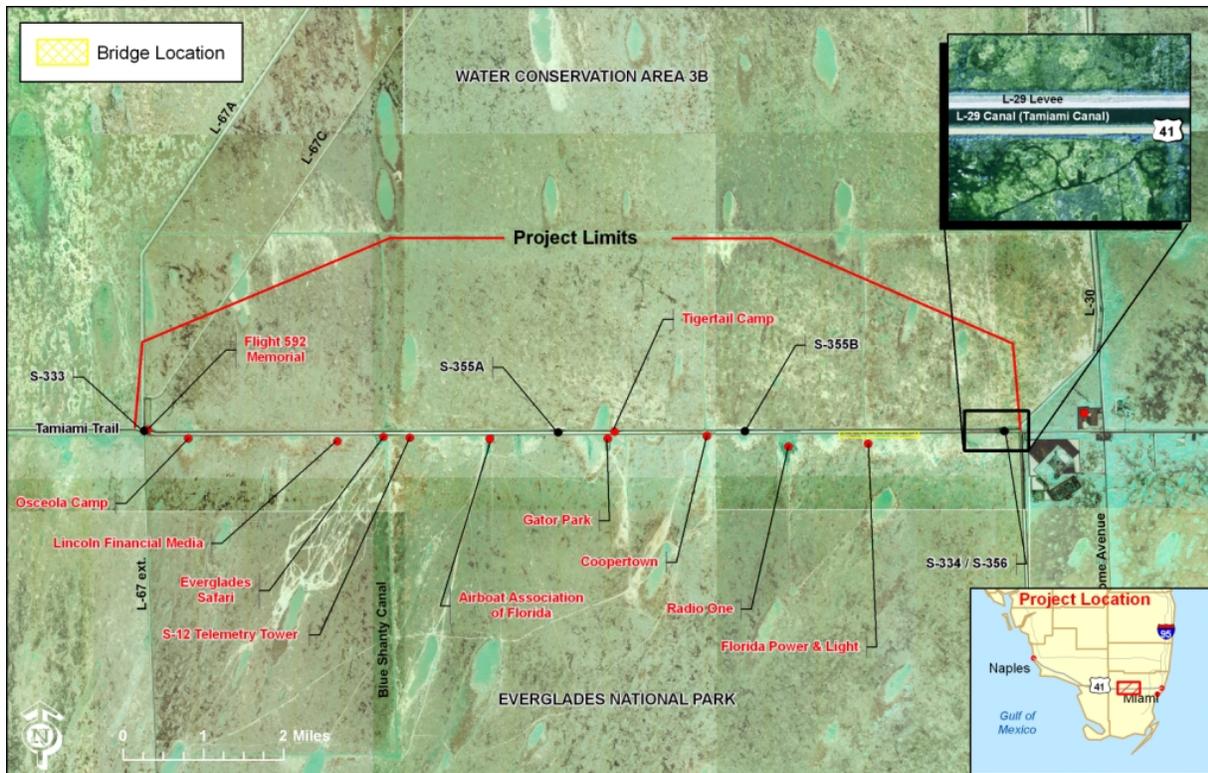


## 6.0 RECOMMENDED PLAN

Based on the limited reevaluation and the review of all existing data and reports concerning the TTM, Alternative 3.2.2a, Raise Canal Stage to 8.5 Feet and Construct a One-Mile Eastern Conveyance Opening, is recommended for implementation under the MWD authorization (*Figure 6-1*).

As part of the Recommended Plan, the federal government would acquire certain real estate rights from FDOT allowing for the conveyance of water as part of the Tamiami Trail project. In order to obtain the perpetual rights to flow water, FDOT would receive compensation. These rights include both a perpetual channel and perpetual flowage easement interests. The channel easement includes conveyance of water for a one-mile-wide stretch of land. Due to the fact that there is an existing roadway at that location, USACE would construct a one-mile bridge that would act as a replacement to the existing Tamiami Trail roadway. In addition, the flowage easement allows for the legal right to flow higher levels of water through and under the property now occupied by the existing Tamiami Trail for the entire expanse of the project area. Placing higher water levels in the L-29 Canal would adversely impact the existing roadway. As such, portions of the roadway would require reinforcing the road and road base to avoid degradation of the road as a result of the higher water stages. Under Substitute Facilities Doctrine, compensation for these real estate rights is based on the cost of a substitute or replacement of the facility that would be lost. Therefore, USACE would construct a one-mile long bridge with approaches as compensation for the loss of the existing Tamiami Trail roadway due to the construction of the channel, and compensation would also be provided to preclude potential damages to the remaining highway resulting from increased stages in the L-29 Canal.

Descriptions of the Recommended Plan and its features are provided in the paragraphs below.



**FIGURE 6-1: LOCATION OF THE RECOMMENDED PLAN**

## 6.1 Modifications

### 6.1.1 Conveyance

The Recommended Plan would enable hydraulic conveyance through Tamiami Trail by removing one mile of the existing highway, embankment and associated culverts. This would allow one mile of connectivity between the L-29 Canal and ENP. A one-mile eastern bridge, coupled with an increased stage of 8.5 feet, would increase annual flow volumes by about 92 percent, to 339,703 acre-feet per year; peak flows would increase by about 48 percent, to 1,848 cfs. Additionally, conveyance over the remainder of Tamiami Trail would be provided through the use of the existing and improved culverts.

### 6.1.2 One-Mile Eastern Bridge (Location, Length, Height, Remove Culverts, Travel Lane Widths)

A one-mile bridge would be constructed as compensation to FDOT for the real estate rights to remove the one mile of Tamiami Trail and maintain motor vehicle traffic. The bridge would start approximately 3,000 feet east of Radio One and end about one mile west of S-334 (*Figure 6-1*). After completion of bridge construction, the unneeded portion of the highway embankment would be removed. The bridge would provide two 12-foot-wide travel lanes with ten-foot shoulders and outside barriers.

The existing highway would require a transition from the existing alignment to the bridge. The transitions to the bridge would have five feet paved shoulder and five feet of grassed shoulder. Guardrails would be located at the outside edges of these shoulders. The profile would be reinforced significantly for transitioning to the bridge and would be established per applicable drift, maintenance, and navigation bridge clearances, while minimizing humps in the profile. The low cord of the bridge would be at 14.75 feet NGVD.

### **6.1.3 Raise L-29 Canal Maximum Operating Limit to 8.5 feet, NGVD**

Implementing Alternative 3.2.2.a is expected to raise the Maximum Operating Limit in the L-29 Canal to 8.5 feet NGVD, one foot above the existing operating limit of 7.5 feet NGVD. FDOT is allowing USACE to use a new standard (adopted in the March 2008 FDOT Flexible Pavement Design Manual) thereby reducing the required separation (Design Base Highwater Clearance) between the Design High Water (DHW) and the bottom of the road base. Design High Water (also referred to as Base Clearance Water Elevation) is defined as the average October wet season elevation plus the rainfall from a specific design storm event (10-year frequency, with duration (1 hr, 8 hr, or 24 hr) producing the highest stage and drawing down within a specific period). The old standard required either a higher base or a lower DHW. The use of this new standard with its reduced requirements for separation between the base and the DHW makes adherence to the DHW more imperative.

All inflows shall be cut off to the structures that influence this canal once the maximum operating limit of 8.5 feet NGVD is reached and in advance of certain stage and weather events. This one foot increase in the maximum stage elevation, coupled with improved hydraulic conveyance under the bridge, is expected to provide additional meaningful benefits as described in this LRR. In addition no changes (such as passive weirs in the L-29 Levee or removal of the L-67 Extension Levee without adequate engineering justification) shall be allowed which may cause stages to exceed the Maximum Operating Limit.

The benefits described in the LRR/EA are potential benefits associated with the evaluation of the LRR alternatives based on a single constraint of 8.5 feet in the L-29 Canal. The constraints that follow are required by FDOT in order to ensure the stability and safety of the highway. Therefore, when these FDOT constraints are applied to the recommended plan, there will be some change of benefits from those identified in this document. During the Combined and Structural and Operational Plan (CSOP) alternative planning process, the effects of these constraints on benefits will be thoroughly evaluated. In addition, there is an expectation that field monitoring, based on a reconfiguration of existing monitoring activities, will continue following implementation of the LRR features in conjunction with the CSOP operating plan. Such monitoring will

allow for adaptive management to potentially mitigate any loss of benefits from those identified in this document.

Operations of the C&SF system will ultimately depend on the operations of both the MWD and C-111 South Dade projects as defined in the CSOP. The operations of CSOP will have to be adjusted because the alternative recommended by this LRR does not allow stages high enough (i.e., 9.7 feet NGVD as proposed in the 2005 RGRR) to allow uncontrolled flow into the L-29 Canal. Specifically, the CSOP operations will have to be modified to include an L-29 maximum operating limit of 8.5 feet NGVD. Therefore, CSOP is dependent on the constraints set forth by this Recommended Plan. These constraints include:

- A. All inflow structures to L-29 Canal will be closed and all inflows terminated, allowing the canal to naturally recede under the following scenarios. For the scenarios requiring a quantitative forecast the SFWMD Daily Quality Precipitation Frequency (QPF) will be used. All L-29 Canal stage references are as measured at the S-333 Tail Water unless this location is unavailable then S-334 Head Water may be used:
  1. Once the stage in the L-29 Canal reaches a stage of 8.5 feet NGVD, input from all structures that discharge into the canal shall be stopped until the level in L-29 Canal recedes beneath 8.5 feet NGVD. The operation of the MWD system, including management of inflows into L-29 Canal, will be determined as part of the CSOP evaluation. The trigger elevation that will allow the recommencement of flows and maintenance of the integrity of the roadway embankment will be determined in a manner consistent with the FDOT or other applicable design criteria and standards in force at the time of the preparation of the LRR.
  2. Two or three days (as soon as forecast information is available) before any named storm or tropical event is expected to impact the area, all inflow shall be stopped.
  3. Two or three days (as soon as forecast information is available) before an approaching rainfall event that is predicted to drop six inches or more inches of rainfall within a 72-hour period if the L-29 Canal stage is at or above 7.8 feet NGVD.
  4. Two or three days (as soon as forecast information is available) that a rainfall event is expected to result in stages that will meaningfully exceed 8.5 feet NGVD. For example, if the forecast is for 2 or more inches of rain and the L-29 stage exceeds 8.4 feet

NGVD; or if the forecast is for 3 or more inches of rain and the L-29 stage exceeds 8.3 feet NGVD; or if the forecast is for 4 or more inches of rain and the L-29 stage exceeds 8.2 feet NGVD; or if the forecast is for 5 or more inches of rain and the L-29 stage exceeds 8.1 feet NGVD.

- B. The following information is provided to clarify expectations for development of the final operating plan and how operations will be monitored once implemented. The LRR Recommended Plan used 8.5 feet NGVD as the DHW elevation for purposes of establishing the roadway profile and pavement design. This DHW was calculated from a 36-year POR by averaging all October days within the initial CSOP model simulation. The LRR Recommended Plan assumed a 36-year POR average October wet season elevation of 7.89 feet NGVD to establish the 8.5 DHW. While the target stage for the L-29 Canal is 8.5 feet, it is understood that the average October wet season elevation is expected to be approximately 7.89 feet, NGVD based on multiple years (36-year simulated POR). Since this elevation is an average, during some individual years the average October elevation may exceed the 7.89 feet stage and other years it would be below 7.89 feet. The average elevation will be dependent on the meteorological conditions of that year. However when considering multiple years the October average should be at or below 7.9 feet NGVD. The final CSOP will be developed such that the average October elevation does not exceed 7.9 NGVD in the L-29 Canal for the model's period of record (1965 through 2000).

These evaluations could also result in the identification of additional criteria that may modify the benefits described in this report. It is the expectation of the participating agencies of the LRR that the subsequent CSOP evaluations will thoroughly analyze the impacts of these modifications and attempt to mitigate any adverse impacts to the level of benefits described in this report.

Agreements with FDOT and other State agencies are contingent on this 36-year POR average October wet season elevation of 7.89 feet NGVD. This elevation was based on modeling performed by the Government during the initial development of the CSOP plan. These model runs assumed sufficient road raising and bridges to allow unconstrained flow into the L-29 Canal. This average October stage will be verified in the following manner:

1. The 7.89 feet NGVD stage elevation is based on a simulated 36-year period of record (POR) modeling data which are the best information currently available. The CSOP team will be required to analyze the 36-year POR modeling average monthly water levels during October and compare the calculated DHW to that defined in this report (7.89 feet, NGVD). If the 36-year POR model simulated average October elevation is

above this stage, adjustments to CSOP shall be required operationally or structurally to ensure the design integrity of the roadway embankment and pavement. USACE will consult with SFWMD and FDOT so that the 36-year POR modeling results in an average October stage at or below the 7.89 feet NGVD.

2. Once the Tamiami Trail Modifications are constructed and operational, yearly average October water surface elevations will be computed (S333 tailwater) and shared with FDOT. After three years of operation, the average of the three years will be computed and compared to the predicted 36-year POR October average of 7.89 feet stage elevation. If the average October elevation is found to be more than 0.2 feet above this stage ( $\geq 8.09$  feet NGVD), adjustments shall be required operationally or structurally to ensure the design integrity of the roadway embankment and pavement. The condition of the roadway will be evaluated using the annual Florida Department of Transportation Pavement Condition Survey ratings for Crack, Rut and Ride. USACE will consult with SFWMD and FDOT on needed changes and implement them in a timely manner. After each subsequent year of operations, the average October elevation will be recalculated to include all operational years (e.g., after four years of operation, the average October elevation will use the four years of elevation data).

- C. FDOT contemplates executing a Joint Participation Agreement (JPA) in favor of USACE on or about July 1, 2011 in the amount of its deferred maintenance. The present day value of that is \$4.716 million and the funding would be provided prior to 30 September 2011. That contribution to project funding is contingent upon and subject to the following:
  1. The availability of funds.
  2. State budget authorizations.

In summary it is important to maintain the integrity and safe conditions for Tamiami Trail. In order to accomplish these conditions, certain assumptions were made on the best available data to predict how the stages in L-29 Canal would change during the wet season and during specific storm events. Certain contingencies were set in place to minimize impacts to the road base and to reevaluate the original assumptions. Potential benefits were based on the best information to date. As stated earlier, final benefits will be thoroughly evaluated and vetted through operating procedures under CSOP.

#### **6.1.4 Highway Modification**

During the construction of Tamiami Trail, FDOT placed culverts underneath the roadway. The federal government may not have the legal right to flow water under the road in a manner consistent with the needs of this project. Therefore, it is prudent for the federal government to acquire a flowage easement over the

full length of the project lands. For this project, it would be necessary to increase the water elevation north of Tamiami Trail in order to flow more water to the south underneath the road. This increase of the L-29 Canal stage is expected to adversely affect Tamiami Trail. In a case such as this, the USACE would be required to conduct a facility relocation. This type of transaction is in actuality an acquisition of an interest in real estate. In the present case, the USACE would make the road reinforcements in exchange for the flowage easement. No money would be exchanged between USACE and FDOT. USACE would construct the road reinforcement according to FDOT standards and turn over the operation and maintenance of the road to FDOT while FDOT would execute a flowage easement document to the USACE. The road, as repaired, then becomes known as the substitute facility.

#### **6.1.5 Access to Existing Facilities/Sites**

Access to all facilities and sites along Tamiami Trail would be maintained.

#### **6.1.6 Drainage/Treatment of Stormwater Runoff**

The grassed shoulders directly adjacent to the existing roadway provide some limited treatment of highway runoff.

The proposed bridge would increase the total impervious surface area (within the bridge footprint), but would have no practicable means of providing grassed shoulders or traditional swales for treatment of stormwater. Therefore, it would be necessary to provide a means to collect and trap contaminants from stormwater runoff (treatment of first flush) from the proposed bridge prior to discharge. There are a number of BMPs sediment removal technologies on the market that would target removal of sediments and gross pollutants from stormwater runoff while minimizing wetland impacts. USACE, in coordination with FDEP and FDOT, in order to meet state water quality standards and FDOT safety standards, has agreed to incorporate into the bridge design a treatment system that removes sediments and hydrocarbons from stormwater runoff as well as complying with the FDOT standard of routing water off traffic lanes. The new bridge deck would include drains that connect to a drainage collection and distribution system that would subsequently connect to separator units. Roadway and bridge specifications would continue to be coordinated with FDEP and FDOT as they are developed to ensure all mandatory requirements of FDOT and FDEP are met in the final design.

#### **6.1.7 Utilities**

The placement of utilities within the highway right-of-way is through permits issued to utility companies by FDOT. Utilities within the corridor that may be affected by the new construction include buried telephone facilities beyond the guardrails north and south of the roadway, fiber optic cables, and a 23 kilovolt overhead electric line about 100 feet south of the guardrail. All utilities within

the bridge and transitions would require relocation. The utilities on the roadway may require relocation, depending on the change in the shoulder width. Utility relocations would be coordinated with each utility owner.

### **6.1.8 Maintenance of Traffic during Construction**

Existing traffic flow would be maintained with one lane of travel in each direction, except during paving operations. During paving operations, the travel would have to be one lane only with flag men at either end. This would be due to the work being done in the existing foot print of the existing roadway. The overlay of the existing roadway would be accomplished using a moving operation. For the proposed bridge, the existing traffic would be shifted to the northern shoulder to provide the necessary area for construction.

### **6.1.9 Real Estate**

The federal government would require real estate rights in order to create a conveyance channel through Tamiami Trail, raise water levels in the L-29 Canal, and flow additional water through and under Tamiami Trail utilizing existing and improved culverts to NESRS.

The federal government would obtain real estate rights along the entire 10.7-mile project area from FDOT through a relocation agreement. The agreement would provide real estate rights for: temporary construction easement, perpetual flowage easement, and channel easement. The compensation to FDOT for these real estate rights would be a substitute facility – the construction of a bridge and roadway modifications as needed to mitigate for increased water levels.

It would be necessary to acquire real estate interests from FP&L for lands on which the project would be constructed. Efforts are currently under way to obtain an easement for FP&L lands that are needed for the construction of the bridge. Approximately 0.44 acres would be needed for a permanent construction easement and an additional 0.44 acres needed for a temporary construction easement.

Flowage easements are also required from the private parcels located along Tamiami Trail before the higher water stages can be implemented. There are six remaining privately owned parcels located along the Tamiami Trail that are authorized for acquisition by DOI as part of the Everglades National Park Protection and Expansion Act (PL 101-229). Funding and the responsibility for these acquisitions are strictly borne by ENP; hence the costs for those acquisitions are not included in this report. Under the Everglades National Park Protection and Expansion Act, these properties were included within the ENP boundary map that was established by Congress; therefore, the Park is responsible for acquisition of those properties.

A flowage easement is required for the Airboat Association of Florida. This property was explicitly excluded from acquisition under the Everglades National Park Protection and Expansion Act. Acquisition of this easement is a TTM project action and cost.

Real estate requirements and issues are discussed in detail in the Real Estate Appendix (Appendix F).

## **6.2 Implementation**

The following steps would take place prior to full implementation of the recommended plan:

### **6.2.1 National Environmental Policy Act Compliance**

This LRR incorporates information contained in the November 2005 RGR/SEIS by reference, and is considered to be tiered off the referenced EIS. To comply with the NEPA process, the formal public comment period for the Draft LRR-EA was 30 days beginning on April 9 and ending on May 9, 2008. A public meeting was held on April 22, 2008 in Miami and both written and oral comments were received. Additionally, the documents were posted on the Jacksonville District, USACE Environmental website during the comment period. After the close of the Draft LRR-EA comment period, this EA was revised and a Finding of No Significant Impact was signed by the District Engineer. The non-federal sponsor will present the LRR-EA to the SFWMD Governing Board, which is expected to issue a letter indicating support if the project is accepted.

The ENP is a cooperating agency under NEPA. An official letter inviting SFWMD, FWS, EPA, ENP, FWC and FDEP to be cooperating agencies (as defined by NEPA) was sent in March 2008. These agencies were chosen because of their special expertise in the area. The selection of these agencies to be invited as cooperating agencies does not exclude any other agencies from full participation in the project. ENP accepted the invitation; no other agency has responded to be a cooperating agency.

### **6.2.2 Preconstruction Engineering and Design**

It is anticipated that the PED of the project would be completed by September 2008.

### **6.2.3 Land Management Agreement**

Prior to SFWMD executing a PCA amendment with USACE, DOI and SFWMD must reach an agreement on how to manage the project features where such features extend into lands owned by the ENP. The executed agreement may be an attachment to the PCA amendment executed by SFWMD and USACE. SFWMD has also requested that USACE become signatory to this agreement.

#### **6.2.4 Project Cooperation Agreement Amendment**

A PCA amendment would be required between USACE and the non-federal sponsor, SFWMD. The PCA is a legally binding document between the federal government and the non-federal sponsor identifying the sponsor's duties and obligations for this project. The SFWMD is the project sponsor and represents local interests.

#### **6.2.5 Highway Easement Deed**

In order to construct the one-mile bridge, the project requires one hundred feet of land (50 feet permanent and 50 feet temporarily for construction) south of Tamiami Trail for the one mile width of the site of the bridge from the DOI. One legal mechanism for DOI to convey these parklands is by means of a HED. The DOI would consent to the deeding of these ENP lands by the FHWA to FDOT since these lands are required for the construction, operation, and maintenance of the project. The HED would be negotiated by DOI, FHWA, FDOT, SFWMD and USACE. In addition to conveying the rights necessary for the construction and OMRR&R of the highway (i.e., the bridge), this HED would also contain a perpetual channel easement and perpetual flowage easement. These additional rights would then allow for the construction, OMRR&R of a channel underneath the bridge and also allow for the flow of water through the channel. As the only grantee to the HED, all of these rights would then issue only to FDOT at this point. The HED is merely a temporary solution for transferring these lands to the state. It is the overall intention of DOI to seek specific legislation from Congress to convey the lands contained in this HED over to the state in fee.

#### **6.2.6 Relocation Agreement**

The USACE, not being a party to the HED conveyance, would not have the legal right to enter upon the property of FDOT. Therefore, the USACE would acquire the real estate interests contained in the HED through a separate agreement with FDOT. This separate document is the relocation agreement. The real estate rights that would be obtained in this agreement include: 1.) the right to enter FDOT lands to construct features and modify the existing roadway; 2.) a channel easement at the location of the bridge; and 3.) a flowage easement for the entire expanse of the roadway within the project limits. This flowage easement allows the USACE to flow water through/under the Tamiami Trail utilizing the existing and any improved culverts as well as the area underneath the bridge. As part of the project, water levels in L-29 Canal would be raised one foot to introduce more water into ENP. As compensation for the conveyance of these three real estate rights, FDOT would receive a newly constructed one-mile bridge to replace removal of one mile of existing roadway that is required as part of the channel easement. In addition, FDOT would receive the reinforcing of portions of lower lying roadway in order to offset the adverse impacts due to raised water levels in L-29 Canal as part of the USACE acquisition of 10.7 miles of land covered by the flowage easement. USACE would not only acquire rights

to FDOT-owned lands by this relocation agreement but would also receive rights to those lands that FDOT obtained under the HED from DOI/FHWA cited above.

### 6.2.7 Real Estate

It would be necessary to acquire real estate interests for lands on which the project would be constructed. In addition to the lands required for construction, it would be necessary to purchase real estate interests in tracts due to increased water levels. DOI, FDOT and private landowners own or hold interests in lands required for the project.

### 6.2.8 Construction Duration

Construction is scheduled to begin in October 2008. It is planned that a single contract would be awarded for both bridge work and road reinforcement, and work on these two components would occur at the same time. It is anticipated that construction would be completed in three and one-half years.

### 6.2.9 Monitoring

The project does not include specific hydrologic or ecological monitoring in addition to existing studies; however, there are many existing sampling stations and ongoing studies carried out by the CERP Monitoring and Assessment Plan (MAP) as well as EPA's Regional Environmental Monitoring and Assessment Plan (REMAP), the USGS's Everglades Depth Estimation Network (EDEN), USACE, and SFWMD, among others, that are on the ground and prepared to detect any changes in hydrology and vegetation. A summary of the monitoring network is provided in Appendix E.

## 6.3 Cost

### 6.3.1 Project Costs

The first costs for the Tamiami Trail items recommended under the MWD authority are shown in *Table 6-1* and are the 90 percent confidence level cost estimates. This confidence level means that there is a 90 percent chance that the final cost for this project would be equal to **or less than** the cost shown. The risk and uncertainty analysis was calculated for the total construction cost; thus the distribution of risk across the project elements is approximate. The entries in this table assume that the cost savings features are implemented and that the agreements among agencies necessary for these cost savings are signed executed. The savings features are listed below. Inability to implement all of these cost saving options would result in a higher cost of the project.

- a. Per the FDOT Pavement Design Manual, the following road reinforcement plan is estimated for 8.5 feet high water elevation:
  - i. For roadway with crown greater than 11.91 feet NGVD, mill road three inches (3") and replace with three inches (3") of asphalt
  - ii. For roadway with crown elevation between 10.91 feet and 11.91 feet NGVD, mill road three inches (3") and replace with five inches (5") of asphalt
  - iii. For roadway crown elevation less than 10.91 feet NGVD, mill down existing pavement until it is one foot above design high water. Then add asphalt base and structural course according to the FDOT design manual.
- b. Use temporary rights-of-way and staging areas within the ENP property
- c. Design optimizations along the bridge
- d. Use fill from nearby SFWMD storage areas
- e. Accelerate the award of construction contract(s) by one year, with award in late 2008 instead of late 2009

**TABLE 6-1: MWD TAMIAMI TRAIL MODIFICATION COSTS**

ITEM	Cost Estimate Including Cost Saving Options	Local Market Escalation Risk	Total
<b>Construction</b>			
Bridge	\$60,100,000	\$16,800,000	\$76,900,000
Bridge - Transitions	\$20,100,000	\$5,600,000	\$25,700,000
Road Modifications	\$61,500,000	\$17,300,000	\$78,800,000
<b>Subtotal</b>	<b>\$141,700,000</b>	<b>\$39,700,000</b>	<b>\$181,400,000</b>
<b>Preconstruction Engineering and Design</b>			\$0
<b>Engineering During Construction</b>			\$3,100,000
<b>Contract Administration</b>			\$14,900,000
<b>Lands And Damages</b>			\$5,900,000
<b>Subtotal</b>			<b>\$23,900,000</b>
<b>TOTAL First Cost</b>			<b>\$205,300,000</b>
<b>Escalation to Mid-Point of Construction</b>			\$6,700,000
<b>TOTAL Fully Funded Cost</b>			<b>\$212,000,000</b>

The risk and uncertainty analysis was calculated for the total construction cost; thus the distribution of risk across the project elements is approximate.

**Table 6-1** does not include an entry for PED. USACE, Jacksonville District has already been funded for PED costs through September 2008, and PED is expected to be complete by that date. The total estimated first cost is \$205,300,000. The fully funded cost estimate is \$212,000,000, with the escalation to the midpoint of construction based on an award date of October 2008 and three and one-half year construction duration.

#### Comparison of Cost Estimates from the Draft LRR and the Final LRR

The costs in Table 6-1 above differ from the costs presented in Tables 4-7 and 4-10 of this final report, and the costs presented in Section 6 the draft LRR. The team incorporated additional design information, updated cost quotes, and applied a different cost estimating method (MCACES 2<sup>nd</sup> Generation (MII) software) for this newest cost estimate for the recommended plan. Appendix C provides additional information on the new cost estimate.

The estimated costs of the recommended plan are lower in this final report than they were in the draft report. The fully funded cost estimate decreased from \$225,000,000 to \$212,000,000. The costs without including escalation subtotal decreased from \$177,000,000 to \$165,600,000. The First Cost appears to have increased from \$177,000,000 to \$205,300,000. However, this increase of first cost is due to a different manner of displaying cost risk and cost escalation. The total amount of estimated cost escalation is approximately the same in the draft and final reports. The draft report combined the escalation risks and presented the total separately from the first cost. This final report splits the total escalation into escalation due to local market conditions and escalation captured by the published OMB escalation rate. USACE guidance is that the local escalation risk should be combined with the construction costs and thus become part of the First Cost. The OMB escalation is added to the First Cost to obtain the Fully Funded Cost estimate.

The costs in **Table 6-1** came from the MII estimate in Appendix C, Tables 5 and 7. Table 7 of this appendix displays values for sunk and previously funded PED costs that are not part of the evaluation and are not carried forward into **Table 6-1**.

#### **6.3.2 Cost Sharing**

Recent cost sharing for the MWD project has been 50/50 USACE/DOI funding. The proposed funding breakdown is shown in **Table 6-2**. The Managers' Report for WRDA 2007 states that arrangements in this report for sharing of future costs between USACE and DOI will be tentative only. Thus this proposed cost sharing between the federal agencies may be changed with additional budgetary guidance. The State of Florida, through FDOT, has verbally agreed to provide \$4,500,000 to the project.

**TABLE 6-2: MWD TAMIAMI TRAIL COST-SHARING**

ITEM	Cost
USACE	\$100,400,000
DOI	\$100,400,000
FDOT	\$4,500,000
<b>Total</b>	<b>\$205,300,000</b>

Because roadway construction is not a major part of the USACE construction authority, it is suggested that both USACE and DOI investigate contributions from other partners to reduce the overall project costs.

Actions that may be implemented in the future under CERP would be cost-shared 50/50 USACE/SFWMD.

### 6.3.3 Budgeting

The stage increase and the conveyance increase are both necessary to achieve the restoration benefits of the project. The benefits would not be achieved if only one were completed. It is expected that the funds for the entire estimated cost of the project would not be available at the start of construction, but would be budgeted and appropriated over several years. The cost estimate and construction schedule assume an October 2008 start and further assume that funding in future years would be available so that construction actions would not be delayed.

An adaptive management approach has been developed, in conjunction with the incremental adaptive management concept developed by the National Academies of Science in 2006. The monitoring program will rely on existing sampling locations and ongoing studies to test water deliveries and the vegetation response within Shark River Slough. The results of this monitoring would be used to inform the requirements for CERP implementation.

## 6.4 Operation, Maintenance, Repair, Rehabilitation and Replacement

The conveyance features system would continue to be operated and maintained as part of the C&SF project by SFWMD and USACE. SFWMD would be responsible for the OMRR&R of the conveyance area and the culverts as part of the project cost-sharing agreement. Other SFWMD responsibilities include cost-sharing, records maintenance, and assisting in managing the project in a manner consistent with applicable Federal and State laws and regulations, including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC 9601-9675.

Annual OMRR&R costs for the conveyance are expected to be \$30,000.

FDOT would be responsible for maintaining the pollution abatement system, bridges, and roadway since these substitute facilities are compensation to FDOT for real estate rights rather than project features. OMRR&R of these facilities is not a TTM project cost.

## 6.5 Additional Considerations

### 6.5.1 Chief of Engineers Actions for Change

The Tamiami Trail study and report are consistent with the Chief of Engineers Actions for Change for Applying Lessons Learned during Hurricanes Katrina and Rita. These actions require a focus on system analysis, sustainability, risk-informed decision making and communication of risks, incorporate professional and technical expertise, and dynamic independent review.

System Analysis: The study is an integral part of the larger Everglades system, and is a priority for any system wide restoration. The project considered compatibility of the proposed features with future potential south Florida restoration efforts, with existing MWD features, and with the purposes and features of the Central and Southern Florida multipurpose project.

Sustainability The recommended plan was developed to be a sustainable restoration feature, and as a foundation for the larger Comprehensive Everglades Restoration Plan. In particular, the following items were considered during the planning:

- Minimizing O&M requirements to help facilitate long term, low cost benefits.
- Engineering flexibility, through the use of design features to help manage water under a variety of future scenarios.
- Stand alone benefits. The project was formulated to provide immediate benefits to the marsh, and work in conjunction with a variety of future scenarios.

Risk: Risk informed decision making was a vital element in the study, and has been integrated through the study process. In particular, two sources of risk and uncertainty were incorporated into the project planning:

- Cost risk and uncertainty: resulting in the potential for cost growth. In order to manage these risks, the study incorporated new risk-based cost estimating methods. Bridge construction and road excavation methods involve relatively low uncertainty. The costs of fuel and oil-based materials, aggregate, concrete, and steel were the major risk factors affecting cost estimates. The proposed early start of construction, autumn of 2008, is the best method to mitigate and minimize these risks.
- Ecological Response uncertainty: there is uncertainty in regard to the landscape changes associated with restored hydrology. This project will

be one of the first major restoration construction projects in the heart of the Everglades ecosystem. Existing hydrologic and ecological monitoring in south Florida will be used to assess the performance of the recommended plan and to aid decisions whether and how to modify operations of the system.

Technical Expertise and Independent Reviews The report was prepared by highly experienced staff from Jacksonville District, Everglades National Park, and other agencies located in south Florida. Draft versions of report were reviewed several times: Independent Technical Review by subject-matter experts throughout the Corps who were not involved in the study; External Peer Review by a panel of independent non-government experts; Model Review by a panel of independent non-government experts; and by the public. The LRR was amended and improved in response to each of these reviews.

### **6.5.2 Environmental Operating Principles**

The project is consistent with the environmental operating principles and is expected to be a benefit to the environment. These principles are listed below along with the project consistency for each principle.

- Strive to achieve Environmental Sustainability. An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.  
Consistency: The basis of the TTM project is to create a sustainable, healthy and diverse Everglades Ecosystem.
- Recognize the interdependence of life and the physical environment, and consider environmental consequences of USACE programs and activities in all appropriate circumstances.  
Consistency: Project provides both immediate and potential long-term benefits to the Everglades ecosystem. The Recommended Plan has been fully reviewed for environmental impacts in NEPA document.
- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.  
Consistency: The Recommended plan was formulated to provide larger ecosystem benefits while still considering and minimizing local impacts.
- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.  
Consistency: Project complies with all National Environmental Policy Act guidelines as well as Endangered Species Act obligations

- Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of the processes and work.
  - Consistency: TTM is one piece of a larger puzzle of both Modified Water Deliveries as well as Comprehensive Everglades Restoration. Cumulative impacts of all relative projects were considered in the formulation and analysis of the Recommended Plan.
- Build and share an integrated scientific, economic and social knowledge base that supports a greater understanding of the environment and impacts of the work.
  - Consistency: The LRR analysis was an inclusive and open process that engaged all stakeholders, interest groups and agencies.
- Respect the views of individuals and groups interested in USACE activities; listen to them actively and learn from their perspective in the search to find win-win solutions to the Nation's problems that also protect and enhance the environment.
  - Consistency: Public input was encouraged through scoping as well as public and stakeholder meetings.

### **6.5.3 Key Social and Environmental Factors**

The TSP above is a first step in overall restoration. It is recognized that by selecting a lower cost plan, additional actions would be required for complete restoration at a later date. These additional actions should keep with landscape changes and adaptive incremental restoration.

### **6.5.4 Stakeholder Perspectives and Differences**

There are considerable differences of opinion on the best solution to the Tamiami Trail, which range from merely adding swales to the construction of the 10.7-mile bridge. The analysis presented in this LRR was designed to look objectively at the full range of values, and implement necessary first steps. However, many stakeholders would prefer a longer-term alternative for implementation. As a result, there may be considerable differences of opinion from stakeholders on the best recommended plan.

## **6.6 Remaining Modified Water Deliveries Project Features**

MWD Project consists of major components:

1. 8.5 SMA Flood Mitigation component,
2. Conveyance and Seepage Control component,
3. Tamiami Trail component and
4. Revised operating plan that incorporates the new components.

The 8.5 SMA component is nearly complete, except for exotic and debris removal in the areas west and north of the protection levee. For the Conveyance and Seepage Control component, the following features are completed: S-355 A and

B gated structures in the L-29 Levee; S-333 modifications; four of the nine miles of L-67 Extension Levee degraded; S-356 pump station; and Tigertail Camp elevation raised.

Subsequent to the release of the Tamiami Trail LRR, USACE will address any design modifications for the remaining Conveyance and Seepage Control features in separate a NEPA document and Engineering Documentation Report (EDR). Remaining features include the following:

1. Structures S-345A, B, and C through the L-67A and C levees
2. Structures S-349 A, B, and C in the L-67A Borrow Canal
3. Degradation of five miles of L-67 Extension Canal and Levee
4. Structures through the L-29 Levee

Potential flooding of Osceola Camp will be addressed. ENP and representatives for the Osceola Camp are negotiating the details of the mitigation actions that would be performed.

The Tamiami Trail component (this LRR) has not been constructed.

To complete the MWD project, a revised operations plan will be developed in conjunction with C-111 South Dade project efforts under CSOP.

### **6.7 Funding Requirements to Complete the Modified Water Deliveries Project**

Based on Alternative 3.2.2a for the Tamiami Trail component and completion of the remaining MWD features, the estimated balance to complete the MWD program from FY09 forward is \$187.1 million dollars (based on FY08 escalated/fully funded dollars). The funding allocations in **Table 6-3** are based on three and one-half year construction duration for the TTM and completion of the remaining features. The estimates are based on engineering information and that may need to be re-examined if the project were to encounter a schedule slip. Because the Administration has not released budgetary guidance, costs beyond FY09 have not been determined between DOI and USACE. The State of Florida has verbally committed to contribute approximately \$4.5 million dollars towards TTM. These monies would normally have been spent on their maintenance of the roadway.

**TABLE 6-3: MWD REMAINING BUDGET REQUIREMENTS**

<b>Modified Water Deliveries Project</b> <b>Funding Allocations to Complete Alternative 3.2.2a</b> <b>1 Mile Eastern Bridge/Road Mitigation</b> (\$ in millions) Dollars Reflected are Oct 07 Price Level (inflated/fully funded dollars)					
	Through FY07	FY08 Enacted	FY09 Pres Bud	Remaining After FY09	Total Project
<b>Costs</b>					
8.5 Square Mile Area	170.4				170.4
Conveyance & Seepage	30.0		0.2	21.0	51.2
Tamiami Trail Modifications	45.5	18.4	54.6	93.5	212.0
Tamiami Trail Design *	11.0	5.7			16.7
Project Implementation Support	41.5	0.0	5.2	12.6	59.4
<b>Mod Water Total TOTAL:</b>	<b>298.4</b>	<b>24.1</b>	<b>60.0</b>	<b>127.1</b>	<b>509.6</b>
<b>Funding</b>					
Department of the Interior	230.7	14.3	10.0		255.0
Corps of Engineers	67.7	9.8	50.0		127.5
State of Florida				4.5	4.5
To Be Determined				122.6	122.6
<b>Mod Water Total TOTAL:</b>	<b>298.3</b>	<b>24.1</b>	<b>60.0</b>	<b>127.1</b>	<b>509.6</b>
* Includes sunk costs for planning, pre-construction, engineering and design.					

Under a separate NEPA process from the Tamiami Trail LRR, a pilot project is being considered that would determine the actual effects of spreader swales. ENP would lead the NEPA action for the pilot. If the pilot project demonstrates that the swales are successful, USACE and ENP would consider incorporating the swales as a part of the remaining Conveyance and Seepage Control component.

### 6.8 Restoration Beyond the Modified Water Deliveries Project

The Recommended Plan of the Tamiami Trail LRR increases water flows to the Park along 10.7 miles of the 20-mile stretch of Tamiami Trail from Krome Avenue to the eastern boundary of Big Cypress National Preserve. This action is consistent with the MWD authority which directs the Secretary of the Army to construct modifications to the C&SF project to improve water deliveries into the Park and, to the extent practicable, take steps to restore the natural hydrological conditions in the Park.

The LRR Recommended Plan would provide significant benefits by:

- allowing the L-29 Canal to be operated at stages up to 8.5 feet NGVD;
- increasing conveyance capacity under Tamiami Trail from 1,250 to 1,848 cfs; and
- increasing flow volumes to the Park by 92 percent.

The remaining activities discussed earlier in this report for the 8.5 SMA would be completed using prior appropriations. Implementation of a plan recommended in the Final Limited Reevaluation Report for Tamiami Trail is contingent upon sufficient appropriations necessary for the completion of the design, engineering, and construction of the features in the plan, to include conveyance and seepage features within WCA-3A and 3B, and the update to the operations and water control plans necessary to account for new project features. The accomplishment of all of these features and updates are in accord with the MWD project, as authorized in the Everglades National Park Protection and Expansion Act of 1989, PL101-229, and the first stage of restoring more natural deliveries into ENP. Future restoration features intended to improve the efficacy of this work and build upon it would be evaluated under other appropriate statutory authority.

## 7.0 RECOMMENDATIONS

I recommend that the MWD to ENP, C&SF project be modified to allow for improved water deliveries to ENP by modification, construction and implementation of the following items to Tamiami Trail in accordance with the Everglades National Park Protection and Expansion Act (P.L. 101-229, Section 104, 16 U.S.C. Part 410r-5 *et seq.*), December 1989.

The Recommended Plan includes features to convey the additional flows from L-29 Canal, north of the Tamiami Trail, south to the ENP. The Recommended Plan consists of the following components, which are described in Section 6, Recommended Plan.

1. Acquisition of the necessary real estate interests required for construction of the project from the Airboat Association of Florida, FP&L and FDOT.
2. Construction of a one-mile bridge and reinforcement of the remainder of the Tamiami Trail within the project area in order to counteract the project's higher water levels in the L-29 Canal. Road reinforcement is part of TTM and will be paid for by the MWD project. FDOT will contribute \$4,500,000 to the road reinforcement as part of their normal maintenance program.
3. Acquisition of real estate interests from FDOT by means of a relocation agreement within the project area to include a channel easement, a flowage easement, a temporary work area easement and a right of entry for construction upon the FDOT lands in order to construct the project features.

The Limited Reevaluation Report (LRR) Recommended Plan's total first cost estimate (excluding escalation) is **\$205.3 million**; its fully funded cost estimate, which includes escalation to the mid-point of construction, is **\$212 million**.

The above recommendations are made with the provision that prior to project implementation, SFWMD, the non-federal sponsor, shall enter into a binding agreement, most likely in the form of a PCA or PCA amendment, between the Department of the Army and SFWMD for modification of the C&SF project, MWD to ENP project, which provides for the following regarding the conveyance features for the project:

- a. OMRR&R of the project, or functional portion of the project, in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations and any specific directions prescribed by the federal government;
- b. Provide 25 percent of the cost of OMRR&R the project's conveyance features. The non-federal sponsor shall have no responsibility for OMRR&R of the substitute facilities, those being the modified roadway,

- the constructed bridge and its ramps/approaches, the culvert structures underneath Tamiami Trail, along with sediment control within those culverts which shall all become the responsibility of FDOT;
- c. Do not use federal funds to meet the non-federal sponsor's share of project OMRR&R costs unless the federal granting agency verifies in writing that the expenditure of such funds is authorized;
  - d. Give the federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspecting, OMRR&R, or completing the project. No completion, OMRR&R by the federal government shall relieve the non-federal sponsor of the responsibility to meet the non-federal sponsor's obligations, or to preclude the federal government from pursuing any other remedy at law or equity to ensure faithful performance;
  - e. Hold and save the United States free from all damages arising from the construction, OMRR&R of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors;
  - f. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the CERCLA, PL 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, operation, and maintenance of the project that were provided by the Non-Federal Sponsor and for which the Local Sponsor has received a land compensation payment. However, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;
  - g. Assume, as between the federal government and the non-federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines to be necessary for the initial construction, operation, or maintenance of the project that were provided by the Non-Federal Sponsor and for which the Local Sponsor has received a land compensation payment;
  - h. Agree that, as between the federal government and the non-federal sponsor, the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that would not cause liability to arise under CERCLA;

- i. Prevent obstructions of or encroachments on the project (including prescribing and enforcing regulations to prevent such obstruction or encroachments) which might reduce the level of protection it affords, hinder operation and maintenance, or interfere with its proper function, such as any new developments on project lands or the addition of facilities which would degrade the benefits of the project;
- j. Not less than once each year, inform affected interests of the extent of protection afforded by the project;
- k. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of three years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as would properly reflect total costs of construction of the project, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 CFR Section 33.20;
- l. Comply with Section 221 of P.L. 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5), and Section 103 of the WRDA 1986, P.L. 99-662, as amended (33 U.S.C. 2213), which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;
- m. Comply with all applicable federal and state laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, P.L. 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and all applicable federal labor standards and requirements, including but not limited to 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act [formerly 40 U.S.C. 276a et seq.], the Contract Work Hours and Safety Standards Act [formerly 40 U.S.C. 327 et seq.] and the Copeland Anti-Kickback Act [formerly 40 U.S.C. 276c et seq.] ;
- n. Comply with Section 402 of the WRDA 1986, as amended (33 U.S.C. 701b-12), which requires a non-federal interest to participate in and comply with applicable federal floodplain management and flood insurance programs, prepare a flood plain management plan within one year after the date of signing a PCA Amendment,, and implement the plan not later than one year after completion of construction of the project; and,
- o. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, P.L. 91-

646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, necessary for the initial construction, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

The recommendations contained herein reflect the information available at this time and departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Office of Management and Budget (OMB) as proposals for implementation funding. However, prior to transmittal to OMB, any sponsor, the state, interested federal agencies, and other parties would be advised of any modifications and will be afforded an opportunity to comment further.

A handwritten signature in black ink, appearing to read "Paul L. Grosskruger". The signature is stylized with large loops and a long horizontal stroke extending to the right.

Paul L. Grosskruger  
Colonel, U.S. Army  
District Engineer