TURNPIKE STORMWATER MANAGEMENT ALTERNATIVES REPORT

The typical Turnpike scope requires submission of a Stormwater Management Alternatives Report with the 30% roadway submittal of a project, if a pond siting report is not available during design and there is uncertainty that stormwater management can occur within existing FDOT right of way. The purpose of the documentation is three-fold:

1) Identify at least two potential stormwater management design alternatives for each basin within the project; provide quantitative analysis of required pond sizes; and provide a recommended pond alternative for each basin;
2) Address design constraints that affect drainage and other design disciplines; and
3) Obtain and review specific data collection items needed to support the drainage design (i.e. adjacent permits, project permits, relevant studies, etc.).

This report builds upon the Stormwater Management Concepts Report by adding a preliminary quantitative analysis for pond sizes and identifying specific stormwater management facility locations within the project corridor. The report should identify the project's drainage constraints and possible fatal flaws; present stormwater approach; discussion of possible alternatives, and then present the preferred alternative. The goal is agreement/concurrence between Turnpike and EOR on the drainage approach prior to plans development. It is desirable to establish the stormwater management facility requirements early because right-of-way and permitting can impact the schedule. It is expected the Stormwater Management Alternatives Report would be developed without survey or significant roadway design, therefore only planning level (preliminary estimate) calculations similar to those shown in the FDOT Drainage Design Guide Chapter 9 should be performed and presented. Provide enough calculations and sketches to document approach. Details or cross sections need not be CADD drafted. Further, material developed for this document will be used as a basis for the Stormwater Management Design Report prepared for the Design process to be submitted at 45%.

The type of information to present is specific to each project and the possible drainage approach. During creation of this report is the time to explore and discuss innovative ideas that may benefit the project. The format and Table of Contents for the Stormwater Management Alternatives Report developed during PD&E will be expanded for use in the Stormwater Management Design Report.

STORMWATER MANAGEMENT ALTERNATIVES :

Not all types of stormwater management systems could be used based on physical constraints of the project; wet detention, retention, dry detention, on-line, off-line, joint use, exfiltration, and even wetland treatment. Existing right-of-way and surplus

properties are good candidates for location of treatment systems and should be considered first. Include innovative opportunities such as regional facilities, golf course ponds, piped conveyance under treatment swales, and large pipes for attenuation. The FDOT Drainage Design Guide Chapter 9 discusses the general approach in selecting a pond site that can be used as a guide during this development process. Estimating swale treatment opportunities should follow a similar methodology. Factors such as SHGWT, soil permeability, tail water, maintenance concerns and environmental issues should be considered.

As existing facilities are being expanded there is more of an effort to develop schemes that provide for an overall approach to meeting the permit regulations. Stormwater treatment, attenuation, and compensation are valuable methods and management techniques that should be considered. The project should be separated into sub-basins with estimates of water quality requirements for new pavement, previous permit obligations, and existing areas for potential compensation. Stormwater attenuation requirements should be based on a project wide or by major basin divides and should be based on estimates of Tc, curve numbers, regulatory design storms, etc. The ability for Turnpike to take advantage of compensation adds another layer of options. Compensation scenarios should be "story booked". Starting at areas where compensatory treatment is favorable, determine how much can the first option provide. Proceed to next favorable compensation option until project requirements are exceeded. Treatment alternatives (compensation and especially right-of-way for ponds) need to include a second or third choice. Very brief narrative of pros and cons of viable options and marked areas on aerial maps should suffice in presenting recommended options.

The pond alternative evaluation matrix table found in the FDOT Drainage Design Guide Chapter 9 should be included in this report for each alternative.

DESIGN CONSTRAINTS:

The second purpose of the Drainage Concept Report is to establish the various design constraints that affect the project. Experience has taught us that (foreseeable) issues arise that change a component of the design and "if we would have known", another approach may have been elected. The Turnpike Enterprise is requiring early coordination/identification of the design issues as a tangible way to become more efficient. These items could involve more than the drainage engineer and could address such issues as walls, bridges, and other constraints that could impact the design. The projects can benefit from identifying constraints and selecting the method to handle it. The following is an abbreviated list of design constraints and treatment parameters that may pertain to the project:

- *Floodplain encroachment and compensation requirements* – Preliminary estimate of potential encroachment and compensation ideas. This influences pond requirements and should be included with pond evaluation.

- *How to handle offsite area* – Will we have co-mingling or will we bypass? Will any existing drainage systems fail with propose conditions? Does the project eliminate any existing conveyance ditches?
- *Deficiencies in existing conditions* – Is there already a flooding problem? Does channel crossing have substandard clearances, scour or erosion problems? Does soils map indicate presence of unfavorable material?
- *Tail water constraints from receiving water body or storm sewer HGL* – Is the controlled or permitted water stage receiving water body verified? Are the plans to change stages in the future?
- *Estimated SHGWT* – Estimate the range of anticipated values and the methods proposed to establish water table. Relate any boring information to historical rainfall and SCS information. Discuss relationship to base clearance or pond recovery. Will the profile limit allowable stages in pond? Are any roadway profile changes required?
- *Drainage related design variations* – Cross slopes, side slopes, freeboard, canal hazard, etc.
- *R/W* – Evaluate potential for right-of-way, drainage or construction easements.
- *Criteria* – The exercise of reviewing all criteria may bring up questions to be discussed, i.e. safety factors, vertical clearance, and base clearance. Anticipate the most stringent criteria for design.
- *Utility conflicts* – Narrate what is known and unknown. Estimate how tight the constraint will be on drainage features such as outfall structures. Sketches and general solutions should be outlines.
- *Well fields can have significant effect on design* – Determine setbacks. Does their presence eliminate treatment alternatives?
- *Typical section options* – Side slopes guardrail, right-of-way berm details, maintenance area, cross slope to median or outside, canal hazards, and/or base clearance.
- *Roadside berms* – Is there a need to separate project runoff from adjacent canals? How does noise wall match up with berm configuration? How do outfall structure details or back slopes of the canals fit with berm configuration?
- *Retaining wall* – For locations where walls are an option to limit encroachment in ditches, design features like access and maintenance berms need to be considered
- *Wetlands and/or endangered/threatened species* – Approximate location, interface with drainage systems.
- *Water quality, Water Quantity & Special Basin Criteria* – for permitting and drainage requirements. Determine jurisdictional agency(s) responsible for permitting. What is the classification of the outfall water body? Is there additional treatment required for special or Outstanding Florida Waters? TMDL?
- *Sovereign submerged lands* – If this has the potential to create complications, we may want to initiate process early.
- *Outfall points* – Part of the stormwater management concept effort along with estimate of pond size and pond locations.
- *Utilities* – Identify major utilities within project and potential to impact design.

DATA COLLECTION ITEMS:

The third step in this report is to identify site specific data needed to support the drainage design. Again, by identifying, early in the process, information required for the stormwater management design, the approach will be more timely and efficient. Items required at a minimum may include:

- Previous water management district permits;
- Previous drainage connection permits;
- Current flood studies and history of flooding;
- Previous design plans and drainage documentation;
- Existing Turnpike out-parcel maps;
- Previous or new geotechnical information;
- Previous or new survey data;
- Adjacent water control districts' seasonal high water table or control elevations;
- Tidal information;
- Well field maps; and
- And historical, archeological, and environmental information.

STORMWATER MANAGEMENT ALTERNATIVES REPORT

CHECKLIST

Purpose
Project Description
Existing Land Use
Soils
Design High Waters
Floodplains & Floodways
Cross Drains (new)
Permits/Special Basin Criteria
Sovereign Submerged Lands
Stormwater Management (Requirements/Options)
Wetlands
Tail water Constraints
Offsite Areas/Co-mingling of Off-Site Drainage
Utilities
Hazardous Materials
Other Constraints (Cemetery/Parks/Historic Buildings)
Deficiencies of Existing Conditions
Retaining Wall Requirements
Outfall Requirements (R/W, Easements)

EXHIBITS

1. Location Map
2. Drainage Map
3. Soils Map
4. FEMA Map
5. WMD Basin Map
6. Well field Map
7. Stormwater Details/Calculations