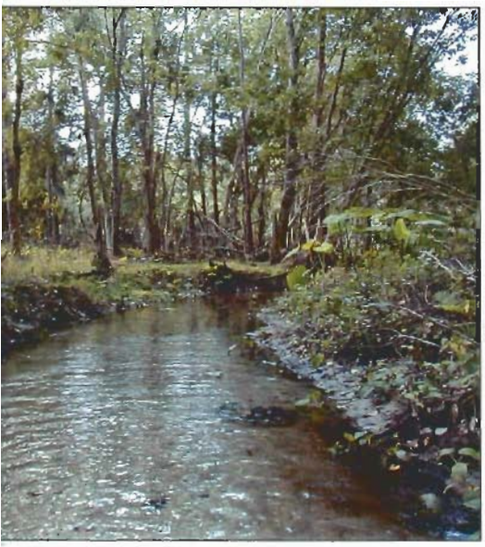

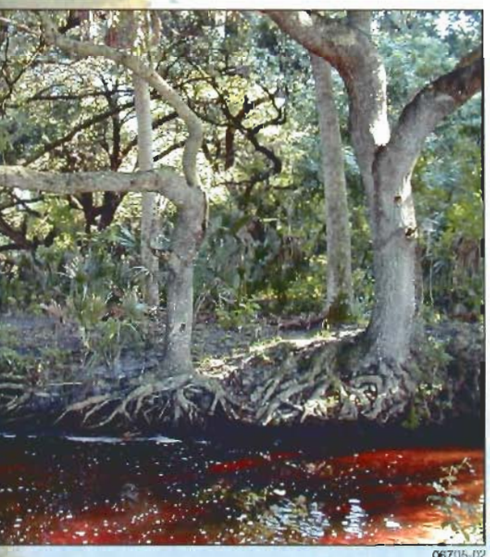

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LITTLE MANATEE RIVER WATERSHED MANAGEMENT PLAN

FINAL REPORT
CHAPTERS 13-19

Prepared for:

Hillsborough County
Board of County Commissioners

Prepared by:

PBSJ

JUNE, 2002

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June 2002

John B. Adams, Jr.
6/26/02

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APPENDICES

CHAPTER 13
ANALYSIS OF ALTERNATIVES

13.1 WATERSHED IMPROVEMENT GOALS

This chapter describes the alternatives that were identified as part of this study to improve flood control, water quality, natural systems and, if applicable, water supply conditions in the Little Manatee River (LMR) watershed. In addition, it describes the methodology and results of the evaluation and selection of the proposed alternatives. The identification of alternatives was based on the existing conditions analysis described in Chapters 1 through 12.

The proposed alternatives address separately the a) flood control and stormwater runoff treatment problems, and b) habitat restoration and conservation opportunities. This procedure was selected because flood control and stormwater runoff treatment issues involve primarily implementation of structural and non-structural approaches, whereas habitat issues deal primarily with land acquisition and vegetation management issues. Alternatives were developed to accomplish one or more of the goals of relevant state and local programs in terms of water quantity, water quality, habitat protection, and overall natural resource use, as listed below. In addition, the work effort considered goals delineated by specific programs in the LMR watershed including the SWFWMD SWIM (Surface Water Improvement and Management) Plan for Tampa Bay, the SWFWMD Comprehensive Watershed Management Plan (CWM) for the LMR Watershed, the Tampa Bay Estuary Program Comprehensive Conservation and Management Plan (CCMP); and the Cockroach Bay Aquatic Preserve Management Plan (CBAPMP) that are summarized in **Table 13-1**.

Water Quantity Goals

- Meet to the maximum extent practicable the watershed's levels of service for flood protection.
- Minimize alterations to the peak, volume, and timing of floodwaters as watershed development occurs.
- Minimize alterations to the timing and volume of natural freshwater inflows to Tampa Bay.
- Reduce potential effects of freshwater inflows from urban and agricultural land uses.

Table 13-1. Existing programs that address planning issues in the LMR watershed.

SWFWMD Plans	TBEP CCMP	CBAPMP
Water Quality		
Protect water quality by preventing further degradation of the water resource and enhancing water quality where appropriate.	Cap nitrogen loadings to Tampa Bay at existing levels to encourage seagrass growth. Protect relatively unimpacted areas of the bay from increases in toxic contaminants. Reduce bacterial contamination in impacted areas of the bay to levels safe for swimming and shellfish harvesting.	Attain and maintain water quality levels for designated uses (Class II, Class III, Outstanding Florida Water - OFW). Enhance seagrass growth within Cockroach Bay and lower Little Manatee River by maintaining and increasing water clarity.
Water Quantity		
To minimize the potential for damage from floods by protecting and restoring the natural water storage and conveyance functions of floodprone areas. The District shall give preference wherever possible to non-structural surface water management methods. Ensure an adequate supply of water resource for all existing and future reasonable and beneficial uses, while protecting and maintaining the water and related resources of the District.	Maintain optimal freshwater inflows to Tampa Bay and its tributaries.	Maintain appropriate freshwater inflows from the Little Manatee River and Cockroach Bay watersheds. Ensure an adequate supply of the water resource for all existing and future reasonable and beneficial uses, while protecting and maintaining the water and related resources within the Cockroach Bay and Little Manatee River watersheds.
Habitat		
Protect, preserve, and restore natural Florida ecosystems and establish minimum water levels and flows to maintain these natural systems.	Increase and preserve the quantity, quality, and diversity of seagrass communities. Restore optimal balance of wetland and associated upland habitats for fish and wildlife, while protecting and enhancing existing habitats. Protect hard-bottom, oyster reef, and soft-bottom communities.	Increase and preserve the quantity, quality, and diversity of seagrass and other habitats in the Cockroach Bay Aquatic Preserve. Restore optimal balance of wetland and associated upland habitats for fish and wildlife, while protecting and enhancing existing habitats. Protect hard-bottom, oyster reef, and soft-bottom communities.

Notes: SWFWMD = Southwest Florida Water Management District
TBEP CCMP = Tampa Bay Estuary Program Comprehensive Conservation and Management Plan
CBAPMP = Cockroach Bay Aquatic Preserve Management Plan

Water Quality Goals

- Control nutrient and contaminants loading from urban land uses.
- Assess disruption of natural surface water treatment features (e.g., wetlands).
- Assess potential bacteria contamination impacts from septic tanks.
- Identify opportunities for erosion and sediment control.

Habitat Goals

- Assess habitat destruction, degradation, and fragmentation resulting from urban, mining, and agricultural activities.
- Identify opportunities for habitat restoration and creation.
- Assess exotic and nuisance plant infestations from species such as Brazilian pepper. Australian pine, and Melaleuca, which outcompete native vegetation.

Overall Resource Use Goals

- Assess enforcement of existing environmental and resource protection regulations.
- Assess promotion of educational programs to promote public awareness and participation.
- Assess bacterial contamination to shellfish harvesting and swimming.
- Assess existing and potential future resource use conflicts such as recreational and commercial fishing, use of public lands for preservation or recreation, etc.
- Assess existing and future land use conflicts such as displacement of agriculture by urban land, potential impacts to natural lands from mining, etc.

13.2 METHODOLOGY FOR IDENTIFICATION AND EVALUATION OF FLOOD CONTROL AND RUNOFF TREATMENT ALTERNATIVES

13.2.1 Identification of Alternatives

As indicated in Chapter 3, the LMR watershed was segmented into seven major basin areas to facilitate description of the major conveyance systems. Each major basin includes a collection of adjacent systems. Based on the results of the existing conditions analysis, as well as the community input obtained through the public meetings, various problem areas and/or improvement opportunities were identified in the watershed. Areas that do not meet levels of service requirements for flood protection were identified through a review of historical data and the results of the hydrologic/hydraulic model.

Problem areas associated with pollutant loading were identified through the results of the pollutant loading model and review of engineering plans and aerial photographs of the various drainage

basins, particularly within urban areas. The purpose of that review was to determine the presence and corresponding estimated pollution removal efficiency of Best Management Practices (BMPs) in the watershed. Opportunities for improvement of ecological conditions through implementation of natural resources projects were identified based on existing areas of natural habitat (particularly sensitive habitat), public land ownership maps, and other natural resources data.

Areas that show opportunities for developing improvement projects are referred herein as "project areas". **Table 13-2** lists the eight project areas identified in this study and their location in the watershed. Various alternatives were identified for each of the project areas. As expected, emphasis has been placed in the developed, or under development areas.

The alternatives vary in scope from an emphasis on flood protection to considering a combination of actions to include flood control, stormwater runoff treatment, water quality protection, and natural systems conservation and restoration. The projects considered as part of the various alternatives included new structures, retrofit opportunities, and non-structural strategies. Projects included conveyance improvements coupled with treatment/storage facilities such as wet detention, altered wetlands utilization/enhancement, and multipurpose facilities that can serve as park, conservation, and/or recreation areas.

Approaches to project development also considered the use of regional, multipurpose facilities that integrate water quantity and water quality management capabilities. Various non-structural strategies that could be implemented throughout the watershed were also considered, but not included in the alternatives and are addressed in Chapter 19, Other Watershed Management Recommendations.

Table 13-2. Location of Project Areas

Project Area	Location	Major Basin
1	Gulf City Road	Lower LMR
2	Marsh Branch north tributary	Lower LMR
3	Marsh Branch, Shell Point Road	Lower LMR
4	Curiosity Creek, Sundance Subdivision	Curiosity Creek
5	Wildcat Creek, Sun City Slough	Lower LMR
6	Sun City Center, Kings Point Subdivision	Lower Middle LMR
7	Dug Creek area	Lower Middle LMR
8	Carlton Branch	Upper Middle LMR

13.2.2 Evaluation of Alternatives

Alternatives were selected for each project area and a preferred alternative was selected. Each project area was considered independently. Comparisons and rankings among the selected preferred alternatives were evaluated at a second evaluation stage, described in Chapter 16 of this report.

Evaluation Criteria

This first step in the evaluation process consisted of establishing the evaluation criteria. A total of 10 criteria were identified and used to analyze and compare the alternatives. The criteria included:

1. Flood protection for buildings and other structures
2. Flood protection for road access
3. Water quality and pollution load reduction potential
4. Conservation and restoration of natural systems
5. Water supply benefits
6. Feasibility, flexibility, and consistency with local plans and policies
7. Regulatory considerations and project permitting
8. Capital costs
9. Operation and maintenance issues and costs
10. Community acceptance

Following is a more detailed description of the evaluation criteria.

Flood Protection for Buildings and Other Structures. A primary goal of establishing levels of service for flood protection is to avoid damages to houses and other structures because of the potential impact on human health and safety and due to the fact that this type of flooding generally results in the largest source of economic losses. An alternative received a better score based on its ability to eliminate structural flooding.

Flood Protection for Road Access. Road access is another important goal of establishing levels of service for flood protection. It considers mainly issues of health and safety of the affected population, including adequate conditions of evacuation routes. An alternative received a better score based on its ability to reduce or eliminate road access flooding problems.

Water Quality and Pollution Load Reduction Potential. One of the objectives of the LMR Watershed Master Plan is to at least maintain and potentially improve water quality conditions by identifying mechanisms to retrofit areas where runoff treatment is not available. An alternative received the full score if it provided runoff treatment comparable to that required for new development, that is one inch of runoff from the contributing drainage area.

Conservation and Restoration of Natural Systems. A desirable benefit provided by certain flood control and water quality-oriented projects is the opportunity to enhance the natural systems through conservation and/or restoration. The larger the benefit, the higher the score an alternative received.

Water Supply Benefits. Water supply is an added benefit of certain improvement projects based on opportunities for groundwater recharge. The larger the recharge potential, the higher the score. However, in the evaluation scoring it was considered that, in general, the water supply benefit of surface water storage systems in the LMR watershed is low because the watershed is an area of low

recharge potential to the Floridan aquifer. This aquifer is the primary source of drinking water in the Tampa Bay area. Hydrogeologic studies have demonstrated that the leakance between the water table and Floridan aquifers is low, amounting to no more than two inches of water depth per year.

Feasibility, Flexibility, and Consistency with Local Plans and Policies. Various issues have been considered as part of this criterion. The feasibility issue considers project constructibility, including property acquisition. Flexibility is the ability of a proposed alternative to accommodate changes to currently projected conditions. Consistency is important because projects to be implemented must be consistent with local plans and policies as stated in the Hillsborough County Comprehensive Plan, the SWFWMD SWIM Plan for the LMR Watershed, the Tampa Bay National Estuary Program (TBNEP) Master Plan, the CBAPM Plan, and the State of Florida Water Plan. As indicated previously, specific watershed goals are listed in Table 13-1.

Regulatory Considerations and Project Permitting. The regulatory and permitting issues are part of project feasibility. However, these are issues that by themselves could facilitate or impede the implementation of an alternative. The easier the anticipated permitting process, the higher the score.

Capital Costs. Preliminary cost estimates were developed for each alternative. The lower the cost, the easier the implementation of an alternative and the higher the score it received. Cost estimates for each of the alternatives are included in **Appendix E**.

Operation and Maintenance Issues and Costs. This criterion considered in a qualitative manner the impact that the implementation of an alternative would have on the operation and maintenance activities conducted by the County. For example a replaced culvert generally would result in low additional maintenance resources needs, whereas the construction of a regional detention facility would require not only additional maintenance personnel but also additional personnel capabilities, such as those required for maintenance of littoral zones. The larger the maintenance requirements, the lower the score.

Community Acceptance. The community acceptance factor was included to reflect public input, as provided during the three public meetings conducted as part of this project. As public support is a critical element for the implementation of an alternative, the larger the perceived support for a project, the better the score an alternative received.

Scoring Procedure

In the evaluation process, the criteria were scored on a scale of 0 to 12 as shown below:

Score	Degree of Benefit
0	No benefit
4	Slightly beneficial
8	Moderately beneficial
12	Significantly beneficial

Furthermore, it was recognized that the criteria do not have the same importance in the evaluation process. Therefore, weighting factors were applied to each score to reflect their relative importance. For ease of evaluation, the sum of the weighting factors was assumed to be 100 percent. The following weighting factors were applied:

Criterion	Weighting Factors (%)
Flood protection for houses and other structures	15
Flood protection for road access	15
Water quality and pollution load reduction potential	15
Conservation and restoration of natural systems	15
Water supply benefits	10
Feasibility, flexibility, and consistency with local plans and policies	5
Regulatory considerations and project permitting	10
Implementation capital costs	10
System operation and maintenance issues	5

The community acceptance criterion was evaluated in a slightly different fashion. Instead of applying a weighting factor in combination with the other criteria, a weight was applied to the overall evaluation of the other factors primarily because input from the community was received once a preliminary evaluation of the alternatives with the other factors had been conducted and presented at the public meetings. In this manner, it was possible to show explicitly the impact that the community input had on the selection of the alternatives.

13.3 PROPOSED FLOOD CONTROL AND RUNOFF TREATMENT ALTERNATIVES

Two or more alternatives were identified and evaluated for each project area. Those alternatives are described in the following subsections.

13.3.1 Project Area 1: Gulf City Road Improvements

Statement of the Problem

Flooding problems have been reported on Gulf City Road in the Lower LMR Basin. Existing conditions model analysis predicts street flooding depths of more than 6 inches at the crossing between Manatee Harbor Road and Frisbie Road on the north edge of Section 14, Township 32S and Range 18E. Gulf City Road provides access to all developments located on the south side of the Little Manatee River north of Cockroach Bay Road and west of U.S. 41. The area receives agricultural runoff from an approximately 340-acre drainage area.

Alternatives

Three alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-1** through **13-3**.

Alternative 1A

Components

1. Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures).
2. Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.

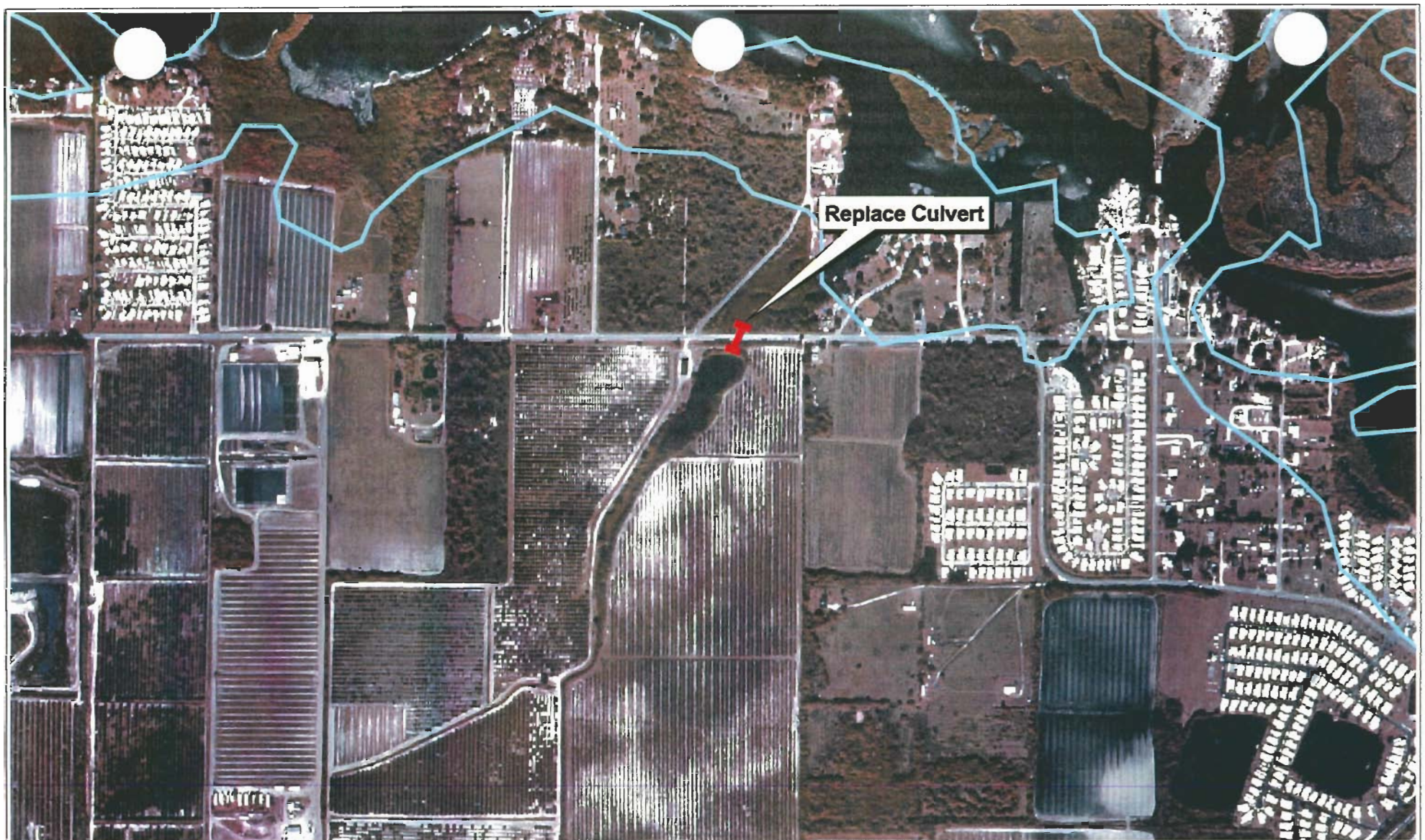
Features

- The proposed pipes would eliminate road flooding conditions for the 25-year storm event
- No water quality treatment is provided

Alternative 1B

Components

1. Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures).
2. Construct a 4-acre detention pond for water quality treatment.
3. Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

500 0 500 Feet

Mar. 13, 2002
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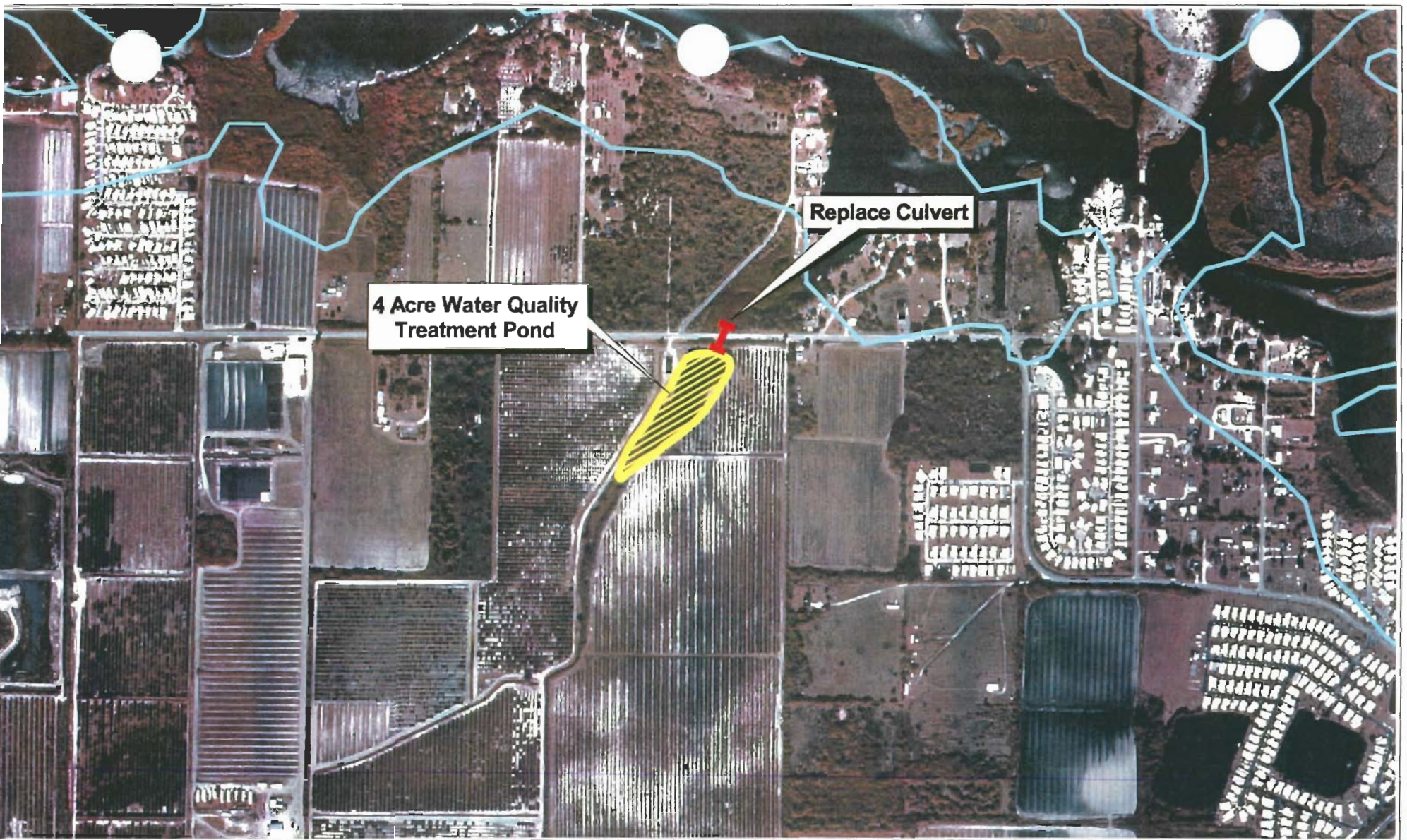
Little Manatee River Watershed Management Plan

Gulf City Road
Proposed Alternative 1A
Figure 13-1

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

500 0 500 Feet

Mar. 13, 2002
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Little Manatee River Watershed Management Plan

Gulf City Road
Proposed Alternative 1B
Figure 13-2

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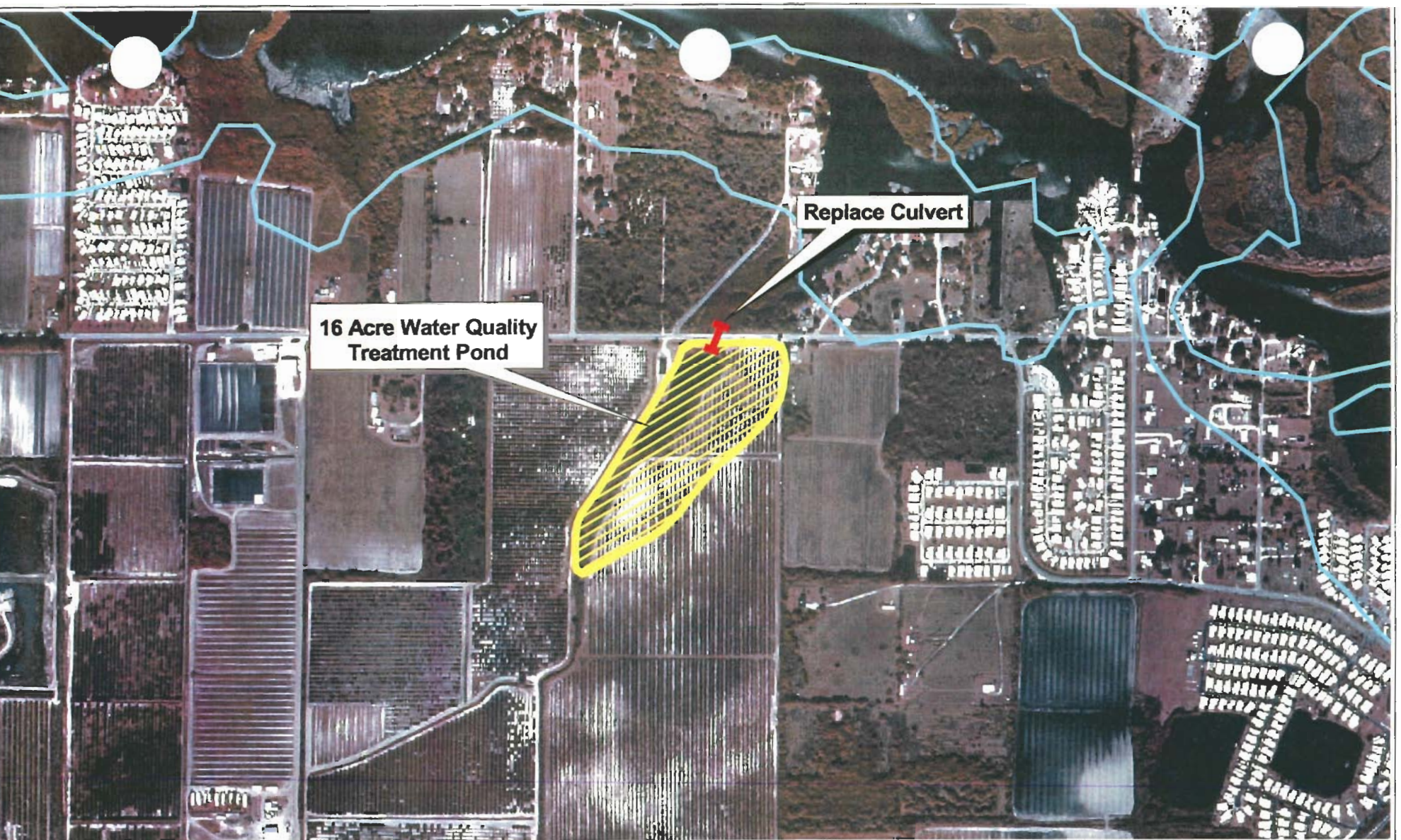

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

500 0 500 Feet

Mar. 13, 2002
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Little Manatee River Watershed Management Plan

Gulf City Road
Proposed Alternative 1C
Figure 13-3

PBSJ

Features

- The proposed culvert improvements would eliminate road flooding conditions for the 25-year storm event.
- The detention pond would provide water quality treatment for approximately 0.25" of runoff (25% of that required for new development).
- Water quality credits could be sold at the runoff treatment facility when the area is developed.

Alternative 1C

Components

1. Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures).
2. Construct a 16-acre detention pond for water quality treatment.
3. Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.

Features

- The proposed pipes would eliminate flooding conditions for the 25-year storm event.
- The detention pond would provide water quality treatment for approximately 1" of runoff (equal to that required for new development).
- When the drainage area is developed, water quality credits could be sold at the runoff treatment facility to recover the initial investment.

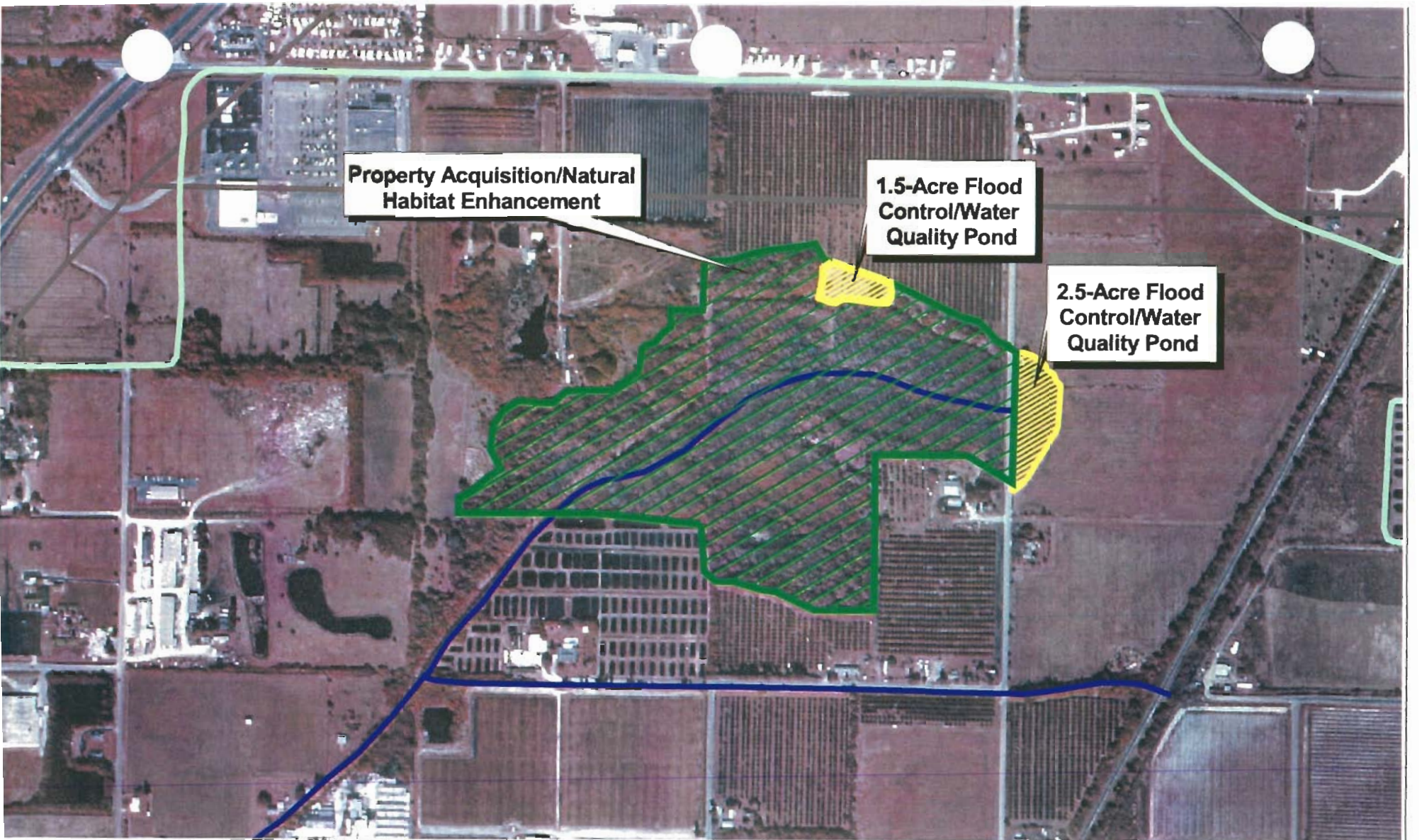
13.3.2 Project Area 2: Marsh Branch North Tributary Improvements

Statement of the Problem

An isolated natural area is located west of 12th Street NE and north of 11th Avenue NE in Ruskin. This area was identified as a "Biodiversity Hotspot" based on the Florida Fish and Wildlife Conservation Commission (Cox et.al., 1994). However, currently this area receives untreated stormwater runoff discharges from the surrounding urban and agricultural land uses that may threaten valuable habitat. In addition, drainage concerns due to needed maintenance of the existing ditches and culverts have been reported downstream, particularly at the intersection of 3rd Street NE and 7th Avenue NE.

Alternatives

Two alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-4** and **13-5**.



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

500 0 500 Feet

Mar. 13, 2002
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Little Manatee River Watershed Management Plan

Marsh Branch North Tributary
Proposed Alternative 2A
Figure 13-4

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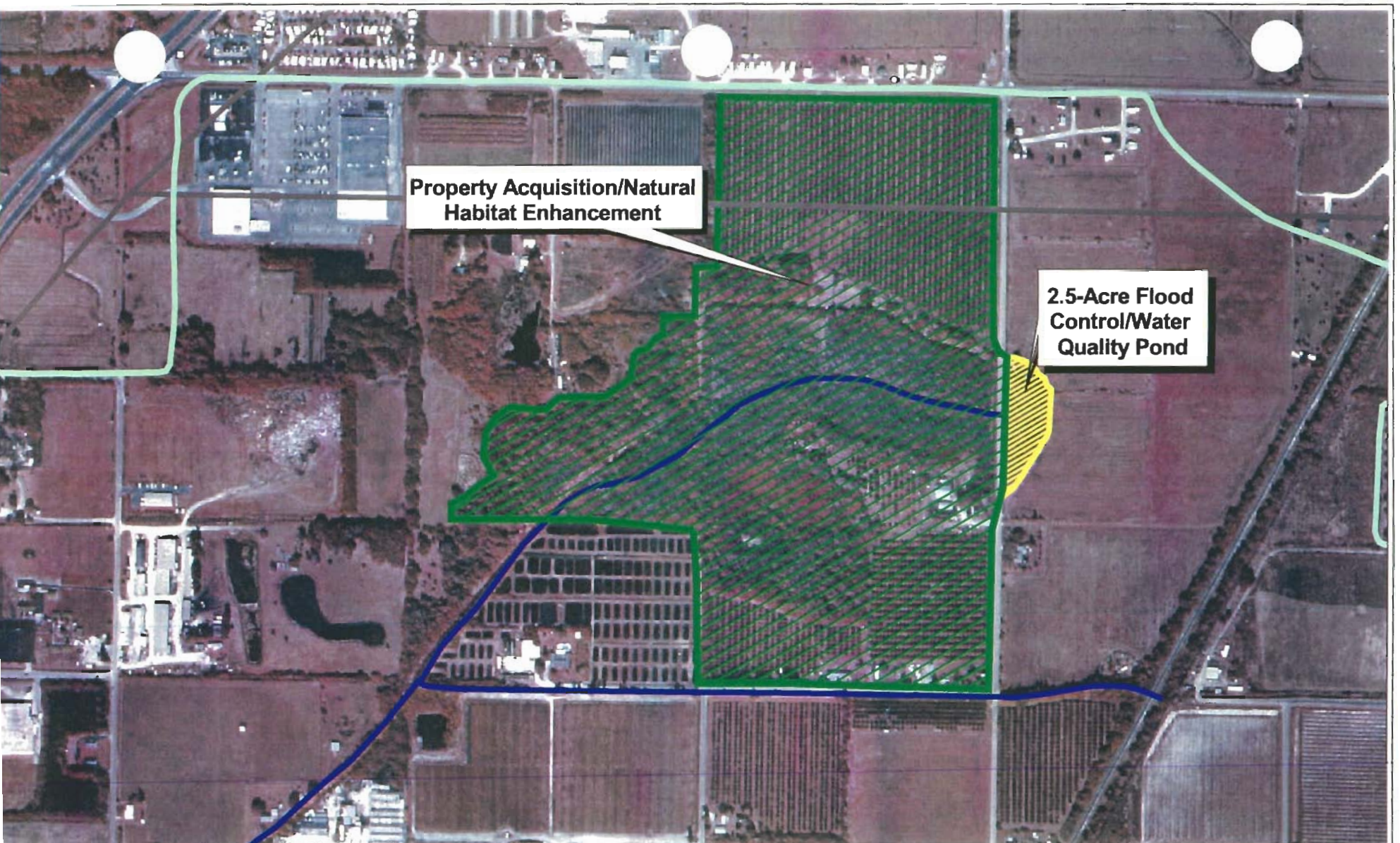

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

300 0 300 Feet

Mar. 13, 2002
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Little Manatee River
Watershed Management Plan

Marsh Branch North Tributary
Proposed Alternative 2B
Figure 13-5

PBSJ

Alternative 2A

Components

1. Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.
2. Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.
3. Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.

Features

- The detention ponds provide protection to the threatened natural area.
- The 1.5-acre detention pond would provide treatment for approximately 0.5 inches of runoff detention over the drainage area (50% of that required for new development).
- The 2.5-acre detention pond would provide treatment for approximately 1.0 inch of runoff detention over the drainage area (equal to that required for new development).
- Small flood control benefits (less than 2-inch flood depth reduction) downstream at the intersection of 3rd Street NE and 7th Avenue NE due to detention.
- Detention facilities are technically feasible and permitable. When the drainage area upstream of both runoff treatment facilities is developed, water quality credits could be sold to recover the initial investment.

Alternative 2B

Components

1. Acquire the parcel located on the southwest corner of 12th Street NE and 19th Avenue NE. This single parcel includes a significant portion of the natural area.
2. Restore the acquired upland and wetland areas as needed to eliminate discharges of man-made pollutants by application of a habitat management plan
3. Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.
4. Encourage application of nutrient management practices and the use of drop irrigation systems in the citrus groves upstream of the 2.5-acre pond.

Features

- Better habitat conservation opportunities than Alternative 2A. Less detention, but more land use controls for water quality.
- Land acquired is isolated and would not provide habitat continuity with other areas. Continuity is one of the County and SWFWMD's property acquisition priority criteria.

- The 2.5-acre detention pond would provide treatment for approximately 1.0 inch of runoff detention over the drainage area (equal to that required for new development).
- When the drainage area is developed, water quality credits could be sold at the runoff treatment facility to recover the initial investment.
- Flood control benefits slightly lower than Alternative 2A (less than 1.5-inch flood depth reduction at the intersection of 3rd Street NE and 7th Avenue NE.

13.3.3 Project Area 3: Marsh Branch, Shell Point Road Improvements

Statement of the Problem

Flooding problems have been reported on Shell Point Road, 13th Street and Atlantic Drive. Existing conditions model analysis predicts street flooding for the 2.33-year design event along Shell Point Road, 13th Street NE, 12th Street NE and Atlantic Drive. Street flooding depths on Shell Point Road for the 25-year event range from 0.6 – 1.0 foot above the road. Structural flooding is predicted for the 25-year event in the development south of Atlantic Drive along with 2.9 feet of street flooding.

Alternatives

Three alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-6** through **13-8**.

Alternative 3A

Components

1. Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad).
2. Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.
3. Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch.
4. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.

Features

- Peak stages on Shell Point Road are reduced an average of 1.0 foot for the 25-year event to below the top of road. A flooding depth of 2.0 feet remains for the 25-year event along Atlantic Drive.
- Structural flooding is eliminated in the development south of Atlantic Drive.

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

300 0 300 Feet

Mar. 13, 2002
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Little Manatee River
Watershed Management Plan

Marsh Branch, Shell Point Road
Proposed Alternative 3A
Figure 13-6

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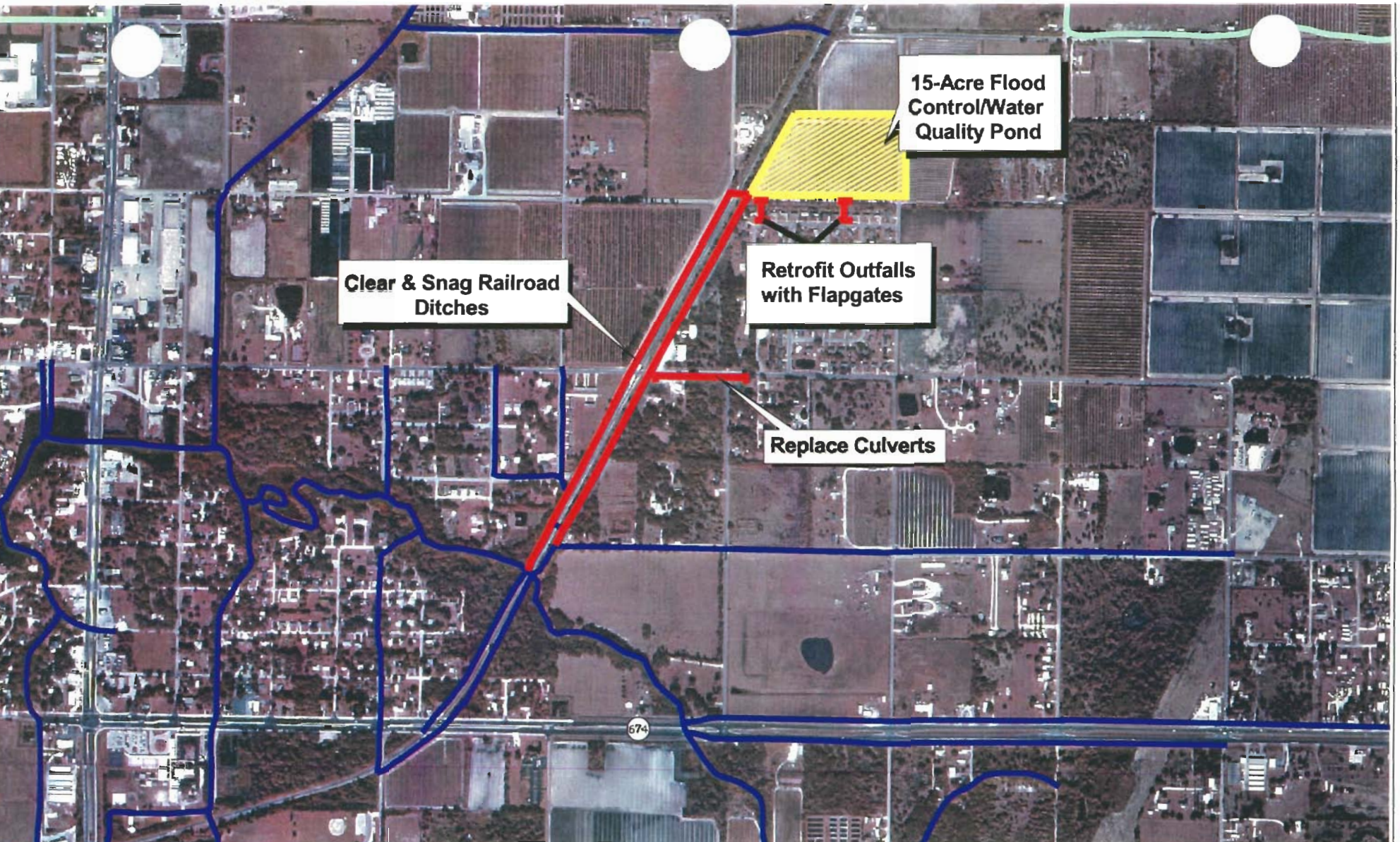

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

300 0 300 Feet

Mar. 13, 2002
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Little Manatee River Watershed Management Plan

Marsh Branch, Shell Point Road
Proposed Alternative 3B
Figure 13-7

PBSJ

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

900 0 900 Feet

Mar. 13, 2002
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Little Manatee River Watershed Management Plan

Marsh Branch, Shell Point Road
Proposed Alternative 3C
Figure 13-8

PBSJ

Alternative 3B

Components

1. Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad).
2. Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.
3. Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch.
4. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.
5. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.

Features

- Peak stages on Shell Point Road are reduced on the average of 1.0 foot for the 25-year event. Peak stages are reduced by 2.5 feet along Atlantic Drive. A road flooding depth of 4 inches remains for the 25-year event along Atlantic Drive.
- Structural flooding is eliminated in the development south of Atlantic Drive.
- Detention pond treats approximately 0.6 inches of runoff over the contributing drainage area (60% of that required for new development).
- Detention facility is technically feasible and permitable. When the drainage area is developed, water quality credits could be sold at the runoff treatment facility to recover the initial investment.
- Creation of the pond would provide additional natural systems habitat.
- Small water supply benefits would result due to potential aquifer recharge.

Alternative 3C

Components

1. Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad).
2. Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.
3. Retrofit existing stormseweir outfalls along Atlantic Drive with check valves.
4. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.
5. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.
6. Construct 7-acre detention pond to catch and treat runoff upstream of Shell Point Road.

Features

- Peak stages on Shell Point Road are reduced an average of 1.0 foot for the 25-year event. Peak stages are reduced by 2.5 feet along Atlantic Drive. A road flooding depth of 4 inches remains for the 25-year event along Atlantic Drive.
- Structural flooding is eliminated in the development south of Atlantic Drive.
- Some water supply benefits due to detention and potential aquifer recharge.
- 15-acre detention pond treats approximately 0.6 inches of runoff over the contributing drainage area (60% of that required for new development).
- Creation of the ponds would provide additional natural systems habitat
- 7-acre detention pond treats approximately 0.2 inches of runoff over the contributing drainage area (20% of that required for new development).
- Detention facilities are technically feasible and permitable. When the drainage area upstream of the facilities is developed, water quality credits could be sold to recover the initial investment.

13.3.4 Project Area 4: Curiosity Creek / Sundance Subdivision Improvements

Statement of the Problem

The Sundance area in the Curiosity Creek basin is a single-family residential neighborhood that is drained through a system of man-made canals. No flooding problems have been identified, but the area has no stormwater treatment facilities. At the canal's discharge point, runoff is conveyed into an undeveloped area that is part of the LMR floodplain, from where it flows into the river. One portion of the downstream canal parallels an undeveloped area covered with wetland and upland vegetation. It is likely that the construction of the canal reduced the hydration opportunities in that area.

Alternatives

Three alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-9** through **13-11**.

Alternative 4A

Components

1. Construct an alum treatment facility on the upstream side of the culvert under Timberlee Road, south of Surrey Trail. Land is available on the north side of the culvert crossing for construction of the alum pump and storage facilities.
2. Construct a 450-ft long by 80-ft wide flock settling pond in the right-of-way immediately downstream of the culvert structure.

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

800 0 800 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed4a

Little Manatee River
Watershed Management Plan

Curiosity Creek/
Sundance Subdivision
Proposed Alternative 4A
Figure 13-9

PBSJ

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

800 0 800 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed4B

Little Manatee River Watershed Management Plan

Curiosity Creek/
Sundance Subdivision
Proposed Alternative 4B
Figure 13-10

PBSJ

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

800 0 800 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed4c

Little Manatee River Watershed Management Plan

Curiosity Creek/
Sundance Subdivision
Proposed Alternative 4C
Figure 13-11

PBSJ

Features

- Treatment of all storms producing one-inch or less of runoff is feasible. Conforms to treatment requirements for new development.
- Facilities are technically feasible and permitable.
- Continuous maintenance of alum injection system is needed.

Alternative 4B

Components

1. Acquire the property that is located north of the ditch receiving stormwater flow from the Timberlee Road culvert. This 18-acre piece of land has been kept in its natural state and is part of a 100-acre tract owned by Tidewater Growers Inc. The rest of the property is used for agriculture.
2. Grade the acquired area below elevation 11 ft NGVD to provide runoff treatment by allowing flow through a wetland system. Restore the existing wetland as needed.
3. Remove portions of the existing berm on the north side of the ditch that runs from Timberlee Road to Lightfoot Road. Construct diversion weirs to move flows toward the area to be acquired.

Features

- Water quality treatment for storms smaller than 0.36 inches (36% of that required for new development).
- There might be reluctance to permit a project that is developed using existing wetland systems.

Alternative 4C

Components

1. Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert.
2. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.
3. Remove portions of the existing berm on the north side of the ditch that runs from Timberlee Road to Lightfoot Road. Construct diversion weirs to move flows toward the area to be acquired.

Features

- Treatment of all storms producing 0.5-inches of runoff conforms to 50% of the treatment requirements for new development.
- Created wetland system is technically feasible and permitable.
- The acquisition of the 100-acre property will create continuity of a natural system that has been isolated by agricultural and development activities. In addition, the property borders areas that have been targeted for ELAPP acquisition.

13.3.5 Project Area 5: Wildcat Creek, Sun City Slough Improvements

Statement of the Problem

Existing conditions analysis predicts street flooding for the 5-year design event along Stephens Road. Street flooding depths for the 25-year event are predicted to be over 1.2 feet above the road.

Alternatives

Three alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-12** through **13-14**.

Alternative 5A

Components

1. Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.
2. Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.

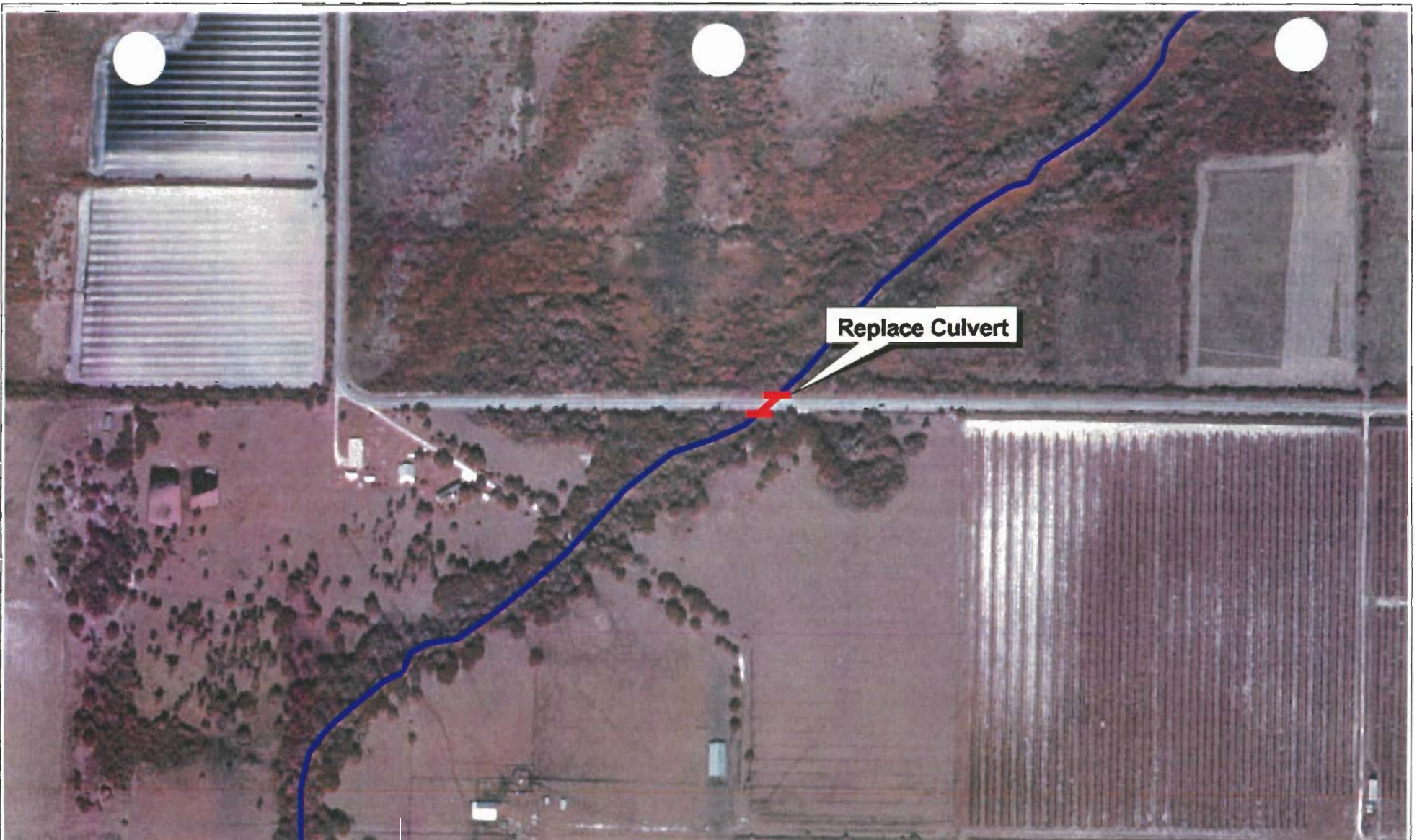
Features

- Road flooding is eliminated for the 10-year design storm event. Less than 6 inches of road flooding are anticipated for the 25-year design event.
- Project is technically feasible and permitable. No downstream impacts are expected.
- No water quality or natural systems benefits will result from this project.

Alternative 5B

Components

1. Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.
2. Raise roadway approximately 6 inches to elevation 13.0 ft-NGVD over a 300-ft length



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

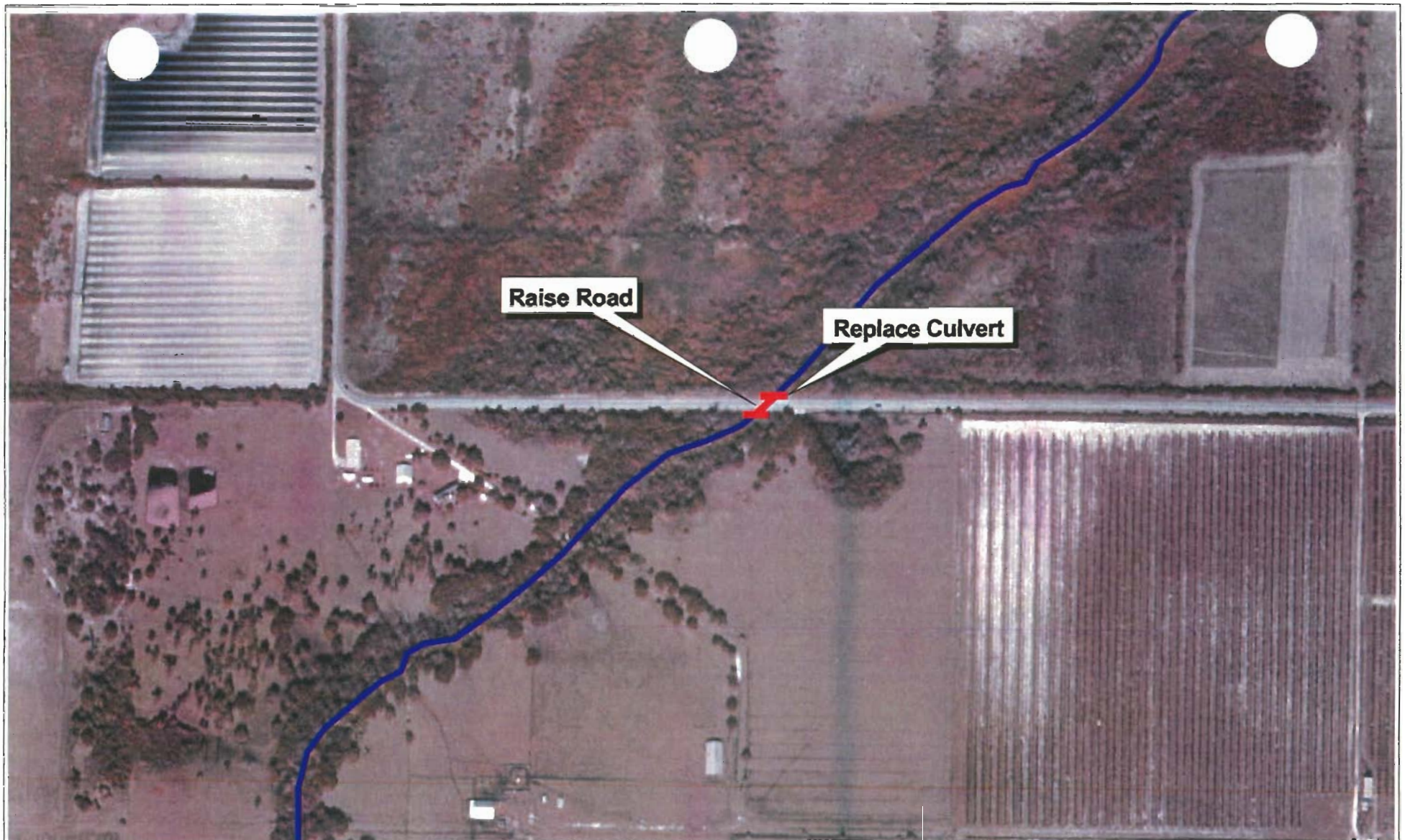
500 0 500 Feet

Final Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed5a

Little Manatee River Watershed Management Plan

Wildcat Creek, Sun City Slough
Proposed Alternative 5A
Figure 13-12

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

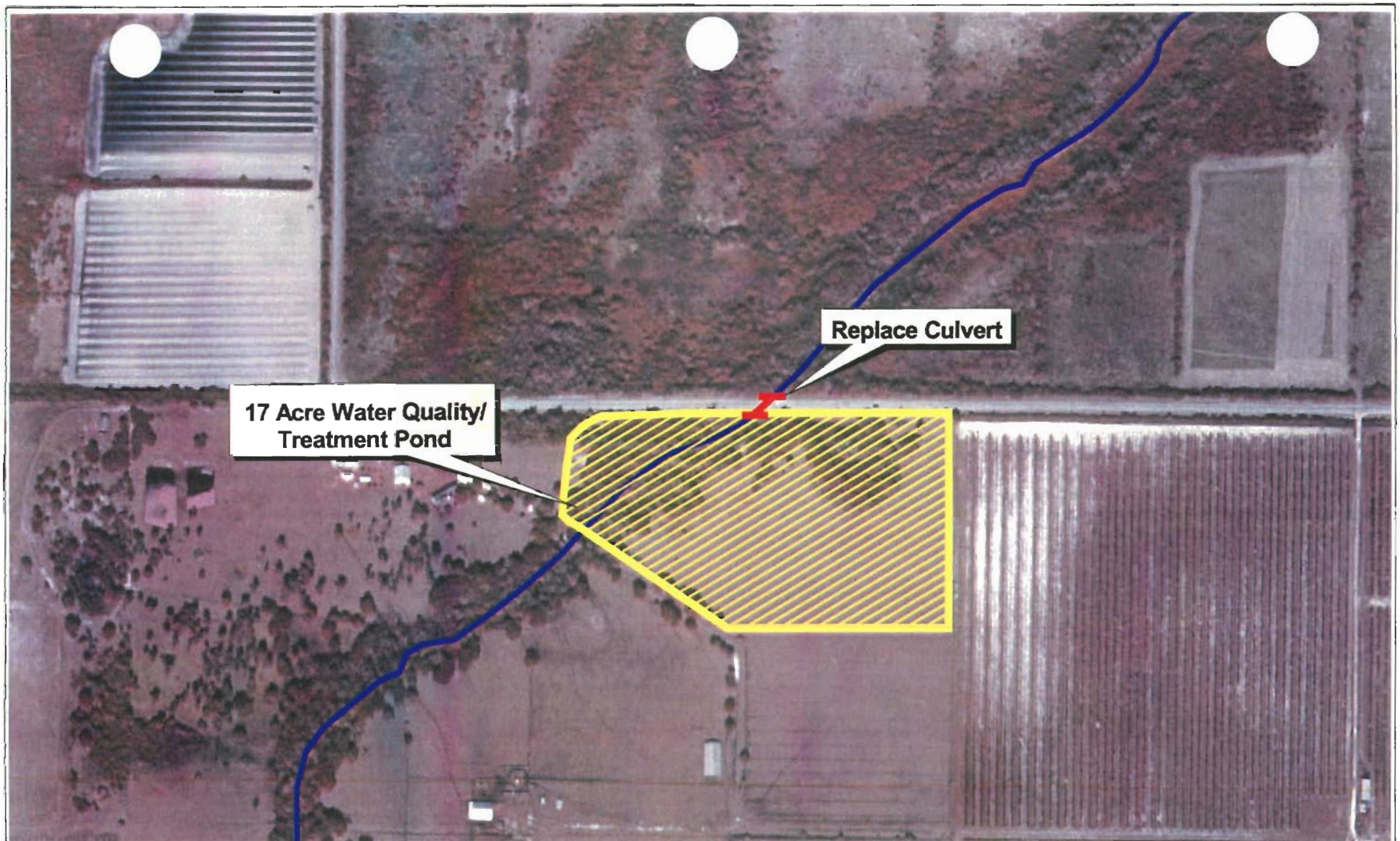
500 0 500 Feet

Final Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed5b

Little Manatee River Watershed Management Plan

Wildcat Creek, Sun City Slough
Proposed Alternative 5B
Figure 13-13

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

500 0 500 Feet

Final Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed5c

Little Manatee River Watershed Management Plan

Wildcat Creek, Sun City Slough
Proposed Alternative 5C
Figure 13-14

PBSJ

3. Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.

Features

- Eliminates road flooding for the 25-year design storm event.
- Project is technically feasible and permitable. No downstream impacts are expected.
- No water quality or natural systems benefits will result from this project.

Alternative 5C

Component

1. Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.
2. Construct a 17-acre storage/treatment pond upstream of Stephens Road to attenuate peak flows.
3. Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.

Features

- Eliminates road flooding for the 25-year design event.
- Project is technically feasible and permitable. No downstream impacts are expected.
- The 17-acre pond will provide approximately 0.25 inches of runoff treatment over the approximately 1200-acre contributing drainage area (25% of that required for new development).
- When the drainage area is developed, water quality credits could be sold at the runoff treatment facility to recover the initial investment.

13.3.6 Project Area 6: Sun City Center / Kings Point Subdivision Improvements

Statement of the Problem

Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Street and structure flooding was reported after a significant September 2001 rainfall in the Sun City Center area near Del Webb Boulevard, Brockton Green Drive and Tremont Court. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.

Alternatives

Four alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-15** through **13-18**.

Alternative 6A

Components

1. Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.
2. Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert under La Jolla Avenue.
3. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'
4. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.
5. Replace the four 30-inch RCPs at Del Webb Boulevard with one 4' x 12' box culvert. Clear and snag channel (west side) from Del Webb Boulevard to approximately 800 feet downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Boulevard with a new outfall discharging westerly. Regrade swale between houses at the end of Tremont Court to provide for overflow from a secondary system inlet located in the cul-de-sac to a northwest stormwater pond.

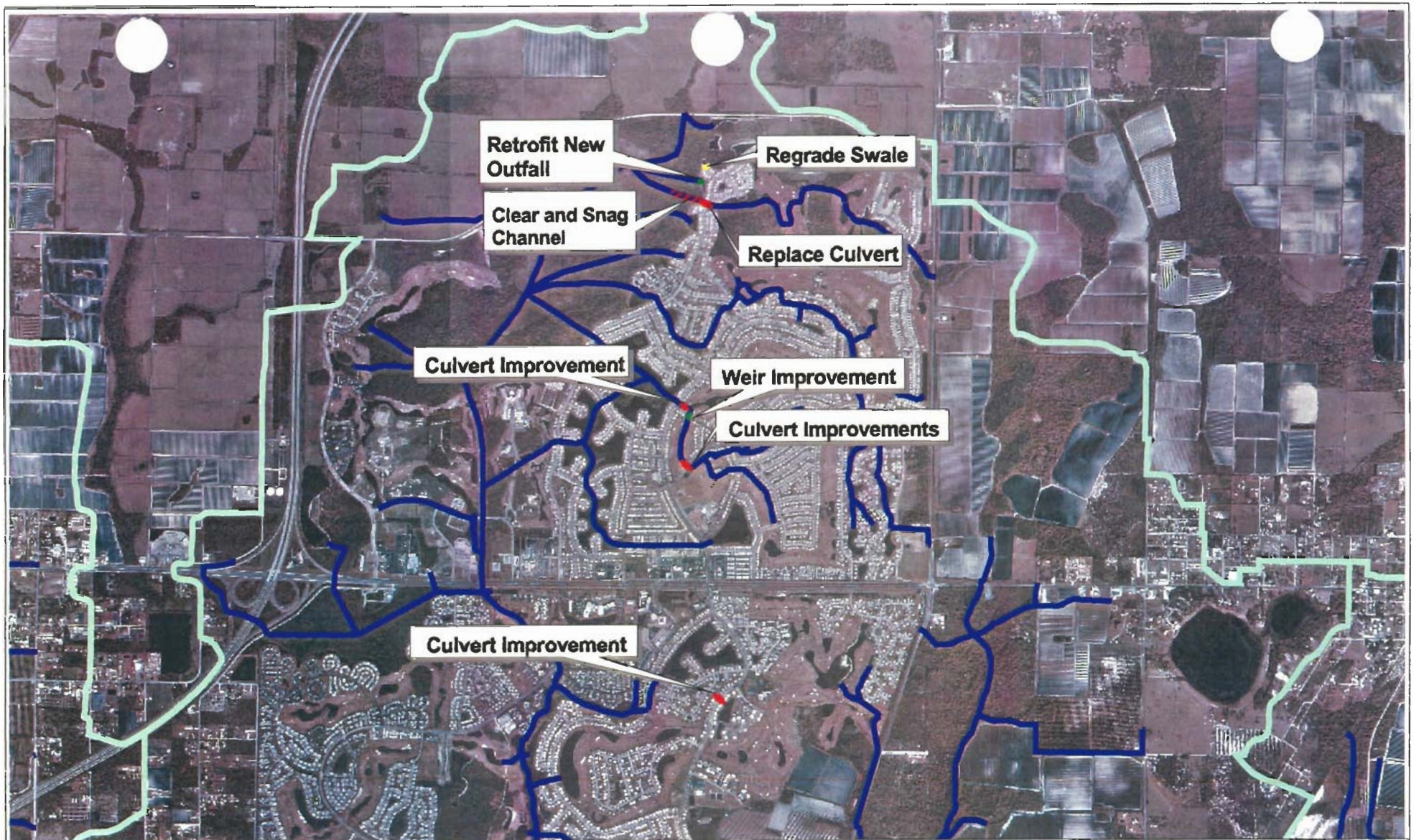
Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- Structural flooding is eliminated in the area of Tremont Court and Brockton Green Drive.
- Projects do not provide water quality treatment capabilities.

Alternative 6B

Components

1. Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.
2. Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert under La Jolla Avenue.
3. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'
4. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.
5. Replace the four 30-inch RCPs at Del Webb Boulevard with one 4' x 12' box culvert. Clear and snag channel (west side) from Del Webb Boulevard to approximately 800 feet downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Boulevard with a new outfall discharging westerly. Regrade swale between houses at the end of Tremont Court to provide for overflow from a secondary system inlet located in the cul-de-sac to a northwest stormwater pond.



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

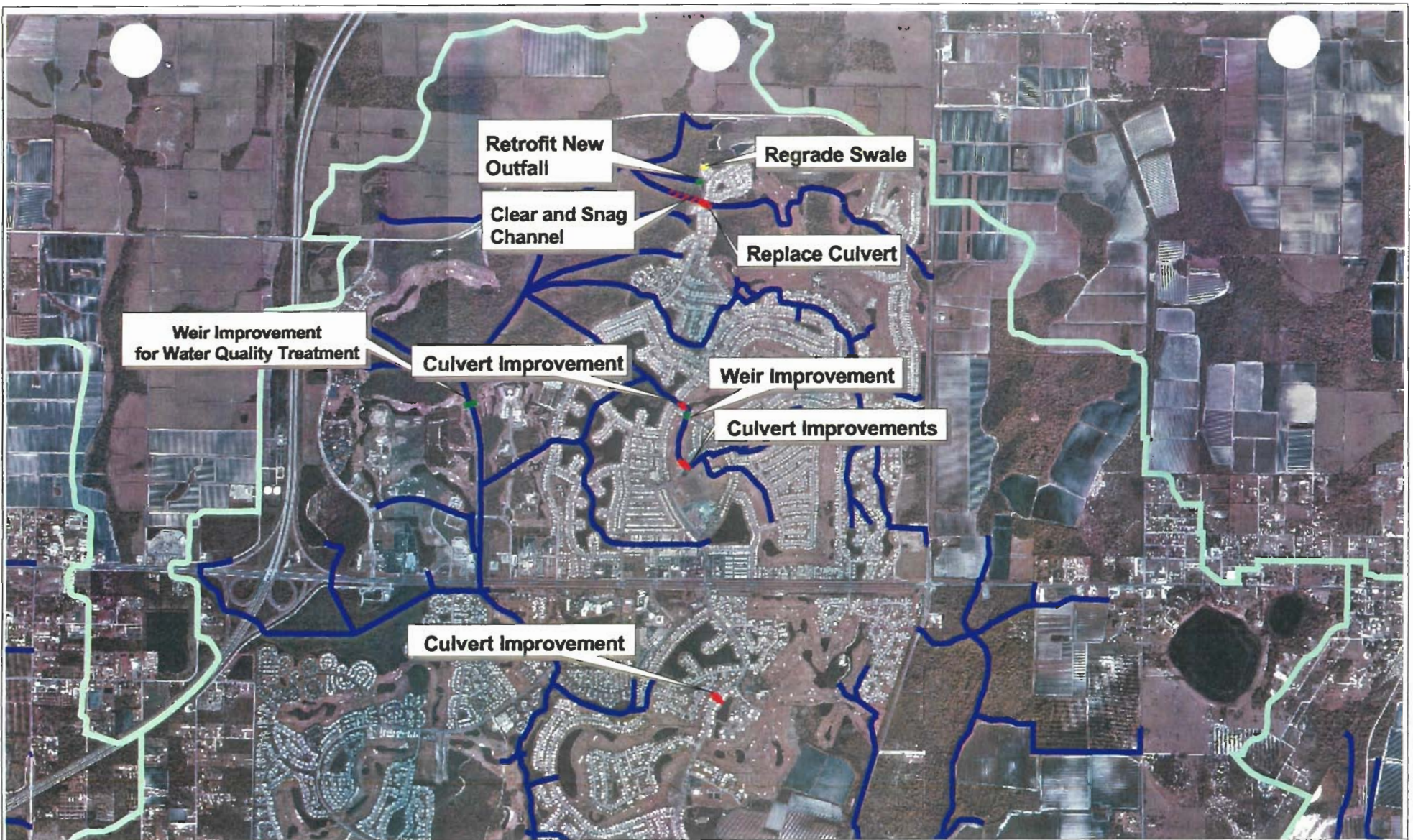
2000 0 2000 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed6a

Little Manatee River Watershed Management Plan

Sun City Center/Kings Point Subdivision
Proposed Alternative 6A
Figure 13-15

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

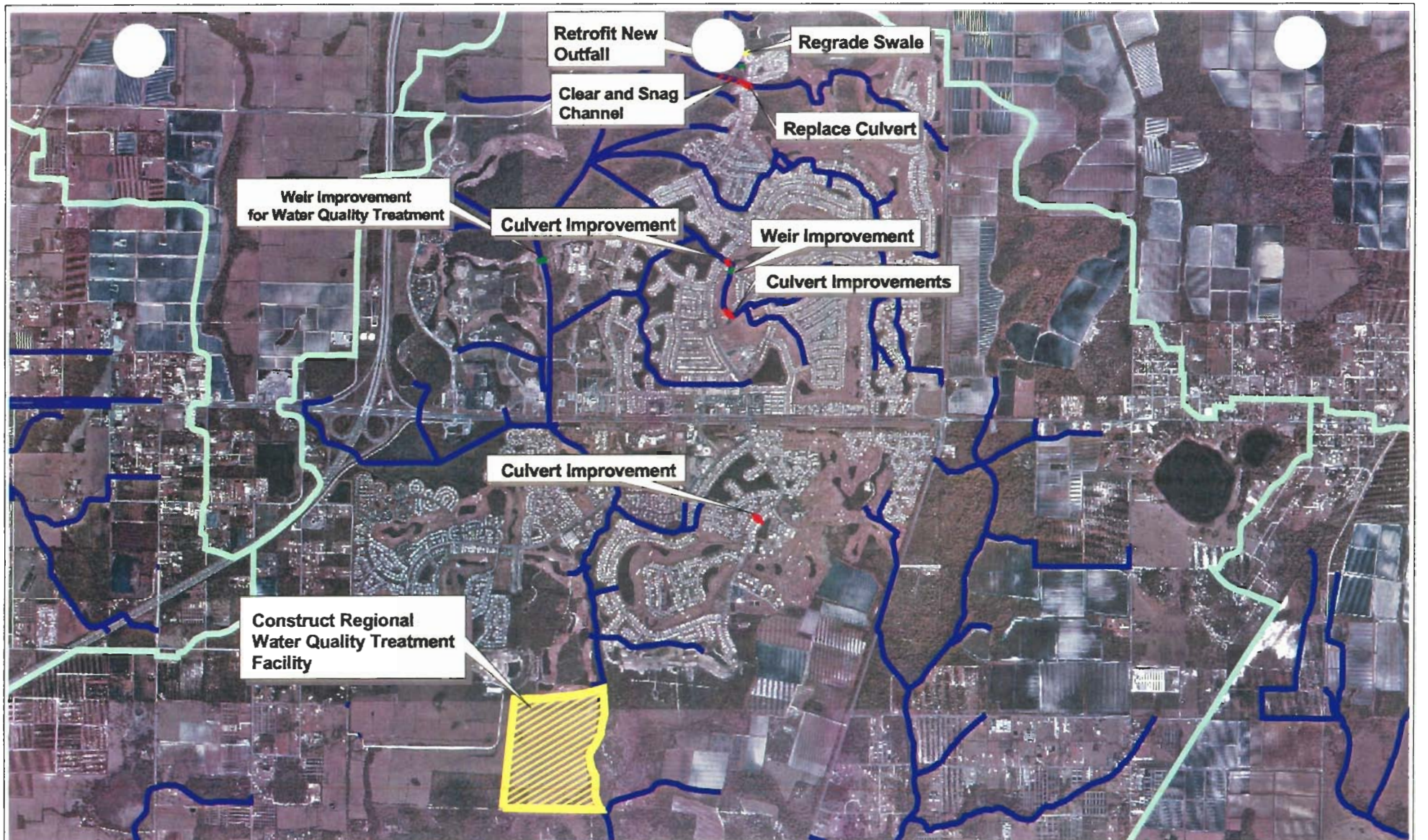
2000 0 2000 Feet

Mar. 13, 2002
P:/kantarus/lmr/lmrreport10_7.apr/proposed6b

Little Manatee River Watershed Management Plan

Sun City Center/Kings Point Subdivision
Proposed Alternative 6B
Figure 13-16

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

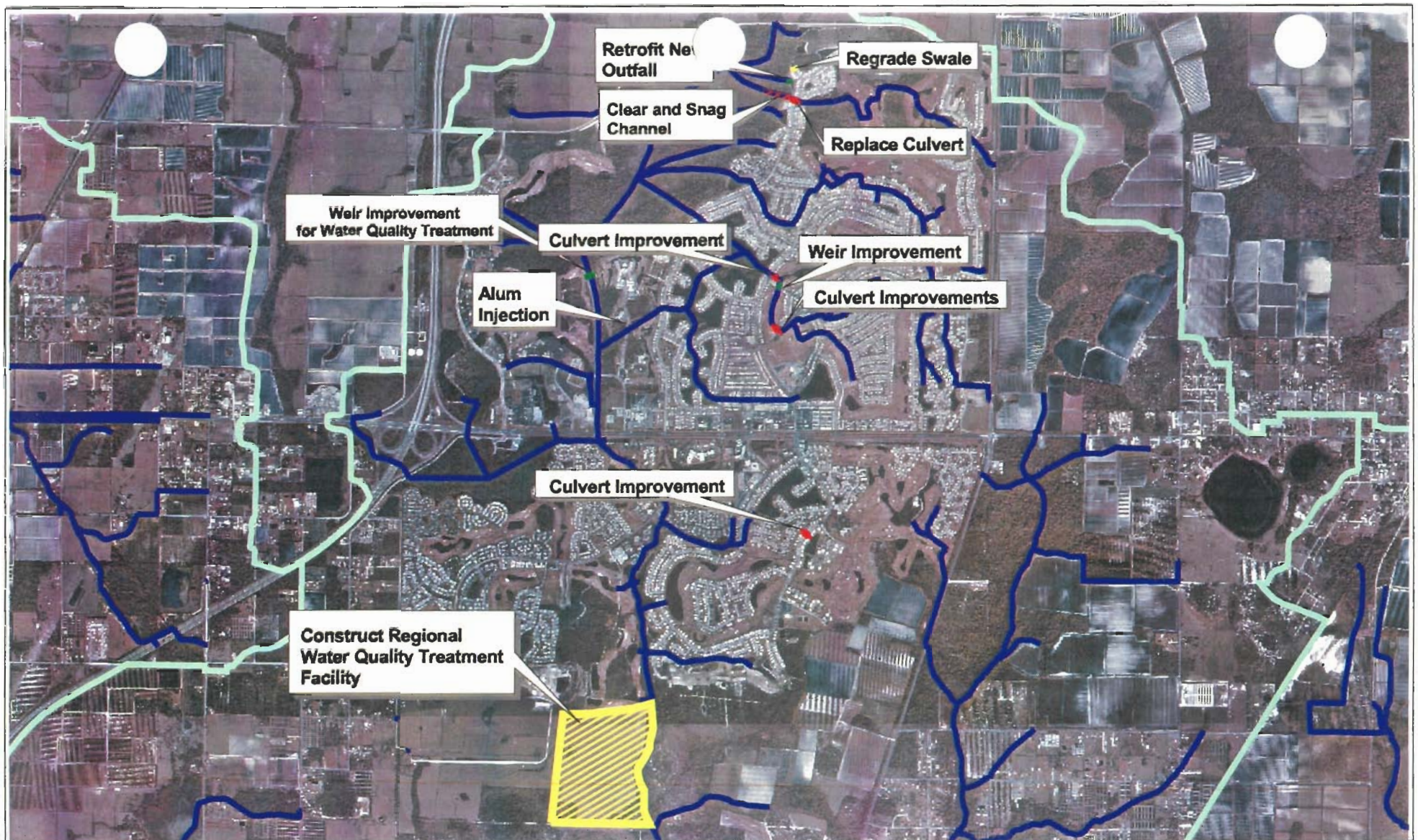
2000 0 2000 Feet

Mar. 13, 2002
P:/kantarus/lmr/lmrreport10_7.apr/proposed6a

Little Manatee River Watershed Management Plan

Sun City Center/Kings Point Subdivision
Proposed Alternative 6C
Figure 13-17

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

2000 0 2000 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed6d

Little Manatee River Watershed Management Plan

Sun City Center/Kings Point Subdivision
Proposed Alternative 6D
Figure 13-18

PBSJ

6. Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- Structural flooding is eliminated in the area of Tremont Court and Brockton Green Drive.
- The Cypress Creek weir would provide water quality treatment for 0.5" of runoff from the contributing area (50% of that required for new development).
- The installation of the Cypress Creek weir may result in permitting objections due to the impact to the change in hydration periods. However, those changes should not have a significant impact on the existing vegetation, as water runoff storage would be recovered in approximately 48 hours.

Alternative 6C

Components

1. Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.
2. Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert under La Jolla Avenue.
3. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'
4. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.
5. Replace the four 30-inch RCPs at Del Webb Boulevard with one 4' x 12' box culvert. Clear and snag channel (west side) from Del Webb Boulevard to approximately 800 feet downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Boulevard with a new outfall discharging westerly. Regrade swale between houses at the end of Tremont Court to provide for overflow from a secondary system inlet located in the cul-de-sac to a northwest stormwater pond.
6. Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery.
7. Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- Structural flooding is eliminated in the area of Tremont Court and Brockton Green Drive.
- The Cypress Creek weir would provide runoff treatment for 0.5" of runoff from the contributing area (50% of that required for new development).
- The installation of the Cypress Creek weir may result in permitting objections due to the impact to the change in hydration periods. However, those changes should not have a significant impact on the existing vegetation, as water runoff storage would be recovered in approximately 48 hours.
- The regional runoff treatment facility would provide 0.25 inches of runoff treatment for the area south of Sun City Center Boulevard (25% of that required for new development). However, because the facility will operate in series with the treatment occurring in the Cypress Creek wetland, some flow would experience double treatment.

Alternative 6D

Components

1. Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.
2. Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert under La Jolla Avenue.
3. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'
4. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.
5. Replace the four 30-inch RCPs at Del Webb Boulevard with one 4' x 12' box culvert. Clear and snag channel (west side) from Del Webb Boulevard to approximately 800 feet downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Boulevard with a new outfall discharging westerly. Regrade swale between houses at the end of Tremont Court to provide for overflow from a secondary system inlet located in the cul-de-sac to a northwest stormwater pond.
6. Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery.
7. Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.
8. Construct an alum treatment system to treat runoff flows from the approximately 300-acre area west of Valley Forge Boulevard and north of Sun City Center Boulevard, on the east side of Cypress Creek. Alum would be injected on the upstream side of the culvert across

American Eagle Boulevard, approximately 3,000 ft north of Sun City Center Boulevard. A 200 ft by 100 ft floc settling pond would be constructed downstream of the alum injection point.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- Structural flooding is eliminated in the area of Tremont Court and Brockton Green Drive.
- The Cypress Creek weir would provide runoff treatment for 0.5" of runoff from the contributing area (50% of that required for new development).
- The installation of the Cypress Creek weir may result in permitting objections due to the impact to the change in hydration periods. However, those changes should not have a significant impact on the existing vegetation, as water runoff storage would be recovered in approximately 48 hours.
- The regional runoff treatment facility would provide 0.25 inches of runoff treatment for the area south of Sun City Center Boulevard (25% of that required for new development). However, because the facility will operate in series with the treatment occurring in the Cypress Creek wetland, some flow would experience double treatment.
- The alum system would complement and complete runoff treatment for the entire Sun City Center / Kings Point area.

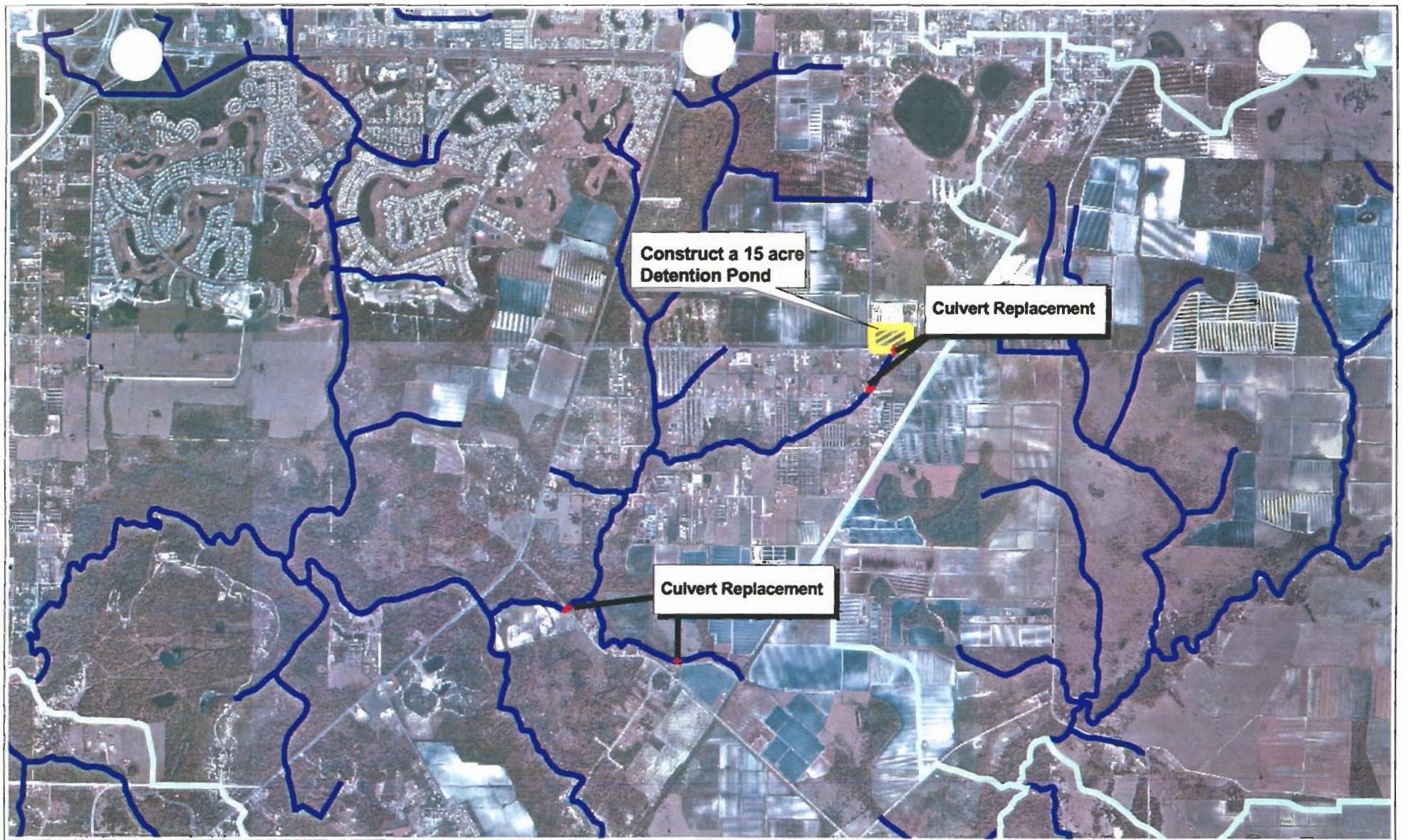
13.3.7 Project Area 7: Dug Creek Area Improvements

Statement of the Problem

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.

Alternatives

Three alternatives were identified for this project area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-19** through **13-21**.



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

4000 0 4000 Feet

Mar. 7, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed7a

Little Manatee River Watershed Management Plan

Dug Creek
Proposed Alternative 7A
Figure 13-19

PBSJ

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

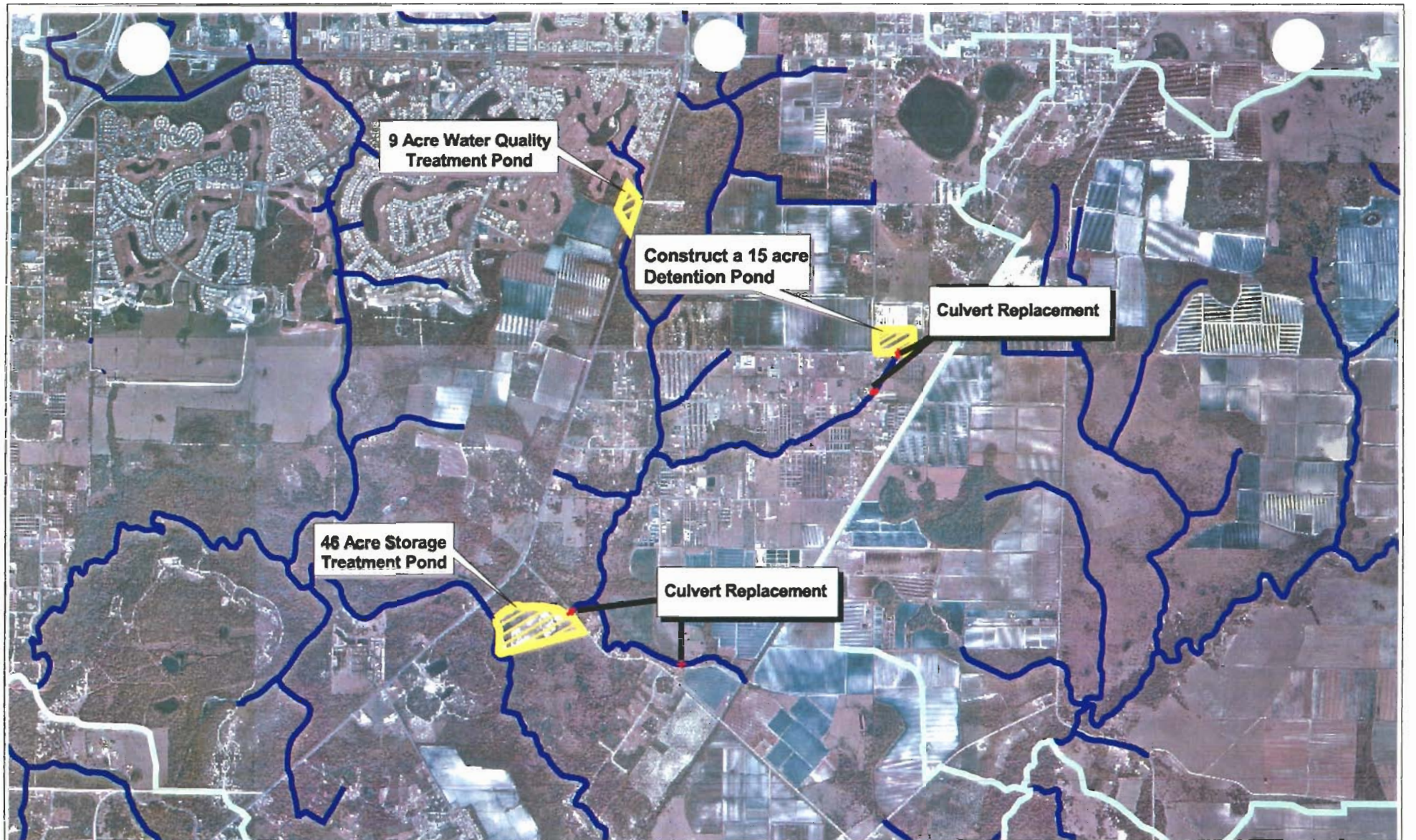
3000 0 3000 Feet

Mar. 7, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed7b

Little Manatee River
Watershed Management Plan

Dug Creek
Proposed Alternative 7B
Figure 13-20

PBSJ



Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

4000 0 4000 Feet

Mar. 7, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed7c

Little Manatee River Watershed Management Plan

Dug Creek
Proposed Alternative 7C
Figure 13-21

PBSJ

Alternative 7A

Components

1. Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert.
2. Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.
3. Upgrade Bishop Road culvert crossing with an additional 42-inch RCP and construct a 15-acre detention pond to catch and treat runoff upstream of Bishop Road.
4. Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- Culvert replacement projects do not provide water quality treatment capabilities.
- The proposed 15-acre pond would provide 1.0 inches of water quality treatment for the contributing drainage area.

Alternative 7B

Components

1. Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert.
2. Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.
3. Upgrade Bishop Road culvert crossing with an additional 42-inch RCP and construct a 15-acre detention pond to catch and treat runoff upstream of Bishop Road.
4. Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.
5. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.
6. Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- The proposed 15-acre pond would provide 1.0 inches of water quality treatment for the contributing drainage area.
- The 46-acre pond would provide 0.25 inches of runoff treatment for the drainage area (25% of that required for new development).
- The golf course pond improvement and the proposed pond would provide 1 inch of water quality treatment for approximately 190-acre contributing drainage area, which conforms to treatment requirements for new development.
- Retrofitting of existing ponds may be difficult to negotiate with private golf course property owners.

Alternative 7C

Components

1. Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert.
2. Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.
3. Upgrade Bishop Road culvert crossing with an additional 42-inch RCP and construct a 15-acre detention pond to catch and treat runoff upstream of Bishop Road.
4. Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.
5. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.
6. Construct online 9-acre pond downstream of St. Andrews subdivision to provide 1 inch of water quality treatment for approximately 190-acre contributing drainage area.

Features

- Eliminates road flooding for the 25-year 24-hour storm conditions.
- The proposed 15-acre pond would provide 1.0 inches of water quality treatment for the contributing drainage area.
- The 46-acre pond would provide 0.25 inches of runoff treatment for the drainage area (25% of that required for new development).
- The proposed 9-acre pond would provide 1 inch of water quality treatment for approximately 190-acre contributing drainage area, which conforms to treatment requirements for new development.
- Additional land acquisition is required.

13.3.8 Project Area 8: Carlton Branch Improvements

Statement of the Problem

The analysis indicated that the Carlton Branch Lake Road crossing is likely to flood during large storm events, thus causing access problems to local residences. Development upstream of Carlton Branch Lake Road has also occurred with no consideration to stormwater runoff treatment because construction of residences has occurred independently, and not as part of a development plan. Therefore, untreated runoff is conveyed to secondary ditches for subsequent discharge to Carlton Branch.

Alternatives

Two alternatives have been identified for this area. The components and features of each are listed below. Diagrams showing the proposed improvements are shown in **Figures 13-22** and **13-23**.

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

400 0 400 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed8a

Little Manatee River Watershed Management Plan

Carlton Branch
Proposed Alternative 8A
Figure 13-22

PBSJ

Department of Public Works
Stormwater Management Section

Legend

Watershed Boundary

Primary Stormwater System

N
W E
S

400 0 400 Feet

Mar. 13, 2002
P:/kantaras/lmr/lmrreport10_7.apr/proposed8b

Little Manatee River
Watershed Management Plan

Carlton Branch
Proposed Alternative 8B
Figure 13-23

PBSJ

Alternative 8A

Components

1. Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split the discharge to an existing ditch draining southeasterly to Carlton Branch.

Features

- Flood stages will be reduced to meet levels of service standards for a collector road.
- No water quality or natural systems benefits will result from this project.
- The project is technically feasible, but project permitting would be difficult because increases in peak elevations are expected downstream.

Alternative 8B

Components

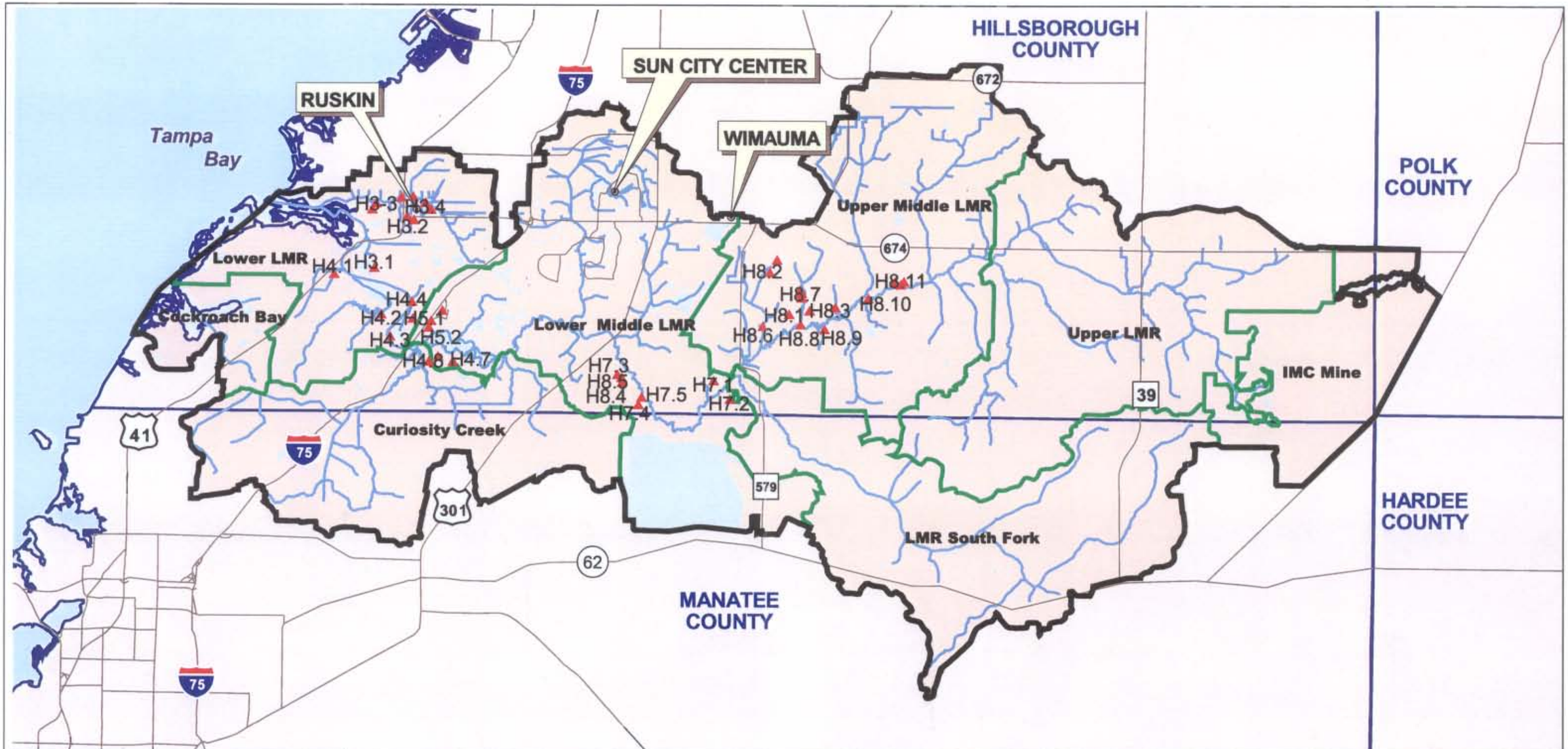
1. Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split the discharge to an existing ditch draining southeasterly to Carlton Branch.
2. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion

Features

- Flood stages will be reduced to meet levels of service standards for a collector road, while maintaining peak flood stages downstream.
- The pond is sized to treat 0.25 inches of runoff from the upstream drainage area (25% of that required for new development).
- Land acquisition should not be a problem because land is available.

13.4 EVALUATION MATRIX AND RECOMMENDATIONS FOR IMPLEMENATION OF FLOOD CONTROL AND RUNOFF POLLUTION CONTROL PROJECTS

The various flood control and runoff treatment alternatives and corresponding scoring by evaluation criterion are shown in the evaluation matrix included as **Table 13-3**. That table also highlights the preferred alternative. **Table 13-4** summarizes the analysis by listing the selected alternatives and the corresponding recommended flood control and runoff pollution control projects. Proposed natural systems projects are also shown in **Figure 13-24**.



Department of Public Works
Stormwater Management Section

Legend

N
W E
S

2 0 2 Miles

- Natural Systems Projects
- Cities
- Little Manatee River
- Major Basin Boundary
- Water
- Roads
- County Boundary
- Watershed Boundary

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Little Manatee River Watershed Management Plan

Figure 13-24
Proposed Natural Systems Project Locations

PBSJ

TABLE 13-3
Little Manatee River Watershed Management Plan
Alternatives Analysis Decision Matrix

Alternative by Project Area	*Structural Flooding*	*Road Flooding*	*Water Quality*	*Natural Systems*	*Water Supply*	*Feasibility/Flexibility/ Consistency*	*Permitability*	*Capital Cost*	*O&M Issues/ Cost*	*Total*	*Community Acceptance*	*Weighted Total*
Weighting Factor	**15%**	**15%**	**15%**	**15%**	**10%**	**5%**	**10%**	**10%**	**5%**		**20%**	
Gulf City Road Improvements												
1A	0	12	0	0	0	12	8	12	12		5%	
1B	0	12	6	2	2	8	12	8	8		15%	
1C	0	12	12	4	4	0	4	4	4		20%	
Weighted 1A	0	1.8	0	0	0	0.6	0.8	1.2	0.6	5.00		5.25
Weighted 1B	0	1.8	0.9	0.3	0.2	0.4	1.2	0.8	0.4	6.00		6.90
Weighted 1C	0	1.8	1.8	0.6	0.4	0	0.4	0.4	0.2	5.60		6.72
Marsh Branch North Tributary Improvements												
2A	0	4	8	8	4	8	12	8	8		15%	
2B	0	4	8	8	4	4	12	4	8		20%	
Weighted 2A	0	0.6	1.2	1.2	0.4	0.4	1.2	0.8	0.4	6.20		7.13
Weighted 2B	0	0.6	1.2	1.2	0.4	0.2	1.2	0.4	0.4	5.60		6.72
Marsh Branch - Shell Point Road Improvements												
3A	8	6	0	0	0	12	8	12	12		5%	
3B	8	8	4	4	4	8	8	4	8		15%	
3C	8	8	4	4	4	8	4	4	8		20%	
Weighted 3A	1.2	0.9	0	0	0	0.6	0.8	1.2	0.6	5.30		5.57
Weighted 3B	1.2	1.2	0.6	0.6	0.4	0.4	0.8	0.4	0.4	6.00		6.90
Weighted 3C	1.2	1.2	0.6	0.6	0.4	0.4	0.4	0.4	0.4	5.60		6.72
Curiosity Creek - Sundance Subdivision Improvements												
4A	0	0	8	0	0	4	0	4	4		0%	
4B	0	0	4	4	0	8	8	12	8		15%	
4C	0	0	12	12	4	8	12	4	8		20%	
Weighted 4A	0	0	1.2	0	0	0.2	0	0.4	0.2	2.00		2.00
Weighted 4B	0	0	0.6	0.6	0	0.4	0.8	1.2	0.4	4.00		4.60
Weighted 4C	0	0	1.8	1.8	0.4	0.4	1.2	0.4	0.4	6.40		7.68

TABLE 13-3
Little Manatee River Watershed Management Plan
Alternatives Analysis Decision Matrix

Alternative by Project Area	*Structural Flooding*	*Road Flooding*	*Water Quality*	*Natural Systems*	*Water Supply*	*Feasibility/Flexibility/ Consistency*	*Permitability*	*Capital Cost*	*O&M Issues/ Cost*	*Total*	*Community Acceptance*	*Weighted Total*
Weighting Factor	**15%**	**15%**	**15%**	**15%**	**10%**	**5%**	**10%**	**10%**	**5%**		**20%**	
Wildcat Creek - Sun City Slough Improvements												
5A	0	8	0	0	0	12	8	12	12		10%	
5B	0	12	0	0	0	4	8	4	12		5%	
5C	0	12	4	4	4	0	8	0	0		10%	
Weighted 5A	0	1.2	0	0	0	0.6	0.8	1.2	0.6	4.40		4.84
Weighted 5B	0	1.8	0	0	0	0.2	0.8	0.4	0.6	3.80		3.99
Weighted 5C	0	1.8	0.6	0.6	0.4	0	0.8	0	0	4.20		4.62
Sun City Center - Kings Point Subdivision Improvements												
6A	0	12	0	0	0	12	12	12	12		5%	
6B	0	12	4	0	1	12	8	12	12		15%	
6C	0	12	8	8	4	8	12	4	8		20%	
6D	0	12	9	8	4	8	8	4	4		10%	
Weighted 6A	0	1.8	0	0	0	0.6	1.2	1.2	0.6	5.40		5.67
Weighted 6B	0	1.8	0.6	0	0.1	0.6	0.8	1.2	0.6	5.70		6.56
Weighted 6C	0	1.8	1.2	1.2	0.4	0.4	1.2	0.4	0.4	7.00		8.40
Weighted 6D	0	1.8	1.35	1.2	0.4	0.4	0.8	0.4	0.2	6.55		7.21
Dug Creek Area Improvements												
7A	0	12	0	0	0	8	8	12	12		5%	
7B	0	12	4	8	4	8	12	8	8		15%	
7C	0	12	4	8	4	8	12	4	8		20%	
Weighted 7A	0	1.8	0	0	0	0.4	0.8	1.2	0.6	4.80		5.04
Weighted 7B	0	1.8	0.6	1.2	0.4	0.4	1.2	0.8	0.4	6.80		7.82
Weighted 7C	0	1.8	0.6	1.2	0.4	0.4	1.2	0.4	0.4	6.40		7.68
Carlton Branch Improvements												
8A	0	12	0	0	0	12	8	12	12		5%	
8B	0	12	12	4	4	8	12	8	8		15%	
Weighted 8A	0	1.8	0	0	0	0.6	0.8	1.2	0.6	5.00		5.25
Weighted 8B	0	1.8	1.8	0.6	0.4	0.4	1.2	0.8	0.4	7.40		8.51

Table 13-4. Proposed Projects by Project Area

Project Area	Project ID	Description of Proposed Project
1		**Gulf City Road**
	1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures).
	1.2	Construct a 4-acre detention pond for water quality treatment.
	1.3	Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.
2		**Marsh Branch North Tributary**
	2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.
	2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.
	2.3	Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.
3		**Marsh Branch, Shell Point Road**
	3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP in series (12th Street crossing) with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad).
	3.2	Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.
	3.3	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch.
	3.4	Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.
	H3.1	Exotic and invasive species removal project in Domino Boat Ramp
	H3.2	Exotic and invasive species removal project in Beaudette (Ruskin) Park
	H3.3	Exotic and invasive species removal project at Ruskin Commongood
	H3.4	Exotic and invasive species removal project at Ruskin Inlet/Marsh Branch

Table 13-4 (continued)

4		**Curiosity Creek, Sundance Subdivision**
	4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert.
	4.2	Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to one-half inch of runoff from the Sundance development.
	H4.1	Exotic and invasive species removal project in Sun City Heritage Park
	H4.2	Exotic and invasive species removal project in Wildcat Creek Park
	H4.3 to H4.6	Exotic and invasive species removal project upstream of S.R. 301 on main river channel
	H4.7	Restoration project along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres).
	H4.8	Erosion control project along the main river channel at Lightfoot Road, east of I-75. (commensurate with Project H4.7)
5		**Wildcat Creek, Sun City Slough**
	5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.
	5.2	Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.
	H5.1	Restoration project on east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).
	H5.2	Erosion control project east side of I-75, west of 24th Street and on the north side of the river (commensurate with H5.1).
6		**Sun City Center, Kings Point Subdivision**
	6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.
	6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert under La Jolla Avenue.
	6.3	Lengthen weir upstream of Cherry Hills Drive from 39' to 120'.
	6.4	Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.
	6.5	Replace the four 30-inch RCPs at Del Webb Boulevard with one 4' x 12' box culvert. Clear and snag channel (west side) from Del Webb Boulevard to approximately 800 feet downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Boulevard with a new outfall discharging westerly. Regrade swale between houses at the end of Tremont Court

Table 13-4 (continued)

		to provide for overflow from a secondary system inlet located in the cul-de-sac to a northwest stormwater pond.
	6.6	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery
	6.7	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.
7		**Dug Creek Area**
	7.1	Replace five 84-inch CMPs at Saffold Road with an 7' x 50' box culvert.
	7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.
	7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP and construct a 15-acre detention pond to catch and treat runoff upstream of Bishop Road.
	7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.
	7.5	Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.
	7.6	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.
	H7.1 to H7.2	Restoration projects north (approximately 274 acres) and south (approximately 57 acres) of the main river channel, between Saffold Road and C.R. 579.
	H7.3 to H7.5	Erosion control projects next to Saffold and Willow roads, consistent with H8.4 and H8.5 locations.

Table 13-4 (continued)

8		**Carlton Branch**
	8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split the discharge to an existing ditch draining southeasterly to Carlton Branch.
	8.2	Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion
	H8.1 to H8.3	Restoration projects west of S.R. 301, on the north and south sides of the Little Manatee River, from C.R. 579 to Grange Hall Loop (4 parcels, ranging from 11 to 214 acres and totaling nearly 500 acres).
	H8.4 to H8.5	Restoration projects west of S.R. 301, on the south side of the river at Saffold Road and C.R. 579 (approximately 44 acres).
	H8.6 to H8.9	Erosion control projects next to Leonard Lee Road, consistent with H8.1 and H8.3 locations.
	H8.10 to H8.11	Erosion control projects along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop.

13.5 METHODOLOGY FOR IDENTIFICATION AND EVALUATION OF HABITAT RESTORATION AND CONSERVATION ALTERNATIVES.

13.5.1 Goals of the Habitat Restoration and Conservation Projects

Habitat goals in the LMR watershed focused on the restoration and maintenance of native communities. Three primary habitat goals were identified:

- Restore and maintain native submerged aquatic, saltwater marsh, and mangroves to current extent and to a quality that allows perpetuation of natural functions.
- Restore and maintain freshwater marsh and forested wetlands to current extent and to a quality that allows perpetuation of natural functions.
- Protect, enhance, and restore native upland communities.

13.5.2 Identification of Alternatives

One of the objectives of the LMR watershed management plan was to identify opportunities to restore and protect natural systems. Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. The first step toward meeting this objective was to identify and describe historical and existing natural systems. Subsequently, the issues and areas of concern for specific habitat types were identified, and the opportunities for improvements were investigated.

Methods used to identify and evaluate potential areas for habitat restoration and/or conservation activities were described earlier in Chapter 8 (*Natural Systems*) of this report. Components addressed in identification of these areas included:

- Conservation areas
- Urban development
- Exotic species
- Disturbed areas
- Future development.

Methods were supplemented by agency and public input, and field verification. Natural habitats in the watershed were subsequently mapped based on vegetation type. ELAPP lands, parks and other public lands, greenway systems, and other significant wildlife habitat were also mapped. These criteria were included in a matrix and used to calculate a sensitivity score for the habitat area.

Stressed or sensitive habitat in the eastern portion of the basin within existing mining land uses was easily identified as natural areas. Designated sensitive habitats also occurred in the east-central portion of the watershed, on either side of U.S. 301. In these cases the stressed habitats were associated primarily with urban and residential development around Sun City and Wimauma, as well as surrounding croplands. Exotic species and disturbance are not the predominant characteristics impacting habitat in this portion of the watershed.

Areas with the "least stress" were identified in Cockroach Bay and along the Little Manatee River channel and tributaries. These areas are closely associated with conservation areas and future protection of such areas is likely dependent on the continued protection and acquisition of natural lands, such as those presented in the integrated Conservation Plan Map (Figure 8-5). Both existing and future conservation and public lands are included as part of the integrated Conservation Plan Map in an effort to further identify important habitat in the LMR watershed.

13.5.3 Evaluation Criteria

Another objective of this watershed management plan is to identify opportunities to protect and restore natural systems that are important to the protection of habitat, water quality, and water supply in the LMRW. Projects proposed in this chapter are intended to address potential causes and contributors, and to present strategies for reducing negative impacts to natural resources in the LMRW, specifically habitat degradation and loss. Evaluation criteria in identifying potential projects for improvements to habitats in the LMRW are listed below and followed by summaries.

It is important that goals to address habitat issues in the LMR watershed be consistent with respect to public use and existing programs affecting the watershed. Regional natural resource management programs that affect the Little Manatee River and are either being implemented or developed through the programs include the SWIM Plan for Tampa Bay, the CSWM Plan for the Little Manatee River Watershed, the Tampa Bay National Estuary Program CCMP; and the Cockroach Bay Aquatic Preserve Management Plan (CBAPMP) (Table 13-1).

13.6 PROPOSED HABITAT RESTORATION AND CONSERVATION ALTERNATIVES

Habitat projects were grouped according to one of the following issues:

- Exotic and invasive species removal
- Habitat restoration
- Erosion control
- Land acquisition

Alternatives that address each of these issues and the corresponding proposed projects are described below. Alternatives are defined here as alternative degrees of management activities intended to accomplish habitat goals and objectives.

13.6.1 Proposed Exotic and Invasive Species Removal Projects

Alternatives

The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species. As part of the LMRW Management Plan, the focus on control of exotic plant species on public properties throughout the watershed through existing programs should be continued. Additional exotic and invasive species removals are included under restoration projects.

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. Direct exotic and invasive species removal is proposed for localized areas in and adjacent to public recreation facilities and boat ramps along the lower LMR.

Alternative A

Actions
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

Benefits/ Features
- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.
-

Alternative B

Actions
- Removal of exotic and invasive species with no revegetation efforts.
- Inclusion of education component.

Benefits/ Features
- Without revegetation, invasive and exotic species control will remain an issue and control will be difficult and time consuming.
- Public education can continue to be an important component of an exotic species removal program.

Alternative C

Actions

- Address exotic and invasive species only as part of education component.

Benefits/ Features

- Exotic and invasive species will continue to spread into and from the park in the absence of any control efforts. Public education can still occur.

Alternative D

Actions

- No action.

Benefits/ Features

- Exotic and invasive species will continue to spread into and from the park in the absence of any control efforts.

Location of Proposed Projects

Project Area 3: Marsh Branch Improvements

Proposed Project H3.1: Domino Boat Ramp. Domino boat ramp is located at the south end of 22nd Avenue and 8th Street, on the LMR. It is maintained by Hillsborough County.

Proposed Project H3.2. Beaudette (Ruskin) Park. Beaudette Park is located at 6th Street Southeast, south of College Avenue East, in Ruskin. Park amenities included camp programs, a picnic area, playground equipment, basketball courts, softball fields, and a community center.

Proposed Project H3.3: Ruskin Commongood. Ruskin Commongood is located at 1st Avenue NW and 2nd Street in Ruskin, along Marsh Branch on the west side of U.S. 41. Local civic groups (e.g. Pepper Patrol and Ruskin Community Development Foundation) have targeted the area for exotic species removal and potential restoration.

Proposed Project H3.4: Ruskin Inlet/Marsh Branch. This project area is located between 2nd Street and the railroad along Marsh Branch. Like Ruskin Commongood, local civic groups have identified the area as one of concern over exotic species.

Project Area 4: Sun City Slough/ Wildcat Park

Proposed Project H4.1. Sun City Heritage Park. Sun City Heritage Park is located off U.S. 41, three miles south of Ruskin on the LMR. The park is maintained by Hillsborough County and presently includes picnic facilities and a boat ramp.

Proposed Project H4.2. Wildcat Creek Park. Wildcat Creek Park is located on Stephens road, east of U.S. 41, on the LMR and has a boat ramp. The park is maintained by Hillsborough County.

Proposed projects H4.3 – H4.6: Upstream of S.R. 301 on main river channel. These project areas are located along the main river channel, and at its confluence with some tributaries, including Pierce Branch, Carlton Branch, Lake Wimauma drain, and Dug Creek. These project locations are also consistent with restoration and erosion/water quality control projects and are addressed under proposed projects in the Dug Creek and Carlton Branch areas, which are described later in this section.

13.6.2 Proposed Restoration Projects

Alternatives

Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires. Enforcement of existing regulations regarding water quality and encouraging agricultural BMPs in these areas are also important to habitat restoration in the LMR watershed. Three primary habitat restoration goals are listed below.

- Restore and maintain freshwater marsh and forested wetlands.
- Protect, enhance, and restore native upland communities.
- Restore recently purchased ELAPP lands that buffer existing river corridors, as well as areas that have been adversely impacted.

Alternative A

Actions
- Regrade and replant streambank vegetation with native plant associations.
- Implement a monitoring program to evaluate the success of the restoration.
- Terminate grazing and implement prescribed burning in overgrown pasture areas.
- Support ongoing efforts to remove exotics and apply efforts to restoration sites.
- Encourage the practice of agricultural BMPs through education programs.

Benefits/ Features
- Restoration of stream banks and commensurate wildlife habitat.
- Maintenance of natural communities through active management.
- Decreased spread of invasive species.
- Public education about agricultural BMPs.

Alternative B

Actions

- Terminate grazing and implement prescribed burning in overgrown pasture areas.
- Support ongoing efforts to remove exotics and apply efforts to restoration sites.
- Encourage the practice of agricultural BMPs through education programs.

Benefits/ Features

- Maintenance of natural communities through active management.
- Decreased spread of invasive species.
- Public education about agricultural BMPs.

Alternative C

Actions

- No action.

Benefits/ Features

- Without revegetation, invasive and exotic species control will remain an issue and future control will be difficult and time consuming.
- Without continued efforts towards public education, there will be little public support for the maintenance of native plant communities and habitat.
- Without management, a successful restoration project is unlikely.

Location of Proposed Projects

Project Area 4: Curiosity Creek/ Sundance

Proposed Project H4.7. Along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres).

Project Area 5: Wildcat Creek/ Sun City Slough

Proposed Project H5.1. East side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).

Project Area 7: Dug Creek

Proposed Projects H7.1 – H7.2. Located on north (approximately 274 acres) and south (approximately 57 acres) of the main river channel, between Saffold Road. and C.R. 579.

Project Area 8: Carlton Branch

Proposed Projects H8.1 – H8.3. West of S.R. 301, on the north and south sides of the Little

Manatee River, from C.R. 579 to Grange Hall Loop (4 parcels, ranging from 11 to 214 acres and totaling nearly 500 acres).

Proposed Projects H8.4 – H8.5. West of S.R. 301, on the south side of the river at Saffold Road and C.R. 579 (approximately 44 acres).

13.6.3 Proposed Erosion Control Projects

Alternatives

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.

Alternative A

Actions
- Stabilize sandy levees along the river with grading and revegetation.

Benefits/ Features
- Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
- Maintain stream bank storage capacity and help maintain year-round stream flow.
- Provide aesthetic and recreation benefits.

Alternative B

Actions
- No action.

Benefits/ Features
- No change in existing channel and floodplain conditions.

Location of Proposed Locations

Project Area 4: Curiosity Creek/ Sundance

Proposed Project H4.8. Along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres), commensurate with project H4.7.

Project Area 5: Wildcat Creek/ Sun City Slough

Proposed Project H5.2. East side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres), commensurate with project H5.1.

Project Area 7: Dug Creek

Proposed Project H7.3 – H7.5. Near Saffold and Willow roads, consistent with projects H8.4 and H8.5.

Project Area 8: Carlton Branch

Proposed Project H8.6 – H8.9. Near Leonard Lee Road, consistent with projects H8.1 and H8.3.

Proposed Project H8.10 – H8.11. Along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop.

Proposed Land Acquisition Projects

Alternatives

Environmental lands are those lands which shall have as their purpose the conservation and protection of environmentally unique, irreplaceable and valued ecological resources. The primary purpose of acquiring such lands shall be for resource protection, but all lands shall be open for public use and enjoyment to the extent that the County finds such use compatible with the conservation and protection of these lands. Each environmental lands project shall be qualified by satisfying one or more of the following criteria:

Through the first twelve years, the ELAPP Teams have identified one hundred two sites as meeting the ELAPP criteria for protection or acquisition. Forty sites are now considered as acquired. The program has acquired or participated in the preservation of more than 34,729 acres at a cost of approximately $119 million. The program has an additional 280 acres under contract for $750,000 with several of these transactions closing before the end of 2001. On existing acquisitions and pending contracts, approximately 33% of the total acquisition costs have or will be funded by Preservation 2000 or by partnerships with other agencies. These programs and agencies include the Florida Communities Trust (Department of Community Affairs), the Southwest Florida Water Management District Save Our Rivers Program, and the Conservation and Recreational Lands Program. ELAPP has also cooperated with the City of Tampa, City of Temple Terrace, and Plant City for funding application on ELAPP sites. Currently many of the approved sites are in various stages of negotiations. It has been formerly established that ELAPP will not use the power of eminent domain to acquire property.

Alternative A

Actions

- Continue identification and acquisition of ELAPP lands under existing program.
- Continue to focus on purchases adjacent to river and tributaries.
- Continue to focus on wildlife corridors and connections among existing acquisitions.

Benefits/ Features

- Protection of designated Strategic Habitat Conservation Areas (SHCAs) and biodiversity hotspots and other habitat important to fish and wildlife.
- Consistent with TBEP goals.
- Consistent with ELAPP goals.

Alternative B

Actions

- No action. No support for existing ELAPP strategies.

Benefits/ Features

- No habitat benefits.

Location of Proposed Projects

Acquisition of lands for habitat protection already exists as part of Hillsborough County's ELAP Program. This program identifies potential acquisitions in the LMRW and manages existing acquisitions. The project locations identified in this Master Plan support those identified by ELAPP.

13.7 RECOMMENDATIONS FOR IMPLEMENTATION OF HABITAT RESTORATION/ CONSERVATION PROJECTS

Alternative A provides the best overall action for the successful:

- Long term exotic species removal and management;
- Restoration of disturbed areas and their long term management;
- Long term management of soil erosion in problem areas;
- Continuation and implementation of land acquisition efforts.

Therefore, Alternative A is recommended for implementation with all habitat restoration and conservation projects described above. Table 3-4 lists these projects by project area, in conjunction with the proposed flood control and runoff treatment projects. Benefits and specific habitat components addressed by habitat projects are summarized in **Table 13-5**. The location of the proposed habitat restoration and conservation projects is shown in **Figure 13-24**, except for the

proposed land acquisition projects, which are consistent with those identified by ELAPP and shown in Figure 8-2. Cost estimates for natural systems projects are also included in Appendix 13.

TABLE 13-5 Benefits and specific habitat components addressed by habitat projects (refer to maps for further location and size detail).

Proposed Project	BENEFIT/ Details	Exotic Species	Revegetation	Erosion Control	Water Quality	Education	Recreation
EXOTIC SPECIES	BENEFIT: Restoration of native vegetation and habitat for fish and wildlife, including listed species. Focus on lower river.						
H4.1 Sun City Heritage	ACTIONS: Removal of exotic species, replacement with native tree species, followed by maintenance. Include information on how to control such species as Brazilian Pepper.	X	X			X	X
H4.2 Wildcat Creek Park		X	X			X	X
H3.1 Domino Boat Ramp		X	X			X	X
H3.2 Beaudette Park		X	X			X	X
H3.3 Ruskin Commongood		X	X			X	X
H3.4 Ruskin Inlet/ Marsh Branch		X	X			X	X
H4.3 – H4.6 (see H8.1– H8.5, below)							
RESTORATION	BENEFIT: Restoration of native vegetation and habitat for fish and wildlife, including listed species. Focus on upper middle river.						
H5.1 E. side of I-75, N. side of LMR	ACTIONS: Restore areas altered due to previous land use activities and resulting alterations in hydrology and soils. Restoration activities include removal of exotic species, including Brazilian Pepper, Lead tree, carrot wood, cogon grass and others, and continued maintenance. Prescribed burning is recommended.	X	X		X	X	X
H4.7 LMR and Lightfoot Rd. (east of I-75)		X	X		X	X	X
H7.1-H7.2 N. and S. of LMR, between Saffold Rd. and C.R. 579		X	X	X	X	X	
H8.1–H8.3 North side of LMR between CR 579 and Grange Hall Loop (west of SR 301)		X	X	X	X	X	
H8.4-H8.5 S. side of LMR, south and west of Saffold Road.		X	X	X	X	X	
EROSION /WATER QUALITY	BENEFIT: Decrease sedimentation in river and stabilize shoreline habitat. Alleviate impacts of agricultural runoff to river and improve water quality and aquatic habitat. Primarily along middle river. Consistent with TBEP goals.						
OVERALL ACTIONS	1. Implement and encourage golf course and agricultural BMPs 2. Require BMPS and monitoring for golf courses and existing lands leased to agriculture. 3. Require 100-foot buffer along river and primary stream channels to protect water from agriculture and development.						
H7.3-H7.5 Saffold &Willow Rd	ACTIONS: Stabilize sandy levees along river with grading and revegetation. Add marsh wetlands to treat agricultural runoff entering the river. Encourage greater adherence to agricultural BMPs.	X	X	X	X	X	
H8.10-H8.11 Grange Hall Loop		X	X	X	X	X	
H8.6-H8.9 Leonard Lee Rd		X	X	X	X	X	
ACQUISITION	BENEFIT: Protection of designated Strategic Habitat Conservation Areas and biodiversity hotspots as well as protection of habitat important to fish and wildlife. Consistent with TBEP goals.						
OVERALL ACTIONS	1. Continue identification and acquisition of ELAPP lands under existing program. 2. Acquisitions should continue to focus on purchases that are adjacent to the river and tributaries. 3. Acquisitions should also focus on wildlife corridors and connections among existing acquisitions.						

CHAPTER 14
PUBLIC INPUT (SECOND MEETING)

14.1 MEETING MINUTES

The Second Public Meeting for the Little Manatee River Watershed Management Plan (LMRWMP) was held on June 14, 2001 from 6:30 pm to 8:30 pm at the Wimauma Civic Center. The purposes of the meeting included:

- Acquainting local residents with the project objectives;
- Presenting conceptual improvement alternatives being considered for the watershed plan;
- Working with residents to provide solutions to known deficiencies in the watershed; and
- Receiving input and suggestions regarding watershed issues and proposed alternatives.

The meeting was part of the monthly Wimauma Civic Association meeting. Citizens were greeted at the door and were given a brief overview of the meeting format. Handout materials included relevant contact information, a conceptual alternatives summary, proposed alternatives location map a summary of written comments and responses from the First Public Meeting and comment forms for the Second Public Meeting. The president of the Wimauma Civic Association gave a brief introduction to the audience announcing the team and meeting format. Several project displays regarding reported and identified alternatives, proposed project alternatives and conservation and habitat areas were set up to address known problem areas in the watershed. The project team presented a review of the goals of the LMR Watershed Management Plan; concerns from the First Public Meeting; conceptual project alternatives; and project displays.

Following the presentation an open discussion took place in order to allow questions and comments regarding the proposed project alternatives. The goal of the open discussion was to more clearly communicate the project objectives, prioritize proposed project alternatives and to help the project team discover any new problem areas or possible solutions. The meeting also included individual breakout sessions where the public has an opportunity to review displays and discuss problems and potential solutions one-on-one. A total of 35 attendees signed in on the forms provided to document attendance at the Second Public Meeting. The Hillsborough County meeting notice, meeting agenda, sign-in-sheets, handouts and public comment forms are included in **Appendix K**.

14.2 COMMENTS AND RECOMMENDATIONS

Comments from citizens regarding observations on flood control, regional water quality treatment, retrofit of existing systems, erosion control, habitat restoration, exotic species removal

and acquisition projects were encouraged. Listed below is a summary of the written comments received through comment forms distributed at the Second Public Meeting. A response to how the LMRWMP addressed each comment is also presented below.

Comment: *Poor drainage systems and new construction cause older homes to suffer from runoff.*

Response: Hillsborough County and the Southwest Florida Water Management District (SWFWMD) permit new construction activities in the watershed. Current permitting requires that post-construction peak discharge rate for the 25-year, 24-hour storm event must be less than or equal to the pre-construction conditions. Prior to current regulations, upstream and downstream impacts may not have been adequately addressed. The computer model created as part of this project will allow regulators to ensure that no impacts occur upstream or downstream of proposed new developments.

Comment: *Road floods on 3rd Avenue between 7th and 8th Streets in Ruskin.*

Response: Proposed projects will reduce peak stages throughout the Marsh Branch drainage area. However, those projects will not significantly improve conditions created by tidal surges within the floodplain. It is generally not cost-effective to provide drainage relief for low-lying, tidally influenced area through increased drainage conveyance. Assistance is available through programs such as flood proofing or property relocation. Improved system maintenance, which is also addressed as part of this project, will also increase conveyance of floodwaters. . To assess some of the problems, the computer model was developed to simulate the system under a high tide condition.

Comment: *Flooding problems exist from high tides or tidal surges.*

Response: See previous comment and response.

Comment: *Improve maintenance of existing systems to decrease flooding problems. Ditch crossing American Eagle Boulevard, Upper Creek Drive and 674 in poor condition.*

Response: Maintenance of the existing systems has been reviewed as part of the watershed plan. An operations and maintenance (O&M) plan for the system and recommendations for improvement is outlined in Appendix G of the final report. A deficiency in maintenance is noted in the O&M plan.

Comment: *Remove exotic species.*

Response: Removal of exotic species, replacement with native species, followed by maintenance is proposed on Environmental Lands Acquisition and Protection Program (ELAPP) lands and specifically for proposed projects natural systems projects described in Chapter 13.

Comment: *Keep Little Manatee pristine and natural.*

Response: Requirement of a 100-foot buffer along river and primary stream channels to protect the river from agriculture and development impacts is recommended.

Comment: *Earthen dam ½ mile north of Little Manatee River and Carlton Branch.*

Response: This is a maintenance issue that will be addressed by Hillsborough County. A recommendation for maintenance activity has been included in the O&M plan included in Appendix G.

Comment: *Disagree with regional water quality treatment.*

Response: Regional water quality treatment facilities provide excellent benefits through efficient land use and less time intensive maintenance requirements than multiple treatment sites. In addition, the use of this type of facilities may be the only option for retrofitting urban areas that were developed prior to the current stormwater regulations that require runoff water quality treatment.

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CHAPTER 15
PROPOSED LEVEL OF SERVICE

15.1 INTRODUCTION

This Chapter describes the flood protection level of service (FPLOS) and the water quality treatment level of service (WQTLOS) associated with the projects that were identified by the alternative analysis described in Chapter 13. Definitions of the FPLOS and WQTLOS are provided in Chapters 6 and 11, respectively. The proposed FPLOS was determined by conducting simulations of the proposed stormwater system using the hydrologic/hydraulic model described in Chapter 4, whereas the WQTLOS was determined using the pollutant loading model described in Chapter 10. FPLOS and WQLOS are generally discussed in below and in more detail by watershed major basins in subsequent sections.

15.1.1 Proposed Flood Protection Level of Service

Consistent with the FPLOS methodology described in Chapter 6, the proposed stormwater system was simulated using the 25-year, 24-hour design storm event conditions. The results of the simulations were then compared against the landmark flood elevations established for every subbasin in the watershed, as described in Chapter 6. The landmark elevations were selected to be reflective of the worst case flooding that is expected to occur in a subbasin. From the results, a proposed FPLOS was established for the subbasins and overall watershed. The proposed FPLOS associated with each subbasin and a comparison summary of existing and proposed conditions are shown in **Appendix C**.

15.1.2 Proposed Water Quality Treatment Level of Service

The characteristics of the proposed alternatives, as described in Chapter 13, were included in a proposed conditions pollutant loading model simulation that incorporated both expected land use conversions and stormwater treatment impacts. Since pollutant loads are heavily influenced by land use, changes in land use cover due to project implementation were expected to have significant effects on improving water quality within a basin. For example, several proposed projects would result in land use conversions from agricultural land cover to natural land cover due to construction of stormwater treatment systems (storage facilities). The proposed stormwater storage/treatment facilities were simulated assuming wet detention removal efficiencies, as specified in the model. The proposed WQTLOS for the major subbasins is listed in **Table 15-1**. Estimates of net pollutant loads for each subbasin are provided in **Appendix I**. The proposed WQTLOS for each subbasin is included in **Appendix J**.

Table 15-1. Overall LOS scores among major subbasins.

Basin ID	BOD5	TSS	TKN	NO3 +NO2	TN	TP	TDP	Oil and Grease	Cd	Cu	Pb	Zn
Cockroach Bay	F	C	C	D	C	F	F	A	F	D	F	C
Curiosity Creek	F	C	D	F	F	F	F	B	F	F	F	C
IMC Mine	F	A	C	B	C	B	B	A	D	A	A	A
LMR South Fork	F	B	F	F	F	F	F	B	F	F	B	B
Lower Middle LMR	F	C	D	F	D	F	F	B	F	F	F	D
Lower LMR	F	D	D	F	F	F	F	B	F	F	F	D
Upper LMR	F	B	F	F	F	F	F	B	F	F	B	B
Upper Middle LMR	F	B	F	F	F	F	F	B	F	F	A	B

15.2 COCKROACH BAY BASIN

Flood Control/water quality projects were not proposed in the Cockroach Bay major basin. Therefore, proposed LOS remains the same as the existing conditions LOS.

15.3 CURIOSITY CREEK BASIN

A stormwater wetland system (Project 4.1) is proposed in the Curiosity Creek major basin. This project provides minimal flood protection benefits. However, it is estimated that the proposed project could treat flows equivalent to one inch of runoff from the Sundance development. This estimated removal results in an improvement of nearly 15 subbasins from LOS C to LOS A. However, because the improved area is small compared with that of the Curiosity Creek basin, the overall WQTLOS remains the same for the major basin.

15.4 LOWER LITTLE MANATEE RIVER BASIN

A total of six flood control and/or water quality projects are proposed within the Lower Little Manatee River major basin: Project 1.1 in the Gulf City Road area; Projects 3.1 and 3.2 in the Marsh Branch/Shellpoint Road area; and Project 5.1 in the Wildcat Creek area provide significant flood protection benefits. A comparison of predicted peak stages for the 25-year, 24-hour design storm event and corresponding FPLOS for both existing and proposed conditions at critical locations is shown in **Table 15-2** below.

Table 15-2
Little Manatee River Watershed Management Plan
Summary of Peak Stages and Flood Protection LOS for the Lower LMR Major Basin
25-Year, 24-Hour Event

Model Node	*Location*	*Critical Elevation (ft-NGVD)*	*Existing Condition Peak Stage (ft-NGVD)*	*Existing Condition LOS*	*Proposed Condition Peak Stage (ft-NGVD)*	*Proposed Condition LOS*
922035	Shell Point Road	10.70	10.96	C	10.51	A
922030	Shell Point Road	10.70	10.95	C	10.25	A
922010	Shell Point Road	9.80	10.84	C	8.90	A
922001	Atlantic Drive	8.42	11.31	C	8.77	B
905200	Gulf City Road	4.30	4.83	C	3.77	A
915250	Stephens Road at Wildcat Creek	12.53	13.77	C	12.86	B

Projects 1.1, 2.1, 2.2 and 3.2 (wet detention treatment systems) provide WQTLOS improvements. Project 1.1 improves the WQTLOS for TSS of subbasin 905200 from F to B. Project 3.2 improves the WQTLOS for TSS of subbasin 922000 from F to D. Project 2.1 improves WQTLOS for TSS of subbasin 921800 from B to A and Project 2.2 improves the WQTLOS for TSS of subbasin 921850 from C to B. It is predicted that the overall WQTLOS for all pollutants remains the same for the major basin.

15.5 LOWER MIDDLE LITTLE MANATEE RIVER BASIN

A total of 10 flood control and/or water quality projects are proposed within the Lower Middle Little Manatee River major basin. Projects 6.1 through 6.3 in the Sun City Center/Kings Point Subdivision area and Projects 7.1 through 7.4 in the Doug Creek area in the Marsh Branch/Shellpoint Road area provide significant flood protection benefits. A comparison of predicted peak stages for the 25-year, 24-hour design storm event and corresponding FPLOS for both existing and proposed conditions at critical locations is shown in **Table 15-3** below.

Table 15-3
Little Manatee River Watershed Management Plan
Summary of Peak Stages and Flood Protection LOS for the Lower Middle LMR Major Basin
25-Year, 24-Hour Event

Model Node	*Location*	*Critical Elevation (ft-NGVD)*	*Existing Condition Peak Stage (ft-NGVD)*	*Existing Condition LOS*	*Proposed Condition Peak Stage (ft-NGVD)*	*Proposed Condition LOS*
946150	Saffold Road	17.32	18.03	C	16.81	A
946800	West Lake Drive	62.81	63.47	C	61.52	A
946850	Bishop Road	67.40	68.74	C	67.38	A
946250	Unnamed Rd. off Saffold Rd.	35.25	36.44	C	35.14	A
941000	S. Pebble Beach Blvd.	59.23	59.49	C	58.94	A
945550	Del Webb Blvd.	38.25	38.59	D	38.13	A
943190	La Jolla Avenue	47.32	47.91	C	47.20	A

Projects 6.4, 6.5, 7.1, 7.3 and 7.5 provide WQTLOS improvements. It is predicted that the overall WQTLOS for the Upper LMR major basin will improve upon implementation of the proposed water quality treatment projects. However, looking at the entire Lower Middle LMR major basin, only the LOS scores for the pollutants lead (B to A) and zinc (C to B) change.

15.6 UPPER MIDDLE LITTLE MANATEE RIVER BASIN

One flood control and/or water quality project is proposed within the Upper Middle Little Manatee River major basin. Project 8.1 in the Carlton Branch area provides significant flood protection benefits. A comparison of predicted peak stages for the 25-year, 24-hour design storm event and corresponding FPLOS for both existing and proposed conditions at Carlton Lake Road is shown in **Table 15-4** below.

Table 15-4
Little Manatee River Watershed Management Plan
Summary of Peak Stages and Flood Protection LOS for the Upper Middle LMR Major Basin
25-Year, 24-Hour Event

Model Node	*Location*	*Critical Elevation (ft-NGVD)*	*Existing Condition Peak Stage (ft-NGVD)*	*Existing Condition LOS*	*Proposed Condition Peak Stage (ft-NGVD)*	*Proposed Condition LOS*
966850	Carlton Lake Road	121.50	122.14	C	120.58	A

Project 8.1 also provides WQTLOS improvements. The proposed project is predicted to improve the WQTLOS for subbasin 966800 for TKN and NO_2+NO_3 from F to D. However, it is predicted that the overall WQTLOS for the Upper Middle LMR major basin will remain unchanged from existing conditions.

15.7 UPPER LITTLE MANATEE RIVER & SOUTH FORK BASINS

Flood Control/water quality projects were not proposed in Upper Little Manatee River and South Fork major basins. However, it is recommended that the County pursues implementation of BMPs associated with agricultural activities through coordination programs with the natural Resources Conservation Service and the Florida Department of Agriculture and Consumer Services (DACS) in their ongoing programs of working with farmers to develop Farm Management Plans that focus on improving irrigation practices and chemical management programs. Therefore, proposed LOS remains the same as the existing conditions LOS.

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CHAPTER 16
PRELIMINARY IMPLEMENTATION PLAN

16.1 INTRODUCTION

This chapter outlines a preliminary implementation plan of the individual projects that make up the selected alternatives as identified through the evaluation procedure described in Chapter 13. In turn, the identification of alternatives was based on the existing conditions analysis described in Chapters 1 through 12. Proposed project descriptions are summarized in Table 13-4. The projects were identified to improve flood control, water quality, natural systems and, if applicable, water supply conditions in the Little Manatee River (LMR) watershed. This chapter also describes the methodology used to assign priority to the proposed projects and develop the preliminary implementation plan.

This implementation plan considered separately the recommended (a) flood control and water quality projects and (b) natural systems projects. This procedure was selected because flood control and water quality projects involve primarily implementation of structural and non-structural approaches to help meet established objectives measured in terms of levels of service. In contrast, natural systems projects deal primarily with non-structural vegetation/wildlife management issues.

16.2 PROJECT PRIORITIZATION METHODOLOGY

This section describes the methodology used to prioritize the individual projects that make up the recommended alternatives identified in Chapter 13. Consistent with the plan, separate prioritization methodologies were used to evaluate flood control/water quality projects and natural systems projects.

16.2.1 Evaluation of Flood Control and Water Quality Preferred Alternative Projects

The first step in the prioritization process consisted of establishing the prioritization criteria. Three criteria were identified and used to analyze and compare the proposed projects. The criteria are listed below and a more detailed description of those criteria follows.

- Consistency with Existing Local, State and Federal Programs Affecting Watershed Management
- Project Costs Versus Benefit Ratio for Flood Control
- Project Cost Versus Benefit Ratio for Water Quality
- Public Acceptance

Consistency with Existing Local, State and Federal Programs Affecting Watershed Management. Consistency with existing local, state and federal programs affecting watershed management issues in Hillsborough County is essential. The consistency criterion was analyzed

separately for local and state/federal programs. The existing local programs that address planning issues in the LMR watershed include the SWFWMD SWIM (Surface Water Improvement and Management) Plan for Tampa Bay, the SWFWMD Comprehensive Watershed Management Plan (CWM) for the LMR Watershed, the Tampa Bay Estuary Program Comprehensive Conservation and Management Plan (CCMP), and the Cockroach Bay Aquatic Preserve Management Plan (CBAPMP). The goals of each of these plans are outlined in Chapter 13. Each plan addresses three main components: water quantity, water quality and habitat issues. The prioritization scoring for this sub-criterion was based on a numerical ranking from 0 to 3 depending on the number of existing plan components that a proposed project addresses. For example, if a project addresses strictly flood control improvements, it was given a score of 1. If all three planning components are addressed, the score given was 3.

At the state and federal level, there are numerous programs that could potentially impact watershed management planning, including the National Pollutant Discharge Elimination System (NPDES) for stormwater discharges, the Total Maximum Daily Load (TMDL) Program, the programs associated with the Resource Conservation and Recovery Act (RCRA), the programs resulting from the Comprehensive Environmental Response, Compensation and Liability Acts (CERCLA), and the Safe Drinking Water Act. For the LMR watershed, the programs with most significant planning impact included those related to the NPDES and TMDL.

Phase I of the NPDES program addressed sources of stormwater runoff that have the greatest potential to negatively impact water quality. Under Phase I, NPDES permits were issued for stormwater discharges from "medium" and "large" municipal separate storm sewer systems (MS4s) located in incorporated places or counties with populations of 100,000 or more, which included Hillsborough County. The NPDES permit application required Hillsborough County to develop and provide information on items such as a) pollutant source identification and characterization, b) estimates of annual and seasonal pollutant loads, c) establishment of a program to detect and remove illicit discharges, d) establishment of a program to reduce pollutants in runoff, and e) fiscal analysis of necessary capital and O&M expenditures necessary to implement improvement plans. Hillsborough County has been working with the USEPA to link the NPDES permit-related improvement projects to the recommendations of the watershed management plans, including that for the LMR watershed. Therefore, the recommendations in this master Plan will be made part of the program to be implemented to reduce pollutants in the runoff, as required by the NPDES permit.

The TMDL program, initiated from Section 303 of the 1972 Clean Water Act, is an effort to meet water quality standards in the nation's waters through the control of both point and non-point sources of pollution. Under TMDL regulations, USEPA requires states to list water bodies that are not meeting water quality standards set for designated uses. For each "impaired" water body, the state must identify the amount by which pollution sources must be reduced to meet the standards. In Florida, the TMDL process revolves around two important regulatory approaches: a) the Impaired Waters Rule and b) the TMDL allocation process.

The Impaired Waters Rule set forth the basis for identifying impaired water segments based upon existing water quality data, which then was evaluated to determine the water bodies' assimilative

capacity as a basis for evaluating the level of pollutant load reductions required to meet State standards and ultimately achieve their designated uses. Based on The Impaired Waters Rule, the State of Florida developed a preliminary list of impaired water bodies. This list, commonly known as the 303(d) list, includes the Little Manatee River itself, South Fork and Cockroach Bay. Three impairment parameters were identified for these water bodies, nutrients, coliforms, and dissolved oxygen (DO).

For this project, because of the close relationship between the NPDES and TMDL programs, the project prioritization for this sub-criterion focused on the impacts on the TMDL program. However, because the entire LMR was identified as an impaired water body, discharges to a TMDL impaired segment could not be used as a project prioritization criterion. The prioritization process then focused on the degree of positive impact of a project on the impairment parameters nutrients, coliforms, and DO. The TMDL impairment parameters can be compared to event mean concentration (EMC) values reported in Hillsborough County NPDES applications discussed in Chapter 10.

Existing data collected for coliforms from urban runoff is too limited to identify any land use distinctions related to pollutant EMCs. However, a comparison can be made to the between nutrients and the NPDES parameter of total nitrogen (TN). The nutrient parameter of TN was evaluated because it has been established as the limiting pollutant to Tampa Bay. A related comparison can also be made between DO and the NPDES parameter five-day biological oxygen demand (BOD_5). Water quality LOS for each subbasin was established for TN and BOD_5 in Chapter 11. Projects benefiting areas that are currently showing a lower water quality treatment LOS for the impairment parameters received a higher score than those projects affecting areas with a higher LOS. Estimated total pollutant load removal was also considered in the scoring. The projects with the highest estimated pollutant load removals were placed in the first group and given a score of 3, whereas the projects with the lowest estimated pollutant load removals were placed in the fourth group and given a score of 0.

The final scoring for this criterion was calculated as the average of the scores for the two sub-criteria, consistency with local plans and consistency with state and federal programs. The scoring for each of the consistency sub-criteria is shown in **Table 16-1**.

Another federal program of relevance for watershed management is the Federal Emergency Management Agency (FEMA) Local Mitigation Strategy (LMS) Program. The purpose of the LMS programs is to build "disaster resistant communities" by providing local assistance to retrofit flood prone areas. However, similar to the NPDES program, the LMS for Hillsborough County is, at least partially, being developed based on the projects identified through the watershed management plans. Therefore, the LMS impact was not considered herein as a prioritization criterion.

Table 16-1
Little Manatee River [illegible]shed Management Plan
Proposed Project Est[illegible] Pollutant Loads Removed
and Prioriuzation Score (*)

Project	Project Description	TSS Pollutant Load Removed (lb)	Priority Score
6.5	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	267,013	3
6.4	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery	93,214	3
4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	42,414	3
7.1	Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	25,262	3
3.2	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.	15,068	2
7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	8,358	2
7.5	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.	4,034	2
1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). Construct a 4-acre detention pond for water quality treatment.	2,479	2
2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.	1,694	1

Table 16-1
Little Manatee Rive rshed Management Plan
Proposed Project Es , Pollutant Loads Removed
and Prioriuzation Score (*)

Project	Project Description	TSS Pollutant Load Removed (lb)	Priority Score
8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	1,220	1
2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.	419	1
3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	--	0
5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.	--	0
6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	--	0
6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert at La Jolla Avenue. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	--	0
6.3	Replace the 4, 30-inch RCPs at Del Webb Blvd with one 4' by 12' box culvert. Clear and snag 800' downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd with a new outfall. Regrade swale between houses at the end of Treemont Ct to a northwest pond to provide for overflow from an inlet located in the cul-de-sac.	--	0
7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	--	0
7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	--	0

(*) Prioritization score for consistency with State/Federal plans and programs criterion.

Project Costs Versus Benefit Ratios for Flood Control. Cost versus benefit (C/B) ratios are commonly calculated in economic terms. Costs generally include both capital and O&M. Detailed capital cost estimates for each of the proposed projects is included in **Appendix E**. O&M costs were not calculated for each project. For project prioritization purposes it was assumed that O&M costs would be directly proportional to capital costs.

Project benefits for flood control are commonly measured in terms of reduction in expected annual flood damages. As the scope of services for this project did not include development of the various economic studies necessary to calculate project benefits in those terms, a simplified planning level approach was used. Flood control benefits for each proposed project were measured as the number of flood control level of service (LOS) deficiencies removed as a result of project implementation. The LOS problem areas improved by the selected alternatives are discussed in the proposed watershed level of service analysis detailed in Chapter 15.

The C/B ratios for flood control are shown in **Table 16-2**. Projects were then ranked according to C/B ratio from high to low. When the C/B ratio for two or more projects were the same, ranking was decided based on secondary factors such as potential opportunities for further project enhancement, secondary flood protection impacts (i.e. flood stage reduction in an off-line detention facility), opportunities for water supply benefits, and others. Finally, to make the procedure consistent with the other prioritization criteria, the ranked projects were divided into four groups. The projects with the lowest C/B ratios were placed in the first group and given a score of 3, whereas the projects with the highest C/B ratios were placed in the fourth group and given a score of 0.

Project Costs Versus Benefit Ratios for Water Quality. Similar to the C/B ratios for flood control, C/B ratios for water quality were based on expected project capital costs, as included in Chapter 13. Water quality benefits are commonly measured in terms of added recreational benefits due to improved water and ecological quality, improved property values and other factors. A simplified approach used in this analysis measured benefits as reductions in expected average annual pollution loads (in lbs/yr) resulting from project implementation. Because pollution load reductions vary by chemical parameter, it was assumed that total suspended solids (TSS) reductions represented runoff treatment capabilities. This is consistent with 62-40 FAC, Florida Water Policy, in terms of reductions in pollution loads from stormwater management systems.

Public Acceptance. The community acceptance factor was included to reflect public input, as provided during the public meetings conducted as part of this project. As public support is a critical element for the implementation of an alternative, the larger the perceived support for a project, the better the score an alternative received. Based on the comments and feedback received as a result of the first and second public meetings, it should be noted that significant input was received during watershed plan development in favor of water quality and environmental conservation projects. This is likely due to the extended undeveloped nature of the LMR watershed. The public acceptance factor also included issues of land acquisition because plan implementation can be hampered if the process requires involvement in land condemnation procedures. Scoring was based on a qualitative assessment of community acceptance on a scale from 0 to 3.

Little Manatee River Watershed Management Plan
Consistency with Existing Local, State & Federal Programs

Project	Project Description	Consistency w/ Local Plans & Programs	Consistency w/ State/Federal Plans & Programs (*)	Average Score	Comment
1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). Construct a 4-acre detention pond for water quality treatment.	2	2	2.0	Consistent w/ flood control and water quality components of local plans. Provides a moderate impact to TMDL impairment parameters.
2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.	3	1	2.0	Consistent w/ flood control, water quality and natural systems components of local plans. Provides a lower impact to TMDL impairment parameters.
2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.	2	1	1.5	Consistent w/ flood control and water quality components of local plans. Provides a lower impact to TMDL impairment parameters.
3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	2	0	1.0	Consistent w/ flood control and water quality components of local plans. Provides no impact to TMDL impairment parameters.
3.2	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.	2	2	2.0	Consistent w/ flood control and water quality components of local plans. Provides a moderate impact to TMDL impairment parameters.
4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	3	3	3.0	Consistent w/ flood control, water quality and natural systems components of local plans. Provides a high impact to TMDL impairment parameters.

16-2
Little Manatee River Watershed Management Plan
Consistency with Existing Local, State & Federal Programs

Project	Project Description	Consistency w/ Local Plans & Programs	Consistency w/ State/Federal Plans & Programs (*)	Average Score	Comment
5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.	1	0	0.5	Consistent w/ flood control components of local plans. Provides no impact to TMDL impairment parameters.
6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	1	0	0.5	Consistent w/ flood control components of local plans. Provides no impact to TMDL impairment parameters.
6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert at La Jolla Avenue. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	1	0	0.5	Consistent w/ flood control components of local plans. Provides no impact to TMDL impairment parameters.
6.3	Replace the 4, 30-inch RCPs at Del Webb Blvd with one 4' by 12' box culvert. Clear and snag 800' downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd with a new outfall. Regrade swale between houses at the end of Treemont Ct to a northwest pond to provide for overflow from an inlet located in the cul-de-sac.	2	0	1.0	Consistent w/ flood control and water quality components of local plans. Provides no impact to TMDL impairment parameters.
6.4	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery	2	3	2.5	Consistent w/ water quality and natural systems components of local plans. Provides a high impact to TMDL impairment parameters.
6.5	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	3	3	3.0	Consistent w/ flood control, water quality and natural systems components of local plans. Provides a high impact to TMDL impairment parameters.

16-2
Little Manatee River Watershed Management Plan
Consistency with Existing Local, State & Federal Programs

Project	Project Description	Consistency w/ Local Plans & Programs	Consistency w/ State/Federal Plans & Programs (*)	Average Score	Comment
7.1	Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	3	3	3.0	Consistent w/ flood control, water quality and natural systems components of local plans. Provides a high impact to TMDL impairment parameters.
7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	1	0	0.5	Consistent w/ flood control components of local plans. Provides no impact to TMDL impairment parameters.
7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	2	2	2.0	Consistent w/ flood control and water quality components of local plans. Provides a moderate impact to TMDL impairment parameters.
7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	1	0	0.5	Consistent w/ flood control components of local plans. Provides no impact to TMDL impairment parameters.
7.5	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.	1	2	1.5	Consistent w/ water quality components of local plans. Provides a moderate impact to TMDL impairment parameters.
8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	2	1	1.5	Consistent w/ flood control and water quality components of local plans. Provides a lower impact to TMDL impairment parameters.

(*) Per Table 16-1

16.2.2 Evaluation of Natural Systems Preferred Alternative Projects

A total of five criteria were identified and used in an analysis and ranking of the proposed projects. The criteria used are listed below and a more detailed description of the evaluation criteria follows.

- Impact on invasive/exotic vegetation
- Impact to protected species
- Public accessibility
- Impact to hydrology
- Connectivity with existing habitat/natural systems

Impact on Invasive/ Exotic Vegetation. The displacement of native vegetation by invasive and exotic species can reduce the value of habitat available for fish and wildlife and the biodiversity of a system. Exotic species such as Brazilian pepper, and invasive native species such as cattails can replace native species where disturbance, such as altered hydrology, or clearing for a boat ramp, has provided an opportunity for their introduction and/or expansion. This criterion is a measure of the anticipated impact of a proposed project on invasive and exotic species. The greater the potential success of replacing invasive and exotic species with desirable native species, the higher a project is ranked. Large projects with greater connectivity to natural systems are assigned higher ranks. The means by which projects were ranked on this criterion are summarized below.

3 = Significantly improves natural vegetation (larger, contiguous habitat)
2 = Moderately improves natural vegetation (contiguous, but smaller or includes public park)
1 = Slightly improves natural vegetation (smaller, isolated, or includes public boat ramp)
0 = No improvement in natural vegetation

Impacts to Protected Species. The purpose of natural systems projects is the restoration of native habitat for fish and wildlife, including protected species. Protected species are designated as endangered, threatened, or of special concern by state or federal agencies and deserve special protection or consideration in the watershed. Protected species and SHCA occurrences in the watershed were used to rank a project on this criterion. A project that includes a SHCA, a focal species, a biodiversity hotspot, or has a known listed species is assigned a higher rank, while a project with no SHCAs, biodiversity hotspots, focal species, or know occurrence of listed species within or nearby the project area were ranked lower. The higher the anticipated success of a project in protecting a listed species, the higher the project is ranked. Ranks were assigned as described below.

3 = Significant impact on listed species (includes a SHCA, biodiversity hotspot, or focal species)
2 = Moderately impact on listed species (shares a boundary or part of a SHCA, biodiversity hotspot, or focal species)
1 = Slightly impact on listed species (adjacent to or near a SHCA, biodiversity hotspot, or focal species)
0 = No impact on listed species

Public Accessibility. Public access to natural systems projects as a potential park/recreation/observation area is important to the community in the LMR watershed, because of both interest by the public and the ability to educate the public. Direct public access with recreation facilities is assigned a higher rank when compared with a project that has no public access. The higher the potential for public accessibility, the higher the evaluations score, as summarized below.

3 = Significant public access (direct public access with recreation facilities)
2 = Moderate public access (direct public access without recreation facilities)
1 = Slight public access (difficult access)
0 = No public access

Impact On Hydrology. Maintaining natural hydrology is important to fish and wildlife in the LMR watershed in that it maintains habitat connectivity and provides foraging, breeding, and maturation habitat for many species. Intact natural systems also buffer excessive runoff volumes and pollutant loadings, protect stream channel stability, and reduce stream bank erosion. The greater the proposed benefit to hydrology, the higher the evaluations score. Higher ranks were assigned to projects directly associated with the main river channel and lowest ranks were assigned to those projects isolated from the river.

3 = Significant impact on hydrology (directly associated with the main river channel)
2 = Moderately impact on hydrology (directly associated with a tributary of the river)
1 = Slightly impact on hydrology (isolated wetland or depression)
0 = No impact on hydrology

Connectivity with Existing Natural Systems. Adjacent conservation/natural areas reduce the "stress" to a habitat. Adjacent natural areas increase the opportunity for success of the project through the natural buffer from urbanized or disturbed areas and provide habitat connectivity important to fish and wildlife. The greater potential for connectivity with existing natural systems, the higher the rank. Ranks were assigned based primarily on connections to existing protected conservation areas and greenways. Projects located within an existing conservation area were ranked higher than isolated projects. Ranks were assigned as described below.

3 = Significant connectivity with existing natural systems (located in an existing conservation area)
2 = Moderately connectivity with existing natural systems (located adjacent to an existing conservation area)
1 = Slightly connectivity with existing natural systems (included in the same major basin as an existing conservation area)
0 = No connectivity with existing natural systems

16.3 EVALUATION MATRIX AND RESULTS

The results of the proposed flood control/water quality projects and natural systems projects prioritization matrices are given in **Tables 16-3** and **16-4**, respectively. Generally, projects, which included water quality treatment elements that contributed to flood control, scored higher than projects with flood control only. This can be attributed to meeting each prioritization criteria: good consistency with existing plans and programs, a high degree of public acceptance, and larger benefits per capital cost. The highest-ranking flood control/water quality projects contributed to improvement in flood control, water quality and natural systems. The lowest ranked projects included the flood control projects with the higher capital costs. For natural systems projects, the restoration projects ranked highest with exotic species removal following next and erosion control projects last. Natural systems projects with a better connectivity with existing natural systems typically scored higher than projects without strong connectivity.

Flood control/water quality projects with equal ranking scores were prioritized by total project capital cost. The final prioritization plan for flood control/water quality and natural systems projects is presented in **Tables 16-5** and **16-6**, respectively.

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Little Manatee River Watershed Management Plan
Project Capital Costs Compared to Benefit Rankings

Project	Project Description	LOS Deficiencies	TSS Pollutant Load Removed (lb)	Estimated Capital Cost	Cost per lb TSS Removed	Cost per LOS Deficiency Addressed	Rank by Cost/LOS Deficiency	Rank by Cost/TSS Pollutant Load Removal
1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). Construct a 4-acre detention pond for water quality treatment.	1	2,479	$907,000	$366	$907,000	9	10
2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.	0	419	$454,000	$1,083	--	14	11
2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.	0	1,694	$607,000	$358	--	13	9
3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	4	--	$85,000	--	$21,250	1	12
3.2	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.	1	15,068	$2,061,000	$137	$2,061,000	11	6
4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	0	42,414	$3,353,000	$79	--	17	4
5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.	2	--	$398,000	--	$199,000	5	18

16-3
Little Manatee River Watershed Management Plan
Project Capital Costs Compared to Benefit Rankings

Project	Project Description	LOS Deficiencies	TSS Pollutant Load Removed (lb)	Estimated Capital Cost	Cost per lb TSS Removed	Cost per LOS Deficiency Addressed	Rank by Cost/LOS Deficiency	Rank by Cost/TSS Pollutant Load Removal
6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	1	--	$64,000	--	$64,000	3	13
6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert at La Jolla Avenue. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	3	--	$597,000	--	$199,000	6	16
6.3	Replace the 4, 30-inch RCPs at Del Webb Blvd with one 4' by 12' box culvert. Clear and snag 800' downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd with a new outfall. Regrade swale between houses at the end of Treemont Ct to a northwest pond to provide for overflow from an inlet located in the cul-de-sac.	1	--	$232,000	--	$232,000	7	15
6.4	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery	0	93,214	$20,000	$0.21	--	18	1
6.5	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	0	267,013	$13,458,000	$50	--	15	3

16-3
Little Manatee River Watershed Management Plan
Project Capital Costs Compared to Benefit Rankings

Project	Project Description	LOS Deficiencies	TSS Pollutant Load Removed (lb)	Estimated Capital Cost	Cost per lb TSS Removed	Cost per LOS Deficiency Addressed	Rank by Cost/LOS Deficiency	Rank by Cost/TSS Pollutant Load Removal
7.1	Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	1	25,262	$5,320,000	$211	$5,320,000	12	8
7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	1	--	$42,000	--	$42,000	2	14
7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	1	8,358	$1,435,000	$172	$1,435,000	10	7
7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	1	--	$194,000	--	$194,000	4	17
7.5	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.	0	4,034	$550,000	$136	--	16	5
8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	1	1,220	$404,000	$331	$404,000	8	2

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Prioritization Matrix

Project	Project Description	Consistency w/ Existing Plans & Programs	Cost per LOS Deficiency	Cost per lb TSS Removed	Public Acceptance	Total	Comment
1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). Construct a 4-acre detention pond for water quality treatment.	2.0	1	2	3	8.0	Higher flood control LOS costs with moderate costs per lb for pollutant removal. High public acceptance because of water quality component.
2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.	2.0	0	2	3	7.0	Little flood control LOS benefit with moderate costs per lb for pollutant removal. High public acceptance because of water quality component.
2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.	1.5	0	2	3	6.5	Little flood control LOS benefit with moderate costs per lb for pollutant removal. High public acceptance because of water quality component.
3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	1.0	3	0	2	6.0	Low flood control LOS costs with no pollutant removal benefits. Moderate public acceptance.
3.2	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.	2.0	1	3	2	8.0	Higher flood control LOS costs with low costs per lb for pollutant removal. Moderate public acceptance because of high cost of land acquisition.
4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	3.0	0	3	2	8.0	Little flood control LOS benefit with lower costs per lb for pollutant removal. Moderate public acceptance because of high cost of land acquisition.

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Prioritization Matrix

Project	Project Description	Consistency w/ Existing Plans & Programs	Cost per LOS Deficiency	Cost per lb TSS Removed	Public Acceptance	Total	Comment
5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.	0.5	2	0	2	4.5	Moderate flood control LOS costs with no pollutant removal benefits. Moderate public acceptance.
6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	0.5	3	0	2	5.5	Low flood control LOS costs with no pollutant removal benefits. Moderate public acceptance.
6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert at La Jolla Avenue. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	0.5	2	0	2	4.5	Moderate flood control LOS costs with no pollutant removal benefits. M0derate public acceptance.
6.3	Replace the 4, 30-inch RCPs at Del Webb Blvd with one 4' by 12' box culvert. Clear and snag 800' downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd with a new outfall. Regrade swale between houses at the end of Treemont Ct to a northwest pond to provide for overflow from an inlet located in the cul-de-sac.	1.0	2	0	3	6.0	Moderate flood control LOS costs with no pollutant removal benefits. High public acceptance because of impact to surrounding homes.
6.4	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery	2.5	0	3	3	8.5	Little flood control LOS benefit with moderate costs per lb for pollutant removal. High public acceptance because of water quality and natural systems components.
6.5	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	3.0	0	2	3	8.0	Little flood control LOS benefit with moderate costs per lb for pollutant removal. High public acceptance because of water quality and natural systems components.

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Prioritization Matrix

Project	Project Description	Consistency w/ Existing Plans & Programs	Cost per LOS Deficiency	Cost per lb TSS Removed	Public Acceptance	Total	Comment
7.1	Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	3.0	1	2	3	9.0	High flood control LOS costs with moderate costs per lb for pollutant removal. High public acceptance because of water quality and natural systems components.
7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	0.5	3	0	2	5.5	Low flood control LOS costs with no pollutant removal benefits. Moderate public acceptance.
7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	2.0	1	3	2	8.0	High flood control LOS costs with low costs per lb for pollutant removal. High public acceptance because of water quality component.
7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	0.5	3	0	2	5.5	Low flood control LOS costs with no pollutant removal benefits. Moderate public acceptance.
7.5	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.	1.5	0	3	3	7.5	Little flood control LOS benefit with low costs per lb for pollutant removal. High public acceptance because of water quality component.
8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	1.5	2	3	3	9.5	Moderate flood control LOS costs with low costs per lb for pollutant removal. High public acceptance because of water quality component.

Little Manatee River Watershed Management Plan
Natural Systems Projects Prioritization Matrix

Project	Project Description	Impact on Native/Exotic Vegetation and Habitat	Impact on Listed Species	Public Accessibility	Impact on Hydrology	Connectivity with Existing Natural Systems	Total	Comment
H3.1	Exotic and invasive species removal project in Domino Beach Ramp (approximately 1.5 acres).	1	1	3	0	0	5	Public accessibility to the boat ramp makes it a highly visible location for exotic/invasive species removal and associated education component.
H3.2	Exotic and invasive species removal project in Beaudette (Ruskin) park (approximately 60 acres).	2	1	3	0	1	7	Invasive/exotic species removal in the park will provide natural, public areas for the public and provide an opportunity for public education regarding invasive/exotic species.
H3.3	Exotic and invasive species removal project at Ruskin Commongood (approximately 44 acres).	1	2	3	0	0	6	This project provides public access to native areas, no large benefits to wildlife, hydrology, or habitat.
H3.4	Exotic and invasive species removal project at Ruskin Inlet/Marsh Branch (approximately 20 acres).	3	3	1	0	3	10	The size of this project , connection to existing natural areas, and protection for listed species in an otherwise urban area are major benefits of this project.
H4.1	Exotic and invasive species removal project in Sun City Heritage Park (approximately 98 acres).	2	2	3	0	2	9	Public access makes this project highly visible and there are benefits to habitat and listed species.
H4.2	Exotic and invasive species removal project in Wildcat Creek Park (approximately 98 acres).	1	2	3	0	2	8	Public access and visibility are the greatest benefits of this project.
H4.3 - H4.6	Exotic and invasive species removal project upstream of S.R. 301 on main river channel (approximately 11 acres).	3	3	1	0	3	10	This project is relatively large, and will benefit habitat and listed species, but will have less impact on hydrology.

Little Manatee River Watershed Management Plan
Natural Systems Projects Prioritization Matrix

Project	Project Description	Impact on Native/Exotic Vegetation and Habitat	Impact on Listed Species	Public Accessibility	Impact on Hydrology	Connectivity with Existing Natural Systems	Total	Comment
H4.7	Restoration project along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres).	3	2	1	3	3	12	This project is relatively large, will improve habitat and hydrology, and provide protection for listed species.
H4.8	Erosion control project along the main river channel at Lightfoot Road, east of I-75.	0	1	0	3	1	5	This project is limited primarily to stabilization of the water channel along the river. Its location limits public access and by itself, will not enhance habitat for wildlife or listed species.
H5.1	Restoration project on east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).	3	2	1	3	3	12	Benefits of this project include connection to existing natural areas, improved habitat due to removal of invasive/exotic species, hydrologic restoration, and protection for existing listed species.
H5.2	Erosion control project east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).	0	1	0	3	1	5	This project is limited to primarily stabilization of the water channel along the river. Its location limits public access and by itself, will not enhance habitat for wildlife or listed species.
H7.1 - H7.2	Restoration projects north (approximately 274 acres) and south (approximately 57 acres) of the main river channel, between Saffold Road and C.R. 579.	3	3	1	3	3	13	Benefits of this project include connection to existing natural areas, improved habitat due to removal of invasive/exotic species, hydrologic restoration, and protection for existing listed species.
H7.3 - H7.5	Erosion control projects next to Saffold and Willow roads.	0	1	0	3	1	5	This project is limited to primarily stabilization of the water channel along the river. It provides little connectivity or wildlife habitat.

16-5
Little Manatee River Watershed Management Plan
Natural Systems Projects Prioritization Matrix

Project	Project Description	Impact on Native/Exotic Vegetation and Habitat	Impact on Listed Species	Public Accessibility	Impact on Hydrology	Connectivity with Existing Natural Systems	Total	Comment
H8.1 - H8.3	Restoration projects east of S.R. 301, on the north and south sides of the Little Manatee River, from C.R. 579 to Grange Hall Loop (4 parcels, ranging from 11 to 214 acres and totaling nearly 500 acres).	3	2	1	3	3	12	Benefits of this project include connection to existing natural areas, improved habitat due to removal of invasive/exotic species, hydrologic restoration, and protection for existing listed species.
H8.4 - H8.5	Erosion control projects along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop.	3	1	1	3	3	11	Benefits of this project include connection to existing natural areas, improved habitat due to removal of invasive/exotic species, hydrologic restoration, although less protection for existing listed species when compared with H8.1-H8.3.
H8.6 - H8.9	Restoration projects east of S.R. 301, on the south side of the river at Saffold Road and C.R. 579 (approximately 44 acres).	0	0	0	3	1	4	This project is limited to erosion control along the river channel. It provides little connectivity or wildlife habitat.
H8.10 - H8.11	Erosion control projects next to Leonard Lee Road.	0	0	0	3	3	6	Although this project is limited to erosion control, it is part of an existing conservation area.

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Preliminary Implementation Plan

Project	Project Description	Ranking Score	Estimated Capital Cost	Project Ranking
8.1	Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	9.5	$404,000	1
6.4	Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club Estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery	8.5	$20,000	2
1.1	Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). Construct a 4-acre detention pond for water quality treatment.	8.0	$907,000	3
7.3	Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	8.0	$1,435,000	4
3.2	Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main collection ditch. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.	8.0	$2,061,000	5

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Preliminary Implementation Plan

Project	Project Description	Ranking Score	Estimated Capital Cost	Project Ranking
4.1	Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	8.0	$3,353,000	6
7.1	Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	8.0	$5,320,000	7
6.5	Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	8.0	$13,458,000	8
7.5	Retrofit existing golf course pond in St. Andrews subdivision and construct online 4.6-acre pond.	7.5	$550,000	9
2.1	Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.	7.0	$454,000	10
2.2	Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.	6.5	$607,000	11

Little Manatee River Watershed Management Plan
Flood Control / Water Quality Projects Preliminary Implementation Plan

Project	Project Description	Ranking Score	Estimated Capital Cost	Project Ranking
3.1	Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	6.0	$85,000	12
6.3	Replace the 4, 30-inch RCPs at Del Webb Blvd with one 4' by 12' box culvert. Clear and snag 800' downstream to improve conveyance. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd with a new outfall. Regrade swale between houses at the end of Treemont Ct to a northwest pond to provide for overflow from an inlet located in the cul-de-sac.	6.0	$232,000	13
7.2	Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	5.5	$42,000	14
6.1	Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	5.5	$64,000	15
7.4	Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	5.5	$194,000	16
5.1	Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.	4.5	$398,000	17
6.2	Replace the four 29" x 45" ERCPs with a 3' x 20' box culvert at La Jolla Avenue. Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	4.5	$597,000	18

Table 16-7
Little Manatee River Watershed Management Plan
Natural Systems Projects Preliminary Implementation Plan

Project	Project Description	Estimated Capital Cost	Project Ranking
H7.1 - H7.2	Restoration projects north (approximately 274 acres) and south (approximately 57 acres) of the main river channel, between Saffold Road and C.R. 579.	$1,131,000	1
H4.7	Restoration project along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres).	$505,000	2
H5.1	Restoration project on east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).	$720,000	3
H8.1 - H8.3	Restoration projects east of S.R. 301, on the north and south sides of the Little Manatee River, from C.R. 579 to Grange Hall Loop (4 parcels, ranging from 11 to 214 acres and totaling nearly 500 acres).	$2,698,000	4
H8.4 - H8.5	Restoration projects east of S.R. 301, on the south side of the river at Saffold Road and C.R. 579 (approximately 44 acres).	$116,000	5
H4.3 - H4.6	Exotic and invasive species removal project upstream of S.R. 301 on main river channel (approximately 11 acres).	$44,000	6
H3.4	Exotic and invasive species removal project at Ruskin Inlet/Marsh Branch (approximately 20 acres).	$81,000	7
H4.1	Exotic and invasive species removal project in Sun City Heritage Park (approximately 98 acres).	$399,000	8
H4.2	Exotic and invasive species removal project in Wildcat Creek Park (approximately 98 acres).	$483,000	9
H3.2	Exotic and invasive species removal project in Beaudette (Ruskin) park (approximately 60 acres).	$243,000	10

Table 16-7
Little Manatee River Watershed Management Plan
Natural Systems Projects Preliminary Implementation Plan

Project	Project Description	Estimated Capital Cost	Project Ranking
H8.10 - H8.11	Erosion control projects along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop.	$151,000	11
H3.3	Exotic and invasive species removal project at Ruskin Commongood (approximately 44 acres).	$177,000	12
H3.1	Exotic and invasive species removal project in Domino Beach Ramp (approximately 1.5 acres).	$6,000	13
H4.8	Erosion control project along the main river channel at Lightfoot Road, east of I-75.	$76,000	14
H5.2	Erosion control project east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).	$76,000	15
H7.3 - H7.5	Erosion control projects next to Saffold and Willow roads.	$114,000	16
H8.6 - H8.9	Erosion control projects next to Leonard Lee Road.	$226,000	17

CHAPTER 17
PUBLIC INPUT (THIRD MEETING)

17.1 MEETING MINUTES

The Third Public Meeting for the Little Manatee River Watershed Management Plan (LMRWMP) was held on August 30, 2001 from 6:30 pm to 8:30 pm at the Ruskin Elementary School Cafeteria. The purposes of the meeting included:

- Acquainting local residents with the project objectives;
- Presenting proposed alternatives being considered for the watershed plan;
- Assessing the public's acceptance or support for the proposed alternatives; and
- Receiving input and suggestions regarding watershed issues and the proposed alternatives.

The overall meeting followed an "open-house" format. Citizens were greeted at the door and were given a brief overview of the meeting format. Handout materials included relevant contact information, project history, a glossary of terms and abbreviations, proposed alternatives descriptions, operations and maintenance plan summary, a summary of written comments and responses from the Second Public Meeting and comment forms for the Third Public Meeting. A brief introduction to the audience announcing the team and meeting format was given once most of the meeting attendees arrived. Several project displays regarding the proposed flood control/water quality and natural systems project alternatives were set up to address known problem areas in the watershed. The project team presented a review of the goals of the LMR Watershed Management Plan; concerns from the Second Public Meeting; proposed project alternatives; and project displays.

Following the presentation an open discussion took place in order to allow questions and comments regarding the proposed project alternatives. The goal of the open discussion was to more clearly communicate the project objectives, prioritize proposed project alternatives and to help the project team discover any enhancements or new possible solutions. The meeting also included individual breakout sessions where the public has an opportunity to review displays and discuss problems and potential solutions one-on-one. A total of 35 attendees signed in on the forms provided to document attendance at the Third Public Meeting. The Hillsborough County meeting notice, meeting agenda, sign-in-sheets, handouts and public comment forms are included in **Appendix K**.

17.2 COMMENTS AND RECOMMENDATIONS

Comments from citizens regarding the proposed alternative projects were encouraged. Listed below is a summary of the written comments received through comment forms distributed at the Third

Public Meeting. A response to how the LMRWMP addressed each comment is also presented below.

Comment: *Poor drainage systems and new construction cause older homes to suffer from runoff.*

Response: Hillsborough County and the Southwest Florida Water Management District (SWFWMD) permit new construction activities in the watershed. Current permitting requires that post-construction peak discharge rate for the 25-year, 24-hour storm event must be less than or equal to the pre-construction conditions. Prior to current regulations, upstream and downstream impacts may not have been adequately addressed. The computer model created as part of this project will allow regulators to ensure that no impacts occur upstream or downstream of proposed new developments.

Comment: *Poor secondary drainage along W. Shellpoint Road, West of Janie Street.*

Response: Flooding improvement projects have been proposed on Shellpoint Road as part of Project 3.1. Secondary drainage should also improve as a result of implementing this Project.

Comment: *Potential water quality problems exist in the Sundance Community and implementation of the proposed alternative is a positive step.*

Response: Regional water quality treatment facilities provide excellent benefits through efficient land use and less time intensive maintenance requirements than multiple treatment sites. In addition, the use of this type of facilities may be the only option for retrofitting urban areas that were developed prior to the current stormwater regulations that require runoff water quality treatment.

Comment: *It is difficult to provide for long-term maintenance in constructed wetland systems.*

Response: Once established, wetlands flourish (as long as they are hydrated) and provide an excellent source of water quality treatment. It should be noted that sediment should be removed prior to discharge to wetlands. A small vegetated buffer/sediment sump area at the entrance to the constructed wetland limits areas requiring maintenance.

Comment: *Inspection of constructed systems is key to operations and maintenance success.*

Response: A routine inspection program with maintenance performed on an as needed basis is recommended as part of the LMRWMP. The operations and maintenance (O&M) plan is included in Appendix G. Other facility inspection recommendations are detailed in Chapter 19.

Comment: *Land acquisition required for regional stormwater facilities can be difficult.*

Response: Land acquisition is a challenge in implementation of regional stormwater facilities. However, from a watershed point of view, regional stormwater management is preferred because of the following advantages: reduction of capital costs, reduction in total maintenance costs, greater reliability, greater opportunities to control multiple source pollutant loading, and the ability to provide multifunctional facilities. For these reasons, Hillsborough County should work closely with developers to support opportunities for regional stormwater treatment.

Comment: *Flooding problems exist from high tides or tidal surges.*

Response: Proposed projects will reduce peak stages throughout the watershed. However, those projects will not significantly improve conditions created by tidal surges within the floodplain. It is generally not cost-effective to provide drainage relief for low-lying, tidally influenced area through increased drainage conveyance. Assistance is available through programs such as flood proofing or property relocation. Improved system maintenance, which is also addressed as part of this project, will also increase conveyance of floodwaters. . To assess some of the problems, the computer model was developed to simulate the system under a high tide condition.

Comment: *Encourage the use of vegetated buffers near direct discharge areas to estuary systems.*

Response: Major improvements can be achieved with the introduction of vegetated buffers and other similar stormwater systems such as vegetated swales and bioretention. By allowing stormwater to pass through vegetation prior to discharge (to near waters), sediments are removed, which in turn reduces pollutants. Encouragement of the use of vegetated buffers as part of land use controls and planning is recommended.

Comment: *Increase public education regarding native habitat.*

Response: A recommended public education management action involving the development and implementation of a comprehensive public involvement program for the LMR watershed is detailed in Chapter 19 of this LMRWMP.

Comment: *Remove exotic species.*

Response: Removal of exotic species, replacement with native species, followed by maintenance is proposed on Environmental Lands Acquisition and Protection Program (ELAPP) lands and specifically for proposed projects natural systems projects described in Chapter 13.

Comment: *Consider special taxation for stormwater treatment projects in the watershed.*

Response: The overall goal of this study is to develop a Comprehensive Watershed Management Plan that characterizes existing hydrologic, hydraulic, water quality and habitat conditions in the watershed; identify and assess existing and potential problem areas; and formulate solution and/or prevention scenarios to improve or maintain future watershed conditions. Alternative solution scenarios to improve areas not currently meeting the County's level of service criteria were formulated and evaluated in Chapter 13 and final recommendations are presented in Chapters 18 and 19.

Comment: *Consider a study on the relation of stormwater pollution and spawning of oysters.*

Response: The study proposal has been forwarded to the SWFWMD for consideration by the LMR Comprehensive Watershed Management (CWM) team.

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CHAPTER 18
LIST OF RECOMMENDED PROJECTS

18.1 INTRODUCTION

This chapter presents the recommended projects for the Little Manatee River (LMR) watershed based upon input received from the third public meeting process and comments from Hillsborough County staff. As discussed in Chapter 16, this plan considered separately the recommended (a) flood control and water quality projects and (b) the natural systems projects. This procedure was selected because flood control and water quality projects involve primarily implementation of structural and non-structural approaches to help meet established objectives measured in terms of levels of service, whereas natural systems projects deal primarily with more intangible vegetation/wildlife management issues.

18.2 SUMMARY OF RECOMMENDED PROJECTS

The recommended project implementation plan for the LMR watershed consists of 18 new flood control and water quality projects and 17 new natural systems projects. Each of the recommended projects is discussed in detail in Chapter 13. Costs for each recommended project are presented in Appendix 13-A. The development of project implementation prioritization scoring is discussed in Chapter 16. A summary of the recommended flood control and water quality projects is presented in **Table 18-1**. A summary of the recommended natural systems projects is included in **Table 18-2**. In addition, diagrams summarizing the recommended projects are shown in **Figures 18-1** through **18-35**. The estimated total capital cost of implementing the recommended flood control/water quality and natural systems projects in the LMR watershed is $30,181,000 and $7,246,000, respectively, for a total estimated capital cost of $37,427,000.

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Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Hillsborough County Florida

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
8.1	The analysis indicated that the Carlton Branch Lake Road crossing is likely to flood during large storm events, thus causing access problems to local residences. Development upstream of Carlton Branch Lake Road has also occurred with no consideration to stormwater runoff treatment because construction of residences has occurred independently, and not as part of a development plan. Therefore, untreated runoff is conveyed to secondary ditches for subsequent discharge to Carlton Branch.	1. Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch 2. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.	$404,000	1
6.4	Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.	· Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure with an invert elevation equal to the current weir crest elevation for storage recovery.	$20,000	2
1.1	Flooding problems have been reported on Gulf City Road in the Lower LMR Basin. Existing conditions model analysis predicts street flooding depths of more than 6 inches at the crossing between Manatee Harbor Road and Frisbee Road on the north edge of Section 14, T32S R18E. Gulf City Road provides access to all developments located on the south side of the Little Manatee River north of Cockroach Bay Road and west of .S. 41. The area receives agricultural runoff from an approximately 340-acre drainage area.	1. Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures). 2. Construct a 4-acre detention pond for water quality treatment. 3. Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.	$907,000	3

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
7.3	Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.	1. Upgrade Bishop Road culvert crossing with an additional 42-inch RCP. 2. Construct a 15-acre detention pond to catch and treat the runoff upstream of Bishop Road.	$1,435,000	4
3.2	Flooding problems have been reported on Shell Point Road, 13th Street and Atlantic Drive. Existing conditions model analysis predicts street flooding for the 2.33-year design event along Shell Point Road, 13th Street NE, 12th Street NE and Atlantic Drive. Street flooding depths on Shell Point Road for the 25-year event range from 0.6 - 1.0 foot above the road. Structural flooding is predicted for the 25-year event in the development south of Atlantic Drive along with 2.9 feet of street flooding.	1. Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main ditch. 2. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive. 3. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.	$2,061,000	5
4.1	The Sundance area in the Curiosity Creek basin is a single-family residential neighborhood that is drained through a system of man-made canals. No flooding problems have been identified, but the area has no stormwater treatment facilities. At the canal's discharge point, runoff is conveyed into an undeveloped area that is part of the LMR floodplain, from where it flows into the river. One portion of the downstream canal parallels an undeveloped area covered with wetland and upland vegetation. It is likely that the construction of the canal reduced the hydration opportunities in that area.	1. Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert. 2. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.	$3,353,000	6

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
7.1	Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.	1. Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert. 2. Acquire approximately 46-acre property and construct a storage/treatment facility on disturbed area downstream of Saffold Road.	$5,320,000	7
6.5	Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.	· Acquire and develop as an off-line regional water quality treatment facility an 80-acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.	$13,458,000	8
7.5	Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.	1. Retrofit existing golf course pond in St. Andrews subdivision. 2. Construct online 4.6-acre pond.	$550,000	9

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
2.1	An isolated natural area is located west of 12th Street NE and north of 11th Avenue NE in Ruskin. This area was identified as a "Biodiversity Hotspot" based on the Florida Fish and Wildlife Conservation Commission. However, currently this area receives untreated stormwater runoff discharges from the surrounding urban and agricultural land uses that may threaten valuable habitat. In addition, drainage concerns due to needed maintenance of the existing ditches and culverts have been reported downstream, particularly at the intersection of 3rd Street NE and 7th Avenue NE.	1. Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area. 2. Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.	$454,000	10
2.2	An isolated natural area is located west of 12th Street NE and north of 11th Avenue NE in Ruskin. This area was identified as a "Biodiversity Hotspot" based on the Florida Fish and Wildlife Conservation Commission (Cox et.al., 1994). However, currently this area receives untreated stormwater runoff discharges from the surrounding urban and agricultural land uses that may threaten valuable habitat. In addition, drainage concerns due to needed maintenance of the existing ditches and culverts have been reported downstream, particularly at the intersection of 3rd Street NE and 7th Avenue NE.	1. Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE. 2. Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.	$607,000	11

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
3.1	Flooding problems have been reported on Shell Point Road, 13th Street and Atlantic Drive. Existing conditions model analysis predicts street flooding for the 2.33-year design event along Shell Point Road, 13th Street NE, 12th Street NE and Atlantic Drive. Street flooding depths on Shell Point Road for the 25-year event range from 0.6 - 1.0 foot above the road. Structural flooding is predicted for the 25-year event in the development south of Atlantic Drive along with 2.9 feet of street flooding.	1. Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad). 2. Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.	$85,000	12
6.3	Street and structure flooding was reported after a significant September 2001 rainfall in the Sun City Center area near Del Webb Blvd., Brockton Green Drive and Tremont Court. Existing conditions model analysis predicts street flooding for the 10 year design event along Del Webb Blvd. Street flooding depths for the 25 year event are predicted to be over 8 inches and above the road.	1. Replace the four 30-inch RCP's at Del Webb Blvd. with one 4 ft X 12 ft box culvert 2. Clear and Snag channel (west side) from Del Webb Blvd. to approximately 800 ft downstream to improve conveyance. 3. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd. with a new outfall discharging westerly. 4. Regrade swale between houses at the end of Tremont Court to drain toward a northwest stormwater pond. The swale will provide for overflow from a secondary system inlet located in the cul-de-sac.	$232,000	13
7.2	Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.	· Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.	$42,000	14

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
6.1	Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.	· Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.	$64,000	15

Table 18-1
Little Manatee River Watershed Management Plan
Recommended Flood Control and Water Quality Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
7.4	Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.	1. Replace three 36-inch CMPs at unnamed road off Saffold Road with a 6' x 12' box culvert.	$194,000	16
5.1	Existing conditions analysis predicts street flooding for the 5-year design event along Stephens Road. Street flooding depths for the 25-year event are predicted to be over 1.2 feet above the road.	1. Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert. 2. Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.	$398,000	17
6.2	Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.	· Replace the four 29" x 45" ECRPs with a 3' x 20' box culvert under La Jolla Avenue. · Lengthen weir upstream of Cherry Hills Drive from 39' to 120'. · Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.	$597,000	18

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H7.1 - H7.2	Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.	Restoration projects north and south of the main river channel, between Saffold Road and C.R. 579. Regrade and replant streambank vegetation with native plant associations. Implement a monitoring program to evaluate the success of the restoration. Terminate grazing and implement prescribed burning in overgrown pasture areas. Support ongoing efforts to remove exotics and apply efforts to restoration sites. Encourage the practice of agricultural BMPs through education programs.	$1,131,000	1
H4.7	Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.	Restoration project along the main channel at Lightfoot Road, east if I-75. (approximately 113 acres) Regrade and replant streambank vegetation with native plant associations. Implement a monitoring program to evaluate the success of the restoration. Terminate grazing and implement prescribed burning in overgrown pasture areas. Support ongoing efforts to remove exotics and apply efforts to restoration sites. Encourage the practice of agricultural BMPs through education programs.	$505,000	2

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H5.1	Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.	Restoration project on east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres). Regrade and replant streambank vegetation with native plant associations. Implement a monitoring program to evaluate the success of the restoration. Terminate grazing and implement prescribed burning in overgrown pasture areas. Support ongoing efforts to remove exotics and apply efforts to restoration sites. Encourage the practice of agricultural BMPs through education programs.	$720,000	3
H8.1 - H8.3	Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.	Restoration projects west of S.R. 301, on the north and south sides of the Little Manatee River, from C.R. 579 to Grange Hall Loop. Regrade and replant streambank vegetation with native plant associations. Implement a monitoring program to evaluate the success of the restoration. · Terminate grazing and implement evaluate the success of the restoration. Terminate grazing and implement prescribed burning in overgrown pasture areas. Support ongoing efforts to remove exotics and apply efforts to restoration sites. Encourage the practice of agricultural BMPs through education programs.	$2,698,000	4

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H4.3 - H4.6	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project upstream of S.R. 301 on main river channel. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$116,000	5
H3.4	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project at Ruskin Inlet/Marsh Branch. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$44,000	6

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H4.1	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project in Sun City Heritage Park. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$81,000	7
H4.2	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project in Wildcat Park. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$399,000	8

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H3.2	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project in Beaudette (Ruskin) Park. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$483,000	9
H8.10 - H8.11	Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.	Erosion control projects along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop. Stabilize sandy levees along the river with grading and revegetation.	$243,000	10

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H3.3	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project at Ruskin Commongood. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$151,000	11

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H3.1	Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity. Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species – (Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.	Exotic and invasive species removal project at Domino Boat Ramp. Removal of exotic and invasive species in parks and at boat ramps. Replacement with native species. Include education component as part of overall county education efforts.	$177,000	12
H4.8	Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.	Erosion control project along the main river channel at Lightfoot Road, east of I-75 (approximately 113 acres). Stabilize sandy levees along the river with grading and revegetation.	$6,000	13
H5.2	Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.	Erosion control project east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres). Stabilize sandy levees along the river with grading and revegetation.	$76,000	14
H7.3 - H7.5	Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.	Erosion control projects next to Saffold and Willow roads. Stabilize sandy levees along the river with grading and revegetation.	$76,000	15

Table 18-2
Little Manatee River Watershed Management Plan
Recommended Natural Systems Projects

Project Number/Title	Problem Description	Recommended Project Description	Capital Cost	Ranking Number
H8.6 - H8.9	Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.	Erosion control projects next to Leonard Lee Road. Stabilize sandy levees along the river with grading and revegetation.	$114,000	16
H8.4 - H8.5	Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.	Restoration projects west of S.R. 301, on the south side of the river at Saffold Road and C.R. 579. Regrade and replant streambank vegetation with native plant associations. Implement a monitoring program to evaluate the success of the restoration. Terminate grazing and implement prescribed burning in overgrown pasture areas. Support ongoing efforts to remove exotics and apply efforts to restoration sites. Encourage the practice of agricultural BMPs through education programs.	$226,000	17

Preferred Alternatives Figure 18-1

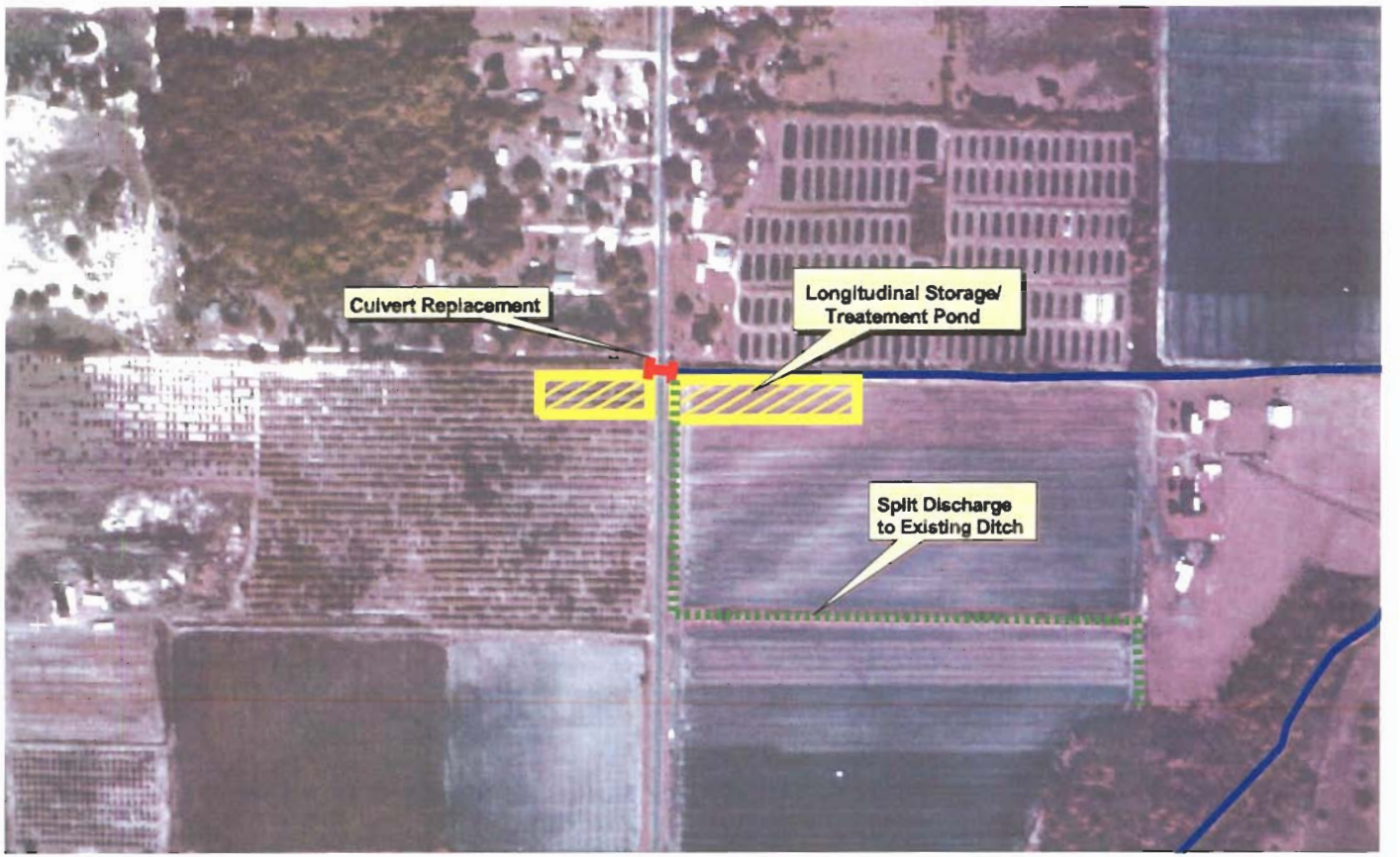
Carlton Branch Improvements

Project 8.1

Priority Ranking 1 of 18

STATEMENT OF PROBLEM

The analysis indicated that the Carlton Branch Lake Road crossing is likely to flood during large storm events, thus causing access problems to local residences.Development upstream of Carlton Branch Lake Road has also occurred with no consideration to stormwater runoff treatment because construction of residences has occurred independently, and not as part of a development plan. Therefore, untreated runoff is conveyed to secondary ditches for subsequent discharge to Carlton Branch.



SOLUTION

1. Parallel the existing 28" x 42" ECMP culvert pipe under Carlton Lake Road with an additional pipe of the same size and split discharge to existing ditch draining southeasterly to Carlton Branch
2. Construct a longitudinal detention pond 800 ft long and 100 ft wide by expanding the existing ditch upstream and downstream of the culvert expansion.

FEATURES

· Flood stages will be reduced to meet levels of service standards for a collector road, while maintaining peak flood stages downstream.
· The pond is sized to treat 0.25 inches of runoff from the upstream drainage area.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$229,000
Land Acquisition	$60,000
Engineering and Contingency	$115,000
TOTAL	**$404,000**

- Culvert
- Primary Stormwater System
- Water Treatment
- Split Discharge

Preferred Alternatives Figure 18-2

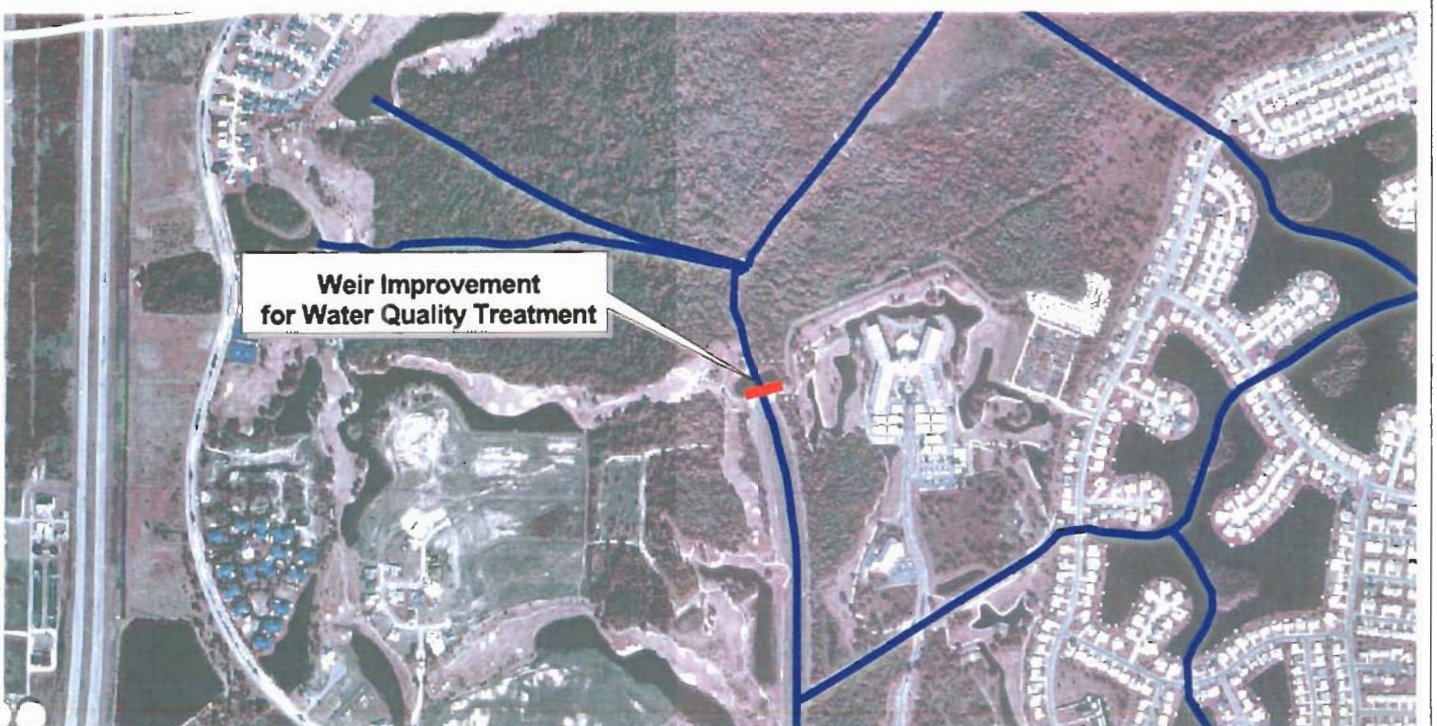
Sun City Center-Kings Point Subdivision Improvements

Project 6.4

Priority Ranking 2 of 18

STATEMENT OF PROBLEM

Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.



SOLUTION

· Raise Cypress Creek control weir (located approximately 1,000 ft west of the northern end of American Eagle Boulevard) by 6 inches to create a temporary storage for water quality treatment of the Caloosa Country Club estates area, north of Sun City Center Boulevard. Install a 4" PVC pipe across the weir structure wiht an invert elevation equal to the current weir crest elevation for storage recovery.

FEATURES

· The Cypress Creek weir would provide runoff treatment for 0.5" of runoff from the contributing area (50% of that required for new development).
· The installation of the Cypress Creek weir may result in permitting objections due to the impact to the change in hydration periods. However, those changes should not have a significant impact on the existing vegetation as water runoff storage would be recovered in approximately 48 hours.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$15,000
Land Acquisition	$0
Engineering and Contingency	$5,000
TOTAL	**$20,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-3

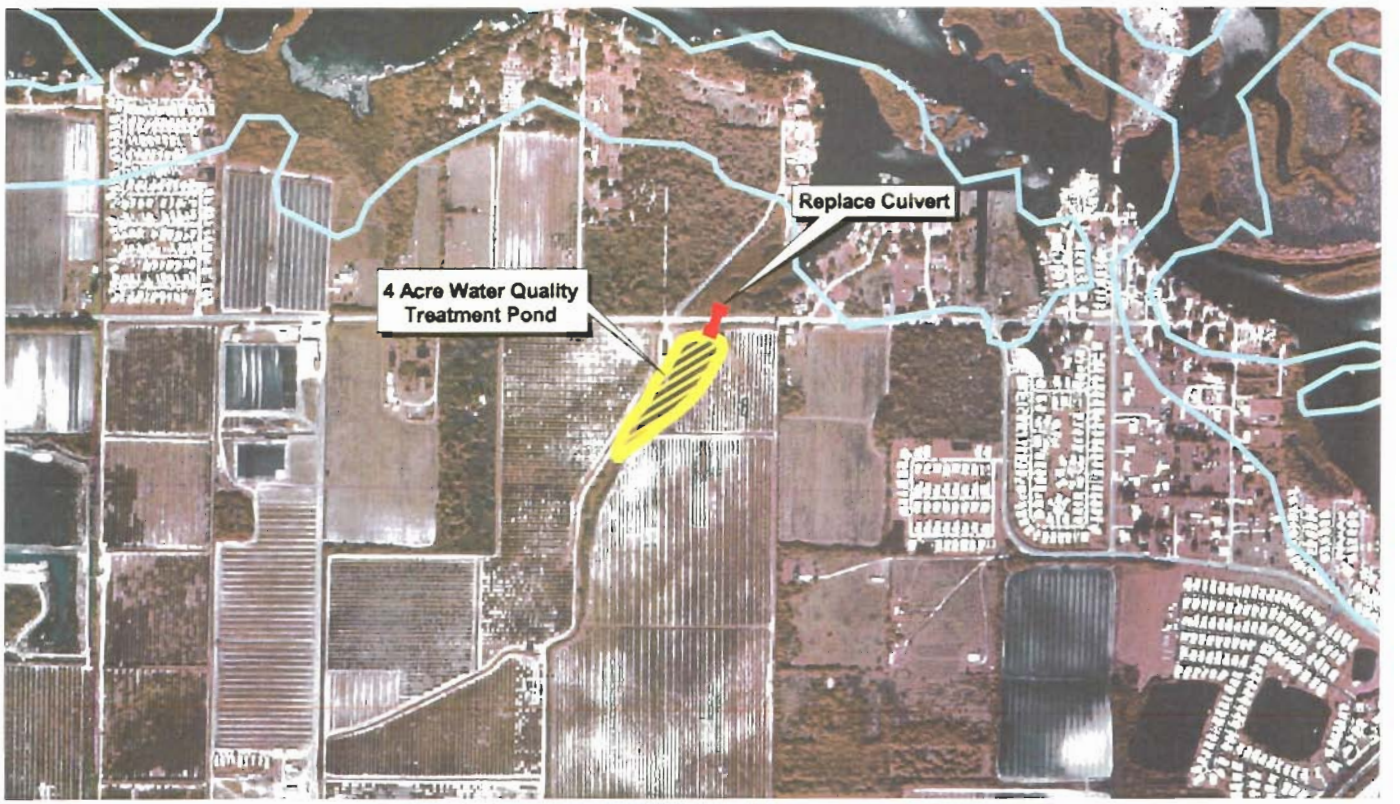
Gulf City Road Improvements

Project 1.1

Priority Ranking 3 of 18

STATEMENT OF PROBLEM

Flooding problems have been reported on Gulf City Road in the Lower LMR Basin. Existing conditions model analysis predicts street flooding depths of more than 6 inches at the crossing between Manatee Harbor Road and Frisbie Road on the north edge of Section 14, T32S R18E. Gulf City Road provides access to all developments located on the south side of the Little Manatee River north of Cockroach Bay Road and west of U.S. 41. The area receives agricultural runoff from an approximately 340-acre drainage area.



SOLUTION

1. Replace the two existing 48-inch RCPs with three 66-inch RCPs (a detailed survey would indicate if it would be preferable to add two 66-inch RCPs to the existing structures).
2. Construct a 4-acre detention pond for water quality treatment.
3. Encourage implementation of non-structural BMPs in the drainage area including nutrient and pesticide management and crop residue use.

FEATURES

- The proposed culvert improvements would eliminate road flooding conditions for the 25-year storm event.
- The detention pond would provide water quality treatment for approximately 0.25" of runoff (25% of that required for new development).
- Water quality credits could be sold at the runoff treatment facility when the area is developed.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$597,000
Land Acquisition	$100,000
Engineering and Contingency	$210,000
TOTAL	**$907,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-4

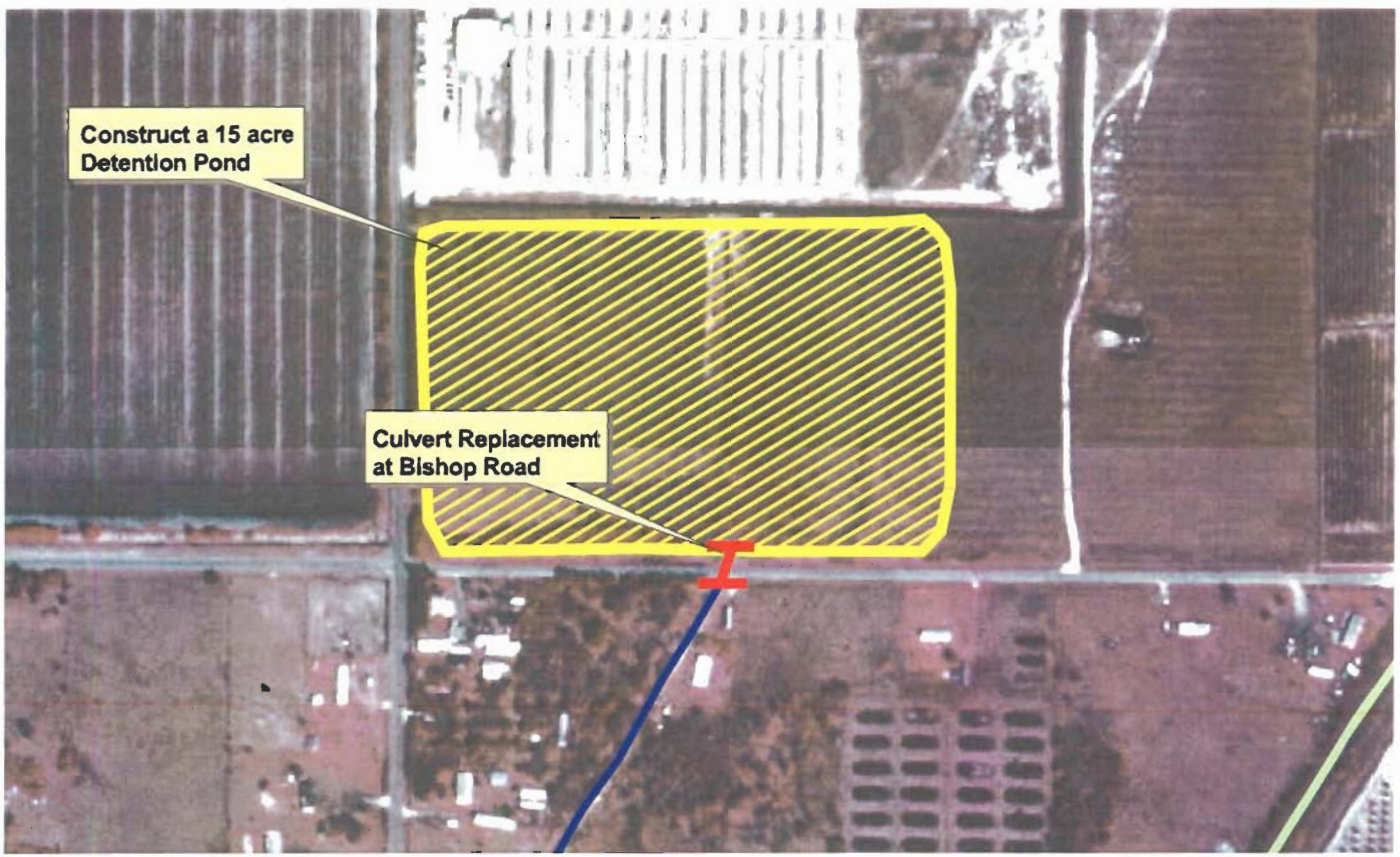
Dug Creek Area Improvements

Project 7.3

Priority Ranking 4 of 18

STATEMENT OF PROBLEM

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.



SOLUTION

1. Upgrade Bishop Road culvert crossing with an additional 42-inch RCP.
2. Construct a 15-acre detantion pond to catch and treat the runoff upstream of Bishop Road.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.
· The proposed 15-acre pond would provide 1 inch of water quality treatment for the drainage area.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$1,044,000
Land Acquisition	$75,000
Engineering and Contingency	$316,000
TOTAL	**$1,435,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-5

Marsh Branch-Shell Point Road Improvements

Project 3.2

Priority Ranking 5 of 18

STATEMENT OF PROBLEM

Flooding problems have been reported on Shell Point Road, 13th Street and Atlantic Drive. Existing conditions model analysis predicts street flooding for the 2.33-year design event along Shell Point Road, 13th Street NE, 12th Street NE and Atlantic Drive. Street flooding depths on Shell Point Road for the 25-year event range from 0.6 - 1.0 foot above t he road. Structural flooding is predicted for the 25-year event in the development south of Atlantic Drive along with 2.9 feet of street flooding.

SOLUTION

1. Retrofit existing stormsewer outfalls along Atlantic Drive with check valves to avoid backflows from the main ditch.
2. Construct a 15-acre detention pond to catch and treat the runoff upstream of Atlantic Drive.
3. Encourage use of nutrient and pesticide management and residue use in the agricultural area (row crops) upstream of Atlantic Drive.

FEATURES

· Peak stages are reduced by 2.5 feet along Atlantic Drive. A road flooding depth of 4 inches remains for the 25-year event along Atlantic Drive.
· Structural flooding is eliminated in the development south of Atlantic Drive.

· Detention pond treats approximately 0.6 inches of runoff over the contributing drainage area (60% of that required for new development).
· Detention facility is technically feasible and permitable. When the drainage area is developed, water quality credits could be sold at the runoff treatment facility to recover the initial investment.
· Creation of the pond would provide additional natural systems habitat.
· Small water supply benefits would result due to potential aquifer recharge.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$1,044,000
Land Acquisition	$702,000
Engineering and Contingency	$315,000
TOTAL	**$2,061,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-6

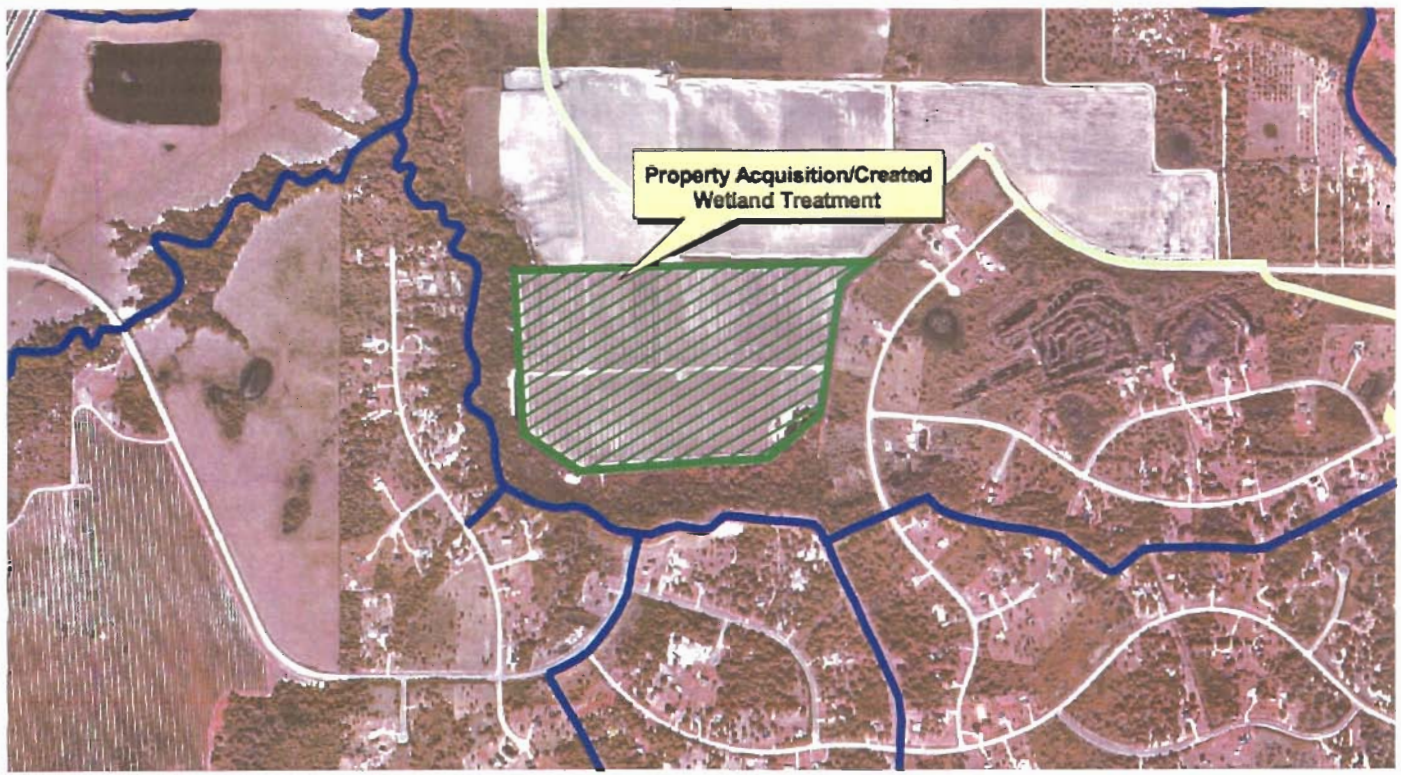
Curiousity Creek- Sundance Subdivision Improvements

Project 4.1

Priority Ranking 6 of 18

STATEMENT OF PROBLEM

The Sundance area in the Curiosity Creek basin is a single-family residential neighborhood that is drained through a system of man-made canals. No flooding problems have been identified, but the area has no stormwater treatment facilities. At the canal's discharge point, runoff is conveyed into an undeveloped area that is part of the LMR floodplain, from where it flows into the river. One portion of the downstream canal parallels an undeveloped area covered with wetland and upland vegetation. It is likely that the construction of the canal reduced the hydration opportunities in that area.



SOLUTION

1. Acquire the approximately Tidewater Growers Inc.100-acre property that is located north of the ditch that receives stormwater flow from the Timberlee Road culvert.
2. Develop a stormwater wetland system in the portion of that property that is currently used for agriculture and integrate it with the existing adjacent natural systems. Design the system to treat stormwater flows equivalent to 0.5 inches of runoff from the Sundance development.

FEATURES

· Treatment of all storms producing one-inch of runoff conforms with treatment requirements for new development.
· The acquisition of the 100-acre property will create continuity of a natural system that has been isolated by agricultural and development activities. In addition, the property borders areas that have been targeted for ELAP acquisition.
· Created wetland system is technically feasible and permitable.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$2,271,000
Land Acquisition	$400,000
Engineering and Contingency	$682,000
TOTAL	**$3,353,000**

N Primary Stormwater System
Watershed Boundary
Wetland Treatment

Department of Public Works
Stormwater Management Section

Preferred Alternatives Figure 18-7

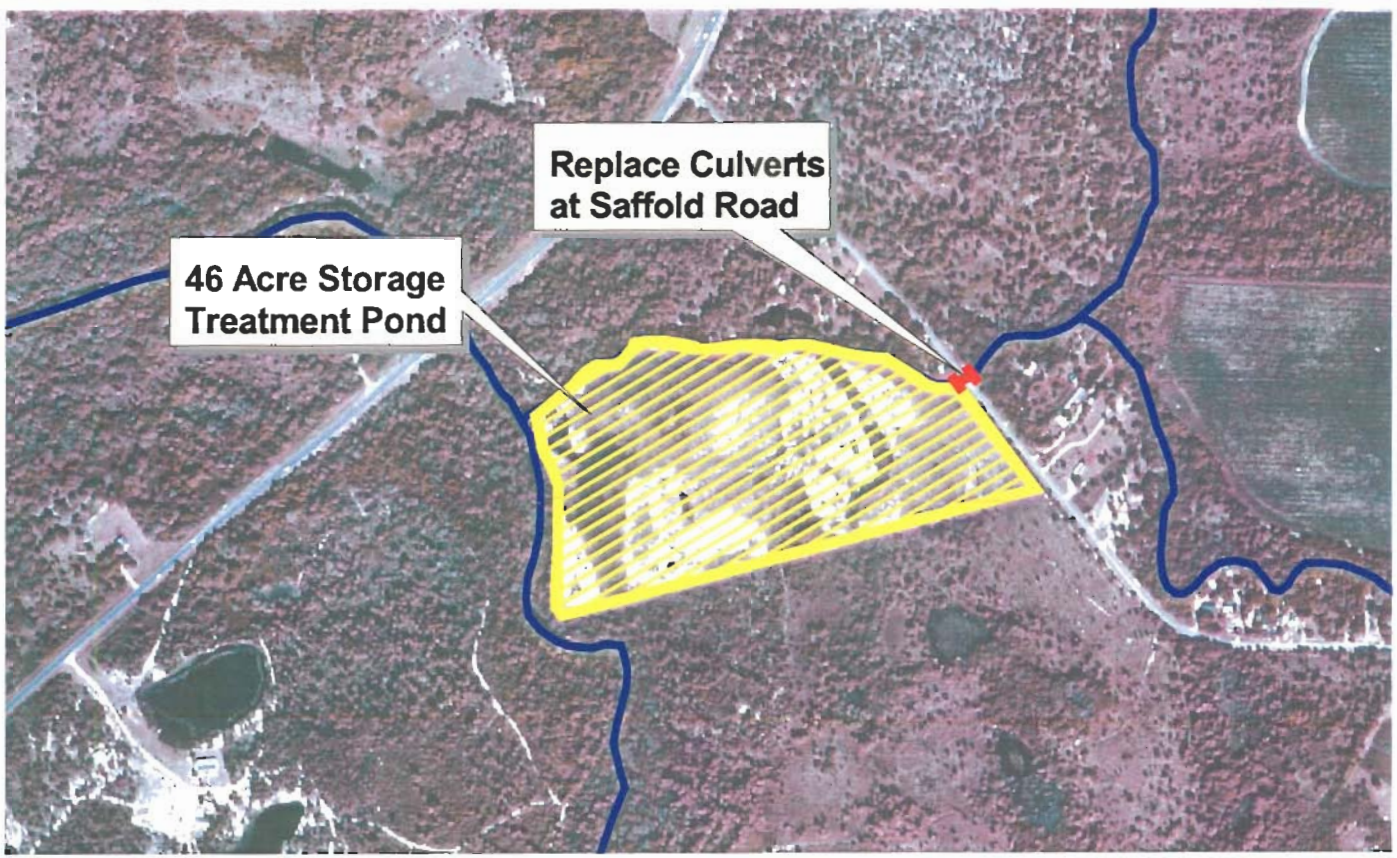
Dug Creek Area Improvements

Project 7.1

Priority Ranking 7 of 18

STATEMENT OF PROBLEM

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.



SOLUTION

1. Replace five 84-inch CMPs at Saffold Road with a 7' x 50' box culvert.
2. Acquire approximately 46-acre property and construct a storage/ treatment facility on disturbed area downstream of Saffold Road.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.
· The 46-acre pond provides 0.25 inches of runoff treatment for the drainage area.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$3,940,000
Land Acquisition	$250,000
Engineering and Contingency	$1,380,000
TOTAL	**$5,320,000**

- Culvert
- Primary Stormwater System
- Watershed Boundary
- Water Treatment

Preferred Alternatives Figure 18-8

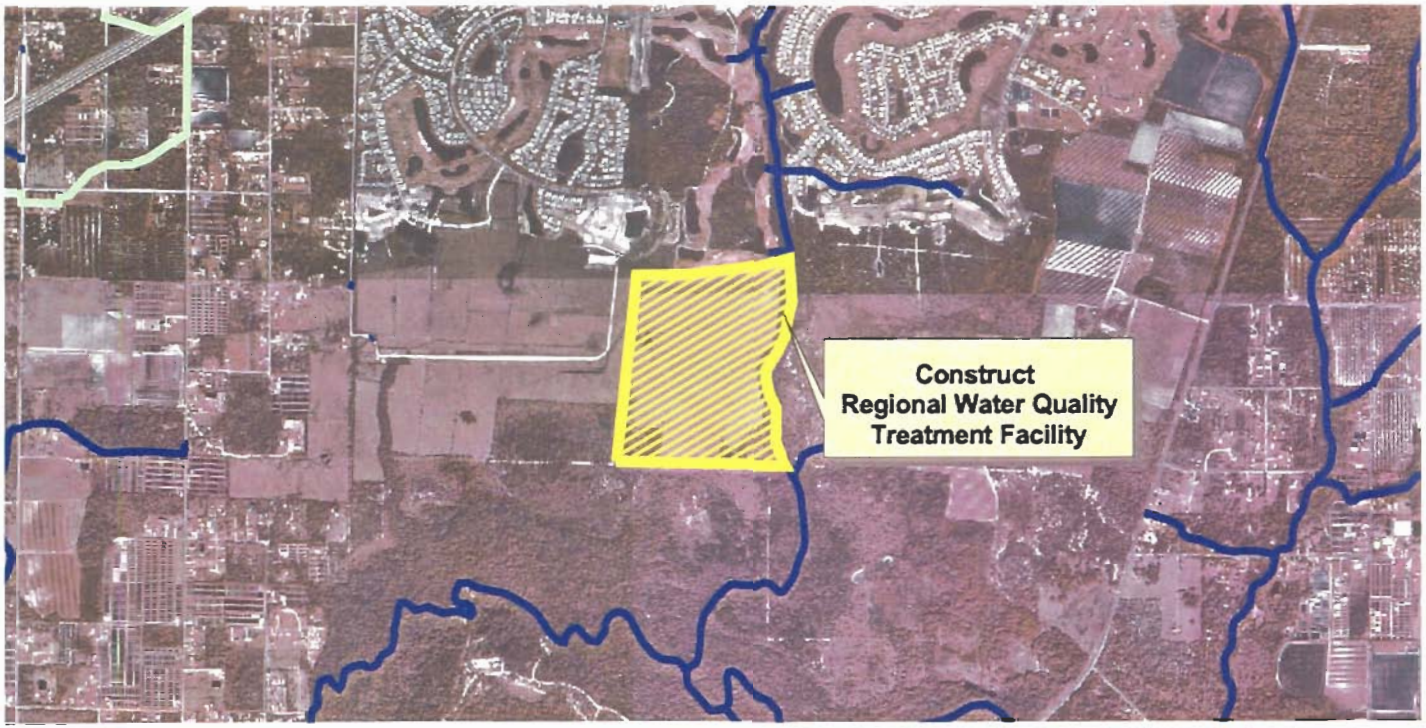
Sun City Center-Kings Point Subdivision Improvements

Project 6.5

Priority Ranking 8 of 18

STATEMENT OF PROBLEM

Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.



SOLUTION

· Acquire and develop as an off-line regional water quality treatment facility an 80--acre piece of land located on the west side of the Cypress Creek main branch, south of Kings Boulevard (NE corner of S24 T32S R19E). That area is part of a larger property currently owned by WCI Communities Inc.

FEATURES

· The regional runoff treatment facility would provide 0.25 inches of runoff treatment for the area south of Sun City Center Boulevard. This storage capacity conforms to treatment requirements for new development. However, because the facility will operate in series with the treatment occurring in the Cypress Creek wetland, some flow would experience double treatment.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$9,731,000
Land Acquisition	$320,000
Engineering and Contingency	$3,407,000
TOTAL	**$13,458,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Department of Public Works
Stormwater Management Section

Preferred Alternatives Figure 18-9

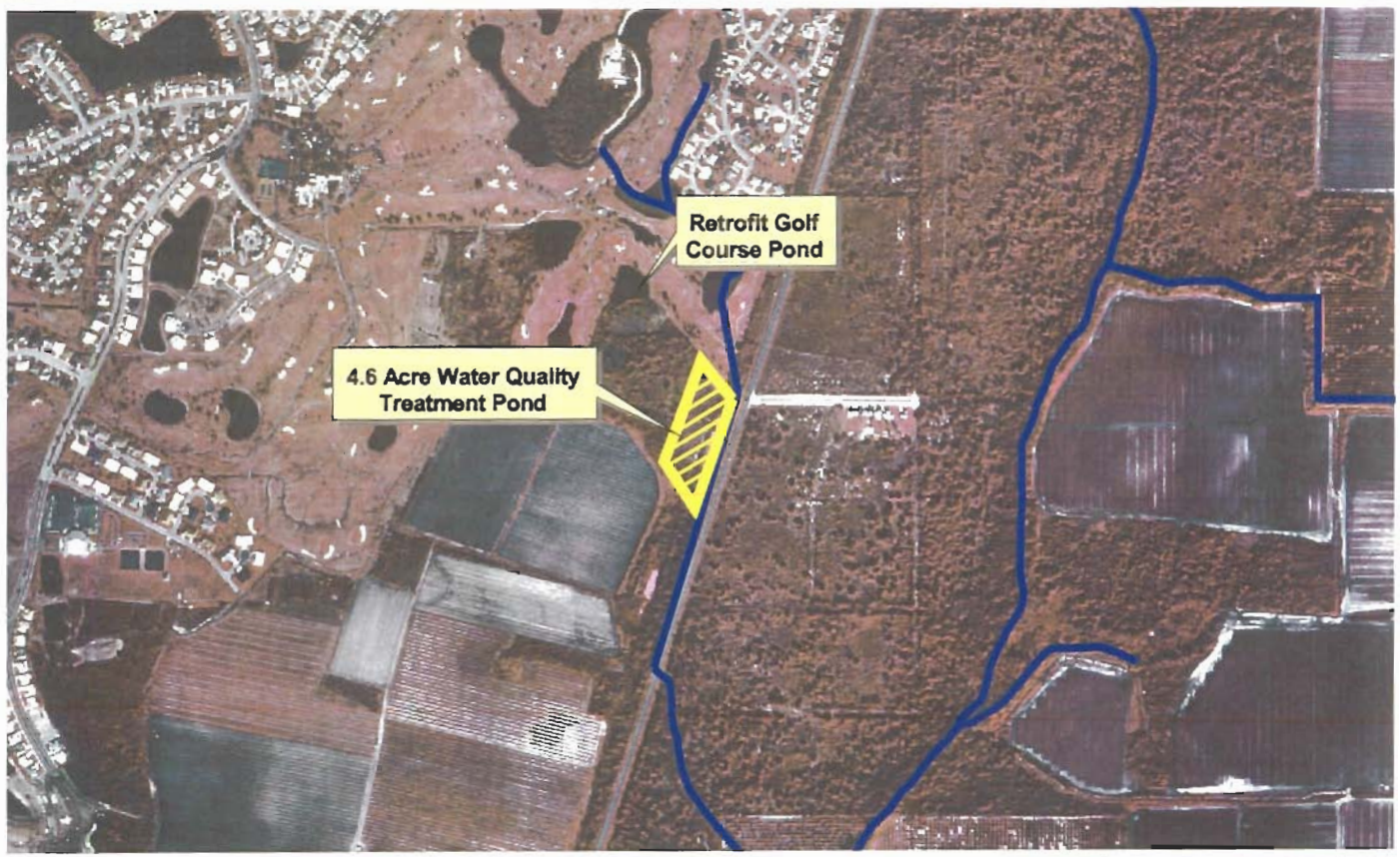
Dug Creek Area Improvements

Project 7.5

Priority Ranking 9 of 18

STATEMENT OF PROBLEM

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.



SOLUTION

1. Retrofit existing golf course pond in St. Andrews subdivision.
2. Construct online 4.6-acre pond.

FEATURES

· The golf course pond improvement and the proposed pond would provide 1 inch of water quality treatment for approximately 190-acre contributing drainage area, which conforms to treatment requirements for new development.
· Retrofitting of existing ponds may be difficult to negotiate with private golf course property owners.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$382,000
Land Acquisition	$25,000
Engineering and Contingency	$143,000
TOTAL	**$550,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Department of Public Works
Stormwater Management Section

Preferred Alternatives Figure 18-10

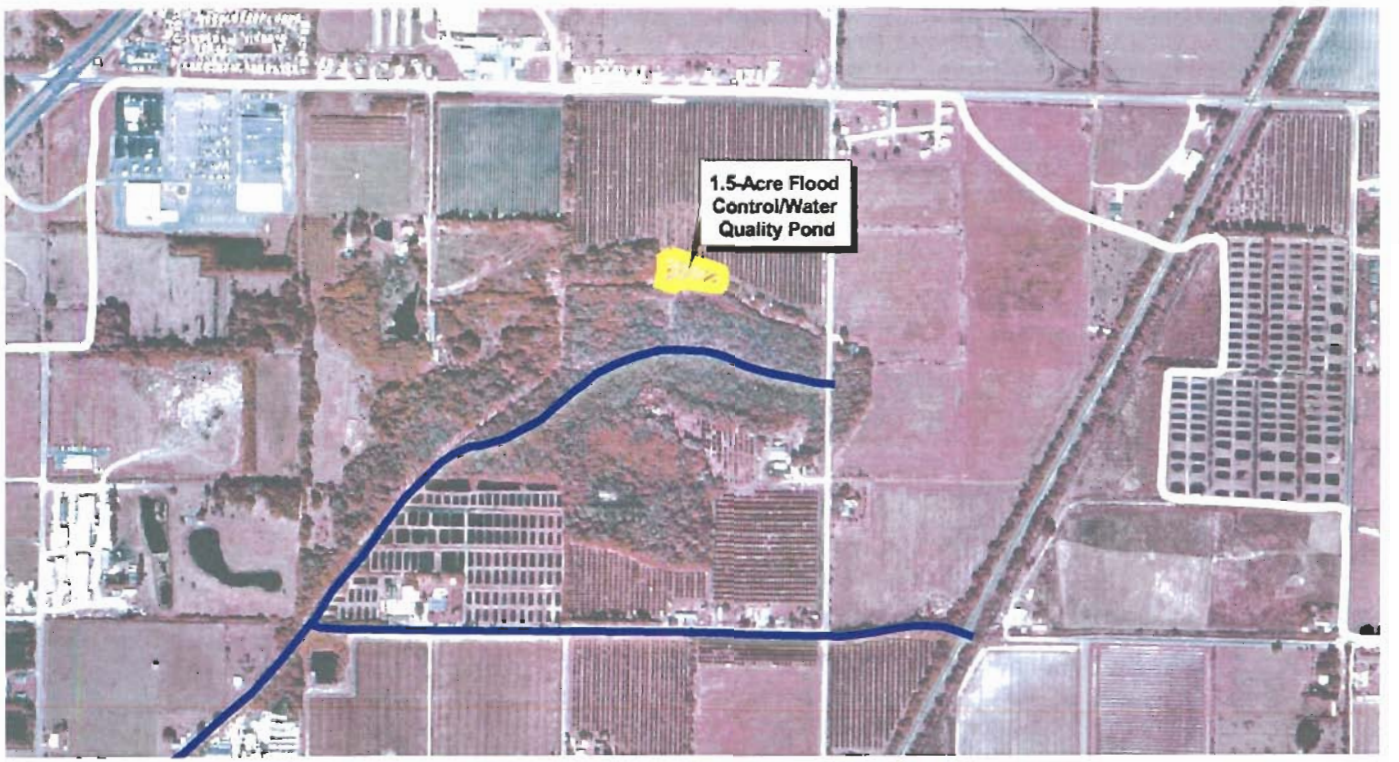
Marsh Branch North Tributary Improvements

Project 2.1

Priority Ranking 10 of 18

STATEMENT OF PROBLEM

An isolated natural area is located west of 12th Street NE and north of 11th Avenue NE in Ruskin. This area was identified as a "Biodiversity Hotspot" based on the Florida Fish and Wildlife Conservation Commission . However, currently this area receives untreated stormwater runoff discharges from the surrounding urban and agricultural land uses that may threaten valuable habitat. In addition, drainage concerns due to needed maintenance of the existing ditches and culverts have been reported downstream, particularly at the intersection of 3rd Street NE and 7th Avenue NE.



SOLUTION

1. Construct a 1.5-acre detention pond to catch and treat the runoff from the adjacent citrus grove on the north side of the natural area.
2. Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.

FEATURES

· The detention ponds provide protection to the threatened natural area.
· The 1.5-acre detention pond would provide treatment for approximately 0.5 inches of runoff detention over the drainage area (50% of that required for new development).
· Detention facilities are technically feasible and permitable. When the drainage area upstream of both runoff treatment facilities is developed, water quality credits could be sold to recover the initial investment.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$293,000
Land Acquisition	$58,000
Engineering and Contingency	$103,000
Total	**$454,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-11

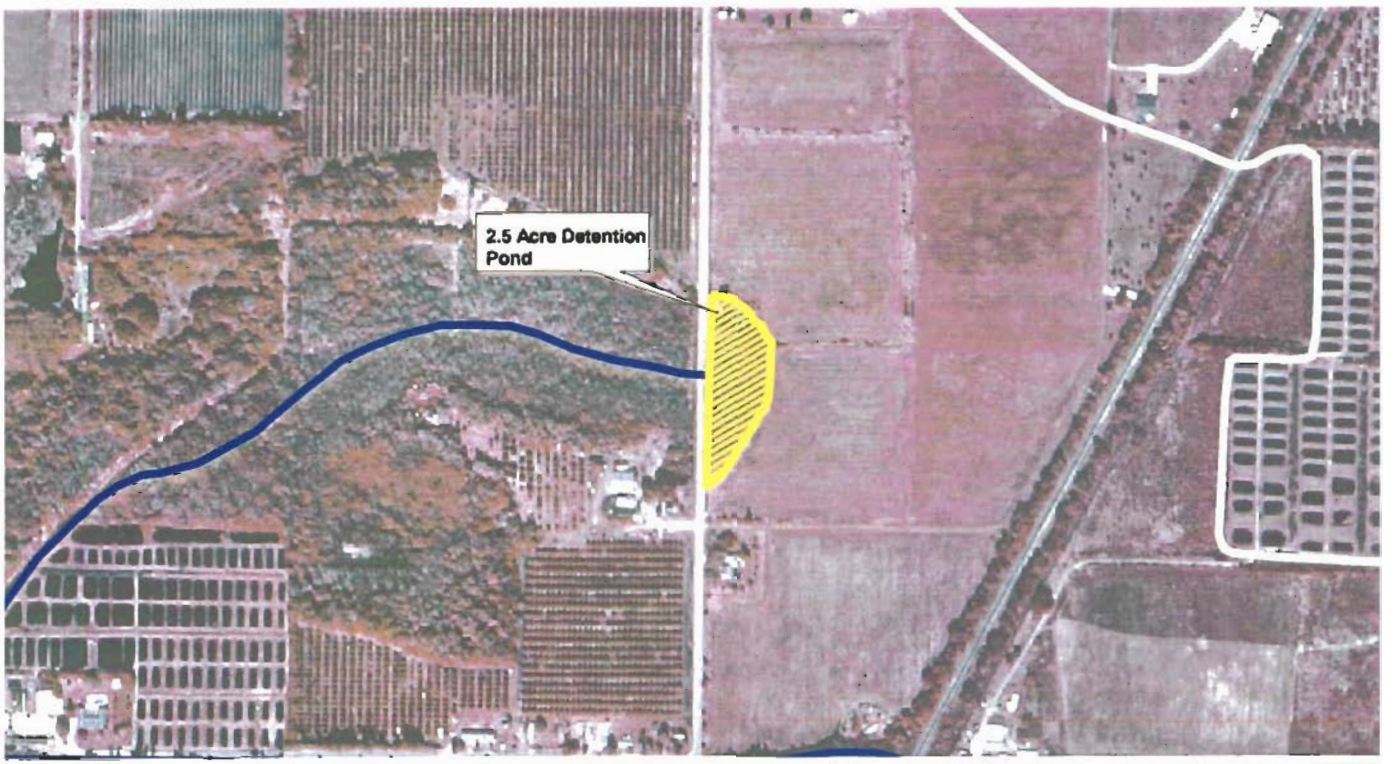
Marsh Branch North Tributary Improvements

Project 2.2

Priority Ranking 11 of 18

STATEMENT OF PROBLEM

An isolated natural area is located west of 12th Street NE and north of 11th Avenue NE in Ruskin. This area was identified as a "Biodiversity Hotspot" based on the Florida Fish and Wildlife Conservation Commission (Cox et.al., 1994). However, currently this area receives untreated stormwater runoff discharges from the surrounding urban and agricultural land uses that may threaten valuable habitat. In addition, drainage concerns due to needed maintenance of the existing ditches and culverts have been reported downstream, particularly at the intersection of 3rd Street NE and 7th Avenue NE.



SOLUTION

1. Construct a 2.5-acre detention pond to treat runoff from the drainage area on the east side of 12th Street NE.
2. Encourage application of nutrient management practices and the use of drop irrigation systems in the upstream citrus groves.

FEATURES

· The detention ponds provide protection to the threatened natural area.
· The 2.5-acre detention pond would provide treatment for approximately 1.0 inches of runoff detention over the drainage area (equal to that required for new development).
· Small flood control benefits (less than 2-inch flood depth reduction) downstream at the intersection of 3rd Street NE and 7th Avenue NE due to detention.
· Detention facilities are technically feasible and permitable. When the drainage area upstream of both runoff treatment facilities is developed, water quality credits could be sold to recover the initial investment.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$377,000
Land Acquisition	$98,000
Engineering and Contingency	$132,000
TOTAL	**$607,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-12

Marsh Branch-Shell Point Road Improvements

Project 3.1

Priority Ranking 12 of 18

STATEMENT OF PROBLEM

Flooding problems have been reported on Shell Point Road, 13th Street and Atlantic Drive. Existing conditions model analysis predicts street flooding for the 2.33-year design event along Shell Point Road, 13th Street NE, 12th Street NE and Atlantic Drive. Street flooding depths on Shell Point Road for the 25-year event range from 0.6 - 1.0 foot above t he road. Structural flooding is predicted for the 25-year event in the development south of Atlantic Drive along with 2.9 feet of street flooding.

SOLUTION

1. Replace culverts along the south side of Shell Point Road including: the single 15-inch RCP with three 30-inch RCPs (east of 12th Street); the two 24-inch RCPs and one 18-inch RCP (12th Street crossing) in series with two 36-inch RCPs; and the single 24-inch RCP with 2 42-inch RCPs (east of railroad).
2. Clear and snag railroad ditch (east and west side) from Atlantic Drive to Shell Point Road.

FEATURES

· Peak stages on Shell Point Road are reduced on the average of 1.0 foot for the 25-year event.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$65,000
Land Acquisition	$0
Engineering and Contingency	$20,000
TOTAL	**$85,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-13

Sun City Center-Kings Point Subdivision Improvements

Project 6.3

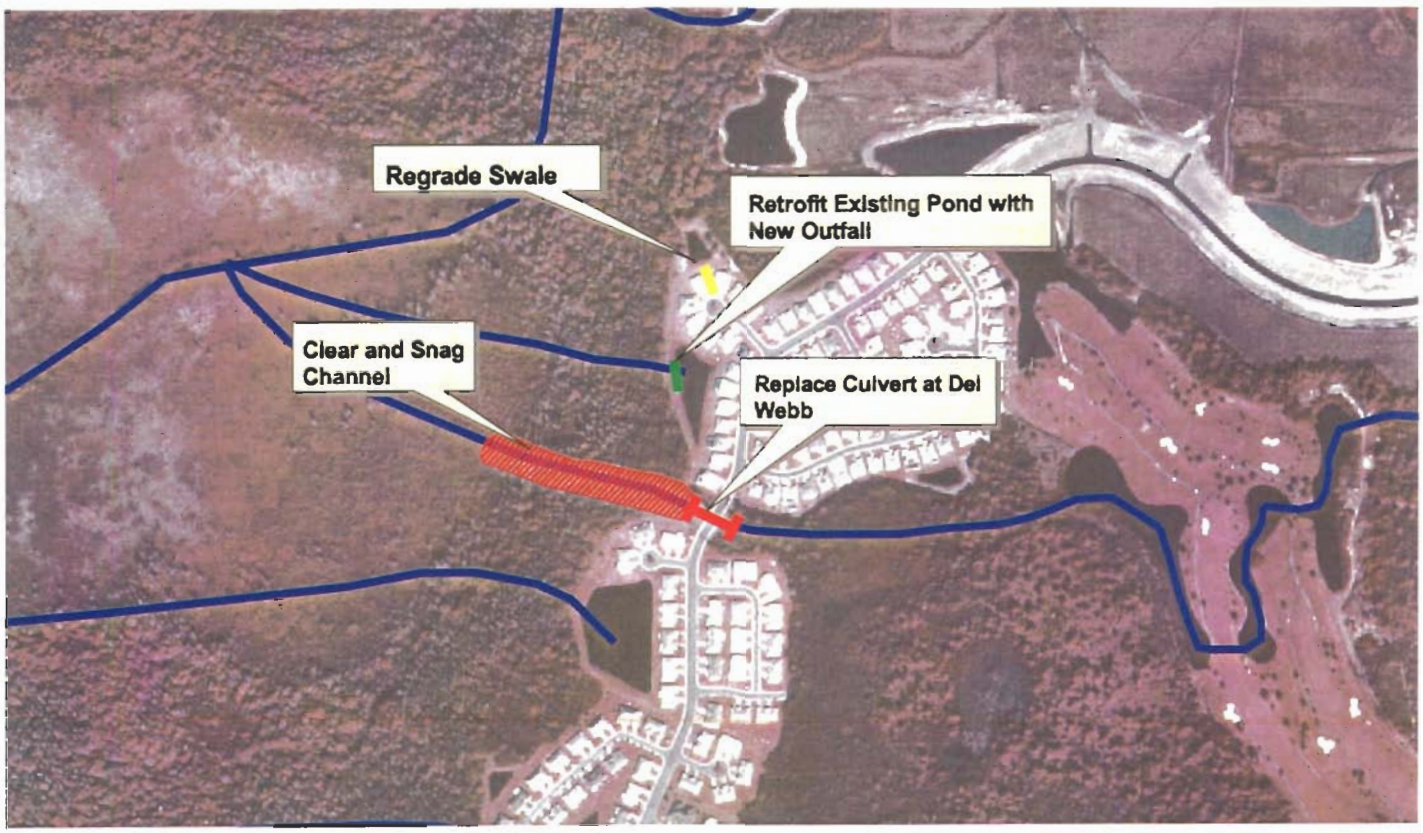
Priority Ranking 13 of 18

STATEMENT OF PROBLEM

Street and structure flooding was reported after a significant September 2001 rainfall in the SunCity Center area near Del Webb Blvd., Brockton Green Drive and Tremont Court. Existing conditions model analysis predicts street flooding for the 10 year design event along Del Webb Blvd. Street flooding depths for the 25 year event are predicted to be over 8 inches and above the road.

SOLUTION

1. Replace the four 30-inch RCP's at Del Webb Blvd. with one 4 ft X 12 ft box culvert
2. Clear and Snag channel (west side) from Del Webb Blvd. to approvimately 800 ft downstream to improve conveyance.
3. Retrofit existing pond southwest of Tremont Court and west of Del Webb Blvd. with a new outfall discharging westerly.
4. Regrade swale between houses at the end of Tremont Court to drain toward a northwest stormwater pond. The swale will provide for overflow from a secondary system inlet located in the cul-da-sac.



FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.
· Structural Flooding is eliminated in the area of Tremont Court and Brockton Green Dr.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$166,000
Land Acquisition	$0
Engineering and Contingency	$66,000
TOTAL	**$232,000**

Culvert
Primary Stormwater System
Swale
Outfall Structure

Preferred Alternatives Figure 18-14

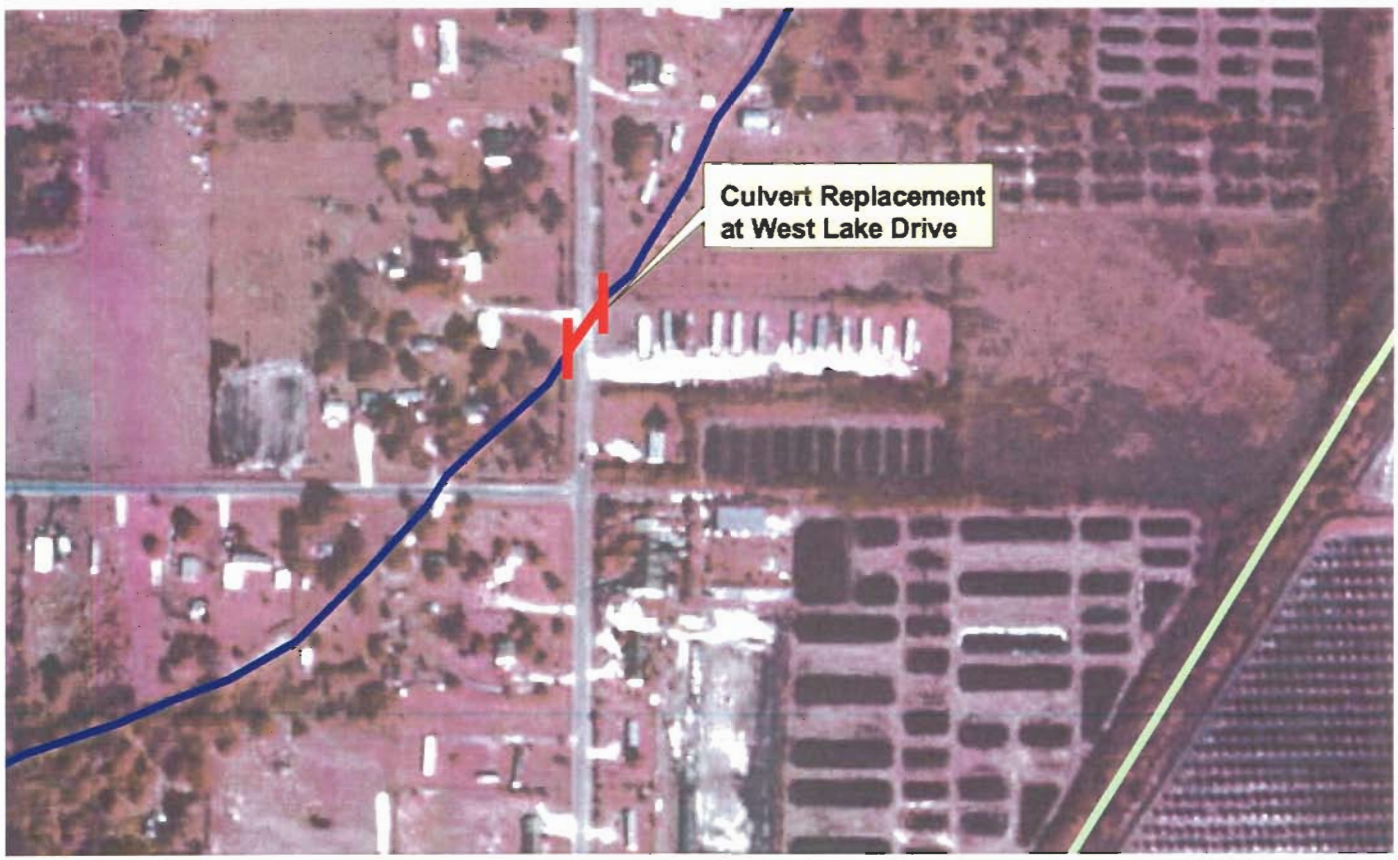
Dug Creek Area Improvements

Project 7.2

Priority Ranking 14 of 18

STATEMENT OF PROBLEM

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.



SOLUTION

· Replace two 36-inch CMPs at West Lake Drive with 3, 36-inch RCPs.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$31,000
Land Acquisition	$0
Engineering and Contingency	$11,000
TOTAL	**$42,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-15

Sun City Center-Kings Point Subdivision Improvements

Project 6.1

Priority Ranking 15 of 18

STATEMENT OF PROBLEM

Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.

SOLUTION

· Upgrade the 54" RCP culvert under South Pebble Beach Boulevard to double 54" RCPs and expand length of control structure from 6' to 18'.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$49,000
Land Acquisition	$0
Engineering and Contingency	$15,000
TOTAL	**$64,000**

- Culvert
- Primary Stormwater System
- Watershed Boundary
- Water Treatment

Preferred Alterntaives Figure 18-16

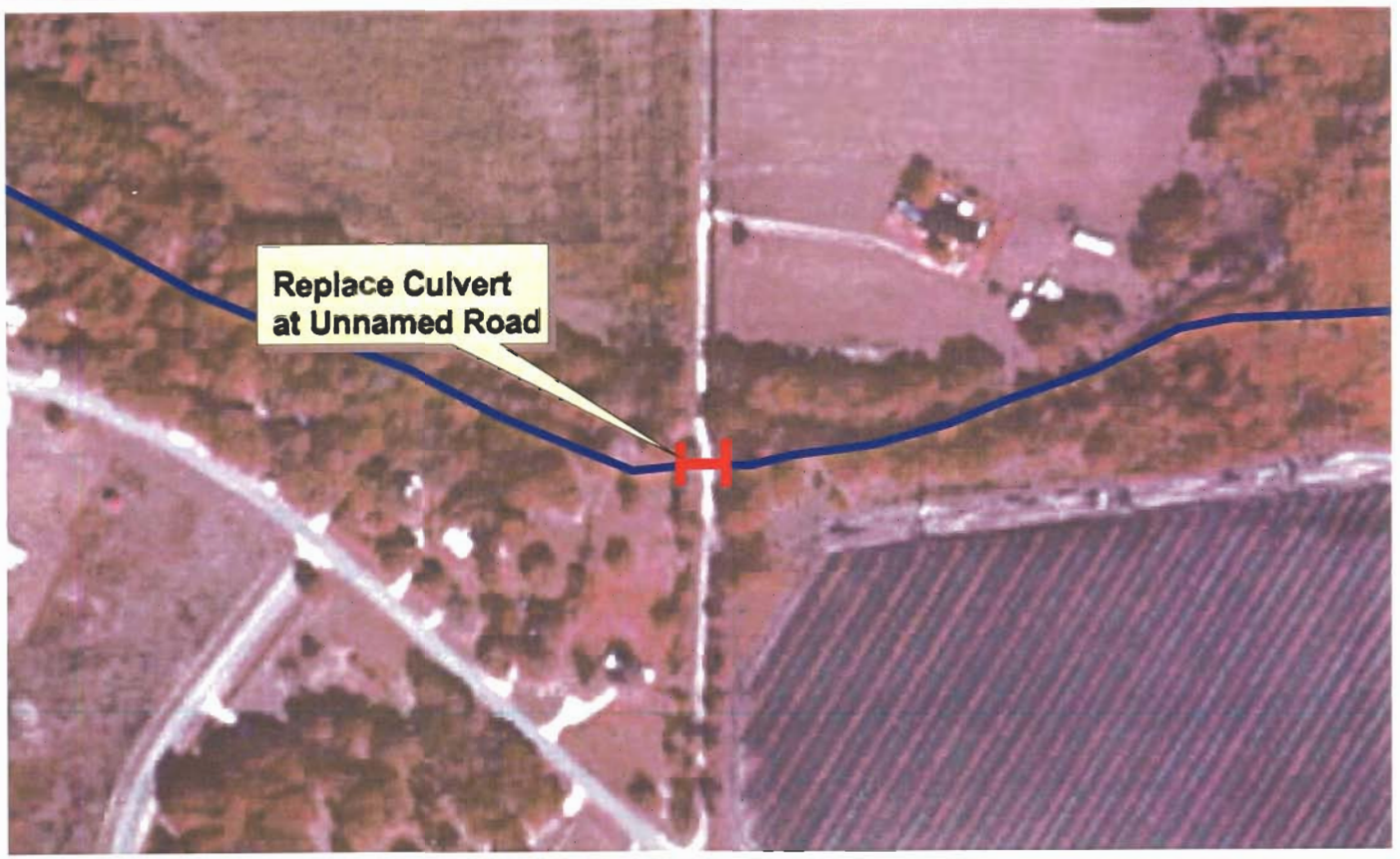
Dug Creek Area Improvements

Project 7.4

Priority Ranking 16 of 18

STATEMENT OF PROBLEM

Flood protection problems have been identified in the Dug Creek area at Saffold Road. Existing conditions model analysis predicts street flooding at Saffold Road, an unnamed road off Saffold Road, West Lake Drive and Bishop Road. Street flooding depths on Saffold Road for the 25-year event exceed 0.5 feet above the road. Street flooding depths are predicted to approach more than 1.5 feet above the road for the 25-year design event at Bishop Road. Untreated stormwater flows discharge from the St. Andrews subdivision and golf course to Dug Creek.



SOLUTION

1. Replace three 36-inch CMPs at unnamed road off Saffold Road with a 4' x 12' box culvert.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$143,000
Land Acquisition	$0
Engineering and Contingency	$51,000
TOTAL	**$194,000**

Culvert
Primary Stormwater System
Watershed Boundary
Water Treatment

Preferred Alternatives Figure 18-17

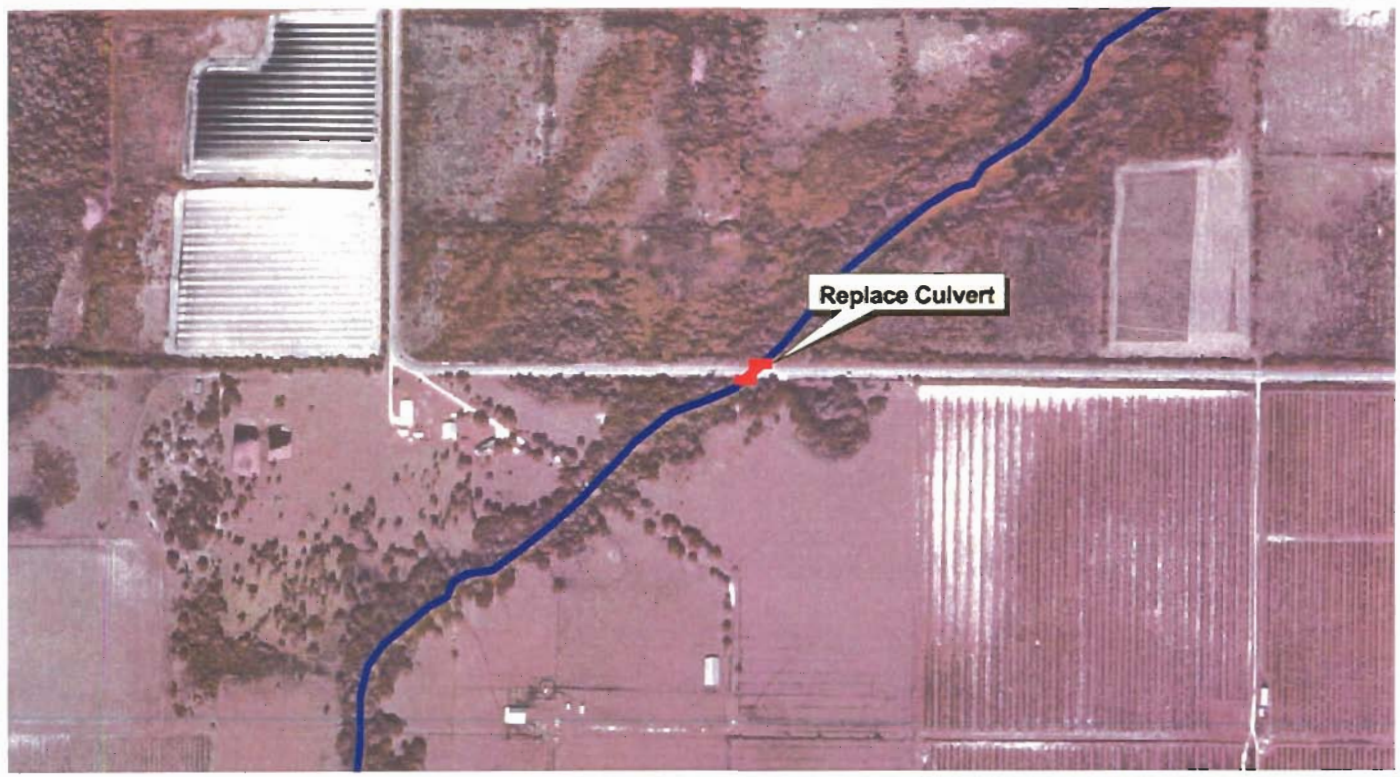
Wildcat Creek-Sun City Slough Improvements

Project 5.1

Priority Ranking 17 of 18

STATEMENT OF PROBLEM

Existing conditions analysis predicts street flooding for the 5-year design event along Stephens Road. Street flooding depths for the 25-year event are predicted to be over 1.2 feet above the road.



SOLUTION

1. Replace the two 54-inch RCPs along Stephens Road with a 6 ft by 24 ft box culvert.
2. Encourage the use of nutrient and pest management practices in the open pasture and hay fields existing upstream. Prescribed grazing and forage harvest are recommended practices applicable to pasture and hay fields, respectively.

FEATURES

- Road flooding is eliminated for the 10-year design storm event. Less than 6 inches of road flooding are anticipated for the 25-year design event.
- Project is technically feasible and permitable. No downstream impacts are expected.
- No water quality or natural systems benefits will result from this project.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$299,000
Land Acquisition	$9,000
Engineering and Contingency	$90,000
TOTAL	**$398,000**

Culvert
Primary Stormwater System
Watershed Boundary

Preferred Alternatives Figure 18-18

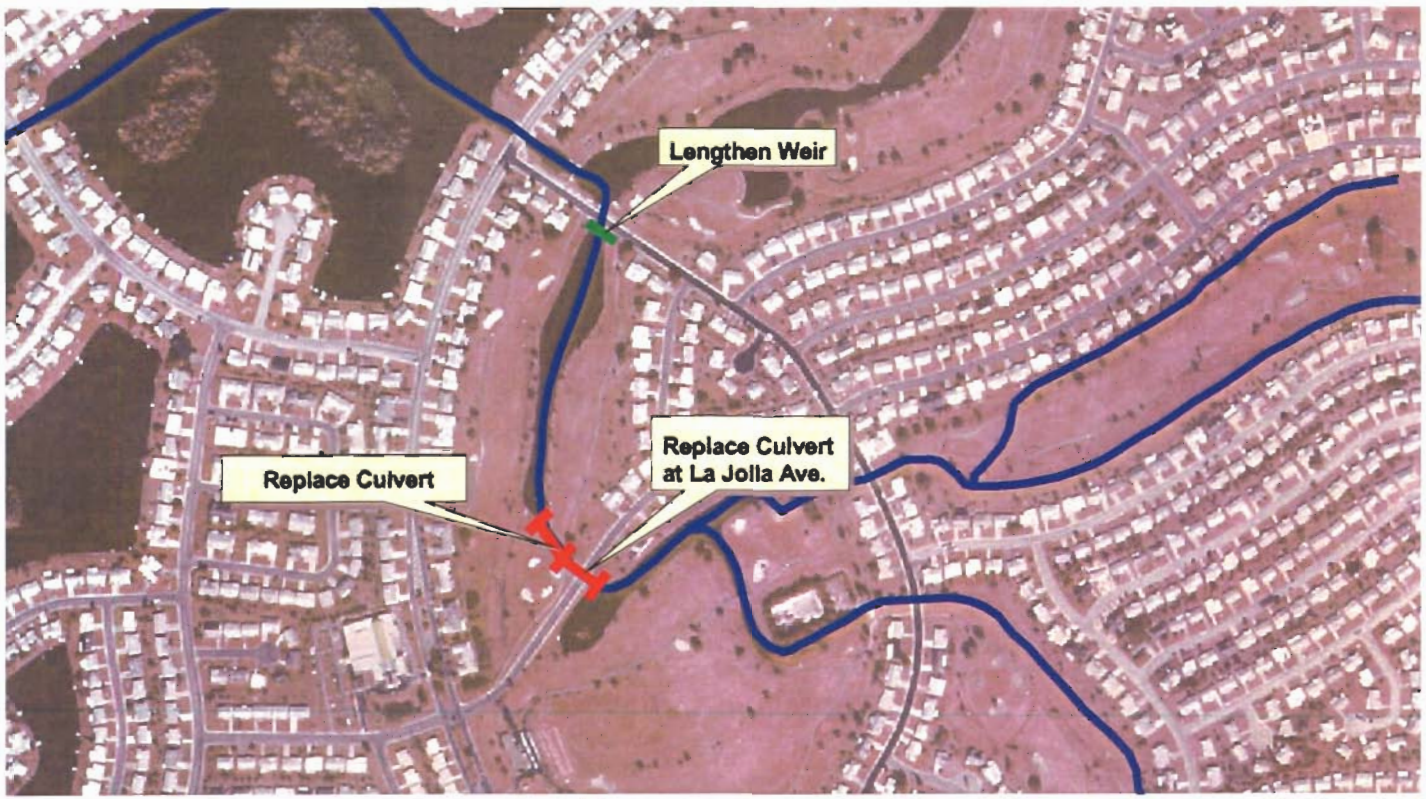
Sun City Center-Kings Point Subdivision Improvements

Project 6.2

Priority Ranking 18 of 18

STATEMENT OF PROBLEM

Both flood protection and water quality problems have been identified in the Sun City Center / Kings Point area. Road flooding has occurred in the area adjacent to Pebble Beach Boulevard and Cherry Hills Drive. Water quality is a problem associated with the entire developed area between U.S. 301 and I-75 because the subdivisions were not designed to include water quality treatment facilities. Untreated stormwater flows discharge to Cypress Creek for subsequent conveyance to the Little Manatee River.



SOLUTION

· Replace the four 29" x 45" ECRPs with a 3' x 20' box culvert at La Jolla Avenue.
· Lengthen weir upstream of Cherry Hills Drive from 39' to 120'.
· Replace existing double 3.3' x 4' box culvert with a 3' x 15' box culvert downstream of La Jolla Avenue.

FEATURES

· Eliminates road flooding for the 25-year 24-hour storm conditions.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$442,000
Land Acquisition	$0
Engineering and Contingency	$155,000
TOTAL	**$597,000**

- Culvert
- Primary Stormwater System
- Watershed Boundary
- Water Treatment

Preferred Alternatives Figure 18-19

Restoration Saffold Road and C.R. 579

Project H7.1 to 7.2

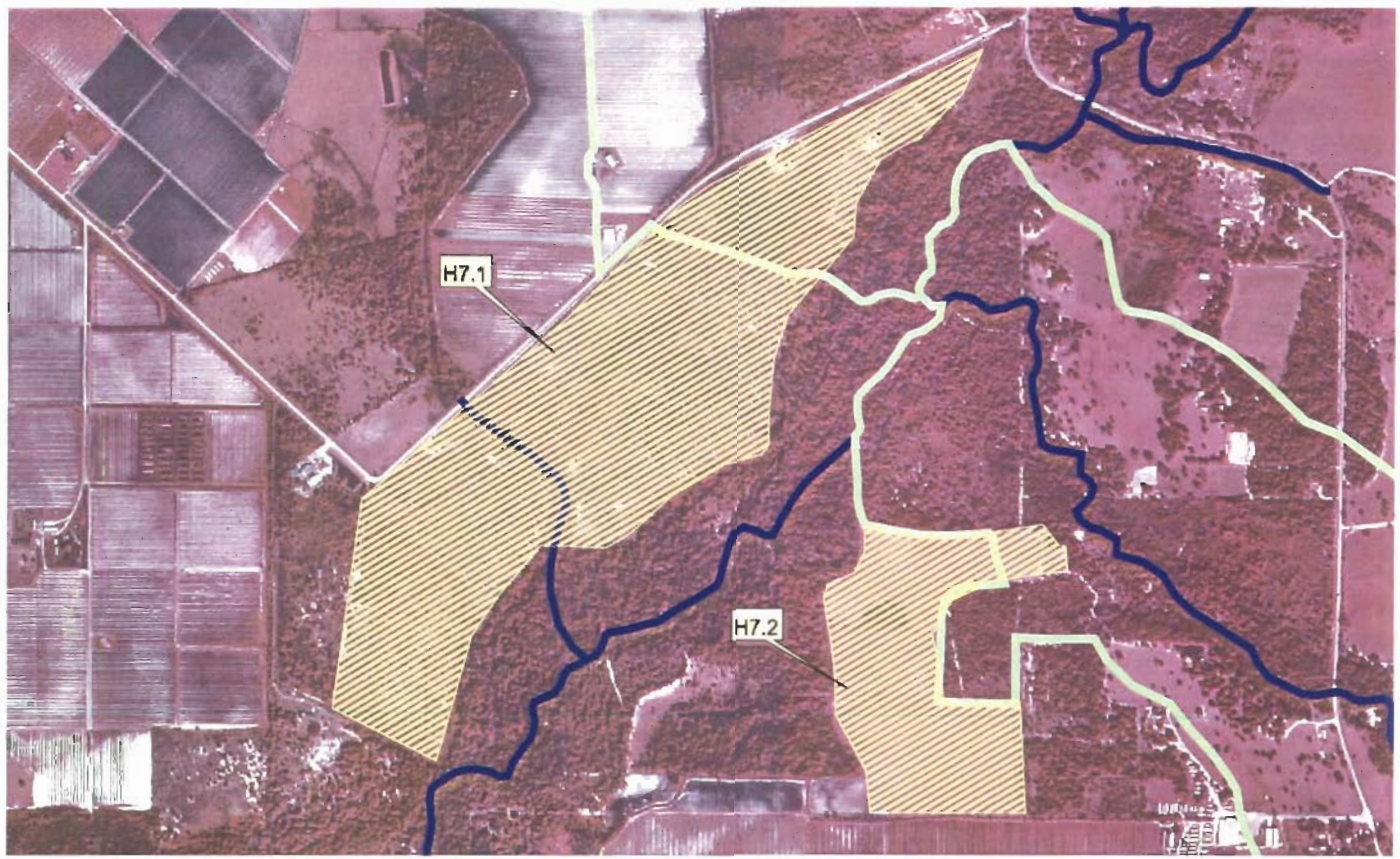
Priority Ranking 1 of 17

STATEMENT OF PROBLEM

. Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.

ACTIONS

· Restoration projects north and south of the main river channel, between Saffold Road. and C.R. 579. (approx. 331 acres) Regrade and replant streambank vegetation with native plant associations.
· Implement a monitoring program to evaluate the success of the restoration.
· Terminate grazing and implement prescribed burning in overgrown pasture areas.
· Support ongoing efforts to remove exotics and apply efforts to restoration sites.
· Encourage the practice of agricultural BMPs through education programs.



FEATURES

· Restoration of stream banks and commensurate wildlife habitat.
· Maintenance of natural communities through active management.
· Decreased spread of invasive species.
· Public education about agricultural BMPs.

COST ESTIMATE

DESCRIPTION	AMOUNT
Restoration	$837,000
Land Acquisition	$0
Engineering and Contingency	$293,000
TOTAL	**$1,130,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-20

Restoration Lightfoot Road

Project H4.7

Priority Ranking 2 of 17

STATEMENT OF PROBLEM

Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.

ACTIONS

· Restoration project along the main channel at Lightfoot Road, east if I-75. (approximately 113 acres).
· Regrade and replant streambank vegetation with native plant associations.
· Implement a monitoring program to evaluate the success of the restoration.
· Terminate grazing and implement prescribed burning in overgrown pasture areas.
· Support ongoing efforts to remove exotics and apply efforts to restoration sites.
· Encourage the practice of agricultural BMPs through education programs.

FEATURES

· Restoration of stream banks and commensurate wildlife habitat.
· Maintenance of natural communities through active management.
· Decreased spread of invasive species.
· Public education about agricultural BMPs.

COST ESTIMATE

DESCRIPTION	AMOUNT
Restoration	$374,000
Land Acquisition	$0
Engineering and Contingency	$131,000
TOTAL	**$505,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-21

Restoration West of 24th Street

Project H5.1

Priority Ranking 3 of 17

STATEMENT OF PROBLEM

. Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.

ACTIONS

· Restoration project on east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).
· Regrade and replant streambank vegetation with native plant associations.
· Implement a monitoring program to evaluate the success of the restoration.
· Terminate grazing and implement prescribed burning in overgrown pasture areas.
· Support ongoing efforts to remove exotics and apply efforts to restoration sites.
· Encourage the practice of agricultural BMPs through education programs.

FEATURES

· Restoration of stream banks and commensurate wildlife habitat.
· Maintenance of natural communities through active management.
· Decreased spread of invasive species.
· Public education about agricultural BMPs.

COST ESTIMATE

DESCRIPTION	AMOUNT
Restoration	$533,000
Land Acquisition	$0
Engineering and Contingency	$187,000
TOTAL	**$720,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-22

Restoration, C.R. 579 to Grange Hall Loop

Project H8.1 to H8.3

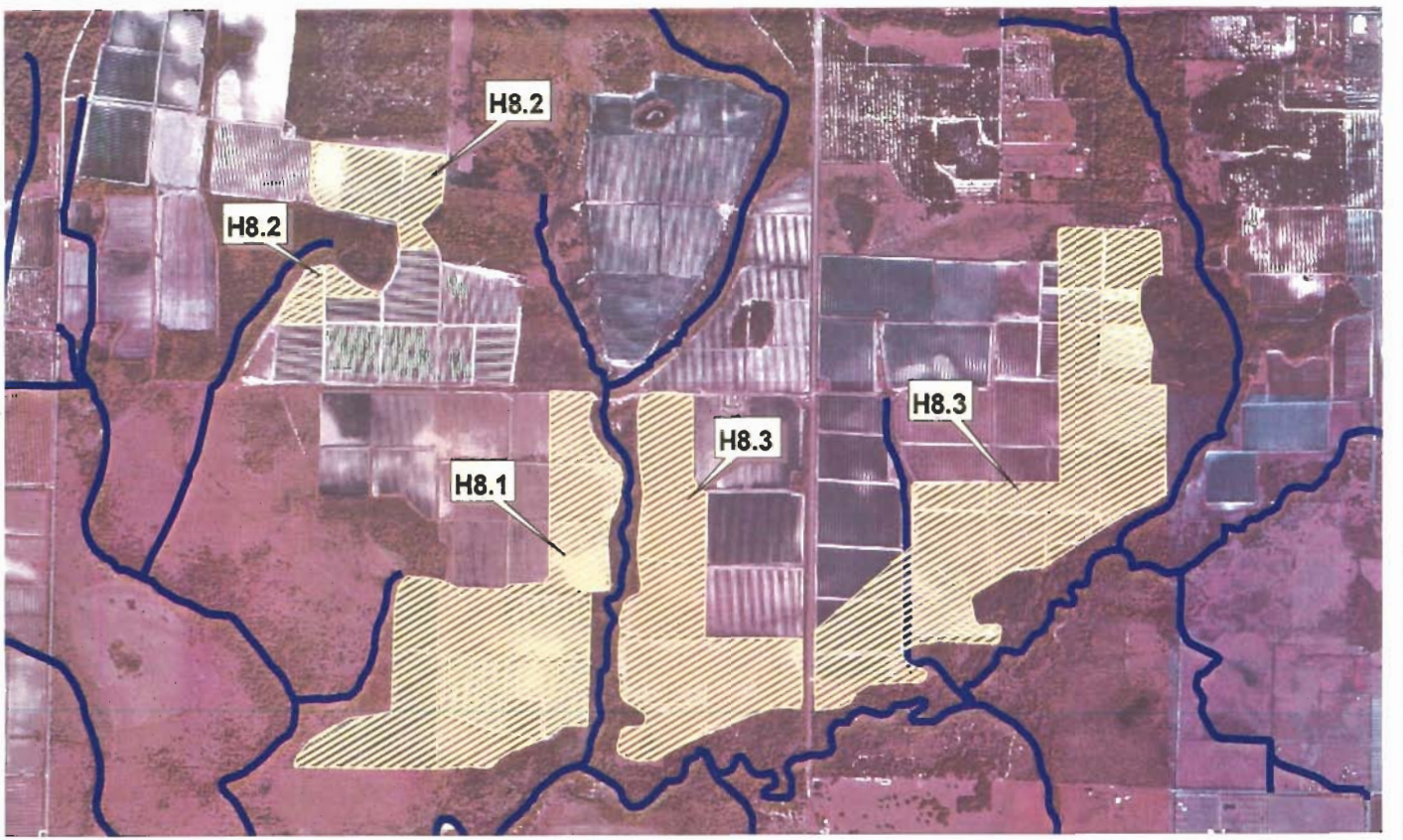
Priority Ranking 4 of 17

STATEMENT OF PROBLEM

. Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.

ACTIONS

· Restoration projects east of S.R. 301, on the north and south sides of the Little Manatee River, from C.R. 579 to Grange Hall Loop. (approximately 500 acres)
· Regrade and replant streambank vegetation with native plant associations.
· Implement a monitoring program to evaluate the success of the restoration.
· Terminate grazing and implement prescribed burning in overgrown pasture areas.
· Support ongoing efforts to remove exotics and apply efforts to restoration sites.
· Encourage the practice of agricultural BMPs through education programs.



FEATURES

· Restoration of stream banks and commensurate wildlife habitat.
· Maintenance of natural communities through active management.
· Decreased spread of invasive species.
· Public education about agricultural BMPs.

COST ESTIMATE

DESCRIPTION	AMOUNT
Restoration	$1,997,000
Land Acquisition	$0
Engineering and Contingency	$699,000
TOTAL	**$2,696,000**

Erosion Control
Restoration
Exotic Species Removal
Primary Stormwater System

Preferred Alternatives Figure 18-23

Restoration, East of S.R. 301, Saffold Rd. & C.R. 579

Project H8.4 to H8.5

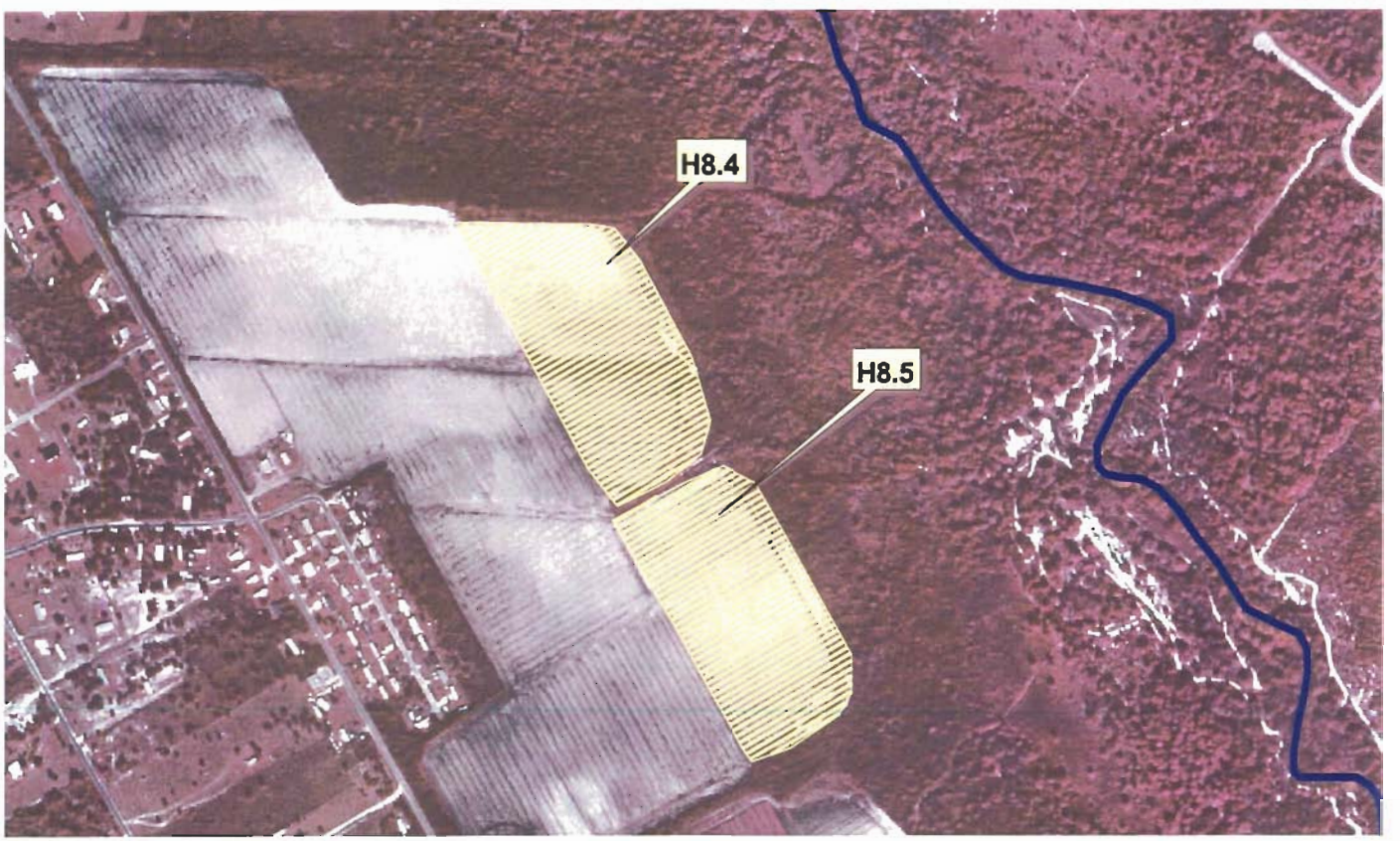
Priority Ranking 5 of 17

STATEMENT OF PROBLEM

Protecting habitat is important for preventing excessive runoff volumes and pollutant loadings, maintaining terrestrial and aquatic biodiversity, protecting stream channel stability, and reducing stream bank erosion. Restoration efforts in the LMR watershed should be focused on areas in the upper and middle portion of the watershed where previous land use activities have resulted in alterations in hydrology and soils. These changes have resulted in loss of habitat due to conversion to croplands and pasture and associated erosion. Soil compaction due to grazing is also a problem in many areas, although without more aggressive burn management, grazing is the means used to control understory vegetation and prevent uncontrolled fires.

ACTIONS

- Restoration projects east of S.R. 301, on the south side of the river at Saffold Road and C.R. 579. (approximately 44 acres)
- Regrade and replant streambank vegetation with native plant associations.
- Implement a monitoring program to evaluate the success of the restoration.
- Terminate grazing and implement prescribed burning in overgrown pasture areas.
- Support ongoing efforts to remove exotics and apply efforts to restoration sites.
- Encourage the practice of agricultural BMPs through education programs.



FEATURES

- Restoration of stream banks and commensurate wildlife habitat.
- Maintenance of natural communities through active management.
- Decreased spread of invasive species.
- Public education about agricultural BMPs.

COST ESTIMATE

DESCRIPTION	AMOUNT
Restoration	$86,000
Land Acquisition	$0
Engineering and Contingency	$30,000
TOTAL	**$116,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-24

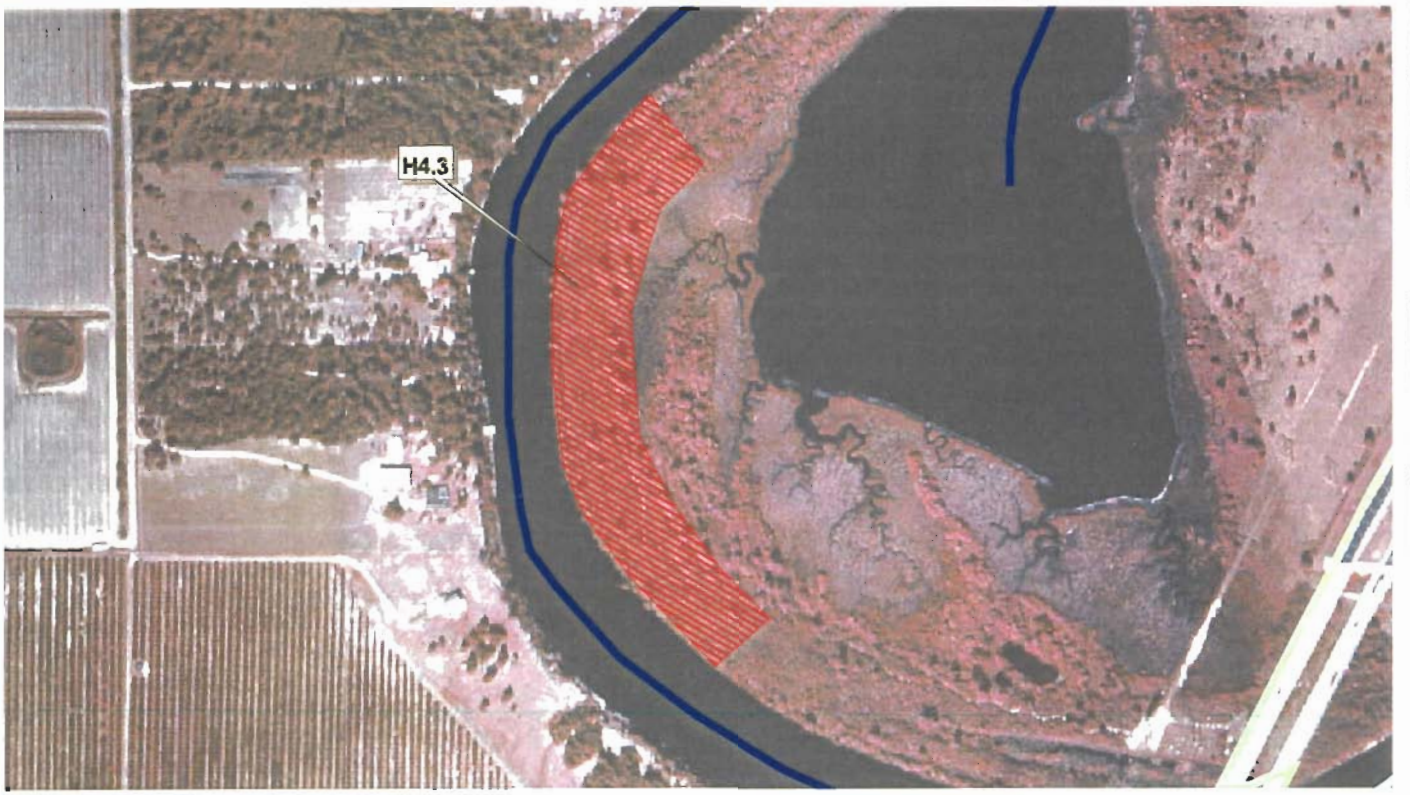
Exotic Species Removal, S.R. 301 Main River Channel

Project H4.3 to H4.6

Priority Ranking 6 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.



ACTIONS

· Exotic and invasive species removal project upstream of S.R. 301 on main river channel. (approx. 4 acres)
· Removal of exotic and invasive species in parks and at boat ramps.
· Replacement with native species.
· Include education component as part of overall county education efforts.

FEATURES

· Restoration of native species and commensurate wildlife habitat.
· Decrease spread of invasive species.
· Increased recreation value.
· Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$32,000
Land Acquisition	$0
Engineering and Contingency	$11,000
TOTAL	**$43,000**

Erosion Control
Restoration
Exotic Species Removal
Primary Stormwater System

Final March 3, 2002
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Department of Public Works
Stormwater Management Section

Preferred Alternatives Figure 18-25

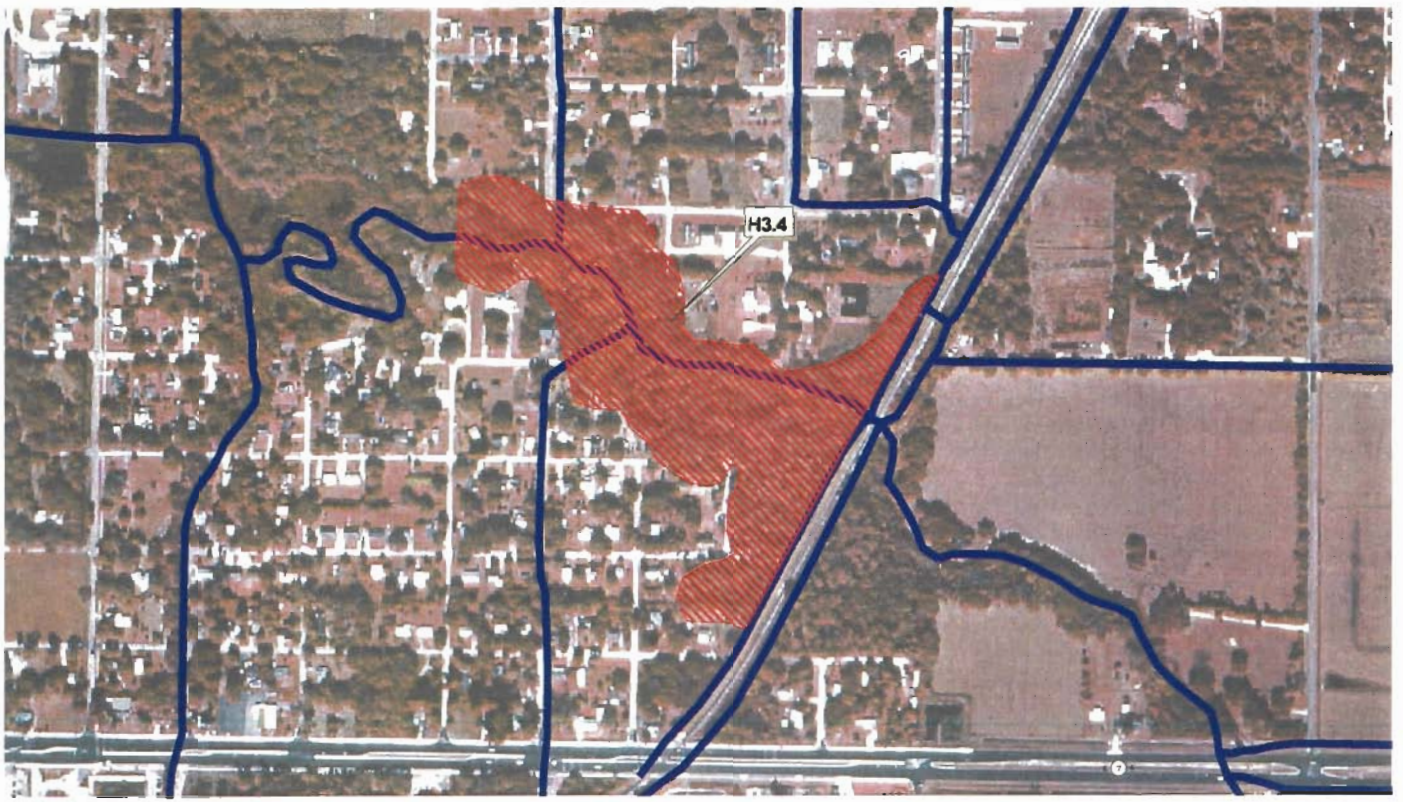
Exotic Species Removal Ruskin Inlet/Marsh Branch

Project H3.4

Priority Ranking 7 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.



ACTIONS

- Exotic and invasive species removal project at Ruskin Inlet/Marsh Branch (approx. 20 acres)
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

FEATURES

- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$60,000
Land Acquisition	$0
Engineering and Contingency	$21,000
TOTAL	**$81,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Final March 3, 2002
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Preferred Alternatives Figure 18-26

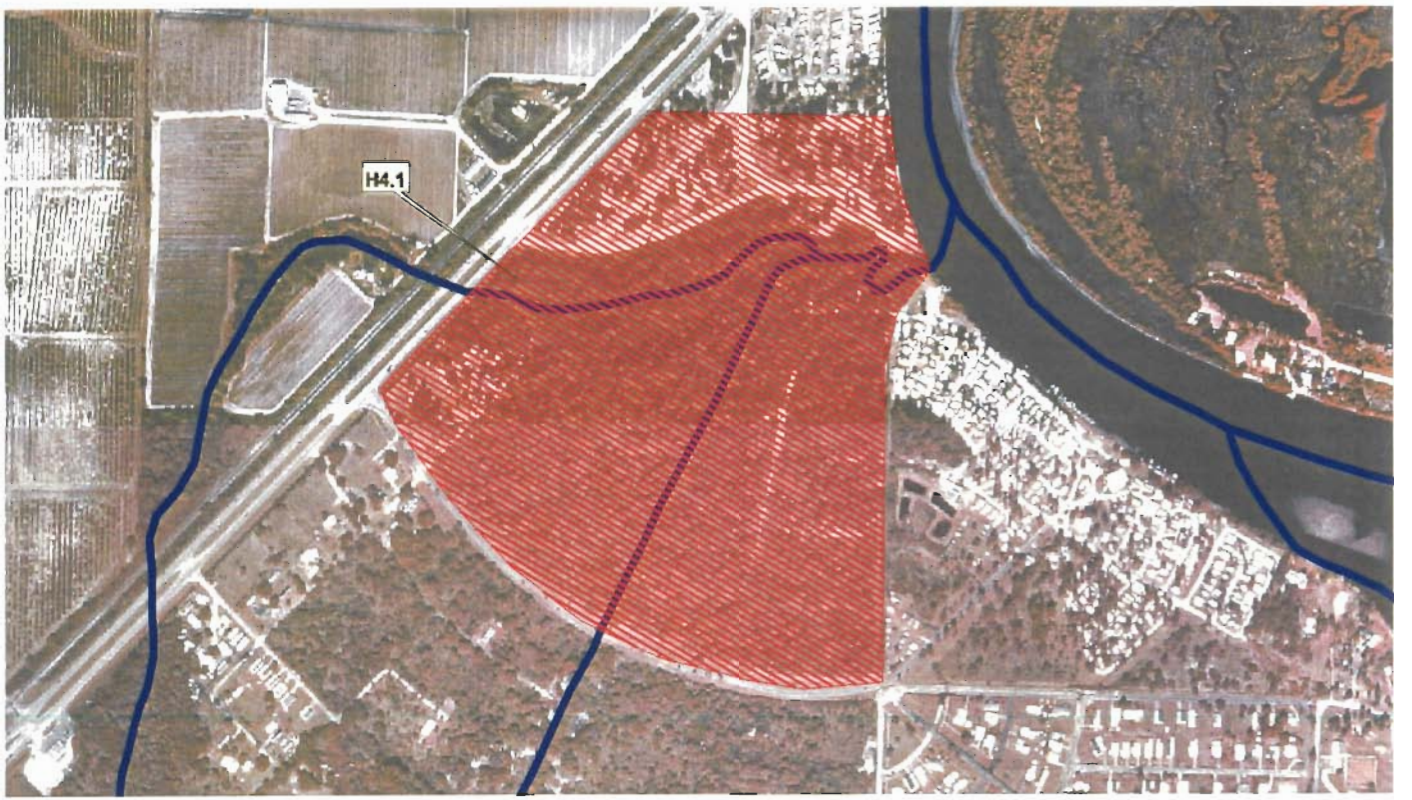
Exotic Species Removal Sun City Heritage Park

Project H4.1

Priority Ranking 8 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.



ACTIONS

· Exotic and invasive species removal project in Sun City Heritage Park. (approximately 98 acres)
· Removal of exotic and invasive species in parks and at boat ramps.
· Replacement with native species.
· Include education component as part of overall county education efforts.

FEATURES

· Restoration of native species and commensurate wildlife habitat.
· Decrease spread of invasive species.
· Increased recreation value.
· Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$295,000
Land Acquisition	$0
Engineering and Contingency	$103,000
TOTAL	**$398,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-27

Exotic Species Removal Wildcat Creek Park

Project H4.2

Priority Ranking 9 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.

ACTIONS

- Exotic and invasive species removal project in Wildcat Park
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

FEATURES

- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$357,000
Land Acquisition	$0
Engineering and Contingency	$125,000
TOTAL	**$483,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Final March 3, 2002

Preferred Alternatives Figure 18-28

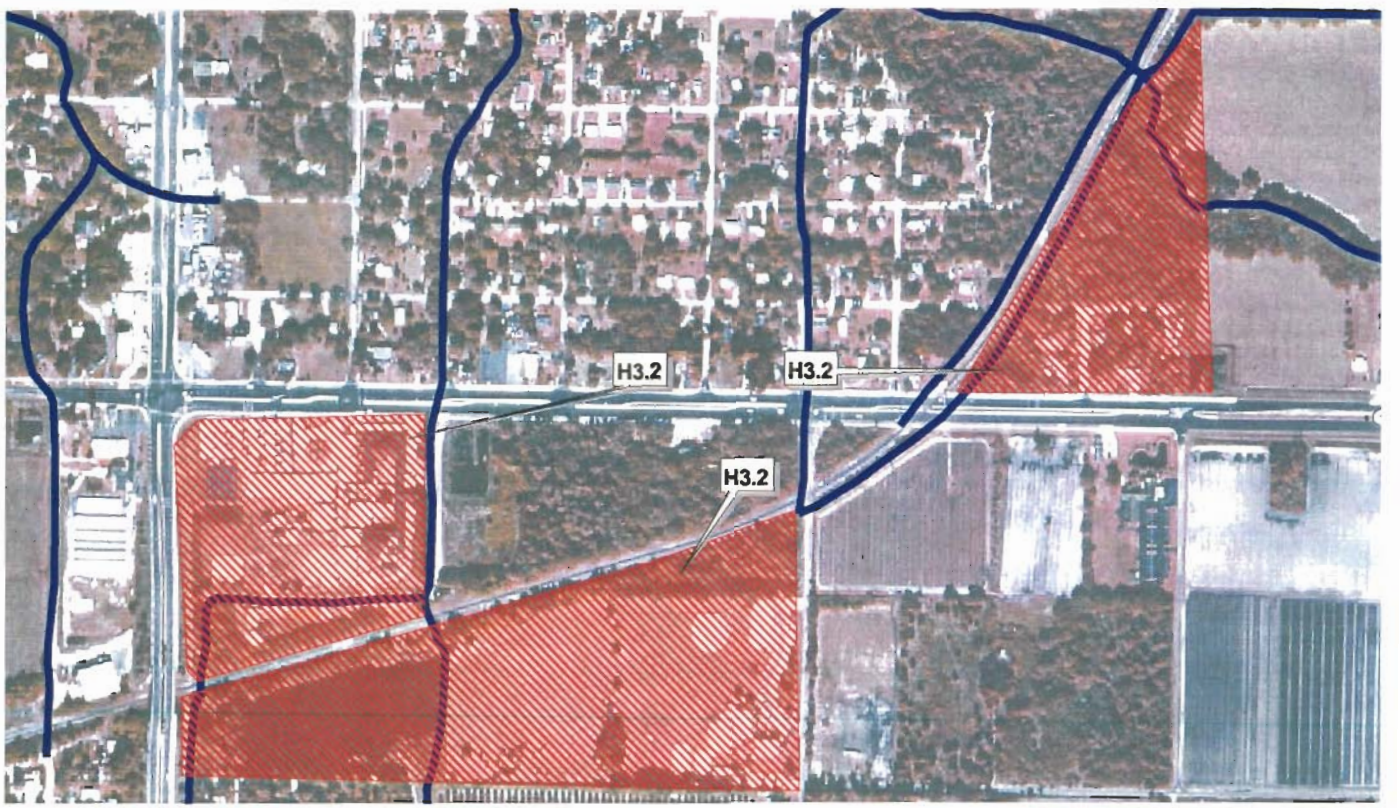
Exotic Species Removal Beaudette (Ruskin) Park

Project H3.2

Priority Ranking 10 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.



ACTIONS

- Exotic and invasive species removal project in Beaudette (Ruskin) Park (approx. 60 acres)
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

FEATURES

- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$180,000
Land Acquisition	$0
Engineering and Contingency	$63,000
TOTAL	**$243,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Final March 3, 2002

Preferred Alternatives Figure 18-29

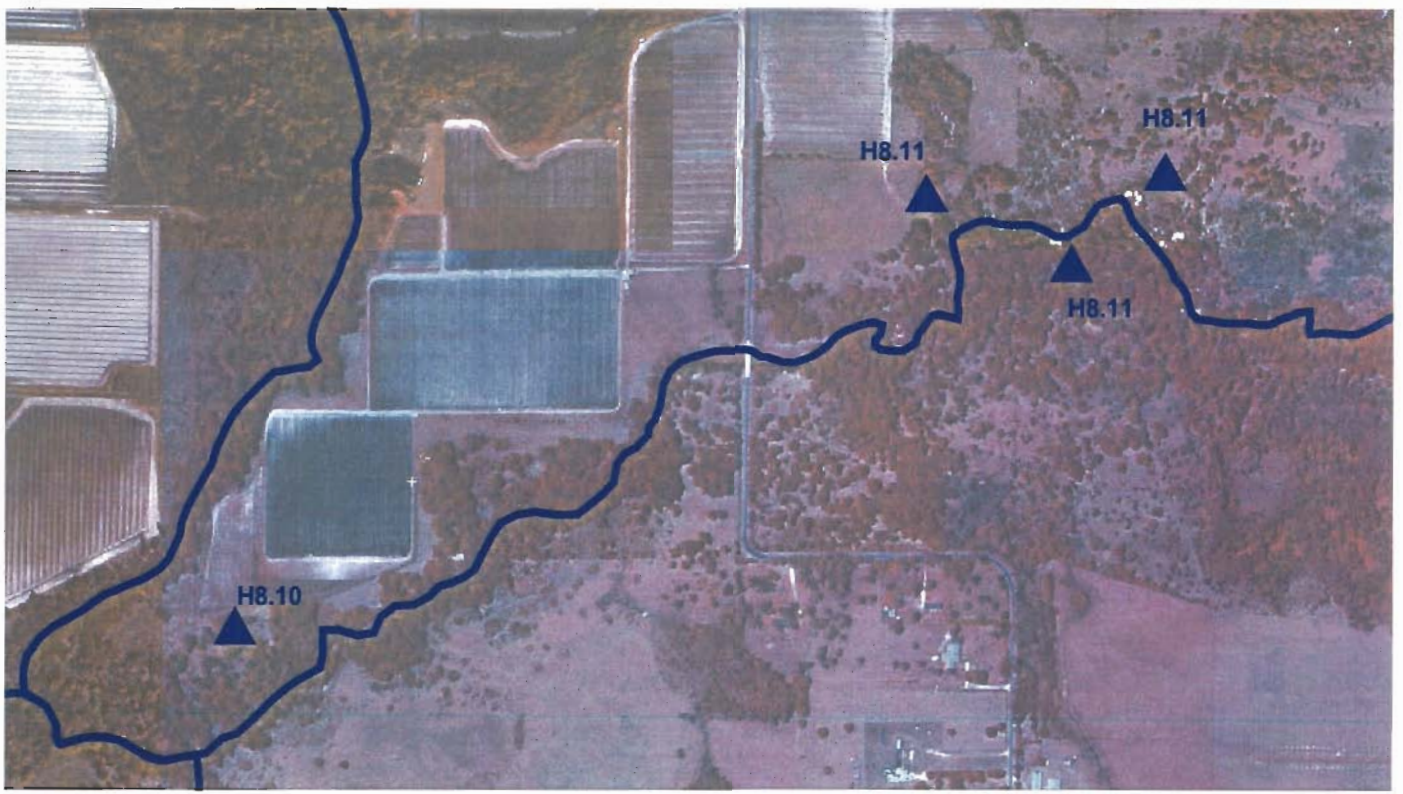
Erosion Control, C.R. 579 to Grange Hall Loop

Project H8.10 to H8.11

Priority Ranking 11 of 17

STATEMENT OF PURPOSE

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.



ACTIONS

· Erosion control projects along main river channel, just below confluence with Pierce Branch, at Grange Hall Loop.
· Stabilize sandy levees along the river with grading and revegetation.

FEATURES

· Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
· Maintain stream bank storage capacity and help maintain year-round stream flow.
· Provide aesthetic and recreation benefits.

COST ESTIMATE

DESCRIPTION	AMOUNT
Erosion Control	$111,000
Land Acquisition	$0
Engineering and Contingency	$39,000
TOTAL	**$150,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Final March 3, 2003

Preferred Alternatives Figure 18-30

Exotic Species Removal Ruskin Commongood

Project H3.3

Priority Ranking 12 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.

ACTIONS

- Exotic and invasive species removal project at Ruskin Commongood (approx. 44 acres)
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

FEATURES

- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$131,000
Land Acquisition	$0
Engineering and Contingency	$46,000
TOTAL	**$177,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Final March 3, 2002

Preferred Alternatives Figure 18-31

Exotic Species Removal Domino Boat Ramp

Project H3.1

Priority Ranking 13 of 17

STATEMENT OF PROBLEM

Most exotic plant species were introduced into Florida without their native diseases and insects to control them in the environment. Many of these species out compete and displace native species, especially when an area has been disturbed by practices such as agriculture and development. The displacement of native vegetation can reduce habitat available for fish and wildlife as well as biodiversity.Six species of invasive exotic plants (Florida Exotic Pest Plant Council's List of Florida's Most Invasive Species - Category I) have been identified as common within the LMR watershed: Brazilian pepper, Australian pine, melaleuca (punk wood), carrot wood, cogon grass, rosary pea, and air potato. The purpose of exotic and invasive species removal projects is the restoration of native vegetation and habitat for fish and wildlife, including listed species.

ACTIONS

- Exotic and invasive species removal project at Domino Boat Ramp.
- Removal of exotic and invasive species in parks and at boat ramps.
- Replacement with native species.
- Include education component as part of overall county education efforts.

FEATURES

- Restoration of native species and commensurate wildlife habitat.
- Decrease spread of invasive species.
- Increased recreation value.
- Educate public about invasive and exotic species.

COST ESTIMATE

DESCRIPTION	AMOUNT
Construction	$4,000
Land Acquisition	$0
Engineering and Contingency	$2,000
TOTAL	**$6,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-32

Erosion Control Lightfoot Road

Project 4.8

Priority Ranking 14 of 17

STATEMENT OF PURPOSE

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.

ACTIONS

· Erosion control project along the main river channel at Lightfoot Road, east of I-75 .
· Stabilize sandy levees along the river with grading and revegetation.

FEATURES

· Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
· Maintain stream bank storage capacity and help maintain year-round stream flow.
· Provide aesthetic and recreation benefits.

COST ESTIMATE

DESCRIPTION	AMOUNT
Erosion Control	$56,000
Land Acquisition	$0
Engineering and Contingency	$20,000
TOTAL	**$76,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-33

Erosion Control West of 24th Street

Project H5.2

Priority Ranking 15 of 17

STATEMENT OF PURPOSE

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.

ACTIONS

· Erosion control project east side of I-75, west of 24th Street and on the north side of the river (approximately 180 acres).
· Stabilize sandy levees along the river with grading and revegetation.

FEATURES

· Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
· Maintain stream bank storage capacity and help maintain year-round stream flow.
· Provide aesthetic and recreation benefits.

COST ESTIMATE

DESCRIPTION	AMOUNT
Erosion Control	$56,000
Land Acquisition	$0
Engineering and Contingency	$20,000
TOTAL	**$76,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure 18-34

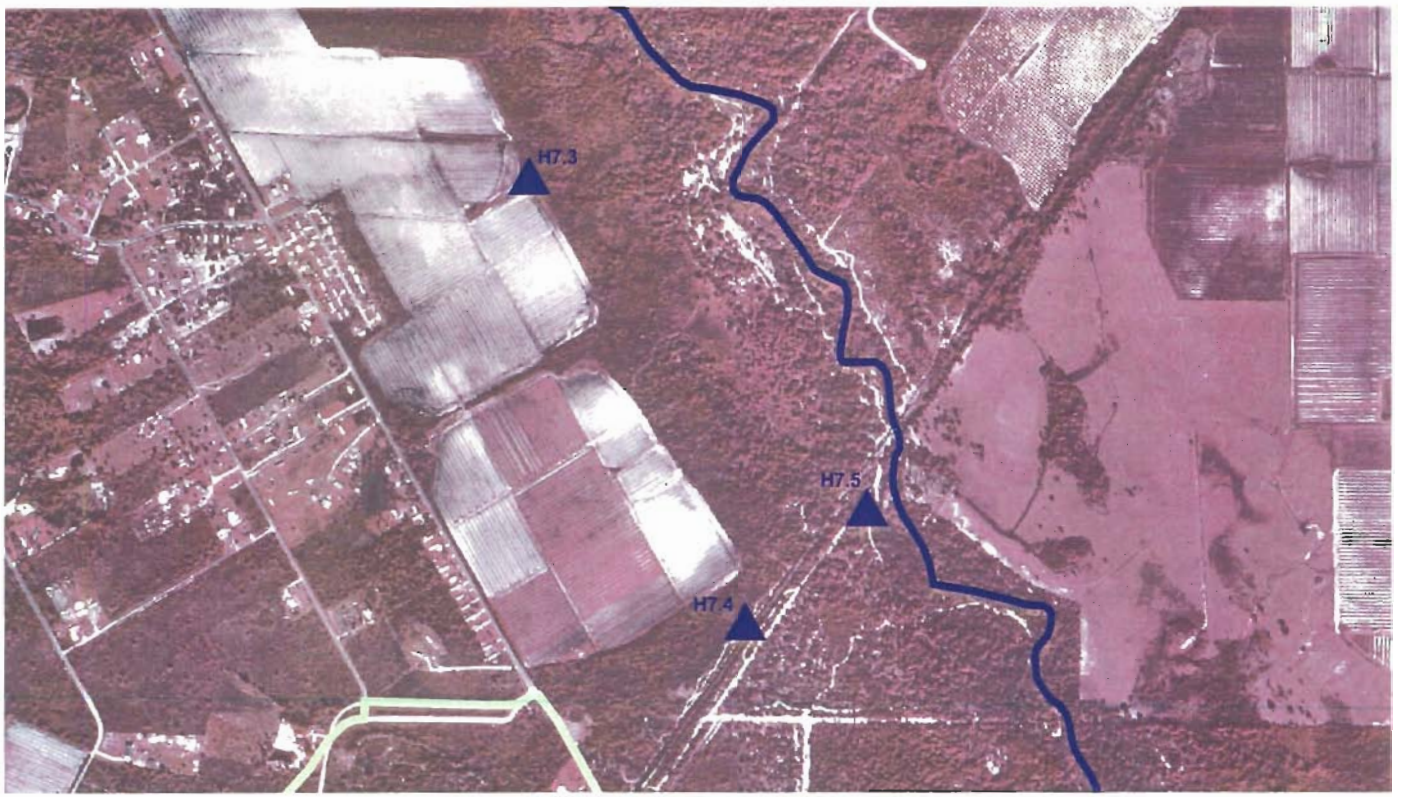
Erosion Control, Saffold and Willow Roads

Project H7.3 to H7.5

Priority Ranking 16 of 17

STATEMENT OF PURPOSE

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.



ACTIONS

- Erosion control projects next to Saffold and Willow roads.
- Stabilize sandy levees along the river with grading and revegetation.

FEATURES

- Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
- Maintain stream bank storage capacity and help maintain year-round stream flow.
- Provide aesthetic and recreation benefits.

COST ESTIMATE

DESCRIPTION	AMOUNT
Erosion Control	$83,000
Land Acquisition	$0
Engineering and Contingency	$29,000
TOTAL	**$112,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

Preferred Alternatives Figure18-35

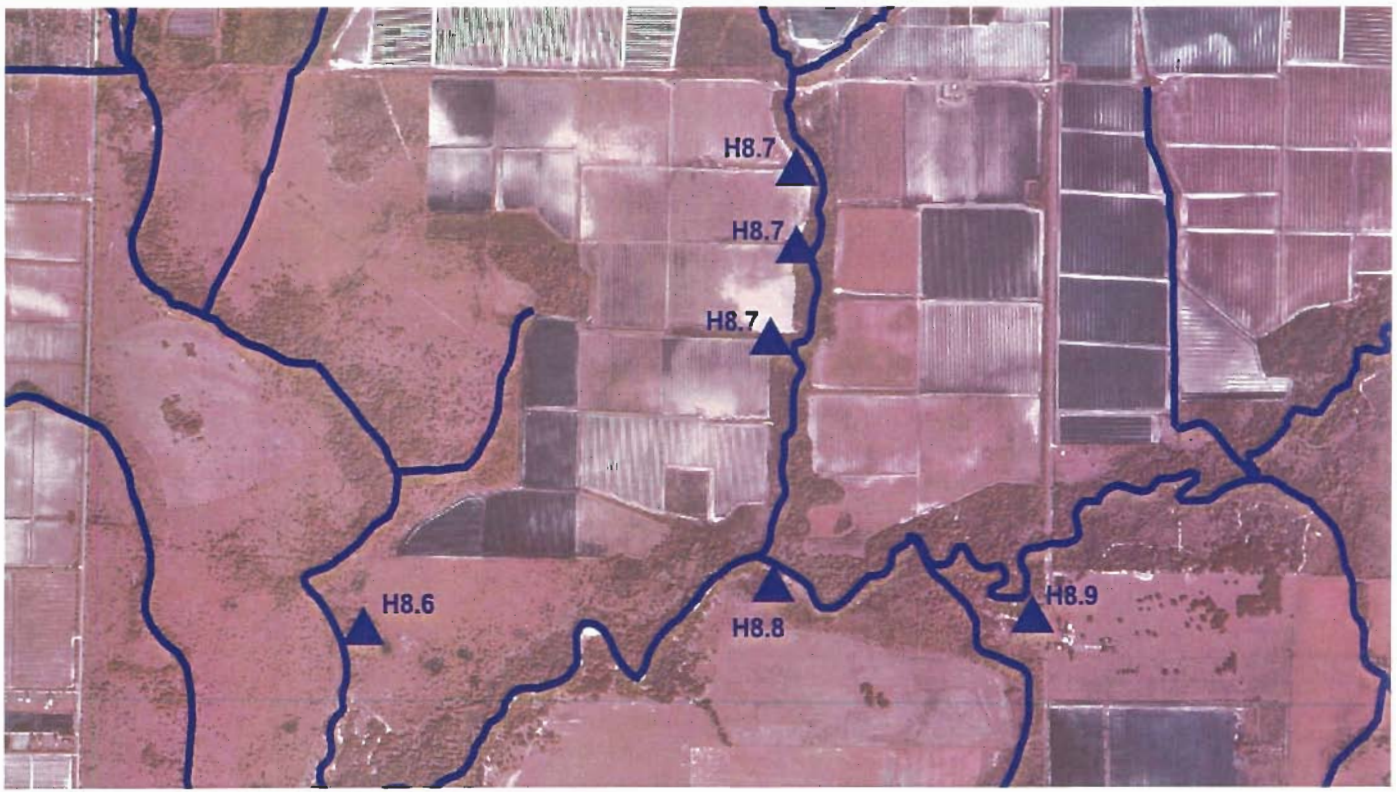
Erosion Control Leonard Lee Road

Project H8.6 to H8.9

Priority Ranking 17 of 17

STATEMENT OF PURPOSE

Erosion control projects are intended to decrease sedimentation in river and stabilize shoreline habitat and improve water quality and aquatic habitat. Areas of erosion control have been identified primarily along the middle basins.



ACTIONS

- Erosion control projects next to Leonard Lee Road.
- Stabilize sandy levees along the river with grading and revegetation.

FEATURES

- Reduced flood damage and soil erosion: trees, shrubs and grasses dissipate energy by slowing the speed of floodwaters and reducing erosive potential.
- Maintain stream bank storage capacity and help maintain year-round stream flow.
- Provide aesthetic and recreation benefits.

COST ESTIMATE

DESCRIPTION	AMOUNT
Erosion Control	$166,000
Land Acquisition	$0
Engineering and Contingency	$58,000
TOTAL	**$224,000**

- Erosion Control
- Restoration
- Exotic Species Removal
- Primary Stormwater System

CHAPTER 19
OTHER WATERSHED MANAGEMENT RECOMMENDATIONS

19.1 INTRODUCTION

Investigations presented in prior sections were conducted to determine appropriate improvement measures for flood protection, water quality, natural systems and, if applicable, water supply conditions in the Little Manatee River (LMR) watershed. This chapter presents other recommendations that were developed to help manage the watershed beyond the implementation of the projects identified in this study to solve site-specific watershed problems.

19.2 RECOMMENDED MANAGEMENT STRATEGIES

This section provides a description of the recommended management strategies and components for implementation in the LMR watershed. Management components are those strategies that involve non-structural modifications to the function and operation of a facility or resource within the LMR watershed.

19.2.1 Regional Versus Onsite Stormwater Management Systems

Wet detention is the most common stormwater runoff treatment system in Hillsborough County and throughout Florida. In general, there are two basic strategies for development of those stormwater management improvements on a countywide scale: regional and onsite.

Onsite Approach

In the case of future urban development or retrofit of existing development, the onsite approach (also known as piecemeal approach to stormwater control) involves the delegation of responsibilities for BMP development to local land developers or the use by the County of BMPs serving small areas due to site constraints. Each developer is responsible for constructing a structural BMP at the development site to control nonpoint pollution loadings from the site. Onsite detention ponds typically have contributing areas of 20-50 acres. The local government is responsible for reviewing each structural BMP design to ensure conformance with specified design criteria, for inspecting the constructed facility to ensure conformance with the design, and for ensuring that a maintenance plan is implemented for the facility. The treatment facility usually consumes 15% of the developable site based on research done in the State of Florida.

Regional Approach

The regional approach to stormwater control involves strategically locating regional structural BMPs to control nonpoint pollution loadings from multiple development projects. F or ponds serving new development, the front-end costs for constructing the structural BMP are assumed by the developer and/or the local government that administers the regional BMP plan. BMP capital costs could then be recovered from upstream developers on a "pro-rata" basis as development occurs. Individual regional BMPs are phased in as development occurs rather than constructing all regional facilities at one time. Maintenance responsibility for regional structural BMPs can be assumed by the developer (or designee with certified maintenance bonds) or by the local government. For retrofit of existing development, regional BMPs may also be used to cost-effectively treat areas where the on-site approach is not feasible due to land availability constraints. The regional approach can address concurrence for the entire watershed.

It is clear from this description that from a watershed point of view, regional stormwater management is preferred because of the following advantages: reduction of capital costs, reduction in total maintenance costs, greater reliability, greater opportunities to control multiple source pollutant loading, and the ability to provide multifunctional facilities. For these reasons, Hillsborough County should work closely with developers to support opportunities for regional stormwater treatment. The County should also continue to work with SWFWMD, FDOT, FDEP, USCOE, HCEPC, Tampa Bay Regional Planning Council and Manatee County through the Comprehensive Watershed Management (CWM) Program for water resource assessment and planning on a regional basis. Adequate planning is necessary to make sure that resources are allocated such that they are recovered within a reasonable amount of time. Development of regional facilities has been recommended in this study to retrofit the areas of Sun City Center and Doug Creek. It is recommended that through the ELAPP program the County consider acquisition of properties along the LMR, outside of the floodplain, to develop as regional facilities. These facilities could then be integrated with the floodplain property to provide larger continuous areas that enhance the natural environment.

19.2.2 Retrofitting of Existing Treatment Facilities

A number of ponds exist in the watershed, particularly in the Sun City Center area, that were built exclusively for flood control purposes. These facilities were constructed prior to the enactment of the current stormwater regulations. Retrofitting of one of these facilities to include stormwater runoff treatment is one of the recommended projects in this Management Plan. There may be other opportunities in the watershed throughout the secondary system, but their identification requires site-specific studies. It is recommended that the County investigate these opportunities in detail. The ideal situation would be to retrofit the facilities to current treatment standards. That may not be always possible. However, runoff treatment can be provided by developing planted littoral shelves around the facilities to filter runoff prior to discharge. In addition, facility improvement plans should incorporate habitat improvement elements wherever feasible. This is particularly important in areas such as existing golf courses.

Although facilities constructed prior to 1985 are legally vested from meeting water quality standards, if the facilities are privately-owned, an attempt should be made to get the owner of pre-1985 facilities to voluntarily participate in the program through financial incentives and/or assistance.

The pollutant load reduction associated with improving the performance of existing stormwater treatment systems is potentially significant given the level of development in the study area, especially in the western and southern portions of the watershed. It is not possible to accurately quantify this potential load reduction, however, until an inventory of existing facilities in completed.

Hillsborough County would have the primary responsibility for implementing this management action. Coordination with the SWFWMD would also be required for accessing and reviewing old permit files and monitoring reports.

19.2.3 Improvement of Treatment Efficiency of Existing Stormwater Facilities

There is a rebuttable presumption that State design criteria for Management and Storage of Surface Water (MSSW) facilities achieve an 80% pollutant load reduction. Although the statutes do not specify which pollutants are targeted by the State design criteria, they are generally interpreted to address total suspended solids (TSS) and biological oxygen demand. Attainment of these performance standards is rarely verified or enforced due to the complexities in monitoring individual MSSW facilities. However, available data indicate that most MSSW facilities are substantially deficient if not properly maintained. State law allows for stringent enforcement of these performance standards where it can be demonstrated that State water quality standards are being violated. Although not many stormwater treatment facilities currently exist within the watershed, the existing facilities may not be functioning at their intended level of service. Therefore, measures to bring these facilities into compliance with current performance standards are likely to be a cost-effective management option. This is particularly important to help bring the LMR into compliance with water quality standards, as required by the TMDL program.

This recommended management action involves the development and implementation of a comprehensive local program to improve compliance monitoring and enforcement of permitted surface water management (MSSW) facilities in the basin. This program would involve the following elements:

1. Develop an inventory of all existing permitted MSSW facilities in the watershed, both public and privately owned, and identify target MSSW facilities for inspection and potential monitoring. Stormwater entering and discharging from the facility following a storm event should be sampled for TSS, BOD5, TN, and TP, and coliforms. The last four chemicals are the currently identified impairment parameters in the watershed.

2. Working cooperatively with the owners (if it is a privately-owned facility), develop a site-specific improvement plan for each target MSSW facility. The improvement plans could

include such modifications as changing the water level control elevations or planting a littoral shelf.

3. Provide financial assistance and technical guidance to owners, as appropriate, to implement the facility improvement plans.

4. Although there are not too many existing facilities in the LMR watershed, The County should control stormwater runoff and pollutant loading from county-owned or operated facilities. To do so, government facilities should be inspected specifically for the purpose of identifying areas of stormwater runoff concerns such as exposed materials storage, maintenance improvements, and uncontrolled erosion or sedimentation. Based upon the inspection, the County should prepare plans for each facility to improve stormwater management; these plans are called stormwater pollution prevention plans (SWPPPs). The SWPPPs should document actions needed to reduce stormwater pollution.

19.3 RECOMMENDED REGULATORY PROGRAM IMPROVEMENTS

Upon review of the extensive stormwater regulatory requirements applicable within Hillsborough County, there appears to be sufficient regulatory controls to manage stormwater pollution for new development. Land use development controls are in place that limit encroachment on sensitive lands and require post-construction stormwater management in accordance with regional and state regulations. However, there are some issues related to regulatory programs recommended for improvement including operations and maintenance, enforcement of existing regulations and reduction of imperviousness. This section presents recommended general regulatory recommendations for use throughout the LMR watershed for pollutant source controls.

19.3.1 Reduction of Imperviousness

One of the major elements of the LMRWMP is to reduce stormwater runoff from existing and future developments. This can be accomplished by source controls (reduction of the amount of runoff from property) or by post-development structural improvements (storage or runoff before discharge off-site). Of these two, the more cost-effective is the control of the source. Reducing imperviousness reduces stormwater runoff. The implementation of such source controls can be accomplished through regulatory reduction of imperviousness or through the effective reduction by landscaped swales along roads, driveways and parking lots.

It is recommended that the County offer incentives or otherwise encourage the reduction of imperviousness. It may be that this must be done on a case-by-case basis. One example of imperviousness reduction is the reduction of commercial parking areas. Commercial parking areas can be reduced by allowing parking lots to be sized for average use, not high attendance times. Overflow parking areas can be more pervious (e.g., previous pavement, reinforced grass, etc.). In this manner, the total imperviousness and pollutant loading would be reduced. Incentives to reduce imperviousness could be offered or excess-parking areas could be regulated to require pervious

pavement. For public developments, the County should adopt a policy of imperviousness reduction through design changes offering pervious pavement and more vegetated areas. For private developments, the County should develop standard incentives for impervious area reductions through regulatory changes.

It is also recommended that the County strive to minimize the amount of directly connected impervious area (DCIA) on a site and promote the use of green buffer zones around paved areas for infiltration. For example, roof runoff from structures can be directed to green buffer zones or shallow swales around houses. In addition, parking lots and driveways can be graded to landscaped/grassed areas or swales, reducing direct runoff to the storm drainage system. The County should also participate with SWFWMD to complete statistical comparisons between the design percent impervious and the actual constructed impervious.

19.3.2 Land Use Planning and Controls

Land use planning and management presents an important opportunity to reduce/minimize pollutants in stormwater runoff and control flooding by using a comprehensive planning process to integrate County goals into the development and redevelopment process. Management measures may include modification or restrictions of certain land use activities. Greater restrictions may be warranted where development can affect impaired, threatened, or significant water bodies. Because increased pollutant loadings and flooding correspond to increase in impervious cover, land use planning can become an effective control measure.

Through the Hillsborough County Land Development Code, land uses are regulated sufficiently regarding stormwater management. Two recommendations are offered:

- The use of freshwater wetlands for the treatment of stormwater runoff should be encouraged. Wetlands are natural treatment facilities and generally, wetlands need water to survive. Many wetlands need to be rehydrated and stormwater is an excellent source of such water after treated by vegetated swale systems. It should be noted that sediment should be removed prior to discharge to the wetlands.

- The reduction of imperviousness of developed lands should be encouraged. See Subsection 19.3.1.

19.3.3 Low Impact Development

Because the LMR watershed is largely undeveloped, there are opportunities to guide new growth such that development impacts are minimized. It is recommended that the County promote what has been termed "low impact design". Low impact development emphasizes environmental sensitive design development principles. Applying the principles together, planners, developers, and local officials can measurably reduce impervious cover, conserve natural areas, and reduce the impacts of

stormwater from new development while at the same time enhancing both the natural environment and community well being.

Listed below are some examples of low impact development ideas:

- Residential streets designed for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency vehicle access.
- Reduction of residential street lengths by examining alternative street layouts.
- Minimization of the number of street cul-de-sacs and incorporate landscape areas to reduce their impervious cover.
- Where density, topography, soils and slope permit, vegetated open channels should be used in the street right-of-way to convey and treat runoff.
- Reduce excessive parking, minimize stall dimensions, encourage shared parking, and use pervious materials in spillover parking areas where possible.
- Provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands.
- Advocate open space design development incorporating smaller lot sizes to minimize total impervious area, conserve natural areas, provide community recreational space, and promote watershed protection.
- Relaxation of setbacks to reduce overall lot imperviousness.
- Consider locating sidewalks on only one side of the street and providing common walkways linking pedestrian area.
- Promote alternative driveway surfaces and shared driveways to reduce overall lot imperviousness.
- Direct rooftop runoff to pervious areas.
- Clearing and grading of forested and native vegetation at a site should be limited to the minimum amount needed to build lots.
- Conserve trees and other vegetation at each site by planning additional vegetation, clustering tree areas, and promoting the use of native plants.

Therefore, it is recommended that the Hillsborough County Land Development Code be reviewed to incorporate low impact design concepts. Similarly, the Florida Yards and Neighborhoods program should be considered as part of the landscape regulations.

19.4 NONSTRUCTURAL STORMWATER MANAGEMENT RECOMMENDATIONS FOR WATER QUALITY IMPROVEMENTS

This section presents recommended non-structural Best Management Practices (BMP) recommendations for use throughout the LMR watershed for pollutant source controls. Recommended strategies include:

- Public Information and Education
- Fertilizer Application Control
- Pesticide Use Control
- Aquifer Recharge
- Illicit Connections (Non-Stormwater Discharges) Identification and Removal
- Agricultural Source Controls

19.4.1 Public Information and Education

Develop and Implement a Comprehensive Public Involvement Program

Public apathy regarding watershed management is a common pattern until obvious problems such as nuisance algae blooms and aquatic weed infestations become apparent. The public response to such problems is typically quite negative and unproductive. Improved public understanding of the causes of watershed management problems, and the role that individuals can play in managing and improving the quality of the lake and watershed will go a long way to furthering the goals of the LMRWMP. In addition, increased public involvement as stakeholders in the ownership and implementation of the LMRWMP should reduce unproductive public criticism of governmental agencies, and improve the overall watershed management effort.

This recommended management action involves the development and implementation of a comprehensive public involvement program for the LMR watershed. The program would include a number of elements including the following:

- Preparation of a semi-annual newsletter (e.g., twice per year) to be mailed to residents and businesses in the basin informing the public of the various components of the Plan as well as findings, trends, and upcoming activities.

- Production and airing of a government access television presentation on the LMR, with updates to the program to be made on an annual basis. A videotape of this presentation should be made available to citizens upon request.

- Establish a speakers bureau for homeowners association meetings and other public functions.
- Establish an information clearinghouse for technical reports, monitoring data, and other information related to the LMR.

Two other public involvement programs that are recommended for use throughout the LMR watershed are the Florida Clean Marina Program and the Florida Yards and Neighborhood Program.

Florida Clean Marina Program. FDEP has designed the Florida Clean Marina program to introduce citizens to simple, innovative BMPs for boatyards. Other participating organizations include the University of Florida Sea Grant, Marine Industries Association (MIA) of Florida (including numerous local chapters), International Marine Institute, Marine Resource Council, Florida Marine Trades Association, Marina Operators Association of America, Marina Owner/Operators and Consultants. Guiding FDEPs actions are the principles of ecosystem management, foremost of which is that all things are connected. Ecosystem management takes a holistic approach to environmental protection, where air, water, land and living things are all considered together, not in isolation.

The Clean Marine Program applies to boatyards that repair and convert recreational and small commercial vessels for Florida's waterways. U.S. shipyards are categorized as either first-tier or second-tier. This program addresses second-tier which is compromised of many small and medium-size businesses that construct and repair vessels fewer than 122 meters (383 feet). The Clean Marina Program promotes hurricane preparations, petroleum control, boat cleaning, solid waste management, hazardous waste management, fish waste management and sewage management BMPs to prevent or reduce pollutant discharge.

Florida Yards and Neighborhoods Program. The Florida Yards and Neighborhoods Program were developed to address serious problems of pollution and disappearing habitats by enlisting citizens in the battle to save the natural environment. The program provides special educational and outreach activities directed at the community to help residents reduce pollution and enhance their environment by improving home and landscape management. The Florida Yards and Neighborhoods program should be considered as part of the County landscape regulations.

Develop and Implement Local Citizens River Watch Program

A variety of data needs are identified in Section 19.6. Interested citizens are recruited to assist in the collection of such data wherever feasible. Local Citizen Watch programs have been very successful in central Florida, where numerous lake associations are actively involved in monitoring and data collection on their lakes. This type of public "ownership" in the resource can greatly improve public interest and involvement.

Hillsborough County has successfully run the Lake Watch Program. This management action involves the recruitment of interested local citizens to participate in the collection of monitoring data

from the LMR watershed. This program should be maintained and expanded to monitor the main LMR and its tributaries. This is particularly important to identify sources of pollution control that are causing the impairments identified per the 303(d) list.

19.4.2 Fertilizer Application Control

As indicated previously, nutrient concentrations are one of the LMR impairment parameters. Fertilizer application control is a voluntary control mechanism by citizens who use fertilizer as part of their landscaping activities. Fertilizer application controls are implemented through a public information program by making the public aware of the principals of environmental landscape maintenance and the problems associated with overuse of fertilizers. Overuse of fertilizers will cause excessive runoff of nutrients to surface waters thereby wasting money for the homeowner and potentially degrading the receiving water body. This is especially true during heavy rainfall periods that produce yard and neighborhood flooding. Information programs should be extended to homeowners and civic associations in the Ruskin, Sun City Center, and Wimauma areas.

Simultaneously, the source of nutrients may be the result of the agricultural activities in the upstream portion of the watershed. It is recommended that the County work closely with the Natural resources Conservation Service to implement agricultural BMPs, including fertilizer applications control.

19.4.3 Pesticide Use Control

Pesticide use control is also a voluntary control by citizens who use pesticides as part of their housekeeping and lawn maintenance activities. Pesticides are also used for farming activities. Some pesticides are priority pollutants (e.g., Endrin, Lindane, and Silvex), which can be toxic. Overuse of these chemicals can cause excessive runoff to surface waters and entry into the food chain. Many professional applicators of pesticides are using approved pesticides in a safe and proper manner. An information program on pesticide use will help to reduce the amount of pesticides entering the stormwater system. Information programs should be extended to homeowners and civic associations in the Ruskin, Sun City Center, and Wimauma areas. Coordination should also occur with the Natural resources Conservation Service.

19.4.4 Aquifer Recharge

Another problem associated with excessive groundwater withdrawals, especially in coastal communities, is saltwater intrusion (Mahon 1989). In nature, the freshwater-saltwater interface is gradual and its location depends on the pore characteristics of the aquifer and the hydraulic pressure. Increasing the stress on the groundwater system results in lowering of the potentiometric surface, with a resulting displacement of the interface inland into freshwater aquifers. This may be exacerbated in the LMR watershed, because recharge rates in the eastern portions of the watershed are less than 1 inch/year, while the far northwestern portion discharges at a rate of 1 to 5 inches/year. The southwest portion of the LMR watershed shows discharge rates of less than 1 inch/year, which is comparable to the recharge rates on the east. With this level of protection and by properly

managing the resources through, for example, the preferential use of brackish groundwater, the potential for an overall improvement in groundwater quality in the watershed is much greater.

For those areas designated as probable recharge areas (Hydrologic Group A soils as defined by the SCS and USGS), it is recommended that the first 3 inches of runoff over DCIAs be retained and infiltrated onsite for all new development or construction so the County can maximize remaining recharge areas to ensure long-term protection of groundwater supplies.

Aquifer storage and recovery (ASR) is a technique involving pumping treated water to a confined shallow aquifer (> 500 feet) for future use. The pumped water forms a "bubble" displacing native saline water. Differences in densities between the two water masses and restrictions of the aquifer formation minimize mixing of pumped and native waters. Recovery of the pumped water, for irrigation or other uses, can take place either immediately or in the future. The County should look for opportunities for protection in agricultural areas in the Cockroach Bay and Lower Little Manatee major basins.

19.4.5 Illicit Connections (Non-Stormwater Discharges) Identification and Removal

In the 1987 Clean Water Act Amendments, three major goals were identified: to control pollution form municipal stormwater systems to the maximum extent practicable (MEP), to eliminate "illicit" discharges to storm sewers and to control the discharge of stormwater from industrial activities. These goals have generated the National Pollutant Discharge Elimination System (NPDES) permitting programs for municipal storm sewer discharges to waters of the United States. For the second goal, "illicit" discharges are defined as those that are non-stormwater discharges to the storm sewer. Examples include laundromat wastewater, car washing water, restaurant wastes, etc. To achieve this goal, EPA has been encouraging municipalities to search for illicit connections and eliminate such discharges. The ongoing EPA NPDES illicit connection survey should be used to strengthen applicable codes and eliminate these connections that can cause plugs of toxic substances to enter surface waters. Aggressive inspection is a key component of this BMP program. Emphasis on cooperation and public outreach is also a critical to the effort to eliminate illicit discharges.

19.4.6 Agricultural Source Controls

Agriculture encompasses nearly 50 percent of the land use in the LMR watershed and is associated with water quality problems due to excessive pumping and runoff. Agriculture, like other industries, can impact water quality with the addition of pesticides, soil, animal waste, and nutrients that wash from farmlands into nearby surface waters that decrease the beneficial use of those resources. Agricultural Best Management Practices can reduce the amounts of pollutants reaching waterbodies but can be effective only if they are applied correctly and maintained. Without repairing to maintain top performance or monitoring the practices, BMPs can become ineffective. Proper pasture and riparian area management is an important tool in reducing nonpoint source pollution. This is accomplished by increasing the permeability of the soil through plant spacing, root depth, and depth,

in the humus and nutrient layer. Healthy riparian areas provide the final protection for our water quality by filtering out sediment and pollutants before they enter the stream.

Recommended agricultural BMP procedures for the LMR watershed are as follows:

- Ponding with or without irrigation helps control surface runoff and can also provide a source of irrigation water.
- No-till planting in prior-crop residues helps erosion by placing seeds in soil without tillage and maintains previous plant residues.
- Sod-based rotation most frequently planted in 2- to 4-year rotations.
- Tail water recovery by use of large reuse ponds collecting runoff and seepage.
- Contour plowing or plowing and crop rows following field contours.
- Strip-cropping: alternating row crops with close-grown crops along contours.
- Pesticide-herbicide substitutes: using mechanical and biological substitutes.
- Reservoir tillage: small pits with small dikes between crop rows to reduce runoff and promote infiltration.
- Computer based irrigation scheduling.
- Control the frequency and intensity of grazing to provide grassed plants the opportunity for adequate regrowth during the growing season.
- Livestock numbers and distribution should take into consideration water availability, quantity, quality, and location.
- On irrigated pastures, coordinate grazing and irrigation to minimize soil compaction and physical disturbance of plants.
- Graze riparian areas when banks are dry, and allow adequate time for regrowth. Stubble height is critical to provide bank protection during high water events.
- Season long grazing is not recommended. A pasture rotation plan that allows for alternate seasons of use will help to protect plant and soil stability, prolonging pasture life and quality.

The County should enhance its current coordination activities with the natural Resources Conservation Service and the Florida Department of Agriculture and Consumer Services (DACS) in

their ongoing programs of working with farmers to develop Farm Management Plans that focus on improving irrigation practices and chemical management programs. Improved programs can further reduce nutrient and pesticide loadings to the watershed's receiving waters from agricultural land uses. The County should also encourage the development of site-specific grazing management plans that protect soil and addresses the soil, plant and water relationship. Short-term objectives should move the site toward long-term goals.

19.5 OPERATIONS AND MAINTENANCE (O&M)

A recent survey by FDEP has reported that nearly 70 percent of existing treatment facilities in Florida are not properly maintained and therefore do not provide the intended pollutant removal effectiveness. Because of this, one of the most effective non-structural BMPs is routine maintenance of existing treatment facilities. For publicly owned treatment facilities, routine maintenance and inspection should be performed. For privately owned facilities, a municipality does not typically perform maintenance. There are several options that can be pursued by a municipality to help ensure that proper maintenance is being conducted. These options include a certification program initiated by a municipality that requires all approved subdivision ponds (private) to be recertified by the owner on a predetermined time interval. A state certified/trained inspector or engineer may complete the recertification. Enforcement of maintenance of privately owned facilities is one of the most difficult problems for privately owned facilities. Potential enforcement measures may include County intervention (after sufficient notification) where the County completes critical maintenance and the cost of the maintenance is billed to the owner or by other means as deemed necessary by the municipality. Another option would be to consider the assessment of fines.

Maintenance can be provided on a routine basis or as needed based upon inspection. Many governments provide a mixture of routine maintenance for critical facilities and inspection-based maintenance for less critical facilities. **Appendix G** includes an operations and maintenance (O&M) review of the County's existing level of maintenance performed in the watershed. A Stormwater O&M plan is presented in Appendix G that recommends an appropriate level of O&M for the LMR Watershed. The following paragraphs highlight some important maintenance considerations for BMPs and provide a summary of O&M recommendations.

19.5.1 Mowing

The side slopes, embankments, emergency spillways, and other grassed areas of stormwater facilities must be periodically mowed to prohibit woody growth and control weeds. More frequent mowing may be required in residential areas by adjacent homeowners. Mowing usually constitutes the largest routine maintenance expense. The uses of native or introduced grasses which are water-tolerant, pest-tolerant, and slow growing are recommended.

19.5.2 Debris and Litter Removal

Debris and litter accumulate near stormwater facility control structures and should be removed during regular mowing operations. Particular attention should be paid to floatable debris that can eventually clog the control structure or riser. Trash screens or racks can be strategically placed near inflow or outflow points to capture debris.

19.5.3 Erosion Control

Side slopes, emergency spillways, and embankments all may periodically suffer from slumping and erosion. This should not occur often if the soils are properly compacted and vegetated during construction. Regrading and revegetation may be required to correct any problems that develop.

19.5.4 Nuisance Control

Standing water or soggy conditions within a stormwater facility can create nuisance conditions for nearby residents. Odors, mosquitoes, weeds, and litter can all be potential problems in stormwater facilities. However, wetland plants established in wet detention ponds can harbor birds and predacious insects and fish that serve as a natural check on mosquitoes, and regular maintenance to remove debris and ensure control structure functionality will help control these potential problems.

19.5.5 Structural Repairs and Replacement

Eventually, the facility control structure will deteriorate and must be replaced. For ponds, these should be inspected at least once annually. In the case of exfiltration trenches and porous pavement, when the trench or pavement becomes clogged, part or all of the facility may need replacement.

19.5.6 O&M Recommendations

Currently, new development and significant redevelopment are required to provide treatment of stormwater runoff. Based upon review of existing regulatory requirements for stormwater treatment facilities should be sufficient to achieve the objectives of the LMRWMP. Therefore, it is recommended that, to confirm that maintenance will be provided to both public and private stormwater facilities, the following actions should be adopted:

1. It is recommended that the County first establish a routine inspection program with maintenance performed on an as needed basis. Additional personnel and equipment can be added until a desired level of service is achieved. The County has already initiated a GIS stormwater structure inventory. Once the database is established, the magnitude of the effort will be clear, and it will be easier to track inspections and maintenance to each facility and each subsequent visit. The County should keep and maintain an accurate inventory of equipment, including maintenance records an operating hours for each piece of equipment, to help identify failing equipment and justify the need for new/additional equipment. The

County Maintenance Unit should keep and maintain an accurate inventory of equipment, including maintenance records and operating hours for each piece of equipment, to help identify failing equipment and justify the need for new/additional equipment. At this time, it is recommended that an additional inspector be hired.

2. County inspectors should participate in the Florida Department of Environmental Protection's Sediment and Erosion Control training program. This would ensure that inspectors are properly trained on runoff control.

3. The County should evaluate the maintenance frequency guidelines identified in the O&M Plan (Appendix G, Table G-5), revise them to fit the observed needs within this watershed, and then incorporate this information into the maintenance standards as they are developed.

4. The addition of two 12-person inmate crews is needed. The benefit of these crews relative to the cost is evident. However, County staff indicates that additional crews may not be available from the Corrections Department. Nevertheless, the purchase of additional personnel vans and the addition of personnel are included in our recommendation contingent on the commitment of additional crews.

5. The County currently does not have enough excavation equipment to routinely maintain all of the length of ditches in the County. A routine program would require 3 additional grade-alls and 2 dump trucks. However, the County may not need to routinely maintain all ditches. Therefore, it is recommended that the County purchase 2 additional grade-alls and 1 dump truck to work toward an acceptable level of service.

6. Although not a part of the scope for this project, it cannot be overlooked that the age of existing equipment in the County inventory is approaching the expected operable life. It is recommended that additional investigations be performed into how equipment maintenance costs can more easily be tracked.

7. Annually, the private development should document that maintenance has occurred through photographs and re-certification by the owner.

8. The County should inspect private stormwater facilities every other year with half of the facilities completed each year. Failure to comply with maintenance agreements should result in code enforcement.

9. As an option, the County can consider a stormwater facility operating permit that requires annual maintenance for compliance. Such a permit would need to create the administrative and regulatory ability to enforce.

10. Establish a cooperative program to remove Brazilian pepper from public and private property throughout the watershed. Citizen groups such as the Pepper Patrol located in the local community can be a valuable resource.

19.6 RECOMMENDATIONS ASSOCIATED WITH FEMA'S NATIONAL FLOOD INSURANCE PROGRAM AND THE COMMUNITY RATING SYSTEM

The development and implementation of stormwater management plans not only provides a direction for solving watershed issues in a community, but it could also impact directly in the community by lowering flood insurance premiums. Flood insurance throughout the nation is implemented through the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA). The NFIP Rules and Regulations are described in 44 CFR 59.1.

An associate program of the NFIP is the Community Rating System (CRS) program. The objective of the CRS is to reward communities that are doing more than just meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses. The CRS also provides an incentive for communities to initiate new flood protection activities. The goal of the CRS is to encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the National Flood Insurance Program to:

- Reduce flood losses
- Protect public health and safety
- Reduce damage to buildings and contents
- Prevent increases in flood damage from new construction
- Reduce the risk of erosion damage
- Protect natural and beneficial floodplain functions
- Facilitate accurate insurance rating
- Promote the awareness of flood insurance

A description of the NFIP and the CRS, as provided by FEMA, is provided in the following paragraphs.

19.6.1 Purpose and Scope of NFIP

The NFIP provides federally backed flood insurance that encourages communities to enact and enforce floodplain regulations. Since its inception in 1968, the program has been very successful in helping flood victims get back on their feet. There are over 4 million policies in force. Since 1978, over 650,000 losses totaling more than $8 billion have been paid.

To be covered by a flood insurance policy, a property must be in a community that participates in the NFIP. To qualify for the program, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas. The basic objective of the ordinance is to ensure that such development will not aggravate existing flooding conditions and that new buildings

will be protected from flood damage. Today, over 19,000 communities participate in the NFIP. The NFIP has been successful in requiring new buildings to be protected from damage by a 100-year flood. However, flood damage still results from floods greater than the 100-year flood and from flooding in unmapped areas.

Under the Community Rating System (CRS), there is an incentive for communities to do more than just regulate construction of new buildings to minimum national standards. Under the CRS, flood insurance premiums are adjusted to reflect community activities that reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, help insurance agents obtain flood data, and help people obtain flood insurance.

19.6.2 Community Rating System Credit

The CRS "provides for 10 classes, with Class 1 having the most premium credit and communities in Class 10 receiving none. A community's CRS class is based on the number of credit points calculated for the activities that are undertaken to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. A community is automatically a Class 10 community unless it applies for a CRS classification and shows that the activities it is implementing warrant a better classification. A community may apply for CRS credit by submitting a *CRS Application* with appropriate documentation to its Insurance Service Office (ISO)/CRS Specialist." Application prerequisites and documentation are discussed in detail in the CRS Coordinator's Manual, which is a publication that includes the CRS schedule, commentary, and activity worksheets.

CRS activities are grouped in the four categories listed below. Each activity includes a number or sub-activities, each associated with a defined number of credit points.

Public information activities (Series 300),
Mapping and regulatory activities (Series 400),
Flood damage reduction activities (Series 500), and
Flood preparedness activities (Series 600)

19.6.3 Recommendations Associated with FEMA's Community Rating System Program

Based on an analysis of the current CRS credits, it is recommended that the following activities be implemented to reduce flood losses and provide lower flood insurance rates for the community.

1. Use the LMRWMP and the other plans to develop new base flood elevations. This will provide additional National Flood Insurance Program (NFIP) Community Rating System (CRS) points that would result in a lowering of flood insurance rates in the area.

Continue with the ELAPP acquisition process of properties along the LMR. Subsequently, the County can establish a regulatory floodway along the river where no allowable rise in flood elevations would be permitted. This would require an eventual control of both peak discharges and runoff volumes. Additional CRS points for the amount of preserved open space would also be obtained.

2. Issue an ordinance by which any residential and non-residential structure is required to have the lowest floor elevation no lower than 12 to 18 inches above the base flood elevation. This would add 100 point to the CRS credit.

3. Hazard disclosure is an important topic for flood protection. Issue an ordinance by which real estate agents are required to notify potential customers of the flood hazards associated with a property. This would discourage development of properties located in the flood hazard area.

4. Implement a program by which construction permitting for new development is based on the 100-year, 24-hour storm event. This will ensure that floodplain elevations are maintained throughout the watershed. Currently, the SWFWMD base permitting requirements for new development on the 25-year, 24-storm event.

5. Implement a program to acquire or relocate the repetitive loss properties in the LMR watershed. According to Hillsborough County information, five properties are currently included in FEMA's repetitive loss list.

6. Implement a reverse 911 system that is part of a flood-warning program in the area.

19.7 MONITORING AND EVALUATION PROGRAM

This section provides recommendations to measure the success of the implementation of the LMRWMP. The purpose of this effort is to help the regulatory agencies to determine the effectiveness of the implemented plan, to help the County decide whether or not limited public funds are being cost-effectively spent, and to show the benefits of the implemented LMRWMP to the public. Toward these ends, the following issues are pertinent.

19.7.1 Monitoring of Activities

One method of monitor success is to document the activities completed as part of the LMRWMP. Two types of activities can be monitored: best management practices (BMPs) and capital improvements. In the case of BMPs, the following monitoring is recommended for each of the activities identified in Sections 19.3 through 19.7.

- **Municipal Facilities.** In Subsection 19.4.1 it is recommended that the County municipal facilities should be inspected and pollution prevention plans prepared for each. The pollution prevention plan should have a list of activities to promote pollution control on the facility

site. To monitor success, The County should annually inspect each municipal facility to document the completed activities related to the pollution prevention plan. Once completed, the annual inspections can document the maintenance of the onsite facilities.

- **Maintenance.** The County should document maintenance activities of county-owned or operated stormwater facilities. Maintenance activities such as mowing, litter control, repair, revegetation, sediment removal, etc., can be documented to show not only maintenance but also the effectiveness of the maintenance. For example, documenting the volume of litter removed indicates the volume of litter and trash eliminated from potential contamination of near shore waters.

- **Land Use Controls.** As noted in Subsection 19.4.2, the use of degraded wetlands or other habitat for stormwater management and the reduction of imperviousness are recommended. Wetlands can provide both attenuation and water quality treatment as long as they are not over-exposed to water or pollutants and the stormwater can rehydrate the wetland. Therefore, the success of land use controls can be measured by monitoring wetlands and imperviousness.

19.7.2 Monitoring of Capital Improvements

The success of the SMMP can be monitored related to the stormwater improvements. A number of capital improvements are recommended in Chapter 18. Each of these was recommended to remediate an existing flooding or stormwater quality concern. The lack of flooding is a measure of success and is easily monitored through public reporting. To some degree, the public can also observe stormwater quality improvements. However, there are some more direct measures available. In particular, it is recommended that one or more of the capital improvements be monitored through sampling of the incoming stormwater and the outgoing treated water. Such monitoring should occur over more than one year to achieve a statistically significant dataset with paired stations (influent and effluent). The choice of the BMP monitored must be done with care because successful sampling is contingent upon controlled conditions (e.g., single points of water entry and exit).

19.7.3 Monitoring Near Shore Water Quality

Finally, monitoring the change in water quality of the near shore waters is another method to assess the success of the LMRWMP. Essentially, ambient water quality samples would be collected periodically and statistically assessed to determine trends. For the pertinent parameters of nutrients and sediments, ambient monitoring could show an increasing trend, which may imply that the LMRWMP is not successful, or a decreasing trend, implying that the LMRWMP is succeeding. However, as indicated in Chapter 7 (Existing Water Quality Conditions), there are many sources of pollutants in the environment. Ambient monitoring assesses the effects of the combination of sources, including the natural ones. Also, to capture the effects of stormwater runoff, sampling must be taken during storm events. Experience has shown that this monitoring method is expensive, difficult to implement and generally inconclusive unless a significant number of samples are

collected. For these reasons, the existing ambient monitoring should continue; however, if a trend is encountered showing water quality improvements, it should be interpreted that all of the environmental remedial actions taken by the County and others are succeeding.

The County should monitor the privately owned drainage system components along the primary stormwater conveyance system delineated in Chapters 1 through 12 within the watershed. The private systems may include FDOT roadways and drainage systems, CSX Railroad crossings and private property owners. If these components are being improperly maintained, the County should formally notify the responsible entities of the need to perform timely maintenance.

The County should also increase monitoring of fish farm discharges, reportedly a frequent source of illicit discharges to the County's MS4 system. The fish farm discharges are reported by maintenance staff to accelerate growth in the County drainage system downstream of the discharges. The accelerated growth can be a possible maintenance problem leading to potential flooding of adjacent areas.

Therefore it is recommended that the County should support the following SWFWMD Comprehensive Watershed Management (CWM) Program recommended sites for surface water monitoring as ranked in order of priority:

1. South Fork Little Manatee River at 579
2. Marsh Branch in Ruskin at 15th Street SE
3. South Fork Little Manatee River at Taylor Grade
4. Cypress Creek at Kings Blvd.
5. Carlton Branch at SR 674
6. Howard Prairie Branch near Stanland Road
7. Curiosity Creek at Valroy Road
8. Dug Creek at Stafford Road
9. Pierce Branch at SR 674
10. Alderman Creek at Taylor Gill Road
11. Gully Branch at Unnamed Road east of CR 579
12. Unnamed Slough at Lightfoot Road
13. South Fork Little Manatee River at Bunker Hill Road (situated 1 mile west of CR 39, off SR 62)
14. Little Manatee River near Ft Lonesome
15. Unnamed Creek at Flowers Road
16. Wimauma Drain at Unnamed Road east of CR 579
17. North Fork of Little Manatee River
18. Little Manatee River near Wimauma

19.7.4 Monitoring of Natural Habitat

The County should cooperate with IFAS, NRCS, FFWCC, and other agencies to monitor and assess undesirable plant species in agricultural, coastal, disturbed, and fringe areas, in order to protect the remaining habitat areas within the watershed.

19.8 ADDITIONAL STUDIES AND PLANNING

19.8.1 Water Quality and Ecological Protection Practices

The County should periodically update the Watershed Management Plan to reflect changes in the development of the watershed that impact water quality, new monitoring data, findings from assessments and special studies, and new regulations that impact discharges to receiving waters and private stormwater management systems.

The County should participate in re-evaluating the extent that agricultural irrigation waters are flowing to streams in the LMR watershed. If flow supplementation is occurring, identify problem areas and implement BMPs to minimize irrigation runoff.

The County should participate in review of streamflow management criteria for phosphate mining reclamation plans and if necessary develop improved technical methods to evaluate the effect of mine reclamation on streamflow. Reclamation plans should be designed so that historic flow regimes in tributary subbasins are maintained to the greatest extent practical.

The County should participate in revision of the diversion schedule for diversions from the LMR by the Florida Power and Light Power Plant to comply with agency recommendations. The process may evaluate alternative revisions of the diversion schedule.

The County should participate in collecting and evaluating hydrologic and ecological information necessary to establish minimum flows for the LMR. The County should then move to adopt minimum flows for the LMR so as not to harm the water resources or ecology of the area.

19.8.2 Floodplain Management

Hillsborough County should periodically update the Watershed Management Plan to reflect changes in the development of the watershed, new data (structural, topographic, as-built information, etc.). The hydrologic and hydraulic model developed for the watershed should be updated as the watershed and conveyance structures are modified and more information becomes available. In this way, the model will continue to provide valuable information regarding changes in hydraulic performance and potential flooding caused by new projects, replacement of existing structures and other engineering and regulatory issues. Changes in applicable regulations could also necessitate periodic watershed plan updates.