Agenda Item No. C - 8

VILLAGE OF ROYAL PALM BEACH
Agenda Item Summary

Agenda Item:

PUBLIC HEARING TO APPROVE RESOLUTION 24-02, A RESOLUTION OF THE VILLAGE COUNCIL OF THE VILLAGE OF ROYAL PALM BEACH, FLORIDA, ADOPTING THE VILLAGE OF ROYAL PALM BEACH WATERSHED MASTER PLAN; PROVIDING FOR IMPLEMENTATION; AND FOR AN EFFECTIVE DATE.

Issue:

The Florida Division of Emergency Management's ("FDEM's") Bureau of Mitigation prioritizes flood risk management as an integral part of its mission. The Watershed Planning Initiative is funded through a $26.6 million grant under the Hazard Mitigation Grant Program, as approved by FDEM and the Federal Emergency Management Agency, with the purpose of creating standardized, cost-effective, and easily replicable Watershed Master Plans ("WMP") throughout the state.

The Village was awarded $112,500 in grant funding to create a WMP for the Village. The WMP will act as a guidance document for future projects and maintenance level of service for the Village's stormwater systems and help maintain the Village's flood resiliency. The WMP can also help the Village with the National Flood Insurance Program Community Rating System ("CRS") by providing necessary points (approximately 175) to improve the classification/rating of the Village. This credit under the CRS program is only provided if the community implements stormwater management regulations through an adopted WMP.

The Village's WMP has been completed by CDM Smith dated December 2023.

Recommended Action:

Staff recommends approval of Resolution 24-02.

RECOMMENDED ACTION: Motion to Approve

Initiator	Village Manager Approval	Agenda Date	Village Council Action
Village Engineer		**3/21/24**	

RESOLUTION NO. 24-02

A RESOLUTION OF THE VILLAGE COUNCIL OF THE VILLAGE OF ROYAL PALM BEACH, FLORIDA, ADOPTING THE VILLAGE OF ROYAL PALM BEACH WATERSHED MASTER PLAN; PROVIDING FOR IMPLEMENTATION; AND FOR AN EFFECTVIE DATE.

WHEREAS, the Florida Division of Emergency Management's ("FDEM's") Bureau of Mitigation prioritizes flood risk management as an integral part of its mission; and

WHEREAS, The Watershed Planning Initiative is funded through a $26.6 million grant under the Hazard Mitigation Grant Program ("HMGP"), as approved by FDEM and the Federal Emergency Management Agency ("FEMA"), with the purpose of creating standardized, cost-effective, and easily replicable Watershed Master Plans ("WMP") throughout the state of Florida; and

WHEREAS, the Village of Royal Palm Beach ("Village") was awarded $112,500 in grant funding to create a WMP for the Village; and

WHEREAS, development of a WMP will act as a guidance document for future projects and maintenance level of service for the Village's stormwater systems and help maintain the Village's flood resiliency; and

WHEREAS, in addition of being a planning tool, the WMP can help the Village with the National Flood Insurance Program ("NFIP") Community Rating System ("CRS") by providing necessary points (approximately 175) to improve the classification/rating of the Village; and

WHEREAS, credit under the CRS program is only provided if the community implements stormwater management regulations through an adopted WMP; and

WHEREAS, the WMP has been completed by CDM Smith and a copy of the Final Signed & Sealed WMP dated December 2023 is attached as Exhibit "A"; and

WHEREAS, staff recommends that the Village Council adopt the Village of Royal Palm Beach's Watershed Master Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE VILLAGE COUNCIL OF THE VILLAGE OF ROYAL PALM BEACH, FLORIDA, THAT:

Section 1. The above recitals are true and correct and are hereby incorporated into this section of this resolution as if fully set forth herein.

Section 2. The Village Council of the Village of Royal Palm Beach hereby adopts the Watershed Master Plan a copy which is attached as Exhibit "A".

Section 3. The Village Manager is hereby authorized to take such further action as may be necessary to implement the purpose and the provisions of this resolution.

Section 4. This resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED this 21st day of March, 2024.

VILLAGE OF ROYAL PALM BEACH

____
Mayor Fred Pinto

ATTEST:

(SEAL)

____
Diane DiSanto, Village Clerk

FINAL WMP SUBMITTAL

Village of Royal Palm Beach, Florida

Watershed Master Plan

Project#: 4337-4-Pai

FLORIDA DIVISION OF EMERGENCY MANAGEMENT
HAZARD MITIGATION GRANT PROGRAM

December 2023

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Section 1

Statement of Purpose

The Florida Division of Emergency Management's (the Division or FDEM) Bureau of Mitigation prioritizes flood risk management as an integral part of its mission. The goals of this project are to assist local communities in developing a Watershed Master Plan for the purposes of moving up in the Community Rating System (CRS) of the National Flood Insurance Program (NFIP) and to increase resiliency in Florida communities. This project is funded through the Hazard Mitigation Grant Program (HMGP) DR-4337-004-P, as approved by the Division and the Federal Emergency Management Agency (FEMA) to create and update Watershed Master Plans (WMPs) throughout the state of Florida.

As indicated by the data and modeling and based on observations during heavy rainfall events there are potential problem areas in the Village's primary drainage system that may require additional maintenance and / or mitigation efforts throughout the Village, particularly as the system ages. The Development of a Watershed Management Plan will act as a guidance document for future projects and maintenance level of service for the Village's stormwater system and help maintain the Village's flood resiliency. These improvements in level of service and resiliency will potentially make the Village eligible for approximately 300 CRS points which will allow the residents of the Village who purchase flood insurance to save money on their insurance premiums.

This analysis and document follows the format of the guidance materials provided by floridadisaster.org to ensure consistency with the statewide approach to WMP development.

1.1 Defining the Watershed Planning Process

In 2015 the Village of Royal Palm Beach (Village) developed a Stormwater Master Plan Update Technical Report. The Stormwater Master Plan was completed using best available data to model 10, 25, and 100-year return period storm events to evaluate the Level of Service (LOS) through the Village's stormwater drainage system. The results of the Technical Report indicated that some structures within the Village would be affected by flooding from the modeled storms.

The FEMA Flood Insurance Rating Map (FIRM) updates for Palm Beach County (PBC) became effective October 5th, 2017. These updated FIRM maps showed similar flood elevations to the model results in the Technical Report but also identified several hundred more structures in the Special Flood Hazard Area (SFHA) "AE" flood zone. Almost all of the affected structures are within 1 foot of the base flood elevation (BFE). Given the close proximity of many structures to the BFE, the Village is focused on following best practices in regulating any new development or re-development and following best practices regarding inspections and maintenance of the stormwater drainage system.

Due to the aforementioned potential problems, the Village secured a FDEM Watershed Planning Initiative grant to develop a WMP for the purposes of planning projects to reduce local flood risk and maximize CRS credits.

According to the Association of State Floodplain Managers (ASFPM) (2020), the WMP generally consists of the following activities:

1. Evaluation of the watershed's runoff response from specific design storms under current and predicted future conditions.
2. Assessment of the impacts of sea level rise and climate change.
3. Identification of wetlands and other natural areas throughout the watershed.
4. Protection of natural channels.
5. Implementation of regulatory standards for new development such that peak flows and volumes are sufficiently controlled.
6. Specific mitigation recommendations to ensure that communities are resilient in the future.
7. A dedicated funding source to implement the mitigation strategies recommended by the plan.

To accomplish the watershed planning process listed above, the Village is updating the Stormwater Master Plan model developed 2015 with new available data for the primary stormwater management system (PSMS), boundary conditions, rainfall, and landuse changes.

The WPM is accomplished in two phases

- Creation of preliminary project plan, initial flood modeling, and submission of draft WMP to CRS officials for courtesy review and comments.
- Submission of final WMP & CRS approval.

The project will analyze and identify capital improvement projects comprised of potential mitigative measures to manage flood stages and flows to current levels to the extent practicable to meet the Village's desired flood management LOS. The accepted mitigation measures will be evaluated and incorporated into capital improvement projects and the Village CRS program. Results of the updated Stormwater Master Plan model will be incorporated into the WMP which will act as a framework for the Village's stormwater management program as well as meet the CRS 452.b WMP credit requirements. **Appendix A** provides a detailed Analysis Plan for WMP and the required Deliverables Checklist.

The flood modeling considers evaluations of the watershed's runoff response from the 10-, 25-, and 100-year 72-hour South Florida Water Management District (SFWMD) design storms and includes an assessment of the potential impact of sea level rise and climate change. Updates will include changes in land use/land cover (i.e.: impervious area), PSMS, and topography since the 2015 model and adds projected build out land use/land cover for future conditions with an assumed pervious and impervious areas and topography. Stormwater model parameters and supporting data are provided in **Appendix B.**

1.2 Overview of the Watershed

The Village of Royal Palm Beach was incorporated in 1959 and consists of approximately 11.7 square miles. According to the United States Census Bureau, the village has a total area of 10.1 square miles (26.1 km^2), of which 9.9 square miles (25.6 km^2) is land and 0.2 square mile (0.5 km^2) (1.79%) is water. The Village is generally bounded by State Route 7 to the east, Southern Boulevard (S.R. 80) to the South, Crestwood Boulevard to the west, and 40th Street to the north. A relatively small, annexed area (0.8 square miles) also exists to the south of Southern Boulevard. **Figure 1-1** shows the limits of the Village.

Land uses in the village are primarily residential-based with supporting commercial services. Stormwater is collected by a system of canals co-managed by Village of Royal Palm Beach, Indian Trail Improvement District (ITID), Loxahatchee Groves Water Control District, Lake Worth Drainage District (LWDD), which ultimately discharge into the South Florida Water Management District (SFWMD) regional canal C-51. Land surface elevations range from a high of approximately 35 feet (referenced to the North American Vertical Datum of 1988, ft-NAVD) in the Village Commons to approximately 15 ft-NAVD south of Southern Blvd. The majority of the Village has topography range between 15 and 20 ft-NAVD.

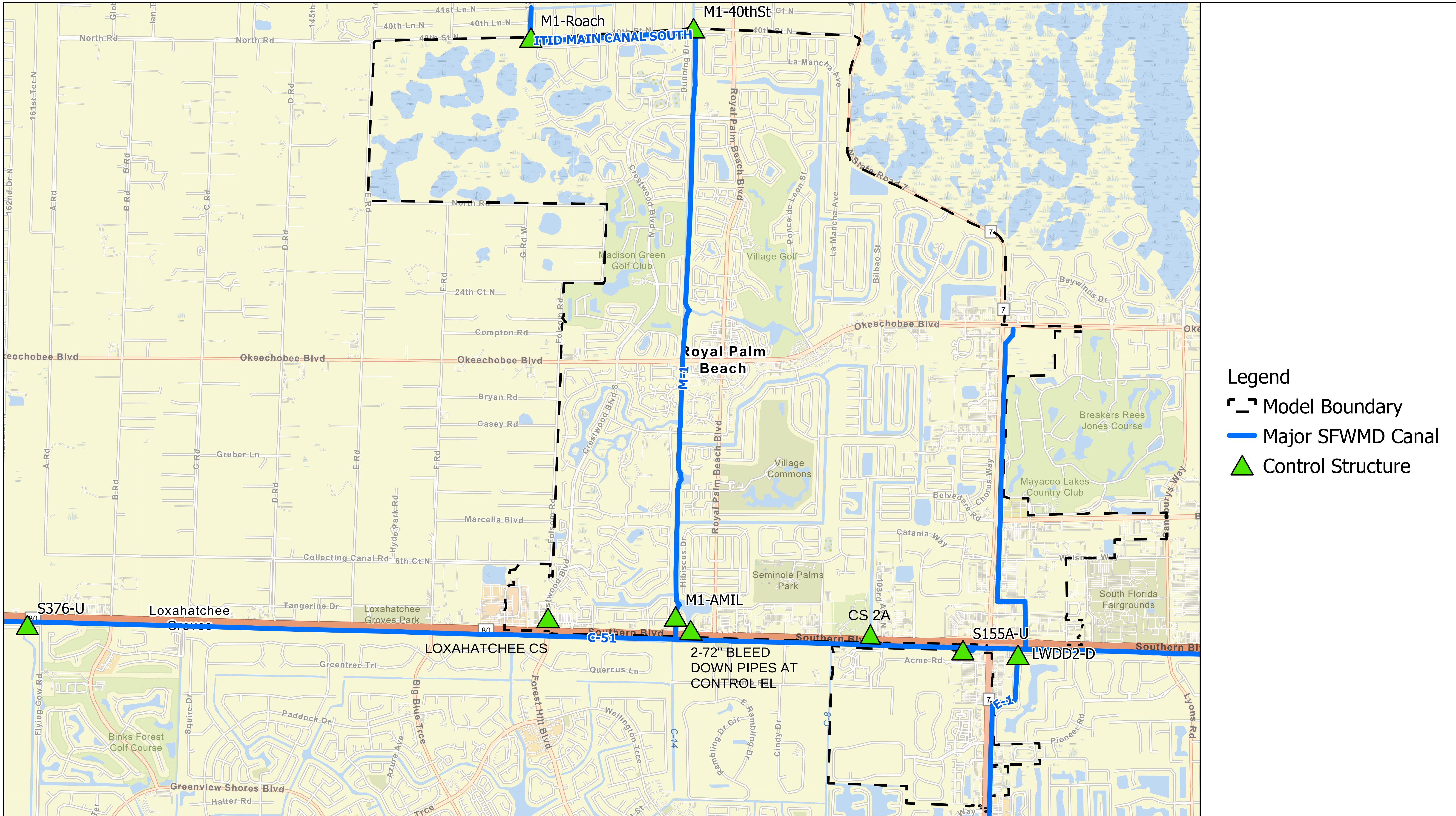
The climate of Royal Palm Beach is tropical. Rain falls throughout the year in Royal Palm Beach. The area can experience tropical storms and severe convective precipitation. A drier season occurs during October-May, however, wet cold fronts sweep across the nation tend to stall over the south Florida Region and can bring steady heavy rainfall for several days. The month with the least rain in Royal Palm Beach is December, with an average rainfall of 1.6 inches. The month with the most rain in Royal Palm Beach is June, with an average rainfall of 5.9 inches. Historically, the chance of a wet day over the course of June starts the month at 47% and ends at 62%.

1.2.1 Geomorphological Considerations

The Village is located within SFWMD C-51 major basin (164 square miles), and more specifically the C-51 West subbasin (79.5 square miles). Land uses in the village are primarily residential-based with supporting commercial services. There are approximately 800 acres of surface water bodies and 470 acres of wetlands within the Village limits. The sub basin areas are identified on **Figure 1-2**.

1.2.2 Waterway Features

Waterway features are also shown on Figure 1-1. Stormwater in the Village is generally collected into the Village's extensive canal systems with the largest canal being the M-1 canal. The M-1 canal conveys stormwater runoff from ITID and the Village to the C-51 Canal. Stormwater runoff from ITID (north of the Village) is discharged into the Village's PSMS based upon a gate operation schedule permitted by the SFWMD. The secondary canal maintained by the Village is the smaller NPBCID canal system. Water levels in this canal are controlled by a fixed weir (2A structure) on Southern Boulevard. The third system is the LWDD E-1 Canal located in the southeast corner of the Village and is controlled by stages in the C-51 canal. It should be noted that this canal is also downstream of the Pond Cypress Natural Area. The fourth system is the Loxahatchee groves water control system located in the southwest corner of the village and is controlled by stages in the C-51 canal.



Village Study Area Limits and Major Canals, Structures, and Waterbodies

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 1-1
7/10/2023

CDM Smith

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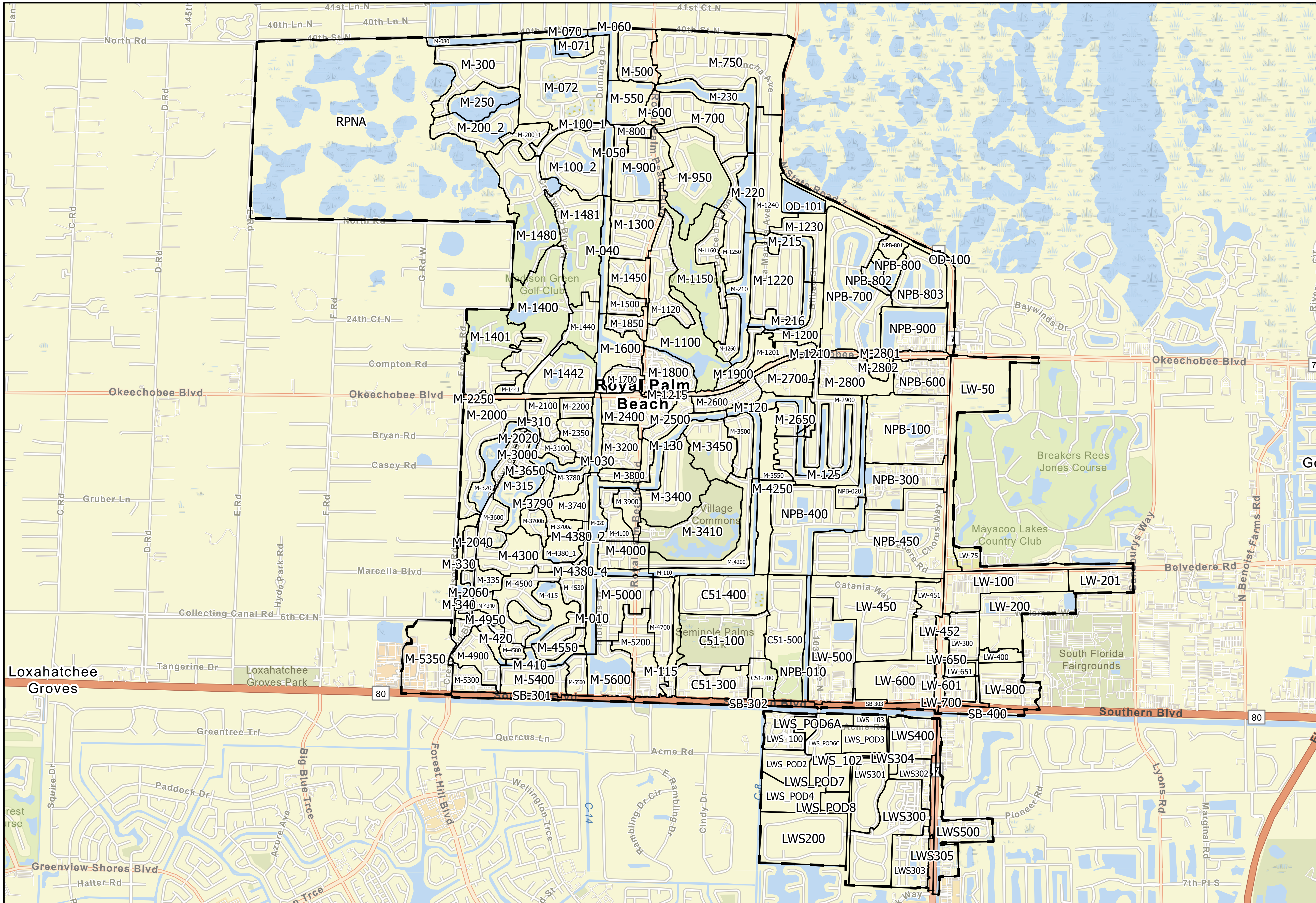

Legend
Model Boundary
Model HU

Model Hydraulic Units and Sub Basins

CDM Smith

Village of Royal Palm Beach
Watershed Master Plan
Figure 1-2
7/10/2023

N

0 1,250 2,500 5,000 Feet
1:35,000

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The C-51 (regional drainage canal) is operated by means of various water control structures that are located throughout the basin and serve several purposes including flood protection for the basin, discharge of flood flows from the adjacent L-8 basin to tidewater, water supply to the basins during periods of low flow and maintaining an adequate groundwater table elevation west of structure SFWMD Structure S-155 in order to limit saltwater intrusion. The S-155 structure is a gated spillway located within the C-51 Canal at Dixie Highway in West Palm Beach, approximately 10 miles east of the M-1 Canal and 2 miles south of Southern Boulevard. This structure controls stages in the canal and regulates discharge into the Intracoastal Waterway. Structures S-5AW (gated spillway), S-5AE (gated spillway), and S-5A (pump station) are located at the west end of the C-51 Canal near its confluence with the L-10/L-12, and L-8 Canals (approximately 8 miles west of the M-1 Canal). These structures are operated in a manner to control runoff into or from the C-51 basin as well as to supply water to the C-51 basin from WCA 1 and Lake Okeechobee. When excess water is present in the C-51 West subbasin, it can be discharged to the Intracoastal Waterway primarily through structure S-155, or alternatively, to the Water Conservation Area (WCA 1) via structures S-5AE, S-5AW and S-5A. Since 2005, the S-155A divide structure has been built in the C-51 Canal, immediately west of State Road 7 to control stages and flows in the eastern C-51 watershed. The SFWMD (C-51 Basin Rule Draft, February 2014) describes the S-155A structure as a remotely operated dual gate spillway. The structure has a design capacity of 1,460 cfs from the C-51 Western Basin to the east. The water level upstream of S-155A is maintained at 9.6 to 10.6 ft NAVD during the wet season to divert excess water into Stormwater Treatment Area STA-1E through the S-319 Pump Station. Under flood conditions, the gates close if the tailwater exceeds 10.3 ft NAVD, the headwater rises above 11.6 ft NAVD, the headwater falls below 9.6 ft NAVD, or the flow through the S-155 structure exceeds 4,800 cfs.

The discharge from ITID into the Village's M-1 canal is controlled by two gates (Roach and 40th Street structures) located on the north side of the Village. The Roach structure consists of twin 84-inch diameter culverts that control flow by slide gates. The inverts of the twin 84-inch diameter culverts are approximately at elevation 5.6 ft-NAVD. The 40th Street Structure consists of four 3.5-ft high slide gates. Two of the gates are 5-ft wide and the other two are 4-ft wide. The invert elevation of the gates is 10.6 ft-NAVD. The operation schedules for the control structures at 40th Street and Roach were updated to reflect current protocols (as of 2023) and those proposed under SFWMD Permit (Modification) No. 50-00761-S (issued 2/10/2014, see Appendix C), which modified how ITID discharges to the M-1 Canal under certain circumstances. Under typical current operating conditions, peak discharge from ITID into the Village is limited to no more than 565 cfs. Flows and stages are presented in the tables on Exhibit 2.1 of the permit. The SFWMD Permit provides stage elevations in the National Geodetic Vertical Datum of 1929 (NGVD), which is approximately 1.45 ft higher than the NAVD datum at the Village. The stages below have been converted from NGVD to NAVD to conform with this WMP.

The M-1 Basin has multiple operating modes, including: water conservation, normal, rainfall condition, stage condition (recovery) and emergency. For the purposes of this WMP, which evaluates the Village under design storm conditions, the "Rainfall Condition" mode is used. The 40th St and Roach structures are operated to maintain stages between 12.05 and 12.35-ft NAVD in M-1 Canal downstream of the structures. Under the modified operating schedule promulgated in SFWMD Permit No. 50-00761-S, ITID will be permitted to continue discharging through the 40th and Roach structures at a peak rate of 200 cfs during the peak of the storm event, with full permitted discharge resuming once the M-1 Canal has recovered to 12.35-ft NAVD.

The third gate is an AMIL gate which is located along the M-1 canal just north of Southern Boulevard at the confluence of the M-1 Canal and the C-51 Canal. This structure is permitted to allow up to 720 cfs from the M-1 Canal plus the conditional discharge from ITID (565 cfs). By its design, the normal operation of an AMIL gate is balanced/ballasted to maintain a constant upstream water level irrespective of variation in flow. The gate is normally closed under lower flow conditions and opens progressively as inflow increases, resulting in a maximum discharge with low headlosses. This structure operation schedule was also updated with proposed protocols permitted in SFWMD Permit No. 50-00761-S to offset the additional inflow from ITID by opening the manual slide gates to allow additional outflow from the M-1 Canal into the C-51 Canal equal to the ITID inflow plus 50 cfs (i.e. a maximum of 250 cfs when ITID discharges 200 cfs). Current M-1 Canal operational documents are provided in **Appendix C**.

1.2.3 Hydrologic Boundaries

Hydrologic Units (HU) are generally defined by natural physical features or constructed stormwater management systems that control and direct stormwater runoff to a common outfall. The following general criteria were used to determine HU boundaries:

- Large-scale physical features such as major roads were used to establish hydrologic divides.
- HU boundaries were delineated where structures or topographic features could appreciably impound water for the 100-year event.
- In areas without hydrologic divides, HU boundaries were determined by the extent of the PSMS.
- Existing reports and construction drawings were used, along with field verification, to define ambiguous boundaries.

For modeling purposes, the Village was subdivided into 194 HUs ranging in size from 2.0 acres to 785 acres and averaging 41 acres. The largest HU primarily represents the Royal Palm Beach Pines Natural Area; the next largest HU is 177 acres. Two additional HUs were added to account for stormwater inflows from the Upper Indian Trails Basin and the Lower Indian Trails Basin, which are outside the Village limits (and therefore are not accounted for in these statistics).

The Light Detection and Ranging (LiDAR) Digital Elevation Model (DEM) indicated that there was generally a shallow berm at the edge of the canals in the Village; therefore, runoff from the HUs adjacent to the canals would not necessarily sheet flow into the canals. Because of this, the canals were provided separate HUs such that on the precipitation that falls inside the berms would runoff directly to the canal. A similar methodology was used for the larger ponds (if they also were bermed). All other HUs runoff directly to the Village's PSMS and can thus flow to the canals through the pipe system, or through overland flows that are profiles of the berms. See section 1.1.6 Flow Paths and Natural Channels. The HUs were then digitized as polygons using the

Geographic Information System (GIS) software ArcGIS Version 10.2. These HUs are also illustrated on Figure 1-2. The basin areas are indicated in the Appendix B tables.

1.2.4 Wetlands and Natural Areas

The National Wetlands Inventory (NWI), maintained by the United States Fish and Wildlife Service (FWS), updated to May 2021, shows that within the Village there are several wetlands and natural areas classified as Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, and Riverine. **Table 1-1** Wetlands and Natural Areas Classification presents the total area in acres for each type of wetland that was identified and its corresponding sub-classification according to the NWI wetland codes.

Table 1-1 Wetlands and Natural Areas Classification

Wetland Type / NWI Code	Sum of ACRES
Freshwater Emergent Wetland	**227.69**
PEM1/SS1B	1.63
PEM1/SS1C	1.61
PEM1B	30.99
PEM1C	178.74
PEM1F	10.78
PEM1Fx	3.94
Freshwater Forested/Shrub Wetland	**127.32**
PFO1/4C	5.30
PFO1/SS1B	26.70
PFO1/SS1C	24.03
PFO1B	21.04
PFO1C	28.31
PFO2/1C	4.35
PFO2F	7.78
PFO3C	2.70
PFO4/EM1B	7.10
Freshwater Pond	**426.82**
PUBHx	358.11
PUSAx	2.68
PUSC	1.28
PUSCx	64.76
Lake	**94.78**
L1UBH	20.82
L1UBHx	73.96
Riverine	**326.29**
R2UBHx	291.30
R5UBFx	22.45
R5UBH	12.54
Grand Total	**1202.9**

To supplement the NWI data for credit toward WMP(5) criteria, Part II of the Village Code of Ordinances, Chapter 18 – Planning and Development, Article IV Environmentally Sensitive Lands Sec 18-45 provides the supporting documentation for the definition of, identification criteria, and required protection and preservation of the wetlands and natural open space within the Village limits.

1.2.5 Floodplains

The 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. The current effective FEMA Flood Insurance Study (FIS) for Palm Beach County and Incorporated Areas is the 2017 FIS. Engineering analyses were performed for each flooding source to calculate its 1% annual chance flood elevations. The engineering models and methods are described in detail in the 2017 FIS.

The Village jurisdiction falls within the following (9) FIRM panels: 12099C0532F, 12099C0534F, 12099C0542F, 12099C0551F, 12099C0552F, 12099C0553F, 12099C0554F, 12099C0561F, 12099C0562F, which identify multiple SFHA as: zone AE with BFE ranging from 14' ft-NAVD to 18.6' ft-NAVD, zone AH with BFE of 17.9' ft-NAVD and other areas zone X with minimal flood hazard and 0.2% annual chance flood hazard. The composite FEMA Flood Map for the Village is provided in **Appendix D**.

1.2.6 Flow Paths and Natural Channels

The Village has reached a stage in which all land available for development has plans for or has been developed/re-developed and there are no natural channels or streams as part of the stormwater system, only man-made ditches and canals exist. The flow channels/waterway features identified in the previous section 1.1.2 are the base of the model's hydraulic network. Due to that the stormwater system is made of a pipe system, man-made canals, and ponds. The flow paths were also analyzed to define the hydrologic boundaries.

As discussed previously, the LiDAR DEM indicated that there is a shallow berm between the canals and most Village neighborhoods. Therefore, the runoff from most of these neighborhoods drains to the underground stormwater (pipe) system and stages up in the streets, prior to running off into the canals. At the same time, the berms allow for higher stages in the canals before they can get out of bank and overflow into the neighborhoods. To simulate this in SWMM, a storage node is provided for each HU and given the stage-area relationship calculated from the DEM. Pipes are added to the model from the storage node to junctions at locations along the canals, and parallel (hydraulic) overflows are added to represent flow over the berm if stages in the streets or stages in the canal overtop the berm elevation. Hydraulic Overland flow links were added to the model to represent potential flow between storage nodes or between a storage node and a canal junction. Note, this is not the same as overland flows in the runoff (hydrologic) calculations. In the hydraulic model, overland flows are relatively short flows over shallow berms or ridges (often a road crown) to equalize flood stages between two areas. As discussed previously, overland flows are used parallel to the outfall pipes to link street flooding to the canals. They are also used to equalize street flooding between two HUs which have been delineated based on underground stormwater system, where there are no major roads separating the neighborhoods. Another use is parallel to bridge links or culverts to represent potential overtopping. Overland flow links, if relatively flat, may be represented by wide weirs or short, wide open trapezoidal channels. If the boundary is more irregular, the irregular conduit is used and the link is similar to a short, wide shallow channel. To maintain model stability, the links cannot be too short (i.e., a minimum of 50 ft is used and flows are checked for model stability).

For future credit toward WMP(7), this WMP has added the recommendation for modification of the Village Code of Ordinances Chapter 7 – Bulkheads and Waterways, to include explicit language to encourage channel improvement projects use natural or "soft" approaches rather than gabions, rip rap, concrete, or other "hard" techniques into WMP Section 6 - Action Plan. The process of development of the draft and final ordinance language and legal reviews for the planned code amendment(s) will follow.

1.3 Planning Goals and Scope

On October 1, 2018, the Village of Royal Palm Beach was accepted into the FEMA CRS program with a Class 6 rating. The Class 6 rating will allow Village residents who are in the Special Flood Hazard Area SFHA to receive a 20% discount on their flood insurance premiums. Residents not in the SFHA who wish to purchase flood insurance can receive a 10% discount. The CRS is a voluntary program for communities participating in the NFIP. The CRS offers flood insurance policy premium discounts in communities that develop and execute extra measures beyond minimum floodplain management requirements to provide protection from flooding.

According to the Watershed Planning Process defined at the beginning of Section 1, the planning goals and scope can be defined as shown in **Table 1-2** below.

Table 1-2 WMP Planning Goals

Goal	Quantitative Indicator	Management/Project
Reduce local flood risk	▪ Decreasing number of incidents per year ▪ Decreasing number of repetitive loss claims ▪ Decreasing number of structures within SFHA	▪ Changes to flood maps ▪ Canal and culvert maintenance / dredging / improvements ▪ Develop additional stormwater storage ponds
Preserve wetlands	▪ Constant or increasing wetland areas in the inventory map	▪ Increase regulatory protection ▪ Acquire properties
Maximize CRS credits	▪ Obtain most of CRS 315 credits points for WMPs ▪ Increase flood insurance premium discount rates obtained through the CRS program ▪ Improve the Village's CRS class rating	▪ Develop a WMP that meets 452.b CRS credit requirements

1.4 Public Outreach

The Program for Public Information (PPI) Committee is part of the Village's Community Rating System (CRS) program. This committee serves to provide oversight for the Village's public information outreach concerning flood mitigation. In so doing, they will be able to help reduce the flood insurance rates for residents and businesses in the community. The committee meets 1-2 time per year.

The key to a successful community outreach program is to assess attitudes and perceptions among target audiences and identify barriers, advantages and levels of support. A suggested partial list of potential stakeholders for this WMP includes the following:

- Village of Royal Palm Beach government
- Community groups, residents, homeowners' associations
- Local and regional business owners
- Palm Beach County government
- Florida Department of Environmental Protection
- United States Army Corps of Engineers
- South Florida Water Management District
- Indian Trail Improvement District
- Northern Palm Beach Improvement District
- Lake Worth Drainage District
- Loxahatchee Groves Water Control District
- Florida Department of Transportation
- Florida Fish and Wildlife Conservation Commission
- Florida Division of Emergency Management officials
- FEMA Community Rating System officials
- Emergency responders
- Media

The goals of the WMP public outreach program reflect the steps required to solicit the input of the public and build awareness of the project throughout diverse communities. Information presented to the public must be straightforward, factual, and designed to be appreciated by non-technical audiences. The Village will review its current public outreach program and make necessary arrangements to ensure the goals of the Public Outreach Program are achieved:

- Create and implement a meaningful public involvement process that communicates effectively and engages with the diverse communities and stakeholders
- Develop a list of public and regional benefits
- Create public forums and collateral materials that provide clear, concise and easy-to understand information to enable the public to make informed decisions and provide input
- Publish and distribute the draft environmental documents for review and also notify the public, elected officials and other stakeholders of upcoming community meetings and public hearings

- Respond to public and stakeholder feedback in an accurate, consistent, and timely manner
- Evaluate the public involvement process on a regular basis

The meetings must be public, and all input recorded. Each meeting should be developed with an agenda that includes:

- Date/times
- Locations
- Attendance
- Meeting formats
- Speakers/presenters
- Content of presentation material

A website should be created to provide documentation for all meetings including:

- Agendas
- Notices/ads
- Meeting materials
- Meeting summaries
- Minutes
- Public comment logs
- Plan documents
- Action items

Because many stakeholders cannot attend daytime meetings in person, options to provide input should include:

- Comment tool on the webpage
- Virtual meetings
- Blogs/discussion boards
- Survey platforms
- Electronic news outlets

Such forums must be monitored to incorporate feedback into the plan, typically government websites should be considered good hosting places. All outreach should incorporate a news media outlet. Examples of outreach materials are developed using the CRS Coordinator's Manual to identify those CRS activities that require outreach effort(s) for credit.

The Village website currently incorporates all of these elements as applicable and further supporting information is found at https://www.royalpalmbeachfl.gov .

Section 2

Watershed Characterization

To understand how the watershed works, characteristic data was collected existing information and data sets from site visits and previous planning efforts involving water quantity. This section discusses the data gathering process to create a data inventory, identify any critical data gaps, and analyze the data with screening tools and modeling to identify and prioritize areas of flood risk that should be addressed by the WMP. It is important to note that this step is iterative and ongoing as new data are generated and projects are implemented and monitored.

2.1 Surface Topography

Land surface elevations range from a high of approximately 35 feet (referenced to the North American Vertical Datum of 1988, ft-NAVD) in the Village Commons to approximately 15 ft-NAVD south of Southern Blvd. Updated topographic data was provided by the Village, which included a 4-ft by 4-ft Light Detection and Ranging (LIDAR) grid covering the Village limits and neighboring areas **(Figure 2-1**). In the Village Commons area, a 2-ft by 2-ft grid was developed by the Village from survey for the post-construction topography. The two datasets were merged into one comprehensive DEM. The DEM is used to guide HU delineation and estimate stage-storage area relationships and (hydraulic) overland flow profiles.

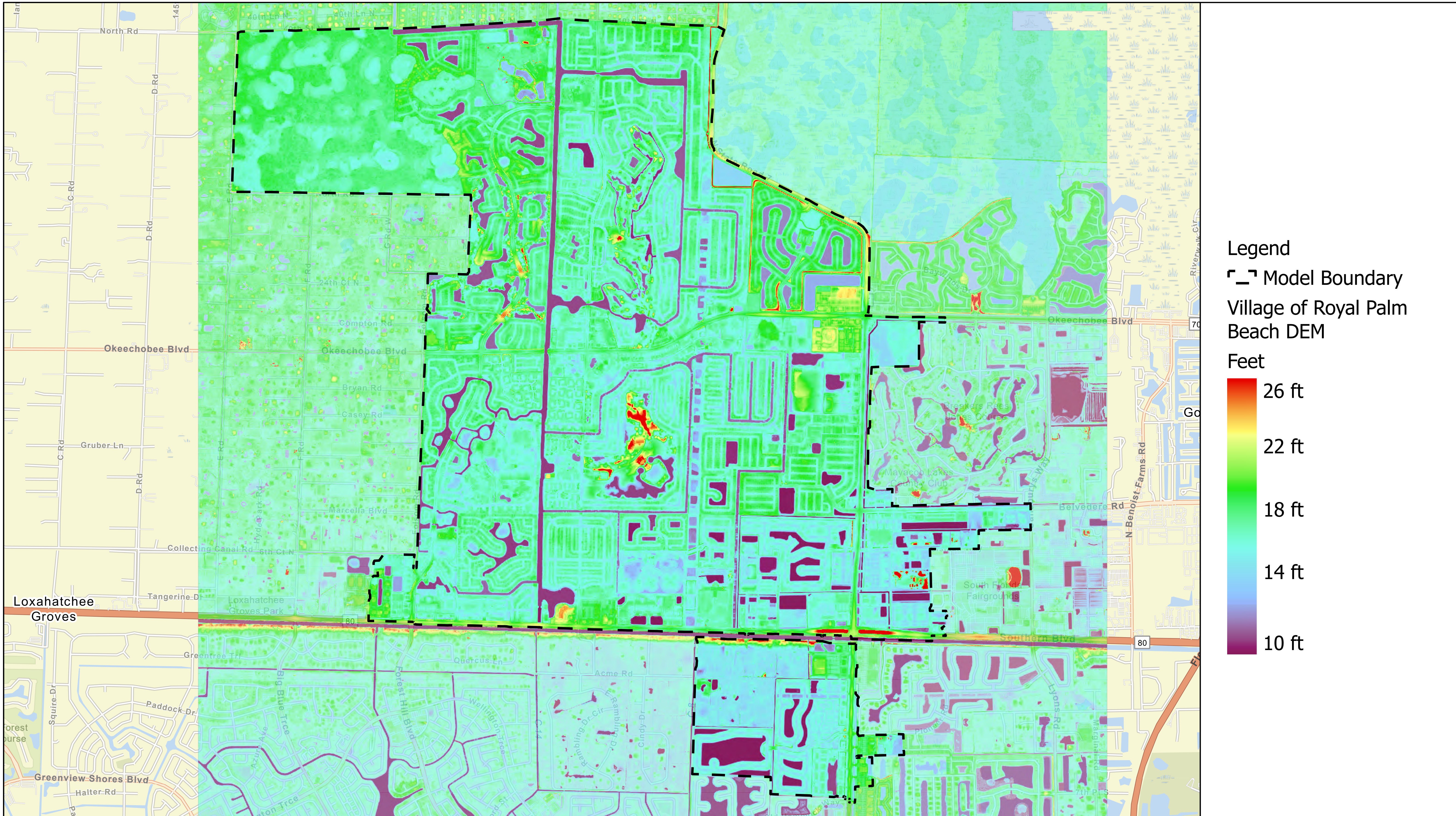
2.2 Groundwater

Groundwater plays a key role in determining the soil storage capacity, which is the ability of the soil to absorb precipitation. The groundwater and surface water are controlled by the structures and canals in the watershed hence the soil storage capacity was determined with the Horton infiltration method. Soil storage capacity is discussed in the 2.4 Soils section.

2.3 Surface Water/Tides

The Village is an inland community and is not subjected to the effects of tides. Gated salinity structures prevent tidal influence from traveling upstream in the major drainage canals of the study area. Flow and stages in the M-1 Canal are controlled by three variable gate structures (Roach, 40th St., and AMIL Gate Structures). Flow and stages in the NPBWCD Canal are controlled by the fixed weir at its confluence of the C-51 Canal. Flows and stages in the LWDD E-1 Canal are controlled by stages in the C-51 Canal.

Surface water data is gathered from control structures and the corresponding operation schedule as described in the previous section 1.1.2 Waterway Features. **Figure 2-2** shows the major control structure locations controlling the tides and canal levels in the system.



Study Area LiDAR Topography

0 1,250 2,500 5,000 Feet

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Village of Royal Palm Beach
Watershed Master Plan
Figure 2-1
7/10/2023

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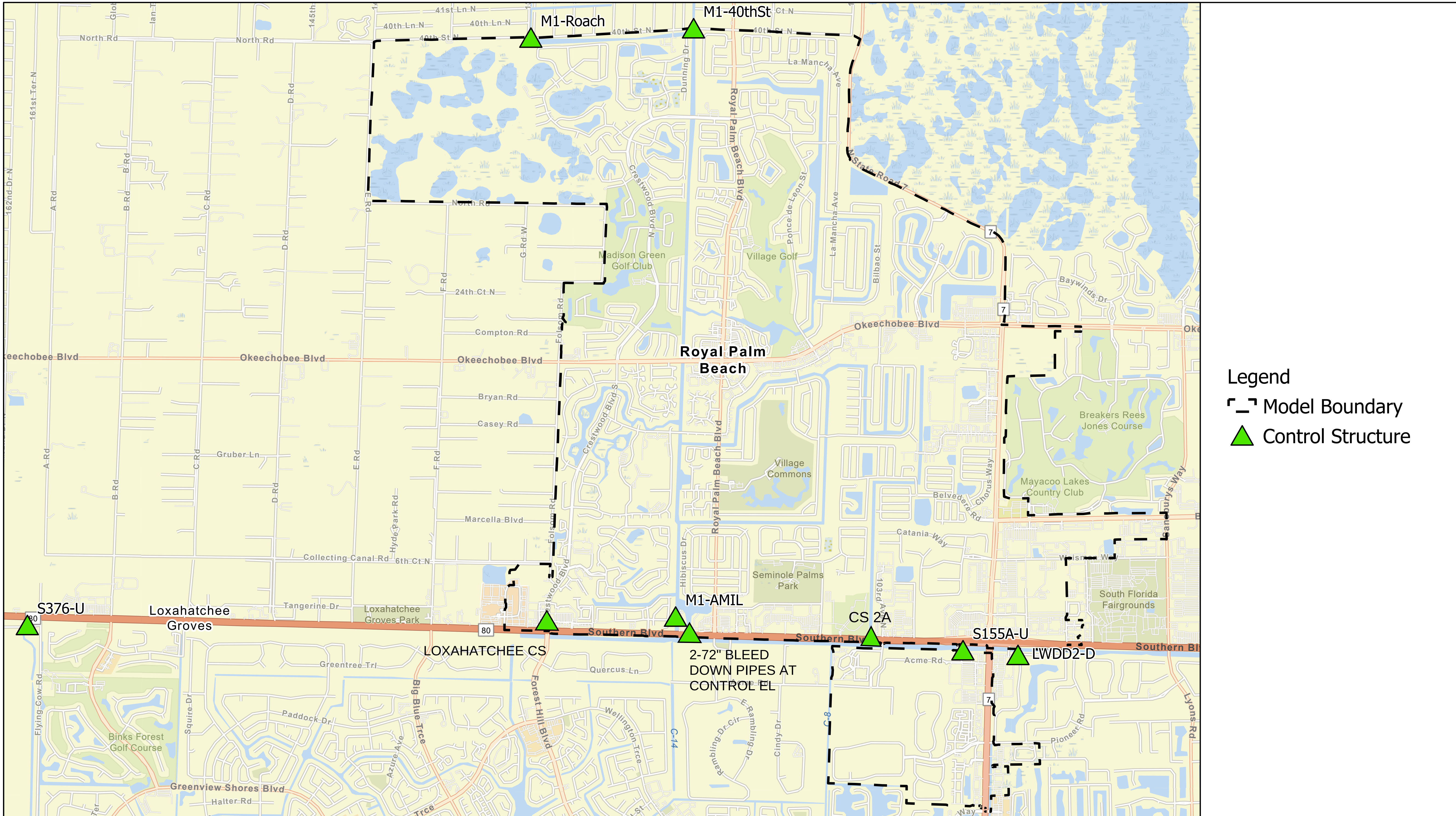

Control Structure Locations

Village of Royal Palm Beach
Watershed Master Plan
Figure 2-2
7/10/2023

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2.4 Soils

Soil data were used to evaluate stormwater runoff, infiltration, and recharge potential for pervious areas. Information on soil types was obtained from data compiled by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey of Palm Beach County, Florida (NRCS, 1978) and in digital format from the SFWMD. Each soil type has been assigned a soil series and Hydrologic Soil Group designated by the NRCS. Hydrologic Soil Group A is comprised of soils having very high infiltration potential and low runoff potential. Hydrologic Soil Group D is characterized by soils with very low infiltration potential and a high runoff potential. Hydrologic Soil Groups B and C are designated between these two categories. For the purposes of this study, dual class soil groups were assigned to the more conservative value (wet season). **Table 2-1** presents the NRCS Hydrologic Soil Group assigned to each NRCS defined soils series within the study area. GIS and spreadsheets were used to generate the percentage of each Hydrologic Soil Group within the updated HUs.

Table 2-1 NRCS Soils Groups

Map Unit Symbol Number	Soils Series Name	NRCS Hydrologic Soils Group
4	ARENTS-URBAN LAND COMPLEX, 0 TO 5 % SLOPES	C
10	BOCA FINE SAND	B/D
12	CHOBEE FINE SANDY LOAM	B/D
15	FLORIDANA FINE SAND	A/D
16	HALLANDALE FINE SAND	A/D
24	OKEELANTA MUCK	A/D
29	PINEDA FINE SAND	B/D
30	PINELLAS FINE SAND	B/D
31	PITS, 0 TO 5 % SLOPES	A
36	RIVIERA FINE SAND	B/D
37	RIVIERA FINE SAND, DEPRESSIONAL	B/D
38	RIVIERA-URBAN LAND COMPLEX	B/D
39	SANIBEL MUCK	A/D
42	TEQUESTA MUCK	B/D
47	UDORTHENTS, 2 TO 35 % SLOPES	B
48	URBAN LAND	C
49	WABASSO FINE SAND	B/D

Note - Hydrologic soil groups A/D and B/D were assigned to D for modeling purposes.

The Horton infiltration equation option was used to calculate the rate and volume of water that infiltrates into the soil, which is the same methodology used in the 2015 Study. The Horton infiltration equation is based upon conveyance through an unsaturated soil zone and must be modified in order to represent saturated soil conditions. SWMM includes a soil storage shut-off option that restricts the infiltration of stormwater once the soil storage capacity is exceeded. Soil storage capacity is a measure of the amount of soil pore space (in inches) available for the storage of infiltrated water. **Table 2-2** shows the global infiltration parameters that were used for this study. The table lists maximum and minimum infiltration rates and soil storage capacities for average antecedent moisture conditions (AMC – Type II). Area-weighted infiltration parameters were computed for each hydrologic unit (see Appendix B, Table B-1).

Table 2-2 Infiltration Parameters

Hydrologic Soil Group	Maximum Infiltration Rate (in/hr)	Minimum Infiltration Rate (in/hr)	Infiltration Decay Rate (1/hr)	Soil Storage Capacity (in) AMC II Average
A	12	1.00	2.0	6.5
B	9	0.50	2.0	5.0
C	6	0.25	2.0	3.8
D	4	0.15	2.0	1.4

2.5 Land Cover

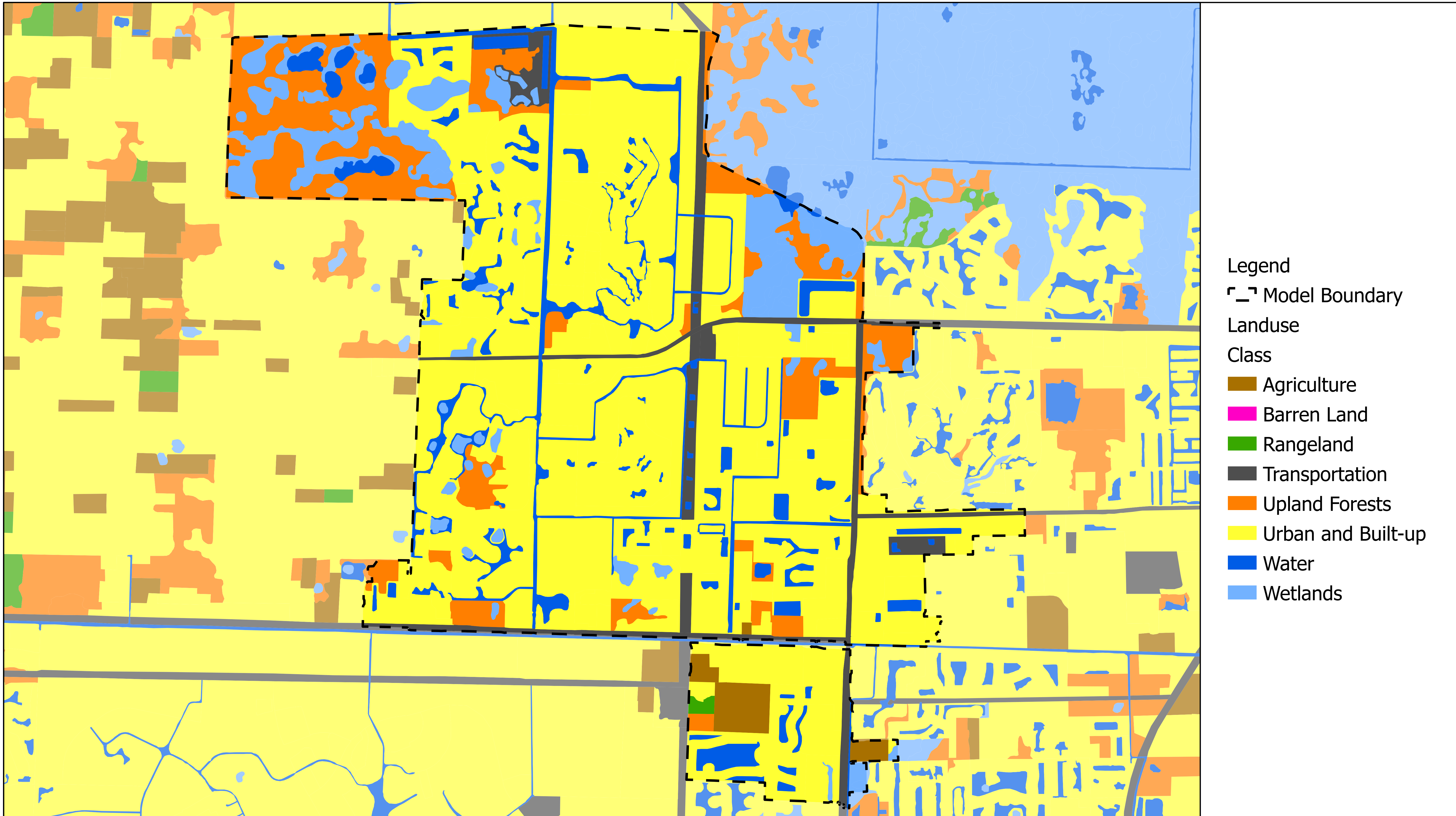
Land use/land cover data was used to estimate HU surface friction factors and initial abstractions. Note that these are secondary hydrologic components of the model (i.e., the model is generally less sensitive to reasonable ranges of these parameters than to impervious percentage and/or the geometry of the HU). See Section 2.8 for the impervious coverage of the Village.

Existing land use information was obtained from two sources. The Village Zoning and Planning Department provided a copy of its 1999 zoning plan. Existing land use data were also obtained from the SFWMD. Using these data sets, a matrix was developed grouping the land use data into 10 categories for modeling purposes, as shown in **Table 2-3** below. GIS was then used to generate the percent of each land use category for each HU. **Figure 2-3** displays the Land Use map covering the Village.

Table 2-3 Land Use Categories

Land Use Category	Percent Routed to Impervious	Pervious[1] n	Pervious IA	Impervious IA
1. Forest, Open, & Park	80	0.4	0.25	0.1
2. Pasture	80	0.3	0.25	0.1
3. Agriculture & Golf Course	80	0.3	0.25	0.1
4. Low Density Residential	50	0.25	0.25	0.1
5. Medium Density Residential	14	0.2	0.25	0.1
6. High Density Residential	15	0.2	0.25	0.1
7. Commercial / Light Industrial, Utilities	10	0.2	0.25	0.1
8. Heavy Industrial / Roads	10	0.2	0.25	0.1
9. Wetlands	0	-	0.5	0.5
10. Waterbodies	0	-	0..1	0.1

Note (1) Impervious Area n=0.015 for all land uses.



CDM Smith

Land Use Map for Village

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 2-3
7/10/2023

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For future conditions, the Village has provided known modifications for re-development which are approved and some in construction, thus for WMP planning purposes, the existing conditions model includes these areas and is essentially the same as the future conditions model, which reaches the buildout condition. Following the same methodology used to determine the land use for the existing conditions, the future land use map and GIS will be used to generate the percent of each land use category for each HU, additionally an assumed pervious area and topography will be provided for the future conditions modeling.

2.6 Precipitation

Specified rainfall data was used to generate stormwater runoff hydrographs for each hydrologic unit in the hydrologic model. Observed rainfall data are generally characterized by an amount (depth, measured in inches), intensity (inches per hour), frequency or occurrence (return period, in years), event duration (hours), spatial distribution (local variance), and temporal distribution (time variance). Design storm events are typically named by the return period of the rainfall depth and by the event duration. For example, a 100-year, 72-hour design storm event describes a rainfall depth over a 72-hour period that has a one percent (1 in 100) chance of occurring at a particular location in any given year.

For this study, design storm event quantities and distributions were updated using the latest National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Point Precipitation Frequency Estimates (https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=fl) for Florida, and the SFWMD 72-hour distribution in 5-minute intervals for the three design storm events simulated with the model. The SFWMD 72-hour distribution applies the SFWMD 24-hour distribution from hours 48 through 72, with continuous lower intensity rainfall over the first 48 hours. The ratio between the 72-hour volume and the 24-hour volume for a given storm is 1.359.

Therefore, the 24-hour duration volumes were selected from the Atlas 14 tables and multiplied by 1.359 to provide the SFWMD require 3-day distribution for that storm. Note that one value is used for the entire Village per storm, as spatial distributions are not expected to significantly alter the model results. The updated volumes are significantly larger than the previous volumes and indicate the increases in storm volumes that have been occurring since the original SFWMD volumes were developed in the 1990s. **Table 2-4** presents the previous 2015 WMP and the updated 2023 WMP rainfall volumes respectively.

Table 2-4 Design Storm Volumes

Land Use Category	2015 WMP*	2023 WMP	% Change
10-year, 72-hour	10.1	11.8	16.8
25-year, 72-hour	12.2	15.2	24.6
100-year, 72-hour	16.3	21.0	28.8

Note: *The 2015 WMP used a 10-year, 24-hour storm volume of 7.4 inches – this has been multiplied by 1.359 to provide a 72-hour estimate

2.7 Open Space

Open space is defined as areas that are exempted from development. Permanent protection of sensitive areas can provide critical areas to store excess water after storms, thereby serving the dual benefit of nutrient reduction and storage. As discussed in Section 1.1, the Village has reached a stage in which all land available for development has been developed (or is planned for development as in the new annexed areas south of the C-51 Canal). However, there is land that has been protected and reserved from development as the Royal Palm Beach Pines Natural Area on the northwest corner of the study area, and other open space areas as Forest, Open and Parks, Pasture, Agricultural & Golf Course, and Wetlands as shown in the land use map.

2.8 Impervious Areas

The Village provided GIS layers of buildings, roads, and non-residential impervious areas which were used to estimate the impervious percentage for each hydrologic unit for most of the model. This data was augmented using recent aerial photography of the Village. For the future developments in the Annex, south of Southern Boulevard and the C-51 Canal, relatively high estimates of impervious cover were used as a conservative full built-out condition. Since most of the Village is completely built-out, aside from the reserved open space noted above, and the future planned developments in the Annex, this WMP represents Future Landuse/Impervious conditions. Existing impervious conditions were not modeled in the update as this condition is not expected to remain in the Annex and there are no changes in the rest of the Village.

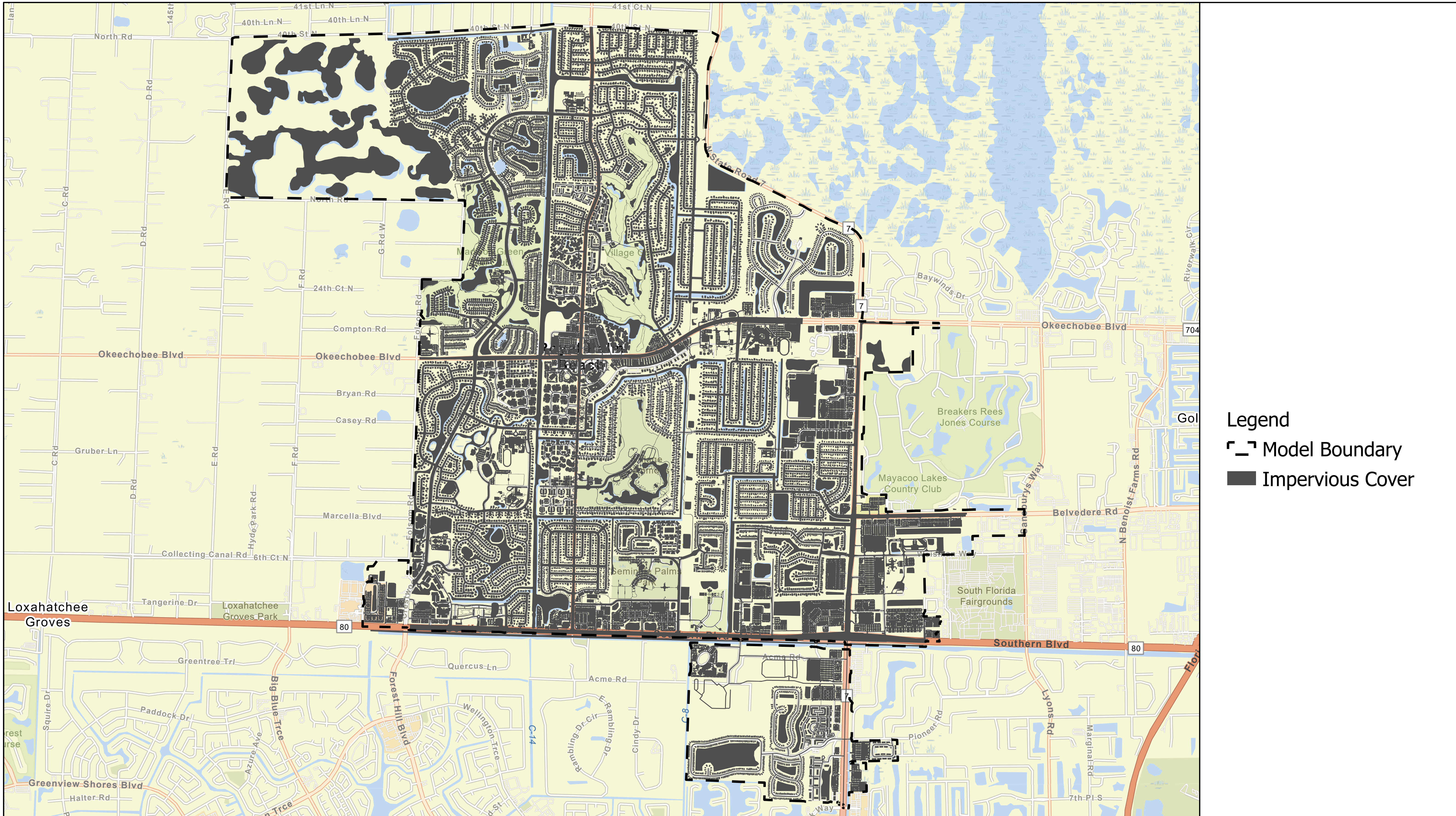
Figure 2-4 presents the impervious coverage for the Village. Note that wetlands and water bodies count as impervious surfaces in the model, because in these areas there is no infiltration capacity under wet season conditions. The total impervious cover for the Village is 50.7 percent of the area, with a range from < 1 percent to 95 percent over the HUs. Appendix B, Table B-1 presents the hydrologic parameters for the model, including the impervious coverage per HU.

2.9 Waterbodies

The PSMS for the Village consists of a combination of conveyance and storage elements. Conveyance elements primarily consist of pipes, open channels (canals/ditches), culvert crossings, and stage/flow control gates. Storage elements consist of stormwater ponds, and floodplain storage. The study area contains a large number of lakes, stormwater ponds and wetlands that have been previously identified and shown on the land use map and when defining the impervious areas.

2.10 Natural Resources

Understanding the watershed's natural resources is critical to identifying potential sources of water quality degradation and areas to designate for conservation, protection, and restoration. Key natural resources as wetlands and open areas, waterbodies, soils, land use have been discussed in previous sections. The Royal Palm Beach Pines Natural Area, is a county purchased natural area for conservation purposes. This 772-acre site includes mesic flatwoods, wet flatwoods, hydric hammock, wet prairie, depression marsh, and dome swamp, with wetland ecosystems covering almost half the area. The natural area attracts many birds, including bald eagle, red-shouldered hawk, Osprey and Great Horned Owls, Palm and Prairie Warblers,



Impervious Areas Coverage

Village of Royal Palm Beach
Watershed Master Plan
Figure 2-4
7/10/2023

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American Kestrel, and Pileated, Downy and Red-bellied woodpeckers, and Florida sandhill crane. Other animals sighted include bobcat, southern cricket frog, and eastern box turtle. This site helps maintain a diversity of plants and animals and allows residents to enjoy nature-based activities.

2.11 Demographics

Demographics data is important for determining several key indicators for watershed master planning such as the ability to pay for improvements, social justice issues, land acquisition costs, property/land use, and communication strategies. The US Census has databases at the census tract level. Based on the census data for the study area, **Table 2-5** outlines population and racial composition demographics.

Table 2-5 Demographics

Demographic Parameter	Study Area
Area (Square miles)	11.5
Population	38,697
Number of Households	13,993
Median Annual Household Income	$84,797
Median Age	41
Male	47.8%
Female	52.2%
White	57.4%
Black, African American	28.0%
Asian	4.2%
Other Race	2.3%
Two or More Races	8.1%
Hispanic or Latino (Regardless of Race)	24.7%

2.12 Stormwater Infrastructure Inventory

The PSMS forms the foundation for the model representation of the hydraulic system. The 2015 model was built from GIS database and construction drawings of stormwater facilities (i.e., culverts, bridges, detention ponds). Mainly, sources of this information included the following:

- Village of Royal Palm Beach GIS geodatabase.
- Village of Royal Palm Beach Archived Construction Drawings
- SFWMD Permit Data
- Palm Beach County Construction Drawing Files
- ITID Comprehensive Drainage Plan (2013)
- Lake Worth Drainage District Maintained Canal Elevations Map

For the purpose of this WMP, the PSMS was updated with the latest information from the Village GIS inventory of their stormwater infrastructure. This dataset was augmented as required using construction drawings provided by the Village to reflect the changes in the PSMS that had occurred since the 2015 model and had not been incorporated in the inventory.

Revisions were incorporated into the model wherever the PSMS was impacted. The following list includes some, but not necessarily all of the impacted areas:

- FP&L powerline easement ponds
- Portosol development
- The Annex, south of the C-51 Canal (Turtle Royal and other future developments).
- Crestwood Development

Additionally, revisions were made to the M-1 operations schedule to reflect current operation, the AMIL Gate, and the ITID inflow which were modeled explicitly.

2.13 Data Gaps

The following data gaps were identified and resolved as follows:

1. One of the requirements for the WMP is the analysis of sea level rise (SLR) effects on the 100-yr rainfall event. The SFWMD is in the process of developing their Flood Protection Level of Service (FPLOS) model which covers the area of the Village and results will not be available at the time of this writing. SFWMD model will identify any needs of long-term flood protection for basins throughout a 16-county region. The mission of that program is to identify and prioritize long-term infrastructure improvement needs, and to develop an implementation strategy to assure that each basin can maintain its designated FPLOS, in a technical and cost-effective manner, in response to population growth, land development, sea level rise and climate conditions change. In lieu of that data, an engineering analysis was performed on the hydraulics and hydrogeology of the system for the Village study site (see Section 4.3) of which the results show negligible impact from future SLR.

2. The WMP models are capable of providing estimates of flood stages within the Village at a higher level of detail than FEMA flood maps; however, Finished Floor Elevations (FFEs) of are needed for structures of interest, such as Critical Buildings or residential homes at relatively low elevations, do determine potential flood risk. The Village was unable to provide a GIS layer of structure FFEs. The surrounding LiDAR DEM was used in lieu of FFEs to provide rough estimates of flood risks per neighborhood.

3. The LiDAR DEM is 5 years old at the time of this writing. The Crestwood Development and the proposed developments in the Annex south of the C-51 Canal use rough estimates of topography. Additionally, maps of flood depth estimates are not provided for the areas.

4. As discussed in Section 2.8, the impervious cover for the Annex were set to conservative estimates of (relatively high) imperviousness.

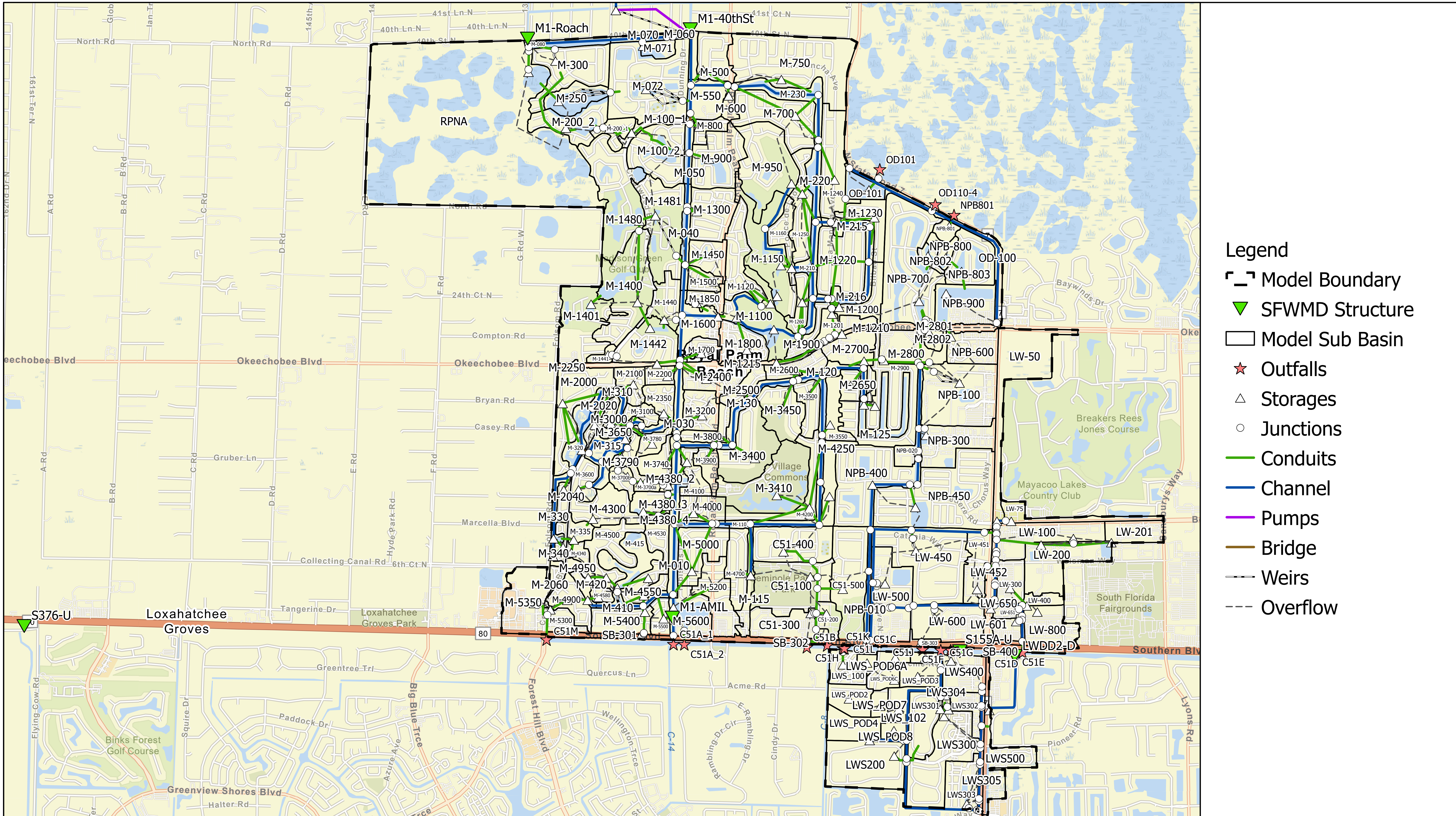
2.14 Model Elements

Table 2-6 presents a summary of the model elements within the Village (i.e., the ITID subbasins have been excluded as discussed in Section 1.1.3). The model schematic is shown on **Figure 2-5**. More detailed information on the hydraulic properties of the model are presented in Appendix B.

Table 2-6 Summary of Model Elements

Element	Value
Total Model Area (Acres)	7,900
Sub-Basins (HUs)	192
Sub-Basin Avg Size (Acres)	41.1
Model Nodes	391
Tabular Storage Nodes	176
Outfalls	16
Conduits Circular	242
Conduits Ellipse	8
Conduits Rectangular	8
Irregular Channel	110
Overland Flow Channels Irregular	210
Overland Flow Channels Trapezoidal	16
Bridge (Irregular Channel/Custom)	14
Conduit Arch	1
Pumping Stations*	0
Weirs	60
Orifices**	22

Note: 1. * Though there are no pump stations in the Village, 3 pumps are used to mimic M-1 gate operations
2. ** Orifices may be "side" for small bleeders on larger weirs, or "bottom" to represent rectangular structures



Existing System Inventory and Model Schematic

Village of Royal Palm Beach
Watershed Master Plan
Figure 2-5
7/10/2023

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Section 3

Policy Framework

This section presents an inventory of existing regulations, policies, and plans that are in place within the watershed and its vicinity. The agencies having jurisdiction and the regulations that grant them the authority to enact plans and policies and regulate activities that might otherwise affect water quantity and quality in the watershed are discussed. This will give context on the complex regulatory dynamics that involve stormwater management in the Village.

3.1 Existing Regulations

3.1.1 Federal Regulations

The federal and state of Florida rules have been interconnected since the 1980s with delegation of enforcement and administration of the major environmental protection rules to the states.

The Federal Government regulates, through Section 404 of the Clean Water Act, some of the activities that occur in wetlands. The Section 404 program originated in 1972, when Congress substantially amended the Federal Water Pollution Control Act and created a Federal regulatory plan to control the discharge of dredged or fill materials into wetlands and other waters of the United States.

The Clean Water Act (CWA) regulates surface discharges to fresh waters, ocean discharges by wastewater plants, disposal of concentrated process waters from water plants (such as concentrate from membrane facilities), and disposal of residuals (sludge). Implicit is that stormwater and agricultural runoff issues may affect potable water supplies and are potentially subject to regulation. The U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) share the responsibility for implementing the permitting program under Section 404 of the Clean Water Act.

The National Flood Insurance Act (NFIA) (Public Law Number 90-448, 82 Stat. 572 (August 1, 1968). Codified, as amended, at 42 U.S.C. §4001), established the National Flood Insurance Program (NFIP). Property located in a flood area where the community participates in the NFIP is subject to the NFIA's requirements.

The Flood Disaster Protection Act of 1973 (FDPA - Public Law Number 93-234, 87 Stat. 975.). Section 102(b) of the FDPA amended the NFIA to require the Board of Governors of the Federal Reserve System (Board), the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), and the National Credit Union Administration (NCUA) to issue regulations directing lending institutions under their supervision not to make, increase, extend, or renew any loan secured by improved real estate or mobile homes located, or to be located, in a Special Flood Hazard Area (SFHA) where flood insurance is available under the NFIP unless the building or mobile home and any personal property securing the loan are covered by flood insurance for the term of the loan.

The National Flood Insurance Reform Act of 1994 (Reform Act - Title V of the Riegle Community Development and Regulatory Improvement Act of 1994, Public Law Number 103-325 (September 23, 1994)), made comprehensive changes to the NFIA and FDPA. The changes included obligating lenders to escrow all premiums and fees for flood insurance required under the NFIA.

The Biggert-Waters Flood Insurance Reform Act of 2012 (BWA) ensured the NFIP's fiscal stability. To make the program self-sustaining, the BWA phased out both subsidized rates, which apply to approximately 20% of policyholders (Pub. L. No. 112- 141, 126 Stat. 916 (2012). The BWA also directed FEMA to implement full-risk pricing for all policies.

The NFIP requirements can be found in Chapter 44 of the Code of Federal Regulations (44 CFR). Revisions to these requirements are first published in the Federal Register, a publication the Federal Government uses to disseminate rules, regulations and announcements. NFIP regulations identify minimum requirements that communities must fulfill to join and stay in the program. The requirements that apply to a particular community depend on its flood hazard and the level of detail of the data FEMA provides to the community.

USEPA under Section 402 (p) of the Clean Water Act (N40CFR Part 112.26) developed MS4 and other permitting systems to address area runoff. A municipal separate storm sewer system (MS4) is a publicly owned conveyance or system of conveyances (i.e., ditches, curbs, catch basins, underground pipes, etc.) designed or used for collecting or conveying stormwater and that discharges to surface waters of the state. In Florida, the state has delegated much of this effort to the Florida Department of Environmental Protection (FDEP) and the water management districts. As implemented by Chapter 62-624, F.A.C., Phase I addresses discharges of stormwater runoff from "medium" and "large" MS4s (i.e., those MS4s located in areas with populations of 100,000 or greater). Under Phase II, the program regulates discharges from certain MS4s not regulated under Phase I, and that meet designation criteria set forth in Chapter 62-624, F.A.C.

USACE has rules associated with federal works that apply to dredging, and other activities on navigable waters, which also includes wetlands.

USACE published, in 1987, the Corps of Engineers Wetland Delineation Manual, a technical manual that provides guidance to Federal agencies about how to use wetland field indicators to identify and delineate wetland boundaries (USACE, 1987). In January of 1989, USEPA, USACE, Soil Conservation Service (SCS), and FWS adopted a single manual for delineating wetlands under the Section 404 and Swampbuster programs - The Federal Manual for Identifying and Delineating Jurisdictional Wetlands (commonly referred to as the "1989 Manual"). The "1989 Manual" establishes a national standard for identifying and delineating wetlands by specifying the technical criteria used to determine the presence of the three wetland characteristics: wetland hydrology, water-dependent vegetation, and soils that have developed under anaerobic conditions (USEPA, 1991).

3.1.2 State Regulations

The Florida Legislature enacted the Florida Watershed Restoration Act (FWRA) in 1999 to protect Florida's water resources from excessive pollution loading. It focuses on the Total Maximum Daily Load (TMDL) program that is required by the federal Clean Water Act and discusses specifics of how this program should be implemented in Florida. It does not address water quantity directly.

Waterbodies that do not meet water quality standards are identified as "impaired," and implementation plans must be developed describing how the point and nonpoint sources of pollution will meet their discharge allocations. This implementation plan is referred to as Basin Management Action Plan (BMAP)

FDEP is the lead agency in establishing TMDLs and for enforcing the FWRA when addressing point source and nonagricultural nonpoint source pollution, while the Florida Department of Agriculture and Consumer Affairs (FDACS) is the lead agency for enforcing the FWRA when it comes to agricultural nonpoint source pollution. FDEP is required to coordinate with the water management districts, FDACS, soil and water conservation districts, environmental groups, regulated parties, and local stakeholders during all phases of the TMDL process.

In Florida, the authority for regulating wastewater, drinking water and injection wells has remained with the State, which has delegated watershed management regulatory authority to the water management districts under FS 373. Thus, the authority in this watershed is the SFWMD.

The Florida Building Code applies to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures. The purpose of this code is to establish the minimum requirements to provide a reasonable level of safety, public health and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

American Society of Civil Engineers Flood Resistant Design and Construction, ASCE Standard 24, incorporated by reference in the Florida Building Code provides minimum requirements for flood-resistant design and construction of structures located in flood hazard areas.

The Florida Department of Transportation (FDOT) Chapter 334, F.S., known as the Florida Transportation Code, establishes the responsibilities of the state, counties, and municipalities for the planning and development of the transportation systems serving the people of Florida, with the objective of assuring development of an integrated, balanced statewide system.

The FDOT, under Florida Administrative Code (F.A.C.) Rule chapter 14, regulates permit requirements, and information concerning the permit applications and how to submit them.

3.1.3 Regional Regulations

Stormwater management systems in the study area are regulated by SFWMD. These regulations apply to the design of stormwater management systems that require a permit as described in Chapter 62-330, F.A.C., or Section 403.814(12) F.S.

SFWMD published the Environmental Resource Permitting (ERP) Manual that contains SFWMD-specific appendices for regionally-specific criteria such as basin maps for cumulative impact assessments (see Applicant's Handbook Volume I, Section 10.2.8), mitigation bank service area determination (refer to Chapter 62-342, F.A.C), and above ground impoundments. Projects that qualify for a general permit in Section 403.814(12), F.S., are not regulated under Chapter 62-330, F.A.C.

Permit Volume II contains design and performance standards that are relevant to the design of projects that qualify for that general permit. The ERP manual provides specific, detailed water quality and quantity design and performance criteria for stormwater management systems regulated by SFWMD through the ERP program authorized under Part IV of Chapter 373, F.S.

Chapter 40E-41, Part III C-51 Basin, F.A.C establishes criteria applicable to Environmental Resource Permits and Surface Water Management Permits in the C-51 Basin.

3.1.4 Local Regulations/Comprehensive Plans

Local governments in the study area have local land development regulations that require construction and environmental permits for certain regulated activities. As a general statement, the local regulations/comprehensive plans contain the policy framework necessary for environmental resource regulation. All local regulations/plans, require applicants to obtain all permits issued by the corresponding state and federal regulatory agencies that have jurisdiction, prior to the commencement of any construction.

3.1.4.1 Palm Beach County

- Code of Ordinances
- Unified Land Development Code
- Comprehensive Plan

3.1.4.2 Village of Royal Palm Beach

- Code of Ordinances:
    - Chapter 6 – Buildings and Building Regulations
    - Chapter 7- Bulkheads and Waterways
    - Chapter 9 – Fences, Hedges, and Walls
    - Chapter 11.5 – Floodplain Management
    - Chapter 13 – Health and sanitation
    - Chapter 15 – Landscaping and Vegetation Management
    - Chapter 18 - Planning and Development
    - Chapter 21.5 – Stormwater Management and Drainage Chapter 22 – Subdivision of Land
    - Chapter 24 – Utilities (Articles II & III – Water Conservation & Stormwater Management)
    - Chapter 26 - Zoning

- Comprehensive Plan (2016)
- Stormwater Master Plan (2015)
- Stormwater Utility – Final Policy and Procedures Manual (2012)

3.1.4.3 Lake Worth Drainage District

LWDD requires a permit prior to the commencement of any construction activities within the service boundary where projects are adjacent or connect to a District canal(s), or where projects utilize or occupy canal rights-of-way.

- Right-of-Way Operating Policies, District's criteria for review of individual applications.

3.1.4.4 Loxahatchee Groves

Work within the limits of the Town that would change or modify property, infrastructure, roadways, utilities, or vegetation is required to apply for a permit. Certain activities are allowed for maintenance and operation of existing drainage, access roads, and agricultural properties.

- Unified Land Development Code (ULDC), Part V, Article 110
- Code of Ordinances, Part 2, Chapter 10-18 and 34
- Paving, grading, drainage, water, and wastewater, pump stations, lift stations, storage tanks ULDC, Part 3, Article 70 - Drainage, Swales and Culverts
- Floodplain Components such as excavation, fill, building foundations, roadways, borrow pits, ponds, and all other topographical, any project proposing fill, excavation, grading, or vegetation removal within 50 feet of a designated FEMA, or any activity with the potential to impact the operation, maintenance, or administration of the floodplain, ULDC, Article 175 - Floodplain Management

3.1.4.5 Indian Trail Improvement District (ITID)

An ITID permit is required prior to commencement of construction activities that involve connection or utilization of ITID works or construction upon or occupation of ITID property or right-of-way (Section 2 of Chapter 2002-330, Laws of Florida {ITID's Charter} and Florida Statute 298.28.)

3.2 Design Storm Events

The South Florida Water Management District (SFWMD) is the authorized governing body for the receiving larger watershed for the Village of Royal Palm Beach's primary stormwater management system and requires the 72-hour or 3-day storm event shall be used. A 5-day event as recommended by the CRS manual is non-standard in this location (except for some closed, depressional systems in central Florida). Additionally, no SFWMD Canal boundary condition exists for the larger receiving basin for a 5-day event for calibration and modelling purposes.

The 2017 CRS Coordinator's Manual Section 452.b states that *"If a community can demonstrate that an event shorter than five days is the locally appropriate "worst-case" runoff event for* *stormwater management, it may receive this credit if it uses that event for its regulatory standard. In some areas this may require continuous-simulation modeling. If a community, regional, state, or federal agency can demonstrate that, for example, the 72-hour event provides the “worst case” runoff for a watershed, the 72-hour event would be credited for communities in that area”.* Additionally, the 3-day event uses the same rainfall data peak intensity as the 5-day compressed into a more conservative shorter time period, and due to local soils and groundwater aquifer characteristics, the 5-day duration rainfall would show negligible differences in the analysis outcome. Accordingly, the Village has selected the locally-imposed permit requirement for the 3-day event be used as the appropriate rainfall duration for the WMP.

Accordingly, for consistency with local required governance for approval of proposed WMP projects, the 3-day duration was necessarily selected for the rainfall duration as its use is required for all regional watershed permitting. Pursuant to the review of existing regulations in the previous section, and to meet the CRS credit requirements for WMP, the following design storms were analyzed:

- 10-year, 72-hr
- 25-year, 72 hr
- 100-year, 72 hr

See section 2.6 Precipitation for the development of the design storm distributions.

3.3 Peak Flows and Volumes

The peak flood stages, flows and volumes obtained from the analysis of the design storms under existing and future planned conditions were used as the benchmark to identify potential mitigative measures to manage flood stages and flows to current levels to the extent practicable to meet the Village's desired flood management LOS and ensure management of future peak flows and volumes.

The South Florida Water Management District (SFWMD, District) is the authorized governing body as the receiving watershed for the Village of Royal Palm Beach. The District is a regional governmental agency that manages the water resources in the southern half of the State. Created in 1949, the agency is responsible for managing and protecting water resources of South Florida by balancing and improving flood control, water supply, water quality and natural systems. The District's regulatory responsibilities are shared with the Florida Department of Environmental Protection and other state and local governments. SFWMD operates under authorization of Florida Administrative Code F.A.C. 40E.

An approved SFWMD Environmental Resource Permit (ERP) is required for all development and redevelopment in the watershed and applicants must satisfactorily demonstrate the control of the peak flows for the 25-year 72-hour design storm to at or below current flows and negligible impact to receiving water body stages, as well as maintaining the pre-post 100-year floodplain storage and maintain historic flow paths. The Village has adopted this requirement by reference in their Code of Ordinances, Chapter 11.5 – Floodplain Management, Sec. 11.5-4. Section 22-51 (10)

Drainage – which imposes the requirements for on-site retention/detention and related design criteria for flood-resistant development.

Additionally, all of the recommended stormwater model run alternatives and associated proposed capital improvements analyzed in this WMP do reduce stages and flows from existing conditions in their intended sub-basins and in the connected, neighboring ITID shared system. See report Section 5 pre-post proposed CIP tables demonstrating these reductions.

3.4 Minimum Flows and Levels (MFLs)

One of the ways in which the SFWMD is working to protect and conserve Florida's water resources is through the minimum flows and minimum water levels (MFLs) program. In south Florida, minimum levels have been established for lakes, wetlands and aquifers. Minimum flows have been set for rivers, streams and estuaries.

MFLs are adopted only for priority waterbodies as water management district rules (Chapter 40E-8, *Florida Administrative Code*) by the governing boards of the water management districts pursuant to Sections 373.042 and 373.0421, Florida Statutes. The MFL is then implemented through the District's consumptive use permitting and water supply planning programs.

The MFLs in this watershed are driven by the adopted MFLs for the Aquifer, in Rule 40E-8.231 at structure S-155 which is the discharge point of basin C-51 to the Intracoastal Waterway.

As discussed in the previous section 1.1.2 Waterway Features, stormwater in the Village is generally collected into the Village's extensive system of managed canals with the largest canal being the M-1 canal. The minimum flows and levels for each canal are defined by each control structure approved operation schedule in its respective SFWMD permit which are approved in accordance with the C-51 Basin Rule.

3.5 Available Policy Documents

The watershed master plan should be sensitive to local, state, and federal regulatory requirements that may or may not be already in place. Note that WMPs are distinctly different than a variety of other plans: Water quality and TMDL plans, local mitigation strategy plans, Flood Insurance Studies (FIS), Floodplain Management Plans (FMP), stormwater master plans, local ordinances and CRS plans, are all examples of plans that are developed for different purposes.

These plans/policies can be developed by different agencies having jurisdiction at all levels and are taken in consideration for developing the Village WMP. In the following sections these plans that might have relevant information are identified, briefly introduced and the source of information provided for further reference.

3.5.1 Water Quality Management Reports (TMDL/BMAP/SWIM Plans)

The FDEP's Division of Water Resource Management uses a comprehensive approach to protecting Florida water quality involving basin-wide assessments and the application of regulatory and non-regulatory strategies to reduce pollution. The Total Maximum Daily Load (TMDL) program is the heart of this comprehensive approach.

The MS4 permit requires permittees address any TMDL(s) that was established by FDEP (or that was adopted by the EPA and verified by FDEP) at the time the MS4 permit was issued. A permittee is only responsible to take part in TMDL program activities (planning, monitoring, improvements, etc.) if its MS4 discharges into the water body with a TMDL.

The Village falls within two water bodies (WBIDs) identified as 3245G1 north of Southern Blvd. and 3252C1 for the annex south of Southern Blvd. **(Table 3-1)** however, no Total Maximum Daily Load (TMDL) requirements have been set for these.

Table 3-1 Waterbody Identification

HUC	WBID	Water Body Name	Group Name
03090206	3245G1	C-51 West	Lake Worth Lagoon – Palm Beach Coast
03090206	3252C1	ACME (North Sector)	Lake Worth Lagoon – Palm Beach Coast

There are no Basin Management Action Plans (BMAP) or Surface Water Improvement and Management plan (SWIM) defined for the Village, but there are plans that have been established in neighboring areas. The surface water BMAP for Lake Okeechobee limits with the Village on the north. **Table 3-2** and **Figure 3-1** shows the Village is located adjacent to two areas that have defined TMDLs.

Table 3-2 Adjacent TMDLs Identification

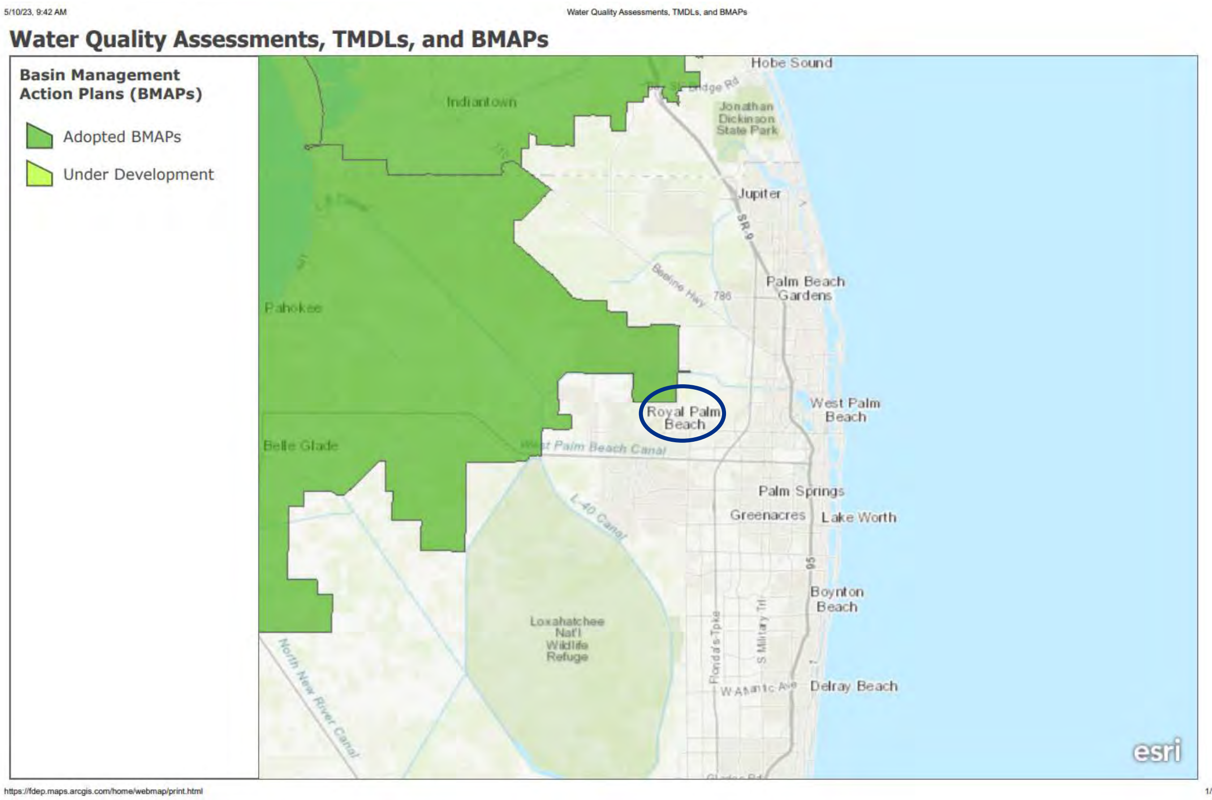
WBID	Name	Parameter	TMDL Status	TMDL Documents
3238	West Palm Beach Canal (C-51 canal)	Fecal Coliform	State adopted and EPA approved TMDLs	http://publicfiles.dep.state.fl.us/DEAR/DEARweb/TMDL/Final_TMDL/gp5/fecaltmdl_wpbcanal.pdf
3238	West Palm Beach Canal (C-51 canal)	Turbidity	EPA established TMDLs	http://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=72092
3238	West Palm Beach Canal (C-51 canal)	Total Suspended Solids	EPA established TMDLs	http://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=72092
3233	L-8 Canal	Turbidity	EPA established TMDLs	http://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=72092

3.5.2 Flood Insurance Study

The current effective FEMA Flood Insurance Study (FIS) for Palm Beach County and Incorporated Areas is the 2017 FIS available at FEMA Flood Map Service Center: https://msc.fema.gov/portal/search?AddressQuery=Village%20of%20Royal%20Palm%20Beach%2C%20FL#searchresultsanchor

3.5.3 Floodplain Management Plan

The Village most current Stormwater Master Plan (2015) is published in the official website. https://www.royalpalmbeachfl.gov/publicworks/page/stormwater-master-plan



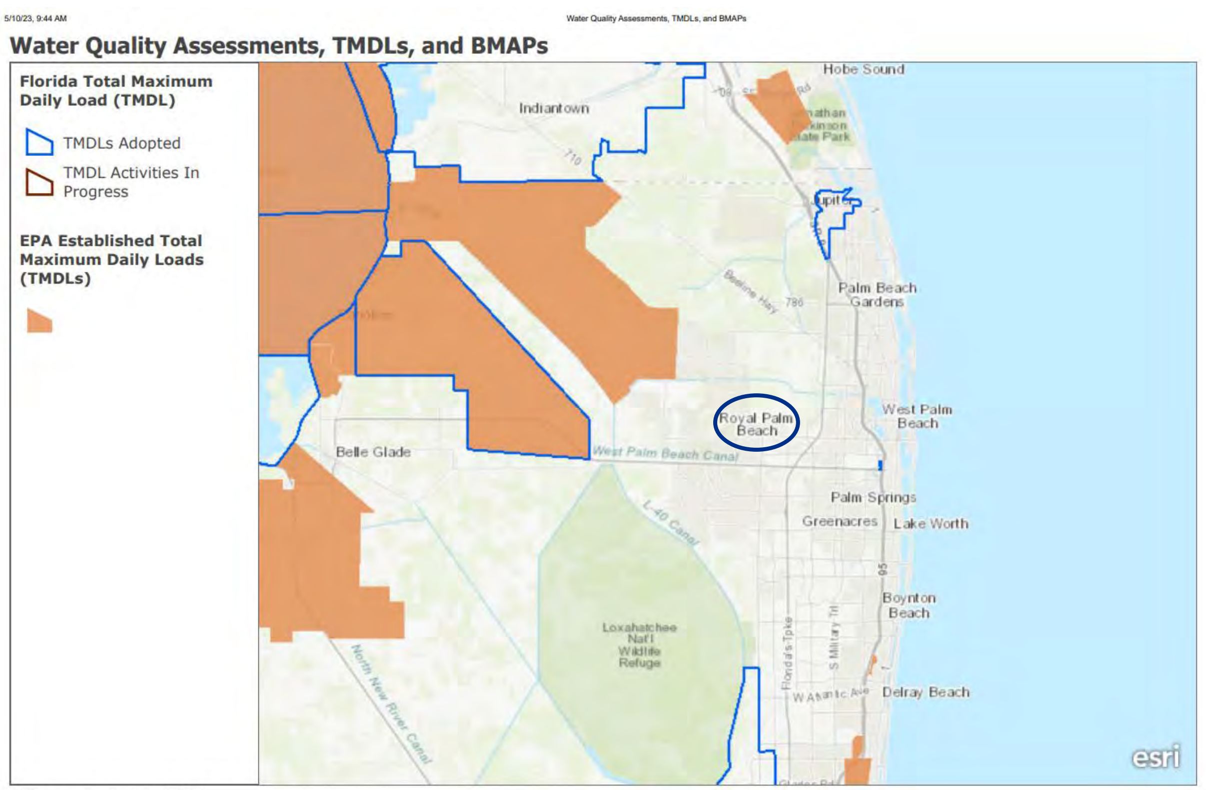


Figure 3-1 TMDL and BMAP Locations

Per Section 3.1.4.2, the Village in its code of ordinances has enacted Chapter 11.5 – Floodplain Management to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas.

The Village of Royal Palm Beach uses the Palm Beach County Unified Local Mitigation Strategy (LMS) for credit under the Community Rating System (CRS) Activity 510, Floodplain Management Planning. See Section 3.5.8.

3.5.4 Florida "Peril of Flood" Guidance

Palm Beach County revised the Coastal Management Element in the Comprehensive Plan for compliance with the Peril of Flood Act that was signed into law by Governor Scott in 2015. The Act added a new requirement that the Coastal Management Element must address the peril of flood through the reduction of flood risk in coastal areas. The amendment ensured compliance with the Peril of Flood Act and acknowledged existing County programs and plans that reduce flood risk. The Village does not have a plan/guidance regarding the "Peril of Flood" since the Act is only applicable to local governments in Florida that are required to have a Coastal Management Element in its comprehensive plan, per s.380.24, F.S.

3.5.5 Comprehensive Plans

Palm Beach County Comprehensive Plan provides the framework for land use changes within the unincorporated area and mechanisms and standards through which changes could occur. The basic concept of the plan was to permit development at urban densities in those areas where urban services could be provided efficiently and economically, and to prevent urban density development in areas, which were not planned for extension of urban services. The Stormwater Management Sub-Element addresses Stormwater and surface water management in Palm Beach County, including identification of drainage systems, characteristics, problems and needs.

The Village's Comprehensive Plan is its blueprint for existing and future development. The plan's goals, objectives and policies reflect the Village's vision for its future, and for how it will meet the needs of existing and future residents, visitors and businesses. In its Infrastructure Element, Drainage Sub-element section, it sets forth the policies regarding stormwater management.

3.5.6 Unified Land Development Regulations (ULDRs)

Land development codes/comprehensive planning were discussed in Section 3.1.4, which is tied directly to the Village's code of ordinances.

Palm Beach County Unified Land Development Code intent is to implement and ensure that all Development Orders approved in unincorporated Palm Beach County are consistent with the Comprehensive Plan and its managed growth systems. In its 18 articles it sets forth the regulatory requirements that drive land development including Environmental Standards, and Flood Damage Prevention.

3.5.7 Stormwater Management Policies

See section 3.5.5 which discusses the sections of the County and the Village comprehensive plans where stormwater management policies are set forth. In 1987, the EPA was required under

Section 402 (p) of the Clean Water Act (N40CFR Part 112.26) to establish final regulations governing stormwater discharge permit application requirements. In 1990, the Federal Register indicated that the Palm Beach County area was to begin compliance with the program. In 1997, the first 5-year permit was issued to Palm Beach County's forty co-permittees. In November 2002, the second term permit was issued. The Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) is a federal program designed to reduce stormwater pollutant discharges to receiving waters of the United States.

Stormwater runoff within the Village is regulated under the MS4 NPDES permit system that is administered by the FDEP. The Village is a co-permittee through the Palm Beach County MS4 NPDES program. The County has a cooperative program now involving thirty-nine co-permittees, the FDEP and the USEPA. NPBCID acts as lead permittee for the Palm Beach County group. A Steering Committee was formed in 1991 to coordinate and facilitate joint activities within the Palm Beach County MS4 NPDES Program. Mock, Roos, and Associates Inc. acts as staff to the Steering Committee, assisting with the administration of the program. The permittees have taken a cooperative approach to permit compliance, jointly conducting several permit activities and collectively developing a number of tools used to carry out the permit programs. Each permit cycle, the lead permittee (NPBCID) enters into inter-local agreements with each of the other permittees to oversee the joint activities.

3.5.8 Local Mitigation Strategies (LMS)

The Local Mitigation Strategy (LMS) details all of the possible hazards that the incorporated and unincorporated areas need to be concerned about. These possible hazards are identified and rated on the potential for damage based on previous hazards of similar type. Looking at the natural hazards that have the potential to affect a community, assess the possibility for damage, plan for risks and vulnerably, and establish planned actions after such events. LMS follows the FEMA hazard mitigation definitions to address issues that will reduce or eliminate exposure to hazard impacts.

These reports are only produced at the county level but are adopted through resolutions into a municipal ordinance. While municipalities do not have an active role in creating a local mitigation strategy, they can contact the county government to take part in the process of updating the report. To receive funding for mitigation projects and non-emergency assistance, FEMA requires these LMS and their resubmission every five years to stay eligible. Section 322 of the Disaster Mitigation Act of 2000 specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation project grants.

The Village adopted by resolution the revised 2020 Palm Beach County LMS. The purpose of the LMS is to develop and execute an ongoing strategy for reducing the community's vulnerability to identified natural, technological, and human caused hazards. The strategy provides a rational, managed basis for considering and prioritizing hazard-specific mitigation options and for developing and executing sound, cost-effective mitigation projects. The LMS also provides a basis for justifying the solicitation and use of local, state, federal, and other funding to support hazard mitigation projects and initiatives.

3.5.9 Intergovernmental Cooperative Agreements

The Intergovernmental Coordination Element of the Village's Comprehensive Plan establishes that the Village shall participate in the Palm Beach County Intergovernmental Plan Amendment Review Committee (IPARC) process and shall cooperate with the Treasure Coast Regional Planning Council and all other local governments for the purpose of facilitating intergovernmental coordination.

Comprehensive Plan Amendment Coordinated Review Interlocal Agreement establishes the IPARC and the Executive Committee and a process for countywide comprehensive plan amendment review with a Clearinghouse to disseminate proposed comprehensive plan amendments in advance of public hearings, to coordinate a fact-finding panel when there is a conflict between local plan amendments and provide administrative services. The agreement also establishes a conflict resolution process.

Multi-Jurisdictional Issues Coordination Forum Interlocal Agreement establishes an Issues Forum and Executive Committee as a means of establishing a countywide position relative to multi-jurisdictional issues. This is done by providing a place to go to for consensus building, identification, research and debate on such issues, and providing direction on the steps to address, resolve, or implement a program to do so.

The MS4 NPDES Fourth Cycle Permit Interlocal Agreement between the Village and the MS4 NPDES Lead Permittee NPBCID establishes the cooperation framework to carry out the joint activities and allocate duties, responsibilities, and costs associated with the permit.

There are no intergovernmental cooperative agreements in the basin regarding stormwater management. Refer to Section 3.1 Existing Regulations for a discussion of agencies having jurisdiction and the regulated activities that require permits.

3.5.10 Special Watershed Restoration Plans

The Village is within the geography of the Comprehensive Everglades Restoration Plan (CERP), whose mission is to restore the altered south Florida watershed into a more natural state. The CERP is the single largest restoration program underway in the South Florida Ecosystem. The CERP, authorized by the Water Resources Development Act (WRDA) of 2000, is implemented by a federal-state partnership to restore, protect, and preserve the region's water resources by addressing the quantity, quality, timing, and distribution (QQTD) of water.

The State of Florida and the USEPA reached a consensus on new strategies for improving water quality in America's Everglades. The primary objectives were to establish a Water Quality Based Effluent Limit (WQBEL) that would achieve compliance with the State of Florida's numeric phosphorus criterion in the EPA and to identify a suite of additional water quality projects to work in conjunction with the existing Everglades Stormwater Treatment Areas (STAs) to meet the WQBEL.

Based on the collaborative effort described above, a suite of projects have been identified that would achieve the WQBEL. The Restoration Strategies Regional Water Quality Plan describes those resulting projects and the evaluation tools and assumptions that were utilized in the technical evaluation. The Eastern Flow Path project consists primarily of the proposed strategies for C-51 West and S-5A Basins. The Village is in C-51 West basin.

3.5.11 Stormwater Pollution Prevention Plans (SWPPPs)

Stormwater Pollution Prevention Plans (SWPPPs) identify primary sources of stormwater pollution at construction sites, best practices to reduce stormwater discharge from construction sites, and procedures to comply with construction permits. As part of the Clean Water Act, it is required that nearly all construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more, including smaller sites in a larger common plan of development or sale, must obtain a National Pollutant Discharge Elimination System (NPDES) permit for their stormwater discharges. Understanding the requirements of the SWPPP and the NPDES will be helpful in addressing parts of a WMP with regards to stormwater and runoff management.

The Village regulates stormwater runoff from industrial activities through its Stormwater Control Ordinance found in Chapter 21.5 of the code of ordinances.

3.5.12 Post-Disaster Redevelopment Plan

Palm Beach County Division of Emergency Management adopted the Comprehensive Emergency Management Plan (CEMP) (2020) which establishes the framework to ensure the county will be adequately prepared to respond to, and recover from, any hazards that threaten the lives and property of residents and visitors of the county.

The CEMP is the guiding document for the County's response to and recovery from a disaster. It is supported by additional plans and procedures including the LMS, Disaster Recovery Plan, Post Disaster Redevelopment Plan (PDRP), Section Coordinating Procedures, Hazard Specific Plans (HSP), Incident Support Plans (ISP), program plans, and standard operating guides. Together, they provide the framework for all phases of emergency management.

The CEMP is in compliance with the latest criteria issued for CEMP revisions by the state of Florida Division of Emergency Management (FDEM) and as required by Florida Statute (F.S.) Chapter 252 and Florida Administrative Code (FAC) Rule 27P-6.0023.

The Village's Hurricane/Flood Preparedness page is the channel to find information and useful links to seek assistance after a storm event.

The FDEM, through its Recovery Bureau works to maximize disaster assistance to eligible public entities, individuals, and families through various State and Federal disaster assistance programs. These programs help to rebuild lives and communities that have been impacted by a major disaster and begin the recovery process. After being requested by the Governor, the President may sign a disaster declaration that includes both Individual and Public Assistance programs as authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

FEMA, in collaboration with federal interagency partners, created a Recovery and Resilience Resource Library to assist in navigating the numerous programs available to the United States and its territories. The resources are intended for state, local, territorial, and tribal governments, nonprofits, businesses, healthcare institutions, schools, individuals, and households. This tool helps users find and research federal recovery resources that would be beneficial in pre-disaster recovery planning or the wake of a disaster.

3.5.13 Climate Adaptation Action Plan (CAAP)

Palm Beach County has received $1,800,000 in funding to conduct a climate change vulnerability assessment and resilience action plan (VARAP). This project will result in a roadmap for PBC to mitigate and adapt to environmental hazards and disaster risks that are exacerbated by climate change and sea-level rise. This project is robust and includes the examination of current and future conditions that impact the sustainability and resilience of the organization and community. The final Resilience Action Plan is expected to be completed by 2026 and will directly benefit 1.4+ million residents in PBC.

The adaptation chapter of Florida's Climate Adaptation Action Plan (CAAP) is one that contains a series of 28 varying goals with strategies that work towards addressing the impacts of climate change as they relate to infrastructure, biodiversity, coastal areas, and oceans (Georgetown Climate Center, 2018). While all sections of the CAAP are significant, the topics of particular interest to the development of WMP are as follows:

- Coasts and Oceans. Recommends actions to improve overall coastal resilience to bolster both impact communities and ecosystems.
- Water. Identifies the impacts of climate change and how they relate to the water resources of the state. Recommends actions that would improve conservation measure and efforts to understand, quantify, and plan for uncertainties affecting water resources.
- Infrastructure. Identifies development strategies and engineering solutions that can reduce risks from tidal flooding, storm surge, stormwater-driven flooding, and related impacts of sea-level rise when updating coastal management elements of their comprehensive plans.
- Public Health and Emergency Preparedness. Recommends actions that would reduce public health threats from climate change and resilience against the impacts of climate change.

The Southeast Florida Regional Climate Change Compact (Compact) represents a joint commitment of Broward, Miami-Dade, Palm Beach and Monroe counties to partner in climate mitigation and adaptation activities across county lines in the region. The Compact published the most recent update of the Regional Climate Action Plan (RCAP), which is a voluntary framework designed to align, guide and support the acceleration of local and regional climate action in Southeast Florida to realize a healthy, prosperous, more equitable and resilient, low-carbon region.

3.6 Dedicated Funding Sources

The Village Stormwater Utility Fee governed by Ordinance No. 864 (**included in Appendix H),** collectively referred to below as the Stormwater Utility Ordinance, provides the Village with the authority to establish and collect fees for the services and Control Measures provided by the Village. Opportunities for Credits and Adjustments were also created in the Stormwater Utility Ordinance.

A Stormwater Utility Fund has been established for the deposit of fees and charges collected by the utility. These funds are for the exclusive use of the Village's stormwater management system as defined in Section 24-26 of the Stormwater Management Utility (Ordinance No. 864), which includes the following:

- Preparation of plans for improvements and betterments to the stormwater management system
- Construction of improvements and betterments to the stormwater management system, including, but not limited to, the purchase of land for same
- Promulgation of regulations for the use of the stormwater management system, including provisions for enforcement of such regulations
- Review and approval of all new development permits within the Village for compliance with stormwater management regulations included in present Village ordinances or ordinances later adopted
- Performance of routine and as needed maintenance and minor improvement to the stormwater management system
- Establishment of charges for the Village's stormwater management system
- Evaluation of water quality concerns for discharges to the stormwater management system
- Performance of all normal utility functions to include construction, operation, and maintenance of the Village's stormwater management system, including, but not limited to, the hiring of staff, the selection of special consultants, the entering into contracts for services and construction of facilities, and the handling of purchase, lease, sale or other rights to property for the stormwater management system

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Section 4

Assessment of Vulnerable Areas

Defining flood risk due to compounding hydrographic influences is the central concern of this WMP. Modeling and assessment of vulnerability focused on the combination of a high-water table elevation, heavy rains, and a relatively built out impervious conditions, and limited outflows from the M-1 Canal that can lead to localized flooding events. Utilizing the information collected and analyzed in Chapters 1 and 2, and cross checking with regulations and policies described in Chapter 3, vulnerability can be identified using this process. Flood risk for repetitive loss areas is assessed by screening the FEMA FIRM maps for the study area and reported insurance payout. Inundation mapping produce from the validated stormwater system model under various design events helps to assess the current level of service (LOS).

4.1 Historical and Existing Challenges

The Village's challenges to stormwater management include a permit-limited discharge out of the watershed, inflow into the watershed from other systems, essentially built-out landuse, limitations on the ability to move water into the ground due to unfavorable subsurface hydrogeology and restrictive cost, and a lack of available new areas for dedicated bermed/pumped floodplain storage.

The Village of Royal Palm Beach (CID 120225 540 active policies) as reported in NFIP 36 total flood insurance claims $234,000 since 1978. There has been a total of three flood events officially reported the study area in the last several years associated with claims. These events resulted in no deaths or injuries.

- Hurricane Frances September 4-5, 2005
- Hurricane Wilma October 24, 2005
- Tropical Storm Isaac August 27, 2012

The largest past storm was Tropical Storm Isaac on August 2, 2012, which resulted in approximately 15" of rainfall and associated accumulation of flooding on many roadways and low lying areas.

The most recent storm in this part of Palm Beach County was Tropical Storm Isaac, which hit South Florida in August 2012. Flooding in the Village was limited due to relatively low tailwater conditions in the C-51 Canal. The storm did cause flooding in ITID, which spurred the rule changes to allow an additional 200 cfs in the M-1 Canal.

Prior to Isaac, flooding occurred within the Village in the Saratoga Subdivision as a result of the rainfall associated with Hurricane Frances and Hurricane Jeanne that hit southeastern Florida in September 2004.

Prior to those events, the most significant flooding had occurred in the fall of 1999 when approximately 20 homes flooded within the La Mancha Subdivision as a result of a breach in the berm separating the Village from the Pond Cypress Natural Area. On October 14 and 15, 1999 approximately 9.6 inches of rainfall fell over a 48-hour period filling the available storage within the Pond Cypress Natural Area and causing the breach. The subsequent construction of the SR-7/Portosol subdivision eliminated the possibility of a future breach. As a result of the breach, Palm Beach County worked with the SFWMD and the Village to develop a management plan for the Pond Cypress Natural Area that included restoration of the berm separating the Village from the Pond Cypress Natural Area and the design of a drawdown structure that would allow the County to do a controlled release of stormwater from the Pond Cypress Natural Area to the C-51 Canal during flood conditions.

Historical recurrent flooding problems documented by the Village include:

- Flooding in Preservation Park, including Park Road North
- Flooding in La Mancha, including potential high water-table flooding along Rivera Ave
- Street flooding in the low-lying areas in the vicinity of Sevilla Ave and Ponce De Leon Street.
- Flooding of a low-lying area on Meadowlark Drive and other streets adjacent to the Village Commons.
- Flooding in the Saratoga Subdivision.

4.1.1 Existing Stormwater Management Efforts in the Watershed

The entire basin is controlled by the SFMWD with the intent of reducing flooding within the district boundaries. The Village and all other agencies, local government, districts have local stormwater utility infrastructure and planning/policy tools to reduce future flood potential as discussed in Chapter 3.

4.1.2 Critical Target Areas Identification

One of the strategies used to identify critical target areas is by modeling the watershed response to prescribed recorded or design storm event. This approach is further discussed in Section 4.2.

Additionally, critical target areas can be identified as:

- Areas that are predicted to flood in FEMA's FIRMs
- Areas with critical assets (e.g. fire, police, hospitals, water, sewer, main roadways, etc.)
- Economic centers (e.g. dense commercial/industrial/manufacturing)
- Property risks affecting large populations or populations with limited opportunity to address the risk
- Areas known to flood per reports from residents and Village staff.

4.1.3 Potential Preservation Areas

There are no potential preservation areas beyond what is currently protected in the study area.

4.2 Vulnerability Maps

4.2.1 Screening Tool

Due to the size of the Village's watershed and contributing areas, and the opportunity to build from an existing hydrologic and hydraulic model, the entire watershed was modeled in detail. The initial screening process to identify critical target areas was therefore not necessary to be performed as part of this WMP.

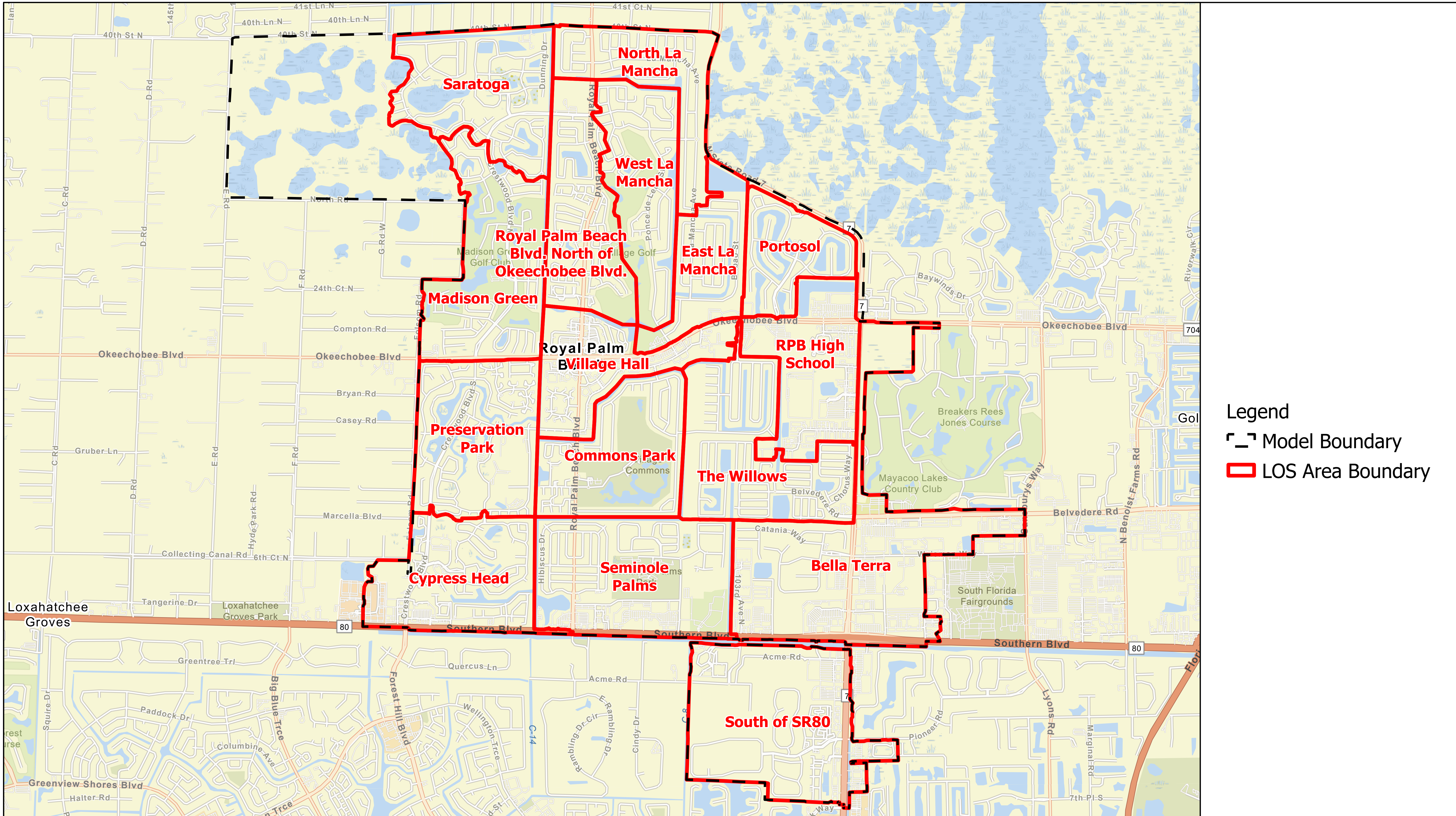
The hydrologic and hydraulic evaluation of the Village's PSMS was conducted with the USEPA Stormwater Management Model (SWMM) Version 5. The SWMM computer model was selected based on its ability to simulate the hydrologic and hydraulic behaviors of the Village PSMS. In addition, SWMM has been verified for stormwater design and master plan uses throughout Florida and is accepted by the Florida regulatory community.

4.2.2 Identification of Vulnerable Areas

The Village can be described as a closed system regulated by the controlled discharge into the watershed from ITID, the rainfall accumulated onto the watershed impervious areas and runoff, and the regulated controlled discharge out of the watershed at the C-51 canal. Under these constraints, there are few alternatives for the management of stormwater, discussed further in Section 5.

By modeling the watershed flood response to a 3-day, 10-year, 3-day, 25-year, and 3-day, 100-year storm events it is possible to identify the critical target areas. There is no published 5-year boundary condition or data for the SFWMD C-51 canal, thus the 5-year event is not modeled. From the modeling results, a series of maps showing the estimated flood depths for the 3-day, 10-year, 3-day, 25- year, and 3-day, 100-year storm events, were created. These flood depths are estimated by assigning all areas within a given model HU the peak flood stage of the HU load junction, converting the polygons to a raster surface and subtracting the topography DEM from the calculated flood surface. All remaining negative areas are thus not flooded and all remaining positive areas represent the estimated depth of flooding. The critical target areas were identified based on a LOS criteria, the number of critical and potential flooded structures, as well as the depth of flooded roads for the 10-year storm for subbasin side streets, and for the 25-year storm on divided streets or major evacuation routes.

LOS was defined by a comparison of the peak flood stages provided by the model to surveyed elevations (such as finished floor elevations) within a set area for a given storm. Where surveyed elevations are not available, LOS is often defined by depth above crown for roads and depth above ground for structures. In order to organize the nearly 200 HUs into a manageable set, the Village was divided into 16 contiguous level of service areas (LOS areas) as shown on **Figure 4-1**. The LOS area boundaries were determined by neighborhood/ subdivision, topography, location of PSMS, and continuity of flood extent, where practicable.



LOS Area Boundaries for Analysis

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 4-1
9/8/2023

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For each LOS area, a critical low road crown was found for local side streets, and a critical elevation found for the lowest divided road, if applicable. Since divided streets often have medians and/or will need traffic flow in both directions, this critical elevation was found approximately one lane from the median/ center.

For this study, the following LOS criteria were compared to the model:

- A flood depth above the critical road crown for the 10-year, 72-hour design storm for local roads.
- A flood depth above the critical road elevation for the 25-year, 72-hour design storm for major roads, where applicable
- The 100- year, 72-hour design storm flood elevation in relation to structures. The mean topographic elevation around the perimeter of the structure footprint (as determined by the LiDAR DEM) was compared to the peak flood stage within the given subbasin. If a structure straddles two or more subbasins, the subbasin with the highest peak flood elevation was used.
- A flood elevation of 1 foot above ground (as determined by the LiDAR topography) for the 100- year, 72-hour design storm, in relation to structures.
- A comparison of Critical Facilities provided by the Village to the 100- year, 72-hour design storm.

4.3 Future Challenges of Sea Level Rise and Climate Change

Global observations from satellites and long-term data collection have made it possible to document and analyze patterns of change in the Earth's climate. Scientific analysis of the impact of these changes has helped to improve the understanding of future flood hazard driving forces and long-term impacts on human activities and watershed master planning (http://www.research.noaa.gov/climate/t_observing.html). Examples of impacts are rising global average air and ocean temperatures, increased and earlier snow and ice melt, shorter subtropical rainy seasons, shifted seasons, sea level rise, and greater variations in temperature and precipitation (IPCC, 2013; Freas et al., 2008; Marshall et al., 2004; Bloetscher et al., 2010). NOAA and IPCC (2013) predictions suggest that by 2100, global temperatures will be on the order of 2-3°C (3-5°F) higher than current values. The results of these climate changes are likely to: 1) threaten the integrity and availability of fresh water supplies and 2) increase the risk of flooding, not only in the low-lying coastal areas, but also in the interior.

Multiple efforts are being made by SFWMD, PBC, and neighboring local governments. (See Section 3.5.13) to assess and address the rising hazard threat due to climate change and sea level rise. SFWMD established a flood protection level of service (FPLOS) program to identify and prioritize long-term infrastructure improvement needs, and to develop an implementation strategy to assure that each basin can maintain its designated FPLOS, in a technical and cost-effective manner, in response to population growth, land development, sea level rise and climate conditions change.

4.3.1 NOAA Intermediate High Scenario for the Study Area

The NFIP and CRS requirements propose the use of the NOAA Intermediate High (NIH) projection for sea level rise scenario analyses. This study area is not coastal and is therefore not directly impacted by sea level rise. However, to incorporate the effects of sea level rise into the analysis, it was intended to develop time/stage series from the sea level rise scenario of SFWMD FPLOS model for Palm Beach County using the stage results for the C-51 canal and update the Village's model boundaries accordingly at the discharge points into the C-51 canal. At the time of this WMP, CDM Smith was advised by SFWMD that model results for the Palm Beach County FPLOS model were in process and will not be available. Therefore, to analyze a sea level rise scenario and investigate its impacts to the system, the following approach was taken based on the best available data.

The initial approach was to analyze observed stages upstream and downstream of the SFWMD S-155 Structure on the C-51 Canal at the Intracoastal Waterway, and at the SFWMD S-155A Structure in the C-51 Canal adjacent to the Village and look for stage variations under differing flow conditions. The methodology was to examine the head loss in the canal between the downstream side of S-155A to the upstream side of S-155 under extreme flows for periods of low tide conditions and for periods of high tailwater condition. This would than allow an estimate of how far a given SLR might propagate upstream. For example, CDM Smith has performed studies for five watersheds in Miami-Dade and Broward Counties in Southeastern Florida: The C-1 Basin in South Miami, the C-6 (Miami River) Basin in the City of Miami, the C-100 Basin in Kendall to provide SLR Boundary Conditions for the Miami Executive Airport, the C-8 Basin in North Miami-Dade County to provide SLR Boundary Conditions for the Opa-Locka executive Airport, and the C-10/C-11 Basin in the City of Hollywood. In all previous cases, CDM Smith had modeled the watersheds to the Intracoastal Waterway/ Biscayne Bay and was not reliant on the SFWMD FPLOS modeling. In all these cases, the effect of SLR rise dampened upstream of the SFWMD Salinity Structure. For example, a 2-foot SRL in Biscayne Bay corresponded to an approximate 6-inch increase 4 miles inland in the C-1 Canal for the 100-year Storm. The response was not linear as the larger SLR values tended to not produce the same ratio increase as smaller levels (i.e., the response flattened). Note that very large increases in SLR and/or surge events would no longer be constrained to the Canals and would likely produce a very high response inland for these areas where land elevations are on the order of 4-8 ft-NAVD. However, very large increases in SLR were not tested. These previous projects would suggest there should be measurable effects of SLR, including high canal stages and higher wet season groundwater levels, well inland in Palm Beach County also, though somewhat subdued at 10 miles inland. However, the analysis of observed data showed that this will be unlikely to occur.

Figure 4-2 shows the daily maximums for the S-155 and S-155S SFWMD structures for the previous 20 years. The lowest curve, averaging about 1 ft-NAVD is the tailwater condition at S-155 and measures tide in the Intracoastal Waterway. The next two curves, just above 8 ft-NAVD show stages on the upstream side of the S155 Structure (blue) and the downstream side of the S-155A Structure (gold), respectively. The grey curve near 11 ft-NAVD represents the upstream side of S-155A. **Figure 4-3** presents a scatter plot of flow through the S-155 Structures versus the head difference across the structure from headwater to tailwater. The head difference remains above 4 feet for all flow regimes and is basically 6 feet at 5000 cfs and at times of no flow when the gate is closed. This is considerably different from observed data in Miami-Dade and southern

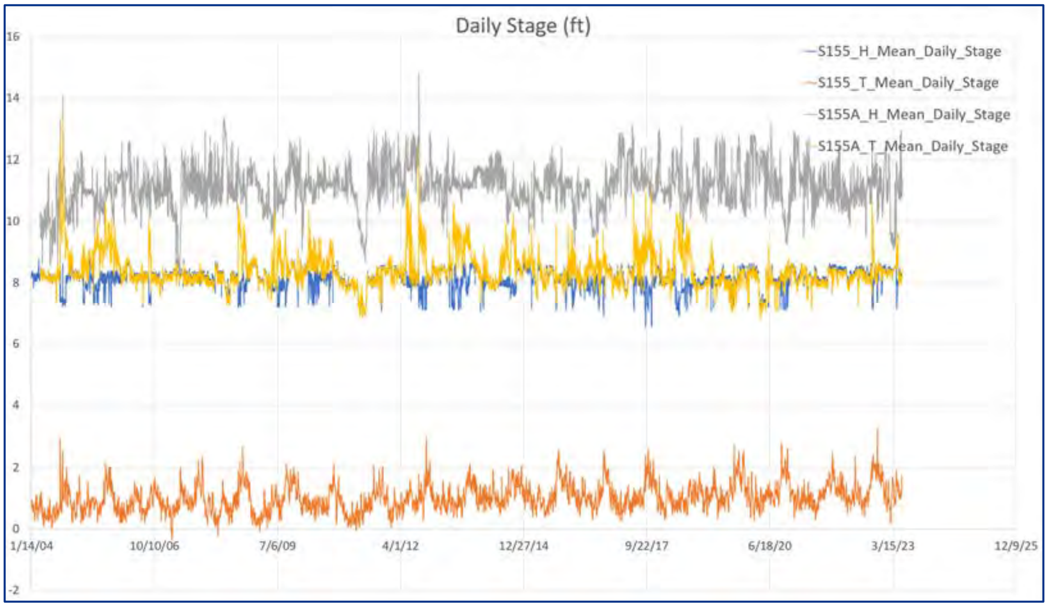

Figure 4-2 Time Series Data for Tidal Gates

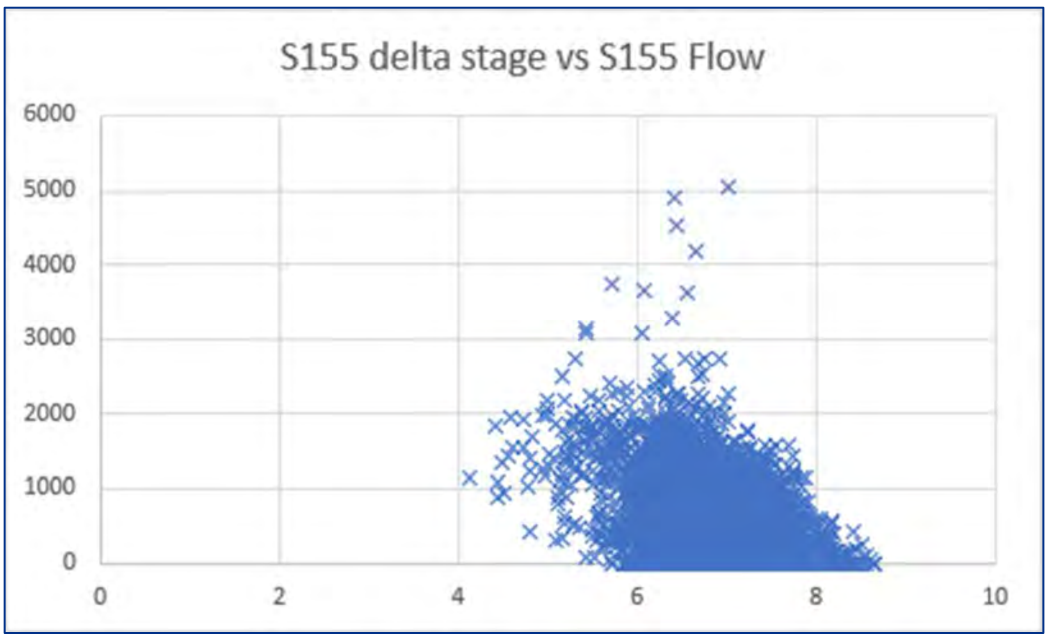

Figure 4-3 Scatter Plot of S-155 Flow versus Headwater to Tailwater Stage Differences

Broward County. The underlying Biscayne Aquifer in Miami-Dade and southern Broward is extremely transmissive and the salinity structures there cannot maintain such large head differences due to groundwater flows. Head differences are commonly 1-2 feet and tend towards zero when the gates are open, except at very high flows where there is measurable loss across the structure. Note that in Figure 4-2, there are head losses shown in the C-51 Canal between S-155A tailwater and S-155 headwater (gold versus blue), but the S-155 tailwater (red) does not have an impact on this. **Figure 4-4** shows the USGS report of the lithography from west of the Village to east, approximately parallel to the C-51 Canal. The upper aquifer is predominantly sand, as opposed to very porous limestone further south. The transmissivity (aquifer permeability x depth) of this aquifer is significantly (likely orders of magnitude) lower than the Biscayne aquifer in Miami-Dade County. Due to this, the inland propagation of SLR is expected to cover a relatively short distance. This is similar to the cone of influence of a well, where lower transmissivity causes a deep cone with a relatively small area of influence and higher transmissivities produce shallow cones with very wide areas of influence. The water-table gradient is steep and short between the C-51 Canal upstream of the structure and the Intracoastal tidewater. Raising the tailwater, even up to 2.65 ft, is not likely to significantly change this gradient or the distance it covers. It is unlikely groundwater levels in the Village would be significantly impacted.

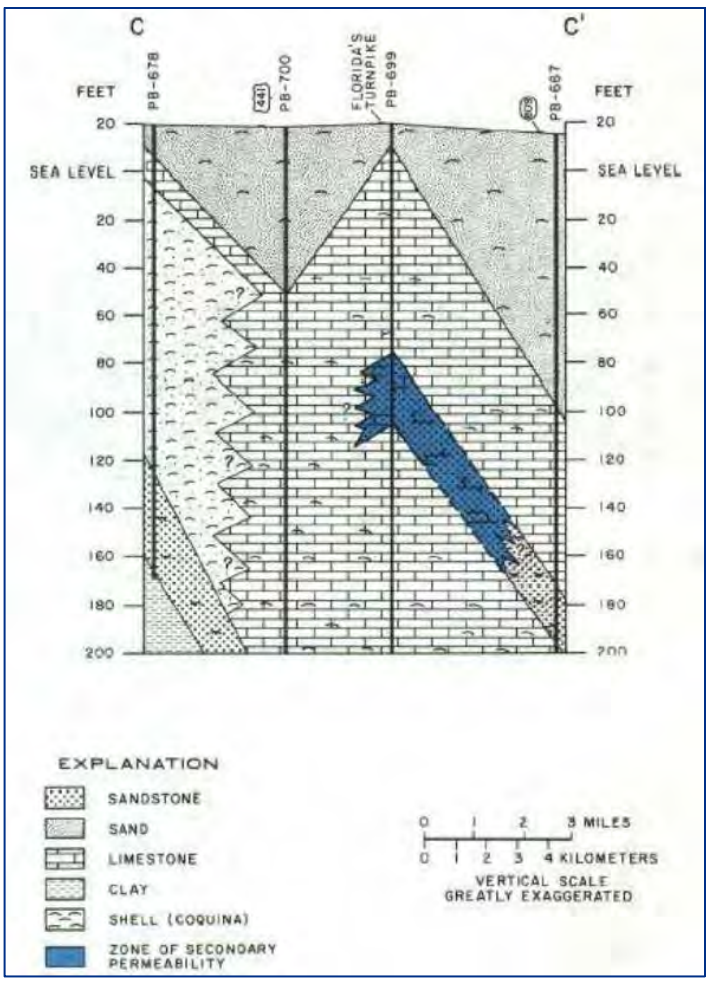

Figure 4-4 Subsurface Lithologic Section of Study Area
(USGS Water-Resources Investigations Report 83-4249)

At very high flows, head losses through the S-155 Structure plus head losses in the C-51 Canal, coupled with SLR in the tailwater may slightly impact the tailwater conditions for the Village, but the 4-6 foot head difference across the S-155 Structure makes this unlikely for the SLR scenarios examined in this report. Without data from the SFWMD FPLOS to rebut or confirm, it is concluded that at this inland location upstream of the salinity control gates with the existing lithography, no changes in future boundary conditions would be expected.

4.3.2 Potential Seal Level Rise Impacts

Per section 4.3.1, no potential sea level rise impact is anticipated for the Village or its tailwaters.

4.4 Modeling Results

The following sections describe the stormwater model and analysis results.

4.4.1 Existing (Including Buildout) Conditions Model

The model simulations include scenarios for the 10-year, 25-year, and 100-year design storms using the SFWMD 72-hour distributions. See Section 2.6 for more information on the precipitation events.

The “Existing Conditions” (EC) model includes the future buildout of the Village Annex south of the C-51 Canal (to the detail provided by VRPB at the onset of this WMP). The remainder of the Village, north of the C-51 Canal is nearly completely built-out and there are not expected to be significant changes in impervious cover or topographic conditions in the future. Since there are no known problem areas in the Annex, this Existing Condition model for the Village north of C-51/ Future Condition in the Annex, represents both Existing Conditions and Future Buildout Conditions for the purposes of this report.

A series of flood inundation maps that depict current conditions predicted depth of flooding in the study area based on the following scenarios were extracted from the detailed model output:

- EC 10-year storm event 3-day, **(Figure 4-5)**
- EC 25-year storm event 3-day, **(Figure 4-6)**
- EC 100-year storm event, 3-day **(Figure 4-7)**

The flood depths are generally deeper than those depicted in the 2015 WMP, for two reasons:

1. The 2015 WMP used a 10-year, 24-hour storm event as opposed to the 10-year 72-hour event shown here. With the SFWMD distribution, final 24 hours of the 72-hour distribution matches the 24-hour distribution, so the peak rainfall intensity remains the same; however, since there is significant rainfall in the first 48 hours, the soil storage tends to fill up, which produces more runoff.

2. Rainfall volumes have increased in the interim as this WMP uses the more recent NOAA Atlas 14 volumes (See Section 2.6).

The Village has been divided into 16 LOS neighborhoods, as discussed in Section 4.2, to begin to quantify the flooding problems. **Table 4-1** shows model results for existing conditions.

Legend

Model Boundary

10-Year 72-Hour Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

CDM Smith

Results for Existing Conditions

10-yr, 72-hr Design Storm Inundation Map

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach

Watershed Master Plan

Figure 4-5

7/10/2023

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Legend

Model Boundary

25-Year 72-Hour Storm Flood

Feet

- <= 0 ft.
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- > 1.5 ft.

N

CDM Smith

Results for Existing Conditions

25-yr, 72-hr Design Storm Inundation Map

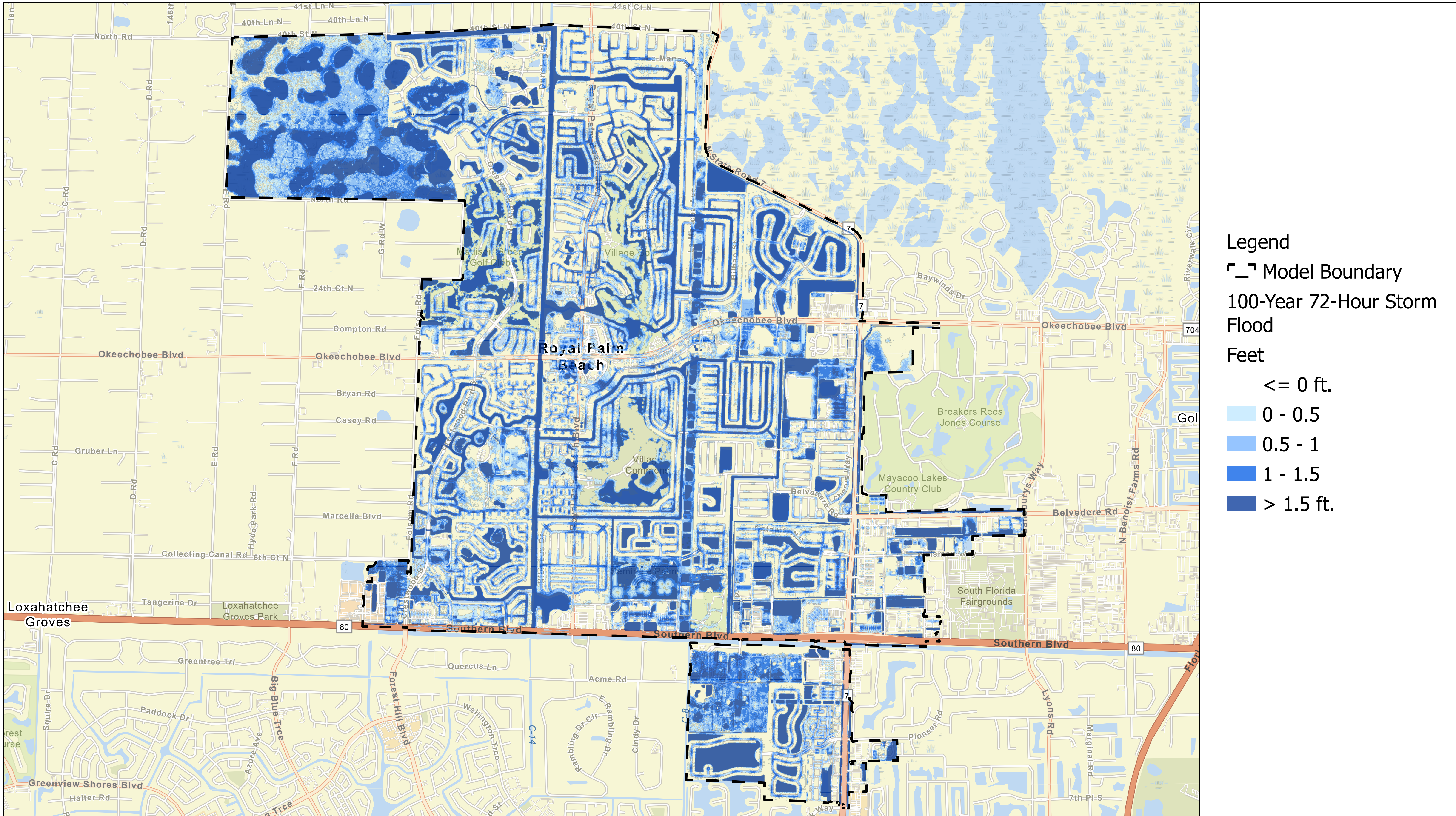
0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan

Figure 4-6

7/10/2023



Results for Existing Conditions
100-yr, 72-hr Design Storm Inundation Map

Village of Royal Palm Beach
Watershed Master Plan
Figure 4-7
7/10/2023

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Table 4-1
Existing Condition
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Existing Land Use Conditions						
						10-Year Storm		25-Year Storm		100-Year Design Storm		
						Peak Stage (ft-NAVD)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Flood Depth (feet)	Peak Stage (ft-NAVD)	# Flooded Structures[3]	DEM + 1 ft # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	17.6	1.2	17.7	1.5	18.8	186	1
Madison Green	2			16.3	17.2	16.6	0.3	17.6	0.4	18.3	203	0
Preservation Park	3		M-3740	14.6	16.4	16.4	1.8	16.9	0.5	17.8	27	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.9	1.4	17.2	0.9	18.2	52	0
North La Mancha	5	P-10, P-11		14.4	17.1	16.1	1.7	17.5	0.4	17.8	13	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	16.0	0.8	16.8	1.2	17.3	104	0
West La Mancha	7	P-2, P-3		14.8		16.1	1.3			17.2	99	0
East La Mancha	8	P-16, P-17		15		16.0	0.9			17.2	14	0
Portosol	9			16.9	16.9	18.1	1.2	18.4	1.5	18.7	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.4	1.0	18.0	0.5	17.2	43	2
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	16.2	1.8	16.1	1.1	17.4	169	3
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	0.9	16.7	0.0	17.1	25	0
RPB High School	13	P-23		16.7	17.9	17.3	0.6	18.3	0.4	17.7	24	0
Seminole Palms	14	P-22		15.6	17.6	16.4	0.8	16.2	0.0	17.1	30	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.9	14.8	0.0	16.4	25	0
S of SR80	16			14.6	14.9	15.6	1.0	15.8	0.9	17.8	15	0
Totals											***1037***	***6***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road
2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear
3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building
4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot

Since the Village does not have a GIS layer or data on FFEs for structures, the 100-Year storm flood inundation maps were compared to the mean LIDAR DEM elevation around the perimeters of every structure in the Village. Typically, FFEs of newer construction are at least one foot above grade; however, older neighborhoods maybe closer to grade. Both levels are presented in Table 4-1, with 6 structures expected to be at risk in the 100-year storm using the former criteria, and 1037 using the latter. Note that:

- The peak stage elevations provided in the table represent the highest peak stages within a given LOS area; however, each structure is compared to the peak stage in the subbasin it resides.
- The flood elevations are rounded to the nearest tenth of a foot to better represent the accuracy of the model. However, very small changes in peak stage could change the rounding and affect dozens of structures within the more populated LOS areas.
- The LiDAR DEM is less accurate at the edge of a structure than in an open area, due to vegetation, roofline effects, etc. Therefore, the values provided as the "number of flooded structures" are best considered as rough ranges. For example, the first alternative in Section 5 reduced the number of flooded structures to 991. We can expect some reduction in the number of flooded structures under this scenario, but not exactly 46.

The Village provided the GIS inventory of buildings for this comparison; however, structures were removed if:

- The footprint was small (< 500 sq ft) and thus likely a shed or detached garage.
- The buildings did not appear on recent aerial photography.
- The building did not appear habitable: such as a park pavilion.

There are approximately 10,500 structures in Royal Palm Beach using these criteria. Thus, about 10% of the structures are at-risk if the FFEs are between zero and one foot above the LiDAR estimated grade. Surveys of FFEs in some of the lower and/or older neighborhoods would likely provide more insight to this risk.

The flood inundation maps and Table 4-1 show expected widespread flooding throughout the Village under extreme precipitation events. However, many of the roads are passable during the peak of the storms with peak flood depths less than six inches. The table show the worst flooding in each neighborhood, some of which may be corrected with re-grading, provided the re-grading is performed with additional mitigative measures (equivalent storage in swales for example), to prevent simply moving the flooding from the road to yards where homes may be impacted.

The following are examples of neighborhoods where flooding is expected to be severe:

- The northern portion of the Saratoga Subdivision (LOS Area # 1). The topography map (Figure 2-1) indicates that this subdivision is lower than the neighboring subdivision to the south and this is readily apparent in the floodmap.

- The La Mancha neighborhood (LOS Area # 5) is expected to have relatively deep street flooding on Rivera Avenue and Salzedo Street, though the homes are better protected from the 100-year flood. This is also the neighborhood for which Village staff has indicated floods due to a high groundwater table, with likely groundwater flow from ITID (from north of the neighborhood) to the canal to the south. Additionally it is believed that the Cypress Pond Natural Area to the east may be contributing to the problem in this location.
- Preservation Park (LOS Area #3) including Park Road North.
- The neighborhood surrounding Village Commons (LOS Area # 11), including Meadowlark Drive, Sandpiper Avenue, and Heron Parkway.
- Other areas of concern include neighborhoods near the Village Golf Course (Ponce De Leon Street and Sevilla Avenue), the Portosol Development, and low-lying portions of the Cultural Center.

4.4.2 Critical Facilities Analysis

The Village provided a GIS inventory of Critical Facilities **(Appendix E),** most of which are located in the Civic Center neighborhood (LOS Area # 10) as shown on previous Figure Nos. 4-5 through 4-7**.** Critical Facilities identified herein are expected to be clear of the flood inundation for these design storms.

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Section 5

Inventory of Potential Solutions

5.1 Proposed Capital Improvement Projects (CIP) to Reduce Flooding

The process of identifying potential mitigation measures to implement begins with narrowing down the feasible engineering alternatives using threshold criteria and quantifiable selection criteria that include measures of effectiveness, cost, and added benefit to the community.

Due to the constraints of the regulated discharge out of the system, compounded with the allowable inflow from ITID into the Village and the built-out nature of the current landuse with little area remaining for stormwater management lands, the following combinations of options were considered:

1. Exfiltration – Maximizing catchment of runoff on the existing "uphill" areas and ridges to minimize the flow of runoff down into the lower-lying areas where it accumulates and ponds in swales and exfiltration systems. Limited, if any, areas within the study area exist with the required combined parameters of sufficient elevation (driving head) above the groundwater table elevation and favorable soils and/or favorable saturated hydraulic conductivity (Ksat) of the geological formation beneath. The Existing Conditions models show relatively minor positive effects on overall flood inundation due to the existing exfiltration. Though exfiltration may be effective for smaller storms in RPB, they are not a viable mitigative measure for the larger design storms modeled in the WMP.

2. Stormwater Pump Stations - Adding new pump stations to areas that are too low to positively drain by gravity and uphill catchment is not sufficient due to topography and hydraulics is not a feasible option and not permittable due to the regulated discharge restrictions at the system outfall.

3. Injection Systems – Installation of systems that direct stormwater into the ground and out of the primary system where conditions (groundwater elevation and hydraulics allow) thus reducing localized flooding with treatment and recharge and creating capacity in the existing system. Similar to option 1 above, the gravity well systems are not hydraulically feasible due to subsurface conditions in the study area. Pumped stormwater wells of sufficient collective capacity (diameter, depth, and quantity of wells) to accept and attenuate the peak of the storms require a large number of wells and pumps, and extensive backup systems are required, and the permitting and cost of these facilities compare to their impact on the LOS makes this option infeasible for most municipal stormwater operations.

4. Storage – Bermed or below ground pumped storage to attenuate the peak of the storm to alleviate flooding, and bleed down at the regulated discharge rate. This requires large

land areas within the mostly built-out study area. Potential areas are identified in the WMP.

5. Operational Modifications to M-1 Canal Discharge Control Structure – Modification of the discharge to the C-51 canal to allow pre-storm release or pumping of the study area canal system water levels, lowering stages, and creating more available storage volume for a storm event. Automatic gates are in place for the M-1 and this solution is currently implemented in coordination with SFWMD and ITID to lower the canals to 0.5 ft below the control elevation. Lowering further pre-storm can make additional impact on flooding areas. The Village also can lower the Portosol system through a manual gate when stage elevations rise.

6. Additional PSMS piping, channels, and elimination of system bottlenecks – Although the identification of needed systems of inlets and conveyance piping or open channels and correction (replacement) of system choke points of identified small diameter pipes or open channels in the system can increase the flow out of a collection area lowering stages up stream and improving the LOS locally, the additional flow must be analyzed and balanced so as not to result in additional flooding downstream in another location. Due to the constrained system hydraulics, in larger storms, the system stages rise back into the system rendering the system capacity increases ineffective in most areas.

7. Building Code and Ordinance Updates – Requirements for development/re-development and introduction for additional on-site storge and green measures such as rain barrels, restoration of retention swales / bio swales, porous pavement, stormwater storage and re-use for irrigation to synergistically add to the stormwater management system.

5.1.1 Proposed Project Descriptions

Alternative mitigative measures have been developed and analyzed within the WMP models to provide guidance and potentially a path forward to meet the Village's LOS goals in the vulnerable areas. Note, although labelled herein as "Alternatives", these mitigative options are not mutually exclusive of each other.

None of the alternatives listed below are expected to solve all the flooding issues in the Village due to the permitting constraints and hydraulic limitations of the existing system, especially for the 100-year design storm, however, the modeling results provide a scale for how much flood reduction capital improvement projects (CIPs) each will achieve; and locally, the proposed CIPs can significantly reduce flooding.

The Alternative measures are separated into:

1. General operational measures – modification to existing gates and pumping schedules to lower pre-storm stages and provide needed storage volume for peak attenuation.

2. Neighborhood-scale CIP – pipes, channels, interconnections, and pump stations to help move stormwater water and equalize stages in the PSMS to provide an increased LOS.

5.1.1.1 Operations-Based Improvements

Alternative 1 Description

This alternative mitigation measure simulates a scenario where the operation of the M-1 Canal is lowered under the SFWMD Rainfall Conditional mode. SFWMD Permit Modification No. 50-00761-S (issued 2/10/2014 - see Appendix C), Exhibit 2.1 provides the definition of the Rainfall Conditional mode as per-event and during and event where the measured or predicted rainfall for RPB exceeds 5 inches in a 24-hour period, which includes all the design storm models in this WMP. Under this mode, the auto AMIL Gate operates at 12.35 ft-NAVD (13.8 ft-NGVD converted to feet NAVD). Additionally, the operable gates at both the downstream M-1 Canal AMIL location and the upstream M-1 Canal 40th and Roach structures are operated to maintain stages between 12.05 ft-NAVD and 12.35 ft-NAVD to the extent possible.

Alternative 1 is used to analyze the LOS improvement if these trigger levels are dropped by 1.0 feet. Note that the operations for inflows from ITID at the 40th Street and Roach structures are not changed. The intent is to lower the M-1 Canal and tributary connections prior to the peak of the storm, without negatively impacting ITID. This alternative should provide no negative impacts downstream of the AMIL Gate in the C-51 Canal, as the released flows would occur well before the C-51 Canal reaches peak stage; however, any operational change would require a permit modification and cooperation from relevant stake holder included, but not limited to the SFWMD, ITID, and Palm Beach County.

Additional caveats:

- Though this is a relatively easy operation to model, this WMP does not examine the level of difficulty in changing or permitting the operations at the AMIL Gate.
- The LOS improvement could be increased if the normal pool elevations in all lakes and ponds within the Village were also dropped by one foot pre-storm. However, many of the outlet structures from these lakes are fixed at the same 12.05 ft-NAVD elevation, or higher, and the alternative would likely transition from a general operation to many local CIPs to revise all the structures. If the operational modifications alternative is considered viable by the Village and relevant stakeholders, this should be revisited.

5.1.1.2 Proposed Capital Improvement Projects for Flooding Areas of Concern

The following projects have been developed to show what may be done locally to improve LOS, and to indicate the scale of flood reduction a CIP may provide. The alternatives have been selected to mitigate flooding in some of the more vulnerable areas noted in Section 4.4. Similar CIPs may be applied elsewhere in the Village with commensurate LOS improvements likely.

Alternative 2 Description

This alternative proposes CIPs in the Saratoga Subdivision, near Preservation Park, and in the La Mancha neighborhood.

- Saratoga: As noted in Section 4.4, the northern portion of the Saratoga Subdivision is lower than the neighborhoods to the south. Additionally, the control structure between the pond at Derby Lane and Saratoga Boulevard East is relatively small at 4-feet wide, with the main weir at an elevation of 14.9 ft-NAVD. The CIP proposes a second PSMS parallel to the existing PSMS from the pond north of Lexington Drive to Crestwood Boulevard. A weir structure is proposed near the intersection of Crestwood Boulevard and the existing PSMS (approximately 350 ft north of Saratoga Boulevard). This weir would be similar in size and invert (12.55 ft NAVD) to the weir structure for Madison Green to the south. The proposed outlet pipe would be adjacent to/ under Crestwood Boulevard and outfall to the M-1 Canal.

- Preservation Park: Prior to the development of the WMP, Village Staff had indicated a desire to improve LOS in Preservation Park by potentially routing some park flows west to the tributary canal. The Existing Conditions model indicates significant flooding along Park Road, in addition to the flooding in the park. The proposed CIP includes an outfall pipe from the park, west to the canal between Sweet Bay Lane and Cocoplum Circle, and another system east to the M-1 Canal from multiple locations along Park Road.

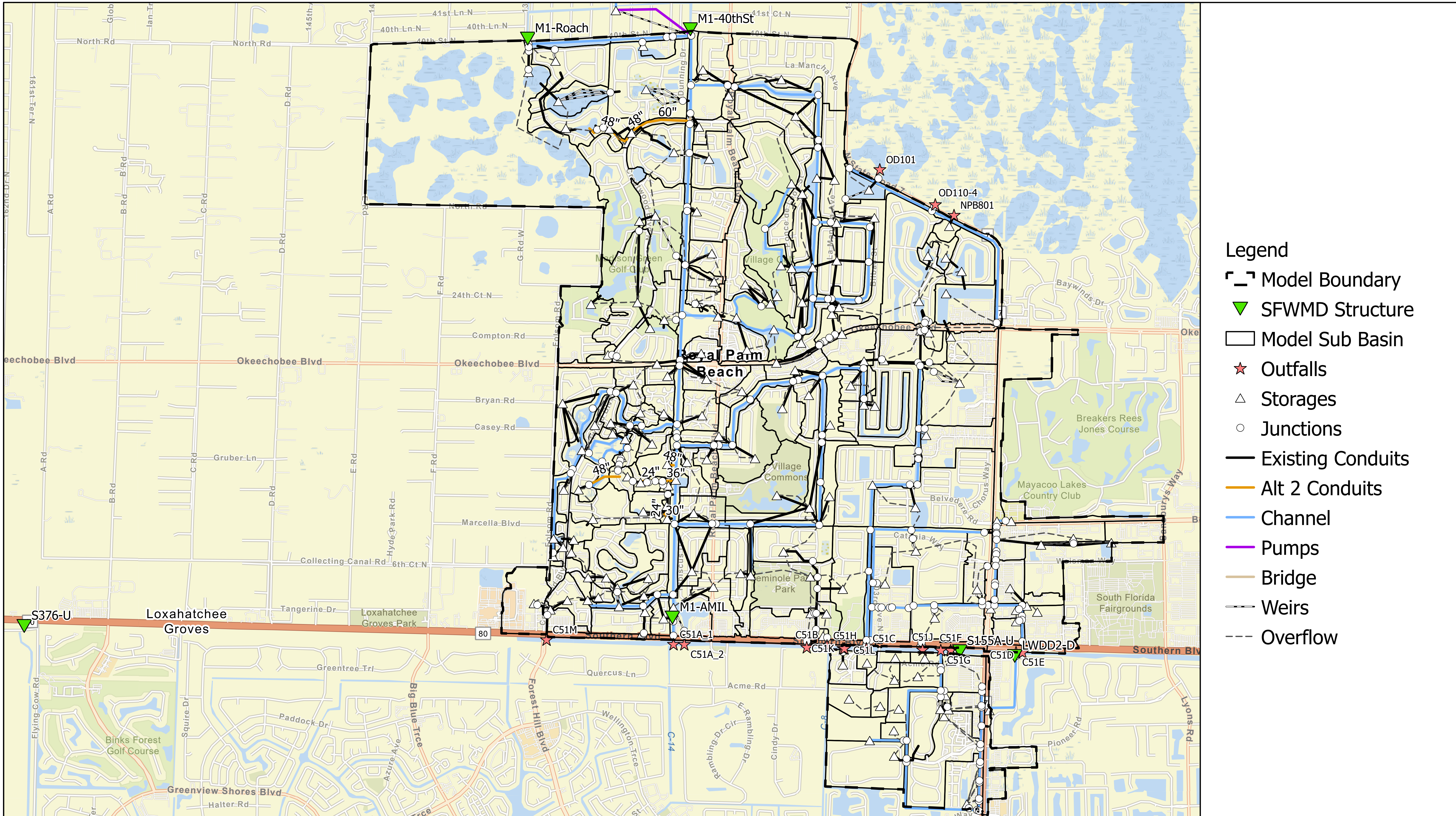
- La Mancha: As noted in Section 4.4, Salzedo Street and Rivera Avenue are expected to flood in the design storms, but also may flood in smaller events due to a high groundwater table and groundwater flows from ITID. The outfall pipes from this neighborhood are considerable larger than some other areas of the Village. The lowest road crown (14.4 ft-NAVD) is one of the lowest in the Village, but still well above the normal operating level of the auto AMIL Gate (12.35 ft-NAVD). Therefore, the road crowns are expected to be clear due to the large gravity outfalls, though there may be significant flooding in the lower yards/ driveways. The proposed CIP in this area is a 50 cfs Stormwater Pump Station (SWPS) located at the bend in the canal near the intersection of Salzedo Street and Rivera Avenue. This CIP is not intended to improve LOS for the extreme design storm events. To meet the LOS for such events, the SWPS would likely need to be an order of magnitude larger and the existing gravity system outfitted with backflow prevention (the combined peak flows from the existing gravity PSMS and the SWMP is over 500 cfs for the 10-year design storm). This could be excluded from the Alternative without change in the model results but has been added as an example of what is possible and what limitations exist.

Figure 5-1 presents the proposed CIP schematic for Alternative 2.

Alternatives 3 and 4 Description

These alternatives propose CIPs in the Village Commons to reduce flooding along Meadowlark Drive, Sandpiper Avenue, Heron Parkway and other streets surrounding the commons. The existing topography indicates a relatively high ridge running though the commons near Poinciana Boulevard. There are detention swales at the edge of the commons near Meadowlark Drive and Heron Parkway that collect flows from both the Village Commons stormwater systems and the neighborhood systems. Both the topography allowing runoff to leave the commons and enter the neighborhoods, and the connects stormwater create flooding issues in the neighborhood.

Alternative 3 proposes a berm be placed around the Village Commons and the Village Commons drainage be severed from the neighborhood systems. This would both reduce the runoff impacting the neighborhood and eliminate excess flows from the detention swales from flowing



Alternative 2 Proposed CIP Model Schematic

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-1
7/10/2023

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through the neighborhood PSMS. Note that this WMP model does not include the systems interior to Village Commons. There may need to be additional piping to move water from the border detention swales to the main lake.

Alternative 4 further builds on Alternative 3 by adding a 410 cfs SWPS on the northeast side of the commons to pump water from the neighborhoods surrounding the Village Commons into the bermed park. This SWPS would also draw from the canal system, which could lower stages in the M-1 Canal. Alternative 4 includes a significant expansion of the Village Commons Lake to provide more storage (just over 40 acres), and an emergency spillway/outfall pipe back to the canal near Royal Palm Beach Boulevard.

Figure 5-2 presents the proposed model CIP schematic for combined Alternative 4, including the location of the berm and an approximate footprint of the expanded lake. The lakes would be connected with canals and bridges to equalize stages in the park. The berm is expected to be on the order of 22 ft-NAVD with the 100-ft wide emergency spillway set to 20 ft-NAVD. Note that even with the expanded lake, the extreme (25-year, 100-year) events utilize the spillway and some flow is then circulated back to the canals. Potentially, this can be reduced by pumping the lake to a lower level pre-storm, possibly by a reverse pump at the proposed SWPS.

5.1.1.3 Combined Operation Change and Proposed Capital Improvement Projects

The following projects have been developed as a combination of the operational change in Alternative 1 and the CIP changes in Alternatives 2 and 4. It should be noted that Alternative 2 increases outfall flows to the M-1 Canal at the peak of the event, and therefore increases the canal stages slightly. This is enough to reduce inflows from ITID and therefore Alternative 2, by itself is not recommended.

Alternative 1 & 2 Description

This alternative combines the improvements in Saratoga, Preservation Park, and La Mancha with the reduction in the M-1 operating level.

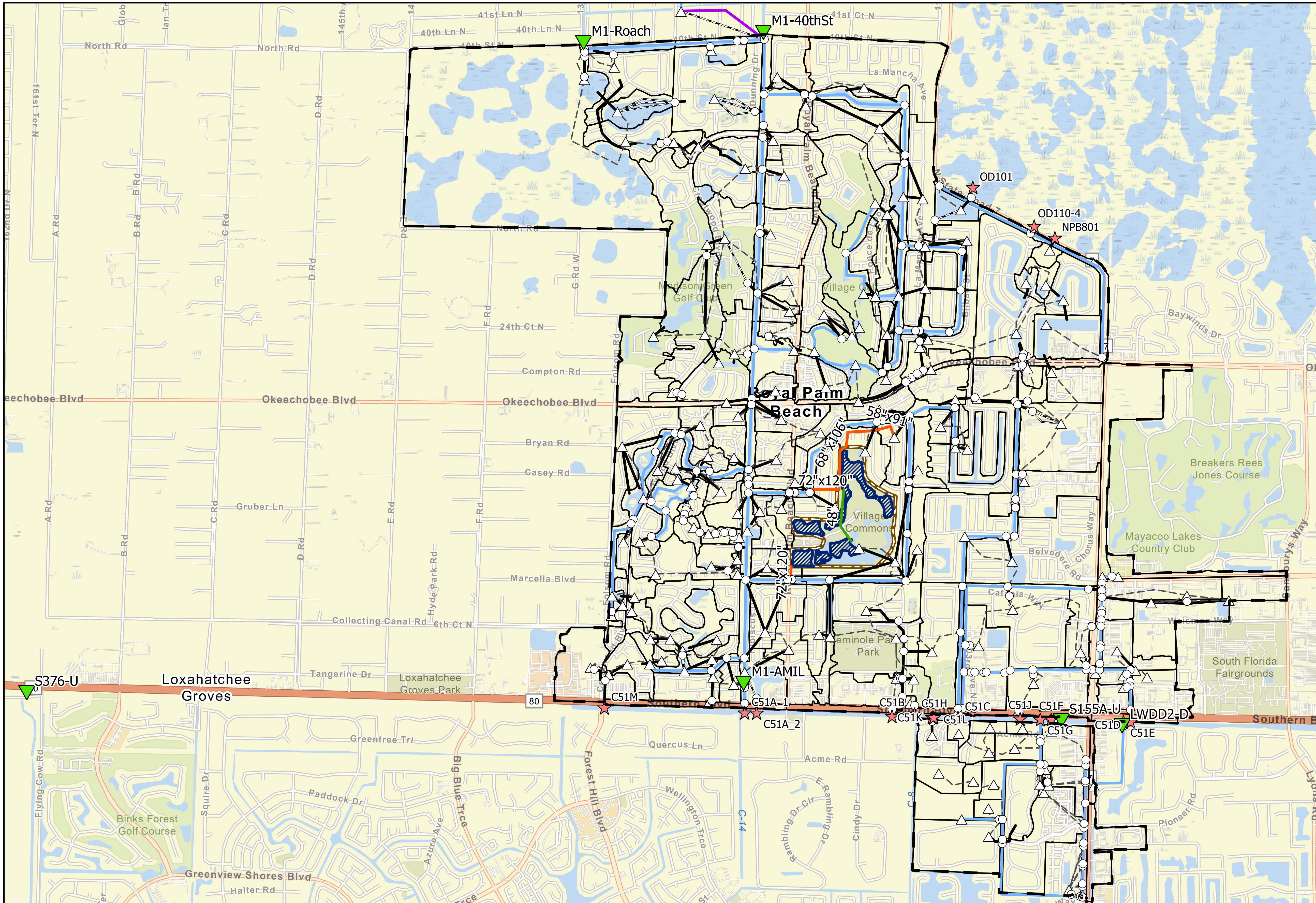
Alternative 1 & 4 Description

This alternative combines the improvements around Village Commons, including the proposed SWPS, with the reduction in the M-1 operating level.

5.1.2 Proposed Project Results and Flood Inundation Maps

The results of the proposed alternative mitigative measures are provided below. A series of flood inundation maps that depict predicted depth of flooding in the study area for the 10-year, 3-day storm event were extracted from the detailed model output and included in each section below:

- Alternative 1, Modified M-1 Canal Operation
- Alternative 2, Localized Larger PSMS Outfalls
- Alternative 3, Bermed Village Commons



Legend
- Model Boundary
- SFWMD Structure
- Model Sub Basin
- Outfalls
- Storages
- Junctions
- Existing Conduits
- Alt 4 Conduits
- Alt 4 Force Main
- Channel
- Pumps
- Bridge
- Weirs
- Overflow
- Alt 4 Berm
- Alt 4 Extended Pond

CDM Smith

Alternative 4 Proposed CIP Model Schematic

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-2
7/10/2023

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- Alternative 4, Village Commons Pump Station added to Alternative 3
- Combined Alternative 1 & 2
- Combined Alternative 1 & 4

The 25-year, 3-day and the 100-year, 3-day flood inundation maps for the six analyses of the alternatives are presented in **Appendix F.** Peak stage results for all model nodes, for Existing Conditions and for the six Alternatives are also provided in **Appendix G.**

5.1.2.1 Alternative 1 Results

Table 5-1 provides a summary of the peak flood stages for Alternative 1, which represents existing conditions with the operations of the M-1 Canal dropped by 1 foot, essentially providing an extra foot of storage over the footprint of the M-1 and tributary canals **(Figure 5-3).** Note that this table is comparable to Table 4-1 in Section 4, which provided flood depths and structure counts for existing conditions. The second column under each separate storm event compares the peak stage of the alternative to the peak stage under existing conditions.

Note that there is some minor improvement in peak stage for the 10-year storm, but little to none for the large events. Typically, providing this much additional storage to a drainage basin would show significant benefits; however, the M-1 Canal system has limited discharge due to permitting, as well as additional inflows from ITID. This circumstance causes the storage to fill prior to the onset of the more intense portions of the storms. There is a small improvement to ITID as well, i.e. the lower M-1 Canal stages allow more inflow to the system from the north.

5.1.2.2 Alternative 2 Results

Table 5-2 provides a summary of the peak flood stages for Alternative 2, which provides additional, larger outfalls from the northern Saratoga Subdivision and Preservation Park, as well as the SWPS in La Mancha to mitigate groundwater inflows (See Section 5.1.1). Again, this table is comparable to Table 4-1 in Section 4, which provided flood depths and structure counts for existing conditions. The second column under each separate storm event compares the peak stage of the alternative to the peak stage under existing conditions.

The flood inundation map **(Figure 5-4)** and this table show significant reduction in flooding for the 10-year design storm for the two prioritized neighborhoods of Saratoga Preservation Park. There is only minor improvement in La Macha as the mitigation was designed to remove groundwater inflows during smaller events and not design storms. Given the relatively large size of the La Mancha existing PSMS, additional gravity outfalls are not likely to significantly improve LOS in this neighborhood.

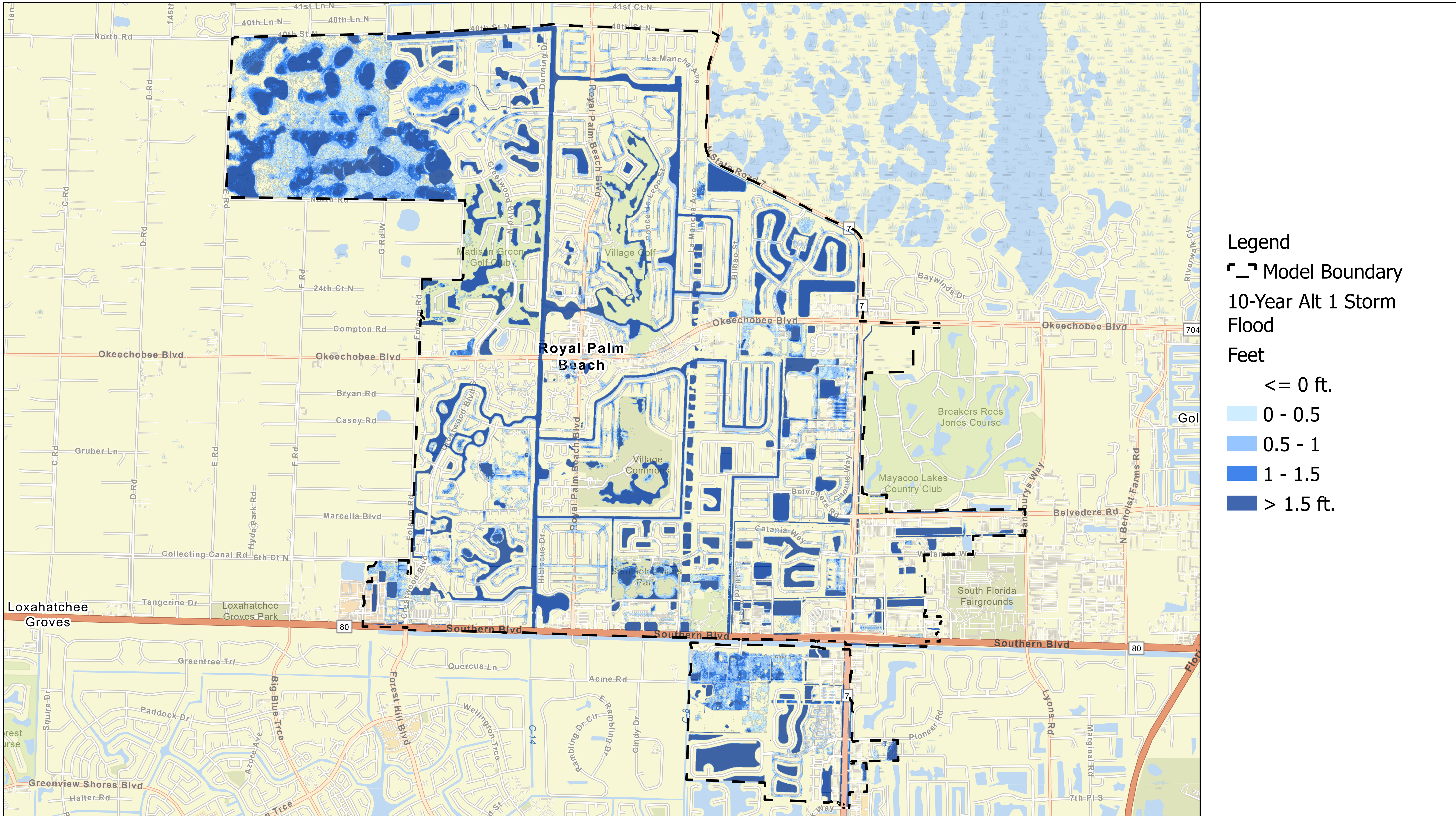
A few additional notes:

- This alternative causes an increase in flows from the neighborhoods to the M-1 Canal and therefore slightly increases peak stages in the canal system. This reduces flows from ITID and therefore would not be permittable as a stand-alone CIP.

Table 5-1
Alternative 1
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternative 1									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	17.6	0.0	1.2	17.7	0.0	1.5	18.8	0.0	186	1
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.5	0.0	0.3	18.3	0.0	192	0
Preservation Park	3		M-3740	14.6	16.4	16.4	-0.1	1.8	16.9	0.0	0.5	17.8	0.0	23	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.8	0.0	1.3	17.2	0.0	0.9	18.2	0.0	45	0
North La Mancha	5	P-10, P-11		14.4	17.1	15.9	-0.1	1.5	17.5	0.0	0.3	17.8	0.0	12	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	15.9	-0.1	0.7	16.8	0.0	1.2	17.3	0.0	98	0
West La Mancha	7	P-2, P-3		14.8		15.9	-0.2	1.1				17.2	0.0	97	0
East La Mancha	8	P-16, P-17		15		15.9	-0.1	0.9				17.2	0.0	11	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.2	-0.1	0.8	18.0	0.0	0.5	17.2	0.0	43	2
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	16.1	-0.1	1.7	16.0	-0.1	1.0	17.4	0.0	161	2
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	-0.1	0.9	16.7	0.0	0.0	17.1	0.0	24	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.3	-0.1	0.7	16.2	0.0	0.0	17.0	0.0	27	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***991***	***5***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road
2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear
3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building
4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot



Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 1

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-3
7/10/2023

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Table 5-2
Alternative 2
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternative 2									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	16.4	-1.2	0.0	17.1	-0.7	0.9	18.7	0.0	136	0
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.6	0.0	0.4	18.2	-0.1	188	0
Preservation Park	3		M-3740	14.6	16.4	15.3	-1.1	0.7	16.9	0.0	0.5	17.8	0.0	24	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.9	0.0	1.4	17.2	0.0	0.9	18.2	0.0	45	0
North La Mancha	5	P-10, P-11		14.4	17.1	16.0	-0.1	1.6	17.5	0.0	0.4	17.8	0.0	6	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	16.0	0.0	0.8	16.8	0.0	1.2	17.3	0.0	102	0
West La Mancha	7	P-2, P-3		14.8		16.1	0.0	1.3				17.2	0.0	97	0
East La Mancha	8	P-16, P-17		15		16.0	0.0	1.0				17.2	0.0	11	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.4	0.0	1.0	18.0	0.0	0.5	17.2	0.0	43	2
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	16.2	0.0	1.8	16.2	0.0	1.2	17.4	0.0	161	2
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.8	0.0	0.9	16.7	0.0	0.0	17.1	0.0	24	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.4	0.0	0.8	16.2	0.0	0.0	17.0	0.0	27	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***936***	***4***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road
2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear
3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building
4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot

Legend

Model Boundary

10-Year Alt 2 Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

CDM Smith

Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 2

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-4
7/10/2023

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- There is no change in the 25-Year LOS for Preservation Park because the divided road with the lowest elevation in the neighborhood is on the opposite side of the park from these improvements.
- There is still approximately 1 foot of expected flooding one-lane in from the median on Crestwood Boulevard in the Saratoga Subdivision for the 25-year storm, though it appears the lane will be passable for nearly all vehicles based on the flood map.
- Additional investigation should be performed in the La Mancha subdivision to determine the source of the flooding in this area including CCTV of the outfall pipes, and potentially stage monitoring. Under normal operating conditions the canal should be lower than the adjacent roadways and the outfall pipes should clear any groundwater contributing to flooding.

5.1.2.3 Alternative 3 Results

Table 5-3 provides a summary of the peak flood stages for Alternative 3, which provides a berm around the Village Commons (See Section 5.1.1). This table is comparable to Table 4-1 in Section 4, with the second column under each separate storm event comparing the alternative peak stage to existing conditions peak stage.

This Alternative **(Figure 5-5)** provides some LOS improvement in the neighborhoods adjacent to the Village Commons, but street flooding is expected to remain significant. Note that for each LOS area, the subbasin with the lowest road crown or highest structure count is used as the target critical elevation in these tables, though there are many subbasins per LOS area.

5.1.2.4 Alternative 4 Results

Table 5-4 provides a summary of the peak flood stages for Alternative 4, which provides a berm around the Village Commons, an expanded Commons Lake, and a Stormwater Pump Station pumping from the nearby neighborhood and the canal system into the Commons Storage area (See Section 5.1.1). This table is comparable to Table 4-1 in Section 4, with the second column under each separate storm event comparing the alternative peak stage to existing conditions peak stage.

The flood inundation map (**Figure 5-6**) and the table show significant reductions in flood level for the design storms and removes all of the local at-risk structures (using the plus one foot criteria) out of the 100-year floodplain, including a few from across the canal. This alternative shows how both detention and a SWPS may be used to mitigate flooding, and how much storage is required to make a small dent in the M-1 Canal and tributary flood stages. Smaller pump stations and underground tanks, or potentially elevated tanks, may be used to improve LOS at a relatively small neighborhood level, but much large systems are needed to mitigate the large volumes of flooding from these extreme precipitation events. Outside of the private golf courses, there is not enough open area in the Village to do more of these large systems.

Table 5-3
Alternative 3
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternative 3									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	17.6	0.0	1.2	17.7	0.0	1.5	18.8	0.0	186	1
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.6	0.0	0.4	18.3	0.0	200	0
Preservation Park	3		M-3740	14.6	16.4	16.4	0.0	1.8	16.9	0.0	0.5	17.8	0.0	23	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.9	0.0	1.4	17.2	0.0	0.9	18.2	0.0	45	0
North La Mancha	5	P-10, P-11		14.4	17.1	16.1	0.0	1.7	17.5	0.0	0.4	17.8	0.0	12	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	16.0	0.0	0.8	16.8	0.0	1.2	17.3	0.0	101	0
West La Mancha	7	P-2, P-3		14.8		16.1	0.0	1.3				17.2	0.0	97	0
East La Mancha	8	P-16, P-17		15		16.0	0.0	0.9				17.2	0.0	11	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.4	0.0	1.0	18.0	0.0	0.5	17.2	0.0	43	2
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	15.7	-0.5	1.3	16.1	0.0	1.1	17.1	-0.3	138	2
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	0.0	0.9	16.7	0.0	0.0	17.1	0.0	23	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.4	0.0	0.8	16.2	0.0	0.0	17.0	0.0	26	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***977***	***5***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road

2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear

3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building

4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot

Legend

Model Boundary

10-Year Alt 3 Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

0 1,250 2,500 5,000 Feet

1:35,000

N

CDM Smith

Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 3

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-5
7/10/2023

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Table 5-4
Alternative 4
Peak Flood Stages

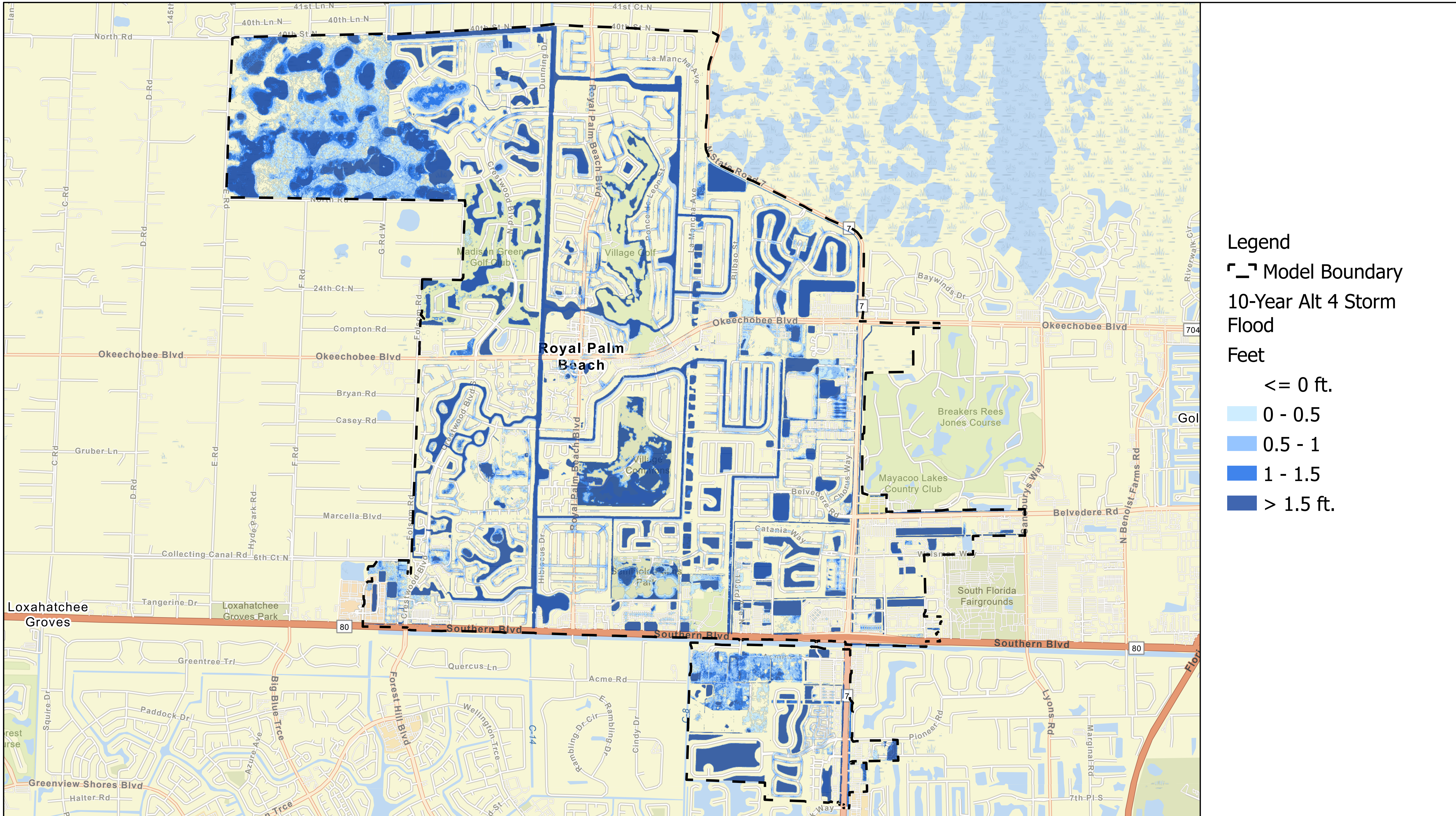
LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternative 4									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	17.6	0.0	1.2	17.7	0.0	1.5	18.8	0.0	181	1
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.5	0.0	0.3	18.3	0.0	171	0
Preservation Park	3		M-3740	14.6	16.4	16.4	0.0	1.8	16.9	0.0	0.5	17.8	0.0	16	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.9	0.0	1.4	17.2	0.0	0.9	18.2	0.0	28	0
North La Mancha	5	P-10, P-11		14.4	17.1	16.1	0.0	1.7	17.5	0.0	0.4	17.8	0.0	7	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	15.9	0.0	0.7	16.8	0.0	1.2	17.3	0.0	76	0
West La Mancha	7	P-2, P-3		14.8		16.1	0.0	1.3				17.2	-0.1	79	0
East La Mancha	8	P-16, P-17		15		15.9	0.0	0.9				17.1	-0.1	6	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.3	0.0	0.9	18.0	0.0	0.5	17.0	-0.1	35	0
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	14.4	-1.8	0.0	15.8	-0.3	0.8	16.3	-1.1	18	0
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	0.0	0.9	16.7	0.0	0.0	16.9	-0.2	12	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.4	0.0	0.8	16.2	0.0	0.0	16.9	-0.2	6	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***707***	***1***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road

2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear

3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building

4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot



N

CDM Smith

Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 4

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-6
7/10/2023

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As noted in Section 5.1.1, even with more than 40 acres of additional storage added to the Commons, the emergency spillway is used in the larger 25-year and 100-year storm events, indicating that this system is still not large enough for the highest volume events. Though the berm may be raised further, eventually the detention would qualify as a high hazard dam, which would not be permittable.

5.1.2.5 Combined Alternative 1 & 2 Results

Table 5-5 provides a summary of the peak flood stages for the combination of Alternative 1, the revision of the M-1 operating levels, and Alternative 2, which increase outfalls to the M-1 Canal, primarily for the Saratoga Subdivision and Park Road (See Section 5.1.1). This table is comparable to Table 4-1 in Section 4, with the second column under each separate storm event comparing the alternative peak stage to existing conditions peak stage. **Figure 5-7** provides the flood inundation map.

The results are very similar to the Alternative 2 results; however, for this scenario, peak stages in the M-1 Canal are slightly lower than existing conditions. Thus, there are no adverse offsite impacts when Alternative 2 is combined with Alternative 1. Since Alternative 2, and/or any CIP with significant additional flows to the M-1, are likely not permittable due to adverse offsite impacts, these CIPs will need to be combined with mitigation options that lower M1 stages, like Alternative 1, or potentially Alternative 4.

5.1.2.6 Combined Alternative 1 & 4 Results

Table 5-6 provides a summary of the peak flood stages for the combination of Alternative 1, the revision of the M-1 operating levels, and Alternative 4, which provides a large bermed detention in the Village Commons and a large SWPS pumping into it (See Section 5.1.1). This table is comparable to Table 4-1 in Section 4, with the second column under each separate storm event comparing the alternative peak stage to existing conditions peak stage.

Alternative Nos. 1and 4 were combined because both reduce stages in the M-1 Canal and the intent was to determine if the combination would significantly lower peak stages in the canals. The results for the Combined Alternative Nos. 1 and 4 are not substantially different than the results for Alternative No. 4 alone. The more the mitigative alternatives drop the M-1 Canal, the more inflows occur from ITID. In this case, the difference between Alternative 4 and Alternatives 1 and 4 combined is that the ITID flows continue at the max allowable 565 cfs for many hours longer in the latter case. The total volume of flow in the 100-year storm flowing through the M-1 Canal from ITID and then out through the AMIL Gate is nearly 3 times as high. **Figure 5-8** provides the flood inundation map.

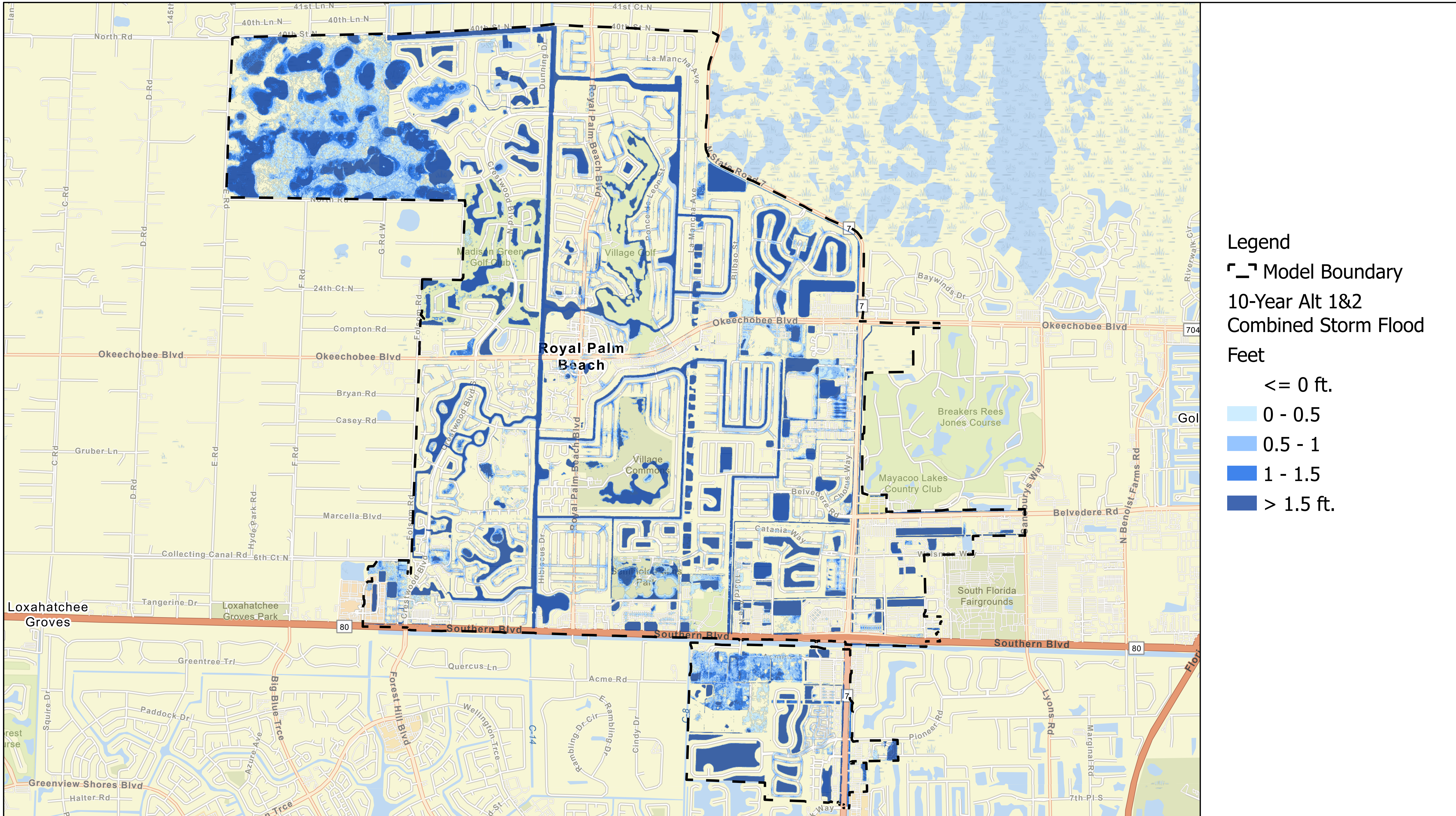
5.2 Risk, Vulnerability, and Mitigation Strategies

The Village is constrained by the regulated permittable flows by others into, through, and out of its watershed, and by the limited remaining viable stormwater management options for its generated runoff. As costs for stormwater management tend to increase exponentially as the LOS increases, and because critical facilities within the study area can be hardened and/or flood-proofed on an individual basis by raising sensitive equipment out of the floodplain, berming up entry and egress areas, and raising first-floor elevations under parallel vulnerability assessments, the Village is concentrating its municipal CIP on lowering stages for the design storms to keep

Table 5-5
Alternatives 1 and 2
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternatives 1 & 2 Combined									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	16.2	-1.4	-0.2	17.0	-0.8	0.8	18.7	0.0	136	0
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.5	0.0	0.3	18.2	-0.1	174	0
Preservation Park	3		M-3740	14.6	16.4	15.0	-1.4	0.4	16.9	0.0	0.5	17.8	0.0	21	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.8	0.0	1.3	17.2	0.0	0.9	18.2	0.0	44	0
North La Mancha	5	P-10, P-11		14.4	17.1	15.8	-0.3	1.4	17.5	0.0	0.3	17.8	0.0	4	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	15.9	-0.1	0.7	16.8	0.0	1.2	17.3	0.0	98	0
West La Mancha	7	P-2, P-3		14.8		15.9	-0.2	1.1				17.2	0.0	92	0
East La Mancha	8	P-16, P-17		15		15.9	-0.1	0.9				17.2	0.0	11	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.2	-0.1	0.8	18.0	0.0	0.5	17.1	0.0	41	2
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	16.1	-0.1	1.7	16.1	-0.1	1.1	17.4	0.0	157	2
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	-0.1	0.9	16.7	0.0	0.0	17.1	0.0	21	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.3	-0.1	0.7	16.2	0.0	0.0	17.0	0.0	25	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***896***	***4***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road
2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear
3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building
4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot



Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 1&2 Combined

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-7
7/10/2023

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Table 5-6
Alternatives 1 and 4
Peak Flood Stages

LOS Area	LOS #	2005 Problem Areas	2015 Problem Areas	CE[1] 10	CE[2] 25	Alternatives 1 & 4 Combined									
						10-Year Storm			25-Year Storm			100-Year Design Storm			
						Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	Flood Depth (feet)	Peak Stage (ft-NAVD)	Delta vs Exist (ft)	# Flooded Structures[3]	DEM + 12 in # Flooded Structures[4]
Saratoga	1	P-1, P-7	M-100, M-200, M-300	16.4	16.2	17.6	0.0	1.2	17.7	0.0	1.5	18.8	0.0	181	1
Madison Green	2			16.3	17.2	16.6	0.0	0.3	17.5	0.0	0.3	18.3	0.0	165	0
Preservation Park	3		M-3740	14.6	16.4	16.4	-0.1	1.8	16.9	0.0	0.5	17.8	0.0	14	0
Cypress Head	4	P-8, P-9	M-4500, M-4900, M-5500	15.5	16.3	16.8	0.0	1.3	17.2	0.0	0.9	18.2	0.0	26	0
North La Mancha	5	P-10, P-11		14.4	17.1	15.9	-0.1	1.5	17.4	0.0	0.3	17.8	0.0	7	0
Royal Palm Beach Blvd N of Okeechobee	6	P-13, P-14, P-15	M-900, M-1800, M-1850	15.2	15.6	15.9	-0.1	0.7	16.8	0.0	1.2	17.3	0.0	74	0
West La Mancha	7	P-2, P-3		14.8		15.9	-0.2	1.1				17.2	-0.1	76	0
East La Mancha	8	P-16, P-17		15		15.9	-0.1	0.9				17.1	-0.1	6	0
Portosol	9			16.9	16.9	18.1	0.0	1.2	18.4	0.0	1.5	18.7	0.0	8	0
Village Hall	10	P-18	M-2500	14.4	17.5	15.2	-0.2	0.8	18.0	0.0	0.5	17.0	-0.2	33	0
Commons Park	11	P-4, P-19, P-20	M-3400 - M-3500, M-4100	14.4	15.0	14.1	-2.1	-0.3	15.7	-0.4	0.7	16.2	-1.2	17	0
The Willows	12	P-21, P-25	M-2900	14.8	18.2	15.7	-0.1	0.9	16.7	0.0	0.0	16.9	-0.2	11	0
RPB High School	13	P-23		16.7	17.9	17.3	0.0	0.6	18.3	0.0	0.4	17.7	0.0	24	0
Seminole Palms	14	P-22		15.6	17.6	16.3	-0.1	0.7	16.2	0.0	0.0	16.9	-0.2	5	0
Bella Terra	15	P-6, P-26	LW-450	14.7	16.5	15.6	0.0	0.9	14.8	0.0	0.0	16.4	0.0	25	0
S of SR80	16			14.6	14.9	15.6	0.0	1.0	15.8	0.0	0.9	17.8	0.0	15	0
Totals														***687***	***1***

1. CE 10: Critical Elevation for 10-year Storm. Lowest road crown for local road

2. CE 25: Critical Elevation for 25-year Storm. Lowest major road - approximately one lane clear

3 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter of building

4 Compares peak flood stage versus LiDAR DEM using mean elevation around perimeter plus 1 foot

Legend

Model Boundary

10-Year Alt 1&4 Combined Storm Flood

Feet

- <= 0 ft.
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- > 1.5 ft.

CDM Smith

Proposed CIP Results Flooding Reduction
10-yr, 72-hr Design Storm
for Alternative 1&4 Combined

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Figure 5-8
7/10/2023

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roads passable and reduce the number of homes flooding, in turn, the depth and duration of flooding becomes less and quality of life for the residents increases. The WMP will be used as a guide for future CIP to address vulnerable flooding areas.

Specifically for addressing the 100-year storm event, each proposed project alternative removes a number of structures from the 100-year flood plain using the DEM plus one-foot FFEL criteria. **Table 5-7** provides the summary of pre-post CIP reduction in flooded homes for the 100-year event predicted in the model as discussed in Section 5.

Table 5-7 Pre-Post Proposed CIP Flooded Home Reduction for the 100-year Storm Event

ALT	EXISTING CONDITIONS FLOODED STRUCTURES	POST CIP FLOODED STRUCTURES	REDUCTION
1	6	5	1
2	6	4	2
3	6	5	1
4	6	1	5
1 & 2	6	4	2
1 & 4	6	1	5

As shown in the table, Alternative 4 provides the greatest flood protection for the 100-year storm for structures Citywide reducing the predicted number from 6 to 1. Adding Alternative 1 to the project (gate operation modification) reduces flooding further Citywide but does not change the flooded structure count further. Thus Alternative 4 would be the stormwater management scenario implemented to mitigate the predicted impact of the 100-year storm.

5.2.1 Mitigation Strategies

The following flood mitigation strategies are being considered by the Village:

1. Regional Strategy – Coordination with large-scale State and Federal agencies such as the SFWMD and USACE for implementation of in-progress or planned regional flooding mitigation projects to lower boundary conditions and enhance resiliency to sea level rise effects and climate change.

2. Operational Strategy – Investigation of operational modifications to lower local boundary conditions pre-storm to provide additional flood plain storage and peak attenuation.

3. Capital Improvements Program – Financial planning and implementation over time of local stormwater improvements projects such as piping and inlets and pump stations, to alleviate flooding in identified vulnerable areas of the Village while not impacting existing areas and worsening flooding.

4. Pro-active Maintenance Strategy – Continue to fund and perform pro-active maintenance on the stormwater system components to ensure the existing system performs as designed.

5. Building Code, Ordinance, and Enforcement Strategy – Enhancement of Village building codes and ordinances for development and re-development to incorporate green elements and individual stormwater quantity and quality measures that synergistically can enhance stormwater management.

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Section 6

Action Plan

This WMP is a component of the Village's goal to continue to increase the LOS and quality of life while increasing its CRS credit points passing flood insurance savings on to its residents. In 2017, the Village made great strides in this effort and was verified as a CRS Class 6 by the ISO with a total of 2,114 awarded credit points, resulting in a 20% insurance discount to its residents. The discounts provide an incentive for communities to implement new flood protection activities that can help save lives and property when a flood occurs.

As listed in the WMP requirements under FEMA NFIP CRS, the key components of the implementation phase are:

1. Establishment of the implementation team (complete).
2. Information/education program (established and in progress, on-going).
3. Selection of Capital improvement projects (in progress, on-going) along with a program to verify the FFELs in the 100-year storm flooding areas to weigh the prioritization of implementation of the alternatives.
4. Maintenance (in progress, on-going).
5. Monitoring (in progress, on-going).
6. Recurrent evaluation and adjustments (in progress, on-going).

Watershed Implementation Team

A watershed implementation team made up of key stakeholder partners from the planning team, particularly those whose responsibilities include making sure tasks are being implemented, reviewing monitoring data, ensuring technical assistance in the design and installation of management measures, finding new funding sources, and communicating results to the Public. The Village has establishing the WMP Implementation team below **(Table 6-1)**.

Table 6-1 VRPB Watershed Implementation Team

Position	Assigned To	Support by	Responsible For
Lead Village WMP Contact	Christopher Marsh, PE	Jeffrey Sullivan	Primary Oversight
CIP Implementation	Christopher Marsh, PE	Paul Webster	Implementation of Stormwater Capital Improvements
Monitoring & Compliance Programs	Paul Webster	Christopher Marsh, PE	Monitoring and Compliance Activities
GIS Coordinator	Jeffrey Sullivan	Luis Rivera	Geographic Systems Database Coordination and Maintenance
SFWMD Coordinator	Christopher Marsh, PE	Adamo DiSisto	Coordination With SFWMD Policy and Projects
PBC Coordinator	Christopher Marsh, PE	Adamo DiSisto	Coordination With Palm Beach County Policy and Projects
FDOT Coordinator	Christopher Marsh, PE	Adamo DiSisto	Coordination With State Department of Transportation Policy and Projects
CRS Coordinator	Jeffrey Sullivan	Christopher Marsh, PE	Coordination With CRS
Funding Coordinator	Sharon Almeida	Shernett Lee	Funding, Joint Project, and Grant Coordination for CIP
Public Outreach Coordinator	Jeffrey Sullivan	Miranda Russell	Public Outreach Program
Stormwater O&M Coordinator	Paul Webster	Christopher Marsh, PE	Stormwater Operations and Maintenance Coordination and Tracking
Development Coordinator	Rob Hill	Todd Wax	Stormwater Regulation and Floodplain Management for Development/Redevelopment
Shared Infrastructure Coordinator	Paul Webster	Kurt Riggot	Coordination of Shared Infrastructure Improvement and Operation

6.1 Information/Education Plan

The Village will continue to implement and administer its public outreach programs as detailed in Section 1.4. The Village website maintains a dedicated stormwater-specific page/section under Public Works labeled the “Citizen Support Center” which houses information on the submission of requests and complaints, posts Stormwater FAQs, provides stormwater issue contact information, illicit discharge or other violation reporting, provides other stormwater-related educational materials, and has a repository for the Village’s public documents such as the stormwater utility manual and master plans.

6.2 Maintenance Plan

The Village will continue to administer and fund its stormwater system maintenance programs.

Regular Maintenance Activities include:

- Debris and Litter Removal
- Street Sweeping/Cleaning
- Erosion Control and Repairs
- Waterborne Nuisance Control
- Outlet Control
- Sediment Removal
- System Component Structural Repairs and Replacement
- Channel and Canal Maintenance and Aquatic Vegetation Control

6.3 Monitoring and Compliance Requirements

The Village will continue to administer its monitoring and compliance plans:

- Inspections of credited private systems identified in the SWU are performed by a representative of the Village Department to assure that a Stormwater Control Measure is operating (no blockage due to excessive sediment accumulation, logs, or debris). Inspections of problematic areas are additionally performed following large storm events (two inches of rainfall or more over a 24-hour period).
- Modification of the Village Code of Ordinances Chapter 7 – Bulkheads and Waterways to include language to encourage channel improvement projects use natural or "soft" approaches rather than gabions, rip rap, concrete, or other "hard" techniques. The process of development of the draft and final ordinance language and legal reviews for the planned code amendment(s) will follow.
- NPDES/MS4 Compliance - Stormwater runoff within the Village is regulated under the Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit system that is administered by the Florida Department of Environmental Protection (FDEP). The Village is a co-permittee under the Palm Beach County (PBC) MS4 NPDES permit. The County has a cooperative program involving thirty-nine co-permittees, the Florida Department of Environment Protection and the United States Environmental Protection Agency (EPA). Northern Palm Beach County Improvement District (NPBCID) acts as lead permittee for the Palm Beach County group. Regular stormwater system inspections and sampling fall under this group permit.
- The Village of Royal Palm Beach has adopted a "Fertilizer Friendly-Use Ordinance". The purpose of the ordinance is to enhance water quality in our local water bodies. The ordinance requires the use of Best Management Practices (BMP's) for fertilizer application and vegetative debris management and specifies allowable application rates and methods. By following the requirements of this ordinance, the Village can minimize the amount of nutrients (nitrogen and phosphorus) that are in the stormwater runoff which goes into the canals and feeding the invasive aquatic vegetation that is growing in the canals.

6.4 Capital Plan

The current Stormwater Utility Ordinance 864 and recent budget summary showing stormwater CIP funding appropriation together demonstrating the community has a funding source dedicated to implementing the plan's recommendations is provided in Appendix H.

Following the strategy that was developed in Section 5.2.1., the process of implementation of the proposed capital improvements recommended for further flood reduction will begin at the Village including:

- Prioritization of projects
- Development of smaller immediate action projects and larger phased project plans
- Initialization of pre-project permitting discussions with the SFWMD
- Budget planning and identification of supplemental funding sources including grant, loan, and joint project partnership opportunities

- Stormwater program CIP scheduling
- Procurement planning for design and construction of CIP
- Regular re-evaluation of the Plan for further CRS credit

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Appendix A

Detailed Analysis Plan for WMP and Deliverables Checklist

Minimum Criteria for a Creditable WMP*

(*From CRS Coordinator's Manual Checklist)

**Location in Document provided separately as deliverable No. 2*

Data Inventory and Collection:

1. Data inventory (used for initial flood modeling):
   a. Inventory of ground characteristics (e.g., soil type, impervious surfaces, wetlands)
   b. Inventory of existing drainage system
   c. Inventory of data availability
2. Locations of:
   a. critical facilities, cultural/historical, and other places/areas of interest
   b. vulnerable areas and their descriptions
   c. natural and constructed drainage systems and channels
3. Existing regulations and plans in place for reducing flood risks

Initial Flood Modeling

4. For current/existing conditions land use, future land use, and the fully developed watershed scenarios:
   a. Evaluations of the existing drainage system's runoff response from design storms using a hydrologic and hydraulic study with a hydrograph approach under current and predicted future land use conditions with assessments of the impacts of climate change and sea level rise for 10-, 25- & 100-year storm events
   b. For currently fully developed watersheds: studies of existing development and the potential impact of any redevelopment
   c. Evaluations of different management scenarios for at least the 100-year rainfall event for a fully developed watershed at a scale sufficient to determine local problems.
   d. Determinations of the change in runoff from current to future, fully developed conditions
   e. Recommendations for managing at least the 10-year and the 25-year rainfall events
5. For communities impacted by sea level rise: evaluations of the impacts of the NOAA Intermediate 2100 sea level rise scenario on the 100-year rainfall event

a. It is highly recommended to include 2 other scenarios up to 2100, which could be based on sea level for 2 time frames into the future or a number of feet of sea level rise within this timeframe.

6. The plan must include a strategy and action plan to address the results of the studies for:

   a. controlling the timing of peak flows to prevent or minimize problems for the entire watershed due to new development, redevelopment, and fully developed conditions

   b. the impact of climate change and sea level rise on fully developed conditions

   c. at least the 25-year rainfall event in fully developed conditions, with a list of possible solutions for addressing at least the 25-year rainfall event

   d. at least one event larger than the 25-year rainfall event, with a list of possible solutions for addressing this event

   e. ensuring that flood hazards from the 10-year and the 25-year events are not increased by future development (the 2-year storm is also recommended).

7. The community must adopt the final plan.

8. If applicable, WMP plans more than 5 years old must be evaluated to ensure that they remain applicable to current conditions. For instance, are previous assumptions on hydrology, sea level rise and future land use still applicable.

Deliverable Checklist for Draft WMP Submittal (Task 1)

1) An (1) electronic copy of the preliminary Project Plan;
2) A separate electronic document listing how and where in the preliminary Project Plan the Minimum Criteria listed above are met
3) A separate electronic document clarifying the Sub-Recipient's existing data inventory at the time of contract execution, how the data are used, and which tasks and efforts have already been completed prior to contract execution.

The Sub-Recipient will provide Deliverable 1 to the Division via email to:

watershedplanning@em.myflorida.com

Appendix B

Model Parameters Supporting Data

HU	Area (Ac)	Impervious (%)	Width (ft)	Slope (%)	Impervious n	Pervious n	Impervious IA (in)	Pervious IA (in)	Routed Area (%)	Max Inf Rate (in/hr)	Min Inf Rate (in/hr)	Soil Storage (in)
C51-100	92.3	28.9	2,526	0.10	0.024	0.40	0.33	0.25	25	4.0	0.10	1.4
C51-200	19.5	39.5	932	0.26	0.015	0.40	0.10	0.25	14	4.0	0.10	1.4
C51-300	44.5	77.2	3,178	0.31	0.017	0.39	0.83	0.25	15	4.0	0.10	1.4
C51-400	70.3	52.8	4,781	0.38	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
C51-500	90.8	34.1	1,568	0.11	0.015	0.20	0.10	0.25	16	4.0	0.10	1.4
LW-100	70.4	75.1	1,644	0.14	0.015	0.20	0.93	0.25	15	10.3	0.80	5.6
LW-200	74.1	30.2	2,007	1.91	0.015	0.20	0.10	0.25	23	8.9	0.65	4.8
LW-201	31.7	90.0	672	0.55	0.015	0.20	0.10	0.25	10	11.8	0.98	6.6
LW-300	30.0	75.0	1,221	0.24	0.015	0.20	2.60	0.25	15	9.3	0.66	5.4
LW-400	11.5	8.5	1,465	5.19	0.015	0.20	0.10	0.25	70	7.8	0.51	4.2
LW-450	132.9	55.5	3,769	0.39	0.015	0.20	0.10	0.25	15	5.7	0.29	2.5
LW-451	40.4	65.1	801	0.15	0.015	0.20	0.10	0.25	15	4.1	0.11	1.5
LW-452	11.7	41.7	1,080	1.51	0.015	0.20	0.10	0.25	14	5.1	0.21	2.3
LW-50	98.0	25.6	743	0.10	0.019	0.38	0.21	0.25	31	4.0	0.10	1.4
LW-500	88.2	68.9	2,896	0.23	0.015	0.25	0.40	0.25	15	4.0	0.10	1.4
LW-600	67.8	68.1	2,900	0.46	0.015	0.35	1.70	0.25	15	4.7	0.16	2.3
LW-601	8.3	62.2	327	0.68	0.015	0.20	0.10	0.25	15	5.0	0.18	2.6
LW-650	2.7	9.8	2,715	19.07	0.015	0.20	0.10	0.25	66	5.1	0.18	2.7
LW-651	9.0	66.3	493	0.93	0.015	0.20	0.73	0.25	15	4.0	0.10	1.4
LW-700	6.7	81.9	273	4.38	0.015	0.20	0.20	0.25	15	5.0	0.18	2.6
LW-701	15.4	73.1	567	0.61	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
LW-75	27.6	37.1	643	0.18	0.015	0.20	0.70	0.25	14	4.0	0.10	1.4
LW-800	49.3	69.4	2,098	0.33	0.015	0.20	0.10	0.25	15	8.9	0.63	4.8
LWS_100	28.5	82.5	1,134	0.25	0.015	0.20	1.20	0.25	15	4.2	0.12	1.6
LWS_102	20.0	4.7	1,195	0.11	0.015	0.29	0.10	0.25	80	4.0	0.10	1.4
LWS_103	8.3	2.9	513	1.67	0.015	0.25	0.10	0.25	80	5.1	0.19	2.2
LWS_POD2	31.1	82.5	1,738	0.88	0.015	0.20	0.10	0.25	15	4.1	0.11	1.6
LWS_POD3	24.5	82.5	1,112	0.10	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
LWS_POD4	37.3	15.0	850	0.32	0.015	0.25	0.10	0.25	50	4.0	0.10	1.4
LWS_POD6A	7.9	90.0	715	1.11	0.015	0.20	0.10	0.25	10	4.0	0.10	1.4
LWS_POD6B	9.1	90.0	459	1.27	0.015	0.20	0.10	0.25	10	4.6	0.15	1.8
LWS_POD6C	19.4	90.0	946	0.51	0.015	0.20	0.10	0.25	10	4.0	0.10	1.4
LWS_POD7	11.4	90.0	875	0.11	0.015	0.20	0.10	0.25	10	4.0	0.10	1.4
LWS_POD8	10.7	5.0	871	0.19	0.015	0.30	0.10	0.25	80	4.0	0.10	1.4
LWS200	92.0	63.4	13,354	0.67	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
LWS300	96.9	44.9	2,753	0.69	0.015	0.20	0.10	0.25	14	4.0	0.10	1.4
LWS301	46.6	43.4	1,072	0.13	0.015	0.20	0.10	0.25	14	4.0	0.10	1.4
LWS302	20.3	62.9	571	0.30	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
LWS303	41.0	48.8	2,172	0.69	0.021	0.29	0.45	0.25	15	4.0	0.10	1.4
LWS304	3.0	53.3	3,746	13.17	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
LWS305	12.9	50.4	6,635	5.00	0.015	0.21	0.10	0.25	71	4.0	0.10	1.4
LWS400	39.9	58.1	5,794	1.00	0.015	0.21	0.10	0.25	15	4.4	0.13	1.7
LWS500	57.3	51.0	8,314	1.00	0.021	0.29	1.30	0.25	14	4.0	0.10	1.4
M-010	17.5	52.0	10,165	2.70	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-020	38.0	50.0	15,351	3.24	0.015	0.20	0.10	0.25	100	4.1	0.11	1.6
M-030	16.0	61.6	7,811	2.00	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-040	19.8	67.6	17,212	5.82	0.015	0.29	0.10	0.25	100	4.0	0.10	1.4
M-050	13.3	71.4	11,559	5.49	0.015	0.21	0.10	0.25	100	4.0	0.10	1.4
M-060	13.5	52.8	7,365	3.77	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-070	9.5	25.6	5,329	4.16	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-071	14.1	32.8	419	0.49	0.015	0.34	0.10	0.25	18	4.0	0.10	1.4
M-072	141.0	45.3	2,244	0.20	0.021	0.39	0.25	0.25	15	4.0	0.10	1.4
M-080	16.3	31.8	7,724	4.36	0.015	0.23	0.10	0.25	100	4.0	0.10	1.4
M-100_1	12.3	66.2	2,000	0.50	0.015	0.20	0.11	0.25	15	4.0	0.10	1.4
M-100_2	71.5	67.3	3,048	0.25	0.015	0.20	0.11	0.25	15	4.0	0.10	1.4
M-110	28.4	47.1	12,064	2.06	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-1100	70.1	32.3	4,513	0.91	0.015	0.29	0.10	0.25	19	4.0	0.10	1.4
M-1120	51.5	52.8	2,095	0.45	0.015	0.24	0.10	0.25	15	4.0	0.10	1.4
M-115	20.2	47.3	579	0.94	0.015	0.27	0.49	0.25	15	4.0	0.10	1.4
M-1150	87.4	25.5	4,996	0.67	0.015	0.29	0.10	0.25	31	4.0	0.10	1.4

HU	Area (Ac)	Impervious (%)	Width (ft)	Slope (%)	Impervious n	Pervious n	Impervious IA (in)	Pervious IA (in)	Routed Area (%)	Max Inf Rate (in/hr)	Min Inf Rate (in/hr)	Soil Storage (in)
M-1160	26.3	55.8	1,968	0.46	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-120	30.2	47.9	13,496	1.68	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-1200	27.3	32.4	501	0.22	0.015	0.27	0.10	0.25	19	4.0	0.10	1.4
M-1201	24.2	33.7	897	0.67	0.015	0.36	0.10	0.25	17	4.0	0.10	1.4
M-1210	8.1	88.1	500	0.50	0.015	0.35	0.10	0.25	11	4.0	0.10	1.4
M-1215	9.4	87.9	500	0.50	0.015	0.20	0.10	0.25	11	4.0	0.10	1.4
M-1220	76.6	48.0	5,112	0.46	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-1230	32.2	41.8	2,019	1.04	0.015	0.20	0.10	0.25	14	4.0	0.10	1.4
M-1240	66.7	37.4	3,315	0.51	0.015	0.20	0.11	0.25	14	4.0	0.10	1.4
M-125	32.2	48.4	17,247	3.32	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-1250	45.0	53.6	4,490	0.76	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-1260	20.9	46.4	1,698	0.65	0.015	0.22	0.10	0.25	15	4.0	0.10	1.4
M-130	25.1	44.6	8,250	0.93	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-1300	54.8	51.4	1,661	0.15	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-1400	105.5	51.4	2,980	0.48	0.017	0.25	0.16	0.25	15	4.0	0.10	1.4
M-1401	81.3	48.0	2,668	0.37	0.016	0.24	0.13	0.25	15	4.0	0.10	1.4
M-1440	32.9	55.3	1,253	1.77	0.015	0.25	0.10	0.25	15	4.0	0.10	1.4
M-1441	7.3	5.8	4,825	3.32	0.028	0.20	0.46	0.25	78	4.0	0.10	1.4
M-1442	54.6	53.7	2,005	0.66	0.015	0.22	0.10	0.25	15	4.0	0.10	1.4
M-1450	29.2	65.0	2,127	0.50	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-1480	109.5	50.3	1,372	0.23	0.018	0.23	0.17	0.25	15	4.0	0.10	1.4
M-1481	90.5	46.5	1,683	0.29	0.018	0.25	0.19	0.25	15	4.0	0.10	1.4
M-1500	17.0	63.7	924	0.35	0.015	0.25	0.10	0.25	15	4.0	0.10	1.4
M-1600	41.0	58.7	4,588	0.75	0.015	0.37	0.20	0.25	100	4.0	0.10	1.4
M-1700	19.1	75.3	1,118	0.33	0.015	0.30	0.20	0.25	15	4.0	0.10	1.4
M-1800	40.2	75.5	1,765	0.43	0.015	0.20	0.20	0.25	15	4.0	0.10	1.4
M-1850	16.8	62.3	1,505	0.61	0.015	0.30	0.10	0.25	15	4.0	0.10	1.4
M-1900	17.2	64.7	985	0.40	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-200_1	18.9	50.0	1,400	0.35	0.017	0.22	0.16	0.25	15	4.0	0.10	1.4
M-200_2	48.8	59.6	2,500	0.40	0.017	0.22	0.16	0.25	15	4.0	0.10	1.4
M-2000	72.6	52.8	2,762	0.32	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2020	12.2	62.3	1,007	0.74	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2040	10.4	57.9	1,358	0.74	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2060	17.8	70.2	1,205	0.28	0.015	0.22	0.10	0.25	15	4.0	0.10	1.4
M-210	29.1	41.0	12,903	2.14	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-2100	22.9	58.7	1,185	0.36	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-215	19.8	34.0	9,076	2.37	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-216	19.2	31.5	8,927	2.01	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-220	20.0	57.6	10,175	3.24	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-2200	13.6	56.9	827	0.47	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2250	14.1	74.4	510	0.50	0.016	0.20	0.12	0.25	15	4.0	0.10	1.4
M-230	36.9	58.0	15,500	0.96	0.015	0.22	0.10	0.25	100	4.0	0.10	1.4
M-2350	22.1	71.2	1,203	0.26	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2400	43.9	65.7	2,288	0.19	0.015	0.20	0.53	0.25	15	4.0	0.10	1.4
M-250	34.3	91.2	4,601	1.08	0.029	0.20	0.48	0.25	9	4.0	0.10	1.4
M-2500	19.3	47.6	1,357	0.52	0.015	0.20	0.20	0.25	15	4.0	0.10	1.4
M-2600	24.9	55.6	1,221	0.24	0.015	0.20	0.80	0.25	15	4.0	0.10	1.4
M-2650	22.4	53.1	1,571	0.49	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2700	36.5	32.1	1,994	0.78	0.015	0.37	0.10	0.25	20	4.0	0.10	1.4
M-2800	47.6	48.9	1,491	0.19	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-2801	20.9	90.0	700	0.50	0.016	0.20	0.13	0.25	10	4.0	0.10	1.4
M-2802	8.8	73.2	549	0.21	0.025	0.20	0.36	0.25	15	4.0	0.10	1.4
M-2900	93.0	53.7	5,044	0.53	0.015	0.21	0.10	0.25	15	4.0	0.10	1.4
M-300	75.8	60.2	3,427	0.22	0.017	0.20	0.14	0.25	15	4.0	0.10	1.4
M-3000	11.8	64.3	914	0.51	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-310	19.5	42.9	9,918	2.45	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
M-3100	13.7	54.0	1,044	0.48	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-315	32.8	34.7	4,976	0.96	0.022	0.29	0.28	0.25	100	4.0	0.10	1.4
M-320	30.3	66.1	11,786	1.98	0.017	0.20	0.16	0.25	100	4.0	0.10	1.4
M-3200	34.7	68.5	1,507	0.30	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4

HU	Area (Ac)	Impervious (%)	Width (ft)	Slope (%)	Impervious n	Pervious n	Impervious IA (in)	Pervious IA (in)	Routed Area (%)	Max Inf Rate (in/hr)	Min Inf Rate (in/hr)	Soil Storage (in)
M-330	15.8	62.1	12,670	5.02	0.015	0.24	0.10	0.25	100	4.0	0.10	1.4
M-335	13.3	74.7	1,766	1.02	0.021	0.20	0.27	0.25	100	4.0	0.10	1.4
M-340	2.5	62.4	1,938	1.08	0.015	0.23	0.10	0.25	100	4.0	0.10	1.4
M-3400	75.4	28.6	3,284	1.19	0.015	0.24	0.10	0.25	26	6.1	0.26	2.9
M-3410	102.1	39.7	8,891	1.00	0.015	0.30	0.10	0.25	14	9.0	0.50	5.0
M-3450	48.9	31.8	1,497	0.54	0.015	0.26	0.10	0.25	20	4.0	0.10	1.4
M-3500	25.9	47.1	1,503	0.41	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-3550	26.3	22.5	4,287	1.06	0.015	0.20	0.10	0.25	37	4.0	0.10	1.4
M-3600	22.9	64.1	1,661	0.33	0.019	0.20	0.22	0.25	15	4.0	0.10	1.4
M-3650	3.6	56.3	591	1.24	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-3700a	13.4	21.7	1,600	0.73	0.019	0.39	0.96	0.25	22	4.0	0.10	1.4
M-3700b	13.9	39.2	1,200	0.73	0.019	0.39	0.40	0.25	22	4.0	0.10	1.4
M-3740	22.3	34.0	1,011	0.36	0.015	0.30	0.10	0.25	16	4.0	0.10	1.4
M-3780	16.1	68.1	1,301	0.38	0.017	0.20	0.15	0.25	15	4.0	0.10	1.4
M-3790	12.7	46.0	1,319	0.42	0.019	0.32	0.19	0.25	15	4.0	0.10	1.4
M-3800	20.2	58.9	1,352	0.71	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-3900	18.5	58.0	1,133	0.33	0.015	0.20	0.10	0.25	15	5.2	0.19	2.8
M-4000	28.7	47.3	1,239	0.20	0.015	0.23	0.10	0.25	15	4.0	0.10	1.4
M-410	13.9	60.3	9,920	2.75	0.016	0.33	0.13	0.25	100	4.0	0.10	1.4
M-4100	22.8	57.4	1,547	0.67	0.015	0.20	0.10	0.25	15	5.7	0.23	3.4
M-415	37.7	69.9	7,080	2.05	0.018	0.20	0.18	0.25	100	4.0	0.10	1.4
M-420	9.1	36.1	408	0.79	0.015	0.25	0.10	0.25	14	4.0	0.10	1.4
M-4200	41.7	44.6	2,486	0.48	0.015	0.22	0.10	0.25	14	4.0	0.10	1.4
M-4250	29.3	14.7	4,072	1.26	0.015	0.20	0.10	0.25	51	4.0	0.10	1.4
M-4300	52.5	37.3	1,126	0.17	0.015	0.29	0.11	0.25	14	4.0	0.10	1.4
M-4340	11.0	50.4	426	0.31	0.015	0.37	0.10	0.25	15	4.0	0.10	1.4
M-4380_1	18.7	42.6	1,000	0.20	0.015	0.26	0.10	0.25	14	4.0	0.10	1.4
M-4380_2	3.1	32.0	600	0.20	0.015	0.26	0.10	0.25	14	4.0	0.10	1.4
M-4380_3	3.6	57.9	770	0.20	0.015	0.26	0.10	0.25	14	4.0	0.10	1.4
M-4380_4	2.0	56.2	300	0.20	0.015	0.26	0.10	0.25	14	4.0	0.10	1.4
M-4500	51.8	55.3	3,592	0.54	0.015	0.21	0.11	0.25	15	4.0	0.10	1.4
M-4530	33.6	59.0	2,164	0.41	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-4550	13.9	56.4	1,343	0.72	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-4580	8.5	61.2	640	0.67	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-4700	37.9	57.8	1,757	0.24	0.015	0.23	0.10	0.25	15	4.0	0.10	1.4
M-4900	32.0	57.5	1,579	0.40	0.015	0.21	0.10	0.25	15	4.0	0.10	1.4
M-4950	7.8	33.6	526	0.44	0.015	0.32	0.10	0.25	17	4.0	0.10	1.4
M-500	40.2	55.3	4,334	0.65	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-5000	54.2	57.7	2,394	0.24	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-5200	52.8	65.1	1,409	0.16	0.015	0.22	0.10	0.25	15	4.0	0.10	1.4
M-5300	18.2	71.1	629	0.16	0.015	0.20	0.29	0.25	15	4.0	0.10	1.4
M-5350	71.2	41.8	2,737	0.34	0.015	0.33	0.39	0.25	14	4.0	0.10	1.4
M-5400	38.5	46.3	1,032	0.25	0.017	0.38	0.16	0.25	15	4.0	0.10	1.4
M-550	36.6	46.0	1,792	0.33	0.015	0.35	0.10	0.25	15	4.0	0.10	1.4
M-5500	16.9	56.4	1,158	0.63	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-5600	45.2	72.4	2,941	0.67	0.015	0.20	0.29	0.25	15	4.0	0.10	1.4
M-600	9.1	47.7	658	0.69	0.015	0.23	0.10	0.25	15	4.0	0.10	1.4
M-700	76.1	50.6	3,545	0.31	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-750	157.3	46.7	6,420	0.41	0.015	0.22	0.10	0.25	15	4.0	0.10	1.4
M-800	14.6	58.8	893	0.51	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-900	66.1	57.4	3,403	0.18	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
M-950	96.5	34.6	7,733	2.19	0.015	0.26	0.10	0.25	15	4.0	0.10	1.4
NPB-010	13.1	54.7	8,178	4.23	0.015	0.20	0.10	0.25	100	4.0	0.10	1.4
NPB-020	22.0	37.9	3,309	3.40	0.015	0.20	0.10	0.25	14	4.0	0.10	1.4
NPB-100	115.4	61.9	2,992	0.16	0.017	0.39	0.15	0.25	15	4.0	0.10	1.4
NPB-300	59.5	67.0	1,744	0.20	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
NPB-400	113.9	53.6	4,170	0.30	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
NPB-450	177.2	56.6	5,741	0.27	0.015	0.20	0.10	0.25	15	4.0	0.10	1.4
NPB-600	41.4	40.3	1,522	0.19	0.015	0.34	0.20	0.25	14	4.0	0.10	1.4
NPB-700	148.9	40.2	7,991	0.60	0.015	0.20	0.10	0.25	14	4.0	0.10	1.4

HU	Area (Ac)	Impervious (%)	Width (ft)	Slope (%)	Impervious n	Pervious n	Impervious IA (in)	Pervious IA (in)	Routed Area (%)	Max Inf Rate (in/hr)	Min Inf Rate (in/hr)	Soil Storage (in)
NPB-800	13.1	19.8	630	0.35	0.028	0.40	0.45	0.25	41	4.0	0.10	1.4
NPB-801	10.1	0.8	1,006	1.70	0.03	0.40	0.50	0.25	80	4.0	0.10	1.4
NPB-802	11.0	35.1	601	0.83	0.028	0.40	0.45	0.25	14	4.0	0.10	1.4
NPB-803	54.9	46.8	2,400	0.42	0.03	0.40	0.49	0.25	15	4.0	0.10	1.4
NPB-900	59.4	72.5	1,519	2.50	0.015	0.26	0.11	0.25	15	4.0	0.10	1.4
OD-100	33.4	35.0	3,323	3.81	0.026	0.40	0.38	0.25	14	4.0	0.10	1.4
OD-101	20.7	78.1	22,430	19.49	0.015	0.40	0.11	0.25	15	4.0	0.10	1.4
RPNA	784.8	42.9	6,214	0.10	0.026	0.39	0.40	0.25	14	4.0	0.10	1.4
SB-301	18.8	95.0	680	0.50	0.015	0.20	2.60	0.25	5	4.0	0.10	1.4
SB-302	24.3	70.7	880	0.50	0.015	0.32	2.60	0.25	15	4.0	0.10	1.4
SB-303	17.2	77.7	413	0.73	0.015	0.35	1.30	0.25	15	4.1	0.10	1.4
SB-400	12.8	61.5	4,327	5.26	0.015	0.24	0.10	0.25	15	4.2	0.12	1.7

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Boundary Condition
C51A_1	Outfall	906,297	853,874	-0.76	S-155_HW
C51A_2	Outfall	906,653	853,870	-0.76	S-155_HW
C51B	Outfall	910,698	853,772	-0.77	S-155_HW
C51C	Outfall	912,668	853,736	-0.78	S-155_HW
C51D	Outfall	917,822	853,604	-0.79	S-155_TW
C51E	Outfall	917,610	853,605	-0.79	S-155_TW
C51F	Outfall	915,452	853,674	-0.78	S-155_HW
C51G	Outfall	915,125	853,674	-0.78	S-155_HW
C51H	Outfall	911,368	853,831	-0.78	S-155_HW
C51J	Outfall	914,524	853,693	-0.78	S-155_HW
C51K	Outfall	911,895	853,737	-0.78	S-155_HW
C51L	Outfall	911,943	853,734	-0.78	S-155_HW
C51M	Outfall	902,103	854,025	-0.78	S-155_HW
NPB801	Outfall	915,563	868,052	0.00	Free
OD101	Outfall	913,112	869,562	0.00	Free
OD110-4	Outfall	914,943	868,404	0.00	Free

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
C51-300-1	Junction	910,948	854,902	0.00	12.15
C51-300S	Storage	910,828	854,908	0.00	12.15
ITID_LowM1	Storage	904,393	874,832	0.00	13.55
ITID_UpM1	Storage	904,421	878,780	0.00	13.55
LW0050	Junction	916,676	855,161	0.00	8.03
LW0100	Junction	916,896	855,160	0.00	8.03
LW0150	Storage	917,413	855,736	0.00	8.03
LW0200	Junction	917,808	855,157	0.00	8.03
LW0300	Storage	917,965	855,155	0.00	8.03
LW0350	Storage	918,312	854,955	0.00	8.03
LW0370	Junction	917,805	854,805	0.00	8.03
LW0380	Junction	917,803	854,678	0.00	8.03
LW0400	Junction	917,818	853,965	0.00	8.03
LW104-1	Junction	911,891	853,620	0.00	10.62
LW201	Storage	920,755	857,247	0.00	8.03
LW2970	Junction	916,960	856,945	0.00	8.03
LW2975	Junction	916,954	856,847	0.00	8.03
LW450	Junction	914,153	857,642	0.00	9.45
LW450S	Storage	914,299	856,973	0.00	10.65
LW451	Junction	914,202	857,361	0.00	9.45
LW-451S	Storage	916,320	855,700	0.00	10.60
LW500S	Storage	913,280	855,888	0.00	10.52
LW501	Junction	913,011	855,891	0.00	9.45
LW505	Junction	912,882	855,900	0.00	9.45
LW510	Junction	912,802	854,000	0.00	9.45
LW510-1	Junction	912,848	855,094	0.00	9.45

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
LW510-2	Junction	913,064	855,091	0.00	9.45
LW510-3	Junction	913,167	855,089	0.00	9.45
LW510-4	Junction	913,439	855,079	0.00	9.45
LW510-5	Junction	913,510	855,091	0.00	9.45
LW510-7	Junction	914,063	855,067	0.00	9.45
LW510-8	Junction	914,223	855,148	0.00	9.45
LW-601S	Storage	916,770	855,064	0.00	11.60
LW-651	Junction	917,708	855,029	0.00	8.03
LW-651S	Storage	917,613	855,016	0.00	8.03
LW-701S	Storage	917,612	854,639	0.00	8.03
LW-701S-2	Junction	917,716	854,645	0.00	8.03
LW8900	Storage	917,449	857,954	0.00	9.45
LW9000	Junction	917,264	857,954	0.00	9.45
LW9100	Storage	916,977	857,957	0.00	9.45
LW9200	Junction	916,965	857,749	0.00	9.45
LW9210	Junction	916,562	857,567	0.00	9.45
LW9215	Junction	916,963	857,556	0.00	9.45
LW9220	Junction	916,961	857,517	0.00	8.03
LW9225	Storage	919,501	857,385	0.00	10.55
LW9226	Junction	919,507	857,201	0.00	8.03
LW9240	Storage	918,434	857,170	0.00	8.03
LW9250	Junction	916,965	857,327	0.00	8.03
LW9300	Junction	916,941	856,651	0.00	8.03
LW9400	Junction	916,935	856,463	0.00	8.03
LW9401	Junction	916,662	856,451	0.00	12.00
LW9500	Junction	916,917	855,905	0.00	8.03
LW9600	Junction	916,912	855,812	0.00	8.03
LW9650	Junction	916,899	855,345	0.00	8.03
LW9700	Storage	914,922	854,760	0.00	10.91
LW9750	Junction	914,916	855,017	0.00	9.45
LW9800	Junction	914,905	855,160	0.00	9.45
LW9900	Junction	916,495	855,161	0.00	9.45
LW9901	Junction	916,486	855,298	0.00	9.45
LWS_100S	Storage	911,893	853,210	0.00	10.62
LWS_102S	Storage	913,731	851,751	0.00	14.00
LWS_103S	Storage	914,594	853,419	0.00	14.00
LWS_POD2S	Storage	912,090	852,084	0.00	14.00
LWS_POD3S	Storage	914,362	852,826	0.00	14.00
LWS_POD4S	Storage	912,774	850,710	0.00	14.00
LWS_POD6AS	Storage	912,687	853,271	0.00	14.00
LWS_POD6BS	Storage	913,621	853,441	0.00	14.00
LWS_POD6CS	Storage	913,591	852,709	0.00	14.00
LWS_POD7S	Storage	913,121	851,841	0.00	14.00
LWS_POD8S	Storage	913,575	851,036	0.00	14.00
LWS110	Junction	913,896	850,691	0.00	10.30

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
LWS200S	Storage	913,584	850,196	0.00	11.55
LWS300-2S	Storage	915,230	851,505	0.00	12.00
LWS300-4	Junction	915,239	852,332	0.00	10.30
LWS300S	Storage	915,112	851,740	0.00	11.55
LWS302	Junction	915,339	851,804	0.00	12.50
LWS302S	Storage	915,375	851,728	0.00	12.50
LWS303-1	Junction	916,321	848,393	0.00	10.30
LWS303-2	Junction	913,987	849,971	0.00	10.30
LWS303-3	Junction	913,994	850,092	0.00	10.30
LWS303-5	Junction	916,049	848,454	0.00	10.87
LWS303S	Storage	915,980	848,608	0.00	10.87
LWS304S	Storage	915,272	852,196	0.00	12.00
LWS305-1	Junction	916,385	848,371	0.00	15.80
LWS305-10	Junction	916,471	851,789	0.00	15.80
LWS305-11	Junction	916,468	851,845	0.00	15.80
LWS305-12	Junction	916,483	852,304	0.00	15.80
LWS305-13	Junction	916,470	851,177	0.00	15.80
LWS305-2	Junction	916,386	848,693	0.00	15.80
LWS305-3	Junction	916,385	848,771	0.00	15.80
LWS305-4	Junction	916,396	849,306	0.00	15.80
LWS305-5	Junction	916,398	849,369	0.00	15.80
LWS305-6	Junction	916,418	849,896	0.00	15.80
LWS305-7	Junction	916,422	849,986	0.00	15.80
LWS305-8	Junction	916,427	850,442	0.00	15.80
LWS305-9	Junction	916,433	850,569	0.00	15.80
LWS310	Junction	915,121	852,132	0.00	10.30
LWS320	Junction	915,123	853,115	0.00	10.30
LWS330	Junction	915,123	853,012	0.00	10.30
LWS340	Junction	915,121	852,342	0.00	10.30
LWS350	Junction	913,995	850,691	0.00	10.30
LWS400-1	Junction	916,487	852,473	0.00	15.80
LWS400S	Storage	915,461	853,339	0.00	11.05
LWS410	Junction	915,452	853,565	0.00	10.30
LWS500S	Storage	916,724	851,702	0.00	14.55
LWS520	Junction	917,606	853,482	0.00	14.55
OD100	Storage	912,751	868,906	0.00	17.02
OD100-1	Junction	911,976	868,589	0.00	12.05
OD101-2	Junction	913,065	869,261	0.00	17.02
OD110	Junction	916,969	864,494	0.00	17.02
OD110-1	Junction	912,108	869,604	0.00	17.02
OD110-2	Junction	914,831	868,192	0.00	17.02
OD110-3	Junction	914,911	868,344	0.00	17.02
RP071S	Storage	905,294	873,657	0.00	12.05
RP072S	Junction	905,268	873,769	0.00	12.05
RP1000	Storage	907,766	864,711	0.00	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP1050	Junction	906,581	864,745	-0.80	12.05
RP1100	Junction	906,512	863,261	-1.00	12.05
RP1120S	Storage	908,663	865,774	0.00	12.05
RP1160S	Storage	910,197	866,319	0.00	12.05
RP1200	Junction	906,497	863,080	-1.10	12.05
RP1200S	Storage	911,526	864,799	0.00	12.55
RP1201S	Storage	911,763	865,027	0.00	12.05
RP1205S	Junction	911,518	864,972	0.00	12.05
RP1210S	Storage	911,858	864,139	0.00	12.55
RP1211S	Junction	911,624	864,104	0.00	12.55
RP1212S	Junction	911,466	863,975	0.00	12.55
RP1213S	Junction	911,295	863,871	0.00	12.55
RP1214S	Junction	911,279	863,887	0.00	12.55
RP1215S	Storage	909,694	863,185	0.00	12.55
RP1216S	Junction	911,140	863,808	0.00	12.55
RP1217S	Junction	911,095	863,770	0.00	12.55
RP1218S	Junction	911,108	863,754	0.00	12.55
RP1219S	Junction	911,442	863,999	0.00	12.55
RP1220S	Storage	911,690	866,566	0.00	12.05
RP1230S	Storage	912,931	867,985	0.00	12.05
RP1240S	Storage	911,612	869,232	0.00	12.05
RP1250S	Storage	910,549	868,771	0.00	12.05
RP1260S	Storage	910,545	865,184	0.00	12.05
RP1300	Junction	906,412	861,138	-1.30	12.05
RP1300S	Storage	907,063	868,184	0.00	12.05
RP1400	Junction	906,400	860,841	-1.40	12.05
RP1400S	Storage	905,107	865,182	0.00	12.55
RP1401S	Storage	903,571	865,128	0.00	12.55
RP1440S	Storage	905,990	864,607	0.00	12.55
RP1441	Junction	906,376	864,591	0.00	12.05
RP1441S	Storage	904,130	863,453	0.00	12.55
RP1441S-2	Junction	904,269	863,436	0.00	12.55
RP1441S-3	Junction	904,418	863,383	0.00	12.55
RP1442S	Storage	905,518	864,334	0.00	12.55
RP1480S	Storage	905,696	868,048	0.00	12.55
RP1480S_2	Storage	905,169	867,875	0.00	12.55
RP1480S_3	Junction	905,157	867,530	0.00	12.55
RP1481	Junction	906,384	866,708	0.00	12.05
RP150	Storage	902,397	873,162	0.00	12.05
RP1500	Junction	906,403	860,707	-1.50	12.05
RP1500S	Storage	907,636	865,869	0.00	12.05
RP155	Junction	902,375	873,525	0.00	12.05
RP1600	Junction	906,405	860,443	-1.60	12.05
RP1650	Storage	906,369	859,318	-1.70	12.05
RP1700	Junction	906,329	857,845	-1.80	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP1700S	Storage	907,210	863,499	0.00	12.05
RP1800	Junction	906,282	855,512	0.00	12.05
RP1800S	Storage	908,721	863,616	0.00	12.05
RP1900	Storage	906,292	855,102	0.00	12.05
RP1900S	Storage	910,512	863,844	0.00	12.05
RP1925	Junction	906,650	854,315	0.00	10.30
RP200	Junction	901,507	873,701	0.00	12.05
RP2000	Junction	906,287	854,728	0.00	12.05
RP2000S	Storage	902,632	861,846	0.00	12.05
RP2020S	Storage	903,695	861,126	0.00	12.05
RP2040S	Storage	902,671	858,986	0.00	12.05
RP2060S	Storage	902,648	857,094	0.00	12.05
RP2100S	Storage	904,967	862,470	0.00	12.05
RP2200S	Storage	906,097	862,746	0.00	12.05
RP2250S	Storage	905,749	863,152	0.00	12.05
RP235	Storage	905,388	872,225	0.00	12.05
RP2350S	Storage	905,973	861,512	0.00	12.05
RP235-3	Junction	906,601	871,830	0.00	12.05
RP240	Junction	904,212	872,105	0.00	12.05
RP2400	Junction	906,287	854,627	-3.45	10.30
RP2400S	Storage	907,385	862,650	0.00	12.05
RP250	Storage	902,494	871,830	0.00	12.07
RP2500	Junction	906,295	854,156	-0.67	10.30
RP2500S	Storage	908,553	862,248	0.00	12.05
RP255	Junction	901,519	873,467	0.00	17.55
RP255-1	Junction	901,514	873,605	0.00	12.05
RP260	Junction	906,071	873,937	0.00	12.05
RP2600S	Storage	910,312	862,944	0.00	12.05
RP2650S	Storage	912,147	862,437	0.00	12.05
RP270	Junction	906,273	873,955	0.00	12.05
RP2700	Storage	902,738	870,942	0.00	12.05
RP2700S	Storage	912,587	863,247	0.00	12.05
RP2701	Junction	903,775	870,878	0.00	12.05
RP2702	Junction	903,976	870,943	0.00	12.05
RP2703	Storage	904,176	870,921	0.00	12.05
RP2800S	Storage	913,248	863,267	0.00	12.05
RP2801	Junction	914,743	863,185	0.00	12.05
RP2801S	Storage	914,454	864,251	0.00	15.55
RP2802	Junction	914,374	863,180	0.00	12.05
RP2802S	Storage	914,740	864,186	0.00	15.55
RP2803	Junction	914,458	864,213	0.00	11.88
RP2805	Junction	913,174	863,285	0.00	12.05
RP2900	Storage	906,311	870,143	0.00	12.05
RP2900S	Storage	912,944	861,758	0.00	12.05
RP2903	Storage	904,910	870,787	0.00	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP3000	Junction	904,212	862,227	0.00	12.05
RP3000S	Storage	904,225	861,199	0.00	12.05
RP3002	Junction	903,629	861,663	0.00	12.05
RP3005	Storage	903,271	860,299	0.00	12.05
RP3010	Junction	902,966	859,655	0.00	12.05
RP3100	Junction	904,400	862,185	0.00	12.05
RP3100S	Storage	905,198	861,539	0.00	12.05
RP3200	Storage	904,699	860,660	0.00	12.05
RP3200S	Storage	907,238	861,445	0.00	12.05
RP3202	Junction	903,502	860,187	0.00	12.05
RP3205	Junction	903,941	859,907	0.00	12.05
RP3210	Junction	903,507	859,140	0.00	12.05
RP325	Junction	902,900	859,524	0.00	12.05
RP3300	Junction	904,856	861,101	0.00	12.05
RP330S	Storage	902,332	857,379	0.00	12.05
RP3350	Junction	905,243	861,089	0.00	12.05
RP335S	Storage	902,998	857,337	0.00	12.05
RP338	Junction	902,316	856,898	0.00	12.05
RP3400	Storage	904,439	855,752	0.00	12.05
RP3400S	Storage	908,988	860,029	0.00	12.05
RP340S	Storage	902,316	856,797	0.00	12.05
RP3450	Junction	904,438	855,597	0.00	12.05
RP3450S	Storage	909,891	861,680	0.00	12.05
RP3500	Storage	904,497	855,137	0.00	12.05
RP3500S	Storage	910,764	862,117	0.00	12.05
RP3550	Storage	902,229	855,029	0.00	12.05
RP3550S	Storage	911,468	861,139	0.00	12.05
RP3600	Storage	902,788	855,342	0.00	12.05
RP3600S	Storage	903,159	858,995	0.00	12.05
RP3650S	Storage	904,287	860,845	0.00	12.05
RP3700	Storage	903,460	855,345	0.00	12.05
RP3700S	Storage	904,776	859,429	0.00	12.05
RP3700S_1	Storage	906,126	859,129	0.00	12.05
RP3700S_10	Storage	905,206	859,231	0.00	12.05
RP3700S_13	Junction	904,953	859,258	0.00	12.05
RP3700S_3	Junction	905,952	859,134	0.00	12.05
RP3700S_4	Junction	905,931	859,257	0.00	12.05
RP3700S_5	Junction	905,691	859,262	0.00	12.05
RP3700S_8	Junction	905,472	859,223	0.00	12.05
RP3700S_9	Junction	905,419	859,224	0.00	12.05
RP3740S	Storage	906,089	859,839	0.00	12.05
RP3780S	Storage	905,587	860,510	0.00	12.05
RP3790S	Storage	904,579	860,068	0.00	12.05
RP3790S_1	Junction	904,773	860,353	0.00	12.05
RP3790S_2	Junction	904,557	860,001	0.00	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP3790S_3	Junction	904,538	859,936	0.00	12.05
RP3790S_5	Junction	904,501	859,805	0.00	12.05
RP3790S_8	Junction	904,463	859,644	0.00	12.05
RP3790S_9	Junction	904,462	859,609	0.00	12.05
RP3800S	Storage	907,795	860,767	0.00	12.05
RP3900	Junction	905,296	855,137	0.00	12.05
RP400	Junction	906,882	873,985	0.00	12.05
RP4000	Junction	905,759	855,514	0.00	12.05
RP4000S	Storage	906,958	858,220	0.00	12.05
RP4100	Junction	908,312	872,293	0.00	12.05
RP4100S	Storage	906,741	859,904	0.00	12.05
RP4200	Junction	908,084	872,341	0.00	12.05
RP4200S	Storage	910,785	858,395	0.00	12.05
RP4250S	Storage	911,448	858,773	0.00	12.05
RP4300	Junction	911,077	872,023	-2.40	12.05
RP4300S	Storage	903,637	858,025	0.00	12.05
RP4340S	Storage	902,920	856,915	0.00	12.05
RP4380S	Storage	905,297	858,271	0.00	12.05
RP4380S_1	Junction	906,109	858,823	0.00	12.05
RP4380S_2	Storage	906,085	858,033	0.00	12.05
RP4380S_3	Junction	905,796	858,116	0.00	12.05
RP4380S_4	Storage	906,072	858,458	0.00	12.05
RP4400	Junction	911,086	870,533	0.00	12.05
RP4500	Junction	911,064	870,285	0.00	12.05
RP4500S	Storage	904,074	856,089	0.00	12.05
RP4530S	Storage	905,457	856,073	0.00	12.05
RP4550	Storage	911,032	869,295	0.00	12.05
RP4550S	Storage	905,317	855,493	0.00	12.05
RP4580S	Storage	903,812	855,438	0.00	12.05
RP4600	Junction	910,988	867,821	0.00	12.05
RP4700	Storage	910,891	866,336	0.00	12.05
RP4700S	Storage	908,512	856,232	0.00	12.05
RP4800	Junction	910,900	865,298	0.00	12.05
RP4900	Junction	910,557	864,215	0.00	12.05
RP4950	Junction	910,404	864,038	0.00	12.05
RP4950S	Storage	903,475	856,092	0.00	12.05
RP4970	Storage	909,608	864,289	0.00	12.05
RP500	Junction	906,869	872,345	0.00	12.05
RP5000	Storage	908,374	864,681	0.00	12.05
RP5000S	Storage	906,905	856,299	0.00	12.05
RP500S	Storage	907,268	872,871	0.00	12.05
RP5200S	Storage	907,610	855,778	0.00	12.05
RP5300	Storage	907,061	865,165	0.00	12.05
RP5301	Junction	907,008	865,119	0.00	12.05
RP5350S	Storage	901,686	855,236	0.00	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP5350S-1	Junction	902,128	854,839	0.00	10.30
RP5350S-2	Junction	901,796	855,174	0.00	10.30
RP5400	Storage	907,561	866,799	0.00	12.05
RP5400S	Storage	905,352	854,950	0.00	12.05
RP5500	Storage	907,470	869,923	0.00	12.05
RP5500S	Storage	905,971	854,733	0.00	12.05
RP5510	Storage	910,192	869,109	0.00	12.05
RP5515	Junction	909,317	867,603	0.00	12.05
RP5520	Storage	909,845	866,404	0.00	12.05
RP5525	Storage	909,720	865,389	0.00	12.05
RP5526	Storage	909,496	865,143	0.00	12.05
RP5527	Junction	909,195	865,039	0.00	12.05
RP5600	Junction	911,488	867,817	0.00	12.05
RP5700	Storage	911,682	867,813	0.00	12.05
RP5725	Junction	912,784	867,656	0.00	12.05
RP5750	Junction	912,744	866,504	0.00	12.05
RP5775	Junction	912,408	865,246	0.00	12.05
RP5800	Junction	911,514	865,287	0.00	12.05
RP5900	Junction	911,396	865,283	0.00	12.05
RP600	Junction	906,853	871,417	0.00	12.05
RP6000	Storage	912,584	861,801	0.00	12.05
RP600S	Storage	908,118	872,011	0.00	12.05
RP6200	Junction	912,587	861,983	0.00	12.05
RP6250	Junction	912,574	862,990	0.00	12.05
RP6300	Junction	911,219	862,745	0.00	12.05
RP6400	Junction	910,416	862,610	0.00	12.05
RP6500	Junction	910,244	862,561	0.00	12.05
RP6550	Junction	908,828	861,960	0.00	12.05
RP6600	Junction	908,241	860,452	0.00	12.05
RP6700	Junction	907,792	860,448	0.00	12.05
RP6800	Junction	907,633	860,448	0.00	12.05
RP6900	Storage	907,393	859,991	0.00	12.05
RP700	Junction	906,834	871,060	0.00	12.05
RP7000	Storage	909,708	858,807	0.00	12.05
RP700S	Storage	910,329	871,347	0.00	12.05
RP7100	Junction	911,204	860,782	0.00	12.05
RP7200	Junction	911,192	860,541	0.00	12.05
RP7250	Junction	911,149	859,228	0.00	12.05
RP7300	Junction	911,111	857,812	0.00	12.05
RP7350	Junction	908,833	857,847	0.00	12.05
RP7355	Storage	908,844	856,161	0.00	12.05
RP7400	Junction	907,703	857,856	0.00	12.05
RP7500	Junction	907,574	857,856	0.00	12.05
RP750S	Storage	909,857	872,551	0.00	12.05
RP7600	Junction	914,446	863,075	0.00	11.88

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
RP7700	Junction	914,399	860,999	0.00	11.88
RP7750	Junction	914,591	860,999	0.00	11.88
RP7800	Storage	914,640	860,793	0.00	11.88
RP7825	Junction	914,388	860,257	0.00	11.88
RP7850	Junction	914,380	860,001	0.00	11.88
RP7900	Junction	914,352	859,150	0.00	11.88
RP800	Junction	906,821	870,105	0.00	12.05
RP8000	Junction	914,101	859,150	0.00	11.88
RP800-2	Storage	915,288	866,659	0.00	15.55
RP800S	Storage	907,140	870,981	0.00	12.05
RP801	Storage	915,405	867,702	0.00	14.45
RP8010	Junction	912,669	853,840	0.00	10.30
RP802	Storage	914,698	866,717	0.00	15.55
RP8025	Storage	912,868	859,153	0.00	11.88
RP8030	Junction	912,800	857,650	0.00	11.88
RP8050	Junction	912,746	856,285	-0.40	11.88
RP8100	Junction	912,666	854,006	-1.00	11.88
RP825	Junction	906,745	868,326	-0.10	12.05
RP8404	Junction	910,897	856,617	0.00	10.30
RP8406	Junction	911,055	856,089	0.00	10.30
RP8408	Junction	911,046	855,712	0.00	10.30
RP8410	Junction	911,011	854,895	0.00	10.30
RP8415	Junction	911,004	854,363	0.00	10.30
RP8420	Junction	910,698	853,970	0.00	10.30
RP850	Junction	906,748	868,191	-0.20	12.05
RP900	Junction	906,681	866,407	-0.50	12.05
RPC51100	Storage	910,815	856,121	0.00	10.30
RPC51200	Storage	911,346	854,897	0.00	10.30
RPC51400	Storage	909,930	856,945	0.00	10.30
RPC51500	Storage	911,886	855,710	0.00	10.30
RPN100	Storage	915,744	862,521	0.00	11.88
RPN110	Junction	914,892	862,877	0.00	11.88
RPN450	Storage	914,283	858,411	0.00	11.88
RPN600S	Storage	915,454	864,048	0.00	15.55
RPN650	Junction	914,723	864,527	0.00	15.55
RPN660	Junction	914,624	864,589	0.00	15.55
RPN700	Storage	914,404	865,220	0.00	15.55
RPN700_1	Junction	914,593	864,495	0.00	15.55
RPN700_2	Junction	914,589	864,257	0.00	15.55
RPN800	Storage	915,809	866,211	0.00	15.55
RPN900	Storage	915,297	865,478	0.00	15.55
RPNA-100	Storage	901,505	872,792	0.00	12.07
RPNA-100-1	Junction	901,507	872,865	0.00	17.55
SB-301S	Storage	905,214	854,174	0.00	16.41
SB-301S-1	Junction	905,316	854,213	0.00	12.05

Node	Type	X (FL SP East - ft)	Y (FL SP East - ft)	Invert (ft-NAVD)	Init. Elv. (ft-NAVD)
SB-301S-2	Junction	905,317	854,243	0.00	12.05
SB-302S	Storage	911,236	854,161	0.00	12.07
SB-302S-2	Junction	911,372	854,096	0.00	10.30
SB-303S	Storage	914,483	853,972	0.00	14.38
SB-303S-2	Junction	914,486	853,947	0.00	12.17
SB-303S-3	Junction	914,489	853,931	0.00	10.30
SyphonDS	Junction	904,428	878,485	0.00	13.55
SyphonUS	Junction	904,425	878,675	0.00	13.55

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP3200	RP3300	RP3200	8.32	8.22	128	ARCH		0.023	91	143	1	0.5	0.5
C51-300S	C51-300-1	C51-300S	6.27	6.25	60	CIRCULAR		0.013	24	0	1	0.5	0.3
LW0050	LW0100	LW0050	7.08	5.58	254	CIRCULAR		0.013	60	0	1	0.5	0.5
LW0150	LW0300	LW0150	7.05	2.05	146	CIRCULAR		0.013	72	0	1	0.5	0.5
LW0201	LW0300	LW0200	6.41	6.40	105	CIRCULAR		0.013	60	0	1	0.5	0.5
LW0370	LW0380	LW0370	3.72	3.77	97	CIRCULAR		0.013	60	0	2	0.5	0.5
LW0400	C51D	LW0400	3.38	3.02	210	CIRCULAR		0.013	60	0	2	0.5	0.5
LW104-1	LW104-1	LWS_100S	9.55	5.07	305	CIRCULAR		0.013	30	0	1	0.5	0.3
LW201	LW9240	LW201	7.90	7.80	80	CIRCULAR		0.013	30	0	1	0.5	0.3
LW2970	LW2975	LW2970	5.03	5.02	72	CIRCULAR		0.013	72	0	1	0.5	0.3
LW451	LW450	LW451	8.24	8.11	71	CIRCULAR		0.013	48	0	1	1.0	0.5
LW501	LW505	LW501	9.55	9.52	45	CIRCULAR		0.013	18	0	2	1.0	0.3
LW510-2	LW510-3	LW510-2	7.10	7.00	100	CIRCULAR		0.013	72	0	1	0.5	0.3
LW510-4	LW510-5	LW510-4	7.27	7.26	71	CIRCULAR		0.013	72	0	1	0.5	0.5
LW510-7	LW510-8	LW510-7	9.87	9.65	174	CIRCULAR		0.013	72	0	1	0.5	0.5
LW-601S	LW9650	LW-601S	11.60	11.50	82	CIRCULAR		0.013	24	0	1	0.5	0.3
LW-651	LW0200	LW-651	6.95	6.90	56	CIRCULAR		0.013	24	0	1	0.5	0.2
LW-701S-2	LW0380	LW-701S-2	6.04	5.99	56	CIRCULAR		0.013	15	0	1	0.5	0.3
LW8900	LW9000	LW8900	6.52	6.11	48	CIRCULAR		0.023	60	0	1	0.5	0.7
LW9100	LW9200	LW9100	5.21	4.92	167	CIRCULAR		0.013	72	0	1	0.5	0.5
LW9210	LW9215	LW9210	10.54	9.55	246	CIRCULAR		0.013	60	0	1	1.0	0.5
LW9220	LW9250	LW9220	5.05	5.04	72	CIRCULAR		0.013	72	0	1	0.5	0.5
LW9225	LW9240	LW9226	7.40	7.22	55	CIRCULAR		0.013	24	0	1	0.5	0.5
LW9240	LW9250	LW9240	8.55	4.85	1,345	CIRCULAR		0.013	48	0	2	1.0	0.5
LW9300	LW9400	LW9300	5.34	5.33	142	CIRCULAR		0.013	72	0	1	0.5	0.5
LW9401	LW9400	LW9401	12.00	11.50	192	CIRCULAR		0.013	60	0	1	0.5	0.3
LW9500	LW9600	LW9500	4.00	4.58	89	CIRCULAR		0.013	72	0	1	0.5	0.5
LW9650	LW0100	LW9650	4.58	4.00	71	CIRCULAR		0.013	72	0	1	1.0	0.5
LW9750	LW9800	LW9750	7.59	7.64	79	CIRCULAR		0.023	24	0	1	0.5	0.7
LW9901	LW9900	LW9901	9.00	8.66	48	CIRCULAR		0.013	24	0	1	1.0	0.5
LWS110	LWS350	LWS110	8.50	8.40	40	CIRCULAR		0.015	72	0	1	1.0	0.5
LWS200S	LWS300S	LWS200S	3.85	4.81	1,095	CIRCULAR		0.013	48	0	1	1.0	0.5
LWS300-2S	LWS304S	LWS300-2S	7.34	7.20	243	CIRCULAR		0.013	24	0	1	1.0	0.3
LWS300-4	LWS340	LWS300-4	8.47	8.49	20	CIRCULAR		0.013	24	0	1	0.5	0.3
LWS302S	LWS302	LWS302S	6.53	6.50	73	CIRCULAR		0.013	36	0	1	0.5	0.3
LWS303	LWS303-5	LWS303S	11.44	11.17	53	CIRCULAR		0.013	36	0	1	0.5	0.3
LWS303-2	LWS303-3	LWS303-2	8.50	8.49	400	CIRCULAR		0.013	72	0	1	0.5	0.3
LWS305-13	LWS500S	LWS305-13	16.00	15.80	151	CIRCULAR		0.013	24	0	1	0.5	0.3
LWS310	LWS340	LWS310	8.59	8.53	25	CIRCULAR		0.018	39	0	2	1.0	0.3
LWS330	LWS320	LWS330	8.10	8.00	94	CIRCULAR		0.013	72	0	1	0.5	0.3
LWS410	C51F	LWS410	11.10	10.86	120	CIRCULAR		0.013	18	0	1	1.0	0.5
OD100-1	RP5700	OD100-1	11.10	8.05	864	CIRCULAR		0.013	24	0	1	0.5	0.3
OD110-2	OD110-3	OD110-2	14.48	14.45	172	CIRCULAR		0.013	24	0	1	0.5	0.3

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP0350	LW0300	LW0350	2.03	2.05	123	CIRCULAR		0.013	72	0	1	0.5	0.5
RP0372	LW0380	LW0370	3.90	3.77	81	CIRCULAR		0.013	60	0	1	0.5	0.5
RP072S	RP260	RP072S	6.75	6.50	78	CIRCULAR		0.013	30	0	1	0.5	0.3
RP1120S1	RP5526	RP1120S	11.01	10.50	230	CIRCULAR		0.013	24	0	2	1.0	0.3
RP1120S2	RP5527	RP1120S	9.69	9.45	700	CIRCULAR		0.013	36	0	1	1.0	0.3
RP1160S1	RP5520	RP1160S	11.15	11.51	150	CIRCULAR		0.018	24	0	2	1.0	0.3
RP1160S3	RP5515	RP1160S	10.90	10.30	200	CIRCULAR		0.016	24	0	4	1.0	0.3
RP1200S1	RP5800	RP1205S	8.05	7.85	120	CIRCULAR		0.013	36	0	4	1.0	0.3
RP1201S	RP5800	RP1201S	8.22	7.88	182	CIRCULAR		0.013	36	0	1	0.5	0.3
RP1201S_1	RP5800	RP1201S	11.05	10.05	187	CIRCULAR		0.013	30	0	1	0.5	0.3
RP1210S1	RP1211S	RP1210S	8.75	8.45	255	CIRCULAR		0.013	30	0	1	1.0	0.3
RP1211S	RP1200S	RP1211S	7.45	7.25	112	CIRCULAR		0.013	42	0	1	1.0	0.3
RP1212S	RP1210S	RP1212S	8.05	8.04	205	CIRCULAR		0.013	36	0	1	0.2	0.3
RP1212S-2	RP1219S	RP1212S	14.15	13.95	34	CIRCULAR		0.013	18	0	1	0.9	0.3
RP1213S	RP1212S	RP1213S	8.05	8.04	200	CIRCULAR		0.013	36	0	1	0.2	0.3
RP1214S	RP1213S	RP1214S	13.55	13.35	23	CIRCULAR		0.013	18	0	1	0.9	0.3
RP1215S	RP1218S	RP1215S	8.85	8.05	1,551	CIRCULAR		0.013	42	0	1	1.0	0.3
RP1216S	RP1214S	RP1216S	8.05	8.04	160	CIRCULAR		0.013	36	0	1	0.9	0.3
RP1217S	RP1216S	RP1217S	14.58	14.46	59	CIRCULAR		0.013	18	0	1	0.2	0.3
RP12181S	RP1217S	RP1218S	14.25	14.05	21	CIRCULAR		0.013	18	0	1	0.9	0.3
RP1219S	RP1211S	RP1219S	7.45	7.30	210	CIRCULAR		0.013	18	0	1	0.7	0.3
RP1220S1	RP5700	RP1220S	8.42	7.96	185	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1220S2	RP4700	RP1220S	7.66	7.10	190	CIRCULAR		0.013	30	0	2	1.0	0.3
RP1220S3	RP5800	RP1220S	7.83	7.20	185	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1220S4	RP5750	RP1220S	10.47	9.55	185	CIRCULAR		0.013	36	0	1	1.0	0.3
RP1230S1	RP5700	RP1230S	9.70	9.08	250	CIRCULAR		0.014	33	0	2	1.0	0.3
RP1230S2	RP5750	RP1230S	10.87	10.46	186	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1240S1	RP4400	RP1240S	10.83	10.05	200	CIRCULAR		0.018	30	0	2	1.0	0.3
RP1240S2	RP4550	RP1240S	9.57	9.21	200	CIRCULAR		0.014	33	0	2	1.0	0.3
RP1250S1	RP5510	RP1250S	6.68	5.92	190	CIRCULAR		0.013	36	0	1	1.0	0.3
RP1250S2	RP4550	RP1250S	5.65	5.15	250	CIRCULAR		0.018	30	0	3	1.0	0.3
RP1250S3	RP4600	RP1250S	8.01	7.62	200	CIRCULAR		0.018	24	0	2	1.0	0.3
RP1250S4	RP4700	RP1250S	8.70	8.31	200	CIRCULAR		0.018	27	0	2	1.0	0.3
RP1260S1	RP4700	RP1260S	11.25	10.86	197	CIRCULAR		0.013	18	0	1	1.0	0.3
RP1260S2	RP4800	RP1260S	11.19	10.80	197	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1260S3	RP4900	RP1260S	9.19	8.80	197	CIRCULAR		0.013	21	0	1	1.0	0.3
RP1260S4	RP4950	RP1260S	12.05	11.71	170	CIRCULAR		0.013	18	0	1	1.0	0.3
RP1300S1	RP825	RP1300S	6.40	5.99	250	CIRCULAR		0.013	42	0	1	1.0	0.3
RP1300S2	RP850	RP1300S	5.02	4.89	250	CIRCULAR		0.014	30	0	4	1.0	0.3
RP1400S	RP1480S_3	RP1400S	7.85	10.45	95	CIRCULAR		0.013	24	0	1	0.2	0.3
RP1400S1	RP1442S	RP1400S	5.95	6.05	440	CIRCULAR		0.013	54	0	1	1.0	0.5
RP1401S	RP1400S	RP1401S	7.25	6.65	311	CIRCULAR		0.013	36	0	1	1.0	0.3
RP1441	RP1050	RP1441	7.95	6.65	100	CIRCULAR		0.013	42	0	1	0.5	0.5

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP1441S-	RP1441S-3	RP1441S-2	8.85	9.26	295	CIRCULAR		0.013	24	0	1	0.2	0.3
RP1441S-3	RP1442S	RP1441S-3	9.52	8.98	89	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1442S	RP1440S	RP1442S	5.55	5.54	146	CIRCULAR		0.013	54	0	1	1.0	0.3
RP1480S_2	RP1480S	RP1480S_2	8.75	6.55	400	CIRCULAR		0.013	48	0	1	1.0	0.3
RP1480S_3	RP1480S_2	RP1480S_3	10.45	7.35	283	CIRCULAR		0.013	24	0	1	1.0	0.3
RP1481	RP900	RP1481	8.75	5.55	160	CIRCULAR		0.013	42	0	1	0.5	0.5
RP1500S	RP900	RP1500S	6.70	6.53	200	CIRCULAR		0.018	30	0	2	1.0	0.3
RP155	RP200	RP155	7.17	6.55	286	CIRCULAR		0.013	30	0	1	0.5	0.3
RP1700S	RP1100	RP1700S	10.17	8.05	400	CIRCULAR		0.016	42	0	2	1.0	0.3
RP1800S	RP5000	RP1800S	9.15	5.60	400	CIRCULAR		0.015	36	0	4	1.0	0.3
RP1900S1	RP4950	RP1900S	12.74	7.78	425	CIRCULAR		0.013	42	0	1	1.0	0.3
RP1900S2	RP4900	RP1900S	10.92	10.05	200	CIRCULAR		0.019	30	0	2	1.0	0.3
RP1926	C51A_2	RP1925	10.40	10.30	98	CIRCULAR		0.013	72	0	2	0.5	0.7
RP2000S1	RP3010	RP2000S	11.71	8.55	200	CIRCULAR		0.013	18	0	3	1.0	0.3
RP2000S2	RP3005	RP2000S	6.66	6.25	175	CIRCULAR		0.012	24	0	3	1.0	0.3
RP2000S3	RP3000	RP2000S	7.49	6.60	175	CIRCULAR		0.018	30	0	4	1.0	0.3
RP2020S	RP3000	RP2020S	11.79	9.35	170	CIRCULAR		0.015	18	0	4	1.0	0.3
RP2040S	RP325	RP2040S	10.25	6.55	200	CIRCULAR		0.017	21	0	5	1.0	0.3
RP2060S1	RP340S	RP2060S	9.35	7.35	100	CIRCULAR		0.018	27	0	4	1.0	0.3
RP2060S2	RP330S	RP2060S	9.85	7.95	130	CIRCULAR		0.018	21	0	3	1.0	0.3
RP2100S	RP3100	RP2100S	7.89	6.44	210	CIRCULAR		0.013	36	0	2	1.0	0.3
RP2200S	RP1200	RP2200S	9.15	8.82	250	CIRCULAR		0.013	42	0	1	1.0	0.3
RP2250S	RP1100	RP2250S	7.95	7.00	615	CIRCULAR		0.013	42	0	1	1.0	0.3
RP2350S	RP1300	RP2350S	7.24	6.70	175	CIRCULAR		0.017	27	0	4	1.0	0.3
RP235-2	RP240	RP235	6.08	6.02	378	CIRCULAR		0.013	54	0	1	0.5	0.3
RP235-3	RP600	RP235-3	5.85	5.79	128	CIRCULAR		0.013	54	0	1	0.5	0.3
RP2400S1	RP1100	RP2400S	9.34	9.00	500	CIRCULAR		0.013	36	0	1	1.0	0.3
RP2400S2	RP1200	RP2400S	7.05	7.04	270	CIRCULAR		0.016	30	0	1	1.0	0.3
RP250	RP255	RPNA-100-1	13.50	12.57	627	CIRCULAR		0.013	24	0	1	0.5	0.3
RP2500S	RP6550	RP2500S	8.90	8.40	240	CIRCULAR		0.015	30	0	3	1.0	0.3
RP255-1	RP200	RP255-1	11.50	10.63	24	CIRCULAR		0.013	24	0	1	0.5	0.3
RP260	RP270	RP260	3.80	3.55	62	CIRCULAR		0.023	96	0	2	0.5	0.5
RP2600S1	RP6300	RP2600S	6.43	6.38	160	CIRCULAR		0.018	27	0	2	1.0	0.3
RP2600S2	RP6400	RP2600S	12.45	11.75	175	CIRCULAR		0.013	15	0	1	1.0	0.3
RP2600S3	RP6500	RP2600S	7.41	6.84	250	CIRCULAR		0.018	27	0	4	1.0	0.3
RP2650S	RP6250	RP2650S	10.40	10.00	160	CIRCULAR		0.013	24	0	4	1.0	0.3
RP2700	RP150	RP2700	2.33	10.94	3,223	CIRCULAR		0.013	42	0	1	3.0	0.3
RP2700-2	RP2701	RP2700	0.00	0.20	170	CIRCULAR		0.013	36	0	1	0.7	0.5
RP2700-2_2	RP2900	RP2903	9.50	5.95	1,127	CIRCULAR		0.013	30	0	1	2.4	0.3
RP2700S1	RP6250	RP2700S	5.43	5.32	105	CIRCULAR		0.013	72	0	1	1.0	0.5
RP2700S2	RP6300	RP2700S	9.25	7.85	500	CIRCULAR		0.011	24	0	3	1.0	0.3
RP2701	RP2702	RP2701	0.20	0.40	218	CIRCULAR		0.013	36	0	1	0.2	0.3
RP2702	RP2703	RP2702	6.10	5.60	2,004	CIRCULAR		0.013	30	0	1	0.0	0.0

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP2703	RP2903	RP2703	6.41	9.50	946	CIRCULAR		0.013	30	0	1	1.4	0.3
RP2800S	RP7600	RP2803	10.96	10.70	1,146	CIRCULAR		0.013	42	0	1	0.5	0.3
RP2801	RP2802	RP2801	12.55	11.05	387	CIRCULAR		0.013	30	0	1	0.2	0.3
RP2802	RP2800S	RP2802	9.25	8.75	580	CIRCULAR		0.013	36	0	1	1.0	0.3
RP2805	RP2700S	RP2805	5.95	5.59	357	CIRCULAR		0.013	72	0	1	1.0	0.5
RP2900S	RP6000	RP2900S	9.50	9.00	160	CIRCULAR		0.019	24	0	15	1.0	0.3
RP3000S	RP3300	RP3000S	10.60	9.55	180	CIRCULAR		0.016	24	0	2	1.0	0.3
RP3100S	RP3300	RP3100S	6.18	5.75	200	CIRCULAR		0.012	30	0	2	1.0	0.3
RP3200S	RP1300	RP3200S	5.75	4.95	200	CIRCULAR		0.017	36	0	4	1.0	0.3
RP335S	RP330S	RP335S	10.40	7.53	76	CIRCULAR		0.013	48	0	1	1.0	0.5
RP3400	RP3450	RP3400	5.55	5.54	202	CIRCULAR		0.013	42	0	1	0.5	0.5
RP3400S	RP6600	RP3400S	9.00	8.00	220	CIRCULAR		0.012	30	0	3	1.0	0.3
RP3450S	RP6500	RP3450S	6.08	5.85	240	CIRCULAR		0.017	33	0	2	1.0	0.3
RP3500S	RP6300	RP3500S	8.60	8.23	200	CIRCULAR		0.013	30	0	3	1.0	0.3
RP3550	RP3600	RP3550	10.60	7.16	195	CIRCULAR		0.013	42	0	1	1.0	0.3
RP3550S	RP7100	RP3550S	13.05	9.80	95	CIRCULAR		0.013	30	0	6	1.0	0.3
RP3600	RP3700	RP3600	10.31	10.35	140	CIRCULAR		0.013	24	0	1	0.5	0.7
RP3600S	RP3210	RP3600S	8.20	8.05	150	CIRCULAR		0.018	27	0	4	1.0	0.3
RP3650S	RP3200	RP3650S	11.83	9.55	200	CIRCULAR		0.013	15	0	1	1.0	0.3
RP3700S_1	RP4380S_1	RP3700S_1	10.50	9.90	311	CIRCULAR		0.013	22	0	1	0.2	0.3
RP3700S_10	RP3700S_9	RP3700S_10	12.00	12.50	212	CIRCULAR		0.013	15	0	1	0.2	0.3
RP3700S_13	RP3700S_10	RP3700S_13	11.50	12.00	257	CIRCULAR		0.013	18	0	1	0.2	0.5
RP3700S_3	RP3700S_1	RP3700S_3	11.20	10.50	173	CIRCULAR		0.013	12	0	1	0.2	0.3
RP3700S_4	RP3700S_3	RP3700S_4	11.30	11.20	125	CIRCULAR		0.013	15	0	1	0.7	0.3
RP3700S_5	RP3700S_4	RP3700S_5	11.30	11.10	241	CIRCULAR		0.013	15	0	1	0.7	0.3
RP3700S_8	RP3700S_5	RP3700S_8	11.10	10.90	222	CIRCULAR		0.013	15	0	1	0.3	0.3
RP3700S_9	RP3700S_8	RP3700S_9	11.00	10.30	53	CIRCULAR		0.013	10	0	1	0.2	0.3
RP3740S	RP1600	RP3740S	8.14	8.05	200	CIRCULAR		0.013	18	0	2	1.0	0.3
RP3780S	RP3300	RP3780S	7.67	7.47	200	CIRCULAR		0.018	24	0	5	1.0	0.3
RP3790S	RP3205	RP3790S	7.05	6.17	167	CIRCULAR		0.013	42	0	1	1.0	0.3
RP3790S_1	RP3200	RP3790S_1	7.70	7.00	120	CIRCULAR		0.013	24	0	1	1.0	0.3
RP3790S_2	RP3790S	RP3790S_2	9.20	9.10	70	CIRCULAR		0.013	36	0	1	0.5	0.3
RP3790S_3	RP3790S_2	RP3790S_3	12.10	12.00	68	CIRCULAR		0.013	30	0	1	0.2	0.3
RP3790S_5	RP3790S_3	RP3790S_5	12.40	12.10	136	CIRCULAR		0.013	24	0	1	0.2	0.3
RP3790S_8	RP3790S_5	RP3790S_8	12.70	12.40	173	CIRCULAR		0.013	15	0	1	0.5	0.3
RP3790S_9	RP3790S_8	RP3790S_9	11.50	11.20	36	CIRCULAR		0.013	12	0	1	0.2	0.3
RP3800S1	RP6600	RP3800S	9.98	9.93	250	CIRCULAR		0.015	24	0	3	1.0	0.3
RP3800S2	RP6800	RP3800S	8.55	7.98	250	CIRCULAR		0.017	24	0	3	1.0	0.3
RP4000S1	RP1700	RP4000S	7.58	7.00	200	CIRCULAR		0.018	36	0	2	1.0	0.3
RP4000S2	RP7500	RP4000S	8.99	8.50	170	CIRCULAR		0.013	21	0	3	1.0	0.3
RP4100S1	RP1600	RP4100S	8.52	7.82	250	CIRCULAR		0.019	24	0	2	1.0	0.3
RP4100S2	RP1650	RP4100S	8.45	8.25	70	CIRCULAR		0.014	30	0	2	1.0	0.3
RP4200S1	RP7350	RP4200S	8.15	7.75	170	CIRCULAR		0.013	30	0	2	1.0	0.3

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP4200S2	RP7300	RP4200S	8.45	8.05	170	CIRCULAR		0.019	30	0	4	1.0	0.3
RP4200S3	RP7200	RP4200S	8.21	7.85	180	CIRCULAR		0.013	30	0	1	1.0	0.3
RP4250S	RP7300	RP4250S	13.05	9.80	110	CIRCULAR		0.013	30	0	5	1.0	0.3
RP4300S	RP335S	RP4300S	3.25	3.13	150	CIRCULAR		0.018	48	0	2	1.0	0.3
RP4340S	RP335S	RP4340S	9.55	8.05	180	CIRCULAR		0.013	24	0	1	1.0	0.3
RP4380S	RP4380S_3	RP4380S	11.50	11.40	72	CIRCULAR		0.013	18	0	1	0.6	0.3
RP4380S_1	RP1650	RP4380S_1	9.85	9.45	155	CIRCULAR		0.013	24	0	1	1.0	0.3
RP4380S_2	RP1700	RP4380S_2	9.00	8.90	150	CIRCULAR		0.013	18	0	1	1.0	0.3
RP4380S_3	RP4380S_4	RP4380S_3	11.40	10.50	454	CIRCULAR		0.013	18	0	1	0.9	0.3
RP4380S_4	RP4380S_1	RP4380S_4	10.50	9.90	391	CIRCULAR		0.013	24	0	1	1.4	0.3
RP4500S	RP3400	RP4500S	7.38	6.55	200	CIRCULAR		0.013	24	0	16	1.0	0.3
RP4530S	RP3400	RP4530S	8.36	7.16	190	CIRCULAR		0.013	30	0	6	1.0	0.3
RP4550S1	RP4000	RP4550S	9.15	7.37	170	CIRCULAR		0.013	30	0	1	1.0	0.3
RP4550S2	RP3900	RP4550S	9.85	7.95	160	CIRCULAR		0.013	24	0	1	1.0	0.3
RP4550S3	RP3500	RP4550S	8.72	7.85	170	CIRCULAR		0.013	24	0	2	1.0	0.3
RP4580S	RP3700	RP4580S	6.15	5.98	180	CIRCULAR		0.017	30	0	2	1.0	0.3
RP4700S	RP7355	RP4700S	8.30	6.61	135	CIRCULAR		0.013	27	0	3	1.0	0.3
RP4950S	RP4500S	RP4950S	7.59	6.56	600	CIRCULAR		0.013	30	0	1	0.3	0.3
RP5000S1	RP7500	RP5000S	7.66	7.00	165	CIRCULAR		0.013	48	0	1	1.0	0.3
RP5000S2	RP1700	RP5000S	8.81	9.05	320	CIRCULAR		0.013	24	0	1	1.0	0.3
RP5000S3	RP1800	RP5000S	11.93	8.90	148	CIRCULAR		0.013	30	0	1	1.0	0.3
RP500S1	RP4200	RP500S	12.00	9.55	200	CIRCULAR		0.016	18	0	3	1.0	0.3
RP500S2	RP500	RP500S	8.11	7.71	175	CIRCULAR		0.019	30	0	2	1.0	0.3
RP5200S	RP1900	RP5200S	9.65	9.00	127	CIRCULAR		0.013	54	0	1	1.0	0.3
RP5300	RP1000	RP5301	9.85	9.75	321	CIRCULAR		0.023	18	0	1	0.5	0.7
RP5350S-1	C51M	RP5350S-1	7.90	7.40	814	CIRCULAR		0.013	72	0	1	1.0	0.3
RP5350S-2	RP5350S-1	RP5350S-2	12.15	12.45	603	CIRCULAR		0.013	36	0	1	2.4	0.3
RP5400	RP900	RP5400	8.20	7.05	729	CIRCULAR		0.013	24	0	1	0.5	0.5
RP5400S	RP3900	RP5400S	11.04	10.74	150	CIRCULAR		0.011	42	0	4	1.0	0.3
RP5500S	RP2000	RP5500S	10.01	9.67	180	CIRCULAR		0.013	24	0	2	1.0	0.3
RP5500S1	RP800	RP5500	8.57	5.49	300	CIRCULAR		0.018	24	0	3	1.0	0.3
RP5500S2	RP4000	RP5500S	11.72	11.35	175	CIRCULAR		0.013	15	0	2	1.0	0.3
RP600S	RP4200	RP600S	11.05	9.55	325	CIRCULAR		0.013	24	0	1	0.5	0.3
RP6900	RP6800	RP6900	9.15	9.00	250	CIRCULAR		0.015	30	0	2	1.0	0.3
RP7003	RP4200S	RP7000	7.67	10.55	260	CIRCULAR		0.015	24	0	3	1.0	0.3
RP700S1	RP4300	RP700S	7.80	6.50	500	CIRCULAR		0.014	36	0	2	1.0	0.3
RP700S2	RP4100	RP700S	9.40	8.60	300	CIRCULAR		0.016	36	0	3	1.0	0.3
RP700S3	RP4400	RP700S	4.40	4.12	180	CIRCULAR		0.013	48	0	1	1.0	0.3
RP7355_1	RP7350	RP7355	7.75	6.21	1,619	CIRCULAR		0.013	72	0	1	1.0	0.3
RP750S1	RP4300	RP750S	8.90	8.60	500	CIRCULAR		0.012	54	0	3	1.0	0.3
RP750S2	RP4100	RP750S	4.00	3.90	150	CIRCULAR		0.013	48	0	2	1.0	0.3
RP7750	RP7700	RP7750	9.30	8.05	43	CIRCULAR		0.023	30	0	1	0.5	0.7
RP800S1	RP700	RP800S	8.60	8.30	175	CIRCULAR		0.011	18	0	4	1.0	0.3

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP800S2	RP600	RP800S	9.20	7.60	700	CIRCULAR		0.013	12	0	2	1.0	0.3
RP8010	C51C	RP8010	6.65	5.68	180	CIRCULAR		0.013	72	0	3	0.5	0.5
RP8404	RP8406	RP8404	8.14	7.67	641	CIRCULAR		0.013	24	0	1	0.5	0.3
RP8406	RP8408	RP8406	7.16	7.13	305	CIRCULAR		0.013	30	0	1	0.2	0.3
RP8408	RP8410	RP8408	6.14	5.04	784	CIRCULAR		0.013	36	0	1	0.2	0.2
RP8415	RP8420	RP8415	4.94	4.77	660	CIRCULAR		0.013	42	0	1	1.8	0.2
RP8420	C51B	RP8420	4.88	4.23	125	CIRCULAR		0.013	48	0	1	0.5	0.5
RPC51100	RP8406	RPC51100	9.42	9.28	260	CIRCULAR		0.013	24	0	1	0.5	0.3
RPC51400	RP8404	RPC51400	8.55	8.50	912	CIRCULAR		0.013	36	0	1	1.0	0.3
RPC51500	RP8408	RPC51500	8.66	8.19	464	CIRCULAR		0.013	30	0	1	0.5	0.3
RPN101-2	OD101-2	OD100	16.14	11.78	235	CIRCULAR		0.013	24	0	1	0.2	0.3
RPN110	RP7600	RPN110	5.65	5.12	67	CIRCULAR		0.013	42	0	1	1.0	0.3
RPN450	RP8000	RPN450	9.29	9.00	490	CIRCULAR		0.013	24	0	1	1.0	0.3
RPN650	RP2802S	RPN650	7.50	7.00	225	CIRCULAR		0.013	72	0	1	1.0	0.3
RPN700	RPN660	RPN700	7.75	7.70	253	CIRCULAR		0.013	54	0	1	0.5	0.3
RPN700_1	RPN700_1	RPN700	7.70	7.50	140	CIRCULAR		0.013	72	0	1	0.5	0.3
RPN700_2	RPN700_2	RPN700_1	9.05	8.75	200	CIRCULAR		0.013	30	0	1	0.9	0.3
RPN700_3	RP2801S	RPN700_2	8.75	8.50	140	CIRCULAR		0.013	24	0	1	0.5	0.3
RPN800-2	RPN800	RP800-2	8.85	8.74	340	CIRCULAR		0.013	48	0	1	1.0	0.3
RPN801	NPB801	RP801	14.75	14.45	340	CIRCULAR		0.013	24	0	1	0.5	0.3
RPN802	RPN700	RP802	8.93	8.73	375	CIRCULAR		0.013	36	0	1	1.0	0.3
RPN900	RPN800	RPN900	12.85	8.55	630	CIRCULAR		0.013	36	0	1	1.0	0.3
RPN900-2	RPN600S	RPN900	10.00	9.50	380	CIRCULAR		0.013	60	0	1	1.0	0.3
SB-301S	SB-301S-1	SB-301S	13.48	13.10	52	CIRCULAR		0.013	66	0	1	0.8	0.3
SB-301S-2	RP3900	SB-301S-2	11.65	5.11	957	CIRCULAR		0.013	66	0	1	1.4	0.2
SB-302S	C51H	SB-302S-2	2.82	2.55	246	CIRCULAR		0.013	60	0	1	0.5	0.3
SB-303S	C51J	SB-303S-3	6.91	6.51	224	CIRCULAR		0.013	24	0	1	0.5	0.3
RP1160S2	RP4700	RP1160S	11.15	10.78	192	CIRCULAR		0.013	30	0	1	1.0	0.3
LWS305-10	LWS305-11	LWS305-10	15.52	15.56	52	HORIZ_ELLIPSE		0.013	19	30	1	0.5	0.3
LWS305-2	LWS305-3	LWS305-2	15.50	15.40	72	HORIZ_ELLIPSE		0.013	12	18	1	0.5	0.3
LWS305-4	LWS305-5	LWS305-4	15.50	15.40	84	HORIZ_ELLIPSE		0.013	12	18	1	0.5	0.3
LWS305-6	LWS305-7	LWS305-6	15.50	15.40	84	HORIZ_ELLIPSE		0.013	14	23	1	0.5	0.3
LWS305-8	LWS305-9	LWS305-8	15.50	15.40	146	HORIZ_ELLIPSE		0.013	14	23	1	0.5	0.3
LWS400-1	LWS305-12	LWS400-1	4.54	4.22	150	HORIZ_ELLIPSE		0.013	12	18	1	0.5	0.3
RP8410	RP8415	RP8410	4.99	4.80	500	HORIZ_ELLIPSE		0.013	34	53	1	0.1	0.3
RPC51200	RP8410	RPC51200	9.33	9.03	108	HORIZ_ELLIPSE		0.013	23	36	1	0.5	0.3
RP2500	C51A_1	RP2500	-0.67	-0.56	119	RECT_CLOSED		0.013	192	180	1	0.5	0.5
RP3000	RP3100	RP3000	7.10	6.20	50	RECT_CLOSED		0.035	120	216	2	0.5	0.5
RP325	RP3010	RP325	6.05	5.45	143	RECT_CLOSED		0.013	142	91	1	0.5	0.5
RP4900	RP4950	RP4900	8.05	8.35	40	RECT_CLOSED		0.035	168	216	2	0.5	0.5
RP5000	RP1000	RP5000	5.90	7.00	50	RECT_CLOSED		0.035	168	216	2	0.5	0.5
RP7900	RP8000	RP7900	3.54	3.53	50	RECT_CLOSED		0.029	156	288	3	0.5	0.5
RPNA-100	RP250	RPNA-100	6.16	5.32	400	RECT_CLOSED		0.013	24	38	1	1.0	0.5

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
Sypho2	SyphonDS	SyphonUS	0.00	0.00	180	RECT_CLOSED		0.013	72	120	1	0.5	1.0
RP604	RP700	RP600	2.10	2.00	95	CUSTOM	Bridge	0.035	164	0	1	0.0	0.0
RP1100	RP1200	RP1100	-1.00	-1.10	100	IRREGULAR	Bridge						
RP1401	RP1500	RP1400	-1.40	-1.50	65	IRREGULAR	Bridge						
RP3202_2	RP3005	RP3202	11.30	11.20	200	IRREGULAR	Bridge						
RP4100	RP4200	RP4100	7.90	6.30	200	IRREGULAR	Bridge						
RP440	RP4500	RP4400	4.20	4.30	60	IRREGULAR	Bridge						
RP5601	RP5700	RP5600	5.40	5.70	80	IRREGULAR	Bridge						
RP5800	RP5900	RP5800	5.00	4.90	70	IRREGULAR	Bridge						
RP6000	RP6200	RP6000	3.10	1.70	100	IRREGULAR	Bridge						
RP6400	RP6500	RP6400	6.60	5.10	100	IRREGULAR	Bridge						
RP6700	RP6800	RP6700	5.30	5.00	100	IRREGULAR	Bridge						
RP7100	RP7200	RP7100	3.70	4.20	100	IRREGULAR	Bridge						
RP7400	RP7500	RP7400	3.00	4.70	50	IRREGULAR	Bridge						
RP7825	RP7850	RP7825	5.40	5.20	50	IRREGULAR	Bridge						
ITIDM1	ITID_LowM1	SyphonDS	7.00	5.00	11,000	IRREGULAR	Ditch/Channel						
LW0100	LW0200	LW0100	5.50	2.55	910	IRREGULAR	Ditch/Channel						
LW0200	LW0370	LW0200	2.55	3.72	350	IRREGULAR	Ditch/Channel						
LW0380	LW0400	LW0380	3.77	3.38	505	IRREGULAR	Ditch/Channel						
LW2975	LW9300	LW2975	5.35	5.34	232	IRREGULAR	Ditch/Channel						
LW450	LW9210	LW450	5.00	5.10	2,515	IRREGULAR	Ditch/Channel						
LW505	LW450	LW505	5.10	5.00	2,986	IRREGULAR	Ditch/Channel						
LW510_1	LW510-1	LW510	5.00	5.06	1,105	IRREGULAR	Ditch/Channel						
LW510_2	LW505	LW510-1	5.06	5.10	814	IRREGULAR	Ditch/Channel						
LW510-1	LW510-2	LW510-1	7.70	7.60	215	IRREGULAR	Ditch/Channel						
LW510-3	LW510-4	LW510-3	7.60	7.50	272	IRREGULAR	Ditch/Channel						
LW510-5	LW510-7	LW510-5	6.00	5.90	551	IRREGULAR	Ditch/Channel						
LW510-8	LW9800	LW510-8	7.90	7.50	681	IRREGULAR	Ditch/Channel						
LW9000	LW9100	LW9000	6.11	5.21	414	IRREGULAR	Ditch/Channel						
LW9200	LW9215	LW9200	4.92	5.36	286	IRREGULAR	Ditch/Channel						
LW9250	LW2970	LW9250	5.35	5.34	490	IRREGULAR	Ditch/Channel						
LW9400	LW9500	LW9400	4.55	3.95	578	IRREGULAR	Ditch/Channel						
LW9600	LW9650	LW9600	4.55	3.50	496	IRREGULAR	Ditch/Channel						
LW9800	LW9900	LW9800	7.64	7.08	1,650	IRREGULAR	Ditch/Channel						
LWS100S	LWS110	LWS_POD4S	8.40	8.50	1,090	IRREGULAR	Ditch/Channel						
LWS303-1_OF	LWS303-2	LWS303-1	9.50	8.50	3,891	IRREGULAR	Ditch/Channel						
LWS303-3_OF	LWS350	LWS303-3	8.50	8.40	599	IRREGULAR	Ditch/Channel						
LWS305-1	LWS305-2	LWS305-1	15.60	15.40	322	IRREGULAR	Ditch/Channel						
LWS305-11	LWS305-12	LWS305-11	15.75	15.60	459	IRREGULAR	Ditch/Channel						
LWS305-13_1	LWS305-10	LWS305-13	15.65	15.80	611	IRREGULAR	Ditch/Channel						
LWS305-3	LWS305-4	LWS305-3	15.70	15.60	534	IRREGULAR	Ditch/Channel						
LWS305-5	LWS305-6	LWS305-5	15.60	15.50	527	IRREGULAR	Ditch/Channel						
LWS305-7	LWS305-8	LWS305-7	15.65	15.55	456	IRREGULAR	Ditch/Channel						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
LWS305-9	LWS305-13	LWS305-9	15.43	15.65	609	IRREGULAR	Ditch/Channel						
LWS320	C51G	LWS320	8.00	7.90	360	IRREGULAR	Ditch/Channel						
LWS340	LWS330	LWS340	8.00	8.10	825	IRREGULAR	Ditch/Channel						
LWS350	LWS340	LWS350	8.40	8.00	2,680	IRREGULAR	Ditch/Channel						
LWS500S	LWS520	LWS500S	5.00	4.90	2,240	IRREGULAR	Ditch/Channel						
OD110_1	OD110-2	OD110	14.80	16.62	3,756	IRREGULAR	Ditch/Channel						
OD110_2	OD110-1	OD110-2	16.62	18.00	2,844	IRREGULAR	Ditch/Channel						
RP1000	RP1050	RP1000	4.00	3.00	1,000	IRREGULAR	Ditch/Channel						
RP1050	RP1100	RP1050	-0.80	-1.00	1,600	IRREGULAR	Ditch/Channel						
RP1200	RP1300	RP1200	-1.00	-1.30	1,900	IRREGULAR	Ditch/Channel						
RP1300	RP1400	RP1300	-1.30	-1.40	380	IRREGULAR	Ditch/Channel						
RP1500	RP1600	RP1500	-1.50	-1.60	300	IRREGULAR	Ditch/Channel						
RP1600	RP1650	RP1600	-1.60	-1.70	1,225	IRREGULAR	Ditch/Channel						
RP1650	RP1700	RP1650	-1.70	-1.80	1,225	IRREGULAR	Ditch/Channel						
RP1700	RP1800	RP1700	1.55	0.55	2,360	IRREGULAR	Ditch/Channel						
RP1800	RP1900	RP1800	0.65	0.55	400	IRREGULAR	Ditch/Channel						
RP1900	RP2000	RP1900	0.55	1.25	400	IRREGULAR	Ditch/Channel						
RP200	RP260	RP200	2.50	2.40	4,670	IRREGULAR	Ditch/Channel						
RP2400	RP2500	RP2400	-3.45	0.63	500	IRREGULAR	Ditch/Channel						
RP270	RP400	RP270	2.40	2.30	670	IRREGULAR	Ditch/Channel						
RP3002	RP3000	RP3002	0.50	2.30	930	IRREGULAR	Ditch/Channel						
RP3005	RP3002	RP3005	4.50	0.50	1,320	IRREGULAR	Ditch/Channel						
RP3010	RP3005	RP3010	5.70	4.50	1,000	IRREGULAR	Ditch/Channel						
RP3100	RP3300	RP3100	3.80	2.80	1,485	IRREGULAR	Ditch/Channel						
RP3202_1	RP3200	RP3202	5.50	4.90	1,500	IRREGULAR	Ditch/Channel						
RP3205_1	RP3202	RP3205	7.30	7.00	520	IRREGULAR	Ditch/Channel						
RP3205_2	RP3200	RP3205	7.30	6.30	1,250	IRREGULAR	Ditch/Channel						
RP3210	RP3205	RP3210	4.60	4.80	1,080	IRREGULAR	Ditch/Channel						
RP3300	RP3350	RP3300	3.50	4.70	480	IRREGULAR	Ditch/Channel						
RP330S	RP325	RP330S	8.10	8.00	2,540	IRREGULAR	Ditch/Channel						
RP3350	RP1300	RP3350	4.70	2.90	1,370	IRREGULAR	Ditch/Channel						
RP338	RP330S	RP338	8.00	8.10	500	IRREGULAR	Ditch/Channel						
RP3500	RP3900	RP3500	5.00	3.50	478	IRREGULAR	Ditch/Channel						
RP3700	RP3500	RP3700	5.40	5.60	1,219	IRREGULAR	Ditch/Channel						
RP3900	RP4000	RP3900	3.50	2.70	518	IRREGULAR	Ditch/Channel						
RP400	RP500	RP400	2.30	2.20	1,600	IRREGULAR	Ditch/Channel						
RP4000	RP1800	RP4000	2.70	2.00	630	IRREGULAR	Ditch/Channel						
RP4200	RP500	RP4200	0.60	1.50	1,100	IRREGULAR	Ditch/Channel						
RP4300	RP4400	RP4300	2.00	2.50	1,630	IRREGULAR	Ditch/Channel						
RP4301	RP4100	RP4300	-2.40	0.00	2,833	IRREGULAR	Ditch/Channel						
RP4500	RP4550	RP4500	1.20	1.50	1,225	IRREGULAR	Ditch/Channel						
RP4550	RP4600	RP4550	4.00	6.70	1,225	IRREGULAR	Ditch/Channel						
RP4600	RP4700	RP4600	6.70	3.20	1,500	IRREGULAR	Ditch/Channel						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP4700	RP4800	RP4700	3.20	2.80	1,034	IRREGULAR	Ditch/Channel						
RP4800	RP4900	RP4800	2.80	5.20	1,395	IRREGULAR	Ditch/Channel						
RP4950	RP4970	RP4950	6.10	6.20	750	IRREGULAR	Ditch/Channel						
RP4970	RP5000	RP4970	10.10	10.00	860	IRREGULAR	Ditch/Channel						
RP500	RP600	RP500	2.20	2.10	1,150	IRREGULAR	Ditch/Channel						
RP5510	RP5515	RP5510	8.00	7.90	1,280	IRREGULAR	Ditch/Channel						
RP5515	RP5520	RP5515	7.90	8.00	1,500	IRREGULAR	Ditch/Channel						
RP5527	RP5000	RP5527	6.20	6.30	1,450	IRREGULAR	Ditch/Channel						
RP5600	RP4600	RP5600	5.40	6.70	500	IRREGULAR	Ditch/Channel						
RP5700	RP5725	RP5700	5.70	2.30	1,200	IRREGULAR	Ditch/Channel						
RP5725	RP5750	RP5725	2.30	4.90	1,215	IRREGULAR	Ditch/Channel						
RP5750	RP5775	RP5750	4.90	1.90	1,540	IRREGULAR	Ditch/Channel						
RP5775	RP5800	RP5775	1.90	5.00	840	IRREGULAR	Ditch/Channel						
RP5900	RP4800	RP5900	4.90	4.00	515	IRREGULAR	Ditch/Channel						
RP6200	RP6250	RP6200	1.70	1.40	1,055	IRREGULAR	Ditch/Channel						
RP6250	RP6300	RP6250	2.20	3.00	1,578	IRREGULAR	Ditch/Channel						
RP6300	RP7100	RP6300	4.40	3.70	2,060	IRREGULAR	Ditch/Channel						
RP6301	RP6400	RP6300	4.90	6.60	817	IRREGULAR	Ditch/Channel						
RP6500	RP6550	RP6500	3.50	4.80	1,610	IRREGULAR	Ditch/Channel						
RP6550	RP6600	RP6550	4.80	3.10	1,870	IRREGULAR	Ditch/Channel						
RP6600	RP6700	RP6600	3.10	5.30	490	IRREGULAR	Ditch/Channel						
RP6800	RP1600	RP6800	5.00	5.50	1,192	IRREGULAR	Ditch/Channel						
RP700	RP800	RP700	0.30	0.10	1,100	IRREGULAR	Ditch/Channel						
RP7200	RP7250	RP7200	2.60	3.40	1,450	IRREGULAR	Ditch/Channel						
RP7250	RP7300	RP7250	3.40	2.70	1,300	IRREGULAR	Ditch/Channel						
RP7300	RP7350	RP7300	3.00	2.00	2,225	IRREGULAR	Ditch/Channel						
RP7350	RP7400	RP7350	4.40	3.00	1,195	IRREGULAR	Ditch/Channel						
RP7355_2	RP7350	RP7355	3.90	3.80	1,800	IRREGULAR	Ditch/Channel						
RP7500	RP1700	RP7500	4.70	1.50	1,250	IRREGULAR	Ditch/Channel						
RP7600	RP7700	RP7600	3.20	4.60	1,947	IRREGULAR	Ditch/Channel						
RP7700	RP7825	RP7700	4.60	2.50	963	IRREGULAR	Ditch/Channel						
RP7850	RP7900	RP7850	1.20	1.10	1,006	IRREGULAR	Ditch/Channel						
RP800	RP825	RP800	0.10	-0.10	1,700	IRREGULAR	Ditch/Channel						
RP8000	RP8025	RP8000	2.80	4.20	1,313	IRREGULAR	Ditch/Channel						
RP8025	RP8030	RP8025	0.50	4.90	1,500	IRREGULAR	Ditch/Channel						
RP8030	RP8050	RP8030	4.90	-0.40	1,725	IRREGULAR	Ditch/Channel						
RP8050	RP8100	RP8050	-0.40	-1.00	2,267	IRREGULAR	Ditch/Channel						
RP828	RP850	RP825	-0.10	-0.20	50	IRREGULAR	Ditch/Channel						
RP850	RP900	RP850	-0.20	-0.50	1,900	IRREGULAR	Ditch/Channel						
RP900	RP1050	RP900	-0.50	-0.80	1,600	IRREGULAR	Ditch/Channel						
C51-300S_OF	RP8420	C51-300S	17.55	17.50	50	IRREGULAR	Overflow						
C51-300S_OF2	RPC51100	C51-300S	17.24	17.19	2,288	IRREGULAR	Overflow						
C51-300S_OF3	RP8410	C51-300S	17.55	17.50	50	IRREGULAR	Overflow						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
LW0350_OF	LW0300	LW0350	14.07	13.97	50	IRREGULAR	Overflow						
LW201_OF	LW9240	LW201	13.50	13.45	50	IRREGULAR	Overflow						
LW201_OF2	LW9225	LW201	14.67	14.62	50	IRREGULAR	Overflow						
LW2970_OF	LW2975	LW2970	14.80	14.70	50	IRREGULAR	Overflow						
LW450S_OF	LW9900	LW-451S	15.70	15.60	50	IRREGULAR	Overflow						
LW450S-2_OF	LW-451S	LW450S	15.41	15.31	50	IRREGULAR	Overflow						
LW-451S_OF	LW9401	LW-451S	15.56	15.46	50	IRREGULAR	Overflow						
LW500S_OF	LW450S	LW500S	15.80	15.70	50	IRREGULAR	Overflow						
LW500S_OF2	LW505	LW500S	15.00	14.90	50	IRREGULAR	Overflow						
LW505_OF	RP8050	LW505	14.50	14.40	50	IRREGULAR	Overflow						
LW-601S_OF	LW0100	LW-601S	15.68	15.58	50	IRREGULAR	Overflow						
LW-651S_OF	LW0200	LW-651S	15.05	15.00	50	IRREGULAR	Overflow						
LW-701S_OF1	LW0380	LW-701S	15.81	15.76	50	IRREGULAR	Overflow						
LW-701S_OF2	LW-651S	LW-701S	15.59	15.54	50	IRREGULAR	Overflow						
LW8900_OF	LW9000	LW8900	16.70	16.60	48	IRREGULAR	Overflow						
LW9100_OF	LW9200	LW9100	17.00	16.90	164	IRREGULAR	Overflow						
LW9220_OF	LW9250	LW9220	15.70	15.60	50	IRREGULAR	Overflow						
LW9225_OF	LW9250	LW9225	15.20	15.10	50	IRREGULAR	Overflow						
LW9240_OF	LW9225	LW9240	13.90	13.80	50	IRREGULAR	Overflow						
LW9300_OF	LW9400	LW9300	16.64	16.44	141	IRREGULAR	Overflow						
LW9500_OF	LW9600	LW9500	16.00	15.90	50	IRREGULAR	Overflow						
LW9650_OF	LW0100	LW9650	15.40	15.30	50	IRREGULAR	Overflow						
LW970_OF	LW9800	LW9700	15.70	15.60	50	IRREGULAR	Overflow						
LWS_102S_OF	LWS350	LWS_102S	14.77	14.67	50	IRREGULAR	Overflow						
LWS_103S_OF	LWS_POD3S	LWS_103S	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD2S_OF	LWS_POD7S	LWS_POD2S	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD3S_OF	LWS330	LWS_POD3S	15.50	15.49	50	IRREGULAR	Overflow						
LWS_POD6AS-OF	LWS_POD6CS	LWS_POD6AS	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD6BS_OF	LWS_POD6CS	LWS_POD6BS	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD6CS_OF	LWS_POD3S	LWS_POD6CS	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD7S_OF	LWS_102S	LWS_POD7S	16.00	15.90	50	IRREGULAR	Overflow						
LWS_POD8S_OF	LWS110	LWS_POD8S	14.85	14.75	50	IRREGULAR	Overflow						
LWS200S_OF	LWS350	LWS200S	16.50	16.40	50	IRREGULAR	Overflow						
LWS300-2S_OR	LWS300S	LWS300-2S	15.12	15.07	50	IRREGULAR	Overflow						
LWS300S_OF	LWS340	LWS300S	16.20	16.10	50	IRREGULAR	Overflow						
LWS304S_OR	LWS302S	LWS304S	14.75	14.70	50	IRREGULAR	Overflow						
LWS305-10_OF	LWS302S	LWS305-10	17.57	17.52	50	IRREGULAR	Overflow						
LWS305-11_OF	LWS302S	LWS305-11	17.59	17.54	50	IRREGULAR	Overflow						
LWS305-2-OF	LWS303S	LWS305-2	18.13	18.08	50	IRREGULAR	Overflow						
LWS305-3_OF	LWS303S	LWS305-3	17.98	17.94	50	IRREGULAR	Overflow						
LWS305-4_OF	LWS303S	LWS305-4	17.59	17.54	50	IRREGULAR	Overflow						
LWS305-5_OF	LWS303S	LWS305-5	17.52	17.47	50	IRREGULAR	Overflow						
LWS305-6_OF	LWS303S	LWS305-6	18.11	18.06	50	IRREGULAR	Overflow						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
LWS305-7_OF	LWS303S	LWS305-7	17.40	17.35	50	IRREGULAR	Overflow						
LWS305-8_OF	LWS300-2S	LWS305-8	17.52	17.47	50	IRREGULAR	Overflow						
LWS305-9_OF	LWS300-2S	LWS305-9	17.47	17.42	50	IRREGULAR	Overflow						
LWS330_OF	LWS320	LWS330	15.80	15.70	50	IRREGULAR	Overflow						
LWS400S_OF	LWS320	LWS400S	16.70	16.60	50	IRREGULAR	Overflow						
LWS400S-OF	LWS400-1	LWS400S	18.25	18.15	50	IRREGULAR	Overflow						
OD110_OF	RP2801S	OD110	19.14	19.09	50	IRREGULAR	Overflow						
R1101_OF	RP1200	RP1100	17.70	17.60	98	IRREGULAR	Overflow						
RP110_OF	OD100	OD110-1	18.12	18.02	50	IRREGULAR	Overflow						
RP1120S_OF	RP5526	RP1120S	16.60	16.50	50	IRREGULAR	Overflow						
RP1160S_OF1	RP1250S	RP1160S	15.80	15.70	50	IRREGULAR	Overflow						
RP1160S_OF2	RP1260S	RP1160S	15.40	15.30	50	IRREGULAR	Overflow						
RP1200S_OF	RP1201S	RP1200S	15.50	15.45	50	IRREGULAR	Overflow						
RP1201S_OF	RP5800	RP1201S	15.75	15.70	50	IRREGULAR	Overflow						
RP1210S_OF	RP1200S	RP1210S	18.20	18.10	50	IRREGULAR	Overflow						
RP1210S_OF2	RP1215S	RP1210S	17.83	17.78	50	IRREGULAR	Overflow						
RP1215S_OF_2	RP4970	RP1215S	16.94	16.89	50	IRREGULAR	Overflow						
RP1220S_OF	RP5700	RP1220S	15.60	15.50	50	IRREGULAR	Overflow						
RP1230S_OF	RP5700	RP1230S	16.30	16.20	50	IRREGULAR	Overflow						
RP1240S_OF	RP5700	RP1240S	16.30	16.20	50	IRREGULAR	Overflow						
RP1250S_OF	RP4700	RP1250S	16.10	16.00	50	IRREGULAR	Overflow						
RP1260S_OF	RP4800	RP1260S	16.70	16.60	50	IRREGULAR	Overflow						
RP1300S_OF	RP825	RP1300S	17.00	16.90	50	IRREGULAR	Overflow						
RP1400S_5	RP1480S	RP1400S	18.10	18.05	50	IRREGULAR	Overflow						
RP1400S_OF	RP1440S	RP1400S	17.60	17.50	50	IRREGULAR	Overflow						
RP1400S_OF4	RP1480S_2	RP1400S	17.78	17.75	50	IRREGULAR	Overflow						
RP1401S_OF	RP1400S	RP1401S	17.31	17.26	50	IRREGULAR	Overflow						
RP1401S_OF2	RP1400S	RP1401S	17.23	17.18	50	IRREGULAR	Overflow						
RP1440S_OF	RP1050	RP1440S	17.80	17.70	50	IRREGULAR	Overflow						
RP1441S_OF	RP2250S	RP1441S	17.66	17.61	50	IRREGULAR	Overflow						
RP1480_OF1	RP2900	RP1480S	17.60	17.50	50	IRREGULAR	Overflow						
RP1480S_OF	RP900	RP1480S	17.80	17.70	50	IRREGULAR	Overflow						
RP150_OF	RP200	RP150	17.70	17.60	50	IRREGULAR	Overflow						
RP1500S_OF1	RP900	RP1500S	17.30	17.20	50	IRREGULAR	Overflow						
RP1500S_OF2	RP5300	RP1500S	16.60	16.50	50	IRREGULAR	Overflow						
RP1700S_OF	RP1100	RP1700S	16.30	16.20	50	IRREGULAR	Overflow						
RP1800S_OF	RP4970	RP1800S	16.50	16.40	50	IRREGULAR	Overflow						
RP1900S_OF	RP4900	RP1900S	17.00	16.90	50	IRREGULAR	Overflow						
RP2000S_OF	RP3005	RP2000S	17.00	16.90	50	IRREGULAR	Overflow						
RP2020S_OF1	RP3202	RP2020S	16.60	16.50	50	IRREGULAR	Overflow						
RP2020S_OF2	RP3000	RP2020S	17.20	17.10	50	IRREGULAR	Overflow						
RP2040S_OF	RP325	RP2040S	16.90	16.80	50	IRREGULAR	Overflow						
RP2060S_OF	RP330S	RP2060S	16.40	16.30	50	IRREGULAR	Overflow						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP2100S_OF1	RP3100	RP2100S	17.50	17.40	50	IRREGULAR	Overflow						
RP2100S_OF2	RP3100S	RP2100S	16.80	16.70	50	IRREGULAR	Overflow						
RP2200S_OF	RP1200	RP2200S	17.10	17.00	50	IRREGULAR	Overflow						
RP2250S_OF	RP2100S	RP2250S	17.00	16.90	50	IRREGULAR	Overflow						
RP2350S_OF	RP3100S	RP2350S	16.40	16.30	50	IRREGULAR	Overflow						
RP2400S_OF1	RP1200	RP2400S	17.50	17.40	50	IRREGULAR	Overflow						
RP2400S_OF2	RP2500S	RP2400S	16.60	16.50	50	IRREGULAR	Overflow						
RP2500S_OF	RP6550	RP2500S	16.20	16.10	50	IRREGULAR	Overflow						
RP2600S_OF	RP6500	RP2600S	16.60	16.50	50	IRREGULAR	Overflow						
RP2650S_OF	RP6250	RP2650S	17.00	16.90	50	IRREGULAR	Overflow						
RP2700_OF2	RP2701	RP2700	17.60	17.50	50	IRREGULAR	Overflow						
RP2701-OF	RP2703	RP2701	17.20	17.10	50	IRREGULAR	Overflow						
RP2800S_OF	RP2801	RPN100	16.47	16.42	50	IRREGULAR	Overflow						
RP2801S_OF	RP2800S	RP2801S	17.39	17.29	50	IRREGULAR	Overflow						
RP2802S_OF	RP2801	RP2802S	16.94	16.84	50	IRREGULAR	Overflow						
RP2900_OF	RP800	RP2900	17.70	17.60	50	IRREGULAR	Overflow						
RP2900S_OF1	RP6000	RP2900S	16.60	16.50	50	IRREGULAR	Overflow						
RP2900S_OF2	RP2650S	RP2900S	15.90	15.80	50	IRREGULAR	Overflow						
RP2901-OF	RP2900	RP2903	16.80	16.70	50	IRREGULAR	Overflow						
RP2904-OF2	RP2903	RP2703	17.25	17.20	50	IRREGULAR	Overflow						
RP3000S_OF	RP3300	RP3000S	17.40	17.30	50	IRREGULAR	Overflow						
RP3100S_OF	RP3300	RP3100S	17.10	17.00	50	IRREGULAR	Overflow						
RP3200_OF1	RP3300	RP3200	17.70	17.60	50	IRREGULAR	Overflow						
RP3200S_OF1	RP1300	RP3200S	17.10	17.00	50	IRREGULAR	Overflow						
RP3200S_OF2	RP2500S	RP3200S	17.10	17.00	50	IRREGULAR	Overflow						
RP325_OF	RP3010	RP325	17.00	16.90	50	IRREGULAR	Overflow						
RP335S_OF	RP330S	RP335S	16.80	16.70	50	IRREGULAR	Overflow						
RP3400_OF	RP3450	RP3400	16.80	16.70	202	IRREGULAR	Overflow						
RP3400S_OF	RP6600	RP3400S	16.20	16.10	50	IRREGULAR	Overflow						
RP340S_OF	RP338	RP340S	14.40	14.30	50	IRREGULAR	Overflow						
RP3450_OF	RP3500	RP3450	16.70	16.60	50	IRREGULAR	Overflow						
RP3450S_OF	RP6500	RP3450S	17.10	17.00	50	IRREGULAR	Overflow						
RP3500S_OF	RP6300	RP3500S	17.10	17.00	50	IRREGULAR	Overflow						
RP3550_OF	RP3600	RP3550	16.70	16.60	50	IRREGULAR	Overflow						
RP3550S_OF	RP7100	RP3550S	15.20	15.10	50	IRREGULAR	Overflow						
RP3600_OF	RP3700	RP3600	16.30	16.20	50	IRREGULAR	Overflow						
RP3600S_OF1	RP3210	RP3600S	15.70	15.60	50	IRREGULAR	Overflow						
RP3600S_OF2	RP4300S	RP3600S	16.10	16.00	50	IRREGULAR	Overflow						
RP3650S_OF	RP3000S	RP3650S	17.20	17.10	50	IRREGULAR	Overflow						
RP3700S_1_OF	RP4380S_4	RP3700S_1	16.70	16.60	50	IRREGULAR	Overflow						
RP3700S_10_OF	RP3700S_5	RP3700S_10	16.05	16.00	50	IRREGULAR	Overflow						
RP3700S_13_OF	RP3700S_10	RP3700S_13	16.00	15.90	50	IRREGULAR	Overflow						
RP3700S_5_OF	RP3700S_1	RP3700S_5	16.40	16.30	50	IRREGULAR	Overflow						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP3700S_OF	RP3700S_13	RP3700S	14.95	14.90	50	IRREGULAR	Overflow						
RP3700S_OF2	RP3790S_9	RP3700S	16.05	16.00	50	IRREGULAR	Overflow						
RP3740S_OF1	RP3700S_1	RP3740S	15.70	15.60	50	IRREGULAR	Overflow						
RP3740S_OF2	RP1600	RP3740S	16.30	16.20	50	IRREGULAR	Overflow						
RP3780S_OF	RP3300	RP3780S	16.30	16.20	50	IRREGULAR	Overflow						
RP3790S_1_OF	RP3200	RP3790S_1	16.60	16.50	50	IRREGULAR	Overflow						
RP3790S_8_OF	RP3790S	RP3790S_8	17.25	17.20	50	IRREGULAR	Overflow						
RP3790S_9_OF1	RP3790S_8	RP3790S_9	16.60	16.50	50	IRREGULAR	Overflow						
RP3790S_9_OF2	RP3205	RP3790S_9	17.15	17.10	50	IRREGULAR	Overflow						
RP3790S_OF	RP3790S_1	RP3790S	17.35	17.30	50	IRREGULAR	Overflow						
RP3790S1_OF2	RP3780S	RP3790S_1	16.30	16.20	50	IRREGULAR	Overflow						
RP3800S_OF	RP6600	RP3800S	16.70	16.60	50	IRREGULAR	Overflow						
RP4000S_OF1	RP7500	RP4000S	16.70	16.60	50	IRREGULAR	Overflow						
RP4000S_OF2	RP4100S	RP4000S	16.00	15.90	50	IRREGULAR	Overflow						
RP4100S_OF	RP1650	RP4100S	16.10	16.00	50	IRREGULAR	Overflow						
RP4200S_OF	RP7300	RP4200S	16.80	16.70	50	IRREGULAR	Overflow						
RP4250S_OF	RP7300	RP4250S	16.00	15.90	50	IRREGULAR	Overflow						
RP4340S_OF	RP4950S	RP4340S	16.50	16.40	50	IRREGULAR	Overflow						
RP4380S_2_OF1	RP1700	RP4380S_2	16.70	16.60	50	IRREGULAR	Overflow						
RP4380S_3_OF1	RP4380S_2	RP4380S_3	16.15	16.10	50	IRREGULAR	Overflow						
RP4380S_3_OF2	RP4300S	RP4380S_3	15.80	15.70	50	IRREGULAR	Overflow						
RP4380S_4_OF	RP4380S_3	RP4380S_4	16.50	16.40	50	IRREGULAR	Overflow						
RP4380S_OF1	RP4380S_3	RP4380S	16.80	16.70	50	IRREGULAR	Overflow						
RP4500S_OF	RP3450	RP4500S	16.30	16.20	50	IRREGULAR	Overflow						
RP4530S_OF1	RP4550S	RP4530S	16.80	16.70	50	IRREGULAR	Overflow						
RP4550S_OF	RP3450	RP4550S	16.50	16.40	50	IRREGULAR	Overflow						
RP4580S_OF1	RP3700	RP4580S	16.80	16.70	50	IRREGULAR	Overflow						
RP4580S_OF2	RP3450	RP4580S	16.30	16.20	50	IRREGULAR	Overflow						
RP4700S_OF1	RP7355	RP4700S	16.90	16.80	50	IRREGULAR	Overflow						
RP4700S_OF2	RP5200S	RP4700S	16.10	16.00	50	IRREGULAR	Overflow						
RP4950S_OF	RP4500S	RP4950S	16.30	16.20	50	IRREGULAR	Overflow						
RP5000S_OF	RP5200S	RP5000S	16.00	15.90	50	IRREGULAR	Overflow						
RP500S_OF	RP500	RP500S	17.20	17.10	50	IRREGULAR	Overflow						
RP5200S_OF	RP1900	RP5200S	16.10	16.00	50	IRREGULAR	Overflow						
RP5300_OF	RP1000	RP5300	16.40	16.30	50	IRREGULAR	Overflow						
RP5350S_OF	RP3550	RP5350S	17.80	17.70	50	IRREGULAR	Overflow						
RP5400_OF1	RP900	RP5400	17.90	17.80	729	IRREGULAR	Overflow						
RP5400_OF2	RP1500S	RP5400	15.80	15.70	50	IRREGULAR	Overflow						
RP5400S_OF1	RP3900	RP5400S	16.50	16.40	50	IRREGULAR	Overflow						
RP5400S_OF2	RP5500S	RP5400S	15.90	15.80	50	IRREGULAR	Overflow						
RP5500_OF	RP800	RP5500	16.90	16.80	50	IRREGULAR	Overflow						
RP5500S_OF	RP2000	RP5500S	16.80	16.70	50	IRREGULAR	Overflow						
RP5520_OF	RP5525	RP5520	12.90	12.80	50	IRREGULAR	Overflow						

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP5525_OF	RP5526	RP5525	16.30	16.20	50	IRREGULAR	Overflow						
RP5526_OF	RP5527	RP5526	11.20	11.10	50	IRREGULAR	Overflow						
RP600S_OF	RP4200	RP600S	17.10	17.00	50	IRREGULAR	Overflow						
RP6900_OF	RP4100S	RP6900	16.00	15.90	50	IRREGULAR	Overflow						
RP7000_OF	RP4200S	RP7000	17.00	16.90	50	IRREGULAR	Overflow						
RP700S_OF1	RP4400	RP700S	17.40	17.30	50	IRREGULAR	Overflow						
RP700S_OF2	RP5510	RP700S	16.10	16.00	50	IRREGULAR	Overflow						
RP710_OF	RP7200	RP7100	16.40	16.30	50	IRREGULAR	Overflow						
RP750S_OF	RP4100	RP750S	17.40	17.30	50	IRREGULAR	Overflow						
RP7800_OF	RP7700	RP7800	17.00	16.90	50	IRREGULAR	Overflow						
RP7826_OF	RP7850	RP7825	16.50	16.40	34	IRREGULAR	Overflow						
RP800S_OF	RP700	RP800S	16.90	16.80	50	IRREGULAR	Overflow						
RP800S_OF2	RP5500	RP800S	16.00	15.90	50	IRREGULAR	Overflow						
RP802_OF	RPN700	RP802	17.70	17.65	50	IRREGULAR	Overflow						
RP810_OF	RP8010	RP8100	18.80	18.70	194	IRREGULAR	Overflow						
RP8410_OF	RPC51200	RP8410	17.20	17.10	50	IRREGULAR	Overflow						
RPC51100_OF1	RPC51500	RPC51100	15.60	15.50	50	IRREGULAR	Overflow						
RPC51100_OF2	RP7355	RPC51100	15.30	15.20	50	IRREGULAR	Overflow						
RPC51200_OF	RPC51100	RPC51200	15.30	15.20	50	IRREGULAR	Overflow						
RPC51400_OF1	RP7300	RPC51400	16.50	16.40	50	IRREGULAR	Overflow						
RPC51400_OF2	RPC51100	RPC51400	16.30	16.20	50	IRREGULAR	Overflow						
RPC51500_OF	RP8050	RPC51500	16.60	16.50	50	IRREGULAR	Overflow						
RPN100_OF	RP7700	RPN100	16.80	16.70	50	IRREGULAR	Overflow						
RPN100_OF_2	RP7600	RPN100	16.26	16.21	50	IRREGULAR	Overflow						
RPN450_OF1	RP8025	RPN450	17.50	17.40	50	IRREGULAR	Overflow						
RPN450_OF2	LW450	RPN450	15.90	15.80	50	IRREGULAR	Overflow						
RPN600_OF	RPN100	RPN600S	17.00	16.90	50	IRREGULAR	Overflow						
RPN700_OF	RP1201S	RPN700	17.30	17.20	50	IRREGULAR	Overflow						
RPN800_OF	RPN700	RPN800	16.90	16.80	50	IRREGULAR	Overflow						
RPN802_OF	RP800-2	RP802	17.23	17.13	50	IRREGULAR	Overflow						
RPN900_OF	OD110	RPN900	17.80	17.70	50	IRREGULAR	Overflow						
RPNA-100_OF1	RP200	RPNA-100	18.30	18.20	50	IRREGULAR	Overflow						
RPNA-100_OF2	RP2700	RPNA-100	18.40	18.30	50	IRREGULAR	Overflow						
SB-302S_OF	RPC51200	SB-302S	15.57	15.52	50	IRREGULAR	Overflow						
SB-303S_OF	LW9700	SB-303S	16.82	16.77	50	IRREGULAR	Overflow						
LW0150_OF	LW0200	LW0150	15.80	15.70	50	TRAPEZOIDAL	Overflow	0.030	36	4800	1	0.0	0.0
LW037R	LW0380	LW0370	16.10	16.00	50	TRAPEZOIDAL	Overflow	0.030	48	1800	1	0.0	0.0
R1401R	RP1500	RP1400	18.50	18.40	60	TRAPEZOIDAL	Overflow	0.040	60	2400	1	0.0	0.0
RP020R	LW0300	LW0200	15.85	15.75	50	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP26R	RP270	RP260	19.00	18.90	62	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP2700_OF1	RP250	RP2700	18.00	17.90	50	TRAPEZOIDAL	Overflow	0.030	24	6000	1	0.0	0.0
RP4401	RP4500	RP4400	19.00	18.90	45	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP5000R	RP1000	RP5000	19.00	18.90	32	TRAPEZOIDAL	Overflow	0.040	60	2400	1	0.0	0.0

Link	Inlet Node	Outlet Node	Inlet Elv. (ft NAVD)	Outlet Elv. (ft NAVD)	Length (ft)	Type	Subtype	Roughness (n)	Depth (in)	Width (in)	Barrels	Entrance Loss	Exit Loss
RP5602	RP5700	RP5600	19.00	18.90	45	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP5801	RP5900	RP5800	19.00	18.90	45	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP6000R	RP6200	RP6000	19.00	18.90	32	TRAPEZOIDAL	Overflow	0.040	60	2400	1	0.0	0.0
RP6400R	RP6500	RP6400	18.50	18.40	50	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP6701	RP6800	RP6700	18.50	18.40	50	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP7401	RP7500	RP7400	18.80	18.70	50	TRAPEZOIDAL	Overflow	0.040	48	1800	1	0.0	0.0
RP7750R	RP7700	RP7750	17.72	17.35	43	TRAPEZOIDAL	Overflow	0.040	84	2400	1	0.0	0.0
RP7900_OF	RP8000	RP7900	18.00	17.60	50	TRAPEZOIDAL	Overflow	0.040	60	2400	1	0.0	0.0

Link	Inlet Node	Outlet Node	Type	Subtype	Shape	Inlet Elv. (ft NAVD)	Length (ft)	Height (ft)	Coefficient
C51-300-1-W	RP8410	C51-300-1	Weir	TRANSVERSE		17.94	4.00	0.50	3.10
CS2-W1	RP235-3	RP235	Weir	TRANSVERSE		12.03	2.50	1.53	3.10
CS2-W2	RP235-3	RP235	Weir	TRANSVERSE		13.56	4.50	2.34	3.10
CS2-W3	RP235-3	RP235	Weir	TRANSVERSE		15.90	10.50	3.94	3.10
CS3	LWS300-4	LWS304S	Weir	TRANSVERSE		12.00	4.00	2.00	3.10
CS4	LWS304S	LWS302	Weir	TRANSVERSE		13.09	2.00	2.00	3.10
D1-W	RP072S	RP071S	Weir	TRANSVERSE		16.42	2.00	1.00	3.10
LW_D1	LW-651	LW-651S	Weir	TRANSVERSE		15.68	2.00	0.50	3.10
LW104-1-W	C51K	LW104-1	Weir	TRANSVERSE		15.73	5.00	4.22	3.10
LW-701S	LW-701S-2	LW-701S	Weir	TRANSVERSE		15.50	2.00	0.38	3.10
LWS303-5W	LWS303-1	LWS303-5	Weir	TRANSVERSE		10.87	3.00	2.00	3.10
OD100-W	OD100-1	OD100	Weir	TRANSVERSE		21.55	1.00	0.50	3.10
RP255	RP255-1	RP255	Weir	V-NOTCH		17.55	1.75	0.50	3.10
RP2801_W	RP2803	RP2801S	Weir	TRANSVERSE		15.55	2.00	2.00	3.10
S130	SB-301S-2	SB-301S-1	Weir	TRANSVERSE		16.41	8.99	1.98	3.10
S139	OD110-4	OD110-3	Weir	TRANSVERSE		17.10	3.00	2.45	3.10
S142	OD101	OD101-2	Weir	TRANSVERSE		17.02	3.00	2.53	3.10
S43	RP1205S	RP1200S	Weir	V-NOTCH		12.55	0.80	0.75	3.10
SB-303SW	SB-303S-3	SB-303S-2	Weir	TRANSVERSE		12.17	4.00	2.00	3.10
WEIR@LW9215-LW9220	LW9220	LW9215	Weir	TRANSVERSE		9.45	10.00	10.00	3.10
WEIR@LW99900-LW0050	LW0050	LW9900	Weir	TRANSVERSE		9.45	10.00	10.00	3.10
WEIR@LWS300S-LWS310_1	LWS310	LWS300S	Weir	V-NOTCH		11.55	0.67	0.67	3.10
WEIR@LWS300S-LWS310_2	LWS310	LWS300S	Weir	TRANSVERSE		14.00	10.00	10.00	3.10
WEIR@LWS400S-C51F1	LWS410	LWS400S	Weir	V-NOTCH		11.05	0.67	0.67	3.10
WEIR@LWS400S-C51F2	LWS410	LWS400S	Weir	TRANSVERSE		13.50	8.00	10.00	3.10
Weir@LWS520-C51E	C51E	LWS520	Weir	TRANSVERSE		14.55	25.00	10.00	3.10
WEIR@RP1440-RP1441	RP1441	RP1440S	Weir	TRANSVERSE		12.55	11.90	4.40	3.10
WEIR@RP1480-RP900	RP1481	RP1480S	Weir	TRANSVERSE		12.55	11.90	4.40	3.10
WEIR@RP150-RP200_1	RP155	RP150	Weir	TRANSVERSE		17.35	4.50	10.00	3.20
WEIR@RP150-RP200_2	RP155	RP150	Weir	TRANSVERSE		16.55	0.60	0.80	3.20
WEIR@RP1900-RP1925	RP1925	RP1900	Weir	TRANSVERSE		12.18	12.00	14.42	3.00
WEIR@RP250-RP240_1	RP240	RP250	Weir	TRANSVERSE		17.75	4.00	10.00	2.80
WEIR@RP250-RP240_2	RP240	RP250	Weir	V-NOTCH		12.07	0.67	0.67	3.10
WEIR@RP250-RP240_3	RP240	RP250	Weir	TRANSVERSE		14.82	1.50	2.00	2.80
Weir@RP2800S-RP2700	RP2805	RP2800S	Weir	TRANSVERSE		15.00	8.00	10.00	3.10
WEIR@RP2900-RP800	RP800	RP2900	Weir	TRANSVERSE		14.89	4.00	15.00	3.20
WEIR@RP300-RP400	RP400	ITID_LowM1	Weir	TRANSVERSE		20.55	500.00	20.00	2.80
WEIR@RP5300-RP5301_1	RP5301	RP5300	Weir	TRANSVERSE		15.00	4.00	10.00	3.10
WEIR@RP5300-RP5301_2	RP5301	RP5300	Weir	V-NOTCH		9.81	0.67	0.67	3.10

Link	Inlet Node	Outlet Node	Type	Subtype	Shape	Inlet Elv. (ft NAVD)	Length (ft)	Height (ft)	Coefficient
WEIR@RP7800-RP7750	RP7750	RP7800	Weir	TRANSVERSE		16.50	8.00	10.00	3.10
WEIR@RPN660-RPN650	RPN650	RPN660	Weir	TRANSVERSE		17.55	11.00	10.00	3.13
WEIR@RPNA-RP200	RP255-1	RP255	Weir	TRANSVERSE		18.05	2.15	1.50	2.80
WEIR1@LW450-LW451	LW451	LW450S	Weir	TRANSVERSE		14.77	7.50	10.00	3.10
WEIR1@LW450-LW9901	LW9901	LW-451S	Weir	TRANSVERSE		15.00	8.00	10.00	3.10
WEIR1@LW500-LW505	LW501	LW500S	Weir	TRANSVERSE		14.64	2.00	1.90	3.10
WEIR1@LW9225-LW9240	LW9226	LW9225	Weir	TRANSVERSE		14.55	6.00	10.00	3.00
WEIR1@LW9700-LW9750	LW9750	LW9700	Weir	TRANSVERSE		15.00	8.00	10.00	3.10
WEIR1@RP3450-3500	RP3500	RP3450	Weir	TRANSVERSE		15.50	8.00	10.00	3.10
WEIR1@RP8100-C51B	RP8010	RP8100	Weir	TRANSVERSE		11.88	30.00	10.00	3.10
WEIR1@RPN100-RP7600	RPN110	RPN100	Weir	TRANSVERSE		15.19	8.00	10.00	3.10
WEIR2@LW450-LW451	LW451	LW450S	Weir	V-NOTCH		10.65	0.67	0.67	3.00
WEIR2@LW500-LW505	LW501	LW500S	Weir	V-NOTCH		10.52	0.50	0.50	3.00
WEIR2@LW9225-LW9240	LW9226	LW9225	Weir	V-NOTCH		10.55	0.67	0.67	3.10
WEIR2@LW9700-LW9750	LW9750	LW9700	Weir	V-NOTCH		10.91	0.67	0.67	3.00
WEIR2@RLW450-LW9901	LW9901	LW-451S	Weir	V-NOTCH		10.60	0.67	0.67	3.00
WEIR2@RP3450-3500	RP3500	RP3450	Weir	V-NOTCH		12.05	0.67	0.67	3.10
WEIR2@RP8100-C51B	RP8010	RP8100	Weir	TRANSVERSE		14.49	66.00	10.00	3.10
Weir2@RPN100-RP7600	RPN110	RPN100	Weir	V-NOTCH		10.16	0.67	0.67	3.10
Weir2Syphon	SyphonUS	ITID_UpM1	Weir	TRANSVERSE		14.55	13.50	10.00	3.10
Wetl_Cntrl_Strct_2	RP1441S-2	RP1441S	Weir	TRANSVERSE		17.05	1.00	1.00	3.10
C51-300-1-Or	RP8410	C51-300-1	Orifice	SIDE	CIRCULAR	12.15	0.50	0.00	0.65
D1-B	RP072S	RP071S	Orifice	SIDE	CIRCULAR	11.89	1.00	0.00	0.65
LW104-1-Or	C51L	LW104-1	Orifice	SIDE	CIRCULAR	10.62	0.39	0.00	0.65
LW500S_Or	LW501	LW500S	Orifice	BOTTOM	CIRCULAR	16.45	3.00	0.00	0.65
LW-651S_OR	LW-651	LW-651S	Orifice	SIDE	CIRCULAR	10.55	0.25	0.00	0.65
LW-701S_OR	LW-701S-2	LW-701S	Orifice	SIDE	CIRCULAR	10.38	0.25	0.00	0.65
LWS302_O	LWS304S	LWS302	Orifice	SIDE	CIRCULAR	12.50	1.00	0.00	0.65
ORIFICE@RP150-RP200	RP155	RP150	Orifice	SIDE	CIRCULAR	12.05	0.50	0.00	0.65
ORIFICE@RP2900-RP800	RP800	RP2900	Orifice	SIDE	CIRCULAR	12.05	0.75	0.00	0.65
ORIFICE@RPN660-RPN650	RPN650	RPN660	Orifice	SIDE	RECT_CLOSED	15.05	1.25	3.50	0.60
ORIFICE1@RP7800-RP7750	RP7750	RP7800	Orifice	SIDE	CIRCULAR	11.55	0.50	0.00	0.62
RP071S-Or1	RP072S	RP071S	Orifice	SIDE	CIRCULAR	17.26	2.00	0.00	0.65
RP1200S-Or	RP1205S	RP1200S	Orifice	BOTTOM	RECT_CLOSED	13.45	3.00	4.00	0.65
RP1441S-Or	RP1441S-2	RP1441S	Orifice	BOTTOM	RECT_CLOSED	17.95	2.00	4.00	0.65
RP5350-OR1	RP5350S-2	RP5350S	Orifice	SIDE	CIRCULAR	14.55	0.25	0.00	0.65
RP5350-OR2	RP5350S-2	RP5350S	Orifice	BOTTOM	CIRCULAR	16.55	3.00	0.00	0.65
RP5350-OR3	RP5350S-2	RP5350S	Orifice	SIDE	RECT_CLOSED	15.80	1.25	0.30	0.65
RPNA-100-O	RP255-1	RPNA-100	Orifice	BOTTOM	RECT_CLOSED	19.46	2.75	2.00	0.65

Link	Inlet Node	Outlet Node	Type	Subtype	Shape	Inlet Elv. (ft NAVD)	Length (ft)	Height (ft)	Coefficient
RPNA-100-Or	RPNA-100-1	RPNA-100	Orifice	BOTTOM	RECT_CLOSED	17.59	4.00	4.00	0.65
S266-O	SB-302S-2	SB-302S	Orifice	SIDE	CIRCULAR	12.07	0.25	0.00	0.65
SB-302S_O2	SB-302S-2	SB-302S	Orifice	BOTTOM	RECT_CLOSED	14.96	4.33	10.04	0.65
SB-303SOr	SB-303S-2	SB-303S	Orifice	BOTTOM	RECT_CLOSED	14.38	3.00	4.00	0.65

Appendix C

M-1 Canal Control Documentation

FORM #0157
Rev. 07/09

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ENVIRONMENTAL RESOURCE
PERMIT MODIFICATION NO. 50-00761-S
DATE ISSUED: FEBRUARY 10, 2014

PERMITTEE: INDIAN TRAIL IMPROVEMENT DISTRICT
(INDIAN TRAIL IMPROVEMENT DISTRICT M-1 BASIN)
13476 61ST STREET NORTH,
WEST PALM BEACH, FL 33412-1915

ORIGINAL PERMIT ISSUED: JUNE 12, 1980

ORIGINAL PROJECT DESCRIPTION: CONSTRUCTION AND OPERATION OF A WATER MANAGEMENT SYSTEM SERVING 22,800 ACRES OF RESIDENTIAL LANDS BY A RETENTION AREA, DIKE, PUMP STATION CONSISTING OF 5-100,000 GPM PUMPS, 2-54" ALUMINUM CMP'S WITH 84" FLASHBOARD RISERS DISCHARGING INTO L-8, AN INTERNAL PUMP STATION CONSISTING OF 3-40,000 GPM PUMPS, CANAL ENLARGEMENTS AND ROADWAY IMPROVEMENTS, A PLUG WITH 1-72" ALUMINUM CMP WITH 1-96" RISER AND FLASHBOARDS.

APPROVED MODIFICATION: MODIFICATION OF THE INDIAN TRAIL IMPROVEMENT DISTRICT STORMWATER MANAGEMENT SYSTEM TO ALLOW FOR 200 CFS DISCHARGE THROUGH THE M-1 CANAL INTO THE C-51 CANAL IN ACCORDANCE WITH AN OPERATIONS SCHEDULE, AND TO AUTHORIZE OTHER COMPONENTS OF THE ITID SYSTEM.

PROJECT LOCATION: PALM BEACH COUNTY, SECTION - TWP 42S RGE 39E
SECTION - TWP 43S RGE 40E

PERMIT DURATION: See Special Condition No:1.

This is to notify you of the District's agency action concerning Permit Application No. 130628-6, dated June 24, 2013. This action is taken pursuant to the provisions of Chapter 373, Part IV, Florida Statutes (F.S.).

Based on the information provided, District rules have been adhered to and an Environmental Resource Permit Modification is in effect for this project subject to:

1. Not receiving a filed request for an administrative hearing pursuant to Section 120.57 and Section 120.569, or request a judicial review pursuant Section 120.68, Florida Statutes.
2. The attached 18 General Conditions.
3. The attached 9 Special Conditions.
4. The attached 2 Exhibits.

Should you object to these conditions, please refer to the attached "Notice of Rights" which addresses the procedures to be followed if you desire a public hearing or other review of the proposed agency action. Should you wish to object to the proposed agency action or file a petition, please provide written objections, petitions and/or waivers to:

Juanita Addie, Deputy Clerk, MSC9610
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416-4680

Please contact this office if you have any questions concerning this matter. If we do not hear from you in accordance with the "Notice of Rights", we will assume that you concur with the District's action.

CERTIFICATION OF SERVICE

I HEREBY CERTIFY that the Staff Report, Conditions and Notice of Rights have been mailed or electronically submitted to the Permittee (and the persons listed on the attached staff report distribution list) no later than 5:00 p.m. on this 11th day of February, 2014, in accordance with Section 120.60(3), Florida Statutes, and a copy has been filed and acknowledged with the Deputy District Clerk.

By Juanita A
DEPUTY CLERK
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Attachments

SPECIAL CONDITIONS

1. The construction phase of this permit shall expire on February 10, 2019.
2. Operation of the stormwater management system shall be the responsibility of the PERMITTEE.
3. Discharge Facilities:

Basin: UPPER M-1, Structure: PS #2 BYPASS

130 LF of 84" dia. CORRUGATED METAL PIPE culvert.
130 LF of 108" dia. CORRUGATED METAL PIPE culvert.
1-84" wide X ' high slide gate'NGVD 29.
1-108" wide X ' high slide gate'NGVD 29.

Receiving body : LOWER M-1 BASIN
Control elev : 16 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: UPPER M-1, Structure: PS #3

5-100000gpms with pump on at elev. 16'NGVD 29.

Receiving body : M-1 IMPOUNDMENT
Control elev : 16 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: 40TH ST.

2-' wide X ' high slide gateS'NGVD 29.
4-48" wide X ' high slide gateS'NGVD 29.

Receiving body : M-1 CANAL
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: PS #2

3-44000gpms with pump on at elev. 15'NGVD 29.

Receiving body : UPPER M-1 BASIN
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: ROACH

2-84" dia. REINFORCED CONCRETE PIPE culverts each 76' long.
2-84" wide X ' high slide gateS with invert at elev. 7' NGVD 29 AND with crest at elev. 14'NGVD 29.

Receiving body : M-1 CANAL
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: M-1 IMPOUNDMENT, Structure: NE

3-37.5" WIDE SHARP CRESTED weirs with crest at elev. 13.6' NGVD 29.
3-37.5" W X 40.8" H SHARP CRESTED weirs with crest at elev. 21.1' NGVD 29.
1-11.25' DIAMETER SEMI-CIRCULAR weir with crest at elev. 24.5' NGVD 29.

Receiving body : ITID OUTFALL CANAL
Control elev : 16 feet NGVD 29. /21 FEET NGVD 29 DRY SEASON.

Basin: M-1 IMPOUNDMENT, Structure: SW

2-38.75" WIDE SHARP CRESTED weirs with crest at elev. 15' NGVD 29.
2-38.75" WIDE SHARP CRESTED weirs with crest at elev. 21' NGVD 29.
2-38.75" W X 24" H RECTANGULAR ORIFICE weirs with crest at elev. 21' NGVD 29.
1-84" DIAMETER SEMI-CIRCULAR weir with crest at elev. 24.5' NGVD 29.

Receiving body : L-8 CANAL
Control elev : 16 feet NGVD 29. /21 FEET NGVD 29 DRY SEASON.

4. A stable, permanent and accessible elevation reference shall be established on or within one hundred (100) feet of all permitted discharge structures no later than the submission of the certification report. The location of the elevation reference must be noted on or with the certification report.

5. A turbidity control plan shall be implemented. Prior to the commencement of construction in surface waters, floating turbidity curtains with weighted skirts that extend to the bottom of the water body shall be properly installed to isolate adjacent waters from the work area. The floating turbidity curtains shall be maintained and shall remain in place until all construction is complete and turbidity levels in the project area are within 29 NTUs of background levels. The permittee shall be responsible for ensuring that turbidity control devices are inspected daily and maintained in good working order so that there are no violations of state water quality standards outside of the turbidity screens.

6. Discharge from the ITID structures located at the confluence of the M-1 Canal and the C-51 Canal to the C-51 Canal shall be in accordance with Exhibit 2.1.

7. On or before September 1, 2014, the permittee shall purchase, install, and make fully operational the proposed telemetry system at the Roach & 40th Street structures, the Okeechobee Boulevard bridge over the M-1 Canal, and the Amil location, which will provide the following:

   a. Real-time access to a persistent web page or supervisory control and data acquisition (SCADA) view only application that does not time-out and that can be accessed by multiple users at a time;

   b. Daily, breakpoint, and mean daily stage and flow data for at least the last 30 days;

   c. Access to flow equations for the various discharge structures when set up in the telemetry system. Flow equations for the discharge structures will be calibrated to measured flow data and approved by the SFWMD;

   d. Gate openings reported in increments of 0.1 feet with an indicator bar and number (gate opening) for each gate.

   Access to the telemetry data shall be made, at a minimum, to SFWMD and Village of Royal Palm Beach staff. Prior to September 1, 2014, but no later than June 1, 2014, ITID shall provide the Village of Royal Palm Beach staff the means of electronically accessing data from the current telemetry system, including any necessary passwords.

8. Prior to the initiation of the Pump Plan, the permittee shall provide a copy of the executed agreement with the City of West Palm Beach.

9. Prior to commencement of any construction activities associated with the M-1 Impoundment Plan, the permitte shall

apply for and obtain a Dewatering Permit.

GENERAL CONDITIONS

1. All activities shall be implemented following the plans, specifications and performance criteria approved by this permit. Any deviations must be authorized in a permit modification in accordance with Rule 62-330.315, F.A.C. Any deviations that are not so authorized shall subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S. (2012).

2. A Recorded Notice of Environmental Resource Permit may be recorded in the county public records in accordance with Rule 62-330.090(7), F.A.C. Such notice is not an encumbrance upon the property.

3. Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be installed immediately prior to, and be maintained during and after construction as needed, to prevent adverse impacts to the water resources and adjacent lands. Such practices shall be in accordance with the "State of Florida Erosion and Sediment Control Designer and Reviewer Manual" (Florida Department of Environmental Protection and Florida Department of Transportation June 2007), and the "Florida Stormwater Erosion and Sedimentation Control Inspector's Manual" (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008), unless a project-specific erosion and sediment control plan is approved or other water quality control measures are required as part of the permit.

4. At least 48 hours prior to beginning the authorized activities, the permittee shall submit to the Agency a fully executed Form 62-330.350(1), "Construction Commencement Notice" indicating the expected start and completion dates. If available, an Agency website that fulfills this notification requirement may be used in lieu of the form.

5. Unless the permit is transferred under Rule 62-330.340, F.A.C., or transferred to an operating entity under Rule 62-330.310, F.A.C., the permittee is liable to comply with the plans, terms and conditions of the permit for the life of the project or activity.

6. Within 30 days after completing construction of the entire project, or any independent portion of the project, the permittee shall provide the following to the Agency, as applicable:
   a. For an individual, private single-family residential dwelling unit, duplex, triplex, or quadruplex- "Construction Completion and Inspection Certification for Activities Associated With a Private Single-Family Dwelling Unit"[Form 62-330.310(3)]; or
   b. For all other activities- "As-Built Certification and Request for Conversion to Operational Phase" [Form 62-330.310(1)].
   c. If available, an Agency website that fulfills this certification requirement may be used in lieu of the form.

7. If the final operation and maintenance entity is a third party:
   a. Prior to sales of any lot or unit served by the activity and within one year of permit issuance, or within 30 days of as-built certification, whichever comes first, the permittee shall submit, as applicable, a copy of the operation and maintenance documents (see sections 12.3 thru 12.3.3 of Applicant's Handbook Volume I) as filed with the Department of State, Division of Corporations and a copy of any easement, plat, or deed restriction needed to operate or maintain the project, as recorded with the Clerk of the Court in the County in which the activity is located.
   b. Within 30 days of submittal of the as- built certification, the permittee shall submit "Request for Transfer of Environmental Resource Permit to the Perpetual Operation Entity" [Form 62-330.310(2)] to transfer the permit to the operation and maintenance entity, along with the documentation requested in the form. If available, an Agency website that fulfills this transfer requirement may be used in lieu of the form.

8. The permittee shall notify the Agency in writing of changes required by any other regulatory agency that require changes to the permitted activity, and any required modification of this permit must be obtained prior to implementing the changes.

9. This permit does not:
   a. Convey to the permittee any property rights or privileges, or any other rights or privileges other than those specified

herein or in Chapter 62-330, F.A.C.;
b. Convey to the permittee or create in the permittee any interest in real property;
c. Relieve the permittee from the need to obtain and comply with any other required federal, state, and local authorization, law, rule, or ordinance; or
d. Authorize any entrance upon or work on property that is not owned, held in easement, or controlled by the permittee.

10. Prior to conducting any activities on state-owned submerged lands or other lands of the state, title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund, the permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees of the Internal Improvement Trust Fund shall not be considered received until it has been fully executed.

11. The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities that may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any project authorized by the permit.

12. The permittee shall notify the Agency in writing:
a. Immediately if any previously submitted information is discovered to be inaccurate; and
b. Within 30 days of any conveyance or division of ownership or control of the property or the system, other than conveyance via a long-term lease, and the new owner shall request transfer of the permit in accordance with Rule 62-330.340, F.A.C. This does not apply to the sale of lots or units in residential or commercial subdivisions or condominiums where the stormwater management system has been completed and converted to the operation phase.

13. Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the project or activities to ensure conformity with the plans and specifications authorized in the permit.

14. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered binding unless a specific condition of this permit or a formal determination under Rule 62-330.201, F.A.C., provides otherwise.

16. The permittee shall provide routine maintenance of all components of the stormwater management system to remove trapped sediments and debris. Removed materials shall be disposed of in a landfill or other uplands in a manner that does not require a permit under Chapter 62-330, F.A.C., or cause violations of state water quality standards.

17. This permit is issued based on the applicant's submitted information that reasonably demonstrates that adverse water resource-related impacts will not be caused by the completed permit activity. If any adverse impacts result, the Agency will require the permittee to eliminate the cause, obtain any necessary permit modification, and take any necessary corrective actions to resolve the adverse impacts.

18. A complete copy of this permit shall be kept at the work site of the permitted activity during the construction phase, and shall be available for review at the work site upon request by the Agency staff. The permittee shall require the contractor to review the complete permit prior to beginning construction.

NOTICE OF RIGHTS

As required by Sections 120.569(1), and 120.60(3), Fla. Stat., following is notice of the opportunities which may be available for administrative hearing or judicial review when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Not all the legal proceedings detailed below may be an applicable or appropriate remedy. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (SFWMD or District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Fla. Stat. Persons seeking a hearing on a District decision which does or may determine their substantial interests shall file a petition for hearing with the District Clerk within 21 days of receipt of written notice of the decision, unless one of the following shorter time periods apply: 1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Fla. Stat.; or 2) within 14 days of service of an Administrative Order pursuant to Subsection 373.119(1), Fla. Stat. "Receipt of written notice of agency decision" means receipt of either written notice through mail, or electronic mail, or posting that the District has or intends to take final agency action, or publication of notice that the District has or intends to take final agency action. Any person who receives written notice of a SFWMD decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

Filing Instructions

The Petition must be filed with the Office of the District Clerk of the SFWMD. Filings with the District Clerk may be made by mail, hand-delivery or facsimile. **Filings by e-mail will not be accepted.** Any person wishing to receive a clerked copy with the date and time stamped must provide an additional copy. A petition for administrative hearing is deemed filed upon receipt during normal business hours by the District Clerk at SFWMD headquarters in West Palm Beach, Florida. Any document received by the office of the SFWMD Clerk after 5:00 p.m. shall be filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the SFWMD Clerk, P.O. Box 24680, West Palm Beach, Florida 33416.
- Filings by hand-delivery must be delivered to the Office of the SFWMD Clerk. **Delivery of a petition to the SFWMD's security desk does <u>not</u> constitute filing. To ensure proper filing, it will be necessary to request the SFWMD's security officer to contact the Clerk's office.** An employee of the SFWMD's Clerk's office will receive and file the petition.
- Filings by facsimile must be transmitted to the SFWMD Clerk's Office at (561) 682-6010. Pursuant to Subsections 28-106.104(7), (8) and (9), Fla. Admin. Code, a party who files a document by facsimile represents that the original physically signed document will be retained by that party for the duration of that proceeding and of any subsequent appeal or subsequent proceeding in that cause. Any party who elects to file any document by facsimile shall be responsible for any delay, disruption, or interruption of the electronic signals and accepts the full risk that the document may not be properly filed with the clerk as a result. The filing date for a document filed by facsimile shall be the date the SFWMD Clerk receives the complete document.

Initiation of an Administrative Hearing

Pursuant to Rules 28-106.201 and 28-106.301, Fla. Admin. Code, initiation of an administrative hearing shall be made by written petition to the SFWMD in legible form and on 8 and 1/2 by 11 inch white paper. All petitions shall contain:

1. Identification of the action being contested, including the permit number, application number, District file number or any other SFWMD identification number, if known.
2. The name, address and telephone number of the petitioner and petitioner's representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency determination.
4. A statement of when and how the petitioner received notice of the SFWMD's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the SFWMD's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the SFWMD's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the SFWMD to take with respect to the SFWMD's proposed action.

A person may file a request for an extension of time for filing a petition. The SFWMD may, for good cause, grant the request. Requests for extension of time must be filed with the SFWMD prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and that the SFWMD and any other parties agree to or oppose the extension. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

If the District takes action with substantially different impacts on water resources from the notice of intended agency decision, the persons who may be substantially affected shall have an additional point of entry pursuant to Rule 28-106.111, Fla. Admin. Code, unless otherwise provided by law.

Mediation

The procedures for pursuing mediation are set forth in Section 120.573, Fla. Stat., and Rules 28-106.111 and 28-106.401-.405, Fla. Admin. Code. The SFWMD is not proposing mediation for this agency action under Section 120.573, Fla. Stat., at this time.

RIGHT TO SEEK JUDICIAL REVIEW

Pursuant to Sections 120.60(3) and 120.68, Fla. Stat., a party who is adversely affected by final SFWMD action may seek judicial review of the SFWMD's final decision by filing a notice of appeal pursuant to Florida Rule of Appellate Procedure 9.110 in the Fourth District Court of Appeal or in the appellate district where a party resides and filing a second copy of the notice with the SFWMD Clerk within 30 days of rendering of the final SFWMD action.

FINAL APPROVED BY EXECUTIVE DIRECTOR FEBRUARY 10, 2014

Last Date For Agency Action: February 12, 2014

INDIVIDUAL ENVIRONMENTAL RESOURCE PERMIT STAFF REPORT

Project Name: Indian Trail Improvement District M-1 Basin

Permit No.: 50-00761-S
Application No.: 130628-6

Application Type: Environmental Resource (Construction/Operation Modification)

Location: Palm Beach County, S-/T42S/R39E
S-/T43S/R40E

Permittee : Indian Trail Improvement District

Operating Entity : Permittee

Project Area: 18,527.00 acres

Permit Area: 18,527.00 acres

Project Land Use: Residential

Drainage Basin: L-8
Drainage Basin: C-51 WEST

Receiving Body: C-51 & L-8 CANALS **Class:** CLASS III

Special Drainage District: Indian Trail Improvement District

Conservation Easement To District : No
Sovereign Submerged Lands: No

PROJECT PURPOSE:

This application is a request for modification of the Indian Trail Improvement District (ITID) stormwater management (SWM) system to allow for 200 cfs discharge through the M-1 Canal into the C-51 Canal in accordance with an Operations Schedule, and to authorize other components of the ITID system.

PROJECT EVALUATION:

PROJECT SITE DESCRIPTION:

The ITID is located in central Palm Beach County and operates a stormwater management system serving 18,527 acres of the ITID M-1 Basin and an additional 5,024.6 acres of offsite areas, consisting of the Rustic Lake/Kramer Parcel, the Bayhill/Stonewal development, School Site 'H', the Pines West Park, Palm Beach County Section 32, the southern half of Northlake Boulevard extending along the northern boundary of ITID, and a portion of the JW Corbett Area. Please refer to Exhibits 1.1 and 1.2 for general and detailed location maps, respectively.

BACKGROUND:

On April 15, 1976, the Governing Board of the SFWMD gave conceptual approval for a SWM system serving the M-1 Acreage area, and on June 12, 1980, construction and operation approval was granted (Permit No. 50-00761-S).

Permit No. 50-00761-S, Application No. 911001-8 was issued on December 10, 1992, for the construction and operation of the "5 Point Plan", which approved an operation schedule that varied the control elevations during the wet season in the Upper and Lower M-1 basins. It also approved an operating schedule for "off-peak" discharge to the C-51 canal.

Permit No. 50-00761-S, Application No 931102-9 was issued on February 10, 1994, for the modification of the Upper and Lower M-1 Basin boundaries and renewal of the "5 Point Plan" for another year.

On February 9, 1995, Permit No. 50-00761-S, Application No. 940913-3 was issued authorizing the modification of the inoperable Amil gate in the M-1 canal to add operable screw gates for "off-peak" discharge to the C-51 Canal in accordance with the 40th Street structure's operation schedule and renewal of the "5 Point Plan" for another year. The inoperable Amil gate was to be locked open with three screw gates and one metal plate constructed in front of the Amil gate to control discharges. Under that modification, only one of these screw gates was to be operated since the calculated discharge through one gate is approximately equal to the capacity of the existing 40th Street structure facility located upstream.

Permit No. 50-00761-S, Application No. 950928-12 was issued on February 15, 1996, authorizing the construction of two operable sluice gates at the Roach structure, realignment of the roadway at the Roach structure, modification of the inoperable metal plate at the Amil gates to be an operable screw gate, lowering the wet season control elevations for the Upper and and Lower M-1 basin by 0.5 feet, inclusion of an off-peak discharge plan (L-8 Plan) to lower the wet season water levels to the new lowered control elevations by pumping from the M-1 Impoundment to the L-8 Canal then pumping at an identical rate from the L-8 Canal to the M canal, discontinuance of the yearly renewal of the "5 Point Plan" until regional plans had developed to a point where ITID could modify its SWM system to be consistent with those plans, and provision of mitigation for wetland impacts within the M-1 acreage area due to lowered control elevations by restoring wetlands within ITID's Unit of Development No. 11.

On April 12, 1996, the SFWMD and ITID entered into a Consent Agreement to authorize and develop a Pilot Pump Project. This Pilot Pump Project would allow ITID to pump surface water from the Upper M-1 basin to the City of West Palm Beach's (WPB's) M canal for purposes of flood protection, water supply, calibration of model development in the region and ecological restoration. The Pilot Pump Project has been completed and the pumps removed.

Permit No. 50-00761-S, Application No. 960913-16 was issued on December 12, 1996, authorizing the lowering of the wet season control elevation within the M-1 Impoundment from 20.0-ft NGVD to 16.0-ft NGVD, excavation within the M-1 impoundment, and construction of impermeable barriers adjacent to the M-1 Impoundment dike. This construction was not completed, and the authorization has expired.

On July 10, 1997, the SFWMD and ITID entered into Memorandum of Agreement (MOA) C-8973, which established the conditions for discharges into the C-51 canal from the ITID M-1 Basin after completion of the western C-51 project and specifically when structure S-155A became operational. The MOA defines and describes allowable discharges from the M-1 Canal into the C-51 Canal, operational requirements, and agencies' responsibilities for three modes of operation; normal, conditional, and emergency .

Permit No. 50-00761-S, Application No. 970723-4 was issued on January 15, 1998 to incorporate the provisions of the MOA into the ITID M-1 Basin permit. In addition, the permit modification addressed operational guidelines for the interim period prior to structure S-155A becoming operational.

PROPOSED PROJECT:

Proposed are the following modifications to the ITID master SWM system:

1) Discharge of a total of 200 cfs from ITID using the Roach or 40th Street structures or a combination of both to the M-1 Canal when balanced by a reasonably equal discharge (+ 50 cfs) through the operable gates located at the confluence of the C-51 and M-1 Canals, subject to the operations schedule attached as Exhibit 2.1, i.e., when the combined average hourly flow from the Roach and 40th Street structures is 200 cfs then the flow through the ITID operable slide gates at the Amil location (those gates controlling flow through the locked open western Amil gate) would be between 200 and 250 cfs. Specifically, except when directed by SFWMD due to special conditions within the C-51 Basin, ITID will be allowed without coordination to discharge up to 200 cfs from ITID's operable slide gates at the Amil location during RAINFALL CONDITIONAL (pre-event and event conditions) and discharge up to a combined total of 200 cfs from ITID?s 40th Street and Roach structures during STAGE CONDITIONAL (event recovery) operations as long as an equal or greater flow occurs through ITID's operable slide gates at the Amil location. The trigger stage and duration limits, for projection of the Village of Royal Palm Beach's (VRPB?s) roads, previously in the STAGE CONDITION mode of operations, remains unchanged. As discharge from ITID's operable gates at the Amil location is reduced, so too will the discharge from the Roach and 40th Street structures be reduced.

2) Reauthorization of the L-8 Plan as originally authorized by Permit No. 50-00761-S, Application No. 950928-12. The permit and application authorized, amongst other revisions, additional discharge to the L-8 Canal by ITID subject to the following:

a) Stages in the Lower M-1 Basin have receded to 15.0-ft NGVD in the wet season;

b) Stages in the Upper M-1 Basin have receded to 16.0-ft NGVD in the wet season;

c) Stage in the L-8 Canal is below 15.0-ft NGVD;

d) No flood control releases are being made to the C-17, C-18, or C-51 Canals from the City of West Palm Beach's (WPB's) Grassy Waters Preserve or Clear Lake system;

e) WPB is operating the pump station at the L-8 Tieback Canal (M-Canal) for water supply purposes;

f) ITID has notified SFWMD staff in writing or via e-mail prior to operating this plan.

g) ITID will operate its pump station (PS) #3 at a rate equal to or less than the currently permitted discharge rate from the M-1 Impoundment to the L-8 Canal (274 cfs) plus that of the WPB pump station withdrawing from the L-8 Canal. PS #3 shall only operate above 274 cfs as long as the WPB pumps are operating and shall discontinue operations when the Lower M-1 Basin stage reaches 14.5-ft NGVD at the 40th Street structure or the Upper Basin stage reaches 15.5-ft NGVD at the PS #3/M-O Canal telemetry station location;

h) The L-8 and Pump Plans can also be utilized with higher stages in the ITID's Upper and Lower M-1 Basin as long as conditions c - g are met.

A Pump Plan was also authorized allowing discharge from the Upper M-1 Basin directly to WPB's M Canal. The intent was that the Pump Plan would replace the L-8 Plan in that ITID would pump directly into WPB's M Canal from the Upper M-1 Basin and cease operations pursuant to item a - g above. The respective plans are not currently operated. This permit reauthorizes both plans. However, the Pump Plan will require, and be subject to, an agreement between ITID and the WPB for direct pumping from ITID's L Canal into WPB's M Canal prior to its implementation, and the L-8 Plan will govern until that time;

3) Revision of the Operations Schedule as set forth in the Memorandum of Agreement (MOA) C-8973 executed in July of 1997, and incorporated into Permit No. 50-00761-S under Application No. 970723-4. Specifically, deletion of Section 1.B which defines a canal stage level of 9.0-ft NGVD in the C-51 Canal at bridge number 934251 as one criterion of an Emergency Operations Condition. This criterion was included to protect low lying areas around the bridge from flooding. ERP No. 50-09028-P issued to Palm Beach County authorized the construction and operation of the L-2 pump station, which addresses these flooding concerns, rendering Section 1.B. of the MOA unnecessary. Please refer to Exhibit 2.1 for the revised Operations Schedule;

4) Installation of a second bypass structure at ITID PS #2 to facilitate pre and post-storm drawdown of the Upper M-1 Basin via discharge through the Roach Structure to the M-1 Canal. Drawdown of the Upper M-1 Basin shall be subject to the constraints outlined in Exhibit 2.1;

5) Reauthorization of the M-1 Impoundment Plan as originally authorized by Permit No. 50-00761-S, Application No. 960913-16. The permit modification authorized the lowering of the wet season control elevation from 20.0-ft NGVD to 16.0-ft NGVD within the M-1 Impoundment, excavation of portions of the impoundment to the revised control elevation to provide additional storage, and installation of an impermeable barrier between the impoundment dike and existing off-site wetlands to avoid any potential adverse impacts to wetlands. The improvements were not constructed and the authorization has since expired. This permit reauthorizes those improvements;

6) Maintenance activities at the location of the inverted siphon within the M-1 Canal under WPB's M Canal. Activities include addition of revetments to the north side of the siphon, removing boards within the siphon, and excavating the M-1 Canal to its permitted depth on the north side of the M Canal.

LAND USE:

The Upper M-1 Basin area is 10,767 acres, the Lower M-1 Basin is 7,040 acres and the M-1 Impoundment is 720 acres for a total M-1 Basin area of 18,527 acres. Offsite areas of 5024.6 acres discharging to the M-1 Basin include the Rustic Lakes/Kramer Parcel (320 acres), the Bayhill/Stonewal development (960 acres), a portion of the J.W. Corbett Area (3,500 acres), School Site 'H' (48.4 acres), the Pines West Park (17.5 acres), Palm Beach County Section 32 (152.1 acres), and the southern half of Northlake Boulevard extending along the northern boundary of ITID. The total drainage area served by the ITID M-1 Basin SWM system is 23,551.6 acres.

WATER QUANTITY :

Discharge Rate :

This application proposes a total discharge rate of 200 cfs from ITID using the Roach and 40th Street structures to the M-1 Canal, with a reasonably equal amount of discharge (+ 50 cfs) from the ITID structures at the confluence of the M-1 and C-51 Canals, as defined in the Operations Schedule attached as Exhibit 2.1, i.e., when the combined average hourly flow from the Roach and 40th Street structures is 200 cfs then the flow through the ITID operable slide gates at the Amil location would be between 200 and 250 cfs.. Realization of this discharge will not require any modification to the physical structures, and no modifications are requested at part of this application. Additional telemetry will be installed and operated by ITID at the Roach & 40th Street structures, the Okeechobee Boulevard bridge over the M-1 Canal, and the Amil location. The telemetry will provide real-time access to a persistent web page or supervisory control and data acquisition (SCADA) view-only application that does not time-out and that can be accessed by multiple users at a time. Daily, breakpoint and mean daily stage and flow data for at least the last 30 days, access to flow equations for the various discharge structures in the telemetry system, and reporting of the height of gate openings in increments of 0.1 feet with an indicator bar and number (gate opening) for each gate will be provided. Flow equations for the discharge structures will be calibrated to measured flow data and approved by the SFWMD. The structure data that follows is provided for informational purposes only, with the exception of the second PS #2 by-pass, which is a proposed facility authorized under this application.

The previously permitted allowable peak discharge from the M-1 Basin Impoundment to the L-8 canal will remain 274 cfs (0.25 in/day). No modification of the discharge rate to the L-8 Canal is proposed as part of this permit modification.

Control Elevation :

Basin	Area (Acres)	Ctrl Elev (ft, NGVD 29)	WSWT Ctrl Elev (ft, NGVD 29)	Method Of Determination
UPPER M-1	10767.00	16/17	16.00	Previously Permitted
LOWER M-1	7040.00	15/17	15.00	Previously Permitted
M-1 IMPOUNDMENT	720.00	16/21	16.00	Previously Permitted

Receiving Body :

Basin	Str.#	Receiving Body
Upper M-1	PS #2 BYPA	LOWER M-1 BASIN
Upper M-1	PS #3	M-1 IMPOUNDMENT
Lower M-1	40TH ST.	M-1 CANAL
Lower M-1	AMIL LOCA	C-51 CANAL
Lower M-1	PS #2	UPPER M-1 BASIN
Lower M-1	ROACH	M-1 CANAL
M-1 Impoundment	NE	ITID OUTFALL CANAL
M-1 Impoundment	SW	L-8 CANAL

Discharge Structures: Note: The units for all the elevation values of structures are (ft, NGVD 29)

Gates:

Basin	Str#	Count	Type	Width	Height	Invert Elev.
LOWER M-1	AMIL LOCATION	4	Slide Gate	6'		2.7

Discharge Structures:

Weirs:

Basin	Str#	Count	Type	Width	Height	Length	Dia.	Elev.
M-1 IMPOUNDMENT	NE	1	Semi-Circular				11.25'	24.5 (crest)
M-1 IMPOUNDMENT	NE	3	Sharp Crested	37.5"	40.8"			21.1 (crest)
M-1 IMPOUNDMENT	NE	3	Sharp Crested	37.5"				13.6 (crest)
M-1 IMPOUNDMENT	SW	1	Semi-Circular				84"	24.5 (crest)
M-1 IMPOUNDMENT	SW	2	Rectangular Orifice	38.75"	24"			21 (crest)
M-1 IMPOUNDMENT	SW	2	Sharp Crested	38.75"				15 (crest)
M-1 IMPOUNDMENT	SW	2	Sharp Crested	38.75"				21 (crest)

SWM(Internal) Structures: Note: The units for all the elevation values of structures are (ft, NGVD 29)

Culverts:

Basin	Str#	Count	Type	Width	Length	Dia.
LOWER M-1	ROACH	2	Reinforced Concrete Pipe		76'	84"
UPPER M-1	PS #2 BYPASS	1	Corrugated Metal Pipe		130'	108"
UPPER M-1	PS #2 BYPASS	1	Corrugated Metal Pipe		130'	84"

Gates:

Basin	Str#	Count	Type	Width	Height	Invert Elev.
LOWER M-1	40TH ST.	2	Screw Gate			
LOWER M-1	40TH ST.	4	Slide Gate	48"		
LOWER M-1	ROACH	2	Sluice Gate	84"		7
UPPER M-1	PS #2 BYPASS	1	Screw Gate	108"		
UPPER M-1	PS #2 BYPASS	1	Screw Gate	84"		

Pumps:

Basin	Str#	Count	Type	Capacity	Elev.
LOWER M-1	PS #2	3	Diesel	44000gpm	15 (on)
UPPER M-1	PS #3	5	Diesel	100000gpm	16 (on)

WATER QUALITY :

WQ treatment is provided in the roadside swales, canals and in the 720-acre M-1 impoundment. A WQ monitoring plan is in place throughout the M-1 Basin. In addition, an extensive WQ monitoring program was completed in conjunction with the Pilot Pump Program with monitoring locations within the ITID's "L" canal and the City of West Palm Beach's "M" canal. The applicant is requesting to modify the WQ monitoring program to eliminate zinc, lead, and mercury monitoring and to change sampling from bimonthly to quarterly. No impacts to water quality are anticipated as a result of the proposed modifications.

WETLANDS:

There are no wetlands affected by the proposed project.

The project does include internal conveyance facilities improvements within surface waters of the ITID M-1 Canal. These improvements include construction of an additional bypass at ITID's PS #2, installation of riprap at each end of the bypass pipe, and shoring up (bottom contouring, installation of bulkhead and installation of riprap) the south end of the ITID M-1 Canal around the restricted inflow side. The improvements will impact an estimated 0.24 acre of other surface waters. No mitigation is required for the impacts to the surface waters.

Wetland Inventory :

CONSTRUCTION MOD -Internal Conveyance Facilities Improvements

Site Id	Site Type	Pre-Development				Post-Development						
		Pre Fluc cs	AA Type	Acreage (Acres)	Current Wo Pres	With Project	Time Lag (Yrs)	Risk Factor	Pres. Adj. Factor	Post Fluccs	Adj Delta	Functional Gain / Loss
1	ON	500	Direct	.24						500	.000	.000
			Total:	.24								.00

Fluccs Code	Description
500	Water

CERTIFICATION, OPERATION, AND MAINTENANCE:

Pursuant to Chapter 62-330.310 Florida Administrative Code (F.A.C.), Individual Permits will not be converted from the construction phase to the operation phase until construction completion certification of the project is submitted to and accepted by the District. This includes compliance with all permit conditions, except for any long term maintenance and monitoring requirements. It is suggested that the permittee retain the services of an appropriate professional registered in the State of Florida for periodic observation of construction of the project.

For projects permitted with an operating entity that is different from the permittee, it should be noted that until the construction completion certification is accepted by the District and the permit is transferred to an acceptable operating entity pursuant to Sections 12.1-12.3 of the Applicant's Handbook Volume I and Section 62-330.310, F.A.C., the permittee is liable for operation and maintenance in compliance with the terms and conditions of this permit.

In accordance with Section 373.416(2), F.S., unless revoked or abandoned, all stormwater management systems and works permitted under Part IV of Chapter 373, F.S., must be operated and maintained in perpetuity.

The efficiency of stormwater management systems, dams, impoundments, and most other project components will decrease over time without periodic maintenance. The operation and maintenance entity must perform periodic inspections to identify if there are any deficiencies in structural integrity, degradation due to insufficient maintenance, or improper operation of projects that may endanger public health, safety, or welfare, or the water resources. If deficiencies are found, the operation and maintenance entity will be responsible for correcting the deficiencies in a timely manner to prevent compromises to flood protection and water quality. See Section 12.4 of Applicant's Handbook Volume I for Minimum Operation and Maintenance Standards.

RELATED CONCERNS:

Water Use Permit Status:

The project does not require irrigation. Therefore, a Consumptive Use Permit (CUP) is not required.

The applicant has indicated that any construction activities, other than those associated with implementation of the M-1 Impoundment Plan, will qualify for a No-Notice Short-Term Dewatering Permit. Prior to commencement of any construction activities associated with the M-1 Impoundment Plan, the applicant shall apply for and obtain a Dewatering Permit, per Special Condition No. 9.

This permit does not release the permittee from obtaining all necessary Water Use authorization(s) prior to the commencement of activities which will require such authorization, including construction dewatering and irrigation.

CERP:

The proposed project is not located within or adjacent to a Comprehensive Everglades Restoration Project component.

Potable Water Supplier:

N/A. The project does not require potable water supply.

Waste Water System/Supplier:

N/A. The project does not require waste water service.

Right-Of-Way Permit Status:

A District Right-of-Way Permit is not required for this project.

DRI Status:

This project is not a DRI.

Historical/Archeological Resources:

No information has been received that indicates the presence of archaeological or historical resources in the project area or indicating that the project will have any effect upon significant historic properties listed, or eligible for listing in the National Register of Historic Places.

DEO/CZM Consistency Review:

The issuance of this permit constitutes a finding of consistency with the Florida Coastal Management Program.

Third Party Interest:

The Village of Royal Palm Beach (VRPB) has contacted the District with concerns about this application. They are being provided a copy of this permit.

Enforcement:

There has been no enforcement activity associated with this application.

STAFF RECOMMENDATION TO EXECUTIVE DIRECTOR:

The Staff recommends that the following be issued :

Modification of the Indian Trail Improvement District stormwater management system to allow for 200 cfs discharge through the M-1 Canal into the C-51 Canal in accordance with an Operations Schedule, and to authorize other components of the ITID system.

Based on the information provided, District rules have been adhered to.

Staff recommendation is for approval subject to the attached General and Special Conditions.

STAFF REVIEW:

NATURAL RESOURCE MANAGEMENT APPROVAL

ENVIRONMENTAL EVALUATION

Trisha D. Stone

Trisha Stone

SUPERVISOR

Barbara J. Conmy

Barbara J. Conmy

SURFACE WATER MANAGEMENT APPROVAL

ENGINEERING EVALUATION

Jesse Markle

Jesse Markle, P.E.

SUPERVISOR

Carlos A. de Rojas, P.E.

ENVIRONMENTAL RESOURCE PERMITTING BUREAU CHIEF :

Anita R. Bain

Anita R. Bain

DATE: 2/6/14

REGULATION DIVISION ASSISTANT DIRECTOR :

Anthony M. Waterhouse, P.E

DATE: 2/6/14

GENERAL CONDITIONS

1. All activities shall be implemented following the plans, specifications and performance criteria approved by this permit. Any deviations must be authorized in a permit modification in accordance with Rule 62-330.315, F.A.C. Any deviations that are not so authorized shall subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S. (2012).

2. A Recorded Notice of Environmental Resource Permit may be recorded in the county public records in accordance with Rule 62-330.090(7), F.A.C. Such notice is not an encumbrance upon the property.

3. Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be installed immediately prior to, and be maintained during and after construction as needed, to prevent adverse impacts to the water resources and adjacent lands. Such practices shall be in accordance with the "State of Florida Erosion and Sediment Control Designer and Reviewer Manual" (Florida Department of Environmental Protection and Florida Department of Transportation June 2007), and the "Florida Stormwater Erosion and Sedimentation Control Inspector's Manual" (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008), unless a project-specific erosion and sediment control plan is approved or other water quality control measures are required as part of the permit.

4. At least 48 hours prior to beginning the authorized activities, the permittee shall submit to the Agency a fully executed Form 62-330.350(1), "Construction Commencement Notice" indicating the expected start and completion dates. If available, an Agency website that fulfills this notification requirement may be used in lieu of the form.

5. Unless the permit is transferred under Rule 62-330.340, F.A.C., or transferred to an operating entity under Rule 62-330.310, F.A.C., the permittee is liable to comply with the plans, terms and conditions of the permit for the life of the project or activity.

6. Within 30 days after completing construction of the entire project, or any independent portion of the project, the permittee shall provide the following to the Agency, as applicable:
   a. For an individual, private single-family residential dwelling unit, duplex, triplex, or quadruplex- "Construction Completion and Inspection Certification for Activities Associated With a Private Single-Family Dwelling Unit"[Form 62-330.310(3)]; or
   b. For all other activities- "As-Built Certification and Request for Conversion to Operational Phase" [Form 62-330.310(1)].
   c. If available, an Agency website that fulfills this certification requirement may be used in lieu of the form.

7. If the final operation and maintenance entity is a third party:
   a. Prior to sales of any lot or unit served by the activity and within one year of permit issuance, or within 30 days of as- built certification, whichever comes first, the permittee shall submit, as applicable, a copy of the operation and maintenance documents (see sections 12.3 thru 12.3.3 of Applicant's Handbook Volume I) as filed with the Department of State, Division of Corporations and a copy of any easement, plat, or deed restriction needed to operate or maintain the project, as recorded with the Clerk of the Court in the County in which the activity is located.
   b. Within 30 days of submittal of the as- built certification, the permittee shall submit "Request for Transfer of Environmental Resource Permit to the Perpetual Operation Entity" [Form 62-330.310(2)] to transfer the permit to the operation and maintenance entity, along with the documentation requested in the form. If available, an Agency website that fulfills this transfer requirement may be used in lieu of the form.

GENERAL CONDITIONS

8. The permittee shall notify the Agency in writing of changes required by any other regulatory agency that require changes to the permitted activity, and any required modification of this permit must be obtained prior to implementing the changes.

9. This permit does not:
   a. Convey to the permittee any property rights or privileges, or any other rights or privileges other than those specified herein or in Chapter 62-330, F.A.C.;
   b. Convey to the permittee or create in the permittee any interest in real property;
   c. Relieve the permittee from the need to obtain and comply with any other required federal, state, and local authorization, law, rule, or ordinance; or
   d. Authorize any entrance upon or work on property that is not owned, held in easement, or controlled by the permittee.

10. Prior to conducting any activities on state-owned submerged lands or other lands of the state, title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund, the permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees of the Internal Improvement Trust Fund shall not be considered received until it has been fully executed.

11. The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities that may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any project authorized by the permit.

12. The permittee shall notify the Agency in writing:
    a. Immediately if any previously submitted information is discovered to be inaccurate; and
    b. Within 30 days of any conveyance or division of ownership or control of the property or the system, other than conveyance via a long-term lease, and the new owner shall request transfer of the permit in accordance with Rule 62-330.340, F.A.C. This does not apply to the sale of lots or units in residential or commercial subdivisions or condominiums where the stormwater management system has been completed and converted to the operation phase.

13. Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the project or activities to ensure conformity with the plans and specifications authorized in the permit.

14. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered binding unless a specific condition of this permit or a formal determination under Rule 62-330.201, F.A.C., provides otherwise.

GENERAL CONDITIONS

16. The permittee shall provide routine maintenance of all components of the stormwater management system to remove trapped sediments and debris. Removed materials shall be disposed of in a landfill or other uplands in a manner that does not require a permit under Chapter 62-330, F.A.C., or cause violations of state water quality standards.

17. This permit is issued based on the applicant's submitted information that reasonably demonstrates that adverse water resource-related impacts will not be caused by the completed permit activity. If any adverse impacts result, the Agency will require the permittee to eliminate the cause, obtain any necessary permit modification, and take any necessary corrective actions to resolve the adverse impacts.

18. A complete copy of this permit shall be kept at the work site of the permitted activity during the construction phase, and shall be available for review at the work site upon request by the Agency staff. The permittee shall require the contractor to review the complete permit prior to beginning construction.

SPECIAL CONDITIONS

1. The construction phase of this permit shall expire on February 10, 2019.
2. Operation of the stormwater management system shall be the responsibility of the PERMITTEE.
3. Discharge Facilities:

Basin: UPPER M-1, Structure: PS #2 BYPASS

130 LF of 84" dia. CORRUGATED METAL PIPE culvert.
130 LF of 108" dia. CORRUGATED METAL PIPE culvert.
1-84" wide X ' high slide gate'NGVD 29.
1-108" wide X ' high slide gate'NGVD 29.

Receiving body : LOWER M-1 BASIN
Control elev : 16 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: UPPER M-1, Structure: PS #3

5-100000gpms with pump on at elev. 16'NGVD 29.

Receiving body : M-1 IMPOUNDMENT
Control elev : 16 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: 40TH ST.

2-' wide X ' high slide gateS'NGVD 29.
4-48" wide X ' high slide gateS'NGVD 29.

Receiving body : M-1 CANAL
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: PS #2

3-44000gpms with pump on at elev. 15'NGVD 29.

Receiving body : UPPER M-1 BASIN
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: LOWER M-1, Structure: ROACH

2-84" dia. REINFORCED CONCRETE PIPE culverts each 76' long.
2-84" wide X ' high slide gateS with invert at elev. 7' NGVD 29 AND with crest at elev. 14'NGVD 29.

Receiving body : M-1 CANAL
Control elev : 15 feet NGVD 29. /17 FEET NGVD 29 DRY SEASON.

Basin: M-1 IMPOUNDMENT, Structure: NE

SPECIAL CONDITIONS

3-37.5" WIDE SHARP CRESTED weirs with crest at elev. 13.6' NGVD 29.
3-37.5" W X 40.8" H SHARP CRESTED weirs with crest at elev. 21.1' NGVD 29.
1-11.25' DIAMETER SEMI-CIRCULAR weir with crest at elev. 24.5' NGVD 29.

Receiving body : ITID OUTFALL CANAL
Control elev : 16 feet NGVD 29. /21 FEET NGVD 29 DRY SEASON.

Basin: M-1 IMPOUNDMENT, Structure: SW

2-38.75" WIDE SHARP CRESTED weirs with crest at elev. 15' NGVD 29.
2-38.75" WIDE SHARP CRESTED weirs with crest at elev. 21' NGVD 29.
2-38.75" W X 24" H RECTANGULAR ORIFICE weirs with crest at elev. 21' NGVD 29.
1-84" DIAMETER SEMI-CIRCULAR weir with crest at elev. 24.5' NGVD 29.

Receiving body : L-8 CANAL
Control elev : 16 feet NGVD 29. /21 FEET NGVD 29 DRY SEASON.

4. A stable, permanent and accessible elevation reference shall be established on or within one hundred (100) feet of all permitted discharge structures no later than the submission of the certification report. The location of the elevation reference must be noted on or with the certification report.
5. A turbidity control plan shall be implemented. Prior to the commencement of construction in surface waters, floating turbidity curtains with weighted skirts that extend to the bottom of the water body shall be properly installed to isolate adjacent waters from the work area. The floating turbidity curtains shall be maintained and shall remain in place until all construction is complete and turbidity levels in the project area are within 29 NTUs of background levels. The permittee shall be responsible for ensuring that turbidity control devices are inspected daily and maintained in good working order so that there are no violations of state water quality standards outside of the turbidity screens.
6. Discharge from the ITID structures located at the confluence of the M-1 Canal and the C-51 Canal to the C-51 Canal shall be in accordance with Exhibit 2.1.
7. On or before September 1, 2014, the permittee shall purchase, install, and make fully operational the proposed telemetry system at the Roach & 40th Street structures, the Okeechobee Boulevard bridge over the M-1 Canal, and the Amil location, which will provide the following:

   a. Real-time access to a persistent web page or supervisory control and data acquisition (SCADA) view only application that does not time-out and that can be accessed by multiple users at a time;

   b. Daily, breakpoint, and mean daily stage and flow data for at least the last 30 days;

   c. Access to flow equations for the various discharge structures when set up in the telemetry system. Flow equations for the discharge structures will be calibrated to measured flow data and approved by the SFWMD;

   d. Gate openings reported in increments of 0.1 feet with an indicator bar and number (gate opening) for each gate.

   Access to the telemetry data shall be made, at a minimum, to SFWMD and Village of Royal Palm Beach staff. Prior to September 1, 2014, but no later than June 1, 2014, ITID shall provide the Village of Royal Palm Beach staff the means of electronically accessing data from the current telemetry system, including any necessary passwords.

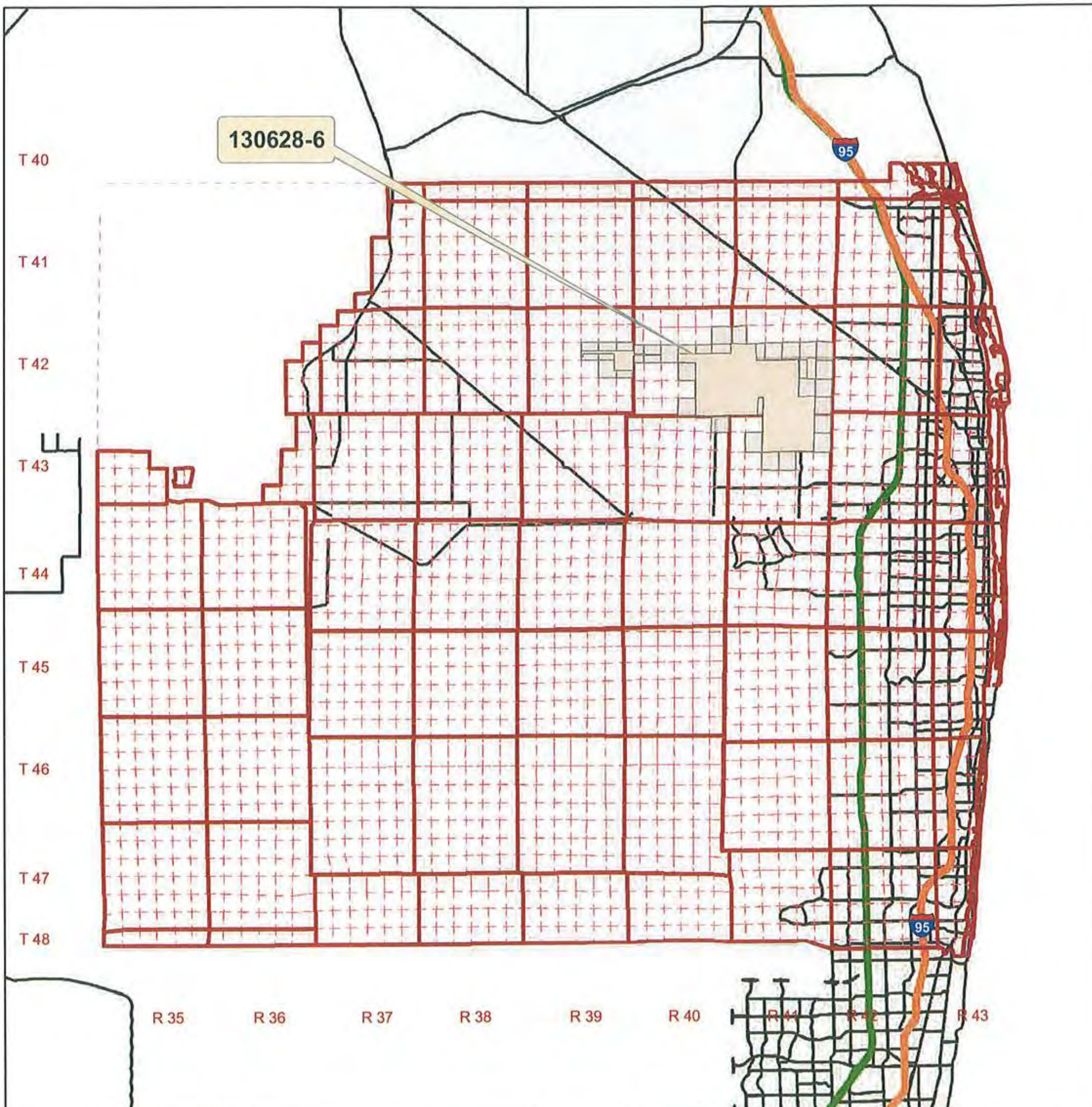
SPECIAL CONDITIONS

8. Prior to the initiation of the Pump Plan, the permittee shall provide a copy of the executed agreement with the City of West Palm Beach.
9. Prior to commencement of any construction activities associated with the M-1 Impoundment Plan, the permitte shall apply for and obtain a Dewatering Permit.

Table of Contents for Staff Report Exhibits

Application No. 130628-6

Indian Trail Improvement District (ITID) M-1 Basin



PALM BEACH COUNTY, FLORIDA

N

Application No: 130628-6

Map Date: 2013-10-16

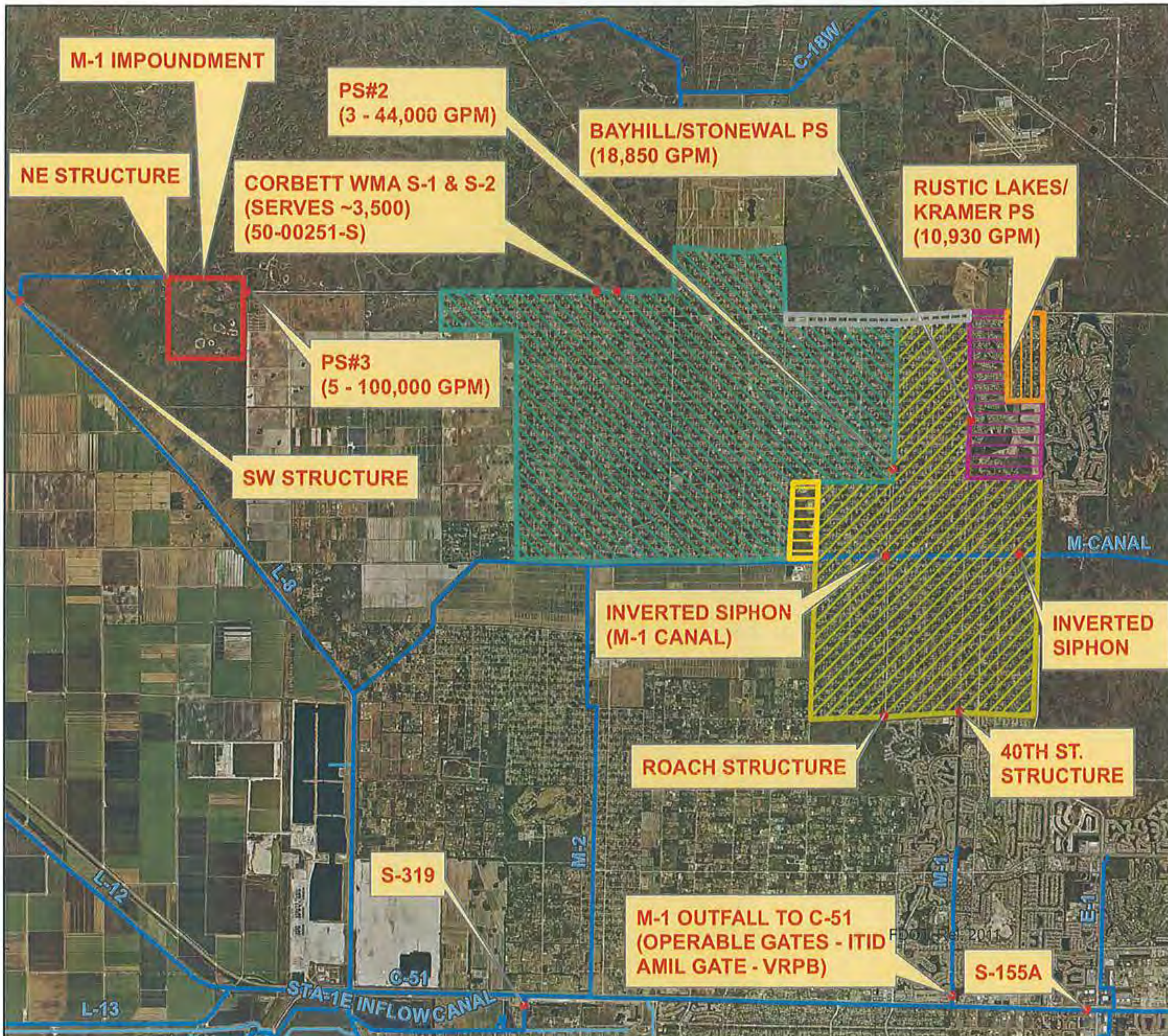
Permit No: 50-00761-S

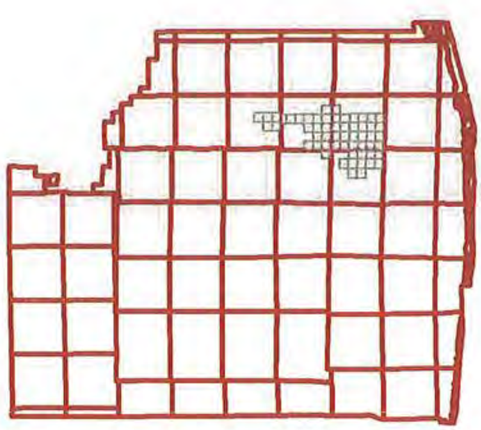
Sec - / Twp 42 / Rge 39

Project Name: INDIAN TRAIL IMPROVEMENT DISTRICT M-1 BASIN

0 5 10 Miles

Exhibit Number: 1.1





PALM BEACH COUNTY, FLORIDA

Legend

N

Upper M-1 Basin (~10,767-ac)

Lower M-1 Basin (~7,040-ac)

Map Date: 2013-07-10

Bayhill/Stonewal (~960-ac) (50-01111-S & S-02)

Rustic Lakes/Kramer (~320-ac)

School Site "H" (~48.4-ac)
Pines West Park (~17.5-ac)
PBC Section 32 (~152.1-ac)

Northlake (South) (~26.6-ac)

Application Number: 130628-6

Permit Number: 50-00761-S

Project Name: INDIAN TRAIL IMPROVEMENT DISTRICT M-1 BASIN

0 11,250 22,500 Feet

Exhibit Number: 1.2

Page 1 of 1

OPERATIONS SCHEDULE
INDIAN TRAIL IMPROVEMENT DISTRICT'S (ITID'S) M-1 BASIN TO THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT'S C-51 CANAL

Operations of the ITID that discharge stormwater into the C-51 Canal via the M-1 Canal will occur in one of five modes: Water Conservation, Normal, Rainfall Conditional, Conditional, or Emergency as defined below:

Water Conservation Mode of Operations

The Water Conservation mode of operations is defined based on conditions in which it is critical to conserve water within the C-51 Basin and limit discharges of freshwater to tide.

Normal Mode of Operations

The Normal mode of operations is the default mode and shall be used when no in Water Conservation, Rainfall Conditional, Stage Conditional (Recovery) or Emergency modes operation. During the Normal mode of operations, ITID will have the flexibility and ability to manage its operations independently, and required communications and coordination efforts with the SFWMD will be minimal.

Stage Conditional (Recovery) Mode of Operations

The Stage Conditional (Recovery) mode of operations will occur when water levels immediately west of the S-155A divide structure reach a level within 0.5 feet below its design stage. During conditional operations, ITID will have reduced flexibility and ability to manage its operations independently, and required communications and coordination efforts with the SFWMD will be moderate.

Rainfall Conditional Mode of Operations

The Rainfall Conditional mode of operations will occur when measured rainfall or the total of measured and predicted rainfall (as determined by the National Weather Service [NWS] or the SFWMD Quantitative Precipitation Forecast [QPF]) for the Village of Royal Palm Beach [VRPB] in any 24-hour period exceeds 5.3 inches (three-year, one-day storm event).

Emergency Operations

The Emergency mode of operations will occur when one or more of the following exist:

1. The S-155A divide structure must be closed due to operational criteria set by the United States Army Corps of Engineers (USACE) in the Design Documentation Report C-51 Canal & Stormwater Treatment Area 1 East

2. The water level immediately west of the S-155A divide structure exceeds design conditions as specified in the USACE's Design Documentation Report C-51 Canal & Stormwater Treatment Area 1 East; or

3. An emergency has been declared in any portion of the C-51 Basin by the Governing Board of the SFWMD pursuant to Chapters 120.569(2)(d), 373.119, and 373.439,

Florida Statutes, and Rules 40E- 1.609(9) and 40E-4.451, Florida Administrative Code.

Refer to Table 1 for the operational requirements, maximum allowable discharges, and agencies' responsibilities regarding discharge from the M-1 Canal to the C-51 Canal. Refer to Table 2 seasonal operations schedule. Refer to Table 3 for the specific criteria defining each mode of operations.

OPERATIONS SCHEDULE
ITID'S M-1 BASIN TO THE SFWMD's C-51 CANAL

TABLE 1

<table>
<tr><th>Mode of Operations</th><th>Maximum Allowable Discharge from the M-1 Canal to the C-51 Canal</th><th>ITID Responsibilities</th><th>SFWMD Responsibilities</th></tr>
<tr><td>Water Conservation</td><td>720 cfs (all discharge to be made through the VRPB Amil gate)</td><td>Close all operable structures</td><td>Monitor overall C-51 conditions. Communicate and coordinate with ITID as necessary. Operate as necessary and in compliance with this operations schedule, the water control manual, and other requirements.</td></tr>
<tr><td>Normal</td><td>1,285 cfs</td><td>Operate Roach structure, 40th Street structure, and the operable structures at the Amil location so that total discharge from the VRPB auto Amil gate and the ITID operable gates does not exceed 1,285 cfs</td><td rowspan="3">Monitor overall C-51 conditions. Communicate and coordinate with ITID as necessary. Operate as necessary and in compliance with this operations schedule, the water control manual, and other requirements: 1) S-155 & S-155A to move discharges from west C-51 to east C-51 to to tide as needed; 2) S-319 to make discharges to STA-1E</td></tr>
<tr><td>Rainfall Conditional</td><td rowspan="2">720 cfs plus the conditional discharge. The conditional discharge is defined as the lesser of (a) the available hydraulic capacity of S-155A, or (b) 565 cfs, but not less than 200 cfs.</td><td rowspan="2">Operate Roach structure, 40th Street structure and operable structures at Amil location so as not to exceed the conditional discharge; coordinate with VRPB operations staff regarding stages in the M-1 Canal</td></tr>
<tr><td>Stage Conditional (Recovery)</td></tr>
<tr><td>Emergency</td><td>Maximum allowable discharge will vary and be set by SFWMD</td><td>Take part in coordination communications (e-mail/ teleconference) with SFWMD and VRPB operations staff; comply with emergency operational instructions issued by SFWMD</td><td>Issue operational instructions to ITID (and other in emergency area) via e-mail; teleconference specifying water levels and discharges required to coordinate emergency operations</td></tr>
</table>

OPERATIONS SCHEDULE
ITID'S M-1 BASIN TO THE SFWMD's C-51 CANAL

TABLE 2

Conditions						Discharge To		
Season	Months	Impoundment (ft NGVD)	Upper M-1 Basin (ft NGVD)		Lower M-1 Basin (ft NGVD)	L-8 Canal	C-51 Canal	M Canal via L-8 Plan/Pilot Pump Plan
Wet	Jun - Oct	≤16[1]	≤16	AND	≤15	NO	NO	When Authorized[2]
		>16[1]	≤16	AND	≤15	YES	NO	
		>16[1]	>16	AND/OR	>15	YES	YES[3]	
Dry	Nov - Apr	≤21	≤17	AND	≤17	NO	NO	
		>21	>17	AND/OR	>17	YES	YES[3]	
Transition	May	≤21	≤16	AND	≤15.5	NO	NO	
		>21	>16	AND/OR	>15.5	YES	YES[3]	

[1] 20-ft NGVD w/o the M-1 Impoundment Plans
[2] In accordance w/ the L-8 Plan or permanent agreement for the Pilot Pump Plan
[3] See Table 3

OPERATIONS SCHEDULE
ITID'S M-1 BASIN TO THE SFWMD's C-51 CANAL

TABLE 3

Mode of Operations	Surface Water Elevations								Structure Operations/Conditions[3]		
	C-51 Canal		M-1 Canal w/in VRPB					40th St. (HW) Lower M-1 Basin	Auto Amil Gate (VRPB)	Operable Gates @ Amil	40th St. & Roach Structures
			@ 40th (TW)	@ Okeechobee Blvd		@ Amil					
	ft NGVD		ft NGVD	ft NGVD		ft NGVD		ft NGVD	ft NGVD	ft NGVD	ft NGVD
Water Conservation	S-155A HW<12.5; TW<11.2	AND	≤13.5	N/A	AND	≤13.8	AND	≤15.0 (Wet); ≤17.0 (Dry)	HW Open >13.8, Close ≤13.8	Close all operable structures: the order and rate of structure closures shall result in stages in VRPB such that 13.5 ≤ M-1	
Normal[1]		AND	≤14.9	N/A	AND	<14.5	AND	>15.0 (Wet); >17.0 (Dry)		Reasonably balance ITID discharge to M-1 Canal from Roach & 40th Street structures = discharge to C-51 from operable gates at Amil location	
		OR	>14.9	N/A	OR	>14.5	AND			Comply w/ criteria described in the Stage Conditional (Recovery) section below	
Rainfall Conditional[2]	N/A	N/A	N/A	>13.8	N/A	N/A	AND			Operate to achieve stages 13.5 ≤ M-1 Canal ≤ 13.8 at Okeechobee Blvd.	Reduce total discharges so stages are: 13.5 ≤ M-1 Canal ≤ 13.8 at Okeechobee Blvd.
Stage Conditional (Recovery)	S-155A 12.5≤HW≤13.0 or 11.2≤TW≤11.7							15.0<M-1 Basin<19.0 (Wet); 17.0<M-1 Basin<19.0 (Dry)		Operate Roach & 40th Street structures and operable structures at Amil location such that discharge from Roach & 40th Street structures does not exceed discharge from operable structure at Amil location and M-1 Canal stage does not exceed 14.9 immediately downstream of the 40th Street structure or 14.0 immediately upstream of the Amil location for more than 72 hours; after 72 hours reduce flow from Roach & 40th Street structures to 200 cfs (w/o SFWMD coordination) until M-1 Canal stage immediately south of the 40th Street structure <14.9.	
				15.5 < M-1 ≤ 16.0						Same as above for no more than 48 hours	
				16.0 < M-1 ≤ 16.5						Same as above for no more than 24 hours	
	S-155A HW≥12.5; TW≥11.2									See Emergency Mode of Operations	
Emergency	Declared Emergency per definition herein			N/A			OR	≥ 19.0		Up to **200 cfs** pass through flow from ITID to C-51 unless otherwise specified by SFWMD. Structures to be operated in compliance with instructions issued by SFWMD to ITID (and others in emergency area) specifying water levels and discharges. 16.5-ft NGVD is a stage of concern w/in the M-1 Canal and the SFWMD will make operations decisions to ensure this stage is protected.	

[1] Normal Conditions in VRPB are ≤14.9-ft NGVD in the M-1 Canal immediately downstream of the 40th St. structure and <14.5-ft NGVD in the M-1 Canal immediately upstream of the Amil location

[2] Pre-Event & During Event - Measured rainfall or the total of measured and predicted rainfall (as determined by the NWS or SFWMD) for VRPB in any 24-hr period exceeds 5.0 inches (three-year, one-day storm event). This mode of operation shall continue until the measured rainfall or total of measured and predicted rainfall is less than 5.0 inches in 24 hours. The resulting mode of operations shall be determined based on stages at the various locations specified herein.

[3] **The SFWMD, at its discretion, may allow greater or prescribe less discharge from the Roach & 40th Street Structures and/or the M-1 Canal into the C-51 Canal in any mode of operations based on conditions in the basin.**

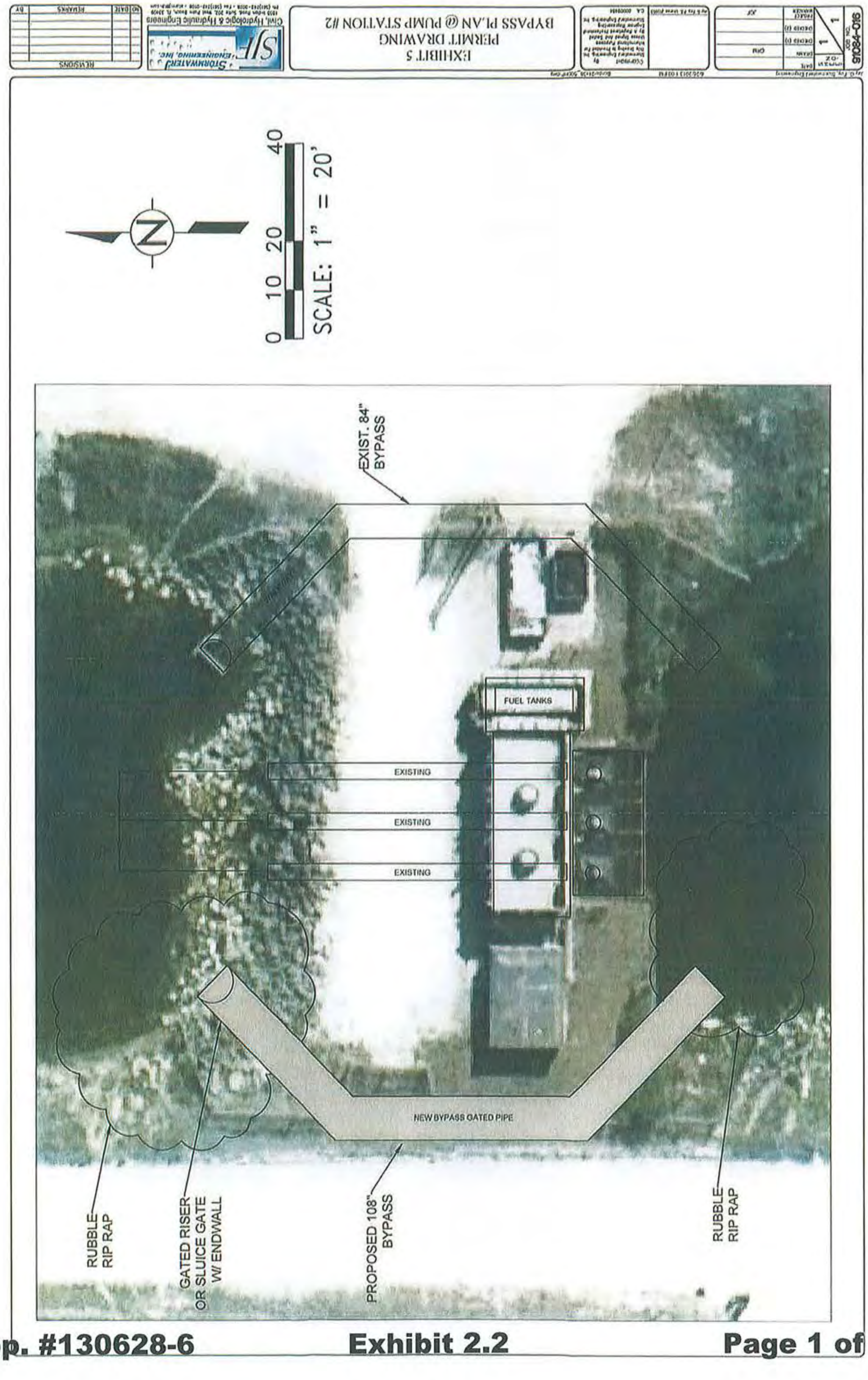


EXHIBIT 5
PERMIT DRAWING
BYPASS PLAN @ PUMP STATION #2
STORMWATER ENGINEERING, INC.
Civil, Hydrologic & Hydraulic Engineers
REVISIONS
91084-016
SCALE: 1" = 20'
0
10
20
40
N
EXIST. 84"
BYPASS
FUEL TANKS
EXISTING
EXISTING
EXISTING
NEW BYPASS GATED PIPE
RUBBLE
RIP RAP
GATED RISER
OR SLUICE GATE
W/ ENDWALL
PROPOSED 108"
BYPASS
RUBBLE
RIP RAP

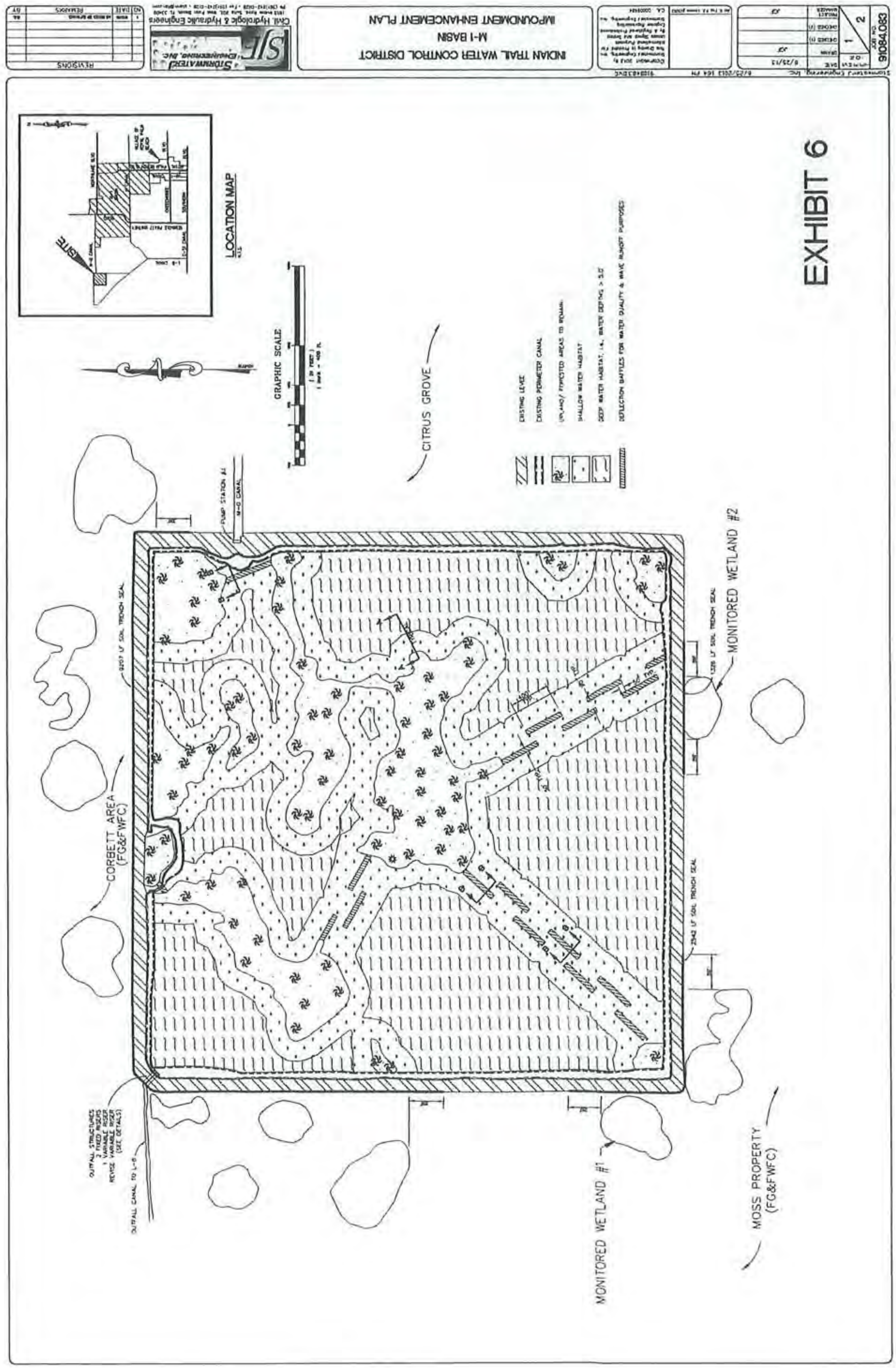
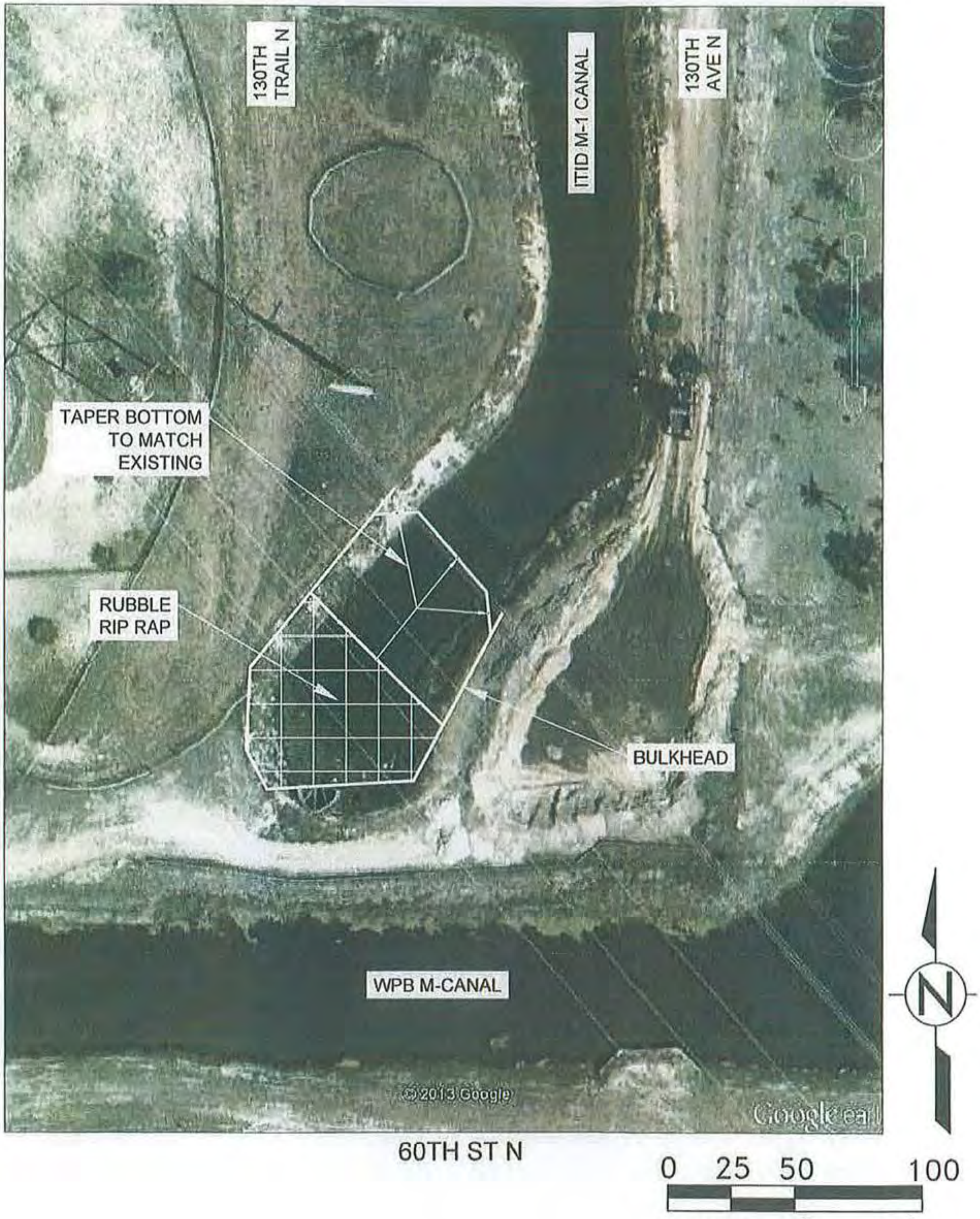


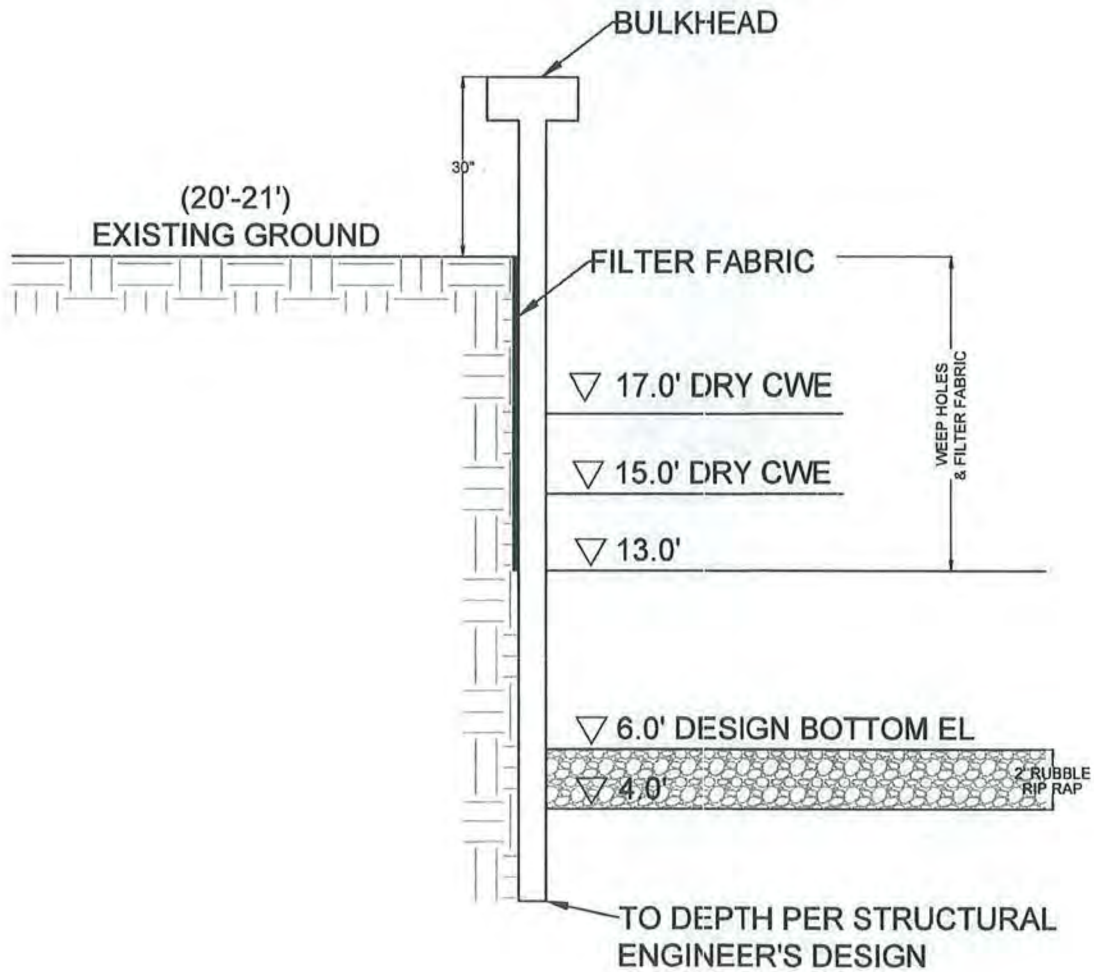
EXHIBIT 6
INDIAN TRAIL WATER CONTROL DISTRICT
M-1 BASIN
IMPOUNDMENT ENHANCEMENT PLAN
Civil, Hydrologic & Hydraulic Engineers
LOCATION MAP
GRAPHIC SCALE
EXISTING LEVEE
EXISTING PERIMETER CANAL
SHALLOW WATER HABITAT
CITRUS GROVE
PUMP STATION #1
MONITORED WETLAND #2
MONITORED WETLAND #1
CORBETT AREA
(FG&FWFC)
MOSS PROPERTY
(FG&FWFC)
9084.083



StormwaterJ Engineering, Inc.
Civil, Hydrologic & Hydraulic Engineers

NORTH OF INVERTED SIPHON -
PERMIT DRAWING - EXHIBIT 7

SHEET NO. 1 / 2
JOB NO. 91084-018



STORMWATER ENGINEERING, INC.
Civil, Hydrologic & Hydraulic Engineers

BULKHEAD DETAIL- EXHIBIT 7
PERMIT DRAWING - NTS

SHEET NO. 2 / 2
JOB NO. 91084-016

SCANNED 07/01/2013 10:39 CMW

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Application No: 130628-6

Permit No: 50-00761-S

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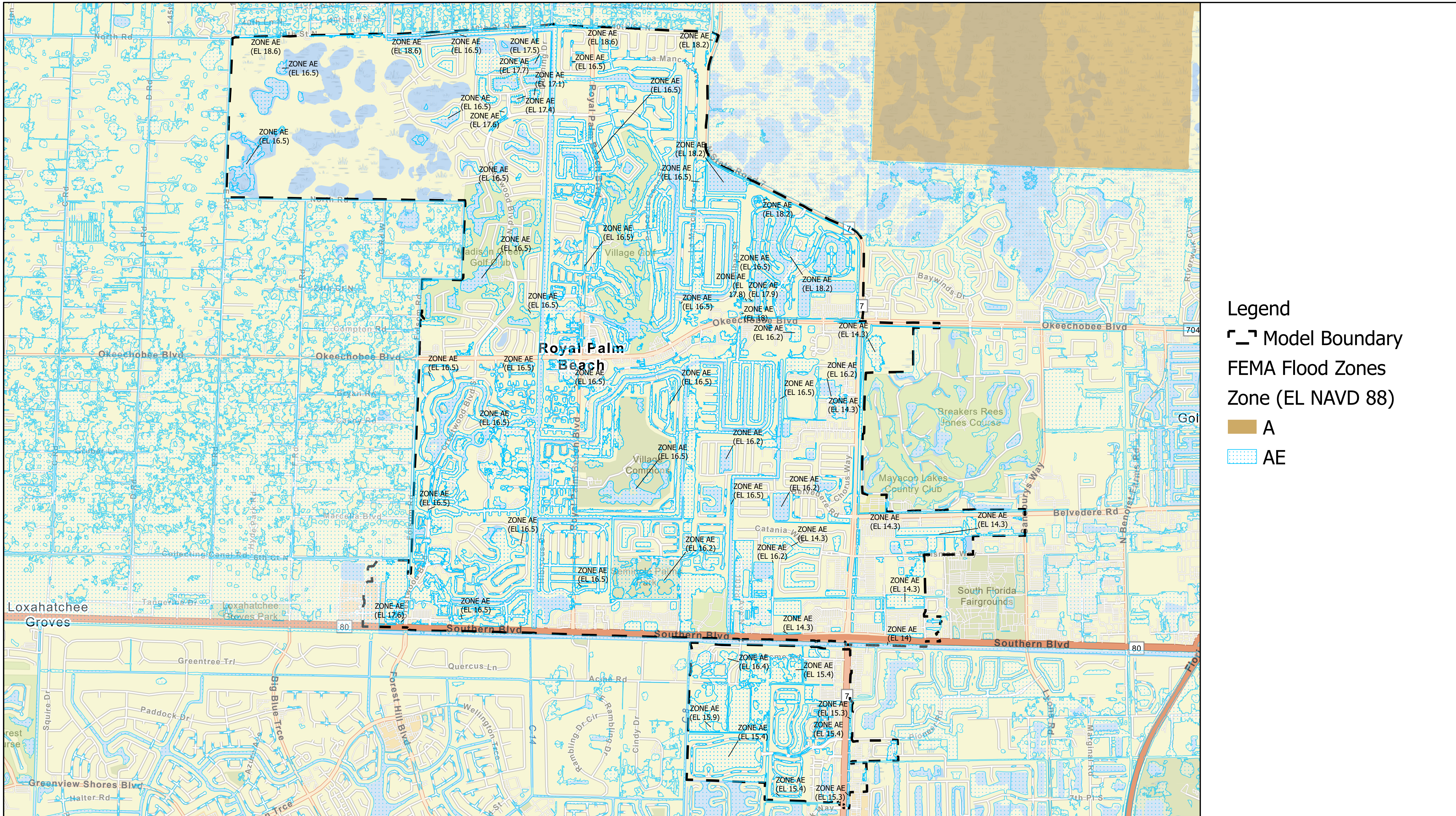
- X Palm Beach County - Water Utilities Operations Center
- X Palm Beach County School District of Palm Beach County
- X Palm Beach County Engineer
- X Village of Royal Palm Beach

OTHER INTERESTED PARTIES

- X Alexandria Larson
- X Rosa Durando

Appendix D

FEMA Flood Map for Village Study Area



Composite FEMA Flood Zones Map for Village Area

Village of Royal Palm Beach
Watershed Master Plan
Appendix D
7/10/2023

0 1,250 2,500 5,000 Feet
1:35,000

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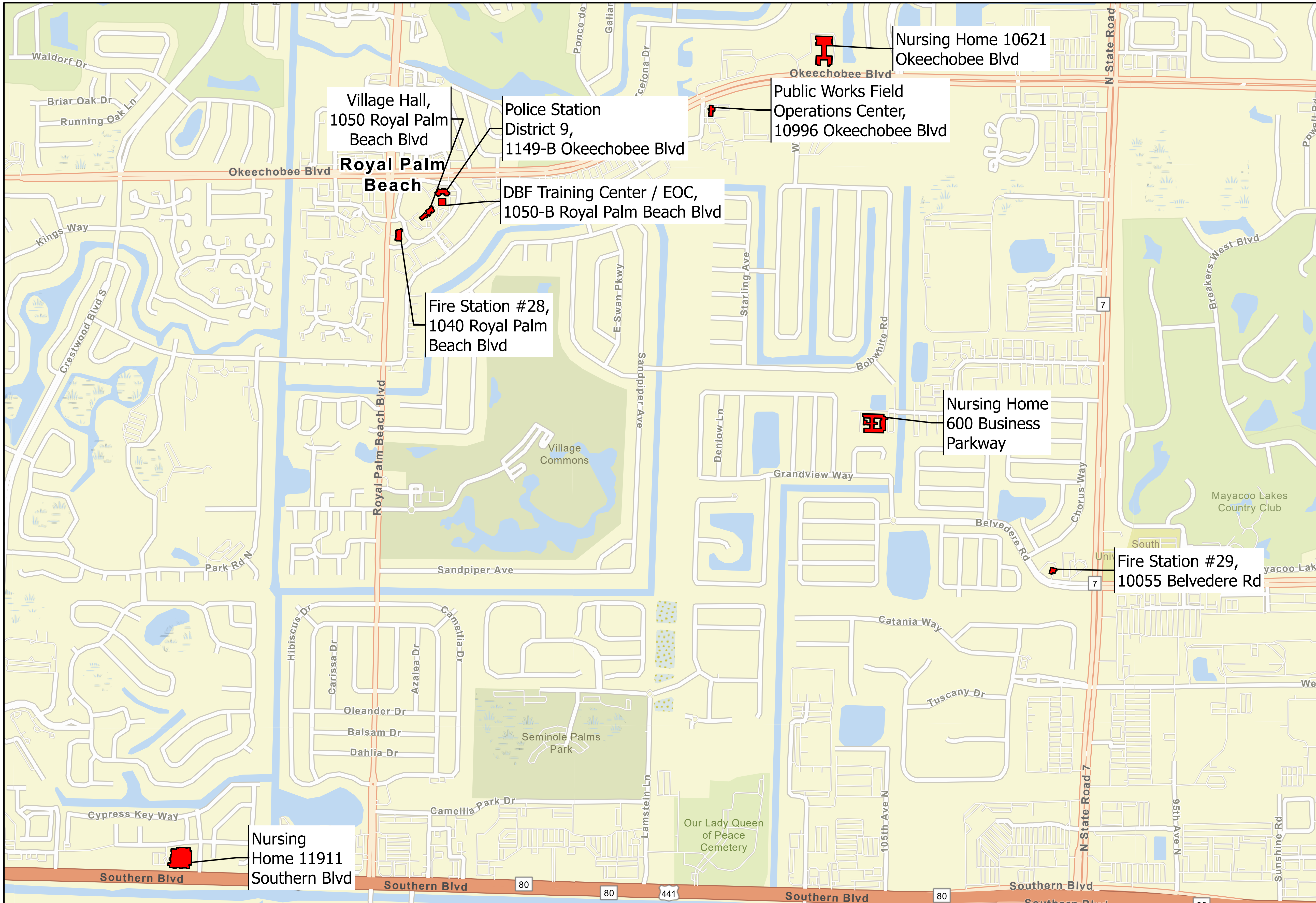
Appendix E

Critical Facilities Map



Legend

Critical Facilities

Critical Facilities Map

Village of Royal Palm Beach
Watershed Master Plan
Appendix E
8/1/2023

0 500 1,000 2,000 Feet
1:15,000

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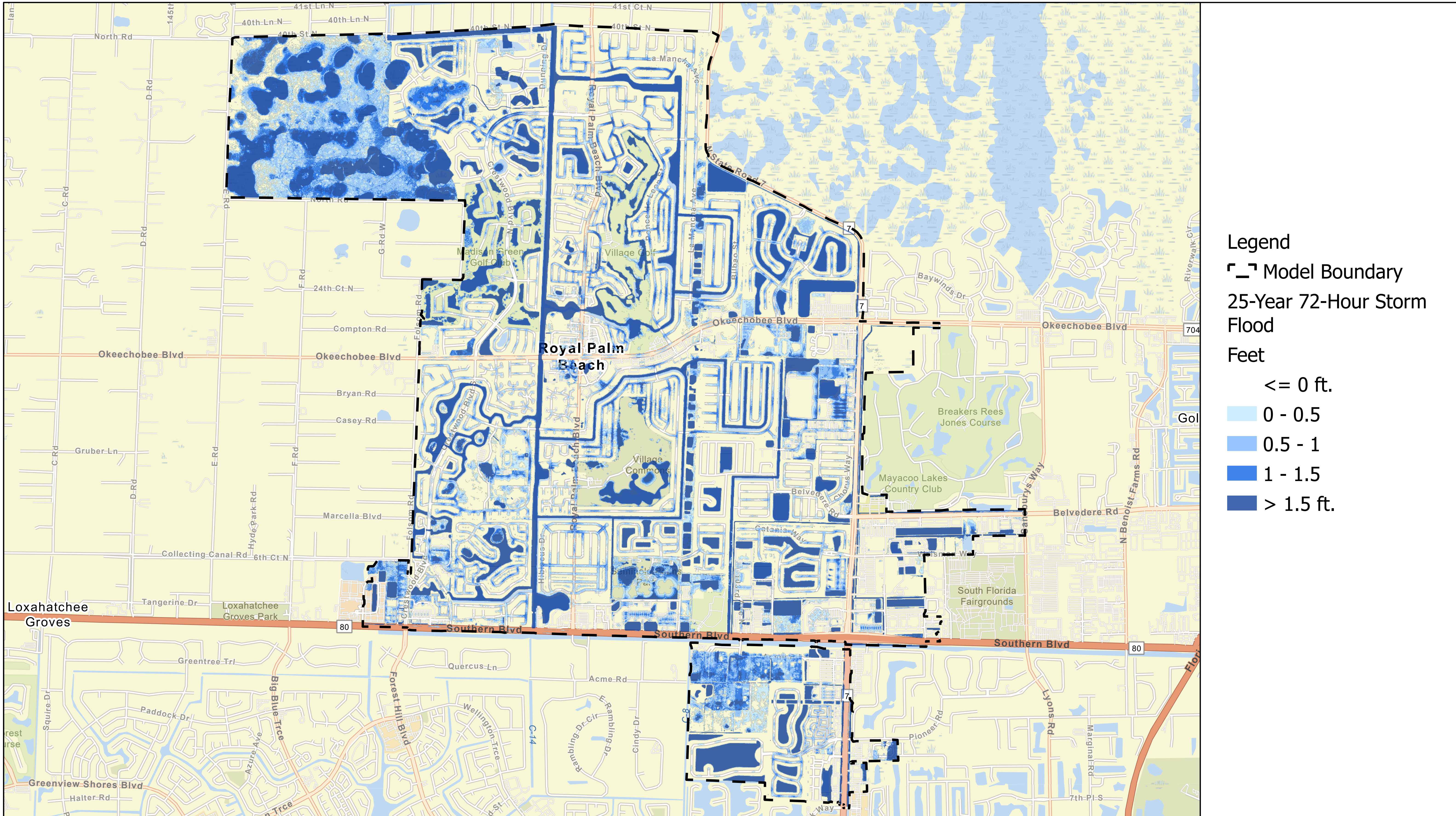
Appendix F

25- and 100-Year Inundation Maps for Potential Alternatives



CDM Smith

Results for Existing Conditions
25-yr, 72-hr Design Storm Inundation Map

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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Legend

Model Boundary

Alt 1 25-Year 72-Hour Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 1

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
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Legend

Model Boundary

Alt 2 25-Year 72-Hour Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 2

0 1,250 2,500 5,000 Feet

1:35,000

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Watershed Master Plan
Appendix F
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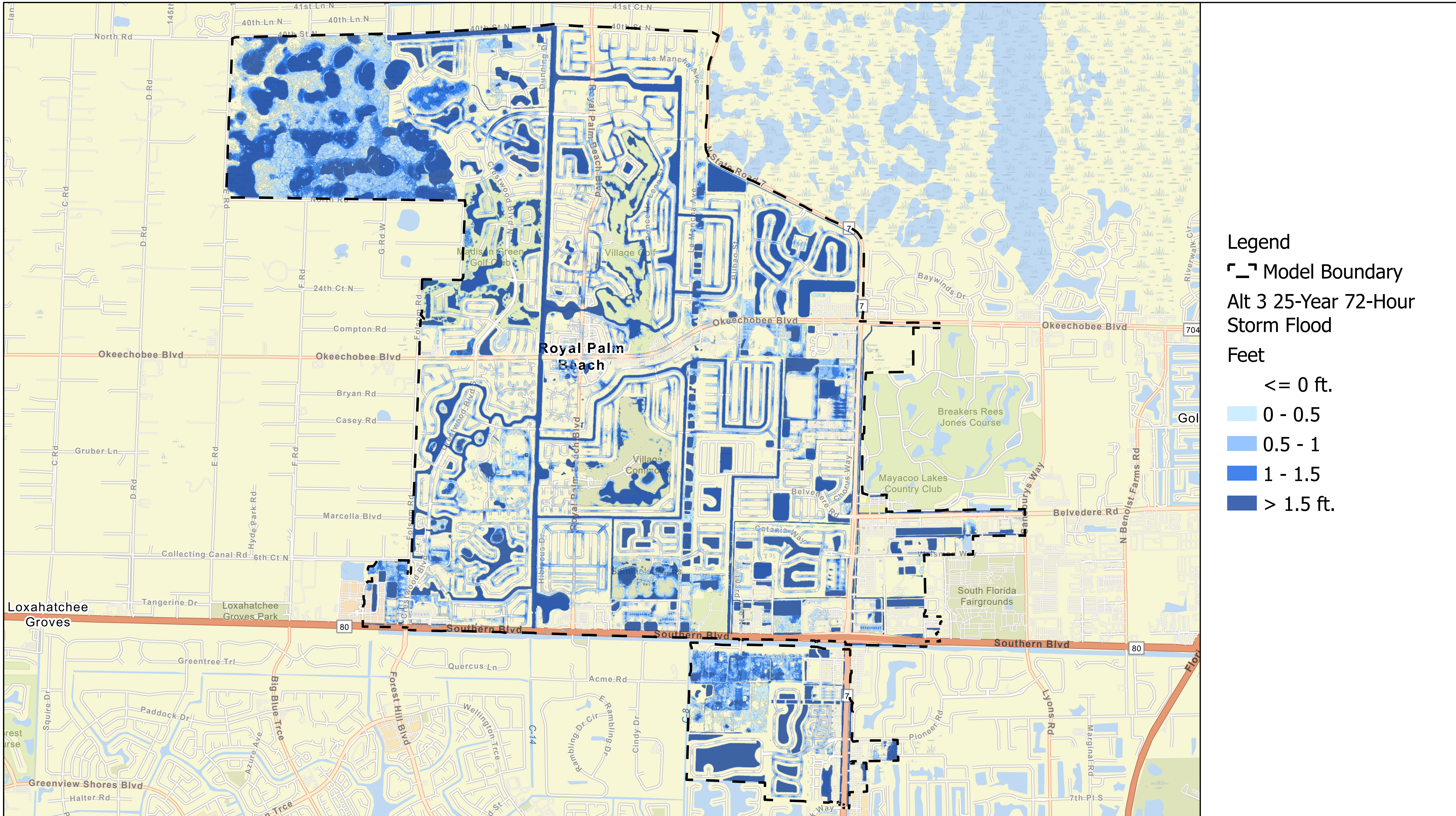

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 3

Village of Royal Palm Beach
Watershed Master Plan
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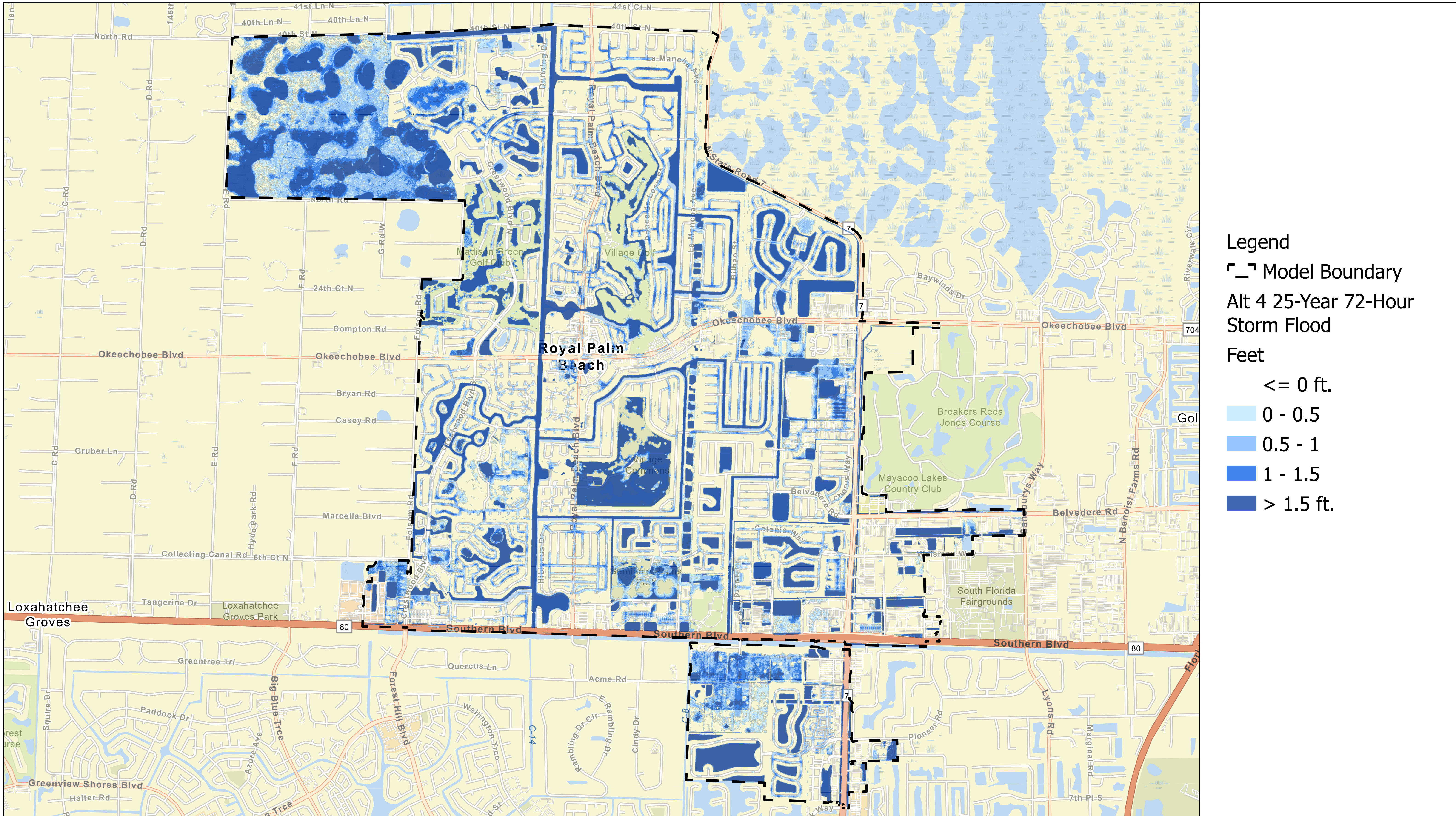

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 4

Village of Royal Palm Beach
Watershed Master Plan
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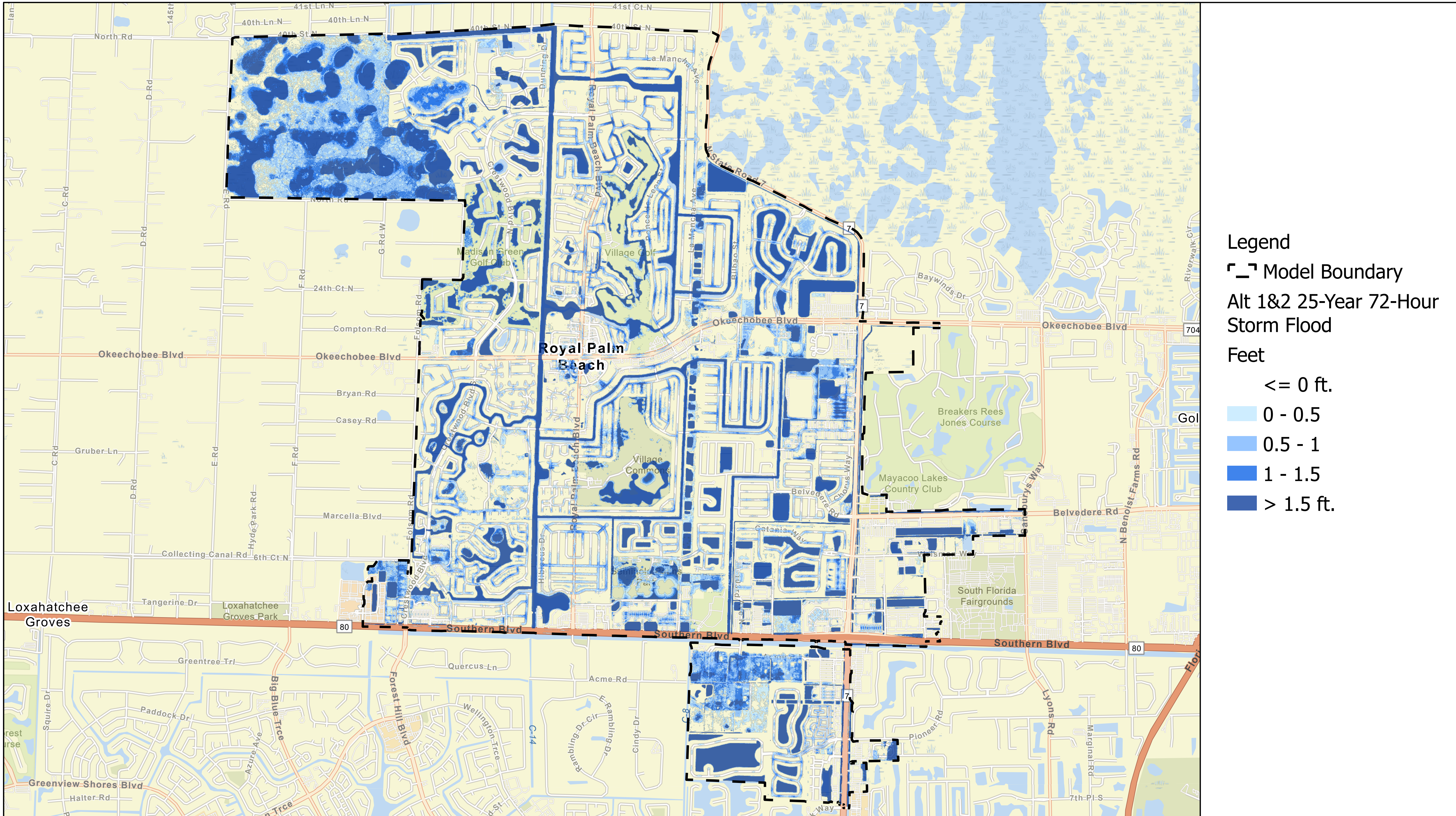

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 1&2 Combined

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
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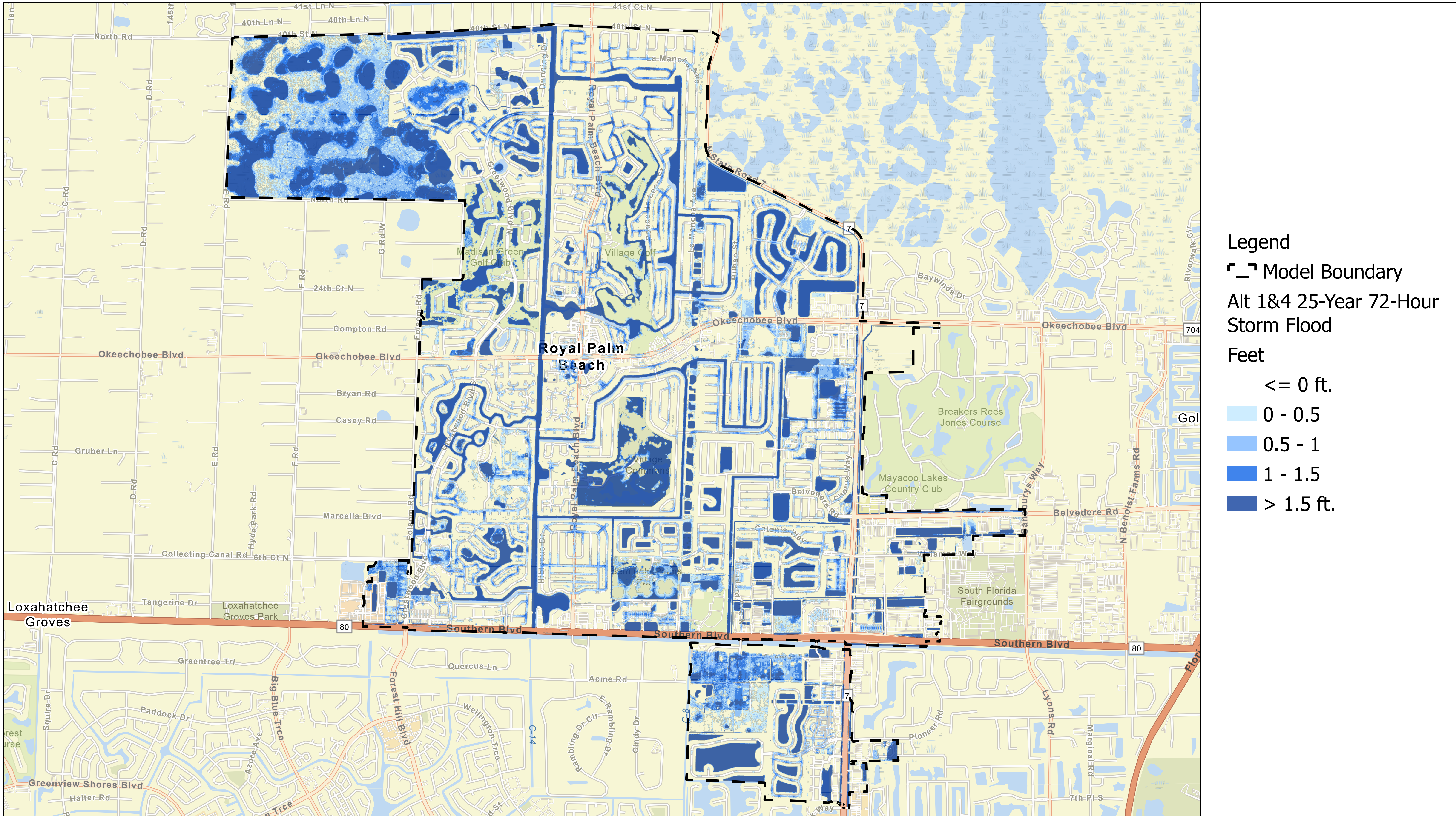

Results 25-yr, 72-hr Design Storm Inundation Map for Alternative 1&4 Combined

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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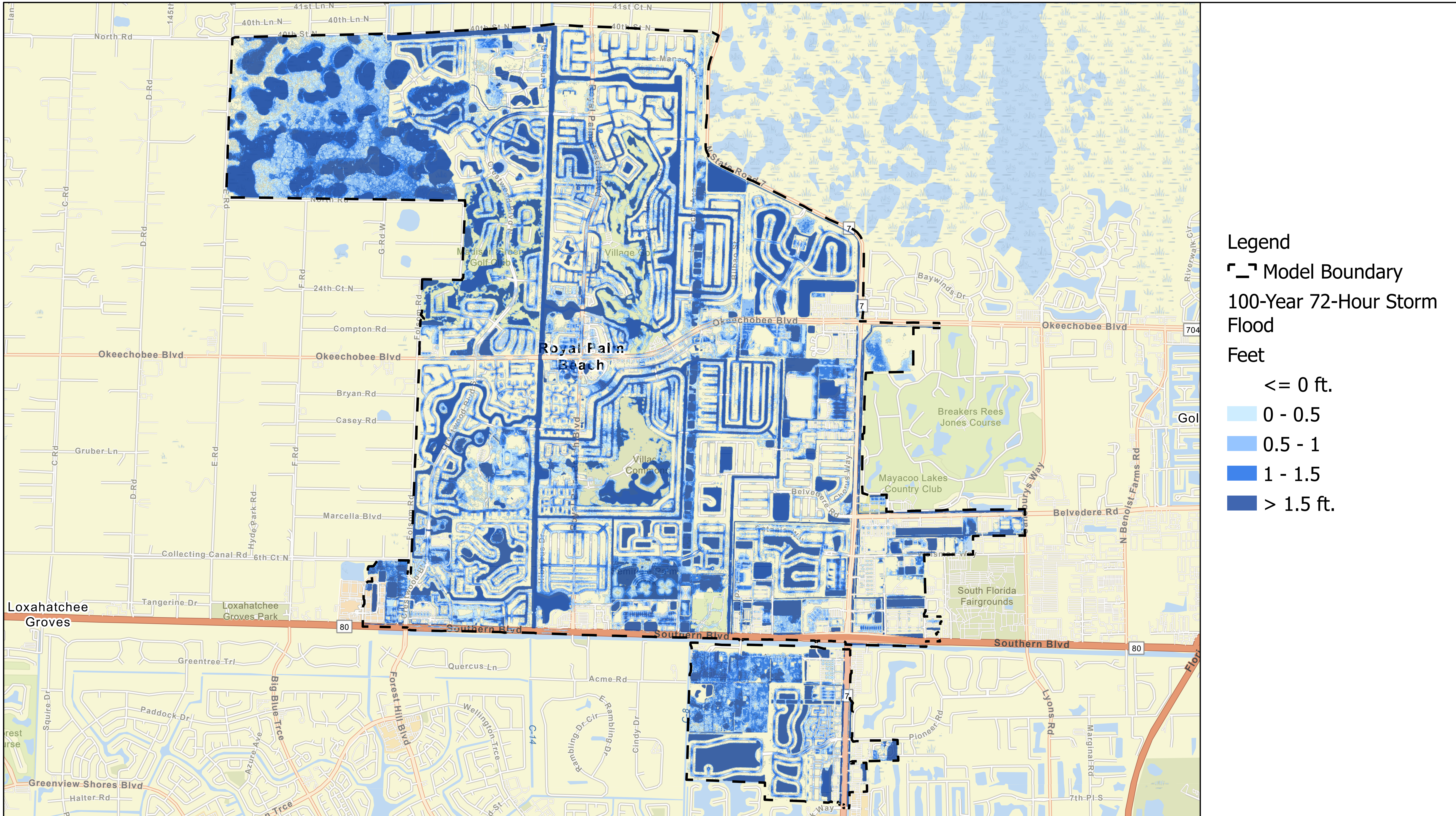

Results for Existing Conditions
100-yr, 72-hr Design Storm Inundation Map

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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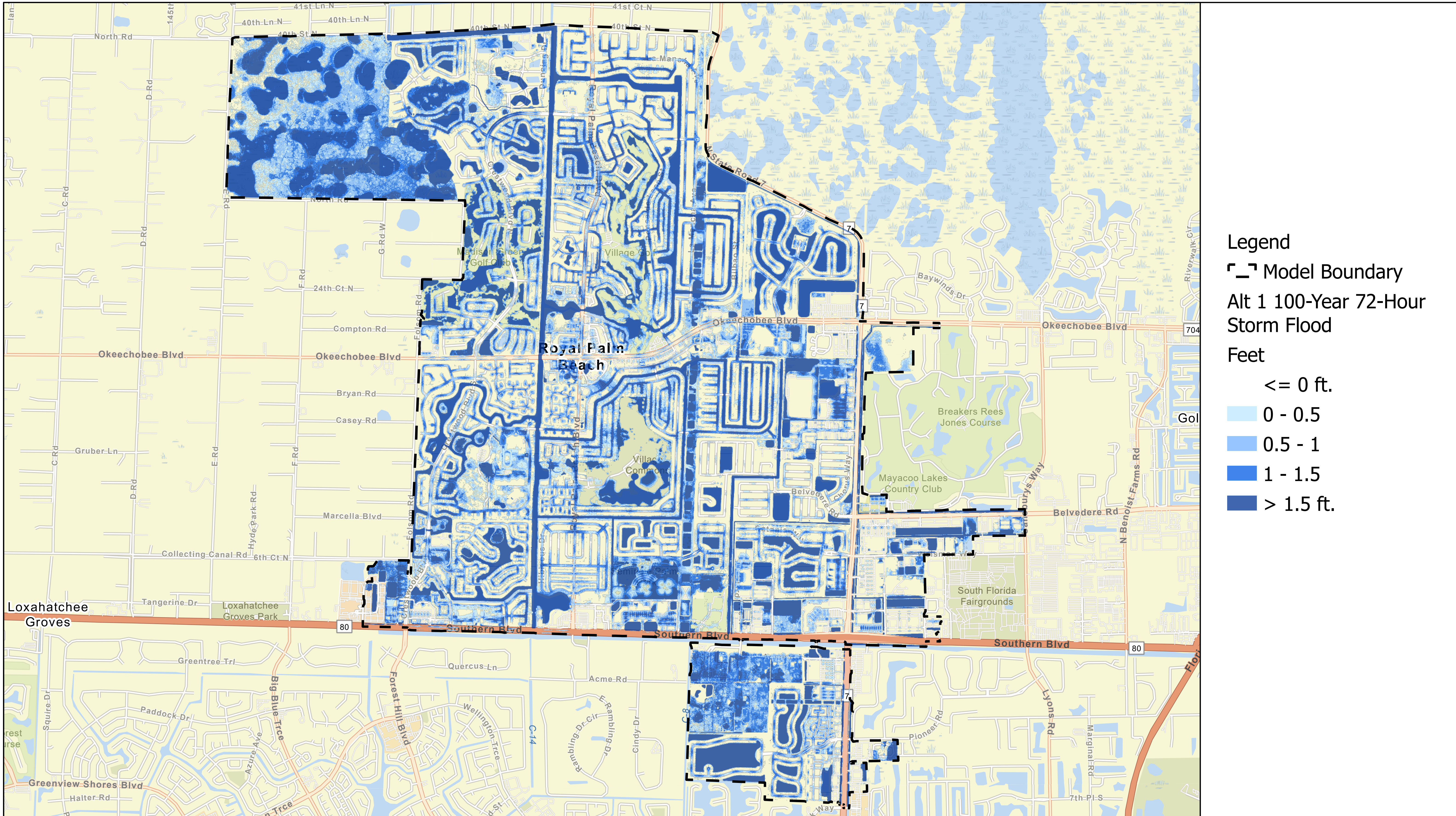

N

CDM Smith

Results 100-yr, 72-hr Design Storm Inundation Map for Alternative 1

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
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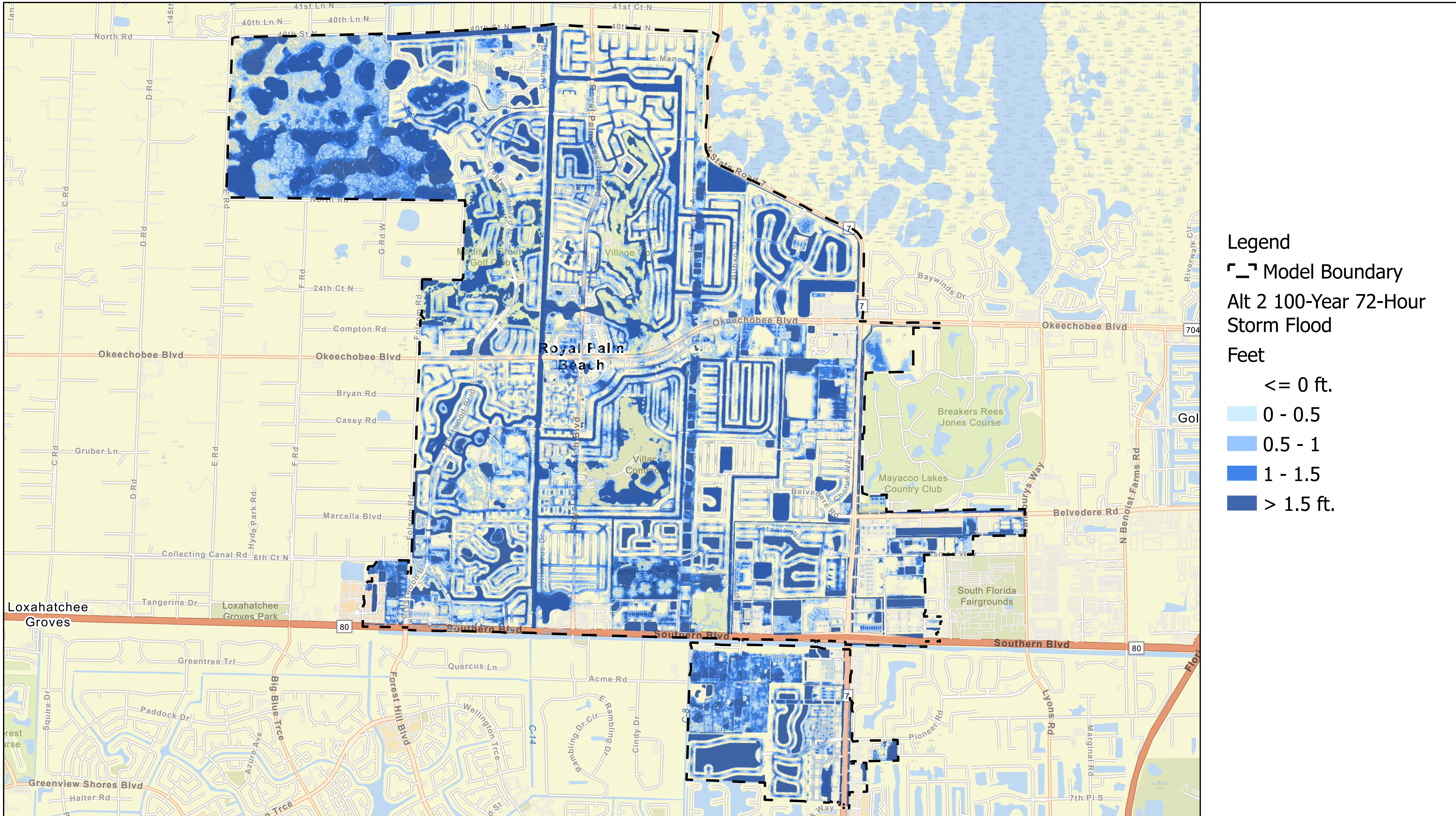

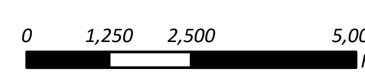

Results 100-yr, 72-hr Design Storm Inundation Map for Alternative 2

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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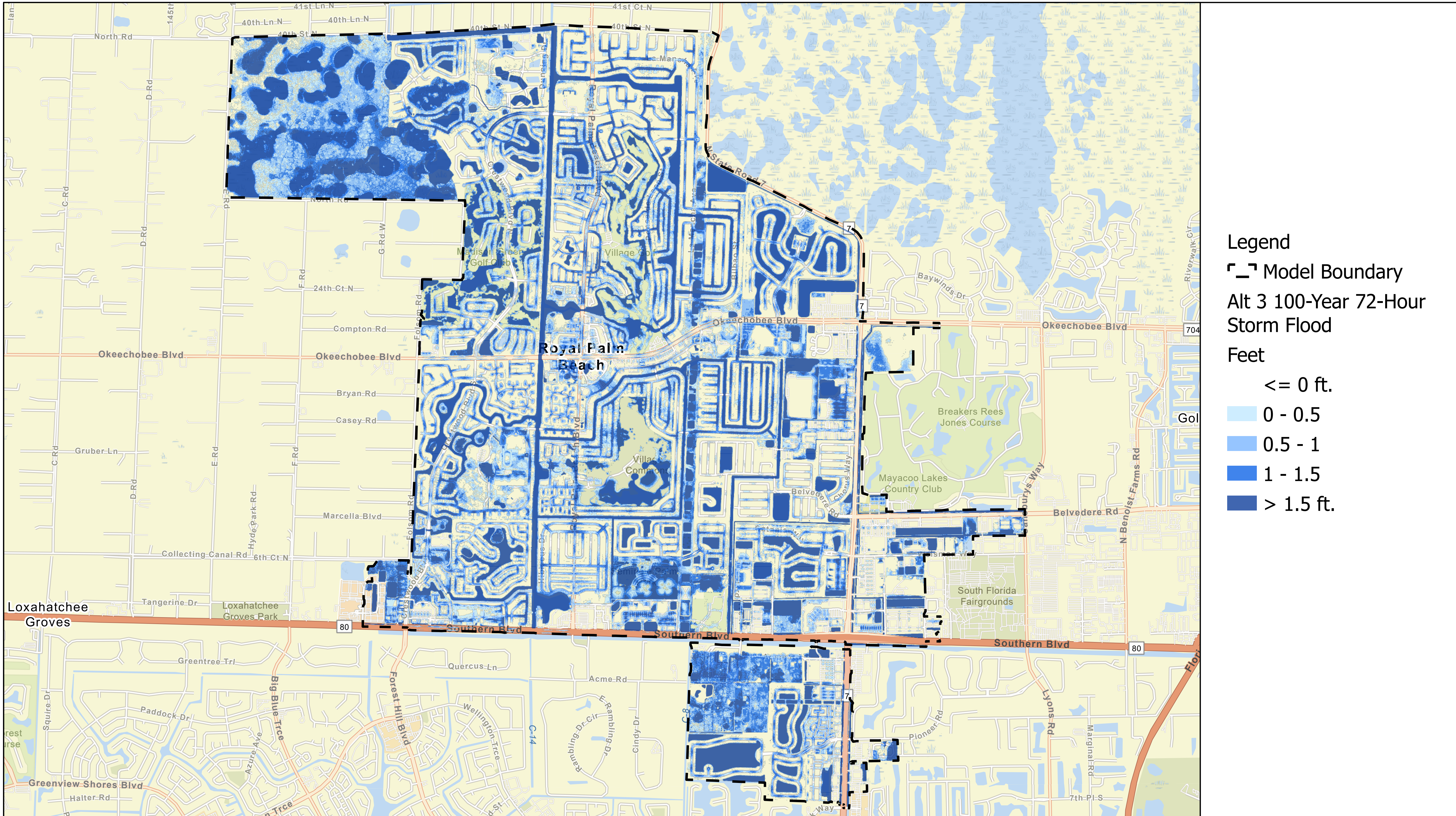

Results 100-yr, 72-hr Design Storm Inundation Map for Alternative 3

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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Legend

Model Boundary

Alt 4 100-Year 72-Hour Storm Flood

Feet

<= 0 ft.

0 - 0.5

0.5 - 1

1 - 1.5

> 1.5 ft.

Results 100-yr, 72-hr Design Storm Inundation Map for Alternative 4

0 1,250 2,500 5,000 Feet

1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
7/10/2023

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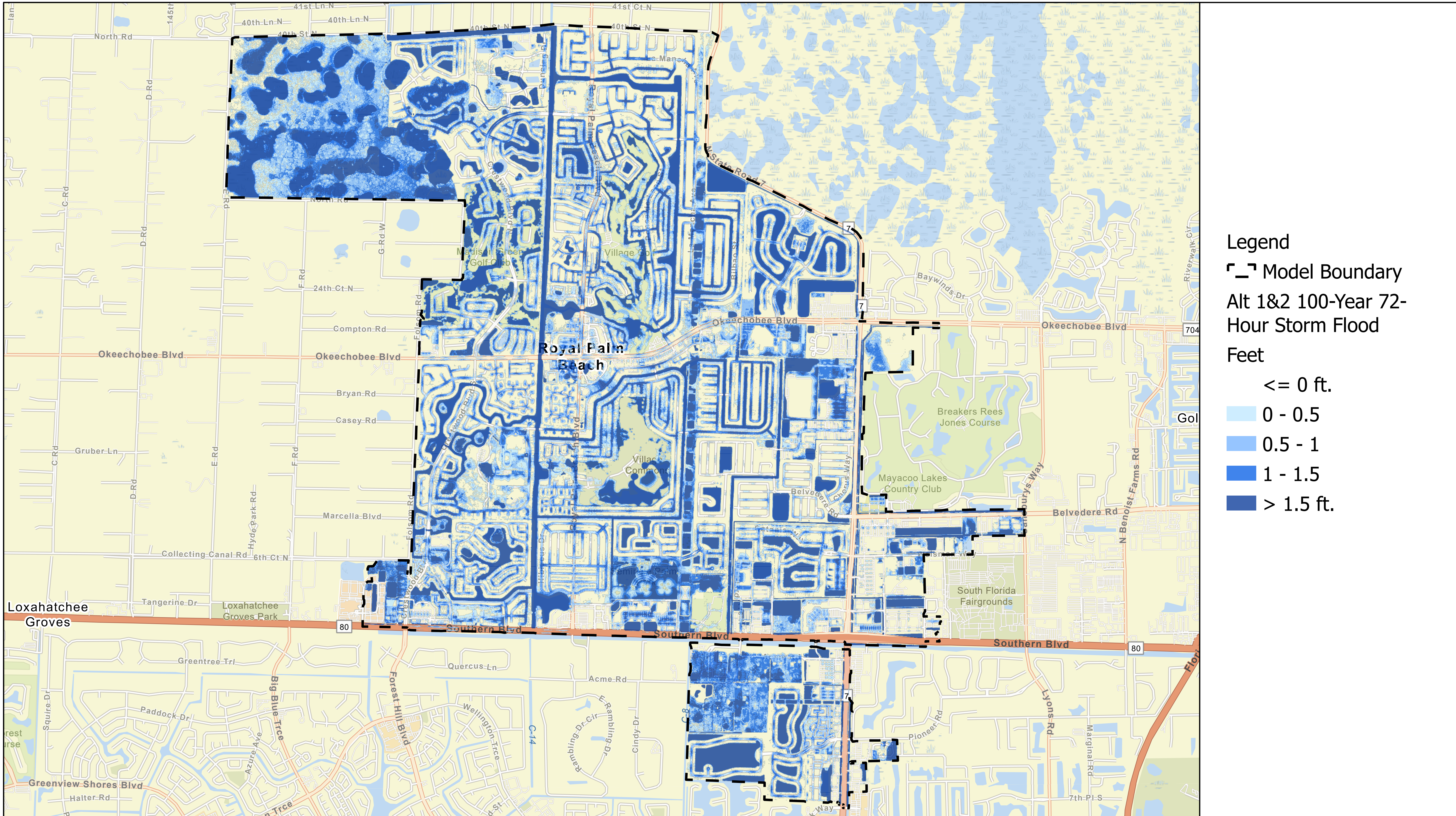

CDM Smith

Results 100-yr, 72-hr Design Storm Inundation Map for Alternative 1&2 Combined

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
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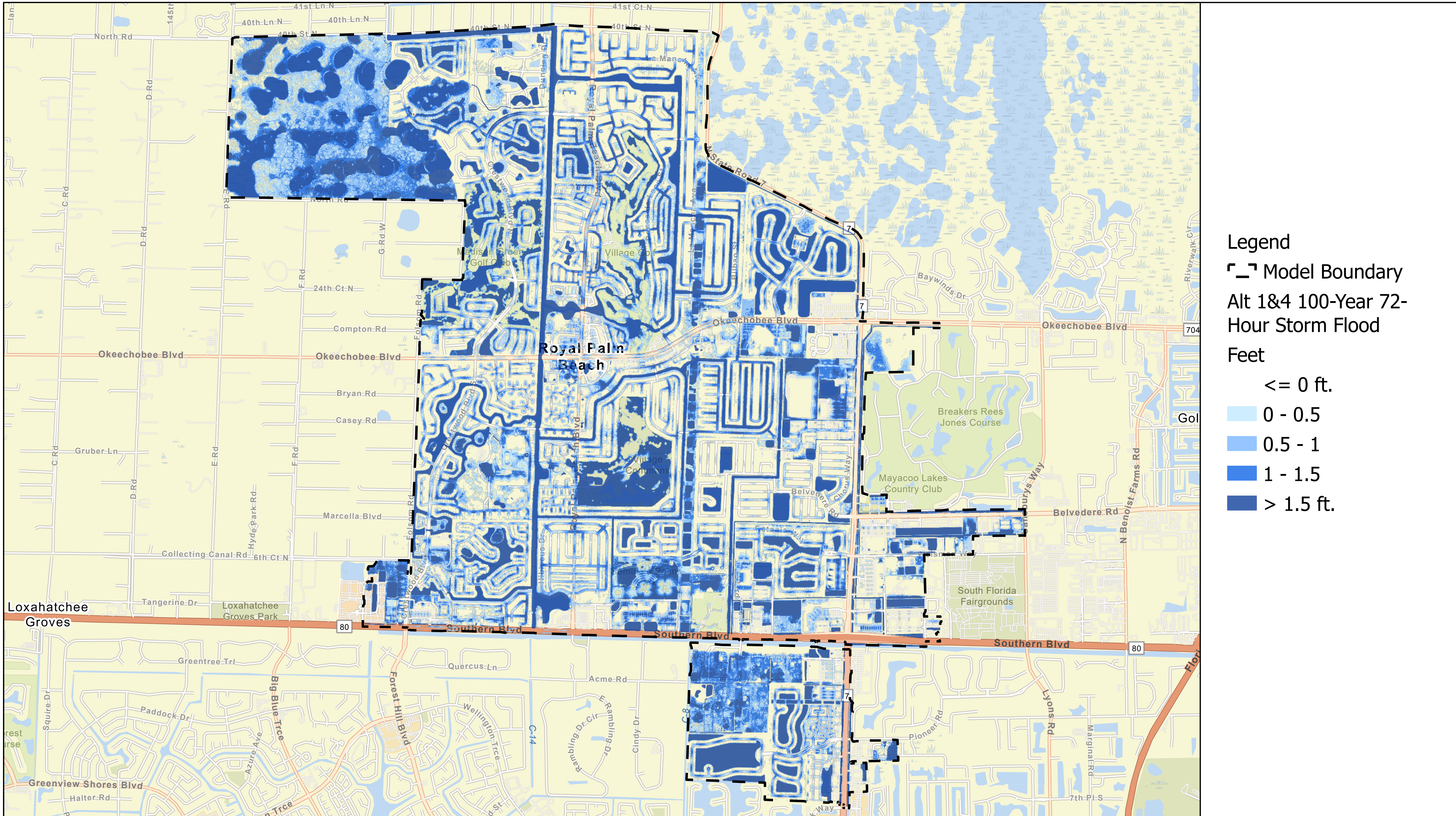

Results 100-yr, 72-hr Design Storm Inundation Map
for Alternative 1&4 Combined

0 1,250 2,500 5,000 Feet
1:35,000

Village of Royal Palm Beach
Watershed Master Plan
Appendix F
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Appendix G

Peak Stage Tables

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.8
ITID_UpM1	19.8	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.9	16.8	17.6
RP1000	15.3	16.2	17.2
RP1120S	16.5	16.9	17.3
RP1160S	16.0	16.4	17.2
RP1200S	16.0	16.7	17.2
RP1201S	16.0	16.7	17.2
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.7	16.2	17.2
RP1230S	16.0	16.4	17.2
RP1240S	16.1	16.5	17.2
RP1250S	15.6	16.4	17.2
RP1260S	16.1	16.4	17.2
RP1300S	15.7	16.3	17.2
RP1400S	16.4	17.2	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.9	16.8	17.9
RP1441S	17.6	17.9	18.1
RP1442S	16.1	17.0	18.0
RP1480S	16.2	17.0	18.2
RP1480S_2	16.4	17.2	18.3
RP150	17.8	18.2	18.6
RP1500S	16.1	16.7	17.2
RP1650	15.2	16.1	17.1
RP1700S	15.7	16.2	17.1
RP1800S	16.0	16.5	17.2
RP1900	15.1	16.0	17.0
RP1900S	15.4	16.2	17.2
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.1	16.5	17.1
RP2060S	15.8	16.2	17.1
RP2100S	16.0	16.5	17.2
RP2200S	15.7	16.2	17.1
RP2250S	17.2	17.6	17.9
RP235	16.2	16.7	17.4
RP2350S	16.1	16.4	17.1
RP2400S	16.0	16.5	17.1
RP250	18.0	18.2	18.8
RP2500S	15.4	16.1	17.1
RP2600S	15.6	16.2	17.1
RP2650S	15.7	16.2	17.1
RP2700	17.7	18.2	18.8
RP2700S	15.4	16.2	17.1
RP2703	17.6	17.9	18.5
RP2705	12.1	17.0	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	16.7	17.7	18.4
RP2900S	15.7	16.2	17.1
RP2903	17.3	17.7	18.4

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3000S	16.7	17.0	17.5
RP3005	15.3	16.2	17.1
RP3100S	15.9	16.4	17.1
RP3200	15.3	16.2	17.1
RP3200S	15.7	16.2	17.1
RP330S	15.3	16.2	17.1
RP335S	15.8	16.5	17.1
RP3400	16.9	17.2	17.5
RP3400S	16.2	16.6	17.1
RP340S	15.3	16.2	17.1
RP3450S	16.2	16.8	17.4
RP3500	15.1	16.0	17.0
RP3500S	15.6	16.1	17.1
RP3550	16.0	16.5	17.1
RP3550S	15.2	16.1	17.1
RP3600	16.0	16.5	17.0
RP3600S	15.4	16.2	17.1
RP3650S	17.4	17.6	17.8
RP3700	15.1	16.0	17.0
RP3700S	16.8	17.0	17.2
RP3700S_1	16.4	16.7	17.1
RP3700S_10	16.8	17.0	17.2
RP3740S	16.4	16.7	17.1
RP3780S	15.6	16.2	17.1
RP3790S	15.6	16.3	17.1
RP3800S	15.6	16.1	17.1
RP4000S	15.2	16.1	17.1
RP4100S	15.4	16.1	17.1
RP4200S	15.2	16.1	17.1
RP4250S	15.2	16.1	17.1
RP4300S	15.9	16.5	17.1
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.3
RP4380S_2	15.5	16.3	17.1
RP4380S_4	16.3	16.6	17.1
RP4500S	16.9	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.4	16.2	17.2
RP4550S	15.6	16.4	17.3
RP4580S	15.5	16.8	17.3
RP4700	15.4	16.2	17.2
RP4700S	16.4	16.7	17.0
RP4950S	16.8	17.2	17.5
RP4970	15.4	16.2	17.2
RP5000	15.3	16.2	17.2
RP5000S	16.2	16.6	17.0

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP500S	17.2	17.5	17.8
RP5200S	16.4	16.7	17.0
RP5300	16.7	16.8	17.2
RP5350S	17.3	17.7	18.2
RP5400	16.4	16.7	17.2
RP5400S	15.1	16.0	17.0
RP5500	15.7	16.3	17.2
RP5500S	15.6	16.0	17.0
RP5510	16.1	16.6	17.2
RP5520	16.1	16.6	17.2
RP5525	16.1	16.6	17.2
RP5526	15.3	16.2	17.2
RP5700	15.4	16.2	17.2
RP6000	15.3	16.1	17.1
RP600S	17.1	17.4	17.7
RP6900	15.3	16.1	17.1
RP7000	15.2	16.2	17.1
RP700S	15.7	16.3	17.2
RP7355	15.2	16.1	17.1
RP750S	16.1	16.7	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	16.0	16.3	17.2
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.1	17.1
RPC51200	15.7	16.1	17.1
RPC51400	15.9	16.5	17.1
RPC51500	15.9	16.2	17.1
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	17.1
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8
LW0050	11.7	13.7	15.8
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.8

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.4	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2
LWS303-5	14.2	15.3	16.3
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.4	16.3	17.2
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.4	16.3	17.3
RP1050	15.3	16.2	17.2
RP1100	15.3	16.2	17.1
RP1200	15.3	16.2	17.1
RP1205S	15.4	16.2	17.2
RP1211S	16.0	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.2	17.5	18.0
RP1300	15.3	16.2	17.1
RP1400	15.3	16.1	17.1
RP1441	15.9	16.7	17.8
RP1441S-2	16.1	17.0	18.0
RP1441S-3	16.1	17.0	18.0
RP1480S_3	16.4	17.2	18.2
RP1481	16.1	17.0	18.2
RP1500	15.3	16.1	17.1
RP155	15.5	16.7	17.8

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1600	15.3	16.1	17.1
RP1700	15.2	16.1	17.0
RP1800	15.1	16.0	17.0
RP1925	14.0	15.0	16.4
RP200	15.4	16.2	17.2
RP2000	15.1	16.0	17.0
RP235-3	15.6	16.4	17.3
RP240	16.3	16.8	17.5
RP2400	14.3	15.2	16.6
RP2500	14.3	15.2	16.5
RP255	18.4	18.6	18.6
RP255-1	15.4	16.3	17.2
RP260	15.4	16.2	17.2
RP270	15.4	16.2	17.2
RP2701	17.6	17.9	18.5
RP2702	17.6	17.9	18.5
RP2803	14.2	15.1	16.5
RP2805	15.6	16.3	17.2
RP3000	15.3	16.2	17.1
RP3002	15.3	16.2	17.1
RP3010	15.3	16.2	17.1
RP3100	15.3	16.2	17.1
RP3202	15.3	16.2	17.1
RP3205	15.3	16.2	17.1
RP3210	15.3	16.2	17.1
RP325	15.3	16.2	17.1
RP3300	15.3	16.2	17.1
RP3350	15.3	16.2	17.1
RP338	15.3	16.2	17.1
RP3450	16.6	16.9	17.3
RP3700S_13	16.8	17.0	17.2
RP3700S_3	16.7	16.9	17.2
RP3700S_4	16.7	16.9	17.2
RP3700S_5	16.8	17.0	17.2
RP3700S_8	16.8	17.0	17.2
RP3700S_9	16.8	17.0	17.2
RP3790S_1	15.3	16.2	17.1
RP3790S_2	15.6	16.3	17.1
RP3790S_3	15.6	16.3	17.1
RP3790S_5	15.6	16.4	17.1
RP3790S_8	16.3	17.0	17.2
RP3790S_9	16.8	17.0	17.2
RP3900	15.1	16.0	17.0
RP400	15.4	16.2	17.2
RP4000	15.1	16.0	17.0
RP4100	15.4	16.2	17.2

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP4200	15.4	16.2	17.2
RP4300	15.4	16.2	17.2
RP4380S_1	15.8	16.4	17.1
RP4380S_3	16.1	16.5	17.1
RP4400	15.4	16.2	17.2
RP4500	15.4	16.2	17.2
RP4600	15.4	16.2	17.2
RP4800	15.4	16.2	17.2
RP4900	15.4	16.2	17.2
RP4950	15.4	16.2	17.2
RP500	15.4	16.2	17.2
RP5301	16.7	16.8	17.2
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	16.1	16.6	17.2
RP5527	15.3	16.2	17.2
RP5600	15.4	16.2	17.2
RP5725	15.4	16.2	17.2
RP5750	15.4	16.2	17.2
RP5775	15.4	16.2	17.2
RP5800	15.4	16.2	17.2
RP5900	15.4	16.2	17.2
RP600	15.4	16.2	17.2
RP6200	15.3	16.1	17.1
RP6250	15.3	16.1	17.1
RP6300	15.2	16.1	17.1
RP6400	15.3	16.1	17.1
RP6500	15.3	16.1	17.1
RP6550	15.3	16.1	17.1
RP6600	15.3	16.1	17.1
RP6700	15.3	16.1	17.1
RP6800	15.3	16.1	17.1
RP700	15.4	16.2	17.2
RP7100	15.2	16.1	17.1
RP7200	15.2	16.1	17.1
RP7250	15.2	16.1	17.1
RP7300	15.2	16.1	17.1
RP7350	15.2	16.1	17.1
RP7400	15.2	16.1	17.1
RP7500	15.2	16.1	17.0
RP7600	14.1	15.0	16.2
RP7700	14.1	14.9	16.2
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2

Peak Stage Results: Existing Conditions

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP800	15.4	16.2	17.2
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.4	16.2	17.2
RP8404	15.9	16.5	17.1
RP8406	15.7	16.1	17.0
RP8408	15.7	16.0	17.0
RP8410	15.3	15.7	16.8
RP8415	14.9	15.4	16.6
RP8420	14.1	15.0	16.3
RP850	15.4	16.2	17.2
RP900	15.3	16.2	17.2
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.8
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	20.0
SB-301S-2	15.2	16.2	17.7
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.9	19.2	19.8
SyphonUS	19.3	19.7	20.4

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.7
ITID_UpM1	19.7	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.7	16.7	17.6
RP1000	15.1	16.1	17.1
RP1120S	16.5	16.9	17.3
RP1160S	15.9	16.3	17.2
RP1200S	15.8	16.7	17.2
RP1201S	15.8	16.7	17.2
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.6	16.1	17.2
RP1230S	15.9	16.3	17.2
RP1240S	16.0	16.5	17.2
RP1250S	15.5	16.3	17.2
RP1260S	16.0	16.3	17.2
RP1300S	15.5	16.2	17.2
RP1400S	16.3	17.1	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.8	16.7	17.8
RP1441S	17.6	17.9	18.1
RP1442S	16.0	16.9	17.9
RP1480S	16.0	17.0	18.2
RP1480S_2	16.3	17.2	18.3
RP150	17.8	18.2	18.6
RP1500S	16.1	16.6	17.2
RP1650	14.9	16.0	17.0
RP1700S	15.6	16.1	17.1
RP1800S	15.9	16.5	17.2
RP1900	14.8	15.9	17.0
RP1900S	15.2	16.1	17.2
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.0	16.5	17.1
RP2060S	15.6	16.2	17.1
RP2100S	15.9	16.4	17.2
RP2200S	15.5	16.1	17.1
RP2250S	17.2	17.5	17.9
RP235	16.1	16.7	17.4
RP2350S	16.0	16.4	17.1
RP2400S	15.9	16.4	17.1
RP250	18.0	18.2	18.8
RP2500S	15.2	16.0	17.1
RP2600S	15.4	16.1	17.1
RP2650S	15.6	16.1	17.1
RP2700	17.7	18.2	18.8
RP2700S	15.1	16.1	17.1
RP2703	17.6	17.9	18.5
RP2705	12.1	16.9	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	16.6	17.7	18.4
RP2900S	15.7	16.1	17.1
RP2903	17.3	17.7	18.4

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3000S	16.6	17.0	17.5
RP3005	15.0	16.0	17.1
RP3100S	15.8	16.3	17.1
RP3200	15.0	16.0	17.1
RP3200S	15.5	16.1	17.1
RP330S	15.0	16.1	17.1
RP335S	15.6	16.4	17.1
RP3400	16.8	17.2	17.5
RP3400S	16.1	16.6	17.1
RP340S	15.1	16.1	17.1
RP3450S	16.1	16.7	17.4
RP3500	14.8	15.9	17.0
RP3500S	15.5	16.0	17.1
RP3550	15.8	16.4	17.1
RP3550S	15.0	16.0	17.1
RP3600	15.8	16.4	17.0
RP3600S	15.2	16.1	17.1
RP3650S	17.4	17.6	17.8
RP3700	14.8	15.9	17.0
RP3700S	16.8	17.0	17.2
RP3700S_1	16.4	16.7	17.1
RP3700S_10	16.8	17.0	17.2
RP3740S	16.4	16.7	17.1
RP3780S	15.5	16.0	17.1
RP3790S	15.2	16.2	17.1
RP3800S	15.4	16.0	17.1
RP4000S	15.1	16.0	17.0
RP4100S	15.2	16.0	17.0
RP4200S	14.9	16.0	17.1
RP4250S	14.9	16.0	17.0
RP4300S	15.7	16.5	17.1
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.3
RP4380S_2	15.4	16.1	17.1
RP4380S_4	16.2	16.5	17.1
RP4500S	16.8	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.1	16.1	17.2
RP4550S	15.2	16.3	17.3
RP4580S	15.2	16.8	17.3
RP4700	15.1	16.1	17.2
RP4700S	16.3	16.6	17.0
RP4950S	16.8	17.2	17.5
RP4970	15.1	16.1	17.2
RP5000	15.1	16.1	17.1
RP5000S	16.1	16.6	17.0

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP500S	17.1	17.5	17.8
RP5200S	16.3	16.6	17.0
RP5300	16.7	16.8	17.1
RP5350S	17.3	17.7	18.2
RP5400	16.2	16.6	17.2
RP5400S	14.8	15.9	17.0
RP5500	15.5	16.2	17.2
RP5500S	15.5	15.9	17.0
RP5510	15.9	16.6	17.2
RP5520	15.9	16.6	17.2
RP5525	15.9	16.6	17.2
RP5526	15.1	16.1	17.1
RP5700	15.1	16.1	17.2
RP6000	15.0	16.0	17.1
RP600S	17.1	17.4	17.7
RP6900	15.0	16.0	17.0
RP7000	14.9	16.0	17.1
RP700S	15.6	16.2	17.2
RP7355	14.9	16.0	17.0
RP750S	15.9	16.6	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	15.9	16.3	17.2
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.1	17.0
RPC51200	15.7	16.1	17.0
RPC51400	15.9	16.5	17.0
RPC51500	15.9	16.2	17.0
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	17.0
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8
LW0050	11.7	13.7	15.8
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.8

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.4	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2
LWS303-5	14.2	15.3	16.3
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.1	16.1	17.2
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.1	16.1	17.2
RP1050	15.1	16.1	17.1
RP1100	15.0	16.1	17.1
RP1200	15.0	16.1	17.1
RP1205S	15.1	16.1	17.2
RP1211S	15.8	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.1	17.5	18.0
RP1300	15.0	16.0	17.1
RP1400	15.0	16.0	17.1
RP1441	15.7	16.7	17.8
RP1441S-2	16.0	17.0	17.9
RP1441S-3	16.0	16.9	18.0
RP1480S_3	16.3	17.1	18.1
RP1481	16.0	16.9	18.2
RP1500	15.0	16.0	17.1
RP155	15.2	16.6	17.7

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1600	15.0	16.0	17.1
RP1700	14.9	16.0	17.0
RP1800	14.8	15.9	17.0
RP1925	14.0	14.9	16.4
RP200	15.1	16.1	17.2
RP2000	14.8	15.9	17.0
RP235-3	15.3	16.3	17.3
RP240	16.2	16.7	17.5
RP2400	14.3	15.2	16.6
RP2500	14.3	15.2	16.5
RP255	18.4	18.6	18.6
RP255-1	15.1	16.1	17.2
RP260	15.1	16.1	17.2
RP270	15.1	16.1	17.2
RP2701	17.6	17.9	18.5
RP2702	17.6	17.9	18.5
RP2803	14.2	15.1	16.5
RP2805	15.4	16.3	17.2
RP3000	15.0	16.0	17.1
RP3002	15.0	16.0	17.1
RP3010	15.0	16.0	17.1
RP3100	15.0	16.0	17.1
RP3202	15.0	16.0	17.1
RP3205	15.0	16.0	17.1
RP3210	15.0	16.0	17.1
RP325	15.0	16.0	17.1
RP3300	15.0	16.0	17.1
RP3350	15.0	16.0	17.1
RP338	15.0	16.1	17.1
RP3450	16.6	16.9	17.3
RP3700S_13	16.8	17.0	17.2
RP3700S_3	16.6	16.9	17.1
RP3700S_4	16.7	16.9	17.2
RP3700S_5	16.8	17.0	17.2
RP3700S_8	16.8	17.0	17.2
RP3700S_9	16.8	17.0	17.2
RP3790S_1	15.0	16.0	17.1
RP3790S_2	15.2	16.3	17.1
RP3790S_3	15.2	16.3	17.1
RP3790S_5	15.3	16.3	17.1
RP3790S_8	16.2	17.0	17.2
RP3790S_9	16.8	17.0	17.2
RP3900	14.8	15.9	17.0
RP400	15.1	16.1	17.2
RP4000	14.8	15.9	17.0
RP4100	15.1	16.1	17.2

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP4200	15.1	16.1	17.2
RP4300	15.1	16.1	17.2
RP4380S_1	15.6	16.3	17.1
RP4380S_3	16.1	16.5	17.1
RP4400	15.1	16.1	17.2
RP4500	15.1	16.1	17.2
RP4600	15.1	16.1	17.2
RP4800	15.1	16.1	17.2
RP4900	15.1	16.1	17.2
RP4950	15.1	16.1	17.2
RP500	15.1	16.1	17.2
RP5301	16.7	16.8	17.1
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	15.9	16.6	17.2
RP5527	15.1	16.1	17.1
RP5600	15.1	16.1	17.2
RP5725	15.1	16.1	17.2
RP5750	15.1	16.1	17.2
RP5775	15.1	16.1	17.2
RP5800	15.1	16.1	17.2
RP5900	15.1	16.1	17.2
RP600	15.1	16.1	17.2
RP6200	15.0	16.0	17.1
RP6250	15.0	16.0	17.1
RP6300	15.0	16.0	17.1
RP6400	15.0	16.0	17.1
RP6500	15.0	16.0	17.1
RP6550	15.0	16.0	17.1
RP6600	15.0	16.0	17.1
RP6700	15.0	16.0	17.1
RP6800	15.0	16.0	17.1
RP700	15.1	16.1	17.2
RP7100	15.0	16.0	17.1
RP7200	14.9	16.0	17.1
RP7250	14.9	16.0	17.0
RP7300	14.9	16.0	17.0
RP7350	14.9	16.0	17.0
RP7400	14.9	16.0	17.0
RP7500	14.9	16.0	17.0
RP7600	14.1	15.0	16.2
RP7700	14.1	14.9	16.2
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2

Peak Stage Results: Alternative 1

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP800	15.1	16.1	17.2
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.1	16.1	17.2
RP8404	15.9	16.5	17.1
RP8406	15.7	16.0	17.0
RP8408	15.7	15.9	17.0
RP8410	15.3	15.7	16.8
RP8415	14.9	15.4	16.6
RP8420	14.1	15.0	16.3
RP850	15.1	16.1	17.2
RP900	15.1	16.1	17.1
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.8
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	20.0
SB-301S-2	14.8	16.0	17.6
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.8	19.2	19.7
SyphonUS	19.3	19.7	20.3

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.8
ITID_UpM1	19.8	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	16.0	16.8	17.6
RP1000	15.4	16.2	17.1
RP1120S	16.5	16.9	17.3
RP1160S	16.0	16.4	17.2
RP1200S	16.0	16.7	17.2
RP1201S	16.0	16.7	17.2
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.7	16.3	17.2
RP1230S	16.0	16.4	17.2
RP1240S	16.1	16.5	17.2
RP1250S	15.6	16.4	17.2
RP1260S	16.1	16.4	17.2
RP1300S	15.7	16.3	17.2
RP1400S	16.4	17.2	18.1
RP1401S	16.6	17.4	18.1
RP1440S	16.0	16.8	17.8
RP1441S	17.6	17.9	18.1
RP1442S	16.1	17.0	18.0
RP1480S	16.2	17.0	18.2
RP1480S_2	16.4	17.2	18.2
RP150	17.2	17.9	18.4
RP1500S	16.1	16.7	17.2
RP1650	15.3	16.1	17.0
RP1700S	15.7	16.2	17.1
RP1800S	16.0	16.5	17.2
RP1900	15.2	16.0	17.0
RP1900S	15.4	16.3	17.2
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.1	16.5	17.1
RP2060S	15.8	16.2	17.1
RP2100S	16.0	16.5	17.2
RP2200S	15.7	16.2	17.1
RP2250S	17.2	17.6	17.9
RP235	16.3	16.7	17.4
RP2350S	16.1	16.4	17.1
RP2400S	16.0	16.5	17.1
RP250	18.0	18.1	18.7
RP2500S	15.4	16.2	17.1
RP2600S	15.6	16.2	17.1
RP2650S	15.7	16.2	17.1
RP2700	16.7	18.0	18.7
RP2700S	15.5	16.2	17.1
RP2705	12.1	17.0	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	15.9	16.7	18.3
RP2900S	15.8	16.2	17.1
RP2901	15.9	16.6	18.3
RP2902	16.0	17.0	18.4

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP2903	16.0	17.1	18.4
RP2904	16.6	17.7	18.5
RP3000S	16.7	17.1	17.5
RP3005	15.3	16.2	17.1
RP3100S	15.9	16.4	17.1
RP3200	15.3	16.2	17.1
RP3200S	15.7	16.2	17.1
RP330S	15.4	16.2	17.1
RP335S	15.8	16.5	17.1
RP3400	16.9	17.2	17.5
RP3400S	16.2	16.6	17.1
RP340S	15.4	16.2	17.1
RP3450S	16.2	16.8	17.4
RP3500	15.2	16.1	17.0
RP3500S	15.6	16.2	17.1
RP3550	16.0	16.5	17.1
RP3550S	15.3	16.1	17.1
RP3600	16.0	16.5	17.0
RP3600S	15.4	16.2	17.1
RP3650S	17.4	17.6	17.8
RP3700	15.2	16.1	17.0
RP3700S	16.2	16.5	17.1
RP3700S_1	15.3	16.2	17.1
RP3700S_10	15.6	16.5	17.1
RP3700S1	15.4	16.2	17.1
RP3740S	15.3	16.1	17.1
RP3780S	15.6	16.2	17.1
RP3790S	15.5	16.3	17.1
RP3800S	15.6	16.2	17.1
RP4000S	15.3	16.1	17.0
RP4100S	15.4	16.1	17.0
RP4200S	15.3	16.1	17.1
RP4250S	15.3	16.1	17.0
RP4300S	15.9	16.5	17.1
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.2
RP4380S_2	15.3	16.1	17.1
RP4380S_4	15.6	16.2	17.1
RP4500S	16.9	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.4	16.3	17.2
RP4550S	15.7	16.4	17.3
RP4580S	15.5	16.8	17.3
RP4700	15.4	16.3	17.2
RP4700S	16.4	16.7	17.0
RP4950S	16.8	17.2	17.5

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP4970	15.4	16.3	17.2
RP5000	15.4	16.2	17.1
RP5000S	16.2	16.6	17.0
RP500S	17.2	17.5	17.8
RP5200S	16.4	16.7	17.0
RP5300	16.7	16.8	17.1
RP5350S	17.3	17.7	18.2
RP5400	16.4	16.7	17.2
RP5400S	15.2	16.1	17.0
RP5500	15.8	16.3	17.2
RP5500S	15.6	16.1	17.0
RP5510	16.1	16.6	17.2
RP5520	16.1	16.6	17.2
RP5525	16.1	16.6	17.2
RP5526	15.4	16.2	17.1
RP5700	15.4	16.3	17.2
RP6000	15.3	16.2	17.1
RP600S	17.1	17.4	17.7
RP6900	15.3	16.2	17.0
RP7000	15.3	16.2	17.1
RP700S	15.7	16.3	17.2
RP7355	15.3	16.1	17.0
RP750S	16.0	16.6	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	16.0	16.3	17.2
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.1	17.0
RPC51200	15.7	16.1	17.0
RPC51400	15.9	16.5	17.0
RPC51500	15.9	16.2	17.0
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	17.0
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8
LW0050	11.7	13.7	15.8

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.8
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.3	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2
LWS303-5	14.2	15.3	16.3

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.4	16.3	17.2
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.4	16.3	17.2
RP1050	15.4	16.2	17.1
RP1100	15.4	16.2	17.1
RP1200	15.4	16.2	17.1
RP1205S	15.4	16.3	17.2
RP1211S	16.0	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.2	17.5	18.0
RP1300	15.3	16.2	17.1
RP1400	15.3	16.2	17.1
RP1441	15.9	16.8	17.8
RP1441S-2	16.2	17.0	17.9
RP1441S-3	16.2	17.0	18.0
RP1480S_3	16.4	17.2	18.1

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1481	16.2	17.0	18.1
RP1500	15.3	16.2	17.1
RP155	15.4	16.4	17.7
RP1600	15.3	16.2	17.1
RP1700	15.2	16.1	17.0
RP1800	15.2	16.1	17.0
RP1925	14.0	15.0	16.4
RP200	15.4	16.3	17.2
RP2000	15.2	16.0	17.0
RP235-3	15.6	16.4	17.3
RP240	16.3	16.8	17.4
RP2400	14.3	15.2	16.6
RP2500	14.3	15.2	16.5
RP255	18.4	18.6	18.6
RP255-1	15.4	16.3	17.2
RP260	15.4	16.3	17.2
RP270	15.4	16.3	17.2
RP2701	16.7	17.8	18.5
RP2702	16.7	17.8	18.5
RP2703	16.4	17.7	18.5
RP2803	14.2	15.1	16.5
RP2805	15.7	16.4	17.2
RP3000	15.3	16.2	17.1
RP3002	15.3	16.2	17.1
RP3010	15.3	16.2	17.1
RP3100	15.3	16.2	17.1
RP3202	15.3	16.2	17.1
RP3205	15.3	16.2	17.1
RP3210	15.3	16.2	17.1
RP325	15.3	16.2	17.1
RP3300	15.3	16.2	17.1
RP3350	15.3	16.2	17.1
RP338	15.4	16.2	17.1
RP3450	16.6	16.9	17.3
RP3700S_13	16.2	16.5	17.1
RP3700S_14	15.3	16.1	17.1
RP3700S_3	15.4	16.3	17.1
RP3700S_4	15.4	16.4	17.1
RP3700S_5	15.4	16.5	17.1
RP3700S_8	15.4	16.5	17.1
RP3700S_9	15.5	16.5	17.1
RP3790S_1	15.3	16.2	17.1
RP3790S_2	15.5	16.3	17.1
RP3790S_3	15.5	16.3	17.1
RP3790S_5	15.5	16.3	17.1
RP3790S_8	15.6	16.3	17.1

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3790S_9	15.6	16.4	17.1
RP3900	15.2	16.1	17.0
RP400	15.4	16.3	17.2
RP4000	15.2	16.1	17.0
RP4100	15.4	16.3	17.2
RP4200	15.4	16.3	17.2
RP4300	15.4	16.3	17.2
RP4380S_1	15.3	16.1	17.1
RP4380S_3	16.1	16.5	17.1
RP4400	15.4	16.3	17.2
RP4500	15.4	16.3	17.2
RP4600	15.4	16.3	17.2
RP4800	15.4	16.3	17.2
RP4900	15.4	16.3	17.2
RP4950	15.4	16.3	17.2
RP500	15.4	16.3	17.2
RP5301	16.7	16.8	17.1
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	16.1	16.6	17.2
RP5527	15.4	16.2	17.1
RP5600	15.4	16.3	17.2
RP5725	15.4	16.3	17.2
RP5750	15.4	16.3	17.2
RP5775	15.4	16.3	17.2
RP5800	15.4	16.3	17.2
RP5900	15.4	16.3	17.2
RP600	15.4	16.2	17.2
RP6200	15.3	16.2	17.1
RP6250	15.3	16.2	17.1
RP6300	15.3	16.2	17.1
RP6400	15.3	16.2	17.1
RP6500	15.3	16.2	17.1
RP6550	15.3	16.2	17.1
RP6600	15.3	16.2	17.1
RP6700	15.3	16.2	17.1
RP6800	15.3	16.2	17.1
RP700	15.4	16.2	17.2
RP7100	15.3	16.1	17.1
RP7200	15.3	16.1	17.1
RP7250	15.3	16.1	17.1
RP7300	15.3	16.1	17.0
RP7350	15.3	16.1	17.0
RP7400	15.3	16.1	17.0
RP7500	15.3	16.1	17.0
RP7600	14.1	15.0	16.2

Peak Stage Results: Alternative 2

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP7700	14.1	14.9	16.2
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2
RP800	15.4	16.2	17.2
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.4	16.2	17.2
RP8404	15.9	16.5	17.1
RP8406	15.7	16.1	17.0
RP8408	15.7	16.0	17.0
RP8410	15.3	15.7	16.8
RP8415	14.9	15.4	16.6
RP8420	14.1	15.0	16.3
RP850	15.4	16.2	17.2
RP900	15.4	16.2	17.1
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.7
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	20.0
SB-301S-2	15.3	16.3	17.7
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.9	19.2	19.8
SyphonUS	19.3	19.7	20.4

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.7
ITID_UpM1	19.7	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.7	16.7	17.6
RP1000	15.1	16.1	17.1
RP1120S	16.5	16.9	17.3
RP1160S	15.9	16.4	17.1
RP1200S	15.8	16.7	17.2
RP1201S	15.8	16.7	17.2
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.6	16.2	17.1
RP1230S	15.9	16.3	17.1
RP1240S	16.0	16.5	17.1
RP1250S	15.5	16.3	17.1
RP1260S	16.0	16.4	17.1
RP1300S	15.6	16.2	17.2
RP1400S	16.3	17.2	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.8	16.7	17.8
RP1441S	17.6	17.9	18.1
RP1442S	16.0	16.9	17.9
RP1480S	16.1	17.0	18.2
RP1480S_2	16.3	17.2	18.2
RP150	17.1	17.9	18.4
RP1500S	16.1	16.6	17.2
RP1650	15.0	16.0	17.0
RP1700S	15.6	16.1	17.1
RP1800S	15.9	16.5	17.1
RP1900	14.9	15.9	17.0
RP1900S	15.2	16.1	17.1
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.0	16.5	17.1
RP2060S	15.7	16.2	17.1
RP2100S	15.9	16.4	17.2
RP2200S	15.6	16.1	17.1
RP2250S	17.2	17.5	17.9
RP235	16.2	16.7	17.3
RP2350S	16.0	16.4	17.1
RP2400S	15.9	16.4	17.1
RP250	18.0	18.1	18.7
RP2500S	15.2	16.0	17.0
RP2600S	15.4	16.1	17.0
RP2650S	15.6	16.1	17.1
RP2700	16.6	18.0	18.7
RP2700S	15.2	16.1	17.0
RP2705	12.1	16.9	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	15.8	16.6	18.3
RP2900S	15.7	16.1	17.1
RP2901	15.8	16.5	18.3
RP2902	15.9	16.9	18.4

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP2903	15.9	17.0	18.4
RP2904	16.6	17.7	18.5
RP3000S	16.6	17.0	17.5
RP3005	15.1	16.1	17.1
RP3100S	15.8	16.3	17.1
RP3200	15.1	16.1	17.1
RP3200S	15.6	16.1	17.1
RP330S	15.1	16.1	17.1
RP335S	15.6	16.4	17.1
RP3400	16.8	17.2	17.5
RP3400S	16.1	16.6	17.0
RP340S	15.1	16.1	17.1
RP3450S	16.1	16.8	17.4
RP3500	14.9	15.9	17.0
RP3500S	15.5	16.1	17.1
RP3550	15.8	16.5	17.1
RP3550S	15.0	16.0	17.0
RP3600	15.8	16.4	17.0
RP3600S	15.2	16.1	17.1
RP3650S	17.4	17.6	17.8
RP3700	14.9	15.9	17.0
RP3700S	16.2	16.5	17.0
RP3700S_1	15.0	16.0	17.0
RP3700S_10	15.3	16.4	17.0
RP3700S1	15.2	16.1	17.1
RP3740S	15.0	16.0	17.0
RP3780S	15.5	16.1	17.1
RP3790S	15.2	16.2	17.1
RP3800S	15.4	16.0	17.0
RP4000S	15.1	16.0	17.0
RP4100S	15.2	16.0	17.0
RP4200S	15.0	16.0	17.0
RP4250S	15.0	16.0	17.0
RP4300S	15.7	16.4	17.1
RP4340S	16.8	17.2	17.5
RP4380S	16.8	17.1	17.2
RP4380S_2	15.0	16.0	17.1
RP4380S_4	15.3	16.1	17.1
RP4500S	16.8	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.1	16.1	17.1
RP4550S	15.3	16.3	17.3
RP4580S	15.3	16.8	17.3
RP4700	15.1	16.1	17.1
RP4700S	16.3	16.7	17.0
RP4950S	16.8	17.2	17.5

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP4970	15.1	16.1	17.1
RP5000	15.1	16.1	17.1
RP5000S	16.1	16.6	17.0
RP500S	17.1	17.5	17.8
RP5200S	16.3	16.6	17.0
RP5300	16.7	16.8	17.1
RP5350S	17.3	17.7	18.2
RP5400	16.2	16.7	17.2
RP5400S	14.9	15.9	17.0
RP5500	15.5	16.2	17.2
RP5500S	15.5	15.9	17.0
RP5510	15.9	16.6	17.2
RP5520	15.9	16.6	17.2
RP5525	15.9	16.6	17.2
RP5526	15.1	16.1	17.1
RP5700	15.1	16.1	17.1
RP6000	15.0	16.0	17.0
RP600S	17.1	17.4	17.7
RP6900	15.0	16.1	17.0
RP7000	14.9	16.1	17.1
RP700S	15.6	16.2	17.2
RP7355	15.0	16.0	17.0
RP750S	15.8	16.5	17.3
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	15.9	16.3	17.2
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.1	17.0
RPC51200	15.7	16.1	17.0
RPC51400	15.9	16.5	17.0
RPC51500	15.9	16.2	17.0
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	17.0
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8
LW0050	11.7	13.7	15.8

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.8
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.3	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2
LWS303-5	14.2	15.3	16.3

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.2	16.2	17.1
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.2	16.2	17.2
RP1050	15.1	16.1	17.1
RP1100	15.1	16.1	17.1
RP1200	15.1	16.1	17.1
RP1205S	15.2	16.2	17.1
RP1211S	15.8	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.1	17.5	18.0
RP1300	15.0	16.1	17.1
RP1400	15.0	16.0	17.0
RP1441	15.8	16.7	17.8
RP1441S-2	16.1	17.0	17.9
RP1441S-3	16.0	16.9	18.0
RP1480S_3	16.3	17.2	18.1

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1481	16.0	16.9	18.1
RP1500	15.0	16.0	17.0
RP155	15.2	16.3	17.7
RP1600	15.0	16.0	17.0
RP1700	15.0	16.0	17.0
RP1800	14.9	15.9	17.0
RP1925	14.0	14.9	16.4
RP200	15.1	16.1	17.2
RP2000	14.9	15.9	17.0
RP235-3	15.4	16.3	17.2
RP240	16.2	16.7	17.4
RP2400	14.3	15.2	16.6
RP2500	14.3	15.2	16.5
RP255	18.4	18.6	18.6
RP255-1	15.1	16.2	17.2
RP260	15.1	16.1	17.1
RP270	15.1	16.1	17.1
RP2701	16.6	17.8	18.5
RP2702	16.6	17.8	18.5
RP2703	16.2	17.7	18.5
RP2803	14.2	15.1	16.5
RP2805	15.4	16.3	17.2
RP3000	15.1	16.1	17.1
RP3002	15.1	16.1	17.1
RP3010	15.1	16.1	17.1
RP3100	15.1	16.1	17.1
RP3202	15.1	16.1	17.1
RP3205	15.1	16.1	17.1
RP3210	15.1	16.1	17.1
RP325	15.1	16.1	17.1
RP3300	15.1	16.1	17.1
RP3350	15.0	16.1	17.1
RP338	15.1	16.1	17.1
RP3450	16.6	16.9	17.3
RP3700S_13	16.2	16.5	17.0
RP3700S_14	15.0	16.0	17.1
RP3700S_3	15.1	16.2	17.1
RP3700S_4	15.1	16.3	17.1
RP3700S_5	15.1	16.4	17.0
RP3700S_8	15.2	16.4	17.1
RP3700S_9	15.2	16.4	17.0
RP3790S_1	15.1	16.1	17.1
RP3790S_2	15.2	16.2	17.1
RP3790S_3	15.2	16.2	17.1
RP3790S_5	15.2	16.2	17.1
RP3790S_8	15.3	16.2	17.0

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3790S_9	15.3	16.3	17.0
RP3900	14.9	15.9	17.0
RP400	15.1	16.1	17.1
RP4000	14.9	15.9	17.0
RP4100	15.1	16.1	17.1
RP4200	15.1	16.1	17.1
RP4300	15.1	16.1	17.1
RP4380S_1	15.0	16.0	17.1
RP4380S_3	16.1	16.4	17.1
RP4400	15.1	16.1	17.1
RP4500	15.1	16.1	17.1
RP4600	15.1	16.1	17.1
RP4800	15.1	16.1	17.1
RP4900	15.1	16.1	17.1
RP4950	15.1	16.1	17.1
RP500	15.1	16.1	17.1
RP5301	16.7	16.8	17.1
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	15.9	16.6	17.2
RP5527	15.1	16.1	17.1
RP5600	15.1	16.1	17.1
RP5725	15.1	16.1	17.1
RP5750	15.1	16.1	17.1
RP5775	15.1	16.1	17.1
RP5800	15.1	16.1	17.1
RP5900	15.1	16.1	17.1
RP600	15.1	16.1	17.1
RP6200	15.0	16.0	17.0
RP6250	15.0	16.0	17.0
RP6300	15.0	16.0	17.0
RP6400	15.0	16.0	17.0
RP6500	15.0	16.0	17.0
RP6550	15.0	16.0	17.0
RP6600	15.0	16.0	17.0
RP6700	15.0	16.0	17.0
RP6800	15.0	16.0	17.0
RP700	15.1	16.1	17.1
RP7100	15.0	16.0	17.0
RP7200	15.0	16.0	17.0
RP7250	15.0	16.0	17.0
RP7300	15.0	16.0	17.0
RP7350	15.0	16.0	17.0
RP7400	15.0	16.0	17.0
RP7500	15.0	16.0	17.0
RP7600	14.1	15.0	16.2

Peak Stage Results: Alternative 1 and 2 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP7700	14.1	14.9	16.2
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2
RP800	15.1	16.1	17.1
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.1	16.1	17.1
RP8404	15.9	16.5	17.0
RP8406	15.7	16.0	17.0
RP8408	15.7	15.9	16.9
RP8410	15.3	15.7	16.8
RP8415	14.9	15.4	16.6
RP8420	14.1	15.0	16.3
RP850	15.1	16.1	17.1
RP900	15.1	16.1	17.1
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.8
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	20.0
SB-301S-2	14.9	16.1	17.7
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.8	19.2	19.7
SyphonUS	19.3	19.7	20.3

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.8
ITID_UpM1	19.8	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.9	16.8	17.6
RP1000	15.3	16.2	17.1
RP1120S	16.5	16.9	17.3
RP1160S	16.0	16.4	17.2
RP1200S	16.0	16.7	17.2
RP1201S	16.0	16.7	17.2
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.7	16.2	17.2
RP1230S	16.0	16.4	17.2
RP1240S	16.1	16.5	17.2
RP1250S	15.6	16.4	17.2
RP1260S	16.1	16.4	17.2
RP1300S	15.7	16.3	17.2
RP1400S	16.4	17.2	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.9	16.8	17.8
RP1441S	17.6	17.9	18.1
RP1442S	16.1	17.0	18.0
RP1480S	16.2	17.0	18.2
RP1480S_2	16.4	17.2	18.3
RP150	17.8	18.2	18.6
RP1500S	16.1	16.7	17.2
RP1650	15.2	16.1	17.0
RP1700S	15.7	16.2	17.1
RP1800S	16.0	16.5	17.2
RP1900	15.1	16.0	17.0
RP1900S	15.4	16.2	17.2
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.1	16.5	17.1
RP2060S	15.8	16.2	17.1
RP2100S	16.0	16.5	17.2
RP2200S	15.7	16.2	17.1
RP2250S	17.2	17.6	17.9
RP235	16.2	16.7	17.4
RP2350S	16.1	16.4	17.1
RP2400S	16.0	16.5	17.1
RP250	18.0	18.2	18.8
RP2500S	15.4	16.1	17.1
RP2600S	15.6	16.2	17.1
RP2650S	15.7	16.1	17.1
RP2700	17.7	18.2	18.8
RP2700S	15.4	16.2	17.1
RP2703	17.6	17.9	18.5
RP2705	12.1	17.0	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	16.7	17.7	18.4
RP2900S	15.7	16.1	17.1
RP2903	17.3	17.7	18.4

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3000S	16.7	17.0	17.5
RP3005	15.3	16.1	17.1
RP3100S	15.9	16.4	17.1
RP3200	15.3	16.1	17.1
RP3200S	15.7	16.1	17.1
RP330S	15.3	16.1	17.1
RP335S	15.8	16.5	17.1
RP3400	16.9	17.2	17.5
RP3400S	15.7	16.2	17.1
RP340S	15.3	16.1	17.1
RP3450S	16.0	16.5	17.1
RP3500	15.1	16.0	17.0
RP3500S	15.6	16.1	17.1
RP3550	16.0	16.5	17.1
RP3550S	15.2	16.1	17.1
RP3600	15.9	16.5	17.0
RP3600S	15.4	16.2	17.1
RP3650S	17.4	17.6	17.8
RP3700	15.1	16.0	17.0
RP3700S	16.8	17.0	17.2
RP3700S_1	16.4	16.7	17.1
RP3700S_10	16.8	17.0	17.2
RP3740S	16.4	16.7	17.1
RP3780S	15.6	16.1	17.1
RP3790S	15.6	16.3	17.1
RP3800S	15.6	16.1	17.1
RP4000S	15.4	16.1	17.0
RP4100S	15.4	16.1	17.0
RP4200S	15.2	16.1	17.0
RP4250S	15.2	16.1	17.0
RP4300S	15.9	16.5	17.1
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.3
RP4380S_2	15.5	16.3	17.1
RP4380S_4	16.3	16.6	17.1
RP4500S	16.9	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.4	16.2	17.2
RP4550S	15.6	16.4	17.3
RP4580S	15.5	16.8	17.3
RP4700	15.4	16.2	17.2
RP4700S	16.4	16.7	17.0
RP4950S	16.8	17.2	17.5
RP4970	15.3	16.2	17.2
RP5000	15.3	16.2	17.1
RP5000S	16.2	16.6	17.0

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP500S	17.2	17.5	17.8
RP5200S	16.4	16.7	17.0
RP5300	16.7	16.8	17.1
RP5350S	17.3	17.7	18.2
RP5400	16.4	16.7	17.2
RP5400S	15.1	16.0	17.0
RP5500	15.7	16.3	17.2
RP5500S	15.6	16.0	17.0
RP5510	16.1	16.6	17.2
RP5520	16.1	16.6	17.2
RP5525	16.1	16.6	17.2
RP5526	15.3	16.2	17.1
RP5700	15.4	16.2	17.2
RP6000	15.2	16.1	17.1
RP600S	17.1	17.4	17.7
RP6900	15.3	16.1	17.0
RP7000	15.5	16.4	17.4
RP7000_1	15.2	16.1	17.2
RP700S	15.7	16.3	17.2
RP7355	15.2	16.1	17.0
RP750S	16.1	16.7	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	16.0	16.3	17.2
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.1	17.0
RPC51200	15.7	16.1	17.0
RPC51400	15.9	16.5	17.0
RPC51500	15.9	16.2	17.0
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	17.0
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8
LW0050	11.7	13.7	15.8
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0370	11.6	13.1	14.8
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.4	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2
LWS303-5	14.2	15.3	16.3
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS305-11	18.0	18.2	18.3
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.4	16.2	17.2
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.4	16.2	17.3
RP1050	15.3	16.2	17.1
RP1100	15.3	16.2	17.1
RP1200	15.3	16.2	17.1
RP1205S	15.4	16.2	17.2
RP1211S	16.0	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.2	17.5	18.0
RP1300	15.3	16.1	17.1
RP1400	15.2	16.1	17.1
RP1441	15.9	16.7	17.8
RP1441S-2	16.1	17.0	17.9
RP1441S-3	16.1	17.0	18.0
RP1480S_3	16.4	17.2	18.2
RP1481	16.1	17.0	18.2
RP1500	15.2	16.1	17.1

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP155	15.5	16.7	17.8
RP1600	15.2	16.1	17.1
RP1700	15.2	16.1	17.0
RP1800	15.1	16.0	17.0
RP1925	14.0	15.0	16.4
RP200	15.4	16.2	17.2
RP2000	15.1	16.0	17.0
RP235-3	15.6	16.4	17.3
RP240	16.3	16.8	17.5
RP2400	14.3	15.2	16.6
RP2500	14.3	15.2	16.5
RP255	18.4	18.6	18.6
RP255-1	15.4	16.2	17.2
RP260	15.4	16.2	17.2
RP270	15.4	16.2	17.2
RP2701	17.6	17.9	18.5
RP2702	17.6	17.9	18.5
RP2803	14.2	15.1	16.5
RP2805	15.6	16.3	17.2
RP3000	15.3	16.1	17.1
RP3002	15.3	16.1	17.1
RP3010	15.3	16.1	17.1
RP3100	15.3	16.1	17.1
RP3202	15.3	16.1	17.1
RP3205	15.3	16.1	17.1
RP3210	15.3	16.1	17.1
RP325	15.3	16.1	17.1
RP3300	15.3	16.1	17.1
RP3350	15.3	16.1	17.1
RP338	15.3	16.1	17.1
RP3450	16.6	16.9	17.3
RP3700S_13	16.8	17.0	17.2
RP3700S_3	16.7	16.9	17.2
RP3700S_4	16.7	16.9	17.2
RP3700S_5	16.8	17.0	17.2
RP3700S_8	16.8	17.0	17.2
RP3700S_9	16.8	17.0	17.2
RP3790S_1	15.3	16.1	17.1
RP3790S_2	15.6	16.3	17.1
RP3790S_3	15.6	16.3	17.1
RP3790S_5	15.6	16.4	17.1
RP3790S_8	16.3	17.0	17.2
RP3790S_9	16.8	17.0	17.2
RP3900	15.1	16.0	17.0
RP400	15.4	16.2	17.2
RP4000	15.1	16.0	17.0

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP4100	15.4	16.2	17.2
RP4200	15.4	16.2	17.2
RP4300	15.4	16.2	17.2
RP4380S_1	15.8	16.4	17.1
RP4380S_3	16.1	16.5	17.1
RP4400	15.4	16.2	17.2
RP4500	15.4	16.2	17.2
RP4600	15.4	16.2	17.2
RP4800	15.4	16.2	17.2
RP4900	15.4	16.2	17.2
RP4950	15.4	16.2	17.2
RP500	15.4	16.2	17.2
RP5301	16.7	16.8	17.1
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	16.1	16.6	17.2
RP5527	15.3	16.2	17.1
RP5600	15.4	16.2	17.2
RP5725	15.4	16.2	17.2
RP5750	15.4	16.2	17.2
RP5775	15.4	16.2	17.2
RP5800	15.4	16.2	17.2
RP5900	15.4	16.2	17.2
RP600	15.3	16.2	17.2
RP6200	15.2	16.1	17.1
RP6250	15.2	16.1	17.1
RP6300	15.2	16.1	17.1
RP6400	15.2	16.1	17.1
RP6500	15.2	16.1	17.1
RP6550	15.2	16.1	17.1
RP6600	15.2	16.1	17.1
RP6700	15.2	16.1	17.1
RP6800	15.2	16.1	17.1
RP700	15.3	16.2	17.2
RP7100	15.2	16.1	17.1
RP7200	15.2	16.1	17.0
RP7250	15.2	16.1	17.0
RP7300	15.2	16.1	17.0
RP7350	15.2	16.1	17.0
RP7400	15.2	16.1	17.0
RP7500	15.2	16.1	17.0
RP7600	14.1	15.0	16.2
RP7700	14.1	14.9	16.2
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2

Peak Stage Results: Alternative 3

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP7900	14.1	14.9	16.2
RP800	15.3	16.2	17.2
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.3	16.2	17.2
RP8404	15.9	16.5	17.1
RP8406	15.7	16.1	17.0
RP8408	15.7	15.9	17.0
RP8410	15.3	15.7	16.8
RP8415	14.9	15.4	16.6
RP8420	14.1	15.0	16.3
RP850	15.3	16.2	17.2
RP900	15.3	16.2	17.1
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.7
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	20.0
SB-301S-2	15.2	16.2	17.7
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.9	19.2	19.8
SyphonUS	19.3	19.7	20.4

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.8	19.2	19.8
ITID_UpM1	19.8	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.8	16.7	17.6
RP1000	15.1	15.9	17.0
RP1120S	16.5	16.9	17.3
RP1160S	16.0	16.3	17.1
RP1200S	15.9	16.7	17.1
RP1201S	15.8	16.7	17.1
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.7	16.1	17.1
RP1230S	15.9	16.4	17.1
RP1240S	16.1	16.5	17.1
RP1250S	15.6	16.3	17.1
RP1260S	16.0	16.4	17.1
RP1300S	15.7	16.2	17.1
RP1400S	16.3	17.1	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.8	16.6	17.7
RP1441S	17.6	17.9	18.1
RP1442S	16.0	16.9	17.9
RP1480S	16.1	16.9	18.2
RP1480S_2	16.3	17.2	18.3
RP150	17.8	18.2	18.6
RP1500S	16.1	16.7	17.2
RP1650	14.9	15.8	16.9
RP1700S	15.7	16.1	17.0
RP1800S	16.0	16.5	17.0
RP1900	14.8	15.7	16.8
RP1900S	15.3	16.0	17.1
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.1	16.5	17.0
RP2060S	15.8	16.2	16.9
RP2100S	16.0	16.5	17.1
RP2200S	15.6	16.1	17.0
RP2250S	17.2	17.5	17.9
RP235	16.1	16.7	17.3
RP2350S	16.0	16.4	16.9
RP2400S	16.0	16.4	17.0
RP250	18.0	18.2	18.8
RP2500S	15.3	15.8	16.9
RP2600S	15.5	16.2	16.9
RP2650S	15.7	16.1	16.9
RP2700	17.7	18.2	18.8
RP2700S	15.1	16.0	16.9
RP2703	17.6	17.9	18.5
RP2705	12.1	16.9	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	16.6	17.7	18.4
RP2900S	15.7	16.1	16.9
RP2903	17.3	17.7	18.4

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3000S	16.7	17.0	17.5
RP3005	15.0	15.9	16.9
RP3100S	15.9	16.3	16.9
RP3200	15.0	15.9	16.9
RP3200S	15.6	16.1	16.9
RP330S	15.0	15.9	16.9
RP335S	15.7	16.4	16.9
RP3400	16.9	17.2	17.5
RP3400S	14.4	15.2	16.5
RP340S	15.1	15.9	16.9
RP3450S	14.8	15.4	16.3
RP3500	14.8	15.7	16.8
RP3500S	14.9	15.6	16.5
RP3550	15.9	16.5	17.1
RP3550S	14.9	15.8	16.9
RP3600	15.9	16.5	16.9
RP3600S	15.4	15.9	16.9
RP3650S	17.4	17.6	17.8
RP3700	14.8	15.7	16.8
RP3700S	16.8	17.0	17.2
RP3700S_1	16.4	16.7	17.0
RP3700S_10	16.8	17.0	17.2
RP3740S	16.4	16.7	17.0
RP3780S	15.6	15.9	16.9
RP3790S	15.5	16.3	16.9
RP3800S	15.5	16.0	16.9
RP4000S	15.3	15.8	16.9
RP4100S	15.3	15.8	16.9
RP4200S	15.1	15.9	16.9
RP4250S	14.9	15.8	16.9
RP4300S	15.8	16.5	16.9
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.3
RP4380S_2	15.5	15.9	16.9
RP4380S_4	16.3	16.5	16.9
RP4500S	16.9	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	15.1	16.0	17.1
RP4550S	15.5	16.3	17.3
RP4580S	15.4	16.7	17.3
RP4700	15.1	16.0	17.1
RP4700S	16.4	16.7	17.0
RP4950S	16.8	17.2	17.5
RP4970	15.1	16.0	17.0
RP5000	15.1	16.0	17.0
RP5000S	16.1	16.6	17.0

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP500S	17.2	17.5	17.8
RP5200S	16.4	16.6	17.0
RP5300	16.7	16.8	17.0
RP5350S	17.3	17.7	18.2
RP5400	16.3	16.7	17.2
RP5400S	14.8	15.7	16.8
RP5500	15.6	16.2	17.1
RP5500S	15.6	16.0	16.8
RP5510	16.1	16.6	17.2
RP5520	16.1	16.6	17.2
RP5525	16.1	16.6	17.1
RP5526	15.1	16.0	17.0
RP5700	15.1	16.0	17.1
RP6000	14.9	15.8	16.9
RP600S	17.1	17.4	17.7
RP6900	15.0	15.8	16.9
RP7000	19.7	20.6	20.7
RP7000_1	18.8	19.7	19.9
RP7000_2	14.9	15.8	17.6
RP7005	13.3	14.2	15.4
RP7006	146.0	112.4	23.6
RP700S	15.7	16.3	17.2
RP7355	14.9	15.8	16.9
RP750S	16.1	16.7	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	15.9	16.3	17.1
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.0	16.9
RPC51200	15.7	16.0	16.9
RPC51400	15.9	16.5	16.9
RPC51500	15.9	16.2	16.9
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	16.9
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0050	11.7	13.7	15.8
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.7
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.4	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS303-5	14.2	15.3	16.3
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	15.1	16.0	17.1
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	15.1	16.0	17.2
RP1050	15.1	15.9	17.0
RP1100	15.0	15.9	17.0
RP1200	15.0	15.9	17.0
RP1205S	15.1	16.0	17.1
RP1211S	15.9	16.7	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.1	17.5	18.0
RP1300	14.9	15.9	16.9
RP1400	14.9	15.8	16.9
RP1441	15.7	16.6	17.7
RP1441S-2	16.0	16.9	17.9
RP1441S-3	16.0	16.9	17.9

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1480S_3	16.3	17.1	18.1
RP1481	16.0	16.9	18.2
RP1500	14.9	15.8	16.9
RP155	15.2	16.5	17.7
RP1600	14.9	15.8	16.9
RP1700	14.9	15.8	16.9
RP1800	14.8	15.7	16.8
RP1925	13.9	14.8	16.3
RP200	15.1	16.0	17.1
RP2000	14.8	15.7	16.8
RP235-3	15.3	16.2	17.1
RP240	16.2	16.7	17.4
RP2400	14.3	15.1	16.5
RP2500	14.3	15.1	16.5
RP255	18.4	18.6	18.6
RP255-1	15.1	16.0	17.1
RP260	15.1	16.0	17.1
RP270	15.1	16.0	17.1
RP2701	17.6	17.9	18.5
RP2702	17.6	17.9	18.5
RP2803	14.2	15.1	16.5
RP2805	15.4	16.2	17.1
RP3000	15.0	15.9	16.9
RP3002	15.0	15.9	16.9
RP3010	15.0	15.9	16.9
RP3100	15.0	15.9	16.9
RP3202	15.0	15.9	16.9
RP3205	15.0	15.9	16.9
RP3210	15.0	15.9	16.9
RP325	15.0	15.9	16.9
RP3300	15.0	15.9	16.9
RP3350	15.0	15.9	16.9
RP338	15.0	15.9	16.9
RP3450	16.6	16.9	17.3
RP3700S_13	16.8	17.0	17.2
RP3700S_3	16.6	16.9	17.1
RP3700S_4	16.7	16.9	17.2
RP3700S_5	16.8	17.0	17.2
RP3700S_8	16.8	17.0	17.2
RP3700S_9	16.8	17.0	17.2
RP3790S_1	15.0	15.9	16.9
RP3790S_2	15.5	16.3	17.0
RP3790S_3	15.5	16.3	17.0
RP3790S_5	15.5	16.3	17.0
RP3790S_8	16.2	17.0	17.2
RP3790S_9	16.8	17.0	17.2

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3900	14.8	15.7	16.8
RP400	15.1	16.0	17.1
RP4000	14.8	15.7	16.8
RP4100	15.1	16.0	17.1
RP4200	15.1	16.0	17.1
RP4300	15.1	16.0	17.1
RP4380S_1	15.6	16.2	16.9
RP4380S_3	16.1	16.5	16.9
RP4400	15.1	16.0	17.1
RP4500	15.1	16.0	17.1
RP4600	15.1	16.0	17.1
RP4800	15.1	16.0	17.1
RP4900	15.1	16.0	17.1
RP4950	15.1	16.0	17.1
RP500	15.1	16.0	17.1
RP5301	16.7	16.8	17.0
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	16.1	16.6	17.2
RP5527	15.1	16.0	17.0
RP5600	15.1	16.0	17.1
RP5725	15.1	16.0	17.1
RP5750	15.1	16.0	17.1
RP5775	15.1	16.0	17.1
RP5800	15.1	16.0	17.1
RP5900	15.1	16.0	17.1
RP600	15.1	16.0	17.0
RP6200	14.9	15.8	16.9
RP6250	14.9	15.8	16.9
RP6300	14.9	15.8	16.9
RP6400	14.9	15.8	16.9
RP6500	14.9	15.8	16.9
RP6550	14.9	15.8	16.9
RP6600	14.9	15.8	16.9
RP6700	14.9	15.8	16.9
RP6800	14.9	15.8	16.9
RP700	15.1	16.0	17.0
RP7100	14.9	15.8	16.9
RP7200	14.9	15.8	16.9
RP7250	14.9	15.8	16.9
RP7300	14.9	15.8	16.9
RP7350	14.9	15.8	16.9
RP7400	14.9	15.8	16.9
RP7500	14.9	15.8	16.9
RP7600	14.1	15.0	16.2
RP7700	14.1	14.9	16.2

Peak Stage Results: Alternative 4

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2
RP800	15.1	16.0	17.0
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	15.1	16.0	17.0
RP8404	15.9	16.5	16.9
RP8406	15.7	16.0	16.8
RP8408	15.7	15.9	16.7
RP8410	15.3	15.7	16.6
RP8415	14.9	15.4	16.4
RP8420	14.1	15.0	16.3
RP850	15.1	16.0	17.0
RP900	15.1	16.0	17.0
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.8
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	19.9
SB-301S-2	15.1	16.1	17.6
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.8	19.2	19.8
SyphonUS	19.2	19.7	20.4

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
C51-300S	16.5	17.2	17.8
ITID_LowM1	18.7	19.2	19.7
ITID_UpM1	19.7	20.2	20.8
LW0150	11.6	13.1	14.8
LW0300	11.6	13.1	14.8
LW0350	11.6	13.1	14.8
LW201	12.9	14.5	15.6
LW450S	15.3	15.8	16.4
LW-451S	15.6	15.8	16.3
LW500S	15.3	15.5	16.2
LW-601S	13.6	14.1	15.1
LW-651S	15.3	15.5	15.8
LW-701S	15.7	15.9	16.2
LW8900	12.7	14.5	15.8
LW9100	12.7	14.5	15.8
LW9225	14.4	14.8	15.6
LW9240	12.5	14.5	15.6
LW9700	15.5	16.0	16.4
LWS_100S	16.1	16.4	16.8
LWS_102S	15.2	15.3	16.2
LWS_103S	16.2	16.2	16.4
LWS_POD2S	16.2	16.3	16.5
LWS_POD3S	16.0	16.2	16.4
LWS_POD4S	14.1	15.2	16.2
LWS_POD6AS	16.3	16.4	16.5
LWS_POD6BS	16.3	16.4	16.5
LWS_POD6CS	16.3	16.4	16.5
LWS_POD7S	16.1	16.3	16.5
LWS_POD8S	15.3	15.3	16.2
LWS200S	14.1	14.9	16.2
LWS300-2S	15.6	15.8	16.2
LWS300S	14.1	15.2	16.2
LWS302S	15.3	15.6	16.2
LWS303S	14.3	15.4	16.4
LWS304S	14.9	15.6	16.2
LWS400S	16.5	17.2	17.8
LWS500S	15.9	16.2	16.6
OD100	18.8	19.1	19.5
RP071S	15.6	16.6	17.5
RP1000	14.8	15.8	17.0
RP1120S	16.5	16.9	17.3
RP1160S	15.8	16.3	17.0
RP1200S	15.7	16.6	17.1
RP1201S	15.5	16.6	17.1
RP1210S	17.8	18.1	18.5
RP1215S	17.9	18.0	18.2

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1220S	15.6	16.1	17.0
RP1230S	15.9	16.3	17.0
RP1240S	16.0	16.5	17.1
RP1250S	15.5	16.2	17.0
RP1260S	16.0	16.3	17.0
RP1300S	15.5	16.2	17.1
RP1400S	16.2	17.1	18.1
RP1401S	16.6	17.4	18.1
RP1440S	15.7	16.6	17.7
RP1441S	17.6	17.9	18.1
RP1442S	15.9	16.8	17.9
RP1480S	16.0	16.9	18.2
RP1480S_2	16.3	17.1	18.3
RP150	17.8	18.2	18.6
RP1500S	16.1	16.6	17.2
RP1650	14.6	15.7	16.9
RP1700S	15.6	16.1	17.0
RP1800S	15.9	16.4	17.0
RP1900	14.5	15.6	16.8
RP1900S	15.2	15.9	17.0
RP2000S	16.4	16.8	17.4
RP2020S	16.6	16.9	17.2
RP2040S	16.0	16.5	17.0
RP2060S	15.6	16.2	16.9
RP2100S	15.9	16.4	17.1
RP2200S	15.5	16.1	17.0
RP2250S	17.2	17.5	17.9
RP235	16.1	16.6	17.3
RP2350S	16.0	16.4	16.9
RP2400S	15.9	16.4	17.0
RP250	18.0	18.2	18.8
RP2500S	15.2	15.8	16.9
RP2600S	15.3	16.1	16.9
RP2650S	15.6	16.1	16.9
RP2700	17.7	18.2	18.8
RP2700S	14.9	15.9	16.9
RP2703	17.6	17.9	18.5
RP2705	12.1	16.9	17.4
RP2800S	17.2	17.5	17.7
RP2801	17.2	17.4	17.6
RP2801S	17.9	17.9	18.0
RP2802	17.2	17.5	17.7
RP2802S	17.4	17.5	17.6
RP2900	16.6	17.6	18.4
RP2900S	15.7	16.1	16.9
RP2903	17.3	17.7	18.4

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3000S	16.6	17.0	17.5
RP3005	14.7	15.7	16.9
RP3100S	15.8	16.3	16.9
RP3200	14.7	15.7	16.9
RP3200S	15.5	16.1	16.9
RP330S	14.7	15.8	16.9
RP335S	15.5	16.3	16.9
RP3400	16.8	17.2	17.5
RP3400S	14.1	15.1	16.5
RP340S	15.1	15.8	16.9
RP3450S	14.6	15.4	16.2
RP3500	14.5	15.6	16.8
RP3500S	14.8	15.5	16.4
RP3550	15.7	16.4	17.1
RP3550S	14.6	15.7	16.9
RP3600	15.7	16.4	16.9
RP3600S	15.2	15.8	16.9
RP3650S	17.4	17.6	17.8
RP3700	14.5	15.6	16.8
RP3700S	16.8	17.0	17.2
RP3700S_1	16.4	16.7	17.0
RP3700S_10	16.8	17.0	17.2
RP3740S	16.4	16.7	17.0
RP3780S	15.5	15.9	16.9
RP3790S	15.2	16.2	16.9
RP3800S	15.4	16.0	16.9
RP4000S	15.1	15.8	16.9
RP4100S	15.2	15.8	16.9
RP4200S	15.0	15.7	16.9
RP4250S	14.6	15.7	16.9
RP4300S	15.6	16.4	16.9
RP4340S	16.8	17.2	17.5
RP4380S	16.9	17.1	17.3
RP4380S_2	15.4	15.9	16.9
RP4380S_4	16.2	16.5	16.9
RP4500S	16.8	17.2	17.5
RP4530S	16.9	17.2	17.6
RP4550	14.9	15.9	17.0
RP4550S	15.2	16.3	17.3
RP4580S	15.2	16.7	17.3
RP4700	14.9	15.9	17.0
RP4700S	16.3	16.6	17.0
RP4950S	16.8	17.2	17.5
RP4970	14.9	15.9	17.0
RP5000	14.8	15.8	17.0
RP5000S	16.1	16.6	17.0

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP500S	17.1	17.4	17.8
RP5200S	16.3	16.6	17.0
RP5300	16.7	16.8	17.0
RP5350S	17.3	17.7	18.2
RP5400	16.2	16.6	17.2
RP5400S	14.5	15.6	16.8
RP5500	15.4	16.2	17.1
RP5500S	15.5	15.9	16.8
RP5510	15.9	16.6	17.2
RP5520	15.9	16.6	17.2
RP5525	15.9	16.6	17.1
RP5526	14.8	15.8	17.0
RP5700	14.9	15.9	17.0
RP6000	14.6	15.7	16.9
RP600S	17.1	17.4	17.7
RP6900	14.7	15.7	16.9
RP7000	19.3	20.6	20.7
RP7000_1	18.4	19.6	19.9
RP7000_2	14.6	15.7	17.5
RP7005	13.1	14.1	15.4
RP7006	144.5	113.2	23.2
RP700S	15.6	16.2	17.2
RP7355	14.6	15.7	16.9
RP750S	15.9	16.6	17.4
RP7800	17.3	17.5	17.7
RP800-2	18.1	18.4	18.7
RP800S	15.9	16.3	17.1
RP801	16.7	16.9	17.2
RP802	18.1	18.4	18.7
RP8025	14.1	14.9	16.2
RPC51100	15.8	16.0	16.9
RPC51200	15.7	16.0	16.9
RPC51400	15.9	16.5	16.9
RPC51500	15.9	16.2	16.9
RPN100	16.9	17.3	17.6
RPN450	16.5	16.7	17.0
RPN600S	18.0	18.3	18.6
RPN700	18.1	18.4	18.7
RPN800	18.1	18.4	18.7
RPN900	18.2	18.7	19.4
RPNA-100	18.8	19.0	19.2
SB-301S	19.7	20.1	20.5
SB-302S	16.0	16.2	16.8
SB-303S	16.7	17.3	17.5
C51D	11.5	12.4	13.9
C51-300-1	16.5	17.2	17.8

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LW0050	11.7	13.7	15.8
LW0100	11.7	13.2	14.8
LW0200	11.6	13.1	14.8
LW0370	11.6	13.1	14.7
LW0380	11.6	12.9	14.5
LW0400	11.6	12.9	14.5
LW104-1	16.1	16.3	16.5
LW2970	12.3	14.2	15.6
LW2975	12.1	13.9	15.5
LW450	12.8	15.3	16.9
LW451	12.8	15.3	16.6
LW501	12.9	15.2	16.2
LW505	12.8	15.2	16.2
LW510	12.8	15.2	16.2
LW510-1	12.8	15.2	16.2
LW510-2	12.8	15.2	16.2
LW510-3	12.8	15.0	16.0
LW510-4	12.7	14.9	16.0
LW510-5	12.7	14.7	16.0
LW510-7	12.7	14.7	16.0
LW510-8	12.4	14.4	16.1
LW-651	11.6	13.1	14.8
LW-701S-2	11.6	13.0	14.6
LW9000	12.7	14.5	15.8
LW9200	12.6	14.4	15.8
LW9210	12.8	15.2	17.0
LW9215	12.6	14.4	15.8
LW9220	12.4	14.3	15.7
LW9226	12.5	14.5	15.6
LW9250	12.3	14.2	15.6
LW9300	12.1	13.9	15.5
LW9400	11.9	13.7	15.3
LW9401	12.0	13.7	15.3
LW9500	11.9	13.7	15.3
LW9600	11.8	13.5	15.1
LW9650	11.8	13.5	15.1
LW9750	12.9	15.8	16.4
LW9800	12.3	14.3	16.1
LW9900	11.9	14.0	16.0
LW9901	12.4	15.1	16.3
LWS110	14.0	15.2	16.2
LWS300-4	14.5	15.4	16.3
LWS302	15.1	15.6	16.3
LWS303-1	14.0	15.1	16.2
LWS303-2	14.0	15.1	16.2
LWS303-3	14.0	15.1	16.2

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
LWS303-5	14.2	15.3	16.3
LWS305-1	17.4	17.5	17.6
LWS305-10	18.2	18.5	18.8
LWS305-11	18.0	18.2	18.3
LWS305-12	18.0	18.2	18.3
LWS305-13	18.2	18.5	18.8
LWS305-2	17.4	17.5	17.6
LWS305-3	17.4	17.5	17.6
LWS305-4	17.4	17.5	17.6
LWS305-5	17.4	17.5	17.6
LWS305-6	17.4	17.5	17.6
LWS305-7	17.4	17.6	17.7
LWS305-8	17.4	17.6	17.7
LWS305-9	18.2	18.5	18.7
LWS310	14.0	14.9	16.2
LWS320	14.0	14.9	16.3
LWS330	14.0	14.9	16.2
LWS340	14.0	14.9	16.2
LWS350	14.0	15.1	16.2
LWS400-1	18.0	18.2	18.3
LWS410	16.5	17.2	17.8
LWS520	15.9	16.2	16.6
OD100-1	14.9	15.9	17.1
OD101-2	18.1	18.2	18.4
OD110	18.7	18.9	19.4
OD110-1	18.8	19.1	19.5
OD110-2	18.9	19.2	19.6
OD110-3	18.3	18.4	18.5
RP072S	14.9	15.9	17.1
RP1050	14.8	15.8	17.0
RP1100	14.7	15.8	17.0
RP1200	14.7	15.8	17.0
RP1205S	14.9	15.9	17.0
RP1211S	15.7	16.6	17.3
RP1212S	17.8	18.1	18.4
RP1213S	17.8	18.1	18.4
RP1214S	17.8	18.1	18.3
RP1216S	17.8	18.1	18.3
RP1217S	17.9	18.0	18.3
RP1218S	17.9	18.0	18.2
RP1219S	17.1	17.5	18.0
RP1300	14.7	15.7	16.9
RP1400	14.7	15.7	16.9
RP1441	15.6	16.6	17.7
RP1441S-2	16.0	16.9	17.9
RP1441S-3	15.9	16.8	17.9

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP1480S_3	16.2	17.1	18.1
RP1481	15.9	16.8	18.2
RP1500	14.7	15.7	16.9
RP155	14.9	16.4	17.7
RP1600	14.7	15.7	16.9
RP1700	14.6	15.7	16.8
RP1800	14.5	15.6	16.8
RP1925	13.9	14.8	16.3
RP200	14.9	15.9	17.0
RP2000	14.5	15.6	16.8
RP235-3	15.1	16.1	17.1
RP240	16.1	16.7	17.4
RP2400	14.3	15.1	16.5
RP2500	14.3	15.1	16.5
RP255	18.4	18.6	18.6
RP255-1	14.9	15.9	17.1
RP260	14.9	15.9	17.0
RP270	14.9	15.9	17.0
RP2701	17.6	17.9	18.5
RP2702	17.6	17.9	18.5
RP2803	14.2	15.1	16.5
RP2805	15.2	16.1	17.0
RP3000	14.7	15.7	16.9
RP3002	14.7	15.7	16.9
RP3010	14.7	15.7	16.9
RP3100	14.7	15.7	16.9
RP3202	14.7	15.7	16.9
RP3205	14.7	15.7	16.9
RP3210	14.7	15.7	16.9
RP325	14.7	15.8	16.9
RP3300	14.7	15.7	16.9
RP3350	14.7	15.7	16.9
RP338	14.7	15.8	16.9
RP3450	16.6	16.9	17.3
RP3700S_13	16.8	17.0	17.2
RP3700S_3	16.6	16.9	17.1
RP3700S_4	16.7	16.9	17.2
RP3700S_5	16.8	17.0	17.2
RP3700S_8	16.8	17.0	17.2
RP3700S_9	16.8	17.0	17.2
RP3790S_1	14.7	15.7	16.9
RP3790S_2	15.2	16.2	17.0
RP3790S_3	15.2	16.2	17.0
RP3790S_5	15.3	16.3	17.0
RP3790S_8	16.0	17.0	17.2
RP3790S_9	16.8	17.0	17.2

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP3900	14.5	15.6	16.8
RP400	14.9	15.9	17.0
RP4000	14.5	15.6	16.8
RP4100	14.9	15.9	17.0
RP4200	14.9	15.9	17.0
RP4300	14.9	15.9	17.0
RP4380S_1	15.5	16.2	16.9
RP4380S_3	16.1	16.4	16.9
RP4400	14.9	15.9	17.0
RP4500	14.9	15.9	17.0
RP4600	14.9	15.9	17.0
RP4800	14.9	15.9	17.0
RP4900	14.9	15.9	17.0
RP4950	14.9	15.9	17.0
RP500	14.9	15.9	17.0
RP5301	16.6	16.8	17.0
RP5350S-1	14.0	14.9	16.3
RP5350S-2	15.9	16.8	17.2
RP5515	15.9	16.6	17.2
RP5527	14.8	15.8	17.0
RP5600	14.9	15.9	17.0
RP5725	14.9	15.9	17.0
RP5750	14.9	15.9	17.0
RP5775	14.9	15.9	17.0
RP5800	14.9	15.9	17.0
RP5900	14.9	15.9	17.0
RP600	14.8	15.9	17.0
RP6200	14.6	15.7	16.9
RP6250	14.6	15.7	16.9
RP6300	14.6	15.7	16.9
RP6400	14.6	15.7	16.9
RP6500	14.6	15.7	16.9
RP6550	14.6	15.7	16.9
RP6600	14.6	15.7	16.9
RP6700	14.6	15.7	16.9
RP6800	14.6	15.7	16.9
RP700	14.8	15.9	17.0
RP7100	14.6	15.7	16.9
RP7200	14.6	15.7	16.9
RP7250	14.6	15.7	16.9
RP7300	14.6	15.7	16.9
RP7350	14.6	15.7	16.9
RP7400	14.6	15.7	16.9
RP7500	14.6	15.7	16.8
RP7600	14.1	15.0	16.2
RP7700	14.1	14.9	16.2

Peak Stage Results: Alternative 1 and 4 Combined

Model Node	Design Storm Peak Flood Elevation (ft NAVD)		
	10-Year	25-Year	100-Year
RP7750	14.1	15.3	17.1
RP7825	14.1	14.9	16.2
RP7850	14.1	14.9	16.2
RP7900	14.1	14.9	16.2
RP800	14.8	15.9	17.0
RP8000	14.1	14.9	16.2
RP8010	14.0	14.9	16.3
RP8030	14.1	14.9	16.2
RP8050	14.1	14.9	16.2
RP8100	14.1	14.9	16.2
RP825	14.8	15.9	17.0
RP8404	15.9	16.5	16.9
RP8406	15.7	16.0	16.8
RP8408	15.7	15.9	16.7
RP8410	15.3	15.7	16.6
RP8415	14.9	15.4	16.4
RP8420	14.1	15.0	16.3
RP850	14.8	15.9	17.0
RP900	14.8	15.9	17.0
RPN110	14.8	15.9	17.1
RPN650	17.4	17.5	17.7
RPN660	18.0	18.2	18.5
RPN700_1	18.1	18.4	18.7
RPN700_2	17.9	18.1	18.4
RPNA-100-1	18.6	18.7	18.9
SB-301S-1	19.3	19.6	19.9
SB-301S-2	14.8	15.9	17.5
SB-302S-2	14.0	14.9	16.3
SB-303S-2	15.9	16.4	16.7
SB-303S-3	15.2	15.8	16.3
SyphonDS	18.7	19.2	19.7
SyphonUS	19.2	19.7	20.3

Appendix H

CRS Courtesy Review Comments, Village Responses, and Supplemental Informational Attachments

621 NW 53rd Street, Suite 265
Boca Raton, Florida 33487
tel: 561 571-3800

December 11, 2023

Tammy Kinsley
CRS Flood Specialist
ISO/Verisk, Community Hazard Mitigation
Tammy.Kinsley@verisk.com
(775) 434-4032 mobile

Subject: Village of Royal Palm Beach, FL
Watershed Masterplan (WMP)
Courtesy Review 120225 - 30-day letter Activity 450
Comment Responses

Thank you for your courtesy review of the Village of Royal Palm Beach Draft WMP. Below for your records are the responses to the specific comments and associated modifications being made to the Final WMP document submittal so that the applicable credits may be received.

WMP(1) – credit criteria met.

WMP(2) – credit criteria met.

WMP(3) - *For WMP(3) Credit, the Plan must: Provide onsite management of future peak flows and volumes so that they do not increase over present values. The Plan submitted did not manage peak flows and volumes on-site.*

Response:

The South Florida Water Management District (SFWMD, District) is the authorized governing body as the receiving watershed for the Village of Royal Palm Beach. The District is a regional governmental agency that manages the water resources in the southern half of the State. Created in 1949, the agency is responsible for managing and protecting water resources of South Florida by balancing and improving flood control, water supply, water quality and natural systems. The District's regulatory responsibilities are shared with the Florida Department of Environmental Protection and other state and local governments. SFWMD operates under authorization of Florida Administrative Code F.A.C. 40E.

An approved SFWMD Environmental Resource Permit (ERP) is required for all development and redevelopment in the watershed and applicants must satisfactorily demonstrate the control of the peak flows for the 25-year 72-hour design storm to at or below current flows and negligible impact to receiving water body stages, as well as maintaining the pre-post 100-year floodplain storage and maintain historic flow paths. The Village has adopted this requirement by reference in their Code of Ordinances, Chapter 11.5 – Floodplain Management, Sec. 11.5-4. Section 22-51 (10) Drainage – which imposes the requirements for on-site retention/detention and related design criteria for flood-resistant development.

Additionally, all of the recommended stormwater model run alternatives and associated proposed capital improvements analyzed in the WMP do reduce stages and flows from existing conditions in their intended sub-basins and in the connected, neighboring ITID shared system. See report Section 5 pre-post proposed CIP tables demonstrating these reductions. The report has been modified to include this additional language explicitly.

WMP(4) - *For WMP(4) Credit, the Plan must: manage the runoff from all storms up to and including the 5-day event. The Plan submitted did not include hydrologic and hydraulic modeling or manage runoff from all storms up to and including the 5-day event.*

Response:

The South Florida Water Management District (SFWMD) is the authorized governing body for the receiving larger watershed for the Village of Royal Palm Beach's primary stormwater management system and requires the 72-hour or 3-day storm event shall be used. A 5-day event is non-standard (except for some closed, depressional systems in central Florida). Additionally, no SFWMD Canal boundary condition exists for the larger receiving basin for a 5-day event. For consistency with local required governance for approval of proposed WMP projects, the 3-day duration was selected for the rainfall duration as its use is required for local permitting.

The 2017 CRS Coordinator's Manual Section 452.b states that *"If a community can demonstrate that an event shorter than five days is the locally appropriate "worst-case" runoff event for stormwater management, it may receive this credit if it uses that event for its regulatory standard. In some areas this may require continuous-simulation modeling. If a community, regional, state, or federal agency can demonstrate that, for example, the 72-hour event provides the "worst case" runoff for a watershed, the 72-hour event would be credited for communities in that area".* Additionally, the 3-day event uses the same rainfall data peak intensity as the 5-day compressed into a more conservative shorter time period, and due to local soils and groundwater aquifer characteristics, the 5-day duration rainfall would show negligible differences in the analysis outcome.

Accordingly, the Village requests the locally-imposed permit requirement for the 3-day event be used as the appropriate rainfall duration for the WMP. The report has been modified to include this additional language explicitly.

WMP(5) - *For WMP(5) Credit, the Plan must: identify existing wetlands or other natural open space areas to be preserved from development so that natural attenuation, retention, or detention of runoff is provided. Using the National Wetlands Inventory (NWI) to identify existing wetlands does not meet the WMP(5) credit criteria. Supporting ordinance language requiring wetlands or other natural open space areas to be preserved was not provided.*

Response:

To supplement the NWI data, Part II of the Village Code of Ordinances, Chapter 18 – Planning and Development, Article IV Environmentally Sensitive Lands Sec 18-45 provides the supporting documentation for definition, identification criteria, and required protection and preservation of the wetlands and natural open space within the Village limits and is provided attached.

WMP(6) - *For WMP(6) Credit, the Plan must: recommend prohibiting development, alteration, or modification of existing natural channels and the community has adopted a qualifying ordinance. The Plan submitted did not prohibit development, alteration, or modification of the existing natural channels. Ordinance language was not provided.*

Response:

The Village Code of Ordinances Chapter 7 – Bulkheads and Waterways is provided attached which establishes the enforceable rules for the alteration of existing channels, and addresses retaining the natural characteristics of channels.

WMP(7) - *For WMP(7) Credit, the Plan must: recommend that channel improvement projects use natural or "soft" approaches rather than gabions, rip rap, concrete, or other "hard" techniques, and the community has adopted appropriate design standards or ordinances. The Plan submitted did not recommend the use of soft channel improvements and supporting ordinance language was not provided.*

Response:

The WMP has added the recommendation for modification of the Village Code of Ordinances Chapter 7 – Bulkheads and Waterways to include language to encourage channel improvement projects use natural or "soft" approaches rather than gabions, rip rap, concrete, or other "hard" techniques into Section 6 - Action Plan. The process of development of the draft and final ordinance language and legal reviews for the planned code amendment(s) will follow at a later date.

WMP(8) - *For WMP(8) Credit, the community must have a funding source dedicated to implementing the plan's recommendations. Documentation showing a tax or fee to fund future stormwater* *management improvements was not provided, but the checklist does reference a stormwater utility fee. For credit, please provide a Resolution or other documentation of the stormwater utility.*

Response:

The WMP has added an Appendix attaching the current Stormwater Utility Ordinance 864 and recent budget summary showing stormwater CIP funding appropriation. Information is attached herein.

Should any additional information on the project be required, please contact Jeffrey Sullivan of the Village of Royal Palm Beach.

Very truly yours,

Jonathan Z. Goldman, P.E., BCEE, PMP
Associate
CDM Smith Inc.

Enclosures
File: PW_PL1\33275\282397\03
CDM Smith PN 282397

xc: Village of Royal Palm Beach
Jeffrey Sullivan
Christopher Marsh

WMP(3) SUPPLEMENTAL INFORMATION

Code of Ordinances, Chapter 11.5 – Floodplain Management, Sec. 11.5-4. Section 22-51 (10) Drainage

Sec. 22-51. Street and drainage construction specifications.

(a) *Work.* All work shall be done in accordance with the latest version of the Florida Department of Transportation (FDOT) standard specifications for road and bridge construction except as expressly modified herein:

(b) *Engineering.*

(1) *Plans and specifications.*

a. Shall be submitted by the developer's engineer;

b. Electronically signed and sealed plans and specifications shall be submitted with an engineering plan application.

(2) *Supervision of construction.*

a. The village will have an inspector on the project when deemed necessary and all work shall be performed to his satisfaction and under his inspection in accordance with the approved plans and specifications. Any changes required in the plans and specifications must first be approved in writing by the village engineer or his authorized representative;

b. The developer shall have available, when necessary, a qualified survey party for the purpose of setting all line and grade stakes when required by the contractor or the village inspector. Such survey party will be in the employ of the developer's engineer.

(3) *Testing of materials.*

a. The following testing procedures will be performed by the developer's engineer and a commercial testing laboratory and the expense will be borne by the developer:

1. Subgrade and shoulders—Width, depth and limerock bearing ratio;

2. Base—Width, depth, crown and density;

3. Surface—Width, depth, extraction and stability;

4. Concrete—Compressive strength;

b. Prior to final inspection by the village and start of one (1) year maintenance by the developer, the developer's engineer shall submit a statement to the village engineer certifying that all material used have met the Florida Department of Transportation specifications, and that the tests and measurements performed by him met the requirements of these reports. Each report shall be submitted to the village engineer's officer as soon as it is prepared. Final inspection shall be delayed until heavy equipment traffic to adjacent developments has been completed.

(4)	Right-of-Way		Required Right-of-Way
	a.	Widths:	
		Type of Street	Urban Section
		Arterial	106 feet
		Collector	80 feet
		Culs-de-sac	50-foot radius
		Minor	60 feet

b. *Clearing and grubbing:* All rights-of-way must be selectively cleared and grubbed for their entire width according to current Florida Department of Transportation specifications.

c. *Backfilling:* Per latest version of the FDOT standard specifications for road and bridge construction.

d. *Disposal of waste materials:*

1. Gumbo and other plastic clays shall be removed within the area one (1) foot below the subgrade and extending horizontally to the ditch slope;

2. Muck and peat shall be completely removed within twenty (20) feet, each side of centerline, and spread uniformly, two (2) inches loose, on shoulders and front slopes;

3. Trash, brush, trees, etc., may be burned within the right-of-way limits provided no local, county, state or federal law is broken.

(5) *Grading.*

Preparation of grade: Per latest version of the FDOT standard specifications for road and bridge construction.

(6) *Subgrade.*

a. *Width:* The subgrade width shall be two (2) feet wider than the base course (one (1) foot each side) and in the case of curb and gutter shall extend six (6) inches behind the curb.

b. *Depth:*

1. Depth of subgrade shall be twelve-inch minimum and shall have a limerock bearing ratio of forty (40);

2. Shoulders shall be eight (8) feet wide and shall be stabilized six (6) inches deep to a limerock bearing of forty (40).

c. *Care of subgrade:* Trucks will be allowed on finished subgrade to dump base course, but contractor will be required to level out ruts. In the event the trucks cause too much damage to the subgrade, the village inspector or engineer may require dumping, spreading and hauling on the base course.

(7) *Base.*

a. *Acceptable types:*

Minimum of optional base group 6;

b. *Width:* All bases shall be one (1) foot wider (six (6) inches each side) than the finished surface.

c. *Forms:* No form boards will be required unless, in the opinion of the inspector or engineer, the contractor is not taking precautions to obtain the full depth at the edges.

d. *Prime coat:* Per latest version of the FDOT standard specifications for road and bridge construction.

(8) *Surface.*

a. *Acceptable types:*

1. Major arterial streets—Minimum Standard—one and one-half (1.5) inch of SP 12.5 and one (1) inch of FC 9.5.

2. All others—Minimum Standard—two (2) inches of SP-9.5 - Two (2) lifts.

b. *Roadway Surface Widths*
Paved Area

1.	Arterial street	64	feet
2.	Collector street	24	feet plus curbs
3.	Minor street with curbs	20	feet plus curbs
4.	Minor street with swales	24	feet
5.	Cul-de-sacs	40	feet radius plus curbs
6.	All roadway surfaces of less than full widths shall be surfaced in increments approved by the planning and zoning commission.		

(9) *Roadway cross-sections.* All roadway cross-sections shall meet the minimum requirements as set forth in these regulations.

(10) *Drainage.*

a. *General:*

1. Drainage system shall be designed using accepted engineering principles to provide the following degree of protections:

i. All future buildings shall be protected from the greater of the following: one-in-one-hundred-year, three-day storm event; the onsite stage created by a one-hundred-year, three-day storm event assuming no off-site discharge; current FEMA base flood elevation plus one (1) foot.

ii. All roadway and paved areas shall be protected from a ten-year, three-day storm event;

iii. Storm sewers shall be designed for maximum rainfall intensity for a three-year storm;

iv. All construction shall conform to the current Florida Department of Transportation's specifications, and to the latest edition of the Florida Department of Transportation Drainage Manual.

2. System shall provide for drainage of lots, streets, roads and other public areas as well as handling the runoff from adjacent areas that naturally flows into the subject area.

3. Runoff coefficients shall be based on completed projects.

4. Retention and/or detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one (1) of the three (3) following criteria or equivalent combinations thereof:

i. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of two and one-half (2.5) inches times the percentage of imperviousness, whichever is greater.

ii. Dry detention volume shall be provided equal to seventy-five (75) percent of the above amounts computed for wet detention.

iii. Retention volume shall be provided equal to fifty (50) percent of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a demonstration of guarantees of long term operation and maintenance of system bleed-down ability. This must normally consist of proof of excellent soil percolation rates or an operations entity which specifically reserves funds for operation, maintenance and replacement.

5. The developer shall obtain a FEMA letter of map revision (LOMR) if the proposed development includes the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations (BFEs), or the special flood hazard area (SFHA).

6. The developer shall obtain a FEMA letter of map revision based on fill (LOMR-F) if the proposed development includes the modification of the special flood hazard area (SFHA) shown on the flood insurance rate map (FIRM) based on the placement of fill outside the existing regulatory floodway.

b. *Design:*

1. Developer's engineer shall furnish drainage map to village engineer showing entire area to be developed and, if feasible, all remaining area in the same watershed. Final disposal of storm waters shall be shown and drainage computations for all systems shall be presented with development plans.

2. Drainage system shall be designed for:

i. Long life;

ii. Low maintenance cost;

iii. Ease of maintenance.

c. *Pipe:*

1. Cross-drain pipe requirements:

i. Reinforced concrete or other material approved by Florida Department of Transportation, or village engineer;

ii. Minimum size of fifteen (15) inches or equal;

iii. Cover over pipe shall be adequate for its protection;

iv. Headwall, inlet or manhole required at each end.

2. Storm sewer requirements:

i. Reinforced concrete; or

ii. Other material approved by Florida Department of Transportation, or village engineer;

iii. Minimum size of fifteen (15) inches or equal;

iv. Inlet or manhole required at each change of alignment or grade.

3. Side drain pipe requirements:

i. Concrete; or

ii. Other material approved by the Florida Department of Transportation, or village engineer;

iii. Minimum size of fifteen (15) inches or equal.

4. French drains shall be designed in accordance with the South Florida Water Management District Manual, latest edition.

d. *Headwalls:*

1. Types.
    i. Concrete—gravity or cantilever;
    ii. Sand-cement rip rap—5:1 mix in approved bags (temporary only);
    iii. To be constructed adjacent to and immediately outside of right-of-way line.
2. Headwalls shall be designed in accordance with the Florida Department of Transportation's publication entitled "Standard Plans," latest available edition.

e. *Inlets:*

1. Types.
    i. Reinforced concrete;
2. Size of openings shall be 28″ × 36″ minimum.
3. Inlets shall be designed in accordance with the Florida Department of Transportation's publication entitled "Standard Plans," latest available edition.

f. *Bridges:*

1. Type—Concrete only.
2. Width.
    i. Provide five (5) feet wide on-street bike paths on each side;
    ii. Provide five-foot-wide sidewalks on each side.
3. Design—H-20 loading.

g. *Curb, curb and gutter, swales:*

1. Curbs are required on all arterial and collector streets.
2. Types:
    i. FDOT type f curb and gutter on arterial streets;
    ii. FDOT type f curb and gutter on collector streets;
    iii. Lip curb on minor streets.

h. *Easements:*

1. Drainage easements (width as specified herein shall be construed as the designed width).
    i. Twenty-five (25) feet for canals up to fifty (50) feet top width;
    ii. Twenty-five (25) feet each side for canals over fifty (50) feet to width;
    iii. The width of drainage easements for underground storm drainage systems shall be the pipe diameter plus the depth of the pipe (finished grade minus invert elevation) times two (2) or a minimum of ten (10) feet.
2. Utility easements—As approved by public utilities involved.

i. *Manhole types:*

1. Reinforced concrete;
2. Brick.

j. *Bulkheads:* Bulkheads installed along navigable waterways shall be of reinforced concrete design. The design shall conform to good engineering practice and shall meet the approval of the village engineer. The minimum concrete cover over reinforcing steel shall be two (2) inches. Walls used merely as a line of demarcation of the shoreline need not comply with the above except that they shall meet the approval of the village engineer.

(11) *Sidewalk/bike path.*

a. Except as provided in this section, sidewalks shall be constructed on both sides of all platted streets. For marginal access streets abutting major arterial or expressway streets, sidewalks shall be constructed on one (1) side of the marginal access street on the side facing away from the major arterial or expressway right-of-way.

b. Sidewalks and bike paths shall be constructed of concrete to the following specifications:

1. Four (4) feet in width shall be provided on each side of all minor and cul-de-sac streets, four (4) inches thick.

2. Five (5) feet in width shall be provided on each side of all minor collector streets, four (4) inches thick.

3. Eight (8) feet in width with on street bike lanes on each side of collector streets, six (6) inches thick.

4. Ten (10) feet in width with on-street bike lanes on each side of arterials or designated state roads, six (6) inches thick.

5. Six (6) inches thick at driveways.

6. Expansion joints per FDOT "Standard Plans".

c. Reserved.

d. Alternative master pedestrian/bike path system:

1. An alternative master pedestrian/bike path system may be approved by the village upon demonstration and proof that the alternative system meets or exceeds the continuity and safety of the pedestrian system which would be provided by the required sidewalks.

2. Sidewalks may be omitted from minor local streets upon presentation at the time of subdivision approval an alternative master pedestrian/bike path system and approval by the village.

3. Sidewalks approved under an alternative master pedestrian/bike path system may be located inside or outside of platted rights-of-way or may meander inside and outside of the right-of-way.

4. Bike paths located outside of the right-of-way as part of an alternative master pedestrian/bike path system shall be ten (10) feet in width.

e. Maintenance responsibility, control and jurisdiction of sidewalks and/or bike paths within private streets or subject to an alternative master pedestrian/bike path system shall be placed in a property owners' association or improvement district which shall agree in writing on the plat or by separate instrument filed in the public records to accept such obligation.

f. Pedestrian/bike path systems outside of the rights-of-way are recommended to encourage nonvehicular circulation between subdivisions, schools, shopping centers, park and recreation facilities, transportation and other community facilities.

(12) *Miscellaneous.*

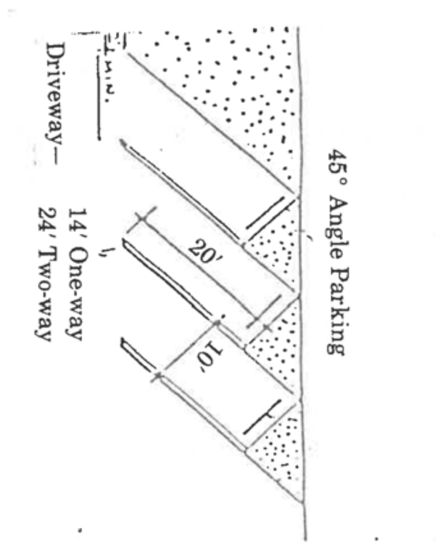
a. *Grassing and mulching:* That area within the right-of-way line, lying between the edge of pavement or curb and the sidewalk or right-of-way line shall be sodded or sprigged and mulched in accordance with Standard Specifications for Road and Bridge Construction (latest edition), prepared by the Florida Department of Transportation.

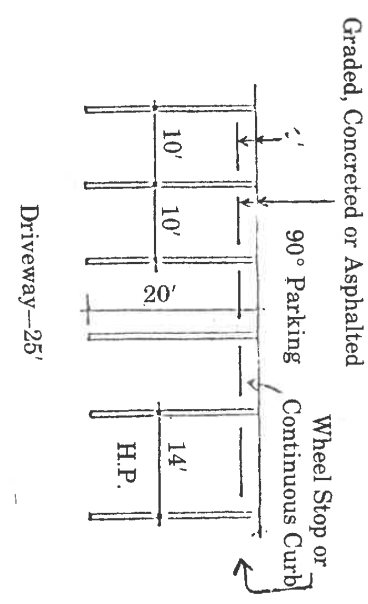
b. *Concrete requirements:* Per the FDOT Standard Specifications for Road and Bridge Construction (latest edition).

c. *Reserved.*

d. *Reserved.*

e. *Parking facility design standards:* Minimum dimensions for all parking facilities shall be determined by the design angle or spaces as depicted in the following illustrations:





All off-street parking spaces, except those relating to single-family, detached residential dwellings, shall be designed so that no vehicle shall be required to back into a public street right-of-way, exclusive of alleys, to obtain egress.

All required off-street parking shall be marked by double-solid stripes of reflective paint of at least four (4) inches each in width along each side of the space, except those sides which permit vehicle entry or abut curbs. The required width of such parking space shall be measured from centerline to centerline of the double-solid stripes.

Wheel stops or continuous curbing shall be placed two (2) feet from the closed end of all parking spaces except those in a parallel configuration. Wheel stops shall be at least six (6) feet in width and stabilized by steel pins and be of a design and material approved by the village engineer.

An off-street loading space shall include an area of at least twelve (12) feet wide by forty-five (45) feet long with fourteen and one-half (14½) feet vertical clearance. Each off-street loading space shall be easily accessible and arranged for convenient and safe ingress and egress by motortruck or trailer combination.

f. All water wells shall be constructed by a water well contractor licensed by the South Florida Water Management District in accordance with Chapters 40E-3 and 10D-4, Florida Administrative Code.

g. *Disputes or discrepancies:* In case of dispute or discrepancy in the plans or specifications, the current Florida Department of Transportation specifications shall prevail.

h. *Maintenance:* Upon completion of the work and approval by the village engineer, the work may be accepted subject to a maintenance bond posted by the contractor or owner, in the amount of ten (10) percent of the certified costs of construction of the public amenities as certified by the developer's engineer either in a surety bond or a letter of credit (subject to approval by the village attorney) payable to the village.

i. *Authority of the village engineer:* The village engineer shall decide all questions, difficulties and disputes of whatever nature which may arise relative to the interpretation of plans and construction of public improvements.

(Code 1967, § 20-24; Ord. No. 156, § 1, 2-21-80; Ord. No. 271, § 1, 12-17-87; Ord. No. 287, § 1, 9-15-88; Ord. No. 298, § 1, 12-15-88; Ord. No. 307, § 2, 6-15-89; Ord. No. 344, § 2, 6-21-90; Ord. No. 394, § 7, 8-17-00; Ord. No. 977, § 3, 10-4-18)

WMP (5) SUPPLEMENTAL INFORMATION

Part II of the Village Code of Ordinances, Chapter 18 – Planning and Development, Article IV Environmentally Sensitive Lands Sec 18-45

ARTICLE IV. ENVIRONMENTALLY SENSITIVE LANDS[1]

Sec. 18-41. Purpose; applicability.

The purpose of this article is to preserve and protect the values and functions of environmentally sensitive lands in the village from land alternations that would result in the loss of these lands or significant degradation of their values and functions. It is the further purpose of this article to preempt any regulation by the Palm Beach County Board of County Commissioners of development on environmentally sensitive lands located in the village.

This article shall apply to the alteration as herein defined of environmentally sensitive lands as defined.

(Ord. No. 357, § 2(1), 9-25-90)

Sec. 18-42. Definitions.

The following definitions apply within this article:

Alteration: The result of human-caused activity which modifies, transforms or otherwise changes environmentally sensitive lands, including but not limited to the placement of vehicles, structures, debris or any other material objects thereon, introduction or injection of water or other substances and the removal, displacement or disturbance of plant or animal species, soil, rock, minerals or water.

Council: The council of the village.

Department: The village planning and zoning department, including any consultant(s) retained by the village for reviewing and assessing applications made pursuant to this article.

Ecosystem: An assemblage of living organisms (plants, animals, microorganisms, etc.) and nonliving components (soil, water, air, etc.) that functions as a dynamic whole through organized energy flows.

Endangered, threatened or rare species: Species listed as endangered, threatened or rear by one (1) or more of the following agencies:

(1) U.S. Fish and Wildlife Service;

(2) Florida Game and Fresh Water Fish Commission;

(3) Treasure Coast Regional Planning Council.

Environmentally sensitive lands: Ecological sites which contain one (1) or more of the following:

(1) Endangered, threatened or rare species of wildlife or vegetation;

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[1]Editor's note(s)—Ord. No. 357, § 2, adopted Sept. 25, 1990, amended the Code but did not specify the manner of inclusion; therefore, codification of said provisions as Art. IV, §§ 18-41—18-46, was at the editor's discretion.

Cross reference(s)—Fences, hedges and walls, Ch. 9; garbage and refuse, Ch. 12; junked, wrecked, abandoned property, Ch. 14; offenses, Ch. 14.

(2) Wetlands;

(3) Artifacts of archeological or historic significance;

(4) Unusual, outstanding or unique geologic features;

(5) Lands within public water supply system wellfield cone(s) of influence;

(6) Lands within floodways or subject to flooding;

(7) Native, relatively unaltered wildlife or vegetation representing a natural area unique to or scarce within a region of Florida or larger geographic area.

Mitigation: An action or series of actions that will offset the adverse impacts to the environmentally sensitive lands located within a proposed development.

Wetland: Wetlands shall be defined in accordance with F.S. § 373.421(1), and include any area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soils as characterized by the dominance of those submerged and/or transitional wetland species addressed in Chapter 62-340 of the Florida Administrative Code.

(Ord. No. 357, § 2(2), 9-25-90; Ord. No. 816, § 1, 2-5-09; Ord. No. 946, § 1, 4-20-17)

Sec. 18-43. Exemptions; mitigation.

(a) *Prior alteration.* An exemption from this article is available for any project whereby, upon the effective date hereof:

(1) The environmentally sensitive area was altered prior to the effective date.

(2) The land alteration occurred pursuant to valid permits from all applicable regulatory entities; and

(3) The property no longer retains the natural values and functions which made the property an environmentally sensitive area.

This subsection shall not apply to restrict existing legal uses for which, upon the effective date hereof, an intensity of use has been documented. Documented uses may continue at this same intensity; however, an increased intensity of use or a change in use shall come under the regulatory scope of this article.

(b) *Single-family residential lots.* Any exemption from this article is available for single-family residential lots whereby, upon the effective date hereof:

(1) The lot contains less than one and one-half (1.5) acres of environmentally sensitive lands; and

(2) The environmentally sensitive lands are not contiguous with other environmentally sensitive lands; or, if contiguous, the total environmentally sensitive land would be less than five (5) acres.

(c) *Publicly owned property.* Any exemption from this article is available for property that has been determined by the director of the department to be owned by a public entity.

(d) *Vested development rights.* An exemption from this article is available for any project for which, upon the effective date hereof:

(1) A building permit has been issued; or

(2) A site plan approval has been issued; or

(3) A subdivision plat has been recorded in the public records of Palm Beach County, pursuant to the approval of said plat under chapter 22 of the Village Code of Ordinances; or

(4) A master plan approval has been issued; or

(5) A complete application for subsections (1) through (4) above was submitted on or before the effective date of this article; or

(6) A local governmental development agreement, as provided in sections 163.3220 through 163.3243 Florida Statutes, has been approved by council; or

(7) A valid development of regional impact order has been issued; or

(8) A sufficiency notification for a development of regional impact has been issued by the Treasure Coast Regional Planning Council.

(e) An applicant who desires an exemption from this article must submit an application for exemption to the department with accompanying evidence that he or she is entitled to the exemption pursuant to this section. The application should include at a minimum a site location map, a recent aerial photograph clearly delineating the location of the property (if possible), documentation of any prior approvals, a survey and, where applicable, a description of the nature and extent of any previous alteration of environmentally sensitive lands on the subject property. The department shall make a determination of the applicant's eligibility for the exemption and render a written decision thereon within thirty (30) days of receipt by the department of the application and all information needed to make the exemption determination.

(f) *Mitigation procedures for environmentally sensitive lands other than wetlands*. Mitigation in the form of a payment or conveyance of land to the village in lieu of preservation of environmentally sensitive lands other than wetlands may be permitted within the village under certain circumstances:

(1) *Application*. An applicant who desires to provide mitigation (either monetary contribution or conveyance of land) in lieu of preservation of environmentally sensitive lands other than wetlands under this article must submit an application regarding same to the department. The application should include, at a minimum, the following: a site location map; a recent aerial photograph clearly delineating the location of the environmentally sensitive area, if possible, or other type of photographic depiction of the environmentally sensitive area; documentation of any prior approvals or permits; a survey; and, where applicable, a description of the nature and extent of any previous alteration of environmentally sensitive lands on the subject property. Additionally, a justification statement shall be submitted indicating why the lands cannot or should not be preserved. Upon review of the application, the planning and zoning department may either recommend approval, approval with conditions or denial to the village council.

(2) *Determination of mitigation fee or conveyance of land.* Where the payment of a mitigation fee or conveyance of land to the village is requested by the applicant in order to receive approval for the proposed alteration of environmentally sensitive lands in lieu of preservation, the amount of such fee or the extent of a land conveyance shall be based upon the fair market value of the subject property which contains the environmentally sensitive area that otherwise would have been set aside for preserve status under this article. The village staff and the applicant may agree as to the fair market value of the subject property containing the environmentally sensitive area. Alternatively, the applicant may obtain, at his own expense, an appraisal of the subject property by a qualified real estate appraiser approved by the village based upon a generally recognized appraisal formula that utilizes the subject property's value; and this appraisal of fair market value of the subject property may be accepted by the planning and zoning department if found to be reasonable. In case of a dispute as to the proposed fair market value of the subject property, the village shall then, at the applicant's expense, obtain an appraisal of the subject property containing the environmentally sensitive area by a qualified real estate appraiser chosen by the village who shall utilize a generally recognized appraisal formula to determine the mitigation value for the environmentally sensitive area, which determination shall be final. The square foot value of the subject property, as determined hereinabove, shall be utilized to determine the proposed mitigation fee, per square feet, of the environmentally sensitive

area, altered or destroyed, which will be accepted by the village and shall become a condition of approval of any development order issued pertaining to the subject property. (See section 18-45.)

(g) *Mitigation procedures for wetlands*. Wetland mitigation shall be performed in accordance with the Florida Uniform Mitigation Assessment Method as adopted in Chapter 62-345, Florida Administrative Code, as may be amended from time to time. A mitigation plan approved by a federal, state or regional agency shall be presumed to be acceptable to the village.

(Ord. No. 357, § 2(3), 9-25-90; Ord. No. 632, § 1, 4-4-02; Ord. No. 816, § 2, 2-5-09; Ord. No. 946, § 1, 4-20-17)

Sec. 18-44. Proposed land alteration—Review procedures.

(a) Any application to the village involving proposed alteration of land shall include a description of all lands which could be considered environmentally sensitive lands hereunder and an environmental impact study identifying the effects that the proposed alteration would have on such environmentally sensitive lands. This application shall accompany the application for the earliest stage of development approval by the village proposed development which requires the approval of a proposed site plan and shall be processed in the same manner as such development approval. If no site plan approval for a proposed development is required, the application shall accompany the application for a building permit or vegetation removal permit, as applicable, and be processed in the same manner as such permit application. All applications must be submitted on a form prepared by the department. It shall be the responsibility of the applicant to provide all information necessary for the department to review the application and prepare the evaluations and recommendations specified herein.

(b) The department's evaluation of the proposed alteration or development shall be based upon the application submitted by the property owner or his or her designee. The application shall include but not be limited to the following information (the application needs to include the information required in subsections (3) through (5) only if either the applicant in the initial application or the department after review of the initial application identifies environmentally sensitive lands on the site location map and alterations of any of those areas is proposed):

(1) Application form.

(2) Site conditions:

a. Site location map with the specific property clearly indicated.

b. Aerial photograph with the specific property and acreage clearly indicated (*Scale:* 1’= 600” or less).

c. Map and inventory of existing terrestrial and aquatic vegetation, including exotic species and native plant community types, including canopy, understory and ground cover, shall be provided.

d. Soil type(s) and condition(s).

e. List of endangered, threatened and rare species found on site.

f. Colonial bird nesting or roosting areas or areas in which migratory species are known to concentrate.

g. Archaeologically and/or historically significant features.

h. Analysis of the functional viability and quality of the various habitats.

i. Geologically significant features.

j. Areas of previous disturbance or degradation, including present and past human uses of site.

k. Location of public water supply system cone(s) of influence.

l. Location of floodways and areas subject to flooding if any.

m. Surrounding land uses.

(3) Project design:

a. Conceptual footprint of site development, including buildings, roadways, parking areas, utilities, water features, flood-control structures, stormwater systems, wellfield locations, landscaped areas, buffer areas, preserve areas, agricultural activities and other open space areas at the same scale and as an overlay to vegetation mapping detailed in subsection (b)(2)a. above.

b. Existing zoning.

c. Status of development approvals, including permit applications.

d. Discussion of the impacts, both positive and negative, of the proposed development on environmentally sensitive lands.

e. Discussion concerning whether the proposed development will cause any irreplaceable or irretrievable environmental damage.

(4) Project operation:

a. Description of proposed operations to be performed on site, including use, storage, handling or production of substances known to be harmful to plants and/or animals.

b. Identification of any pollutants expected to be emitted during project operation.

c. Identification of solid wastes generated and disposal methods expected to be used.

(5) Project alternatives:

a. Discussion of project alternatives should be provided, including options considered and rejected and the rationale for rejection of each option considered.

b. A mitigation plan that describes actions to be taken to replace those functions and values of the environmentally sensitive land to be lost as a result of the proposed development. Wetland mitigation shall be performed in accordance with the Florida Uniform Mitigation Assessment Method as adopted in Chapter 62-345, Florida Administrative Code, as may be amended from time to time. A mitigation plan approved by a federal, state or regional agency shall be presumed to be acceptable to the village.

(c) Upon receipt of an application containing the information required by subsections (b)(1) and (2), the department will conduct an initial review to determine whether and to what extent the proposed development includes the alteration of environmentally sensitive lands. If the department determines that the proposed development includes no environmentally sensitive lands or no alteration of environmentally sensitive lands, the applicant will be so advised, and no further review under this article will be required. If upon the receipt of such information, the department determines that the alteration of environmentally sensitive areas is proposed, the applicant will be so advised and will be required to provide the information required in subsections (b)(3) through (5).

(d) The applicant shall submit the appropriate fee as determined by the department at the same time the information described in subsections (b)(3) through (5) is required to be provided to defer the department's cost of processing. The department shall recommend a fee schedule to council, which council may adopt by resolution. No application shall be deemed complete without the specified fee payment.

(Ord. No. 357, § 2(4), 9-25-90; Ord. No. 946, § 1, 4-20-17)

Sec. 18-45. Proposed land alteration—Approval criteria.

(a) After consideration of the department's recommendations, the proposed land alteration for environmentally sensitive lands other than wetlands shall be approved by council if:

(1) The project design provides for the protection and preservation of the values and functions of the environmentally sensitive lands; and

(2) Those portions of the environmentally sensitive lands as determined by the village council are set aside in a preserve status. Lands to be preserved shall be selected based on the quality of habitats, the presence of endangered, threatened or rare species, proximity to other natural areas and other relevant factors. The portion of environmentally sensitive lands which shall be preserved. Such areas shall be preserved in viable condition with intact canopy, understory and groundcover; and

(3) A management plan of the area to be preserved shall be prepared by the applicant and shall include but not be limited to eradication and continued monitoring and removal of exotic species and fencing requirements. Periodic, controlled burning or other mechanical methods that would simulate the natural processes of the natural historic fire regime may be required for some areas; and

(4) For those lands identified for preserve status, environmentally sensitive land status shall be designated on the approved site plan. In addition, appropriate deed restrictions shall be placed on said lands and recorded in the public records of Palm Beach County; or they may be dedicated to a public entity or approved private conservation group for the purposes of preservation; or appropriate restrictive conservation easements may be established or such other similar protective measures as determined by the village council upon completion of all review processes hereunder; and

(5) Permitted development densities in areas to be preserved will be transferred to more suitable areas within the proposed development. No development shall be permitted in areas to be preserved other than footpaths or entryways to waterways; and

(6) For a site on which endangered, threatened or rare species are present, one (1) of the following criteria can be satisfied:

a. The applicant successfully demonstrates that the proposed development will not preclude the continued survival and viability of those species located on the site; or

b. The applicant presents a plan for relocation, either onsite or offsite, for those species which has been reviewed by all appropriate agencies.

(b) If the environmentally sensitive lands are greater than six hundred forty (640) acres in size and are owned by a single entity, the village shall allow for the consideration of a master plan which provides a preserve area for a portion of environmentally sensitive land and which provides the flexibility to define the preserve area or adjust its boundaries accordingly as development proceeds. This master plan shall include the information identified in subsection 18-44(b)(2) to enable the department to distinguish intrasite differences in the quality of the environmentally sensitive lands. This master plan shall be submitted in lieu of the submittal requirements outlined in section 18-44 with the exception of section 18-44(d) (fees). For lands identified for preserve status, protective measures as determined acceptable by the village council shall be implemented. Upon consideration, approval will be granted provided that:

(1) The minimum preserve area as required by the village council is maintained; and

(2) The master plan and designated preserve boundaries are approved by the village council.

(c) After consideration of the department's recommendations, the proposed alteration of environmentally sensitive lands upon payment of a mitigation fee may be approved by the village council if:

(1) The village council determines that alteration of the subject land is adequately compensated for by the payment of the mitigation fee which must be agreed upon by the village council. Such fees shall either be applied to the purchase and/or improvement of other publicly owned environmentally sensitive lands or other public lands within the village; and

(2) The mitigation fee is determined to be reasonable pursuant to the procedures set forth in section 18-43 for mitigation hereinabove. All mitigation fees shall be paid prior to the issuance of the first building permit.

(d) Proposed land alteration for wetlands that is not tied to a development project requiring development plan approval, shall be approved through a permit issued by the department so long as the land alteration is permitted by the federal, state or regional agency that has jurisdiction over wetlands. Proposed land alteration for wetlands that is tied to development projects requiring development plan approval shall be approved by the village council so long as the land alteration is permitted by the federal, state or regional agency that has jurisdiction over wetlands. All permits and development orders, as applicable, shall incorporate any general and specific conditions of permits or other approvals issued by federal, state or regional agencies that relate to wetland preservation and/or mitigation. The village may withhold issuance of a village permit or development order until any or all such other permits by the federal, state or regional agencies having jurisdiction are issued. Applicants shall provide copies of all federal, state or regional permit applications relating to wetlands to the village. Concurrent applications to the village and any federal, state or regional agency shall be encouraged.

(Ord. No. 357, § 2(5), 9-25-90; Ord. No. 632, § 2, 4-4-02; Ord. No. 946, § 1, 4-20-17)

Editor's note(s)—Ord. No. 946, § 1, 4-20-17, changed the title of § 18-45 from "Same—Approved criteria" to read as herein set out.

Sec. 18-46. Violations; enforcement; penalties.

It shall be unlawful for any person or entity to engage in any activity which will remove, fill, drain, dredge, clear, destroy or alter any environmentally sensitive land without first obtaining a permit or other approval from the village. Failure to comply with the requirements of this article or any permit or approval granted or authorized hereunder shall constitute a violation of this article. Additionally, damage to the environmentally sensitive lands may result in an order to restore to preexisting site conditions. In addition to the sanctions contained herein, the village may take any other appropriate legal action, including but not limited to administrative action and requests for temporary and permanent injunctions to enforce the provisions of this article. It is the purpose of this article to provide additional cumulative remedies.

(Ord. No. 357, § 2(6), 9-25-90; Ord. No. 946, § 1, 4-20-17)

WMP (6) SUPPLEMENTAL INFORMATION

Village Code of Ordinances Chapter 7 – Bulkheads and Waterways

Chapter 7 - BULKHEADS AND WATERWAYS

Footnotes:

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Cross reference— *Buildings and building regulations, Ch. 6; planning and development, Ch. 18; subdivision of land, Ch. 22.*

State Law reference— *Tidal lands and bulkheads, F.S. § 253.12 et seq.; Florida boat registration law, F.S. § 327.01 et seq.; restrictions on filling land and dredging, F.S. § 253.123 et seq.*

ARTICLE I. - IN GENERAL

Secs. 7-1—7-15. - Reserved.

ARTICLE II. - CONSTRUCTION STANDARDS FOR STRUCTURES ON WATERWAYS

Footnotes:

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Editor's note— *Section 1 of Ord. No. 871, adopted Feb. 7, 2013, repealed the former Art. II, §§ 7-16—7-21, and enacted a new Art. II as set out herein. The former Art. II pertained to similar subject matter, and derived from the 1967 Code, § 8-9; Ord. No. 497, § 1, adopted Oct. 19, 1995; Ord. No. 506, § 1, adopted April 18, 1996; and Ord. No. 831, § 1, adopted March 4, 2010.*

Sec. 7-16. - Permit required.

No person or agency shall build, maintain, extend or make structural alterations on any building, pier, piling, bulkhead, sea wall, reef, breakwater, or other structure, in, upon or over the public and private waterways, or do any filling, excavating or dredging in said waterways without first obtaining a written permit from the village to do so. Waterway shall be defined as both submerged (water body) and non-submerged portions of land dedicated for drainage, attenuation, and water quality purposes. Water body shall be defined as the submerged portion of the waterway at control elevation as defined by the applicable South Florida Water Management Permit.

(Ord. No. 871, § 1, 2-7-13)

Sec. 7-17. - Permit rights upon divestment of abutting real property interests.

No person who as an abutting upland owner or lessee of real property was granted a permit for a pier, float, bulkhead, seawall or other structure regulated by this article shall retain any right of use in such pier, float, bulkhead, seawall or any other regulated structure after having been divested of the ownership or leasehold interest in such real property. Upon such divesting in the real property interest, the ownership interest in the pier, float, bulkhead, seawall or any other regulated structure shall automatically vest in the subsequent purchaser with notice being provided by such purchaser to the entity controlling or owning the waterways. Except where rights of ownership or use have heretofore been judicially decreed, no person may heretofore or hereafter gain any rights of ownership or use of any such pier, float, bulkhead, seawall or structure regulated by this article through any purported transfer except through the conveyance of real property interests to the upland real property abutting the waterways.

(Ord. No. 871, § 1, 2-7-13)

Sec. 7-18. - Permit application; procedure; support documentation; standards.

(a) *Application for permit.* An application for any permit required by this article shall be made to the building official in writing on forms provided therefor. The permit shall constitute an agreement by the permittee, or any successors or assigns of property interests in the upland real property abutting the waterways, to comply with all conditions imposed in the granting of the permit.

(b) *Plans; standards.* The application for permit shall be accompanied by plans drawn to scale and specifications setting forth in detail the proposed structure. The plans and specifications submitted shall include all information needed by the building department to insure code compliance and must meet the following standards:

(1) For construction water side of any lot on the water body, a dock shall not be placed within ten (10) feet of the side property line extended;

(2) Docks shall extend a maximum of five (5) feet out from the face of the bulkhead wall or from the edge of the water body;

(3) In no instance shall any structure extend more than twenty (20) percent of the width of the water body;

(4) Any structure under roof shall be limited to one hundred (100) square feet and a height of eight (8) feet as measured at the eave line;

(5) Bulkheads and seawalls shall be constructed four (4) feet landward of the original water body's edge;

(6) The tops of all bulkheads and seawalls shall be constructed to an elevation no greater than one and one-half (1.5) feet above the water body's control elevation as defined by the applicable South Florida Water Management permit.

(c) *Additional documents required.* The following documents must be included with permit applications:

(1) Permits required from any other authority that has a vested interest in the waterway must be submitted with permit application and indicate that such approval may be granted or granted with condition(s). Additionally, a permit from any other entity with either ownership,

easement or other controlling interests in the waterways within which a structure is proposed to be built or maintained must be submitted with the application. If the waterways are owned or controlled by the village, sub-paragraphs (2} through (6) shall continue to apply.

(2) A fully executed easement agreement along with a hold harmless agreement on forms provided by the village shall be submitted with permit application if the structure is proposed to be located on village-controlled land.

(3) A certificate of insurance indicating general liability and property damage coverage in an amount of at least three hundred thousand dollars ($300,000.00) per incident shall be submitted with the permit application.

(4) Permits for bulkheads and seawalls must be accompanied by a survey showing the property line, waterway's edge, existing ground elevations and all easements.

(5) Designs for bulkheads and seawalls shall be prepared by a registered professional engineer, licensed to practice in the State of Florida;

(6) Designs for bulkheads and seawalls shall meet the current Construction Standards and Details for Waterways, Bulkheads and Banks.

(d) *Inspection required.* A final inspection of all docks and structures extending into or proposed to be placed within the waterways of the village shall be required prior to the issuance of the certificate of completion and upon any modifications to the dock or other regulated structures. The owners of such docks or regulated structures are responsible for the continuous maintenance of same.

(e) *Fees.* Each application for permit shall be accompanied by a fee in an amount established by resolution of the village council. No application for permit shall be accepted unless it is accompanied with the applicable fee which shall be nonrefundable.

(Ord. No. 871, § 1, 2-7-13)

Sec. 7-19. - Processing the application.

(a) *Staff.* The application and plans and specifications shall be reviewed by the building official to determine whether the proposed work meets all the requirements of this article and any standards and policies adopted by the council for such construction or work. The building official without council approval is authorized to approve and issue permits for new structures and for revisions to existing structures that conform to the provisions of this article.

(b) *Council approval if non-compliant structure proposed.* Prior approval of the council shall be required when the structure for which a permit is sought does not comply with this article and the drawings and policies and when one of the following conditions apply:

(1) The abutting upland property is a dedicated public right-of-way;

(2) The abutting property is owned by the village;

(3) The abutting property is zoned commercial;

(4) Approved bulkhead lines, pierhead lines or setback lines do not exist;

(5) The structure would affect a designated swimming area;

(6) Commercial signs are to be installed;

(7) More than one (1) slip or float is requested on the water side of an abutting upland single parcel; or

(8) The abutting upland lot configuration would make it impossible to comply with the regulated structure permit standards.

(c) *Conditions.* In granting any such application, the council may impose conditions in the permit which it deems necessary to protect navigation or fishing or the use, operation or development of the public and private waters. Additionally, the council may grant such application if the general intent of this article has been met and the entity which owns or controls the waterways within which the structure is to be built has consented to its installation. In no instance whatsoever, will the council grant an application that has not been approved by the property owner or entity controlling the waterways within which the structure is proposed to be constructed.

(Ord. No. 871, § 1, 2-7-13)

Sec. 7-20. - Revocation of permit.

(a) *Grounds for revocation.* Any permit heretofore or hereafter granted for any structure or work in the public and private waterways may be revoked at any time by the building official upon any of the following grounds:

(1) The work or structure has become detrimental to navigation, fishing or swimming;

(2) The work or structure is detrimental to the use, operation or development of the public and private waters;

(3) The work or structure does not comply with the permit or does not meet the standards adopted by the council for such work or structure;

(4) The permittee has failed for a period of sixty (60) days to pay the fee or fees heretofore or hereafter imposed for the occupancy of tidelands, filled tidelands or submerged lands upon which such work or structure exists;

(5) The work or structure has fallen into a state of disrepair;

(6) The space occupied by such work or structure is over publicly owned land and such space is to be devoted to a public use;

(7) The permittee has breached or failed to comply with the terms or conditions contained in the permit or upon which the permit as granted.

(b)

Notice and appeal. The building official shall provide written notice to the permit applicant, and to the property owner if different from the permit applicant, of any decision to revoke the permit. The building official's decision to revoke a permit may be appealed to the planning and zoning commission. All appeals must be in writing, set forth the reasons for the appeal, be filed with the village clerk within ten (10) days from the date the building official issues its written notice of revocation, and be accompanied by the appropriate filing fee as determined by resolution of the village council. The filing of any appeal shall suspend the revocation of the permit until the commission has taken final action on the appeal. The planning and zoning commission shall take final action within forty-five (45) days of the filing of a complete notice of appeal. The commission may, upon request, consider oral and written arguments. The commission may affirm the decision of the building official, remand the matter to the building official for further review and consideration, or reverse the decision of the building official if it finds that the substantial rights of the appellant have been prejudiced because the findings, conclusions or decisions of the building official were in violation or in excess of its authority or jurisdiction, made upon unlawful procedures, clearly erroneous in view of the entire record as submitted and the public policy contained in this article, or arbitrary and capricious.

(Ord. No. 871, § 1, 2-7-13; Ord. No. 920, § 1, 11-19-15)

Sec. 7-21. - Structures maintained without a permit.

Every structure maintained in or over the public and private waterways without a current, valid permit existing therefor when required by this article, or maintained in a manner or for a purpose other than or different from that provided in the permit, shall constitute a nuisance and shall be immediately abated and may be revoked. If upon written notice to remove any such structure the owner thereof fails, refuses, or neglects to do so within a reasonable time specified in the notice, being not less than five (5) nor more than thirty (30) days after such notice, the village shall abate or remove it and the attorney's fees and cost thereof may be recovered from the owner of such structure in a civil action.

(Ord. No. 871, § 1, 2-7-13)

Secs. 7-22—7-35. - Reserved.

ARTICLE III. - WATERFRONT DEVELOPMENT

Sec. 7-36. - Definitions.

The following words when used in this article shall have the meaning ascribed herein unless the context clearly indicates otherwise:

Abutting property. See contiguous.

Access. The principal means of ingress and egress to abutting property from a publicly dedicated right-of-way.

Alley. A right-of-way which affords only a secondary means of access to property abutting thereon and is not intended or used for general traffic circulation.

Certificate of occupancy. A statement signed by a duly authorized village building official setting forth that a building or structure legally complies with the village building code and that the same may be used for the purposes stated therein.

Contiguous. Lands are contiguous if they abut each other or if separated by streets, ways, easements, pipelines, power lines, conduits or rights-of-way under ownership of the petitioner, or a governmental agency, or subdivision, or public or private utility.

Developer. Any individual, firm, association, syndicate, co-partnership, corporation, trust or any other legal entity commencing proceedings under this article.

Development or to develop. A development includes the construction of any new building or other structures on a lot, the relocation of any existing buildings on another lot, or the use of a tract of land for any new uses. To develop is to create a development.

Easement. Any strip of land created by a subdivider or granted by the owner, for public or private utilities, drainage, sanitation or other specified uses having limitations, the title to which shall remain in the name of the property owner, subject to the right of use designated in the reservation of the servitude.

Engineer, registered. A professional engineer registered by the state and trained in the field of civil engineering.

Governing body, applicable. A city, county, state, state agency or other political government subdivision or entity authorized to administer and enforce the provisions of this Code, as adopted or amended.

Landscape architect. A landscape architect registered by the State of Florida.

Planning commission. The advisory board to the council known as the planning and zoning commission.

Plat. A map depicting the division or subdivision of land into lots, blocks, parcels, tracts or other portions thereof, however the same may be designated, prepared in accordance with the provisions of this article and those of any applicable law and/or local ordinance; and which may be designated to be placed on record in the office of the Clerk of the Circuit Court of Palm Beach County.

Plat of record. A plat which conforms to the requirements of the applicable laws of the state and ordinances of the village which has been accepted by the council and placed in the official records of Palm Beach County.

Plat, preliminary. A copy of the plat in sufficient form to readily compare the plat with the master plan and construction plans.

Premises. Any lot, area, or tract of land whether used in connection with a building or not.

Property line, rear. A property line opposite and most distant from the front property line. For a triangular lot, the rear property line shall mean a line ten (10) feet in length within the lot parallel to the front property line, or parallel to the chord of a curved front property line, and at the maximum distance from it.

Property owners' association. A nonprofit organization recognized as such under the laws of the state operated under recorded land agreements through which each owner of a portion of a subdivision, be it a lot, home, property or any other interest, is automatically subject to a charge for a prorated share of expenses either direct or indirect for maintaining common properties within the subdivision, such as roads, parks, recreational areas, common areas or other similar properties. Within the text of this article a property owners' association is considered a single entity for property ownership.

Public agency. Any government or governmental agency, board, commission, authority or public body of Palm Beach County, the state or of the United States government or any legally constituted governmental subdivision or special district.

Public park. Any publicly-owned park, playground, beach, parkway or other recreation areas and open space as well as areas designated as such in the public ownership zoning district.

Right-of-way. A strip of land dedicated or deeded to the perpetual use of the public.

Site development plan. A graphic and information representation of a specific design solution for a development phase or the entirety, meeting the requirements and conditions of this Code.

Street. A strip of land, owned privately or publicly, which affords the principal means of access to abutting property. The word "street" includes road, thoroughfare, parkway, avenue, boulevard, expressway, lane, throughway, place, square or however otherwise designated within the above mentioned right-of-way.

Street, private. Any street existing prior to or at the time of adoption of the ordinance from which this article was derived which has not been dedicated for public use and not accepted for ownership or maintenance by the village. After adoption of the ordinance from which this article was derived, private streets shall be limited to property under single ownership or a property owners' association.

Street, public. Any street designed to serve more than one property owner which is dedicated to the public use and accepted for ownership and maintenance by the village; includes any street right-of-way dedicated to the public prior to or at the time of adoption of the ordinance from which this article was derived. Streets controlled by a property owners' association may be retained as private streets by said association as long as said association accepts the obligation for complete control and maintenance. A street designed to serve more than one property owners' association must be public.

Street right-of-way. See right-of-way.

Subdivision. The division of a parcel of land, whether improved or unimproved, into three (3) or more contiguous lots or parcels of land, designated by reference to the number or symbol of the lot or parcel contained in the plat of such subdivision, for the purpose, whether immediate or future, of transfer of ownership, or, if the establishment of a new street is involved, any division of such parcel.

Surveyor. A land surveyor registered in the state.

(Ord. No. 187, § 1, 3-17-83)

Cross reference— Definitions and rules of construction generally, § 1-2.

Sec. 7-37. - Compliance.

When a developer designs a subdivision or phase of subdivision with waterfront property adjacent to existing or proposed canals, watercourses, lakes, streams, drainage ways or channels such subdivision shall comply and conform to the requirements of this article.

(Ord. No. 187, § 2, 3-17-83)

Sec. 7-38. - Easements or rights-of-way.

Where a development includes proposed canals, watercourses, lakes, streams, drainage ways or channels, there shall be provided a storm water easement or a drainage right-of-way conforming substantially with the lines of such watercourse and such further width or construction or both as will be adequate for the purpose. Additional right-of-way may be required where necessary for maintenance, safety and convenience.

(Ord. No. 187, § 3, 3-17-83)

Sec. 7-39. - Design and excavation.

All lakes, canals, watercourses, drainage ways, streams or channels which are adjacent to, exist or are to be excavated upon a parcel to be developed, shall retain natural characteristics or be so designed to protect against hazard to life, property and safety. Waterbodies proposed in conjunction with the development shall have a minimum water depth of six (6) feet. Where bulkheads, retainage walls or hand-placed natural stone rip-rap are not required, the design shall incorporate a minimum of a 4:1 slope from the existing ground to a minimum depth of three (3) feet below the maintained water surface on all waterbodies with the exception of lakes which shall have a minimum of a 6:1 slope from the existing ground to a minimum depth of three (3) feet below the maintained water surface. The banks and/or side slopes shall be fully sodded and/or landscaped to the water's edge at such time as the adjacent land is developed. The width of all drainage easements and/or rights-of-way shall be adequate to accommodate the drainage facility plus twenty (20) feet on one side for maintenance purposes; however the top width of the canal or waterbody shall not exceed fifty (50) feet. Where the top width of the canal or waterbody exceeds fifty (50) feet, twenty (20) feet shall be provided on each side for maintenance purposes.

(Ord. No. 187, § 4a, 3-17-83)

Sec. 7-40. - Maintenance.

It is the responsibility of the adjacent upland property owner, property owner's association or title holder, beneficial or otherwise, to maintain the banks or side slopes of all waterbodies within the village, down to the water's edge. A development plan which has a waterbody shall be approved by neither the planning and zoning commission nor the council unless maintenance responsibility is a condition of approval.

(Ord. No. 187, § 4b, 3-17-83)

Sec. 7-41. - Controlling of obnoxious aquatic vegetation.

(a) The responsibility entity shall furnish all labor, material and equipment necessary for the control of the aquatic vegetation.

(b) A continuing program for the control of aquatic vegetation encompassing the following shall be established:

  (1) Elimination of undesirable aquatic vegetation, including but not limited to hydrilla, hyacinth, algae, torpedo grass and cabomba;

  (2) Maintenance of aquatic life.

(c) Any chemicals used in the program will be approved for such use by local, state and federal regulations.

(d) Waters of all waterbodies must be guaranteed useful for lawn watering. This guarantee only applies to result or effect of any chemical used.

(e) If any fish kill is experienced, responsible entity must dispose of same in a manner suitable to the village.

(Ord. No. 187, § 4c, 3-17-83)

Sec. 7-42. - Exceptions.

This article shall not apply to drainage easements containing subsurface drainage systems or drainage ditches permitted.

(Ord. No. 187, § 8, 3-17-83)

Sec. 7-43. - Permits required; procedure.

(a) When a developer designs a development with waterfront property adjacent to existing or proposed canals, watercourses, lakes, streams, drainage ways or channels, before any work may be done to modify existing lands, or to develop, alter or change such watercourses, construction plans shall be prepared in accordance with the provisions of this article. The construction plans shall be submitted to the village engineer for the issuance of a dredge, fill or excavation permit. Prior to the issuance of such a permit, the plans shall be approved by the village engineer, the planning and zoning department, and the council.

(b) No person, firm, corporation or any other association shall alter, reroute, deepen, widen or change in any way, any existing ditch, canal, drain or drainage system without first obtaining a written permit from the village engineer. Construction plans for such work shall be submitted to the village engineer for the issuance of a dredge, fill or excavation permit. Prior to the issuance of such a permit, the plans shall be approved by the village engineer; the planning and zoning department, and the council.

(c) Prior to the construction or alteration of watercourses as prescribed in paragraphs a and b of this section, right-of-way required for such work must be appropriately dedicated. Where such construction or alteration affects a governmental water control district, the dedication, deed or easement shall be to such agency.

(Ord. No. 187, § 5, 3-17-83)

Sec. 7-44. - Bulkheads, canal banks and retaining walls.

Prior to the construction of any bulkhead, canal banks and retaining walls, a construction permit shall be obtained. The permitting procedure shall be as outlined in section 7-18.

(Ord. No. 187, § 6, 3-17-83; Ord. No. 506, § 3, 4-18-96)

Sec. 7-45. - Permits required for certain installations.

Waterways, bulkheads and banks shall be installed under permit issued by the building department, and approved by the engineering department.

(Ord. No. 506, § 4, 4-18-96)

Sec. 7-46. - Dedication and maintenance.

Where canals, watercourses, lakes, streams, drainage ways or channels are proposed or exist upon the property to be developed, they shall be identified, dedicated, and maintenance obligations defined on the development plan or plat.

(1) *Dedication.* Where a public rights for drainage purposes are proposed within a waterway, the easement shall be dedicated to the public, and the remainder of the waterway shall be dedicated to a property owners' association or reserved for the use of the residents of a subdivision when the subdivision is developed as a condominium or cooperative development as defined by state law, or in lieu of the foregoing, the waterway in its entirety may be dedicated to a legally constituted drainage district or to the council.

(2) *Maintenance.* Canals, watercourses, lakes, streams or channels shall be dedicated to the public or reserved for the use of the residents of the subdivision and the developer shall place deed restrictions covering the property to be developed which state that the owners of property within the subdivision are subject to assessment by the village under a legally constituted improvement or special taxing district or by a property owner's association or a condominium or cooperative association as defined by state law for the cost of maintenance and operation of such above enumerated waterway.

(Ord. No. 187, § 7, 3-17-83)

Sec. 7-47. - Active subdivision development.

A plat and/or development plans for a subdivision accepted under the subdivision regulations adopted by the village, and amendments thereto, currently active and under development shall be completed as accepted under those regulations with respect to the accepted plans and/or plat; however, additions thereto which have not been accepted and are not actively under construction shall be subject to the requirements of this article.

(Ord. No. 187, § 9, 3-17-83)

Sec. 7-48. - Requirements.

(a) *Improvements.* The required improvements shall be installed either prior to the issuance of a certificate of occupancy or under surety posted within the village. When the required improvements are to be completed prior to the recording of the plat, it shall be expressly understood that no building permit shall be issued for any structure on a lot wherein the final plat has not been approved and recorded in the manner prescribed and the approval to construct the required improvements prior to recording of the plat shall not be construed as authority for the sale of lots in reference thereto.

(b) *Completion time.* All required improvements shall be completed within one year from the date of acceptance of the development. Time extensions may be granted by the council at the request of the developer when, in the opinion of the council, undue hardships or conditions exist beyond the control of the developer. No such time extensions shall exceed one additional year. The construction, acceptance and maintenance of required improvements shall be administered as prescribed in preceding sections.

(Ord. No. 187, § 10, 3-17-83)

Sec. 7-49. - Construction standards for waterways, bulkheads and banks.

Construction methods shall be those prescribed in the current Construction Standards and Details for Waterways, Bulkheads and Banks.

(Ord. No. 187, § 12, 3-17-83)

Sec. 7-50. - Acceptance and maintenance of required improvements.

(a) *Workmanship and material agreement.* The developer shall execute an agreement guaranteeing the required improvements against defect in workmanship and material for one year after acceptance of such improvements by the council. Said agreement shall be submitted to the village engineer along with the completion certificate and project records.

(b) *Acceptance of dedication and maintenance of improvements.* The dedication of public space, parks, rights-of-way, easements or the like on the plat shall not constitute an acceptance of the dedication by the village. The acceptance of the dedication shall be indicated by a resolution of the council adopted at such time as all improvements meet for exceed the standards set forth by this article. The village engineer upon satisfactory completion and receipt of the agreement shall certify that the developer has complied with all of the provisions of this article and shall recommend to the council the acceptance of the dedications and, when applicable, the maintenance of the required improvements. Upon such recommendations, the council by resolution, shall approve the subdivision, the dedications on the plat and the maintenance responsibilities of the required improvements.

(c) *Village completion of required improvements.* When a plat has been recorded or a development completed and the developer fails to complete the required improvements as required by this ordinance, the council shall complete the required improvements under the guarantees provided by the developer. In such case, the council shall direct the village engineer to call upon the guarantees to secure satisfactory completion of the required improvements. Upon the completion of such action, the village engineer shall report to the council and the council shall accept by resolution the dedications and maintenance responsibility as indicated on the plat or agreement. In such cases, the remaining guarantees posted by the developer shall be retained for a period of one year after completion in lieu of the agreement. Any defects occurring during this period shall be repaired using funds remaining in the guarantee.

(d)

Failure to complete unrecorded subdivisions. Where a developer has elected to install the required improvements prior to recordation of the plat and fails to complete such improvements within the time limitations of this article, all approvals of the subdivision shall be null and void and the land shall revert to its original state. No reference shall be made to the plat with respect to the sale of lots or issuance of building permits, unless and until the plat has been resubmitted with all of the supplementary material and approvals as herein prescribed have been granted.

(Ord. No. 187, § 13, 3-17-83)

Sec. 7-51. - Maintenance required.

If any person, developer, association or responsible entity fails to maintain the banks, side slopes and waterbodies as required by law, the village will have the required maintenance performed, and a lien shall be placed upon the subject property and enforced in accordance with the law.

(Ord. No. 187, § 14, 3-17-83)

Secs. 7-52—7-55. - Reserved.

ARTICLE IV. - WATERWAYS BOAT CONTROL

> *Footnotes:*
> *--- (**3**) ---*
> ***Editor's note—*** *Section 2 of Ord. No. 371, adopted Nov. 15, 1990, repealed former Art. IV, §§ 7-56—7-72, and added a new Art. IV, §§ 7-56—7-64, pertaining to the same subject matter. Former Art. IV originated from Ord. No. 213, adopted July 19, 1984; Ord. No. 302, adopted Feb. 16, 1989; and Ord. No. 306, adopted May 4, 1989.*
> ***Cross reference—*** *Litter, § 12-26 et seq.; adoption of state law misdemeanors, § 17-1.*

Sec. 7-56. - Short title.

This article shall be known and may be cited as the *Waterways Boat Control Ordinance.*

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-57. - Incorporation by reference of Chapter 327, Florida Statutes.

Chapter 327 of the Florida Statutes, the Florida Vessel Registration and Safety Law 1989, and as it may be amended from time to time, is hereby fully incorporated into this article by reference.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-58. - Definitions.

In addition to the definitions set forth in Chapter 327, Florida Statutes, the following term or phrase and its derivations shall have the meaning given herein:

Village waterway is any waters, waterway, lake, river, tributary, canal, lagoon or connecting waters within the boundaries of the village.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-59. - License compliance.

No vessel shall be operated in or on the village waterways unless properly licensed as required by applicable state and federal laws and regulations.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-60. - US Coast Guard regulations.

No vessel shall be operated in or on village waterways unless it meets all applicable equipment requirements of the United States Coast Guard.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-61. - Speed limit.

All vessels shall be operated in or on village waterways consistent with speed limits posted on village waterways, which speed limits shall be the same as indicated on the map on file in the office of the village clerk, which has been approved by the Florida Department of Environmental Protection. The village council may by resolution temporarily waive enforcement of speed limit restrictions posted on village waterways when the village council determines that special circumstances warrant such temporary waiver.

(Ord. No. 371, § 2, 11-15-90; Ord. No. 548, § 1, 9-3-98)

Sec. 7-62. - Maintenance of docks.

Persons controlling or occupying vessels shall at all times keep the docks, seawalls and premises adjacent to such vessels in a neat and orderly manner and free from trash, rubbish, repair parts, machinery, equipment and debris of all kinds.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-63. - Waste disposal.

Dumping of waste, including without limitation solid waste, garbage, paper, bottles, cans, refuse, debris and sanitary waste, on, into or adjacent to village waterways is prohibited.

(Ord. No. 371, § 2, 11-15-90)

Sec. 7-64. - Launching of vessels.

Launching of vessels from any publicly or privately owned property without the express authorization of the property owner, whether such property is developed or undeveloped, shall be prohibited.

(Ord. No. 371, § 2, 11-15-90)

Secs. 7-65—7-80. - Reserved.

ARTICLE V. - BOAT RAMP ACCESS

> *Footnotes:*
> *--- (**4**) ---*
> ***Editor's note—** Ord. No. 311, adopted Sept. 21, 1989, amended the Code but did not specify the manner of inclusion; hence, §§ 2—5 of such ordinance have been codified herein by the editor as Art. V, §§ 7-81—7-84.*

Sec. 7-81. - Construction, location generally.

A boat ramp providing access into the village waterways shall be constructed by the village with the location to be determined by village council.

(Ord. No. 311, § 2, 9-21-89)

Sec. 7-82. - Use; maximum hull length.

The aforementioned boat ramp shall be for the exclusive use of village residents only; and the village shall enforce a twenty-four-foot maximum boat-hull length for said ramp. Such ramp for access to the village waterways shall be utilized only by single-engine vessels which have a boat-hull less than or equal to the maximum length set forth herein.

(Ord. No. 311, § 3, 9-21-89; Ord. No. 888, § 1, 9-3-13)

Sec. 7-83. - Procedures for exclusive use generally.

The village council directs the village manager and the village staff to provide for the necessary procedures and safeguards to ensure that the boat ramp is utilized exclusively by village residents.

(Ord. No. 311, § 4, 9-21-89)

Sec. 7-84. - Procedures for safe operation generally.

The village council directs the village manager and the village staff to institute the necessary procedures to ensure the safe operation and use of boats in, on and around the boat ramp.

(Ord. No. 311, § 5, 9-21-89)

WMP(8) SUPPLEMENTAL INFORMATION

Village of Royal Stormwater Utility Ordinance 864 and FY Stormwater CIP Appropriations

ORDINANCE NO. <u>864</u>

AN ORDINANCE OF THE VILLAGE COUNCIL OF THE VILLAGE OF ROYAL PALM BEACH, FLORIDA, AMENDING CHAPTER 24. UTILITIES. OF THE CODE OF ORDINANCES OF THE VILLAGE OF ROYAL PALM BEACH BY ADOPTING AN ENTIRELY NEW ARTICLE III. TO BE ENTITLED "STORMWATER MANAGEMENT UTILITY." TO ESTABLISH STORMWATER MANAGEMENT AS A UTILITY ENTERPRISE IN ACCORDANCE WITH SEC. 403.0893, *FLORIDA STATUTES*; PROVIDING, IN PART, FOR DEFINITIONS, UTILITY ESTABLISHMENT, DUTIES AND POWERS, AUTHORITY FOR SERVICE CHARGES, CREDITS, ADJUSTMENTS, EXEMPTIONS, APPEALS, BILLING, AND UTILITY ENTERPRISE FUND CREATION; PROVIDING A CONFLICTS CLAUSE, A SEVERABILITY CLAUSE AND AUTHORITY TO CODIFY; PROVIDING AN EFFECTIVE DATE; AND FOR OTHER PURPOSES.

WHEREAS, the Village Council desires to adopt stormwater management utility in accordance with Sec. 403.0893, *Florida Statutes*; and

WHEREAS, the Village of Royal Palm Beach desires to provide for a continuing source of revenue for the construction, operation and maintenance and other tasks associated with the proper management of a stormwater management system in order to maintain adequate levels of service for the Village's stormwater management program; and

WHEREAS, the Village Council believes this ordinance to be in the best interests of the Village of Royal Palm Beach.

NOW, THEREFORE, BE IT ORDAINED BY THE VILLAGE COUNCIL OF THE VILLAGE OF ROYAL PALM BEACH, FLORIDA, THAT:

<u>Section 1</u>: Chapter 24. Utilities. of the Code of Ordinances of the Village of Royal Palm Beach is hereby amended by the adoption of an entirely new Article III. which shall be entitled "STORMWATER MANAGEMENT UTILITY"; providing that Article III. shall hereafter read as follows:

ARTICLE III. STORMWATER MANAGEMENT UTILITY

<u>Sec. 24-21. - Intent.</u>

It is the intent of this article that the Village will establish stormwater management as a Village utility enterprise in accordance with F.S. § 403.0893 and shall establish a program of user charges for stormwater management service to be charged to all Developed property within the Village that contributes stormwater runoff to the Village's stormwater management systems to accomplish the functions of such utility. These functions include, but are not limited to, maintenance, planning, design, construction, regulation, surveying, and inspection as they relate to stormwater management facilities of the Village.

Sec. 24-22. – Findings.

The Village finds and determines that uncontrolled drainage and development of land has a significant adverse impact upon the health, safety, and welfare of the Village community. Further, Village finds as follows:

(a) Stormwater runoff is capable of carrying pollutants into receiving bodies, thereby degrading water quality;

(b) The increase in nutrients, such as phosphorous and nitrogen, resulting from stormwater runoff accelerates eutrophication of receiving water bodies and adversely affecting flora and fauna;

(c) Improperly channeling water increases the velocity of stormwater runoff and increases erosion and sedimentation;

(d) Construction requiring the alteration of natural topography and removal of vegetation tends to increase erosion;

(e) Siltation of water bodies resulting from increased erosion decreases the capacity of water bodies to hold and transport water, interferes with navigation, and harms flora and fauna;

(f) Impervious surfaces increase the volume and rate of storm water runoff and allow less water to percolate into the soil, thereby decreasing groundwater recharge;

(g) Improperly managed stormwater runoff may increase the incidence and intensity of flooding, which endangers property and human welfare;

(h) Substantial economical losses may result from adverse impacts upon the waters of the Village ecosystem;

(i) Village has an existing Stormwater Management Program, through which it administers various stormwater management functions and maintains a system of storm and surface water management facilities including, but not limited to, conduits, manholes, channels, ditches, waterways, drainage easements, retention and detention basins, infiltration facilities, and other components;

(j) The existing stormwater system in Village requires regular maintenance and improvements;

(k) Due to the age of existing infrastructure, rehabilitation and replacement of some portions of the existing stormwater system and implementation of new stormwater systems are required;

(l) All Developed Property in Village either uses or benefits from the Village's administration of the its Stormwater Management Program;

(m) The extent of use of the Stormwater Program by each Property depends upon factors, such as land use and the amount of Impervious Surface on the Property, which influence runoff;

(n) The costs of administration of the Village's Stormwater Program should be allocated, to the extent practicable, to all Customers based in part on the impact of runoff from the impervious areas of their Property on the stormwater system; and

(o) Management of the Village's Stormwater Program to protect the public health, safety, and welfare requires adequate revenues, and it is in the interest of the public to finance stormwater management adequately with a reasonable and equitable user fee system so each user of the program pays to the extent to which the user contributes to the need for the Stormwater Program.

<u>Sec. 24-23. - Definitions.</u>

As used in this article:

Village shall mean the Village of Royal Palm Beach, Florida, and its staff and elected officials.

Department shall mean the Village public works department.

Developed property shall mean any parcel of land that has been modified by the action of persons to reduce the land's natural ability to absorb and hold rainfall. These modifications include, but are not limited to, clearing, grading, cementing, filling, or compacting the natural ground, or erecting or constructing buildings, parking lots, driveways, patios, decks, walkways, and athletic courts.

Drainage area shall mean the watershed (acreage) contributing surface water runoff to the Village's storm drainage system.

Equivalent residential unit (ERU) shall mean the basic unit for the computation of stormwater service charges and is defined as 2,723 square feet of impervious area, which represents the estimated median impervious area for all developed, detached single-family properties in the Village.

Impervious area shall mean the horizontal projection of any part of any parcel of land that has an impermeable cover caused to be erected or constructed by the action of persons, and such covers include, but are not limited to, buildings, parking lots, driveways, patios, decks, walkways, and athletic courts.

Manager shall mean the Village manager or designee.

Multifamily residential properties shall mean and include all residential development not classified as single-family residential. Common areas associated with such properties shall be included in the charge to the multifamily units on such properties.

Nonresidential/commercial properties shall mean and include all Developed property that is not primarily used for residential purposes and that is classified by the property appraiser as land use types 10 through 99 using Florida Department of Revenue Land Use Codes, as amended or supplemented.

Receiving water shall mean those creeks, streams, rivers, lakes, sinkholes, and other bodies of water into which surface waters are directed, either naturally or in manmade ditches, pipes, or open systems.

Single-family property shall mean and include all single-family detached housing units.

Stormwater basin area shall mean the horizontal area occupied by stormwater detention, retention, and/or detention/retention basins at the design maximum water surface elevation.

Stormwater detention basin shall mean a facility, either natural or manmade, that collects and contains stormwater runoff and allows the release of the stormwater through a structure that is designed to control the rate of the release of the stormwater, as acknowledged by the Village manager or designee.

Stormwater fee adjustment shall mean a change made to a fee to correct an overcharge or an undercharge of the customer's stormwater fee.

Stormwater fee credit shall mean a reduction a customer receives for implementing practices that mitigate the peak discharge or runoff pollution or decrease the Village's cost of maintaining the system beyond standard (base) requirements.

Stormwater detention/retention basin shall mean a facility, either natural or manmade, that performs a combination of both a stormwater detention basin and a retention basin, as acknowledged by the Village manager or designee.

Stormwater management system shall mean and include all natural and manmade elements used to convey stormwater from the first point of impact with the surface of the earth to a suitable receiving water body or location internal or external to the boundaries of the Village. The stormwater management system includes all pipes, channels, streams, ditches, wetlands, sinkholes, inlets, swales, detention/retention basins, ponds, and other stormwater conveyance and treatment facilities.

Stormwater retention basin shall mean a facility, either natural or manmade, that collects and contains stormwater runoff and only allows the release of the stormwater runoff by one or more of the following: evaporation, percolation into the natural ground and/or percolation into a manmade filtration system that may convey the stormwater runoff to a stormwater management system, as acknowledged by the Village manager or designee.

Stormwater retention volume shall mean the maximum capacity of a stormwater retention basin(s).

Undeveloped shall mean any real property that is not Developed property.

Sec. 24- 24. - Stormwater management utility—Established.

There is hereby created and established in the Village a stormwater management utility in accordance with Section 403.0893, *Florida Statutes*. This utility shall be responsible for the Village's stormwater management system and shall have equal status with other services provided by the Village.

Sec. 24-25. - Director.

Director of the stormwater management utility shall be the Manager.

Sec. 24-26. - Duties and powers.

The stormwater management utility shall have all powers necessary for the exercise of its responsibility for the drainage from all properties within the Village, including, but not limited to, the following:

(a) Preparation of plans for improvements and betterments to the stormwater management system;

(b) Construction of improvements and betterments to the stormwater management system, including, but not limited to, the purchase of land for same;

(c) Promulgation of regulations for the use of the stormwater management system, including provisions for enforcement of such regulations;

(d) Review and approval of all new development permits within the Village for compliance with stormwater management regulations included in present Village ordinances or ordinances later adopted;

(e) Performance of routine and as needed maintenance and minor improvement to the stormwater management system;

(f) Establishment of charges for the Village's stormwater management system;

(g) Evaluation of water quality concerns for discharges to the stormwater management system; and,

(h) Performance of all normal utility functions to include construction, operation, and maintenance of the Village's stormwater management system, including, but not limited to, the hiring of staff, the selection of special consultants, the entering into contracts for services and construction of facilities, and the handling of purchase, lease, sale or other rights to property for the stormwater management system.

Sec. 24-27. - Authority for service charges.

(a) *Authorization.* The stormwater management utility is empowered by this article to establish charges for the use and discharge to the Village's stormwater management system. Such charges shall be based on the cost of providing stormwater management services to all Developed property within the Village and may be different for properties receiving different classes of service.

(b) *Rates for stormwater management service.* There is charged to all owners or occupants of real property in the Village, with improvements or uses thereon which contribute stormwater runoff to the Village's stormwater management system, a monthly fee as established by resolution of the Village Council in accordance with the following definitions:

(1) *Residential customer.* Each single-family property and each multifamily or condominium dwelling unit shall be considered one ERU for billing purposes.

(2) *Nonresidential/commercial customer.* Nonresidential/commercial property service charge shall be:

Number of ERU's = Impervious Area divided by ERU Impervious Area

A minimum value of 1.0 ERU shall be assigned to each nonresidential/commercial customer. The ERU calculation shall be rounded to the nearest 0.1 ERU.

(3) Monthly Service Charge = (No. of ERU's) *x* Rate/ERU.

(4) *Application to all developed properties.* Service charges shall apply to all Developed property within the Village using the Village's stormwater management system.

(5) *Undeveloped property.* Stormwater management service charges shall not be charged to Undeveloped property.

(c) *Billing.* The fees imposed by this article shall be billed on a monthly basis and shall be billed in conjunction with the customer's monthly water bill issued by Palm Beach County Water Utilities unless otherwise provided for herein.

Sec. 24-28. Combined Billing

(a) A combined statement for applicable Village stormwater management utility services and Palm Beach County water service, plus applicable taxes and surcharges, shall be rendered each customer monthly for such service. The rendering of combined billings is not an obligation on the part of the Village and failure of the customer to receive the statement shall not release nor diminish the obligation of the customer with respect to payment thereof, or relieve the customer of any obligation under this article.

(b) Combined Billings for service are due and payable when rendered; and shall be processed in accordance with the Palm Beach County Water Utility Department's adopted policies.

Sec. 24-29. - Enterprise fund.

(a) A stormwater management utility enterprise fund is hereby established into which all revenues from user fees, grants, or other funding sources shall be deposited and from which all expenditures related to the Village's stormwater management utility shall be paid. Accounting and reporting procedures shall be consistent with state law and applicable accounting practices and then reported to the Village Council by the Manager annually.

(b) Expenditures from the fund for activities that are not related to the Village's stormwater management utility shall not be permitted, except for a prorated charge for general Village government services that relate to the overall administration of the stormwater management system.

Sec. 24-30. – Appeals; Adjustments; Exemptions.

Stormwater Fee Appeals, Adjustments and Exemptions from the Stormwater fee shall be as provided in the Village's "Uniform Policy and Procedures Manual for Stormwater Utility" currently adopted by the Village Council and as such manual may be amended. This manual may be reviewed on the Village website and a copy may be obtained from the Village Clerk.

Sec. 24-31. Stormwater Fee Credit.

(a) *Eligibility.* A customer may be eligible for a stormwater fee credit under the following three circumstances:

(1) the customer has installed an onsite stormwater control measure to standards set forth in the Village's adopted Stormwater Utility Credit Policy;

(2) the customer reduces the burden of non-structural best management practices required of the Village under its NPDES permit for its MS4 General Permit; or

(3) the customer holds and is in compliance with an NPDES MS4 General Permit separate from the Village's NPDES MS4 General Permit.

(b) *Stormwater Utility Credit Policy.* The above-referenced credits shall be available and be provided in conformance with the Village's Stormwater Utility Credit Policy which shall be part of the Uniform Policy and Procedures Manual for Stormwater Utility referenced above. Customers must pay a fee for stormwater services and must apply for credit for developed property containing the credited stormwater control measures to be eligible for a fee credit. A stormwater control measure must be privately maintained in strict compliance with Village standards and the State of Florida standards where applicable to ensure that the control measure functions as credited at all times.

(c) *Application.* Fee credit application will be made through the Village Public Works Department and credits granted will be in effect for three (3) years provided the applicant maintains the credited Best Management Practice (BMP) each year.

Secs. 24-32—24-40. - Reserved.

Section 2: All Ordinances or parts of Ordinances in conflict be and the same are hereby repealed.

Section 3: Should any Section or provision of this Ordinance or any portion thereof, any paragraph, sentence or word be declared by a Court of competent jurisdiction to be invalid, such decision shall not affect the validity of the remainder of this Ordinance.

Section 4: Specific authority is hereby granted to codify this Ordinance.

Section 5: This Ordinance shall take effect immediately upon passage.

FIRST READING this 5th day of April, 2012.

SECOND AND FINAL READING this 19th day of April, 2012.

VILLAGE OF ROYAL PALM BEACH

Matty Mattioli

MATTY MATTIOLI, MAYOR

ATTEST:

(SEAL)

Diane DiSanto

DIANE DISANTO, VILLAGE CLERK

K:\STORMWATER UTILITY\ORDINANCE\2012_0329_ORD864-CH24-STORMWATERUTILITY-FINAL.DOCX

VILLAGE OF ROYAL PALM BEACH
2021/2022 BUDGET
ALL FUNDS - BUDGET SUMMARY

FUND CODE NO.	REVENUE SOURCE	FY 2019 ACTUAL	FY 2020 ACTUAL	FY 2021 ADOPTED BUDGET	FY 2021 PROJECTED ACTUAL	FY 2022 ADOPTED BUDGET
001	General Fund	29,921,534	29,233,333	24,912,103	29,745,078	27,297,471
101	Recreation Facilities Fund	905,809	911,479	862,671	888,390	1,789,462
102	Community Beautification Fund	447,294	371,709	292,492	369,365	448,232
301	Impact Fees Fund	3,730,051	2,952,228	3,709,493	3,709,493	6,965,153
302	Sales Tax Surtax	6,812,711	7,763,933	9,612,116	8,378,661	25,485,885
303	General Capital Improvements Fund	3,288,141	2,793,563	3,467,480	1,736,260	3,369,226
407	Utility Fund			1,295,844	1,406,862	1,312,854
408	Stormwater Capital Improvement Fund	200,000	300,000	500,080	400,017	600,067
	TOTAL REVENUES	45,305,540	44,326,245	44,652,280	46,634,126	67,268,349

ACCOUNT DESCRIPTION	FY 2019 ACTUAL	FY 2020 ACTUAL	FY 2021 ADOPTED BUDGET	FY 2021 PROJECTED ACTUAL	FY 2022 ADOPTED BUDGET
Operating Expenditures:					
Village Council	285,458	268,536	309,788	299,759	307,275
Village Manager	1,617,786	1,637,763	1,746,386	1,503,137	2,012,902
Finance	1,457,839	821,144	906,998	809,854	1,000,343
Information Systems		882,324	1,122,980	1,065,842	1,200,030
Legal	371,376	423,159	321,000	313,028	322,000
Police	7,945,130	8,128,017	8,098,508	8,098,508	8,260,478
Community Development	1,231,243	1,296,988	1,316,828	1,241,166	1,317,136
Engineering	916,925	1,025,907	1,058,506	1,067,564	1,114,083
Public Works	2,515,302	2,785,722	2,649,708	2,658,264	2,890,046
Parks & Recreation	4,625,857	4,483,017	5,164,877	3,841,641	5,611,751
Utilities			1,281,413	827,251	1,201,855
Non-Departmental Operating	1,947,867		2,239,280	2,193,963	2,342,426
Sub-Total	22,914,783	21,752,577	26,216,272	23,919,979	27,580,327

VILLAGE OF ROYAL PALM BEACH
2021/2022 BUDGET
ALL FUNDS - BUDGET SUMMARY

ACCOUNT DESCRIPTION	FY 2019 ACTUAL	FY 2020 ACTUAL	FY 2021 ADOPTED BUDGET	FY 2021 PROJECTED ACTUAL	FY 2022 ADOPTED BUDGET
Capital Outlay:					
Village Council	0	0	0	0	0
Village Manager	47,572	0	0	0	0
Community Development	78,795	0	0	0	30,000
Finance	297,455	1,673	306,563	127,331	
Information Systems			0	0	288,851
Engineering	2,224,001	610,977	10,198,391	777,072	16,936,880
Public Works	1,525,413	1,876,100	3,645,877	661,145	6,832,348
Parks & Recreation	1,267,147	1,870,572	8,223,625	1,935,641	6,870,891
Transfer Out	0	23,000	0	0	0
Reserve for Future CIP	9,987,491	10,649,994	2,128,049	10,914,716	7,729,054
Sub-Total	15,427,874	15,032,316	24,502,505	14,415,906	38,688,024
Non-Departmental:					
Transfers			100,000		1,000,000
Debt Service					
Sub-Total	0	0	100,000	0	1,000,000
TOTAL EXPENDITURES	38,342,657	36,784,893	50,818,780	38,335,885	67,268,350

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	*Project Number*	*Fund*
Drainage Systems Improvements	PW1903	302

Program Category	*Project Type*	*Division*	*Project Manager*
Stormwater	Carry-over	Public Works	Public Works Director

Project Location
Various Roads throughout the Village

Project Components	*FY 22*	*FY 23*	*FY 24*	*FY 25*	*FY 26*	*5 Year Total (+ Carry-over)*	*Carry-over FY 21*
Construction	0	0	0	0	0	51,312	51,312
Total	***$0***	***$0***	***$0***	***$0***	***$0***	***$51,312***	***$51,312***

Funding Source - Fund Balance
Fund Balance

Project Description
On Heron Parkway, replace the 21" RCP to 24" HDPE to eliminate a choke point in the drainage system. Alternatively on Heron Parkway, replace the 21" RCP with two (2) drainage pipes depending on the most efficient design to eliminate this choke point.

Project Justification
The drainage pipes need to be replaced with larger pipes to increase the flow capacity and eliminate choke points in the drainage system.

Project Alternatives
None identified

List of Equipment
N/A

Financial Impact on Operating Budget for first FY

N/A

PW1903

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	Project Number	Fund
Storm Drain Outfall Replacement	PW21SD	302

Program Category	Project Type	Division	Project Manager
Stormwater	Revised	Public Works	Public Works Director

Project Location

Various Locations in Drainage System (Canals) throughout the Village.

Project Components	FY 22	FY 23	FY 24	FY 25	FY 26	5 Year Total (+ Carry-over)	Carry-over FY 21
Construction	20,000	20,000	20,000	20,000	20,000	108,625	8,625
Total	***$20,000***	***$20,000***	***$20,000***	***$20,000***	***$20,000***	***$108,625***	***$8,625***

Funding Source - Fund Balance

Fund Balance

Project Description

Replace deteriorated storm drain outfalls throughout the Village. Anticipate replacing two (2) outfalls each year. (Varying diameter)

Project Justification

Pipes have deteriorated to the point that replacement is the only option.

Project Alternatives

None identified.

List of Equipment

N/A

Financial Impact on Operating Budget for first FY

N/A

PW21SD

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	*Project Number*	*Fund*
Storm Drain Outfall Replacement	PW22SD	302

Program Category	*Project Type*	*Division*	*Project Manager*
Stormwater	Revised	Public Works	Public Works Director

Project Location

Various Locations in Drainage System (Canals) throughout the Village.

Project Components	*FY 22*	*FY 23*	*FY 24*	*FY 25*	*FY 26*	*5 Year Total (+ Carry-over)*	*Carry-over FY 21*
Construction	20,000	20,000	20,000	20,000	20,000	100,000	0
Total	***$20,000***	***$20,000***	***$20,000***	***$20,000***	***$20,000***	***$100,000***	***$0***

Funding Source - Fund Balance

Fund Balance

Project Description

Replace deteriorated storm drain outfalls throughout the Village. Anticipate replacing two (2) outfalls each year. (Varying diameter)

Project Justification

Pipes have deteriorated to the point that replacement is the only option.

Project Alternatives

None identified.

List of Equipment

N/A

Financial Impact on Operating Budget for first FY

N/A

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	Project Number	Fund
Canal System Dredging	SW1901	302

Program Category	Project Type	Division	Project Manager
Stormwater	Revised	Utilities - Stormwater	Village Engineer

Project Location

Village wide

Project Components	FY 22	FY 23	FY 24	FY 25	FY 26	5 Year Total (+ Carry-over)	Carry-over FY 21
Construction	0	0	0	0	0	1,000,000	1,000,000
Other (Specify below)	0	0	0		0		0
Total	***$0***	***$0***	***$0***	***$0***	***$0***	***$1,000,000***	***$1,000,000***

Funding Source - Fund Balance

Sales Tax Surtax Fund Balance, Grant-$500,000(FY2021)

Project Description

Most of the canal system throughout The Village was designed and built nearly 50 years ago. While the system does currently provide sufficient storage for stormwater runoff, it has degraded over time due to the effects of sedimentation and erosion. As a result, the canals are holding a thick layer of nutrient rich muck along the bottom & are often times much shallower than their intended design. The shallow depths and muck layer are leading to aquatic vegetation blooms which are unsightly and obstruct navigation and drainage flow. As these blooms increase in intensity and frequency the costs to treat and remove the aquatic vegetation increases. In order to restore the canals to their designed depths & remove the years of sedimentation, the canal system will need to be dredged of these materials. The dredging of the canal system would take place over several years with a target to complete 1 linear mile a year. Techniques for sediment removal would vary by location and will likely be dependent on access. The project will also include an update to the stormwater master plan.

Project Justification

The removal of years of sedimentation, unwanted vegetation and litter from the canal system will allow the canal system to continue providing the necessary storage and conveyance needed for flood control as well as providing clean and safe waterways for the enjoyment of the residents of The Village.

Project Alternatives

List of Equipment

Financial Impact on Operating Budget for first FY

Project will decrease the cost of aquatic weed eradication.

SW1901

Village of Royal Palm Beach
Capital Improvement Program
General Capital Improvements Fund - 303

	FY2021 CARRYOVER	FY 2022	FY2023	FY2024	FY2025	FY2026
Source of Funds:						
Carryover	1,249,650	446,025	26,345	(1,075,102)	(2,483,382)	(2,365,418)
Interest		170	3	(108)	(248)	(237)
SubTotal	1,249,650	446,195	26,348	(1,075,210)	(2,483,630)	(2,365,655)
Other Sources:						
Grants						
**EN1601-Vill-wide ADA Improv-MPO/TAP	173,381	-				
EN2102-Bike Path Trailhead & Sign-TPA/FDOT	-	-		599,378	-	-
EN2302-ADA Improvement Phase II-TPA	-	-			587,262	-
PR2402-Camellia Park Reno-FRDAP	-				200,000	-
Sub-Total	173,381	-	-	599,378	787,262	-
Transfers						
Transfer From Fund 001		1,000,000				
Transfer From Fund 304		500,000	500,000	500,000	0	0
Sub Total	-	1,500,000	500,000	500,000	-	-
	1,423,031	1,946,195	526,348	24,168	(1,696,368)	(2,365,655)
Total Revenue		3,369,226	526,348	24,168	(1,696,368)	(2,365,655)
Use Of Funds:						
Community Development						
BD2201-Vehicles-Building Dept.	-	30,000	90,000	-	-	-
Sub-Total		30,000	90,000	-	-	-
Engineering						
**EN1403-E-Permitting	34,261	-				
**EN1601-Village-wide ADA Improve	227,522	-				
**EN1801-Commons Rehab Completion	62,030	-				
**EN2004-FPL Street Light Convr to LED	50,000	-				
**EN2102-Bike Path Trailhead & Signage	10,000	40,000	810,000	-	-	
**EN2106-Traffic Security Cameras	357,473	-				
EN22TR-Truck		55,000				
EN2301-Earth Day Lake Bank Stabilization	-	-	65,000	-	-	
EN2302-ADA Improvement Phase II	-	-	50,000	1,000,000	-	-
Sub-Total	741,286	95,000	925,000	1,000,000	-	-
Information Systems						
**GA1801-AnalyticsNow Report Writing	33,410	10,000	-	-	-	-
**GA1802-Naviline Upgrade/Web Design	50,794	10,000	-	-	-	-
**GA1803-Electronic Plan Review	14,050	50,000	-	-	-	-
**GA2001-Laserfiche Software Upgrade	3,247	10,000	-	-	-	-
IS22RX-Radio/Satellite Communication		10,550	10,150	10,550	10,050	10,550.00
IS22XX-Info Systems Network Upgrade		96,800	83,800	76,000	96,500	96,800.00
Sub-Total	101,501	187,350	93,950	86,550	106,550	107,350
Parks & Recreation						
**PR2106-Passenger Trams/Tugs (2)	96,000	-				
**PR2110-Security Cameras - Commons	112,500	-				
**PR2112-Gazebo (Home Place Pk)	24,750	-				

Village of Royal Palm Beach
Capital Improvement Program
General Capital Improvements Fund - 303

	FY2021 CARRYOVER	FY 2022	FY2023	FY2024	FY2025	FY2026
PR2202-Resurface Tennis Courts(6)		50,000				
PR2203-Assessible Playground Equip.		50,000				
PR2204-Disc Golf Course		35,000				
PR2205-Playground Fencing		60,000				
PR2206-Shade Structures(3)		100,000				
PR2207-Resurface Skate Park		20,000				
PR2208-Automated Bike Rental System		25,000				
PR2209-Playscape Replacement		150,000				
PR2210-Shade Cover Replacement(4)		25,000				
PR2211-Resurface Basketball Courts(4)		15,000				
PR2212-Automated Kayak Dispenser		35,000				
PR2213-Park Furniture Replacement		50,000				
PR2215-Katz Field Renovation		150,000				
PR24TR-Truck Replacement		-	-	50,000	100,000	83,000
PR2401-Cultural Center Entry Enhance	-	-		300,000		-
PR2402-Camellia Park Renovation	-	-		500,000		-
Sub-Total	233,250	765,000	-	850,000	100,000	83,000
<u>Public Works</u>						
**PW2002-Roadway Crack Sealing	78,750	40,000	40,000	40,000	40,000	40,000
**PW2004-Civic Cntr Way Monument Sign	112,793	-				
**PW2102-Street Light Fixture Repl-LED	29,868	57,500	57,500	57,500	57,500	57,500
**PW2103-SR80 Decorative St. Light Pole	50,000	50,000	50,000	50,000	50,000	50,000
**PW2104-Bridge Guard Rail Replacement	15,598	30,000	30,000	30,000	30,000	30,000
**PW2105-Street Light Repl-LaMancha	10,684	20,000	20,000	20,000	20,000	-
**PW2107-School Zone Flashing Beacons	10,469	70,000				
**PW2108-Okeechobee Blvd. Light Replc	12,355	-				
**PW21SS-Street Sign Replace & Repair	26,477	-	-	-	-	-
PW2201-FOC Roof Replacement		100,000				
PW2202-Shelter Enhancement		100,000				
PW2203-Street Light Replacement SR80		20,000				
PW2204-La Mancha Subdiv Underdrain		80,000	80,000	80,000	80,000	80,000
PW2205-Canal Bank Maintenance		40,000	40,000	40,000	40,000	40,000
PW2206-FOC Windo Replacement		20,000				
PW2208-Fountain Replacement		25,000				
PW22BF-Backflow Preventer Replace		10,000	10,000	10,000	10,000	10,000
PW22BS-Bus Shelter R&R		15,000	15,000	15,000	15,000	15,000
PW22SR-Street Restriping		20,000	20,000	20,000	20,000	20,000
PW22SS-Street Sign Replace & Repair		40,000	40,000	40,000	40,000	40,000
PW22TR-Truck Replacement		105,000	50,000	110,000	60,000	75,000
PW2301-Equipment Replacement			40,000	28,500		
PW2402-Okeechobee Entry Sign Landscape	-			30,000	-	-
PW2601-Harvester Equipment	-				-	300,000
Sub-Total	346,994	842,500	492,500	571,000	462,500	757,500
	1,423,031	1,919,850	1,601,450	2,507,550	669,050	947,850
Total Expenditure		3,342,881	1,601,450	2,507,550	669,050	947,850
Reserve for Future CIP	-	26,345	(1,075,102)	(2,483,382)	(2,365,418)	(3,313,505)

**REPRESENTS PROJECTS FUNDED IN PRIOR YEARS

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	*Project Number*	*Fund*
Canal Bank Maintenance	PW2205	303

Program Category	*Project Type*	*Division*	*Project Manager*
Stormwater	New	Public Works	Public Works Director

Project Location
Various canal locations throughout the Village.

Project Components	*FY 22*	*FY 23*	*FY 24*	*FY 25*	*FY 26*	*5 Year Total (+ Carry-over)*	*Carry-over FY 21*
Construction	40,000	40,000	40,000	40,000	40,000	200,000	0
Total	***$40,000***	***$40,000***	***$40,000***	***$40,000***	***$40,000***	***$200,000***	***$0***

Funding Source - Fund Balance
Fund Balance

Project Description
Project is for the removal of trees that have overgrown and are impacting travel for boats.

Project Justification
Public Works is tasked with the maintenance of the canals including the removal of trees that are impacting the use of the canal.

Project Alternatives
None identified.

List of Equipment
N/A

Financial Impact on Operating Budget for first FY
N/A

PW2205

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	Project Number	Fund
Harvester Equipment	PW2601	303

Program Category	Project Type	Division	Project Manager
Equipment/Vehicles	New	Public Works	Public Works Director

Project Location

Field Operations Center

Project Components	FY 22	FY 23	FY 24	FY 25	FY 26	5 Year Total (+ Carry-over)	Carry-over FY 21
Equipment/Furnishings	0	0	0	0	300,000	300,000	0
Total	***$0***	***$0***	***$0***	***$0***	***$300,000***	***$300,000***	***$0***

Funding Source - Fund Balance

Fund Balance

Project Description

The project consists of purchasing the equipment the Village would need to conduct aquatic vegetation debris removal in-house.

Project Justification

The state legislature has discussed eliminating the use of chemicals to manage aquatic vegetation. If the regulatory environment changes, the Village may not be able to contract for aquatic vegetation debris removal. The equipment needed to conduct aquatic vegetation debris removal consists of: large aquatic harvester; small aquatic harvester; shore conveyor; and 12cuyd dump truck.

Project Alternatives

Continue with contracted debris services until regulatory environment changes.

List of Equipment

Large aquatic harvester; small aquatic harvester; shore conveyor; and 12cuyd dump truck.

Financial Impact on Operating Budget for first FY

N/A

Village of Royal Palm Beach
Capital Improvement Program
Stormwater Capital Projects Fund- 408

	FY2021 CARRYOVER	FY 2022	FY2023	FY2024	FY2025	FY2026
<u>Source of Funds:</u>						
Carryover	100,000	400,017	500,067	200,117	200,137	200,157
Interest		50	50	20	20	20
Transfer from Fund 407		100,000	-	-	-	-
Sub Total	100,000	500,067	500,117	200,137	200,157	200,177
	-					
Total Revenue		600,067	500,117	200,137	200,157	200,177
<u>Use of Funds:</u>						
<u>Public Works</u>						
PR1822-Camelia Park Drainage Improve	100,000	-	300,000	-	-	-
Sub-Total	100,000	-	300,000	-	-	-
Total Expenditure	-	100,000	300,000	-	-	-
Reserve for Future CIP	-	500,067	200,117	200,137	200,157	200,177

****REPRESENTS PROJECTS FUNDED IN PRIOR YEARS**

Village of Royal Palm Beach

FY 22-26 Capital Improvement Projects
CIP Justification Sheet

Project Title	***Project Number***	***Fund***
Camellia Park Drainage Improvements	PR1822	408

Program Category	***Project Type***	***Division***	***Project Manager***
Stormwater	Revised	Parks & Recreation - Parks	Village Engineer

Project Location

Camellia Park

Project Components	***FY 22***	***FY 23***	***FY 24***	***FY 25***	***FY 26***	***5 Year Total (+ Carry-over)***	***Carry-over FY 21***
Other (Specify below)	0	300,000	0	0	0	400,000	100,000
Total	***$0***	***$300,000***	***$0***	***$0***	***$0***	***$400,000***	***$100,000***

Funding Source - Fund Balance

Fund Balance

Project Description

Drainage improvements at Camellia Park to include inlets and pipe along the south side of the Camellia Drive parking lot and in the parking lot; improvements to the swale adjacent to the tennis courts; removal and replacement of concrete walkway at tennis instructor's office; and, piping in the section of Camellia ditch that is adjacent to Camellia Park and Seminole Palms Park. The project also includes in FY21 the dredging of approximately 2,500LF of canal and removal of vegetation along the banks that restricts access for maintenance personnel.

Project Justification

The project is designed to alleviate ponding and flooding issues in the Camellia Park parking lot and in the area of the tennis instructor's office. The dredging and vegetation removal improvements are needed to provide access for maintenance personnel in the Camellia ditch.

Project Alternatives

None identified.

List of Equipment

N/A

Financial Impact on Operating Budget for first FY

N/A

PR1822