



Hillsborough County Water Ferry Feasibility Study - Phase 2

Final Report

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report

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prepared for

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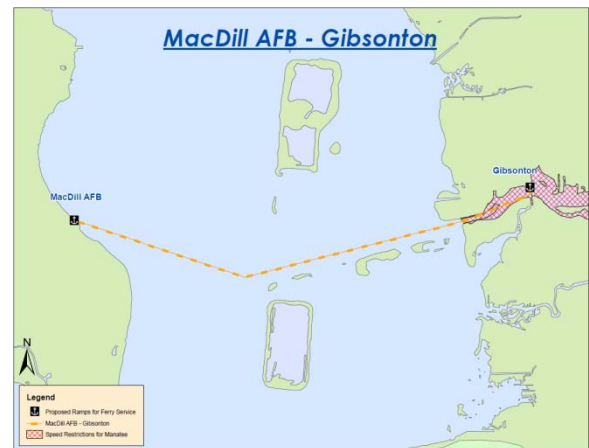
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Executive Summary

BACKGROUND

In 2008, Hillsborough County competed for and was awarded a federal discretionary grant to develop a water ferry demonstration project. The Metropolitan Planning Organization (MPO) has conducted a feasibility study to assist Hillsborough County in determining the best use of these funds. Phase One of the Water Ferry Feasibility Study conducted an initial evaluation of the feasibility of waterborne passenger service as a viable travel alternative as part of the current and future transportation system of Hillsborough County and the Tampa Bay region. Phase One identified potential stations and water way routes for commuting traffic. Travel time was one of the most critical factors in determining feasibility, looking at markets where water ferry service could be competitive with the personal automobile. While there was stakeholder interest in many locations, there was consensus that the most promising route would connect MacDill Air Force Base (AFB) with key residential communities in the Gibsonton and Apollo Beach areas.



Phase Two of the Water Ferry Feasibility Study, summarized here, focuses on this most promising route. The primary objective of Phase Two was to determine if the service is feasible.

FINDINGS

Phase Two provided a more rigorous evaluation of potential ferry service and its anticipated ridership. The following points describe the key findings.

Stakeholder Support

- Key stakeholders support further study.** Interviews conducted with MacDill AFB; Tampa Port Authority; Tampa Bay Pilots; Florida Department of Transportation (FDOT) District Seven; Hillsborough County Departments of Development Services, Real Estate, Parks and Conservation Lands; Mosaic Fertilizer; The Florida Aquarium; Hillsborough Area Regional Transit Authority (HART); Tampa Water Taxi Company; and Yacht Starship helped identify key considerations and did not identify any fatal flaws. Key issues that must and can be addressed include security, weather, conflicts with other vessels, liability for safety and personal property, parking capacity, expansion of service, need for a champion or owner, and funding.



Station Access

- MacDill AFB Station Access.** The proposed station is within 100 yards of a small parking lot, a biking/pedestrian linear park, and a main roadway. The three main work centers are five to seven minutes by shuttle. It is anticipated that the majority of riders will take the shuttle and/or walk.
- Gibsonton Station Access.** The proposed station is located along US 41, which is a main north/south roadway. Access for most riders would be by personal automobile. The MacDill AFB survey results suggest 65 percent of potential riders live within 15 minutes of the station. A traffic analysis of the interchange between US 41 and Williams State Park access road shows the intersection will continue to operate at an acceptable level of service. Parking alternatives would be limited to county and state lands; capacity will be an issue should the high end of ridership estimates be reached (assuming single-occupant vehicle [SOV]).



Station Development Needs

- MacDill AFB Station.** The proposed station has an existing pier equipped with one floating dock currently in use. A second floating dock would be required for a water ferry operation. The pier is within 100 yards of a potential shuttle stop; MacDill AFB operates a circulator shuttle that may be able to serve the station. In addition, a controlled access security check point would be required. The preference would be for an unstaffed, technology-based check point. There are no technical barriers to the needed improvements. Federal defense funding may be available for the security check point technology installations. Dock construction funding has not been identified but could be covered by the Federal Highway Administration (FHWA) Ferry Boat Discretionary Program (FBD) Grant. A station shelter would also be required.



- **Gibsonton Station.** An existing fishing pier and multiple small fixed docks are located near the boat ramp at Williams Park in Gibsonton. This infrastructure is inadequate for a commercial ferry operation, and a new or reconstructed dock is required to safely support the operation. Existing parking is in close proximity to the dock but cannot accommodate even the low end of the forecast ridership. Up to 200 parking spaces with lighting could be constructed on county/state-owned land. Public restrooms exist. Dock construction funding has not been identified but could be covered by the FHWA FBD Grant. A station shelter would also be required.



Navigation

- **MacDill AFB Station Waterway Access.** Tampa Bay near the MacDill AFB station is at least six feet deep at all times. The Bay surrounding the base is restricted to the public and is patrolled; the ferry operator would be required to comply with security protocols and access procedures. Access to the dock would be at idle/no wake speed for safety reasons. No other waterway restrictions exist.
- **Tampa Bay Channels.** The channels within Tampa Bay are deep with no speed restrictions; compliance with Harbor Pilot and U.S. Coast Guard operating and vessel requirements is necessary; this relates to interaction with other vessels such as access restrictions to channels for short periods of time when hazardous materials (HAZMAT) vessels or cruise ships are present. Water outside of the main channels can be shallow with shoaling. Poor weather can impact travel conditions by slowing the vessel and/or suspending service.
- **Alafia River Waterway.** The river is deep enough to accommodate commercial vessels. It has year-round speed restrictions of 25 miles per hour due to the prevalence of manatees. Mosaic Fertilizer has a deep water port facility; incoming or outgoing vessels could delay a water ferry, but conflict is anticipated to be minimal.
- **Gibsonton Station Waterway Access.** The Gibsonton station is located on the Alafia River. Access to the station itself is posted at idle/no wake speed. There is potential for conflict with personal boat launch operations, therefore a new dock should be configured to avoid conflicts with the public boat launch. Water depth on approach to the dock needs to be evaluated.

Ridership Estimates

- **Significant potential ridership exists today.** Two methods were used to quantify potential ferry ridership. Both methodologies resulted in similar estimates. Under the high speed (best case) scenario, the daily morning commute is estimated to be roughly 300 to 600 riders, dependent upon the fare charged. Under the low speed (worst case) scenario, the range decreases to roughly 100 to 225. These ridership estimates reflect conditions today.
- **Future ridership is tied directly to MacDill AFB operations.** Future conditions are based on MacDill AFB expansion or contraction, not regional growth, unless the service is expanded to serve non-base traffic. Plans were announced in September 2011 to cut 1,100 on-base jobs which could impact future ferry ridership estimates¹. While the 1,100 positions reflect a relatively small percent of on-base employment – and therefore a small percent of potential ridership – the move could indicate a larger reduction over the coming years.
- **Travel time and cost drive ridership estimates.** The key difference between the best and worst case estimates is travel time as dictated by assumed vessel speed, the impact of inclement weather, and the effectiveness of the shuttle service to final place of work on MacDill AFB. The range for each represents the impact of low and high fares (\$2.50 vs. \$5.00 per one way trip).
- **Multiple vessels will be required to serve the demand.** For the lowest estimate of 100 passengers, two vessels operating three round trips per two-hour peak period would be required. The high estimate of 600 passengers would require five vessels to operate 15 round trips per two-hour peak period
- **Alternatives estimated to operate at a loss.** Four tested alternatives operate at a loss, consistent with other transit services and other water ferry services. **Table ES.1** summarizes the results. Ridership estimates vary by fare and speed; fares range from \$2.50 to \$5.00 per one way trip. The federal transit subsidy currently available to MacDill AFB employees for the HART express bus service may be an option in the long term. As shown below, the farebox recovery ranges from 26 percent to 63 percent. A detailed operating plan, as proposed by an operator, will be necessary to develop a more refined financial plan.

Table ES.1 Farebox Recovery by Scenario

Scenario	\$2.50 Fare, 5 Vessels, 600 Riders	\$5.00 Fare, 4 Vessels, 300 Riders	\$2.50 Fare, 3 Vessels, 225 Riders	\$5.00 Fare, 2 Vessels, 100 Riders
Daily O&M Costs	\$7,864	\$4,763	\$4,297	\$2,863
Revenues/Day	\$3,000	\$3,000	\$1,125	\$1,000
Profit/Day	(\$4,864)	(\$1,763)	(\$3,172)	(\$1,863)
Farebox Recovery	38%	63%	26%	35%

¹ <http://www.tampabay.com/news/military/macdill/centcom-to-trim-macdill-personnel-by-1100/1190988>

Finding of Feasibility

- **The service is technically feasible.** A water ferry service has the potential to provide a competitive commuter service for a target market. No fatal flaws have been identified; regional stakeholders support the concept; potential stations have been identified; and the waterways have adequate capacity.
- **Ridership estimates indicate there is demand for the service.** Between 100 to 600 daily riders have been estimated based on survey results with potential riders. Geographically, it is a closed loop, captive market.
- **Partial funding for the next phase has been secured.** The FHWA FBD Grant (\$475,000) designated for Hillsborough County can be spent on design, preliminary engineering, construction, and capital investment such as purchase of ferry boats and docking station improvements. The grant can be used for demonstration projects. Hillsborough County, a local government, or a transportation authority could apply for additional federal funding for capital needs once the existing grant is completed.
- **The study findings must be adopted.** Local support by community leaders must be provided. The feasibility study recommendations need to gain support from local governments and potential implementing agencies such as Hillsborough County and the planning sponsor, Hillsborough MPO. The study findings provided in this report documenting the technical feasibility of a water ferry service must be adopted if the \$475,000 grant is to be accepted.

RECOMMENDATIONS AND ACTION ITEMS

The following short to medium term actions are recommended:

- **Adopt study recommendation of feasibility and accept federal discretionary grant.** The technical analysis and market research to date suggest a water ferry service between Gibsonton and MacDill AFB is feasible. Adoption of this recommendation creates an opportunity to access the existing \$475,000 grant. *The Hillsborough MPO Board found the service to be feasible on December 6, 2011.*
- **Identify lead agency.** The successful development of the service is based on many factors. The first is identifying an owner that can provide technical and political support and access to long term funding; and an agency eligible to accept and use the available grant.
- **Define initial service.** A description of the proposed service should be developed. The work to date provides a variety of data and analyses that can be used to support a detailed description of the proposed service. This description should specifically lay out a proposal for the use of the grant. This plan should lay out immediate next steps to encumber and spend down the funding, as well as identify future development activities, such as securing additional capital funding to develop a demonstration project. Initial activities could focus on the engineering, design, and construction of the necessary dock improvements at Williams Park in Gibsonton. These improvements would support the establishment of a demonstration project, should additional funding become available. This proposal should be prepared and submitted to FDOT. This proposal should explicitly address what will be necessary to move forward following spend down of the initial grant.

- **Develop initial financial plan.** Based upon the ridership estimates, estimated capital and operating costs, revenues, and other potential funding sources, an initial financial plan needs to be developed. The plan should identify revenues, costs, and remaining needs. Preliminary cost estimates are incomplete, however, the capital costs associated with an initial service are likely to exceed \$2 million dollars (vessels, parking, docks, station improvements, access improvements, etc.).
- **Apply for additional funding.** Using the detailed description of the initial service, the lead agency should explore the process for applying for additional funding. This will include the FHWA FBD Grant as well as other potential sources.² The applications should reflect the need for outer year capital funds to construct the service.
- **Develop preliminary design and engineering plans.** The preliminary system design, including dock, station, and parking elements, needs to be developed. It will also identify any mitigation requirements or Americans with Disabilities Act (ADA) compliance issues. Parking capacity will be one of the critical elements. Without efficient and convenient parking, the Gibsonton Station location will not work. Developing an acceptable parking plan is critical for this location. Public outreach also will be critical. Meetings should be held for current boat ramp users of Williams Park and potential ferry boat users in the Gibsonton area and in South Hillsborough County. These meetings should be coordinated with Hillsborough County, HART, and the State of Florida. Public awareness should continue with McDill AFB.
- **Develop a Request for Proposals.** A request for proposals (RFP) should be developed to identify and select a private partner. It is anticipated that a private operator with water ferry expertise will operate the service under a contract. This solicitation should coincide with available funding.
- **Select operator and initiate service.** The preferred operator should be selected and contracted with to provide the agreed-upon service. This will require close coordination with MacDill AFB leadership as well as identification of a funding source. This should be defined as a demonstration project designed to provide initial service to gauge the level of interest and then expand (or terminate) over time based on success. In addition, key investments, such as dock improvements at Williams Park and MacDill AFB, will add value to the region regardless of ongoing ferry service. This should help minimize the level of risk.

- **FHWA Ferry Boat Discretionary Funding remains available**

- Grants for 2011 ranged from \$80,000 to \$3 million for items ranging from dock repair to ferry boat acquisition
- 2012 to be funded at \$47 million; applications were due June 3, 2011
- 2013 funding level unknown until the transportation bill is reauthorized

² Discretionary federal funding programs are not anticipated to receive additional allocations at this time.

1.0 Overview and Background

1.1 PHASE ONE HIGHLIGHTS

The objective of Phase One was to conduct an initial evaluation of the feasibility of waterborne passenger service as a viable travel alternative and a part of the current and future transportation system of Hillsborough County and the Tampa Bay region. The study identified and evaluated a range of service options and provided recommendations for the most promising services to be further explored. Commuting traffic was the focus of this analysis. Other service opportunities were identified and discussed qualitatively as opportunities to maximize use of vessels and operator in off-peak periods. Potential stations and routes were also identified, excluding water routes that directly compete geographically with highways. Potential routes were identified based upon waterway characteristics, and each destination area was reviewed for potential station locations. To represent the needs of the community, key stakeholders were brought together to help guide this feasibility study.

Travel time was one of the most critical factors in determining markets where water ferry service could be competitive with the personal automobile. Comparisons were developed between personal auto trip characteristics and proposed water routes. Connections where water ferry and personal auto were comparable in direction and distance, ferry service was not competitive. In other corridors, where the ferry provided a more direct route, the ferry was faster. While there was overall support for waterborne transportation services, stakeholder input recommended initial services focus on a commuter service connecting MacDill AFB with key residential communities in Gibsonton and Apollo Beach areas. Based on current conditions, it was estimated that over 100 daily commuter trips would move between Apollo Beach and MacDill AFB, and almost 400 daily trips would move between Gibsonton and MacDill AFB, growing to 400 and 1,400 respectively by 2035.

While Phase One provided an initial market assessment based on the Tampa Bay Regional Planning Model (TBRPM) and zip code employment data, it did not include detailed data collection from prospective riders. In addition, with the identification of MacDill AFB as the driver of the most feasible service alternatives, additional work with MacDill AFB management and personnel was identified as a critical next step. Stakeholders also recommended a more detailed look be given to service assumptions and environmental conditions. Given these remaining questions, the final determination of feasibility, as related to the FHWA FBD Grant program was delayed pending additional work. Phase Two was designed to address these elements and provide a recommendation related to feasibility.

1.2 PURPOSE OF PHASE TWO STUDY

As part of Phase One, a list of recommended action items was prepared. The Phase Two statement of work was developed to specifically address potential service between Gibsonton and MacDill AFB through the following activities:

- Define the requirements for accepting and applying for the FHWA FBD Grant.
- Conduct outreach to key regional stakeholders to build consensus and support (Tampa Port Authority, Hillsborough County, HART, FDOT District Seven, and MacDill AFB)

- Refine site analysis and service parameters including discussions with potential private sector operators.
- Refine and validate the initial ridership estimates based upon input from MacDill AFB personnel (potential riders).
- Develop recommendations for next steps.

The anticipated outcome of Phase Two was to determine if the service was feasible.

1.3 FHWA FERRY BOAT DISCRETIONARY GRANT REQUIREMENTS

A major objective of Phase Two was to develop a clear understanding of the requirements that must be fulfilled to qualify for the FHWA FBD Grant, and to define “feasibility” as it relates to this funding program. This is critical as Hillsborough County is the recipient of a \$475,000 FBD Grant. However, the service it funds must be considered “feasible.”

Based on the information received from FDOT District Seven, the FHWA FBD Grant usage must meet the following requirements:

- The FHWA FBD Grant (\$475,000) designated for Hillsborough County cannot be used for feasibility studies for water ferry services. Once the project enters the design phase, the federal grant funds can be spent on design, preliminary engineering, construction, and capital investment such as ferry boat purchases and docking station improvements. The grant can be used for demonstration projects.
- The feasibility study should justify the water ferry service is meeting the transportation needs of the general public. The study should include a comprehensive analysis to address questions such as: who are the users of the ferry service, what is the projected ferry ridership, how many trips per day are needed, how many vessels are needed, what are the operation and maintenance costs of the service, what are security costs, etc.
- The feasibility study recommendations need to gain support from local governments and potential implementing agencies such as Hillsborough County and the planning sponsor, Hillsborough MPO. These community leaders must adopt a study recommendation that the service is feasible.
- FDOT District Seven also reported that Hillsborough County, a local government, or a transportation authority could apply for additional federal funding for capital needs once the existing grant is spent. Federal funding solicitation for the FBD Program is at the end of each year. Before solicitation, usually in December, the Special Project Coordinator at FDOT will send out fact sheets to collect input on different projects in need of funding. After the fact sheets are completed and submitted, the Special Project Coordinator will review them and deliver them to FDOT Central Office. Central Office will then determine if projects qualify as funding candidates. The fact sheets must include the amount of funding needed and background information about the project. If the fact sheet is accepted, the project sponsor will be asked to complete the full grant application.

1.4 REPORT ORGANIZATION

The remainder of this report is organized as follows:

- **Section 2, Gibsonton to MacDill AFB Service Characteristics.** This section provides a detailed analysis of service characteristics for the route between MacDill AFB and Gibsonton that were used to support refined ridership estimates.
- **Section 3, Gibsonton to MacDill AFB Ridership Estimates.** This section describes the methodology used to develop refined ridership estimates and presents low and high estimates for current conditions.
- **Section 4, Findings and Recommendations.** This section summarizes the key findings and presents recommendations for next steps.
- **Appendices.** Five appendices contain stakeholder input and technical documentation to support the analysis reported in this report.

2.0 Gibsonton to MacDill Air Force Base Service Characteristics

Phase One of the Water Ferry Feasibility Study provided initial descriptions of ferry service characteristics for multiple routes and stations in the Tampa Bay region. Phase Two included a more detailed analysis for the route between MacDill AFB in South Tampa and Gibsonton in south Hillsborough County. Further refinement of service characteristics was included to support more accurate ridership estimates.

Evaluating potential station locations on MacDill AFB and in Gibsonton included a review of available data on land use/zoning compatibility; transportation access and impacts; and waterside, terminal, and parking infrastructure needs. Also included are vessel and service operating scenarios. Possible environmental characteristics that could impact trip time, comfort, and reliability were used to conduct a sensitivity analysis. Much of the data collected and reviewed was provided by key stakeholder interviews, summarized in **Appendix A**.

2.1 EVALUATION OF KEY STATION SITES

Potential station sites were evaluated at MacDill AFB and in Gibsonton. Site characteristics included the following:

- Water depth,
- Waterway restrictions,
- Existence of dock,
- Landside acreage,
- Parking capacity,
- Existing land use/zoning,
- Security, and
- Amenities.

MacDill Air Force Base

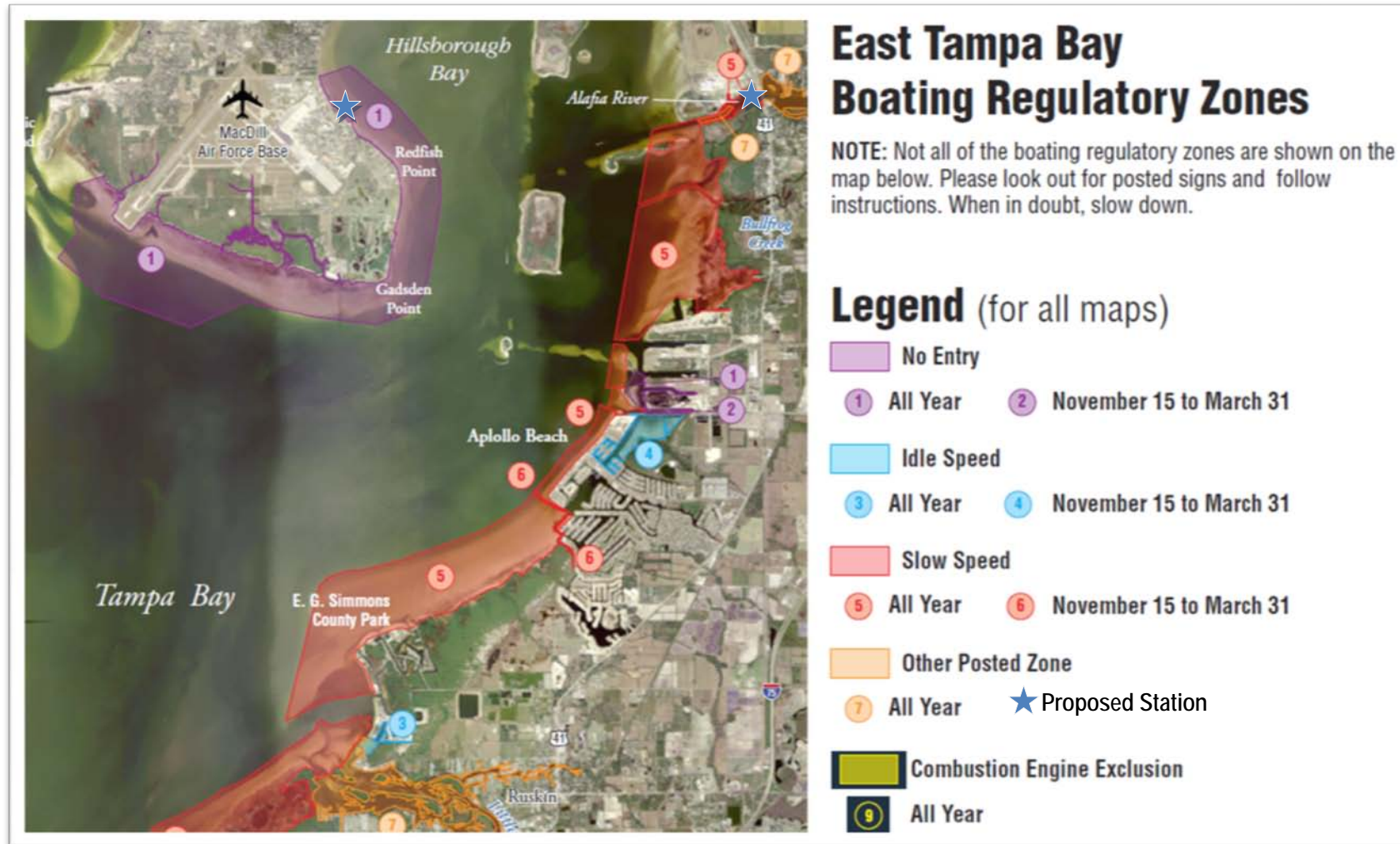
The MacDill AFB site is located on the east side of the base, and is one of two key water access points on the base. The second access point is located on the south border and was discounted as a valid site by Base staff. As configured, the proposed site contains a floating dock that can accommodate two 26-foot security vessels and is currently used by the Military Police. A detailed review is provided below.

- **Water depth:** The waters surrounding the MacDill AFB site, providing access to Tampa Bay, have a low tide minimum water depth of six feet.
- **Waterway restrictions:** Access to the waters surrounding MacDill AFB is controlled by military policy. **Figure 2.1** shows the restricted safety and security zone around MacDill AFB (zone 1). No other restrictions are enforced in this area.
- **Existence of dock:** A pier with a floating dock is present at the proposed ferry station location. **Figures 2.2** through **2.5** show the pier and floating dock on MacDill AFB, which are both approximately 200 feet in length. As configured, it can accommodate two 26-foot security vessels. An additional floating dock would need to be installed unless the security

vessels are relocated. The breadth of potential dock improvements will be determined once vessel type is selected and the potential relocation of the AFB security vessels is decided.

- **Landside acreage:** The existing pier and floating dock are located adjacent to a linear park that runs along the waterfront. Adequate land is available for a ferry boat terminal shelter and limited amenities.
- **Parking capacity:** A small parking lot is located approximately 100 yards from the proposed ferry station and is used primarily for access to the linear park. Parking capacity is not anticipated as a critical factor at the MacDill AFB site as the majority of passengers will leave their vehicle at the Gibsonton station.
- **Existing land use:** The proposed site is part of MacDill AFB. It is currently used as a fishing pier and docking station for security patrol boats. This land use is not expected to change in the future and was not identified as an issue by Base staff.
- **Security:** Security is a high priority at MacDill AFB. Security checks occur when entering the base and average seven seconds per person for a low-level security clearance, the most common clearance. High-level clearance checks take longer. Two different security approaches were discussed with MacDill AFB staff for the ferry service. One approach is to conduct the security check at the Gibsonton station when passengers board; the other is to conduct security checks after riders disembark at the MacDill AFB station. Conducting security checks at the MacDill AFB station is preferred by management. Based on discussion with MacDill AFB staff, the most probable and preferable solution is to use a combination of card readers, biometrics, and turnstiles to control access from the pier to the AFB. Security is not a “deal breaker” according to MacDill AFB management.
- **Amenities:** Lighting is provided at the existing floating dock and pier at the MacDill AFB site. More lighting will be required for the security check point if the ferry terminal is to be built. No other amenities are provided at the site. A shelter would likely be required at a minimum.

Figure 2.1 Location of MacDill AFB within the East Tampa Bay Boating Regulatory Zones



Source: floridamarine.org

Figure 2.2 MacDill AFB: Existing Pier with Floating Dock (looking north towards Downtown Tampa)



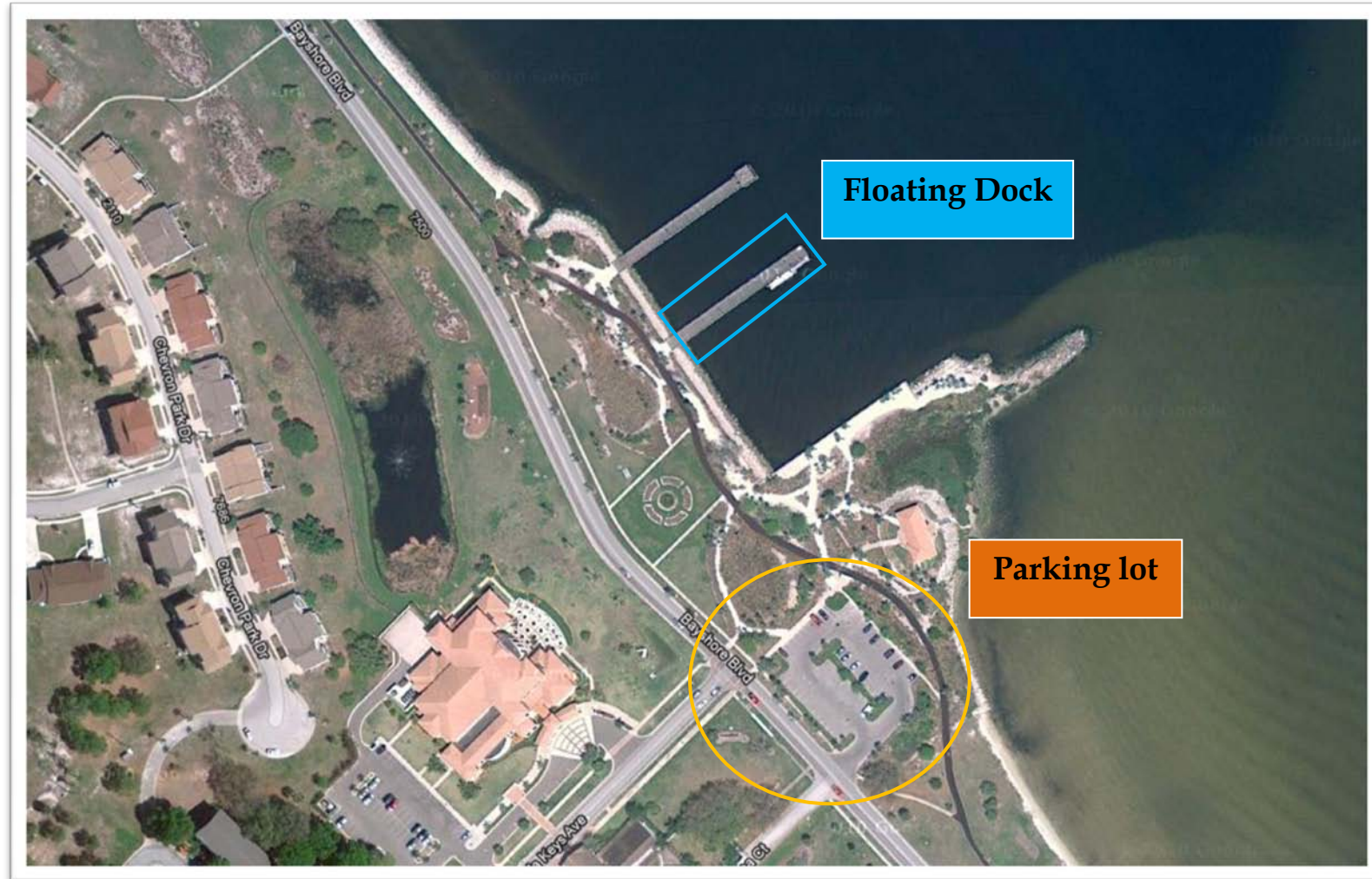
Figure 2.3 MacDill AFB: Existing Pier with Floating Dock (looking northeast)



Figure 2.4 MacDill AFB: Adjacent Fishing Pier (looking north towards Downtown Tampa)



Figure 2.5 Parking Lot Adjacent to the Proposed MacDill AFB Ferry Station



Gibsonton

The potential water ferry docking site at Gibsonton is located to the north of the Alafia River and west of the US 41 bridge, about one-half mile east of Tampa Bay. The dock is located in Williams Park, operated by Hillsborough County on property leased from the State of Florida. The park is open from sunrise to sunset³ and includes a parking lot and large grassy area which could potentially be developed into an additional parking lot if needed. The park also has two fixed docks located within the boat launch area and a fishing pier, as well as basic amenities including power and water supply and restrooms. Detailed characteristics of the Gibsonton site are discussed below.

- **Water depth:** The water level in the Alafia River changes throughout the year. Although water level data is not reported at this site, based on an interview with adjacent property owner Mosaic Fertilizer, the channel on Alafia River is a deep water channel, and is used by Mosaic for cargo movement yearround. Water depth approaching the docks needs to be evaluated.
- **Waterway restrictions:** The Alafia River west of US 41 is within a Manatee Restriction Zone⁴. All boats are required to slow down yearround. The ferry boat must comply with manatee protection zone speed restrictions, and the impact that manatee protection zones and no-wake zones have on speed of service should be considered. **Figure 2.1** (page 2-3) shows the speed restriction zones on the Alafia River (Zone 5). Based upon stakeholder interviews, vessels must operate at idle speed while entering and exiting the docking area; within the channel, vessels can operate at 25 miles per hour. While not a restriction, in the event that the Mosaic cargo boat is moving from its port on the Alafia River, the ferry boats need to wait approximately 10 minutes if they are entering from Tampa Bay for safe operation.
- **Existence of dock:** Three stationary docks are present at the proposed ferry station. **Figures 2.6 through 2.8** show the fixed docks. The straight ramp dock is approximately 70 feet in length and the two “L” shaped docks extend approximately 70 feet into the water and 35 feet to each side. These docks are located in the boat launch ramp area. They will not accommodate a commercial ferry operation without an upgrade to widen and strengthen them. The breadth of potential dock improvements will be determined once vessel type is selected.
- **Landside acreage:** The proposed ferry terminal is located in Williams Park (5.34 acres), operated by Hillsborough County on property leased from the State of Florida. As shown in Figure 2.9 Mosaic Fertilizer, Inc. owns the properties immediately adjacent to Williams Park to the west, north, and south. US 41 borders the east side of Williams Park, and the Alafia River borders the south.

³ <http://www.hillsboroughcounty.org/parks/parkservices/regionalsites.cfm?facilitydetailid=678&selparks=678&selcategory=-1&zipcode=&First=1&Last=5>

⁴ http://ocean.floridamarine.org/Boating_Guides/pages/marine_zones.html

- **Parking capacity:** Limited parking is available in Williams Park. Fourteen standard parking spaces for passenger cars and 25 spaces for vehicles with trailers, including two disabled parking spaces, are available. Figure 2.10 shows the parking lot adjacent to the proposed ferry station. Figures 2.11 through 2.13 show views of existing parking at Williams Park. Because of the relatively low density of development and lack of transit services in this part of Hillsborough County, it is expected that a large number of ferry passengers will park and ride at this site. A preliminary park-and-ride lot development study was conducted by the study team based upon available county/state land and right of way at Williams Park. Up to 200 parking spaces could be constructed, including reuse of current parking spaces. Mosaic, the adjacent land owner, currently is not interested in providing land for parking. More details on park-and-ride development are provided in **Appendix B**.
- **Existing land use:** The proposed site is inside Williams Park. The existing land use of this property is designated as Heavy Industrial⁵ (however, it is currently used as a park). The future land use for this site is designated as Manufacturing. Adjacent land uses are primarily industrial with some residential uses to the east of the Alafia River and US 41.
- **Security:** Williams Park is a non-staffed Hillsborough County park, and does not have a gate at its entrance on US 41. The park itself is highly visible due to its location adjacent to US 41. The hours of operation are from sunrise to sunset. Additional lighting would be necessary for this site to accommodate park-and-ride passengers. According to management with the Hillsborough County Parks, Recreation, and Conservation Department, there is not a current substantive safety problem at Williams Park that is either known or can be documented. The park is busy with recreationists who use the boat ramps and fishing piers. Williams Park is included in routine patrols by a county park ranger or maintenance staff, and the Hillsborough County Sheriff's Department.
- **Amenities:** Lighting is provided on this site. Increased lighting will likely be required for the vessel loading and parking areas. Restrooms and vending machines are also available in Williams Park. Waiting areas with shelters would need to be constructed for passenger safety due to Florida's sub-tropical weather patterns.

⁵ Hillsborough County City-County Planning Commission, <http://www.theplanningcommission.org/>

Figure 2.6 Williams Park Docks in Gibsonton: Boat Launch Area and Docks (looking west)



Figure 2.7 Williams Park Docks in Gibsonton: Westmost Dock and Fishing Pier



Figure 2.8 Williams Park Docks in Gibsonton: Center Dock at Boat Launch Ramp

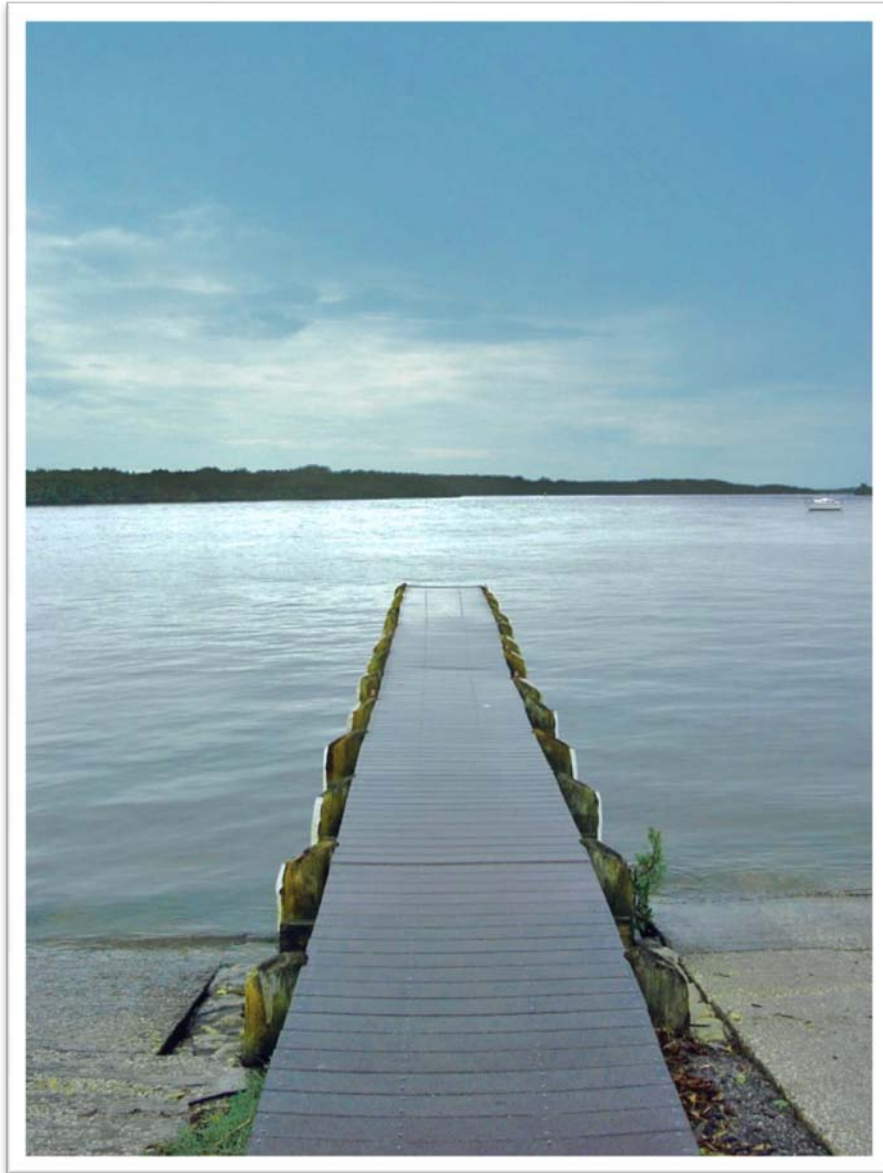
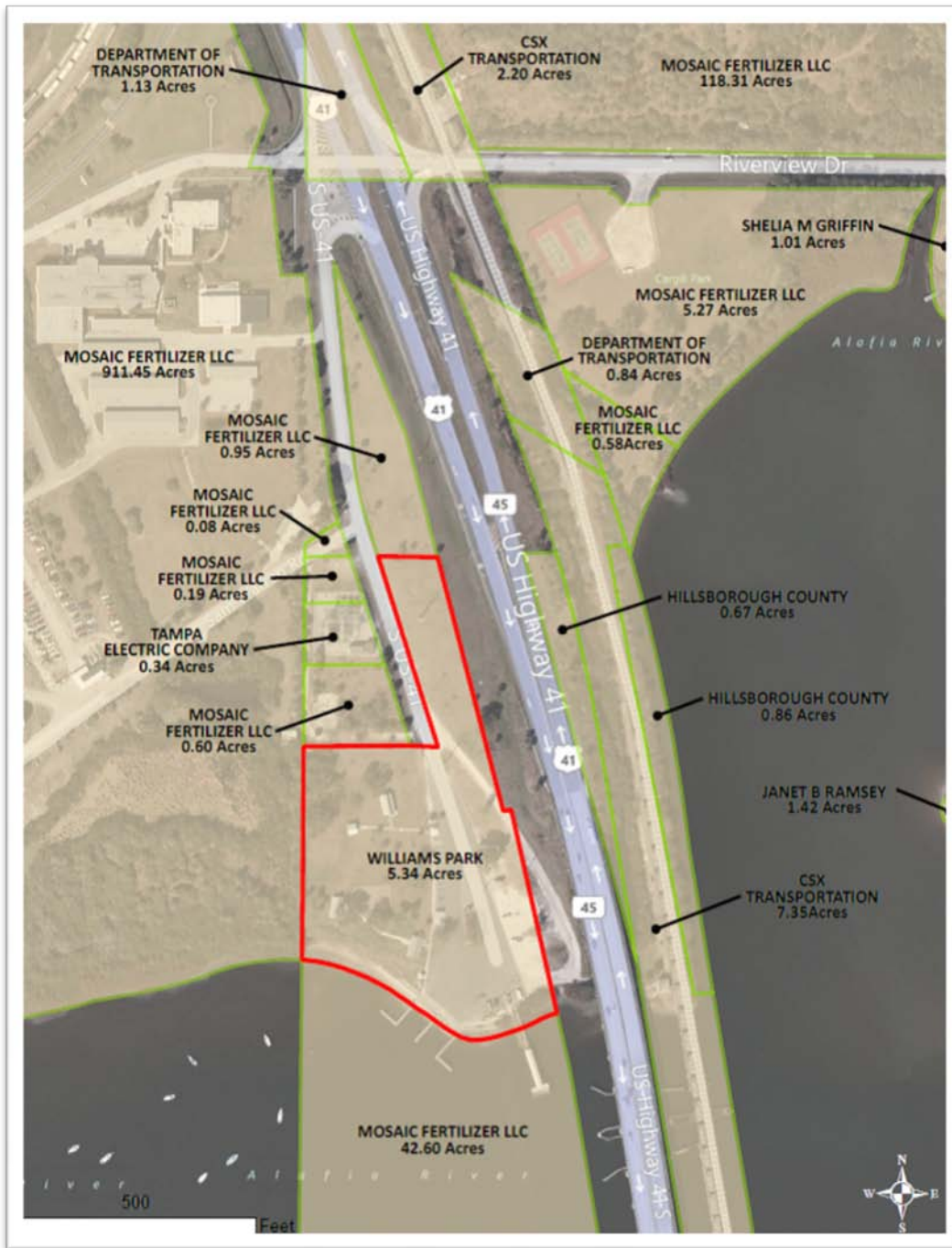


Figure 2.9 Parcels Adjacent to the Proposed Gibsonton Ferry Station



Shaded areas represent parcels

Figure 2.10 Parking Lot Adjacent to the Proposed Gibsonton Ferry Station

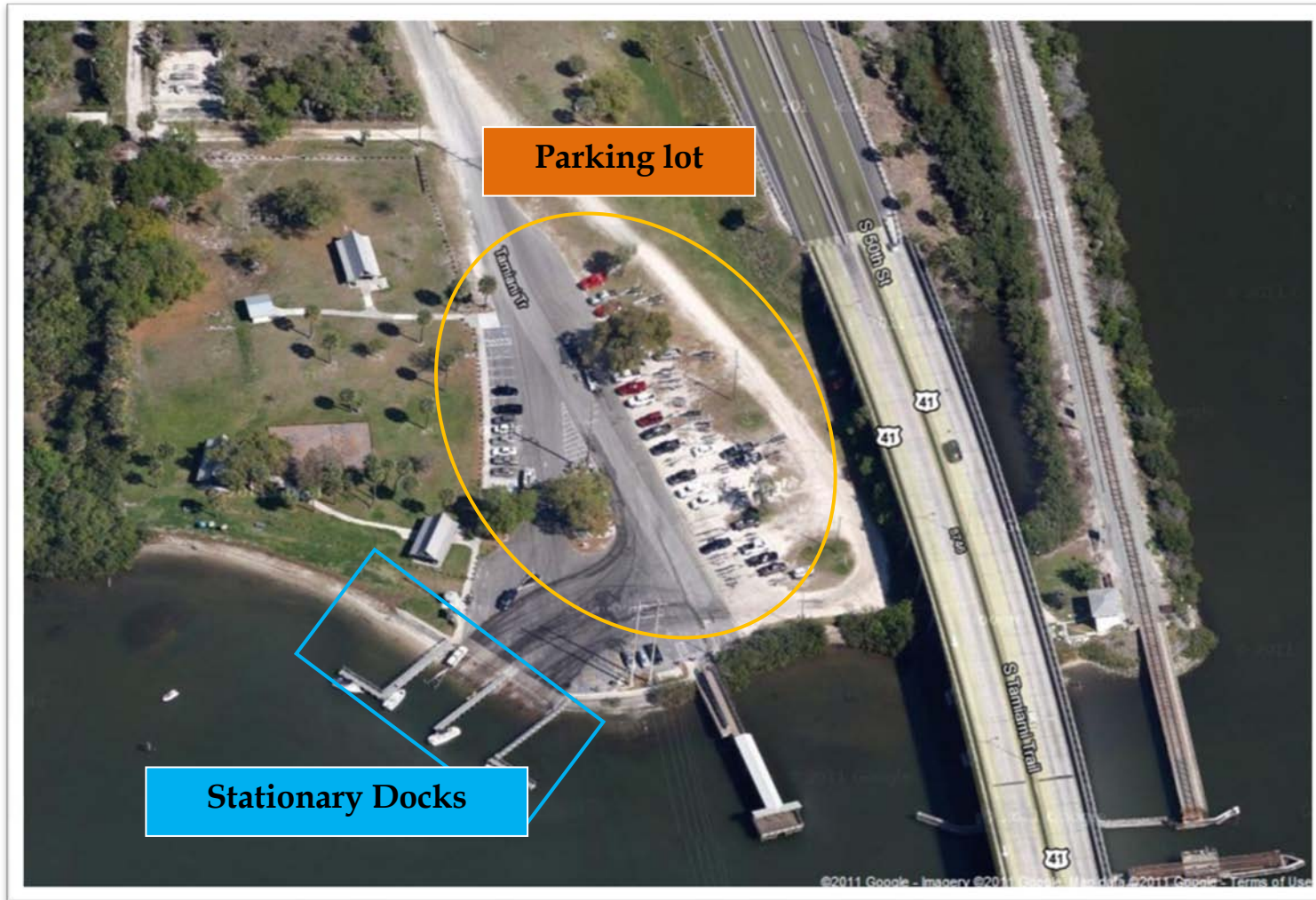


Figure 2.11 Access Road Connecting US 41 to Williams Park (looking south with US 41 to the east)



Figure 2.12 Existing Parking at Williams Park (looking north)



Figure 2.13 Existing Parking at Williams Park (looking southwest)



2.2 EVALUATION OF ACCESS TO STATIONS

Access to MacDill Air Force Base Station

The three main work centers at MacDill AFB – Base Hospital, Centcom, and Socom – are located 1.7 miles, one mile, and one-half mile, respectively, from the dock, as shown in **Figure 2.14**.

An evaluation was conducted by the study team to estimate driving time from the proposed MacDill AFB docking station to the three major work centers at MacDill AFB. The results of the evaluation indicate that the travel times from these work centers are six minutes, three minutes, and two minutes, respectively, assuming non-linked trips.

Of the 19,000 total employees working on the base, 80 percent work within one mile of the dock. There is an interconnected and comprehensive roadway, sidewalk, and bicycle trail network connecting the proposed MacDill AFB docking station with the rest of the base. The AFB operates a circulator shuttle that takes approximately 30 minutes to cover the entire base. The on-base shuttle, bicycling, and/or walking may be feasible for most water ferry passengers. However, additional transportation service may be needed to move ferry passengers to their workplace. MacDill AFB needs to confirm potential use of the existing shuttle for that purpose.

Access to Gibsonton Station

US 41 connects residents living south and north of the proposed Gibsonton water ferry station. This is an industrial corridor with no sidewalks or bicycle lanes. Riverview Road to the north and Gibsonton Drive to the south connect people living east of the station, with Gibsonton Drive providing the closest access to an Interstate 75 interchange. According to the interview with HART, if the proposed ferry service becomes a favorable commuter choice, HART could serve this station with connecting bus service(s).

Traffic Impact Analysis

To address the traffic impact of the proposed ferry station and park-and-ride lot to US 41 and Riverview Drive, the study team conducted a traffic impact analysis. Results of the analysis indicate that the additional traffic generated by the ferry station and the park-and-ride facility added to the intersection during the AM Peak and PM Peak hours will have a moderate effect on the operation of the signalized intersection.

The overall intersection LOS is reduced, and the delay is increased, but the effects are minor, and the intersection will still operate at an acceptable LOS of D or higher. The northbound left turn lane may need to be lengthened by 50' to 100' to accommodate vehicle queues. Further, the intersection should be monitored for any increase in northbound left turn vehicle crashes. If crashes increase, a protected/permissive or protected only left turn phasing should be considered. The detailed analysis is documented in **Appendix B**.

Figure 2.14 Location of the Three Major Work Centers at MacDill AFB



Travel Time Analysis

Additional evaluation was conducted by the study team to estimate driving time from different Traffic Analysis Zones (TAZs) to the proposed Gibsonton Station. MacDill AFB employees residing in each TAZ were estimated using MacDill AFB employee home zip code data and the population density distribution in the TBRPM version 7.1. A total of 27 TAZs were identified as having more than 100 MacDill AFB employees. The GIS shape file of these TAZs was exported to Google Earth to calculate travel distance and travel time from each TAZ to the Gibsonton Station.

The results indicate that the longest travel distance from a TAZ (TAZ ID: 662), with 100 or more employees to the Gibsonton Station is 21 miles, with an estimated travel time of 34 minutes. The shortest travel distance is 4.2 miles, with an estimated travel time of nine minutes. The majority of the travel distances and travel times are between five and 15 miles, with estimated travel time between ten and 25 minutes. The weighted average of travel distance and travel time are 10.5 miles and 22.4 minutes, respectively. The detailed result is summarized in **Appendix C**.

2.3 Navigation

Vessels

Vessels can be categorized by their physical and mechanical characteristics. Physical characteristics include the hull type and vessel dimensions, both of which can affect the design of both the vessel and passenger facilities. **Table 2.1** summarizes a variety of hull types prepared by the Society of Naval Architects and Marine Engineers.

It is common for vessel fuel consumption to double as speeds increase from 25 to 30 knots. This fuel consumption can easily increase operating costs by \$100 per hour. The paradox of this fuel consumption curve is that higher speeds make little difference in overall travel time on short routes. For example, for this proposed ferry route, the total distance is less than seven miles. The difference between a 25-knot vessel and a 30-knot vessel on this ferry route would be about three minutes in travel time. It may be feasible to initiate service on the proposed route with vessels operating at speeds of 25 knots (30 mph or 50 km/h) while trying to maximize loading and unloading efficiency to make the total travel time competitive with driving.

Waterway

The main channel in Tampa Bay is deep enough for any type of ferry boat. Water depth outside of the main channel, however, is very shallow (less than five feet). Thus, the hydraulic impact when traveling outside of the main channel is significant. Operators must also be cautious of sand bars, which change locations throughout the year. There are no speed restrictions in Tampa Bay away from the shore. However, when there are vessels traveling in the main channel, such as cruise ships and other larger vessels, the proposed ferry boats may need to yield to the main channel traffic to maintain safe operating standards. The ferry boat operator(s) would have to coordinate with ship traffic in Tampa Bay via radio and use discretion when crossing in front of or behind other vessels in the main channel. In addition, the ferry boats must remain one-half mile away from ships carrying ammonia cargo.

Occasionally, strong eastern winds can cause waves up to six feet in Tampa Bay. The waves and ship wakes may impact the water ferry vessel at MacDill AFB complicating loading and unloading. Severe thunderstorms will interrupt ferry service as well.

The channel on Alafia River is about 200 feet wide. All boats, including the proposed ferry boats, are required to operate under slow speed (25 miles per hour) in this channel yearround west of US 41 due to the restrictions of Manatee Speed Zones. In the event that the Mosaic cargo boat is moving from its port on the Alafia River, the ferry boats need to wait approximately 10 minutes if they are entering from Tampa Bay.

These waterway characteristics will be considered when estimating the ferry travel time.

2.4 SUMMARY OF FINDINGS

A summary matrix of the evaluation findings for the above mentioned factors - station characteristics, accessibility, and navigation - is provided in **Tables 2.2** and **2.3**. These factors were used to refine ridership estimates.

Table 2.1. Vessel Types Summary

Vehicle Type	Advantage	Disadvantage
Monohull	<ul style="list-style-type: none"> • Low capital cost • Low maintenance cost 	<ul style="list-style-type: none"> • Speed slower than 30 knots • Operate on relatively protected water
Catamaran	<ul style="list-style-type: none"> • Stable platform • Great maneuverability • Require low draft • Reasonable economy of operation 	<ul style="list-style-type: none"> • Comparing to monohull: • Higher capital cost • Wider speed berth • Higher fuel cost increase at low speed
Hydrofoil	<ul style="list-style-type: none"> • Low wake • High speed • Low fuel usage 	<ul style="list-style-type: none"> • Require deep draft • Susceptible to disablement by submerged or floating flotsam
Small Water plane Area Twin Hull (SWATH)	<ul style="list-style-type: none"> • Stable during rough head seas with normal cruising speed 	<ul style="list-style-type: none"> • Not available
Surface Effect Ship	<ul style="list-style-type: none"> • Low fuel usage • High speed 	<ul style="list-style-type: none"> • High capital cost per seat • High maintenance requirements and costs • Susceptible to speed loss in heavy sea conditions • Less comfortable ride
Hovercraft	<ul style="list-style-type: none"> • Attractive for shallow areas • Faster than other vessels • For short distances, these vessels can also operate across land to sites 	<ul style="list-style-type: none"> • High capital and maintenance costs • Bumpy rides • High levels of exterior noise

Source: Transit Capacity and Quality of Service Manual—2nd Edition

Table 2.2 Summary Matrix of Factors Impacting Gibsonton Ferry Service and Proposed Improvements

Ferry Service Components		Important Findings for Gibsonton Ferry Service	Significant Impacts to Ridership (Yes/No)
Station	Dock	<ul style="list-style-type: none"> Requires new or upgraded dock(s) to accommodate commercial ferry 	No
	Security	<ul style="list-style-type: none"> Requires increased lighting for passenger parking and waiting areas 	Yes
	Parking	<ul style="list-style-type: none"> Requires additional parking spaces at the ferry terminal 	Yes
	Amenities	<ul style="list-style-type: none"> Requires additional lighting Requires a waiting facility/shelter Requires improved signage 	Yes
Access	Auto	<ul style="list-style-type: none"> Traffic impacts of the ferry passengers are insignificant Travel distance and time will impact ridership 	Yes
	Transit	<ul style="list-style-type: none"> Potential for HART to provide express bus service(s) 	Yes
	Shuttle	<ul style="list-style-type: none"> No requirement 	No
Water Transport	Vessel	<ul style="list-style-type: none"> Cruising speeds of 35 knots Shallow draft (18 inches at speed) Carries 42 passengers Requires 2 crew members 	Yes
	Waterway	<ul style="list-style-type: none"> Requires low speed in the Alafia River channel Requires clearance time of Mosaic's cargo boat (approx. 10min delay) May require yielding to main channel vessels in Tampa Bay Requires cautious operation outside of main channel in Tampa Bay due to sandbars and shallow depths 	Yes

Table 2.3 Summary Matrix of Factors Impacting MacDill AFB Ferry Service and Proposed Improvements

Ferry Service Components		Important Findings for MacDill AFB Ferry Service	Significant Impacts to Ridership (Yes/No)
Station	Dock	<ul style="list-style-type: none"> New floating dock would be required 	No
	Security	<ul style="list-style-type: none"> Requires security check point at the ferry terminal 	Yes
	Parking	<ul style="list-style-type: none"> A small parking lot exists; limited demand expected 	No
	Amenities	<ul style="list-style-type: none"> Requires lighting at the security check point Requires a waiting facility/shelter 	Yes
Access	Auto	<ul style="list-style-type: none"> No requirement 	No
	Transit	<ul style="list-style-type: none"> No requirement 	No
	Shuttle	<ul style="list-style-type: none"> Requires coordination with MacDill AFB Shuttle for service to the ferry terminal 	Yes
Water Transport	Vessel	<ul style="list-style-type: none"> Cruising speeds of 35 knots Shallow draft (18 inches at speed) Carries 42 passengers Requires 2 crew members 	Yes
	Waterway	<ul style="list-style-type: none"> No restrictions 	No
		<ul style="list-style-type: none"> May require yielding to main channel vessels in Tampa Bay Requires cautious operation outside of main channel in Tampa Bay due to sandbars and shallow depths 	Yes

3.0 Gibsonton to MacDill Air Force Base Ridership Estimates

This section describes the methodology used to develop a range of ridership estimates based on best and worst case conditions. The methodology incorporates a variety of data and tools, including a survey and trip information from the TBRPM.

- **MacDill AFB Employee Survey.** To support the estimation process, an online survey was conducted among MacDill AFB employees residing in the greater Gibsonton area. The survey was designed to capture key input on service characteristics, including travel time, travel cost, station access, and other amenities. For example, questions were asked in regards to home location (city and zip code), work schedule, travel time and distance from home to work and from home to the proposed Gibsonton station, rank of primary factors considered when making decisions on commuting mode choice (transit vs. personal car), and willingness to use the proposed ferry service. The intent of this survey was to develop a better understanding of the potential market. The survey questions and highlights of the results are provided in **Appendix D**.
- **Tampa Bay Regional Planning Model.** TBRPM was re-examined for potential use in the refinement of ridership estimates for ferry service between MacDill AFB and Gibsonton as part of the Phase Two Study. The latest adopted version of the model was reviewed (TBRPM 7.1), focusing specifically on the trip attractions and productions associated with MacDill AFB. It was determined that without completion of a subarea validation, the TBRPM should not be used. It does not accurately reflect trip patterns for this micro analysis. However, it does provide relevant information for trip length and travel time for select origin/destination (O/D) pairs. A detailed review of the TBRPM is provided in **Appendix E**.

Based upon the above considerations, place of residence data (originally provided by MacDill AFB in Phase 1) were combined with the survey data, trip distance and travel time provided by TBRPM, input from stakeholder interviews, and an enhanced analysis of service operational parameters (water, station, access) to refine the original Phase One ridership estimates. The methodology and results are discussed in detail below.

3.1 RIDERSHIP ESTIMATE METHODOLOGY

Two ridership estimation methods were developed to analyze the market share (ridership) for the proposed ferry service. One method was developed based on the survey responses received from MacDill AFB employees. Each individual response was evaluated based upon defined criteria (survey based ridership estimate). The other method was developed based upon the Phase I study methodology. Employees grouped by each individual TAZ were evaluated based upon defined criteria (TAZ level ridership estimate). The ridership estimates using these two methods were then compared to check the reasonableness of the estimate.

For each method, high speed (best case scenario) and low speed (worst case scenario) ridership estimates were developed for the Gibsonton/MacDill AFB route. Ridership estimates were developed for one direction – home to work. This was considered a conservative estimate given that the security screening delay is greater in the AM commute. A series of assumptions were defined for each method under best case and worst case scenarios. The assumptions for best and worst case conditions are provided in **Table 3.1** for each parameter.

Table 3.1 Common Assumptions Used for Both Ridership Estimate Methods

Common Parameters for Ridership Estimate	High Speed Best case	Low Speed Worst case
Ferry speed (mph)	40	25
Ferry travel time ⁽¹⁾ (minutes)	13	18
Safety zone travel time (minutes)	2	2
Vessel speed under severe weather ⁽²⁾ (mph)	15	10
Severe weather penalty on ferry travel time (minutes) - calculated from vessel speed under severe weather	12	18
Waiting time for ferry (minutes)	5	5
Loading duration (minutes)	5	5
Unload plus security check duration (minutes)	7	7
Time on shuttle ⁽³⁾ from ferry station to Socom and Centcom (minutes)	5	5
Time on shuttle from ferry station to Base Hospital (minutes)	5	15
Time on shuttle from ferry station to other work centers(minutes)	15	20
Ferry Fare ⁽⁴⁾ (one way)	\$2.50/\$5.00	\$5.00/\$2.50

Notes:

1. Ferry travel time is calculated based on 100 yard safety zone around the ramp at each station, 5 mph travel speed in each safety zone, 1 mile of restricted speed (25 mph) in Alafia River channel, 25 or 40 mph operation in open water, and 6.5 miles of total on water distance.
2. Under severe weather, vessel speed will be 25 mph in Alafia River Channel, and 15 mph in Tampa bay for best case or 10 mph in Tampa bay for worst case.
3. Shuttle is assumed to leave after the last passenger comes through security check.
4. Both \$2.50 and \$5.00 fares were tested for best case and worst case scenarios. When the ferry fare is \$2.50 for best case, it is \$5.00 for worst case; when ferry is \$5.00 for best case, it is \$2.50 for worst case. The first combination (best case: \$2.50; worst case: \$5.00) represents an ideal situation that lower fare is paid when premium service is provided; the second combination (best case: \$5.00; worst case: \$2.50) represents a more realistic situation that higher fare is paid when premium ferry service is provided.

Survey Based Ridership Estimate

The survey based ridership estimation methodology treats each completed survey as a “potential rider”. A total of 1,184 surveys were completed. A subset of the survey questions were used to support development of an evaluation process designed to determine whether or not a “potential rider” would or would not ride the ferry. The questions used to support decision criteria included: home zip code; driving time from home to the proposed Gibsonton station; existing cost to commute to work; identification of work center at MacDill AFB; auto commute time; rank of importance on a scale of 1 to 10 for travel time, travel cost, and travel time reliability; and likelihood of using ferry to commute on a regular basis. After identifying these parameters, survey respondents were eliminated if: (1) the respondent failed to provide values for the above identified parameters; or (2) it takes more than 25 minutes for the respondent to drive from home to Gibsonton station. A total of 129 respondents were eliminated from the survey database as a result.

Using the above questions, three calculations were completed for each record to ascertain travel time savings using ferry, travel cost savings using ferry, and travel time reliability associated with the ferry service. These three were selected in part because they ranked as the three most important service factors by respondents.

- **Travel time savings** using the ferry was defined as the reduction in travel time a commuter experiences by using the water ferry as opposed to his/her auto. A positive travel time savings indicates that commuting by ferry takes less time than commuting by auto; a negative value indicates that commuting by ferry takes more time. If the ferry commuting time is shorter than auto commuting time, the ferry service is considered to be advantageous.
- **Travel cost savings** using the ferry was defined as the additional travel cost incurred by a commuter using his/her auto compared to commuters using the ferry. A positive travel cost saving indicates that commuting by ferry costs less than commuting by auto. If ferry commuting cost is less than auto commuting cost, ferry service has an advantage over auto.
- **Travel time reliability** using the ferry, in this study, is defined as the additional travel time using the ferry under severe weather as a percent of the total travel time using the ferry. For example, if a commuter’s total travel time using the ferry is 60 minutes, when under severe weather, the travel time is 12 minutes longer (best case scenario in Table 1), then the travel time reliability is calculated to be 20% ($12/60 = 20\%$). The lower this percent is, the more reliable the ferry service is.

A scoring system was created to calculate the score for the three factors under the best and worst case assumptions. The total score for a respondent is the sum of the score for the three factors weighted by the rank (a scale of 1 to 10) provided for these three factors in the survey. After the total score is calculated, the potential for a respondent to become a ferry user was evaluated based on a rule: if a respondent indicated that he/she would be likely use the ferry service to commute regularly, and if his/her total score was greater than 15, the respondent is counted as a ferry rider. The scoring system is described in **Table 3.2**.

Table 3.2 Scoring System Created for Survey Based Ridership Estimate

Factors	Rules to Calculate the Score
Travel Time Savings Using Ferry (a)	Score (a) = 1, if travel time using auto is not more than 5 minutes faster than the ferry service; Score (a) =0, otherwise
Travel Cost Savings Using Ferry (b)	Score (b) = 1, if travel cost using auto is greater than the cost of using the ferry service; Score (b) =0, otherwise
Travel Time Reliability Under Severe Weather (c)	Score (c) = 1, if extra travel time under severe weather is less than 20 percent of the total travel time using the ferry service; Score (c) =0, otherwise
Rank (a,b,c)	Rank (a,b,c) = 1 through 10; level of importance determined from survey responses
Total Score	Score (a)×Rank (a) + Score (b)×Rank (b) + Score (c)×Rank (c) Total potential score = 30
Potential Ridership	The respondent is considered to be a ferry rider if 1) the study respondent is likely to use a ferry service to commute to work; and 2) the total score is greater than 15 points; otherwise, the study respondent is not considered to be a ferry rider

Based on this scoring system, the total number of potential ferry riders within the survey group was calculated. Under the best case scenario, the total ridership within the survey group was estimated to be 397 and 268 with a one way ferry fare of \$2.50 and \$5.00 respectively; for the worst case scenario, the total ridership within the survey group was estimated to be 96 and 160 with a one way ferry fare of \$5.00 and \$2.50 respectively.

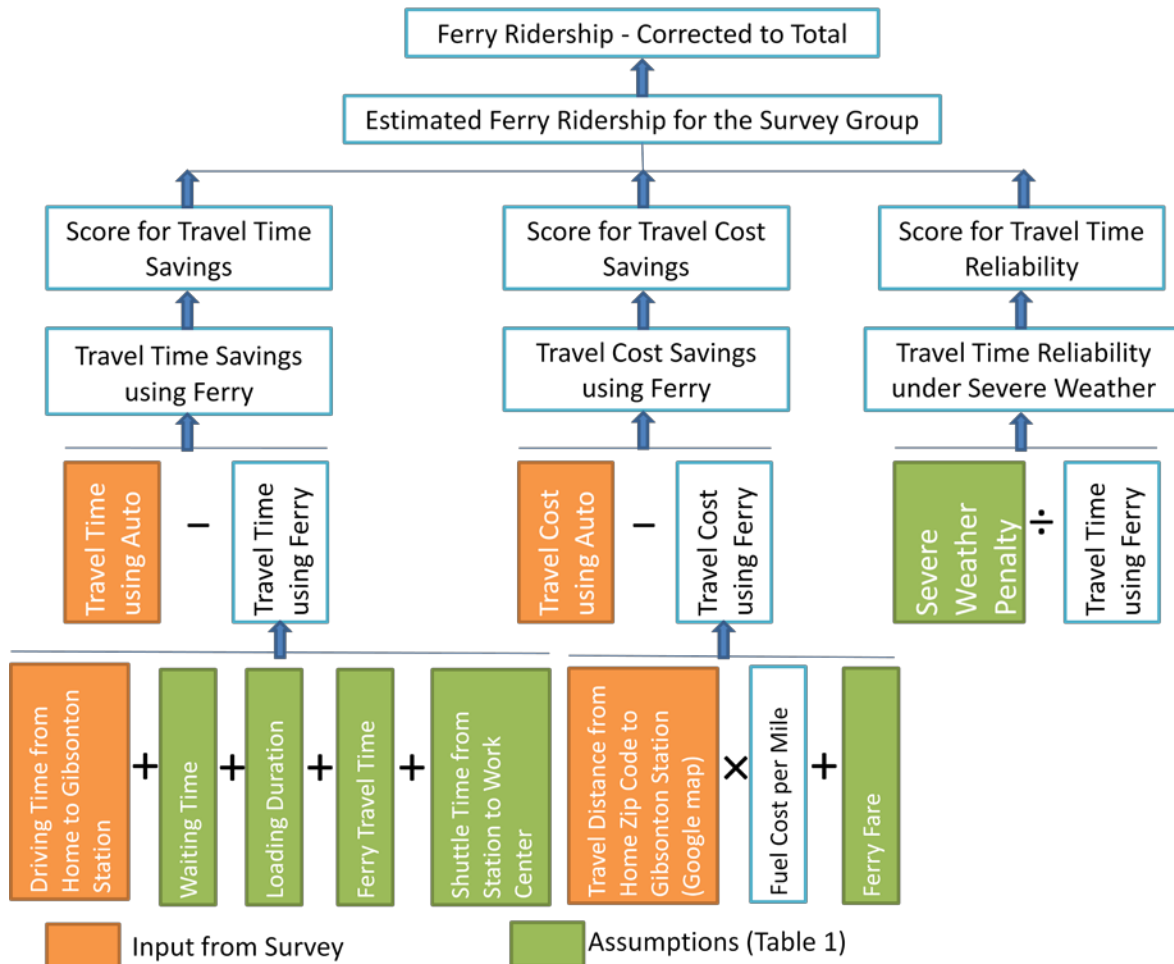
After the ridership estimates for the survey group were calculated, the sample was expanded to represent the full population. All the survey respondents were summarized by their home zip code, as provided by MacDill AFB. It was assumed that the employees who participated in survey were most likely to use the ferry service; a transit acceptance factor of 10 percent was applied to the remaining employees, consistent with Phase One. The expansion was calculated as follows. The estimated riders were summed for each zip code and compared to the number of completed surveys; this provided the percent of completed surveys that resulted in a ferry rider. A 10% transit acceptance factor was assumed for all non-respondent employees. The two percents were then applied to the remaining employees (total minus respondents) to calculate the additional ferry riders.

- For example, if zip code #1 has 1,000 employees; 100 completed the survey; and 10 were identified as ferry riders; expanding the sample to the population would consist of:
 - $(1,000 - 100) \times (10/100) \times 10\% = 9$; total potential riders would be $10 + 9 = 19$.

Under the best case scenario, the total ridership was estimated to be 594 and 401 with a ferry fare of \$2.50 and \$5.00 respectively; for the worst case scenario, the total ridership within the survey group was estimated to be 137 and 226 with a ferry fare of \$5.00 and \$2.50 respectively.

An overview of the parameters/factors and method used in the survey based ridership estimates are presented in **Figure 3.1**.

Figure 3.1 Overview of Survey Based Ridership Estimate



Refined Phase One Based Ridership Estimate

In Phase One, four factors were identified as critical to commuter mode choice: travel time savings using ferry; travel cost savings using ferry, frequency of ferry service (headways), and community transit acceptance. Travel time savings and travel cost savings are based on a comparison of auto and ferry trips; travel time and travel cost were estimated and compared for both auto and ferry. Frequency of service and transit acceptance were defined only for ferry service; auto is assumed to have the advantage given current level of auto acceptance (it is the primary commuter mode) and unparalleled flexibility (frequency is at a driver's discretion). In this Phase II Study, based on survey input, the top three important factors that respondents identified are travel time, travel cost, and travel time reliability. Therefore, travel time reliability was used to replace headways in the revised analysis.

In the Phase One Study, the travel time and distance from home to work using auto was obtained from the TBRPM 7.0 model, with the whole Gibsonton area aggregated into one super zone. Therefore, all the commuters in this area had the same travel time and distance using auto. For this Phase Two Study, the travel time and distance were obtained from the TBRPM 7.1 model at the TAZ level. TAZs with over 100 base employees were used as the sample population. The number of employees was based on an overlay of the place of residence zip code data provided by MacDill AFB. All other TAZs in the market area were assumed to have the same percent of ferry riders.

Similarly, in Phase One, travel time and distance from home to the proposed Gibsonton station were estimated to be an average of 17 minutes and 10 miles respectively for the entire study area. In this Phase Two Study, the travel time and distance from home to the Gibsonton station were both estimated using Google map for each TAZ with over 100 employees. Again, all other TAZs in the market area were assumed to have the same distribution of travel time and distance.

In Phase One Study, travel costs of using ferry did not account for the fuel cost driving from home to the Gibsonton station. This cost has been added to the ferry cost in the Phase Two Study.

In Phase One study, the ferry travel time from the Gibsonton station to MacDill AFB did not consider the extra time to leave and enter the safety zones around the boat ramp. It also did not consider the security check time. In the Phase Two Study, a new set of assumptions was developed to account for the parameters that should be considered as part of the travel time using the ferry service.

In Phase One, a scoring system was developed to measure the impacts of travel time savings, travel cost savings, and headways on commuters' mode choice decisions. In Phase Two, this scoring system was modified to reflect the change of factors used, and importance of these factors. The scoring system is described in **Table 3.3**.

Table 3.3 Scoring System Created for Phase I Based Ridership Estimate

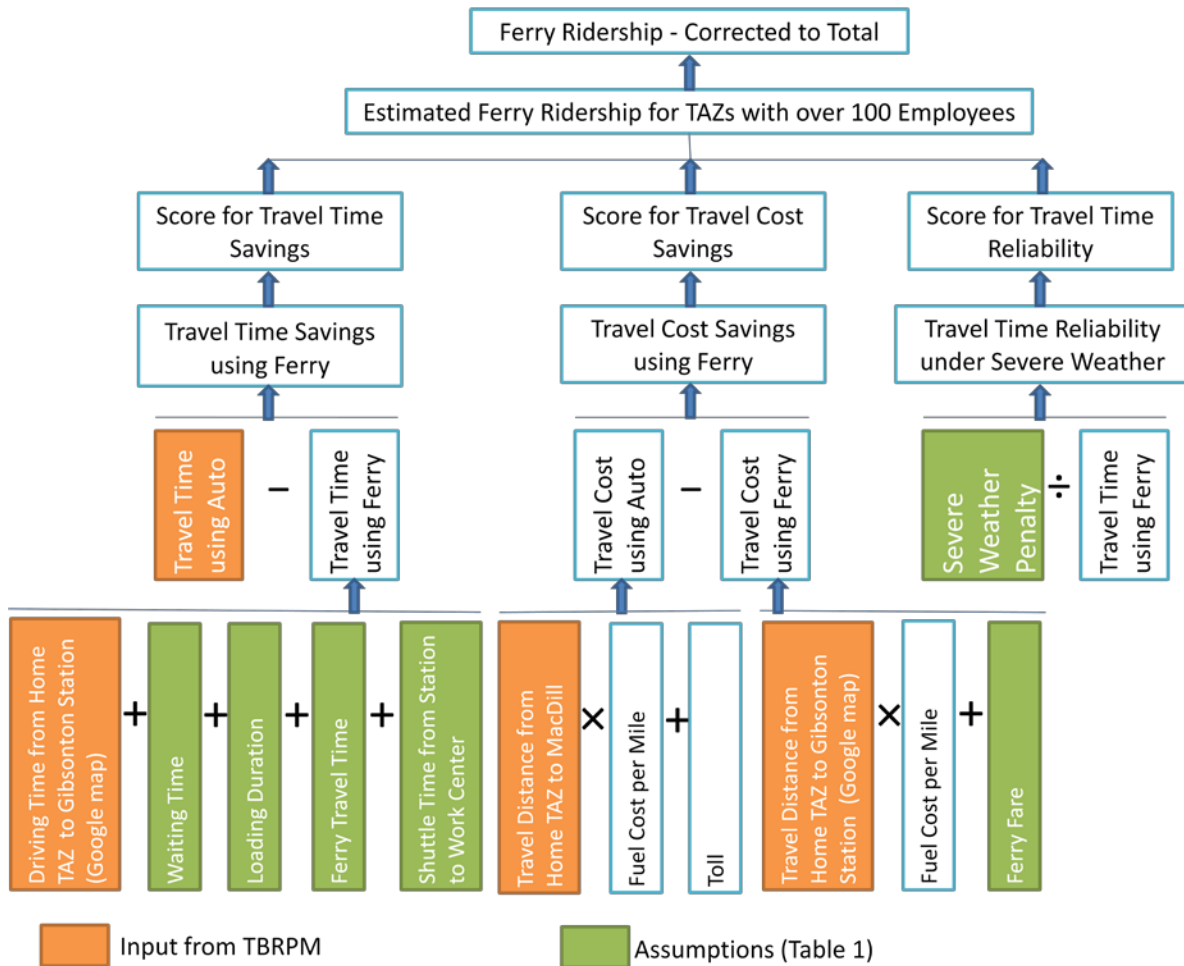
Factors	Rules to Calculate the Score
Travel Time Savings using Ferry (a)	Score (a) = 35 for travel time savings greater than or equal to 5 minutes; Score (a) = 15 for travel time savings between negative 5 and 5 minutes; Score (a) = 0 for travel time savings less than negative 5 minutes
Travel Cost Savings using Ferry (b)	Score (b) = 35 for cost savings greater than \$2; Score (b) = 15 for cost savings between \$2 and negative \$1.00; Score (b) = 0 for cost savings less than negative \$1.00; Score (b) = 0 if commute time savings are less than negative 15 minutes
Travel Time Reliability Under Severe Weather (c)	Score (c) = 30 when the severe weather penalty is less than 15% of total travel time; Score (c) = 15 when the severe weather penalty is between 15% and 25% of total travel time; Score (c) = 0 when the severe weather penalty is greater than 25% of total travel time; Score (c) = 0 if commute time savings are less than negative 15 minutes
Total Score for a TAZ	Score (a) + Score (b) + Score (c)
Potential Ridership for Each TAZ	(Total Employees in a TAZ × Active Duty Rate (74.25%) × Transit Acceptance (10%) × Total Score for a TAZ) ÷ 100

Based on this scoring system, the total number of potential ferry riders for TAZs with over 100 employees was calculated. The sum of employees in the TAZs with over 100 employees is 6,047. The total number of employees in the study area is 9,859. Therefore, the ridership was corrected to the total amount of potential ferry riders by multiplying the potential ferry riders from the sample by a factor of 1.63 ($9,859 \div 6,047 = 1.63$).

As a result, under the best case scenario, the total ridership was estimated to be 372 and 283 with a ferry fare of \$2.50 and \$5.00 respectively; for the worst case scenario, the total ridership was estimated to be 105 and 170 with a ferry fare of \$5.00 and \$2.50 respectively.

An overview of the parameters/factors and method used in the Refined Phase One Based Ridership Estimates is presented in **Figure 3.2**.

Figure 3.2 Overview of Refined Phase I Ridership Estimate



3.2 RIDERSHIP ESTIMATE RESULTS

Using the above described methodologies, the total ridership estimated using the two methods were compared. The assumptions and results are presented in Table 3.4. As shown in the table, ridership estimates from these two methods are comparable. Under the best case scenario, the daily AM commute is estimated to be roughly 300 to 600 riders, dependent on the fare charged. Under the worst case scenario, the range decreases to roughly 100 to 225. These ridership estimates reflect base year conditions. However, given the captive market (e.g., MacDill AFB), future conditions cannot be determined based on regional growth, but rather on what is anticipated to happen over time with levels of base personnel. With recent announcements of downsizing at the AFB, these ridership estimates could remain steady or decrease slightly in the short term. Longer term impacts would be tied to future plans for base staffing levels.

Table 3.4 Ridership Estimate Results Using Two Methods

Service Factors	Best Case		Worst Case	
	2.50 Fare	5.00 Fare	2.50 Fare	5.00 Fare
Ferry speed (mph)	40	40	25	25
Ferry travel time (minutes)	13	13	18	18
Safety zone travel time (minutes)	2	2	2	2
Severe weather speed (mph)	15	15	10	10
Weather penalty (minutes)	12	12	18	18
Waiting time (minutes) for ferry	5	5	5	5
Loading Duration (minutes)	5	5	5	5
Unload+Security Duration (minutes)	7	7	7	7
Shuttle time - Socom and Centcom (minutes)	5	5	5	5
Shuttle time - Base Hospital (minutes)	5	5	15	15
Shuttle time - Other (minutes)	15	15	20	20
Ferry Fare (One Way)	2.5	5	2.5	5
Ridership Estimate -1 (Survey)	594	401	137	226
Ridership Estimate -2 (Phase I method)	372	283	105	170

3.3 ESTIMATE OF COSTS AND REVENUES FOR SERVICE BETWEEN GIBSONTON AND MACDILL AIR FORCE BASE

To develop an assessment of operating and capital costs, along with potential service revenues, a vessel was identified in Phase One. The vessel identified meets the key requirements; it has a cruising speed of 35 knots, has a shallow draft (18 inches at speed), carries 42 passengers, and a crew requirement of two.⁶ The vessel is classified as an exposed water tour vessel and its characteristics are provided in **Figure 3.3**. This vessel was used to illustrate possible operating and capital costs for a Gibsonton to MacDill AFB ferry service. The original Phase One analysis has been updated to reflect revised Phase Two ridership estimates. The cost and revenue estimates represent one possible operation; the numbers will be updated and replaced as part of future service development activities – specifically, input provided by the potential private sector partners as specific vessels are identified and final service profiles are finalized.

As presented above in Section 3.2, potential ridership ranges from 300 to 600 daily round trips under best case conditions and 100 to 225 daily round trips under worst case conditions. The key difference between these two estimates is travel time as dictated by assumed vessel speed, the impact of inclement weather, and the effectiveness of the shuttle service to a passenger's final place of work on MacDill AFB. The range for each represents the impact of low and high fares (\$2.50 vs. \$5.00 per one way trip).

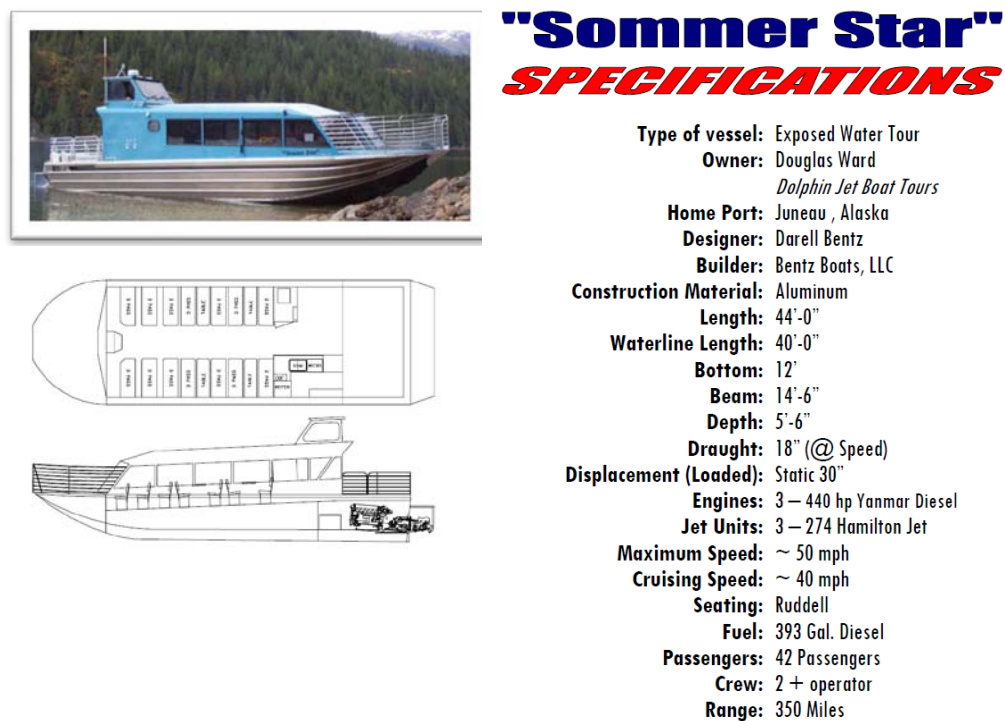
- **Best Case Service Parameters.** **Table 3.5** summarizes the best case analysis. To move 600 passengers in a two-hour peak period, 15 trips are required, using five vessels. This equates to 15 round trips in the AM peak and 15 trips in the PM peak for a total of 30 round trips per day. As configured, there will be one deadhead trip for every loaded trip. This has a significant impact on fuel consumption. For 300 passengers, the number of vessels drops to three and the number of trips drops to eight per peak period.
- **Worst Case Service Parameters.** **Table 3.6** summarizes the worst case analysis. In order to move 225 passengers in a two hour peak period, six trips would be required. Three vessels are required to accomplish this in two hours. This equates to six round trips in the AM peak and 6 trips in the PM peak for a total of 12 round trips per day. As configured, there will be one deadhead trip for every loaded trip. This has a significant impact on fuel consumption. For 100 passengers, the number of vessels drops to two and the number of trips drops to three per two-hour peak period.

For each alternative, operating costs include: crew, fuel, vessel storage, station security, insurance, and administrative costs. Maintenance costs are assumed to be 30 percent of total operating costs. In addition, a contingency of 10 percent of operating costs has been included to cover station/parking operations and maintenance. Revenues are based on a \$2.50 or \$5.00 fare (per direction). For capital costs, \$500,000 is assumed for the purchase of each vessel. Note that an extra vessel to cover breakdowns and routine maintenance has not been included; this would likely be necessary should the initial service be successful.

⁶ www.bentzboats.com/Sommer%20Star.pdf

Based on current assumptions, all alternatives operate at a loss, consistent with other transit and water ferry services. However, the level of farebox recovery is above average. It ranges from 26 to 63 percent of operating and maintenance costs; the daily subsidy requirement ranges from \$1,763 to \$4,864. The primary cost factors are fuel, crew, and maintenance. All of these cost elements will change based upon the vessel selected and the ability to effectively utilize the crew and vessel for off peak purposes. It also should be noted that while the survey results indicate a willingness to pay a premium fare (\$5 per trip), further market analysis should be completed upon finalization of a detailed service plan to validate the ridership.

Figure 3.3 Potential Vessel



POSSIBLE USES

Public Transportation – With its capacity to carry 42 passengers at 40 mph cruising speeds, in water as shallow as 18 inches, along with its low maintenance aluminum hull and Hamilton jet pumps, it offers an attractive alternative to buses and trains along inland waterways.

Tour Operators – Capable of speeds up to 50 mph, hotels, cruise lines, resorts, and tour companies can offer unique trips to enhance the experience of their guests.

Source: www.bentzboats.com/Sommer%20Star.pdf

Table 3.5 Estimate of Costs and Revenues
Best Case Service Parameters

Fare (one way)	\$2.50	\$5.00
Total Daily Riders	600	300
Vessels Required	5	3
Crew (Captain, First Mate, Shore Hand)	\$ 2,048	\$ 1,298
Fuel	\$ 1,890	\$ 1,008
Vessel Storage (Security)	\$ 115	\$ 69
Station Security	\$ 202	\$ 202
Insurance Costs (20% of Operating Costs)	\$ 851	\$ 515
Administrative & Business Costs (10% of Operating Costs)	\$ 511	\$ 309
Total Operating Cost Per Day	\$ 5,617	\$ 3,402
Vessel Maintenance Cost Per Day (30% of Operating Costs)	\$ 1,685	\$ 1,021
Contingency for Station/Parking Operations and Maintenance (10% of Operating)	\$ 562	\$ 340
Total Operating & Maintenance Costs Per Day	\$ 7,864	\$ 4,763
Capital Cost Per Vessel	\$ 500,000	\$ 500,000
Station Development Costs (e.g., Dock, Parking, Security, Amenities)	TBD	TBD
Total Capital Cost (Vessel Only)	\$ 2,500,000	\$1,500,000
Fare	\$ 2.50	\$ 5.00
Revenues/Day	\$ 3,000	\$ 3,000
Profit/Day	(\$ 4,864)	(\$ 1,763)
Annual O&M Subsidy	(\$ 1,264,627)	(\$ 458,308)
Farebox Recovery	38%	63%

Sources: Cambridge Systematics, Inc. analysis.

- Crew costs estimated based upon www.salaryexpert.com
- Dockage costs estimated based upon www.docksearch.com
- Fuel costs estimated based upon vessel operating parameters (www.bentzboats.com) and diesel costs in Florida (www.eia.doe.gov).
- Capital costs estimated by Cambridge Systematics, Inc. based on previous work.
- Annual costs based on 260 days per year.

Table 3.6 Estimate of Costs and Revenues
Worst Case Service Parameters

Fare (one way)	\$2.50	\$5.00
Total Daily Riders (one way)	225	100
Vessels Required	3	2
Crew (Captain, First Mate, Shore Hand)	\$ 1,298	\$ 923
Fuel	\$ 756	\$ 378
Vessel Storage (Security)	\$ 69	\$ 46
Station Security	\$ 202	\$ 202
Insurance Costs (20% of Operating Costs)	\$ 465	\$ 310
Administrative & Business Costs (10% of Operating Costs)	\$ 279	\$ 186
Total Operating Cost Per Day	\$ 3,069	\$ 2,045
Maintenance Cost Per Day (30% of Operating)	\$ 921	\$ 613
Contingency for Station/Parking Operations and Maintenance (10% of Operating)	\$ 307	\$ 204
Total Operating & Maintenance Costs Per Day	\$ 4,297	\$ 2,863
Capital Cost Per Vessel	\$ 500,000	\$ 500,000
Station Development Costs (e.g., Dock, Parking, Security, Amenities)	TBD	TBD
Total Capital Cost (Vessel Only)	\$ 1,500,000	\$ 1,000,000
Fare	\$ 2.50	\$ 5.00
Revenues/Day	\$ 1,125	\$ 1,000
Profit/Day	(\$ 3,172)	(\$ 1,863)
Annual O&M Subsidy	(\$ 824,727)	(\$ 484,337)
Farebox Recovery	26%	35%

Sources: Cambridge Systematics, Inc. analysis.

- Crew costs estimated based upon www.salaryexpert.com
- Dockage costs estimated based upon www.docksearch.com
- Fuel costs estimated based upon vessel operating parameters (www.bentzboats.com) and diesel costs in Florida (www.eia.doe.gov).
- Capital costs estimated by Cambridge Systematics, Inc. based on previous work.
- Annual costs based on 260 days per year.

4.0 Findings and Recommendations

4.1 KEY FINDINGS

The Phase Two study validated findings from the Phase One study and provided a more rigorous evaluation of potential ferry service and anticipated ridership. The following describes the key findings.

Stakeholder Support

- **Key stakeholders support further study.** Interviews conducted with MacDill AFB, Tampa Port Authority, Tampa Bay Pilots, FDOT District Seven, Hillsborough County Departments of Development Services; Real Estate; Parks, Recreation, and Conservation Lands; Mosaic Fertilizer; Florida Aquarium; HART; Tampa Water Taxi Company; and Yacht Starship have helped identify key considerations but failed to identify any fatal flaws. Key issues include security, weather, conflicts with other vessels, liability for safety and personal property, parking capacity, expansion of service, need for a champion/owner, and funding.

Station Access

- **MacDill AFB Station Access.** The station is within 100 yards or less of a small parking lot, a biking/pedestrian linear park, and a main roadway. The three main work centers are within 5 to 7 minutes by shuttle. It is anticipated that majority of riders will take the shuttle and/or walk.
- **Gibsonton Station Access.** The station is located along US 41, which is a main north/south roadway. Access for most riders would be by auto with varying times/distances based on where they live. Survey results suggest 65 percent of respondents live within 15 minutes of the station. A traffic analysis of the interchange between US 41 and Williams State Park access road shows the intersection will still operate at an acceptable level of service. Parking options have been studied; capacity could be an issue should the high end of ridership estimates be reached (assuming SOV).

Station Development

- **MacDill AFB Station.** An existing pier exists on the Northeast border of MacDill AFB in close proximity to the three key employment centers. This pier is equipped with one floating dock currently in use. A second floating dock would be required for a water ferry operation. In addition, a controlled access security check point would be required. The preference would be for an unstaffed, technology-based check point. There are no technical barriers to the needed improvements. Design and funding sources would still be required. The dock is within 100 yards of a potential shuttle stop. Federal funding may be available for the security check point technology installations. Dock construction funding has not been identified but could be covered by the FHWA FBD Grant.
- **Gibsonton Station.** An existing fishing pier exists as do multiple small fixed docks bordering the boat ramp at Williams State Park in Gibsonton. This infrastructure is inadequate for a commercial ferry operation. A new or reconstructed dock would be required to safely support the operation. One of the existing docks could be reconstructed to serve this purpose. Existing parking exists in close proximity but would be inadequate

for high volume parking. Available county/state-owned land provides some additional capacity at Williams Park. Public outreach to the local community would be required. Public restrooms exist; additional lighting and security would likely be necessary. Dock construction funding has not been identified but could be covered by the FHWA FBD Grant.

Navigation

- **MacDill AFB Station Waterway Access.** The Tampa Bay waters providing access to the MacDill AFB station are at least 6-feet deep at all times. The waters surrounding the base are patrolled; the ferry operator would be required to comply with security protocols and access procedures. Access to the dock would be at idle/no wake speed for safety reasons. No other restrictions exist.
- **Tampa Bay Channels.** The channels within Tampa Bay are deep with no speed restrictions; compliance with Harbor Pilot and U.S Coast Guard requirements are necessary. Access to the channel can be restricted for periods of time based on HAZMAT vessels, and cruise ships. Water outside of the main channels can be shallow with shoaling. Poor weather can impact travel conditions.
- **Alafia River Waterway.** The river has deep water. It has year round speed restrictions of 25 mph based on Manatees. Mosaic Fertilizer has a deep water port facility; incoming/outgoing vessels would delay the water ferry; conflict is anticipated to be minimal.
- **Gibson Station Waterway Access.** The Gibson station is located on the Alafia River. Access to the station itself is posted at idle/no wake speed. There is potential for conflict with personal boat launch operations. A new dock should be configured to avoid conflicts with the boat launch. Water depth surrounding the docks needs to be evaluated.

Ridership Estimates

- **Significant ridership exists today.** Two methods were applied and compared to quantify potential ferry ridership. Both methodologies resulted in similar estimates. Under the best case scenario, the daily AM commute is estimated to be roughly 300 to 600 riders, dependent on the fare charged. Under the worst case scenario, the range decreases to roughly 100 to 225. These ridership estimates reflect base year conditions.
- **Future ridership will be tied directly to MacDill AFB operations.** Future conditions will be based on MacDill AFB expansion/contraction, not regional growth – unless the service is expanded to serve non-base traffic. Announcements in September of this year of plans to cut over one thousand on-base jobs could impact future ferry ridership estimates⁷. While the 1,100 positions reflect a relatively small percent of on-base employment – and therefore a small percent of potential ridership – the move could indicate a larger reduction over the coming years.

⁷ <http://www.tampabay.com/news/military/macdill/centcom-to-trim-macdill-personnel-by-1100/1190988>

Definition of Feasible

- **Technically the service is feasible.** A water ferry service has the potential to provide a competitive commuter service for select trips (origin/destination pairs). No fatal flaws have been identified; private sector interest has yet to be evaluated.
- **Ridership estimates indicate there is demand for the service.** Anywhere from 100 to 600 daily riders has been estimated. The estimate is based on survey results with potential riders; geographically, it would be a closed loop, captive market.
- **Funding for the next phase has been identified.** The FHWA FBD Grant (\$475,000) designated for Hillsborough County can be spent on design, preliminary engineering, construction, and capital investment such as ferry boat purchases and docking station improvements. The grant can be used for demonstration projects. Hillsborough County, a local government, or a transportation authority could apply for additional federal funding for capital needs once the existing grant is spent.
- **Local support by community leaders must be provided.** The feasibility study recommendations need to gain support from local governments and potential implementing agencies such as Hillsborough County and the planning sponsor, Hillsborough MPO. These community leaders must adopt the study recommendation that the service is feasible. The Hillsborough MPO Board did find the proposed water ferry service technically feasible at its December 2011 meeting.

4.2 RECOMMENDATIONS/ACTION ITEMS

- **Adopt study recommendation of feasibility and accept federal discretionary grant.** The technical analysis and market research to date suggest a water ferry service between Gibsonton and MacDill AFB is feasible. Adoption of this recommendation creates an opportunity to access the existing \$475,000 grant. *The Hillsborough MPO Board found the service to be feasible on December 6, 2011.*
- **Identify lead agency.** The successful development of the service is based on many factors. The first is identifying an owner that can provide technical and political support and access to long term funding; and an agency eligible to accept and use the available grant.
- **Define initial service.** A description of the proposed service should be developed. The work to date provides a variety of data and analyses that can be used to support a detailed description of the proposed service. This description should specifically lay out a proposal for the use of the grant. This plan should lay out immediate next steps to encumber and spend down the funding, as well as identify future development activities, such as securing additional capital funding to develop a demonstration project. Initial activities could focus on the engineering, design and construction of the necessary dock improvements at Williams Park in Gibsonton. These improvements would support the establishment of a demonstration project, should additional funding become available. This proposal should be prepared and submitted to FDOT. This proposal should explicitly address what will be necessary to move forward following spend down of the initial grant.
- **Develop initial financial plan.** Based upon the ridership estimates, estimated capital and operating costs, revenues, and other potential funding sources, an initial financial plan needs to be developed. The plan should identify revenues, costs, and remaining needs.

Preliminary cost estimates are incomplete, however, the capital costs associated with an initial service are likely to exceed \$2 million (vessels, parking, docks, station improvements, access improvements, etc.).

- **Apply for additional funding.** Using the detailed description of the initial service, the lead agency should explore the process for applying for additional funding. This will include the FHWA FBD Grant as well as other potential sources.⁸ The applications should reflect the need for outer year capital funds to construct the service.
- **Develop preliminary design and engineering plans.** The preliminary system design, including dock, station, and parking elements, needs to be developed. It will also identify any mitigation requirements or ADA compliance issues. Parking capacity will be one of the critical elements. Without efficient and convenient parking, the Gibsonton Station location will not work. Developing an acceptable parking plan is critical for this location. Public outreach also will be critical. Meetings should be held for current boat ramp users of Williams Park and potential ferry boat users in the Gibsonton area and in South Hillsborough County. These meetings should be coordinated with Hillsborough County, HART, and the State of Florida. Public awareness should continue with McDill AFB.
- **Develop a Request for Proposals (RFP).** A request for proposals should be developed to identify and select a private partner. It is anticipated that a private operator with water ferry expertise will operate the service under a contract. This solicitation should coincide with available funding.
- **Select operator and initiate service.** The preferred operator should be selected and contracted with to provide the agreed-upon service. This will require close coordination with MacDill AFB leadership as well as identification of a funding source. Note this should be defined as a demonstration project designed to provide an initial service to gauge level of interest and then expand (or terminate) over time based on success. In addition, key investments, such as dock improvements at Williams Park and MacDill AFB, will add value to the region regardless of ongoing ferry service. This should help minimize the level of risk.

⁸ Discretionary federal funding programs are not anticipated to receive additional allocations at this time.

Appendix A: Summary of Stakeholder Input

INTRODUCTION

As a follow up to the initial evaluation of the feasibility of waterborne passenger service in the Tampa Bay region, Phase Two of the Water Ferry Feasibility Study looks to further evaluate potential service specifically between Gibsonton and MacDill Air Force Base (AFB). The analysis will include further evaluation of the market potential for an initial closed-loop MacDill AFB service; conducting additional market research with MacDill AFB employees; further coordination with MacDill AFB staff to evaluate their commitment to support water-based transit service; evaluation of key station locations; and refining the vessel operational parameters.

The purpose of this phase of the study is to define requirements for the Federal Highway Administration (FHWA) Ferry Boat Discretionary Program (FBD) Grant; conduct outreach with key regional stakeholders to better understand the concerns related to operating a ferry service in the region, and build consensus and support for the project; refine the analysis of the potential station locations; engage potential private sector operators; and develop recommendations for the next phase of the study.

This memorandum details the information provided by the study's stakeholders.

STAKEHOLDER INTERACTION

The initial activity with the study's stakeholders included a kick off meeting with the water ferry stakeholders working group, followed by personal interviews with key stakeholders.

Stakeholders Working Group

The stakeholders working group includes representatives from each organization whose involvement or approval will be necessary for the water ferry service to succeed. The group was assembled during the first phase of the study and reconvened for this phase. A meeting with the working group was held on June 28, 2011 to discuss data collection activities and overall project parameters. The information learned during the meeting is included in the Stakeholder Comments, below.

The following organizations were invited to participate (listed alphabetically):

- Apollo Beach Chamber of Commerce
- City of Oldsmar
- City of Safety Harbor
- City of St. Petersburg
- City of Tampa

- Environmental Protection Commission of Hillsborough County
- Florida Aquarium
- Florida Department of Transportation (FDOT) District Seven
- Hillsborough Area Regional Transit Authority (HART)
- Hillsborough County Development Services Department
- Hillsborough County Public Works
- MacDill AFB
- Pinellas County Metropolitan Planning Organization (MPO)
- Port of Tampa
- SouthShore Roundtable
- Tampa Bay Area Regional Transportation Authority (TBARTA)
- Tampa Downtown Partnership
- Westshore Alliance

Stakeholder Interviews

In addition to the working group meeting, individual interviews were conducted with several key stakeholders. The interviews were designed to capture information critical to refining the service assumptions determined in Phase One, and the identification of fatal flaws. Interviews were conducted with the following organizations (complete list of contacts is provided below):

- MacDill AFB
- Tampa Port Authority
- Tampa Bay Pilots
- FDOT, District Seven
- Hillsborough County Departments of Development Services, Real Estate, Parks and Conservation Lands
- Mosaic Fertilizer
- Florida Aquarium
- HART
- Tampa Water Taxi Company
- Yacht StarShip

STAKEHOLDER COMMENTS

The information provided by the study's stakeholders is organized into seven topic areas: requirements for federal funding; water ferry stations; security; accessibility; navigation; market analysis; operations and private partners.

Federal Funding Requirements

A major objective of Phase Two is to develop a clear understanding of the requirements that must be fulfilled to qualify for the FHWA FBD Grant, and to define “feasibility” as it relates to this funding program. This is critical as Hillsborough County is the recipient of a \$475,000 FBD Grant. However, the service it funds must be considered “feasible.”

Based on the information received from the interview with FDOT District Seven, the FHWA FBD Grant usage must meet the following requirements:

- The FHWA FBD Grant (\$475,000) designated for Hillsborough County cannot be used for feasibility studies for water ferry services. Once the project enters the design phase, the federal grant funds can be spent on design, preliminary engineering, construction, and capital investment such as ferry boat purchases and docking station improvements. The grant can be used for demonstration projects.
- The feasibility study should justify that the water ferry service is meeting the transportation needs of the general public. The study should include a comprehensive analysis to address questions such as: who are the users of the ferry service, what is the projected ferry ridership, how many trips per day are needed, how many vessels are needed, what are the operation and maintenance costs of the service, what are security costs, etc.
- The feasibility study recommendations need to gain support from local governments and potential implementing agencies such as Hillsborough County and the planning sponsor, Hillsborough County MPO. These community leaders must adopt a study recommendation that the service is feasible.
- FDOT District Seven also reported that Hillsborough County, a local government, or a transportation authority could apply for additional federal funding for capital needs once the existing grant is spent. Federal funding solicitation for the FBD program is at the end of each year. Before the solicitation, usually in December, the Special Project Coordinator will send out fact sheets to collect input on different projects in need of funding. After the fact sheets are completed and submitted, the Special Project Coordinator will review them and deliver them to the Central Office. FDOT Central Office will then determine if these projects qualify as funding candidates. The fact sheets must include the amount of funding needed and background information about the project. If the fact sheet is accepted, the project sponsor will be asked to complete the full grant application.

Potential Dock Locations

MacDill Air Force Base

A pier with a floating dock is currently located on the east side of MacDill AFB. The floating dock can currently accommodate two 26-foot security vessels used by the Military Police. The pier and dock are in very good condition. Required improvements would include installation of a new floating, utility improvements, and security infrastructure. The water surrounding the MacDill AFB dock is at least six feet deep at low tide.

Gibsonton

The potential water ferry dock at Gibsonton is located on the north side of the Alafia River and west side of the US 41 bridge, about one-half mile east of Tampa Bay. The dock is located in Williams Park, which is operated by Hillsborough County on leased property from the State of

Florida. The park is open from sunrise to sunset⁹, and includes a parking lot and a large grassy area which could potentially be developed into a parking lot if needed. The park also has two fixed docks and a fishing pier, as well as basic amenities including power and water supply, and restrooms.

The Alafia River, on the west side of the US 41 bridge extending to Tampa Bay, is in the manatee speed zone year-round and will require slow speed for all boats¹⁰. To meet the requirements of water ferry services, the docks and parking lot at Williams Park in Gibsonton require improvements.

Figure A.1 shows the property owners near the proposed Gibsonton site. Williams Park is located on State owned property and operated by Hillsborough County. Mosaic Fertilizer, Inc. owns the properties immediately adjacent to Williams Park to the west, north, and south. US 41 is located directly to the east of Williams Park. The property located on the east side of US 41 is owned by Mosaic Fertilizer.

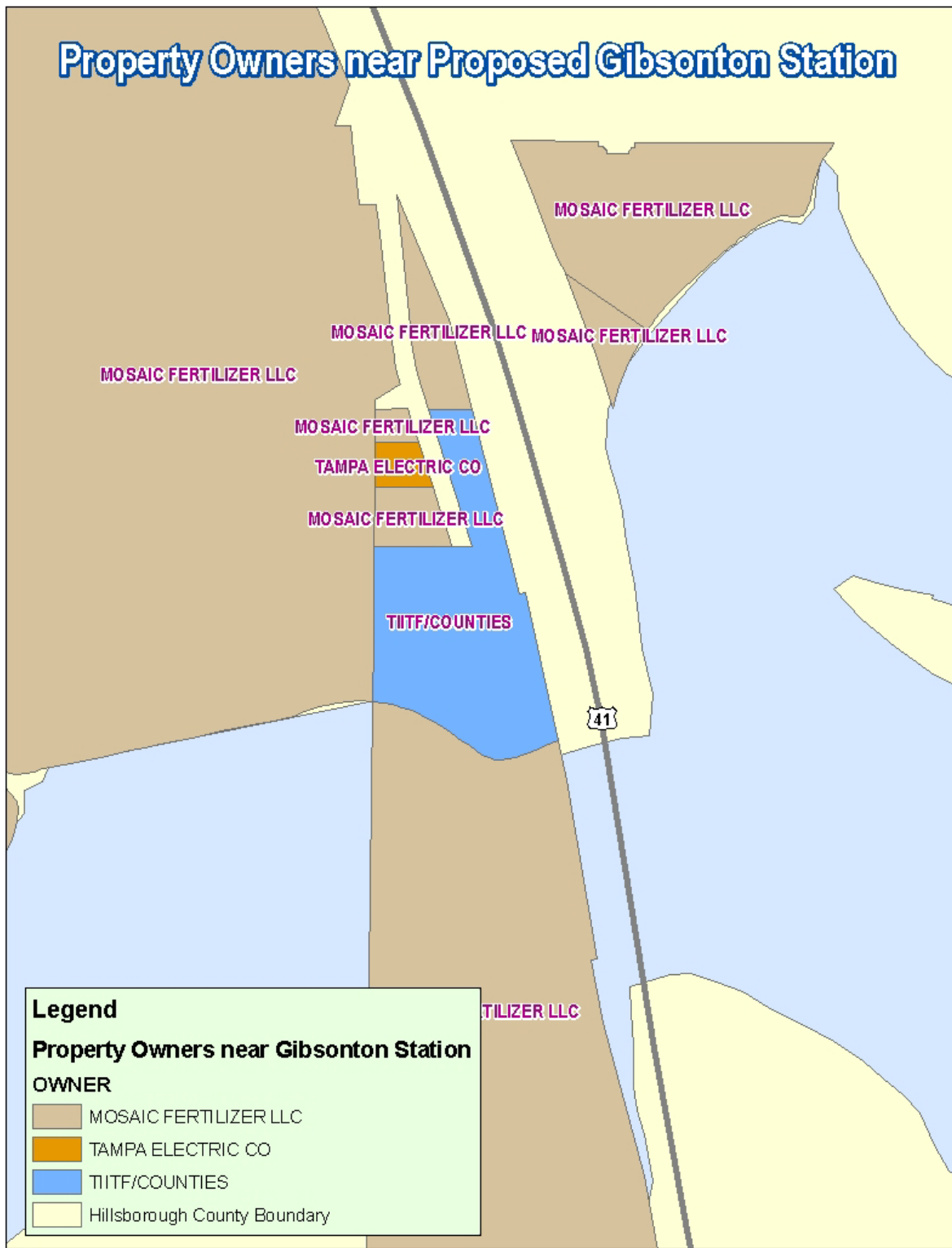
According to Mosaic Fertilizer, over 300 employees work on various shifts at the site northwest of Williams Park. Truck traffic (tanker or dump trucks) can be observed entering and exiting this site 24 hours a day, seven days a week. The signal at the site access road and US 41 operates properly; additional analysis is needed to determine the impact of additional vehicles.

The port along the Mosaic property is a deepwater port. Mosaic utilizes the channel for cargo shipments, on an average of every two to three days. The vessels move 10 knots per hour with the assistance of a tugboat west along the Alafia River to Tampa Bay. However, personal watercraft vehicles move much faster. This property is zoned industrial where there are no wetlands.

⁹<http://www.hillsboroughcounty.org/parks/parkservices/regionalsites.cfm?facilitydetailid=678&selparams=678&selcategory=-1&zipcode=&First=1&Last=5>

¹⁰http://ocean.floridamarine.org/Boating_Guides/products/Boating_zones/east_tampa_bay_boating_zones.pdf

Figure A.1 Property Owners near Proposed Gibsonton Site



Based on the interview with Mosaic, Williams Park seems to be the best candidate site for the proposed ferry station in this immediate area. If this site is selected to be the ferry station site, Mosaic's main concern is liability – it is very likely that vehicles parked at this site will collect drift dust from Mosaic facilities. Current users of the parking lot are boaters and don't appear to notice the drift dust collected on their vehicles during the short time they are parked there. If vehicles are parked there between eight to ten hours a day, people will notice the dust, and will be worried about damages to the paint. It is critical that we recognize Mosaic's property is industrial and will remain that way. Mosaic's other primary concern was safety for ferry passengers. The site is heavily used for fishing and there is a large transient population. Additional lighting and security would be necessary.

Based on the interview and follow-up conversations with Hillsborough County Parks and Real-Estate Departments, the State of Florida Division of Lands leases the property to the County (State Lease Number 2778). The County is discussing the general concept of the ferry operations with Diane Rogowski (850-245-2720, Manager of Leases) with the Division of Lands. If improvements are made to the pier, the County must also work with the Bureau of Submerged Lands. However, according to the County, the State has transferred control of submerged lands to the Tampa Port Authority. At this time the Division of Lands is requesting an outline of the ferry proposal and operations, a description and "bubble map" of site improvements to the dock and parking areas at Williams Park, and a summary of boat operations.

Security

MacDill Air Force Base

Security is a high priority at MacDill AFB. Security checks occur when entering the base and average seven seconds per person for a low level security clearance, which is the most common case. It could take longer if a high level clearance is required.

For HART buses entering the base, passengers who do not intend to arrive for business on MacDill AFB property are required to get off the HART bus before entering the AFB at a HART bus stop. A security guard then boards the bus and gives security checks to passengers remaining on the bus. After all the on-board passengers are cleared, the HART bus enters the base and proceeds to its drop off destinations. Non-MacDill AFB passengers are then picked up when the bus exits the property.

Two different security approaches were discussed by MacDill AFB for the ferry service under study. One approach is to conduct the security check at the Gibsonton station when people board the vessel, the other approach is to conduct security checks after riders disembark the vessel at the MacDill AFB station. Conducting security checks at the MacDill AFB station is the option preferred by MacDill AFB management, as MacDill AFB cannot afford to delegate a security guard at the ferry station for security checks. The most probable and preferable solution is to have a biometric machine for security checks and use turnstiles to control the passage. Security is not a "deal breaker" according to MacDill AFB management.

Gibsonton

Security at the proposed Gibsonton dock is less of a concern. Williams Park at Gibsonton is a non-staffed Hillsborough County park. The park does not have a gate at its entrance on US 41. The hours of operation are from sunrise to sunset. The parking lot may require some security

improvements for park-and-ride passengers. Lighting may be required for those passengers who enter the park and dock very early in the morning at sunrise and late in the afternoon at sunset.

Accessibility

Transportation Access to MacDill Air Force Base Dock

The three main work centers at MacDill AFB – Base Hospital, Centcom, and Socom – are located a quarter mile, one mile, and 1.7 miles respectively from the dock. Of the 19,000 total employees working on the base, 80 percent of them are within one mile of the dock. There is an interconnected and comprehensive roadway, sidewalk, and bicycle trail network connecting the proposed MacDill AFB docking station location with the AFB. In addition, there is a parking lot within 100 yards.

Currently two HART Express Bus Routes¹¹ serve the base during on weekdays – Route 24X (Fishhawk/Riverview/MacDill AFB Express, five services in the AM peak and five services in the PM peak) and Route 25X (South Brandon/MacDill AFB Express, five services in the AM peak and six services in the PM peak). Once the buses enter the base, they stop at the three main work centers before leaving the base. Based on the information received from HART, 50 percent of these buses are dead-head, which makes these two routes very expensive. HART also indicated that if this study would show a travel time advantage for the ferry service, and would show potential reduction in operating costs, HART would consider redeploying these two buses to serve the ferry passengers destined for the Gibsonton station. **Figure A.2** and **Figure A.3** are the route maps for these two express bus services.

The AFB operates a circulator shuttle that takes approximately 30 minutes to cover the entire base. The on-base shuttle, bicycling, and walking may be feasible for most water ferry passengers. However, additional transportation service may be needed to move some ferry passengers to their workplace. MacDill AFB staff needs to confirm the potential of using the existing shuttle for that purpose.

The MacDill AFB management described the difficulty of using federal military funds for work to home transportation. According to the “Domicile-to-Duty” regulations¹², MacDill AFB cannot operate its own shuttle to transport people from home to work. Therefore, because the circulator would aid in transporting staff between home and work, a third party operator (e.g. HART, Charter service, etc.) must be identified if ferry passengers must take a shuttle to get to work after arriving at the MacDill AFB dock.

¹¹ Hart web site, <http://www.gohart.org/routes/commuterexpress/commuter-express.html>

¹² <http://www.army.mil/article/47788/domicile-to-duty-comes-with-regulations/>

Figure A.2 24X - Fishhawk/Riverview/MacDill AFB Express

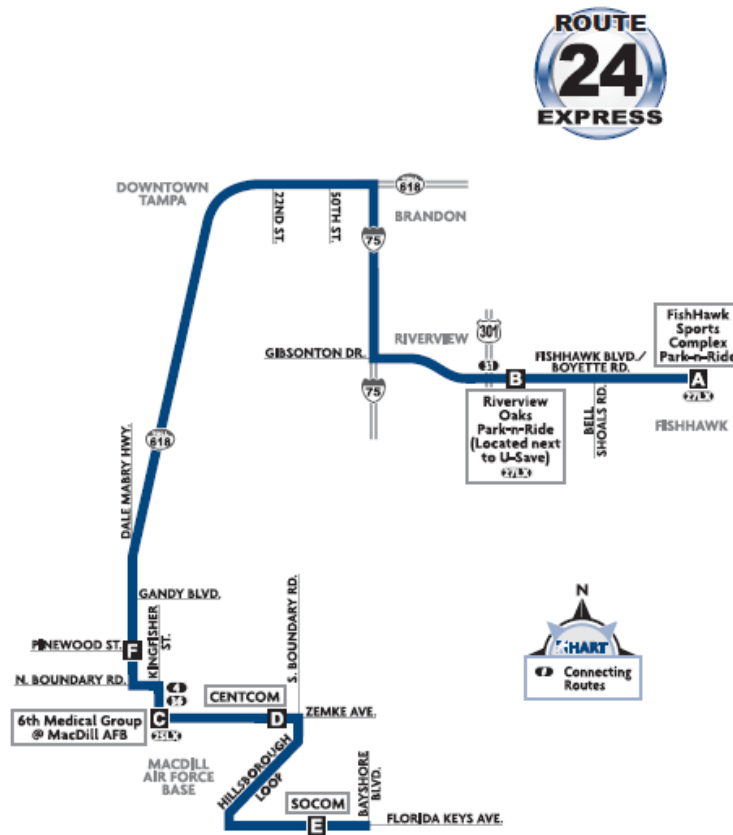
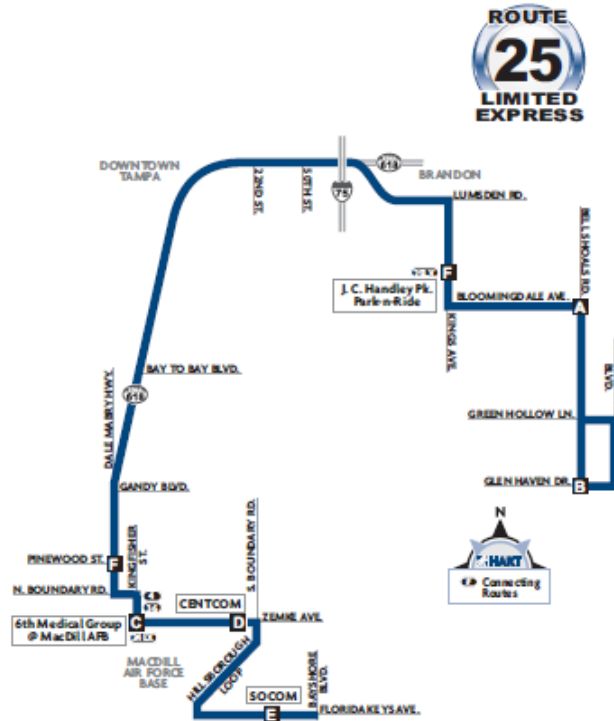


Figure A.3 25X - South Brandon/MacDill AFB Express



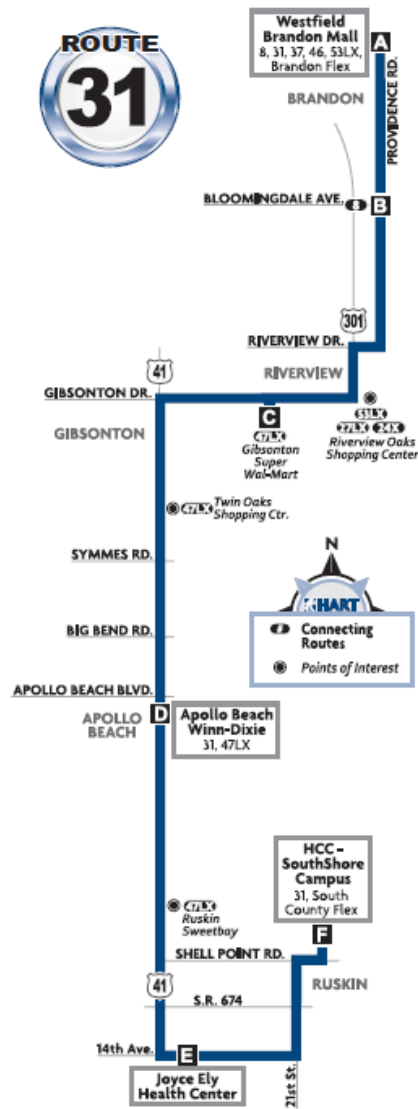
Transportation Access to Gibsonton Docking Station

US 41 connects people living south and north of the proposed Gibsonton water ferry dock. This is an industrial corridor with no sidewalks or bicycle lanes. Riverview Road to the North and Gibsonton Drive to South connect people living east of the station, with Gibsonton Drive providing the closest access to an I-75 interchange.

Currently, no HART bus services connect to Williams Park. A HART local bus Route 31 serves the area near this park (Apollo Beach and Gibsonton), but does not have high ridership due to low population density. Figure A.4 shows the route map of Route 31. There is a traffic signal at the entrance to the park on US 41. Bike and pedestrian access improvements could help people living in close vicinity of the park, however the surrounding residential density is limited.

Additional traffic studies would be necessary to verify the capacity of the existing park access road and its intersection with US 41. This will be dependent on revised ridership forecasts.

Figure A.4 Route 31 – South Hillsborough County



MacDill Air Force Base Market

The major market for this water ferry service is MacDill AFB employees. According to the interview with MacDill AFB, MacDill AFB has four security gates, with eight lanes open in the morning. Approximately 10,000 vehicles enter the base through four gates between 5:00 and 9:00 am. Most vehicles are single occupancy. This volume exceeds the capacity of the gates, causing a significant delay at the gates. In addition to the delay caused by overcapacity, each person must undergo a security check ranging from seven seconds for minimal clearance level requirements to several minutes for higher clearance levels, and could take an indefinite amount of time in certain circumstances. In the morning peak period (typically from 6:30 to 8:30), the delay at the gates could be as long as 30 minutes per person.

Once people arrive at the base, their activities are mostly within their own work center. There is not much need to use their vehicles throughout the day. Each work center has its own working schedule. Some start as early as 5:00 am, some start as late as 8:30 am. This helps spread trips across the peak and would help manage ferry boat capacity constraints.

MacDill AFB encourages its employees to take public transit to work. A \$90/month subsidy is provided by the base to each employee who opts to take transit. This reflects a full price HART pass.

Several capital projects are planned for MacDill AFB, including the construction of a hotel near the dock location. Construction on the hotel is expected to begin in 2012. MacDill AFB has a 10-year Master Plan, including a transportation plan with planned improvements such as roadway widening and pedestrian and bicycle projects. There is no indication that MacDill AFB will be downsizing in the near future and its daily employment and visitor trips on the AFB will continue to exceed 20,000 to 25,000 per day.

These characteristics contribute to the need for alternative transportation modes for the employees at MacDill AFB. MacDill AFB has a strong interest in the results of the study, and will be supportive of the service if it is determined to be feasible. It was also suggested that people other than MacDill AFB employees may want to take the ferry to go to the base for leisure purposes (primarily retired military). Two other attractions (Bird Island and Big Bend Manatee View) are along the ferry route, so the potential of serving these tourists also should be investigated.

To increase the market for the proposed ferry service, HART suggested that cost will be critical. Currently people are using the express bus service at no cost to them. If the ferry service could provide users travel time savings at a low personal cost, it will attract more users.

Navigation

Discussions with Tampa Port Authority staff and Captain Joel Sherry, a Tampa Bay Harbor Pilot, yielded several factors to consider related to navigation, including:

- There are strong eastern winds, occasionally causing six-foot waves in Tampa Bay. The waves and ship wakes may impact the water ferry vessel at MacDill AFB complicating loading and unloading;
- The channel is about 200 feet wide on Alafia River, the waterway connecting the bay and the potential water ferry dock at Williams Park in Gibsonton.

- The water ferry boats are required to remain 0.5 mile away from ships carrying ammonia cargo;
- Water depth outside of the main channel in Tampa Bay is very shallow (less than five feet), and the hydraulic impact is significant; the vessels should also be cautious of sand bars, which change locations throughout the year;
- A manatee zone is on the east side of the main channel on Tampa Bay. Alafia River west of US 41 is all within the manatee zone¹³. The ferry boat needs to comply with the manatee zone speed restrictions, and the feasibility study should consider the impact of manatee protection zones and no-wake zones have on the speed of service provided by the water ferry.
- Water ferry boats could be delayed up to 10 minutes when entering the Alafia River from Tampa Bay to Williams Park due to Mosaic ship activity;
- There are no speed restrictions in Tampa bay; and
- The boats of the Florida Aquarium operate at 15 knots per hour.
- Additional recommendations made are as follows:
- The water ferry boats should be equipped with an Automated Identification System (AIS); the water ferry boats must follow coast guard imposed safety zone regulations¹⁴;
- As this study advances, a briefing should be given to the Harbor Safety Committee; and
- The feasibility study should address ADA requirements.

Operators/Private Partners

The Florida Aquarium

The Florida Aquarium located in Downtown Tampa is committed to building waterborne tourism in Tampa Bay. The aquarium operates a two-level 149-passenger boat "Bay Spirit II". The boat travels for two hours on Suddon Channel and Hillsborough Bay. The cost for customers is \$21.95 for the boat tour only and a \$37.95 combination ticket allowing day long access to the aquarium. The boat operates three times per day (7am, 2pm, and 4pm) seven days per week, except rough weather days (rough weather includes lightning storms and waves on the bay from three to five feet, or small craft warnings). The aquarium also operates special event packages for conventions and school age children and a Port of Tampa tour two days per week on Tuesday and Wednesday. The port tour is offered free of charge.

While its business model and vessel characteristics do not support a commuter service, the aquarium is interested in partnering with the operating agency to provide connectivity. They indicated that a good business model to operate the ferry service could be a third-party operator who has the knowledge of how to operate and maintain a boat.

¹³ http://ocean.floridamarine.org/Boating_Guides/pages/marine_zones.html

¹⁴ <http://cfr.vlex.com/vid/165-704-safety-zone-tampa-bay-florida-19761695>

Florida Aquarium made the following suggestions on critical success factors for ferry operations:

- Boat ramp safety is very important. Current ADA standards do not have a requirement on boat ramps. There is no wheelchair lifting equipment on the market. The aquarium currently does not have access to a floating dock which makes customer access more difficult because of varying water levels on the channel from three to seven feet.
- Service must be reliable, dependable, affordable, and expandable.
- Make sure the vessel is dependable. A backup vessel is highly recommended.
- Weather is a big challenge and will prevent boat operations several days per year.

Tampa Water Taxi Company

A privately operated water taxi service began serving downtown Tampa's waterfront in the mid-1990s. Early efforts failed after several years due to a failed business model that spent too much on the boats and had lower than anticipated ridership due to slower than expected downtown redevelopment.

Since 2007, Tampa Water Taxi has grown to three boats serving about 70 passengers per day. The water taxi service operates on Garrison Channel, Seddon Channel, and the Hillsborough River on-call, not on a fixed schedule. The water taxi loads and unloads passengers at several fixed docks, including the Sheraton Hotel, Harbor Island, and the Tampa Convention Center. The water taxi service also serves public and private docks on the Tampa downtown waterfront including Davis Island (Margery Park), Tampa Bay Performing Arts Center, Marriot Waterside Hotel, and locations located further north on the Hillsborough River such as Rick's on the River and the Lowry Park Zoo. In a recent interview owner and operator "Captain Larry" provided additional insight on boat operations, permitting, and the Tampa market.

Tampa Water Taxi operates 10-, 20-, and 30-passenger boats. Each boat is certified by the US Coast Guard. The 30-passenger boat was bought used in 2011 at a cost of \$100,000. A brand new 30-passenger boat exceeds \$400,000. The maximum speed of the three water taxi boats is 14 knots per hour, but typically the boats travel at five to seven knots per hour. The boats use diesel fuel that costs approximately \$5.60 per gallon, a cost that has doubled in the past 90 days. The cost to operate the 30-passenger boat is more than \$35 per hour in fuel costs.

Tampa Water Taxi made the following observations about the proposed ferry service:

- It is important to use the right equipment for the right job to operate a successful water service.
- Implement service incrementally. Purchase or lease used boats and keep initial upfront cost low. Use existing public and private docks where possible rather than building more expensive new docks.
- Operating concerns include vessel, fuel, and staff costs.
- Determine the correct route and define the market before starting a water service.
- When the service began, the City of Tampa did not have a procedure in place for allowing water taxi service to operate on the Hillsborough River and Seddon Channel. The water taxi negotiated agreements upfront with private property owners to use docks, and worked

with the US Coast Guard to inspect and license the boats. However, the City has since identified an approval process that consists of a small fee and paper work licensing and permitting the water taxi services. The City Police, Parks Department, and Licensing Departments are involved in the review and approval process allowing water taxi operations and connections with city and publically owned dock facilities at the Tampa Convention Center and on Davis Islands. The City has never provided an operating subsidy to the water ferry business.

The water taxi services attract nearly 50 percent of its customers from conventions and out of town visitors. Special events are an increasing part of the business such as concerts and hockey games at the St. Pete Times Forum, weddings, and business group charters. Two years ago the water taxi service provided over 600 customers to and from the Forum for the Elton John/Billy Joel rock concert. The water taxi advertises its services heavily using the internet and social media, as well as through travel and meeting planners, hotels, restaurants, and the Chamber of Commerce.

The water taxi operation is currently consulting with a community in the Tampa Bay region about starting up a new water taxi service. It is considering operating the service and is negotiating start up costs, fees, and service levels. It is anticipated to be funded primarily with tourism dollars, private hotel funds, and from fares.

Yacht Starship

Yacht StarShip Dining Cruises has operated out of Channelside in Tampa since 1990. StarShip also operates a sightseeing and special event yacht from Clearwater Beach. Starship operates a 131-foot, 150-passenger luxury dining yacht as a venue for corporate parties, group functions, weddings, and special events. The Starship also operates a second smaller yacht for smaller size special events. Its dock is located in Downtown Tampa on the Channelside waterfront at the Ybor turning basin. The yacht travels the waters of Sparkman Channel, Hillsborough Bay, and Seddon Channel during a 3-hour cruise. StarShip is heavily marketed in the Tampa Bay region and throughout Florida using all forms of media. Starship is heavily involved in the downtown business community promoting the downtown water front and redevelopment opportunities and special waterfront events such as the annual Dragonboat races. The Captain and owner are both experienced in the industry and have followed a business model that was successful in New Orleans.

Operator Recommendations

During the stakeholder meeting and interviews with key stakeholders, the study team received the following comments and concerns regarding the operations of the water ferry service, financial feasibility, and the potential opportunities of public-private partnership:

- Research an alternate plan for transporting passengers in the event of inclement weather when ferry boats cannot operate;
- Evaluate environmental issues, e.g. lighting at the station may impact wildlife in the area; evaluate the impacts of no-wake zones and manatee protection zones to the operations of the ferry services;
- Explore public-private partnership opportunities to make other ferry routes feasible business-wise;

- Examine off peak and weekend use of ferry boats; engage the private sector;
- Examine the short-term growth impacts of DRIs around the Gibsonton docking station and evaluate the potential growth and economic impact in the area; and
- Evaluate the potential impact of the ferry service on HART Express service.

CONCLUSION

To date, no fatal flaws have been identified by the stakeholders that would prevent this study from continuing. However, some items identified during the interviews will require further analysis to determine their affect on the proposed service. Additional coordination with the study's stakeholders will be documented as needed.

STAKEHOLDER INTERVIEW CONTACTS

Stakeholder	Contact Name	Telephone	Date of Interview
MacDill AFB	Lt. Col. Kenneth W Ohlson, Commander	813-828-2047	6/29/2011
	Lt. Col. Aaron Meadows, USAF AMC 6		
	Robert Hughes, B Civ USAF AMC		
FDOT District Seven	Raymond Clark, Aviations Program/Sea Port Administrator	813-975-6235	6/30/2011
	Steve Love, Special Projects Coordinator	813-975-6410	
	Brian Hunter, Asst. Aviations Program/Sea Port Administrator	813-975-6436	
Hillsborough County Development Services Department	Bob Campbell, PE, Division Director	813-272-5920	6/30/2011
	Ronnie Blackshear		
	Charles White, AICP		
Hillsborough County Real Estate Department	Anthony Haynes	813-272-5810	6/30/2011 8/4/2011
Hillsborough County Parks, Recreation, and Conservation Department	Kurt Gremley	813-272-5810	7/5/2011 8/4/2011 8/31/2011 9/6/2011 10/5/2011 11/10/2011 12/15/2011
	Chris Postiglione		
Tampa Port Authority	Richard Wainio, Port Director	813-905-5103	6/30/2011
	Ram Kancharla, Senior Planning Director		
	Zelko Kirincich, Deputy Port Director, Operational Engineering		
HART	Steve Feigenbaum, Senior Planner	813-623-5835	7/13/2011
Florida Aquarium	Don Eddings, VP of Operations	813-273-4000	7/21/2011
	Scott Rose, VP of Marketing		
MOSAIC	Ron Hall, Director of Real Estate & Land Acquisition	813-773-4376	7/27/2011 8/31/2011 9/1/2011 11/28/2011
	Christine Smith, Community Relations		
Tampa Water Taxi Company	Captain Larry, Boat Captain & Owner	888-665-8667	8/3/2011
Yacht StarShip	Troy Methany, Captain & Owner	813-223-7999	8/8/2011
State of Florida Division of Lands	Diane Rogowski, Division of State Lands	850-245-2720	8/9/2011

Appendix B: Parking and Traffic Operations Analysis for Gibsonton Station

Source: Jacobs Engineering

LOCATION

The potential water ferry dock at the Gibsonton site is located on the north side of the Alafia River and west side of the US 41 bridge, about one-half mile east of Tampa Bay. The dock is located in Williams Park, operated by Hillsborough County on property leased from the State of Florida.

ACCESS

The proposed parking area is accessed by an existing driveway (called Riverview Drive west of US 41) that provides access to Williams Park and the Mosaic Corporation industrial complex as well. This intersection is an uncoordinated signalized intersection maintained by Hillsborough County. The operation of the traffic signal is a two phase operation with the northbound and southbound left turns on US 41 operating under permissive control only. Left turns on Riverview Drive operate under permissive control only.

PARKING ALTERNATIVE

Based on input from the county, state and Mosaic, one parking alternative was developed and evaluated. Parking spaces are fully contained within existing county and state right of way. Ridership estimates range from 100 to 600 passengers. An analysis of available land suggests up to 200 parking spaces would be developed, including existing spaces.

Parking lots and parking spaces where design using the standard parking space configuration as taken from the latest Hillsborough County Transportation Technical Manual, Disable Parking/Marking Typical Detail 1 and Parking Lot Configuration - Typical Detail 2. Standard parking spaces require the dimensions of 9 feet in width and 18 feet in depth. Disabled parking spaces require the dimensions of 12 feet in width and 18 feet in depth and must have an adjacent 5 feet access aisle. Per Hillsborough County Land Development Code, Part 6.05.02.K, every off-street parking areas shall be surfaced with asphaltic or Portland cement binder pavement or an equivalent improvement. Said equivalent improvements shall be by the determination of the Administrator. Exemptions to the above paving requirements shall be by the determination of the Planning and Development Management Department. Per Hillsborough County Land Development Code, Part 6.06.04, off-street vehicular use areas require an eight feet landscape perimeter buffer between right-of-way and off-street vehicular use areas. For internal parking spaces, parking areas shall be terminated with a landscape area of a minimum width of 6 feet (measured inside curb). These parking areas that contain a shade

tree island with a minimum width of 17 feet (measured inside curb) for areas containing more than 10 spaces. The following describes the parking analysis:

- Maintain existing parking at south end of Williams Park;
- Reconfigure existing parking adjacent to park/recreation area; add additional parking north of aforementioned parking spaces;
- Provide new parking lot in north portion of Williams Park and FDOT property to the north; contains dual entrances at the south and north end of parking area and contains 83 standard parking spaces; and
- Use grassed area south of the new parking lot as grassed parking area; contains 83 grass parking spaces; 64 of these spaces can double as vehicle/boat parking.

The above framework results in 203 spaces (6 handicap accessible spaces and 197 standard spaces), as illustrated in Figure B.1.

Figure B.1 Parking Layout



OPERATIONS ANALYSIS

An operations analysis was performed for the No Build and Parking Alternative 5 to determine the effects additional traffic generated by the water ferry service would have on the traffic signal at the intersection of US 41 and Riverview Drive/Park Entrance.

Traffic volumes were determined from current annual average daily traffic received from FDOT and Hillsborough County. The Institute of Transportation Engineers trip generation manual was used to estimate peak out trips from the Mosaic site and Williams Park. Turning movement counts were not available so trip distribution was determined using the percentage of directional design hour volumes from each approach to the intersection.

Table B.1 shows the results of the operational analysis for the signalized intersection. In the AM Peak hour, the existing overall intersection level of service (LOS) is A and the overall intersection delay is 9.8 seconds. As shown for Alternative 5 in the table, adding the additional traffic for the Water Taxi lowers the intersection LOS to B and increases the intersection delay slightly to 11.2 seconds. In the PM Peak hour the existing overall intersection LOS is B and the overall intersection delay is 12.9 seconds. The table shows that for Alternative 5 the overall intersection LOS remains at B and the intersection delay increases slightly to 15.8 seconds.

For Alternative 5, the 95th percentile queue (237 feet) for the northbound left turn lane is greater than the existing storage of 210'.

The additional traffic generated by the Water Taxi and added to the intersection during the AM Peak and PM Peak hours will have a minimal effect on the operation of the signalized intersection. The overall intersection LOS is reduced for the AM Peak and the delay is slightly increased for both the AM and PM Peak hours, but the effects are minor and the intersection will still operate at an acceptable LOS of D or higher. The northbound left turn lane may need to be lengthened by 50' to 100' to accommodate vehicle queues. Further, the intersection should be monitored for any increase in northbound left turn vehicle crashes. If crashes increase, a protected/permissive or protected only left turn phasing should be considered.

Table B.1. US 41 at Riverview Drive (park entrance) - Delay and LOS

Approach	Movement	AM Peak Hour			PM Peak Hour				
		Queue (ft)	Delay (sec)	LOS	Approach LOS	Queue (ft)	Delay (sec)	LOS	Approach LOS
Existing									
EB	Left	0	0	A	C	128	32.7	C	C
	Thru/Right	18	26.5	C		153	30.9	C	
WB	Left/Thru	131	35.4	D	C	114	37.1	D	C
	Right	86	28.9	C		47	25.4	C	
NB	Left	81	9.5	A	A	96	15.0	B	A
	Thru	252	7.9	A		206	8.0	A	
	Right	19	4.8	A		19	5.6	A	
SB	Left	45	9.1	A	A	54	8.8	A	A
	Thru	163	6.6	A		264	8.9	A	
	Right	18	4.8	A		23	5.8	A	
Overall Intersection			9.8		A	12.9			B
Alternative 5									
EB	Left	18	0	A	C	196	38.8	D	C
	Thru/Right	-	25.2	C		163	27.8	C	
WB	Left/Thru	145	34.0	C	C	111	29.0	C	C
	Right	85	27.3	C		45	23.7	C	
NB	Left	237	22.2	C	B	141	22.1	C	B
	Thru	265	8.6	A		272	10.8	B	
	Right	20	5.2	A		24	7.5	A	
SB	Left	48	10.1	B	A	72	12.1	B	B
	Thru	171	7.1	A		348	12.0	B	
	Right	25	5.5	A		29	7.7	A	
Overall Intersection			11.2		B	15.8			B

Source: Jacobs Engineering

PARKING COST ESTIMATES

Design/Cost Assumptions

Pavement design was selected to ensure that the calculated structural number either meets or exceeds the required structural number for pavement per the latest edition of Hillsborough County Transportation Technical Manual, dated Sept, 1, 2009. Three pavement designs were selected: Asphalt Pavement, Concrete Pavement, and Gravel/Shell. For asphalt and concrete pavement, the use of Type "D" Concrete curb was assumed, while the gravel/shell design assumes no use of curbing. Sidewalks were designed to provide safe pedestrian access from all parking areas to the dock area.

Preliminary Costs

Below tables illustrate the preliminary cost estimates for the required parking lot improvements. Total construction cost and total cost are as shown; the total cost includes drainage, design, CEI, and contingency as a percentage of the total construction cost. The total cost for asphalt pavement, concrete pavement, and gravel/shell parking lot improvements are \$173,716.02, \$625,073.96, and \$146,060.20 respectively.

Water Taxi Estimate - Parking Alternative (Asphalt Pavement)					
Pay Item	Description	Unit Cost	Unit Measure	Quantity	Total Cost
110-1-1	Clearing and Grubbing	\$9,472.49	AC	1.10	\$10,419.74
160-1	Type B Stabilization	\$3.71	SY	4,252.01	\$15,774.96
285-70-6	Optional Base Group 6	\$8.33	SY	4,252.01	\$35,419.24
334-1-13	Superpave Asphaltic Conc., Traffic C	\$77.26	TN	233.86	\$18,068.02
350-1-3	Plain Cement Concrete Pavement, 8"	\$73.60	SY		\$0.00
520-2-4	Concrete Curb, Type D	\$17.98	LF	1,289.79	\$23,190.42
522-1	Sidewalk Concrete, 4" Thick	\$24.08	SY	441.00	\$10,619.28
					\$0.00
		Total Construction Cost			\$113,491.67
	Drainage (10% of Construction Cost)	\$11,349.17			\$11,349.17
					\$124,840.83
	Design (10%)	\$12,484.08			\$12,484.08
					\$137,324.92
	CEI (10%)	\$13,732.49			\$13,732.49
					\$151,057.41
	Contingency (15%)	\$22,658.61			\$22,658.61
		Total Cost			\$173,716.02

Costs taken from the "Florida Department of Transportation Item Average Unit Cost, From 2010/09/01 to 2011/08/31" for Area 08 which includes Hillsborough County.

Water Taxi Estimate - Parking Alternative (Concrete)					
Pay Item	Description	Unit Cost	Unit Measure	Quantity	Total Cost
110-1-1	Clearing and Grubbing	\$9,472.49	AC	1.10	\$10,419.74
160-1	Type B Stabilization	\$3.71	SY	4,252.01	\$15,774.96
285-70-6	Optional Base Group 6	\$8.33	SY	4,252.01	\$35,419.24
334-1-13	Superpave Asphaltic Conc., Traffic C	\$77.26	TN		\$0.00
350-1-3	Plain Cement Concrete Pavement, 8"	\$73.60	SY	4,252.01	\$312,947.94
520-2-4	Concrete Curb, Type D	\$17.98	LF	1,289.79	\$23,190.42
522-1	Sidewalk Concrete, 4" Thick	\$24.08	SY	441.00	\$10,619.28
					\$0.00
		Total Construction Cost			\$408,371.58
	Drainage (10% of Construction Cost)	\$40,837.16			\$40,837.16
					\$449,208.74
	Design (10%)	\$44,920.87			\$44,920.87
					\$494,129.61
	CEI (10%)	\$49,412.96			\$49,412.96
					\$543,542.57
	Contingency (15%)	\$81,531.39			\$81,531.39
		Total Cost			\$625,073.96

Costs taken from the "Florida Department of Transportation Item Average Unit Cost, From 2010/09/01 to 2011/08/31" for Area 08 which includes Hillsborough County.

Water Taxi Estimate - Parking Alternative (Gravel/Shell)					
Pay Item	Description	Unit Cost	Unit Measure	Quantity	Total Cost
110-1-1	Clearing and Grubbing	\$9,472.49	AC	1.10	\$10,419.74
160-1	Type B Stabilization	\$3.71	SY	4,252.01	\$15,774.96
285-70-6	Optional Base Group 6	\$8.33	SY	4,252.01	\$35,419.24
334-1-13	Superpave Asphaltic Conc., Traffic C	\$77.26	TN		\$0.00
350-1-3	Plain Cement Concrete Pavement, 8"	\$73.60	SY		\$0.00
520-2-4	Concrete Curb, Type D	\$17.98	LF	1,289.79	\$23,190.42
522-1	Sidewalk Concrete, 4" Thick	\$24.08	SY	441.00	\$10,619.28
					\$0.00
		Total Construction Cost			\$95,423.64
	Drainage (10% of Construction Cost)	\$9,542.36			\$9,542.36
					\$104,966.01
	Design (10%)	\$10,496.60			\$10,496.60
					\$115,462.61
	CEI (10%)	\$11,546.26			\$11,546.26
					\$127,008.87
	Contingency (15%)	\$19,051.33			\$19,051.33
		Total Cost			\$146,060.20

Costs taken from the "Florida Department of Transportation Item Average Unit Cost, From 2010/09/01 to 2011/08/31" for Area 08 which includes Hillsborough County.

TRAFFIC OPERATIONS COST ESTIMATE

Introduction

The parking Alternative 5 proposes parking at the Williams Park site only, located at the Southwest corner of U.S. Highway 41 and Riverview Drive. The traffic analysis shows no significant reduction in the intersection delay and level of service with this alternative. Because of this, no modifications are required to the existing traffic signal at US 41 and Riverview Drive. Street lighting at the intersection already exists.

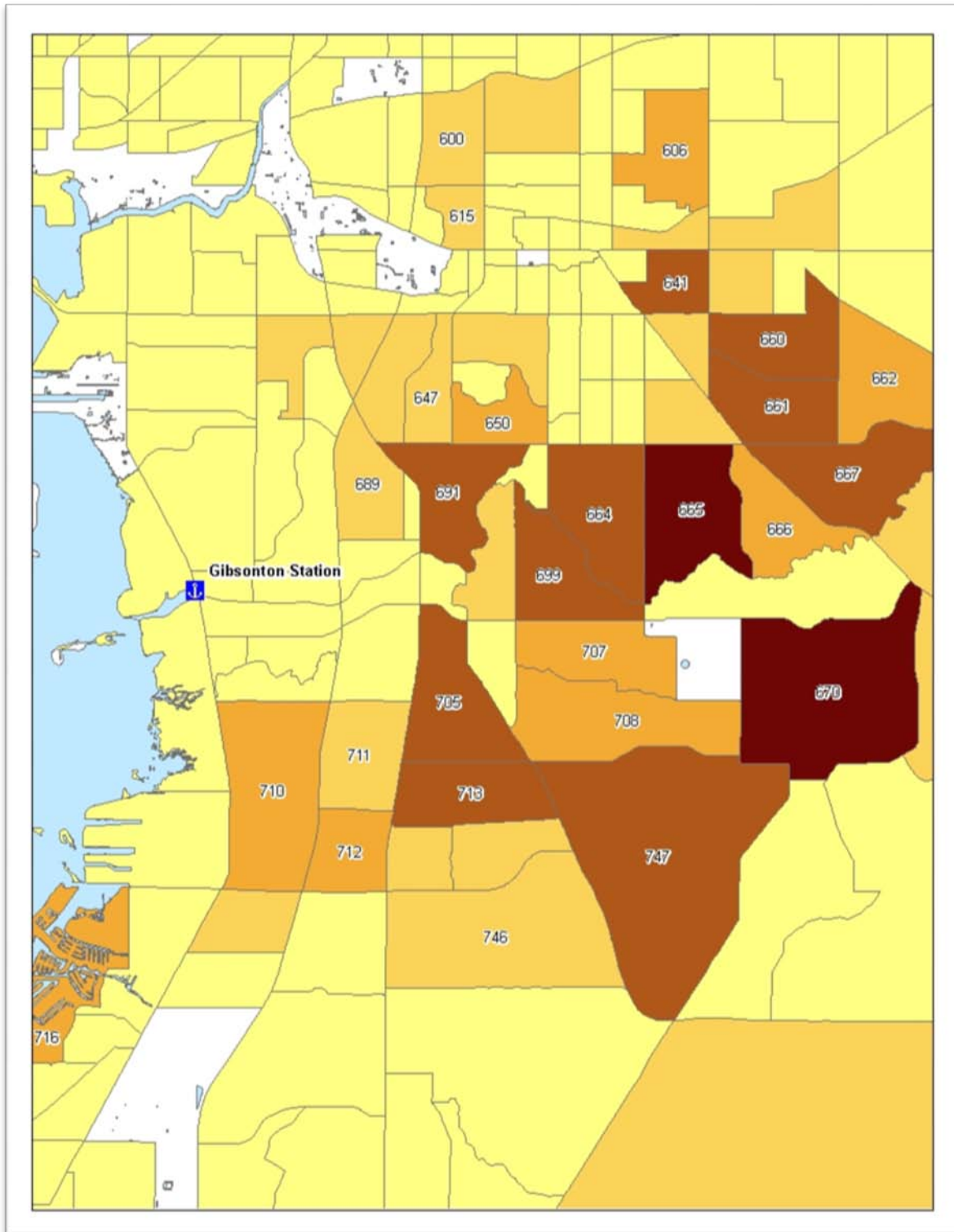
Appendix C: Estimate of Travel Distance and Travel Time from MacDill Air Force Base Employee Residence to Gibsonton Station

**Table C.1 Estimate of Travel Distance and Travel Time
for TAZs with over 100 Base Employees**

TAZ ID	Number of Employees	Travel Distance (miles)	Travel Time (minutes)
600	118	11.8	19
606	154	17.3	28
615	106	12	19
641	223	15.2	24
647	111	7.4	18
650	181	7.9	19
660	286	17.7	28
661	220	12.4	30
662	168	21	34
664	350	9.5	23
665	520	12.1	29
666	174	12	28
667	209	13.6	32
670	522	12.6	29
689	117	6.2	15
691	229	5.9	14
699	230	7.3	19
705	276	6.4	14
707	156	8	20
708	182	8.8	19
710	170	4.2	9
711	135	7.4	17
712	169	9.1	17
713	384	8	17
716	155	10	15
746	140	9.7	19
747	362	10.5	22
Average	-	10.7	22.4

Source: Cambridge Systematics, Inc.

Figure C.1 Map of TAZs with over 100 Base Employees



Source: Cambridge Systematics, Inc.

Appendix D:

Summary of MacDill Air Force Base Survey Questions and Results

1. E-mail
2. Where do you live?
3. What is the nature of your work at MacDill Air Force Base?
 - Military (enlisted, officer)
 - Civilian
 - Contractor
 - Other (please specify)
4. At which center do you work?
 - Base Hospital
 - Centcom
 - Socom
 - Other (please specify)
5. What time do you regularly report for work?
 - 6:00:00 AM
 - 6:30:00 AM
 - 7:00:00 AM
 - 7:30:00 AM
 - 8:00:00 AM
 - 8:30:00 AM
 - 9:00:00 AM
 - Other (please specify)
6. What time do you regularly leave work?
 - 4:00:00 PM
 - 4:30:00 PM
 - 5:00:00 PM
 - 5:30:00 PM
 - 6:00:00 PM
 - 6:30:00 PM
 - 7:00:00 PM
 - Other (please specify)
7. What are your regular work days (select all that apply)?
 - Sunday
 - Monday
 - Tuesday
 - Wednesday
 - Thursday
 - Friday
 - Saturday
8. Do you work overtime?
 - No
 - Yes
9. If yes, how many hours per week on average?
10. How do you commute to work?
 - Drive alone
 - Bus
 - Carpool
 - Other (please specify)

11. What is your average door to door commute time (in minutes)?
12. What is the average delay at the base entrance gate in the morning (in minutes)?
13. Do you experience delay exiting the base in the afternoon?
 - No
 - Less than 2 times per week
 - 3 to 4 times a week
 - Everyday
14. What is the average delay (in minutes)?
15. How much do you pay in tolls each way during your commute (in dollars)?
16. How much does your commute cost per month (in dollars)?
17. What factors are you including in this estimate (check all that apply)?
 - Fuel
 - Tolls
 - Wear and Tear
 - Insurance
18. Do you make on-base trips during the day (both origin and destination are on base)?
 - No
 - Yes
19. If so, what mode of transportation do you use?
 - Personal Car
 - Shuttle
 - HART
 - Walk/Bike
 - Other (please specify)
20. Please rank each characteristic of water ferry service from 1 to 10, with 1 being least important and 10 being most important.
 - Commute Time (equal to or less than current commute time)
 - Wait Time (for boat, boarding/disembarking, security check, shuttle)
 - Cost of Service (equal to or less than current commute cost)
 - Reliability of Service (on time, no service interruptions)
 - Frequency and Number of Departures (multiple peak hour sailings)
 - Gibsonton Station Security (lighting, guard)
 - Parking at Gibsonton Station (free and secure parking area)
 - Express Bus/Shuttle to/from Stations (transit access from home)
 - Distance from Home to Gibsonton Station (close proximity to station)
 - Distance from MacDill AFB Station to Place of Work (close proximity to work)
 - Level of Comfort on Vessel (covered, a/c, stability)
 - Comments
21. When it comes to cost vs. travel time, which package would you be most likely to support (fares are one-way, times include time on the water only)?
 - \$0.00 (Cost covered by Transit Subsidy), 60 minutes on the ferry
 - \$2.50, 45 minutes commute on the ferry
 - \$5.00, 30 minutes commute on the ferry
 - \$10.00, 15 minutes commute on the ferry
 - Comments

22. How long would it take you to get to the proposed ferry station in Gibsonton, located at Williams Park on the Alafia River (9425 US 41 S., Riverview, FL)?
- Less than 5 minutes
 - Between 5 and 10 minutes
 - Between 10 and 15 minutes
 - Between 15 and 20 minutes
 - Between 20 and 25 minutes
 - More than 25 minute
23. Would you be willing to walk to/from work from MacDill AFB station?
- Yes
 - No
24. Would you be willing to walk, bike, or take transit to/from Gibsonton Station?
- Yes
 - No
25. On a scale of 1 to 5, with 1 being least likely and 5 being very likely, how likely would you be to use the following ferry services (assuming the same itinerary for the reverse direction)? Please read each option carefully.
- Drive to Express Bus Station – Express Bus to Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (two peak period sailings each direction with departures every 60 minutes, transit subsidy covers cost, time exceeds drive time by 15 minutes)
 - Drive to Express Bus Station – Express Bus to Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (three peak period sailings each direction with departures every 45 minutes, transit subsidy + water ferry fare (\$2.50 per direction) covers cost, time equals drive time)
 - Drive to Express Bus Station – Express Bus to Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (four peak period sailings each direction with departures every 30 minutes, transit subsidy + \$5 per direction covers cost, time is 15 minutes less than drive time)
 - Drive to and park at Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (two peak period sailings each direction with departures every 60 minutes, transit subsidy covers cost, time exceeds drive time by 15 minutes, park at your own risk)
 - Drive to and park at Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (three peak period sailings each direction with departures every 45 minutes, transit subsidy + \$2.50 per direction covers cost, time equals drive, park at your own risk)
 - Drive to and park at Gibsonton Ferry Station – Ferry to MacDill AFB – Shuttle Bus to Work (four peak period sailings each direction with departures every 30 minutes, transit subsidy + \$5 per direction covers cost, time is 15 minutes less than drive time, secure & lit parking is provided)
26. Overall, are you likely to use a water ferry to commute to work regularly?
- Yes
 - No
27. If yes, what is the biggest motivation?

28. If the answer is “No”, please describe your reason(s):

- I don't like boats
- I like my car
- I believe I can get to work faster and cheaper another way
- Too many transfers (e.g., bus or car to boat to bus)
- My work schedule does not coincide with the service hours
- I need to use my car at work
- I use my car to make stops on my way to/from work
- Other (please specify)

Summary of MacDill Air Force Base Survey Results for Select Questions

At which center do you work?

- | | | | |
|-----------------|-------|--------------------------|-------|
| ▪ Base Hospital | 6.3% | ▪ Socom | 18.6% |
| ▪ Centcom | 41.4% | ▪ Other (please specify) | 1.0% |

What time do you regularly report for work?

- | | | | |
|--------------|-------|--------------------------|-------|
| ▪ 6:00:00 AM | 12.2% | ▪ 8:00:00 AM | 10.8% |
| ▪ 6:30:00 AM | 16.5% | ▪ 8:30:00 AM | 2.8% |
| ▪ 7:00:00 AM | 30.7% | ▪ 9:00:00 AM | 1.2% |
| ▪ 7:30:00 AM | 19.9% | ▪ Other (please specify) | |

What time do you regularly leave work?

- | | | | |
|--------------|--------|--------------------------|-------|
| ▪ 4:00:00 PM | 28.0 % | ▪ 6:00:00 PM | 3.9 % |
| ▪ 4:30:00 PM | 25.0 % | ▪ 6:30:00 PM | 1.6 % |
| ▪ 5:00:00 PM | 17.8 % | ▪ 7:00:00 PM | 1.6 % |
| ▪ 5:30:00 PM | 5.9 % | ▪ Other (please specify) | |

How do you commute to work?

- | | | | |
|---------------|--------|--------------------------|-------|
| ▪ Drive alone | 86.4 % | ▪ Carpool | 8.2 % |
| ▪ Bus | 17.3 % | ▪ Other (please specify) | 3.3 % |

What is your average door to door commute time (in minutes)?

- Average 47.0 min.

What is the average delay at the base entrance gate in the morning (in minutes)?

- Average 9.7 min.

Do you experience delay exiting the base in the afternoon?

- | | |
|------------------------------|--------|
| ▪ No | 24.8 % |
| ▪ Less than 2 times per week | 29.9 % |
| ▪ 3 to 4 times a week | 22.6 % |
| ▪ Everyday | 22.7 % |

What is the average delay (in minutes)?

- Average 9.2 min.

How much do you pay in tolls each way during your commute (in dollars)?

- Average \$ 2.65 (*removed outliers*)

How much does your commute cost per month (in dollars)?

- Average \$ 245

When it comes to cost vs. travel time, which package would you be most likely to support (fares are one-way, times include time on the water only)?

- | | |
|---|--------|
| ▪ \$0.00 (Cost covered by Transit Subsidy), 60 minutes on the ferry | 25.7 % |
| ▪ \$2.50, 45 minutes commute on the ferry | 33.0 % |
| ▪ \$5.00, 30 minutes commute on the ferry | 34.7 % |
| ▪ \$10.00, 15 minutes commute on the ferry | 6.7 % |

How long would it take you to get to the proposed ferry station in Gibsonton, located at Williams Park on the Alafia River (9425 US 41 S., Riverview, FL)?

- Less than 5 minutes 3.3 %
- Between 5 and 10 minutes 23.4 %
- Between 10 and 15 minutes 38.9 %
- Between 15 and 20 minutes 19.7 %
- Between 20 and 25 minutes 8.3 %
- More than 25 minute 6.3 %

Would you be willing to walk to/from work from MacDill AFB station?

- Yes 58.5 %
- No 41.5 %

Would you be willing to walk, bike, or take transit to/from Gibsonton Station?

- Yes 50.4 %
- No 49.6 %

Overall, are you likely to use a water ferry to commute to work regularly?

- Yes 87.2 %
- No 12.8 %

If the answer is "No", please describe your reason(s):

- I don't like boats 0.8 %
- I like my car 9.2 %
- I believe I can get to work faster and cheaper another way 57.3 %
- Too many transfers (e.g., bus or car to boat to bus) 41.2 %
- My work schedule does not coincide with the service hours 19.8 %
- I need to use my car at work 18.3 %
- I use my car to make stops on my way to/from work 16.0 %
- Other (please specify) 42.7 %

(Responders could choose more than one option)

Appendix E:

Review of Applicability of TBRPM 7.1

The Tampa Bay Regional Planning Model (TBRPM) was re-examined for potential use in the refinement of ridership estimates for ferry service between MacDill Air Force Base (AFB) and Gibsonton as part of the Phase Two Study. The latest adopted version of the model was reviewed (TBRPM 7.1), focusing specifically on the trip attractions and productions associated with MacDill AFB. The following summarizes the findings.

TRIP GENERATION

Home-Based Work (HBW) trip attractions and productions associated with MacDill AFB (Traffic Analysis Zone [TAZ] 482) were identified and extracted from the model. TAZ 482 is treated as a special generator in the trip generation model. In both base year 2006 and future year 2035, the number of HBW trips generated by and attracted to TAZ 482 is 5,600 and 8,500, respectively.

TRIP DISTRIBUTION

TBRPM 7.1 employs a gravity model to distribute trips between productions and attractions. Density maps were developed to illustrate the distribution patterns of the trip attractions and products for TAZ 482 for both 2006 and 2035.

- In the base 2006 year model, HBW Production-Attraction (PA) pairs generated by TAZ 482 and attracted to other TAZs total 4,015; while HBW PA pairs attracted to TAZ 482 from other zones total 6,915. Among the 6,915 trips, only 183 trips have their production end within greater the Gibsonton and Apollo Beach market area (See Figures 1 and 2).
- In the future 2035 year model, HBW PA pairs generated by TAZ 482 and attracted to other TAZs total 3,975; while HBW PA pairs attracted to TAZ 482 from other zones total 6,875. Among the 6,875 trips, only 164 trips have their production end within the greater Gibsonton and Apollo Beach market area (See Figures E.1 and E.2).
- In comparison, the place of residence data (at the zip code level) provided by MacDill AFB for its employees suggests a much different pattern and volume. **Figure E.3** illustrates the number of MacDill AFB employees living in each zone.¹⁵ These numbers far exceed those reported by the model in 2006 or 2035.

¹⁵ Analysis of the online survey currently planned with MacDill AFB workers will allow further review the accuracy of the TBRPM and place of residence data provided by MacDill AFB.

Such differences might result from the natural limitation of gravity models – productions and attractions are linked based on inter zonal pair travel impedance and idealized algorithmic processing – or lack of a subarea validation (or other refinement).

RECOMMENDATIONS

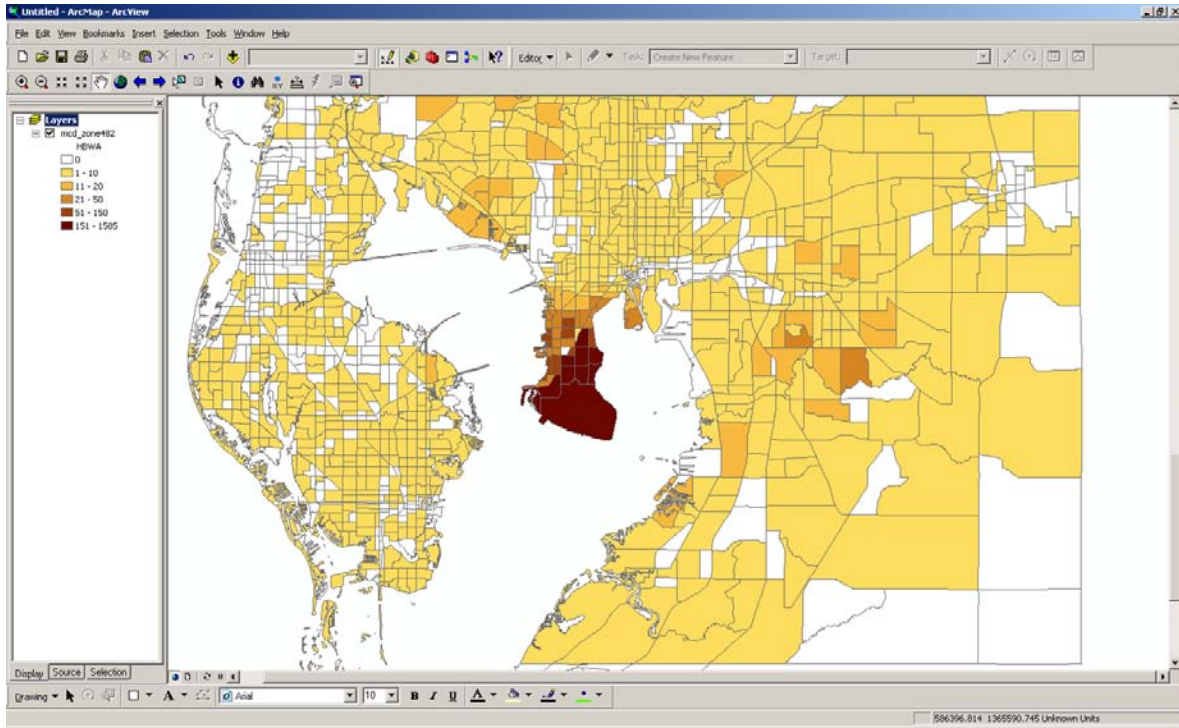
If the TBRPM is to be used for this analysis, a subarea validation procedure is strongly encouraged to calibrate the model. This would include a socioeconomic data quality check, trip length verification, regional network refinements, and a volume over traffic count statistics review. Subarea model validation requires significant effort, data, and time.

At this time, it is reasonable to accept that the place of residence data provided by MacDill AFB is a more accurate data source than the TBRPM – at least without further enhancements and/or validations. In addition, a survey is underway with MacDill AFB employees living in the Gibsonton catchment area which will provide additional data.

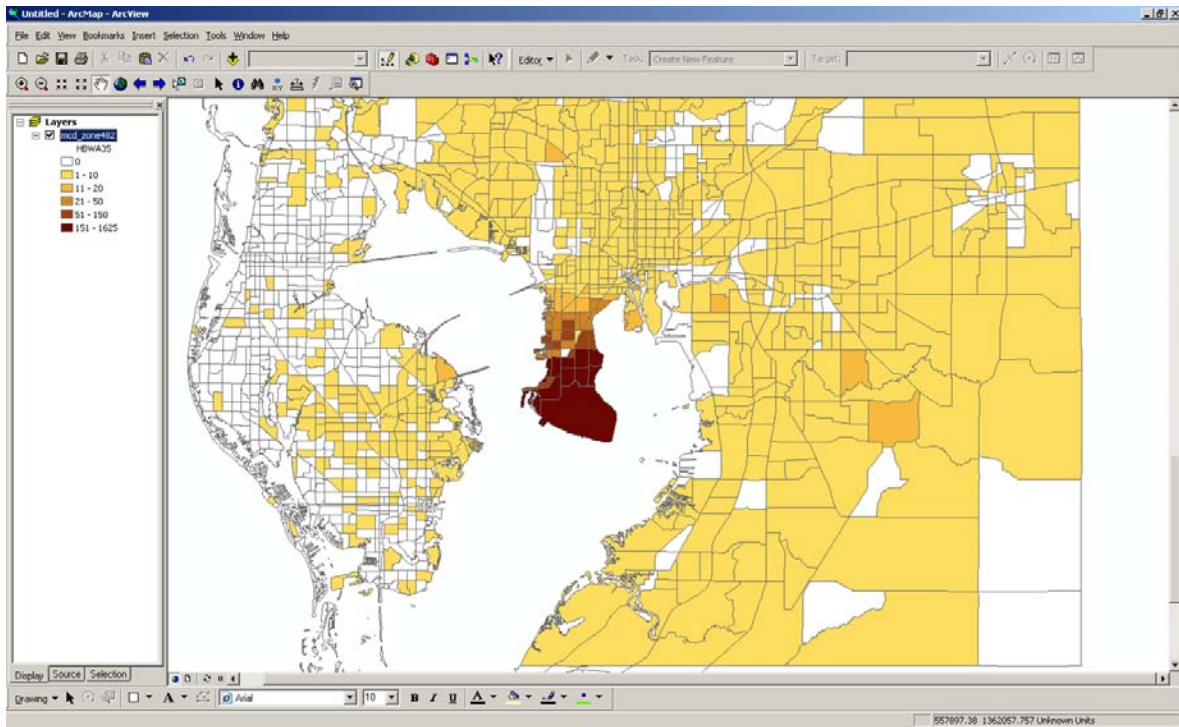
It is our recommendation that the TBRPM not be used to support the Phase Two Study. It does not accurately reflect travel conditions for this micro analysis and the schedule and budget does not support the necessary enhancements. Therefore, we propose to use the place of residence data (also used in Phase One) combined with the new survey data, stakeholder interviews, and enhanced analysis of service operational parameters (water, station, access) to refine the ridership estimates.

Figure E.1. HBW Attractions to TAZ 482 from Other TAZs

YR 2006 Attracted HBW Trips to TAZ 482



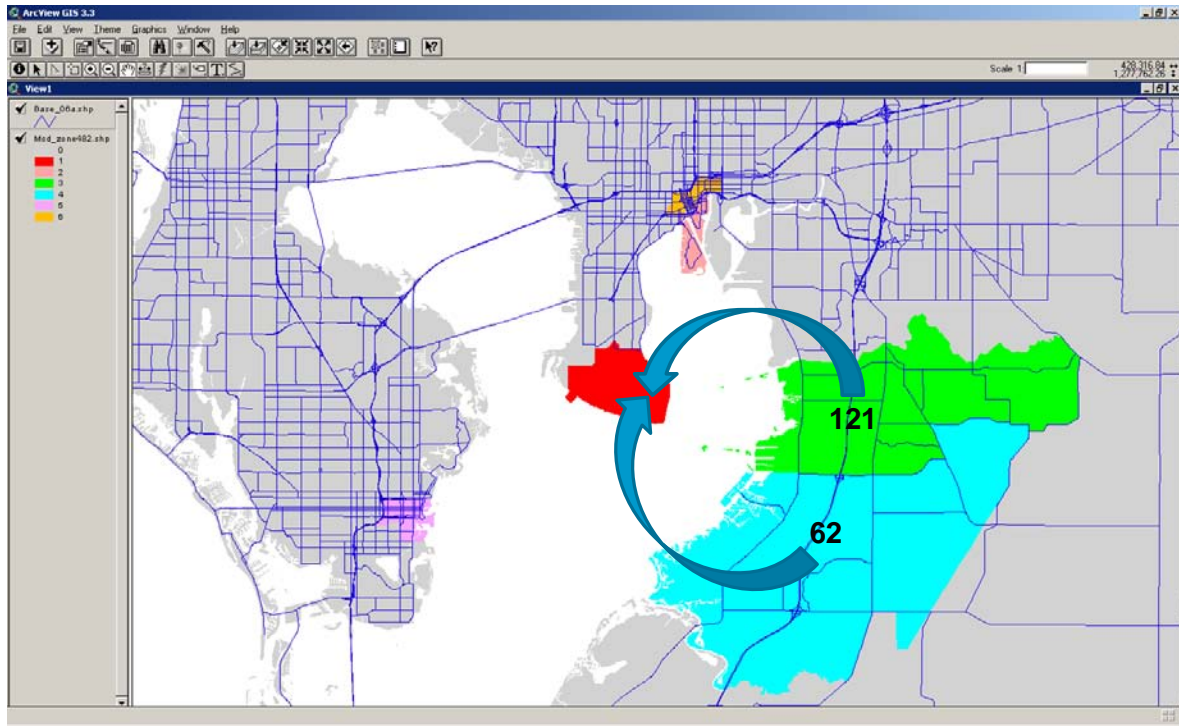
YR 2035 Attracted HBW Trips to TAZ 482



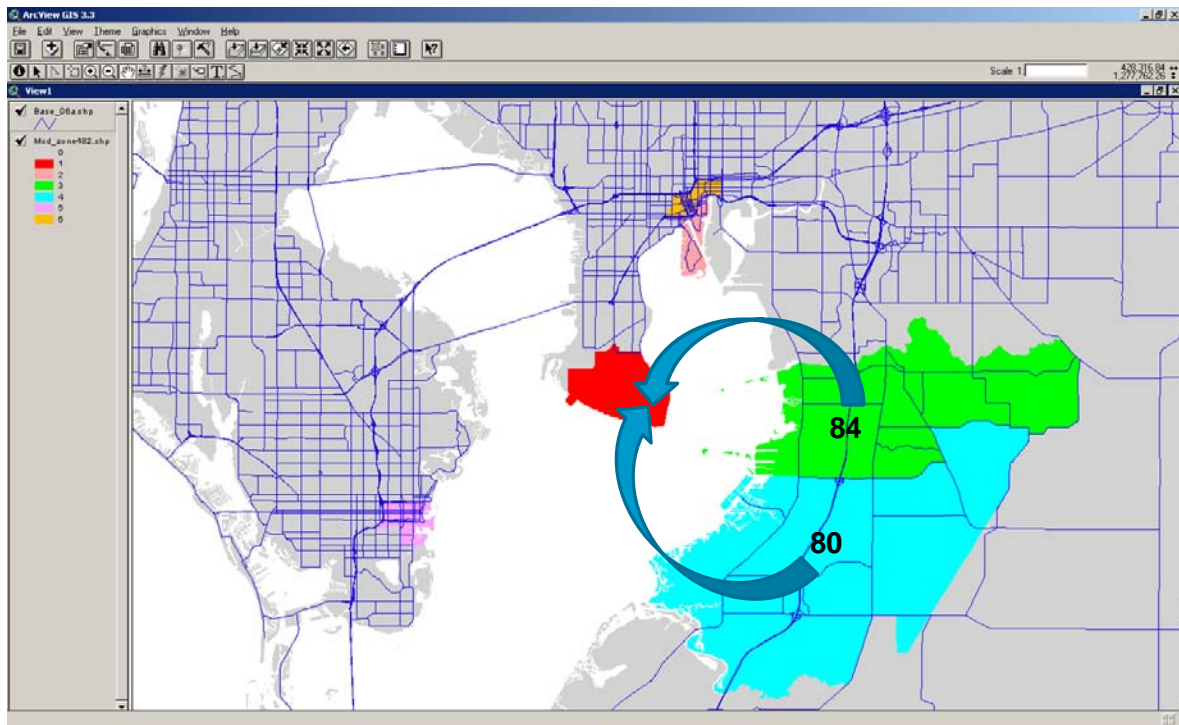
Source: TBRPM Version 7.1

Figure E.2. Summary of HBW Attractions to TAZ 482 from Other TAZs

YR 2006 Attracted HBW Trips to TAZ 482

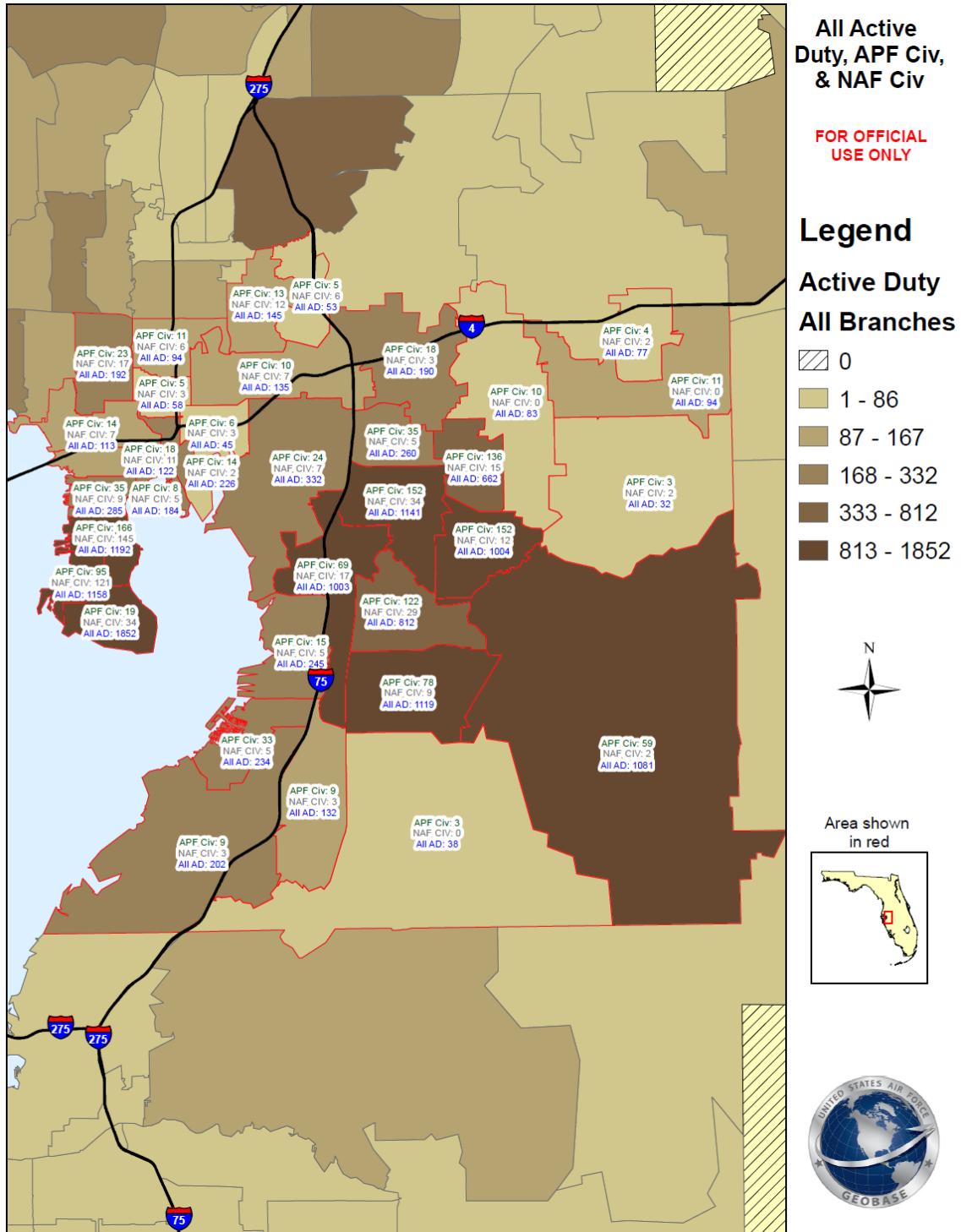


YR 2035 Attracted HBW Trips to TAZ 482



Source: TBRPM Version 7.1

Figure E.3. Location of MacDill AFB Employee Residences by ZipCode & TAZ



Source: MacDill AFB.