	-44,632	-57,228	55,000	405	-170,102	-146,014
2003	-206,942	-22,020	32,964	-217,886	-297,528	-16,055	-23,011	129,652
2002	53,799	-69,512	65,072	58,239		930	119,104	66,235
TOTAL	-1,148,368	-712,752	389,695	-136,957	-430,124	-201,303	-212,462	-172,011

Market Area Historical Retail Absorption

Source: O'Connor & Associates, CDS | Spillette

Market Area Historical Retail Occupancy

	Overall	Class				Туре	
Year	Total	Anchored	Un- Anchored	Grocery Anchored	Strip Center	Neighborhood	Community
2011	86.1%	87.7%	80.9%	90.5%	88.1%	80.9%	87.7%
2010	88.1%	90.0%	83.1% 76.62% 97.84%	91.6% 76.62% 97.84%	86.7% 73.75% 100.00%	83.5% 100.00%	90.2% 73.75% 100.00%
2009	86.5%	88.6%	81.0%	82.5%	82.5%	83.8%	87.9%
2008	89.3%	93.7%	80.8%	87.5%	83.6%	84.5%	93.7%
2007	88.0%	92.6%	79.4%	85.8%	85.3%	81.9%	92.8%
2006	88.9%	94.0%	78.5%	88.1%	85.3%	83.8%	93.3%
2005	85.5%	89.5%	75.8%	87.4%	82.8%	80.6%	89.7%
2004	85.1%	85.2%	79.2%	93.5%	90.9%	84.2%	83.9%
2003	82.3%	80.5%	79.6%	92.1%	88.6%	83.6%	79.3%
2002	84.1%	84.5%	84.7%	81.7%	86.1%	84.1%	83.3%

EXISTING PROPERTY PERFORMANCE - RETAIL

Rent levels by class and type are presented in the table below. Overall rents showed a significant increase from 2002 to 2009, however, they have decreased slightly over the last two years following the economic downturn. Rent levels have increased in anchored, unanchored and grocery anchored space.

Market Area Historical Retail Rent/SF

	Overall	Class				Туре	
Year	Total	Anchored	Un- Anchored	Grocery Anchored	Strip Center	Neighborhood	Community
2011	\$1.47	\$1.51	\$1.24	\$1.76	\$1.41	\$1.39	\$1.50
2010	\$1.49	\$1.51	\$1.30	\$1.81	\$1.48	\$1.42	\$1.50
2009	\$1.50	\$1.55	\$1.29	\$1.67	\$1.45	\$1.38	\$1.47
2008	\$1.50	\$1.56	\$1.23	\$1.78	\$1.30	\$1.37	\$1.61
2007	\$1.46	\$1.51	\$1.20	\$1.78	\$1.21	\$1.37	\$1.53
2006	\$1.39	\$1.41	\$1.09	\$1.77	\$1.14	\$1.31	\$1.43
2005	\$1.42	\$1.48	\$1.08	\$1.76	\$1.08	\$1.29	\$1.51
2004	\$1.37	\$1.39	\$1.08	\$1.74	\$0.99	\$1.31	\$1.41
2003	\$1.36	\$1.38	\$1.06	\$1.72	\$1.00	\$1.26	\$1.40
2002	\$1.27	\$1.32	\$1.05	\$1.52	\$0.96	\$1.25	\$1.35

Source: O'Connor & Associates, CDS | Spillette

ADDITIONAL RETAIL WITHIN THE DISTRICT

Upon drive-by inspections of the NASA Management District, CDS Market Research was able to capture additional retail which was not included in the O'Connor market report due to size (under 10,000 sf) or type. Upon drive-by inspection, all appeared to be 100% occupied. The following is a list of additional retail:

GENERAL ASSESSMENT

Overall, the retail market is functioning well from an occupancy and absorption standpoint. A visual assessment of the area shows that physical conditions vary widely from property to property. Some older properties are in need of renovation; occupancies in these centers are much lower than the newer centers.

There are several factors retailers analyze when choosing a location. Of these, traffic counts and local demographics/income base are both very important. With the well-traveled major thoroughfares that intersect throughout the area and connections to freeways, traffic counts are strong for a Market Area that doesn't actually include freeway frontage.

Given the market size, it is not expected that the corridor would attract big box retail or large retailers/department stores. A realistic scenario would be the refurbishment or quite possibly redevelopment of existing strip retail. Small amounts of retail space in mixeduse projects could be feasible in the long term.

			Net	Building Type		Tenants
Building Name		Address	SF		Occupancy	
Retail Ctr	1210	Nasa Parkway	9,471	Retail Strip		CLC Chiropractic, NB Rehab, NBC Health Care Ctr
Retail Ctr	18018	Nassau Bay Drive	9,410	Retail strip		
Retail Ctr	1354	Nasa Parkway	14,013	Retail Strip		Akimi Sushi,
Kentucky Fried Ck	1360	Nasa Parkway	2,651	Restaurant	100.0%	Kentucky Fried Ck
Lubys	1600	Nasa Parkway	12,858	Restaurant	100.0%	Lubys
CVS	1610	Nasa Parkway	11,421	Retail Single Tenant	100.0%	CVS
Wendy's	1702	Nasa Parkway	3,360	Restaurant	100.0%	Wendy's
Gas Station	1910	Nasa Parkway	1,692	Retail Single Tenant	100.0%	Valero
Strip Center	18000	Upper Bay	12,040	Retail Strip		Conv store, Salon, Quiznos
Fuddrucker's	2040	Nasa Parkway	5,699	Restaurant	100.0%	Fuddrucker's
TOTAL			98,306			

District Retail

MARKET ASSESSMENT - OFFICE

The Competitive Market Area for the H-GAC Study Area is the three ZIP code area as described earlier in this report. Within the ZIP codes there is 5,585,198 square feet of space in 77 office buildings.

Within the NASA Management District boundaries, there is 1,241,610 sf. Average occupancy is 85.9%.

As shown in the chart to the right, the majority of the space (sf) was built in the 1980s.

Market Area Historical Office Construction

Decade Built	# Buildings	SF	Occupancy
1960s	6	308,078	58.16%
1970s	12	542,028	78.49%
1980s	42	3,423,570	84.44%
1990s	3	209,572	80.91%
2000s	12	665,296	73.12%
Under Cons.	1	105,000	90.00%

Source: O'Connor & Associates, CDS | Spillette

Building Name	Occupancy	GrossSF	RentA	Year	Year	STMT	Building
			vg	Built	Renov		Type Name
The Zeta Building	75.59	42,796	\$17.00	1983	1990	Multi Tenant	Traditional
1234 Bay Area Blvd	100	14,500		1980	0	Multi Tenant	Med/Pro
Clear Lake Tower	92.29	27,376	\$16.50	1974	0	Multi Tenant	Traditional
17250 El Camino Real	100	13,202		1976	0	Multi Tenant	Traditional
1350 Nasa Road One	100	26,877		1980	0	Multi Tenant	Traditional
Regents Park I	63.79	14,595	\$12.00	1984	0	Multi Tenant	Traditional
Two Corporate Plaza	79.9	163,000	\$19.50	1989	1995	Multi Tenant	Traditional
Royal Crest Townhome Offices	79.86	24,825	\$13.00	1984	0	Multi Tenant	Traditional
17300 Saturn Ln	69.63	24,330	\$8.50	1983	0	Multi Tenant	Traditional
700 Gemini St	100	20,120	\$17.25	1985	0	Multi Tenant	Traditional
17100 El Camino Real	74.34	10,534	\$21.00	1978	0	Multi Tenant	Traditional
Arbor Square Office Park	100	55,521	\$19.75	1983	0	Multi Tenant	Traditional
18096 Kings Row	100	11,586	\$9.60	1984	0	Multi Tenant	Traditional
Clear Lake Town Crossing	100	24,000		2000	0	Multi Tenant	Traditional
18100 St John Dr – Doctors Ctr	100	46,596	\$20.50	1981	0	Multi Tenant	Med/Pro
Bay Plaza I Office	85.09	108,500	\$19.00	1983	2009	Multi Tenant	Traditional
1120 Bay Area Blvd	100	11,025		1979	1995	Multi Tenant	Traditional
Bldg A- United Way Building	69.57	71,380	\$16.00	1967	1989	Multi Tenant	Traditional
Sverdrup Technology Bldg	100	145,095	\$23.00	1981	0	Multi Tenant	Traditional
2222 Bay Area Blvd	100	70,710	\$15.00	1979	0	Multi Tenant	Traditional
Atlas Bldg	49.07	25,000	\$15.50	1966	1989	Multi Tenant	Traditional
Nova Bldg	0	24,700	\$12.75	1966	1998	Multi Tenant	Traditional
Gemini Plaza	0	162,000	\$19.75	1983	2002	Single Tenant	Traditional
Environmental Center	100	22,100	\$15.20	1982	0	Multi Tenant	Traditional
Camino Center-II	75.51	76,694	\$19.00	1979	0	Multi Tenant	Traditional
Camino Center I	88.86	78,181	\$19.50	1979	2001	Multi Tenant	Traditional
Gemini Bldg	38.7	50,212	\$16.00	1967	1989	Multi Tenant	Traditional
Vanguard Bldg	100	24,752		1967	0	Single Tenant	Traditional
1100 Nasa Rd 1	60.82	59,816	\$16.50	1975	0	Multi Tenant	Traditional
1110 Nasa Rd 1	77.1	60,142	\$16.00	1977	2009	Multi Tenant	Traditional
1120 Nasa Rd 1	85.17	82,000	\$14.15	1976	0	Multi Tenant	Traditional
1322 Space Park - Loral Space	63.62	136,000	\$13.50	1960	1999	Multi Tenant	Traditional
Oceaneering Bldg	100	68,528		1983	0	Multi Tenant	Traditional
Armand Plaza Office Center	46.41	64,000	\$16.00	1980	1999	Multi Tenant	Traditional
2400-50 Nasa Road I (2 Bldgs)	100	172,000	\$18.50	1984	0	Single Tenant	Traditional
Clear Lake-II	100	64,090	\$24.00	1984	0	Multi Tenant	Traditional
Corporate Plaza	95.3	117,000	\$23.50	1984	0	Multi Tenant	Traditional
Mcdonnell-Douglas Tower	100	168,000	\$25.00	1984	0	Multi Tenant	Traditional
Cole Clear Lake	98.77	64,000	\$21.00	1985	0	Multi Tenant	Traditional
Clear Lake Central I	67.98	127,196	\$19.00	1985	0	Multi Tenant	Traditional
Clear Lake Central-II	100	181,200		1986	0	Single Tenant	Traditional
Clear Lake Central-III	100	175,000	\$9.00	1986	0	Multi Tenant	Traditional
Boeing Building	87.47	410,000	\$20.00	1986	0	Multi Tenant	Traditional
2200 Space Park Office Building	33.51	138,905	\$18.50	1985	0	Multi Tenant	Traditional

Market Area Office Inventory

MARKET ASSESSMENT - OFFICE

Building Name	Occupancy	GrossSF	RentA	Year	Year	STMT	Building
			vg	Built	Renov		Type Name
Cole Gemini	98.18	60,656	\$18.75	1985	1999	Multi Tenant	Traditional
Regents Park	70.99	42,565	\$17.00	1985	2002	Multi Tenant	Traditional
Atrium Crest	85.77	108,650	\$20.25	1983	2004	Multi Tenant	Traditional
Boeing Aerospace-III	100	41,350		1986	0	Single Tenant	Traditional
16850 Diana Ln	87.13	17,205	\$18.00	1983	2009	Multi Tenant	Traditional
Onyx One (Clear Lake)	98.59	66,569	\$24.00	1985	2000	Multi Tenant	Traditional
Clear Lake One	100	50,000	\$18.00	1987	0	Multi Tenant	Traditional
Casa Real Office Park	87.2	96,000	\$16.00	1982	0	Multi Tenant	Traditional
2100 Space Park - Atrium	79.47	119,040	\$18.50	1985	0	Multi Tenant	Traditional
Tower-II	76.35	178,126	\$20.00	1993	0	Multi Tenant	Traditional
1212 Bay Area Blvd	100	10,402		1981	0	Multi Tenant	Traditional
400 Medical Center Blvd	56.49	53,018	\$16.00	1974	0	Multi Tenant	Med/Pro
Devon Place Prof Bldg	100	27,011	\$18.50	1985	0	Multi Tenant	Med/Pro
2060 Space Park - Professional	72.5	50,000	\$22.75	1986	0	Multi Tenant	Med/Pro
Clear Lake Medical Tower	60.32	72,000	\$17.00	1983	0	Multi Tenant	Med/Pro
Diagnostic Systems	100	56,424		1984	2003	Multi Tenant	Med/Pro
Laboratories							
Clear Lake Prof Plaza	100	21,125	\$12.00	1999	0	Multi Tenant	Med/Pro
1616 Clear Lake City Blvd	100	19,351	\$18.50	1997	0	Multi Tenant	Med/Pro
Cyberonics Plaza	88.48	144,325	\$23.25	1985	1998	Multi Tenant	Traditional
Clear Lake Commerce Center	89.33	98,078	\$14.00	2000	0	Multi Tenant	Traditional
The Webster Professional 1	0	15,545	\$15.50	2005	0	Single Tenant	Traditional
17100 Glenmount Park	81.57	13,134	\$16.00	2000	0	Multi Tenant	Med/Pro
Medical Center Blvd-East Bldg	100	48,000	\$23.00	2006	0	Multi Tenant	Traditional
Corporate Centre Texas	100	51,600	\$12.00	2007	0	Multi Tenant	Traditional
Bay Area Surgicenter	30.19	23,501	\$13.00	1979	0	Multi Tenant	Med/Pro
Galaxy	12.63	110,000	\$25.00	2008	0	Multi Tenant	Med/Pro
Medical Center Blvd-West Bldg	100	46,497	\$23.00	2009	0	Multi Tenant	Med/Pro
Surgical Arts Center	89.45	88,000	\$18.00	2004	0	Multi Tenant	Med/Pro
Flint Ridge Plaza	0	45,000	\$15.00	2001	0	Multi Tenant	Traditional
1820 Nasa Pkwy		105,000		2010	0	Multi Tenant	Traditional
Clear Lake Medical Office	100	113,112		2006	0	Multi Tenant	Med/Pro
Building							
18050 Saturn - Town Square	91	102,000	\$16.50	0	0	Multi Tenant	Traditional
530 Orchard St	100	13,830		2003	0	Multi Tenant	Med/Pro

Source: O'Connor and Associates

In addition to the offices inventoried by O'Connor and Associates, CDS | Spillete also noted the office properties in the chart below.

Build	sf	
1202	Nasa Rd	6,600
1600	Space Park	2,815
1325	Space Park	18,368
1350	Nasa Rd	25,788
18014	Nassau Bay Dr	3,618
2045	Space Park	23,123
2020	Space Park	48,200
2060	Space Park	49,500
1275	Space Park	43,222
TOTAL		221,234

MARKET PERFORMANCE

Absorption in the Market Area has been negative over the past few years. Most of the shortfall has occurred with the recent completion of new projects that are only now in a leasing period (Town Square 102,000 square feet and approximately 47,000 square feet in 2009).

Throughout 2011, the recovery in the Houston office market gained positive absorption over 1.8 million square feet. At 4th quarter 2011, vacancy was reported at 16% with Class A rents at \$29.40 and Class B at \$19.15/sf.

The Market Area currently has an 85.9% overall occupancy rate, which is lower than that of the overall Houston market. The Market Area vacancy has fluctuated over the past 10 years, however, overall occupancy has remained at 87%. Class A and B space have performed well in the Market Area.

The overall rents are at \$18.53 which is significantly lower than the Houston rents. All sectors had seen increases in rent from 2002 to 2010, with a dip in 2011, as shown in the chart to the right.

MARKET ASSESSMENT - OFFICE

OFFICE MARKET OUTLOOK

As seen in the tables on the previous page, the office properties within the Market Area are performing above Market Area vacancy rates with lower rents than the overall Houston market. Based on rents and occupancy, the office market appears to be healthy, though with uncertainty due to reductions at JSC and questions around the future of federal budgets.

Given the recent construction of Saturn One in Town Square and the proposed second office building, additional new construction of large-scale office space is not foreseen in the near term, unless a large tenant wants to relocate to a newly developed building.



Market Absorption, Square feet

Market Area Historical Office Occupancy

	Overall	Туре				
Year	Total	Class A	Class B	Class C	Class D	
2011	85.96%	90.00%	84.32%	83.57%	0.00%	
2010	87.75%	87.66%	89.92%	76.15%	0.00%	
2009	88.81%	90.20%	90.89%	78.57%	99.65%	
2008	87.58%	83.67%	91.53%	77.90%	75.54%	
2007	85.88%	77.55%	90.13%	76.65%	84.76%	
2006	88.61%	94.11%	89.49%	79.89%	86.53%	
2005	89.08%	89.48%	89.37%	88.71%	79.45%	
2004	91.38%	94.24%	92.35%	85.44%	83.82%	
2003	88.74%	93.56%	88.00%	88.76%	87.33%	
2002	91.31%	95.10%	91.58%	86.89%	89.08%	
AVERAGE	87.90%	89.56%	89.76%	80.21%	68.62%	

Source: O'Connor & Associates, CDS | Spillette, 4th Quarter

Market Area Historical Office Rent

	Overall	Туре				
Year	Total	Class A	Class B	Class C	Class D	
2011	\$18.53	\$19.17	\$18.59	\$16.42		
2010	\$18.79	\$19.91	\$18.67	\$16.71		
2009	\$18.64	\$20.99	\$18.19	\$16.97	\$9.55	
2008	\$18.55	\$20.62	\$19.08	\$15.01	\$15.24	
2007	\$17.75	\$20.34	\$18.05	\$14.87	\$15.24	
2006	\$16.40	\$18.48	\$16.79	\$14.45	\$13.47	
2005	\$15.45	\$18.29	\$15.51	\$13.69	\$12.75	
2004	\$15.85	\$18.15	\$15.99	\$14.47	\$12.31	
2003	\$15.98	\$18.47	\$16.25	\$13.45	\$13.19	
2002	\$15.66	\$16.08	\$16.30	\$13.81	\$12.57	
AVERAGE	\$17.16	\$19.05	\$17.34	\$14.99	\$13.04	

Source: O'Connor & Associates, CDS | Spillette, 4th Quarter

APPENDIX | 131

WORKSHOP 1: VISIONING WORKSHOP

ABOUT THE WORKSHOP

The first workshop was held in the Council Chambers of City Hall located within the Study Area on Upper Bay Road. This first workshop focused on gathering information from the residents and Advisory Committee to gain an understanding of their priorities and vision for change and growth in the City. To attract participants, the Team and the Advisory Committee posted a digital flyer on the City's social media website and published the flyer in the town newsletter. Yard signs advertising the workshop were also set up in the medians of primary streets of entry to Nassau Bay.

ATTENDANCE

There were 24 community members in attendance.

The diagram below illustrates the layout for the first public workshop and shows the ease of migration from station to station in order for the team to easily and successfully gather information.



The Consultant Team delivered a 30-minute presentation summarizing the Needs Assessment and identifying project opportunities and initial ideas. Stations were set up around the room to invite interaction and participation from attendees.

The Community Survey Station employed laptop computers to facilitate an online survey designed to discover individual interests and ideas for Nassau Bay.

The Community Mapping Station, "Imagine Nassau Bay", encouraged attendees to sit with consultants and draw on provided maps to indicate key locations within the community such as their home, place of work, places of interest and opportunities for change.

The Visual Survey Station displayed a collection of images suggesting options for design character in the categories of Open Space, Street Furniture, Gateway, Streetscape, Development Character, Waterfront Development, Wayfinding Branding and Bicycle Mobility. Participants were directed to rank images within each category according to preference.

In addition to the pre-designed station format, workshop participants were also engaged through conversation with consultants and Advisory Committee members.

WORKSHOP 1 PRESENTATION

DESIGN GOALS

- Use the Waterfront Public Realm to connect neighborhoods and create amenity.
- Announce, celebrate and connect Space Center Houston and NASA through Nassay Bay Town Square to the Waterfront and the Peninsula.
- Utilize gateway and streetscape elements to support a unified identity for the City.
- Define key corridors with multi-modal paths.

PRELIMINARY FRAMEWORK DIAGRAM



WORKSHOP 1 SURVEY RESULTS



WORKSHOP 1 SURVEY RESULTS

If you are a boater, is there enough boating access in Nassau Bay?



As you plan for your future, would you consider moving to new housing? If so, which type?







WORKSHOP 1 SURVEY RESULTS



Please indicate your level of agreement with the following statements.

Please indicate your level of agreement with the following statements.



WORKSHOP 1 SURVEY RESULTS



Please indicate your level of agreement that the following are barriers to walking or biking in Nassau Bay.

Please select the most important development activity you would like to see more of within Nassau Bay



WORKSHOP 1 QUESTIONNAIRE RESPONSE

The comments below represent the responses provided to the community questionnaire. The purpose of these questions and the mapping station was to assist

WHAT KIND OF CITY IMPROVEMENTS OR OTHER ADDED AMENITIES WOULD YOU MOST LIKE TO SEE IN NASSAU BAY?

Upper Bay Retail. More amenities in parks. Restaurant. Specialty Grocery. Retail. Hardware Store. Wildlife viewing boardwalk around peninsula. Bike racks. Gateway and Branding on NASA Parkway. Mixed-Use development on waterfront. Bridge to NASA from Town Center. Lighting scheme on commercial buildings. Water park. Preserve peninsula. Improved biking and walking.

WHAT LOCATIONS DO YOU CONSIDER TO E SPECIAL OR UNIQUE PLACES WITHIN THE DISTRICT OR CITY OF NASSAU BAY?

NASA | Space Center Houston entrances. Peninsula. Boardwalk. Waterfront | Clear Lake access. Medical Center. community members in formulating visualizations and answers about the needs within their city. The diagram on the following page illustrates these comments geographically.

WHAT WORDS WOULD YOU USE TO DESCRIBE THE CITY OF NASSAU BAY?

charming. secure. safe. unique. water. friendly. exclusive. incomparable. close-knit. families. birding. small town.

ADDITIONAL COMMENTS

Internal Bike/Walk Route. Breakfast cafe. Ice Skating. Capitalize on events: Food trucks, Box. Iunch to peninsula. Market. Good coffee shop. Pub/Tavern with food and drink - Walkable from Residential area. Sit-down restaurants. Paint street signs - face lift. More fishing. More trees.

WORKSHOP 1 QUESTIONNAIRE RESPONSE DIAGRAM



WORKSHOP 1 VISUAL SURVEY RESULTS

Participants in the Visual Survey ranked images from most favorable (1) to least (6), with average scores reported below and on the following pages. Lowest scores indicate highly ranked images, while higher scores suggest lower ranks. Images with scores below 3.00 are highlighted in red to indicate most desireable character within each category suggesting opportunity for application in Nassau Bay. Images scoring above 5.00 are faded back to indicate low preference.

OPEN SPACE



140 | APPENDIX

WORKSHOP 1 VISUAL SURVEY RESULTS

STREET FURNITURE

А	3.33	D	5.33
В	2.50	E	3.33
С	2.33	F	4.67













WORKSHOP 1 VISUAL SURVEY RESULTS

SIGNAGE / WAYFINDING / BRANDING

А	3.67	D	3.50
В	3.17	Е	2.83
С	4.50	F	4.33













WORKSHOP 1 VISUAL SURVEY RESULTS

BICYCLE MOBILITY

А	1.83	D	2.83
В	3.50	E	5.83
С	2.33	F	4.17













WORKSHOP 1 VISUAL SURVEY RESULTS

WATERFRONT DEVELOPMENT

А	3.17	D	2.83
В	2.67	E	5.83
С	2.33	F	4.17












WORKSHOP 1 VISUAL SURVEY RESULTS

DEVELOPMENT CHARACTER

А	2.83	D	5.00
В	4.83	Е	2.83
С	1.83	F	4.67







WORKSHOP 1 VISUAL SURVEY RESULTS

GATEWAY / IDENTITY

А	5.00	D	3.83
В	4.50	E	2.83
С	2.33	F	3.50



WORKSHOP 1 VISUAL SURVEY RESULTS

STREETSCAPE

А	2.17	D	3.17
В	4.33	Е	2.50
С	2.83	F	5.33













WORKSHOP 2: DRAFT RECOMMENDATIONS & DESIGN WORKSHOP

ABOUT THE WORKSHOP

The NASA Area Management District's second workshop was held from 11:00am to 6:00pm. The consultant team viewed this as a continuation of the first workshop and focused recommendations on information gathered and comments received from both the community and the Advisory Committee.

The workshop was divided into two sessions. The earlier session, which began at 11:00am and concluded at 3:00pm was envisioned as a work session with the Advisory Committee. Appointments were scheduled in advanced with members of the Committee, and the Design Team set up the Nassau Bay Council Chambers in two stations. Station one arranged drawings in a progression of recommendations from those that were broad-based planning recommendations to more focused solutions dealing with branding and identity. Station two contained large print outs, markers,

SESSION ONE, COMMENTS

- No more "Voyager" type residential towers were desired.
- The roundabouts and other traffic calming measures were considered a plus.
- The branding concepts are cool and can be phased.
- Placing office space over retail is a great idea.
- Lower building heights are preferred.
- The waterfront is a precious commodity and should be reserved for public use.
- Public use on the lake side of Balboa is a good idea.
- Connect existing parks with trails.
- The next demographic census will reveal a change in the age of Nassau Bay's population.
- A restaurant on the waterfront will need to be a "big name" draw.
- Nassau Bay needs a specialty grocercy store.
- The word "retail" should be expanded to include professional office space.

pens and paper, and allowed the Team and Advisory Committee members to record comments and ideas directly on to the drawings.

From 3:00 - 4:30pm, the Design Team identified the frequency of comments and prepared a preliminary recommended projects list. The room was also reconfigured during this time, and the drawings were placed on easels to prepare for the public presentation. Shortly after 5:00pm members of the community and the Advisory Committee convened to hear the results of the workshop. The Design Team presented the draft recommendations, and, at the close of the presentation, asked the Committee to individually state the projects deemed most beneficial or of most concern to the success of the Study or the community. These comments became the basis for the final project recommendations.

SESSION TWO, PROJECTS DESIRED

- Branding (7)
- Reclaiming Waterfront (7)
- Roundabouts (4)
- Type of commercial space at waterfront (4)
- Generating revenue while building (3)
- Public space (2)
- Narrowing NASA Parkway (2)
- Zoning (2)
- Additional sidewalks in commercial (2)
- Smaller block sizes (1)
- Well known anchor at waterfront (1)

WORKSHOP 2 PUBLIC REALM CONCEPTS



- Additional open space along the waterfront creates a unique amenity for residents
- Urban open space creates a setting for special events, gatherings, and iconic architecture
- Improved streets create sense of place and promote walkability
- Access to waterfront provides opportunities for recreation and pedestrian connections between districts
- --- New road connections shorten block lengths and improve access
- Roundabouts slow traffic and allow for defining moments to signal transition from commercial to residential districts
- Proposed bridges connect to adjacent attractions and neighborhoods

WORKSHOP 2 ADVISORY COMMITTEE FEEDBACK

NANCY GUTHRIE

- The words to describe our vision are "vigor ously quaint".
- The kinds of restaurant envisioned on the water front is more like a bistro/wine bar than a large name-brand restaurant.
- The Study's process has been great in the way it really engages the public. The projects really show that.
- Great idea to create more public spaces.
- Branding ideas are good. This is something we can do now and should be a priority.

MARY CHAMBERS

- Public space ideas are good. (roundabouts, water ront, plaza).
- Branding to cue people as to where they are within the City is a good idea.
- The streetscape and Build-to-Zone are good ideas.
- More residential and more sales tax is a must in order to make this work.
- I would like to see this become an action plan with timelines put to the projects.

ROSCOE LEE

- The public space proposed on private land is problematic. Doesn't see a public waterfront as viable. This is probably not a short term idea.
- New zoning is consistent with the city's ideas.
- The low hanging fruit is the branding idea.
 Particularly likes the gyroscope concept.
 Developers like to see a city with an established branding strategy.

BETTE JOHNSON

- The branding ideas are a real possibility.
- The roundabouts are a good idea as well, possibly after branding.
- The waterfront as a public attraction won't work simply because the water there isn't that attractive, and people don't spend as much time outdoors during the day. There is currently no reason to go to the waterfront. Provide a reason to go to the waterfront. Is it a light show? It has to be more than just water.

WORKSHOP 2 ADVISORY COMMITTEE FEEDBACK

ANN THOMAS

- Restated the need to consider funding source only can pull from 1% sales tax.
- The District is dependent on projects that build sales tax at the same time.
- The branding ideas are on target. Saturn should be the first gateway to capitalize on the Town Center project. Next might be Upper Bay. The Hilton could come later.
- Retail on the waterfront is possible if there is an anchor restaurant. It could be on the vacant land east of the Balboa. Doesn't have to be right at the Balboa.
- This centerpiece restaurant could generate other spin-off commercial.
- Cow Bayou office properties won't become available for 40 years, not 20.
- The District would never buy private land for public space.
- Idea of narrowing NASA Pkwy is a good idea.
- Roundabouts are a good idea, but they take up too much area. We'll have to resolve the private vs. public issue.
- Sidewalks through commercial are great because the city is currently not walker-friendly.
- This may be more like a 50 year plan.

GARY MITCHELL

- Smaller block size is a good idea.
- Changing Space Park Drive to a walk able street will be challenging because of the north side properties that have turned their front to NASA Parkway and away from

Space Park Drive.

- Don't take multi-family development off the table. New multi-family would be developed as higher end and will be good for the City.
- The branding ideas are great and can help put Nassau Bay on the map. People will know where it is.
- The water here is close to Houston and would be desirable to people coming from Houston and not wanting to drive all the way to Galveston. Water is precious even if it is murky.
- Shade elements are very important.

Gary spoke for Bob Warters who had to leave early. Bob mentioned a project similar to the Peninsula project, in League City, which does not get much attention. The level of investment versus the use should be considered.

SUE DARCY

- Redevelopment happens through partner ships with developers.
 - Only so much can happen with the TIRZ. The City needs a plan with options to
 - show when a developer with interest in the area comes along.
- Communicate economic development priori ties
- The roundabout cost to benefit on a "property (unclear)" is big

FINAL VISION PRESENTATION

The final presentation to the Advisory Committee and community was held from 6:30pm to 8:00pm in the Hilton Houston NASA Clear Lake conference room. Approximately 35 people attended. The format of the event was a formal presentation, introduced by Nassau Bay's mayor, Mark Denman, and followed by a powerpoint presentation by the Consultant Team. An informal Q&A session followed with multiple, identical work stations manned by facilitators from the ConsultantTeam. Food and beverage refreshments were generously provided by the NASA Area Management District in gracious cooperation with the Hilton Houston NASA Clear Lake .

Mark Denman opened the event with a warm welcome and introduction. Mayor Denman spoke briefly about the NASA Area Management District, its role in procuring the Livable Center Grant through H-GAC and the importance of the Livable Center Project building upon the valuable work already accomplished by the District and the City. The Mayor closed with the observation that much has been achieved in recent years and that the Livable Center Study's recommendations were action-oriented and provide important initiatives for the community to consider, adopt and implement.

A member of the design team presented the final project by focusing mainly on the recommended projects, which are contained within the categories of Transportation, Urban Design, and General Development. At the close of the final presentation, discussion was encouraged through the use of the Q&A stations. Members of the Consultant Team were available at the close of the meeting time to discuss the future of the project and field questions over the presentation with members of the community.

The final presentation of recommendations was wellreceived and attendees offered compliments to the NASA Area Management District for a well-conducted study with valuable projects to further the qualities and benefits that make Nassau Bay one of the finest communities in the region.



COASTAL RESILIENCE

INTRODUCTION

The goal of the H-GAC's Livable Centers Program is to facilitate the creation of walkable, mixed-use places that provide multi-modal transportation options, improve environmental quality and promote economic development.

The Study Area is approximately 485-acre area along the south side of NASA Parkway, fronting Clear Lake, south of the JSC.



The Study Area encompasses approximately 17,000 feet of coastline.

Two of the major aspects as discussed in the H-GAC's Livable Centers Program are to improve environmental quality and promote economic development of the Study Area. An important element that was examined to achieve these goals in regards to the 3.2 miles of coastline, is Coastal Resilience. The purpose of coastal resilience is to provide tools and information to better inform decision-making with a primary goal of identifying vulnerable human and natural communities and enabling adaptation solutions which emphasize the important role of ecosystems.

COASTAL RESILIENCE REPORT

Dannebaum Engineering was contracted to provide an environmental analysis of the coastline along Nassau Bay in relation to Coastal Resilience issues and adaptation solutions for human and natural resources while keeping in mind the important role of ecosystems in coastal environments. The information found on the following pages represents the final report issued on the subject of Coastal Resilience.

Coastal Resilience is mitigating vulnerability for human communities and natural resources simultaneously. Vulnerability can come from many sources, including flooding from storms, oil spills and other coastal hazards. Coastal Resilience is defined as a framework that supports decisions to reduce the ecological and socioeconomic risks of coastal hazards. Coastal resilience can be broken down into four elements:

- 1. Engage the community to identify the risks and values, and understand the vulnerability to coastal hazards.
- 2. Development of tools to identify current and future coastal hazards as well as natural, social and economic resources at risk.
- 3. Integration of options in practice and policy for reducing risk, including ecosystem-based options.
- 4. Collaborative evaluation of solutions with leaders and other stakeholders.

The Nassau Bay area is located on the western edge of Galveston Bay. Its location leaves this area very vulnerable to storm tides, climate change and sea level rise. This is a critical factor to consider, as there is a large amount of waterfront redevelopment being examined as a part of the Study. This new capital development could be immediately at risk if its vulnerability is not examined and mitigated. As a part of the Study Team, Dannenbaum began the process of executing the coastal resilience approach by preforming the following tasks:

- 1. Identify current and future coastal hazards as well as natural, social and economic resources at risk
- 2. Identify options available to mitigate for the resources at risk
- 3. Work with the team and community to evaluate and educate the mitigation options

TASK 1: IDENTIFY CURRENT AND FUTURE COAST-AL HAZARDS AS WELL AS NATURAL, SOCIAL AND ECONOMIC RESOURCES AT RISK.

The Dannenbaum team completed two key exercises in the identification of current and future coastal hazards as well as natural, social and economic resources at risk. First, the team conducted a desktop investigation of a number of items, including:

- Storm surge models
- Projected sea level rise
- Property values / Land Use / Zoning
- Historical Data
- Recreational Areas / Parks / Public Use Areas
- Environmentally Sensitive areas
- Location of critical infrastructure such as Hospitals, First Responders, Schools

The Study allowed for the team to identify critical areas that would need to be looked at in a field reconaissance visit. The diagram is found on the following page.

COASTAL RESILIENCE REPORT

The second undertaking was to execute a field reconnaissance visit. This task consisted of members of the Dannenbaum team examining areas around critical infrastructure and environmentally sensitive areas encompassed in the study boundary. This "boots on the ground" exercise allowed our team to make determinations on areas of concern with regards to coastal resilience. As shown on the following pages, we identify three areas of current and possible future coastal hazard, and some of the resources at risk. Please note, this is not an all-inclusive list, as our scope did not allow the Dannenbaum team to fully execute a detailed report on Coastal Resilience for the Study Area. However, these are key examples of how Coastal Resilience could be implemented in this area and further analyzed.



COASTAL RESILIENCE REPORT

BOEING BUILDING SHORELINE 2100 SPACE PARK DRIVE



The highlighted area represents the focus area. Directly north of this line sits the Christus St. Johns Hospital.



Shoreline looking north: There is a limited amount of stone protection and a very dated wooden bulkhead. Property located due north has no protection at all. There is a minimal elevation change here to protect the properties to the north and northwest. This area is very vulnerable to coastal hazards today and in the future.



Shoreline from the same location looking to the north/northwest: Directly on the north side of the building is the hospital. There is very little protection in this area for coastal hazards.

COASTAL RESILIENCE REPORT

BALBOA APARTMENT COMPLEX SHORELINE 2002 SAN SEBASTIAN CT #1101



The highlighted area represents the focus area.



Shoreline looking north: Observed in this photo is a slight elevation change from behind a dated wooden bulkhead. The apartments appear to have been constructed at a higher elevation than the areas closer to the shore. This rise in elevation provides further protection from coastal hazards today and in the future.



Shoreline, same location looking east: Observed was a sheetpile bulkhead with a boardwalk cap. Also behind the wall, the homes have a higher base elevation. This is likely due to construction requirements.

COASTAL RESILIENCE REPORT

NASSAU BAY PENINSULA WILDLIFE PARK HARBOUR DRIVE



The highlighted area represents the focus area. The peninsula was created in the 1950's due to the development in the surrounding areas. Originally this area was a tidal wetland.



From the center of the Peninsula, looking north/northwest: As observed, the peninsula is a mixture of wetlands and coastal prairie. This is a thriving ecological and wildlife habitat. There are a number of trails in this area used by the public.



From the southern portion of the Peninsula looking northeast: There is a significant amount of shoreline erosion all around the whole peninsula. Based on measurements from historical aerial photos, some areas have lost over 100 feet of width in the last 60 years. This is due to both commercial and recreational dredging access and environmental erosion.

COASTAL RESILIENCE REPORT

TASK 2: IDENTIFY OPTIONS AVAILABLE TO MITIGATE FOR RESOURCES AT RISK

- Shoreline restoration
 - -Repair of existing armoring
 - -Shoreline material replacement
- Shoreline armoring Bulkheads Rip-Rap
- Levees
- Restoring/Creating wetlands
 - -Beneficial uses of dredge material
- Laws/Policy
 - -New no wake zones
 - -Restricted access to areas
 - -Building Codes
 - -Higher Base elevations
- Restrict new construction

UNDERSTANDING COASTAL RESILIENCE: UNIVERSITY OF HOUSTON CLEAR LAKE

Of particular interest to the City of Nassau Bay and the NASA Area Management District is the promotion of Coastal Resilience. As a coastal city, Nassau Bay was significantly affected by Hurricane Ike, which made landfall in the 2008 Atlantic Hurricane season. Nassau Bay remains vulnerable to future coastal storms, storm surge, flooding and sea level rise. The University of Houston Clear Lake, Dr. Deanna Schmidt's Urban Geography class, GEOG 4031, collected data in support of the Nassau Bay Livable Centers Study. Specifically, the students conducted semi-structured interviews with adults working and living in Nassau Bav to measure their concerns about resilience to coastal hazards. This data has provided key information to the Design Team, the NASA Area Management District, the Advisory Committee, and the City.

PRELIMINARY STUDENT INTERVIEW QUESTIONS

- Would you be willing to answer a few questions regarding Nassau Bay?
- Are you a resident of Nassau Bay? If so, for how long?
- What supports the local economy?
- How and why has this changed over time?
- How healthy are businesses in Nassau Bay? What could improve business?
- Does Nassau Bay provide all the shopping/services needed? If not, what is missing? Would you do more of your shopping locally?
- Are employees hired locally? If not, from where?
- Are you and your business prepared for another disaster?
- What were the most difficult issues faced during your recovery from Ike? What could have been done better?
- Is sustainable (green) business development important? Why or why not?

Throughout the study, the students fine-tuned their interview questions and continued to research coastal resilience in relation to Nassau Bay. The final student interview questions and resident comments can be found on the following pages.







UNDERSTANDING COASTAL RESILIENCE: UNIVERSITY OF HOUSTON CLEAR LAKE

A total of 21 interviews were completed.

- Average length of residence in Nassau Bay is nearly 15 years.
- Most considered flooding, not storm surge as the most dangerous threat.
- Most were not aware of the Peninsula

HOW DID THE CLEAN-UP EFFORTS GO?

-It was OK.

-Needed faster repair of power.

-Needed quicker response from FEMA.

-Need electricity and water faster.

-Very good.

-Completed well.

-Good.

-Too slow trash pick-up.

- -Slow but effective.
- -Smooth clean up.

-Better effort need regarding traffic.

WHAT ENVIRONMENTAL FEATURE IS MOST IMPORTANT?

-Flood protection.
-Water access.
-Lake views.
-Climate.
-Climate. Weather. Clean.
-Water. Bird watching.
-Water.
-Fishing. (apartment dweller)
-Wetlands, parks, estuaries.
-Parks.
-Water.
-Flooding.
-Water and NASA brings customers.
-Water.

HOW OFTEN DO YOU USE NASSAU BAY PARKS? WHAT ACTIVITIES?

-Weekly. Walking.
-Once a month. Playground and picnic.
-Seldom.
-Often. Biking and playing with children
-Rarely. Walking.
-Rarely. Jogging.
-2x Month. Jogging. Walking. Biking.
-Everyday. Need better up-keep.
-Once a month. Walking.
-Once per week. Running.
-Everyday. Walking the dog.
-Parks.
-Evening walks and bike rides.

UNDERSTANDING COASTAL RESILIENCE: UNIVERSITY OF HOUSTON CLEAR LAKE

HOW CAN WE INSURE THE ENVIRONMENT BOUNCES AFTER AN-OTHER HURRICANE?

- -Environmentally friendly building materials.
- -Proper drainage.
- -Quick clean-up.
- -Quick response to endangered animals.

-Better response.

- -More help from city and state.
- -Stronger building code. Better building.
- -Get trash picked-up more quickly.
- -Debris clean-up.
- -Debris removal from water and shoreline.

-Plan ahead.

- -Prepare for the worst. Overstock generators.
- -Prepare Nassau Bay. one way out, one way in.
- -What communication resources are available to help in recovery?

-FEMA, Military, Facebook, your neighbors.

- -Facebook, City website, phone calls.
- -Facebook, Newspaper, news
- -WFFA Blog. Facebook.
- -Signs, phone calls, internet.
- -Not that I know of. There was an occasional phone call.
- -Phone call system.

WHAT OUTSIDE RESOURCES ARE AVAILABLE FOR DISASTER RECOVERY?

- -Not familiar.
- -Familiar with government assistance.
- -No.

-No.

- -No, interested in gaining more information.
- -Churches were a great help.
- -Government assistance.

WHAT COULD BE DONE TO IMPROVE BUSINESS?

-More food chains. Tourist attractions.

-Need grocery.

-Specialty markets.

-Need a grocery store. Like that hospital so close.

-Tourism is OK as long as it is not brought inside the neighborhood.

- -I support local business. They are what is keeping this community alive.
- -I support local business.

-Grocery store and more restaurants.

-Grocery store.

-Too many fastfood restaurants. Don't need another hotel.

162 | APPENDIX

UNDERSTANDING COASTAL RESILIENCE: UNIVERSITY OF HOUSTON CLEAR LAKE

ARE LOCAL BUSINESSES PREPARED FOR DISASTER?

-I believe so.

IS SUSTAINABILITY IMPORTANT?

-Yes.
-Never paid much attention.
-Yes, as long as we are saving money and energy at the same time.
-Yes and no. It costs a lot and isn't promising.
-Absolutely. Make the neighborhood pretty, feels increase moral.
-Yes.
-Yes.

HOW WELL DO YOU KNOW YOUR NEIGHBORS?

-Very well. Close-knit.
-Very well. Close-knit.
-Close-knit.
-Well.
-Well.
-Pretty well.
-Knows and loves neighbors.
-Fairly well.
-Really well.
-Well enough to speak to them. Would not ask them for anything.

AIR QUALITY ANALYSIS METHODOLOGY

The air quality benefits derived from implementation of the recommended improvements for Nassau Bay were estimated based on the following methodology.

CATCHMENT AREA

The City of Nassau Bay was defined as the catchment area to determine the number of trips that would potentially be affected by the recommended improvements.

TRIPS GENERATED

The following regional trip generation rates based on data from H-GAC were used to estimate the total trips produced in the catchment area:

- 6.54 trips per household.
- 2.53 trips per job.

DEMAND

An assumed 1% of the household and employment trips generated in the catchment area will switch from vehicular trips to bicycle and pedestrian trips. The trip length of an estimated 5% of the trips generated by households in the catchment area were assumed to be reduced by 80%.

VMT REDUCTION

The total vehicle miles traveled (VMT) were calculated utilizing the average trip length from the National Household Travel Survey (9.72 miles/trip) and multiplying by the computed demand.

AIR QUALITY BENEFITS

The MOSERS 11.1 methodology was used to estimate emissions reductions. The estimates for the emissions per mile were used for the following air quality factors.

- NOx 0.239 grams per mile.
- VOC 0.315 grams per mile.
- CO 3.732 grams per mile.

Total emissions were annualized to determine the reduction in annual kilograms (kg) resulting from implementation of Nassau Bay projects that will result in a shift in mode share from vehicular trips to active (bike/ ped) trips (Table A1) and from trip length reductions (Table A2). Total estimated air quality benefits are provided in Table A3.

Table A1. Active Mode (Bike/Ped) Share Shift							
Calculation Step	Equation		Quantity	Units			
Nassau Bay Trip	а	Households	2,412	homes			
Generators	b	Employment	3,732	jobs			
Trip Datas	С	Households	6.54	trips/day/home			
mp kates	d	Employment	2.53	trips/day/job			
Total Trips	e=(a*c)+(b*d)		25,216	trips/day			
Active Mode Shift Rate	f		1.00%	percent trips			
Trips Replaced	g=e*f		252.16	trips			
Miles per Trip Replaced	h		9.72	miles/trip			
Vehicle Miles Travel Replaced	j=g*h		2,451.04	miles			
Emissions Eastors	k	NOx	0.24	gm/mile			
Emissions Factors		VOC	0.32	gm/mile			
	m	CO	3.73	gm/mile			
Tatal Casinaiana	n=j*k	NOx	586.80	gm			
Reduced	o=j*l	VOC	772.17	gm			
neuuceu	p=j*m	CO	9,148.42	gm			
Assumed Annual Days	q		260	days/year			
Metric Conversion Factor	r		1,000 gm/kg				
Annual Engineer	s=n*q/r	NOx	152.57	kg/year			
Annual Emissions Reduction	t=o*q/r	VOC	200.76	kg/year			
neodelion	u=p*q/r	со	2,378.59	kg/year			

Source: 2010 Census, 2000 Census Long Form Regional trip generation rates from HGAC estimates

Table A2. Trip Length Reduction						
Calculation Step	Equation		Quantity	Units		
Nassau Bay Trip Generators	а	Households	2,412	homes		
Trip Rates	с	Households	6.54	trips/day/ home		
Total Trips	e=a*c		15,774	trips/day	1	
Percent of Trips Reduced	f		5.00%	percent trips		
Trips Reduced	g=e*f		788.72	trips	Percent Reduction of Trip	Average Trip Length
Miles per Trip Reduced	h		7.776	miles/trip	0.8	9.72
Vehicle Miles Travel Reduced	j=g*h		6,133.12	miles		
	k	NOx	0.24	gm/mile]	
Emissions Factors	T	voc	0.32	gm/mile		
	m	со	3.73	gm/mile		
	n=j*k	NOx	1,468.33	gm	1	
Total Emissions Reduced	o=j*l	VOC	1,932.16	gm		
Total Emissions reduced	p=j*m	со	22,891.6 6	gm		
Assumed Annual Days	q		260	days/year		
Metric Conversion Factor	r		1,000	gm/kg		
	s=n*q/r	NOx	381.77	kg/year		
Annual Emissions Reduction	t=o*q/r	VOC	502.36	kg/year		
	u=p*q/r	со	5,951.83	kg/year		

The total reduction in emissions (mode shift and trip length reduction) is provided below:

Table A3. Air Quality Benefit Summary.						
Total Annual Emissions	NOx	534.33	kg/year			
Reduction	VOC	703.12	kg/year			
	со	8,330.42	kg/year			

The spreadsheets found on the following pages show how the order of magnitude costs for individual projects were calculated. These costs may vary dependant upon the time in which a project is pursued, construction has begun, and the extent to which elements of a project were chosen for implementation. Additionally, these costs may vary depending on the outcome of further engineering and design proposals. Project costs should be used for project planning purposes.

T.1 (S) - Space Park Drive Improvements

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
636 2001	ALUMINUM SIGNS (TY A)	SF	18.94615	12.00	\$227.35
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	359.98391	4.00	\$1,439.94
	Construction Total				\$1,667.29

T.1 (S) - Space Park Drive Improvements

Task 3 - Prepare design plans and construct a 6 foot sidewalk on north side between Upper Bay Rd. and Town Square development

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	18.33	\$70.76
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	6.11	\$23.11
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	125.00	\$4,507.75
	Roadway & Traffic Signal Total				\$4,601.62
	30% Contingencies				\$1,380.49
	Construction Total				\$5,982.10
	Design Total				\$1,196.42

T.1 (L) - Space Park Drive Improvements

Task 1 - Nassau Bay Dr. to Point Lookout Dr.: prepare plans and stripe / construct 3-lane street with two sharrows and continuous left-turn lane and 6 foot sidewalks

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	5775.00	\$2,233.37
666 2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF	\$0.39	4200.00	\$1,639.55
666 2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF	\$0.39	1575.00	\$619.10
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	18.00	\$2,281.41
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	5775.00	\$1,220.49
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	18.00	\$473.87
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	5775.00	\$691.21
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	18.00	\$1,457.00
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	466.67	\$1,801.24
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	155.56	\$588.24
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	2800.00	\$100,973.49
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	12.00	\$227.35
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	4.00	\$1,439.94
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	0.50	\$1,912.66
	Roadway & Traffic Signal Total				\$117,558.92
	30% Contingencies				\$35,267.68
	Construction Total				\$152,826.60

Г

	T.2 (S) - Saturn Lane Improvements								
	Task 2 - Prepare Striping Plans and Restripe Saturn Lane with sharrows								
ITEM	DESCRIPTION UNIT UNIT COST QUANTITY COST								
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	450.00	\$174.03				
666 2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	\$0.45	450.00	\$203.55				
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	6.00	\$760.47				
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	450.00	\$95.10				
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	6.00	\$157.96				
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	450.00	\$53.86				
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	6.00	\$485.67				
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	111.11	\$428.87				
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	37.04	\$140.06				
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	677.00	\$24,413.95				
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	3.00	\$56.84				
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	1.00	\$359.98				
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	0.50	\$1,912.66				
	Roadway & Traffic Signal Total				\$29,242.99				
	30% Contingencies				\$8,772.90				
	Construction Total				\$38,015.89				
	Design Total				\$7,603.18				

	Single Lane Roundabout								
	Construct Single Lane Roundabout								
ITEM	DESCRIPTION UNIT UNIT COST QUANTITY COST								
104 2001	REMOVING CONC (PAV)	SY	\$	3.86	3888.89	\$15,000.00			
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	\$	2.15	13953.49	\$30,000.00			
260 2012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	\$	145.53	206.14	\$30,000.00			
360 2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	\$	36.14	1937.00	\$70,000.00			
529 2006	CONC CURB (MONO) (TY II)	LF	\$	3.00	3329.02	\$10,000.00			
531 2015	CONC SIDEWALKS (4")	SY	\$	36.06	831.90	\$30,000.00			
	PROVISION FOR CURB ADJUSTMENTS	EA	\$	53,000.00	1.00	\$53,000.00			
	INLET ADJUSTMENTS	EA	\$	25,000.00	0.80	\$20,000.00			
	OTHER UTILITIES	EA	\$	90,000.00	0.44	\$40,000.00			
	PAVEMENT MARKINGS	EA	\$	25,000.00	0.40	\$10,000.00			
	TRAFFIC CONTROL	EA	\$	25,000.00	0.60	\$15,000.00			
	Roadway & Traffic Signal Subtotal					\$323,000.00			
	30% Contingencies					\$96,900.00			
	Construction Total					\$419,900.00			

Note: Cost is generic for a single lane roundabout; actual construction cost for a specific roundabout will vary.

٦

Task 1 - Space park Dr. (north) to Space Park Dr. (south): Reconstruct as 2-lane divided roadway with bike lanes, parallel parking, sidewalks and large roundabout at Space park Dr. (south) as designed in T.3 (S), Task 1					
ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	600.00	\$232.04
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	2.00	\$253.49
666 2057	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL	EA	\$93.36	2.00	\$186.72
666 2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	\$0.37	1600.00	\$599.12
666 2024	REFL PAV MRK TY I (W) 6" (SLD)(100MIL)	LF	\$0.60	1600.00	\$954.21
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	2.00	\$52.65
678 2047	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	\$28.09	2.00	\$56.19
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	1600.00	\$338.14
678 2022	PAV SURF PREP FOR MRK (BLAST CLN)(6")	LF	\$0.32	1600.00	\$504.34
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	2.00	\$161.89
666 2219	PAVEMENT SEALER (ARROW)	EA	\$32.01	2.00	\$64.01
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	1600.00	\$191.50
666 2190	PAVEMENT SEALER 6"	LF	\$0.15	1600.00	\$237.22
104 2001	REMOVING CONC (PAV)	SY	\$3.86	5004.44	\$19,302.84
104 2022	REMOVING CONC (CURB AND GUTTER)	LF	\$4.52	3200.00	\$14,467.39
360 2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	\$36.14	5017.00	\$181,306.60
529 2006	CONC CURB (MONO) (TY II)	LF	\$3.00	3200.00	\$9,612.45
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	1777.78	\$64,110.15
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	\$2.15	5182.22	\$11,141.78
260 2012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	\$145.53	64.13	\$9,332.88
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	296.30	\$1,143.65
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	98.77	\$373.49
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	6.00	\$113.68
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	2.00	\$719.97
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	2.67	\$10,200.86
XXXX	DRAINAGE	EA	\$5,000.00	4.00	\$20,000.00
XXXX	OTHER UTILITY WORK		\$33.33	800.00	\$26,666.67
	Roadway & Traffic Signal Total				\$372,323.92
	30% Contingencies				\$111,697.18
	Construction Subtotal				\$484,021.09

T.3 (L) - Upper Bay Road Improvements

Γ

Task 3 - NASA Parkway to Space Park Dr. (north): Reconstruct as 4-lane divided					
ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	450.00	\$174.03
666 2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF	\$0.45	450.00	\$203.55
666 2024	REFL PAV MRK TY I (W) 6" (SLD)(100MIL)	LF	\$0.60	1200.00	\$715.66
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	2.00	\$253.49
666 2057	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL	EA	\$93.36	2.00	\$186.72
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	450.00	\$95.10
678 2022	PAV SURF PREP FOR MRK (BLAST CLN)(6")	LF	\$0.32	1200.00	\$378.25
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	2.00	\$52.65
678 2047	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	\$28.09	2.00	\$56.19
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	450.00	\$53.86
666 2190	PAVEMENT SEALER 6"	LF	\$0.15	1200.00	\$177.91
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	2.00	\$161.89
666 2219	PAVEMENT SEALER (ARROW)	EA	\$32.01	2.00	\$64.01
104 2001	REMOVING CONC (PAV)	SY	\$3.86	3893.33	\$15,017.13
104 2022	REMOVING CONC (CURB AND GUTTER)	LF	\$4.52	2400.00	\$10,850.54
360 2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	\$36.14	4693.33	\$169,609.79
529 2006	CONC CURB (MONO) (TY II)	LF	\$3.00	2400.00	\$7,209.34
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	1066.67	\$38,466.09
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	\$2.15	4826.67	\$10,377.33
260 2012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	\$145.53	59.73	\$8,692.55
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	666.67	\$2,573.21
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	59.26	\$224.09
100 2001	PREPARING ROW	AC	\$7,786.68	0.17	\$1,287.05
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	3.00	\$56.84
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	1.00	\$359.98
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	2.00	\$7,650.64
XXXX	DRAINAGE	EA	\$5,000.00	3.00	\$15,000.00
XXXX	OTHER UTILITY WORK	EA	\$20,000.00	1.00	\$20,000.00
	Roadway & Traffic Signal Total				\$309,947.91
	30% Contingencies				\$92,984.37
	Construction Total				\$402,932.28

T.3 (L) - Upper Bay Road Improvements

I

T.4 (S) - Bicycle / Pedestrian Bridge over Cow Bayou

Task 2 - Construct bridge over Cow Bayou with 10-foot-wide sidewalk connections

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
4007 2027	PEDESTRIAN TRUSS BRIDGE SPAN (200 FT)	EA	\$225,000.00	1.00	\$225,000.00
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	92.59	\$357.39
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	30.86	\$116.72
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	555.56	\$20,034.42
	Roadway & Traffic Signal Total				\$245,508.53
	30% Contingencies				\$73,652.56
	Construction Total				\$319,161.09

T.6 (L) - Space park Drive Improvements Task 1 - Upper Bay Rd. to Surf Ct.: Prepare design plans and construct 6 foot sidewalk						
ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST	
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	383.33	\$1,479.59	
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	127.78	\$483.20	
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	2314.00	\$83,447.38	
	Roadway & Traffic Signal Total				\$85,410.17	
	30% Contingencies				\$25,623.05	

Task 1 - NASA Parkway to Saxony Ln.: Prepare design plans and reconstruct as a 2-lane divided roadway with					
improved cross-section, e.g. bike lanes, sidewalks, and roundabout at Saxony Lane					
ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	900.00	\$348.06
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	2.00	\$253.49
666 2057	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL	EA	\$93.36	2.00	\$186.72
666 2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	\$0.37	2400.00	\$898.68
666 2024	REFL PAV MRK TY I (W) 6" (SLD)(100MIL)	LF	\$0.60	2400.00	\$1,431.31
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	2.00	\$52.65
678 2047	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	\$28.09	2.00	\$56.19
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	2400.00	\$507.22
678 2022	PAV SURF PREP FOR MRK (BLAST CLN)(6")	LF	\$0.32	2400.00	\$756.50
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	2.00	\$161.89
666 2219	PAVEMENT SEALER (ARROW)	EA	\$32.01	2.00	\$64.01
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	2400.00	\$287.26
666 2190	PAVEMENT SEALER 6"	LF	\$0.15	2400.00	\$355.82
104 2001	REMOVING CONC (PAV)	SY	\$3.86	6666.67	\$25,714.27
104 2001	REMOVING CONC (PAV)	SY	\$3.86	560.00	\$2,160.00
104 2022	REMOVING CONC (CURB AND GUTTER)	LF	\$4.52	4800.00	\$21,701.09
360 2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	\$36.14	7226.67	\$261,160.53
529 2006	CONC CURB (MONO) (TY II)	LF	\$3.00	4800.00	\$14,418.67
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	2666.67	\$96,165.23
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	\$2.15	7493.33	\$16,110.67
260 2012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	\$145.53	92.73	\$13,495.06
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	444.44	\$1,715.47
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	148.15	\$560.23
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	6.00	\$113.68
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	2.00	\$719.97
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	4.00	\$15,301.29
XXXX	DRAINAGE	EA	\$5,000.00	6.00	\$30,000.00
XXXX			\$40,000.00	1.00	\$40,000.00
	Roadway & Traffic Signal Total				\$544,695.94
	30% Contingencies				\$163,408.78
	Construction Subtotal				\$708,104.72

T.7 (L) - Point Lookout Drive Improvements

Task 1 - NASA Parkway to Saxony Ln .: Prepare design plans and reconstruct as a 2-lane divided roadway with						
improved cross-section, e.g. bike lanes, sidewalks, and roundabout at Saxony Lane						
ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST	
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	\$0.39	900.00	\$348.06	
666 2063	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL	EA	\$126.74	2.00	\$253.49	
666 2057	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL	EA	\$93.36	2.00	\$186.72	
666 2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	\$0.37	2400.00	\$898.68	
666 2024	REFL PAV MRK TY I (W) 6" (SLD)(100MIL)	LF	\$0.60	2400.00	\$1,431.31	
678 2045	PAV SURF PREP FOR MRK (BIKE SYMBOL)	EA	\$26.33	2.00	\$52.65	
678 2047	PAV SURF PREP FOR MRK (BIKE ARROW)	EA	\$28.09	2.00	\$56.19	
678 2021	PAV SURF PREP FOR MRK (BLAST CLN)(4")	LF	\$0.21	2400.00	\$507.22	
678 2022	PAV SURF PREP FOR MRK (BLAST CLN)(6")	LF	\$0.32	2400.00	\$756.50	
666 2227	PAVEMENT SEALER SYMBOL	EA	\$80.94	2.00	\$161.89	
666 2219	PAVEMENT SEALER (ARROW)	EA	\$32.01	2.00	\$64.01	
666 2189	PAVEMENT SEALER 4"	LF	\$0.12	2400.00	\$287.26	
666 2190	PAVEMENT SEALER 6"	LF	\$0.15	2400.00	\$355.82	
104 2001	REMOVING CONC (PAV)	SY	\$3.86	6666.67	\$25,714.27	
104 2001	REMOVING CONC (PAV)	SY	\$3.86	560.00	\$2,160.00	
104 2022	REMOVING CONC (CURB AND GUTTER)	LF	\$4.52	4800.00	\$21,701.09	
360 2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	\$36.14	7226.67	\$261,160.53	
529 2006	CONC CURB (MONO) (TY II)	LF	\$3.00	4800.00	\$14,418.67	
531 2015	CONC SIDEWALKS (4")	SY	\$36.06	2666.67	\$96,165.23	
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	\$2.15	7493.33	\$16,110.67	
260 2012	LIME(HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	\$145.53	92.73	\$13,495.06	
110 2001	EXCAVATION (ROADWAY)	CY	\$3.86	444.44	\$1,715.47	
132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	\$3.78	148.15	\$560.23	
636 2001	ALUMINUM SIGNS (TY A)	SF	\$18.95	6.00	\$113.68	
644 2001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	\$359.98	2.00	\$719.97	
502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	\$3,825.32	4.00	\$15,301.29	
XXXX	DRAINAGE	EA	\$5,000.00	6.00	\$30,000.00	
XXXX	OTHER UTILITY WORK		\$40,000.00	1.00	\$40,000.00	
	Roadway & Traffic Signal Total				\$544,695.94	
	30% Contingencies				\$163,408.78	
	Construction Subtotal				\$708,104.72	

T.8 (L) - Nassau Bay Drive Improvements