Estero River, Imperial River, & Springs Creek Storm Assessment

Summary Report

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Estero River, Imperial River, & Springs Creek Storm Assessment

Summary Report

1 Executive Summary

Lee County experienced two significant rainfall events during the summer of 2017 that caused extensive flooding throughout several areas of the County. Flooding occurred in both the Estero River and Imperial River Watersheds and to a lesser degree in the Spring Creek Watershed. In response to those storm events, Lee County contracted with Waldrop Engineering to perform watershed site observations to identify potential causes of the flooding and recommend improvements that could be made to help reduce the impact of future rainfall events.

Tasks included the following:

- Review previous stormwater master plans
- Research and review some SFWMD permits to better understand how portions of the drainage system were designed.
- Obtain and review water level data
- Visually observe each watershed's rivers, creeks, canals, and ditches to understand how well they functioned during the storm events.
- Review photographs that document flooding.
- Interview residents and property owners where available. (Waldrop Engineering project team members live and work within the study area. As such, interviews were not critical. Much of the flooding was observed first hand by the Waldrop Engineering Team). Please refer to Appendix 5: Citizen Questionnaires for all interviews.

The rainfall from both the Invest 92L storm in August and Hurricane Irma were historic storm events on their own. Making them even more significant, was the fact that they occurred less than 2 weeks apart. Water levels were still high from the Invest 92L storm when Hurricane Irma hit. In some areas, water levels were 3.5 ft higher prior to Hurricane Irma than they were prior to Invest 92L. Given how close both events were to each other, there was no opportunity to perform any maintenance work between the two storms. This compounded the flooding caused by Hurricane Irma. Not only were the stormwater management systems not given enough time to properly treat the flooding caused by Invest 92L, but also this storm left impediments to flow, such as fallen trees, sedimentation, and collapsed conveyances, which exacerbated the flooding caused by Irma. This led to historic flooding within both the Estero River and Imperial River Watersheds.

The main rivers, creeks, canals and ditches were visually inspected to identify drainage issues and better understand the flooding that occurred. Following are some general observations. More details can be found later in this report and in Lee County's GIS database.

- Storm generated debris and sediment were found in all conveyances.
- Several areas appeared to receive insufficient maintenance prior to the storm events. Note this was not the case for the Estero River as Lee County cleaned out much of the river prior to the 2017 wet season.

- Flow into and out of the Country Creek bypass ditch was reduced by sediment, debris and vegetation.
- Stain lines at the Villagio Gardens Court box culvert are 1.2 ft higher on the upstream side than the downstream site. This could be an indication of an undersized culvert or additional flows being directed to this location.
- Ground elevations and vegetation indicate there was likely minimal flow between Villagio and Estero Parkway.
- Sediment, vegetation, and debris were identified along Three Oaks Parkway from Estero Parkway to Corkscrew Road.
- Drainage areas including Devore Lane and Halfway Creek west of US-41 must flow through wetland flow ways that are not maintained as flow ways. Fences, berms, debris, and dense vegetation reduces stormwater flows.
- Aerial photographs indicate turbulent flow in the Imperial River on September 14, 2017 from downstream of East Drive to Felts Ave. This turbulent flow likely indicates high velocity and head loss.
- September 14, 2017 aerial photographs indicate much more flooding upstream of the oxbow at Murat Court than downstream of the oxbow.

After site observations were completed, a list of potential drainage projects that could help reduce future flooding was created. Following is a list of potential projects that were identified. A more complete list of projects as well as project details are provided later within this report and in the attached Project Summary Spreadsheet.

- Remove debris, sediment and vegetation within drainage conveyances.
- Increase maintenance frequency of rivers, creeks, canals and ditches.
- Analyze watershed interconnections to better understand flows between watersheds.
- Improve flow through the Country Creek bypass.
- Along the Imperial River, flooding expands significantly upstream of the oxbow at Murat Ct. Analyze the river's flow capacity at this location to determine if it is a flow constriction. If it is, consider constructing a bypass ditch to allow large flows to flow around the oxbow.
- Clean out all drainage swales, pipes, and inlets along Three Oaks Parkway from Estero Parkway to Corkscrew Road.
- Analyze the Three Oaks Parkway drainage system to identify potential improvements.
- Site observations indicated water may not flow efficiently through the land between Estero Parkway and Villagio. This could be causing more water to flow south through the box culvert at Villagio Gardens Court. Flows in this area should be analyzed to better understand how water flows and identify drainage improvements to better handle large flows.
- Several Imperial River bridge crossings (Railroad bridge, Matheson Ave., and Bourbonniere Dr.) may be under sized. They are much smaller than nearby bridges. Each crossing should be analyzed to determine if it is sufficiently sized. If any are too small, replacement options should be investigated.
- Some culverts under I-75 may be underutilized during typical wet season storm events. Investigate options to better utilize the I-75 culvert crossings north of East Terry St, West of De Milano Cir., and west of Pinecrest Lane.

2 Introduction

In 2017, Lee County experienced an exceptionally wet, wet season. From June 1, 2017 to September 30, 2017 there were approximately 58.3 inches of rainfall in southern Lee County. During an average wet season (June 1 – September 30), approximately 39.6 inches of rain is expected. In addition, the county experienced two major rainfall events from August 23rd to August 28th (Invest 92L) and August 9th – 10th (Hurricane Irma). Rainfall totals across the County varied significantly for both events. Generally, coastal areas within Southwest Florida saw more rain from Invest 92L, while inland areas saw more rain from Hurricane Irma. The following are the rainfall totals from Lee County rain gauges, located in Southern Lee County.

Invest 92L:

Three Oaks	13.68 in
Bonita Springs Utilities	11.67 in
Corkscrew Water Plant	9.62 in

Hurricane Irma:

Three Oaks	No Data
Bonita Springs Utilities	10.11 in
Corkscrew Water Plant	6.00 in

It is important to keep in mind throughout this report, the extreme severity of these historic storms, and the compounding effects caused by these back-to-back events. Most major arterial roads, including some evacuation routes and Three Oaks Parkway, along with neighborhood roads, and even sections of US-41 are designed to a 25-year storm event capacity. The design capacity required to have handled the compounded flooding caused by both events is far beyond the typical Level of Service in the area.

While the rainfall totals alone were significant and were expected to cause flooding, the very short period between events, exacerbated conditions, as the Estero River North Branch and Imperial River were unable to recover from the Invest 92L rainfall before Hurricane Irma. Hurricane Irma alone would have been a historic flooding event, and it was made much worse by the fact that all the stormwater management systems were under elevated levels of stress prior to the hurricane. The systems were already experiencing elevated levels of flooding, as well as many impediments such as fallen trees, washouts, sedimentation, and collapsed structures. There was no significant opportunity to perform maintenance work after Invest 92L, before Hurricane Irma.

In response to these exceptional rainfall events, Lee County developed a three-step plan to assess the impact of the storms, fix the damage, and identify potential drainage improvements to reduce future flooding. Elements of the plan are listed below.

1. Identify and remove obvious restrictions: Lee County and City of Bonita Springs staff identified major flow restrictions throughout the main river and creeks of the Estero River and Imperial River Watersheds. Contractors were subsequently hired to remove debris and vegetation that are restricting flows.

2. Assessment of all Conveyances (Subject of this report): Lee County hired four consultants to visually inspect the major conveyances, throughout Lee County, that experienced major flooding during the 2017 wet season. Waldrop Engineering was hired to visually inspect the Estero River,

Imperial River, and Spring Creek Watersheds. More attention was paid to the Estero River and Imperial River Watersheds as they experienced more significant flooding. This phase intends to identify additional areas, where storm damage created maintenance requirements, in addition to potential projects that could improve flood protection in the future.

3. Master Plan Update: The final phase will include an update to several County Stormwater Master Plans. It is expected the that Orange River, Ten Mile Canal/Mullock Creek, Estero River and Imperial River Stormwater Master Plans will be updated.

3 Project Goals

For this phase of the County's project, Assessment of all Conveyance, the project goals include the following:

1. Visually observe as much of the County's stormwater management system as possible.

2. Identify areas that were damaged by the storms.

3. Identify issues that are impeding flow. This includes damaged pipes, pipes that appear to be too small, areas of high flow or head loss, accumulated debris, and sediment buildup or shoaling.

4. Provide a list of potential projects that could help reduce future flooding. Some of these projects will require additional calculations, modeling, design, and cost estimates to understand their full impact and viability.

4 2017 Wet Season Water Level Data

Water level data from Lee County and USGS was reviewed to better understand how the Estero River and Imperial River responded to the rainfall events. The following is a list of water level recorder locations:

Estero River:

East Broadway Ave.: Located in the North Branch of the Estero River directly east of East Broadway Ave. It is located approximately the same distance from the confluence of the North and South Branches as the Corkscrew Road recorder.

Corkscrew Road: Located just downstream of Corkscrew Road in the South Branch of the Estero River. It is located approximately the same distance from the confluence of the North and South Branches as the East Broadway Ave. Recorder.

Halfway Creek Bypass Downstream: Located at the northern end of the canal along Three Oaks Parkway that connects Halfway Creek to the Estero River.

Halfway Creek Bypass Upstream: Located at the southern end of the canal along Three Oaks Parkway that connects Halfway Creek to the Estero River.

Imperial River:

Felts Ave.: Located at the end of Felts Avenue in the Imperial River.

Bonita Grande: Located at the Kehl Canal Weir, west of Bonita Grande Drive.

The following graphs provide a summary of the 2017 wet season water levels for the six recorders located in the Estero River and Imperial River Watersheds.

4.1 Estero River Stage Recorders

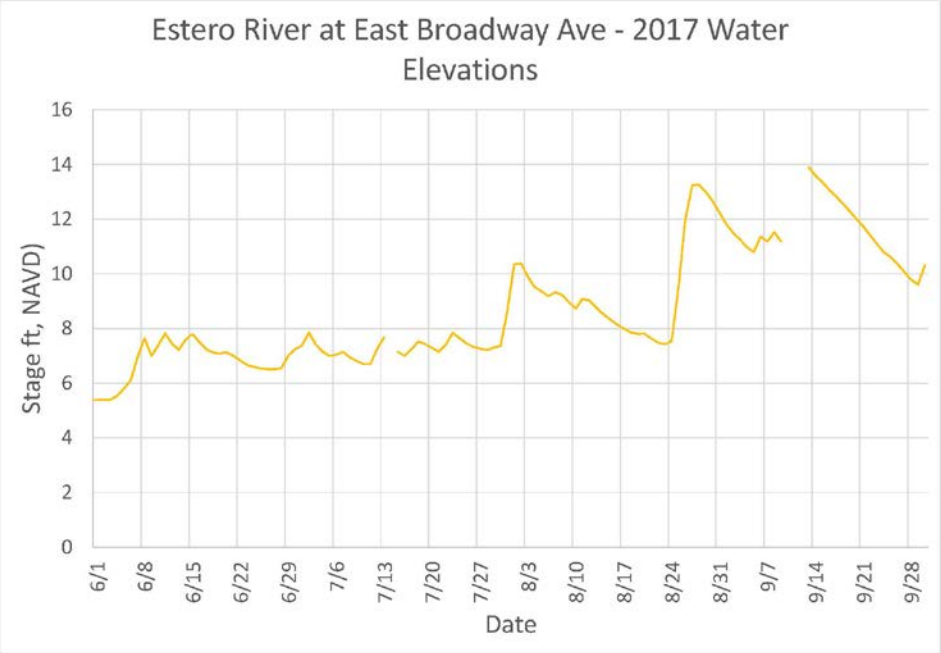

Figure 1 - Water Elv. Estero River at Broadway

The relatively small storm event on July 31st increased water levels in the North Branch approximately 2.0 ft. The River almost recovered back to its previous elevation before the Invest 92L rainfall. The Invest rain increased water levels approximately 5.5 ft. Water levels were only able to recover approximately 2 ft before Hurricane Irma. Water levels were 3.5 ft higher than the June water levels. The peak water elevation for Irma was not recorded due to a recorder malfunction. Extending the recover slope back to the start of the data gap would provide an upper limit (15.0 ft, NAVD) for the potential peak stage. The actual peak stage would be expected to be between 15.0 ft and 14.0 ft, NAVD. This is between 2.5 ft and 3.5 ft higher than the water level before the storm. The peak water levels for Irma were between 6.5 ft and 7.5 ft higher than the water levels before the July 31st event or Invest 92L.

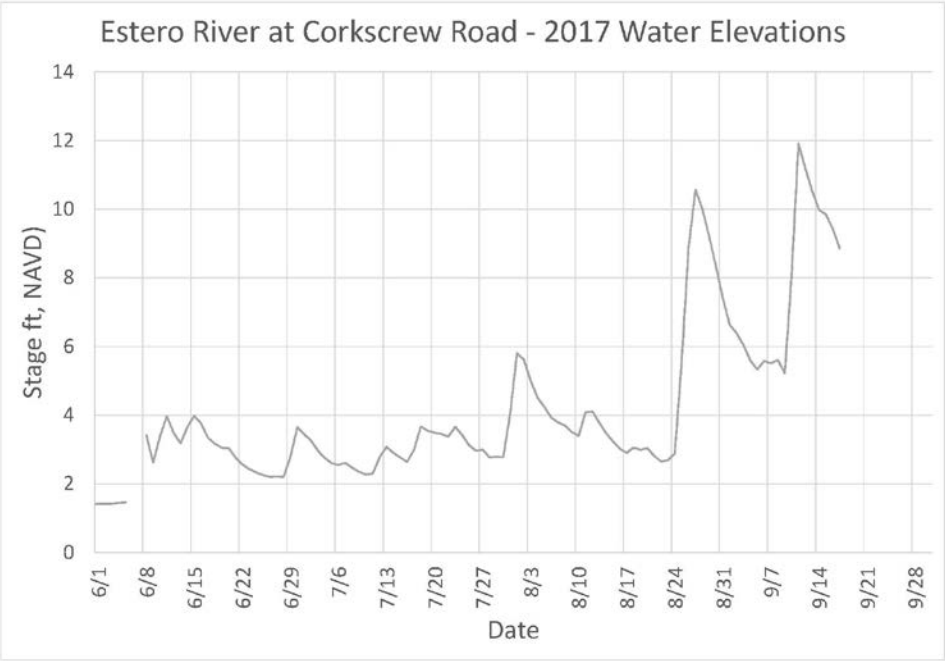

Figure 2 - Water Elv. Estero River at Corkscrew

The July 31st storm event increased water levels at Corkscrew Road approximately 2.5 ft. Water levels recovered prior to the Invest 92L rainfall. With the Invest event, water levels jumped approximately 7.5 ft and recovered approximately 5.0 ft before Hurricane Irma. Water levels just prior to Irma were approximately 2.5 ft higher than they were, prior to Invest 92L. The Hurricane Irma rainfall increased water levels approximately 6.5 ft, peaking at approximately 12.0 ft, NAVD. The peak water levels for Irma were 9.0 ft higher than the water levels before the July 31st event or Invest 92L.

Water levels in the South Branch of the Estero River are generally lower than those in the North Branch. However, water elevations appear to spike higher (relative to starting water elevations) in the South Branch than in the North Branch. Water elevations in the South Branch also appear to recover much faster than in the North Branch.

The Halfway Creek Bypass conveys water from Halfway Creek to the South Branch of the Estero River. Flows are controlled by a structure that consists of a weir and gate, located east of William Road, along Three Oaks Parkway. Under normal operating conditions, flow from Halfway Creek starts at elevation 12.44 ft, NAVD. Water flows over a 10-ft weir and over the top of a sluice gate. When more flow is desired, the sluice gate is raised and water flows at elevation 10.84 ft, NAVD.

From the structure, water flows north along Three Oaks Parkway. Prior to entering the North Branch of the Estero River, water flows across an approximately 16.4 ft wide weir set at elevation 9.84 ft, NAVD. This weir is located just south of Cascina Drive.

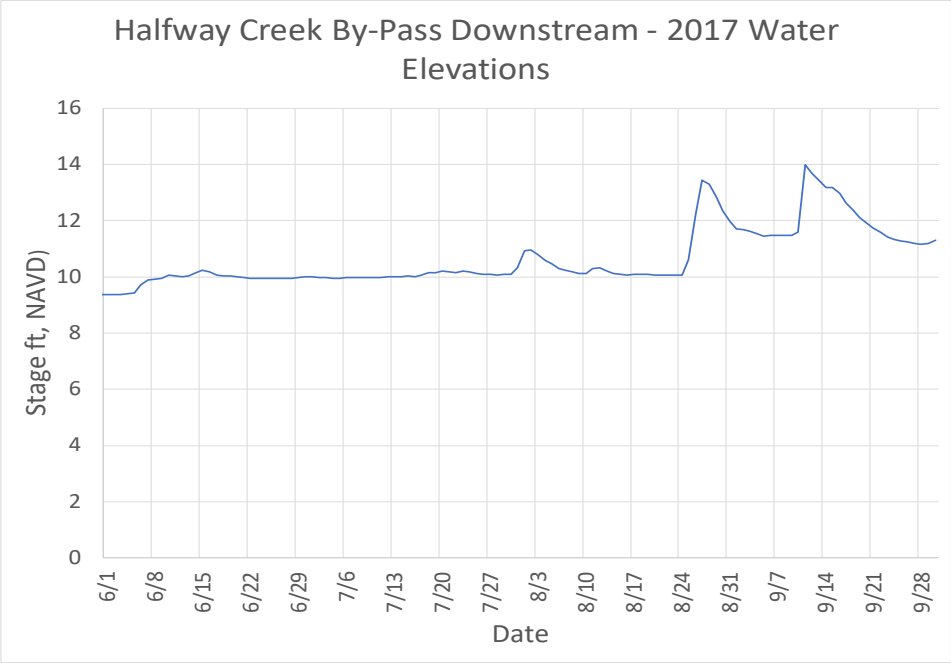

Figure 3 - Water Elv. Halfway Creek Bypass Downstream

Water levels downstream of the bypass structure, generally remained near elevation 10.1 ft – 10.3 ft, NAVD, except after larger rainfall events. This is very close to the downstream weir elevation of 9.84 ft, NAVD. This indicates there is very little water flowing over this weir, except after larger rainfall events.

The July 31st storm event increased water levels by approximately 1.0 ft. Water levels recovered back to the pre-storm elevation in less than two weeks. With the Invest event, water levels jumped approximately 3.3 ft. Water levels only recovered 2.0 ft before Hurricane Irma. Water levels prior to Irma were approximately 1.3 ft higher than they were prior to Invest 92L. The Hurricane Irma rainfall increased water levels approximately 2.3 ft, peaking at approximately 14.0 ft, NAVD. The peak water levels for Irma were 4.0 ft higher than the water levels before the July 31st event.

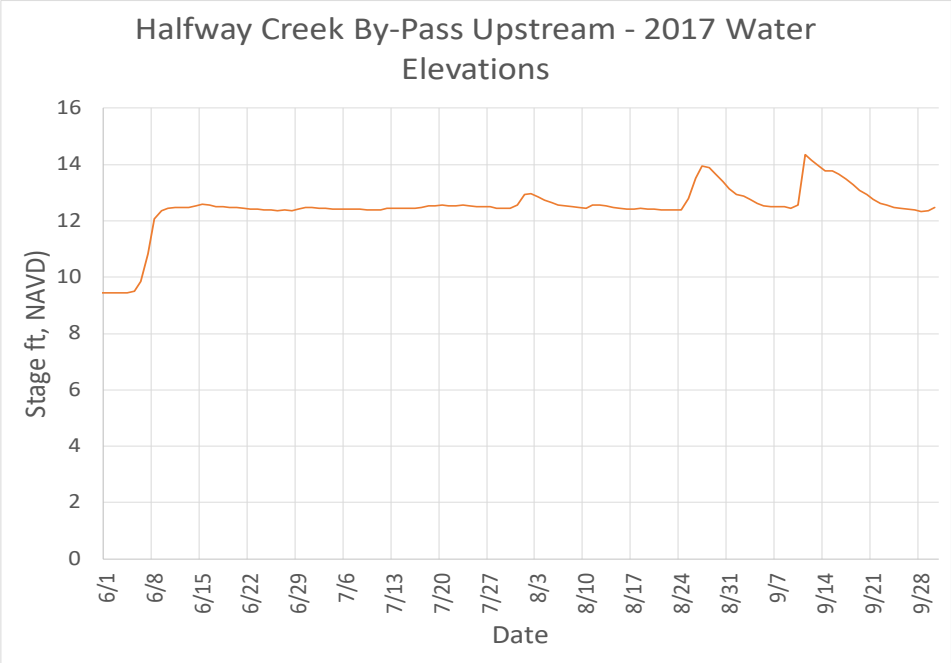

Figure 4 - Water Elv. Halfway Creek Bypass Upstream

Water levels upstream of the bypass structure generally remained near elevation 12.4 – 12.6 ft, NAVD, except after larger rainfall events. This number is very close to the structure's overflow elevation of 12.44 ft, NAVD, indicating there is very little water flowing over this weir, except after larger rainfall events.

The July 31st storm event increased water levels upstream of the bypass, by approximately 0.5 ft. Water levels recovered back to the pre-storm elevation in less than a week. The Invest event caused water levels to jump approximately 1.3 ft. Water levels recovered to approximately 12.4 ft, NAVD before Hurricane Irma. The Hurricane Irma rainfall increased water levels approximately 1.8 ft, peaking at approximately 14.2 ft, NAVD.

4.2 Imperial River Stage Recorders

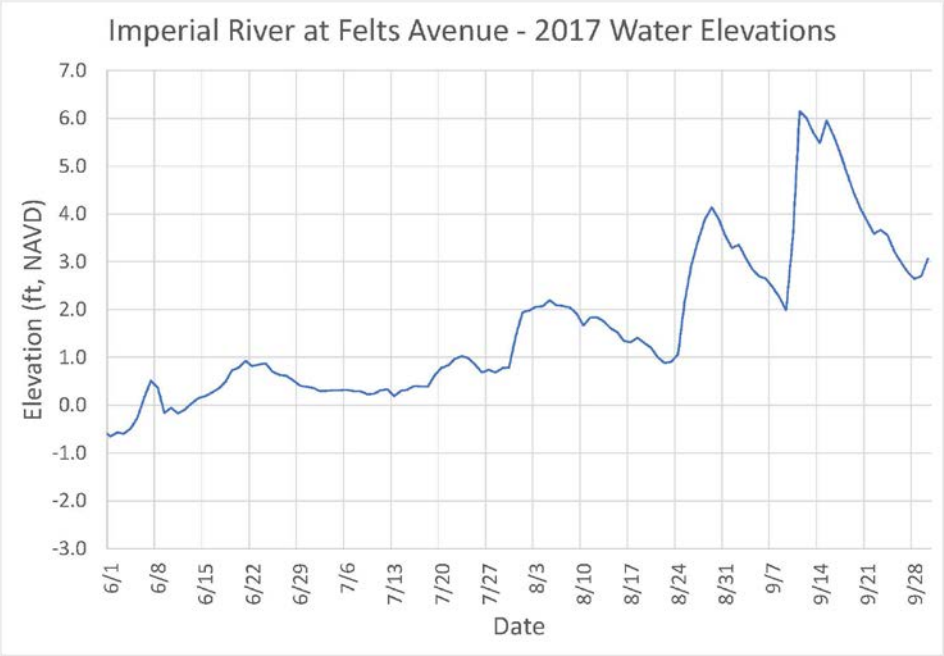

Figure 5 - Water Elv. Imperial River at Felts Ave.

Water levels at Felts Ave. increased by approximately 1.35 ft after the July 31st rainfall. Water levels almost recovered back to the pre-storm levels, prior to the Invest rainfall. With Invest 92L, water levels increased by approximately 3.1 ft and then recovered approximately 2.1 ft prior to Hurricane Irma. The Hurricane Irma rainfall then increased water elevations by 4.1 ft, the storm elevation peaked at approximately elevation 6.1 ft, NAVD. Water levels associated with Hurricane Irma were approximately 5.3 ft higher than the water level, prior to the July 31st rainfall.

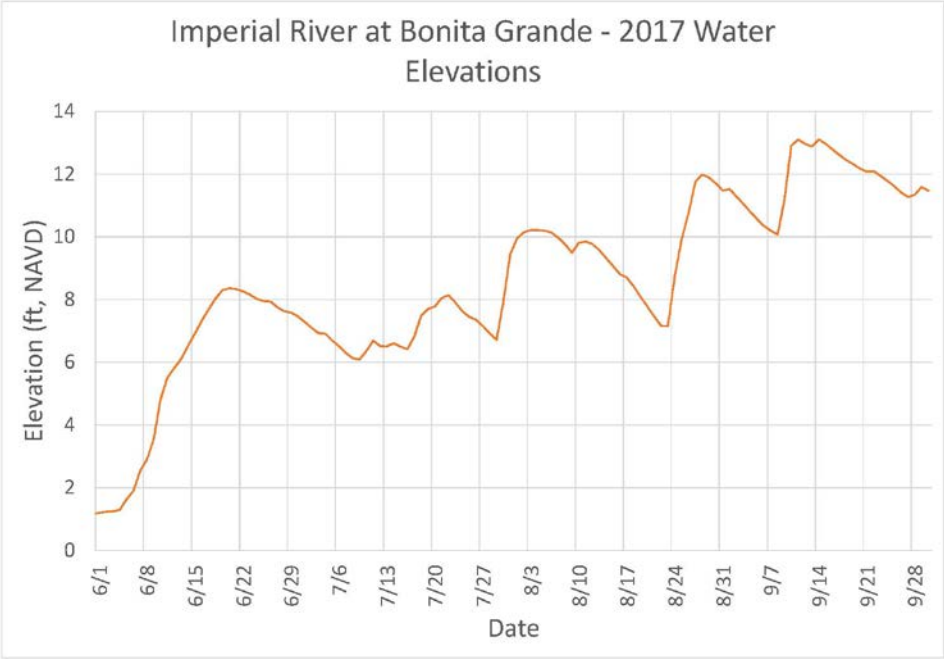

Figure 6 - Water Elv. Imperial River at Bonita Grande

Water levels at Bonita Grande increased by approximately 3.3 ft., after the July 31st rains. This is more than at any of the other recorder locations. Water levels almost recovered back to pre-rainfall levels, prior to Invest 92L. Water levels increased by approximately 5.0 ft with Invest 92L. Water levels only recovered about 2.0 ft before Hurricane Irma. Hurricane Irma increased water levels by approximately 3.0 ft. The peak stage was just over 13.0 ft, NAVD. The peak water levels for Irma were 6.5 ft higher than the water levels before the July 31st event.

5 Aerial Photograph Observations Summary

Google Earth has imagery from September 14, 2017, four days after Hurricane Irma. While this imagery does not show all flooding that occurred, it does provide a snap shot of flooding on that day. For the Estero River and Imperial River watersheds, this is especially helpful, as peak water levels occurred 1 to 4 days after the rainfall. In portions of the Imperial River Watershed, September 14 was close to the peak water levels. Following is a summary of observations made, while reviewing the aerial photographs.

5.1 Estero River Watershed:

The Groves – No flooding observed.
Country Creek - Flooding along Rivers Ford and Country Creek Drive.
Three Oaks Parkway - Flooding between Estero Parkway & Corkscrew Road.
Villagio – Water flowing south across tennis court access road. Minor roadway flooding observed.
Reserve – Roadway flooding throughout community.
Belle Lago – Roadway flooding throughout community.
Cascades – Roadway flooding throughout community.
Germain Arena – Flooding around inlets. North access road flooded.
Tidewater – No flooding observed.
Grandezza – Roadway flooding throughout community. Flooding east of FPL appears to be less extensive.

Bella Terra – No flooding observed.
Preserve at Corkscrew - No flooding observed.
Wildcat Run - No flooding observed.
Stoneybrook - No flooding observed.
Corkscrew Woodlands - Roadway flooding throughout community.
Villa Palmeras - No flooding observed.
Estero Place - No flooding observed.
River Ranch Road – No roadway flooding observed.
The Estates at Estero River – No flooding observed.
Devore Ln – Roadway flooding observed.

5.2 Halfway Creek Watershed:

West Bay Club – Some golf course flooding but no roadway flooding.
El Dorado Acres – Roadway flooding at Key Largo Ln. & E. Eldorado Ave.
Meadowbrook – No roadway flooding observed.
Marsh Landing – Marsh Landing Blvd. flooding near clubhouse. Lone Oak Drive Flooding. No flooding on other roadways observed.
Coconut Trace – Roadway and parking lot flooding.
Coconut Point Mall – No flooding observed. However, dirt/debris around inlets indicates there may have been some flooding prior to aerial.
Fountain Lakes – Flooding along Fountain Lake Blvd near condos.
Rapallo – Roadway flooding throughout. No flooding along Piazza Del Lago Cir.
Brooks – No flooding observed within Halfway Creek Watershed.

5.3 Imperial River Watershed:

Imperial River
- Less flooding observed downstream of railroad & Old US 41.
- Turbulent water from Tennessee St to Felts Ave. With most turbulence from East Dr. to Felts Ave. Likely an indicator of restricted flow from East Dr. to Felts Ave.
- Extensive flooding observed upstream of Tangelo Terrace. Almost all areas along River are flooded. No crossing at this location but homes/fill may cause constriction.

Rosemary Canal
- Flooding upstream of Terry St.
- Water flowing from canal to adjacent property, north of Bonita Springs High School.
- Extensive standing water east of I-75.

Leitner Creek
- Some flooding, but not extensive, from Imperial River to East Terry Street.
- Flooding observed between East Terry Street & Imperial Parkway.
- No flooding between Imperial Parkway & I-75.
- Extensive flooding east of I-75.

Dean Street/Quinn St – Extensive flooding of all roadways. Water across Bonita Beach Road at Saradrienne Lane.
Imperial Bonita Estates – Extensive flooding throughout.
Pinecrest Lane – Extensive flooding of all roadways.
Citrus Park – Extensive flooding on all roadways.
Manna Christian – Extensive flooding of entire property.
Terry Street – Extensive flooding between Imperial Parkway – I-75 & Kent Rd – Morton Ave.
Morton Ave area – Extensive roadway flooding.

Worthington – Extensive roadway flooding.
Hunters Ridge – Minor roadway flooding.
Palmira – Extensive roadway flooding on western side of property. Eastern side, less flooding.
Village Walk – Some roadway flooding. But, less extensive than other adjacent developments.

6 High Water Estimates

To better understand water levels throughout the Estero River and Imperial Rivers watersheds, water levels were estimated in two ways. First, the flooding extents were estimated using the Google Earth aerial images from September 14, 2017 discussed above. Ground elevations at the approximate flooding limits were obtained to estimate the September 14th water levels. Second, water levels were also estimated using high water stains and observed high water levels. Both methods could help identify areas of reduced flow to better focus potential improvements.

6.1 Estero River Watershed:

While high water elevations were identified throughout the Estero River Watershed, much of the reported flooding occurred upstream of Bamboo Island. As such, the water level analysis was focused on the creeks upstream of Bamboo Island and areas of extensive flooding such as Estero Parkway.

6.1.1 September, 14 Aerial

Following is a summary of the estimated water elevations:

Cascades Outfall:

Cascades – 14.0 ft, 13.7 ft, 13.9 ft (Avg. 13.9 ft)

Belle Lago – 14.9 ft, 15.3 ft, 14.6 ft, 14.8 ft, 15.0 ft (Avg. 14.9 ft)

The Reserve – 15.2 ft, 15.4 ft, 15.6 ft, 15.5 ft, 15.4 ft, 15.4 ft (Avg. 15.4 ft)

Water levels in all three communities are more than 2.5 ft above their control elevations. The Reserve is more than 3.0 ft above the control elevation.

North Branch of Estero River:

West side of Bamboo Island - 7.5 ft

Country Creek, West of Creek – 11.0 ft, 11.0 ft, 11.1 ft (Avg. 11.0 ft)

Country Creek, East of Creek – 12.4 ft, 12.0 ft, 12.5 ft, 12.5 ft (Avg. 12.4 ft)

Water levels along the east side of the creek were more than a foot higher than water levels on the east side. This could be due to the large volume of water that was observed flowing into the west side of Country Creek at the Bocce Courts.

Three Oaks Parkway:

At Estero Parkway – 16.4 ft

Rookery Point Box Culverts – 16.2 ft

At Post Office – 15.6 ft

At Quente Way – 15.5 ft

Water levels appear to be highest at the north end of the roadway and lowest at the south end. This indicates flow along Three Oaks Parkway was generally from north to south. This confirms observations made after Hurricane Irma when water was flowing from the east side of Three Oaks Parkway into the ditch along the north side of Corkscrew Road.

West of I-75:

Germain Arena – 17.1 ft, 17.1 ft, 17.4 ft, 17.3 ft (Avg. 17.2 ft)

Grandezza – 18.0 ft, 17.9 ft, 18.4 ft, 18.2 ft, 17.9 ft, 18.2 ft, 18.3 ft (Avg. 18.1 ft)

South Branch:

Corkscrew Woodlands – 14.9 ft, 14.6 ft (Avg. 14.8 ft)

6.1.2 High Water Observations

North Branch:

East side of Bamboo Island – 7.3 ft
At Coachhouse Lane – 11.1 ft (inside community), 11.5 ft (along Creek)
Rookery Point – 16.3 ft (resident observation), 15.3 ft (bridge stain mark)
Villagio Path – 15.6 ft (path elevation, water was overflowing path)
Villagio Gardens Cir Stain Marks – 14.4 ft (downstream), 15.6 ft (upstream)
Estero Parkway wall – 15.9 ft (east), 16.4 ft (west)

The elevation differences within Rookery Point could be because one is an observed high-water elevation and one is a stain mark. The stain mark would be expected to be lower than the peak because it takes time to develop the stain line.

There appears to be a large amount of head loss through the Villagio Gardens crossing. This should be investigated further to determine if the crossing should be larger or if flow restrictions in other areas are pushing more water through this conveyance.

6.2 Imperial River Watershed:

6.2.1 September, 14 Aerial

The water levels within the Imperial River Watershed peaked several days after both Invest 92L and Hurricane Irma. Observations indicate water levels peaked about 3-4 days after the storm events. The flooding extent shown in the September 14, 2017 aerial should provide a good estimate for the overall flooding extents within the Imperial River Watershed.

Imperial River (approx. distance along river from downstream elevation):

Big Bend Rd. – 1.9 ft

Riviera Cir (3,300) – 3.0 ft,

Margina Cir (1,100) – 2.6 ft,

Gasparilla Drive (4,500) – 2.6 ft, 3.0 ft (Avg. 2.8)

JC Ln (700)– 3.3 ft

Harbor Drive (330)– 3.0 ft

Holly Ln (1,600) – 3.3 ft

Patrick St (440) – 3.3 ft

Belle Rio Drive (330) – 3.5 ft

Johnson St (0) – 3.4 ft

Wisconsin St Area (900) – 4.0 ft, 3.7 ft, 3.8 ft (Avg. 3.8 ft)

There was generally minimal head loss observed downstream of Wisconsin St.

River Drive (2,100) – 4.9 ft, 0.00048 ft/ft

Goodwin St (1,900) – 6.4 ft, 0.001 ft/ft

Orange Ct Drive (800) – 6.3 ft

Matheson Ave (2,100) – 9.8 ft, 0.002 ft/ft

Other areas around Matheson Ave. further away from River. Elevations may be higher due to distance from River. This area didn't appear to experience flooding directly from the River.

Childers St – 11.3 ft

Orangewood Dr. – 11.1 ft

Tangelo Drive – 10.9 ft

Citrus Drive – 11.2 ft

Goodwin St – 10.4 ft

Lime St Area (3,100), 0.00029 ft/ft

Lime St Drive N – 10.4 ft

Lime St Drive S – 10.9 ft

Kelly Drive – 11.0 ft

Bonita Beach Road Drive – 10.3 ft

Avg. – 10.7 ft

Imperial Parkway Area (1,500), 0.001 ft/ft

Dean St – 11.5 ft

McKenna Ave – 11.8 ft

Imperial Pkwy – 12.0 ft

Avg. – 11.8 ft

Flamingo Island Flea Market Area (2,600), 0.00019 ft/ft

Bonita Beach Rd Driveway – 12.1 ft

Oakland Drive Parking Lot – 12.4 ft

Avg. – 12.3 ft

There was generally less head loss observed upstream of Pinecrest Lane.

Pinecrest Ln Driveways – 10.9 ft, 12.0 ft, 12.3 ft (Avg. – 12.2 ft), 10.9 ft elevation excluded because elevation appears to be outlier.

Lake Shalimar Area

Lake Shalimar Driveway – 13.3 ft

Rue De Paix Driveway – 12.9 ft

Avg. – 13.1 ft

Orr Drive – 13.1 ft

Morton Ave Area

East Terry sidewalk – 13.4 ft

Melrose Ave. – 13.2 ft

Morton Ave. Driveway – 13.7 ft

Avg. – 13.4 ft

Citrus Park

South – 14.2 ft, 14.2 ft, 14.3 ft (Avg. 14.2 ft)

Middle – 14.5 ft, 14.5 ft, 14.7 ft (Avg. 14.6 ft)

North – 15.2 ft, 15.1 ft (Avg. 15.2 ft)

Liberty Youth Ranch – 15.4 ft

Roger Dodger St (Spring Creek Watershed) – 13.8 ft

Elevations were obtained in the Spring Creek Watershed west of I-75 to understand how they relate to the elevations in the Imperial River Watershed east of I-75. Water elevations in Liberty Youth Ranch are 15.4 ft compared to 13.8 ft in San Carlos Estates. Water is approximately 1.6 ft higher on the east side of I-75 than the west side.

According to these elevations, the highest head loss per foot of river was found in the following locations.

1. River Drive to Matheson Ave.
2. Lime Street to Imperial Parkway.

These areas should be investigated further to better understand potential flow restrictions.

6.2.2 High Water Observations

September 18, 2017 photo of high water on Serrano Way Dock – 2.8 ft

Stain line on tree along S Riverside Drive – 4.9 ft

Upstream and downstream stain lines on Matheson Ave. bridge – 7.8 ft & 7.8 ft

There was no elevation difference upstream/downstream of the bridge. This may be an indication that the bridge is sufficiently sized. However, stain lines take time to form. The bridge capacity should still be checked for peak flows.

Stain line on tree at Murat Ct – 8.7 ft

Stain line on tree downstream of Imperial Pkwy – 11.2 ft

Stain line on tree upstream of Imperial Pkwy – 11.2 ft

There was no elevation difference upstream/downstream of the Imperial Parkway bridge. This may be an indication that the bridge is sufficiently sized. However, stain lines take time to form. The bridge capacity should still be checked for peak flows.

Stain line on tree downstream of Bourbonniere Dr. – 11.7 ft

Stain line on tree upstream of Bourbonniere Dr. – 11.8 ft

There was minimal elevation difference upstream/downstream of the bridge. This may be an indication that the bridge is sufficiently sized. However, stain lines take time to form. The bridge capacity should still be checked for peak flows.

Stain line on structure along Winnebago Dr. – 11.7 ft

Stain line on tree upstream of I-75 – 12.7 ft

Approximately 1 ft of elevation difference in about 0.5 miles.

Bonita Grande Road elevation – elevation was taken in area that did not flood. This elevation doesn't provide a water level reference.

7 Field Observations Summary

7.1 Estero River Watershed

7.1.1 Estero River

Debris, sediment, and vegetation that could impact flow was identified within many areas of the river. Generally, the areas closer to the coast had fewer identified obstructions.

From Estero Bay to Koreshan State Park, there were no major impediments to flow observed. There were some trees overhanging into the river and sediment along the river banks, however none are expected to significantly impact flow. In addition, many of the sediment areas are expected to move downstream, by tidal and storm flows.

Along Koreshan State park upstream to Bamboo Island, there is more vegetation overhanging into the river, and more areas with sediment along the river banks. There were numerous areas of debris entangled in the vegetation, likely reducing flow within the river. It may be beneficial to trim back some of the vegetation, to limit its impact on flows and prevent it from entangling debris in future storm events. A significant amount of sediment was observed at the Railroad Crossing. Approximately ¼ of the bridge opening was filled with sediment. This sediment should be monitored to determine if normal tidal and storm flows are able to move the sediment downstream. If it doesn't move downstream naturally, it should be removed.

7.1.2 Railroad Ditch

There is a fence across the Cascades outfall ditch. The fence should be removed, so it doesn't catch debris and reduce flow.

The Cascades outfall ditch creates a 270° turn as it outfalls into the railroad ditch. This connection should be straightened. This could be accomplished by connecting the ditch prior to the 270° turn using a ditch or culvert.

Sediment build up at the outfall into the Estero River at the Railroad Bridge. Remove sediment from river/canal.

Several ditch segments are overgrown with vegetation.

Check capacity of culverts and ditch to confirm they are large enough for the design flows.

7.1.3 Halfway Creek

Via Coconut to I-75, no flow impediments were identified.

From Via Coconut Point to US 41, fallen trees creating some flow restriction.

US 41 to FPL, no impediments were identified.

FPL to Williams Road, vegetation and debris are restricting flow. Some sediment deposits throughout.

Chain link fence across the flow way south of West Bay Club. Fence is clogged with vegetations and partially knocked over.

Fallen trees are restricting flows north of Williams Road.

7.1.4 Estero River North Branch

The river narrows into what could be called a Creek, and the banks become more vertical. There were a few areas of trees and debris that span the entire river. Debris should be removed in the creek, as well as on the banks.

The historical connection, from North Branch to South Branch east of Bamboo Island, is silted in. No indications of recent flow were found. All water flows further west. This additional connection could increase flows from the North Branch of the Estero River.

Debris and vegetation is located throughout creek.

Near vertical banks in some sections, especially along Blacksmith Forge and Winterberry Way. These slopes should be stabilized, to prevent future erosion that could send sediment into the creek.

The north/south ditch along I-75 is full of vegetation and debris. There is very little maintenance performed on this ditch. This ditch should be cleaned out regularly to maintain flow capacity.

Flow through land between Estero Parkway and Villagio appears to be limited due to land elevation and vegetation coverage. The Three Oaks culverts to the west may only provide flow during extreme events. Leading to build up of water. Investigate a potential bypass ditch along Estero Parkway and Three Oaks Parkway to allow more flow to get to the Three Oaks Parkway culverts.

The buildup of water on the east side of Three Oaks Parkway may indicate culverts are not large enough. Investigate culvert sizes to determine if larger culverts are needed.

Stain marks on the Villagio Gardens Ct culvert crossing indicate an extended period of high head loss. This could be a result of excess water being diverted to this location from flow restrictions, in other areas or an undersized crossing. Additional stormwater modeling is recommended to identify flow issues in this area.

7.1.5 Country Creek Bypass

Vegetation and sediment are reducing flows at the inflow and outfall of the ditch. This area should be cleaned out to improve flow.

Potentially add control structure to control flows down bypass. Keep low flows down creek.

The ditch bottom does not appear to be consistent. Survey ditch to check bottom elevations.

Confirm the two culverts crossing are large enough to handle the design flow.

Consider widening ditch to increase flows.

7.1.6 Estero Parkway Outfall Ditch (between Rookery Point and Cascades)

The outfall is in good condition.

90° turn could reduce flow capacity and could promote sedimentation.

Consider building an overflow to directly connection ditch to Country Creek Bypass. This will reduce high flows down the North Branch of the Estero River.

7.1.7 Estero Parkway

Sediment in eastern outfall pipe.

Drainage from Estero Parkway just east of Three Oaks flows through a bubble up structure. This bubble up structure handles flows from Estero Parkway and The Reef Apartments. Check capacity to confirm it provides sufficient flow.

7.1.8 Three Oaks Parkway

Drainage on the east side of the road consists of throat inlets to bubble up structures. All were full of water and debris. They could also be full of sediment. All structures should be cleaned out and checked annually for debris prior to the wet season.

The swale on west side of the roadway just south of Estero Parkway is full of vegetation. This reduces the flow south to the swale's outfall. The swale should to be maintained to remove the vegetation.

Check internal drainage capacity to confirm they are larger enough to handle design flow. Consider installing pipes to increase flow.

Roadway flooding occurred from the east to west, indicating the roadway may be restricting flows. Check the roadway's capacity to handle off site flow.

7.1.9 Estero River South Branch

The river narrows into what could be called a creek and the banks become more vertical. There were a few areas of trees and debris that span the entire river. In addition, there were two areas located south of Bamboo Island where sediment has accumulated across the entire river. Water depths were only inches deep across the entire river at these locations. These shallow areas significantly reduce water flow. While future rainfall events will likely move the sediment downstream, it is recommended these areas of

sediment be monitored. If downstream movement is not observed, it is recommended the sediment be removed.

Very steep bank slopes along Old Oak Place and Winterberry Way appear to be impacting adjacent properties. Property owners have installed timber retaining walls that appear to be failing. A more permanent stabilization method is recommended to prevent further erosion, which could impact creek flow.

One of the three box culverts under Corkscrew Road has 2-3 ft of sediment. The sediment should be removed to restore the culvert capacity. The upstream end of the box culverts is clogged with debris. Debris should be removed.

Between Corkscrew Road and Three Oaks Parkway there are many downed trees in the creek. These trees should be removed.

There is debris and sediment located at the Three Oaks Parkway box culverts. The debris and sediment should be removed.

There are numerous downed trees in the Creek along Villa Palmaris. Trees should be removed.

Corkscrew Woodlands to I-75 there a few downed trees in the ditch. There also appears to be some exotic vegetation in the flow way. Exotic vegetation should be removed to prevent it from impacting flows.

An existing berm along the north side of the Brooks property appears to limit flows to the north. Investigate Removing or breaching this berm to increase system recovery. Modeling would be required to ensure no downstream impacts are created.

7.1.10 Corkscrew Rd Ditch

Sediment and riprap constricts flow at the outfall to the Estero River. Remove sediment and relay riprap.

The Corkscrew Road control structure, located east of the creek, protrudes into the Canal. Redesign the structure to stay out of canal.

There is some vegetation and debris from Estero River to Corkscrew Commons Drive, but generally in good condition.

There are bars across several driveway MES. These bars reduce flow and catch debris, and they should be removed or redesigned to reduce potential impacts to flow.

Triple culverts at Speedway and Corkscrew Commons Drive while downstream culverts are double culverts. Check sizes and potentially increase capacity of some culverts.

Canal Bank between Puerto Way and Puente Ln appears to be sliding into canal. The bank should be stabilized.

Canal segment east of Corkscrew Commons Drive, north along I-75, to the I-75 box culverts adjacent to Germain Arena is overgrown with vegetation. Canal needs to be maintained.

The Corkscrew Road sidewalks east of I-75 remain flooded during much of the wet season. They should be raised to reduce the flooding frequency. Flow to the west could also be improved by adding pipes, swales or improved maintenance.

7.1.11 River Ranch Road Swale

The inlet at River Ranch Road and Corkscrew Rd regularly clogs. Consider redesigning structure or grate, to prevent debris from clogging the grate.

7.2 Imperial River Watershed

7.2.1 Imperial River

The river located downstream of the Railroad Bridge was mostly clear of sediment and debris.

There were many areas of accumulate sediment and debris found upstream. These areas have been identified in the GIS database. In most cases, sediment accumulated along the river banks, not in the river.

Observations indicate high flow velocities at railroad crossing. Such observations were made on the September 14, 2017 google aerials. Review capacity of this crossing and consider increasing size if it is proved to be a bottleneck.

More flooding appears to have occurred upstream of Tangelo Terrace. This was observed on the September 14, 2017 Google aerials. Review river capacity at this location to determine if it is a major constriction. If it is, investigate ways to reduce constriction or bypass high flows. Potentially construct an oxbow bypass.

The bridge crossings at Matheson Ave. and Bourbonniere Drive (Imperia Bonita Estates) are much shorter than the other bridge crossing. They could be limiting flows. Investigate capacity of these crossings.

7.2.2 Rosemary Canal

The canal segment along the Railroad tracks is more narrow than other sections. Investigate the capacity and determine if it should be expanded.

The southern end of the canal diverts west, away from the railroad tracks, through a more natural section of creek. Determine if extending the railroad ditch to the Imperial River would provide a benefit to the watershed.

The east/west section of the canal showed signs of sediment and erosion.

Culvert crossings under Imperial Parkway had some sediment.

The canal sections along Three Oaks Parkway are regularly overgrown with vegetation.

Two I-75 culverts east of Del Milano Circle are poorly connected to Rosemary Canal. Investigate improving connections.

Citrus Park, Liberty Youth Ranch and BSU Water Treatment Plant may be reducing flows to I-75 culvert crossings. Investigate improving the connection. Determine if an improved connection could have negative impacts on Rosemary Canal.

There have been many discussions about directing some flow from The Imperial River Watershed to Spring Creek Watershed. Investigate building an interconnect along the existing railroad tracks from Rosemary Canal to Spring Creek headwaters.

Investigate installing culverts and gates under Three Oaks Parkway and I-75 at Strike Lane to divert flows to Spring Creek Watershed. In addition, expand the San Carlos Estates drainage ditches to handle the additional flow.

7.2.3 Leitner Creek

Wagon Trail south to just north of the Bonita Dog Park is dry with overgrown vegetation and debris in creek and pipe crossings. Creek needs to be cleaned and maintained.

From fork in Leitner Creek to Terry Street, some vegetation blockages with flow restrictions.

Along East side of Bonita Dog Park, old sea walls are in poor condition and potentially could cause flow restriction/blockage. Creek needs to be cleaned and maintained and sea walls addressed.

From Terry Street, south to Imperial River no major obstructions were noted.

7.2.4 Citrus Park

Drainage is handled by 3 pumps. Internal drainage is conveyed to the pumps via canals and ditches.

According site maintenance staff, there were no major breaches during either of the storm events. They believe water enters their system via flow through the berms. Water was higher on the north side of their berm that it was on their property.

7.3 Spring Creek Watershed

Generally, only culvert crossings were inspected in the Spring Creek Watershed.

At US-41 there was some vegetation over the creek but it didn't appear to significantly impact flow.

Countess Lane crossing is smaller than the upstream crossings. Determine appropriate size and replace if existing crossing is too small.

Downstream of Countess Lane water must make a 90° turn at the FPL transmission line.

Check capacity at FPL crossing. Expand if it is determined to be too small.

Ditch section between US-41 and Railroad has areas of debris and sediment. Maintenance should be performed.

Significant erosion has occurred at the wood bridge. Crossing should be inspected to ensure it is safe. Erosion could indicate the bridge crossing is to narrow. The crossing should be analyzed and expanded if it is too small.

Sediment, vegetation and debris at the railroad bridge is impacting flow through the bridge. This should be cleaned out to improve flow through the bridge.

7.4 Oak Creek Watershed

The creek was only observed at roadway crossings.

Some debris and overgrown vegetation was identified.

The City of Bonita Springs and SFWMD are currently removing debris and trimming vegetation along Oak Creek. Additional maintenance is likely not required.

8 Project Summaries

Improvements made by Lee County can have a positive impact on flooding, within each watershed. However, to be most effective some flooding issues will require a regional intergovernmental approach. The most effective solutions will take the cooperation and efforts of Lee County, Village of Estero, City of Bonita Springs, South Florida Water Management District, Collier County and Hendry County.

It is important that all projects consider potential downstream impacts as part of their analysis and design. Generally, downstream project should be completed prior to upstream projects to prevent moving problems downstream.

Several community outfall structures were retrofitted with grass carp grates, attached directly to the outfall bleeder/weir. These grates restrict flow and catch debris. Debris can accumulate to the point that it significantly reduces flow. In some cases, debris can virtually stop water flow. Control structures with grass carp grates should be redesigned in a way, that does not impact flow or catch debris.

Evacuation shelter surface water management systems should be maintained before, and immediately after, any event where the shelter is utilized. Such maintenance should include visually inspecting all storm drainage structures and pipes. Special attention should be paid to the project's outfall structures. Any debris or sediment should be removed immediately to prevent higher water levels. Structures that constantly clog should be redesigned, to prevent clogging.

Many critical rivers, creeks, canals, ditches and wetland flow ways are owned and operated by individual property owners, HOAs or CDDs. These differences in ownership has led to a patchwork of maintenance. Some areas are over-maintained, while other areas are under-maintained. To ensure rivers, creeks, canals, ditches and wetlands that convey regional flows are maintained appropriately, property owners should be regularly educated on proper maintenance protocol. In addition, the County and/or incorporated city may want to consider taking over operation and maintenance responsibilities of some of the more critical facilities.

There are several locations where two or more large trees, located near the river or creek, caught debris and created a significant impediment to flow. Removing one tree at these locations, could help reduce the likelihood of having debris build up in the future.

8.1 Estero River Watershed

Lee County and The Village of Estero are working to clear vegetation and debris from the Estero River and some tributaries. Many areas of debris and vegetation identified in this report, are expected to be removed as part of this work.

8.1.1 Country Creek Bypass (Table 1, Observation ID: 64, 65, 82)

A portion of the flow from the North Branch of the Estero River is diverted around Country Creek, through a bypass ditch. This ditch flows around the north and west side of the Country Creek Development.

Enhancing the flow through this bypass ditch, could help this section of the creek handle larger flows.

Potential improvements include the following:

- Remove sediment and vegetation at the bypass inflow that is reducing the volume of water flowing down the bypass.

- Install a concrete or sheet pile structure at the bypass inflow to better divert low flows down the creek and high flow through the bypass.
- Remove sediment and vegetation at the bypass outfall to the river.
- Perform calculations to determine if additional capacity is needed through the bypass. If additional capacity is needed, investigate ways to expand capacity including widen ditch and replace culvert crossings.

Consider having County or Village take over operation and maintenance of the bypass canal, to ensure is it operated and maintained appropriately.

8.1.2 Estero River North Branch Creek Restoration (Table 1, Observation ID: L37, 124)

The North Branch of the Estero River has historically flowed to the Estero River at two locations, on the north and east sides of Bamboo Island. The connection east of Bamboo Island has silted in. According to the current property owner, the previous property owner indicated that flows stopped in the late 80's or early 90's.

Dredge the historical flow path to reestablish a second flow path from the North Branch of the Estero River.

8.1.3 Improved I-75 & Corkscrew Ditch Maintenance (Table 1, Observation ID: 1701-1705, 1707-1710, 1712)

The ditch along I-75 north of Corkscrew Road is not well maintained.

To help improve flows, for both small and large storm events, this ditch should be maintained more frequently. It is recommended that the ditch is maintained annually, at a minimum, before each wet season.

8.1.4 Railroad Bridge Sediment Removal (Table 1, Observation ID: 284)

Sediment has built up under the north side of the rail road bridge crossing of the Estero River. This sediment should be removed.

8.1.5 Corkscrew Road Sidewalks

The sidewalks on the north and south sides of Corkscrew Road, just east of I-75, experience extended periods of flooding each wet season. Raising both sidewalks could reduce or eliminate the flooding during normal wet season rainfall events. In addition, the stormwater outfalls to the north and south could be improved, to provide better stormwater outfalls. On the north side of Corkscrew Road, a pipe could be installed to directly connect the ditches on the east and west sides of I-75. Currently, water on the east side of I-75 must travel 0.5 miles north, then 0.5 miles south to reach the ditch along the north side of Corkscrew Road. Along the south side, the swale could be improved west and south to the first I-75 cross culvert, to provide a better outfall.

These improvements could be incorporated into the proposed Corkscrew Road Interchange construction plans.

8.1.6 Grass Carp Barrier Redesign (Table 1, Observation ID: 1098)

Several developments, within the Estero River Watershed, utilize grass carp to maintain aquatic vegetation within their stormwater ponds. Florida Fish and Wildlife requires outfall structures for these ponds to include fish barriers. In many cases the fish barriers consist of bars installed directly over the outfall weir/bleeder. These bars reduce flows even when unclogged. During storm events, the bars often become clogged with debris. In some cases, flow is almost eliminated.

Installing these grates, away from the outfall structure, will increase the surface area and decrease the flow velocity through the grate, ultimately reducing the likelihood of debris clogging the grates.

8.1.7 Cascades Outfall Realignment (Table 1, Observation ID: 565, 2080-2083)

The Estero Parkway outfall ditch that runs through the Cascades, turns north and then south at the railroad tracks. This requires water to make a 270° turn in a relatively short distance, ultimately introducing head loss and increasing the potential for sediment build up.

The turns may have been added to allow for the construction of a berm between the railroad tracks and residences.

There is also a fence across the ditch at the Cascades property line.

Redesign this connection to remove the turns and fence providing a more direct pipe or ditch connection to the railroad ditch.

Confirm the ditch is of sufficient size to handle the contributing flows. If it is not, consider expanding the ditch.

8.1.8 Estero Parkway Bubble-up Structure (Table 1, Observation ID: 791)

Stormwater from Estero Parkway, just east of Three Oaks Parkway, discharges through a bubble up structure located on the south side of the roadway. This bubble up structure is the outfall for Estero Parkway and the Reef Apartments to the north.

Water levels were high during site visits. The bubble up structure and pipes should be inspected to check for sediment or debris.

Confirm bubble up structure is of sufficient size to handle the drainage area. Consider redesigning and installing a new structure if it is determined the structure is too small.

Investigate downstream tailwater conditions to determine if offsite water levels are impacting the bubble up structure.

8.1.9 Rookery Outfall Ditch Realignment (Table 1, Observation ID: 516)

The eastern Estero Parkway outfall, located adjacent to Rookery Pointe, includes a 90 degree turn before it enters the North Branch of the Estero River.

Consider redesigning the ditch, to allow large flows to go directly south into the Country Creek Bypass Ditch. This redesign would reduce the head loss associated with the 90° turn and allow large flows to bypass the North Branch of the Estero River and flow

directly to the Bypass ditch. This would reduce the flows in the North Branch of the Estero River.

This project would require the construction of a swale/ditch across private property. An easement would be required.

8.1.10 Three Oaks Parkway Drainage Improvements (Table 1, Ranking: 3)

The flooding of the northbound lanes, but not the southbound lanes of Three Oaks Parkway indicates Three Oaks Parkway could be holding back water from the east.

Much of the Three Oaks Parkway drainage system functions using bubble up structures. These structures often fill with sediment and debris. Debris was seen in many structures. Water levels were high during site visits so sediment levels are not known. Structures should be inspected for sediment after water levels recede or inlets should be pumped to determine sediment levels in each structure.

Investigate the design of the Three Oaks Parkway drainage system to identify potential improvements, including increasing pipes sizes and/or addition of new pipes. Further investigation, including detailed calculations and permit coordination, are required to determine potential improvements.

8.1.10.1 Three Oaks Parkway Debris

In the interim, prior to design and permitting of drainage improvements the roadway swales, inlets, and structures should all be cleaned to remove sediment, vegetation, and debris.

8.1.11 Flow Way Debris Removal

Within the North and South Branches of the Estero River, vegetation debris became entangled in trees, reducing flows through the creek.

Periodically removing debris within the creek, overbanks and upstream flow ways could reduce the volume of debris that has the potential to become entangled during storm events.

8.1.12 Selective Tree Removal

In the North and South Branches of the Estero River trees caught debris creating dams that in some cases significantly reduced flows and increase upstream elevations.

While the intent is to maintain the Estero River as natural river/creek, in some areas where two or more large trees are located within or directly adjacent to the creek, it may be beneficial to selectively remove trees to prevent the piling up of debris during storm events.

8.1.13 Corkscrew Road (Corkscrew Preserve to Corkscrew Shores)

Existing culverts under Corkscrew Road at Corkscrew Preserve, Bella Terra and Corkscrew Shores discharge to a roadside swale with limited capacity.

Future expansion of Corkscrew Road should account for flows coming from the north in this area and convey flows to areas east and west of the existing developments on the south side of the roadway.

Improvements could include a swale on the north or south side of the roadway or larger culvert on either side of the existing developments.

The design, permitting, and construction of these improvements should occur with the widening of Corkscrew Road.

8.1.14 River, Creek, and Flow Way Maintenance

Individuals and Home Owners Associations maintain a large portion of the main Estero Rivers flow ways, resulting in inconsistent maintenance.

Regular education should be provided to each maintenance entity to ensure they understand the importance of proper maintenance.

If education alone proves to be insufficient, the County or Village could investigate consolidating maintenance responsibilities under one entity, likely the County or Village. This could help ensure the rivers, creeks and flow ways are properly maintained.

8.1.15 Villagio Gardens Court Culvert (Table 1, Observation ID: 907)

Stain lines on the Villagio Garden Court box culvert indicate there was significant head loss through the culverts during the 2017 storm events. The upstream stain line on the culvert crossing was 1.2 ft higher than the downstream stain line.

Investigate the capacity of this crossing to determine if it is of sufficient size.

Note the construction other projects may reduce the need for this improvement, as they could direct water away from the Villagio crossing.

8.1.16 Estero Parkway Flow Way Enhancement (Table 1, Observation ID: 782-785)

The Three Oaks Parkway box culverts, located approximately 0.2 miles south of Estero Parkway and just north of Rookery Point and Villagio, are located downstream of a heavily vegetated property that is owned by Lee County. The elevation and vegetative cover appear to limit the amount of stormwater that can flow from the I-75 ditch to the Three Oaks Parkway box culverts. Construction of a flow way on the property could improve the flow to these box culverts. This could prevent overloading of the other box culverts located further south.

Additional investigation is required to determine the appropriate design and ensure no downstream impacts will occur.

8.1.17 I-75 South Branch Spreader

The I-75 bridge and two box culvert crossings, located between Corkscrew Woodlands and The Brooks, represent three separate point discharges to the headwaters of the South Branch of the Estero River. Installing a spreader swale could promote more uniform flow through the downstream wetlands, which could improve flow and provide a benefit to the existing wetlands.

To maintain flow through the wetlands any existing berms, accumulated debris and exotic vegetation should be removed.

8.1.18 Halfway Creek Ditch Realignment (Table 1, Observation ID: 1882)

The I-75 and Brooks box culverts are not aligned. They are connected by a ditch that makes two approximately 90 degree turns in a short distance. Site visits identified areas of sediment between the culverts.

Redesign the ditch to provide an angled connection between the box culverts to improve flow patterns and potentially reduce the likelihood of accumulated sediment.

8.1.19 Bank Stabilization (Table 1, Observation ID: 127)

There are several locations along the North and South Branches of the Estero River with near vertical creek banks. They are mostly located within the Villages at Country Creek Community. These vertical banks have the potential to collapse into the creek, significantly constricting flows.

Consider working with HOA's and homeowners to stabilize these slopes so banks do not collapse.

8.1.20 River Ranch Road Inlet Redesign (Table 1, Observation ID: 1538)

The drainage structure at River Ranch Road and Corkscrew Road that drains River Ranch Road often becomes clogged with debris.

The structure should be redesigned to reduce the likelihood debris will reduce flows.

8.1.21 Bamboo Island Sediment Removal (Table 1, Ranking: 1)

Relatively large areas of sediment, that span the entire creek, were found to the south of Bamboo Island. While other areas of sediment are likely to have limited impact on creek flow, these areas could reduce flows if storms occur prior to the sediment being flushed downstream. It is recommended that this sediment be monitored. If the sediment does not move downstream, removing the sediment is recommended.

8.1.22 Overland Flow Maintenance (Table 1, Ranking: 13)

South of Williams Road, to US-41 the Halfway Creek stormwater conveyance consists of mostly overland flow, through a wetland slough system. To maintain and improve flow capacity, this area should be maintained in a way that balances stormwater flows and preservation. It is important to remove debris and downed trees from the flow way, keep the area exotic free, and clear out overgrown areas. After the initial maintenance, this area should be inspected annually prior to the wet season and maintained as needed.

8.1.23 Corkscrew Road Box Culvert Sediment (Table 1, Observation ID: 1300, 1673, 1696)

Accumulated sediment was observed in the Estero River South Branch, Corkscrew Road box culvert. This sediment should be removed, to ensure the culvert is functioning at full capacity for the next storm events.

8.1.24 Corkscrew Road Slope (Table 1, Observation ID: 1701, 1702)

A section of sidewalk and ditch slope on the north side of Corkscrew Road, between Puerto Way and Puente Lane, appears to be sliding into the ditch. This slope should be stabilized, and the riprap and sidewalk reinstalled.

8.1.25 Corkscrew Road Driveway MES Grates (Table 1, Observation ID: 745, 1703-1705)

Several of the driveway culverts, along the north side of Corkscrew Road, have grates over the mitered end sections (MES). These grates catch debris during storm events and reduce the flow through the culverts. This ditch is an important conveyance, for this area of the Village. These grates should be removed to prevent debris from impacting flows.

8.1.26 Corkscrew Road Driveway Pipes

The driveway culverts, along the north side of Corkscrew Road, vary in size. The appropriate sized culverts should be calculated. If larger culvers are required, existing culverts should be replaced.

8.1.27 Devore Lane/Mallard Lane (Table 1, Observation ID: 1362, 1363, 1365, 1367)

Improve flows to the south, through existing wetland flow ways. Remove impediments to flow such as berms, spoil piles, debris and exotic vegetation.

The flow ways are all located on private property. Cooperation from these land owners would be required for any drainage improvements.

8.2 Imperial River Watershed

SFWMD and The City of Bonita Springs are working to clear vegetation and debris from both the Imperial River and Oak Creek. The areas of debris and vegetation within the Imperial River and Oak Creek, identified in this report, are expected to be removed by SFWMD and City of Bonita Springs.

8.2.1 Spring Creek/Imperial River Interconnect – Bonita Spring Golf & Country Club

Increasing the flows from the Imperial River Watershed to Spring Creek could help improve recovery and reduce flows within the Imperial River Watershed.

Analyze the potential for increasing flows from the Imperial River Watershed to the Spring Creek watershed through the Strike Lane Ditch and Bonita Spring Golf & Country Club property. The Golf Club property could be used to store, treat, and convey stormwater to Spring Creek while also providing a passive recreational amenity for the community. This could become a signature stormwater/recreation park for the area.

The large size of the property will provide design and operational flexibility, that is not possible for other projects. If the Bonita Springs Golf and Country Club Property is not available for purchase, investigate alternate routes.

8.2.2 I-75 Culvert Connections - East of Paloma (Table 1, Observation ID: L70, L71)

The I-75 double 12x8 box culvert and 54-inch culvert located east of the Paloma Community are not well connected to the Rosemary Canal. Flow is restricted by a narrow channel and a 54-inch pipe that appears to have a higher invert elevation.

Widen the box culvert connection to provide more capacity than the box culverts. Align the connection to promote flow to the south, instead of connecting to the Rosemary canal at a 90° angle.

Consider removing the second 54-inch culvert and connecting the I-75 culvert to the Rosemary Canal using a ditch. If access must be maintained, lower the existing 54-inch culvert to match the I-75 culvert invert and consider angling the pipe to promote southerly flow.

Utilities are located within this area. Any improvements need to be coordinated and may require utility relocation.

8.2.3 East Flow Improvements

During normal wet season conditions, the land located south of Liberty Youth Ranch and BSU Water Treatment Plant appears to be dryer than lands to the north. The culverts south of this area appear to typically carry much less water than the culverts to the north or south. To better distribute flows from the east to I-75, investigate providing better drainage connections to Rosemary Canal and Leitner Creek through the Liberty Youth Ranch, BSU, Citrus Park and Morton Avenue properties. This could include construction of flow ways in the form of canals, ditches, or shallow wetland systems, depending on land constraints. Weir structure with gates could be used to prevent over drainage of upstream wetlands and provide more operational flexibility.

8.2.4 I-75 Median (Table 1, Observation ID: 1883)

Prior to 2016, water flowed south down the I-75 median from the 10x6 box culvert, located just north of Bonita Springs High School, to the double 12x8 box culvert, located approximately 1 miles south. In 2016, FDOT built up the north bank at the double 12x8 box culvert to prevent water from flowing to the box culverts. This bank was breached after Hurricane Irma.

Instead of preventing flow down the I-75 median, the flow could be improved to promote more flow during typical wet season events. This could improve water level recovery.

8.2.5 Railroad Bridge (Table 1, Observation ID: L77)

The Imperial River Railroad crossing is significantly shorter than the adjacent Old US-41 bridge crossing. Flows through the bridge crossing after Hurricane Irma showed signs of increased velocity.

Analyze the bridge crossing capacity. If the size is too small to handle the design flows, consider working with the Railroad to remove or widen the railroad bridge crossing.

8.2.6 Imperial Bonita Estates (IBE) Bridge – Bourbonniere Drive (Table 1, Observation ID: L74)

When compared to the upstream (I-75, approx. 300 ft) and downstream (Imperial Parkway, approx. 218 ft) bridge crossings, the Imperial Bonita Estates Bridge (approx. 88 ft) is much shorter.

Analyze bridge crossing capacity to determine if it is appropriately sized. If it is not, consider replacing the bridge with a larger bridge crossing that can better handle larger flows.

8.2.7 Matheson Avenue Bridge (Table 1, Observation ID: L88)

When compared to the upstream (Imperial Parkway, approx. 218 ft, not include Imperial Bonita Estates) and downstream (Old 41, approx. 210 ft) bridge crossings, the Matheson Ave. Bridge (approx. 75 ft) is much shorter.

Analyze bridge crossing capacity to determine if it is appropriately sized. If it is not, consider replacing the bridge with a larger bridge crossing that can better handle larger flows.

8.2.8 Oxbow Bypass (Murat Ct/Tangelo Terrace)

Near Murat Court and Tangelo Terrace, the Imperial river must make two almost 180° turns in a very short distance. This likely introduces head loss and promotes sedimentation, especially during larger storm events.

To allow large flows to bypass these turns, consider constructing a bypass ditch to allow large flows to bypass these turns. The bypass ditch could be constructed through the conservation area located on the American House property. Flows through the ditch could be controlled by a weir and/or gate located at the upstream end of the ditch. This would allow low flows to be directed down the river and only larger flows through the bypass.

8.2.9 Railroad Ditch Interconnect (Spring Creek/Rosemary Canal)

Others have indicated the drainage area for Spring Creek has been reduced by development. Increasing the flows to Spring Creek could help improve recovery and reduce flows within the Imperial River Watershed.

Analyze the potential for increasing flows from the Imperial River Watershed to the Spring Creek watershed. One potential option is to interconnect the Rosemary Canal and Spring Creek, via an improved ditch along the north/east side of the railroad grade. This ditch would be approximately 1.2 miles long. A weir and/or gate could be included to increase operational flexibility. There is an existing ditch along a portion of the alignment.

8.2.10 I-75/Terry Street Drainage (Table 1, Observation ID: L67, L131)

There is a single 6x4 box culvert under I-75 just north of Terry Street and an 8 x 3 box culvert under Terry Street. The Terry Street culvert has a gate on the north side that controls flow through the box culvert.

At this location, water is forced from the west to east under I-75 due to the lack of an outfall to the south. Better utilizing these culverts to convey stormwater west and south, could help reduce the time it takes for the watershed to recover from both small and large storm events. It could help reduce the buildup of water that occurs when storms occur in succession.

Improve both the upstream conveyance of water to the box culverts and the downstream conveyance to the Imperial River. This will require the construction/expansion of existing ditches and improved maintenance.

8.2.11 Bonita Grande Drive Culverts

In its current condition, water regularly flows over portions of Bonita Grande Drive. During larger storm events, much of the roadway is flooded. Large sections of the roadway we overtopped during both Invest 92L and Hurricane Irma. Flow continued across the roadway for many weeks.

Other than the bridge crossing at Kehl Canal, Bonita Grande Drive only has one small culvert under the roadway, south of Terry Street. Consider increasing the number of culverts under Bonita Grande Drive, to increase the flow during smaller storm events when water is not flowing over the roadway. This could help the system recover and potentially prevent the building up of high water levels and flows during back to back storm events. In addition, this is in line with the hydrologic restoration efforts outlined within the Pine Lakes Preserve Land Management Plan. According to the plan, Pine Lake Preserve does not currently receive enough water.

8.2.12 Bonita Beach Road Projects Outfalls (Table 1, Observation ID: A3, A4)

Worthington Country Club, Palmira Country Club, and Village Walk currently discharge to the Bonita Beach Road Ditch. All experienced some flooding during Hurricane Irma. Worthington experienced high-water levels for an extended period. The southern boundary of all three developments create the drainage basin divide between the Imperial River and Cocohatchee River Watersheds.

Redesigning each project's surface water management system could direct some water away from the Imperial River watershed, helping reduce water levels.

Potential improvements could include the following:

- Control structure(s) for each project that discharge to the south.
- Installation of water control gates to provide operational flexibility.
- Additional internal culverts.
- Downstream improvements within Quail West, if Worthington Communities is proposed to flow through Quail West.

Detailed onsite and offsite stormwater calculations would be required, to demonstrate the proposed modification will not adversely impact onsite or offsite water elevations. In addition, operational criteria would be required for any proposed gates.

8.2.13 Railroad Bridge Sediment (Table 1, Observation ID: 1056-1060)

The railroad bridge crossing over the Rosemary Canal is full of sediment. The sediment should be removed and the upstream and downstream ends of the crossing riprapped to reduce the likelihood of future sediment buildup.

8.2.14 I-75/Imperial Parkway Sediment (Table 1, Observation ID: 1883)

Some sediment was found in the Rosemary Canal at I-75 and Imperial Parkway. This sediment should be removed.

8.2.15 Imperial Parkway Sediment (Table 1, Observation ID: 1017, 1020, 1022)

Some sediment was found in the Rosemary Canal at the middle Imperial Parkway crossing. This sediment should be removed.

8.2.16 Rosemary Canal Sediment

The east/west section of Rosemary Canal from I-75 to Old 41 has numerous areas of sediment. This sediment should be removed and the canal restored back to its design cross section.

8.2.17 Control Flows from East

Aerial photographs and site observations indicate stormwater flows into the Imperial River watershed from Collier County between Bonita Beach Road and the agricultural land located south of Corkscrew Road.

Potential increases in flow from other watersheds should be investigated. If more flow is directed to the Imperial River Watershed, methods to control these flows should be investigated. It is important to consider downstream impacts in both the Imperial River and Cocohatchee River Watersheds.

8.3 Spring Creek Watershed

8.3.1 Bernwood Ditch Maintenance - Old 41 to Railroad (Table 1, Ranking: 29)

Tree roots and sediment have encroached into the canal creating sinuous flows paths and increased erosion. Provide ditch maintenance to improve flow.

8.3.2 Bernwood Wood Bridge (Table 1, Ranking: 29)

Erosion, debris and sediment were found at the Bernwood bridge crossing. The erosion may indicate the bridge crossing is to narrow. Consider replacing the bridge with a clear span or large box culvert.

8.3.3 Railroad Crossing

Sediment, vegetation and debris were identified at the railroad crossing. Sediment, vegetation and debris should be removed to improve flow through the bridge crossing.

8.3.4 Countess Lane

The culverts under Countess Lane are smaller than the upstream culverts. Determine if the existing culverts are the appropriate size. If they are not, replace them so they are not a restriction to flow.

APPENDIX 1:

TABLE 1 - PROJECT SUMMARY TABLE

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
1	1511	River blocked by debris	Debris	26.4361978	-81.801608	WE - Estero River	Blockage needs to be removed immediately if not already accomplished.	Remove significant flow restrictions
	1517	Tree across entire river	Vegetation	26.434691	-81.8022359	WE - Estero River	Blockage needs to be removed immediately if not already accomplished.	
	148	Wall of debris stopping most flow	Debris	26.4372967	-81.798672	WE - Estero River	Blockage needs to be removed immediately if not already accomplished.	
	1519	Sediment and debris across entire river	Debris	26.4352258	-81.8011581	WE - Estero River	Blockage needs to be removed immediately if not already accomplished.	
	341	Debris in creek	Debris	26.4345554	-81.7979215	WE - Estero River	Blockage needs to be removed immediately if not already accomplished.	
	458	Vegetation and debris across canal	Vegetation	26.3352234	-81.7431605	WE - Imperial River	Blockage needs to be removed immediately if not already accomplished.	
	461		Debris	26.3350592	-81.7471436	WE - Imperial River	Remove canal blockage	
	466		Debris	26.3355843	-81.7482568	WE - Imperial River	Remove canal blockage	
	1508	Down tree blocking river	Debris	26.4351152	-81.8030093	WE - Estero River	Remove debris	
	517	Tree limbs in ditch	Debris	26.4430883	-81.7966874	WE - Estero River	Remove tree and dock from creek	
	120	Debris and tree in river	Debris	26.4352274	-81.8005296	WE - Estero River	Remove tree from creek if not already accomplished.	
	115	Vegetation debris in creek	Debris	26.4347014	-81.7995799	WE - Estero River	Remove debris from creek if not already accomplished	
	117	Tree over river	Vegetation	26.4348756	-81.7998234	WE - Estero River	Remove tree from creek if not already accomplished.	
	118	Tree in river	Debris	26.4348344	-81.8000017	WE - Estero River	Remove tree from creek if not already accomplished.	
	133	Tree impeding flow	Vegetation	26.4368309	-81.799248	WE - Estero River	Remove Tree	
	138	Tree across river	Vegetation	26.4382461	-81.7973609	WE - Estero River	Remove tree hanging over creek	
	142	Trees in river	Debris	26.4377612	-81.7981069	WE - Estero River	Remove trees and debris from creek	
	144	Tree across river	Debris	26.4374463	-81.7982578	WE - Estero River	Remove tree hanging over creek	
	149	Fallen trees	Vegetation	26.4371717	-81.7988778	WE - Estero River	Remove tree hanging over creek	
	150	Fallen trees in river	Debris	26.4371003	-81.7989476	WE - Estero River	Remove debris from creek if not already accomplished	
	152	Tree and debris in river	Debris	26.4371252	-81.7990439	WE - Estero River	Remove debris from creek if not already accomplished	
	158	Fallen tree across river	Debris	26.4362857	-81.8003748	WE - Estero River	Remove tree hanging over creek	
	275	Shallow section of creek with debris	Sediment	26.4352544	-81.8005684	WE - Estero River	Remove debris from creek. Consider removing sediment is it doesn't move downstream	
	293	Tree in creek	Debris	26.442149	-81.7954585	WE - Estero River	Remove debris from creek, it not already accomplished.	
	457		Debris	26.3352934	-81.7424173	WE - Imperial River	Remove debris from canal	
	459	Vegetation over canal	Vegetation	26.3351837	-81.7449187	WE - Imperial River	Cut vegetation back from canal	
	468	Sediment and debris	Debris	26.3359862	-81.7489608	WE - Imperial River	Remove debris	
	470	Tree across river	Debris	26.3359191	-81.7500294	WE - Imperial River	Remove tree in river	
	475	Debris in river	Debris	26.3356677	-81.752859	WE - Imperial River	Remove debris from river	
	477	Debris in river	Debris	26.3351406	-81.7538257	WE - Imperial River	Remove debris from river	
	478	Trees and vegetation across river	Debris	26.335025	-81.7546495	WE - Imperial River	Remove debris from river	
	480		Debris	26.3352485	-81.7560885	WE - Imperial River	Remove debris from river	
	481		Debris	26.3352878	-81.7563417	WE - Imperial River	Remove debris from river	
	482	Debris in river	Debris	26.3350775	-81.7576072	WE - Imperial River	Remove debris from river	
	494	Debris in river	Debris	26.3369169	-81.7634916	WE - Imperial River	Remove debris from river	
	495	Trees across river	Debris	26.3371093	-81.7634549	WE - Imperial River	Remove debris from river	
	499	Debris across river	Debris	26.3394135	-81.7667984	WE - Imperial River	Remove debris from river	
	501	Debris in river	Debris	26.3398217	-81.767924	WE - Imperial River	Remove debris from river	
	673		Debris	26.3352141	-81.7561179	WE - Imperial River	Remove debris from river	
	697	Tree in creek	Debris	26.4364897	-81.8015039	WE - Estero River	Remove debris	
	1042	Sediment and debris at culvert	Debris	26.3517339	-81.7792225	WE - Imperial River	Remove debris	
	1043		Sediment	26.3517615	-81.7791865	WE - Imperial River	Remove debris	
	1049	Stump in canal	Vegetation	26.3512289	-81.7795865	WE - Imperial River	Remove stumps to improve flow	
	1055	Narrow area at canal turn	Sediment	26.3488824	-81.7803438	WE - Imperial River	Remove sediment	
	1056	High pt. in canal holding back water	Sediment	26.3489154	-81.7803454	WE - Imperial River	remove high point in canal	
	1057	Sediment blocking south culvert	Sediment	26.3487843	-81.7805708	WE - Imperial River	Remove sediment	

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
2	1060	North culvert silted in. Cypress knees reducing flow area	Sediment	26.3486792	-81.780643	WE - Imperial River	Remove sediment	Remove debris, sediment and vegetation from main conveyances
	1062		Debris	26.3479176	-81.7804708	WE - Imperial River	Remove debris	
	1064	Trees across canal	Vegetation	26.3473095	-81.7803466	WE - Imperial River	Remove debris	
	1068	Debris clogging pipe	Debris	26.345745	-81.7802722	WE - Imperial River	Remove debris	
	1071		Debris	26.3449042	-81.7802322	WE - Imperial River	Remove debris	
	1112	Sediment on north side of downstream bridge	Sediment	26.3403763	-81.7710089	WE - Imperial River	Remove sediment	
	1314	Vegetation down, flow restriction.	Vegetation	26.3467972	-81.7702697	WE - Leitner Creek	Remove sediment	
	1315	Vegetation build up, flow restriction.	Vegetation	26.3472483	-81.7694635	WE - Leitner Creek	Remove debris	
	1316	Vegetation down, flow restriction.	Vegetation	26.3481001	-81.7691355	WE - Leitner Creek	Remove debris	
	1334	Damaged Seawall, potential flow blockage in future.	Other	26.3475619	-81.7691525	WE - Leitner Creek	Replace seawall before it impacts flow	
	1509	Area of narrow flow. Debris and banks	Vegetation	26.4355462	-81.8027528	WE - Estero River	Remove debris and overgrown vegetation	
	1510	Debris in creek	Debris	26.4360063	-81.8022217	WE - Estero River	Remove debris	
	1521	Debris caught by tree	Debris	26.434935	-81.8015112	WE - Estero River	Remove debris	
	1633	Tree over hanging river	Vegetation	26.3385901	-81.7657655	WE - Imperial River	Remove debris	
	1635	Debris across river	Debris	26.3395115	-81.7671051	WE - Imperial River	Remove debris	
	1638	Debris across river	Debris	26.3409727	-81.7721058	WE - Imperial River	Remove debris	
	1639	Debris across river	Debris	26.3412292	-81.7722177	WE - Imperial River	Remove debris	
	1640	Debris in river	Debris	26.3415537	-81.7723401	WE - Imperial River	Remove debris	
	1680	Tree over creek.	Vegetation	26.4365111	-81.8010383	WE - Estero River	Remove debris	
	1681	Large tree in creek	Debris	26.4365626	-81.8012579	WE - Estero River	Remove debris	
	1724	Debris under bridge	Debris	26.3426257	-81.7789646	WE - Imperial River	Remove debris	
	1832	Debris and erosion on upstream face of bridge	Debris	26.3402849	-81.7708507	WE - Imperial River	Remove debris	
	1853	Pipes have much smaller capacity than upstream I-75 box culverts	Vegetation	26.3362845	-81.7530002	WE - Imperial River	Remove debris. Check culvert size.	
	2244	fallen tree across channel	Vegetation	26.4388102	-81.7969011	WE - Estero River	Remove fallen tree	
	2252	Fallen tree	Debris	26.440808	-81.7959648	WE - Estero River	Remove tree stump	
	2255	Standing water stains on tree trunks, trapped debris	High Water Indicator	26.4414466	-81.7957903	WE - Estero River	Remove debris	
	2256	Fallen logs across channel	Debris	26.441509	-81.7955334	WE - Estero River	Remove fallen trees	
	2257	Debris and exposed roots	Erosion	26.4417133	-81.7954973	WE - Estero River	Remove debris	
	2262	Tree in Creek	Debris	26.4426197	-81.7956738	WE - Estero River	Remove fallen tree	
	295	Tree limb in creek	Debris	26.4423416	-81.7955513	WE - Estero River	Remove debris	
	1084	Tree in creek	Vegetation	26.3440138	-81.7806586	WE - Imperial River	Remove tree	
	1044	Trees overhanging canal	Vegetation	26.3520798	-81.7789289	WE - Imperial River	Trim back trees	
	1053		Vegetation	26.349449	-81.7801408	WE - Imperial River	Trim Vegetation	
	1066		Erosion	26.3461263	-81.7802716	WE - Imperial River	Fix bank erosion	
	1507	Tree limbs into river. Debris in tree	Vegetation	26.4349734	-81.8036442	WE - Estero River	Trim tree limbs to prevent flow obstruction	
	1632	Tree and debris in river	Debris	26.3368854	-81.7632705	WE - Imperial River	Remove debris	
	1641	Tree into river	Vegetation	26.3420506	-81.772798	WE - Imperial River	Consider removing tree from river bank	
	1809	Trees and sediment	Sediment	26.436126	-81.8138297	WE - Estero River	Remove debris	
	1811	Trees debris in river	Vegetation	26.4357964	-81.8127758	WE - Estero River	Remove debris	
	589	Vegetation in pipe	Vegetation	26.4536243	-81.7889977	WE - Estero River	Clean out Three Oaks pipe	
	599	Sediment reducing flow in pipe	Sediment	26.4481859	-81.7890516	WE - Estero River	Remove sediment	
	611	Drainage inlet. Likely gets clogged frequently. Consider changing grate	Vegetation	26.4478486	-81.7883791	WE - Estero River	clean out inlet	
	612	Inlet covered with debris	Debris	26.4477057	-81.7886037	WE - Estero River	remove debris	
	616	Outfall pipe for upstream three oaks flows. Pipe size looks small. 15-18 in	Other	26.4465083	-81.7885414	WE - Estero River	check pipe size	
	617	Vegetation covering pipe	Vegetation	26.4511123	-81.7890677	WE - Estero River	remove debris	
	766	Trash and debris in inlet	Debris	26.4383979	-81.7883414	WE - Estero River	remove debris	
	768	Sediment in concrete swale	Sediment	26.4376633	-81.7883786	WE - Estero River	Remove Sediment	
	769	Church control structure sediment	Sediment	26.44153	-81.7883663	WE - Estero River	Remove sediment	
	910	Inlet covered in vegetation	Vegetation	26.4443139	-81.7884623	WE - Estero River	remove debris	Three Oaks Parkway drainage - Remove sediment

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
3	1660	Sediment and overgrowth downstream of three oaks culvert.	Vegetation	26.4492438	-81.7891406	WE - Estero River	Remove sediment and vegetation	Three Oaks Parkway drainage. Remove sediment, debris and vegetation. Analyze drainage system to determine if improvements can be made to more efficiently convey stormwater.
	1661	Three oaks swale south of eater parkway. Overgrown veg.	Vegetation	26.4490442	-81.7890435	WE - Estero River	Maintain swale	
	1663	Debris in front of pipe	Debris	26.4470834	-81.7890152	WE - Estero River	Remove debris	
	1667	Sediment in box culvert	Sediment	26.4450501	-81.7889442	WE - Estero River	Remove sediment	
	1668	Land is blocking flow in half of box culverts. Upstream canal appear to have much less capacity than culvert	Other	26.4448144	-81.7885413	WE - Estero River	Revise design to better convey flow to box culvert	
	1669	Pipe end. Looks small for drainage area. Berm over pipe. Potential gap in berm	Damaged Structure	26.4472674	-81.7890576	WE - Estero River	Confirm size of culvert	
	1690	Debris caught under bubble up grate	Debris	26.4346366	-81.7883267	WE - Estero River	Remove debris	
	1691	Grate covered in debris	Debris	26.4342768	-81.7883452	WE - Estero River	Remove debris	
	720	Vegetation in swale and pipe	Vegetation	26.4526463	-81.7890311	WE - Estero River	Remove vegetation in pipe	
	721	Veg in pipe	Vegetation	26.452186	-81.7890463	WE - Estero River	Remove vegetation in pipe	
4	1673	One box culvert with sediment	Sediment	26.4315655	-81.7935508	WE - Estero River	Remove sediment from box culvert	Remove sediment from Corkscrew Box Culvert at Estero River SB
	L210	Triple Box Culvert under Corkscrew Road		26.4313205	-81.7933235		Clean out sediment from Corkscrew Rd box culvert	
5	2211	Signs of high water level near waters edge. 5 to 10 ft range.	High Water Indicator	26.3398317	-81.7681253	WE - Imperial River	Potential oxbow bypass ditch, weir & gate to direct high flows around sharp turns	Imperial River - Determine if oxbow restricts flow. Investigate bypass ditch if needed.
6	L74	IBE Bridge Crossing Approx. 88 ft	Other	26.3361353	-81.7606241		Investigate capacity of bridge crossing. Increase size if appropriate	Imperial River Bridge Capacity - Analyze bridge capacities.
	L77	Bridge Crossing Approx. 70 ft	Other	26.3425281	-81.7801224		Investigate capacity of bridge crossing. Increase size if appropriate	
	L88	Matheson Ave. Bridge crossing approx. 75 ft.	Other	26.3402982	-81.7709258		Investigate capacity of bridge crossing. Increase size if appropriate	
7	1644	Sediment in inlet	Sediment	26.4489021	-81.8052016	WE - Estero River	Remove sediment from Estero Parkway inlet	Estero Parkway - Remove sediment from drainage system
	515	Sediment in outfall pipe	Sediment	26.4490533	-81.7969367	WE - Estero River	Clean out pipe	
8	1824	Sediment plume downstream of old 41	Sediment	26.3424176	-81.7791277	WE - Imperial River	Monitor sediment. Remove if it doesn't move downstream	Remove Imperial River sediment
	1827	Sediment at River	Sediment	26.3422237	-81.7813728	WE - Imperial River	Monitor sediment. Remove if it doesn't move downstream	
9	1196		Vegetation	26.3392643	-81.7511715	WE - Imperial River	Clean out ditch	Clean out Lake Shamir
10	520	Stacked up debris and debris in creek	Debris	26.4431914	-81.795885	WE - Estero River	Remove debris from creek	Remove debris, sediment and vegetation from upstream conveyances
	523	Constricted flow around tress and debris	Debris	26.4436805	-81.7955546	WE - Estero River	Remove debris from creek	
	524	Downed trees blocking flow	Debris	26.4438219	-81.7955183	WE - Estero River	Remove debris from creek	
	527	Down trees blocking flow	Debris	26.4441457	-81.7951939	WE - Estero River	Remove debris from creek	
	531	Debris	Debris	26.4443919	-81.794804	WE - Estero River	Remove debris from creek	
	532	Debris	Debris	26.4444152	-81.7947239	WE - Estero River	Remove debris from creek	
	534		Debris	26.4446091	-81.7943594	WE - Estero River	Remove debris from creek	
	535		Debris	26.44452	-81.7939527	WE - Estero River	Remove debris from creek	
	536	Debris	Debris	26.4446124	-81.793849	WE - Estero River	Remove debris from creek	
	537		Debris	26.4447427	-81.7936571	WE - Estero River	Remove debris from creek	
	538		Debris	26.4448097	-81.7932173	WE - Estero River	Remove debris from creek	
	539		Debris	26.4448724	-81.7932065	WE - Estero River	Remove debris from creek	
	621	Debris in creek	Debris	26.4326693	-81.7939953	WE - Estero River	Remove debris from Creek	
	623	Trees down in creek	Debris	26.4324917	-81.7940063	WE - Estero River	Remove debris from Creek	
	626	Debris in trees. Trees over creek	Vegetation	26.432356	-81.7936749	WE - Estero River	Remove debris from Creek	
	629	Trees in creek	Debris	26.432223	-81.7937422	WE - Estero River	Remove debris from Creek	
	631	Debris across creek	Debris	26.4320716	-81.7935964	WE - Estero River	Remove debris from Creek	
	636	Trees in creek	Vegetation	26.4330343	-81.7943058	WE - Estero River	Remove debris from Creek	
	641	Debris blocking flow	Debris	26.4340162	-81.7956507	WE - Estero River	Remove debris from Creek	
	644	Trees across creek	Debris	26.4344015	-81.7961742	WE - Estero River	Remove debris from Creek	
	648	Trees in creek	Debris	26.4343623	-81.7970271	WE - Estero River	Remove debris from Creek	
	649	Tree in creek	Debris	26.4345053	-81.7973368	WE - Estero River	Remove debris from Creek	

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
	794	Debris piles up against trees	Debris	26.4464627	-81.7892444	WE - Estero River	Remove debris in flow way	
	795	Exotics in flossy. Could reduce flow	Vegetation	26.4464476	-81.7896845	WE - Estero River	Remove exotics in flow way	
	1627	Debris and sediment	Debris	26.335183	-81.7473816	WE - Imperial River	Remove debris and sediment from canal	
	1628	Vegetation across river	Vegetation	26.335184	-81.7475444	WE - Imperial River	Remove debris	
	1629		Debris	26.3354495	-81.7482181	WE - Imperial River	Remove debris	
	2033		Debris	26.3598357	-81.79397	WE - Spring Creek	Remove vegetation and debris	
	2191	Fallen tree in flow path	Vegetation	26.33680538,	-81.7517172	WE - Imperial River	remove debris	
	2192	fallen tree in flow path	Debris	26.3368059	-81.7521381	WE - Imperial River	Remove debris	
	456		Debris	26.335218	-81.7418221	WE - Imperial River	Remove vegetation	
	1518	Sediment across river	Sediment	26.434793	-81.8016211	WE - Estero River	Remove debris.	
	519	Trees and rip rap in creek.	Vegetation	26.4429919	-81.7958738	WE - Estero River	Remove riprap from flow path	
	528	Debris in tree	Debris	26.4441487	-81.7951389	WE - Estero River	Remove debris	
	642	Tree over creek likely impacts flow	Vegetation	26.4342659	-81.7961004	WE - Estero River	Remove downed tree	
	1695	Trees across canal	Vegetation	26.4315962	-81.7931897	WE - Estero River	Remove downed tree	
	1902	Overgrown vegetation and sediment	Vegetation	26.3524859	-81.7659624	WE - Leitner Creek	Improve ditch maintenance	
	1909	Vegetation build up, flow restriction.	Vegetation	26.3458834	-81.7705479	WE - Leitner Creek	Remove debris	
11	326	Outfall structure covered by metal grade. Restricts flows and catches debris. Causing flooding.	Other	26.4391849	-81.7976523	WE - Estero River	Replace grass carp grate with grate that does not restrict flow or catch debris.	Modify Grass Carp grates to reduce impacts to stormwater flows
	1096	Fish barrier reducing flow	Other	26.4316068	-81.758984	WE - Estero River	Replace grass carp grate with grate that does not restrict flow or catch debris.	
	1098	PVC pipes and small baffle over outfall bleeder. Reducing flow	Debris	26.4437375	-81.7923511	WE - Estero River	Replace grass carp grate with grate that does not restrict flow or catch debris.	
	1321	Damages grass carp barrier. should be redesigned so it doesn't reduce flow	Damaged Structure	26.4380922	-81.7792183	WE - Estero River	Replace grass carp grate with grate that does not restrict flow or catch debris.	
12	565	Fence across ditch. Erosion around fence.	Other	26.4455987	-81.8076212	WE - Estero River	Remove fence across ditch. Consider improving alignment to remove 90 and 180 degree turns.	Modify Cascade/RR outfall to eliminate turns and fence across ditch.
13	936	Fallen trees in flow way. Water still flowing.	Vegetation	26.4189817	-81.8303401	WE - Halfway Creek	Remove debris, exotic vegetation, fences, and overgrowth to improve flow	Halfway Creek flow way improvements
	937	Fallen Tree, minor blockage.	Vegetation	26.4193957	-81.8304369	WE - Halfway Creek		
	938	Fallen trees and debris slowing flow.	Debris	26.4195188	-81.8304886	WE - Halfway Creek		
	939	Fallen tree, sediment.	Sediment	26.4197127	-81.8305199	WE - Halfway Creek		
	940	Sediment buildup under bridge	Sediment	26.4197725	-81.8305413	WE - Halfway Creek		
	941	Fallen tree with some sediment.	Vegetation	26.4200699	-81.8307922	WE - Halfway Creek		
	942	Fallen trees with sediment.	Vegetation	26.4203126	-81.830754	WE - Halfway Creek		
	945	Fallen vegetation.	Vegetation	26.4187526	-81.8302529	WE - Halfway Creek		
	946	Fallen tree.	Vegetation	26.4183244	-81.8300849	WE - Halfway Creek		
	947	Vegetation buildup at cypress roots	Vegetation	26.4179795	-81.8301419	WE - Halfway Creek		
	948	Fallen vegetation, flow restriction.	Vegetation	26.4177559	-81.8299665	WE - Halfway Creek		
	949	Uprooted trees blocking flow	Vegetation	26.4180824	-81.8301427	WE - Halfway Creek		
	950	Vegetation buildup at cypress roots	Vegetation	26.4173789	-81.8300628	WE - Halfway Creek		
	951	Fallen vegetation, restricted flow.	Vegetation	26.4156061	-81.8302535	WE - Halfway Creek		
	953	Vegetation blockage.	Vegetation	26.4153722	-81.8301907	WE - Halfway Creek		
	954	Vegetation blockage, flow restriction.	Vegetation	26.4153322	-81.8299525	WE - Halfway Creek		
	955	Vegetation restricting flow	Vegetation	26.4150082	-81.8300473	WE - Halfway Creek		
	956	Flow restriction due to vegetation and debris.	Vegetation	26.4144216	-81.8299432	WE - Halfway Creek		
	957	Vegetation debris at bridge	Vegetation	26.414664	-81.8299241	WE - Halfway Creek		
	959	Fallen trees, cypress knees, flow restriction and blockage.	Vegetation	26.4132778	-81.8299821	WE - Halfway Creek		
	960	Fallen tree restricting flow	Debris	26.4129621	-81.8296522	WE - Halfway Creek		
	961	Chain link fence with blockage.	Other	26.4125544	-81.8292874	WE - Halfway Creek		
	962	Fallen trees over creek	Vegetation	26.4124199	-81.8288706	WE - Halfway Creek		
	963	Fallen tree with flow blockage and restriction.	Vegetation	26.4121305	-81.8286348	WE - Halfway Creek		
	964	Fallen vegetation with blockage.	Vegetation	26.4114746	-81.8282944	WE - Halfway Creek		
	965	Vegetation down, partial restriction.	Vegetation	26.4111198	-81.8280345	WE - Halfway Creek		

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
	966	Overgrown vegetation in creek	Vegetation	26.4107315	-81.8279383	WE - Halfway Creek		
	967	Vegetation down with flow restriction.	Vegetation	26.4106308	-81.8278365	WE - Halfway Creek		
	968	Trees down with sediment, partial restriction.	Vegetation	26.4099688	-81.8274627	WE - Halfway Creek		
	969	High water line.	High Water Indicator	26.4096055	-81.827503	WE - Halfway Creek		
	970	Fallen trees	Debris	26.4094863	-81.8271392	WE - Halfway Creek		
	971	Fallen trees and debris restricting flow	Debris	26.4094235	-81.8271488	WE - Halfway Creek		
	972	Vegetation growth and fallen. Flow restriction.	Vegetation	26.4089288	-81.8265788	WE - Halfway Creek		
	973	Flow zero, full of vegetation.	Other	26.4088946	-81.8262144	WE - Halfway Creek		
14	1022	Overgrowth along ditch	Vegetation	26.3624649	-81.7642526	WE - Imperial River	Improve ditch maintenance. Regularly remove overgrown vegetation	Rosemary ditch maintenance along I-75
	1017	Sediment in culvert. Trees across ditch	Sediment	26.3652365	-81.7666004	WE - Imperial River	Remove vegetation, debris and sediment	
	1018	Vegetation in ditch	Vegetation	26.3653049	-81.7664488	WE - Imperial River	Improve ditch maintenance	
	1020	Sediment in culvert.	Sediment	26.3653325	-81.7671773	WE - Imperial River	Removed culvert sediment	
15	284	Sediment build up at railroad bridge	Sediment	26.4348057	-81.8066799	WE - Estero River	Remove sediment at railroad bridge crossing	Estero River Rrailroad bridge sediment
	584	Portion of connection to river blocked by sediment at rail road bridge	Sediment	26.4348969	-81.8068675	WE - Estero River	Remove sediment at railroad bridge crossing	
16	147	Trees along bank likely constrict flow	Vegetation	26.4372562	-81.7984784	WE - Estero River	Consider removing one tree to reduce flow restriction and potential for catching debris	Selective Tree removal
	155	Large tree overhanging creek at turn	Vegetation	26.4369649	-81.79939	WE - Estero River	Remove non-native tree from creek bank	
17	1037	Culvert located downstream of I-75. Invert appears higher and pipe is smaller	Other	26.3593519	-81.7614396	WE - Imperial River	Improve flow to and from I-75 culverts to improve water level recover after storm events.	Improve 75 culvert flow
	1038	Canal connection with I-75. Overgrown and narrow. High point near row line	Other	26.3603315	-81.7622715	WE - Imperial River		
18	62	Debris and overgrowth in ditch	Vegetation	26.4366229	-81.800807	WE - Estero River	Clean out and improve flow through Country Creek by-pass.	Country Creek bypass - maintenance
	64	Debris in ditch	Debris	26.4364323	-81.8008301	WE - Estero River		
	65	Country Creek Overflow south connection	Sediment	26.4364041	-81.800842	WE - Estero River		
	84	Bypass north connection to creek. Connection should be improved	Other	26.4419157	-81.7954953	WE - Estero River		
	238	Erosion from flow	Erosion	26.4367796	-81.8008269	WE - Estero River	Stabilize by-pass channel slope	
19	1860	Indicated flow path not located	Other	26.3456306	-81.7529706	WE - Imperial River	Locate pipe. Investigate adding capacity of analysis determines it is needed.	I-75/E Terry flow path not found. Improve connection to the south.
20	122	Connection with north branch and river clogged.	Vegetation	26.4353435	-81.8005607	WE - Estero River	Reconnect North and South Branch of Estero River, east of Bamboo Island.	Estero River N/S branch reconnect east of Bamboo Island
	123	North branch of Estero river clogged	Vegetation	26.4355827	-81.8001661	WE - Estero River		
	124	North branch vegetation	Vegetation	26.4357431	-81.8002294	WE - Estero River		
	125	North branch overflow diversion	Sediment	26.435997	-81.80011	WE - Estero River		
	126	Tree over river	Vegetation	26.4360002	-81.8001134	WE - Estero River		
	L37	Flow path has been blocked by sand deposits. No flow through this section of river. All flow goes east	Sediment	26.4356986	-81.8004078		Reconnect North and South Branches of Estero River through this area	
21	1357		Vegetation	26.4805876	-81.7230451	WE - Estero River	Improve downstream conveyance to allow water in region to flow south to Corkscrew Road.	Devore Ln area drainage improvements
	1362	Double 36 inch pipes. Upstream of double 24		26.4896039	-81.717341	WE - Estero River	Investigate pipes sizes. Adjust as needed	
22	1870	Berm along 75 impedes sheet flow	Other	26.3837852	-81.771915	WE - Imperial River	Berm along I-75 Prevents flow to I-75. Investigate removing the berm to allow more flow west	Berm adjacnet to I-75 - remove to improve flow
	1871	Berm impeding sheet flow	Other	26.3868405	-81.7720181	WE - Imperial River	Berm along I-75 Prevents flow to I-75. Investigate removing the berm to allow more flow west	
23	2035	Smaller downstream culvert crossing	Inspected Area	26.3600558	-81.7977609	WE - Spring Creek	Check size of pipe.	Check Spring Creek crossing size
	745	Bars across pipes likely reduce high flows. Debris on upstream side indicate high water and reduced flow.	Debris	26.4315646	-81.7864869	WE - Estero River	Remove bars to allow more flow and reduce likelihood of clogging	

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24	1703	Bars across pipe can catch debris and reduce flow	Debris	26.4315523	-81.7847454	WE - Estero River	Remove MES bars	Remove MES grates & Check culvert sizes
	1704	Bars can reduce flow and catch debris. Triple pipes upstream of double pipes.	Debris	26.4315304	-81.783929	WE - Estero River	Remove MES bars. Check pipe sizes	
25	1693	Sediment in culvert	Sediment	26.4316349	-81.7917265	WE - Estero River	Removed sediment from driveway box culvert	See See St box culvert sediment
26	L66	Triple 8x10 box culvert	Other	26.3377266	-81.7514883		Investigate improved upstream flow connection	Investigate improved flow under I-75 - flow to and from culverts
	L67	6x4 box culvert	Other	26.3461699	-81.7533477		Investigate improved flow to the west and south along with better flow to the pipe from the east.	
	L68	42 inch pipe (per FDOT plans)	Other	26.3530764	-81.7555455		Investigate better outfall to the west/south and improved flow to the pipe from the east.	
	L69	Double 12x8 box culvert (per FDOT plans)	Other	26.3568486	-81.7587386		Investigate if improved flow from the east if appropriate	
	L70	54 inch pipe (per FDOT plans)	Other	26.359866	-81.7610185		Investigate better outfall to the west/south and improved flow to the pipe from the east.	
	L71	Double 12x8 box culvert (per FDOT plans)	Other	26.3606951	-81.7616958		Investigate better outfall to the west/south and improved flow to the pipe from the east. Potentially use median to convey water.	
27	775	Fence and higher land between 75 box culvert and ditch	Other	26.4453711	-81.7832727	WE - Estero River	Clean out ditch. Remove fence that impedes flow	Remove debris, sediment and vegetation from conveyance further upstream
	777	Debris and vegetation in ditch	Vegetation	26.4453934	-81.7832841	WE - Estero River		
	779	Trees in ditch	Vegetation	26.445751	-81.7834051	WE - Estero River		
	781	Trees across ditch	Vegetation	26.4470446	-81.783833	WE - Estero River		
	792	Debris upstream of culvert	Debris	26.4464655	-81.788595	WE - Estero River	Remove debris	
	908	Trees in ditch	Vegetation	26.4464077	-81.7835906	WE - Estero River	Remove debris	
	909		Vegetation	26.4460967	-81.7835539	WE - Estero River	Remove debris	
	1150	Fallen tree with restriction.	Vegetation	26.4125223	-81.8052658	WE - Halfway Creek	Remove fallen trees from flow way	
	1288	Fallen trees and vegetation build up, flow restriction.	Vegetation	26.4268659	-81.7872314	WE - Estero River	Remove debris	
	1290	Vegetation build up and fallen tree, flow restriction.	Vegetation	26.4272897	-81.7878903	WE - Estero River	Remove debris	
	1291	Heavy sediment build up with fallen trees and flow restriction.	Sediment	26.4272749	-81.7886419	WE - Estero River	Remove sediment and debris	
	1292	Fallen trees and flow restriction.	Vegetation	26.4271765	-81.7894841	WE - Estero River	Remove debris	
	1293	Fallen trees.	Vegetation	26.4278778	-81.7905075	WE - Estero River	Remove debris	
	1294	Down tree restricting flow	Vegetation	26.4279441	-81.790568	WE - Estero River	Remove debris	
	1295	Fallen vegetation, flow restriction.	Vegetation	26.4283843	-81.7913121	WE - Estero River	Remove debris	
	1296	Fallen tree with sediment build up.	Sediment	26.4296144	-81.7919186	WE - Estero River	Remove debris	
	1300	Fallen tree with heavy sediment build up restricting flow to two culverts.	Sediment	26.4310454	-81.7933667	WE - Estero River	Remove debris and sediment	
	1708	Canal overgrown	Vegetation	26.4315328	-81.781457	WE - Estero River	Improve ditch maintenance. Remove debris	
	1709	Ditch over grown	Vegetation	26.4323174	-81.7790923	WE - Estero River	Improve ditch maintenance. Remove debris	
	1710		Vegetation	26.4342745	-81.7793274	WE - Estero River	Improve ditch maintenance. Remove debris	
	1712		Vegetation	26.4358559	-81.7795915	WE - Estero River	Improve ditch maintenance. Remove debris	
	1715	Debris and trash in inlet	Debris	26.4401495	-81.7884299	WE - Estero River	Remove trash & debris	
	1716	Structure covered in vegetation	Vegetation	26.4421449	-81.7884897	WE - Estero River	Remove vegetation	
	1721	Vegetation cutting off flow	Vegetation	26.4491988	-81.7847609	WE - Estero River	Remove vegetation	
	1852		Vegetation	26.3378311	-81.7522336	WE - Imperial River	Remove debris	
	1856	Fence across ditch. Vegetation in ditch	Other	26.3396468	-81.751476	WE - Imperial River	remove debris, remove fence across ditch, improve maintenance	
	1857		Vegetation	26.3379526	-81.7511613	WE - Imperial River	Improve maintenance	
	1865	Sediment, veg and debris in pipe	Debris	26.3568609	-81.7579652	WE - Leitner Creek	Remove sediment and debris	
	1866		Vegetation	26.3603131	-81.7607227	WE - Leitner Creek	Remove vegetation	
	1867	Fence and veg across pipe	Debris	26.3609251	-81.7613427	WE - Leitner Creek	Remove fence.	
	2029		Debris	26.333754	-81.7787945	WE - Oak Creek	Remove debris	
	2031	Vegetation and debris upstream and under bridge	Debris	26.3359676	-81.7805428	WE - Oak Creek	Remove debris	

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	2032	Debris in creek	Debris	26.3366066	-81.7846648	WE - Oak Creek	Remove debris	
	2051	Fence and debris in front of culvert	Debris	26.3669323	-81.7956282	WE - Spring Creek	Remove fence and debris	
	2207	Some leaning and fallen trees, flow seems unobstructed	Vegetation	26.3616448	-81.7992115	WE - Spring Creek	Clean out flow way. Check crossing capacity. Investigate improved flow from east. Water must make two 90 degree turns	
	774	Sediment in ditch	Sediment	26.4452611	-81.7834499	WE - Estero River	remove sediment	
	797	Shrub/tree growing in flow way	Vegetation	26.4458301	-81.7905038	WE - Estero River	Clean flow way of exotics, debris and overgrowth	
	1861	Vegetation and erosion around pipes	Vegetation	26.3461564	-81.7530329	WE - Imperial River	Improved ditch maintenance	
	1862		Vegetation	26.3485703	-81.7536097	WE - Imperial River	Improved ditch maintenance	
	1863		Vegetation	26.3532534	-81.7551202	WE - Imperial River	Improved ditch maintenance	
	1864		Vegetation	26.3552412	-81.7566576	WE - Leitner Creek	Improved ditch maintenance	
	1875	Down fence upstream of pipe	Other	26.4050761	-81.7725297	WE - Estero River	Remove fence from flow path	
	1877		Vegetation	26.4150749	-81.7727862	WE - Estero River	Improved ditch maintenance	
	2034		Sediment	26.3598776	-81.794142	WE - Spring Creek	Remove sediment	
28	A37	Under water during Irma	High Water Indicator	26.3589761	-81.7348266		Install culverts under Bonita Grande Drive	Bonita Grande Culverts
29	1156	Vegetation build up at culvert, flow restricted.	Vegetation	26.3623302	-81.7904152	WE - Spring Creek	Remove vegetation and debris	Bernwood ditch maint
	1157	Wire fence down with vegetation and debris build up with blockage/restriction. Good flow leaving culvert until fence line.	Vegetation	26.3620223	-81.7906643	WE - Spring Creek	Remove fence and debris	
	2040	Fence across ditch	Debris	26.3620273	-81.7906804	WE - Spring Creek	Remove fence across ditch	
	2049		Debris	26.361032	-81.7926455	WE - Spring Creek	Remove debris	
	2050	Sediment and debris around railroad tracks	Debris	26.3608546	-81.7927937	WE - Spring Creek	Remove debris and sediment	
	2208	Water flow seems inhibited by tree debris	Vegetation	26.3607356	-81.7928663	WE - Spring Creek	Remove debris and sediment	
	2209	Railroad	Inspected Area	26.3609232	-81.7928441	WE - Spring Creek	Remove debris	
	1842	Vegetation and sediment build up with blockage and restriction. Flow only in center pipe of crossing.	Sediment	26.3650835	-81.7876195	WE - Spring Creek	Remove sediment and debris	
	2041	Sediment in one side erosion on the other	Sediment	26.3620487	-81.7906496	WE - Spring Creek	Remove fence and sediment	
	2042	Debris and sediment	Debris	26.36237	-81.790422	WE - Spring Creek	Remove debris and sediment	
	2043		Sediment	26.3618393	-81.7914192	WE - Spring Creek	Remove sediment	
	2044	Significant erosion around structure. It may need to be replaced	Erosion	26.3617255	-81.7915614	WE - Spring Creek	Investigate structure capacity. Consider repair/replacement	
	2045		Sediment	26.361695	-81.7917376	WE - Spring Creek	Remove sediment	
	2046	Debris in ditch diverting flow and creating erosion	Debris	26.3614056	-81.7921418	WE - Spring Creek	Remove debris	
	2047	Sediment narrowing flow	Sediment	26.3612711	-81.7923311	WE - Spring Creek	Remove sediment	
	2048	Debris on banks	Debris	26.3611825	-81.792474	WE - Spring Creek	Remove Debris	
30	1119	Sediment in canal	Sediment	26.3530731	-81.7778822	WE - Imperial River	Remove sediment	Rosemary ditch maintenance
	1120		Sediment	26.353118	-81.7761933	WE - Imperial River	Remove sediment	
	1121		Sediment	26.3531212	-81.7742757	WE - Imperial River	Remove sediment	
	1122		Sediment	26.3531732	-81.7688667	WE - Imperial River	Remove sediment	
	1123	Rocks in canal	Sediment	26.3531372	-81.7720182	WE - Imperial River	Remove sediment and rocks	
	1124		Sediment	26.353139	-81.7728906	WE - Imperial River	Remove sediment	
	1025	Sediment and vegetation in ditch	Sediment	26.3572066	-81.7626945	WE - Imperial River	Remove sediment. Get swale back into compliance with design section.	
	1026	Sediment and vegetation in ditch	Sediment	26.3571524	-81.7638365	WE - Imperial River	Remove sediment. Get swale back into compliance with design section.	
	1028	Sediment in ditch	Sediment	26.3571567	-81.7664348	WE - Imperial River	Remove sediment. Get swale back into compliance with design section.	

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	1029	Sediment and vegetation in ditch	Sediment	26.3564409	-81.7677139	WE - Imperial River	Remove sediment. Get swale back into compliance with design section.	
31	1515	Bridge crossing may narrow flow	Other	26.4354537	-81.8027753	WE - Estero River	Investigate capacity at bridge crossing. Consider redesign if to small	Bamboo Island bridge size
32	635	Fast flow under bridge might indicate structure is to small	Other	26.4327786	-81.7939672	WE - Estero River	Check flow capacity under bridge. Consider increasing channel size.	Widen Estero River South Branch channel under Country Creek Drive bridge.
33	1520	Shallow section of river	Sediment	26.4351154	-81.8012828	WE - Estero River	Monitor sediment. Remove if it doesn't move downstream	Estero River sediment - monitor and potentially remove
	280	Shallow area of river	Sediment	26.4346678	-81.8027395	WE - Estero River	Monitor shallow area. Pursue removing sediment if it doesn't naturally move downstream	
	1522	Shallow area	Sediment	26.4348394	-81.8019008	WE - Estero River	Monitor sediment. Remove if it doesn't move downstream	
34	566	Vegetation impacting flow	Vegetation	26.4411161	-81.8068683	WE - Estero River	Remove vegetation from railroad ditch	Estero River Watershed RR ditch - remove vegetation
	574	Tree in middle of ditch	Vegetation	26.4381811	-81.8068561	WE - Estero River	Remove vegetation from railroad ditch	
	575	Tree in ditch	Vegetation	26.4379059	-81.8068617	WE - Estero River	Remove vegetation from railroad ditch	
	578	Tree and stumps in ditch	Vegetation	26.4373677	-81.8068176	WE - Estero River	Remove vegetation from railroad ditch	
	579	Trees in ditch	Vegetation	26.4370867	-81.8068172	WE - Estero River	Remove vegetation from railroad ditch	
	580	Trees and stumps in ditch	Vegetation	26.4365295	-81.8068259	WE - Estero River	Remove vegetation from railroad ditch	
	581	Rocks and stumps narrow ditch	Other	26.4360298	-81.8068379	WE - Estero River	Remove vegetation from railroad ditch	
	582	Tree and fallen tree in ditch	Vegetation	26.4358416	-81.80682	WE - Estero River	Remove vegetation from railroad ditch	
	570	Overgrown banks	Vegetation	26.4396561	-81.8067504	WE - Estero River	Remove vegetation from railroad ditch	
	571	Almost vertical slopes	Erosion	26.4391357	-81.806861	WE - Estero River	Stabilize slope	
	572	Trimmed tree hanging over ditch	Vegetation	26.4389372	-81.8068703	WE - Estero River	Remove tree stump	
	573	Ditch overgrown	Vegetation	26.4388388	-81.8068529	WE - Estero River	Remove vegetation. Stabilize slope	
	577	Trees in ditch	Vegetation	26.4375624	-81.8068441	WE - Estero River	Remove tree in middle of ditch	
	562	Debris and sediment in pipe crossing	Debris	26.4419768	-81.8068899	WE - Estero River	Remove sediment and debris	
35	2162	Stabilized slope	Erosion	26.3405608	-81.7526253	WE - Imperial River	Investigate swale capacity. Did riprap reduce capacity	Pinecrest ln outfall - remove debris and vegetation
	2163		Vegetation	26.3403978	-81.7525837	WE - Imperial River	Remove debris and overgrown vegetation	
	2164		Vegetation	26.3393839	-81.7523951	WE - Imperial River	Remove debris and overgrown vegetation	
	2165		Vegetation	26.3387839	-81.7522662	WE - Imperial River	Remove debris and overgrown vegetation	
	2166	Large tree in ditch	Debris	26.3377804	-81.7520005	WE - Imperial River	Remove debris and overgrown vegetation	
	2167	Sediment, vegetation and debris downstream of box culvert	Debris	26.3374857	-81.7518544	WE - Imperial River	Remove debris and overgrown vegetation	
	2204	No obstructions at pipes	Vegetation	26.336319	-81.7529778	WE - Imperial River	Remove exotic and overgrown vegetation	
	2205	Tree and garbage debris in flow path	Vegetation	26.3363549	-81.7528524	WE - Imperial River	Remove debris	
	2206	Fallen tree in flow path	Vegetation	26.3364162	-81.7527976	WE - Imperial River	Remove debris	
36	1270	Fallen tree blocking flow	Debris	26.4205477	-81.7766585	WE - Estero River	Remove fallen tree	Estero River South Branch upstream sediment, debris and vegetation removal. Investigate potential spreader swale at I-75 to better distribute flows downstream.
	1271	Fallen vegetation	Vegetation	26.4206864	-81.7778639	WE - Estero River	Remove vegetation	
	1272	Fallen vegetation restricting from upland.	Vegetation	26.4207694	-81.777922	WE - Estero River	Remove vegetation	
	1273	Downed trees	Vegetation	26.4217706	-81.7792964	WE - Estero River	Remove vegetation	
	1274	Fallen trees with vegetation build up, flow restriction.	Vegetation	26.4228411	-81.7814494	WE - Estero River	Remove vegetation	
	1278	Vegetation debris blocking flow	Vegetation	26.424502	-81.7840853	WE - Estero River	Remove debris	
	1280	Fallen trees with flow restriction.	Vegetation	26.4246108	-81.784455	WE - Estero River	Remove debris	
	1281	Fallen trees and vegetation restricting flow from upland side canal to flow way.	Vegetation	26.4246322	-81.7846455	WE - Estero River	Remove debris	
	1282	Down trees over creek	Vegetation	26.425509	-81.7852488	WE - Estero River	Remove debris	
	1285	Down trees over creek	Vegetation	26.4262838	-81.7860916	WE - Estero River	Remove debris	
	1286	Fallen trees with vegetation buildup, flow restriction.	Vegetation	26.426474	-81.7865019	WE - Estero River	Remove debris	
	1287	Vegetation and sediment in creek	Vegetation	26.4265689	-81.7866318	WE - Estero River	Remove debris	
	1298	Sediment build up in pipe draining to flow way.	Other	26.429965	-81.7926823	WE - Estero River	Remove debris	
	1299	Fallen vegetation with flow restriction.	Vegetation	26.4302267	-81.7926853	WE - Estero River	Remove debris	

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
	1880	Exotic vegetation could be slowing flow	Vegetation	26.4174336	-81.7737762	WE - Halfway Creek	Remove exotic vegetation to improve flow	
	1881	Veg downstream of culvert	Vegetation	26.4157821	-81.7737428	WE - Halfway Creek	Improved ditch maintenance. Remove exotic vegetation	
	1878		Vegetation	26.4217113	-81.7736188	WE - Estero River	Remove vegetation	
37	1903	Trees in creek, dry, and pipes with vegetation and debris in them, flow restrictions.	Debris	26.3517299	-81.7684636	WE - Leitner Creek	Remove sediment	Leitner tributary sediment, debris and vegetation removal
	1904	Vegetation debris blocking swale	Vegetation	26.3515657	-81.7683782	WE - Leitner Creek	Remove debris and sediment	
38	1592	Pipe full of sediment. Swale elv. Higher than pipe	Sediment	26.4522323	-81.7188936	WE - Imperial River	Improve outfalls under Corkscrew Road. Remove debris, sediment and vegetation. Flows needs to be direct E or W of Developments on S side of Road	Corkscrew Road, east flow to south
	1594	Pipe in a hole.	Other	26.4520916	-81.7209031	WE - Imperial River		
	1595	Pipe in a hole	Other	26.4524025	-81.7152672	WE - Imperial River		
	1596	Pipe in a hole	Sediment	26.452572	-81.7118995	WE - Imperial River		
	1597	Small swale from pipe	Sediment	26.4527246	-81.7088172	WE - Imperial River		
	1598	Fence and veg could reduce flow	Debris	26.4529492	-81.7043431	WE - Imperial River		
	1599	Sediment in end of pipe	Sediment	26.4529803	-81.7033999	WE - Imperial River		
	1600	Rocks at outfall may reduce flow	Other	26.4530528	-81.7021202	WE - Imperial River		
	1601	Sediment in pipe. Pipe in hole with smaller pipe downstream	Sediment	26.4515983	-81.7333247	WE - Estero River		
	1602	Sediment and debris in pipe	Sediment	26.4514586	-81.735228	WE - Estero River		
	1603	Tire in pipe	Debris	26.4935771	-81.7273698	WE - Estero River		
	1605	Debris and veg upstream of pipes	Debris	26.4935427	-81.7275541	WE - Estero River		
	1608	Sediment in pipe	Sediment	26.4933513	-81.727528	WE - Estero River		
	1615	Downstream end clogged with sediment and vegetation	Sediment	26.4499177	-81.7413597	WE - Estero River		
	1645	Driveway with no culvert	Other	26.4497314	-81.7422255	WE - Estero River	Install culvert under driveway	
39	650	Debris line and debris pinned against fence.	Debris	26.4347089	-81.7975928	WE - Estero River	Investigate removing fence to eliminate debris restriction	Estero River South Branch fence
40	791	Bubble up structure. Check to see if it is large enough. Could have sediment in bottom, should check.	Other	26.4492388	-81.7882014	WE - Estero River	Check size of bubble up structure to confirm it is large enough for flow. Determine if there are tailwater affects creating high water levels.	Estero Parkway bubble up structure
41	782	View of flow path	Vegetation	26.4475963	-81.7841718	WE - Estero River	Improve flow through Lee County land south of Estero Parkway. Existing flow appears to be limited	Flow way improvement between Estero Pkwy and Villagio Community
	783	Flow path indicates water but flow difficult	Vegetation	26.4476617	-81.7843588	WE - Estero River		
	784	Berm along ditch	Other	26.4477845	-81.7843508	WE - Estero River		
	785	Rip rap connection to ditch	Vegetation	26.4481053	-81.7843699	WE - Estero River		
42	146	Bank erosion and tree in river	Debris	26.4373263	-81.7983956	WE - Estero River	Consider stabilizing bank slopes	Estero River bank slopes
	628	Retaining wall collapsing	Erosion	26.4324857	-81.7936825	WE - Estero River	Consider stabilizing bank slopes	
43	1349	Erosion and berm breach	Erosion	26.4509419	-81.5951928	WE - Imperial River	Repair erosion and stabilize slope	Corkscrew Rd berm breach
44	1934	Veg appears to indicate southern flow. Approved 65 ft bridge	Other	26.5050017	-81.5114164	WE - Imperial River	Large Drainage Structure at Basin Boundary. Investigate flows that cross boundary.	Watershed boundary flows - investigate flows across watershed boundary
	1935	Approx. 50ft bridge on drainage boundary	Other	26.5095287	-81.5285972	WE - Imperial River	Large Drainage Structure at Basin Boundary. Investigate flows that cross boundary.	
	1936	Triple culvert crossing	Other	26.5255761	-81.5925034	WE - Imperial River	Large Drainage Structure at Basin Boundary. Investigate flows that cross boundary.	
45	A3	Worthington experienced road flooding		26.327762	-81.7301452		Investigate installing outfall to the south to reduce flooding	Redirect flows from Worthington, Palmira and Village Walk south to Cocohatchee River Watershed
	A4	Palmira experienced road flooding		26.3234679	-81.7152812		Investigate installing outfall to the south to reduce flooding	
46	1538	Clogged drain	Debris	26.4310879	-81.794616	WE - Estero River	Structure regularly clogs. Redesign structure to prevent clogging	River Ranch/Corkscrew grate - install new structure that will prevent clogging
47	70	Pipes	Debris	26.4382458	-81.8008382	WE - Estero River	Improve Country Creek by-pass capacity	Country Creek bypass - Improvements
	74	Potential high spot in ditch	Sediment	26.4417791	-81.8008072	WE - Estero River		
	75	Vegetation covering 1 of 3 pipes. Standing water at both sides of pipes	Vegetation	26.4404785	-81.8006289	WE - Estero River		

Project Summary Table

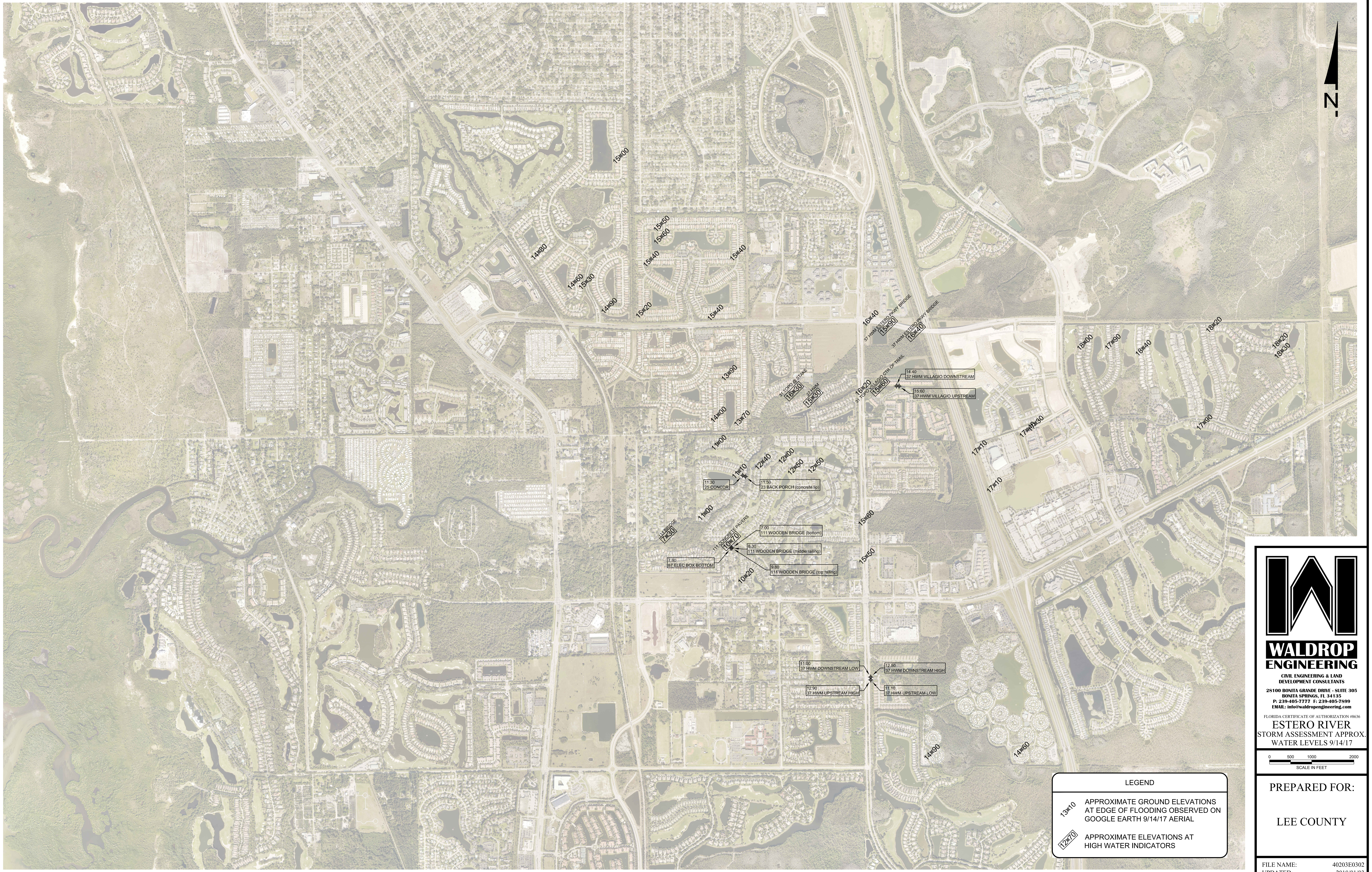
Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
	77	Narrow section	Other	26.4409945	-81.8007966	WE - Estero River		
	78	High area in ditch	Sediment	26.441423	-81.8007679	WE - Estero River		
	82	Sediment at bypass ditch inflow	Sediment	26.4419528	-81.7958919	WE - Estero River		
48	1159	Fallen vegetation throughout stretch of canal on south side of Strike Lane. Some minor flow restrictions.	Vegetation	26.3825167	-81.773503	WE - Spring Creek	Investigate Imperial River/Spring Creek Connection	Imperial River/Spring Creek Interconnection under I-75.
49	2078			26.4465344	-81.8055564	WE - Estero River	check size of swale and pipes	Cascades outfall investigation
	2079			26.4462344	-81.8057469	WE - Estero River	check size of swale and pipes	
	2080			26.4451389	-81.8071244	WE - Estero River	check size of swale and pipes	
	2081			26.445062	-81.8070978	WE - Estero River	check size of swale and pipes	
	2082			26.4451766	-81.8072047	WE - Estero River	check size of swale and pipes	
	2083			26.4455704	-81.8074602	WE - Estero River	check size of swale and pipes	
50	647	Potentially expand capacity under bridge on north side of creek	Other	26.4343187	-81.796774	WE - Estero River	Investigate removing sediment under bridge to increase capacity	Floodplain flow under Country Creek Drive
51	1524	Trees in river	Vegetation	26.4348536	-81.8099929	WE - Estero River	Trim trim tree to reduce flow impacts.	Trim trees by Estero Outfitters
52	1054	Ditch running south along railroad tracks to rosemary canal	Other	26.3488606	-81.7804285	WE - Imperial River	Expand/extend ditch to interconnect Rosemary Canal w/ Spring Creek	Ditch along Railroad to interconnect Rosemary Canal & Spring Creek
53	1882	Better align ditch with two culverts. Sediment.	Sediment	26.4052344	-81.7735387	WE - Halfway Creek	Remove sediment. Realign ditch to reduce sedimentation	I-75 ditch realignment - Spring Creek
54	131	Concrete structure in creek	Other	26.4364559	-81.7994426	WE - Estero River	Remove concrete from creek bank	Remove concrete in creek banks
	291	Concrete embankment	Other	26.4419563	-81.7953108	WE - Estero River	Remove concrete from creek bank	
55	1198	Culvert in a hole and silted in. Only 1 ft 3 in exposed.	Other	26.345489	-81.75444	WE - Imperial River	Investigate constructing a ditch to the south to improve in this area	Investigate improved outfall to the south (E Terry St)
	L131	3x8 box culvert. Gates on north end	Other	26.3457961	-81.7543254		Investigate improved outfall to the south and better conveyance of water to the pipe from the north.	
56	516	Berm at ditch turn to prevent flow south	Other	26.4430773	-81.7968939	WE - Estero River		Construct overflow south from Estero Pkwy outfall to Country Creek bypass ditch
57	2219	Downed vegetation	Vegetation	26.4754075	-81.7922407	WE - Estero River	Remove vegetation	Remove debris, sediment and vegetation from ditch, along I-75 & Three Oaks
	2220	Falling and leaning trees	Vegetation	26.4751857	-81.7922754	WE - Estero River	Remove debris	
	2221	Vegetation	Vegetation	26.4748441	-81.7922	WE - Estero River	Remove vegetation	
	2222	trees along bank	Vegetation	26.472678	-81.7915651	WE - Estero River	Removed vegetation	
	2153	Grass and dirt build up	Sediment	26.4643446	-81.7892068	WE - Estero River	Remove sediment	
	2223	Trees along swale	Vegetation	26.4688862	-81.7905692	WE - Estero River	Remove sediment & debris	
	2225	Vegetation in channel	Vegetation	26.4668789	-81.7898883	WE - Estero River	Remove vegetation	
	2226	Fallen branches	Vegetation	26.4663266	-81.7896856	WE - Estero River	Remove debris	
	2227	Grass and dirt build up	Sediment	26.4657673	-81.789602	WE - Estero River	Remove sediment	
	2228	Dirt and grass build up	Sediment	26.4639094	-81.7890117	WE - Estero River	Remove sediment	
	2230	Grass	Vegetation	26.463754	-81.7890389	WE - Estero River	Remove sediment	
	2231	Grass build up	Vegetation	26.4627825	-81.7887213	WE - Estero River	Remove sediment	
	2232	Grass and dirt build up	Sediment	26.4586476	-81.7875871	WE - Estero River	Remove sediment	
	2233	Lots of vegetation	Vegetation	26.4580672	-81.7874542	WE - Estero River	Remove vegetation	
	2234	Vegetation	Vegetation	26.4576851	-81.7872967	WE - Estero River	Remove vegetation	
	2235	Tree debris	Debris	26.4576153	-81.7873151	WE - Estero River	Remove debris	
58	2086	Riprap in pipe	Debris	26.3387986	-81.7384841	WE - Imperial River	Remove riprap from inside pipe. Relay to provide riprap from clogging pipe	Kehl Canal Weir maintenance
	2093		Erosion	26.339117	-81.7386972	WE - Imperial River	Stabilize slope	
	2087	Riprap in pipe. Damaged hdpe	Damaged Structure	26.3390088	-81.7385199	WE - Imperial River	Check pipe size. Replace/repair as needed.	
	2088	High velocity, debris, vegetation and damaged structure	Damaged Structure	26.3392607	-81.7385422	WE - Imperial River	Check pipe size. Replace/repair as needed.	
	2089		Erosion	26.3393135	-81.7385348	WE - Imperial River	Stabilize channel	
	2091	Sediment upstream of weir	Sediment	26.3386628	-81.7377994	WE - Imperial River	Remove sediment	
	2092		Sediment	26.3390579	-81.7381195	WE - Imperial River	Remove sediment	
59	134	Dead cypress tree in river	Vegetation	26.4369207	-81.799291	WE - Estero River	Remove cypress tree stump	Selective tree removal
	141	Erosion around palm trees next to river	Vegetation	26.4378358	-81.7979975	WE - Estero River	Consider remove palm tree before it falls into creek	
	153	Tree and tree stumps restricting flow	Vegetation	26.4370086	-81.7992857	WE - Estero River	Consider removing tree stump	

Project Summary Table

Ranking	Observation ID	Findings	Observation	LatDD	LongDD	Watershed	Consultant Remarks	General Description
60	1696	Sediment and rip rap reducing flow into creek	Sediment	26.4315815	-81.7934311	WE - Estero River	Channel narrows at connection with Creek. Investigate capacity. Increase size if needed.	Corkscrew ditch capacity at Estero River
61	522	Area of very high land	Sediment	26.4436363	-81.7957725	WE - Estero River	Land appears to be high. Determine if this is natural. If not, consider removing added fill.	High land in Rookery Preserve
62	139	Bank erosion	Erosion	26.4381735	-81.7974101	WE - Estero River	Slope is almost vertical. Consider stabilizing bank slope.	Estero River North Branch slope
63	140	Debris build up in overbank	Debris	26.438187	-81.7974297	WE - Estero River	Remove debris in overbanks to prevent it from creating flow impediments in future events.	Overbank debris - Consider removing so it doesn't restrict flows.
	151	Debris in over banks	Debris	26.4370752	-81.7989895	WE - Estero River		
	521	Trash in overbank. Tree in creek.	Debris	26.4436233	-81.7957873	WE - Estero River	Remove overbank debris	
	526	Debris in floodplain	Debris	26.4441893	-81.795347	WE - Estero River	Remove floodplain debris	
	529	Debris in floodplain and creek	Debris	26.4442628	-81.7950158	WE - Estero River	Remove floodplain debris	
64	1240			26.3523025	-81.7558142	WE - Imperial River	Check pipe size. Replace/repair as needed.	Southern Pines Drive swale and pipe sizes improvement
	1885	Driveway with no pipes across swale	Other	26.3516076	-81.7562654	WE - Imperial River	Add pipe under driveway	
	L132	I-75 pipe much larger capacity than swale or pipes	Other	26.3496436	-81.7557069		Investigate capacity of swale. Increase size if appropriate.	
65	1247	Narrow swale and sediment in pipe	Sediment	26.3590104	-81.7508727	WE - Imperial River	Investigate improve flow south along Morton Ave.	Morton Ave swale improvements
	1889	Swale crossing without pipe	Other	26.3595523	-81.751011	WE - Imperial River		
66	1073	Railroad ditch at turn	Vegetation	26.3440479	-81.7802528	WE - Imperial River	Investigate continuing RR ditch south to Imperial River for overflow.	Rosemary ditch railroad overflow
67	1707	Drainage structure entirely clogged	Sediment	26.4315285	-81.7815271	WE - Estero River	Clean out clogged structure	HOA / Owner coordination
	2027	Baffle preventing flow	Sediment	26.3313466	-81.7692126	WE - Oak Creek	Excavate and install riprap around baffle	
	113	No drainage in back yards. No swales on lot lines.	Other	26.4320184	-81.7975475	WE - Estero River		
	143	Berm breach into river	Erosion	26.437568	-81.7982041	WE - Estero River	Coordinate with HOA to get berm repaired	
	154	Potential home owner landscaping into creek preserve	Vegetation	26.4370013	-81.7993137	WE - Estero River	Work with HOA to address impacts to preserve	
	156	Berm overflow into river	Erosion	26.436865	-81.7994809	WE - Estero River	Coordinate with HOA to get berm repaired	
	157	Berm erosion into river	Erosion	26.4362853	-81.7999443	WE - Estero River	Coordinate with HOA to get berm repaired	
68	1674	Corkscrew rd. Structure clogged	Debris	26.4315555	-81.7936965	WE - Estero River	Remove debris from bleeder	Corkscrew Rd Structure maintenance
69	1356	Rusted out and sediment	Sediment	26.4851137	-81.7230746	WE - Estero River	Replace culvert	Devore/mallard internal maintenance
	1358		Vegetation	26.482277	-81.7229597	WE - Estero River	Remove vegetation and debris from swale	
	1359		Debris	26.4869473	-81.7230707	WE - Estero River	Remove vegetation and debris from swale	
	1360		Vegetation	26.4878447	-81.7230787	WE - Estero River	Remove vegetation and debris from swale	
	1361	Veg in both swales	Vegetation	26.4895781	-81.7227644	WE - Estero River	Remove vegetation and debris from swale	
	1364		Vegetation	26.482886	-81.7031874	WE - Estero River	Remove vegetation and debris from swale	
	1365		Vegetation	26.4901374	-81.7011035	WE - Estero River	Remove vegetation and debris from swale	
	1366		Vegetation	26.4900742	-81.7020261	WE - Estero River	Remove vegetation and debris from swale	
70	1085	Deck and trees in bank	Vegetation	26.3438653	-81.7806989	WE - Imperial River	Investigate flow impacts from Deck and trees. Consider modifications if impacts are significant.	Investigate Rosemary ditch trees & deck impacts
71	1701	Gap in sidewalk indicates potential erosion toward canal	Erosion	26.4315207	-81.7859443	WE - Estero River	Check slope stability. Fix sidewalk. Relay riprap	Corkscrew ditch slope and sidewalk repair
	1702	Rip rap slid into canal	Erosion	26.4315075	-81.7858477	WE - Estero River		
72	388	Rip rap at end of pipe reducing flow	Other	26.4531446	-81.6987439	WE - Imperial River	Lower riprap to improve flow south. Investigate fence alternative to reduce impact on flow.	Corkscrew Rd pipe maintenance
	1617	Vegetation likely impedes flow	Vegetation	26.4481075	-81.7454992	WE - Estero River		
73	1928	Sediment at pipe ends	Sediment	26.4502594	-81.6728482	WE - Imperial River	Remove sediment from pipe	Corkscrew Road East pipes
	1930		Sediment	26.4507888	-81.6159555	WE - Imperial River	Remove sediment from pipe	
74	1938		Vegetation	26.454726	-81.7768927	WE - Estero River	Remove vegetation at culvert	North Branch Estero River at Ben Hill Griffin Pkwy
75	2026		Vegetation	26.3283097	-81.7623607	WE - Oak Creek	Remove vegetation at culvert	Oak Creek at Imperial Pkwy
76	2028	Sediment and debris downstream of culver	Debris	26.3313187	-81.769361	WE - Oak Creek	Remove debris	Oak Creek at Bonita Beach Road
77	2036	Trees across creek	Vegetation	26.364994	-81.808065	WE - Spring Creek	Trim/Remove trees	Spring Creek at US-41
78	2038		Vegetation	26.3665513	-81.7963563	WE - Spring Creek	Remove vegetation from ditch	Spring Creek at Old 41

APPENDIX 2:

WATER ELEVATION MAPS



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FLORIDA CERTIFICATE OF AUTHORIZATION #8636

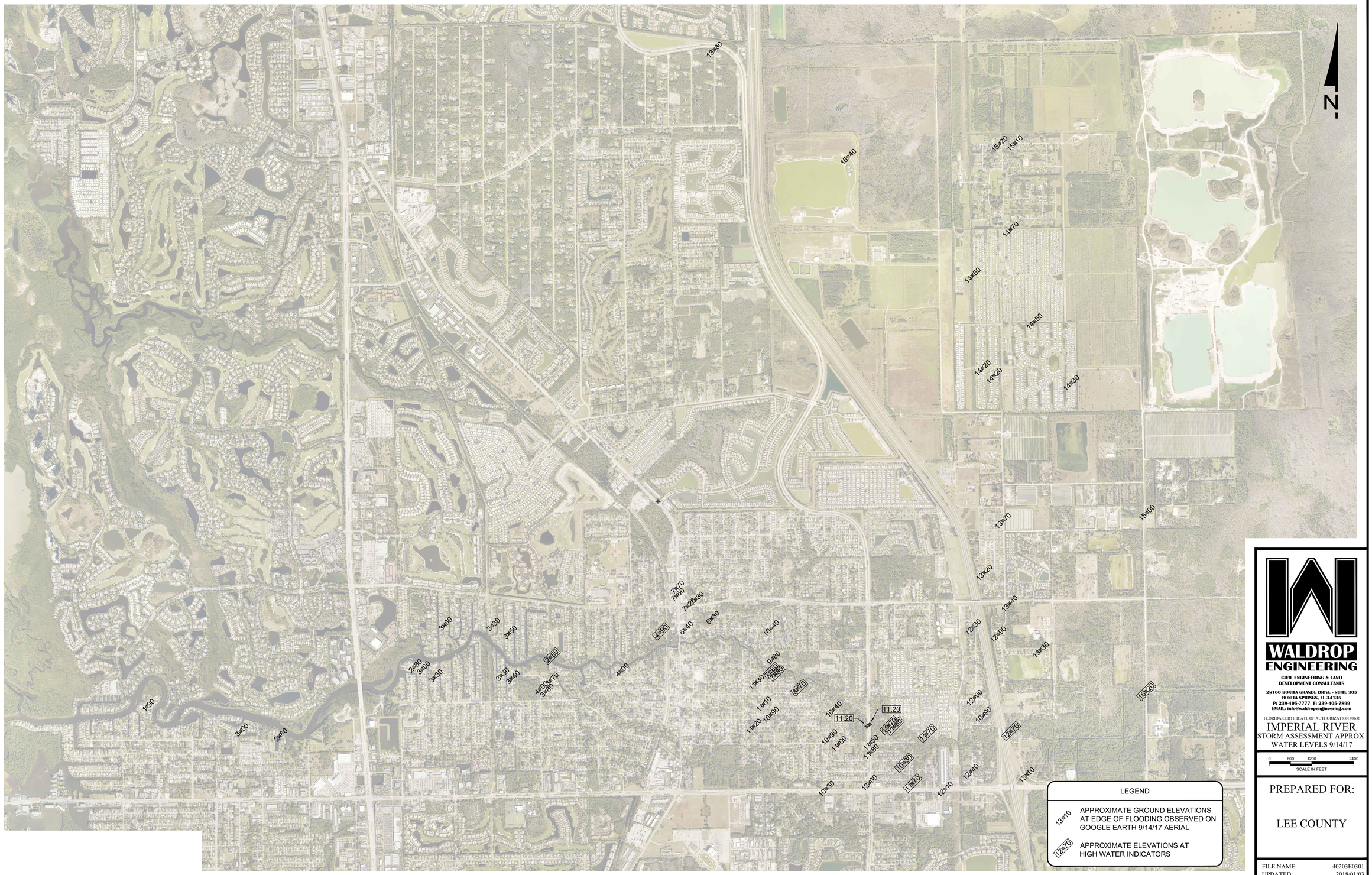
ESTERO RIVER
STORM ASSESSMENT APPROX. WATER LEVELS 9/14/17

0 500 1000 2000
SCALE IN FEET

PREPARED FOR:

LEE COUNTY

FILE NAME: 40203E0302
UPDATED: 2018/01/03



LEGEND

13#10 — APPROXIMATE GROUND ELEVATIONS AT EDGE OF FLOODING OBSERVED ON GOOGLE EARTH 9/14/17 AERIAL

12#70 — APPROXIMATE ELEVATIONS AT HIGH WATER INDICATORS

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FLORIDA CERTIFICATE OF AUTHORIZATION #8636

IMPERIAL RIVER
STORM ASSESSMENT APPROX. WATER LEVELS 9/14/17

0 600 1200 2400
SCALE IN FEET

PREPARED FOR:

LEE COUNTY

FILE NAME: 40203E0301
UPDATED: 2018/01/03

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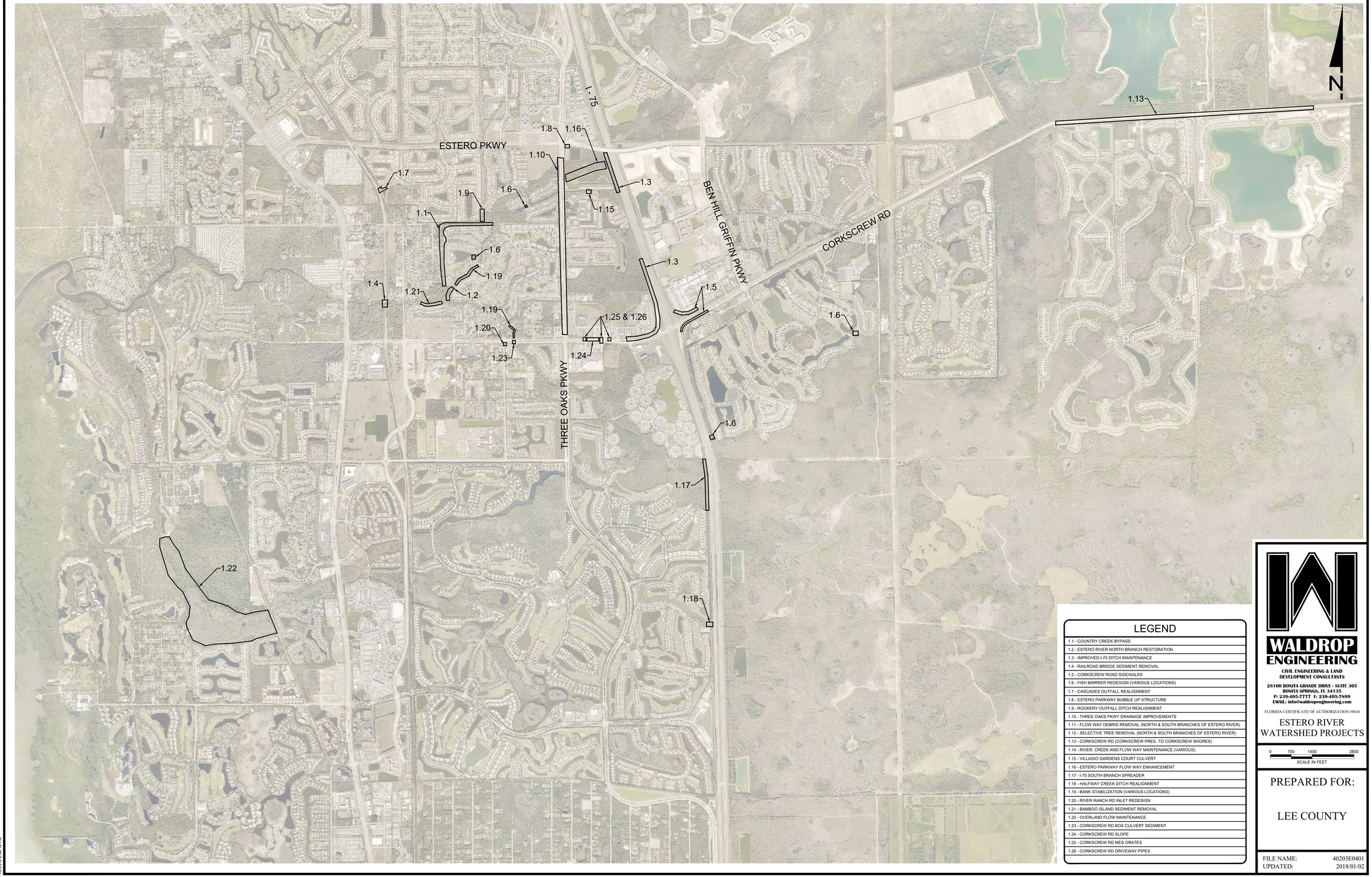
APPENDIX 3:

PROJECT LOCATION MAPS



LEGEND

1.1 - COUNTRY CREEK BYPASS
1.2 - ESTERO RIVER NORTH BRANCH RESTORATION
1.3 - IMPROVED I-75 DITCH MAINTENANCE
1.4 - RAILROAD BRIDGE SEDIMENT REMOVAL
1.5 - CORKSCREW ROAD SIDEWALKS
1.6 - FISH BARRIER REDESIGN (VARIOUS LOCATIONS)
1.7 - CASCADES OUTFALL REALIGNMENT
1.8 - ESTERO PARKWAY BUBBLE UP STRUCTURE
1.9 - ROOKERY OUTFALL DITCH REALIGNMENT
1.10 - THREE OAKS PKWY DRAINAGE IMPROVEMENTS
1.11 - FLOW WAY DEBRIS REMOVAL (NORTH & SOUTH BRANCHES OF ESTERO RIVER)
1.12 - SELECTIVE TREE REMOVAL (NORTH & SOUTH BRANCHES OF ESTERO RIVER)
1.13 - CORKSCREW RD (CORKSCREW PRES. TO CORKSCREW SHORES)
1.14 - RIVER, CREEK AND FLOW WAY MAINTENANCE (VARIOUS)
1.15 - VILLAGIO GARDENS COURT CULVERT
1.16 - ESTERO PARKWAY FLOW WAY ENHANCEMENT
1.17 - I-75 SOUTH BRANCH SPREADER
1.18 - HALFWAY CREEK DITCH REALIGNMENT
1.19 - BANK STABILIZATION (VARIOUS LOCATIONS)
1.20 - RIVER RANCH RD INLET REDESIGN
1.21 - BAMBOO ISLAND SEDIMENT REMOVAL
1.22 - OVERLAND FLOW MAINTENANCE
1.23 - CORKSCREW RD BOX CULVERT SEDIMENT
1.24 - CORKSCREW RD SLOPE
1.25 - CORKSCREW RD MES GRATES
1.26 - CORKSCREW RD DRIVEWAY PIPES

WALDROP ENGINEERING
CIVIL ENGINEERING & LAND DEVELOPMENT CONSULTANTS
28100 BONITA GRANDE DRIVE - SUITE 305
BONITA SPRINGS, FL 34135
P: 239-405-7777 F: 239-405-7899
EMAIL: info@waldropengineering.com
FLORIDA CERTIFICATE OF AUTHORIZATION #8636

ESTERO RIVER WATERSHED PROJECTS

0 700 1400 2800
SCALE IN FEET

PREPARED FOR:

LEE COUNTY

FILE NAME: 40203E0401
UPDATED: 2018/01/02

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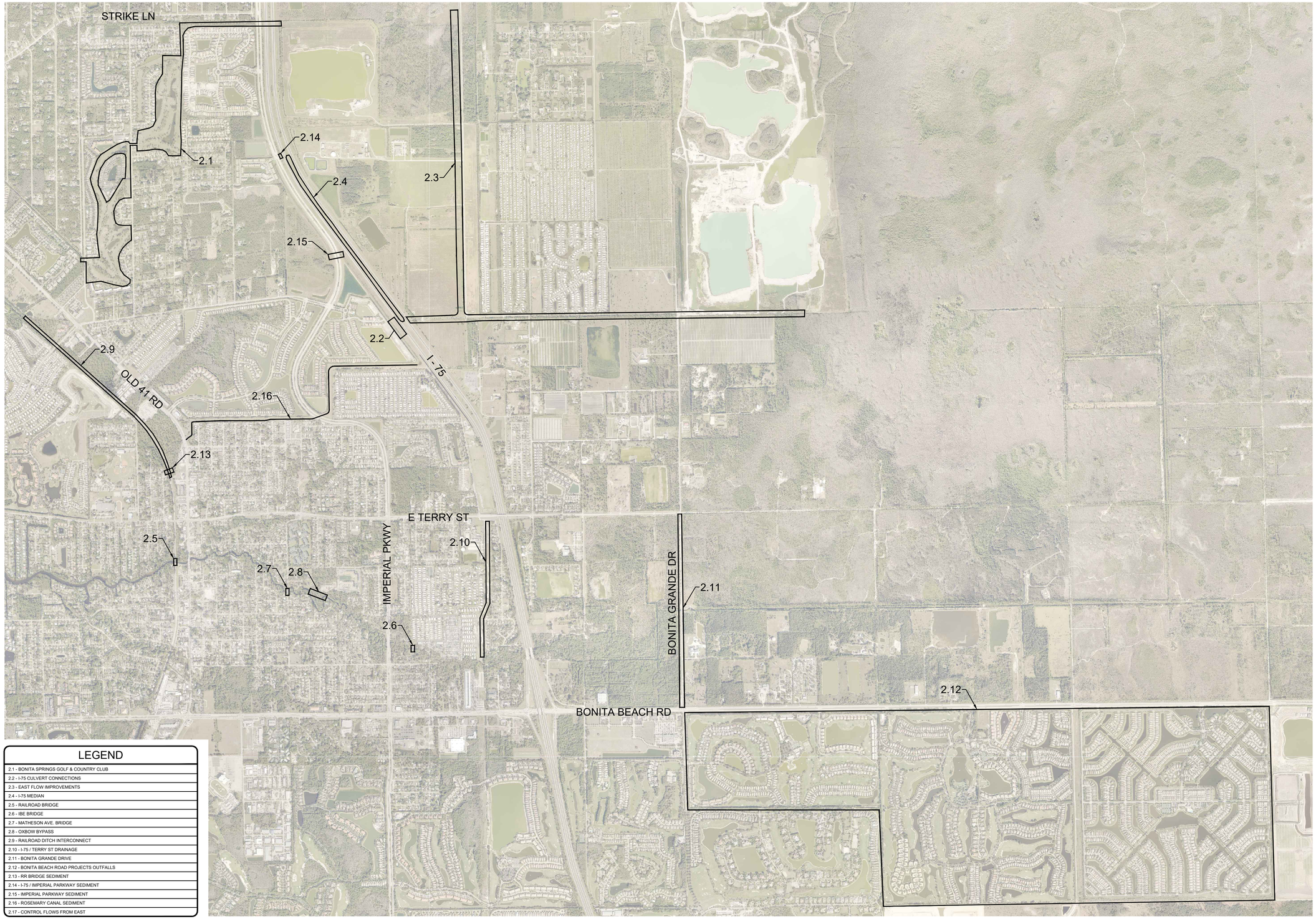
1/2/2018 2:46:18 PM



LEGEND

2.1 - BONITA SPRINGS GOLF & COUNTRY CLUB
2.2 - I-75 CULVERT CONNECTIONS
2.3 - EAST FLOW IMPROVEMENTS
2.4 - I-75 MEDIAN
2.5 - RAILROAD BRIDGE
2.6 - IBE BRIDGE
2.7 - MATHESON AVE. BRIDGE
2.8 - OXBOW BYPASS
2.9 - RAILROAD DITCH INTERCONNECT
2.10 - I-75 / TERRY ST DRAINAGE
2.11 - BONITA GRANDE DRIVE
2.12 - BONITA BEACH ROAD PROJECTS OUTFALLS
2.13 - RR BRIDGE SEDIMENT
2.14 - I-75 / IMPERIAL PARKWAY SEDIMENT
2.15 - IMPERIAL PARKWAY SEDIMENT
2.16 - ROSEMARY CANAL SEDIMENT
2.17 - CONTROL FLOWS FROM EAST

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FLORIDA CERTIFICATE OF AUTHORIZATION #8636

IMPERIAL RIVER WATERSHED PROJECTS

0 600 1200 2400
SCALE IN FEET

PREPARED FOR:

LEE COUNTY

FILE NAME: 40203E0402
UPDATED: 2018/01/02

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APPENDIX 4:

PROJECT SUMMARY PHOTOS

8.1.1 Country Creek Bypass (Table 1, Observation ID: 64, 65, 82)

8.1.2 Estero River North Branch Creek Restoration (Table 1, Observation ID: L37, 124)

8.1.3 Improved I-75 & Corkscrew Ditch Maintenance (Table 1, Observation ID: 1701-1705, 1707-1710, 1712)

8.1.4 Railroad Bridge Sediment Removal (Table 1, Observation ID: 284)

8.1.6 Grass Carp Barrier Redesign (Table 1, Observation ID: 1098)

8.1.7 Cascades Outfall Realignment (Table 1, Observation ID: 565, 2080-2083)

8.1.8 Estero Parkway Bubble-up Structure (Table 1, Observation ID: 791)

8.1.9 Rookery Outfall Ditch Realignment (Table 1, Observation ID: 516)

8.1.10 Three Oaks Parkway Drainage Improvements (Table 1, Ranking: 3)

8.1.15 Villagio Gardens Court Culvert (Table 1, Observation ID: 907)

8.1.16 Estero Parkway Flow Way Enhancement (Table 1, Observation ID: 782-785)

8.1.18 Halfway Creek Ditch Realignment (Table 1, Observation ID: 1882)

8.1.19 Bank Stabilization (Table 1, Observation ID: 127)

8.1.20 River Ranch Road Inlet Redesign (Table 1, Observation ID: 1538)

8.1.21 Bamboo Island Sediment Removal (Table 1, Ranking: 1)

8.1.22 Overland Flow Maintenance (Table 1, Ranking: 13)

8.1.23 Corkscrew Road Box Culvert Sediment (Table 1, Observation ID: 1300, 1673, 1696)

8.1.24 Corkscrew Road Slope (Table 1, Observation ID: 1701, 1702)

8.1.25 Corkscrew Road Driveway MES Grates (Table 1, Observation ID: 745, 1703-1705)

8.1.27 Devore Lane/Mallard Lane (Table 1, Observation ID: 1362, 1363, 1365, 1367)

8.2.2 I-75 Culvert Connections - East of Paloma (Table 1, Observation ID: L70, L71)

8.2.4 I-75 Median (Table 1, Observation ID: 1883)

8.2.13 Railroad Bridge Sediment (Table 1, Observation ID: 1056-1060)

8.2.14 I-75/Imperial Parkway Sediment (Table 1, Observation ID: 1883)

8.2.15 Imperial Parkway Sediment (Table 1, Observation ID: 1017, 1020, 1022)

APPENDIX 5:

CITIZEN QUESTIONNAIRES

OBJECTID	**23**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	Alletram@gmail.com
Property owner or renter?	Property Owner
Name	Jim martella
Phone number	513-235-8690
City	Estero
How many years at this address	5
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	No
Aug High Water Date	
Time of high water	
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	
Owner/Renter summary of August 25-27 flooding experience	
Do you have any photos of the August 25-27 flooding?	
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	
x	-9106872.312
y	3056037.768

OBJECTID	**25**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	gbcupples@gmail.com
Property owner or renter?	Property Owner
Name	Robert and Virginia Cupples
Phone number	614-354-8463
City	Bonita Springs
How many years at this address	15
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	No
Aug High Water Date	
Time of high water	
Aug High Water Date observed	43339
Time of high water observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	
How many days did water remain on your property?	
Owner/Renter summary of August 25-27 flooding experience	water damage especially to skirting
Do you have any photos of the August 25-27 flooding?	No
Were you flooded during Hurricane Irma (September 10)?	No
Did you stay at the property during Hurricane Irma?	
Irma high water date	
Time of high water	
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during Hurricane Irma?	
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	
On average how deep was the water on your property?	
How many days did water remain on your property?	
How many feet away was the water to your home?	
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	
x	-9106591.188
y	3043717.237

ObjectID	**27**
Report date	11/17/2017, 3:00 PM
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	Imperial River
Property Owner/Resident	
Phone	
Owner/Resident phone number	
Owner/Resident e-mail address	
Property Address	27300 Imperial Oaks Circle
How many years have you lived at this location?	1
Did owner/resident stay at property during Hurricane Irma?	Yes
Date of high water	9/11/2017, 3:00 PM
Time of high water	
Date of observation	9/11/2017, 3:01 PM
Time of observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Was your house flooded?	No
How deep?	
Duration?	
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	Water in back yard, didn't reach house. No houses flooded on this street.
Any photos available?	
High water marks available for survey?	
Preparer's comments/observations	High water mark from detention area visible in grass. Higher than top of detention area bank, less than road.
Prepared by	
Property Owner or Resident?	
x	-9101693.818
y	3041405.72

OBJECTID	**32**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	Brucero40@hotmail.com
Property owner or renter?	Property Owner
Name	Bruce Rosenblatt
Phone number	239-595-0207
City	Bonita Springs
How many years at this address	14
Were you flooded during the August 25-27 Rain Event?	No
Did you stay at the property during the August 25-27 Rain Event?	
Aug High Water Date	
Time of high water	4:00 PM
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	
On average how deep was the water on your property?	3 feet
How many days did water remain on your property?	7
Owner/Renter summary of August 25-27 flooding experience	
Do you have any photos of the August 25-27 flooding?	
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	Yes
Irma high water date	11-Sep
Time of high water	4:00 PM
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	3 feet
How many days did water remain on your property?	7
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	Yes
x	-9097163.54
y	3039148.143

ObjectID	**32**
Report date	11/8/2017, 12:00 AM
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	Estero River
Property Owner/Resident	Jarod Novak
Phone	
Owner/Resident phone number	
Owner/Resident e-mail address	
Property Address	21176 Cypress Park Circle
How many years have you lived at this location?	22
Did owner/resident stay at property during Hurricane Irma?	No
Date of high water	
Time of high water	
Date of observation	
Time of observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	For Irma water was just below the top railing on the bridge. August event just over bridge deck.
Was your house flooded?	No
How deep?	
Duration?	
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	
Any photos available?	
High water marks available for survey?	Yes
Preparer's comments/observations	
Prepared by	
Property Owner or Resident?	
x	-9105707.932
y	3053036.354

ObjectID	**39**
Report date	11/28/2017, 2:00 PM
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	Imperial River
Property Owner/Resident	Bill Delayo, General Manager of Worthington
Phone	Landline
Owner/Resident phone number	2399082900
Owner/Resident e-mail address	
Property Address	13550 Worthington Way
How many years have you lived at this location?	
Did owner/resident stay at property during Hurricane Irma?	No
Date of high water	
Time of high water	
Date of observation	
Time of observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Was your house flooded?	No
How deep?	
Duration?	
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	General report of flooding in development. Golf courses and most roads submerged. Flooding reached some garages, but no houses. Development drainage worked as designed, high tail water in canal on Bonita Beach Rd. cause of high water in development. All lakes were pumped down prior to storm. Has aerial drone video of peak flooding.
Any photos available?	Yes
High water marks available for survey?	Yes
Preparer's comments/observations	High water marks on outlet structure
Prepared by	
Property Owner or Resident?	
x	-9098157.31
y	3039903.085

ObjectID	**41**
Report date	12/6/2017, 1:00 PM
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	Imperial River
Property Owner/Resident	Admin staff at front office
Phone	
Owner/Resident phone number	
Owner/Resident e-mail address	
Property Address	
How many years have you lived at this location?	
Did owner/resident stay at property during Hurricane Irma?	
Date of high water	
Time of high water	
Date of observation	9/12/2017, 12:00 PM
Time of observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Was your house flooded?	Yes
How deep?	Over 2'
Duration?	10 days
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	Entire park flooded several feet. Lots of property damage. Most residents evacuated for the storm
Any photos available?	
High water marks available for survey?	Yes
Preparer's comments/observations	
Prepared by	
Property Owner or Resident?	
x	-9101327.476
y	3040840.794

ObjectID	**47**
Report date	
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	
Property Owner/Resident	Shawn Williams
Phone	Cellular
Owner/Resident phone number	239-330-2950
Owner/Resident e-mail address	
Property Address	17520 Devore Lane
How many years have you lived at this location?	
Did owner/resident stay at property during Hurricane Irma?	Yes
Date of high water	
Time of high water	
Date of observation	
Time of observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Was your house flooded?	No
How deep?	
Duration?	
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	Driveway was flooded. Believes mines are cause of flooding.
Any photos available?	
High water marks available for survey?	
Preparer's comments/observations	
Prepared by	
Property Owner or Resident?	
x	-9097494.318
y	3059589.423

ObjectID	**48**
Report date	
Consultant	WE
Watershed (AIM)	
Watershed (Hole Montes)	
Watershed (Johnson Engineering)	
Other - Watershed (Johnson Engineering)	
Watershed (Waldrop Engineering)	
Property Owner/Resident	
Phone	Cellular
Owner/Resident phone number	239-947-6111
Owner/Resident e-mail address	
Property Address	20901 tanglewood lane
How many years have you lived at this location?	
Did owner/resident stay at property during Hurricane Irma?	No
Date of high water	
Time of high water	
Date of observation	
Time of observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	Water in north branch was almost up to bridge. Tree took down dock on south side of property. Creek to east of property stopped flowing in the late 80s or early90s according to previous property owner.
Was your house flooded?	No
How deep?	
Duration?	
Owner/Resident's summary of flooding experience as a result of Irma and 8/25-27 storms?	
Any photos available?	
High water marks available for survey?	
Preparer's comments/observations	
Prepared by	
Property Owner or Resident?	
x	-9106158.35
y	3053125.777

OBJECTID	**66**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	willis22@gmail.com
Property owner or renter?	Property Owner
Name	Alan Willis
Phone number	239-495-7782
City	Bonita Springs, FL
How many years at this address	23
Were you flooded during the August 25-27 Rain Event?	No
Did you stay at the property during the August 25-27 Rain Event?	
Aug High Water Date	
Time of high water	5:00pm
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	
On average how deep was the water on your property?	2 feet
How many days did water remain on your property?	5
Owner/Renter summary of August 25-27 flooding experience	
Do you have any photos of the August 25-27 flooding?	
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	Yes
Irma high water date	15-Sep
Time of high water	5:00pm
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	2 feet
How many days did water remain on your property?	5
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	Downed oak trees made Bridgeford Ave in Worthington impassable for two days. Water level reduction occurred only after the two gasoline powered pumps were placed at the east end of the canal alongside Bonita Beach Road East, directing water down the eventual Logan Street extension.
Do you have any photos of Hurricane Irma flooding?	No
x	-9098354.642
y	3039786.674

OBJECTID	**77**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	lhutchings3@hotmail.com
Property owner or renter?	Property Owner
Name	Lisa LeBlanc-Hutchings
Phone number	239-233-2843
City	Bonita Springs
How many years at this address	20
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	Yes
Aug High Water Date	43338
Time of high water	
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	No
On average how deep was the water on your property?	
How many days did water remain on your property?	
Owner/Renter summary of August 25-27 flooding experience	Paradise Rd and Maddox totally underwater. Access to Carnoustie Ct nearly impassable. At least 12-18 inches on Paradise
Do you have any photos of the August 25-27 flooding?	No
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	No
On average how deep was the water on your property?	
How many days did water remain on your property?	
How many feet away was the water to your home?	
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	No
x	-9103918.685
y	3045934.671

OBJECTID	**79**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	mariacata1962@gmail.com
Property owner or renter?	Property Owner
Name	Maria C Gomez
Phone number	239-404-8099
City	bonita
How many years at this address	12
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	Yes
Aug High Water Date	43340
Time of high water	0.708333333
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	4 feet
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	Started flooding with the first rains on 8/25, and did not go out at all ,inside drains were clogged , after I fall in a ditch, my family decided to clean two drains and water started to recede but not enough to be dry before Irma.
Do you have any photos of the August 25-27 flooding?	Yes
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	Yes
Irma high water date	13-Sep
Time of high water	0.708333333
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	4 feet
How many days did water remain on your property?	>7
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	After Hurricane the water surge came bringing the Imperial River waters inside the neighborhood violently , water kept coming for about 4 more days and finally stopped. Wild life came with the water: alligators, snakes, fish and tortoises. We stayed with about 4 ft of water until the discharge to the I 75 canal was cleaned about October 5 then the water in our pond started going down and then our neighbors cleaned the inner d rains and finally by October 14 water finally was out
Do you have any photos of Hurricane Irma flooding?	Yes
x	-9100283.881
y	3041476.668

OBJECTID	**470**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	rdunitedgroup@comcast.net
Property owner or renter?	Property Owner
Name	RD Kratovil
Phone number	2394980304
City	Estero
How many years at this address	12
Were you flooded during the August 25-27 Rain Event?	No
Did you stay at the property during the August 25-27 Rain Event?	
Aug High Water Date	
Time of high water	
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	
On average how deep was the water on your property?	3 feet
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	
Do you have any photos of the August 25-27 flooding?	
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	after irma
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	3 feet
How many days did water remain on your property?	>7
How many feet away was the water to your home?	>20 feet
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	
x	-9101831.346
y	3053979.32

OBJECTID	**1700**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	ejimp@optonline.net
Property owner or renter?	Property Owner
Name	Edward J. Imp
Phone number	239-405-8263
City	Estero
How many years at this address	6
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	No
Aug High Water Date	
Time of high water	
Aug High Water Date observed	
Time of high water observation	??
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	I was not in Florida during this event. My home watch informed me of the flooded streets in the community. Water never entered my home.
Do you have any photos of the August 25-27 flooding?	No
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	??
Time of high water observation	??
Is this the highest you have seen the water level?	
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	>7
How many feet away was the water to your home?	
Owner/Renter summary of Hurricane Irma flooding experience	I was informed of the flooded streets in the community. The water never entered my home.
Do you have any photos of Hurricane Irma flooding?	No
x	-9105910.97
y	3055670.238

OBJECTID	**1708**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	Tuttlekahn@gmail.com
Property owner or renter?	Property Owner
Name	John Tuttle
Phone number	860-558-0890
City	Estero
How many years at this address	3
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	No
Aug High Water Date	
Time of high water	
Aug High Water Date observed	43338
Time of high water observation	8am
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	2 feet
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	Lake was highest ever until Irma.
Do you have any photos of the August 25-27 flooding?	No
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	Monday 9/12
Time of high water observation	8am
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	2 feet
How many days did water remain on your property?	>7
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	The Reserve was ina dangerous state. 17” if water in the road for a week+. Water 1’ from my home/pool.
Do you have any photos of Hurricane Irma flooding?	Yes
x	-9106347.342
y	3055360.632

OBJECTID	**1709**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	medinarogerr@gmail.com
Property owner or renter?	Property Owner
Name	Roger W. Rose
Phone number	330-703-3846
City	Estero
How many years at this address	4
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	No
Aug High Water Date	
Time of high water	
Aug High Water Date observed	43339
Time of high water observation	noon
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	Lots of vegitation died.
Do you have any photos of the August 25-27 flooding?	Yes
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	43358
Time of high water observation	noon
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	1 foot
How many days did water remain on your property?	>7
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	Killed off most landscape.
Do you have any photos of Hurricane Irma flooding?	Yes
x	-9106474.246
y	3055584.443

OBJECTID	**1710**
I want to:	Sign up for email and fill out the flooding questionnaire because I experienced flooding during the August 25-27 Rain Event or Hurricane Irma (September 10)
Email	schubermail@gmail.com
Property owner or renter?	Property Owner
Name	Laurie Schuber
Phone number	239-398-7852
City	Fort Myers
How many years at this address	9 years
Were you flooded during the August 25-27 Rain Event?	Yes
Did you stay at the property during the August 25-27 Rain Event?	Yes
Aug High Water Date	
Time of high water	
Aug High Water Date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during the August 25-27 Rain Event?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during the August 25-27 Rain Event?	Yes
On average how deep was the water on your property?	4 feet
How many days did water remain on your property?	>7
Owner/Renter summary of August 25-27 flooding experience	
Do you have any photos of the August 25-27 flooding?	No
Were you flooded during Hurricane Irma (September 10)?	Yes
Did you stay at the property during Hurricane Irma?	No
Irma high water date	
Time of high water	
Irma high water date observed	
Time of high water observation	
Is this the highest you have seen the water level?	Yes
Historic water level comments	
Did your house flood during Hurricane Irma?	No
How deep was the water in your house?	
How many days did water remain in your house?	
Did your property flood during Hurricane Irma?	Yes
On average how deep was the water on your property?	4 feet
How many days did water remain on your property?	>7
How many feet away was the water to your home?	0-10 feet
Owner/Renter summary of Hurricane Irma flooding experience	
Do you have any photos of Hurricane Irma flooding?	No
x	-9105936.573
y	3055273.596