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Location Hydraulics Report

Florida Department of Transportation

District 7

Tampa Interstate Study

Supplemental Environmental Impact Statement

I-275 from Howard Frankland Bridge to North of Dr. Martin Luther King, Jr. Boulevard

and

I-4 from I-275 to East of 50th Street with New Alignment from I-4 South to the Existing Selmon Expressway and Improvements to the Selmon Expressway from the Kennedy Boulevard Overpass East to Maydell Drive

Limits of Project: Segments 2B, 3A & 3B

Hillsborough County, Florida

Financial Management Number: 258337-2

ETDM Number:

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

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Work Program Segment # 258337-2

Segments 2B, 3A & 3B

October 2018

SUMMARY

The purpose of this Location Hydraulics Report (LHR) is to document the potential floodplain impacts that result from the effects of the Tampa Interstate Study Project (TIS), I-275 from Rome Avenue to North of Martin Luther King (MLK) Boulevard and I-4 from I-275 to East of 50th Street (FEIS Segments 2B, 3A, and 3B). The study area is illustrated in **Figure 1-1**.

The study area encroaches into floodplain limits in two places: at the Hillsborough River and at the Robles Park pond. The portion of the study area in the vicinity of the I-275 Bridge over the Hillsborough River is located within Zone AE floodplain limits. The proposed bridge extents for all roadway design options extend beyond the limits of the 100-year floodplain. However, it is anticipated that new bridge piles will be required. All new bridge piles will be in line with the existing bridge piles to minimize impact to the floodplain. No change to the bridge hydraulic opening or fill encroachment in the waterway is anticipated. A Bridge Hydraulic Analysis will be performed during the design phase to ensure no rise in the Base Flood Elevation is experienced.

The portion of the study area adjacent to Robles Park encroaches into a designated Zone A flood zone. Two of the four roadway design options propose the I-275 corridor to be entirely bridge in this area; the other two design options do not propose roadway improvements in this area. Therefore, there are no anticipated impacts associated with the FEMA 100-year floodplain limits for the Robles Park area.

A total of 23 cross drains were identified within the project area; all but five are entirely enclosed.

The risk assessment for the project study area is as follows:

This project involves construction within the base floodplain and is described as a "PROJECT ON EXISTING ALIGNMENT INVOLVING REPLACEMENT OF EXISTING DRAINAGE STRUCTURES WITH NO RECORD OF DRAINAGE PROBLEMS". The impacts to a tidally influenced floodplains will require no floodplain storage compensation as required by the SWFWMD or local water management district. The longitudinal impacts at Robles Park will be mitigated utilizing bridges for the I-275 mainline and the reconstruction of local roads at existing grade. Any minor impact to existing ditches will be replaced in-kind. *The proposed structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. Additionally, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.*

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Acronyms

BMP	Best Management Practices
CBD	Central Business District
DCIA	Directly Connected Impervious Area
DEIS	Draft Environmental Impact Statement
DHW	Design High Water
EIS	Environmental Impact Statement
EL	Elevation
ERP	Environmental Resource Permit
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FTE	Florida's Turnpike Enterprise
HFB	Howard Frankland Bridge
HART	Hillsborough Area Rapid Transit Authority
HOV	High Occupancy Vehicle

I	Interstate
LHR	Location Hydraulics Report
LRTP	Long Range Transportation Plan
MLK	Martin Luther King
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NRCS	National Resource Conservation Service
OFW	Outstanding Florida Water
PD&E	Project Development and Environment
RCP	Reinforced Concrete Pipe
ROD	Record of Decision
ROW	Right-of-way
SEIS	Supplemental Environmental Impact Statement
SHWT	Seasonal High Water Table
SMF	Stormwater Management Facility
SR	State Road
SWFWMD	Southwest Florida Water Management District
TBARTA	Tampa Bay Area Regional Transportation Authority
TBN	Tampa Bay Next
TBX	Tampa Bay Express
TIS	Tampa Interstate Study
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
WBID	Water Body Identification

1. INTRODUCTION

The Federal Highway Administration (FHWA) and Florida Department of Transportation (FDOT) have initiated the environmental review process for the Tampa Interstate Study (TIS) Project in Tampa, Hillsborough County, Florida. The study is a supplement to the 1996 Final Environmental Impact Statement (FEIS). FHWA issued the Records of Decision (ROD) in 1997 and 1999. FDOT and FHWA are conducting this study based on a proposed design change that includes a new alternative not previously considered, as well as modified alternatives presented in the 1996 TIS FEIS to accommodate tolled or non-tolled express lanes and other capacity and mobility improvement alternatives, some of which are being considered by FDOT in separate studies. FDOT, in coordination with FHWA, will prepare a Supplemental Environmental Impact Statement (SEIS) in accordance with the National Environmental Policy Act (NEPA) and other regulatory requirements. This Location Hydraulics Report (LHR) was prepared to support the TIS SEIS.

1.1 Purpose of the Report

This report documents the potential floodplain impacts that result from the effects of the Tampa Interstate Study Project (TIS), I-275 from Rome Avenue to North of Martin Luther King (MLK) Boulevard and I-4 from I-275 to East of 50th Street (FEIS Segments 2B, 3A, and 3B).

1.2 Location of the TIS SEIS Project

The proposed TIS SEIS Project is located in the City of Tampa in Hillsborough County, Florida. The study area comprises approximately 11 miles of I-275 and I-4, an approximate 4.4-mile segment of the Selmon Expressway, and an approximate 0.8-mile segment of the I-4/Selmon Expressway Connector (previously known as the Crosstown Connector). The proposed improvements would involve the reconstruction/widening of I-275 from east of Howard Frankland Bridge (HFB) to North of State Road (SR) 574 (Dr. MLK Jr. Boulevard), and I-4 from I-275 to east of 50th Street. The proposed improvements are located in the 1996 TIS FEIS Segments 1A, 2A, 2B, 3A, and 3B (see **Figure 1-1**). Segment 3C is not being considered in the TIS SEIS because it has been constructed.

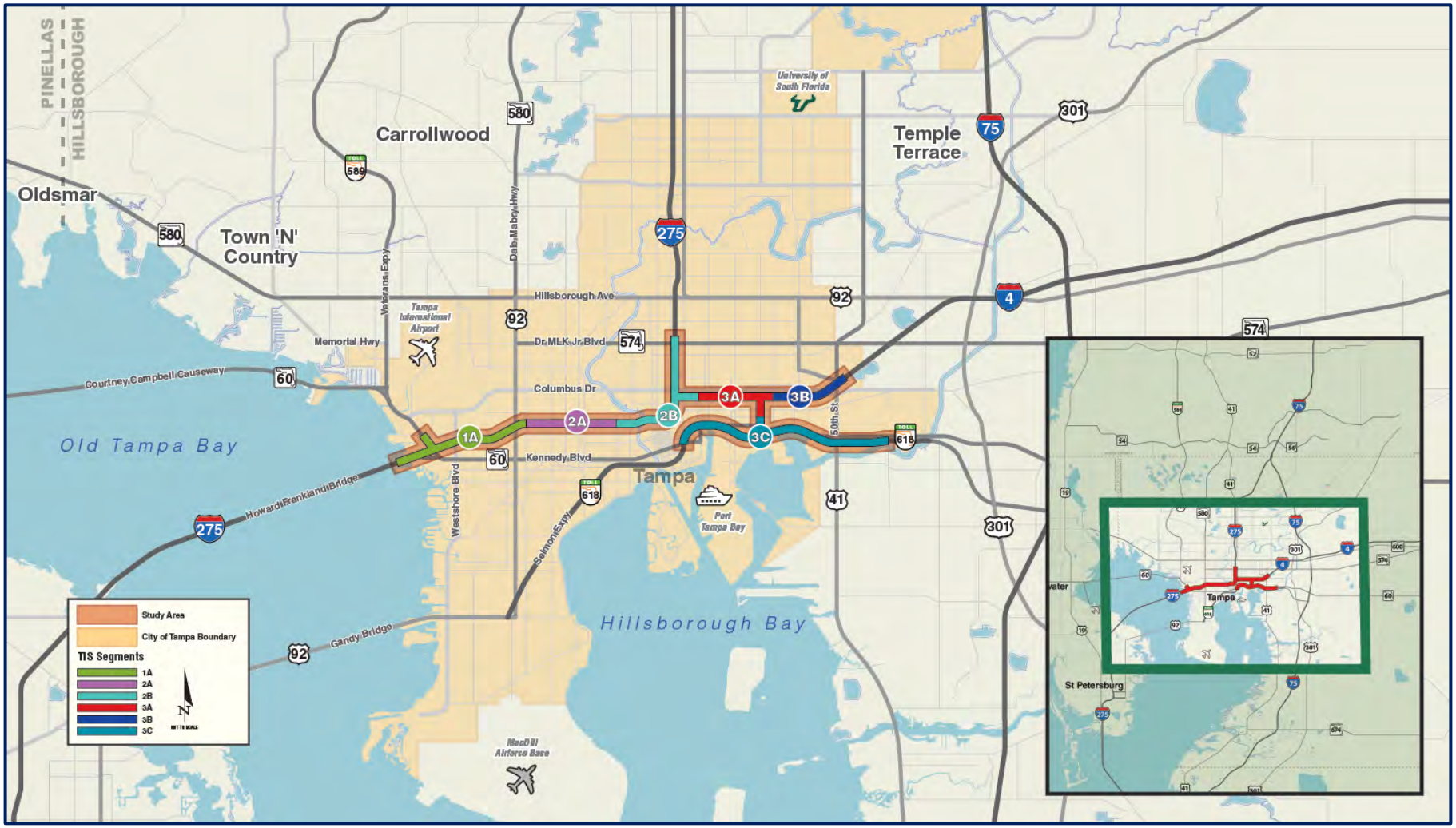
1.3 Background of the TIS SEIS Project

The TIS Project has been under consideration for many years. The Tampa Interstate system is the cornerstone of the Tampa Bay Region's surface transportation system and improvements to the system have been a priority to the State since the 1980's. The proposed improvements to the interstate system are found in the Hillsborough Metropolitan Planning Organization's (MPO) *2035 Long Range Transportation Plan for Hillsborough County* (LRTP) (2009) and the *Imagine 2040: Hillsborough Long Range Transportation Plan* (2014).

1.4 Purpose of the TIS SEIS Project

In the 1996 TIS FEIS, the purpose for the proposed action was: "…to upgrade the safety and efficiency of the existing I-275 and I-4 corridors that service the Tampa urban area while maintaining access to the surrounding community."

The current SEIS Purpose is consistent with the 1996 TIS FEIS Purpose and expands upon the originally identified purpose and need to include congestion relief that improves accessibility, mobility, travel times, system linkages, and multimodal connections, while supporting regional economic development goals and enhancing quality of life for Tampa Bay residents and visitors.



SOURCE: FDOT 1996
Note: Segment 3C has been constructed and is not included in this SEIS.

Figure 1-1 Tampa Interstate Study SEIS Project Study Area

In 1983, FDOT began to identify potential improvements to the Tampa Interstate system, which was constructed in the early 1960's. These improvements included potential short-term safety solutions and design changes, and long-term high-occupancy vehicle (HOV) related improvements to accommodate growing traffic volumes and congestion. The 1983 study considered all transportation needs within the study area, including concurrent highway, rail, and/or transit improvements.

Using the 1983 study as a documented base, FDOT began Phase I of the TIS in 1987. The purpose of the Phase I study was to produce a Master Plan to identify alternatives and make recommendations regarding the preferred type and location of multi-lane improvements, potential HOV facilities, transit facilities, traffic management techniques, and traffic surveillance and control systems. Based on the work performed, FDOT published the *TIS Master Plan Report* in 1989. The Hillsborough County MPO adopted the Tampa Interstate Master Plan Concept into the 2010 LRTP in November 1989.

Following completion of the *TIS Master Plan Report*, FHWA, in cooperation with FDOT, began the preparation of an Environmental Impact Statement (EIS) and the supporting documentation necessary for state and federal approvals and subsequent funding of the *TIS Master Plan Report* concepts. The EIS evaluated impacts associated with a Selected Alternative, a Long-Term Preferred Alternative, and a No-Action Alternative, addressed agency and citizen concerns, and identified ways to minimize impacts.

FHWA approved the EIS in November 1996, issued the ROD for the 1996 TIS FEIS in 1997, and an amended ROD in June 1999. The 1997 and 1999 RODs are the documents that have governed the development of all improvements to I-275 and I-4 providing a roadway system that includes general use lanes and separated express lanes in each direction, as well as a future transit corridor. The intent of the FHWA and the FDOT is to ultimately construct the Long-Term Preferred Alternative as funding becomes available through the Hillsborough County MPO. Since issuance of the 1997 and 1999 RODs, FDOT has taken several major steps to advance the Project to full implementation. The TIS Project has been re-evaluated several times to advance various elements of the project, many of which FDOT has already constructed including portions of Segment 1A, Segment 2A, Segment 3A, Segment 3B, and Segment 3C (see **Figure 1-2**). The following describes the projects that FDOT has constructed.

- **I-275 Widening Southbound and Remainder of Northbound from east of SR 60 to Downtown Tampa** – Corridor length: 4.2 miles, Construction Cost: $217.3 million, Start: July 2012 – Completion: Fall 2016. Reconstruction and roadway widening. Improvements included: providing four through lanes in each direction, flattening the profile of the roadway at bridges over the crossroads, aesthetic treatments, improved interchanges, and increased median width for future improvements.

- **I-275 Northbound from Himes Avenue to the Hillsborough River** – Corridor Length: 2 miles, Construction Cost: $109 million, Start: August 2007 – Completion: Spring 2010. Reconstruction of a 3-lane roadway into a 4-lane roadway primarily south of the existing alignment. Improvements also included: providing an increased median width reserved for future transportation needs, new bridges with improved height clearances, shoulder-mounted 8-foot noise walls near densely developed residential areas, aesthetic treatments, and improved lighting and drainage.

SOURCE: FDOT 2000-2015

Notes: Green line represents TBX Sections 4, 5, and 6, referred to as Segments1A, 2A, and part of 2B in the 1996 TIS FEIS; Grey line comprises part of TBX Section 5, referred to as Segment 2A in the 1996 TIS FEIS; Dark blue line comprises part of TBX Section 6, referred to as part of Segment 2B in the 1996 TIS FEIS; the light blue line comprises part of TBX Section 6, referred to as Segment 3A and 3C in the 1996 TIS FEIS; the turquoise line comprises part of TBX Section 6, referred to as part of Segment 3B and Segment 3C in the 1996 TIS FEIS.

Figure 1-2 Tampa Interstate Study Completed Improvement Projects

- **I-4/I-275 Interchange Operational Improvements (Downtown Tampa Interchange)** - Corridor Length: 2.7 miles, Construction Cost: $81 million, Start: October 2002 – Completion: December 2006. Capacity and safety improvements to the Downtown Tampa Interchange, which widened both interstates to four lanes in each direction. Improvements also included: extending the Ashley Street entrance ramp, providing a local auxiliary exit ramp system, improving weaving movements related to the I-275 southbound to I-4 eastbound flyover ramp, shoulder-mounted 8-foot noise walls near densely developed residential areas, landscaping within infield area and aesthetic treatments.

- **I-4 from West of 14th Street to East of 50th Street** – Corridor Length: 3.2 miles, Construction Cost: $185 million, Start: February 2004 – Completion: Fall 2007. Reconstruction of a 4-lane roadway into a 6-lane roadway (three lanes in each direction with auxiliary lanes) to tie into the Downtown Tampa Interchange improvement project completed in December 2006. Improvements also included: providing an increased median width reserved for future transportation needs, new bridges with improved height clearances, shoulder-mounted 8-foot noise walls near densely developed residential areas, aesthetic treatments, and improved lighting and drainage.

- **I-4/Lee Roy Selmon Expressway Interchange** – Corridor Length: 1 mile, Construction Cost: $425 million, Start: March 2010 – Completion: Spring 2014. Construction of a new north-south toll interchange, which connects I-4 with the Lee Roy Selmon Expressway (SR 618). The elevated roadway with an all-electronic toll collection system links these two, major east-west corridors, and provides "truck-only" lanes for direct access to the Port Tampa Bay to reduce heavy truck traffic from local roads in Ybor City. Aesthetic treatments were also included in this project.

In 2011, FDOT released the *Florida Transportation Vision for the 21st Century*. The vision focused on innovative financing alternatives, advancing projects, and accommodating economic growth. While the 1996 TIS FEIS always included express lanes along the region's interstates, tolling was not a consideration at the time. As a result of the 2011 Vision, FDOT initiated a master plan study in 2012 to determine the feasibility of dynamically tolling the proposed express lanes on the interstate. FDOT's 2015 *Tampa Bay Express (TBX) Master Plan*, which included the TIS Project limits, established a system-wide framework for implementation of dynamically-tolled express lanes within the Tampa Bay Region. As part of the development of the *TBX Master Plan*, FDOT conducted extensive outreach, beginning with focus groups, to better understand public perceptions of the express lanes concept.

Due to funding constraints for the implementation of the ultimate capacity improvements envisioned in the *TBX Master Plan* for the Tampa Bay Region, FDOT identified a series of express lane projects in the five-year work program that could be advanced. FDOT could build each of these smaller-scale projects within a five-year window. FDOT considers these shorter-term improvements the "Starter Projects." The Hillsborough County MPO formally added the Starter Projects to the fiscally-constrained Transportation Improvement Program (TIP) in 2015. The Tampa Bay Regional Transportation Authority (TBARTA) also included the Starter Projects in the *2015 Regional Transportation Master Plan Update*.

2. DEFINITION OF ALTERNATIVES CONSIDERED

The alternatives that will be evaluated in the TIS SEIS are described in the following sections.

2.1 No Further Action Alternative

Portions of the Selected Alternative in the 1996 TIS FEIS have been constructed, so the No-Action Alternative that was evaluated in previous studies is no longer applicable. Therefore, a new No Further Action Alternative will be evaluated for comparison to the 1996 TIS FEIS Long-Term Preferred Alternative and a 2018 Express Lane Alternative. The No Further Action Alternative is defined as the existing transportation system plus projects included in the Hillsborough MPO's *Imagine 2040: Hillsborough Long Range Transportation Plan*. In Segment 1A, the No Further Action Alternative includes construction of the general use lanes (outer roadways) within the I-275/SR 60 Interchange, which was approved under the 1999 ROD. Within the TIS SEIS study area, the remainder of the Imagine 2040 projects have already been built. This alternative provides a baseline against which the Build alternatives can be compared.

2.2 1996 TIS FEIS Long-Term Preferred Alternative (Non-Tolled)

Proposed improvements of the 1996 TIS FEIS Long-Term Alternative consist of a four-roadway system (general use lanes that provide local access and non-tolled express lanes in each direction of travel) on I-275 throughout the study limits and the preservation of a HOV/Transitway corridor within the interstate alignment. Proposed interchange improvements include:

- a fully directional interchange for the I-275 connection to the SR 60/Veterans Expressway;
- modifications to the existing Westshore Boulevard, Lois Avenue, and Dale Mabry Highway interchanges;
- split interchange ramps remaining at Howard and Armenia Avenues;
- a new west bank Central Business District (CBD) interchange with ramps to and from the west on I-275 at North Boulevard;
- a fully directional interchange for the I-4/I-275 connection;
- removal of the existing ramps to and from the north at Floribraska Avenue;
- a full interchange at Dr. MLK, Jr. Boulevard;
- reconfiguration of the split interchange at Columbus Drive and 50th Street;
- removal of the interchange ramps at 40th Street;
- a new directional freeway-to-freeway interchange with the proposed I-4/Selmon Expressway Connector on I-4 near 31st Street; and
- a new Ybor City/east side CBD split interchange on I-4 at 14th and 15th Streets (with extension of the ramps at 14th and 15th Streets as parallel frontage roads to 21st and 22nd Streets to replace the existing access from I-4 to these streets).

Other new non-interstate improvements include the following:

- the removal of the 19th Street overpass and the maintenance of the 26th Street overpass;
- the extension of Sherrill Street from Memorial Highway (SR 60) and Kennedy Boulevard under I-275 to Cypress Street;
- the extension of Trask Street under I-275;
- a Lemon Street Connector to Westshore Boulevard from Occident Street;
- park-n-ride lots to provide access to HOV lanes located at the Florida State Fairgrounds, Yukon Street, Sinclair Hills Road, and SR 56;
- overpass width to accommodate pedestrian and bicycle facilities on cross street; and

- a multi-modal terminal/parking garage at the northern end of the Marion Street.

The TIS FEIS Long-Term Preferred Alternative has been reevaluated numerous times throughout the past 20 years as the various segments of interstate have been constructed. Therefore, this alternative consists of the original impacts, as updated by the approved re-evaluations.

2.3 2018 Express Lane Alternative (Tolled or Non-Tolled Build Alternative)

Improvements identified for the segments that will be evaluated in the TIS SEIS include major components of the 1996 TIS FEIS Long-Term Preferred Alternative. There are areas where the design has changed in alignment and configuration. The TIS segments that will be evaluated in the SEIS and the design differences from the 1996 TIS FEIS Long-Term Preferred Alternative are described in the following sections. **Figure 1-1** shows the TIS SEIS segments.

2B – I-275 from East of Rome Avenue to North of MLK Jr. Boulevard and I-4 from I-275 to East of 15th Street: Operational improvements at the I-275/I-4 interchange were included in the 1996 TIS FEIS. The design changes include tolled or non-tolled express lanes; changes in access to express lanes, which include adding a direct connection to the downtown local street network and slip ramp access north and east of downtown; adding overpasses at several locations to open cross-connections of local streets through the interstate footprint; and additional ROW acquisition involving vacant or undeveloped portions of land at a few pinch-points. This section is adjacent to several historic districts and primarily residential areas.

3A – I-4 from East of 15th Street to East of 34th Street: The general use and express lanes in this section were included in the 1996 TIS FEIS. The outer roadway (general use lanes) has already been constructed from 21st Street to 34th Street. The design changes involve tolled or non-tolled express lanes; changes in access to express lanes, which include slip ramp access east of downtown; and ramp access change with I-4 interchanges at 14/15th Street and 21/22nd Street. No additional ROW would be acquired. Land uses adjacent to this section include historic districts and a mix of residential and commercial areas such as Ybor City and East Tampa.

3B – I-4 from East of 34th Street to East of 50th Street: The general use lanes in this section were included in the 1996 TIS FEIS. The outer roadway (general use lanes) has already been constructed from 34th Street to 50th Street. Minimal ROW would be acquired in this section just east of 50th Street to accommodate barrier separated express lanes along I-4 while accommodating an eastbound ingress just east of 50th Street. Work in this section would include adding express lanes in the median and adjustments in access between express and general lanes. This would require the mainline and eastbound entrance ramp to shift south of the existing ROW within the limits of the ramp.

3C – I-4/Lee Roy Selmon Expressway Interchange: These improvements were fully constructed in 2014 and are not a part of the SEIS.

2.4 Design Options for the 2018 Express Lane Alternative

Several design options are being considered as part of the Build Alternatives. They are described below.

2.4.1 Downtown Interchange Design Options (Segment 2B)

Four express lane interchange design options are being considered for the Downtown Interchange in Segment 2B. They represent both tolled and non-tolled options for managed lanes.

- **Options A and B - Reconstructed Interchange -** The proposed improvements under Options A and B would include reconstructing the interchange to provide a fully directional interchange for the I-4/I-275 connection, with express lanes. The design options include changes in access to express lanes, which include adding a direct connection to the downtown local street network and slip ramp access north and east of downtown; adding overpasses at several locations to open cross-connections of local streets through the interstate footprint; and additional ROW acquisition involving vacant or undeveloped portions of land at a few pinch-points. This section is adjacent to several historic districts and primarily residential areas. The differences between Options A and B are as follows:
  - **Option A - Reconstructed Interchange with Express Lanes to the North:** Option A includes express lanes along the north leg of I-275 with direct connections to I-275 and I-4.
  - **Option B - Reconstructed Interchange without Express Lanes to the North:** Option B does not include express lanes along the north leg of I-275 and does not include direct connections from the express lanes to the north leg of I-275.
- **Options C and D - Existing Interchange with Elevated Express Lanes -** Proposed improvements under Options C and D would include preserving the existing I-275 and I-4 interstate while adding express lanes on elevated structure from west of the Hillsborough River to I-4. Access would be provided to the downtown street grid from the elevated express lanes. However, like the 1996 Long-Term Preferred Alternative, there would be no access to Floribraska Avenue since the ramps would be eliminated. Other improvements include providing two-lane ramps for connections to I-4 and the north leg of I-275, adding express lane ramp connections from I-4 to the north leg of I-275 and reconfiguring the eastbound I-4 exit to Ybor City, to increase capacity and improve operations between the Selmon Connector and the north leg of I-275. Adding express lane ramp connection from I-4 to the north leg of I-275 would eliminate weaving on I-4 for traffic traveling to and from the Selmon Connector and the north leg of I-275. Reconfiguring the eastbound I-4 exit to Ybor City would eliminate weaving between the southbound I-275 ramp to eastbound I-4 and the exit to Ybor City. This would be accomplished by removing the ramp along eastbound I-4, currently serving only 21st/22nd Street and providing separate exits from northbound I-275 and southbound I-275.

  The exit from northbound I-275 would be located between Palm Avenue and Nebraska Avenue while the exit from southbound I-275 would be located off the two-lane flyover to eastbound I-4. Those two separate ramps would then combine along the south side of the eastbound I-4 mainline east of Nebraska Avenue and would tie into 14th/15th Street, providing a new access point the would serve both the 14th/15th Street and 21st/22nd Street interchanges. The ramp would align with the eastbound frontage road that currently connects 14th/15th Street and 21st/22nd Street. The frontage road would be widened to two lanes to facilitate traffic to 21st/22nd Street. The differences between Options C and D are as follows:
  - **Option C - Existing Interchange with Elevated Express Lanes – South Side of I-275:** Under Option C, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the northbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing northbound I-275 lanes from the Hillsborough River to I-4, on the south side of I-275. The elevated express lanes would turn east along I-4 by crossing over to the north side of I-4, adjacent to the westbound I-4 lanes from I-275 to east of 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of 21st Street.
  - **Option D - Existing Interchange with Elevated Express Lanes – North Side of I-275:** Under Option D, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the southbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing southbound I-275 lanes from the Hillsborough River to I-4, on the north side of I-275. The elevated

express lanes would turn east along I-4, adjacent to the westbound I-4 lanes from I-275 to east of 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of 21st Street.

3. REGULATORY SETTING

FDOT, Water Management District, and local government agency (FEMA, City of Tampa) criteria govern the design of floodplain management; coordination between these agencies will be required.

4. FLOODPLAINS

The portion of the study area in the vicinity of the I-275 Bridge over the Hillsborough River is located within the floodplain limits shown on the Flood Insurance Rate Map (FIRM) Community Panel 12057C0354H, effective August 28, 2008. The Hillsborough River is within a designated Zone AE (Elevations 9.0 and 10.0 NAVD88). The proposed bridge extents for Design Options A-D extend beyond the limits of the 100-year floodplain. However, it is anticipated that new bridge piles will be required. All new bridge piles will be in line with the existing bridge piles to minimize impact to the floodplain. No change to the bridge hydraulic opening or fill encroachment in the waterway is anticipated.

The west side of I-275 from north of E. Floribraska Avenue to south of James Street is within the vicinity of the Robles Park pond, which is located within the designated floodplain limits shown on the Flood Insurance Rate Map (FIRM) Community Panel 12057C0352H, effective August 28, 2008. The existing lake and surrounding park area is within a designated Zone A (no base flood elevation determined). Roadway Design Options A and B propose the I-275 corridor to be entirely bridge in this area. Roadway Design Options C and D do not propose roadway improvements that extend north of E. Floribraska Ave. Therefore, there are no anticipated impacts associated with the FEMA 100-year floodplain limits for the Robles Park area.

The rest of the study area is located in Zone X, outside of the 100-year floodplain limits.

Since the impact to the Hillsborough River is considered very minor, a Bridge Hydraulic analysis for the preferred alternative alignment will need to be prepared during the project design phase to evaluate the bridge hydraulics, coastal engineering, and potential scour for the proposed improvement over the Hillsborough River. The estimates of scour, maximum wave crest elevation, and sea level rise at the bridge location will be documented to support evaluation of the study alternatives.

This Location Hydraulics Report (LHR) has been prepared to determine if any floodplains will be significantly affected due to the proposed improvements in accordance with Federal-Aid Policy Guide 23 CFR 650A, Section 650.111. The hydraulic design will follow FDOT, Water Management District, and local (FEMA) design standards. The following items have been addressed to document that the floodplain encroachments are not significant.

4.1 History of Flooding

The Hillsborough River 100-year floodplain, within the limits of the project, is directly connected to Hillsborough Bay. The topography along the I-275 corridor in the vicinity of the Hillsborough River crossing is a low-lying urban coastal zone and the terrain rises quickly to the I-275 / I-4 interchange. The existing I-275 roadway is elevated. Only portions of the ground level areas which are located adjacent to the Hillsborough River are located within

the 100-year floodplain.

Since flooding conditions adjacent the Hillsborough River and surrounding the Robles Park area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to totally eradicate flood impacts or even reduce them in any significant amount, existing localized flooding may continue, but not be increased.

4.2 Longitudinal or Transverse Encroachments

With the increase in the number of travel lanes proposed, there will be longitudinal and transverse impacts to the floodplain. The transverse impacts to the Hillsborough River floodplain will be minimized with bridges that span the floodplain and alignment of the proposed bridge piles with the existing bridge piles. The longitudinal floodplain impacts in the Robles Park area will be minimized with I-275 Bridges and reconstruction of local roads at existing grade.

The Hillsborough River 100-year (base) floodplain associated with this project is based on tidally influenced storm surge and does not involve any regulatory floodways. The negligible encroachment into the floodplain will not cause an increase in flood heights.

4.3 Avoidance Alternatives

Due to the tidally influenced floodplain, existing built-out condition, and minimal upland area that surrounds the I-275 corridor, there are no alignment alternatives that avoid floodplain encroachments. It is noted that project floodplain encroachment in the coastal environment associated with the Hillsborough River will not impact the area floodplain elevation. Thus, floodplain avoidance is not a requirement.

4.4 Emergency Services and Evacuations

There will be no significant change in flood risk and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. The proposed drainage system will perform hydraulically in a manner equal to or greater than the existing drainage system and applicable backwater surface elevations are not expected to increase.

4.5 Base Flood Impacts

Portions of the improvements will encroach upon the 100 year base floodplain. This encroachment is located at the Hillsborough River and would involve minor impacts by bridge piers. A Bridge Hydraulic Analysis will be performed during the design phase to ensure no rise in the Base Flood Elevation is experienced.

4.6 Regulatory Floodway

According to the current FEMA FIRM maps, there are no regulatory floodways within the study limits.

4.7 Cross Drains

Cross drains within the SEIS study area were identified utilizing existing as-built plan sets, the City of Tampa drainage atlas, and the previous TIS LHR dated 1991. Refer to **Appendix D** for the 1991 LHR. Refer to **Appendix B** for the cross drain locations. Refer to **Table 1** for a summary of cross drains.

Table 1 Summary of Cross Drains

Cross Drain No.	Location	Size / Type	Enclosed?
CD-01	N Franklin St.	36” RCP	Yes
CD-02	N Morgan St.	60” RCP	Yes
CD-03	E Henderson Ave.	18” RCP	Yes
CD-04	E Palm Ave.	24” RCP	Yes
CD-05	E Floribraska Ave.	24” RCP	Yes
CD-06	Robles Park Pond	36” RCP	Partially
CD-07	E 26th Ave.	36” RCP	Yes
CD-08	E North Bay St	48” RCP	Partially
CD-09	E Emma St.	36” x 36” CBC	No
CD-10	N 10th St.	60” x 60” CBC	Yes
CD-11	N 13th St.	55” x 61” CBC	Yes
CD-12	N 14th St.	18” RCP	Yes
CD-13	N 15th St.	42” RCP	Yes
CD-14	N 22nd St.	30” RCP	Yes
CD-15	N 23rd St.	108” x 72” CBC	Yes
CD-16	N 26th St.	84” RCP	Yes
CD-17	N 28th St.	120” x 72” CBC	Yes
CD-18	N 34th St.	18” RCP	Yes
CD-19	N 35th St.	72” x 60” CBC	Yes
CD-20	CSX	30” RCP	Yes
CD-21	Between N 40th St. & N 43rd St.	36” RCP	Partially
CD-22	N 45th St.	144” x 48” CBC	No
CD-23	N 50th St.	42” RCP	Yes

As noted in **Table 1**, many of the historical cross drains have been enclosed and no longer function as traditional cross drains. The cross drains that have not been enclosed will need to be modified to accommodate the requirements of the widened roadway. Based upon visual observations it appears that the existing cross drains, if hydraulically suitable, are candidates for extension. However, it is recognized that some existing culverts may need to be replaced with hydraulically equivalent structures when they are analyzed in more detail (hydraulically and structurally) in the design phase or replaced due to age and condition.

The modifications to drainage structures included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increase in flood heights and flood limits. These minimal increases will not result in any adverse impacts on the natural and beneficial floodplain values or any

significant change in flood risks or damage. There will not be a significant change in the potential for interruption or termination of emergency service of this emergency evacuation route. Therefore, it has been determined that this encroachment is not significant.

4.8 Natural and Beneficial Floodplain Values

As previously mentioned, the proposed drainage system will perform hydraulically in a manner equal to or greater than the existing drainage system and applicable backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values.

4.9 Floodplain Consistency and Development

It has been determined based upon information collected from local, state, and federal water resources and floodplain management agencies that there is no regulatory floodway involvement on the proposed project and that the project will not support base floodplain development that is incompatible with existing floodplain management programs. The proposed improvements will not directly or indirectly support floodplain development in a manner inconsistent with the National Flood Insurance Program, which regulates development within the base floodplain. The I-275 corridor and surrounding area are already developed within the base floodplain. Future development will be in accordance with designated land uses according to the adopted comprehensive plans and their land development regulations.

4.10 Floodplain/FIRM

A GIS drawing of the FIRMs illustrating the boundary of the base floodplain in the area of the project limits is presented in **Figure 4-1**. Included in **Appendix B** are the FIRM Panels 12057C0352H, 12057C0353H, 12057C0354H, 12057C0358H, 12057C0359H, and 12057C0360H (dated August 28, 2008) illustrating the boundary of the base floodplain in the area of the project limit. The FEMA has conducted the current Flood Insurance Study for Hillsborough County, which was completed on August 28, 2008 and revised on September 27, 2013. The FIRMs indicate that the majority of the project is in Zone X, which corresponds to the 500-year floodplain or outside (above) the 500-year floodplain.

SOURCE: FEMA, 2008

Figure 4-1 FEMA Floodplain Map

4.11 Risk Assessment

This project involves construction within the base floodplain and is described as a "PROJECT ON EXISTING ALIGNMENT INVOLVING REPLACEMENT OF EXISTING DRAINAGE STRUCTURES WITH NO RECORD OF DRAINAGE PROBLEMS". The impacts to a tidally influenced floodplains will require no floodplain storage compensation as required by the SWFWMD or local water management district. The longitudinal impacts at Robles Park will be mitigated utilizing bridges for the I-275 mainline and the reconstruction of local roads at existing grade. Any minor impact to existing ditches will be replaced in-kind. *The proposed structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. Additionally, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.*

5. REFERENCES

Maps

Federal Emergency Management Agency. August 28, 2008. *Flood Insurance Rate Map City of Tampa*. Community Panel Numbers 120114-0352-H, 120114-0353-H, 120114-0354-H, 120114-0358-H, 120114-0359-H, and 120114-0360-H.

City of Tampa. *Drainage Atlas*. Available online at: https://city-tampa.opendata.arcgis.com/datasets?t=Utility

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Florida Department of Transportation—Office of Environmental Management. 2017. *Project Development and Environment Manual*. Tallahassee, Florida.

Reports

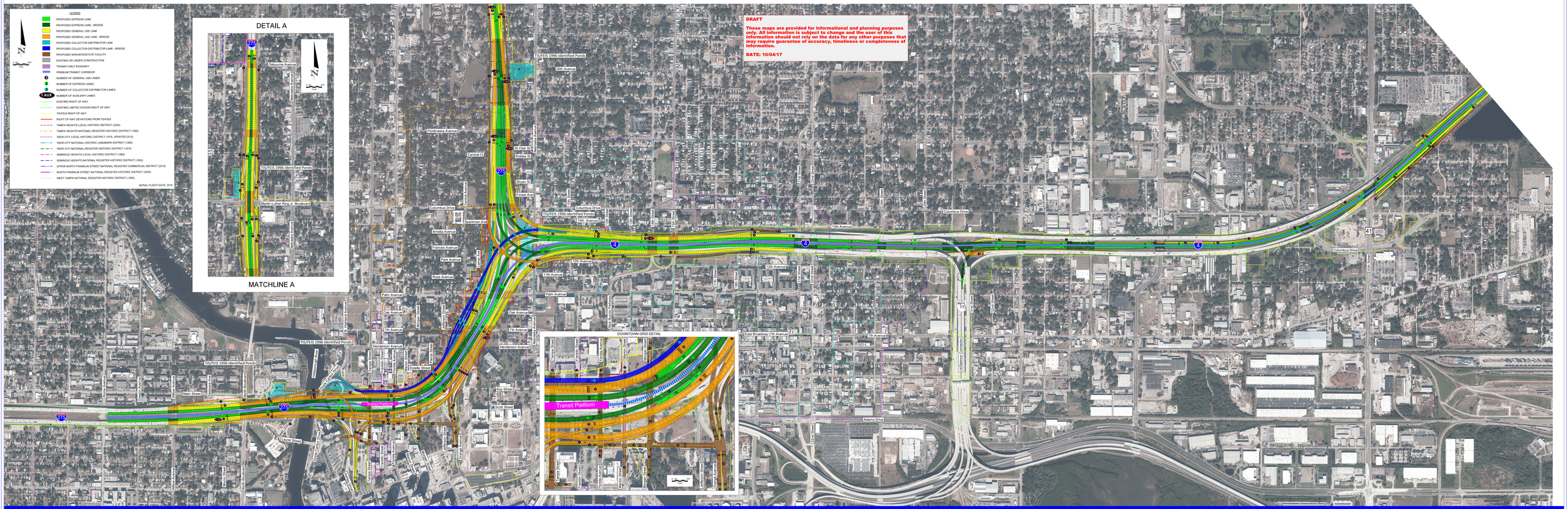
Hillsborough MPO. 2014. *Imagine 2040: Hillsborough Long Range Transportation Plan.* Available online at: http://www.planhillsborough.org/2040-lrtp/

Hillsborough MPO. 2009. *2035 Long Range Transportation Plan.* Available online at: http://www.planhillsborough.org/mpo-2035-lrtp/

APPENDIX A

Design Option Figures

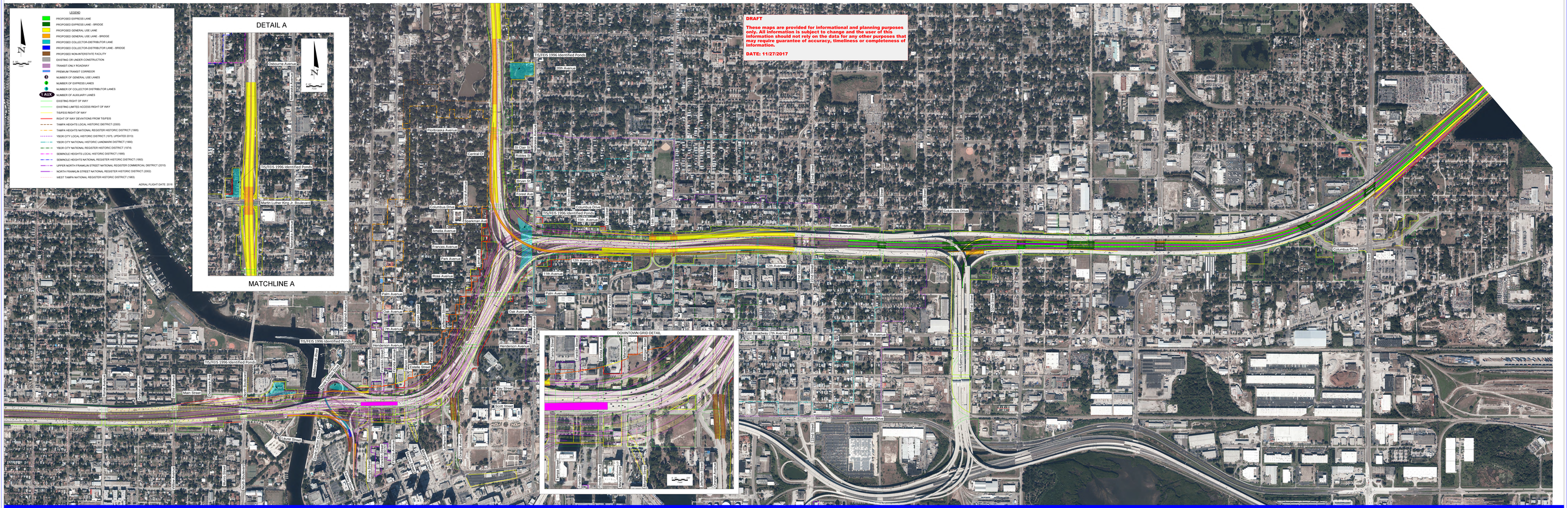
MATCHLINE A



RECONSTRUCTED INTERCHANGE WITH EXPRESS LANES TO THE NORTH

FPID NO. 258337-2

MATCHLINE A



RECONSTRUCTED INTERCHANGE WITHOUT EXPRESS LANES TO THE NORTH

FPID NO. 258337-2

LEGEND
PROPOSED EXPRESS LANE
PROPOSED EXPRESS LANE - BRIDGE
PROPOSED GENERAL USE LANE
PROPOSED GENERAL USE LANE - BRIDGE
PROPOSED COLLECTOR-DISTRIBUTOR LANE
PROPOSED COLLECTOR-DISTRIBUTOR LANE - BRIDGE
PROPOSED NON-INTERSTATE FACILITY
EXISTING OR UNDER CONSTRUCTION
TRANSIT ONLY ROADWAY
EXISTING ROADWAY REMOVAL
PREMIUM TRANSIT CORRIDOR
NUMBER OF GENERAL USE LANES
NUMBER OF EXPRESS LANES
NUMBER OF COLLECTOR DISTRIBUTOR LANES
NUMBER OF AUXILIARY LANES
EXISTING RIGHT OF WAY
EXISTING LIMITED ACCESS RIGHT OF WAY
TSI/FEIS RIGHT OF WAY
RIGHT OF WAY DEVIATIONS FROM TSI/FEIS
TAMPA HEIGHTS LOCAL HISTORIC DISTRICT (2002)
TAMPA HEIGHTS NATIONAL REGISTER HISTORIC DISTRICT (1995)
YBOR CITY LOCAL HISTORIC DISTRICT (1975, UPDATED 2013)
YBOR CITY NATIONAL HISTORIC LANDMARK DISTRICT (1990)
YBOR CITY NATIONAL REGISTER HISTORIC DISTRICT (1974)
SEMINOLE HEIGHTS LOCAL HISTORIC DISTRICT (1989)
SEMINOLE HEIGHTS NATIONAL REGISTER HISTORIC DISTRICT (1993)
UPPER NORTH FRANKLIN STREET NATIONAL REGISTER COMMERCIAL DISTRICT (2010)
NORTH FRANKLIN STREET NATIONAL REGISTER HISTORIC DISTRICT (2002)
WEST TAMPA NATIONAL REGISTER HISTORIC DISTRICT (1983)
AERIAL FLIGHT DATE: 2016
DOWNTOWN GRID DETAIL
DRAFT
These maps are provided for informational and planning purposes only. All information is subject to change and the user of this information should not rely on the data for any other purposes that may require guarantee of accuracy, timeliness or completeness of information.
DATE: 01/11/18
20th Avenue
Fortaleza Avenue
Centre Ct
El Clair Ct
Richelieu Pl
Bryan St
Forest Ave
Columbus Drive
Sparkman Ave
Amelia Avenue
Frances Avenue
Park Avenue
Ross Avenue
15th Avenue
13th Avenue
12th Avenue
11th Avenue
Palm Avenue
Oak Avenue
7th Avenue
Henderson Avenue
Estelle Street
Key Street
Scott Street
Main Street
Laurel Street
East Broadway (7th Avenue)
Adamo Drive
Florida Avenue
Franklin Street
Tampa Street
Ashley Street
Nebraska Avenue
Armenia Avenue
Dale Mabry Highway
Boulevard
Cortez Avenue
Bird Street
Gandy Boulevard
Dr Martin Luther King Jr Blvd
Hillsborough River
Ybor Channel
Nuccio Parkway
Orange Avenue
Highland Avenue

LEGEND
PROPOSED EXPRESS LANE
PROPOSED EXPRESS LANE - BRIDGE
PROPOSED GENERAL USE LANE
PROPOSED GENERAL USE LANE - BRIDGE
PROPOSED COLLECTOR-DISTRIBUTOR LANE
PROPOSED COLLECTOR-DISTRIBUTOR LANE - BRIDGE
PROPOSED NON-INTERSTATE FACILITY
EXISTING OR UNDER CONSTRUCTION
TRANSIT ONLY ROADWAY
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NUMBER OF GENERAL USE LANES
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NUMBER OF COLLECTOR DISTRIBUTOR LANES
NUMBER OF AUXILIARY LANES
EXISTING RIGHT OF WAY
EXISTING LIMITED ACCESS RIGHT OF WAY
TSP/EIS RIGHT OF WAY
RIGHT OF WAY DEVIATIONS FROM TSP/EIS
TAMPA HEIGHTS LOCAL HISTORIC DISTRICT (2002)
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DRAFT
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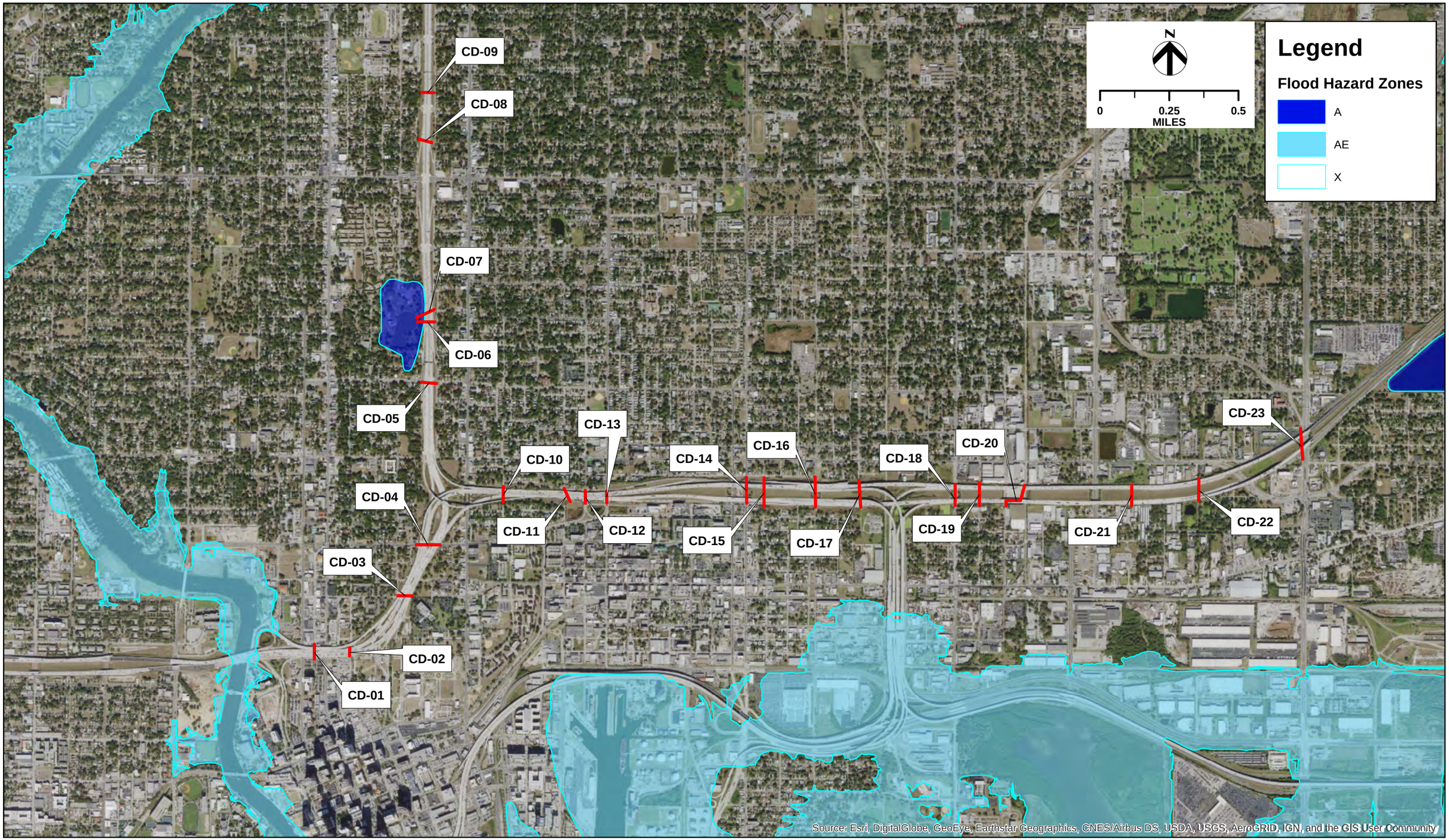
DATE: 1/11/18
Florida Avenue
Central Ct
St Clair St
Robles St
Bryan St
Forest Ave
Columbus Drive
Sparkman Ave
Amelia Avenue
Frances Avenue
Park Avenue
Ross Avenue
Palm Avenue
Oak Avenue
7th Avenue
Henderson Avenue
Estella Street
Main Street
Kay Street
Scott Street
Laurel Street
Adamo Drive
East Broadway (7th Avenue)
15th Avenue
12th Avenue
11th Avenue
Nebraska Avenue
Franklin Street
Tampa Street
Florida Avenue
Marion Street
Cass Street
Zack Street
Tyler Street
Jackson Street
Madison Street
Monroe Street
Jefferson Street
Washington Street
Lincoln Street
Grant Street
Polk Street
Highland Avenue
Ola Street
Cortez Street
Cypress Street
Lois Street
Dale Mabry Highway
Howard Avenue
Armenia Avenue
Manhattan Avenue
Rome Avenue
Himes Avenue
Dr Martin Luther King Jr Blvd
Hillsborough Ave
Nebraska Avenue
Franklin Street
Tampa Street
Florida Avenue
Marion Street
Cass Street
Zack Street
Tyler Street
Jackson Street
Madison Street
Monroe Street
Jefferson Street
Washington Street
Lincoln Street
Grant Street
Polk Street
Highland Avenue
Ola Street
Cortez Street
Cypress Street
Lois Street
Dale Mabry Highway
Howard Avenue
Armenia Avenue
Manhattan Avenue
Rome Avenue
Himes Avenue
Dr Martin Luther King Jr Blvd
Hillsborough Ave
Lincoln Memorial Overpass
Columbus Drive
Cass Street
Zack Street
Tyler Street
Jackson Street
Madison Street
Monroe Street
Jefferson Street
Washington Street
Lincoln Street
Grant Street
Polk Street
Highland Avenue
Ola Street
Cortez Street
Cypress Street
Lois Street
Dale Mabry Highway
Howard Avenue
Armenia Avenue
Manhattan Avenue
Rome Avenue
Himes Avenue
Dr Martin Luther King Jr Blvd
Hillsborough Ave
Nebraska Avenue
Franklin Street
Tampa Street
Florida Avenue
Marion Street

APPENDIX B

General Figures



FDOT

FEMA FLOODPLAIN AND CROSS DRAINS MAP

TIS SEIS SEGMENTS 2B, 3A, AND 3B
LOCATION HYDRAULICS REPORT

DATE
OCTOBER, 2018

FIGURE
FIGURE 1

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Coastal Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Coastal Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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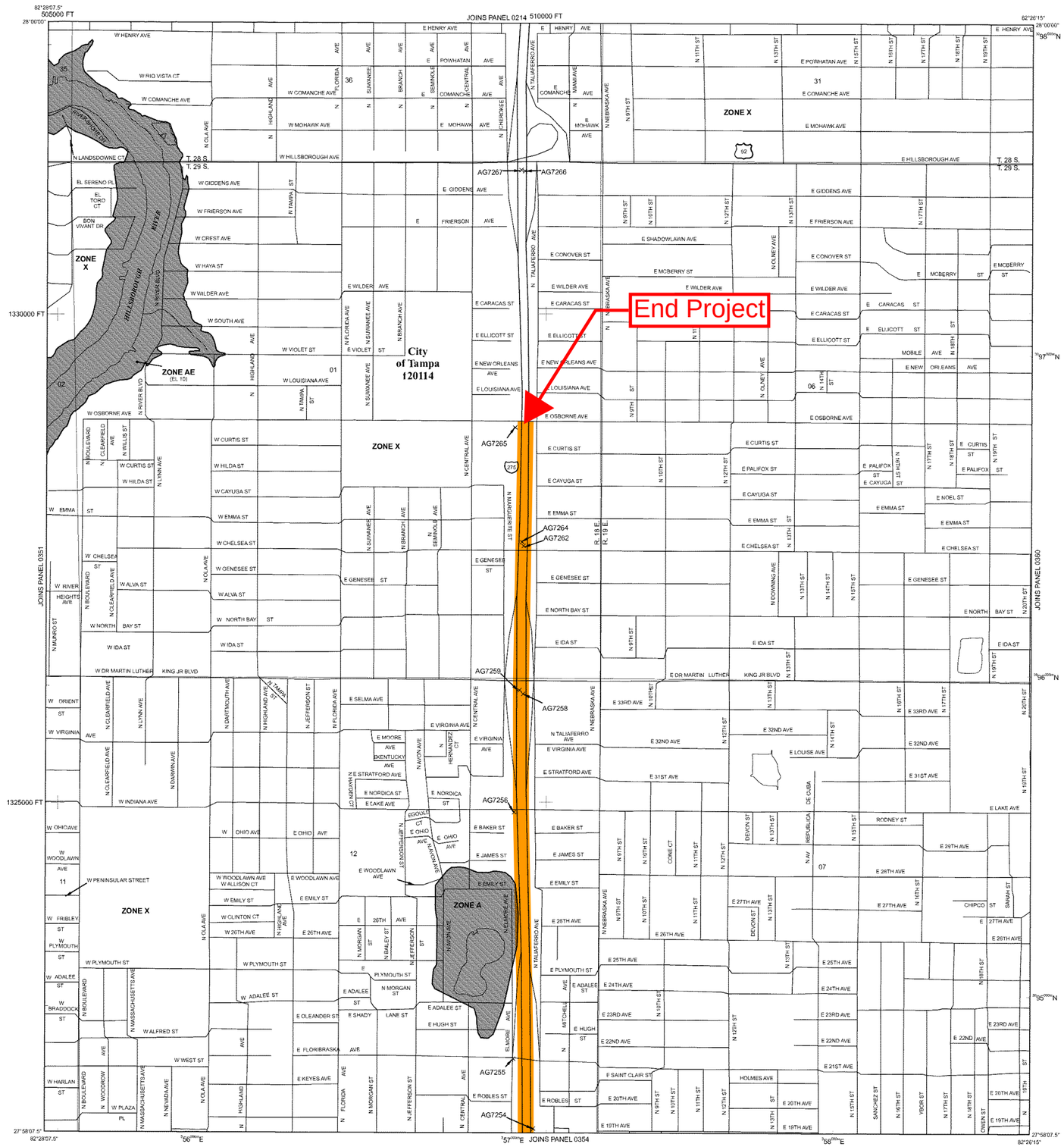
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reachec by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

Hillsborough County

In cooperation with the Federal Emergency Management Agency (FEMA), Hillsborough County developed this Flood Insurance Rate Map in a digital countywide format to assist communities in their efforts to minimize the loss of property and life through effectively management development in floodprone areas. Hillsborough County has implemented a long term approach to floodplain management to reduce the impacts of flooding. This is demonstrated by the County's commitment to map floodplain areas at the local level. As part of this effort, Hillsborough County is working closely with FEMA as a Cooperating Technical Partner to produce and maintain this digital FIRM.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section Line
(23)- - - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
7600000FT	1000-meter Universal Transverse Mercator grid values, zone NAD 83 UTM Zone 17
600000 FT	5000-foot grid ticks: Florida State Plane coordinate system, West zone (FIPSZONE 0902), Transverse Mercator projection
DX5510 ×	Bench mark (See explanation in Notes to Users section of this FIRM panel)
●M1.5	River Mile
♦410285	Junction

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0352H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 352 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAMPA, CITY OF	120114	0352	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12057C0352H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

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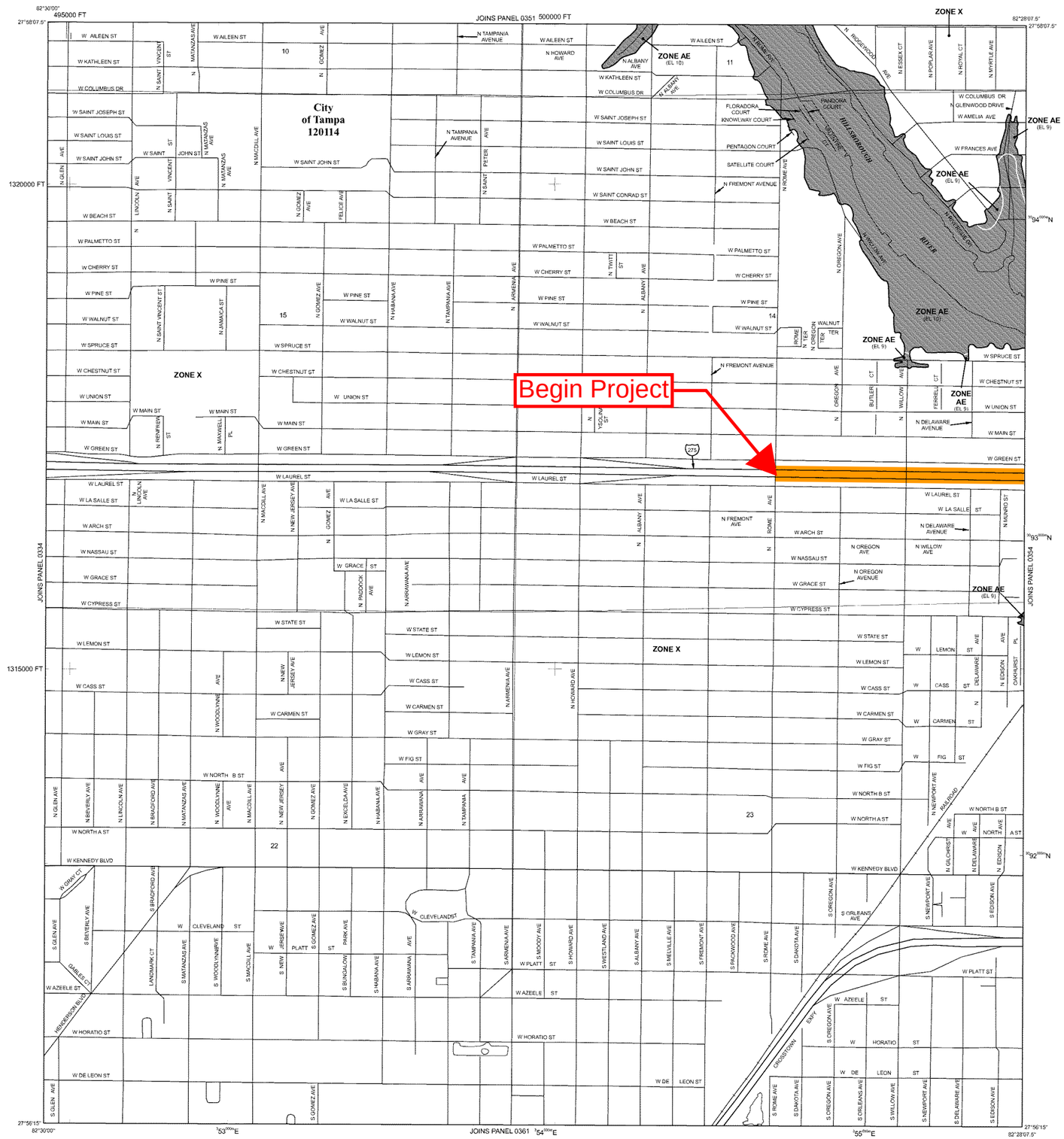
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

Hillsborough County

In cooperation with the Federal Emergency Management Agency (FEMA), Hillsborough County developed this Flood Insurance Rate Map in a digital countywide format to assist communities in their efforts to minimize the loss of property and life through effectively management development in floodprone areas. Hillsborough County has implemented a long term approach to floodplain management to reduce the impacts of flooding. This is demonstrated by the County's commitment to map floodplain areas at the local level. As part of this effort, Hillsborough County is working closely with FEMA as a Cooperating Technical Partner to produce and maintain this digital FIRM.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)—(A)	Cross section Line
(23)- - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
7000000 FT	1000-meter Universal Transverse Mercator grid values, zone NAD 83 UTM Zone 17
600000 FT	5000-foot grid ticks: Florida State Plane coordinate system, West zone (FIPSZONE 0902), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile
◆ 410285	Junction

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0353H

FIRM
FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 353 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAMPA, CITY OF	120114	0353	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12057C0353H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

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To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Coastal Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Coastal Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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Base map information shown on this FIRM was derived from multiple sources. Road centerlines were provided by the City of Tampa Geographic Information System (GIS) group. These data were aligned to aerial imagery at 6-inch pixel resolution dated 2004. Surface water features were provided by the Hillsborough County Information Technology & Services GIS Section. These data were digitized from aerial imagery at 1-foot and 6-inch pixel resolution dated February 2000 and April 2004. Political boundaries were provided by the Hillsborough County Real Estate Department, Survey Division, GIS Section. These data were compiled in 2003. Public Land Survey System (range, township, and sections) were provided by the Florida Geographic Data Library. These data were produced at a scale of 1:24,000.

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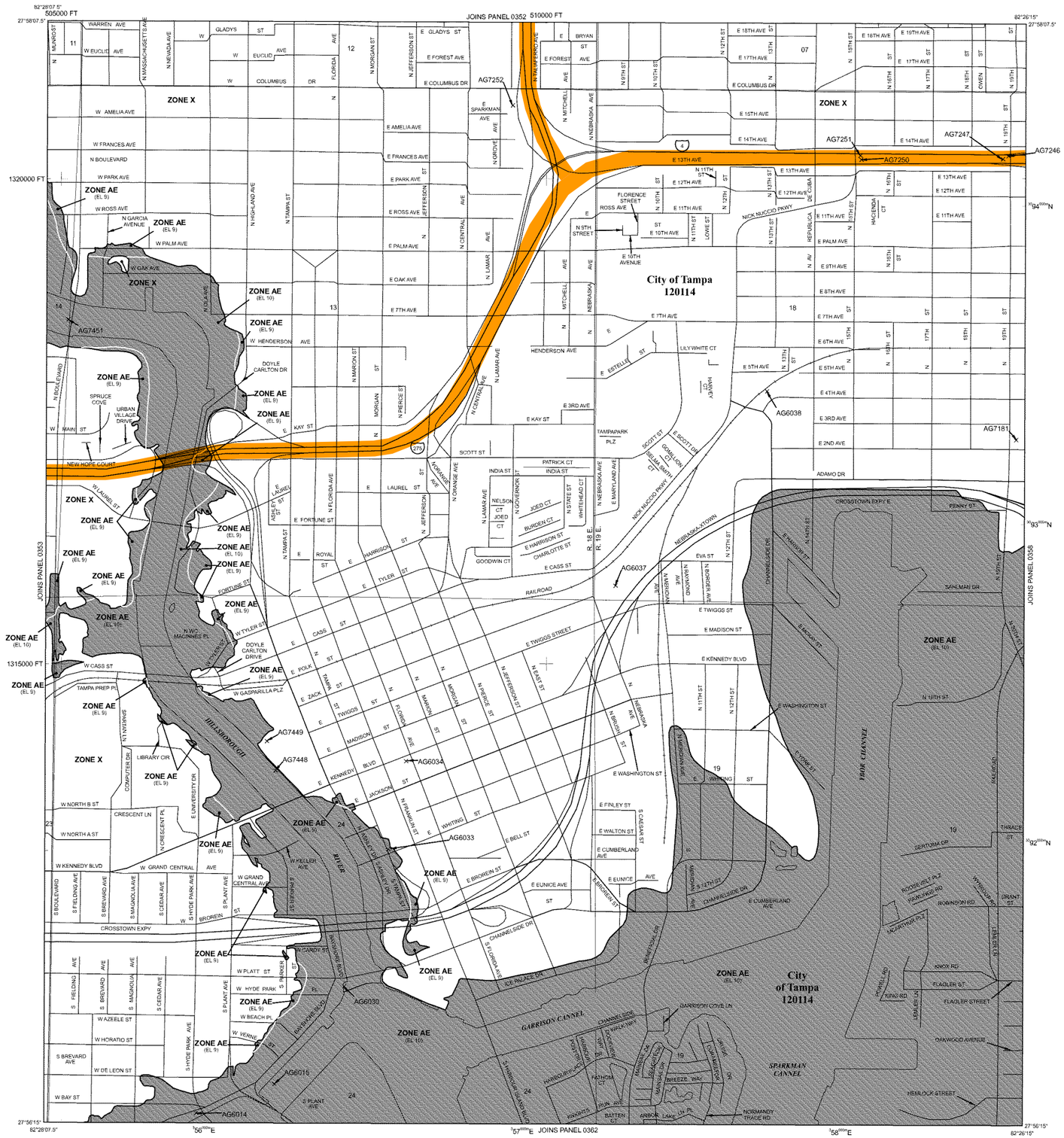

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
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	Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
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* Referenced to the North American Vertical Datum of 1988

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DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile
♦ 410285	Junction

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0354H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 354 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAMPA, CITY OF	120114	0354	H

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MAP NUMBER
12057C0354H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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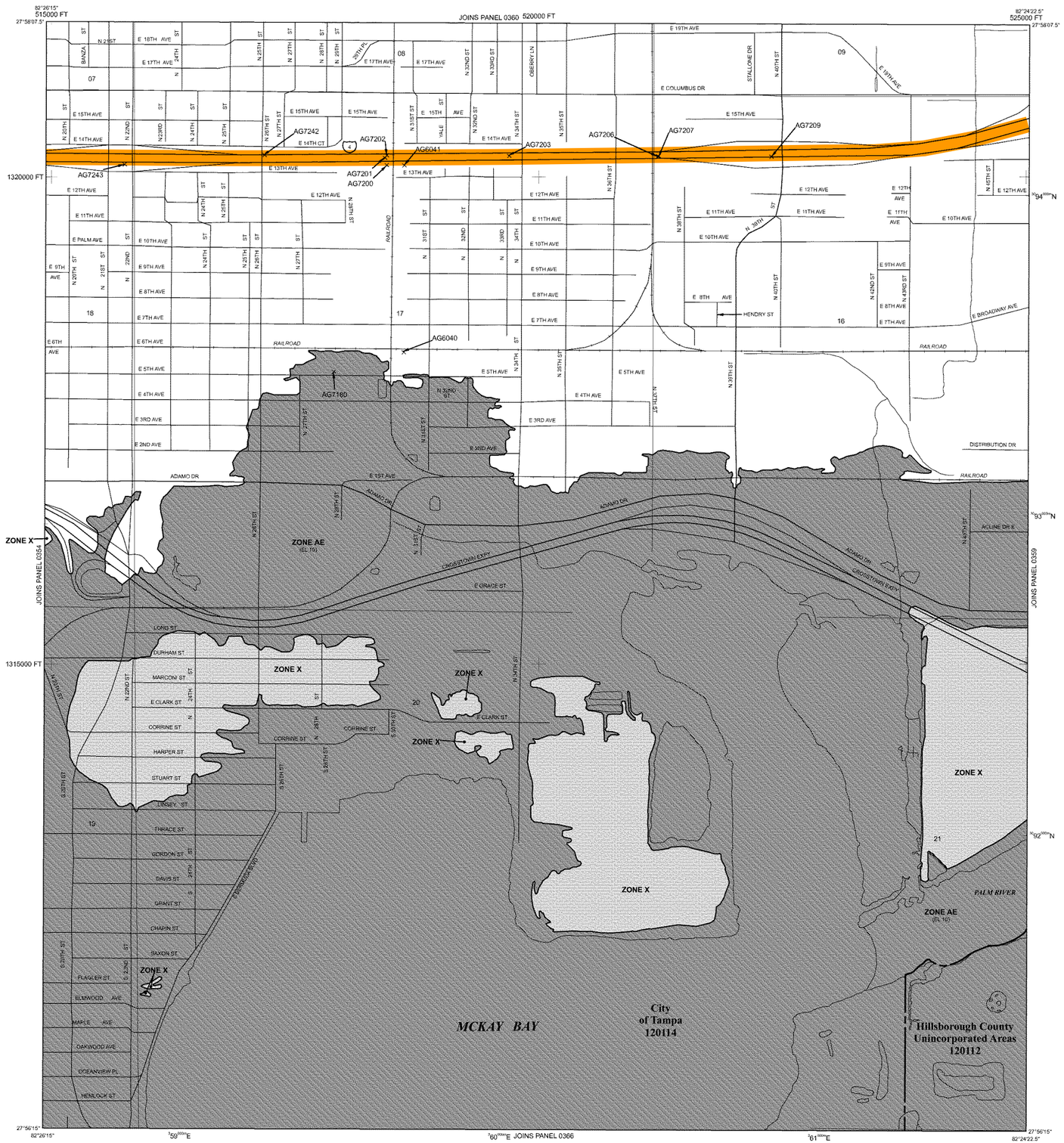

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

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OTHER AREAS

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DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
●M1.5	River Mile
♦410285	Junction

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0358H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 358 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0358	H
TAMPA, CITY OF	120114	0358	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12057C0358H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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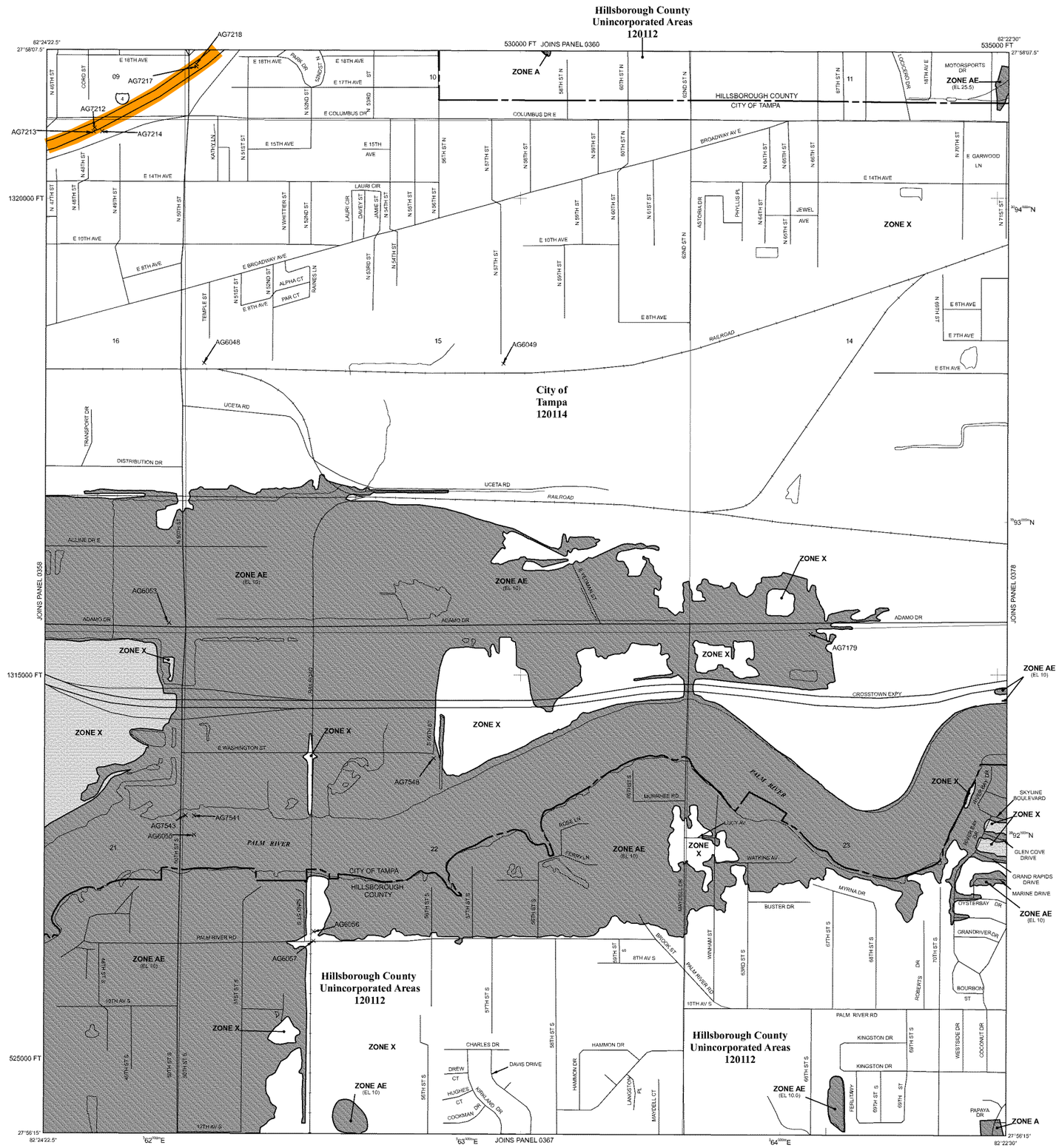

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section Line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
76000mN	1000-meter Universal Transverse Mercator grid values, zone NAD 83 UTM Zone 17
600000 FT	5000-foot grid ticks: Florida State Plane coordinate system, West zone (FIPSZONE 0902), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile
♦ 410285	Junction

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0359H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 359 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0359	H
TAMPA, CITY OF	120114	0359	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12057C0359H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Coastal Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Coastal Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positions differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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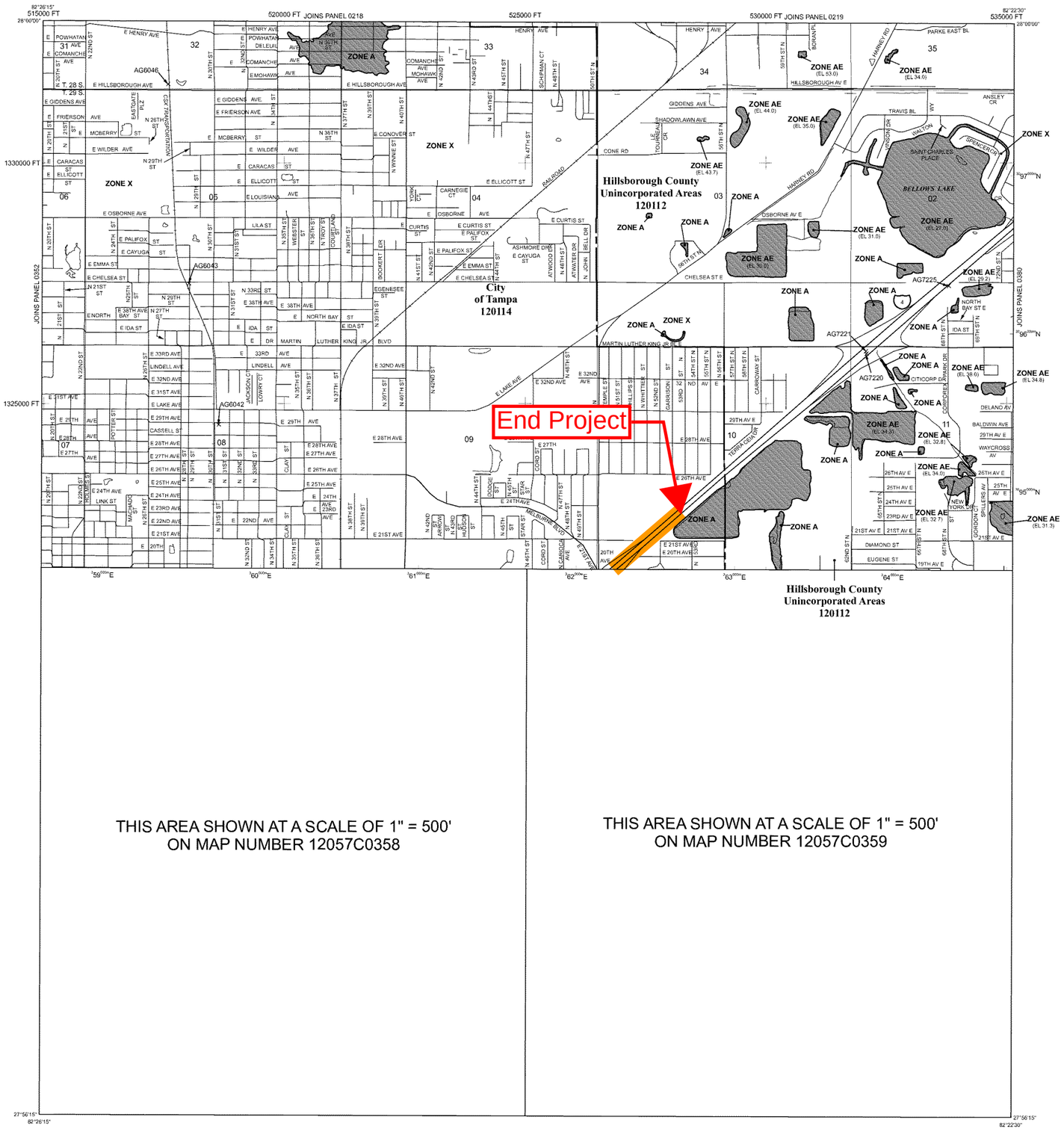

THIS AREA SHOWN AT A SCALE OF 1" = 500'
ON MAP NUMBER 12057C0358

THIS AREA SHOWN AT A SCALE OF 1" = 500'
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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0360H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 360 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

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TAMPA, CITY OF	120114	0360	H

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MAP NUMBER
12057C0360H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

APPENDIX C

Correspondence

Meeting Minutes

Project:	TBX Segment 6 – FPID 433821-2
Subject:	Roadway and Stormwater Design Meeting
Date:	Tuesday, November 15, 2016
Location:	FDOT 7
Attendees:	Mary Lou Godfrey – FDOT Daniel Lauricello - FDOT Richard Moss – FDOT Ginger Crieghton – FDOT Abdul Waris - FDOT David Bredahl – ACP Amy Neidringhaus - FDOT Allan Urbonas – FDOT Bill McTeer – FDOT Jim Johnston - HDR

	Topic	*Facilitator*	*Start*	*End*
1	Click here to enter text.	Name	Time	Time
2	Click here to enter text.	Name	Time	Time
3	Click here to enter text.	Name	Time	Time
4	Click here to enter text.	Name	Time	Time

- HDR (sub to American Consulting Professionals) is scoped to prepare LHR and PSR. American will be preparing 15% line and grade.
- Preliminary conceptual roadway design and r/w information is available. HDR will coordinate with American to obtain the electronic files.
- Mainline design is complete; side streets tie-downs still require adjustments.
- TIS that was provided to HDR was completed in early 1990's so stormwater management criteria has changed.
- HDR should coordinate with Paul Staes, who has been assisting the Department with design and r/w efforts.

Existing Drainage Concerns

- Existing drainage/flooding concerns within the project area should be researched. FDOT may want to resolve where feasible as part of the TBX. Check if any flooding issues are documented in the Hillsborough River Watershed Study.
- Abdul believes there is an existing flooding issue in the vicinity of 40th Street (need clarification from Abdul since it appears 40th St is beyond project limits).
- 14-86 criteria should be used for basins with documented flooding issues if feasible.

Design Approach

- Schedule pre-application meeting with SWFWMD in December or early January. Need to determine if water quality treatment will be required for all DCIA or only the additional impervious area.
- Stormwater management for TBX accommodated in previous projects west of 14th Street.
- Hillsborough River is considered tidal within the project limits. Attenuation would not be required for outfalls to the river. Consider potential outfalls along existing City streets that are not brick.
- Impervious area based on entire r/w would provide the most conservative approach, although proposed infield areas should not be included.

Potential SWM Sites

- Any pond sites on adjacent TBX segments that could be expanded for Segment 6 should be considered.
- Approximately nine remnant parcels are anticipated. Some have been reserved for the proposed trail.
- Remnant parcels that will likely be available for stormwater management include Mobley Park apartments (large site), Presbyterian Village, expansion of Robles Park (pond is being constructed across from park) and the site north of the community center. Also consider the DMS building site.
- Trail agreements will affect the pond siting efforts.
- Former jail site was discussed, may be needed for other future uses.
- Avoid existing single family homes. Although some are close to the proposed improvements, the existing lots are small.
- Public housing site that is currently boarded up may be an option for proposed stormwater management.
- Meet with the City and County to determine if any joint use opportunities exist. City may have purchased flooded home sites within the project limits

Alternative Methods

- Shallow SHWT will likely prevent the use of sand filters.

- Determine if vaults are an option either onsite or offsite. They should not be considered under the roadway pavement. HDR should obtain available information for the existing vaults along the Selmon Expressway to clarify the design approach.
- Determine if there are opportunities for stormwater harvesting and document in the report.
- Determine if deep well injection is an option. May require a very high level of water quality treatment.
- Are there other options that are being used in different regions or FDOT Districts?

TBX Segment 6 Roadway and Stormwater Design Meeting
FPID: 433821-2
11/15/2016

- Overall project limits
- Concept Roadway Design Status for RFP
- Stormwater Management Data Collection efforts
- Existing Drainage Concerns within the Area – Could FDOT resolve offsite flooding as part of the TBX?
- Remnant Parcels Available for stormwater treatment?
- Environmental Look Around
- Joint Use Opportunities with the City of Tampa or Hillsborough County?
- Any opportunities for Stormwater harvesting?
- SWFWMD Pre-Application Meeting
- Deliverables
- Action Items
- Next Meeting

FDOT TBX Section 6 Drainage Meeting

Date: 4/21/17
Time: 10:00 AM – 11:30 AM
Location: D7-HQ, Flamingo

Attendees: See attached Sign-In Sheet

Subject: TBX Section 6 Drainage

Meeting Minutes:

1. Project Overview
   - Schedule
     - American will create once CDP scope is finalized.
   - Current contract status
     - There will be continuity of American/HDR team for the CDP.
     - HDR will submit a letter to FDOT confirming they will not pursuit the Section Design Build contract.
   - Scope/Staff Hour Estimate
     - Kirk Bogen and George Walton will meet to discuss scope.
     - American/HDR will compare PD&E scope with CDP scope and adjust CDP and provide recommendations.
2. Project History
   - A PD&E PSR/LHR has not been submitted yet.
   - Mary Lou Godfrey would like to see HDR submit a PSR/LHR as per the PD&E scope.
   - Daniel Lauricello would like to see a comprehensive PSR completed.
   - There was a discussion on if there should be two separate PSRs submitted or if the requirements of the PD&E scope could be satisfied by way of a PSR Memo and then a formal PSR submitted ongoing with the CDP.
   - Cristina Jackson will forward HDR examples of other TBX Sections PSRs for Right of Way Needs developed during the PD&E phase for their use in developing a PSR Memo to satisfy the requirements of the PD&E scope.
3. Roadway Status
   - HDR has not seen the latest Arcadis concept. David Bredahl will forward the latest Arcadis concept to Bart Rohrer.
   - Arcadis submitted a traffic report and FDOT is currently reviewing and providing comments for it. Once the comments are submitted, they will be forwarded to American/HDR for their use.
   - Jeff Drapp will forward preliminary elevations provided by Arcadis for HDR's use in evaluating hydraulic feasibility of pond sites.
4. Drainage Status
   - Bart Rohrer presented exhibits showing the preliminary sub-basin limits and outfalls:
     - West of Hillsborough River
     - Interchange area
     - North of Interchange
     - Future sub-basin limit coordination with Sections 5, 7 and 8
   - Bart Rohrer presented a table with the proposed treatment and attenuation

- Treatment volume required assumed to be total new impervious. Pond sizes will be revised to address net new impervious only.
- Attenuation volume required assumed direct outfall to Hillsborough River will not require attenuation.
- The TIS Pond Sites were discussed.
  - See attached exhibits.
  - The TIS Pond Site in the northwest corner of I-275 and the Hillsborough River is part of the Presbyterian Village and is still available for pond sites.
  - The TIS Pond Site in the southwest corner of I-275 and the Hillsborough River is part of Julian B Park and will not be available for pond sites.
  - The TIS Pond Site in the northeast corner of I-275 and the Hillsborough River is still available for pond sites.
  - The TIS Pond Site underneath the Downtown Interchange are still available for pond sites however will need to be split into several sites if used.
  - The rectangular TIS Pond Site northwest of the Downtown Interchange will be verified for ROW acquisition status.
    - FDOT will follow up with ROW to find out what has been purchased already.
    - HDR will review FDOT GIS Map Portal that shows the acquired ROW.
  - The TIS Pond Site north of Robles Park and west of I-275 will be part of Robles Park and not available for pond sites.
    - David Bredahl will share the PD&E Commitments with HDR regarding Robles Park.
  - The rectangular TIS Pond Site east of I-275 across from Robles Park will be verified for ROW acquisition status. This site will be expanded for a park but may be available for pond sites if a curvilinear (no BURP) pond site is considered.
  - The TIS Pond Site in the northwest corner of MLK and I-275 has been partially revised to address historic residential property. The available pond site will be revised to include the frontage parcels only plus the commercial Chevron property to form a backwards "L" shape.
  - The TIS Pond Site in the northwest corner of Chelsea St and I-275 will be verified by Kirk Bogen/Ashley Henzel for Cultural Resources.
- Other Proposed Pond Sites were discussed.
  - The vacant parcel north of the Oaklawn Cemetery and south of I-275 will be reserved for a Multi Modal center and not available for pond sites.
  - Alternatives underneath the proposed I-275 bridges north of Floribraska Avenue will not be available for pond sites as they will be reserved for park connectivity in between the west and east sides of I-275.

- Other considerations
  - Daniel Lauricello asked that stormwater harvesting, vaults, and regional ponds/park expansions be considered. Environmental Look Arounds (ELAs) should be considered throughout all PSR phases.
  - FDOT will have preliminary discussions with SWFWMD regarding the SWFWMD River Tower Shoreline Project for potential water quality equivalencies for improvements to Section 6 and 7 of TBX.
  - HDR will provide treatment calculations that include impair water criteria and will not consider utilizing water quality equivalencies from Old Tampa Bay.
  - Jeff Drapp offered that the proposed bridges over 14th and 15th Street might have areas underneath available for pond sites if needed. However, he stated it is the City's preference to

convert those bridges into MSE walls and eliminate the open area underneath if they are not needed for pond sites.

5. Permitting
   - Cristina Jackson will schedule a SWFWMD Pre-Application Meeting.
   - TPA and USCG permits will be required for improvements over the Hillsborough River.
6. Action Items
   - FDOT/American/HDR will continue developing Scope/Staff Hours/Schedule.
   - HDR will submit a letter to FDOT confirming they will not pursuit the Section Design Build contract.
   - Cristina Jackson will forward HDR examples of other TBX Sections PSRs for Right of Way Needs developed during the PD&E phase for their use in developing a PSR Memo to satisfy the requirements of the PD&E scope.
   - Jeff Drapp will forward preliminary elevations provided by Arcadis for HDR's use in evaluating hydraulic feasibility of pond sites.
   - FDOT will follow up with ROW to find out what has been purchased already. HDR will review FDOT GIS Map Portal that shows the acquired ROW.
   - David Bredahl will share the PD&E Commitments with HDR regarding Robles Park.
   - The TIS Pond Site in the northwest corner of Chelsea St and I-275 will be verified by Kirk Bogen/Ashley Henzel for Cultural Resources.
   - Cristina Jackson will schedule a SWFWMD Pre-Application Meeting.
   - Cristina Jackson will schedule a follow up Drainage Meeting to discuss the progress on the action items discussed in this meeting.

FDOT TBN Section 6 PSR Meeting

Date: 1/11/18
Time: 11:00 AM – 12:00 PM
Location: D7-HQ, Planning

Attendees: Kirk Bogen, Jeff Drapp, Brad Flom, Ashley Henzel, Mary Lou Godfrey, Cristina Jackson, Daniel Lauricello, Alice Price, Bart Rohrer, Nicole Selly

Subject: TBN Section 6 PSR

Meeting Minutes:

1. Previous Work:
   - Ponds were originally sized for the entire contributing area per former SWFWMD criteria
   - Ponds were revised to only include the new impervious area per new SWERP criteria
   - FDOT has requested that ROW for ponds be eliminated where possible especially for the MLK and Robles Park Pond
   - FDOT is evaluating four alternatives for Section 6: two reconstruction alternatives and two viaduct alternatives
   - The TBN Owners Rep has performed a preliminary analysis evaluating opportunities to minimize ROW for ponds
2. Project Coordination
   - The PD&E Limits for Section 6 along I-4 are from I-275 to East of 50th.
   - Jeff Drapp sent the latest draft of the four design option exhibits on 1/11/18 to American.
   - Cristina Jackson will send Bart Rohrer the preliminary review done for the Chunk.
   - A follow up workshop/meeting will be scheduled to discuss the implications and considerations to providing a conveyance system with direct discharge to Hillsborough River in lieu of attenuation.
   - TBN Owners Rep will provide the latest FDOT ROW files within Section 6.
   - FDOT will provide direction on what FDOT owned parcels can be used for ponds and which cannot.
   - TBN Owners Rep/FDOT will provide the latest trail concepts along Section 6.
   - Cristina Jackson will schedule a Pre-Application Meeting within a month.
   - Bart Rohrer will discuss Amendment needs with American and provide to FDOT.
   - The regional stormwater quality projects being evaluated by FDOT will not be included in the TBN Section 6 PSR.
   - Bart Rohrer will submit a Draft PSR and LHR in line with the PD&E schedule.

RECORD OF TELEPHONE CALL

Job #	56636; FPN 431746-1-22-01	**Date**	05/20/2014
Call From	Mark Livesay	**Of**	HNTB Corporation
Call To	Jack Moore (Senior PE)	**Of**	SWFWMD (ERP Evaluation Section)
Phone	(813) 985-7481 ext. 2041		

Subject Discussed

Existing Permitted I-4 Ponds – Impaired Waters Criteria:

Jack Moore (Job Title: Senior Professional Engineer) with the Environmental Resource Permit (ERP) Evaluation Section of the Southwest Florida Water Management District (SWFWMD) called back in response to HNTB's question regarding the applicability of the impaired waters criteria on the existing permitted I-4 ponds from 50th Street to the Polk Parkway (SR 570). Mr. Moore had been involved in the review/permitting of the original permits in Hillsborough County.

Mr. Moore was told that HNTB is currently working on a PD&E Study which assesses the capability of the I-4 existing ponds to serve the ultimate typical section. Our research has shown that all of the existing ponds are permitted for the ultimate condition. However, the ponds were designed before the existence of FDEP's verified list of impaired waters and associated criteria.

Mr. Moore remembered that the I-4 permitting in which he was involved had permitted the stormwater management system for the ultimate condition. Therefore, he said that **ponds designed for the ultimate condition will be accepted and SWFWMD will not require any redesign to meet the impaired waters criteria.** Mr. Moore said that this was common SWFWMD practice for stormwater management systems that were designed and permitted for future improvements.

APPENDIX D

1991 TIS Location Hydraulic Report

Task A.5.b.6
Location Hydraulic Report

TAMPA INTERSTATE STUDY

State Project No. 99007-1402, WPI No. 7140004, FAP No. IR-9999(43)

Interstate 275 (I-275) from Dale Mabry Highway Interchange north to Dr. Martin Luther King Jr. Boulevard (formerly Buffalo Avenue), Interstate 4 (I-4) from I-275 (including interchange) to east of 50th Street (U.S. 41), and the Crosstown Connector from I-4 southward to the existing Tampa South Crosstown Expressway, Hillsborough County.

Prepared For The

FLORIDA DEPARTMENT OF TRANSPORTATION

Prepared By

GREINER, INC.

In Association With

KNIGHT APPRAISAL SERVICES, INC.
PIPER ARCHAEOLOGICAL SERVICES

MAY 1991

EXECUTIVE SUMMARY

This report documents the evaluation of existing and proposed cross-drain structures within the Tampa Interstate Study (TIS) Environmental Impact Statement (EIS) project limits. The project limits include I-275 (from east of Dale Mabry Highway to north of Dr. Martin Luther King, Jr. Boulevard), I-4 (from the I-4/I-275 junction to 50th Street), and the proposed Crosstown Connector (from I-4 near 30th Street extending southward to the Crosstown Expressway near McKay Bay) in the City of Tampa. The methodology used in this evaluation was established in Executive Order 11988 "Floodplain Management" and Federal-Aid Highway Program Manual (FHPM) 6-7-3(2), Paragraph 7.

Currently, I-275 provides a six-lane facility from east of Dale Mabry Highway to Howard Avenue and eight lanes from Howard Avenue to the Ashley Street ramps. From Ashley Street eastward through the Central Business District (CBD), six mainline lanes, with various auxiliary lane segments, are provided to the I-275/I-4 interchange. On I-275 between the I-4 junction and Dr. Martin Luther King, Jr. Boulevard, the facility has eight lanes and six lanes north of Dr. Martin Luther King, Jr. Boulevard. On I-4, six lanes are provided from the I-4/I-275 junction to 21st Street. From 21st Street eastward beyond 50th Street, I-4 is a four-lane facility.

The recommended concept for I-275 consists of a four-roadway system from east of Dale Mabry Highway to north of Dr. Martin Luther King, Jr. Boulevard. High Occupancy Vehicle (HOV)/Transitway lanes will be included within the interstate alignment. Interchange improvements include new interchange ramps at Himes Avenue to and from the east on I-275, split interchange ramps remaining at Howard

and Armenia Avenues, modification of ramps at Scott and Kay Streets to and from the west on I-275 to provide a west side CBD distributor interchange at Ashley/Tampa Streets serving all movements and a new west bank CBD interchange with ramps to and from the west on I-275 at North Boulevard.

I-4 improvements include a four-roadway system throughout the recommended concept segment transitioning to a two-roadway system at 50th Street. HOV lanes will be included within the interstate alignment. A new Ybor City/east side CBD split interchange will be included on I-4 at 14th and 15th Streets with the extension of the ramps at 14th and 15th Streets as parallel frontage roads to 21st and 22nd Streets to replace the existing access from I-4 to these streets, removal of the 19th Street overpass while maintaining the 26th Street overpass. Other interchange improvements will include the reconfiguration of the split interchange at Columbus Avenue and 50th Street, the removal of the interchange ramps at 40th Street and a new directional freeway-to-freeway interchange with the Crosstown Expressway Connector on I-4 at 30th Street.

Within the project limits, the existing roadway traverses the Federal Emergency Management Agency (FEMA) flood zones A, B and C. No longitudinal encroachments are within the project corridor. A bridge on I-275 crosses the Hillsborough River. A Bridge Hydraulic Report should be prepared separately to address this crossing. Due to the effects of the USACOE/SWFWMD Tampa Bypass Canal flood-control project on the Hillsborough River, encroachment up to the natural channel banks will not increase the flood elevation. Although the Hillsborough River serves as a floodway for the City of Tampa, the floodway data or delineations are not presented in the

FEMA Flood Insurance Study. All encroachments to the 100-year floodplain (Zone A) will be mitigated according to local and regional regulations.

The project corridor extends through areas which are characterized as heavily urbanized. The existing stormwater drainage systems within the project corridor outfall to Old Tampa Bay, Hillsborough River, and McKay Bay. Thirty cross-drain structures have been identified within the project corridor. These cross-drain structures include 23 reinforced concrete pipes (RCP), with sizes ranging from 18 inches to 84 inches and concrete box culverts (CBC), with sizes ranging from 3 feet by 3 feet to 10 feet by 6 feet. Four existing cross-drain structures were analyzed within the project corridor. Three of the four structures will be lengthened without increasing the headloss significantly. These three structures, along with the bridge crossing of the Hillsborough River, are considered Category 3 structures in accordance with the requirements set forth in FHPM 6-7-3(2), Paragraph 7. One of the four structures, rated as Category 5, will require upgrading to minimize adverse upstream flood impacts.

Modification and replacement of existing structures are needed due to the proposed improvements. The proposed roadway project should not significantly contribute to an increase in flood elevations and will not cause incompatible floodplain development. The proposed project should improve the use of the facility for emergency services and evacuation purposes.

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INTRODUCTION

Purpose

The majority of the Tampa interstate system was designed and constructed in the late 1950's and early 1960's. Realizing the need to upgrade the antiquated interstate system, the Florida Department of Transportation (FDOT) began a study in 1983 to evaluate reconstruction and High Occupancy Vehicle (HOV) improvements on the urban interstate system in Hillsborough County. The study established year 2010 traffic for the interstate system design and described some potential short-term safety and geometric solutions for the existing interstate. Additionally, the study identified long-term, HOV-related improvements to accommodate year 2010 traffic volumes.

A significant conclusion from the completed study was that efforts must be expanded to consider all transportation needs within the corridor, including any concurrent highway, rail, or transit improvements to the area which may impact the corridor, and to recommend improvements to the interstate system to accommodate those needs.

Utilizing the 1983 justification as a documented base, the Tampa Interstate Study (TIS) began in late 1987. Generally, the purpose of TIS was to produce a Master Plan, conceptual design, and an environmental impact data base for improvements to I-4, I-75, and I-275. Those recommended improvements are intended to serve traffic and transportation needs through the year 2010. Specifically, the objectives of the TIS are to prepare a series of reports documenting the requirements for conceptual design,

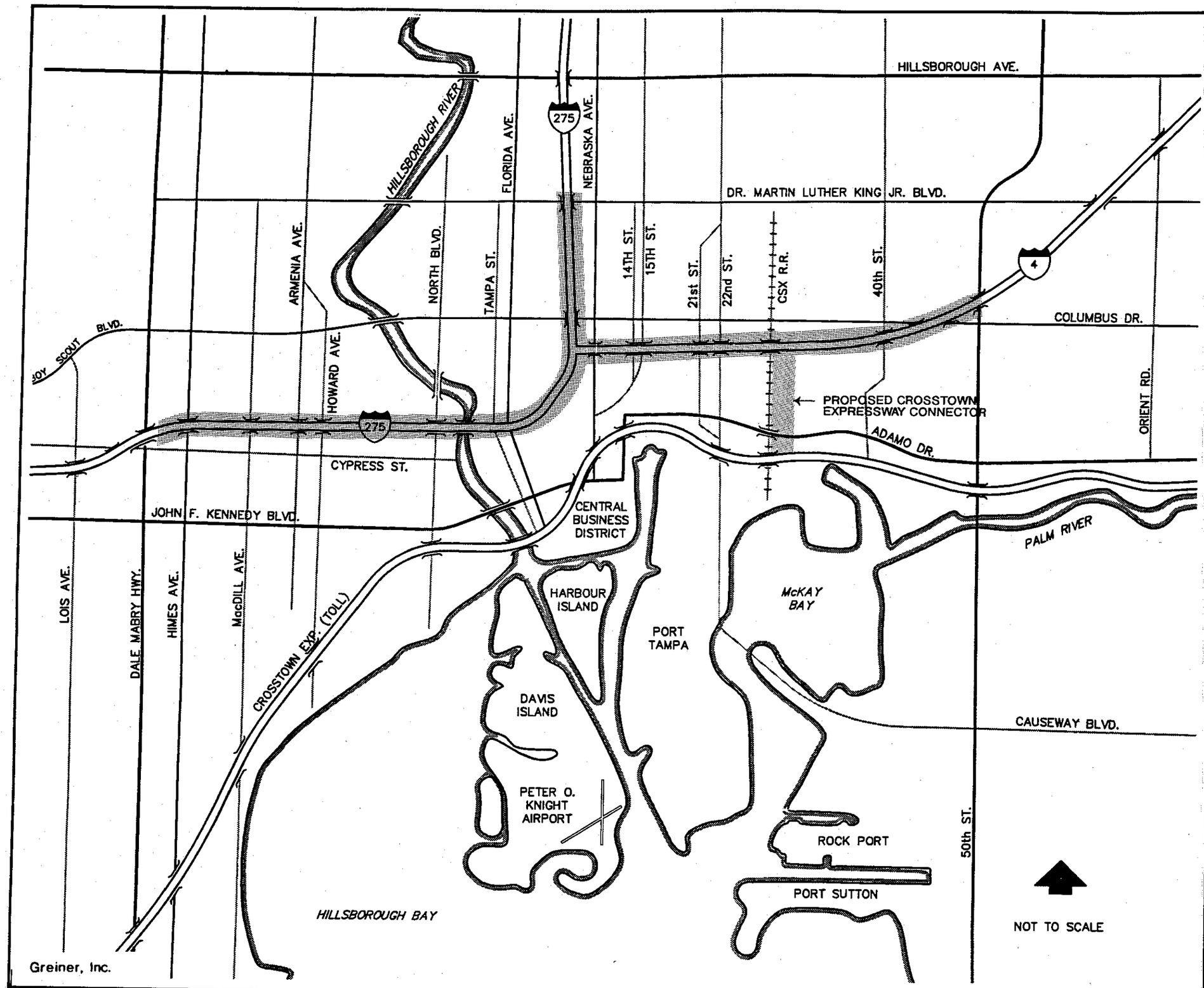
including existing and predicted conditions, typical sections, right-of-way requirements, environmental constraints, and costs of the recommended alternatives.

Following acceptance of the Master Plan, provisions were set forth by the FDOT to implement Phase II of the TIS. Phase II of TIS is intended to satisfy those requirements necessary to fully complete the environmental documentation for the recommended Master Plan. Completion of Phase II activities will enable the FDOT to proceed with final design and construction of the Tampa interstate system.

This Location Hydraulic Report (LHR) was completed in accordance with the requirements set forth in Executive Order 11988 "Floodplain Management" and FHPM 6-7-3(2), Paragraph 7. It provides supporting data, calculations and discussions of potential floodplain impacts due to the TIS proposed improvements along I-275 (from east of Dale Mabry Highway to north of Dr. Martin Luther King, Jr. Boulevard), I-4 (from the I-4/I-275 junction to 50th Street), and the Crosstown Connector (from I-4 near 30th Street southward to the Crosstown Expressway) in the City of Tampa, Florida.

Project Description

The project corridor extends through areas which are characterized as heavily urbanized. The project limits are I-275 from east of Dale Mabry Highway to north of Dr. Martin Luther King, Jr. Boulevard, I-4 from the I-4/I-275 junction east to 50th Street, and the Crosstown Connector in the vicinity of 30th Street on I-4 southward to the Crosstown Expressway. The project limits are shown on Exhibit 1.



LEGEND

Study Limits

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

LOCATION MAP

EXHIBIT 1

Currently, I-275 provides a six-lane facility from east of Dale Mabry Highway to Howard Avenue and eight lanes from Howard Avenue to the Ashley Street ramps. From Ashley Street eastward through the Central Business District (CBD), six mainline lanes, with various auxiliary lane segments, are provided to the I-275/I-4 interchange. On I-275 between the I-4 junction and Dr. Martin Luther King, Jr. Boulevard, the facility has eight lanes and six lanes north of Dr. Martin Luther King, Jr. Boulevard. On I-4, six lanes are provided from the I-4/I-275 junction to 21st Street. From 21st Street eastward beyond 50th Street, I-4 is a four-lane facility.

The recommended Master Plan concept on I-275 consists of a four-roadway system from east of Dale Mabry Highway to north of Dr. Martin Luther King, Jr. Boulevard. HOV/Transitway lanes will be included within the interstate alignment. Interchange improvements include new interchange ramps at Himes Avenue to and from the east on I-275, split interchange ramps remaining at Howard and Armenia Avenues, modification of ramps at Scott and Kay Streets to and from the west on I-275 to provide a west side CBD distributor interchange at Ashley/Tampa Streets serving all movements and a new west bank CBD interchange with ramps to and from the west on I-275 at North Boulevard.

I-4 improvements include a four-roadway system throughout the recommended concept segment transitioning to a two-roadway system at 50th Street. HOV lanes will be included within the interstate alignment. A new Ybor City/east side CBD split interchange will be included on I-4 at the 14th and 15th Streets with the extension of 14th and 15th Street ramps as parallel frontage roads to 21st and 22nd Streets to replace the existing access from I-4 to these streets, removal of the 19th Street overpass and maintain the 26th Street overpass. Other interchange improvements will

include the reconfiguration of the split interchange at Columbus Avenue and 50th Street, the removal of the interchange ramps at 40th Street and a new directional freeway-to-freeway interchange with the Crosstown Expressway Connector on I-4 at 30th Street. Exhibits 2-1 through 2-10 show the typical cross-section locations and cross-sections of the proposed improvements on I-275, I-4, and the Crosstown Connector within the project corridor.

The existing roadway within the project corridor serves the community as an evacuation route. The roadway within the project corridor is an elevated highway; therefore, the roadway overtopping and the traffic interruption due to flooding will be minimized.

The sources of information used in the preparation of this LHR include the following:

* USGS Quadrangle Maps
* Southwest Florida Water Management District's (SWFWMD) Contoured Aerials
* City of Tampa Drainage Atlas
* FEMA Flood Insurance Rate Maps and Flood Insurance Studies for the City of Tampa, Florida.
* USGS Soil Conservation Service, Soil Survey of Hillsborough County.
* Ybor City Stormwater Management Study - Phases 1 and 2, City of Tampa (1985).
* 29th Street Outfall Drainage System - Preliminary Report Phase II, City of Tampa (1973).
* FDOT plans for existing roadway within the study area.

Existing structures data were obtained from the City of Tampa Drainage Atlas (Ref. 1) and FDOT as-built plans (Ref. 6) of the project corridor, as well as other sources.

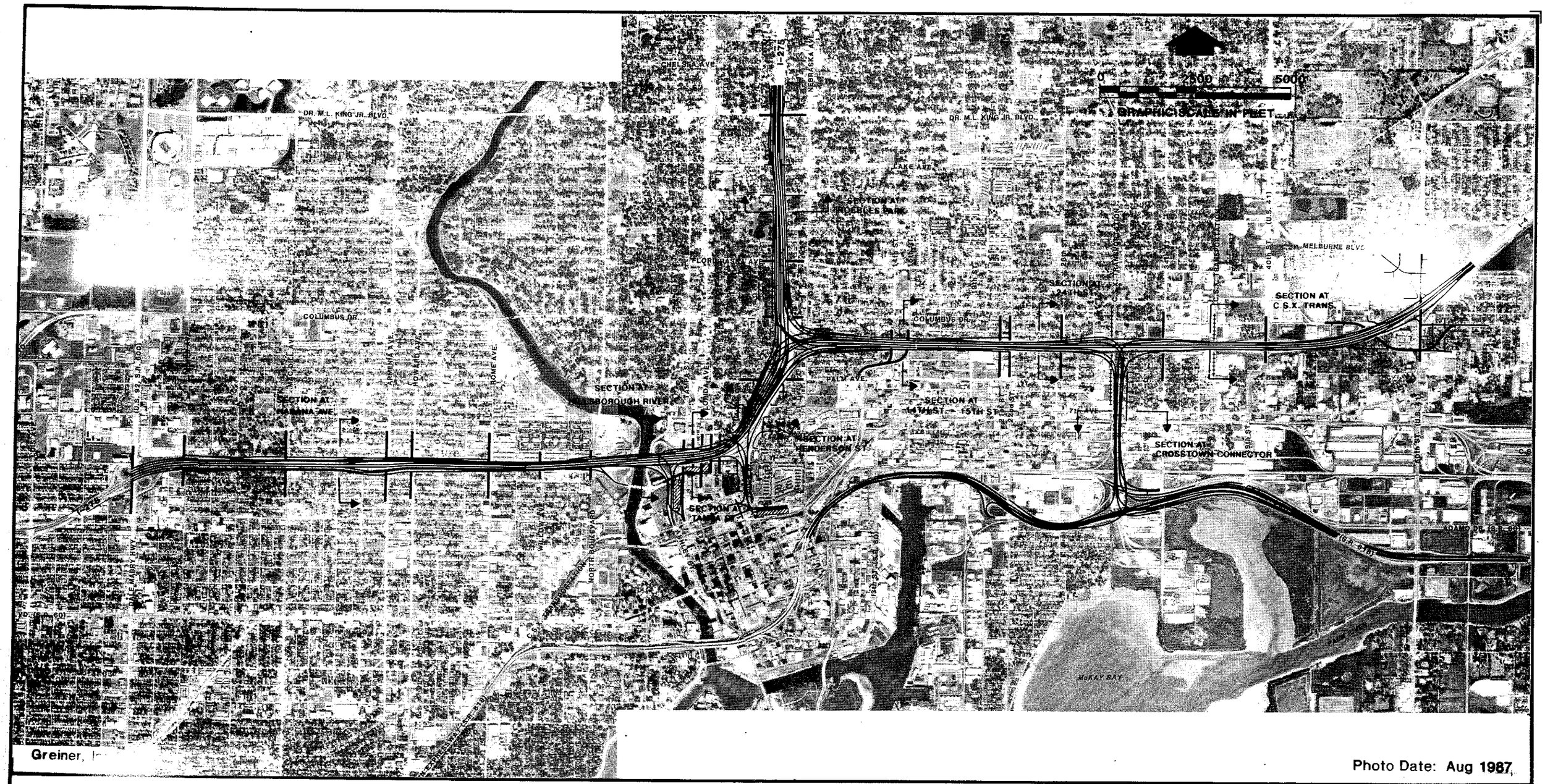


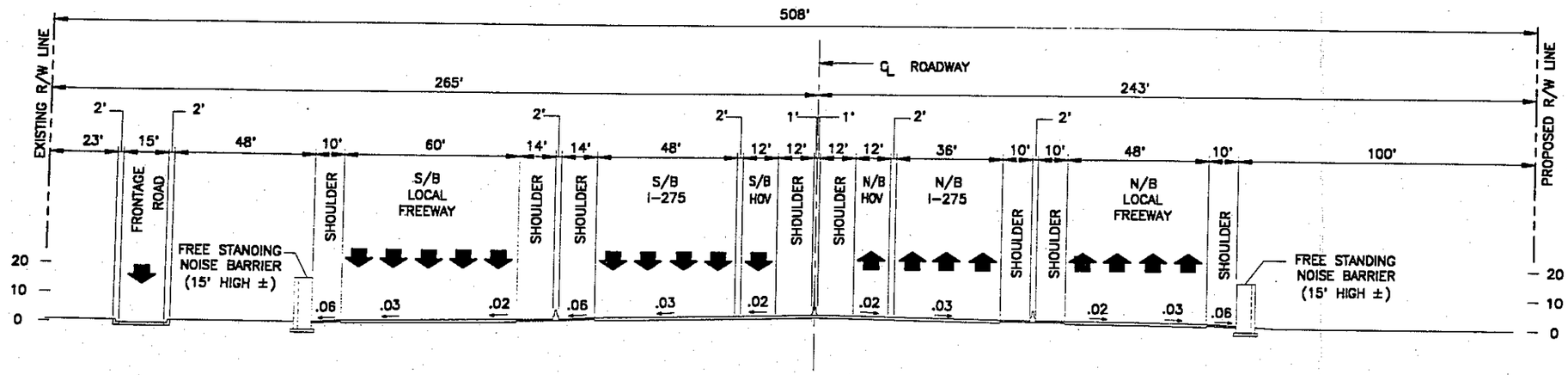
Photo Date: Aug 1987

FLORIDA DEPARTMENT OF TRANSPORTATION
LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II
Hillsborough County, Florida

TYPICAL SECTION LOCATION MAP

EXHIBIT 2-1



STATION 300+00

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

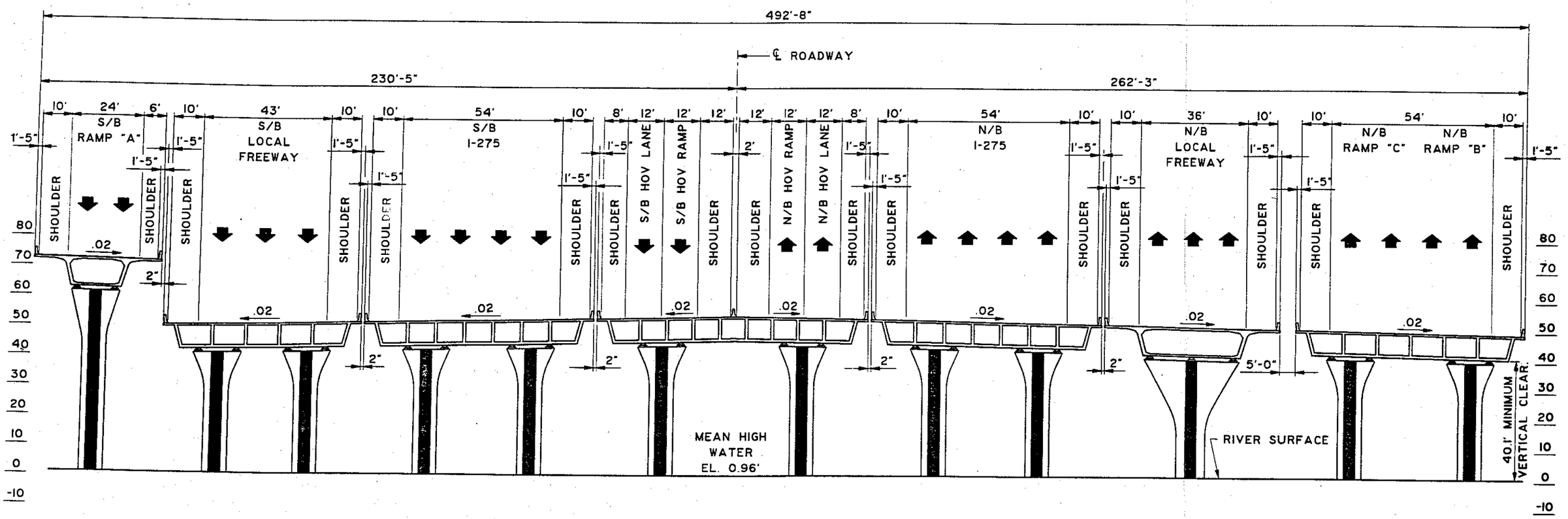
TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-275 AT HABANA AVENUE

EXHIBIT 2- 2

Greiner, Inc.



STATION 421+00

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

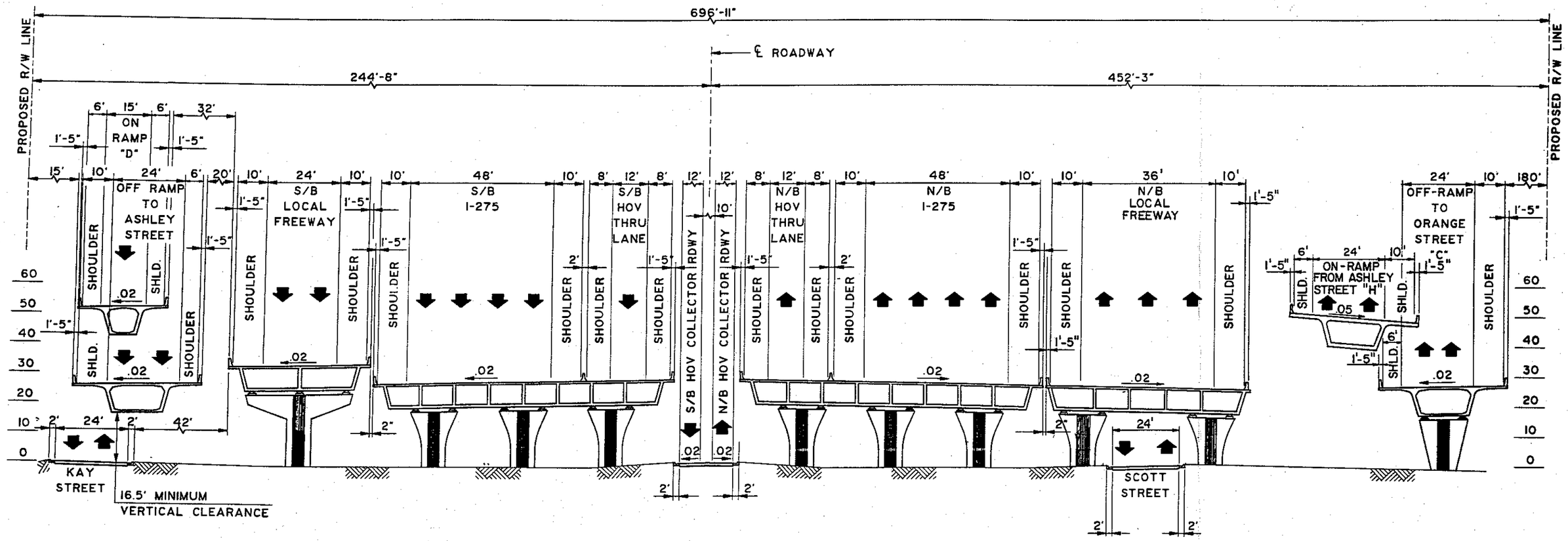
TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-275 AT HILLSBOROUGH RIVER

EXHIBIT 2- 3

Greiner, Inc.



STATION 432 + 00

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY

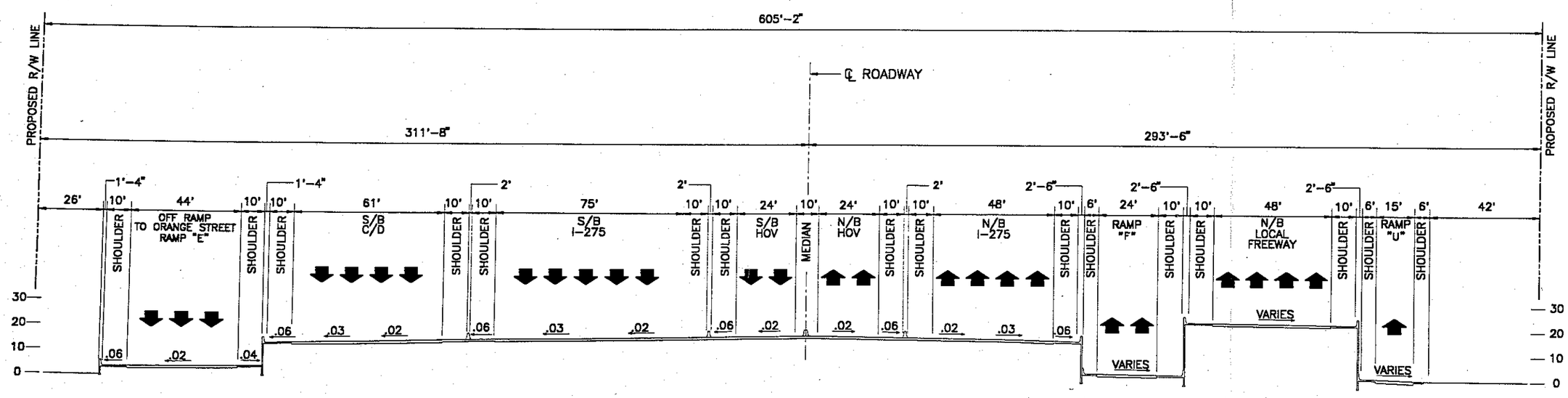
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-275 AT TAMPA STREET

EXHIBIT 2- 4

Greiner, Inc.



STATION 454+00

Greiner, Inc.

FLORIDA DEPARTMENT OF TRANSPORTATION

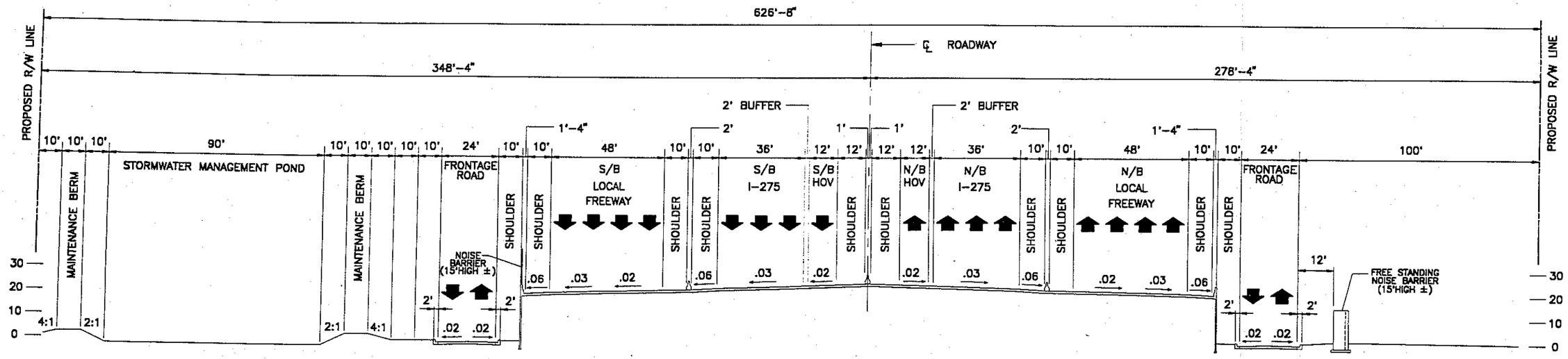
LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-275 AT HENDERSON STREET

EXHIBIT 2- 5



STATION 737+00

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

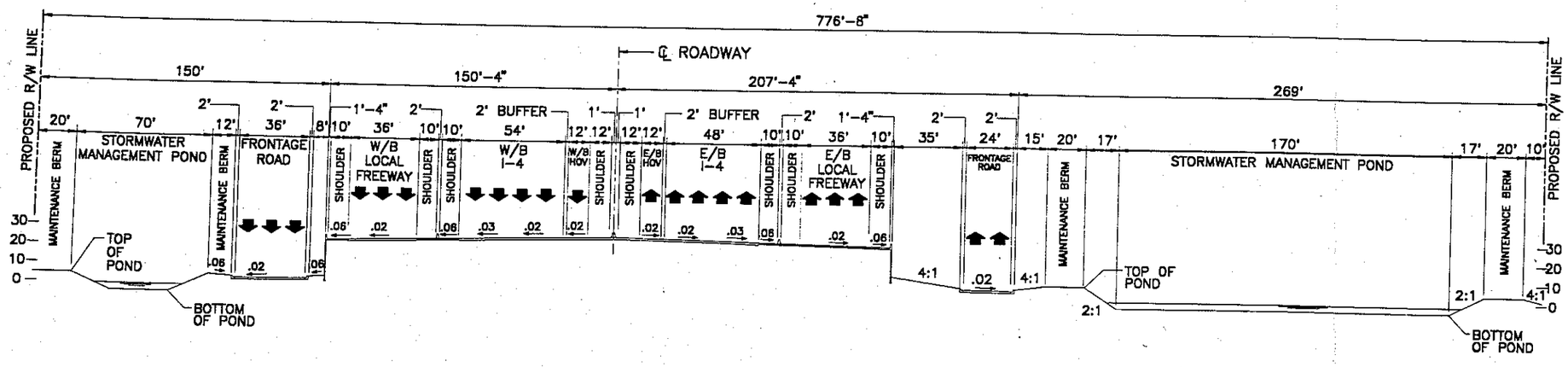
TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-275 AT ROBLES PARK

EXHIBIT 2- 6

Greiner, Inc.



STATION 472+00

Greiner, Inc.

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

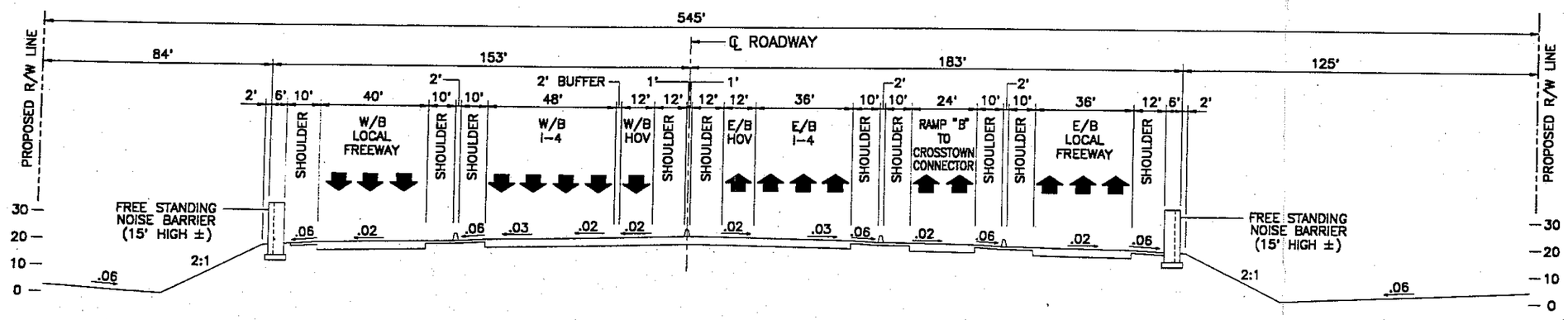
TAMPA INTERSTATE STUDY

PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-4 AT 14TH AND 15TH STREETS

EXHIBIT 2- 7



STATION 508+00

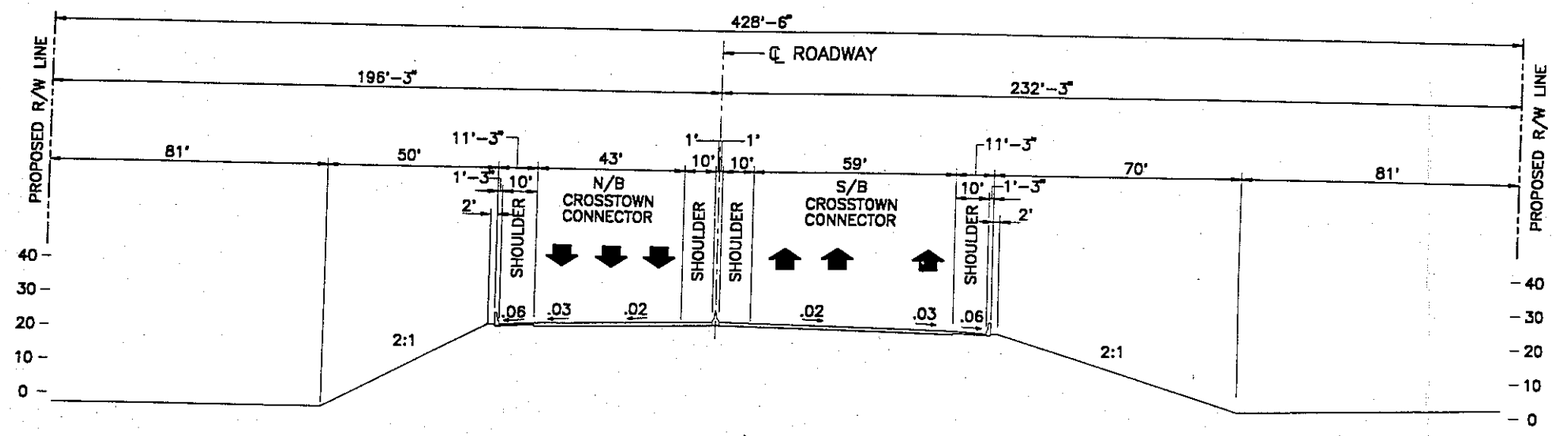
FLORIDA DEPARTMENT OF TRANSPORTATION

TAMPA INTERSTATE STUDY
PHASE II
Hillsborough County, Florida

TYPICAL SECTION
I-4 AT 24TH STREET

EXHIBIT 2-8

Greiner, Inc.



STATION 348+00

Greiner, Inc.

FLORIDA DEPARTMENT OF TRANSPORTATION

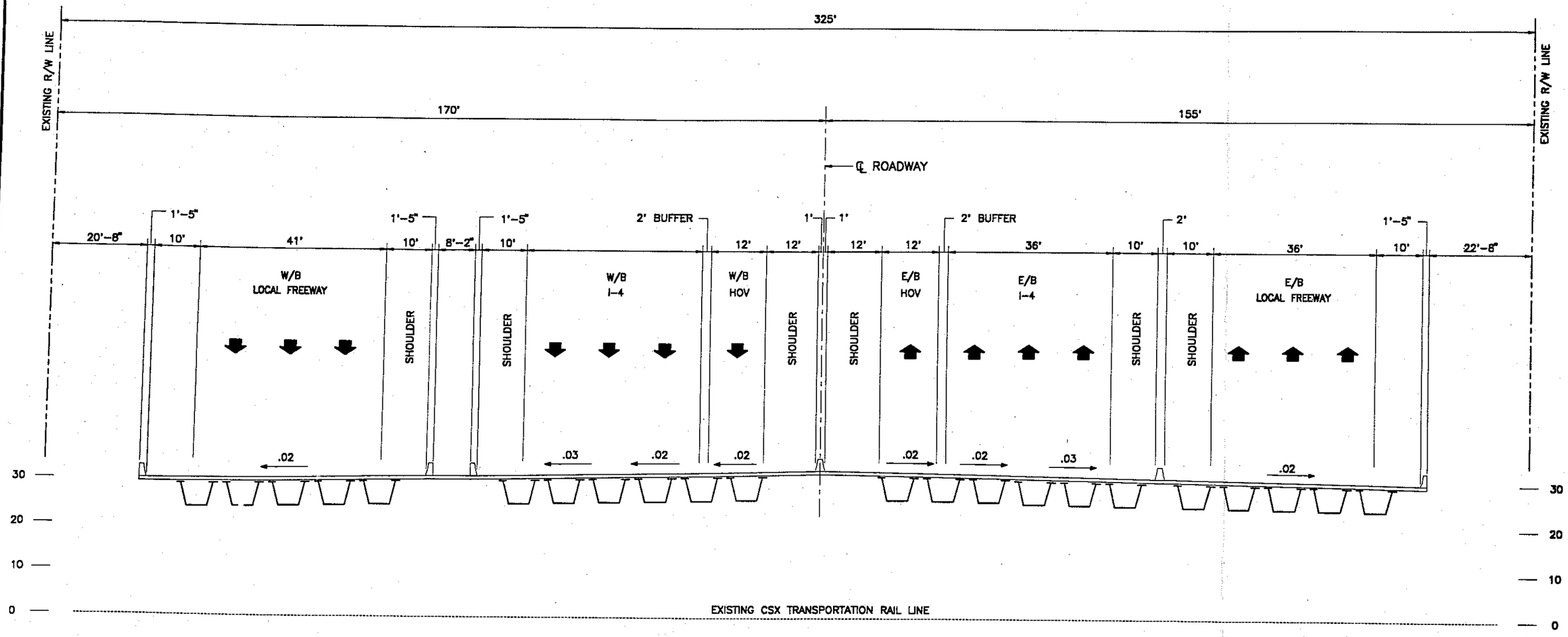
LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
CROSSTOWN EXPRESSWAY CONNECTOR

EXHIBIT 2- 9



STATION 555+00

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

TYPICAL SECTION
I-4 AT C.S.X. TRANSPORTATION CORRIDOR

EXHIBIT 2-10

Greiner, Inc.

This report contains general information and is intended for planning purposes only. Specific, detailed studies will be required for each cross-drain structure before construction of any improvements.

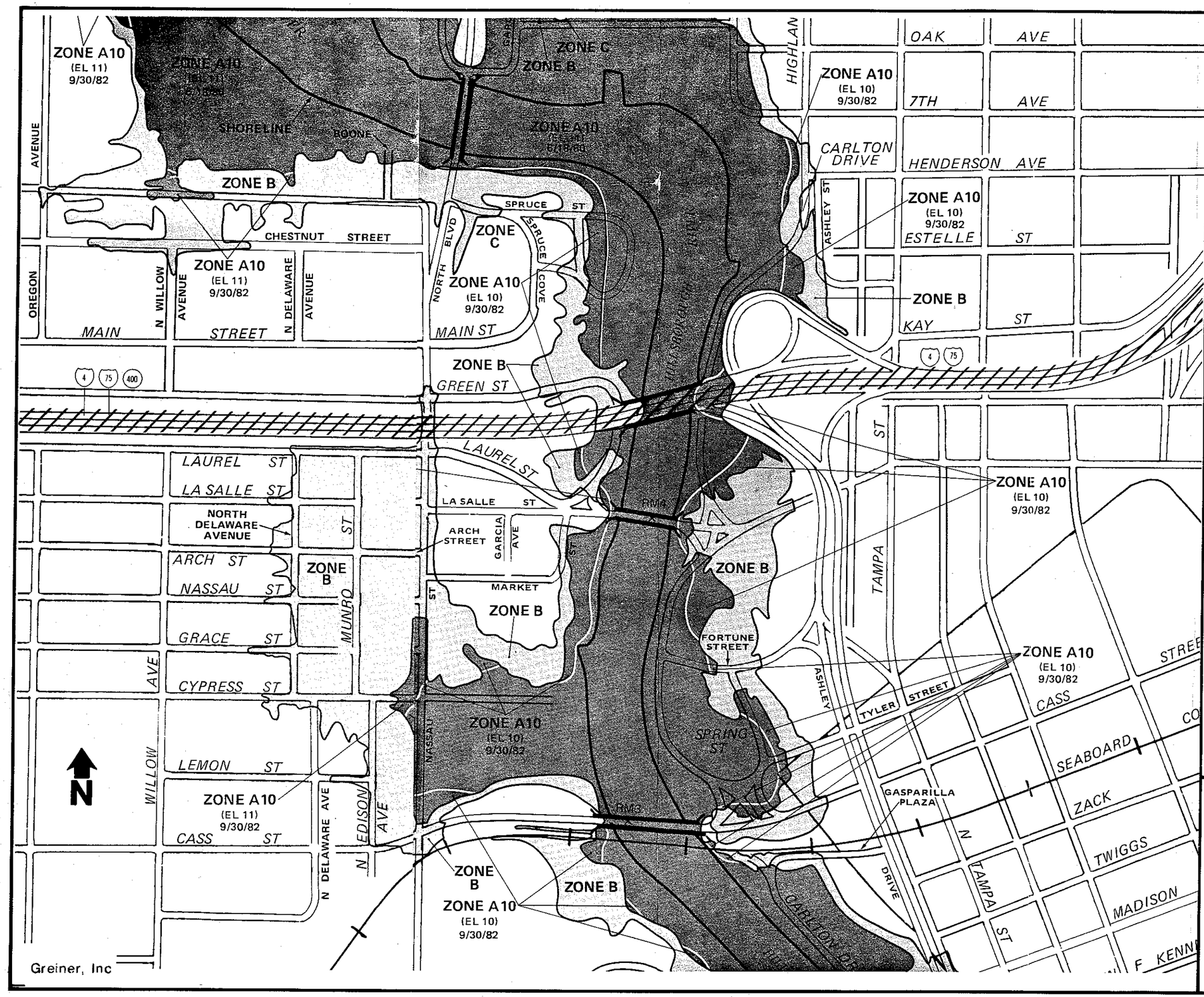
Flood Zone Designations

A floodplain map, prepared for the project corridor from the FEMA Flood Insurance Rate Maps (FIRM, Ref. 2) and Flood Insurance Studies (FIS, Ref. 3), is illustrated in Exhibits 3-1, 3-2, and 3-3. This information was taken from the City of Tampa FIRM Community Panel Numbers 120114 0022C, 120114 0023C, 120114 0024C, 120114 0025C, 120114 0026C, and 120114 0015C, dated September 30, 1982. Exhibits 3-1, 3-2, and 3-3 show the three locations with floodplain (Zones A and B) encroachments within the project corridor. The remaining areas within the project corridor are located in the area of minimal flooding (Zone C). Explanations of the flood zone designations are listed in Table 1.

TABLE 1

FEMA FLOOD ZONE DESIGNATIONS

Zone	Explanation
A	Area of 100-year flood; base flood elevations and flood hazard factors not determined.
A1-A30	Area of 100-year flood; base flood elevations and flood hazard factors determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.
C	Area of minimal flooding.



Greiner, Inc

LEGEND

EXPLANATION OF ZONE DESIGNATIONS

Zone	
A	Area of 100-year flood; base flood elevations and flood hazard factors not determined.
A1–A30	Area of 100-year flood; base flood elevations and flood hazard factors determined
B	100-500 year floodplain
C	Area of minimal flooding (No Shading)
///	Project Corridor

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

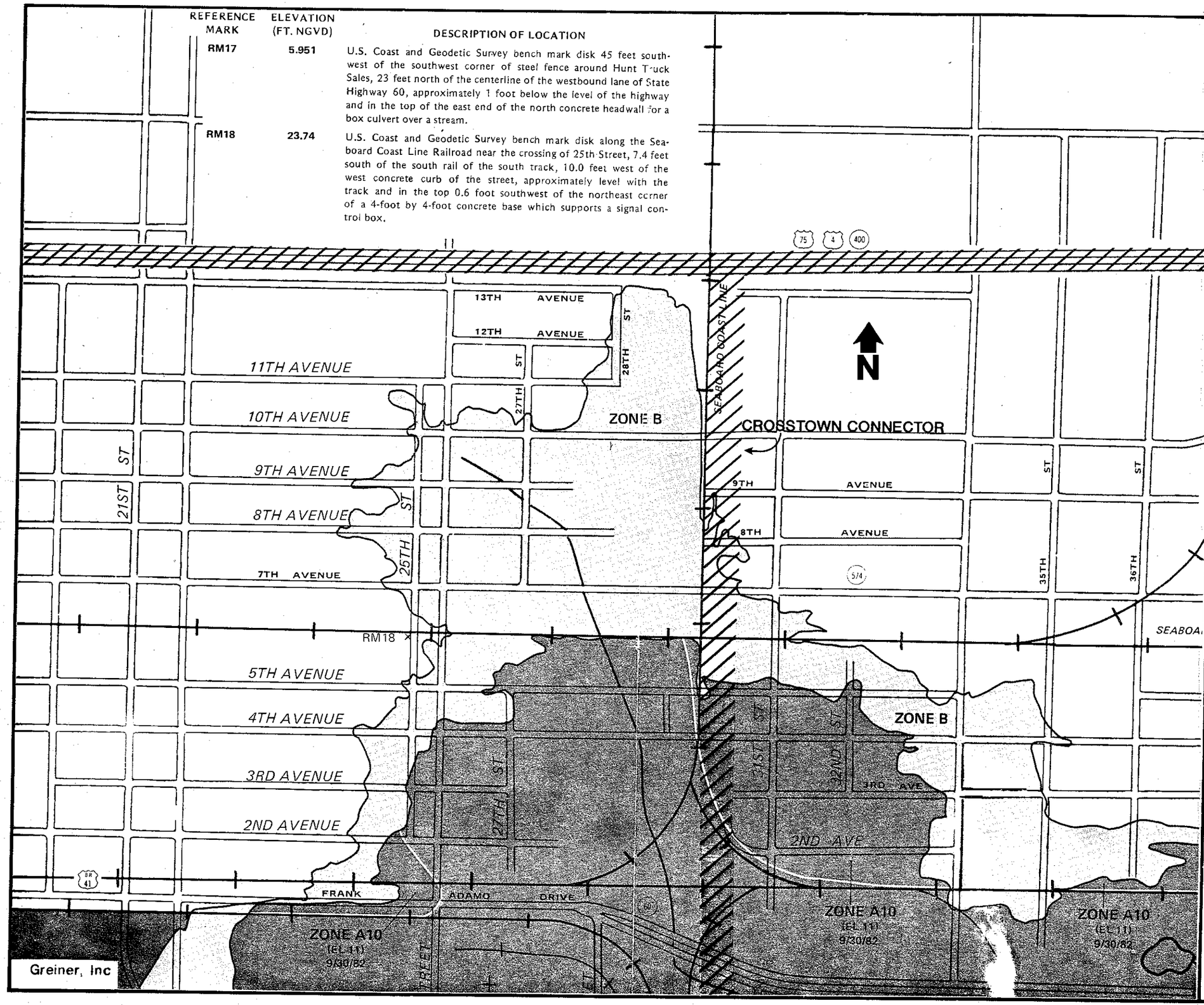
TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

FLOODPLAINS

EXHIBIT 3-1

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM17	5.951	U.S. Coast and Geodetic Survey bench mark disk 45 feet southwest of the southwest corner of steel fence around Hunt Truck Sales, 23 feet north of the centerline of the westbound lane of State Highway 60, approximately 1 foot below the level of the highway and in the top of the east end of the north concrete headwall for a box culvert over a stream.
RM18	23.74	U.S. Coast and Geodetic Survey bench mark disk along the Seaboard Coast Line Railroad near the crossing of 25th Street, 7.4 feet south of the south rail of the south track, 10.0 feet west of the west concrete curb of the street, approximately level with the track and in the top 0.6 foot southwest of the northeast corner of a 4-foot by 4-foot concrete base which supports a signal control box.



LEGEND

EXPLANATION OF ZONE DESIGNATIONS

Zone	
A	Area of 100-year flood; base flood elevations and flood hazard factors not determined.
A1–A30	Area of 100-year flood; base flood elevations and flood hazard factors determined.
B	100-500 year floodplain
C	Area of minimal flooding (No Shading)
////	Project Corridor

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

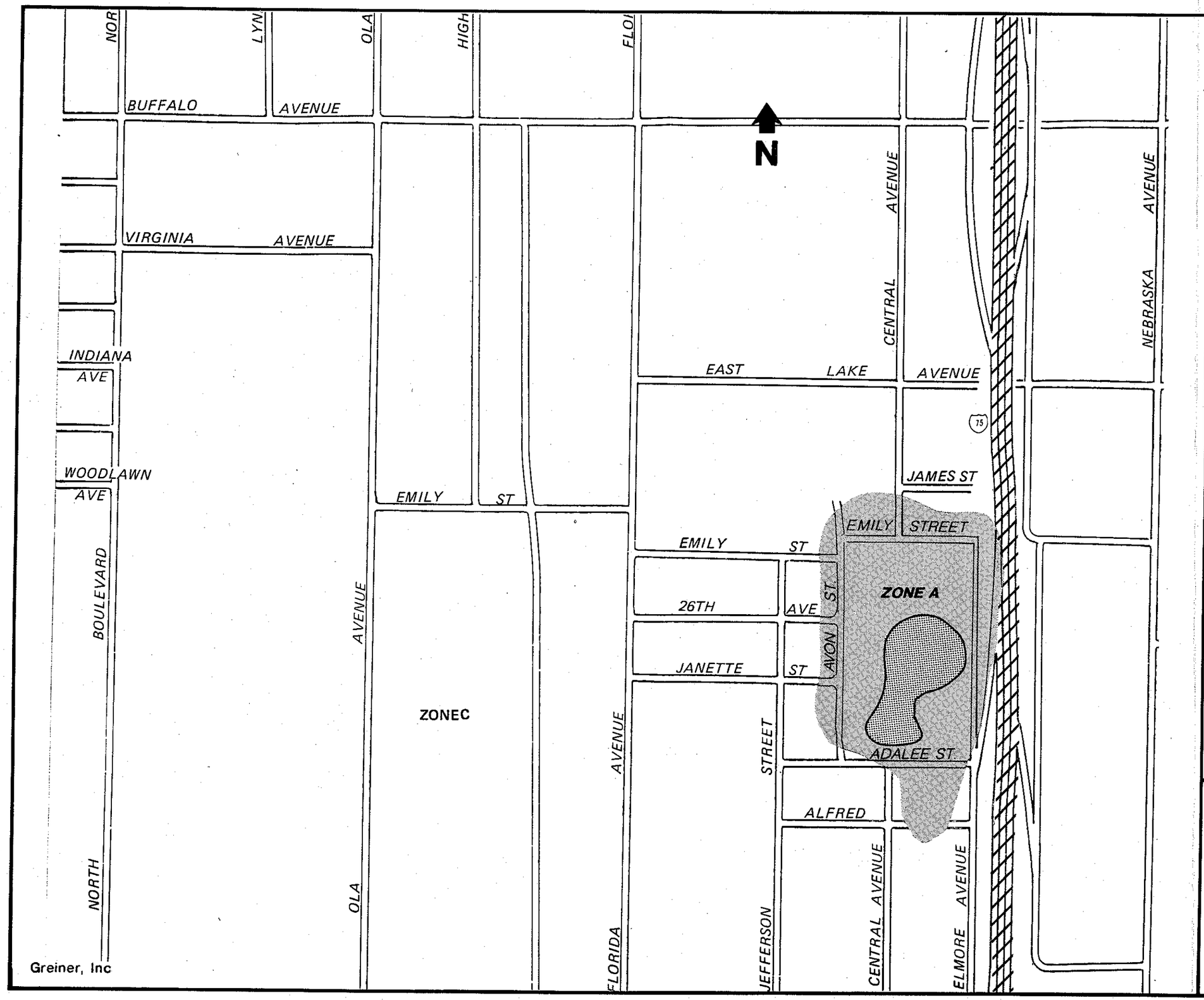
TAMPA INTERSTATE STUDY

PHASE II

Hillsborough County, Florida

FLOODPLAINS

EXHIBIT 3-2



Greiner, Inc

LEGEND

EXPLANATION OF ZONE DESIGNATIONS

Zone

A — Area of 100-year flood; base flood elevations and flood hazard factors not determined.

C — Area of minimal flooding (No Shading)

Project Corridor

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY
PHASE II

Hillsborough County, Florida

FLOODPLAINS

EXHIBIT 3-3

The base floodplain (Zone A10) within this area results from a storm surge associated with a tropical storm or hurricane. The project corridor has three transverse floodplain encroachments. The first area of the base floodplain encroachment is located at the I-275 crossing of the Hillsborough River between North Boulevard and Tampa Street as shown in Exhibit 3-1. The second area of the base floodplain encroachment is located at the proposed Crosstown Connector near 30th Street from 6th Avenue to the Crosstown Expressway (near McKay Bay) as shown in Exhibit 3-2. Finally, a segment of I-275 from Alfred Street to Emily Street is adjacent to the area of the 100-year floodplain (Zone A) in the Robles Park Pond as shown in Exhibit 3-3. Due to the degree of existing development within the project area, the proposed roadway improvements should not cause an incompatible floodplain development.

The Hillsborough River serves as a floodway for the City of Tampa as defined in the National Flood Insurance Program, City of Tampa Flood Insurance Study (Ref. 3). The Lower Hillsborough River is regulated by the Tampa Bypass Canal flood-control project which was constructed by the U.S. Army Corps of Engineers and is owned and operated by the Southwest Florida Water Management District (SWFWMD) (Ref. 14). The Tampa Bypass Canal (TBC) facilities provide flood protection to the urban development area along the Lower Hillsborough River. The Hillsborough River has a total drainage area of 690 square miles. However, flood waters from the 644 square miles of the Uupper Hillsborough River Basin will be diverted to the TBC during major storm events. Due to the effects of the flood-control project, encroachment up to the natural channel banks in the Lower Hillsborough River will not increase the flood elevation. Therefore, the natural channel of the Hillsborough River serves as a floodway in Tampa, with flood control provided by the TBC. No floodway data or

delineations were presented in the City of Tampa FEMA Flood Study due to the control of TBC. The I-275 bridge crossing of the Hillsborough River should be analyzed in a separate Bridge Hydraulic Report.

Existing Drainage Problems

The maintenance and drainage staff of the Florida Department of Transportation (FDOT), Hillsborough County, and the City of Tampa were contacted regarding existing drainage problems within the project corridor. The following areas were reported as having drainage problems:

Location and Problems	Sources
I-275 curb inlet - westbound on north side just east of Morgan Street, curb inlet cannot handle water, slope washes out and Morgan Street floods.	FDOT
I-4, I-275 intersection, barrier walls - Inlets continually fill up with trash, and during heavy rains lanes of I-275 flood.	FDOT
I-4 "off ramp" westbound at 40th Street - Ditches and ramp flood during heavy rains. Apparently no outlet for water to drain through private property.	FDOT
I-4, 10th Street - north side of I-4, inadequate storm sewer drainage system.	City of Tampa
I-4, 44th Street - north side of I-4, inadequate storm sewer drainage system.	City of Tampa
I-275, Robles Park Pond - west side of I-275, inadequate capacity of pump station and drainage system to Hillsborough River.	City of Tampa

In addition, historical flooding has occurred in the 13th Street and 28th Street areas north of I-4, as referenced in the City of Tampa, Ybor City and 29th Street Outfall Drainage Studies (Ref. 7 and 8). The primary cause of flooding in these areas is the overtaxing of the existing storm sewer drainage system.

DESCRIPTION OF DRAINAGE STRUCTURES

The project corridor crosses eight small sub-basins which include the Cypress Memorial Basin, west Hillsborough River Basin, east Hillsborough River Basin, Nuccio Parkway Basin, Ybor City Basin, 29th Street Basin, McKay Bay Outfall Basin, and Robles Park Pond Basin. Generally, areas near the Hillsborough River (west and east Hillsborough River Basins, Robles Park Pond Basin) drain toward the Hillsborough River. The basins which cross I-4 (Nuccio Parkway, Ybor City, 29th Street, and McKay Bay Outfall) drain southward and outfall to McKay Bay. Small portions of the Cypress Memorial Basin within the project corridor drain westward to the Lemon Street Canal and outfall to Old Tampa Bay.

Drainage structures within the study area have been identified utilizing information from the City of Tampa Drainage Atlas, Ybor City Stormwater Management Study, 29th Street Outfall Drainage System Study, site inspections and FDOT as-built plans (Ref. 6). The drainage structures along I-275 and I-4 within the project corridor are listed in Table 2 and shown in Exhibit 4. A total of 30 existing cross-drain structures and one bridge crossing of the Hillsborough River is located within the project limits. The information listed in Table 2 contains cross-drain structure location, type, size, invert elevations, length, drainage basin, and rating category. These cross-drain

TABLE 2

DRAINAGE STRUCTURES

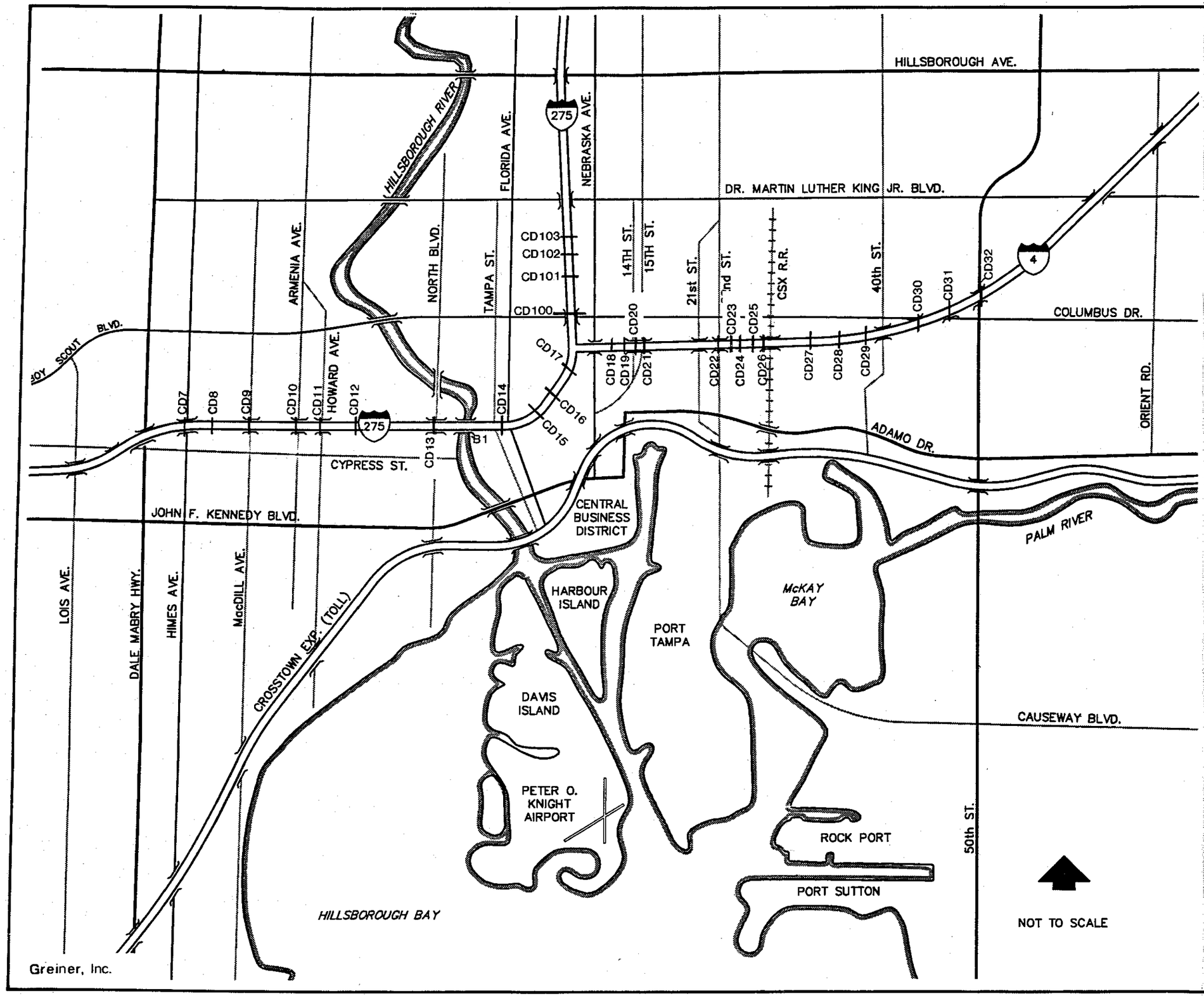
Structure I.D.	Location	Size/Type	Length	Invert (HW) (ft.NGVD)	Invert (TW) (ft.NGVD)	Drainage Basin	Rating*
CD7	Himes Avenue	21" RCP	225'	25.32	24.35	Cypress/Memorial	C
CD8	Glen Avenue	30" RCP	240'	29.97	28.65	Cypress/Memorial	B
CD9	MacDill Avenue	42" RCP	200'	N/A	N/A	Cypress/Memorial	C
CD10	Armenia Avenue	24" RCP	203'	25.20	24.00	East Hillsborough River	B
CD11	Howard Avenue	24" RCP	212'	23.50	23.00	East Hillsborough River	B
CD12	Albany Avenue	24" RCP	N/A	21.43	20.40	East Hillsborough River	B
CD13	North Boulevard	24" RCP	N/A	N/A	N/A	East Hillsborough River	C
CD14	Franklin Street	36" RCP	300'	12.49	7.10	West Hillsborough River	C
CD15	Morgan Street	60" RCP	200'	10.60	10.32	West Hillsborough River	C
CD16	Henderson Avenue	18" RCP	270'	43.40	37.00	West Hillsborough River	C
CD17	Palm Street	24" RCP	440'	40.06	36.08	Nuccio Parkway	C
CD18	10th Street	5'x5' CBC	232'	28.61	28.05	Nuccio Parkway	D
CD19	13th Street	7'x5' CBC	1000'	38.5	N/A	Ybor City	D
CD20	14th Street	18" RCP	250'	35.74	31.25	Ybor City	C
CD21	15th Street	42" RCP	200'	N/A	29.09	Ybor City	B
CD22	22nd Street	30" RCP	N/A	N/A	17.49	29th Street	C
CD23	23rd Street	9'x6' CBC	230'	16.9	15.8	29th Street	D

TABLE 2

DRAINAGE STRUCTURES
(Continued)

Structure I.D.	Location	Size/Type	Length	Invert (HW) (ft.NGVD)	Invert (TW) (ft.NGVD)	Drainage Basin	Rating*
CD24	24th Street	3'x3' CBC	260'	16.9	14.8	29th Street	B
CD25	26th Street	84" RCP	N/A	N/A	N/A	29th Street	C
CD26	28th Street	10'x6' CBC	225'	12.6	11.9	29th Street	D
CD27	34th Street	18" RCP	N/A	N/A	N/A	McKay Bay	C
CD28	35th Street	6'x5' CBC	231'	16.6	16.0	McKay Bay	D
CD29	37th Street	30" RCP	N/A	N/A	N/A	McKay Bay	C
CD30	42nd Street	36" RCP	288'	26.9	26.59	McKay Bay	A
CD31	44th Street	12'x4' CBC	244'	23.40	22.90	McKay Bay	A
CD32	50th Street	42" RCP	N/A	N/A	N/A	McKay Bay	C
CD100	Columbus Drive	18" RCP	260'	N/A	N/A	Nuccio Parkway	C
CD101	Floribraska Avenue	24" RCP	N/A	N/A	N/A	Robles Park Pond/Hillsborough River	B
CD102	Plymouth Street	36" RCP	276'	31.0	21.5	Robles Park Pond/Hillsborough River	A
CD103	26th Avenue	36" RCP	339'	26.2	21.2	Robles Park Pond/Hillsborough River	A
B1	I-275 Bridge Crossing of Hillsborough River between North Boulevard and Tampa Street						

RCP = Reinforced Concrete Pipe
CBC = Concrete Box Culvert
N/A = Not Available
* See Table 3



LEGEND

CD	Cross Drain
B	Bridge

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY

PHASE II

Hillsborough County, Florida

DRAINAGE STRUCTURES LOCATIONS MAP

EXHIBIT 4

structures include 23 reinforced concrete pipes (RCP), with sizes ranging from 18 inches to 84 inches and 7 concrete box culverts (CBC), with sizes ranging from 3' x 3' to 10' x 6'.

A rating system was developed to categorize all identified structures. This rating system separates structures within the project corridor into four levels: Levels A through D. A complete description of the rating system is provided in Table 3. Level A structures will be analyzed, while no analysis is required for Level B, Level C, and Level D structures. For Level B structures, the proposed roadway will cover the entire existing drainage basin. Stormwater from these areas will be collected and drained into the proposed TIS stormwater ponds. Level D structures are those cross-drains which are included with enclosed systems both upstream and downstream of the interstate. Level D structures are considered as part of the City of Tampa storm sewer system per discussion with the drainage staff of FDOT District 7. Level D structures will not be evaluated because they will not be considered as cross-drain structures by the staff of FDOT District 7.

TABLE 3

STRUCTURE RATING STANDARD

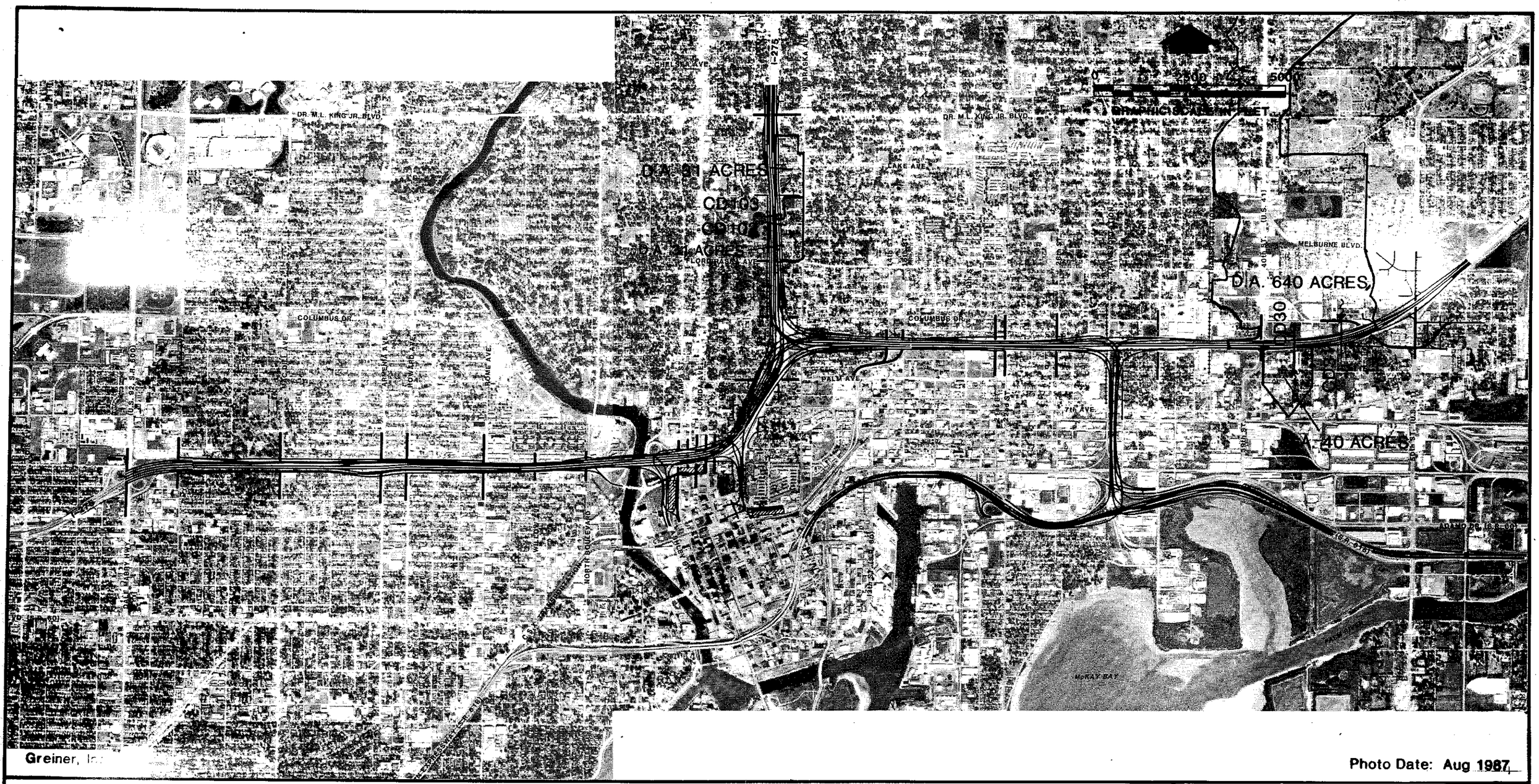
Rating Level	Rating Standard
A	The structure should be lengthened or replaced due to the roadway improvements.
B	Proposed roadway will cover the entire existing drainage basin area; therefore, it is no longer a cross-drain.
C	Cross-drain is part of a storm sewer network and is placed along the central line of a road which is spanned by I-275 for the existing and proposed roadway improvements. Therefore the storm sewer system below the existing road will not be affected by the widening of I-275.
D	Cross-drain is included with enclosed systems both upstream and downstream of the interstate. It will not be considered as a cross-drain and will not be affected by the roadway improvements.

Thirty drainage structures identified within the project corridor include 4 Level A, 6 Level B, 15 Level C, and 5 Level D structures based on the Table 3 rating standard.

Level A structures (CD30, CD31, CD102 and CD103) were analyzed in this report. The drainage basins associated with the analyzed structures (Level A), as shown in Exhibit 5, were determined using the best available information and on-site inspections.

STRUCTURE ANALYSIS

The analysis of cross-drain structures included a determination of 50-year and 100-year peak runoff rates and associated headwater elevations at the structures for the calculated peak flows. Peak runoff rates were determined using the regression



LEGEND

——	Basin Boundries
CD	Structures I.D.
D.A.	Drainage Area (acres)
⇝	Flow Direction

FLORIDA DEPARTMENT OF TRANSPORTATION

LOCATION HYDRAULIC REPORT

TAMPA INTERSTATE STUDY

PHASE II

Hillsborough County, Florida

DRAINAGE BASIN MAP

EXHIBIT 5

equations for the Tampa Bay area from the FDOT Drainage Manual (Ref. 4). Basin characteristics such as basin area, basin channel slope, and basin development factor and structure information were determined from the City of Tampa Drainage Atlas, SWFWMD contour aerials (Ref. 9), USGS Quadrangle Maps (Ref. 10), USGS Soil Survey Maps (Ref. 12) as well as other available information. Headwater elevations were calculated by the FHWA HY-8 culvert analysis program (Ref. 15) based on the peak runoff rate obtained from the Tampa Bay Area Regression Method. These computations are contained in the Appendix.

The four Level A structures and the I-275 bridge crossing over the Hillsborough River are described below. The lengths of the proposed structures were estimated from the TIS Master Plan Report (Ref. 5). The normal depth of the downstream channel (CD31, CD32) and the water surface elevation of Robles Park Pond (CD102, CD103) were used as the tailwater condition in the analysis.

CD30 (Structure at 42nd Street Crossing I-4)

This 36-inch pipe drains a 40-acre basin located south of I-4. The runoff from the basin flows north through the pipe and outfalls to a ditch connecting to CD31 at 44th Street. Both existing and proposed lengthened pipes were analyzed with the 50-year and 100-year peak discharges (29 and 35 cfs, respectively). In the proposed condition, the pipe will be lengthened from 288 feet to 300 feet. The calculations indicate that both the existing and proposed lengthened cross-drains are sufficient to convey the design 50-year and 100-year peak flows without impacting the upstream areas.

CD31 (Structure at 44th Street Crossing I-4)

This structure (12-foot by 4-foot CBC) drains approximately 680 acres total. It includes 640 acres north of I-4 and 40 acres coming from CD30. The basin extends east to 46th Street, west to 37th Street, north to Hillsborough Avenue, south to I-4 and includes a 40-acre area which drains through CD30. The structure will be extended from the existing 244 feet to a proposed 375 feet. Flooding is predicted for the 50-year peak discharge with the existing cross-drain (12-foot by 4-foot CBC). Preliminary sizing of the structure improvements indicates that an additional 12-foot by 4-foot CBC will be necessary to convey the calculated 50-year(Q_{50}) and 100-year (Q_{100}) peak flows. The calculations, based on existing downstream channel conditions, also indicate that the proposed structures (two 12-foot by 4-foot CBC's) will not impact downstream areas.

CD102 (Structure near Plymouth Street Crossing I-275)

Cross-drain CD102, located near Plymouth Street, is a 36-inch RCP which drains a 31-acre basin east of I-275 and outfalls to the Robles Park Pond. The water in the Robles Park Pond is then pumped via the City of Tampa pump station westward to the Hillsborough River. A constant tailwater based on a pump-on design condition (Ref. 1) is used to analyze the structure's capacity. Although the cross-drain will be extended from the existing 276 feet to a proposed 400 feet, calculations indicate the existing pipe size (36 inches) is adequate for Q_{50} (20 cfs) and Q_{100} (23 cfs) conveyance without impacting upstream areas.

CD103 (Structures Near 26th Avenue Crossing I-275)

This cross-drain situation is similar to CD102. It drains approximately 31 acres through a 36-inch pipe which also outfalls to the Robles Park Pond. The same tailwater condition as CD102 is used for analysis. The computations indicate the existing structure (36-inch RCP) will be sufficient to convey the design 50-year (20 cfs) and 100-year (23 cfs) peak discharges without impacting upstream areas in the existing and proposed conditions.

B1 (I-275 Bridge Crossing of the Hillsborough River)

The I-275 bridge crossing of the Hillsborough River near North Boulevard and Tampa Street can be treated as a cross-drain structure. This bridge will be widened from the existing 175 feet to the proposed 493 feet. As previously mentioned, this reach of the Hillsborough River is regulated by the Lower Hillsborough Flood Detention Area and the Tampa Bypass Canal. The existing bridge and the proposed bridges are designed to meet U.S. Coast Guard requirements for navigation clearance. Detailed analysis of structure B1 should be addressed in a separate Bridge Hydraulic Report. The bridge widening will not adversely impact the floodplain or floodway of the Hillsborough River.

CROSSTOWN CONNECTOR

The proposed Crosstown Connector is located between 30th and 31st Streets and extends from I-4 south to the Crosstown Expressway. This connector is transversely encroaching into the 100-year base floodplain in the region near its south end. The

entire segment of the proposed connector does not cross any existing drainage structures. Although there is a concrete paved ditch under the elevated Crosstown Expressway near McKay Bay, the proposed Crosstown Connector is also elevated to connect to the Crosstown Expressway above the ditch, which will not affect the drainage capacity of the existing ditch.

DRAINAGE STRUCTURE CATEGORIZATION

In accordance with the requirements set forth in FHPM 6-7-3(2), Paragraph 7, the project corridor was evaluated to determine the impact of the proposed roadway improvements. Required hydraulic improvements as a result of the roadway improvements are categorized into seven categories based on the type of the hydraulic improvements and estimated floodplain impacts. Within the project corridor, I-275 represents a transverse encroachment on the floodplains associated with the cross-drain structures. This encroachment should remain at existing levels or be reduced to an insignificant level if the proposed hydraulic improvements are implemented.

As analyzed above, the hydraulic structures in the project corridor were divided into two categories depending on hydraulic performance: Category 3 and Category 5. These categories describe the type of individual modification or replacement required for each structure.

Category 3: Projects Involving Modification to Existing Drainage Structures

Category 3 projects include activities which will not involve the replacement of any existing drainage structures or the construction of any new drainage structures. This category applies only to projects which involve modification to existing structures (i.e.,

extending cross-drains, adding headwalls, relocating manholes and inlets). In regards to the TIS project corridor, the following cross-drains fall within this category: CD30, CD102, CD103, and B1.

The following statement applies to Category 3 projects:

> "Drainage structure modifications included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. These minimal increases will not result in any significant adverse impacts on the natural and beneficial floodplain volumes or any significant change in flood risks or damage. There will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant." (FDOT Drainage Manual, 1987).

Category 5: Projects on Existing Alignment Involving Replacement of Drainage Structures in Heavily Urbanized Floodplains

Category 5 addresses those replacement projects in flood sensitive, heavily urbanized floodplains, where the conditions of flooding are largely attributable to the low-lying terrain. Other secondary flood-contributing considerations could be density of floodplain development, and degree and amount of downstream flow constrictions.

Replacement drainage structures in this category are limited to hydraulically equivalent structures in most instances. Conveyance increases due to the improved structures may impact downstream tailwater levels. As a result, downstream channel improvements have been proposed when applicable. In regards to the TIS project area, the following structure falls in this category: CD31.

The following statement applies to Category 5 projects:

> "Replacement drainage structures for this project are limited to hydraulically equivalent structures. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered in this category since it defeats the project purpose or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to totally eradicate flood impacts or even reduce them in any significant amount, existing flooding will continue, but not be increased. The proposed structure will be hydraulically equivalent to or greater than the existing structure, and backwater surface elevations are not expected to increase. As a result, the project will not affect existing flood heights or floodplain limits. This project will not result in any new or increased adverse environmental impacts. There will be

no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant."

REGULATORY AGENCY COORDINATION

Local Agencies

The City of Tampa is the only local agency with jurisdiction for the proposed improvements to I-275, I-4 and the proposed Crosstown Connector. The City of Tampa Drainage Atlas and related basin studies (Ref. 8) were utilized extensively in determining basin areas and characteristics. The two basin studies were conducted by a private consulting firm for the City of Tampa during the years 1973 and 1985. Coordination with the City of Tampa will be required during preliminary and final design to address floodplain and stormwater quality impacts as well as proposed modifications to the existing drainage system.

State Agencies

State agencies that have permitting responsibilities relevant to the proposed I-275 and Memorial Highway drainage facility improvements include the Florida Department of Environmental Regulation (FDER), Florida Department of Natural Resources (FDNR), and the Southwest Florida Water Management District (SWFWMD).

FDER requires permits for all dredge and fill activities conducted in areas either in or connected to waters of the State, pursuant to Chapter 17-4.28, F.A.C.

FDNR requires easements for any crossing of state-owned lands. Coordination for easements should be accomplished during final design.

SWFWMD requires surface water management permits for the construction or alteration of any surface water system pursuant to Chapter 40D-40, F.A.C. This permit considers the impacts on floodplains, stormwater quantity, and wetlands from public roadway projects. In addition, pursuant to Chapter 17-25, F.A.C., SWFWMD regulates the discharge of untreated stormwater runoff which could be a potential source of pollution of the state. All new stormwater discharge facilities must comply with the design and performance standards set forth in Chapter 17-25.025, F.A.C.

Federal Agencies

The Federal agency which could require permits for the proposed I-275 improvements is the U.S. Army Corps of Engineers (COE).

The COE also issues permits relevant to dredge and fill activities in waters of the United States based on COE, Section 404. To simplify the dredge and fill permitting procedures, the FDER and COE have developed a joint application form.

Preliminary meetings were held with representatives of the regulatory agencies having jurisdiction within the EIS study limits. General discussions were held related to the type of long-term commitments available from the agencies. The agencies stated that some agreement mechanism could be reached for long-term commitments between the agencies and FDOT.

Due to the length of the anticipated construction schedule for the TIS project, Greiner recommends that long-term commitments should be pursued which would set drainage-related design criteria and minimize future changes to the TIS design created by changing regulatory agency rules or policies.

CONCLUSIONS

With the roadway improvements proposed for the I-275 and I-4 project corridor, the modification and replacement of existing cross-drain structures will be required. The proposed improvements to the project corridor will require one cross-drain structure (CD31) to be replaced, three culvert drainage structures (CD30, CD102 and CD103) to be lengthened, and one bridge (B1) to be widened. The remaining structures described as Levels B, C, or D were not evaluated because either the roadway spans the drainage structures or the roadway improvements will engulf the entire cross-drain basin.

The existing roadway transverses the FEMA flood zone A in three locations. The first flood zone is located at the I-275 crossing of the Hillsborough River, the second flood zone is located at the south end of the proposed Crosstown Connector, and the third flood zone is located at Robles Park Pond. No longitudinal floodplain encroachments are within the proposed project corridor.

A separate Bridge Hydraulic Report is needed to address the I-275 bridge crossing of the Hillsborough River. Due to the effects of the USACOE/SWFWMD flood-control project on the Hillsborough River (Tampa Bypass Canal), encroachment up to the natural channel banks will not increase the flood elevations.

The proposed roadway project should not significantly contribute to an increase in flood elevations. Due to the degree of existing urbanization within the project corridor, the proposed project should not increase the potential for development within the floodplain. The entire project corridor is an elevated highway; therefore, the roadway overtopping and traffic interruption due to the flooding will not occur or will be insignificant for both existing and proposed facilities.

The roadway within the project corridor serves the community as an evacuation route. Modifications to the roadway width and drainage structures should improve the use of the facility for emergency services and evacuation purposes.

REFERENCES

1. Drainage Atlas; City of Tampa.

2. Flood Insurance Rate Maps for the following community panel numbers in the City of Tampa, Hillsborough County, Florida: 120114 0022C, 120114 0023C, 120114 0024C, 120114 0025C, 120114 0026C, and 120114 0015C, Federal Emergency Management Agency; September 30, 1982.

3. Flood Insurance Study; Federal Emergency Management Agency; for the City of Tampa, Florida; Community Number 120114; March 1980.

4. Drainage Manual, Volume II; Florida Department of Transportation; 1987.

5. Master Plan Report; Florida Department of Transportation; Tampa Interstate Study; 1989.

6. Plan of Proposed State Highway; Florida Department of Transportation, I-4-1(39)-14, I-4-1(42)18, I-4-1(34)19, I-4-1(22)20, I-75-1(17)0 and I-75-1(33)0.

7. Ybor City Stormwater Management Study Phase I and Phase II; Stormwater Management Division, Department of Public Works, City of Tampa, Florida; March and October 1985.

8. Preliminary Report Phase II: 29th Street Outfall Drainage System; City of Tampa, Florida; July 1973.

9. Aerial Photography with Contours; Southwest Florida Water Management District.

10. Management and Storage of Surface Waters Permit Information Manual, Volume I; Southwest Florida Water Management District; March 1988.

11. Quadrangle Maps; USGS; Revised 1981.

12. Soil Survey Hillsborough County, Florida; USGS Soil Conservation Service; 1989.

13. Stormwater Management Technical Standards; City of Tampa; October 1988.

14. Regulation Manual for Lower Hillsborough Flood Detention Area and Tampa Bypass Canal; Department of the Army; April 1983.

15. HY-8 Culvert Analysis Program; Federal Highway Administration; 1987.

APPENDIX

CALCULATIONS

APPENDIX

There are thirty (30) cross-drain structures and one bridge crossing of the Hillsborough River within the project corridor. Twenty-six (26) structures rated as Levels B, C and D were not analyzed while four (4) structures rated as Level A were analyzed in this report. A preliminary hydraulic analysis was performed to categorize each structure. Each analyzed structure's headwater and tailwater elevations were evaluated by determining basin characteristics and peak runoff rates. After computations and classification, the cross-drain Level A structures were determined to be associated with two categories: Category 3 and Category 5. This report contains general information and is intended for planning purposes only. Specific, detailed studies will be required for each cross-drain before construction of any improvements.

The hydraulic data for each structure as listed in Table A-1 were obtained from the best available information. For peak discharge computations, basin areas were determined using FDOT as-built roadway plans, City of Tampa Drainage Atlas, Ybor City Stormwater Management Study - Phases 1 and 2, Preliminary Report of 29th Street Outfall Drainage System, quad maps, field reviews, and SWFWMD contour aerials. Basin characteristics such as slope and basin development factor (BDF) were estimated from the Drainage Atlas, contour aerials and USGS Soil Survey maps. Basin peak runoff rates were evaluated using the Tampa Bay Area Regression Method equations from the FDOT Design Manual Volume 2, Chapter 5. The EPA Stormwater Management Model, Version 3.0 (SWMM III) was used in the Ybor City Stormwater Management Study - Phases 1 and 2 (1985). The studies were based on the 5-year, 4-hour and 25-year, 24-hour design storm rainfall from FDOT Itensity-Duration-Frequency (IDF) curves. In the other report, Phase II of 29th Street Outfall Drainage

System (Western Branch only, 1973), the storm sewer design was performed on a Storm Sewer Tabulation Form based on rational method and 5-year frequency rainfall. The proposed crossing (10' x 6.25' CBC) of I-4 at 26th Street had been installed as 84-inch concrete pipe (CD25). All drainage structures included in both reports (City of Tampa) within the project corridor were enclosed systems both upstream and downstream of I-4. They were not considered as cross-drain structures by the staff of FDOT District 7 and were not analyzed in this Location Hydraulic Report (LHR). For the structures analyzed in this LHR, the peak discharges (Q_{50} and Q_{100}) resulting from the regression equations are listed in Table A-2.

TABLE A-1

DRAINAGE STRUCTURES INFORMATION

Structures ID	Location	Size & Type	Invert Elevation Upstream/Downstream (NGVD Feet)	Existing/Proposed Length (Feet)	U/S & D/S Street EL. (NGVD Feet)	U/S & D/S Connection
CD30	42nd St./I-4	36" RCP	26.9/26.5	288/300	32.4/32.8	Ditch/Ditch
CD31	44th St./I-4	12'x4' CBC	23.4/22.9	244/375	31.1/30.0	Ditch/Ditch
CD102	Plymouth St./I-275	36" RCP	31.0/21.5	295/400	38.0/33.4	Ditch/Pond
CD103	26th Ave./I-275	36" RCP	26.2/21.1	339/400	38.0/33.4	Pipe/Pond

TABLE A-2

PEAK RUNOFF COMPUTED FROM TAMPA BAY AREA

(REGRESSION METHOD)

Outfall Structure ID	Basin Area Acres/Mile^2	BDF*	Channel Slope (feet/mile)	Regression Method Peak Discharge (cfs) Q_{50}	Q_{100}
CD30	40/0.0625	9	11	29	35
CD31	680/1.0625	9	11	722	923
CD102	31/0.0484	10	8	20	23
CD103	31/0.0484	10	8	20	23

* Basin Development Factor

For the culvert/pipe analysis (using HY-8), a tailwater elevation is needed in addition to the information provided in Table A-1. There are two types of tailwater elevations used in this report's hydraulic analysis. When an open channel/ditch is available downstream of the analyzed cross-drain (CD30, CD31), the normal depth of the downstream channel will be assumed with correspondent discharge. Cross-drains CD102 and CD103 outfall to the Robles Park Pond and discharge to the Hillsborough River by the stormwater pump station. The pond elevation associated with pump-on conditions (Drainage Atlas, City of Tampa) was used as the downstream boundary condition.

Based on the available cross-drain information and boundary conditions, each structure was evaluated using HY-8 for the peak flows for the 50-year and 100-year floods. The FDOT requires a design standing headwater (more than 24 hours) to be 2 feet below the roadway base for the design storm. The allowable headwater for the design storm (50-year) is the edge of pavement. The allowable headwater for the 100-

year flood must leave at least one lane dry. If the culvert failed to meet this criterion, then a replacement structure was sized using HY-8. Culverts which did meet the requirements for the existing conditions were evaluated as a group to determine the effects of lengthening the structures to accommodate the additional lanes of traffic.

The street elevations at the upstream end of each cross-drain structure (from the City of Tampa Drainage Atlas and SWFWMD aerials) are compared with existing upstream water surface elevations and listed in Table A-3.

TABLE A-3

UPSTREAM STREET AND WATER SURFACE (Q_{100}) ELEVATION

Structure ID	CD30	CD31	CD102	CD103
Upstream water surface elevation (ft.NGVD) (Q_{100})	30.2	43.3	33.4	33.4
Upstream street elevation (ft.NGVD)	32.4	31.1	38.0	38.0
CONDITION	adequate	flooding	adequate	adequate

After the analysis of the proposed conditions, the cross-drains can be grouped into two categories:

Category 3 Structures

Category 3 structures are those which require only modification of the existing culvert (including lengthening and relocation of manholes and inlets). This group of structures includes CD30, CD102, CD103, and the bridge crossing (B1) of the

Hillsborough River. The headwater and tailwater conditions for each structure were evaluated for the existing and proposed conditions. All of these structures performed satisfactorily to carry the runoff generated from the 50-year and 100-year floods. The headloss increase due to lengthening of structures in this category is listed in Table A-4 (B1 excluded). The worst-case headloss increase occurred in structure CD30 for both the Q_{50} and Q_{100} flows. However, the increase of 0.02 feet can be considered insignificant.

TABLE A-4

HEADLOSS INCREASE DUE TO STRUCTURE LENGTHENING

	Structure ID		
	CD18	CD19	CD23
Headloss Increase for Q_{50} (ft)	0.02	0.02	0.0
Headloss Increase for Q_{100} (ft)	0.02	0.01	0.01

Category 5 Structures

Category 5 structures are those pipes which exhibit a tendency to flood during the design event and which will require replacement. These culverts are analyzed individually to determine a replacement structure. One Category 5 structure was identified within the project limits (CD31). The HY-8 analysis of structure CD31 for the pre- and post-conditions is summarized in Table A-5.

TABLE A-5

SUMMARY OF HY-8 ANALYSIS OF CATEGORY 5 STRUCTURES

			EXISTING CONDITION (Q_{100})				PROPOSED (Q_{100})			
Structure ID	Q_{50} (cfs)	Q_{100} (cfs)	Pipe Size	Length (ft)	Headwater (ft. NGVD)	Upstream Street Elevation (ft. NGVD)	Pipe Size	Length (ft)	Headwater (ft. NGVD)	Upstream Street Elevation (ft. NGVD)
CD31	722	923	12'x4' CBC	244	43.31	31.1	2(12'x4' CBC)	375	31.03	31.1

From the above computed results, the proposed additional 12-foot by 4-foot box culvert in addition to the existing cross-drain CD31 should prevent the upstream area from flooding. The calculations, based on existing downstream channel conditions, also indicate that the proposed structures (two 12-foot by 4-foot CBCs) will not impact downstream areas.

The detailed results of the cross-drain structure analysis from HY-8 the computation are provided in the following pages.

CONCLUSIONS

With the proposed I-275 improvements, modification and replacement of existing drainage structures will be required. The proposed improvements to the project corridor will require one cross-drain structure replacement, the lengthening of three cross-drains and the widening of one bridge. The remaining structures rated as Levels B, C, and D will not be analyzed because the roadway improvements will either engulf the entire cross-drain basin or span the existing and proposed cross-drains.

CD30 EXISTING

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: S30.DAT

DATE: 1-11-90
SUMMARY TABLE

CULV NO.	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	26.90	26.50	288	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	26.90	26.50	0.00	-0.40	0.00	0.00
	4.00	27.83	26.81	0.85	0.93	0.62	3.78
	8.00	28.27	26.95	1.23	1.37	0.89	4.55
	12.00	28.59	27.06	1.53	1.69	1.09	5.15
	16.00	28.90	27.16	1.83	2.00	1.27	5.62
	20.00	29.18	27.24	2.10	2.28	1.42	6.05
	24.00	29.42	27.31	2.35	2.52	1.57	6.42
Q50 →	28.00	29.70	27.37	2.58	2.80	1.70	6.76
	32.00	29.97	27.43	2.82	3.07	1.83	7.08
Q100 →	36.00	30.24	27.49	3.05	3.34	1.94	7.44
	40.00	30.54	27.54	3.30	3.64	2.06	7.75

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE

CD30PROPOSED

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: P30.DAT

DATE: 1-13-91
SUMMARY TABLE

CULV NO.	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	26.92	26.50	300	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	26.92	26.50	0.00	-0.42	0.00	0.00
	4.00	27.85	26.81	0.85	0.93	0.62	3.78
	8.00	28.29	26.95	1.23	1.37	0.89	4.55
	12.00	28.64	27.06	1.53	1.72	1.09	5.15
	16.00	28.92	27.16	1.83	2.00	1.27	5.62
	20.00	29.20	27.24	2.10	2.28	1.42	6.05
	24.00	29.44	27.31	2.35	2.52	1.57	6.42
Q50 →	28.00	29.72	27.37	2.58	2.80	1.70	6.76
	32.00	29.99	27.43	2.82	3.07	1.83	7.08
Q100 →	36.00	30.26	27.49	3.05	3.34	1.94	7.44
	40.00	30.63	27.54	3.30	3.71	2.06	7.75

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE

CD31 EXISTING

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: S31.DAT

DATE: 1-11-90
SUMMARY TABLE

CULV NO.	A - SITE DATA			B - CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	23.40	22.90	244	1 -RCB	144	48	0.012	CONVENTION
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	23.40	22.90	0.00	-0.50	0.00	0.00
	95.00	25.55	24.14	2.14	2.15	1.25	6.33
	190.00	26.83	24.75	3.35	3.43	1.99	7.97
	285.00	27.88	25.22	4.44	4.48	2.60	9.13
	380.00	29.03	25.62	5.63	5.43	3.15	10.04
	475.00	30.46	25.98	7.06	6.31	3.66	10.82
	570.00	32.20	26.30	8.80	8.10	4.00	11.88
	665.00	34.29	26.59	10.89	9.75	4.00	13.85
Q50 →	760.00	36.86	26.86	13.46	11.66	4.00	15.83
	855.00	39.91	27.11	16.51	14.04	4.21	17.81
Q100 →	950.00	43.31	27.35	19.91	16.70	4.45	19.79

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE

CD31 PROPOSED

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: P31.DAT

DATE: 1-13-91
SUMMARY TABLE

CULV NO.	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	23.70	22.90	375	1 -RCB	144	48	0.012	CONVENTIONA
2	23.70	22.90	375	1 -RCB	144	48	0.012	CONVENTIONA
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

SUMMARY OF CULVERT FLOWS (CFS) file: P31.DAT date:1-13-91

	ELEV (FT)	TOTAL	1	2	3	4	5	6	OVERTOP
	23.70	0	0	0	0	0	0	0	0
	25.05	95	48	48	0	0	0	0	0
	25.85	190	95	95	0	0	0	0	0
	26.52	285	143	142	0	0	0	0	0
	27.11	380	190	190	0	0	0	0	0
	27.66	475	237	238	0	0	0	0	0
	28.17	570	285	285	0	0	0	0	0
	28.71	665	333	333	0	0	0	0	0
Q50 →	29.33	760	380	380	0	0	0	0	0
	30.10	855	428	428	0	0	0	0	0
Q100 →	31.03	950	475	475	0	0	0	0	0

PRESS:
(1) TO PLOT TOTAL RATING CURVE
(2) TO DETERMINE SPECIFIC INFORMATION ABOUT EACH CULVERT
(3) TO SEE MULTIPLE CULVERT COMPUTATIONAL ERROR TABLE
(ENTER) TO RETURN FOR NEW RUN OR EXIT

CD102 EXISTING

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: S102.DAT

DATE: 1-11-91
SUMMARY TABLE

CULV NO.	A - SITE DATA			B - CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	31.00	21.50	295	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	31.00	27.00	0.00	-4.00	5.50	0.00
	2.50	31.64	27.00	0.64	-4.00	5.50	0.35
	5.00	31.93	27.00	0.93	-3.98	5.50	0.71
	7.50	32.15	27.00	1.15	-3.95	5.50	1.06
	10.00	32.35	27.00	1.35	-3.90	5.50	1.41
	12.50	32.52	27.00	1.52	-3.84	5.50	1.77
	15.00	32.71	27.00	1.71	-3.77	5.50	2.12
	17.50	32.89	27.00	1.89	-3.69	5.50	2.48
Q50 →	20.00	33.05	27.00	2.05	-3.59	5.50	2.83
Q100 →	22.50	33.21	27.00	2.21	-3.48	5.50	3.18
	25.00	33.36	27.00	2.36	-3.36	5.50	3.54

PRESS (V) TO PLOT PRESS (ENTER) TO CONTINUE

CD102 PROPOSED

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: P102.DAT

DATE: 1-13-91
SUMMARY TABLE

CULV NO.	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	31.00	21.50	400	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	31.00	27.00	0.00	-4.00	5.50	0.00
	2.50	31.65	27.00	0.65	-3.98	5.50	0.35
	5.00	31.94	27.00	0.94	-3.95	5.50	0.71
	7.50	32.16	27.00	1.16	-3.91	5.50	1.06
	10.00	32.35	27.00	1.35	-3.86	5.50	1.41
	12.50	32.53	27.00	1.53	-3.79	5.50	1.77
	15.00	32.72	27.00	1.72	-3.71	5.50	2.12
	17.50	32.90	27.00	1.90	-3.61	5.50	2.48
Q50 →	20.00	33.07	27.00	2.07	-3.49	5.50	2.83
Q100 →	22.50	33.22	27.00	2.22	-3.36	5.50	3.18
	25.00	33.37	27.00	2.37	-3.22	5.50	3.54

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE

CD103 EXISTING

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: S103.DAT

DATE: 1-11-90
SUMMARY TABLE

CULV NO.	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	26.20	21.10	339	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	27.00	27.00	0.00	0.80	5.90	0.00
	2.50	27.20	27.00	0.65	1.00	5.90	0.35
	5.00	27.15	27.00	0.94	0.95	5.90	0.71
	7.50	27.37	27.00	1.17	0.88	5.90	1.06
	10.00	27.56	27.00	1.36	0.93	5.90	1.41
	12.50	27.75	27.00	1.55	0.99	5.90	1.77
	15.00	27.94	27.00	1.74	1.06	5.90	2.12
	17.50	28.11	27.00	1.91	1.15	5.90	2.48
Q50 →	20.00	28.28	27.00	2.08	1.26	5.90	2.83
Q100 →	22.50	28.44	27.00	2.24	1.38	5.90	3.18
	25.00	28.59	27.00	2.39	1.51	5.90	3.54

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE

CD103 PROPOSED

CULVERT ANALYSIS 1.1
CULVERT FILE NAME: P103.DAT

DATE: 1-13-91
SUMMARY TABLE

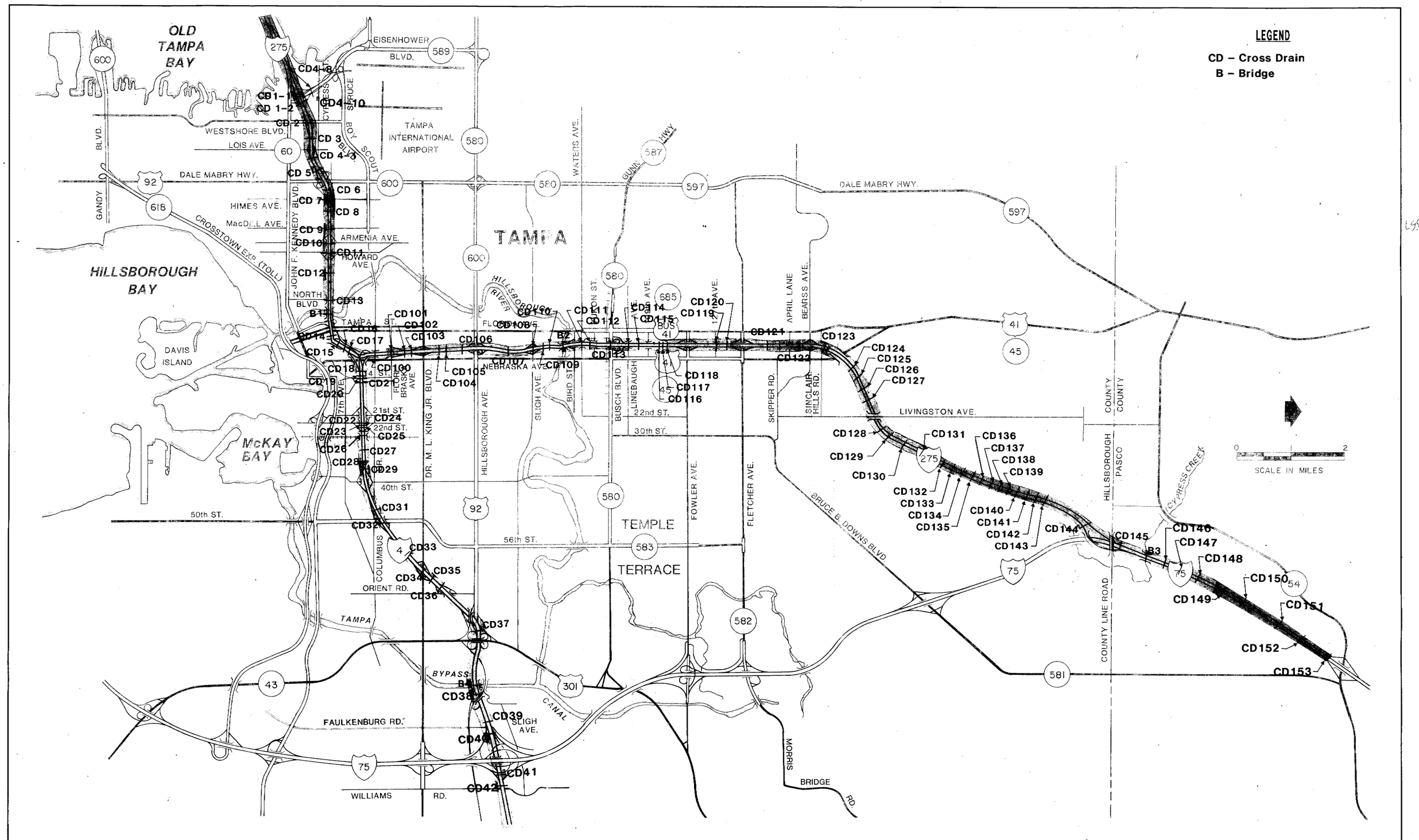
CULV NO.	A - SITE DATA			B - CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	BARRELS SHAPE MATERIAL	SPAN (IN)	RISE (IN)	MANN. N	INLET TYPE
1	26.20	21.10	400	1 -RCP	36	36	0.012	CONVENTIONA
2								
3								
4								
5								
6								

TO EDIT DATA PRESS (A) FOR SITE DATA
(B) FOR CULVERT SHAPE, MATERIAL, OR INLET DATA,
(C) FOR DISCHARGE RANGE,
(D) FOR TAILWATER DATA,
(E) FOR OVERTOPPING DATA,
(F) TO ADD OR DELETE CULVERTS,
(RET) TO CONTINUE ANALYSIS.

CULVERT # 1 PERFORMANCE CURVE
FOR 1 BARRELS

	Q (cfs)	HW (ft)	TWE (ft)	ICH (ft)	OCH (ft)	TWH (ft)	VO (fps)
	0.00	27.00	27.00	0.00	0.80	5.90	0.00
	2.50	27.11	27.00	0.65	0.91	5.90	0.35
	5.00	27.15	27.00	0.95	0.93	5.90	0.71
	7.50	27.37	27.00	1.17	0.85	5.90	1.06
	10.00	27.57	27.00	1.37	0.90	5.90	1.41
	12.50	27.75	27.00	1.55	0.97	5.90	1.77
	15.00	27.94	27.00	1.74	1.06	5.90	2.12
	17.50	28.12	27.00	1.92	1.16	5.90	2.48
Q50 →	20.00	28.28	27.00	2.08	1.27	5.90	2.83
Q100 →	22.50	28.44	27.00	2.24	1.40	5.90	3.18
	25.00	28.59	27.00	2.39	1.55	5.90	3.54

PRESS <V> TO PLOT PRESS <ENTER> TO CONTINUE



PROJECT No. C2380	
PROJECT DATES	
DATES	DESCRIPTION

THE GREINER TEAM
GREINER, INC.
PIPER ARCHAEOLOGICAL RESEARCH, INC.
KNIGHT APPRAISAL SERVICES

CROSS DRAIN STRUCTURES LOCATION MAP

TAMPA INTERSTATE STUDY
FLORIDA DEPARTMENT OF TRANSPORTATION

STATE PROJECT No. 99007-1402 | EXHIBIT A--1