

# **Bacterial Pollution Control Plan for Alligator Creek (WBID 1574)**



**December 2015**

# **Bacterial Pollution Control Plan**

for

## **Alligator Creek (WBID 1574)**

Prepared for:



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December 2015



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## *Purpose and Contents*

This Bacterial Pollution Control Plan (BPCP) was developed to identify infrastructure needs and management practices and programs to reduce bacterial pollution loads in Alligator Creek (WBID 1574) that are ultimately conveyed to the receiving waters. The fecal coliform Total Maximum Daily Load (TMDL) requires a 51 percent reduction from non-point sources discharging to Alligator Creek. The process used for development of this BPCP included the identification of potential bacterial sources, investigation of these potential sources, field reconnaissance and coordination with stakeholders, identification of existing and future programs to address bacterial pollution within the WBID, as well as development of public education and outreach and pet waste management programs to reduce bacterial loadings realized in the Tampa Bay estuarine system.

Source identification was initiated through a comprehensive data collection effort and coordination with stakeholders in a Maps-on-the-Table (MOT) forum, culminating in Walk-the-WBID (WTW) field reconnaissance. The WTW exercise facilitated coordination with stakeholders to identify the location of suspected sources, establish a sampling plan to fill in knowledge gaps, conduct sampling, and initiate management actions for Alligator Creek using existing programs and ongoing activities. The results of the source identification effort were documented in a WTW Summary Report (**Appendix A**), which also identified follow up actions serving as the initial step toward source elimination.

This BPCP for Alligator Creek contains multiple elements required to address the fecal coliform pollution discharging from WBID 1574 to the receiving waters.

This Bacterial Pollution Control Plan includes the following elements:

- 1. Summary of source identification and investigations;*
- 2. Bacteriological Sampling Plan;*
- 3. Initial results of Bacteriological Sampling Plan;*
- 4. Corrective actions necessary at identified sources;*
- 5. Public Education and Outreach Program;*
- 6. Pet Waste Management Program;*
- 7. Existing programs and initiatives targeting fecal coliform load reduction; and*
- 8. Identification of additional structural and non-structural best management practices (BMPs) or programs necessary to achieve fecal coliform reduction goals to the maximum extent practicable (MEP).*

## *Background*

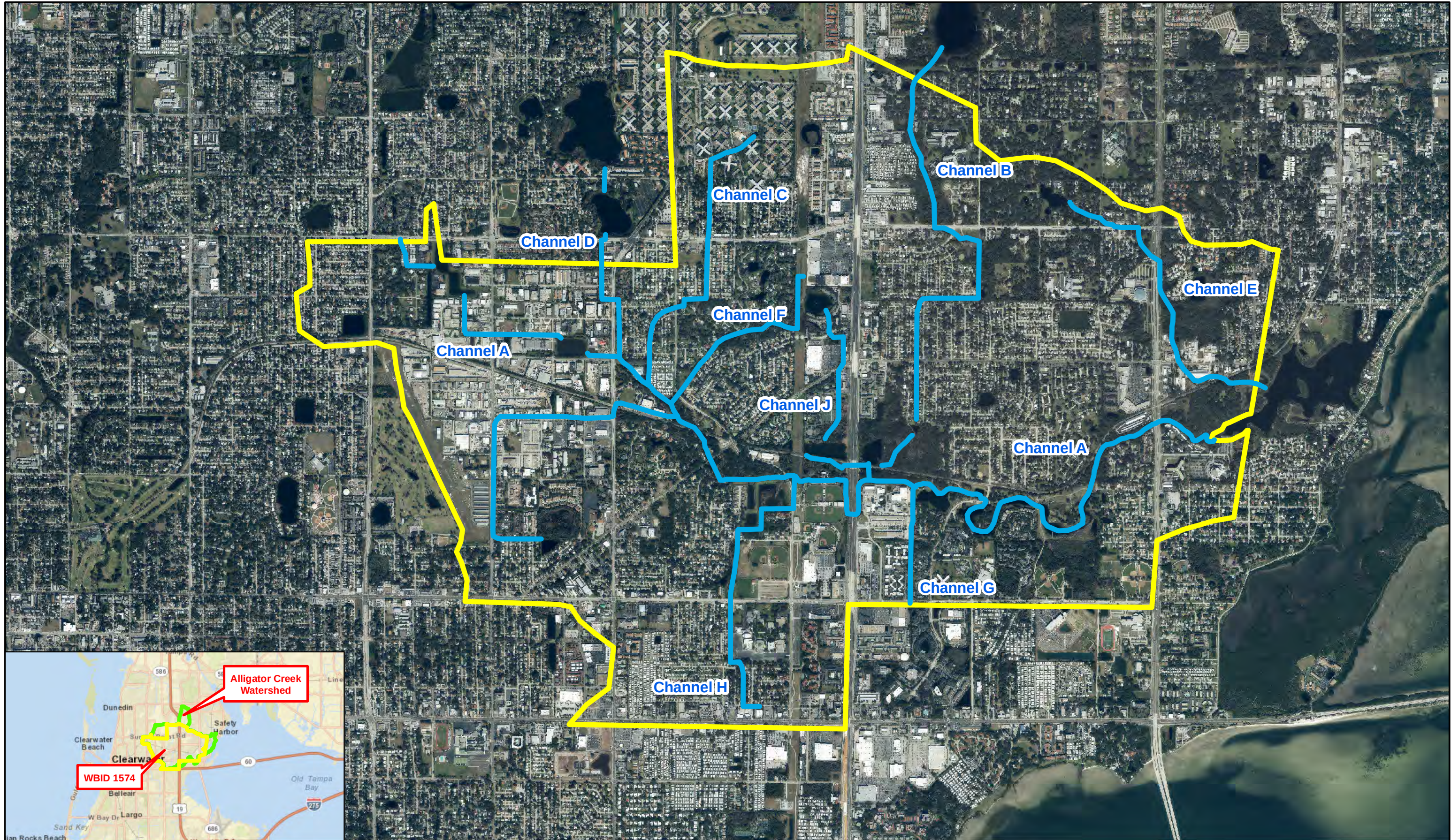
### *Description of the Alligator Creek Watershed*

The Alligator Creek Watershed includes approximately 5,500 acres (**Table 1**) of highly urbanized eastern Pinellas County, Florida. The City of Clearwater comprises approximately 65% of the watershed; unincorporated Pinellas County and the City of Safety Harbor, about 30% and 5%, respectively. WBID 1574 (Alligator Creek; **Figure 1**), encompasses 4,477 acres, or approximately 81% of the total watershed. Alligator Creek is a Class III waterbody, approximately 5.78 miles long, and flows eastward to Alligator Lake and ultimately outfalls to Old Tampa Bay. Alligator Lake is an artificial impoundment where flows are restricted by a salinity barrier constructed at Bayshore Boulevard.

Urban development and infrastructure account for approximately 88.2% of land uses, with residential development representing nearly half of the watershed. Wetlands represent about 6% of land use, and forest/open lands account for approximately 4%; commercial agriculture is nearly non-existent. The core of WBID 1574 is located east of Keene Road, south of Sunset Point Road, west of McMullen Booth Road and north of Drew Street, with portions of WBID 1574 extending up to approximately 0.7 miles past these limits in some locations.

The Alligator Creek watershed is subdivided into nine (9) sub-basins, defined by a main channel (Channel A) and eight (8) tributaries (**Figure 1**). The City of Clearwater further classifies Alligator Creek into unique watershed identification areas that include distinctive channel code designations (**Figure 2**). **Table 1** quantifies the land use for the Alligator Creek watershed for each sub-basin tributary. Most of these tributaries are located within highly urbanized areas, and characterized by deeply incised channels, often with bank protection and portions piped. Areas of wetlands are associated primarily with the main channel (Channel A) and its confluences with tributaries. Wetland quality is generally low, with a high component of nuisance and exotic plant species.





— Alligator Creek Channels    WBID 1574

Alligator Creek  
WBID 1574  
Aerial Imagery

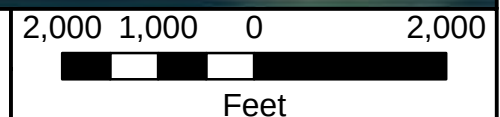
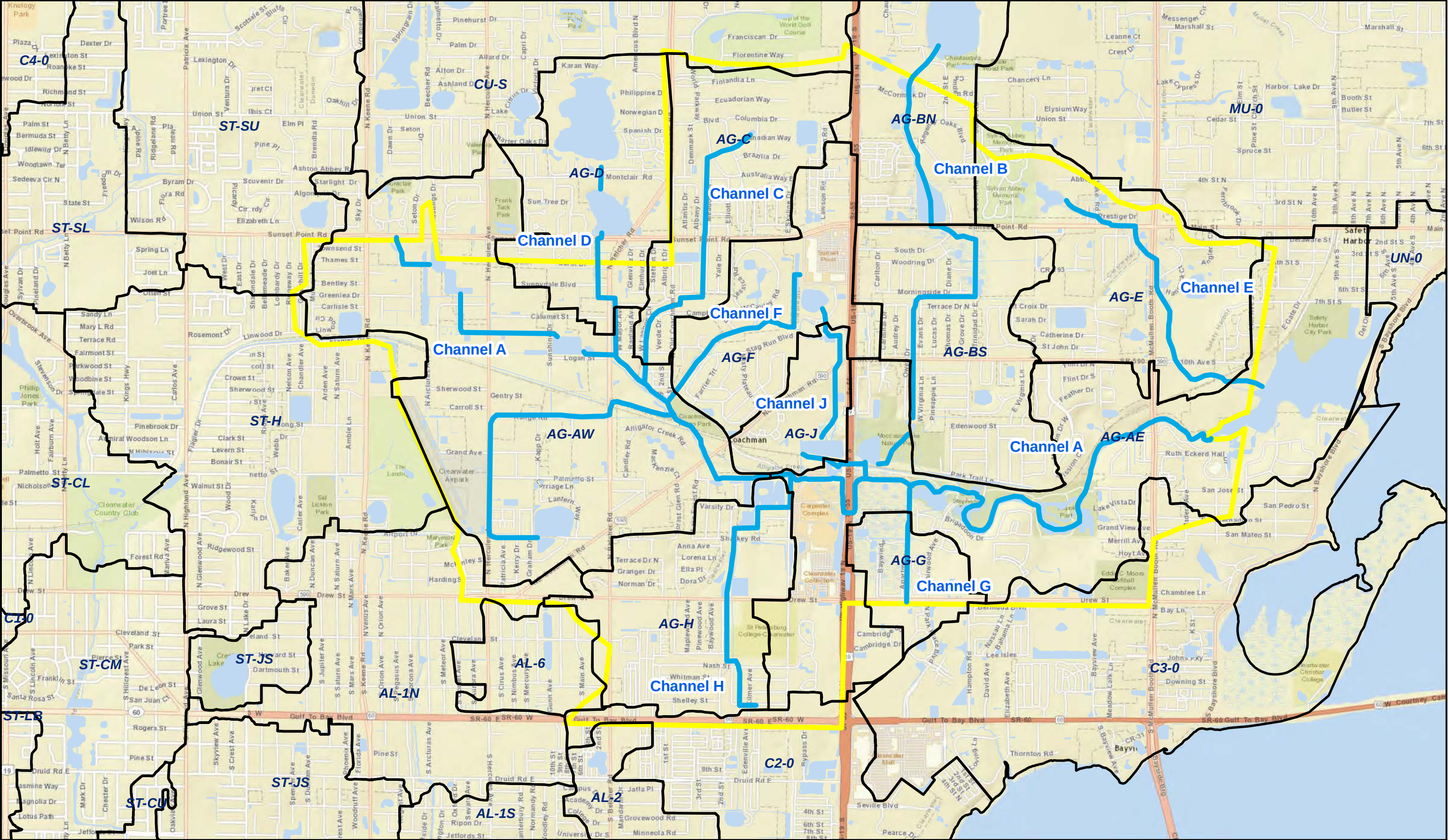


Figure 1



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City of Clearwater Channel Codes Alligator Creek Channels WBID 1574

Alligator Creek  
WBID 1574  
Watershed Identification  
Areas  
Figure 2



2,000 1,000 0 2,000  
Feet



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Table 1. Summary of land use in the Alligator Creek watershed by sub-basin tributary.

| FLUCFCS Code       | Description                 | Alligator Creek Tributary |           |           |           |           |           |           |           |           |          | Total Acres | Percent |
|--------------------|-----------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-------------|---------|
|                    |                             | Channel A                 | Channel B | Channel C | Channel D | Channel E | Channel F | Channel G | Channel H | Channel J |          |             |         |
| 1100               | Residential Low Density     | 38.78                     | 52.85     |           | 5.05      | 40.96     | 2.48      |           | 6.15      |           | 146.27   | 2.6%        |         |
| 1200               | Residential Medium Density  | 157.26                    | 45.68     | 13.08     |           | 105.04    | 84.89     |           | 2.31      |           | 408.26   | 7.4%        |         |
| 1300               | Residential High Density    | 710.67                    | 463.51    | 276.36    | 267.92    | 107.69    | 93.68     | 64.25     | 194.28    | 38.30     | 2,216.66 | 39.9%       |         |
| 1400               | Commercial and Services     | 278.07                    | 139.11    | 15.90     | 16.73     | 19.82     | 28.36     | 39.78     | 72.54     | 72.76     | 683.07   | 12.3%       |         |
| 1500               | Industrial                  | 258.82                    |           |           | 46.37     | 21.75     |           | 10.87     |           | 2.70      | 340.51   | 6.1%        |         |
| 1700               | Institutional               | 106.78                    | 34.54     | 0.38      | 0.01      | 41.23     |           | 22.42     | 30.44     |           | 235.80   | 4.2%        |         |
| 1800               | Recreational                | 186.63                    | 27.99     |           | 0.51      | 64.18     | 0.07      | 9.07      | 39.18     | 4.27      | 331.90   | 6.0%        |         |
| 1820               | Golf Courses                |                           |           | 20.00     | 3.60      |           |           |           |           |           | 23.60    | 0.4%        |         |
| 1900               | Open Land                   | 42.67                     | 28.54     |           |           | 0.09      | 1.10      | 0.10      | 14.79     |           | 87.29    | 1.6%        |         |
| 2400               | Nurseries and Vineyards     |                           |           |           | 13.84     |           |           |           |           |           | 13.84    | 0.2%        |         |
| 2600               | Other Open Lands - Rural    |                           | 1.95      |           |           |           |           |           |           |           | 1.95     | 0.0%        |         |
| 4340               | Hardwood Conifer Mixed      | 47.96                     | 29.12     |           |           | 44.45     |           |           |           | 2.04      | 123.57   | 2.2%        |         |
| 5200               | Lakes                       |                           | 47.43     | 0.28      | 50.60     |           |           |           |           |           | 98.31    | 1.8%        |         |
| 5300               | Reservoirs                  | 62.72                     | 22.39     | 5.45      | 1.84      | 17.41     | 4.58      | 2.24      | 9.42      | 12.85     | 138.90   | 2.5%        |         |
| 5400               | Bays and Estuaries          | 74.37                     |           |           |           |           |           |           |           |           | 74.37    | 1.3%        |         |
| 6120               | Mangrove Swamps             | 1.13                      |           |           |           |           |           |           |           |           | 1.13     | 0.0%        |         |
| 6150               | Stream and Lake Swamps      | 33.60                     | 37.19     |           |           | 5.45      |           |           |           |           | 76.24    | 1.4%        |         |
| 6210               | Cypress                     |                           | 4.94      |           | 1.57      |           |           |           |           |           | 6.51     | 0.1%        |         |
| 6300               | Wetland Forest Mixed        | 39.58                     | 59.33     |           | 2.48      |           |           |           | 0.01      | 22.11     | 123.51   | 2.2%        |         |
| 6410               | Freshwater Marshes          | 45.33                     | 19.61     |           | 11.63     | 12.98     | 5.61      | 1.95      | 1.09      | 3.38      | 101.58   | 1.8%        |         |
| 6420               | Saltwater Marshes           | 19.96                     |           |           |           | 0.06      |           |           |           |           | 20.02    | 0.4%        |         |
| 6440               | Emergent Aquatic Vegetation | 5.16                      |           |           | 0.35      |           |           |           |           |           | 5.51     | 0.1%        |         |
| 6530               | Intermittent Ponds          | 1.47                      | 0.32      | 4.19      |           | 1.98      | 1.63      | 0.25      |           | 0.25      | 10.09    | 0.2%        |         |
| 8100               | Transportation              | 78.62                     | 46.52     | 0.08      | 16.14     | 26.12     | 3.26      | 25.36     | 12.92     | 9.09      | 218.11   | 3.9%        |         |
| 8300               | Utilities                   | 11.99                     | 6.47      | 9.02      |           |           | 13.08     | 1.21      | 2.56      | 17.54     | 61.87    | 1.1%        |         |
| Total Area (acres) |                             | 2,201.57                  | 1,067.49  | 344.74    | 438.64    | 509.21    | 238.74    | 177.50    | 385.69    | 185.29    | 5,548.87 | 100%        |         |
| Percentage         |                             | 39.7%                     | 19.2%     | 6.2%      | 7.9%      | 9.2%      | 4.3%      | 3.2%      | 7.0%      | 3.3%      | 100%     |             |         |

| WBID 1574    |             |         |
|--------------|-------------|---------|
| FLUCFCS Code | Total Acres | Percent |
| 1100         | 1100        | 262.00  |
| 1200         | 1200        | 201.00  |
| 1300         | 1300        | 1669.00 |
| 1400         |             |         |
| 1500         |             |         |
| 1700         |             |         |
| 1800         | 1000        | 1595.00 |
| 1820         |             |         |
| 1900         |             |         |
| 2400         | 2000        | 8.00    |
| 2600         |             |         |
| 4340         | 4000        | 195.00  |
| 5200         |             |         |
| 5300         | 5000        | 115.00  |
| 5400         |             |         |
| 6120         |             |         |
| 6150         |             |         |
| 6210         |             |         |
| 6300         | 6000        | 151.00  |
| 6410         |             |         |
| 6420         |             |         |
| 6440         |             |         |
| 6530         |             |         |
| 8100         | 8000        | 281.00  |
| 8300         |             |         |
| Total Area   | 4477.00     | 100%    |
| Percentage   |             | 80.7%   |

FLUCFCS Code - Florida Land Use Cover and Forms Classification System, FDOT 1999

Data: Alligator Creek Watershed Management Plan - Floodplain Analysis Report, April 2014

Data (WBID 1574): Table 4.1 TMDL Report: Tampa Bay Basin, Alligator Creek (WBID 1574), Fecal Coliform, August 2009



## *Fecal Coliform Impairment of Alligator Creek*

Alligator Creek (WBID 1574) was verified impaired for fecal coliform bacteria in June 2007, based on the State's Impaired Surface Waters Rule (IWR) (*see box at right*). It was adopted to the Verified List of Impaired Waters for the Tampa Bay Basin on June 3, 2008. A Total Maximum Daily Load (TMDL) was adopted for fecal coliform for Alligator Creek in 2009. **Figure 3** depicts the location of previous water quality sampling stations used to establish the TMDL for WBID 1574. A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still meet water quality standards, including its applicable water quality criteria and its designated uses.

TMDLs are developed for waterbodies that are verified as not meeting their water quality standards. They are a critical step in the watershed restoration process because they provide the targets for measuring progress in subsequent water quality restoration efforts.

***The fecal coliform TMDL requires a 51 percent reduction from non-point sources discharging to Alligator Creek***, in order to meet state water quality standards. Currently, no NPDES-permitted wastewater facilities with fecal coliform limits were identified in the Alligator Creek watershed. The stormwater collection system owned and operated by Pinellas County and co-permittees (the Florida Department of Transportation [FDOT], City of Clearwater and the City of Safety Harbor) is covered by a Phase I NPDES municipal separate storm sewer (MS4) permit (FLS000005).

### ***Florida's Water Quality Standard for Fecal Coliform***

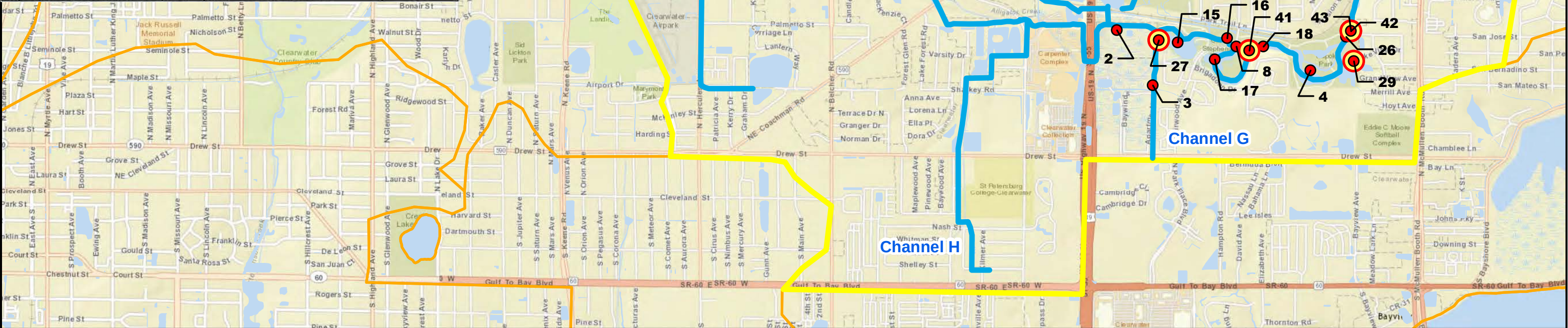
*For determining impairment for fecal coliform bacteria, the IWR states that the most probable number (MPN) or membrane filter (MF) counts per 100 milliliters (mL) of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 500 in 10 percent of the samples, nor exceed 800 on any one day. The criteria state that monthly averages shall be expressed as monthly geometric means (MGM) based on a minimum of 10 samples taken over a 30-day period. However, there were insufficient data (fewer than 10 samples in a given month) available to evaluate the geometric mean criterion for fecal coliform bacteria. Therefore, the criterion selected for the TMDL was not to exceed 400.*

## *Source Identification*

The Fecal Coliform TMDL for Alligator Creek (WBID 1574) (FDEP 2009) identified potential sources of fecal coliform within WBID 1574. Potential sources identified in the Final TMDL Report included the City of Clearwater Master Reuse System (NPDES Permit No. FL0186261), although this facility does not directly or indirectly discharge fecal coliform bacteria to Alligator Creek. Other potential sources identified included: the MS4 (FLS000005); surface runoff; wildlife; livestock and pet waste, particularly from dogs; sanitary sewer overflows (SSOs); and failing sewer lines and septic tanks. The City of Clearwater employed this information as the basis for further investigation of fecal coliform sources within Alligator Creek and for the development of the Bacterial Pollution Control Plan.



| ID | STATION                 | WBID  | AGENCY                               | Number of Observations |
|----|-------------------------|-------|--------------------------------------|------------------------|
| 1  | 112WRD 02307688         | 1574  | U.S. Geological Survey               | -                      |
| 2  | 112WRD 02307671         | 1574  | U.S. Geological Survey               | -                      |
| 3  | 112WRD 02307672         | 1574  | U.S. Geological Survey               | -                      |
| 4  | 112WRD 02307673         | 1574  | U.S. Geological Survey               | -                      |
| 5  | 112WRD 02307688         | 1574  | U.S. Geological Survey               | -                      |
| 6  | 21FLA 24040029          | 1603D | FDEP                                 | -                      |
| 7  | 21FLBRA 1574-A          | 1574  | Biological Research Associates, Inc. | 101                    |
| 8  | 21FLBRA 1574-B          | 1574  | Biological Research Associates, Inc. | 160                    |
| 9  | 21FLGW 37012            | 1603D | FDEP (SWFWMD Site ID)                | 106                    |
| 10 | 21FLGW 37012            | 1603D | FDEP (SWFWMD Site ID)                | 106                    |
| 11 | 21FLGW 38312            | 1603D | FDEP (SWFWMD Site ID)                | 106                    |
| 12 | 21FLGW 41619            | 1603E | FDEP (SWFWMD Site ID)                | 112                    |
| 13 | 21FLGW 41619            | 1603E | FDEP (SWFWMD Site ID)                | 112                    |
| 14 | 21FLGW 8028             | 1574  | FDEP (SWFWMD Site ID)                | 82                     |
| 15 | 21FLKWATPIN-CLIFFSTE-1  | 1574  | Florida LAKEWATCH                    | 269                    |
| 16 | 21FLKWATPIN-CLIFFSTE-2  | 1574  | Florida LAKEWATCH                    | 279                    |
| 17 | 21FLKWATPIN-CLIFFSTE-3  | 1574  | Florida LAKEWATCH                    | 278                    |
| 18 | 21FLKWATPIN-CLIFFSTE-4  | 1574  | Florida LAKEWATCH                    | 277                    |
| 19 | 21FLKWATPIN-HARBOR-1    | 1603E | Florida LAKEWATCH                    | 31                     |
| 20 | 21FLKWATPIN-HARBOR-2    | 1603E | Florida LAKEWATCH                    | 29                     |
| 21 | 21FLKWATPIN-HARBOR-3    | 1603E | Florida LAKEWATCH                    | 31                     |
| 22 | 21FLPDEM14-02           | 1603D | Pinellas County                      | 2771                   |
| 23 | 21FLPDEM14-03           | 1574  | Pinellas County                      | -                      |
| 24 | 21FLPDEM14-08           | 1603E | Pinellas County                      | -                      |
| 25 | 21FLPDEM14-09           | 1603C | Pinellas County                      | 429                    |
| 26 | 21FLPDEM14-10           | 1574  | Pinellas County                      | 1178                   |
| 27 | 21FLPDEM14-11           | 1574  | Pinellas County                      | 1239                   |
| 28 | 21FLPDEM14-12           | 1603C | Pinellas County                      | 243                    |
| 29 | 21FLPDEMAMB 14-10       | 1574  | Pinellas County                      | 429                    |
| 30 | 21FLPDEMAMB 14-2        | 1603D | Pinellas County                      | 718                    |
| 31 | 21FLSWFD21092           | 1603E | SWFWMD                               | 537                    |
| 32 | 21FLSWFD21129           | 1603C | SWFWMD                               | 189                    |
| 33 | 21FLSWFD22697           | 1603D | SWFWMD                               | 195                    |
| 34 | 21FLSWFDBECKETT         | 1603C | SWFWMD                               | -                      |
| 35 | 21FLSWFDBOWDEN (CHAU)   | 1603D | SWFWMD                               | -                      |
| 36 | 21FLSWFDHARBOR          | 1603E | SWFWMD                               | -                      |
| 37 | 21FLSWFDSTA0834         | 1603D | SWFWMD                               | -                      |
| 38 | 21FLSWFDSTA0835         | 1603C | SWFWMD                               | -                      |
| 39 | 21FLSWFDSTA0893         | 1603E | SWFWMD                               | -                      |
| 40 | 21FLTPA 24040029        | 1603D | FDEP - Southwest District            | -                      |
| 41 | 21FLTPA 275826008243109 | 1574  | FDEP - Southwest District            | 444                    |
| 42 | 21FLTPA 275830108242477 | 1574  | FDEP - Southwest District            | 814                    |
| 43 | 21FLTPA 275830108242477 | 1574  | FDEP - Southwest District            | 814                    |
| 44 | 21FLTPA 27584478242314  | 1574  | FDEP - Southwest District            | 828                    |
| 45 | 21FLTPA 275850008244304 | 1574  | FDEP - Southwest District            | 442                    |
| 46 | 21FLTPA 27594898244522  | 1603E | FDEP - Southwest District            | -                      |
| 47 | 21FLTPA 28585728242259  | 1574  | FDEP - Southwest District            | 808                    |



IWR Stations - Run 49

Stations used to establish the TMDL

Alligator Creek Channels

WBID 1574

WBID - Run49

Alligator Creek  
WBID 1574  
Water Quality  
Stations

Figure 3

N  
W  
E  
S

2,000 1,000 0 2,000

Feet

KCA

KISINGER CAMPO  
& ASSOCIATES

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## *Walk the WBID Summary*

The Walk-the-WBID (WTW) Summary Report is included as **Appendix A**, and documents the findings of the WTW Exercise. The lead entity for the WTW exercise was the City of Clearwater (City); other participants included Pinellas County, City of Safety Harbor, Florida Department of Environmental Protection (FDEP), Kisinger Campo & Associates, Corp. (KCA) and Greenman-Pedersen, Inc. (GPI). The WTW exercise was initiated by a data collection effort and coordination with stakeholders in a Maps-on-the-Table (MOT) forum. This MOT session facilitated coordination with stakeholders to identify the location of suspected sources, establish a sampling plan to fill in knowledge gaps, conduct sampling, and initiate management actions for Alligator Creek using existing programs and ongoing activities.

## *Maps on the Table Session*

With representatives from each participating agency, team members held the Maps on the Table session to identify areas of concern (**Table 2, Figure 4**) that could potentially contribute bacterial loading to the WBID. These areas of concern were identified based on field knowledge of agency staff and a synthesis of the available information. Once participants finished identifying potential areas of concern, all potential areas of concerns were synthesized onto a single map, given alpha-designations, and prioritized for field investigations during the WTW exercise. Field representatives were then elected based upon their infrastructure knowledge, access to facilities, familiarity with sampling equipment, protocol and standard operating procedures (SOPs), and their availability to attend the WTW event. Member of the field team for the WTW exercise, again reviewed the mapped areas of concern, further discussed their prioritization, and determine appropriate routes to efficiently perform the field exercise. It was determined that no coordination with local law enforcement was required to visit the higher priority sites.

## *Field Event*

The Walk the WBID team consisted of 14 of the 24 MOT session attendees and used the large-format map set while conducting the field investigations. A documentation team was designated, with a team member assigned to record global positioning system (GPS) location coordinates of potential sources, another person to take pictures, and a primary note taker to record the information. Areas for water quality sampling were identified during the WTW field investigation. Water quality sampling locations were marked in the field and their location coordinates collected in GPS. Water quality sampling was conducted the following day, April 15, 2015, in order to efficiently manage the sampling event, and minimize sample holding time. The team explored the waterbody while in the field, referring to the maps to follow Alligator Creek and its tributaries above and below ground. Types of potential sources that were identified for investigated included the following:

- *Potential illicit connections (PICs) or discharges;*
- *Public and private sanitary sewer infrastructure (such as manholes and pump stations);*
- *Package plants;*



- *Signs of recent SSOs, and areas with multiple SSOs;*
- *Wastewater infrastructure located close to surface waters and/or stormwater inlets, including pump stations, manholes, and air release valves (ARVs);*
- *Locations of septic tanks found in close proximity to surface waters and/or stormwater inlets;*
- *Failing septic tanks (as indicated by ponding and a strong smell of sewage);*
- *Evidence of homeless populations;*
- *MS4 conveyances requiring cleaning;*
- *Accumulated trash and debris on streets and parking lots;*
- *Accumulated trash and debris near to or inside stormwater drains and catch basins;*
- *Clogged or broken stormwater grates;*
- *Stormwater drains undergoing repairs;*
- *Stormwater outfalls discharging from underground conveyances or into ponds;*
- *Sewage smell from stormwater drains, indicating possible cross-connections;*
- *Unusual odors;*
- *Evidence of illegal dumping or discharge of liquids;*
- *Signs of oil and grease;*
- *Excessive sediments and signs of erosion or wash out;*
- *Stagnant water;*
- *Debris in inlets, or inlets located near wastewater infrastructure;*
- *Exposed pipes of unknown origin;*
- *Flood-prone areas;*
- *Pet waste or evidence of high-traffic pet areas;*
- *Presence of horses, cattle, or other ruminants in the water or close to the water;*
- *Evidence of wildlife such as raccoons and waterfowl;*
- *Evidence of chickens or other hobby animals;*
- *Areas with heavy tree cover and vegetated ditches preventing ultraviolet (UV) light penetration.*

A written and photographic record was kept of major findings, including observations about the waterbody, potential sources, followed-up items and the responsible entity, and any areas that should be added to the monitoring plan or that required additional investigation.

**Table 2. Areas of concern identified for Alligator Creek (WBID 1574).**

| Alligator Creek (WBID 1574) Potential Areas of Concern |                                                                                    |                                                                                           | Alligator Creek            |                           |
|--------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------|---------------------------|
| Site ID                                                | Name                                                                               | Description - Potential Source                                                            | Channel Codes <sup>1</sup> | Sub Basin <sup>2</sup>    |
| <b>A</b>                                               | Southern Comfort Mobile Home Park                                                  | Wastewater treatment package plant; possible Sanitary Sewer Overflows (SSOs)              | AG-BN                      | Channel B                 |
| <b>A1</b>                                              | Possible Homeless Encampment (near Southern Comfort Trailer Park)                  | Potential human waste source                                                              | AG-BN                      | Channel B                 |
| <b>B</b>                                               | Channel D inflow from Beckett Lake                                                 | Potential water quality degradation from a nursery located upstream                       | AG-D                       | Channel D                 |
| <b>C</b>                                               | Boulevard Estates Mobile Home Park                                                 | Potential human waste source                                                              | AG-H                       | Channel H                 |
| <b>D</b>                                               | Humane Society Kennels                                                             | Potential animal waste source                                                             | AG-E                       | Channel E                 |
| <b>E</b>                                               | Brigadoon Drive - Potential Dog Walk Area                                          | Potential dog walk adjacent to Alligator Creek                                            | AG-AE                      | Channel A                 |
| <b>F</b>                                               | Alcove Park Mobile Home Park                                                       | Potential dog walk adjacent to Alligator Creek                                            | AG-AW                      | Channels A & C            |
| <b>G</b>                                               | City of Clearwater Solid Waste Transfer Facility                                   | Solid waste potentially attracting animals (birds, rodents)                               | AG-AE                      | Channel A                 |
| <b>H</b>                                               | Possible Sanitary Sewer Overflow (SSO) near US 19                                  | Potential human waste source                                                              | AG-AE                      | Channels A & B            |
| <b>I</b>                                               | Possible Homeless Encampment West of US 19, North of Alligator Creek               | Potential human waste source                                                              | AG-J                       | Channels A & J            |
| <b>J</b>                                               | Peacock and emu hobby farm                                                         | Potential animal waste source                                                             | AG-BS                      | Channel B                 |
| <b>K</b>                                               | Private Individual Septic Systems (OSTDS) near Alligator Creek (Kapok Park)        | Potential human waste source                                                              | AG-AE                      | Channel A                 |
| <b>L</b>                                               | Individual Septic Systems (OSTDS)/Dog Walk Areas near Owens and Evans Drives       | Potential human and animal waste source                                                   | AG-BS                      | Channel B                 |
| <b>M</b>                                               | Sanitary Sewer (SSOs)/Septic Tank (OSTDS) Complaints - Sharkey Rd./Lake Forest Rd. | Potential human waste source                                                              | AG-H                       | Channel H                 |
| <b>N</b>                                               | Coachman Reserve - Potential Pet Waste/Dog Walk Area                               | Potential dog walk area south and west of Lantern Way; adjacent to large wetland area     | AG-AW                      | Channel A                 |
| <b>O</b>                                               | On Top of the World Condominiums - Flooding and Septic Area                        | Potential flooding in an area with septic tanks, west of On Top of the World Condominiums | AG-D                       | (Channel D; outside WBID) |
| <b>O1</b>                                              | On Top of the World Condominiums - Wastewater Treatment System                     | Wastewater treatment package plant; possible human waste source                           | AG-C                       | Channel C                 |
| <b>P</b>                                               | Coachman Ridge - Stag Run Blvd. - Roof Drains and Gabions                          | Potential bacterial source from roof drains (Stag Run Blvd./Wetherington Road area)       | AG-F                       | Channel F                 |

**Notes:**

1. Channel Codes - from City of Clearwater Watershed Identification Areas Map - 2015
2. Sub Basins - from Alligator Creek Watershed Management Plan, Floodplain Analysis Report - 2014



| Bacteria Sampling Station Results and Exceedance |         |                             |                         |
|--------------------------------------------------|---------|-----------------------------|-------------------------|
| Location                                         | Site ID | Fecal Coliform (CFU/100 mL) | Magnitude of Exceedance |
| Abbey Ct.                                        | AC-01   | 60                          | -85%                    |
| Boulevard Estates                                | AC-02   | 760                         | 90%                     |
| McCormick                                        | AC-03   | 50                          | -88%                    |
| SR 590                                           | AC-04   | 140                         | -65%                    |
| Sunnydale                                        | AC-05   | 260                         | -35%                    |
| Sunset Point                                     | AC-06   | 3,100                       | 675%                    |
| Under US 19                                      | AC-07   | 660                         | 65%                     |
| Weatherington                                    | AC-08   | 880                         | 120%                    |
| Belcher & Railroad                               | AC-09   | 3,600                       | 800%                    |
| Belcher & Logan                                  | AC-10   | 2,000                       | 400%                    |
| Sunset Point                                     | AC-11   | 4,500                       | 1025%                   |
| McMullen Booth                                   | AC-12   | 2,400                       | 500%                    |
| Sharkey                                          | AC-13   | 1,120                       | 180%                    |
| McCauley                                         | AC-14   | 50                          | -88%                    |

Legend

A: Southern Comfort Mobile Home Park

A1: Homeless Encampment

B: Channel D Inflow from Beckett Lake

C: Boulevard Estates Mobile Home Park

D: Humane Society Kennels

E: Brigadoon Drive

F: Alcove Park Mobile Home Park

G: Clearwater Solid Waste Transfer Facility

H: Possible Sanitary Sewer Overflow

I: Homeless Encampment

J: Peacocks and Emu Hobby Farm

K: Individual Septic Systems

L: Individual Septic Systems

M: Sanitary Sewer/Septic Tank Complaints

N: Coachman Reserve

O: On Top of the World Condominiums - Flooding and Septic

O1: On Top of the World Wastewater Treatment Plant

P: Coachman Ridge - Roof Drains & Gabions

Bacteria Sampling Point

Possible Fecal Coliform Criteria Exceedance (10% of samples)

Fecal Coliform Criteria Exceedance (daily value)

Area of Concern

Visited Area of Concern

Area of Concern Boundary

Alligator Creek Channels

WBID 1574

Alligator Creek  
WBID 1574  
Summary of Findings

Figure 4

N

E

S

W

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Feet

KCA

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## *Bacteriological Sampling Plan*

Areas of concern (**Table 2, Figure 4**) and discharges potentially contributing to bacterial loading of Alligator Creek were identified for water quality sampling the day following the WTW exercise. A water sampling plan was developed to document the existing bacterial conditions within Alligator Creek, characterize the bacterial pollution throughout the WBID, and to quantify, to the extent practicable, the bacterial loading contribution for each of the areas of concern investigated during the WTW exercise. Sampling was conducted the day after the WTW exercise in order to efficiently manage the sampling episode and to minimize the holding time for the bacteriological samples. Eight (8) water quality samples were collected on April 15, 2015 at stations identified during the WTW exercise (**Figure 4**) the previous day. Based upon the results and analyses of the initial water quality sampling and observations during the WTW exercise, supplemental water quality sampling and analysis was conducted on June 25, 2015. The locations of the additional six (6) sampling sites (**Figure 4**) were selected to provide a more detailed understanding of potential bacterial contribution sources to WBID 1574 as well as a more comprehensive understanding of the Alligator Creek watershed. Water samples were collected by the City of Clearwater and processed at the City of Clearwater Public Utilities Laboratory.

## *Bacteriological Sampling Results*

Water samples were collected by the City of Clearwater and processed at the City of Clearwater Public Utilities Laboratory on April 15, 2015 (Sample Series 15041501-) and June 25, 2015 (Sample Series 15062503-). Processing and analysis of the water quality samples was funded by the City of Clearwater. Water samples were analyzed for fecal coliform bacteria, *E. coli*, and enterococci by this laboratory using standard analytical procedures. The resulting water sample analytical reports are included in **Appendix B**.

The fecal coliform exceedance criteria for Alligator Creek, WBID 1574, is detailed in **Table 3**, which also includes the proposed exceedance criteria for *E. coli* in freshwater bodies. **Table 3** also includes the proposed exceedance criteria for Enterococci for marine waters, which do not directly apply to WBID 1574, which is freshwater.

**Table 3. Bacterial concentration thresholds for the TMDL for Alligator Creek (WBID 1574).**

### **Alligator Creek - Fecal Coliform Exceedance Criteria for the TMDL – WBID 1574**

*Counts per 100 milliliters (mL) of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 400 in 10 percent of the samples, nor exceed 800 on any one day.*

*Proposed exceedance criteria for E. coli (in fresh waters) – propose a monthly geometric means (MGM) limit of 126, and shall not exceed 410 in 10 percent of samples during a given 30-day period.*

*Proposed exceedance criteria for Enterococci (in marine waters) – propose a MGM limit of 35, and shall not exceed 135 in 10 percent of samples during a given 30-day period.*



**Table 4** presents a summary of the results of the analyses of bacterial water quality samples taken at various locations throughout the Alligator Creek watershed. While these samples only offer a single day snapshot of water quality conditions, the results reflect areas of concern that were identified during the Walk the WBID exercise, as well as determined by review of previous water sampling data from Alligator Creek.

**Table 4. Summary of bacteriological sample analysis for Alligator Creek (WBID 1574), April 15 and June 25, 2015. Sampling and analyses performed by the City of Clearwater. Values annotated with a red flag indicate daily, single sample criteria exceedance. Values depicted in red indicate possible 10 percent criteria exceedances. See Appendix B for further information.**

| Alligator Creek WBID 1574 |         |                             |             |                                          |                                      |                                  |                                      |                                       |
|---------------------------|---------|-----------------------------|-------------|------------------------------------------|--------------------------------------|----------------------------------|--------------------------------------|---------------------------------------|
| Location                  | Site ID | Sample Number on Lab Report | Sample Date | Fecal Coliform <sup>1</sup> (CFU/100 mL) | Magnitude of Exceedance <sup>1</sup> | E.Coli <sup>2</sup> (CFU/100 mL) | Magnitude of Exceedance <sup>2</sup> | Enterococci <sup>3</sup> (MPN/100 mL) |
| Abbey Ct.                 | AC-01   | 15041501-001                | 4/15/2015   | 60                                       | -85%                                 | 66                               | -86%                                 | 275                                   |
| Boulevard Estates         | AC-02   | 15041501-002                | 4/15/2015   | 760                                      | 90%                                  | 4,839                            | 1110%                                | 290                                   |
| McCormick                 | AC-03   | 15041501-003                | 4/15/2015   | 50                                       | -88%                                 | 66                               | -84%                                 | 334                                   |
| SR 590                    | AC-04   | 15041501-004                | 4/15/2015   | 140                                      | -65%                                 | 356                              | -11%                                 | 1,298                                 |
| Sunnydale                 | AC-05   | 15041501-005                | 4/15/2015   | 260                                      | -35%                                 | 372                              | -7%                                  | 551                                   |
| Sunset Point              | AC-06   | 15041501-006                | 4/15/2015   | 3,100                                    | 675%                                 | 2,240                            | 460%                                 | 4,839                                 |
| Under US 19               | AC-07   | 15041501-007                | 4/15/2015   | 660                                      | 65%                                  | 403                              | 1%                                   | 821                                   |
| Weatherington             | AC-08   | 15041501-008                | 4/15/2015   | 880                                      | 120%                                 | 731                              | 83%                                  | 4,839                                 |
| Belcher & Railroad        | AC-09   | 15062503-001                | 6/25/2015   | 3,600                                    | 800%                                 | 977                              | 144%                                 | 4,839                                 |
| Belcher & Logan           | AC-10   | 15062503-002                | 6/25/2015   | 2,000                                    | 400%                                 | 192                              | -52%                                 | 615                                   |
| Sunset Point              | AC-11   | 15062503-003                | 6/25/2015   | 4,500                                    | 1025%                                | 1,034                            | 159%                                 | 4,839                                 |
| McMullen Booth            | AC-12   | 15062503-004                | 6/25/2015   | 2,400                                    | 500%                                 | 61                               | -85%                                 | 651                                   |
| Sharkey                   | AC-13   | 15062503-005                | 6/25/2015   | 1,120                                    | 180%                                 | 202                              | -50%                                 | 472                                   |
| McCauley                  | AC-14   | 15062503-006                | 6/25/2015   | 50                                       | -88%                                 | 37                               | -91%                                 | 310                                   |

**Notes:**

MGM = monthly geometric mean, based on a minimum of 5 samples (Class I) or 10 samples (Class III) over a 30-day period.

1. Fecal exceedance = MGM > 200, a single sample > 800, or 10% of samples > 400 during any 30-day period.

Red flag indicates single-sample exceedance, and red font indicates possible 10% exceedance.

2. Proposed E.coli exceedance (fresh waters) = MGM > 126, or 10% of samples > 410 during any 30-day period.

Red font indicates possible 10% exceedance.

3. Proposed Enterococci exceedance (marine waters) = MGM > 35, or 10% of samples > 135 during any 30-day period.

Alligator Creek is a fresh water body; therefore limits do not apply.

## Bacteriological Sample Results Analysis for WBID 1574

### Fecal Coliform Concentration

The results of the bacteriological sampling (**Table 4**) were evaluated as a total set, and independently by collection period. Seven (7) of the 14 total bacterial samples (50%) collected during both time periods exceeded the daily, single sample criteria for fecal coliform concentration. Also, 64.3% of the total samples collected (9 of 14) potentially exceeded the 10% fecal coliform concentration threshold. Only five (5) of the total samples collect were found to contain fecal coliform concentrations below the exceedance criteria.



### *E. coli Concentration*

**Table 4** also presents the concentrations of *E. coli* found in each bacteriological sample. These *E. coli* concentrations were evaluated in total, and for each collection period. Five (5) of the 14 total bacterial samples collected (35.7%) during both time periods potentially exceeded the 10% of monthly sampling *E. coli* concentration threshold. Over 64% (9 of 14) of the total samples collected were found to contain *E. coli* concentrations below the 10% of monthly sampling *E. coli* exceedance criteria.

## *Management Actions for Sources Elimination*

### *Management Actions for Identified Potential Sources*

Management actions associated with existing city and county programs will require scheduling, coordination, and follow-up on behalf of the participating agencies. Examples of follow-up activities that may result in additional costs include system maintenance, repair, and investigation; however, it is important to note that these activities generally correspond with jurisdictional missions and already-established programs. Some of the areas of highest fecal exceedances (*hot spots*; see **Table 4** and **Figure 4**) identified in the bacteriological sampling results are currently under, or part of planned, management activities that would have a net benefit to the reduction of fecal coliform exceedances in those sections of the watershed.

**Figure 4** summarizes the potential areas of concern identified during the MOT session, areas of concern visited during the WTW exercise and the location of the bacteriological water quality sampling stations within WBID 1574. **Table 2** summarizes the potential areas of concern identified during the MOT meeting and water quality concerns, including potential fecal coliform sources, which were observed by the team during the Walk the WBID exercise. The results of the water quality sampling analyses are summarized in **Table 4**, and detailed in **Appendix B**.

Seventeen (17) potential areas of concern (see **Table 2** and **Figure 4**) were initially identified by participants during the MOT meeting, and eight (8) of the highest priority areas of concern were visited by the WTW team on April 14, 2015. Additional coordination with the Florida Department of Health resulted in the addition of another area of interest, the wastewater treatment plant in the Top of the World community, for evaluation. These nine (9) areas are further described and discussed below, along with the results of the water quality analyses for each potential source (**Table 5**), and further management actions for each site (**Table 6**).



*Table 5. Results of the bacteriological sampling for identified areas of concern within the Alligator Creek watershed (WBID 1574). <sup>1</sup> Channel Codes from City of Clearwater Watershed Identification Areas Map - 2015. <sup>2</sup> Sub Basins - from Alligator Creek Watershed Management Plan, Floodplain Analysis Report - 2014. <sup>3</sup> Fecal coliform exceedance = MGM > 200, a single sample > 800, or 10% of samples > 400 during any 30-day period. Large red italic font indicates single-sample exceedance, and red font indicates possible 10% exceedance. <sup>4</sup> Proposed E. coli exceedance (fresh waters) = MGM > 126, or 10% of samples > 410 during any 30-day period. Red font indicates possible 10% exceedance. <sup>5</sup> Proposed Enterococci exceedance (marine waters) = MGM > 35, or 10% of samples > 135 during any 30-day period (Alligator Creek is a fresh water body; therefore limits do not apply). MGM = monthly geometric mean, based on a minimum of 5 samples (Class I) or 10 samples (Class II) over a 30-day period. CFU = colony-forming units; E. coli = Escherichia coli; MPN = most probable number.*

| Alligator Creek (WBID 1574) |                                                                                    |                                                                                           | Potential Areas of Concern |                           | Alligator Creek |            | Water Sample ID                           |                                    | Water Sample Results                   |                                           |                                    |                                        |  |  |
|-----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------|---------------------------|-----------------|------------|-------------------------------------------|------------------------------------|----------------------------------------|-------------------------------------------|------------------------------------|----------------------------------------|--|--|
| Site ID                     | Name                                                                               | Description - Potential Source                                                            | Channel Codes <sup>1</sup> | Sub Basin <sup>2</sup>    | Upstream        | Downstream | Fecal Coliform <sup>3</sup><br>CFU/100 mL | E. coli <sup>4</sup><br>CFU/100 mL | Enterococci <sup>5</sup><br>MPN/100 mL | Fecal Coliform <sup>3</sup><br>CFU/100 mL | E. coli <sup>4</sup><br>CFU/100 mL | Enterococci <sup>5</sup><br>MPN/100 mL |  |  |
| A                           | Southern Comfort Mobile Home Park                                                  | Wastewater treatment package plant; possible Sanitary Sewer Overflows (SSOs)              | AG-BN                      | Channel B                 | AC-03           | AC-06      | 50                                        | 66                                 | 334                                    | 3100                                      | 2240                               | 4839                                   |  |  |
| A1                          | Possible Homeless Encampment (near Southern Comfort Trailer Park)                  | Potential human waste source                                                              | AG-BN                      | Channel B                 | AC-03           | AC-06      | 50                                        | 66                                 | 334                                    | 3100                                      | 2240                               | 4839                                   |  |  |
| B                           | Channel D inflow from Beckett Lake                                                 | Potential water quality degradation from a nursery located upstream                       | AG-D                       | Channel D                 |                 | AC-05      |                                           |                                    |                                        | 260                                       | 372                                | 551                                    |  |  |
| C                           | Boulevard Estates Mobile Home Park                                                 | Potential human waste source                                                              | AG-H                       | Channel H                 |                 | AC-02      |                                           |                                    |                                        | 760                                       | 4839                               | 290                                    |  |  |
| D                           | Humane Society Kennels                                                             | Potential animal waste source                                                             | AG-E                       | Channel E                 | AC-07           | AC-01      | 660                                       | 403                                | 821                                    | 60                                        | 66                                 | 275                                    |  |  |
| E                           | Brigadoon Drive - Potential Dog Walk Area                                          | Potential dog walk adjacent to Alligator Creek                                            | AG-AE                      | Channel A                 | AC-07           | AC-01      | 660                                       | 403                                | 821                                    | 60                                        | 66                                 | 275                                    |  |  |
| F                           | Alcove Park Mobile Home Park                                                       | Potential dog walk adjacent to Alligator Creek                                            | AG-AW                      | Channels A & C            | AC-11           | AC-07      | 4500                                      | 1034                               | 4839                                   | 660                                       | 403                                | 821                                    |  |  |
| G                           | City of Clearwater Solid Waste Transfer Facility                                   | Solid waste potentially attracting animals (birds, rodents)                               | AG-AE                      | Channel A                 | AC-09           | AC-07      | 3600                                      | 977                                | 4839                                   | 660                                       | 403                                | 821                                    |  |  |
| H                           | Possible Sanitary Sewer Overflow (SSO) near US 19                                  | Potential human waste source                                                              | AG-AE                      | Channels A & B            | AC-04           | AC-07      | 140                                       | 356                                | 1298                                   | 660                                       | 403                                | 821                                    |  |  |
| I                           | Possible Homeless Encampment West of US 19, North of Alligator Creek               | Potential human waste source                                                              | AG-J                       | Channels A & J            |                 | AC-07      |                                           |                                    |                                        | 660                                       | 403                                | 821                                    |  |  |
| J                           | Peacock and emu hobby farm                                                         | Potential animal waste source                                                             | AG-BS                      | Channel B                 | AC-04           | AC-07      | 140                                       | 356                                | 1298                                   | 660                                       | 403                                | 821                                    |  |  |
| K                           | Private Individual Septic Systems (OSTDS) near Alligator Creek (Kapok Park)        | Potential human waste source                                                              | AG-AE                      | Channel A                 | AC-07           | AC-01      | 660                                       | 403                                | 821                                    | 60                                        | 66                                 | 275                                    |  |  |
| L                           | Individual Septic Systems (OSTDS)/Dog Walk Areas near Owens and Evans Drives       | Potential human and animal waste source                                                   | AG-BS                      | Channel B                 | AC-06           | AC-04      | 3100                                      | 2240                               | 4839                                   | 140                                       | 356                                | 1298                                   |  |  |
| M                           | Sanitary Sewer (SSOs)/Septic Tank (OSTDS) Complaints - Sharkey Rd./Lake Forest Rd. | Potential human waste source                                                              | AG-H                       | Channel H                 | AC-02           | AC-07      | 760                                       | 4839                               | 290                                    | 660                                       | 403                                | 821                                    |  |  |
| N                           | Coachman Reserve - Potential Pet Waste/Dog Walk Area                               | Potential dog walk area south and west of Lantern Way; adjacent to large wetland area     | AG-AW                      | Channel A                 |                 | AC-13      |                                           |                                    |                                        | 1120                                      | 202                                | 472                                    |  |  |
| O                           | On Top of the World Condominiums - Flooding and Septic Area                        | Potential flooding in an area with septic tanks; west of On Top of the World Condominiums | AG-D                       | (Channel D; outside WBID) |                 | AC-09      |                                           |                                    |                                        | 3600                                      | 977                                | 4839                                   |  |  |
| O1                          | On Top of the World Condominiums - Wastewater Treatment System                     | Wastewater treatment package plant; possible human waste source                           | AG-C                       | Channel C                 |                 | AC-05      |                                           |                                    |                                        | 260                                       | 372                                | 551                                    |  |  |
| P                           | Coachman Ridge - Stag Run Blvd. - Roof Drains and Gables                           | Potential bacterial source from roof drains (Stag Run Blvd./Wetherington Road area)       | AG-F                       | Channel F                 | AC-14           | AC-08      | 50                                        | 37                                 | 310                                    | 4500                                      | 1034                               | 4839                                   |  |  |
|                             |                                                                                    |                                                                                           |                            |                           |                 |            |                                           |                                    |                                        | 880                                       | 731                                | 4839                                   |  |  |

**Table 6. Summary of management actions for identified areas of concern within the Alligator Creek Watershed (WBID 1574).**

| Alligator Creek (WBID 1574) |          |                                          |                                                                                       |                                                                                                                                                                  | Areas of Concern                                          |                           | Management Actions                                                                                                                                                                                                                                                                                                                                                 |  |
|-----------------------------|----------|------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Site ID                     | Priority | Name                                     | Description - Potential Source                                                        | Observations                                                                                                                                                     | Fecal Coliform Exceedance <sup>1</sup> Downstream Samples |                           |                                                                                                                                                                                                                                                                                                                                                                    |  |
|                             |          |                                          |                                                                                       |                                                                                                                                                                  | Daily Value                                               | 10% of Samples CFU/100 mL |                                                                                                                                                                                                                                                                                                                                                                    |  |
| A                           | HIGH     | Southern Comfort Mobile Home Park        | Wastewater treatment package plant; possible Sanitary Sewer Overflows (SSOs)          | Human waste source and health concern for the mobile home park residents. Bacterial sampling conducted.                                                          | 3100                                                      | YES                       | High potential human health and safety concern. Continue bacterial monitoring to document fecal coliform loadings. Resolve litigation. Site is a candidate for inclusion in City wastewater collection and treatment system(pending resolution of litigation). Site is a candidate for redevelopment based on US 19 corridor planning study, currently underway.   |  |
| B                           | LOW      | Channel D inflow from Beckett Lake       | Potential water quality degradation from a nursery located upstream                   | Wetland vegetation in ditch was very healthy, which could indicate elevated nutrient levels. Bacterial sampling conducted.                                       | NO                                                        | NO                        | Continue bacterial and nutrient monitoring to document contribution from Harbor and Beckett Lakes.                                                                                                                                                                                                                                                                 |  |
| C                           | HIGH     | Boulevard Estates Mobile Home Park       | Potential human waste source                                                          | Potential human waste source and health concern for the mobile home park residents. Bacterial sampling conducted.                                                | NO                                                        | 760                       | Highest levels of <i>E. coli</i> (4839 CFU/100 mL) detected in the WBID. High potential human health and safety concern. Continue bacterial monitoring to document fecal coliform loadings. Coordinate with property owner to secure access to pond. Inspect adjacent municipal stormwater system to evaluate potential for co-mingling with bacteria-laden water. |  |
| F                           | MODERATE | Alcove Park Mobile Home Park             | Sanitary sewer line crosses Alligator Creek                                           | No dogs allowed in MHP; no apparent problem with pet waste. Sanitary sewer pipe crosses Alligator Creek and requires inspection.                                 | NO                                                        | 660                       | Inspect sanitary sewer pipe crossing Alligator Creek to insure that it is sound, properly supported and restrained. Periodly monitor bacteria concentrations at the confluence of Channel C and the mainstem of Alligator Creek (Channel A).                                                                                                                       |  |
| L                           | LOW      | Individual Septic Systems                | Potential human and animal waste source                                               | Large open grassed area for surface flows; main channel carried underground in large box culvert. Bacterial sampling conducted.                                  | NO                                                        | NO                        | Continue monitoring bacteria levels in pipes. Include nearby neighborhoods in municipal sewer system expansion, to the extent practicable.                                                                                                                                                                                                                         |  |
| M                           | MODERATE | Sanitary Sewer/Septic Tank Complaints    | Potential human waste source                                                          | Sanitary sewer line co-located with surface swale. Also many septic tanks. Potential waste source. No evidence of recent problems. Bacterial sampling conducted. | 1120                                                      | 660                       | Continue monitoring bacteria levels in pipes. Include nearby neighborhoods in municipal sewer system expansion, to the extent practicable.                                                                                                                                                                                                                         |  |
| N                           | MODERATE | Coachman Reserve                         | Potential dog walk area south and west of Lantern Way, adjacent to large wetland area | No problems apparent. Neighborhood has pet waste stations. Wetland has large natural buffer adjacent to stormwater outfall.                                      | 3600                                                      | YES                       | Continue bacterial monitoring to pinpoint fecal coliform loading source(s) along this reach of Channel A. High fecal coliform levels recorded well downstream from Coachman Reserve, and not consistent with observations in the community. Include neighborhoods adjoining Channel A in municipal sewer system expansion, to the extent practicable.              |  |
| O1                          | HIGH     | On Top of the World Treatment Plant      | Wastewater treatment package plant; possible human waste source                       | Data indicate a substantial difference between reported fecal coliform levels in the DMRs and the downstream ambient water sample. Bact. sampling conducted.     | 4500                                                      | YES                       | Continue bacterial monitoring to identify causal factors contributing to the differences in DMR and ambient bacteria levels. Coordinate with the wastewater treatment plant operator. Include nearby neighborhoods in municipal sewer system expansion, to the extent practicable.                                                                                 |  |
| P                           | HIGH     | Coachman Ridge - Roof Drains and Gabions | Potential bacterial source from roof drains (Stag Run Blvd./ Weatherington Road area) | Alligator Creek, Channel F, is deeply incised, and banks are supported by gabions. Gabions are penetrated by roof drain outfalls. Bacterial sampling conducted.  | 880                                                       | YES                       | Continue bacterial monitoring to pinpoint fecal coliform loading source(s). Possible candidate for retrofit of stormwater treatment solutions (e.g., ponds, sediment traps). Include nearby neighborhoods in municipal sewer system expansion, to the extent practicable.                                                                                          |  |

**Notes:**

1. Maximum value reported for a site with multiple samples.



*Site A - Southern Comfort Mobile Home Park*

A private sewage treatment system (package plant), located on private property, in the southeast corner of the Southern Comfort Mobile Home Park, was identified as a potential area of concern. This package plant is located adjacent to the wetland margins of Channel B of Alligator Creek. The area around the system had a strong septic odor and the ground was saturated. It appears, based on the field review, that treated wastewater is pumped up hill from the package plant and allowed to infiltrate into the upland areas within the mobile home park. Access to the infiltration system is unrestricted (unlocked), not well maintained, and a possible human health concern for the mobile home park residents. It was determined that water samples be taken both upstream and downstream of this site. **Sample AC-03** was collected from Alligator Creek (Channel B) approximately 1000 feet upstream (north) of the Southern Comfort Mobile Home Park, at a location immediately south of McCormick Drive. The results of the analysis of **Sample AC-03 (Table 4)** indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed criteria for *E. coli*. The results were the lowest reported from all samples for fecal coliform (50 CFU/100 mL) and *E. coli* (66 CFU/100 mL). **Sample AC-06** was collected approximately 1050 feet downstream (south) from the Southern Comfort Mobile Home Park where Channel B of Alligator Creek crosses under Sunset Point Road. The results of the analysis of **Sample AC-06 (Table 4)** indicate that bacteria levels exceed criteria for fecal coliform and exceed proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL).

Southern Comfort Mobile Home Park has increased the flow of raw wastewater to their onsite treatment plant, and this volume now exceeds the design capacity of the facility. The park is involved in a number of enforcement issues and litigation with the Florida Department of Health (FDOH) has been ongoing for over 2 years. Currently there are no plans to annex the park into the City of Clearwater. However the City is currently undertaking a comprehensive planning study of the US 19 corridor, including the possibility of rezoning some areas. The report is due to be completed at the end of 2015 and may guide future land use decisions regarding the park and the onsite treatment system.

*Site A - Southern Comfort Mobile Home Park - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|----------------------------|-----------------------------|--------------------------|
| AC-03         | 50                         | 66                          | 334                      |
| AC-06         | 3100                       | 2240                        | 4839                     |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Resolve litigation with the ultimate goal of abandoning the onsite treatment plant, and providing municipal sewage treatment service to either the existing mobile home park, or redevelopment facility based upon the future land use category. Continue compliance monitoring and reporting is recommended until the situation is resolved. This is a private system, located on private property, so enforcement actions will be difficult.



**Figure 5. Site A – Southern Comfort Mobile Home Park – Sewage treatment plant adjacent to wetland margins of Alligator Creek (Channel B).**



**Figure 6. Site A – Southern Comfort Mobile Home Park – Effluent Disposal System. Treated wastewater is pumped up hill to higher areas of the park where it is allowed to infiltrate into the ground.**



***Site B - Channel D Inflow from Beckett Lake***

Water from Harbor and Beckett Lakes enters WBID 1574 from the upper reaches of Channel D of Alligator Creek. This area was investigated to evaluate the potential bacterial loading from Beckett Lake (and a plant nursery located adjacent to Beckett Lake). Site B is a ditch (Channel D) located west of North Belcher Road and north of Sunnydale Boulevard behind local restaurants. This ditch is heavily vegetated, and the vegetation is very robust, which could indicate elevated nutrient levels. Additionally, a dumpster behind one of the restaurants near the ditch was identified as an area of concern, potentially contributing bacterial loading to Channel D of Alligator Creek. It was determined that a sample be taken at this site (**Sample No. 15041501-005**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform and did not exceed proposed criteria for *E. coli*.

***Site B – Channel D inflow from Beckett Lake - Bacterial Analysis Results***

| <b>Sample Number</b> | <b>Fecal Coliform (CFU/100mL)</b> | <b><i>E. coli</i> (CFU/100 mL)</b> | <b>Enterococci (MPN/100 mL)</b> |
|----------------------|-----------------------------------|------------------------------------|---------------------------------|
| <b>AC-05</b>         | 260                               | 372                                | 551                             |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

***Management Actions:*** Continued monitoring for bacteria concentration as well as nutrients is recommended for potential future contributions from Harbor and Beckett Lakes, along Channel D and into WBID 1574.



***Figure 7. Site B – Channel D of Alligator Creek - Inflow from Beckett Lake to WBID 1574.***

*Site C – Boulevard Estates Mobile Home Park*

Boulevard Estates Mobile Home Park, a private mobile home park, is located in the southwest corner of the WBID, east of South Belcher Road and north of SR 60 (Gulf to Bay Boulevard). A pond, located on private property, at the northern end of 3<sup>rd</sup> Street was the focus of the field investigation and identified as an area of concern. The area surrounding the pond contained large amounts of bird and dog feces, and the odor of sewage was detected at the pond. Several old, damaged, seemingly abandoned, pipes were also observed around the margins of the pond. A warning sign was unearthed from the mud at the edge of the pond. It was determined that a water sample be taken here due to the amount of animal feces in close proximity to the water body and the odor from the pond (**Sample AC-02**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels potentially exceed criteria for fecal coliform and exceed proposed criteria for *E. coli*. The results for *E. coli* were reported as off-scale high, with the actual value known to be higher than the reported value (4839 CFU/100 mL). A supplemental sample (**Sample AC-13**) was collected and analyzed on June 25, 2015, downstream along Channel H to evaluate any downstream transport bacterial contamination. The results of the analysis of **Sample AC-13** (**Table 4**) indicate that fecal coliform concentrations exceeded daily, single sample criteria, but the results for *E. coli* (202 CFU/100 mL) were much lower than Sample AC-02 (4839 CFU/100 mL).

*Site C – Boulevard Estates Mobile Home Park - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|----------------------------|-----------------------------|--------------------------|
| AC-02         | 760                        | 4839                        | 290                      |
| AC-13         | 1120                       | 202                         | 472                      |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Continued monitoring for bacteria concentration is recommended. The site should be evaluated from a human health and safety perspective. Coordination with the owner of the park to remedy safety concerns should be undertaken. Code Enforcement Division should evaluate the pond for safety, and recommend a remedy, including possibly fencing the pond, to reduce the possibility of access particularly from children. The adjacent stormwater management system should be evaluated for possible leaks that may allow wastewater, or bacteria-laden water, to co-mingling with stormwater during rain events. This is a private pond, located on private property, so enforcement action will be difficult.





***Figure 8. Site C – Boulevard Estates Mobile Home Park – Pond margin with pet and bird feces, as well as numerous pipes. A sewage odor was detected at the pond.***



***Figure 9. Site C – Boulevard Estates Mobile Home Park – Pond contains an aeration system and many ducks.***



**Figure 10. Site C – Boulevard Estates Mobile Home Park – Warning signage, ineffectually placed.**

***“WARNING  
NO SWIMMING OR WADING***

***Natural water areas in Florida have been found  
to be unsafe for swimming due to bacteria  
which can cause sickness or death.***

***Poisonous snakes and alligators  
can be present in Florida water.***

***“CHILDREN ARE NOT TO BE IN THIS AREA  
WITHOUT ADULT SUPERVISION”***



*Site F – Alcove Park Mobile Home Park*

A large grassed area within the park, adjacent to Alligator Creek, was identified during the MOT meeting as an area to investigate as a potential dog walk area. This area was investigated to evaluate the potential for bacterial loading Alligator Creek. Alcove Park Mobile Home Park is located east of North Belcher Road, west of Old Coachman Road and north of the Long Recreational and Aquatic Center operated by the Clearwater Parks and Recreation Department. Site F is located at the confluence of Channels C and F with the main stem of Alligator Creek (Channel A). Channel C is deeply incised with heavily vegetated areas along the tops of its banks. The grassed area was walked and no signs of continuous use as a pet waste area were observed. Discussions with Alcove Park management indicated that dogs were not allowed in the park, with a few minor exceptions. During the field investigation, a ductile iron pipe was observed crossing Channel C of Alligator Creek. This pipe appeared to be part of a wastewater distribution system, but appeared only marginally supported and restrained where it crossed the creek. This pipe was apparently connected to a recreation center located in the southwest portion of the Alcove Park Mobile Home Park. There were no obvious signs of any bacterial loading contributing to Alligator Creek at Site F, and no water sample was taken at this location during the WTW sampling exercise. A supplemental sample (**AC-11**) was collected approximately 4,400 feet upstream of Site F, and the high fecal coliform (4,500 CFU/100 mL) and *E. coli* (1,034 CFU/100 mL) concentrations do not appear consistent with the observations at Site F. Detection of bacterial pollution resulting from Site F is complicated by its location near the confluence of several tributaries.

*Site F – Alcove Park Mobile Home Park - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100 mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|-----------------------------|-----------------------------|--------------------------|
| AC-11         | 4,500                       | 1,034                       | 4,839                    |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Inspection of the ductile iron pipe crossing Alligator Creek to insure that the pipe is sound and properly supported and restrained. Follow up water sampling may assist in determining bacteria source contribution attributable to Alligator Creek tributaries.



***Figure 11. Site F – Alcove Park Mobile Home Park – Ductile iron sanitary sewer pipe crossing Alligator Creek. Pipe needs to be inspected to determine if it is properly installed, supported and restrained.***



*Site L – Individual Septic Systems (OSTDS) & Dog Walk*

An area with numerous private septic systems (OSTDS) and potential dog walk areas is located east of US 19 between Sunset Point Road and SR 590. Much of Channel B of Alligator Creek is piped underground, in a large box culvert between Owens Drive and Evans Drive, north of SR 590. This area was identified as an area of concern due to the possible pet waste contribution from the adjacent residential community, and possible bacterial loading from the many septic tanks in this area. It was determined that a water sample be taken due to the possible bacterial loading from the residential area (**Sample AC-04**). This water sample (**AC-04**) was collected from Channel B of Alligator Creek on the south side of SR 590 between West Virginia Lane and Owen Drive. This sample was taken downstream of Site L, and upstream of Site J (peacock and emu hobby farm) to quantify any bacterial loading attributable to the residential neighborhood. The results of the analysis of this sample (**Table 4**) indicate that fecal coliform and *E. coli* were low and Enterococci levels were high (1,298 MPN/100 mL).

*Site L – Individual Septic Systems (OSTDS) & Dog Walk - Bacterial Analysis Results*

| <b>Sample Number</b> | <b>Fecal Coliform (CFU/100 mL)</b> | <b><i>E. coli</i> (CFU/100 mL)</b> | <b>Enterococci (MPN/100 mL)</b> |
|----------------------|------------------------------------|------------------------------------|---------------------------------|
| <b>AC-04</b>         | 140                                | 356                                | 1,298                           |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions.** Continue monitoring at both upstream and downstream locations. The upstream sampling site (**AC-06**) is located downstream of the Southern Comfort Trailer Park, which has been identified as a source contributing bacterial loading to Channel B of Alligator Creek.



**Figure 12. Site L – Individual Septic Systems (OSTDS) and Dog Walk Area – Portions of Alligator Creek (Channel B) are piped underground in the neighborhoods with OSTDSs.**

*Site M – Sanitary Sewer/Septic Tank Complaints*

An area of concern, from which numerous complaints associated with wastewater had previously been received, is located east of North Belcher Road, north of Drew Street and south of Old Coachman Road. This area was identified as a possible source of human and pet waste based upon previous complaints, and a sanitary sewer line located in close proximity to a surface water feature. Site M is characterized as a residential area with many septic tanks (OSTDS). Additionally, a sanitary sewer line is also found in this area, near Sharkey and Lake Forest Roads, co-located with a surface water drainage feature. A manhole cover was removed and the sanitary sewer line inspected. No signs of recent overflows or other problems (e.g.; sewer odors) were observed or otherwise obvious. A supplemental water sample (**Sample AC-13**) was taken on June 25, 2015 due to the possible bacterial loading from the residential. This water sample (**AC-13**) was collected from Channel H of Alligator Creek downstream of Site M to quantify any bacterial loading attributable to the residential neighborhood. The results of the analysis of **Sample AC-13** (**Table 4**) indicate that fecal coliform concentration exceeded the daily, single sample criteria, but *E. coli* and Enterococci levels were relatively low.

*Site M – Sanitary Sewer/Septic Tank Complaints - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100 mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|-----------------------------|-----------------------------|--------------------------|
| AC-13         | 1,120                       | 202                         | 472                      |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Continue monitoring for bacterial pollution from the neighborhood and related infrastructure. Additionally, there are two subdivisions adjacent to this sampling site (**Sampling Site AC-13**) that are listed on the project prioritization list in the Sewer System Expansion Feasibility Report (2011). These are the Rolling Heights/Temple Terrace and Eastwood Terrace subdivisions, listed as the 20th and 23rd priorities (respectively, out of 33 total candidate projects) for connection to the City's municipal sewer system. Based on the results of the sampling, it is recommended that the Rolling Heights/Temple Terrace and Eastwood Terrace subdivisions be connected to the City's municipal sewer system.





**Figure 13. Site M – Sanitary sewer line adjacent to surface water conveyance feature.**



*Site N - Coachman Reserve – Potential Pet Waste/Dog Walk Area*

Coachman Reserve is a townhome community, which was built adjacent to a large wetland area. Coachman Reserve is located south of Palmetto Street, between North Hercules Avenue and North Belcher Road. This area was identified as an area of concern due to possible bacterial loading from pet waste generated by the community. The field investigation revealed a well maintained community complete with pet waste disposal stations. The eastern aspects of the wetland area were visited, (near the stormwater management system outfall, west of Lantern Way) and were found to be in overall good general condition, with what appeared to be a healthy wetland margin, and no apparent pet waste management issues. A supplemental water sample (**Sample AC-09**) was collected and analyzed on June 25, 2015. **Sample AC-09** was collected approximately 7,500 feet downstream (south) from Site N along the southwestern branch of Channel A of Alligator Creek. This branch of Alligator Creek runs through a predominately industrial area. **Sample AC-09 (Table 4)** exceeded criteria for daily, single sample fecal coliform and exceeded proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL). The elevated levels of bacteria were measured a great distance away from Site N, and were not consistent with the observations within the Coachman Reserve community.

*Site N – Coachman Reserve – Potential Pet Waste/Dog Walk Area - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100 mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|-----------------------------|-----------------------------|--------------------------|
| AC-09         | 3,600                       | 977                         | 4,839                    |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Continue monitoring for bacterial pollution at **Sampling Site AC-09** to detect potential bacterial loading along Channel A of Alligator Creek. No specific corrective actions appear necessary within the Coachman Reserve community.



**Figure 14. Site N – Coachman Reserve - Potential pet waste/dog walk area. The community has pet waste stations and no water quality problems were apparent.**



*Site O1 – On Top of the World – Wastewater Treatment Plant*

The On Top of the World (OTOTW) condominium complex is located in the extreme northern portion of WBID 1574 and the complex actually straddles this and adjoining WBIDs. Channel C of Alligator Creek is deeply incised and protected with a rip rap revetment where adjoins the OTOTW wastewater treatment plant. The plant has a point source NPDES permit (FLA012905). This plant was identified as a potential source to be evaluated based upon coordination with the FDOH. However, the FDOH noted that they have had very few complaints related to this facility. **Table 7** presents the results for fecal coliform levels reported in recent Discharge Monitoring Reports (DMRs) for this plant. Fecal concentrations in the plant's effluent are almost non-existent.

**Table 7. Monthly fecal coliform levels reported in the DMRs for the On Top of the World wastewater treatment plant.**

| On Top of the World Wastewater Treatment Plant - Fecal Coliform Levels |                           |
|------------------------------------------------------------------------|---------------------------|
| Date                                                                   | Fecal Coliform (#/100 mL) |
| January 2015                                                           | <1.0                      |
| February 2015                                                          | <1.0                      |
| March 2015                                                             | <1.0                      |

It was determined that a water sample (**Sample AC-11**) be taken at this site due to the possible bacterial contribution from this wastewater treatment plant, even though the fecal coliform concentrations in the DMRs were extremely low. The results of the analysis of this sample (**Tables 4 and 5**) indicate that bacteria levels exceeded the daily, single sample criteria for fecal coliform and exceeded the proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL).

*Site O1 – On Top of the World Wastewater Treatment Plant - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100 mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|-----------------------------|-----------------------------|--------------------------|
| AC-11         | 4,500                       | 1,034                       | 4,839                    |
| Plant DMR     | <1                          |                             |                          |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Based on the extreme difference in the results of fecal coliform levels between the DMRs for the treatment plant and the ambient water sampling, supplemental sampling at this site (**Sampling Site AC-11**) is recommended. The City will also follow up with the treatment plant operators to attempt to pinpoint the source of fecal coliform loading to this Channel C of Alligator Creek. One subdivision, Skyline Groves Subdivision, is identified as a potential area of sewer system expansion in the Sewer System Expansion Feasibility Report, though it is listed as a priority project (**Table 8**).



***Figure 15. Site O1 – the On Top of the World wastewater treatment plant. Note the rip rap rubble along the banks of Channel C of Alligator Creek, adjacent to the plant.***



*Site P – Coachman Ridge – Roof Drains and Gabions*

Alligator Creek (Channel F) has been channelized and the shoreline protected with a gabion system along the Coachman Ridge neighborhood (north of Stag Run Boulevard). This area was identified as an area of concern due to roof drainage being directly piped into Alligator Creek from homes in the adjacent residential community, possible pet waste contamination, and the presence of a gabion system that lines Alligator Creek in this area. It was determined that a water sample be taken at this site due to the possible bacterial contribution from this residential area (**Sample AC-08**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels exceeded the daily, single sample criteria for fecal coliform and exceeded the proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL). Based on these results, a supplemental sampling site (**Sampling Site AC-14**) was selected upstream of sampling site AC-08. **Sample AC-14** was collected at the southern outfall from Coachman Lakes Estates located upstream of Channel F, and was not collected from the main channel. The relatively low bacterial concentrations detected in **Sample AC-14** (**Table 4**) indicate that the relatively high bacterial concentrations associated with are not arising from the lakes within Coachman Lakes Estates, located north of Channel F. The City has undertaken extensive field investigations attempting to determine the bacterial pollution sources contributing to Channel F, but to date has determined where they are not originating from.

*Site P – Coachman Ridge Roof Drains and Gabions - Bacterial Analysis Results*

| Sample Number | Fecal Coliform (CFU/100 mL) | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) |
|---------------|-----------------------------|-----------------------------|--------------------------|
| AC-08         | 880                         | 731                         | 4,839                    |
| AC-14         | 50                          | 37                          | 310                      |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

**Management Actions:** Continue monitoring for bacterial pollution at **Sampling Site AC-08** to detect potential bacterial loading along Channel F of Alligator Creek. Further sampling along this reach of Channel F, upstream of **AC-08** to identify the source of bacterial pollution within Channel F is recommended. The City has spent considerable effort in an attempt to pinpoint the source of fecal coliform loading to this channelized tributary of Alligator Creek, and will continue to investigate. This system of gabions and roof drains has significant slope relative to other areas of the watershed. The retrofitting of stormwater features into this system may enhance stormwater filtration (e.g. ponds, sediment traps). An adjacent subdivision, Clearwater Manor, is identified as a potential area of sewer system expansion in the Sewer System Expansion Report, but is currently ranked 29th in priority out of 33 projects for expansion.



**Figure 16. Site P – Coachman Ridge – showing the gabion system and lack of marginal vegetation along Channel F of Alligator Creek.**



**Figure 17. Site P – Coachman Ridge – Gabion system at the headwall along the Wetherington Road crossing of Alligator Creek.**



### *Additional Water Sampling*

Five (5) additional water samples were collected at key locations within WBID 1574 in order to characterize the bacterial content of Alligator Creek. The locations of these samples are shown on **Figure 4**. The results of the analyses of these samples is shown in **Tables 4 and 5**, are discussed below:

- **Sample AC-01** was collected from Alligator Creek just west of McMullen Booth Road (at Abbey Ct.) near the downstream (eastern) end of the WBID boundary. The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed criteria for *E. coli*. The results for Enterococci were the lowest reported for all samples (275 MPN/100 mL).
- **Sample AC-07** was collected from Alligator Creek at the east side of US 19 North. This sample was taken approximately 1,500 feet downstream from the Clearwater Solid Waste Transfer Facility (Site G). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels may exceed (10% of samples) criteria for fecal coliform and approached the exceedance criteria (10% of samples) proposed for *E. coli*.
- **Samples AC-09 and AC-10** were collected from the western reaches of Channel A of Alligator Creek near the intersection of Belcher Road and Logan Street, in an effort to characterize the bacterial pollution within the upper reach of the main stem of Alligator Creek. These sample sites are located in an area characterized by industrial land uses. To the west of the industrial area a small subdivision, Antietam Acres, is prioritized as eighth out of 33 project on the Sewer Expansion Feasibility Report. The results of the analysis of this sample (**Table 4**) indicate that fecal coliform levels (2,000 CFU/100 mL) exceeded the daily single sample criteria for fecal coliform. Concentrations of *E. coli* and Enterococci were relatively lower.
- **Sample AC-12** was collected from the northern reach of Channel E of Alligator Creek where this streamway flows under McMullen Booth Road, in an effort to characterize the bacteria levels in Channel E. Channel E flows directly into Alligator Lake, and does not merge with the mainstem (Channel A) of Alligator Creek. These sample sites are located in an area characterized by mostly residential land uses. The results of the analysis of this sample (**Table 4**) indicate that fecal coliform levels (2,400 CFU/100 mL) exceeded the daily single sample criteria for fecal coliform. However, concentrations of *E. coli* and Enterococci were relatively low. A new school with a new, low pressure, sewage treatment system is being constructed on the corner of McMullen Booth and Sunset Point roads. This new system should improve the water quality in this section of the watershed. Additionally the nearby CR 193 is the highest priority for sewer expansion within the Alligator Creek watershed (**Table 8**).

Additionally, the previously discussed analytical results of **Sample AC-03** were also used to characterize the bacterial loading associated with input from upstream areas of Channel B, originating from the Lake Chautauqua drainage. This water sample was taken from Alligator Creek (Channel B) just south of McCormick Drive near the northern boundary of the WBID. This sample site is located approximately 1000 feet north of the Southern Comfort Mobile Home Park. The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed

criteria for *E. coli*. The results were the lowest reported from all samples for fecal coliform (50 CFU/100 mL) and *E. coli* (66 CFU/100 mL).

### *General On-going Management Activities*

Future management actions associated with existing city and county programs will require scheduling, coordination, and follow-up on behalf of the participating agencies. Examples of follow-up activities that may result in additional costs include system expansion, maintenance, repair, and investigation; however, it is important to note that these activities generally correspond with jurisdictional missions and already-established programs.

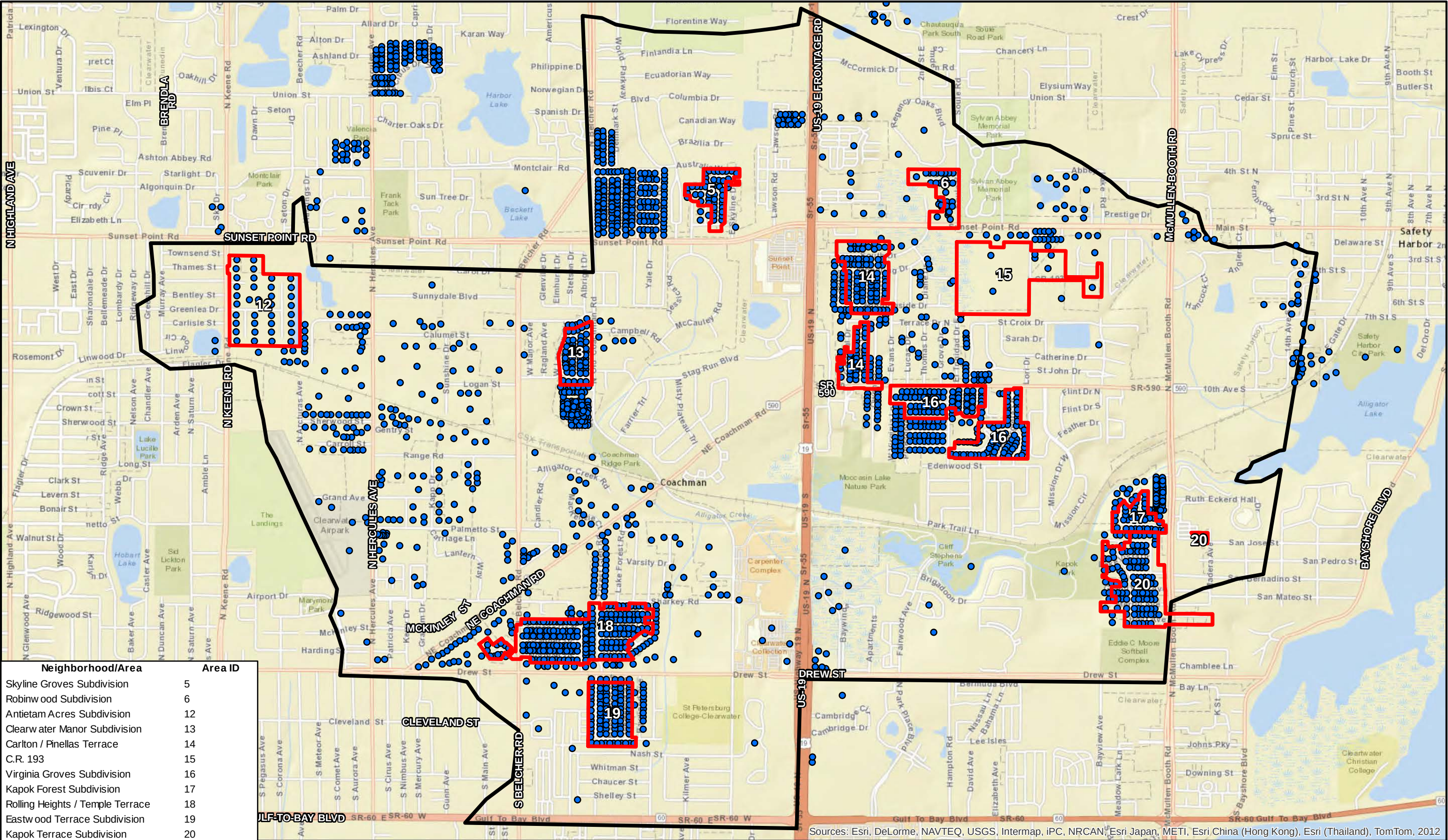
A critical component in the City's plan for reducing bacterial pollution loading is their on-going efforts to reduce the number of septic tanks (OSTDS) in use City-wide. Future expansion of the City's municipal wastewater treatment infrastructure is critical to reducing bacterial loading to Alligator Creek and other water bodies within the jurisdiction of the City. **Table 8** and **Figure 18** present the proposed future sewer expansion projects by area within Alligator Creek (WBID 1574), as prioritized in the City's Sewer System Expansion Feasibility Study. The project priority is referenced relative to the Alligator Creek watershed (WBID 1574).

**Table 8. Selected data from the Prioritization List from the Sewer System Expansion Feasibility Study.**

| Priority Projects for Municipal Sewer Service Expansion |                                |         |
|---------------------------------------------------------|--------------------------------|---------|
| Priority for Alligator Creek (WBID 1574)                | Description of Area            | Area ID |
| <b>1</b>                                                | CR 193                         | 15      |
| <b>2</b>                                                | Kapok Terrace                  | 20      |
| <b>3</b>                                                | Antietam Acres                 | 12      |
| <b>4</b>                                                | Kapok Forest                   | 17      |
| <b>5</b>                                                | Robinwood                      | 6       |
| <b>6</b>                                                | Carlton/Pinellas Terrace       | 14      |
| <b>7</b>                                                | Virginia Groves                | 16      |
| <b>8</b>                                                | Rolling Heights/Temple Terrace | 18      |
| <b>9</b>                                                | Eastwood Terrace               | 19      |
| <b>10</b>                                               | Clearwater Manor               | 13      |
| <b>11</b>                                               | Skyline Groves                 | 5       |

**Tables 9, 10 and 11** detail the actions undertaken by the City to reduce, and ultimately eliminate, bacterial pollution loading from sanitary sewer overflows. These data are for City-wide efforts, including the Alligator Creek watershed. These activities are reported as part of the City's NPDES MS4 permit program. While not specifically targeting fecal exceedances, these maintenance and cleanup activities have a net





| Neighborhood/Area                | Area ID |
|----------------------------------|---------|
| Skyline Groves Subdivision       | 5       |
| Robinw ood Subdivision           | 6       |
| Antietam Acres Subdivision       | 12      |
| Clearw ater Manor Subdivision    | 13      |
| Carlton / Pinellas Terrace       | 14      |
| C.R. 193                         | 15      |
| Virginia Groves Subdivision      | 16      |
| Kapok Forest Subdivision         | 17      |
| Rolling Heights / Temple Terrace | 18      |
| Eastw ood Terrace Subdivision    | 19      |
| Kapok Terrace Subdivision        | 20      |

### Future Sewer System Expansion

Alligator Creek Sanitary Zones

WBID 1574

Alligator Creek Possible Septic Points

Alligator Creek  
WBID 1574  
Existing Septic /  
Future Sewer Expansion

Figure 18

N

E

S

W

1,500

750

0

1,500

Feet

**KCA**  
KISINGER CAMPO  
& ASSOCIATES

Kisinger Campo & Associates, Corp.  
201 N. Franklin Street, Suite 400  
Tampa, FL 33602  
Phone: 813/871-5331  
Fax: 813/871-5135



positive effect of water quality by removing potential organic contaminants from the street to reduce runoff to nearby waterbodies, as well as maintaining the structural integrity of the stormwater system.

**Table 9. City of Clearwater activities to reduce bacterial pollution from sanitary sewer overflows.**

| Selected Clearwater NPDES Data - SSOs Reduction Activities       |                      |
|------------------------------------------------------------------|----------------------|
| SSO Reduction Activity Type                                      | Activities Performed |
| Sanitary sewer pipe inspected for infiltration (linear feet)     | 155,419 linear feet  |
| Sanitary sewer pipe sealed, lined, and/or replaced (linear feet) | 2,513 linear feet    |
| Sanitary sewer line breaks repaired                              | 2,513                |
| Septic systems removed                                           | 266                  |

**Table 10. City of Clearwater stormwater maintenance activities aiding to reduce bacterial pollution.**

| Selected Clearwater NPDES Data - Stormwater Maintenance Activities |                            |                       |                   |                                  |                       |
|--------------------------------------------------------------------|----------------------------|-----------------------|-------------------|----------------------------------|-----------------------|
| Type of Structure                                                  | Total Number of Structures | Number of Inspections | Percent Inspected | Number of Maintenance Activities | Percentage Maintained |
| Dry retention systems                                              | 104                        | 138                   | 100%              | 84                               | 81%                   |
| Wet detention systems                                              | 55                         | 73                    | 100%              | 58                               | 100%                  |
| Pollution control boxes                                            | 25                         | 83                    | 100%              | 68                               | 100%                  |
| Storm water pump stations                                          | 2                          | 4                     | 100%              | 0                                | 0%                    |
| Major storm water outfalls                                         | 18                         | 42                    | 100%              | 29                               | 100%                  |
| Weirs/other control structures                                     | 191                        | 221                   | 100%              | 58                               | 30%                   |
| MS4 pipes/culverts (miles)                                         | 36.5                       | 13.3                  | 37%               | 12.7                             | 36%                   |
| Inlets/catch basins/grates                                         | 5541                       | 2484                  | 47%               | 1326                             | 24%                   |
| Ditches/conveyance swales (miles)                                  | 21.7                       | 43.4                  | 100%              | 18.1                             | 83%                   |

**Table 11. City of Clearwater street sweeping activities contributing to the reduction bacterial pollution.**

| Selected Clearwater NPDES Data - Street Sweeping Activities |                      |
|-------------------------------------------------------------|----------------------|
| Street Sweeping Activity                                    | Activities Performed |
| Frequency of street sweeping (hours)                        | 6,241 hours          |
| Total distance swept (per year)                             | 31,450 miles         |
| Estimated quantity of sweeping material collected           | 4,443 cubic yards    |
| Total nitrogen loadings removed                             | 5,735 lbs.           |
| Total phosphorus loadings removed                           | 3,677 lbs.           |



## *Public Education and Outreach Program*

A critical component of the Bacterial Pollution Control Plan (BPCP) is the public education and outreach. A knowledgeable public is a powerful force in fight to reduce fecal contamination. Fecal contamination is a pollution source that can readily get the attention of citizens. The title alone “fecal contamination”, particularly in relationship to a local waterway or park, is likely to solicit a response from the public. The objective of a strong public education and outreach program is to provide concise information and formulate that response into a positive, solution-oriented action – essentially, “what can I do to help”.

Public outreach programs focusing on reducing fecal coliform contamination most effectively target two major non-point sources – pet waste and onsite sewage treatment and disposal systems (OSTDS) or septic systems. The typical home owner has the greatest opportunities to effect changes to these sources, ultimately reducing the bacterial pollution entering the waterways.

### *Pet Waste Management*

Numerous animal waste programs have been developed in recent years. Several entities in the Tampa Bay region have pet waste programs. In a review of existing programs and research, recommendations have been developed for implementation. While there are many efforts that can be incorporated in a pet waste management program, not all need to be implemented at once.

*Management Actions:* Develop a consistent, citywide education program that incorporates partners such as the Tampa Bay Estuary Program.

The elements of the Public Education and Outreach Program for the Pet Waste Management Program include:

### *Strategy Development*

The strategy for the public education and awareness plan for the Pet Waste Management Program focuses upon the goals and objectives of reducing bacterial pollution reaching waterways. This strategy includes empowering the homeowner (citizen) to effect a positive change on his or her local, as well as regional environment by performing specific positive actions to affect that change. The target audience will be the citizens of the City of Clearwater, although cooperation with other entities, such as the Tampa Bay Estuary program is recommended to reach a larger component of the public, and potentially reduce costs to the City. The campaign delivery method will be multimedia.

### *Marketing Collateral*

Marketing collateral is the collection of media used to support the promotion and delivery of a product or service. Historically, the term collateral pieces referred to brochures, ads and fact sheets. More recently, marketing collateral has been expanded to include a broad range of electronic and social media tools. A collateral piece will be developed by the City that includes concise, salient information about the

pet waste management program, the procedures required, and the benefits to the citizens, and their environment, of compliance.

A content marketing collateral piece can be economically reproduced and provides basic information on watersheds, impacts of pet waste on the environment, and what individuals can do to reduce the pollution from pet waste. Existing materials could be updated and adjusted for this purpose. The material should include why pet waste causes pollution, its impact to water bodies, and how to properly pick up and dispose of the pet waste. Information could also be provided on types of bags, where to get bags, availability of disposal bins, and local contact information.

**Figures 19 through 22** provide some examples of educational material available from the Tampa Bay Estuary Program's "Scoop the Poop - Pooches for the Planet" education program.



## Get The Scoop on (Dog) Poop!





### Fast Facts About Pet Waste

An average-size dog dropping produces 3 billion fecal coliform bacteria.

Research has shown that up to 95% of the fecal coliform found in urban stormwater comes from animals.

Observations of people walking their pets in public areas show that men are less likely to pick up after their dogs than women.

A new national survey says that 38 percent of dog owners don't clean up after their pets.

#### Top 5 Reasons People DON'T Pick Up After Their Pets

- Because it eventually just goes away
- Just because
- Too much work
- Dog goes on the edge of my property, where I don't walk
- It's in my yard (where it doesn't bother anyone)

#### Top 5 Reasons People DO Pick Up After Their Pets

- It's the law
- Environmental reasons
- Hygiene/health reasons
- Neighborhood courtesy
- It should be done

**Four out of 10 U.S. households have a dog.**

**America's 71 millions dogs produce 29,000 tons of waste each day!**

Pooches for the Planet  
[www.tbep.org](http://www.tbep.org)

**Figure 19. Pet waste fact sheet – Tampa Bay Estuary Program**



## Getting the Scoop on Poop



### Pooches for the Planet

**Q** What's worse than picking up dog poop?  
Stepping in it.

**Q** What's even worse than that?  
Swimming in, fishing in or drinking water that has dog poop in it.

Rainwater can wash those little presents your pooch leaves on the ground into streams and rivers leading to Tampa Bay, or directly to the bay itself. Just like human waste, **dog poop poses a threat to both public health and water quality.** It contributes harmful bacteria that can make people ill, as well as **excessive nutrients that cause algae blooms and rob the water of oxygen** needed to support fish and other aquatic life.

Join the "Pooches for the Planet" pack and pick up after your dog. It's easy, it's neighborly, and it's the healthy thing to do ... for you and for Tampa Bay.

 **Scientists from the U.S. Geological Survey estimate that pet waste may be responsible for 20 to 30 percent of the harmful bacteria found in America's waterways.**

## Scoop that Poop!

### Pooches for the Planet

You can help keep local waterways, parks and your own neighborhood clean by taking the following actions:

|                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"></p> <p><b>Pick up after your pet.</b> Flushing pet waste down the toilet is best, because then it is treated at a sewage treatment plant.</p>                                                                                                                            | <p style="text-align: center;"></p> <p><b>Never put waste into storm drains.</b> They flow into streams or rivers leading to Tampa Bay, or into the bay directly.</p>                                              |
| <p style="text-align: center;"></p> <p><b>Bag your dog's waste</b> and put it in a trash can if flushing down the toilet is not feasible. Newspaper bags or plastic grocery bags are great for dog poop disposal. Bag dispensers that clip to a leash also are widely available at pet supply shops.</p> | <p style="text-align: center;"></p> <p><b>Spread the word</b> about the harmful impacts of dog poop on our waters to your friends and neighbors, and encourage them to join the "Pooches for the Planet" pack!</p> |

**CLEAN YARDS  
CLEAN WATERS  
and clean shoes!**

For more information, visit [www.tbep.org](http://www.tbep.org)  
or call (727) 893-2765.



Cover model: Marisa Stream

Figure 20. Pet waste information brochure (door hanger) – Tampa Bay Estuary Program



Figure 21. Pet waste poster – Tampa Bay Estuary Program



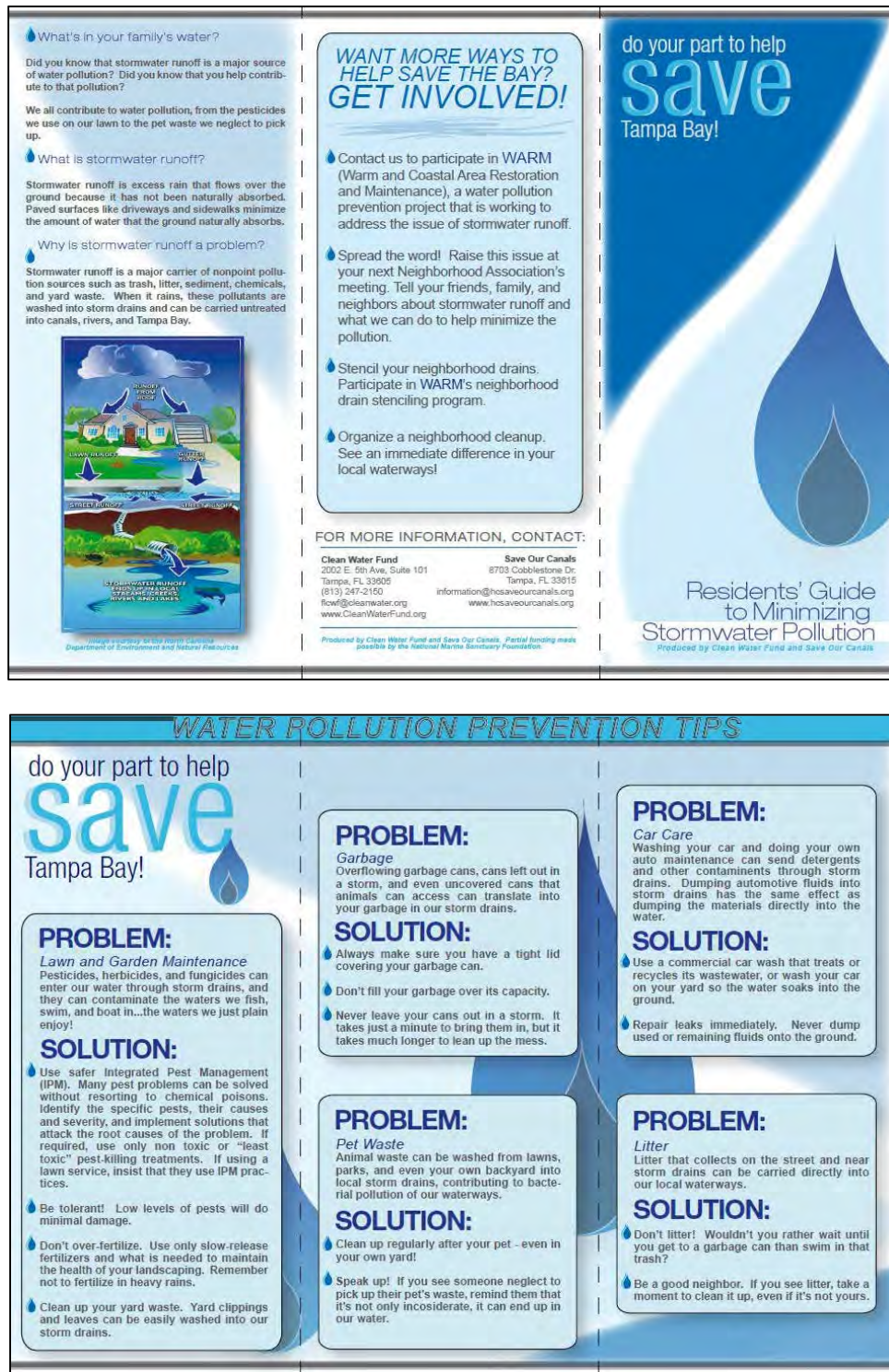


Figure 22. Tri-fold brochure, stormwater pollution, Save Our Canals – Tampa Bay

### *Slide Presentation*

A slide presentation will be developed to present information about watersheds, pet waste, and actions that the public can take to reduce pollution. The presentation can be used by the City at presentations to community groups, schools, and other organizations. The presentation will discuss the impacts of pet waste on water bodies, proper collection and disposal methods, and where to get help.

### *Reminders*

A common response from previous research, people when asked what prevented them from picking up after their pet was forgetting to bring a bag. Based on these responses, it is imperative to identify an item that will provide a specific reminder to “take a bag.” The reminder could be a tag for the leash, a bag dispenser to attach to the leash, or some other item that becomes part of the dog walking process.



### *TV/Radio Message for Government Channel*

Develop a video message to be utilized by government TV channels. There may also be an opportunity to have it aired for free on other channels. Television continues to be a primary source of information for the public. The City can utilize the Tampa Bay Estuary Program’s “Scoop the Poop” television public service announcement.

### *Pet Waste Section for Website*

Add a specific pet waste information section to the existing City’s web site. Content of the collateral piece, the speaking presentation, and a link to the Tampa Bay Estuary Program’s web site can be included. Links to other external web sites can be added.

### *Common Area Signage*

The City can offer to provide standard signage to remind the public to pick up after their pets. The signs can be placed in parks, common areas, utility right-of-ways, and other public areas. The signs should be consistent and promote the pet waste section of the City’s website for more information.



### *Speaker Program/ Speaker’s Bureau Outreach*

The sharing of information is important to encourage the public to think about their actions. Getting out and speaking to groups can offer an opportunity to not only provide good information but to also interact with the audience. This process allows the exchange of ideas and suggestions. Feedback from these interactions can help further fine-tune outreach efforts and be more effective in helping the public make behavior changes. The program can be implemented through the use of professional presenters, City/organization staff, and other volunteers.



### *Give-a-ways – Bag dispenser/Biodegradable bags*

A number of existing programs taking place in communities include some sort of giveaway as part of the education effort. These items varied from bag dispensers, bag containers, magnets, bookmarks, door hangers, and such. Useful items like bag dispensers and biodegradable bags help the public accomplish the goal.

### *Social Media/Networks*

The web serves as a major source of information for people today. The technology continues to offer additional ways of communication. New social networks have developed through web sites such as Facebook, Twitter, and others.



There are other entities that are already involved with pets and pet waste issues. They include homeowner associations, veterinarians, pet supply stores, and dog clubs/groups. This also includes dog trainers.

### *Homeowner Associations/Civic Associations*

Many people live in communities with homeowner associations. These organizations operate like local governments for these communities. The associations supply services and make rules. Most have deed restrictions. Dog walking rules can be part of the restrictions. In studies, it was clear that homeowner associations need to do a better job of enforcement. In some communities, the associations have installed waste stations and distribute the bags. It may be worthwhile to take advantage of associations that would be willing to place pet waste disposal bins and maintain them. Possibly the City can purchase some pet waste stations or disposal bins and work with a few homeowner associations to see if providing disposal stations decreases the amount of pet waste left on the ground. If results are good, then the program could be expanded.

### *Pet Supply Stores*

There are many pet supply stores in the City. Many offer community bulletin boards where information can be posted. In addition, many offer classes and other services to their customers. The City can work with these stores to distribute information about pet waste. Information could also be distributed through the classes.

### *Dog Clubs/Groups*

Dog walking can be a social experience. It is an opportunity to meet neighbors and check out what is happening in the community. In some areas, clubs have formed for the purpose of socializing with dog owners. There are the traditional dog clubs that highlight a specific breed of dog or a specific dog-related activity. The groups offer an opportunity to provide pet waste education and other information on environmental protection. The City can outreach effort to these formal and informal organizations.

### *Disposal Bags*

Remember the Bags! Where are the bags? These exclamations are prevalent in public opinion surveys. The availability of bags appears to play a major role in getting pet waste picked up. While procurement of bags may not represent a major cost, the distribution of the bags and restocking can require effort. The use of staff for this purpose is limited. Volunteers can certainly help with distribution but they are not always available.

### *Disposal Bins*

In pet waste studies, people pointed out the embarrassment or awkwardness of carrying the waste bag back home. It was apparent that more disposal bins are needed. While the cost of the bins initially is not bad, maintenance of the bins, the collection the waste, and disposal of it can present logistical and financial issues. If you are distributing free bags, then there is the cost of the bags and dispensers plus restocking dispensers. There is also concern about vandalism and theft. The City can look into purchasing bins, dispensers, and bags at wholesale costs and then offering them to homeowner associations at cost. Some of these bins could also be used by the City Parks Department.

### *Designated Dog Walking Areas*

The use of common areas for dog walking is prevalent. These areas tend to be the depository of lots of pet waste. In some communities, there are numerous locations including front entrances, landscape areas, utility right-of-ways, playgrounds, and other property. The City can work with homeowner groups to develop designated dog walking areas, similar to dog parks, where bag dispensers and collection bins can be located. This would encourage people to seek a place where they are welcomed and the facilities are available. It would also reduce the efforts that homeowner associations would need since the collection facilities would be in one or two areas versus scattered throughout the community. This concept also relates to the social nature of dog walking by providing a gathering space.



## *Pet Waste Ordinances*

A sharper focus on bacterial pollution resulting from pet waste has led to the development of numerous pet waste ordinances in recent years. Several entities in the Tampa Bay region have developed and enacted pet waste removal and disposal ordinances including the City of Clearwater, City of St. Petersburg, City of Dunedin, and Hillsborough County.

The City of Clearwater has two (2) ordinances (**Tables 12 and 13**), which address the removal and disposal of pet waste. The most recent relevant ordinance, Ordinance No. 8619-15, was enacted on February 5, 2015, and is codified in Section 8.36 of the Clearwater Code of Ordinances. This ordinance (**Table 12**) is specific to dogs.

**Table 12. City of Clearwater Code of Ordinances, Section 8.36, dog waste removal ordinance.**

### **Sec. 8.36. - Removal of dog excreta from certain public and private property.**

- (1) Every dog owner or person in charge of a dog who shall have actual knowledge or reasonable cause to believe that a dog who is under their custody or control has defecated on public or private property shall immediately retrieve all such excrement and dispose of such excrement in a sanitary fashion.
- (2) Subsection (1) shall not apply to a dog that defecates on its owner's private property or on the private property of the person having temporary or permanent custody or control of the dog.
- (3) No dog owner or person having custody or control of a dog shall allow dog excrement to accumulate on their private property in a manner that creates a health hazard or public nuisance (e.g. excrement causes continuous off-site odor offensive to a person of reasonable sensibilities or attracts a large number of flies or other insects or pests).

This new ordinance is a valuable component of the Pet Waste Management Program, and will be cited in the public outreach materials.

The City also has another ordinance (**Table 13**) in place that applies solely to City park properties. This ordinance, Ordinance No. 8074-09, amended Section 22.40 of the Clearwater Code of Ordinances (see below) on June 18, 2009, to include regulation of dog and other pet defecation on City of Clearwater parks, and other selected properties.

**Table 13. City of Clearwater Code of Ordinances, Section 22.40, pet waste removal in parks ordinance.**

**Sec. 22.40. - Domestic animals.**

- (1) Dogs and other pets shall be excluded from any place where food and drinks are consumed or where posted.
- (2) Dogs shall at all times be restrained and on adequate leashes when the dog is on the sandy beach or in the swimming areas abutting the sandy beach located from the boundary of Somerset Street to the northern most boundary of Clearwater Beach.
- (3) Other than as specifically provided for below, in those park areas where dogs and other pets are allowed, the dogs shall at all times be restrained and on adequate leashes, and all other pets shall be under constant physical control of a person.
- (4) At Crest Lake and Enterprise Dog Parks only, there are areas designated for dogs off leash. Dogs in these designated areas must be accompanied by their owner, be under vocal control and not cause a public nuisance, safety hazard or harass wildlife.
- (5) All pets shall be excluded from all public beaches, public pools, and swimming areas abutting public beaches and parks.
- (6) In the case of dog and other pet defecation on park property, the Courtney Campbell Recreation Area, or the sandy beach located from the boundary of Somerset Street to the northern most boundary of Clearwater Beach, the owner or person in charge or in control of the dog or other pet shall remove all feces deposited by such animal and dispose of same in a sanitary manner.
- (7) Notwithstanding restrictions described in this section, animals engaged in training to provide assistance to an individual with a disability, or animals individually trained to provide assistance to an individual with a disability shall be permitted in all public areas and public facilities. The accommodation of service animals as provided for herein shall at all times be in accordance with the Americans with Disabilities Act of 1990 (ADA), 42 USCA § 12101 et. seq., and Florida Statute 413.083, (2012), formerly 413.08 (2011).

(Code 1980, § 116.77; Ord. No. 6122-97, § 2, 1-23-97; Ord. No. 6437-99, § 8, 8-19-99; Ord. No. 6462-99, § 6, 11-4-99; Ord. No. 8007-08, § 1, 11-18-08; Ord. No. 8074-09, § 1, 6-18-09; Ord. No.



### Florida Example Pet Waste Ordinances

#### City of Fort Lauderdale

Section 6-4(c) of the City's Code of Ordinances states that, "It shall further be unlawful for a person to allow or permit a dog or other pet or domesticated animal within that person's control to deposit animal waste (except for law enforcement animals while on duty) upon any public or private property and to fail to promptly remove the animal's waste from the property."

#### Hillsborough County

Ordinance No. 00- 26

As Amended by Ordinance 03-8

##### SECTION 14. ANIMAL WASTE REMOVAL

Any feces deposited by a dog, cat, or pet pig on public property, public walks, recreation areas or the private property of others must be immediately removed by the person who has custody or control of the animal unless otherwise authorized by the property owner.

#### Seminole County

Sec. 190.155. General provisions relating to use of Natural Lands.

(a) The following provisions relate to all Natural Lands parcels:

(7) *Pets.* Domestic animals are allowed on Natural Lands provided they are leashed at all times. It is unlawful to possess a domestic animal on Natural Lands without a leash being affixed to the animal and for the animal to be under the control of the Natural Lands user. It is unlawful for the person who has control over a pet to fail to immediately remove and dispose of animal wastes deposited by the pet on Natural Lands. Disposal of waste shall occur by placing the waste in designated waste containers.

#### Escambia County:

Sec. 10-11. Animal control:

(f) *Removal of canine waste and requirement for possession of device for removal in the county.*

(1) It shall be the duty of each person who is in the company of or responsible for a dog on areas other than the property of such person to remove any feces left by his dog on any yard, sidewalk, gutter, street, right-of-way, or other public or private place.

(2) It shall further be the duty of any person while in direct control of a dog to have in his possession a plastic bag or "pooper scooper" or other such device sufficient for his use in the removal of canine waste.

(3) Violators of this section shall be guilty of a civil infraction and punishable pursuant to section 10-23.

(4) This section may be enforced by the county sheriff or county animal control officers. The provisions of Rule 3.125, Florida Rules of Criminal Procedure, providing that violators of county ordinances may be served with a notice to appear, shall be applicable to violations of this section. Failure of a person receiving a notice to appear to comply with the requirements on the notice shall be deemed a separate violation of this chapter for which a warrant for the violator's arrest may be issued.

#### City of Tallahassee

<http://talgov.com/animals/pdf/ord.pdf>

Ordinance No. 10015AA

**Figure 23. Examples of other Florida pet waste ordinances.**

## *Septic System Management*

Septic systems are often taken for granted because they are out of sight and out of mind. Proper operation and maintenance of your septic system can save you money, protect your family's health and protect your watershed. They can present a health risk to your family. That is why they are regulated by the Department of Health. Septic systems need to be maintained and inspected on a regular basis.

*What is a septic system? How do I maintain one?*

(from: [http://www.nesc.wvu.edu/subpages/septic\\_defined.cfm](http://www.nesc.wvu.edu/subpages/septic_defined.cfm))

A septic system is a highly efficient, self-contained, underground wastewater treatment system. Because septic systems treat and dispose of household wastewater onsite, they are often more economical than centralized sewer systems in rural areas where lot sizes are larger and houses are spaced widely apart. Septic systems are also simple in design, which make them generally less expensive to install and maintain. And by using natural processes to treat the wastewater onsite, usually in a homeowner's backyard, septic systems don't require the installation of miles of sewer lines, making them less disruptive to the environment.

A septic system consists of two main parts—a septic tank and a drainfield. The septic tank is a watertight box, usually made of concrete or fiberglass, with an inlet and outlet pipe. Wastewater flows from the home to the septic tank through the sewer pipe. The septic tank treats the wastewater naturally by holding it in the tank long enough for solids and liquids to separate. The wastewater forms three layers inside the tank. Solids lighter than water (such as greases and oils) float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank forming a layer of sludge. This leaves a middle layer of partially clarified wastewater.

The layers of sludge and scum remain in the septic tank where bacteria found naturally in the wastewater work to break the solids down. The sludge and scum that cannot be broken down are retained in the tank until the tank is pumped. The layer of clarified liquid flows from the septic tank to the drainfield or to a distribution device, which helps to uniformly distribute the wastewater in the drainfield. A standard drainfield (also known as a leachfield, disposal field, or a soil absorption system) is a series of trenches or a bed lined with gravel or coarse sand and buried one to three feet below the ground surface. Perforated pipes or drain tiles run through the trenches to distribute the wastewater. The drainfield treats the wastewater by allowing it to slowly trickle from the pipes out into the gravel and down through the soil. The gravel and soil act as biological filters.

## *Septic System Maintenance*

If you own a septic system, it is important that it be properly maintained. How often you need to pump the solids out of your septic tank depends on three major factors:

1. The number of people in your household;
2. The amount of wastewater generated (based on the number of people in the household and the amount of water used); and,



3. The volume of solids in the wastewater (e.g., using a garbage disposal will increase the amount of solids).

Although your septic tank absorption field generally does not require maintenance, you should adhere to the following rules to protect and prolong its functional life:

1. Do not drive over the absorption field with cars, trucks, or heavy equipment.
2. Do not plant trees or shrubbery in the absorption field area, because the roots can get into the lines and plug them.
3. Do not cover the absorption field with hard surfaces, such as concrete or asphalt. Grass is the best cover, because it will help prevent erosion and help remove excess water.
4. Do divert surface runoff water from roofs, patios, driveways, and other areas away from the absorption field.

### *Don't Flush It*

Take care not to flush the following:

- hair combings
- coffee grounds
- dental floss
- disposable diapers
- kitty litter
- sanitary napkins
- tampons
- cigarette butts
- condoms
- gauze bandages
- fat, grease
- oil
- paper towels
- paints
- varnishes
- thinners
- waste oils
- photographic solutions
- pesticides

### *Implementation of Management Activities*

The implementation of the management activities and strategies outlined above range from permit-required activities to conceptual plans. These recommendations can be implemented as time and funding become available. While some of these activities are targeted at specific hotspots, others can be applied City-wide, and in some cases County-wide, to increase effectiveness. This is especially critical for source control BMPs like public education.

The City is encouraged to continue to partner with other local governments and agencies to leverage existing resources to enhance the effectiveness of structural and non-structural BMPs. Regarding public outreach and education, it's through coordination that a common message can be delivered across the Tampa Bay region. The City program should utilize materials from the Tampa Bay Estuary Program, Pinellas County and Keep Pinellas County Beautiful.

Over the course of the next three years, the City can implement the following maintenance activities to address fecal coliform and *E. coli* exceedances in the general watershed, combined with specific actions from **Table 7** and the expansion of septic to municipal sewer conversions.

**Table 14. City of Clearwater Management Activity Implementation Schedule.**

| Management Activity Implementation Schedule |                                                                                                   |
|---------------------------------------------|---------------------------------------------------------------------------------------------------|
| Timeframe                                   | Activity                                                                                          |
| Year 1                                      | Develop marketing collateral pieces for distribution - pet waste and septic systems               |
| Year 1                                      | Evaluate usage of pet waste signage in City parks                                                 |
| Year 2                                      | Update City website with pet waste and septic tank information                                    |
| Year 2                                      | Air pet waste Public Service Announcements (PSAs) on City television; seek other public forums    |
| Year 3                                      | Post PSAs and other pet waste and septic system outreach materials to City and social media sites |
| On-going                                    | Maintain bag stations at dog parks and walking areas throughout the City                          |
| On-going                                    | Distribute materials at City events                                                               |
| On-going                                    | NPDES Maintenance activities                                                                      |
| Future                                      | Sewer Expansion Report projects                                                                   |

Additional information about septic systems and their maintenance requirements can be found in **Appendix C**.



## *Anticipated Outcomes of Management Actions*

Through the implementation of the sewer expansion, pet waste and septic tank education, evaluation of the pet waste ordinance, continued work to address problem sites (e.g Southern Comfort Trailer Park), and continued NPDES best management practices, the following outcomes should be expected:

*Decreased fecal coliform and E. coli concentrations in hotspots identified by sampling;*

*Decreased septic system issues;*

*Improved coordination and communication between residents and the City in regards to problem areas with fecal contamination issues;*

*Improved understanding by the general public on the important of proper pet waste management; and*

*Improved understanding by septic customers regarding inspection and upkeep of septic systems.*



*Deeply incised banks of Channel C of Alligator Creek*

## *Appendices*



*Appendix A*

*Walk-the-WBID Summary Report*

# Summary of Results

## Walk the WBID Exercise for Alligator Creek (WBID 1574)



June 2015



## Summary of Results

### Walk the WBID Exercise for Alligator Creek (WBID 1574)

Prepared for:



Engineering Department  
100 South Myrtle Avenue  
Clearwater, Florida 33756

Prepared by:



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## Purpose and Contents

This report summarizes the results of the Walk the WBID (WTW) exercise for the Alligator Creek watershed (WBID 1574), located in Clearwater, Pinellas County, Florida on April 14, 2015. This field reconnaissance and source identification/elimination effort was carried out to gain a better understanding of conditions within the watershed, including the hydrology of Alligator Creek and its contributing ditches and branches, flood-prone areas, the locations of sewer and stormwater infrastructure, and potential sources that are contributing fecal coliform bacteria to Alligator Creek.

Basin Management Action Plans (BMAPs) to address sources may be appropriate for some watersheds; however, they are both time and resource intensive. The Walk the WBID exercise is a low-cost, effective alternative to begin addressing fecal coliform pollution in Alligator Creek so that it meets state water quality standards. This common-sense first step allows stakeholders to identify the location of suspected sources, establish a sampling plan to fill in knowledge gaps, conduct sampling, carry out easy-to-implement management actions for the creek using existing programs and ongoing activities, and follow up on those actions to assess the degree of success and the additional effort needed. The exercise allows stakeholders to identify uncertainties and future options for more effective adaptive management. It also contributes to improved communication between and within agencies, and provides opportunities to increase public awareness.

The lead entity for the Walk the WBID exercise is the City of Clearwater; other participants included Pinellas County, City of Safety Harbor, Florida Department of Environmental Protection (FDEP), Kisinger Campo & Associates, Corp. (KCA) and Greenman-Pedersen, Inc. (GPI).

This report includes the following information:

1. *Identification of the WBID;*
2. *Results of any preliminary investigation or issues identified;*
3. *List of entities and staff participating in the field efforts or other operations;*
4. *Sources and potential sources observed;*
5. *Immediate next steps and follow-up actions taken;*
6. *Follow-up actions still needed;*
7. *Sources eliminated or investigated;*
8. *Water quality results from samples taken in the field;*
9. *Monitoring sites identified or proposed; and*
10. *Any other pertinent information.*



## Background

### *Description of the Alligator Creek Watershed*

The Alligator Creek Watershed includes approximately 5,500 acres (**Table 1**) of highly urbanized eastern Pinellas County, Florida. The City of Clearwater comprises approximately 65% of the watershed; unincorporated Pinellas County and the City of Safety Harbor, about 30% and 5%, respectively. WBID 1574 (Alligator Creek; **Figure 1**), encompasses 4,477 acres, or approximately 81% of the total watershed. Alligator Creek is a Class III waterbody, approximately 5.78 miles long, and flows eastward to Alligator Lake and ultimately outfalls to Old Tampa Bay. Alligator Lake is an artificial impoundment where flows are restricted by a salinity barrier constructed at Bayshore Boulevard.

Urban development and infrastructure account for approximately 88.2% of land uses, with residential development representing nearly half of the watershed. Wetlands represent about 6% of land use, and forest/open lands account for approximately 4%; commercial agriculture is nearly non-existent. The core of WBID 1574 is located east of Keene Road, south of Sunset Point Road, west of McMullen Booth Road and north of Drew Street, with portions of WBID 1574 extending up to approximately 0.7 miles past these limits in some locations.

The Alligator Creek watershed is subdivided into nine (9) sub-basins, defined by a main channel (Channel A) and eight (8) tributaries (**Figure 1**). The City of Clearwater further classifies Alligator Creek into unique watershed identification areas that include distinctive channel code designations (**Figure 2**). **Table 1** quantifies the land use for the Alligator Creek watershed for each sub-basin tributary. Most of these tributaries are located within highly urbanized areas, and characterized by deeply incised channels, often with bank protection and portions piped. Areas of wetlands are associated primarily with the main channel (Channel A) and its confluences with tributaries. Wetland quality is generally low, with a high component of nuisance and exotic plant species.

**Table 2. List of participants for the Maps on the Table session and the Walk the WBID exercise.**

| Name             | Representing                                   |
|------------------|------------------------------------------------|
| Sarah Kessler    | City of Clearwater                             |
| Melvin Maciolek  | City of Clearwater                             |
| Felicia Leonard  | City of Clearwater                             |
| Ricky Hess       | City of Clearwater                             |
| Marisa Blackwood | City of Clearwater                             |
| Alexis Wells     | City of Clearwater                             |
| Paul Mack        | City of Clearwater                             |
| William Anderson | City of Clearwater                             |
| Rose Lara        | City of Clearwater                             |
| Elliot Shoberg   | City of Clearwater Stormwater                  |
| Emily Laurenti   | City of Clearwater Public Utilities            |
| Timothy Keene    | City of Clearwater Public Utilities            |
| Duane Barto      | City of Clearwater Public Utilities            |
| Nilda Espinosa   | City of Clearwater Code Compliance             |
| Sarah Malone     | Pinellas County                                |
| Joseph Thames    | Pinellas County                                |
| Julie Vogel      | Pinellas County                                |
| Fred Flowers     | Pinellas County                                |
| Dennis Grizzell  | Pinellas County Stormwater                     |
| Ray Boler        | City of Safety Harbor                          |
| Bob Whitman      | Kisinger Campo & Associates, Corp.             |
| Chris Stiegler   | Kisinger Campo & Associates, Corp.             |
| Scott Deitche    | Greenman-Pedersen, Inc.                        |
| Erin Rasnake     | Florida Department of Environmental Protection |

## **Costs**

The only costs to the participants in the Walk the WBID exercise were staff time and potential management actions. Water samples were collected by the City of Clearwater and processed at the City of Clearwater Public Utilities Laboratory on April 15, 2015. Processing and analysis of the water quality samples was funded by the City of Clearwater.

Future management actions associated with existing city and county programs will require scheduling, coordination, and follow-up on behalf of the participating agencies. Examples of follow-up activities that may result in additional costs include system maintenance, repair, and investigation; however, it is important to note that these activities generally correspond with jurisdictional missions and already-established programs.

## **Initial Steps**

Before going into the field, the stakeholders met and exchanged information during a Maps on the Table (MOT) meeting organized by the City of Clearwater. MOT Meeting attendees included representatives from the City of Clearwater, Pinellas County, City of Safety Harbor, FDEP, KCA and GPI.

In preparation for this meeting, each agency provided information about Alligator Creek, and specifically WBID 1574, to KCA and GPI, which developed both large and small format maps for use at the MOT meeting and the WTW exercise. The maps provided for use during the MOT meeting and the WTW exercise are presented in **Appendix A**. During the MOT meeting, attendees provided specific knowledge in their respective disciplines to better acquaint all attendees with the conditions in the watershed. Several attendees brought collateral information and other map resources with them to more specifically address the conditions likely contributing to the bacteriological loading of WBID 1574. The information that was collected, assimilated and presented at the MOT meeting included the following:

- *Geographic information system (GIS) data;*
- *Stormwater infrastructure maps showing the locations of inlets and outfalls, ponds, ditches, and underground conveyances;*
- *Stormwater best management practices (BMPs) being implemented;*
- *Maps of private and public sewer infrastructure showing the locations of pump stations and force and gravity mains, as well as the location and number of sanitary sewer overflows (SSOs);*
- *Locations of septic tanks and repair permits issued;*
- *Locations of specialty farms, kennels, and other animal operations;*
- *Water quality sampling information such as sampling stations, frequency, and results;*
- *Hydrology, including wetlands, streams, and ponds; and*
- *Locations of known issues or areas of special concern such as homeless populations, dog parks, landfills, and transfer stations.*



### ***Maps on the Table Session***

With representatives from each participating agency, team members held the Maps on the Table session to identify areas of concern that could potentially contribute bacterial loading to the WBID. These areas of concern were identified based on field knowledge of agency staff and a synthesis of the available information. Due to the large number of participants at the meeting, two groups were formed with representatives from each agency. Both groups had large-format maps of the WBID to annotate and mark upon, identifying areas of concern to visit during the WTW exercise. Once both groups finished identifying potential areas of concern, the groups compared maps and all potential areas of concerns were synthesized onto a single map, given alpha-designations, and prioritized for field investigations during the WTW exercise.

Each group then elected field representatives based upon their infrastructure knowledge, access to facilities, familiarity with sampling equipment, protocol and standard operating procedures (SOPs), and their availability to attend the WTW event.

Member of the field team for the WTW exercise, again reviewed the mapped areas of concern, further discussed their prioritization, and determine appropriate routes to efficiently perform the field exercise. It was determined that no coordination with local law enforcement was required to visit the higher priority sites.

### ***Field Event***

The Walk the WBID team consisted of 14 of the 24 attendees of the meeting. The WTW team used the large-format map set while conducting the field investigations. A documentation team was designated, with a team member assigned to record global positioning system (GPS) location coordinates of potential sources, another person to take pictures, and a primary note taker to record the information. Areas for water quality sampling were identified during the WTW field investigation. Water quality sampling locations were marked in the field and their location coordinates collected in GPS. Water quality sampling was conducted the following day, April 15, 2015, in order to efficiently manage the sampling event, and minimize sample holding time.

The team explored the waterbody while in the field, referring to the maps to follow Alligator Creek and its tributaries above and below ground. Team members investigated the banks along the waterbody in the vicinity of the potential areas of concern. Major canals and ditch intersections with Alligator Creek within WBID 1574 were also included in the field investigation. Appropriate agency representatives with access rights to facilities conducted field investigations. Access to private property was restricted to appropriate agency representatives, unless the property owner had granted access to the entire team. Types of potential sources that were identified for investigated included the following:

- *Potential illicit connections (PICs) or discharges;*

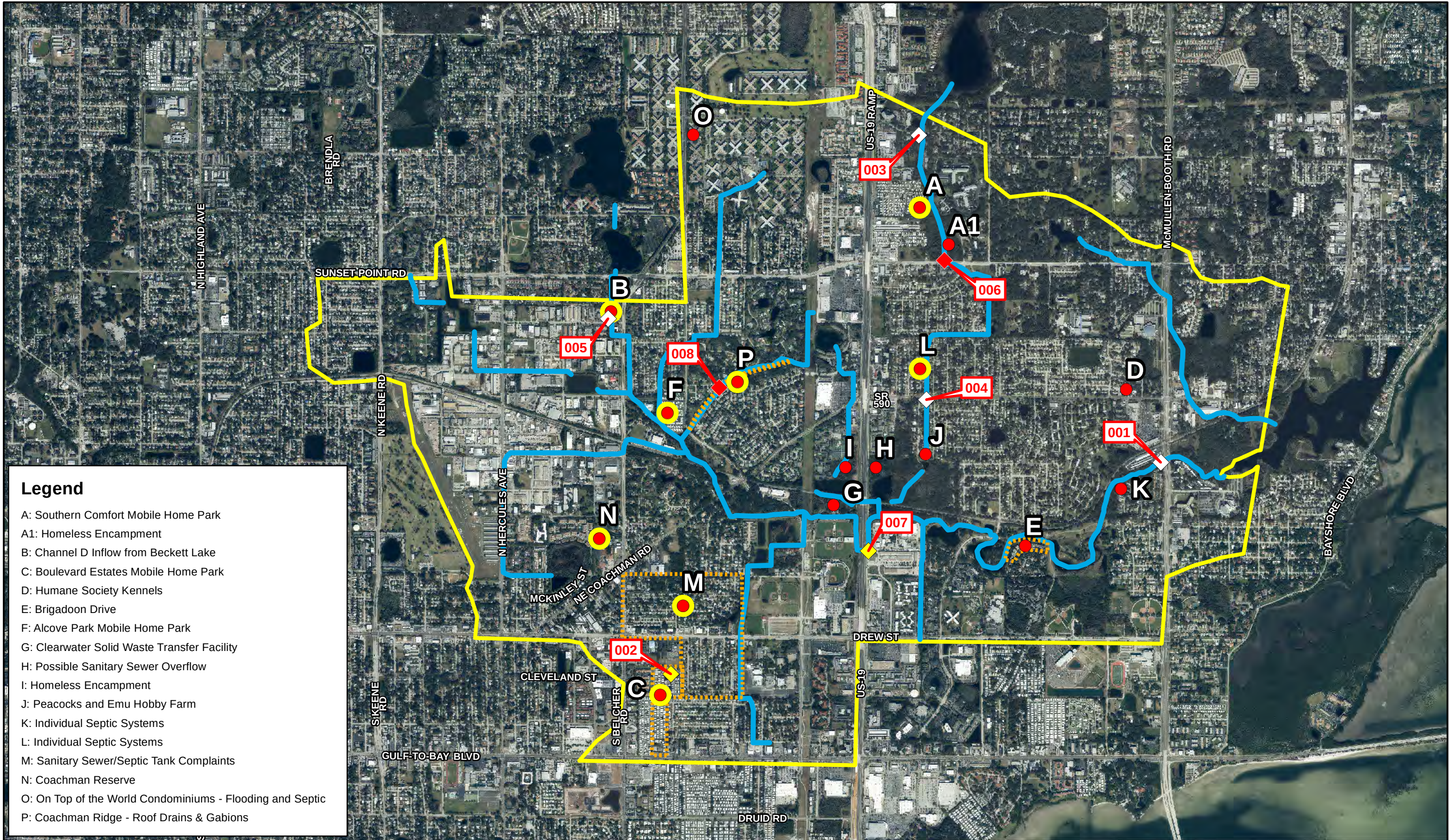
- *Public and private sanitary sewer infrastructure (such as manholes and pump stations);*
- *Package plants;*
- *Signs of recent SSOs, and areas with multiple SSOs;*
- *Wastewater infrastructure located close to surface waters and/or stormwater inlets, including pump stations, manholes, and air release valves (ARVs);*
- *Locations of septic tanks found in close proximity to surface waters and/or stormwater inlets;*
- *Failing septic tanks (as indicated by ponding and a strong smell of sewage);*
- *Evidence of homeless populations;*
- *MS4 conveyances requiring cleaning;*
- *Accumulated trash and debris on streets and parking lots;*
- *Accumulated trash and debris near to or inside stormwater drains and catch basins;*
- *Clogged or broken stormwater grates;*
- *Stormwater drains undergoing repairs;*
- *Stormwater outfalls discharging from underground conveyances or into ponds;*
- *Sewage smell from stormwater drains, indicating possible cross-connections;*
- *Unusual odors;*
- *Evidence of illegal dumping or discharge of liquids;*
- *Signs of oil and grease;*
- *Excessive sediments and signs of erosion or wash out;*
- *Stagnant water;*
- *Debris in inlets, or inlets located near wastewater infrastructure;*
- *Exposed pipes of unknown origin;*
- *Flood-prone areas;*
- *Pet waste or evidence of high-traffic pet areas;*
- *Presence of horses, cattle, or other ruminants in the water or close to the water;*
- *Evidence of wildlife such as raccoons and waterfowl;*
- *Evidence of chickens or other hobby animals;*
- *Areas with heavy tree cover and vegetated ditches preventing ultraviolet (UV) light penetration.*

Areas of concern and discharges potentially contributing to bacterial loading of Alligator Creek were identified for water quality sampling the day following the WTW exercise. Sampling was conducted on April 15, 2015, in order to efficiently manage the sampling episode and to minimize the holding time for the water quality samples. Potential sources or other issues identified while in the field were reported to the proper jurisdiction and cataloged while in the field. A written and photographic record was kept of major findings, including observations about the waterbody, potential sources, followed-up items and the responsible entity, and any areas that should be added to the monitoring plan or that required additional investigation.

## **Results**

**Figure 4** summarizes the potential areas of concern identified during the MOT session, areas of concern visited during the WTW exercise and the location of the bacteriological water quality sampling stations within WBID 1574. **Table 3** summarizes the potential areas of concern identified during the MOT meeting and water quality concerns, including potential fecal coliform sources, which were observed by the team during the Walk the WBID exercise. Water samples were collected by the City of Clearwater and processed at the City of Clearwater Public Utilities Laboratory on April 15, 2015. Water samples were analyzed for fecal coliform bacteria, *E. coli*, and enterococci by this laboratory using standard analytical procedures. The results of the water quality sampling analyses are summarized in **Table 4**, and detailed in **Appendix B**.





**Legend**

- A: Southern Comfort Mobile Home Park
- A1: Homeless Encampment
- B: Channel D Inflow from Beckett Lake
- C: Boulevard Estates Mobile Home Park
- D: Humane Society Kennels
- E: Brigadoon Drive
- F: Alcove Park Mobile Home Park
- G: Clearwater Solid Waste Transfer Facility
- H: Possible Sanitary Sewer Overflow
- I: Homeless Encampment
- J: Peacocks and Emu Hobby Farm
- K: Individual Septic Systems
- L: Individual Septic Systems
- M: Sanitary Sewer/Septic Tank Complaints
- N: Coachman Reserve
- O: On Top of the World Condominiums - Flooding and Septic
- P: Coachman Ridge - Roof Drains & Gabions

- Bacteria Sampling Point
- Possible Fecal Coliform Criteria Exceedance (10% of samples)
- Fecal Coliform Criteria Exceedance (daily value)
- Area of Concern
- Visited Area of Concern
- Area of Concern Boundary
- Alligator Creek Channels
- WBID 1574

Alligator Creek  
WBID 1574  
Summary of Findings



2,000 1,000 0 2,000  
Feet  
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Figure 4



**Table 3. Potential areas of concern identified for Alligator Creek (WBID 1574) during the Maps on Table session.**

| Alligator Creek (WBID 1574) |                                                                                    | Potential Areas of Concern                                                                | Alligator Creek |                           | Water Sample ID |            |
|-----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------|---------------------------|-----------------|------------|
| Site ID                     | Name                                                                               | Description - Potential Source                                                            |                 |                           | 15041501-       |            |
|                             |                                                                                    |                                                                                           | Channel Codes*  | Sub Basin**               | Upstream        | Downstream |
| <b>A</b>                    | Southern Comfort Mobile Home Park                                                  | Wastewater treatment package plant; possible Sanitary Sewer Overflows (SSOs)              | AG-BN           | Channel B                 | 003             | 006        |
| <b>A1</b>                   | Possible Homeless Encampment (near Southern Comfort Trailer Park)                  | Potential human waste source                                                              | AG-BN           | Channel B                 | 003             | 006        |
| <b>B</b>                    | Channel D inflow from Beckett Lake                                                 | Potential water quality degradation from a nursery located upstream                       | AG-D            | Channel D                 |                 | 005        |
| <b>C</b>                    | Boulevard Estates Mobile Home Park                                                 | Potential human waste source                                                              | AG-H            | Channel H                 |                 | 002        |
| <b>D</b>                    | Humane Society Kennels                                                             | Potential animal waste source                                                             | AG-E            | Channel E                 | 007             | 001        |
| <b>E</b>                    | Brigadoon Drive - Potential Dog Walk Area                                          | Potential dog walk adjacent to Alligator Creek                                            | AG-AE           | Channel A                 | 007             | 001        |
| <b>F</b>                    | Alcove Park Mobile Home Park                                                       | Potential dog walk adjacent to Alligator Creek                                            | AG-AW           | Channels A & C            |                 |            |
| <b>G</b>                    | City of Clearwater Solid Waste Transfer Facility                                   | Solid waste potentially attracting animals (birds, rodents)                               | AG-AE           | Channel A                 |                 | 007        |
| <b>H</b>                    | Possible Sanitary Sewer Overflow (SSO) near US 19                                  | Potential human waste source                                                              | AG-AE           | Channels A & B            | 004             | 007        |
| <b>I</b>                    | Possible Homeless Encampment West of US 19, North of Alligator Creek               | Potential human waste source                                                              | AG-J            | Channels A & J            |                 | 007        |
| <b>J</b>                    | Peacock and emu hobby farm                                                         | Potential animal waste source                                                             | AG-BS           | Channel B                 | 004             | 007        |
| <b>K</b>                    | Private Individual Septic Systems (OSTDS) near Alligator Creek (Kapok Park)        | Potential human waste source                                                              | AG-AE           | Channel A                 | 007             | 001        |
| <b>L</b>                    | Individual Septic Systems (OSTDS)/Dog Walk Areas near Owens and Evans Drives       | Potential human and animal waste source                                                   | AG-BS           | Channel B                 | 006             | 004        |
| <b>M</b>                    | Sanitary Sewer (SSOs)/Septic Tank (OSTDS) Complaints - Sharkey Rd./Lake Forest Rd. | Potential human waste source                                                              | AG-H            | Channel H                 | 002             | 007        |
| <b>N</b>                    | Coachman Reserve - Potential Pet Waste/Dog Walk Area                               | Potential dog walk area south and west of Lantern Way; adjacent to large wetland area     | AG-AW           | Channel A                 |                 |            |
| <b>O</b>                    | On Top of the World Condominiums - Flooding and Septic Area                        | Potential flooding in an area with septic tanks, west of On Top of the World Condominiums | AG-D            | (Channel D; outside WBID) |                 | 005        |
| <b>P</b>                    | Coachman Ridge - Stag Run Blvd. - Roof Drains and Gabions                          | Potential bacterial source from roof drains (Stag Run Blvd./Wetherington Road area)       | AG-F            | Channel F                 |                 | 008        |

\* Channel Codes - from City of Clearwater Watershed Identification Areas Map - 2015

\*\* Sub Basins - from Alligator Creek Watershed Management Plan, Floodplain Analysis Report - 2014

**Table 4. Summary of bacteriological sample analysis for Alligator Creek (WBID 1574), April 15, 2015. Sampling and analyses performed by the City of Clearwater. Sampling series number is 15041501. Values depicted in red indicate daily and possible 10 percent criteria exceedances. See Appendix B for further information.**

| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 001           | 66                          | 275                      | 60                          |
| 002           | 4839                        | 290                      | 760                         |
| 003           | 66                          | 334                      | 50                          |
| 004           | 356                         | 1298                     | 140                         |
| 005           | 372                         | 551                      | 260                         |
| 006           | 2240                        | 4839                     | 3100                        |
| 007           | 403                         | 821                      | 660                         |
| 008           | 731                         | 4839                     | 880                         |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number

#### **Alligator Creek - Fecal Coliform Exceedance Criteria for the TMDL – WBID 1574**

Counts per 100 milliliters (mL) of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 400 in 10 percent of the samples, nor exceed 800 on any one day.

Proposed exceedance criteria for *E. coli* (in fresh waters) – propose a monthly geometric means (MGM) limit of 126, and shall not exceed 410 in 10 percent of samples during a given 30-day period.

Proposed exceedance criteria for Enterococci (in marine waters) – propose a MGM limit of 35, and shall not exceed 135 in 10 percent of samples during a given 30-day period.

Seventeen (17) potential areas of concern (see **Table 3 and Figure 4**) were identified by participants during the MOT meeting, and eight (8) of the highest priority areas of concern were visited by the WTW team on April 14, 2015. All potential areas of concern that were visited were walked by the WTW team and any potential issues observed were photographed, their location recorded in a Trimble GPS, and documented in writing. A water sampling plan was developed to document the existing bacterial conditions within Alligator Creek, characterize the bacterial pollution throughout the WBID, and to quantify, to the extent practicable, the bacterial loading contribution for each of the areas of concern investigated during the WTW exercise. Eight (8) water quality samples were collected on April 15, 2015 at stations identified during the WTW exercise the previous day. -The eight (8) potential areas of concern investigated during the WTW exercise (see **Figure 4**) are described below, along with the results of water quality analyses for each site.



## Site A - Southern Comfort Mobile Home Park

A private sewage treatment system (package plant), located in the southeast corner of the Southern Comfort Mobile Home Park, was identified as a potential area of concern. This package plant is located adjacent to the wetland margins of Channel B of Alligator Creek. The area around the system had a strong septic odor and the ground was saturated. It appears, based on the field review, that treated wastewater is pumped up hill from the package plant and allowed to infiltrate into the upland areas within the mobile home park. Access to the infiltration system is unrestricted (unlocked), not well maintained, and a possible human health concern for the mobile home park residents. It was determined that water samples be taken both upstream and downstream of this site. **Sample No. 15041501-003 (Table 4)** was collected from Alligator Creek (Channel B) approximately 1000 feet upstream (north) of the Southern Comfort Mobile Home Park, at a location immediately south of McCormick Drive. The results of the analysis of **Sample No. 15041501-003 (Table 4)** indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed criteria for *E. coli*. The results were the lowest reported from all samples for fecal coliform (50 CFU/100 mL) and *E. coli* (66 CFU/100 mL). **Sample No. 15041501-006** was collected approximately 1050 feet downstream (south) from the Southern Comfort Mobile Home Park where Channel B of Alligator Creek crosses under Sunset Point Road. The results of the analysis of **Sample No. 15041501-006 (Table 4)** indicate that bacteria levels exceed criteria for fecal coliform and exceed proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL).

### Site A - Southern Comfort Mobile Home Park - Bacterial Analysis Results

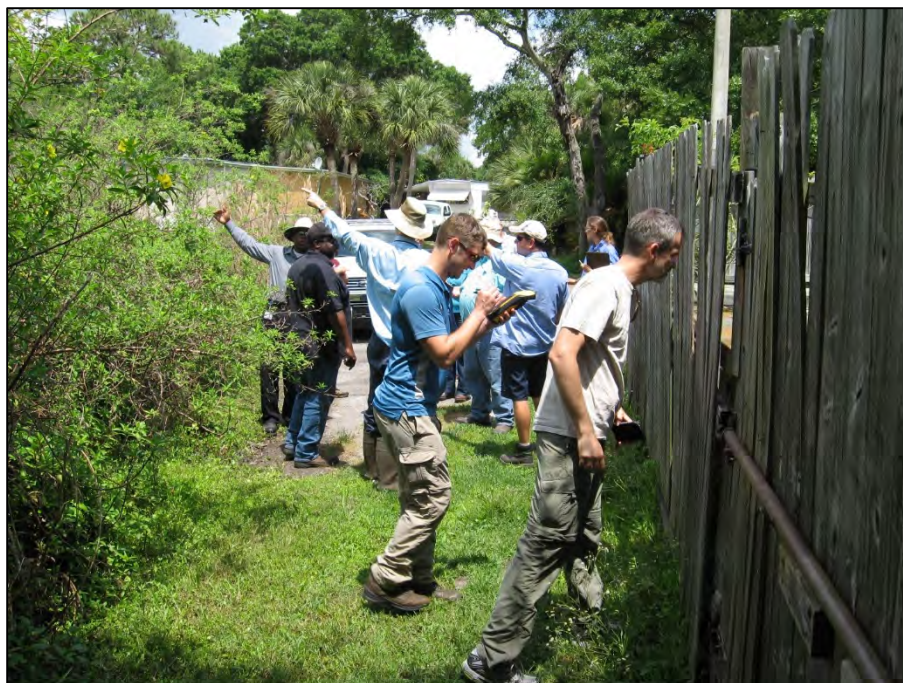
| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 003           | 66                          | 334                      | 50                          |
| 006           | 2240                        | 4839                     | 3100                        |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number



**Figure 5. Site A – Southern Comfort Mobile Home Park – Sewage treatment plant adjacent to wetland margins of Alligator Creek (Channel B).**





**Figure 6. Site A – Southern Comfort Mobile Home Park - WTW Field team inspecting the sewage treatment plant.**



**Figure 7. Site A – Southern Comfort Mobile Home Park – Effluent Disposal System. Treated wastewater is pumped up hill to higher areas of the park where it is allowed to infiltrate into the ground.**





**Figure 8. Site A – Southern Comfort Mobile Home Park – Effluent disposal system access is not secured (unlocked).**



## Site B - Channel D Inflow from Beckett Lake

Water from Harbor and Beckett Lakes enters WBID 1574 from the upper reaches of Channel D of Alligator Creek. This area was investigated to evaluate the potential bacterial loading from Beckett Lake (and a plant nursery located adjacent to Beckett Lake). Site B is a ditch (Channel D) located west of North Belcher Road and north of Sunnydale Boulevard behind local restaurants. This ditch is heavily vegetated, and the vegetation is very robust, which could indicate elevated nutrient levels. Additionally, a dumpster behind one of the restaurants near the ditch was identified as an area of concern, potentially contributing bacterial loading to Channel D of Alligator Creek. It was determined that a sample be taken at this site (**Sample No. 15041501-005**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform and did not exceed proposed criteria for *E. coli*.

### Site B – Channel D inflow from Beckett Lake - Bacterial Analysis Results

| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 005           | 372                         | 551                      | 260                         |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number



**Figure 9. Site B – Channel D of Alligator Creek - Inflow from Beckett Lake to WBID 1574.**





***Figure 10. Site B – Channel D of Alligator Creek - Inflow from Beckett Lake into WBID 1574.***



## Site C – Boulevard Estates Mobile Home Park

Boulevard Estates Mobile Home Park is located in the southwest corner of the WBID, east of South Belcher Road and north of SR 60 (Gulf to Bay Boulevard). A pond located at the northern end of 3<sup>rd</sup> Street was the focus of the field investigation and identified as an area of concern. The area surrounding the pond contained large amounts of bird and dog feces, and the odor of sewage was detected at the pond. Several old, damaged, seemingly abandoned, pipes were also observed around the margins of the pond. A warning sign was unearthed from the mud at the edge of the pond. It was determined that a water sample be taken here due to the amount of animal feces in close proximity to the water body and the odor from the pond (**Sample No. 15041501-002**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels potentially exceed criteria for fecal coliform and exceed proposed criteria for *E. coli*. The results for *E. coli* were reported as off-scale high, with the actual value known to be higher than the reported value (4839 CFU/100 mL).

### Site C – Boulevard Estates Mobile Home Park - Bacterial Analysis Results

| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 002           | 4839                        | 290                      | 760                         |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number



**Figure 11. Site C – Boulevard Estates Mobile Home Park – Pond margin with pet and bird feces, as well as numerous pipes. A sewage odor was detected at the pond.**



**Figure 12.** *Site C – Boulevard Estates Mobile Home Park – Pond contains an aeration system and many ducks.*



**Figure 13.** *Site C – Boulevard Estates Mobile Home Park – mobile homes are in close proximity to the pond.*





**Figure 14. Site C – Boulevard Estates Mobile Home Park – Warning signage, ineffectually placed.**

***“WARNING  
NO SWIMMING OR WADING***

***Natural water areas in Florida have been found  
to be unsafe for swimming due to bacteria  
which can cause sickness or death.***

***Poisonous snakes and alligators  
can be present in Florida water.***

***“CHILDREN ARE NOT TO BE IN THIS AREA  
WITHOUT ADULT SUPERVISION”***

## Site F – Alcove Park Mobile Home Park

A large grassed area within the park, adjacent to Alligator Creek, was identified during the MOT meeting as an area to investigate as a potential dog walk area. This area was investigated to evaluate the potential for bacterial loading Alligator Creek. Alcove Park Mobile Home Park is located east of North Belcher Road, west of Old Coachman Road and north of the Long Recreational and Aquatic Center operated by the Clearwater Parks and Recreation Department. Site F is located at the confluence of Channels C and F with the main stem of Alligator Creek (Channel A). Channel C is deeply incised with heavily vegetated areas along the tops of its banks. The grassed area was walked and no signs of continuous use as a pet waste area were observed. Discussions with Alcove Park management indicated that dogs were not allowed in the park, with a few minor exceptions. During the field investigation, a ductile iron pipe was observed crossing Channel C of Alligator Creek. This pipe appeared to be part of a wastewater distribution system, but appeared only marginally supported and restrained where it crossed the creek. This pipe was apparently connected to a recreation center located in the southwest portion of the Alcove Park Mobile Home Park. There were no obvious signs of any bacterial loading contributing to Alligator Creek at Site F, and no water sample was taken at this location. However a follow up recommendation was made to have the ductile iron pipe inspected and properly supported and restrained, as appropriate.



**Figure 15. Site F – Alcove Park Mobile Home Park – Potential pet waste/dog walk area. Park management informed the team that dogs were not allowed in the park. No significant areas of pet waste were observed.**





**Figure 16. Site F – Alcove Park Mobile Home Park - Deeply incised banks of Channel C of Alligator Creek.**





**Figure 17. Site F - Alcove Park Mobile Home Park – WTW team members reviewing field conditions.**



**Figure 18. Site F - Alcove Park Mobile Home Park – Aerial crossing of Channel C of Alligator Creek by a ductile iron sanitary sewer pipe.**





**Figure 19. Site F – Alcove Park Mobile Home Park – Ductile iron sanitary sewer pipe crossing Alligator Creek. Pipe needs to be inspected to determine if it is properly installed, supported and restrained.**





**Figure 20. Site F – Alcove Park Mobile Home Park – Sanitary sewer line running from a recreation center within the park toward the ductile iron pipe crossing Channel C of Alligator Creek.**



## Site L – Individual Septic Systems (OSTDS) & Dog Walk

An area with numerous private septic systems (OSTDS) and potential dog walk areas is located east of US 19 between Sunset Point Road and SR 590. Much of Channel B of Alligator Creek is piped underground, in a large box culvert between Owens Drive and Evans Drive, north of SR 590. This area was identified as an area of concern due to the possible pet waste contribution from the adjacent residential community, and possible bacterial loading from the many septic tanks in this area. It was determined that a water sample be taken due to the possible bacterial loading from the residential area (**Sample No. 15041501-004**). This water sample (**004**) was collected from Channel B of Alligator Creek on the south side of SR 590 between West Virginia Lane and Owen Drive. This sample was taken downstream of Site L, and upstream of Site J (peacock and emu hobby farm) to quantify any bacterial loading attributable to the residential neighborhood. The results of the analysis of this sample (**Table 4**) indicate that Enterococci levels were high (1298 MPN/100 mL).

### Site L – Individual Septic Systems (OSTDS) & Dog Walk - Bacterial Analysis Results

| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 004           | 356                         | 1298                     | 140                         |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number



**Figure 21. Site L – Individual Septic Systems (OSTDS) and Dog Walk Area – Portions of Alligator Creek (Channel B) are piped underground in the neighborhoods with OSTDSs.**

### Site M – Sanitary Sewer/Septic Tank Complaints

An area of concern, from which numerous complaints associated with wastewater had previously been received, is located east of North Belcher Road, north of Drew Street and south of Old Coachman Road. This area was identified as a possible source of human and pet waste based upon previous complaints, and a sanitary sewer line located in close proximity to a surface water feature. Site M is characterized as a residential area with many septic tanks (OSTDS). Additionally, a sanitary sewer line is also found in this area, near Sharkey and Lake Forest Roads, co-located with a surface water drainage feature. A manhole cover was removed and the sanitary sewer line inspected. No signs of recent overflows or other problems (e.g.; sewer odors) were observed or otherwise obvious.



**Figure 22. Site M – Surface water ditch adjacent to sanitary sewer pipe and manhole.**





**Figure 23. Site M – Sanitary sewer line adjacent to surface water conveyance feature.**





*Figure 24. Site M – Manhole in sanitary sewer line adjacent to surface water conveyance feature.*



### Site N - Coachman Reserve – Potential Pet Waste/Dog Walk Area

Coachman Reserve is a townhome community, which was built adjacent to a large wetland area. Coachman Reserve is located south of Palmetto Street, between North Hercules Avenue and North Belcher Road. This area was identified as an area of concern due to possible bacterial loading from pet waste generated by the community. The field investigation revealed a well maintained community complete with pet waste disposal stations. The eastern aspects of the wetland area were visited, (near the stormwater management system outfall, west of Lantern Way) and were found to be in overall good general condition, with what appeared to be a healthy wetland margin, and no apparent pet waste management issues.



**Figure 25. Site N – Coachman Reserve - Potential pet waste/dog walk area. The community has pet waste stations and no water quality problems were apparent.**





**Figure 26. Site N – Coachman Reserve - Stormwater outfall structure from townhome community.**



**Figure 27. Site N – Coachman Reserve - Margin of existing wetland downstream from stormwater outfall.**



## Site P – Coachman Ridge – Roof Drains and Gabions

Alligator Creek (Channel F) has been channelized and the shoreline protected with a gabion system along the Coachman Ridge neighborhood (north of Stag Run Boulevard). This area was identified as an area of concern due to roof drainage being directly piped into Alligator Creek from homes in the adjacent residential community, possible pet waste contamination, and the presence of a gabion system that lines Alligator Creek in this area. It was determined that a water sample be taken at this site due to the possible bacterial contribution from this residential area (**Sample No. 15041501-008**). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels exceed criteria for fecal coliform and exceed proposed criteria for *E. coli*. The results for Enterococci were reported as off-scale high, with the actual value known to be higher than the reported value (4839 MPN/100 mL).

### Site P – Coachman Ridge Roof Drains and Gabions - Bacterial Analysis Results

| Sample Number | <i>E. coli</i> (CFU/100 mL) | Enterococci (MPN/100 mL) | Fecal Coliform (CFU/100 mL) |
|---------------|-----------------------------|--------------------------|-----------------------------|
| 008           | 731                         | 4839                     | 880                         |

*E. coli* (*Escherichia coli*); CFU - colony-forming units; MPN - most probable number



**Figure 28. Site P – Coachman Ridge – showing the gabion system and lack of marginal vegetation along Channel F of Alligator Creek.**





**Figure 29. Site P – Coachman Ridge – WTW team members inspecting Channel F of Alligator Creek.**





**Figure 30. Site P – Coachman Ridge – Gabion system at the headwall along the Wetherington Road crossing of Alligator Creek.**



**Figure 31. Site P – Coachman Ridge – Roof drains from adjacent residences penetrating the gabion system along Channel F of Alligator Creek.**

## Additional Water Samples

Two (2) additional water samples were collected at key locations within WBID 1574 in order to characterize the bacterial content of Alligator Creek. These samples (see **Figure 4**), and results of their analyses, are discussed below:

- **Sample No. 15041501-001** was collected from Alligator Creek just west of McMullen Booth Road (at Abbey Ct.) near the downstream (eastern) end of the WBID boundary. The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed criteria for *E. coli*. The results for Enterococci were the lowest reported for all samples (275 MPN/100 mL).
- **Sample No. 15041501-007** was collected from Alligator Creek at the east side of US 19 North. This sample was taken approximately 1,500 feet downstream from the Clearwater Solid Waste Transfer Facility (Site G). The results of the analysis of this sample (**Table 4**) indicate that bacteria levels may exceed (10% of samples) criteria for fecal coliform and approached the exceedance criteria (10% of samples) proposed for *E. coli*.

Additionally, the previously discussed analytical results of **Sample No. 15041501-003** were also used to characterize the bacterial loading associated with input from upstream areas of Channel B, originating from the Lake Chautauqua drainage. This water sample was taken from Alligator Creek (Channel B) just south of McCormick Drive near the northern boundary of the WBID. This sample site is located approximately 1000 feet north of the Southern Comfort Mobile Home Park. The results of the analysis of this sample (**Table 4**) indicate that bacteria levels did not exceed criteria for fecal coliform nor exceed proposed criteria for *E. coli*. The results were the lowest reported from all samples for fecal coliform (50 CFU/100 mL) and *E. coli* (66 CFU/100 mL).



## Next Steps and Follow-up Actions

The recommended next steps and follow-up actions in the Alligator Creek watershed are as follows:

1. Develop specific bacterial sampling plan for Alligator Creek
2. Conduct bacterial water sampling and analyses - analyses to include fecal coliform, enterococci and *E. coli*
3. Confirm jurisdiction for identified areas of concern
4. Research litigation associated with Southern Comfort Mobile Home Park
5. Follow up on inspection of sanitary sewer infrastructure, particularly the pipe crossing of Channel C, at Alcove Park Mobile Home Park (Site F)
6. Follow up with inspection of stormwater infrastructure in close proximity to Alligator Creek
7. Conduct additional supplementary water sampling based upon initial sampling results
8. Follow up with relevant City of Clearwater departments, and cooperating agencies
9. Follow up with FDOT District Seven representative
10. Follow up with Department of Health representative
11. Prepare Walk the WBID Summary Report

## Completed Follow-up Actions

Follow up actions have been initiated and a number of them have been completed, as follows:

1. Develop specific bacterial sampling plan for Alligator Creek - **COMPLETED**
2. Conduct bacterial water sampling and analyses - analyses to include fecal coliform, enterococci and *E. coli* – **COMPLETED**
  - o Sampling conducted by Emily Laurenti on April 15, 2015. Lab analysis performed by City of Clearwater Public Utilities Laboratory on April 15, 2015.
3. Confirm jurisdiction for identified areas of concern- **COMPLETED**
4. Research litigation associated with Southern Comfort Mobile Home Park- **COMPLETED**
  - o Litigation between the State of Florida and the MHP owners confirmed by City of Clearwater, DOH and Pinellas County
5. Follow up on inspection of sanitary sewer infrastructure, particularly the pipe crossing of Channel C, at Alcove Park Mobile Home Park (Site F) - **INITIATED**
6. Follow up with inspection of stormwater infrastructure in close proximity to Alligator Creek - **INITIATED**
7. Conduct additional supplementary water sampling based upon initial sampling results
8. Follow up with relevant City of Clearwater departments, and cooperating agencies- **INITIATED**
9. Follow up with FDOT District Seven representative- **INITIATED**

- o Discussed WTW exercise with Sue Moore (FDOT D7) on April 15 and 30, 2015, and she indicated to keep her in the loop as plan development progressed. Ms. Moore did not attend the WTW exercise because she was not notified of the meeting location change by the consultant.
- 10. Follow up with Department of Health (DOH) representative- **INITIATED**
  - o Discussed WTW exercise with Henry Kunce (DOH) on April 15, 2015, and he indicated he was available to assist in providing information for plan development. Mr. Kunce did not attend the WTW exercise because he was not notified of the meeting location change by the consultant. A meeting is scheduled for June 17, 2015, with Mr. Kunce to review the results of the WTW exercise and summary.
- 11. Prepare Walk the WBID Summary Report- **INITIATED**
  - o Draft WTW Summary Report completed and forwarded to the City of Clearwater for review on June 9, 2015.

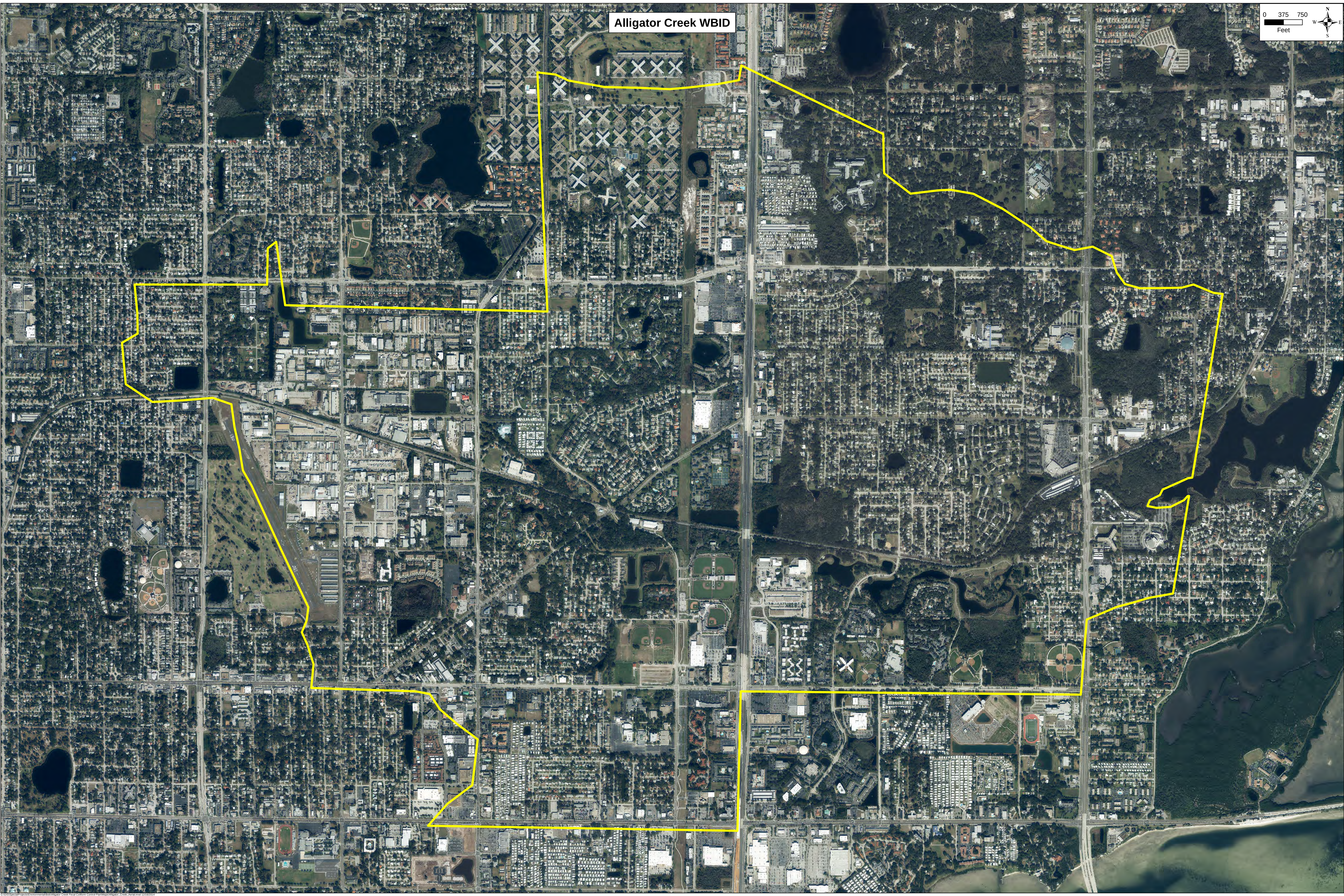
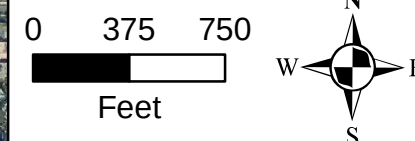


***Appendix A***

***Maps on Table Session and WTW Exercise Maps***

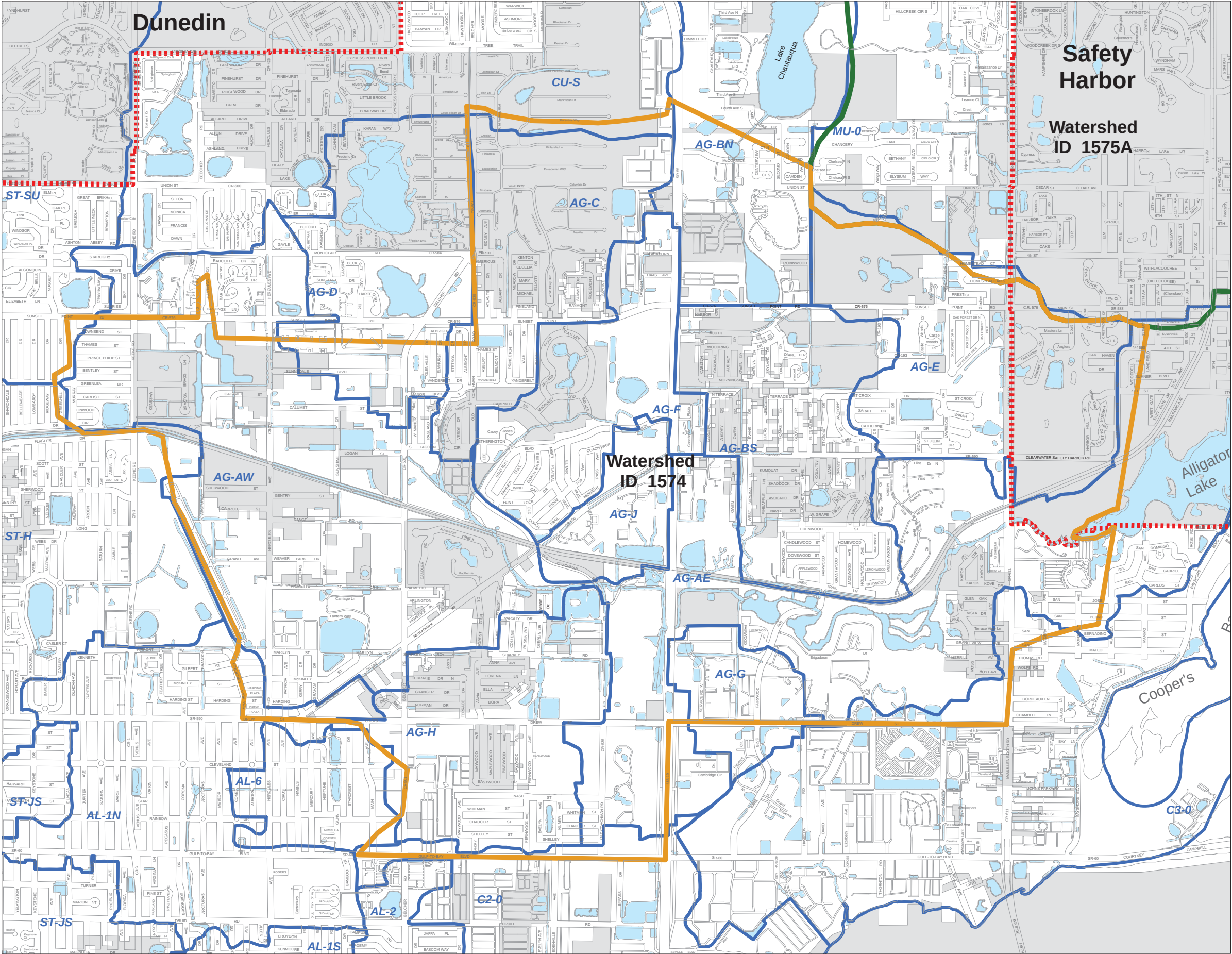


Alligator Creek WBID

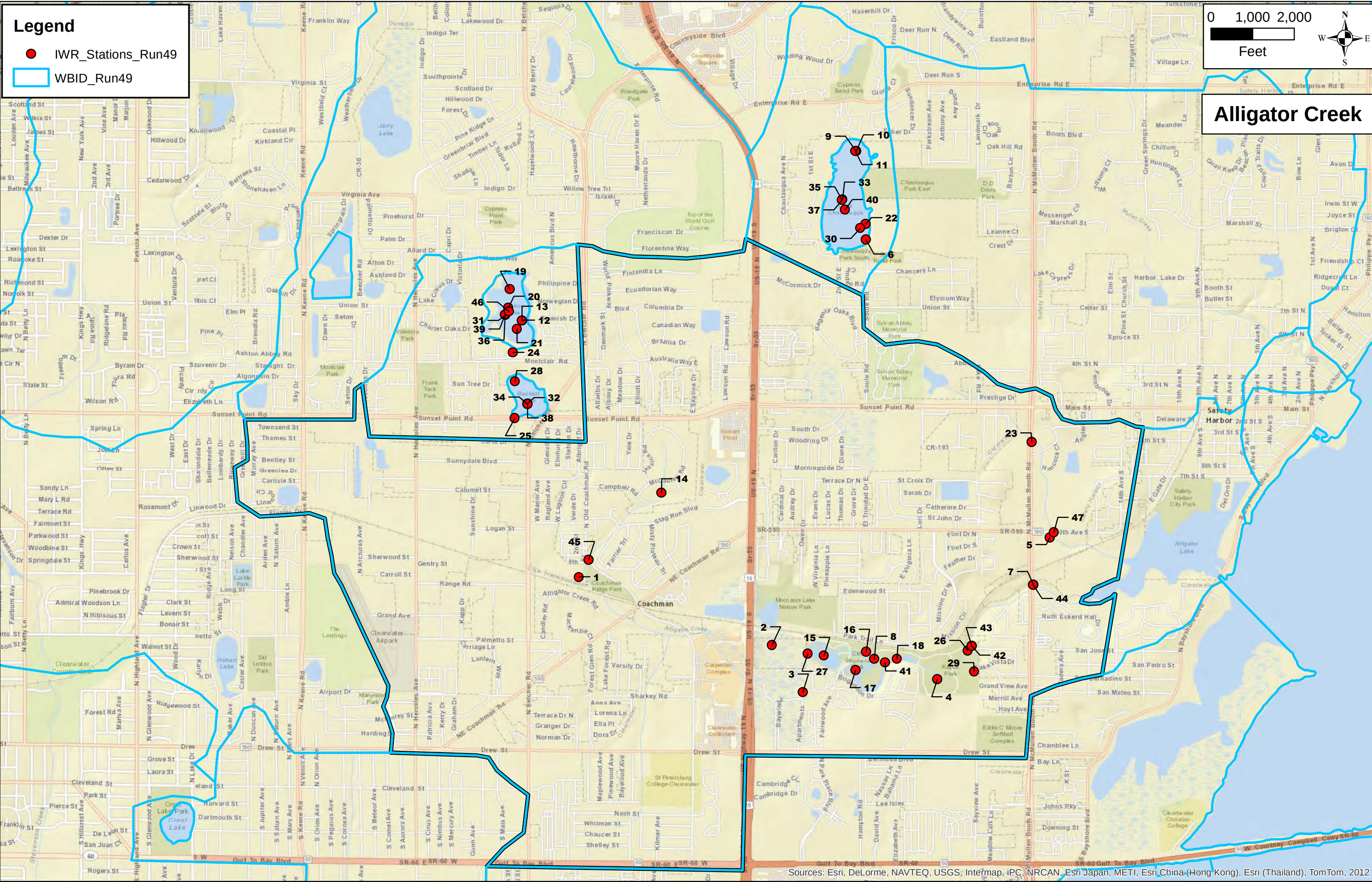




WATERSHED IDENTIFICATION AREAS







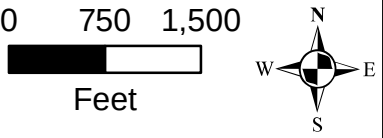


| ID | STA                     | WBID  | NAME1                                                      | LAT      | LON       | BD   | ED   | NOBS | COMMENTS                                                                                                       | RUN    | WQ | BIO |
|----|-------------------------|-------|------------------------------------------------------------|----------|-----------|------|------|------|----------------------------------------------------------------------------------------------------------------|--------|----|-----|
| 1  | 112WRD 02307668         | 1574  | ALLIGATOR CREEK BELOW BELCHER RD AT CLEARWATER FL          | 27.97940 | -82.74250 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 2  | 112WRD 02307671         | 1574  | ALLIGATOR CR BELOW US HWY 19 AT CLEARWATER FL              | 27.97500 | -82.72810 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 3  | 112WRD 02307672         | 1574  | ALLIGATOR CREEK TRIBUTARY AT CLEARWATER FL                 | 27.97190 | -82.72580 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 4  | 112WRD 02307673         | 1574  | ALLIGATOR CREEK AT CLEARWATER FL                           | 27.97280 | -82.71580 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 5  | 112WRD 02307688         | 1574  | ALLIGATOR CREEK TRIBUTARY AT SAFETY HARBOR FL              | 27.98220 | -82.70750 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 6  | 21FLA 24040029          | 1603D | TAMPA BAY BASIN/OLDSMAR/FRESHWATER SITE                    | 28.00180 | -82.72130 | 0    | 0    | 0    | Assigned to 1603D, Run 46 - P.Homann                                                                           |        | 1  | 0   |
| 7  | 21FLBRA 1574-A          | 1574  | 1574 - Alligator Creek - Bridge on McMullen Booth          | 27.97907 | -82.70870 | 2007 | 2007 | 101  | j hand 9/2007                                                                                                  |        | 1  | 0   |
| 8  | 21FLBRA 1574-B          | 1574  | 1574 - Alligator Creek - at park before RR on Fairwood Ave | 27.97412 | -82.72051 | 2007 | 2007 | 160  | j hand 9/2007                                                                                                  |        | 1  | 0   |
| 9  | 21FLGW 37012            | 1603D | Z4-LL-3007 CHAUTAUQUA, LAKE                                | 28.00764 | -82.72207 | 2009 | 2009 | 106  | Assigned by Phil Homann 6/2010                                                                                 | Run 41 | 1  | 1   |
| 10 | 21FLGW 37012            | 1603D | Z4-LL-3007 CHAUTAUQUA, LAKE                                | 28.00764 | -82.72207 | 2009 | 2009 | 106  | Assigned by Phil Homann 6/2010                                                                                 | Run 41 | 1  | 0   |
| 11 | 21FLGW 38312            | 1603D | Z4-LL-3007R CHAUTAUQUA, LAKE                               | 28.00764 | -82.72212 | 2009 | 2009 | 106  |                                                                                                                | Run 42 | 1  | 0   |
| 12 | 21FLGW 41619            | 1603E | Z4-LL-6001 HARBOR LAKE                                     | 27.99632 | -82.74685 | 2012 | 2012 | 112  | New Station assigned to 1603E, Run 48 - P.Homann                                                               | Run 48 | 1  | 1   |
| 13 | 21FLGW 41619            | 1603E | Z4-LL-6001 HARBOR LAKE                                     | 27.99632 | -82.74685 | 2012 | 2012 | 112  | New Station assigned to 1603E, Run 48 - P.Homann                                                               | Run 48 | 1  | 0   |
| 14 | 21FLGW 8028             | 1574  | SWB-LS-1007 UNKNOWN                                        | 27.98500 | -82.73639 | 2000 | 2000 | 62   | Kevin petrus 9/2007                                                                                            |        | 1  | 0   |
| 15 | 21FLKWATPIN-CLIFFSTE-1  | 1574  | Pinellas-Cliff Stephens Park-1                             | 27.97433 | -82.72424 | 1991 | 1998 | 269  | Assigned to 1574, Run 44 - P.Homann; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann |        | 1  | 0   |
| 16 | 21FLKWATPIN-CLIFFSTE-2  | 1574  | Pinellas-Cliff Stephens Park-2                             | 27.97459 | -82.72110 | 1991 | 1998 | 279  | Assigned to 1574, Run 44 - P.Homann; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann |        | 1  | 0   |
| 17 | 21FLKWATPIN-CLIFFSTE-3  | 1574  | Pinellas-Cliff Stephens Park-3                             | 27.97338 | -82.72187 | 1991 | 1998 | 278  | Assigned to 1574, Run 44 - P.Homann; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann |        | 1  | 0   |
| 18 | 21FLKWATPIN-CLIFFSTE-4  | 1574  | Pinellas-Cliff Stephens Park-4                             | 27.97413 | -82.71880 | 1991 | 1998 | 277  | Assigned to 1574, Run 44 - P.Homann; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann |        | 1  | 0   |
| 19 | 21FLKWATPIN-HARBOR-1    | 1603E | Pinellas-Harbor-1                                          | 27.99838 | -82.74777 | 1993 | 1995 | 31   | 6/22/03 Added; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann                       |        | 1  | 0   |
| 20 | 21FLKWATPIN-HARBOR-2    | 1603E | Pinellas-Harbor-2                                          | 27.99715 | -82.74786 | 1993 | 1995 | 29   | 6/22/03 Added; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann                       |        | 1  | 0   |
| 21 | 21FLKWATPIN-HARBOR-3    | 1603E | Pinellas-Harbor-3                                          | 27.99576 | -82.74722 | 1993 | 1995 | 31   | 6/22/03 Added; Lat/long revised based on values provided by LakeWatch, Run 49 - P.Homann                       |        | 1  | 0   |
| 22 | 21FLPDEM14-02           | 1603D | Lake Chautauqua                                            | 28.00283 | -82.72133 | 2003 | 2013 | 2771 | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 23 | 21FLPDEM14-03           | 1574  | ALLIGATOR CR E SIDE MCMULLEN BOOTH BRDG                    | 27.98851 | -82.70888 | 0    | 0    | 0    | Lat/long values updated based on values in Florida STORET, Run 44 - P.Homann                                   |        | 1  | 0   |
| 24 | 21FLPDEM14-08           | 1603E | ARBOR LAKE DISCHARGE N OF MONTCLAIR                        | 27.99420 | -82.74750 | 0    | 0    | 0    | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 25 | 21FLPDEM14-09           | 1603C | Beckett Lake                                               | 27.98988 | -82.74734 | 2007 | 2013 | 429  |                                                                                                                |        | 1  | 0   |
| 26 | 21FLPDEM14-10           | 1574  | Alligator Creek                                            | 27.97470 | -82.71355 | 2007 | 2013 | 1178 | Lat/long values updated based on values in Florida STORET, Run 46 - P.Homann                                   |        | 1  | 0   |
| 27 | 21FLPDEM14-11           | 1574  | Alligator Creek                                            | 27.97445 | -82.72544 | 2003 | 2009 | 1239 | Lat/long values updated based on values in Florida STORET, Run 45 - P.Homann                                   |        | 1  | 0   |
| 28 | 21FLPDEM14-12           | 1603C | Beckett Lake                                               | 27.99230 | -82.74733 | 2008 | 2010 | 243  | J Hand 9/19/2008                                                                                               |        | 1  | 0   |
| 29 | 21FLPDEMAMB 14-10       | 1574  | Alligator Creek                                            | 27.97333 | -82.71306 | 1999 | 2002 | 429  | Kevin petrus 9/2007                                                                                            |        | 1  | 0   |
| 30 | 21FLPDEMAMB 14-2        | 1603D | Lake Chautauqua                                            | 28.00256 | -82.72173 | 1999 | 2002 | 718  | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 31 | 21FLSWFD21092           | 1603E | HARBOR                                                     | 27.99667 | -82.74806 | 2006 | 2012 | 537  | J Hand March 2009                                                                                              | Run 36 | 1  | 0   |
| 32 | 21FLSWFD21129           | 1603C | BECKETT                                                    | 27.99083 | -82.74639 | 2006 | 2012 | 189  | J Hand March 2009                                                                                              | Run 36 | 1  | 0   |
| 33 | 21FLSWFD22697           | 1603D | BOWDEN (CHAUTAUQUA)                                        | 28.00444 | -82.72306 | 2006 | 2012 | 195  | J Hand March 2009                                                                                              | Run 36 | 1  | 0   |
| 34 | 21FLSWFDBECKETT         | 1603C |                                                            | 27.99080 | -82.74640 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 35 | 21FLSWFDBOWDEN (CHAUTAU | 1603D |                                                            | 28.00440 | -82.72310 | 0    | 0    | 0    | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 36 | 21FLSWFDHARBOR          | 1603E |                                                            | 27.99670 | -82.74810 | 0    | 0    | 0    | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 37 | 21FLSWFDSTA0834         | 1603D | LAKE BOWDEN (CHAUTAUQUA) - OPEN WATER                      | 28.00440 | -82.72310 | 0    | 0    | 0    | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 38 | 21FLSWFDSTA0835         | 1603C | BECKETT LAKE - OPEN WATER                                  | 27.99080 | -82.74640 | 0    | 0    | 0    |                                                                                                                |        | 1  | 0   |
| 39 | 21FLSWFDSTA0893         | 1603E | HARBOR LAKE - OPEN WATER                                   | 27.99670 | -82.74810 | 0    | 0    | 0    | CHG. WBID ASSIGN 8/22/02                                                                                       |        | 1  | 0   |
| 40 | 21FLTPA 24040029        | 1603D | Lake Chautauqua/Oldsmar                                    | 28.00376 | -82.72287 | 0    | 0    | 0    | New Station assigned to 1603D, Run 49 - P.Homann                                                               | Run 49 | 0  | 1   |
| 41 | 21FLTPA 275826008243109 | 1574  | TP 460 - Direct Runoff to Bay                              | 27.97389 | -82.71969 | 2006 | 2006 | 444  | J Hand 4/2008 - K ODonnell 12/5/08                                                                             |        | 1  | 0   |
| 42 | 21FLTPA 275830108242477 | 1574  | TP 459 - Direct Runoff to Bay                              | 27.97503 | -82.71325 | 2006 | 2011 | 614  | J Hand 4/2008 - K ODonnell 12/5/08                                                                             |        | 1  | 1   |
| 43 | 21FLTPA 275830108242477 | 1574  | TP 459 - Direct Runoff to Bay                              | 27.97503 | -82.71325 | 2006 | 2011 | 614  | J Hand 4/2008 - K ODonnell 12/5/08                                                                             |        | 1  | 0   |
| 44 | 21FLTPA 27584478242314  | 1574  | TP369-Alligator Creek                                      | 27.97908 | -82.70872 | 2005 | 2011 | 828  | added 6/15/05 J Hand                                                                                           |        | 1  | 0   |
| 45 | 21FLTPA 275850008244304 | 1574  | TP 461 - Direct Runoff to Bay                              | 27.98056 | -82.74178 | 2006 | 2006 | 442  | J Hand 4/2008 - K ODonnell 12/5/08                                                                             |        | 1  | 0   |
| 46 | 21FLTPA 27594898244522  | 1603E | Harbor Lake located in Top of the World Condo complex      | 27.99692 | -82.74782 | 0    | 0    | 0    | New Station assigned to 1603E, Run 49 - P.Homann                                                               | Run 49 | 0  | 1   |
| 47 | 21FLTPA 28585728242259  | 1574  | TP370-Alligator Creek                                      | 27.98256 | -82.70719 | 2005 | 2011 | 808  | Joe Hand 9/16/2005 - K ODonnell 12/5/08                                                                        |        | 1  | 0   |

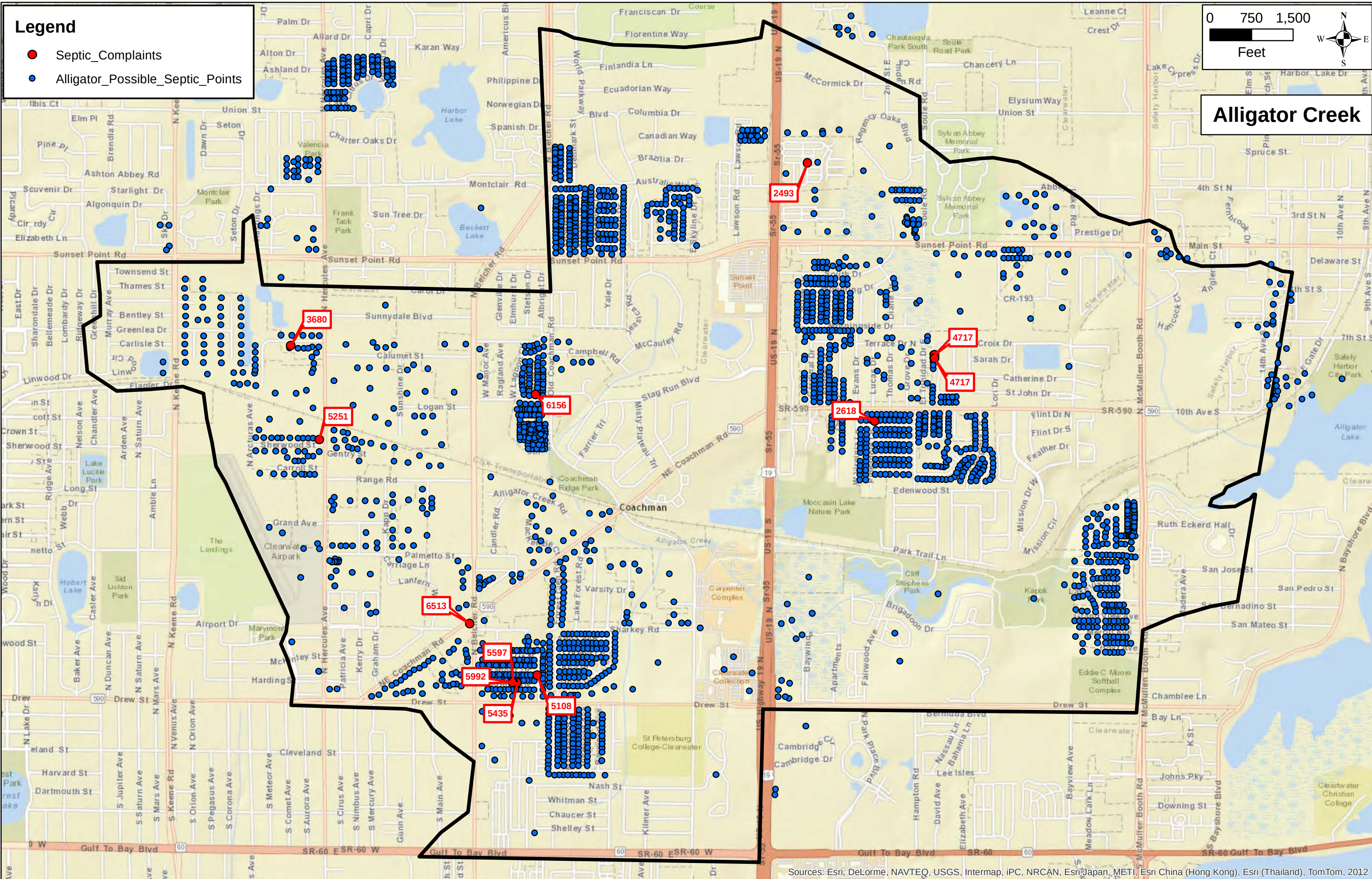


Legend

- Septic\_Complaints
- Alligator\_Possible\_Septic\_Points



Alligator Creek



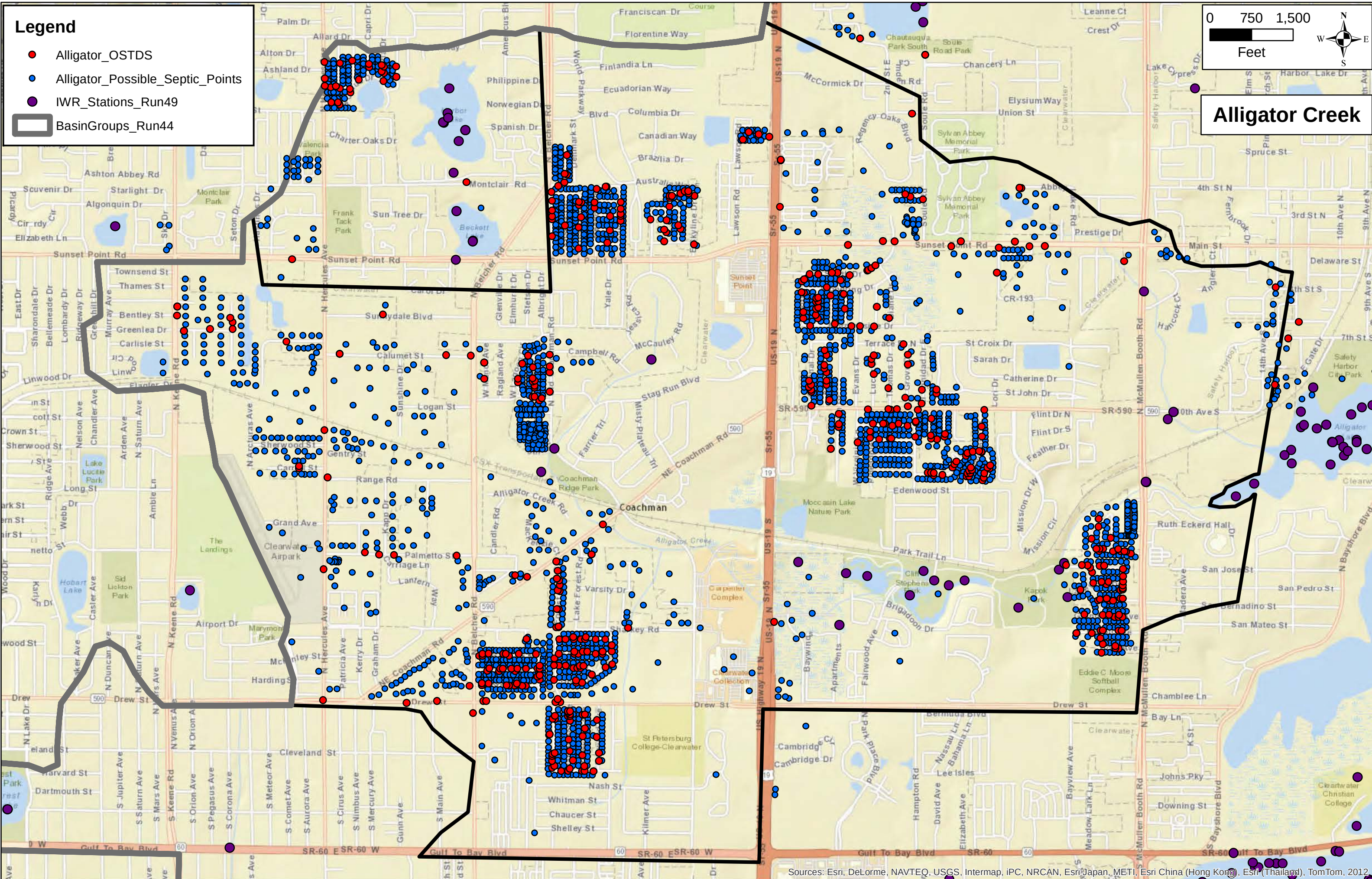


**Legend**

- Alligator\_OSTDS
- Alligator\_Possible\_Septic\_Points
- IWR\_Stations\_Run49
- ▭ BasinGroups\_Run44

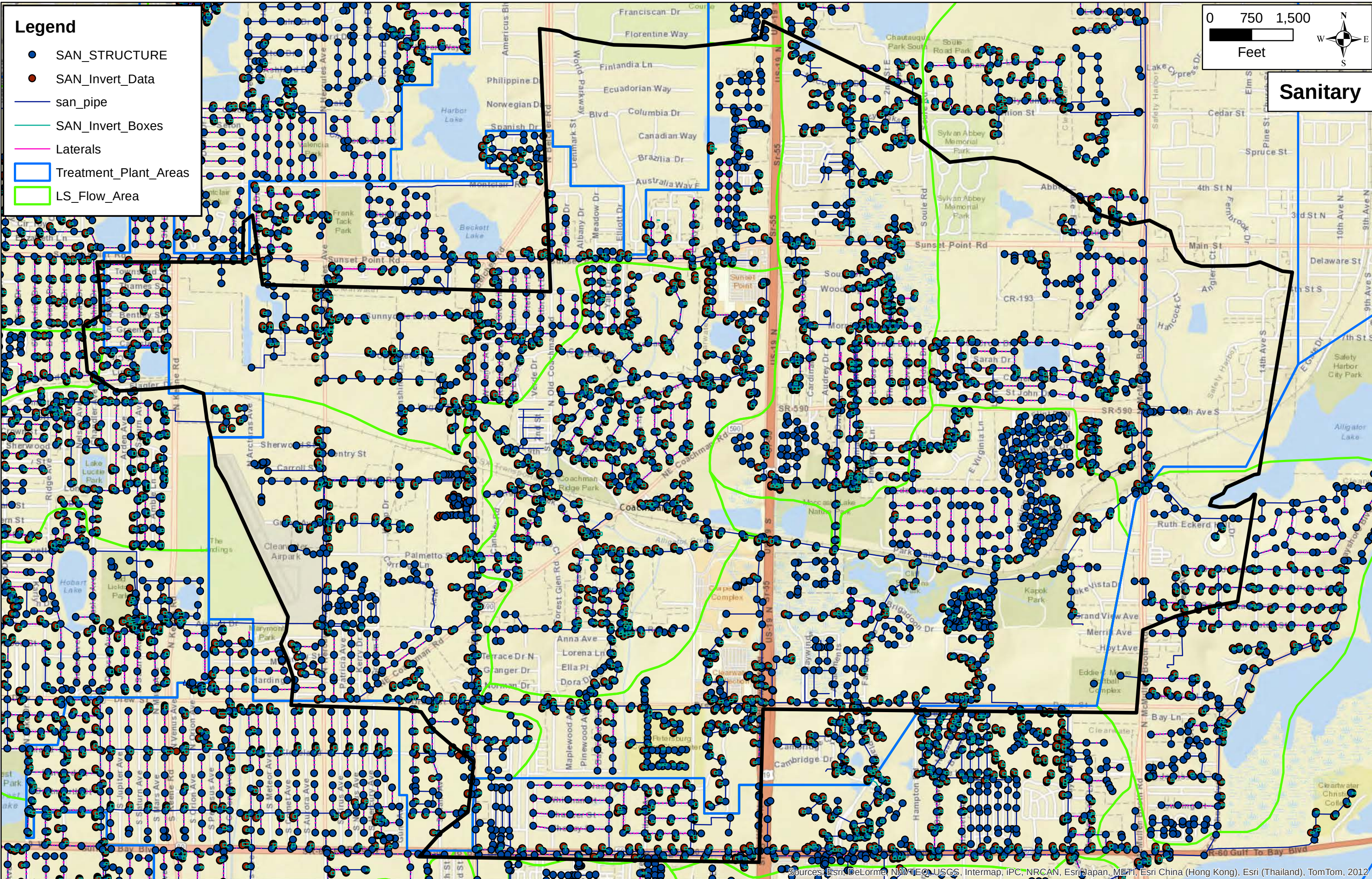
0 750 1,500  
Feet

**Alligator Creek**

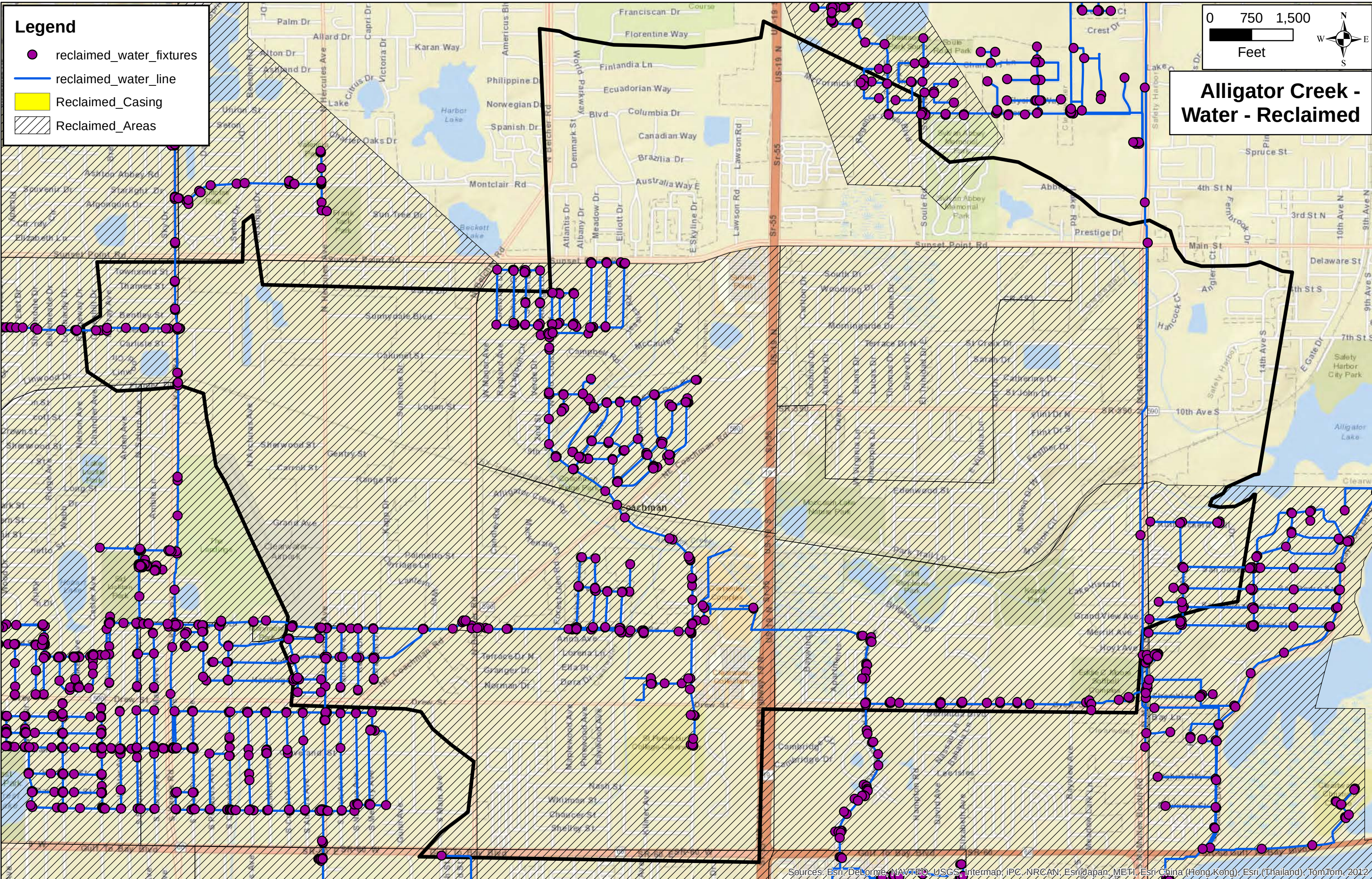


Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012.

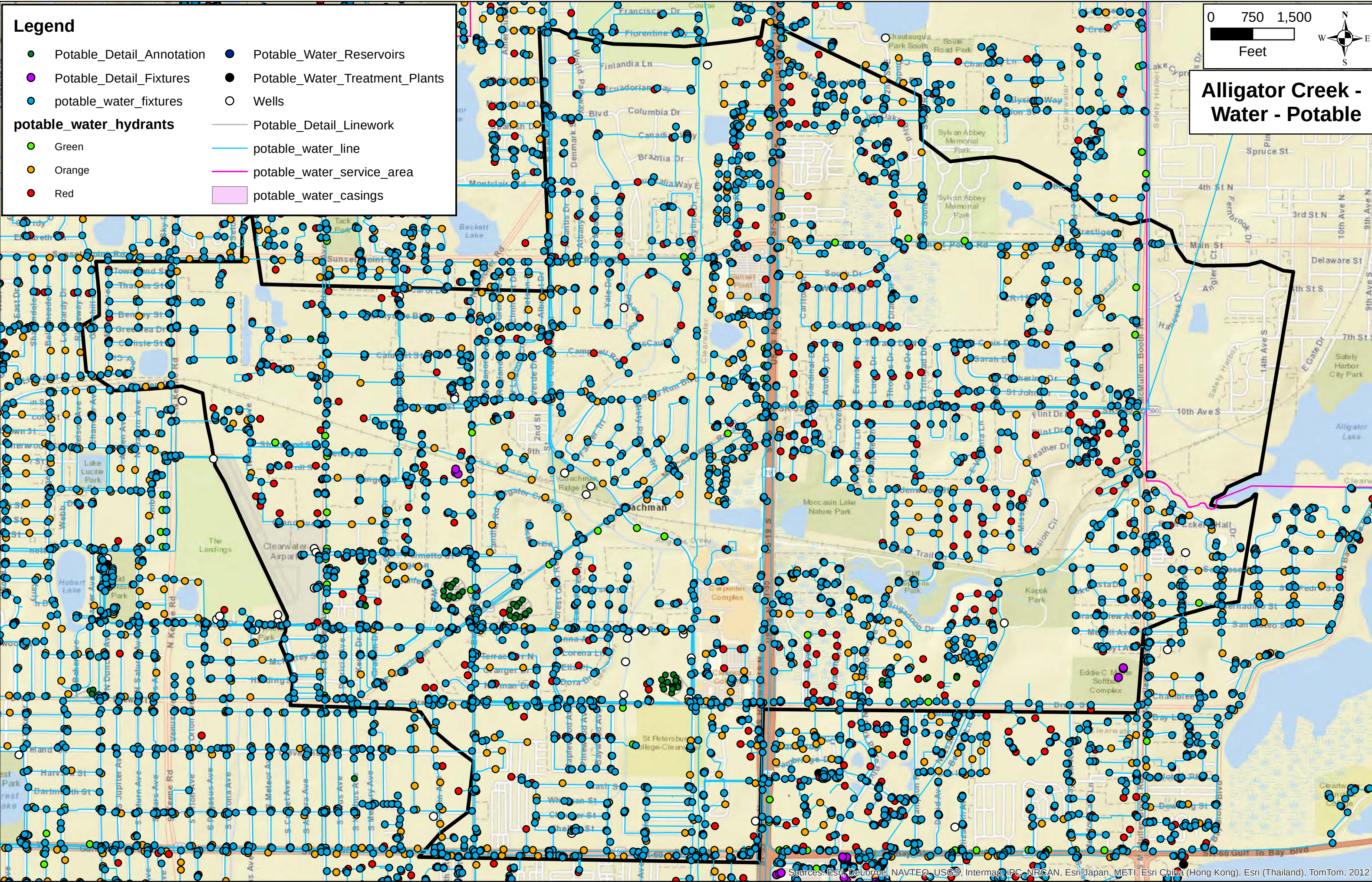








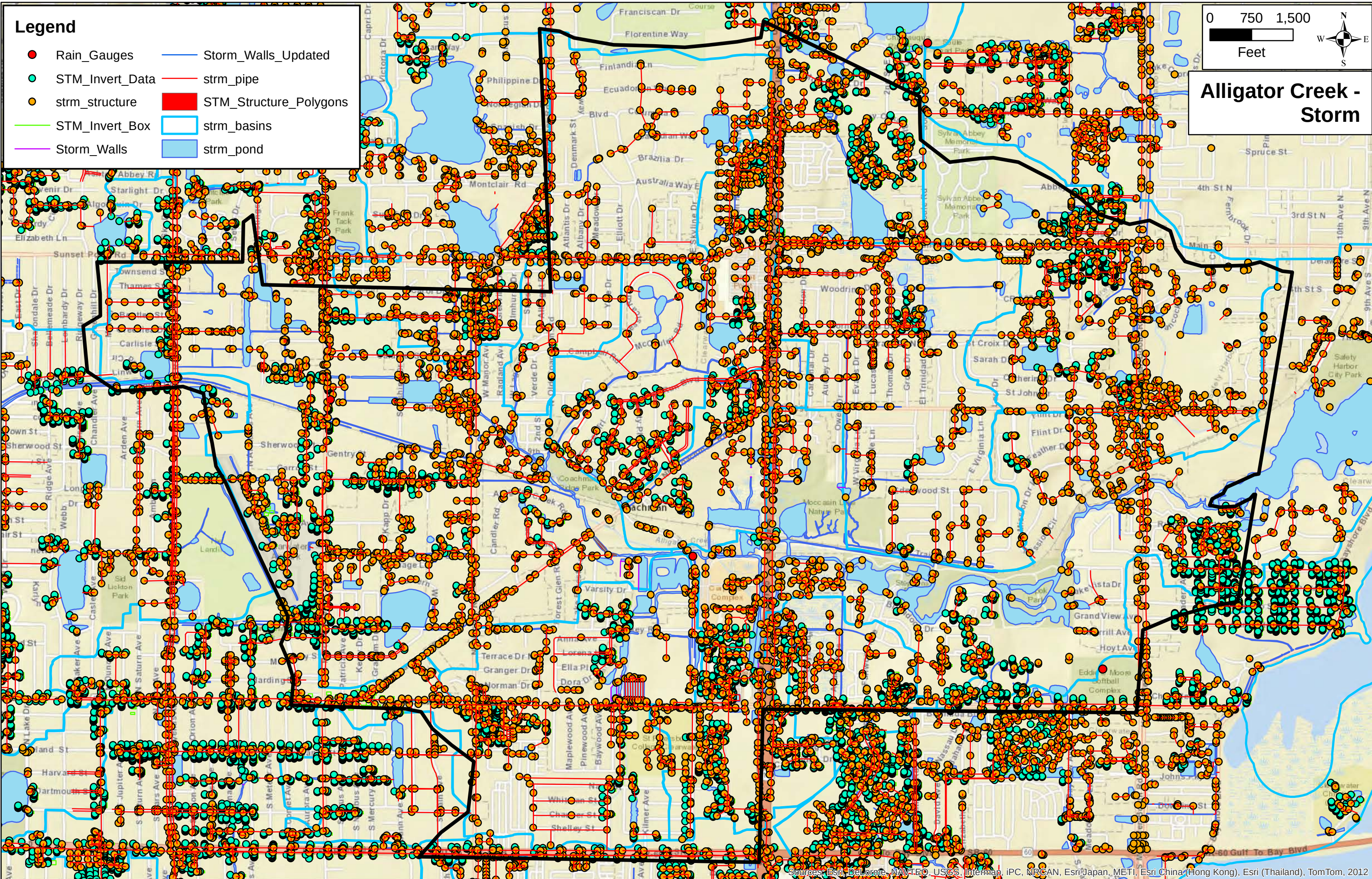




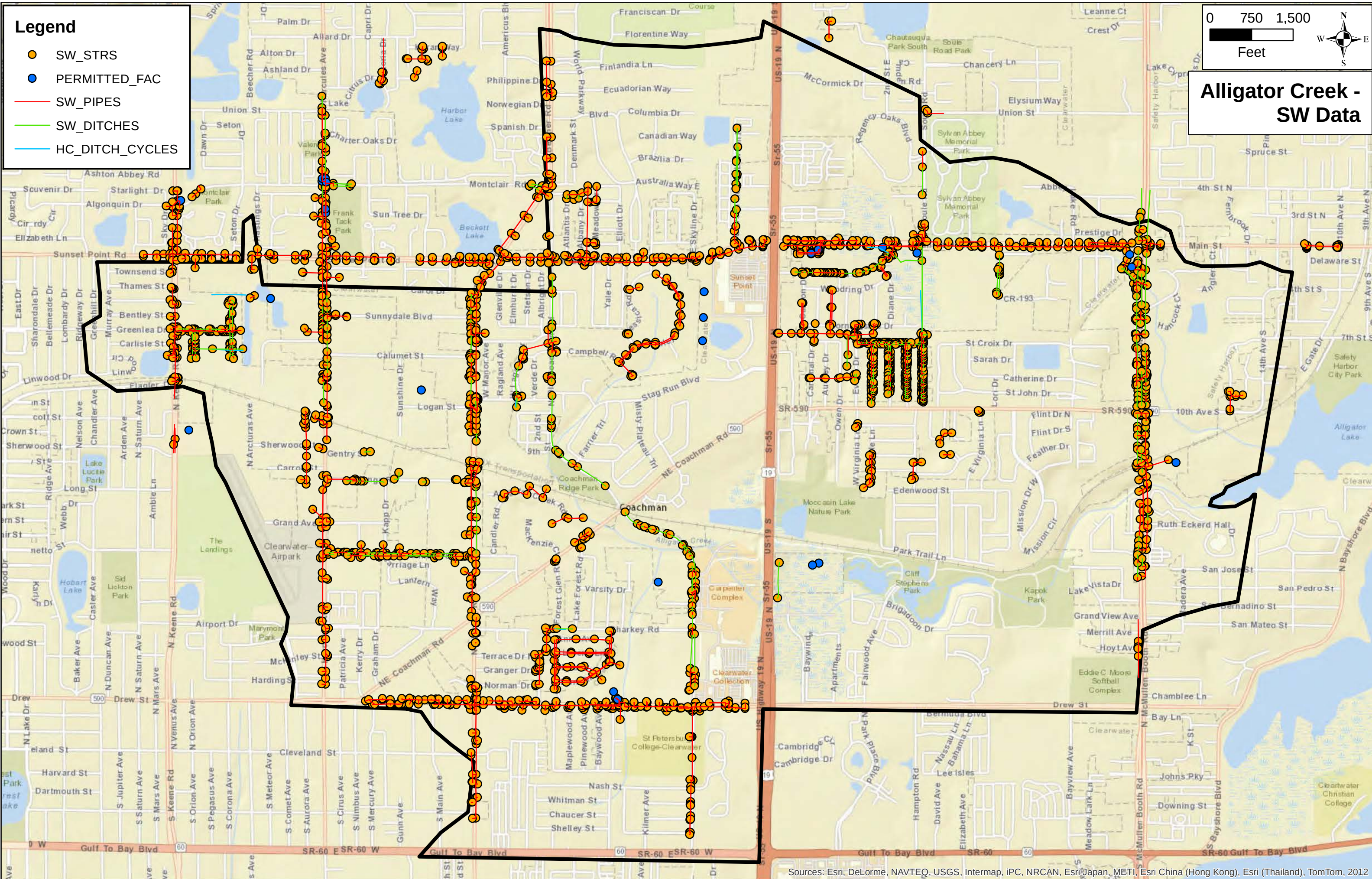




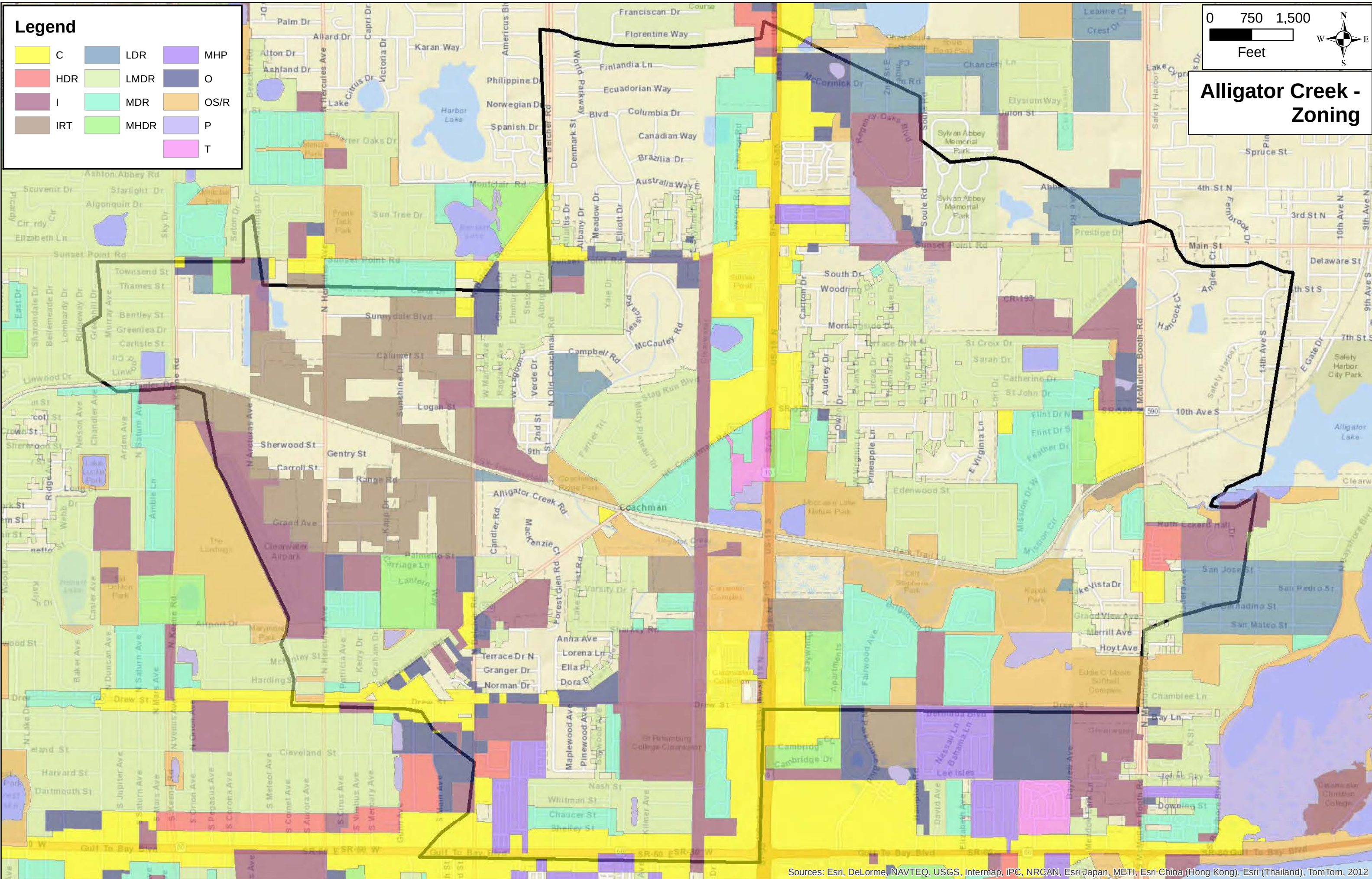






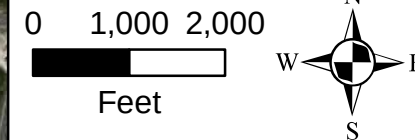








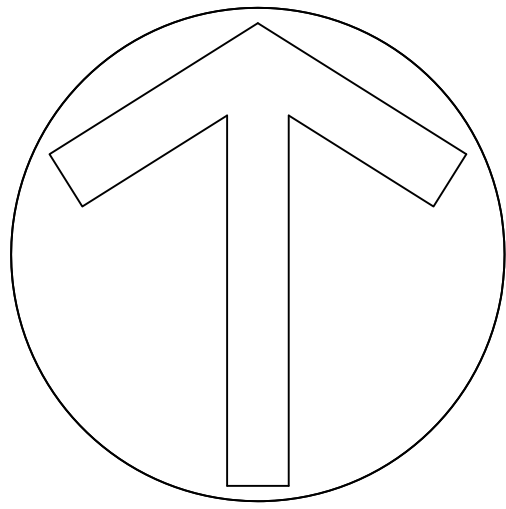
Alligator Creek - Clearwater



Legend

- WBID
- CLEARWATER





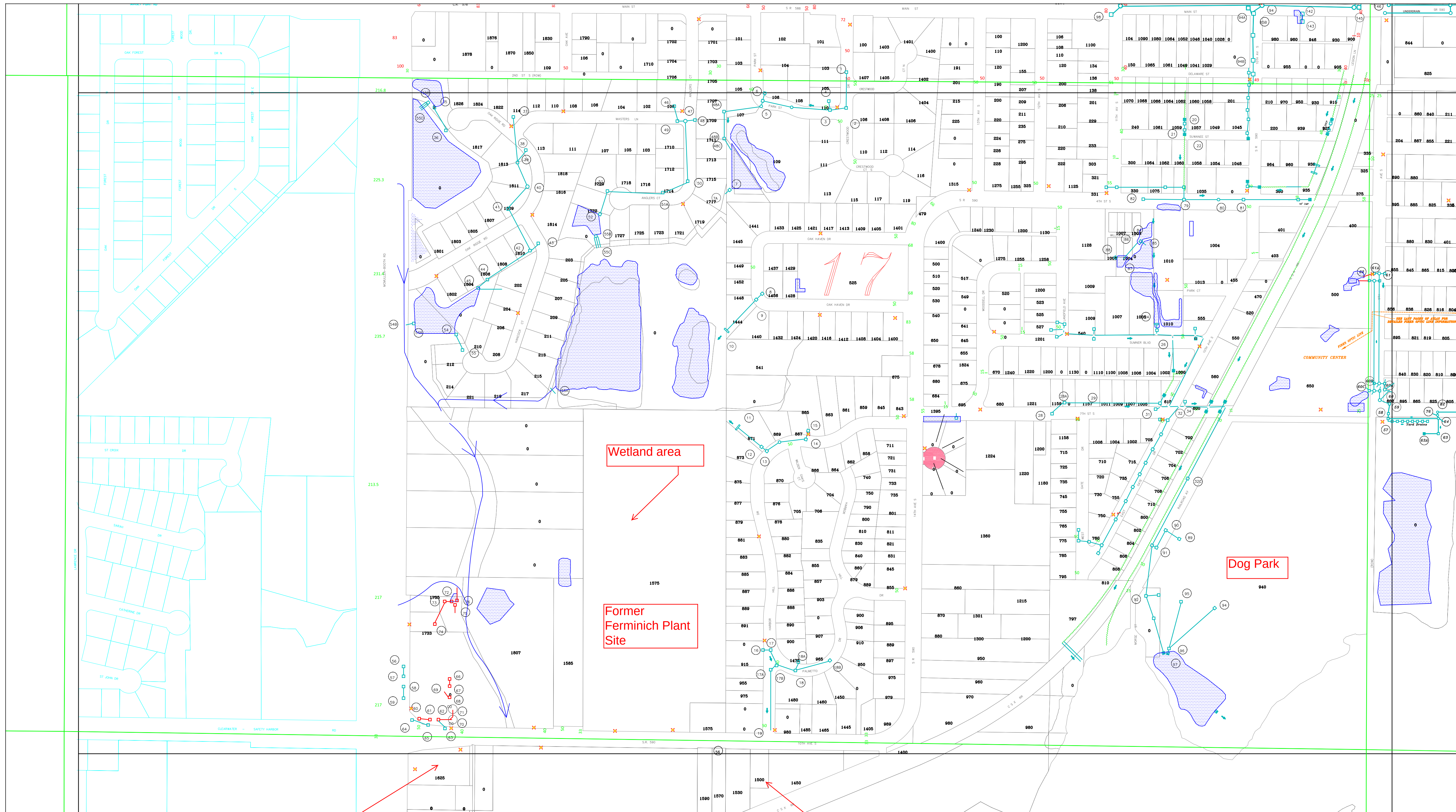
SCALE: 1" = 200'

|    |    |  |
|----|----|--|
| 15 | 16 |  |
| 17 | 18 |  |
| 19 | 20 |  |

SHEET INDEX

S 1/2 4-29-16

SHEET 17 (265AB)



= Gravity Sanitary Lines

= Sanitary Force Main

= Gravity Sanitary Lines To Be Lined

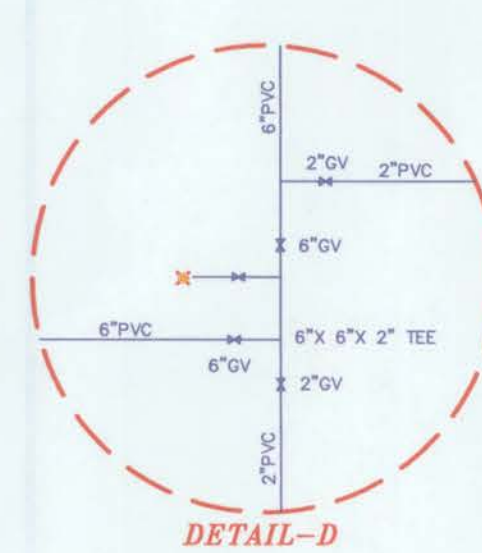
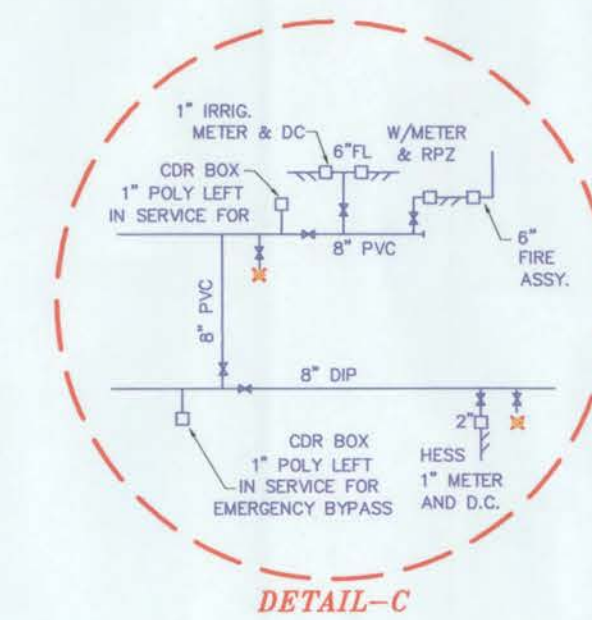
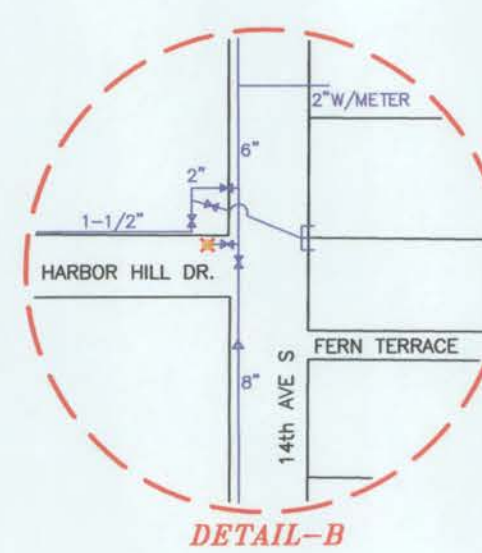
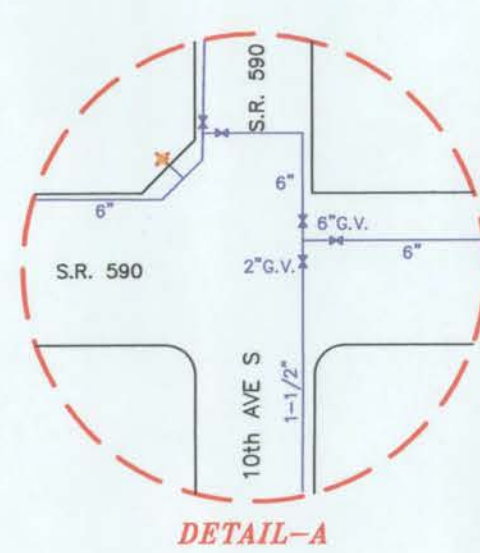
= Sanitary Manhole W/ City I.D. #











**LEGEND**

- Water Line
- Water Line
- Fire Hydrant
- Private Fire Hydrant
- Water Valve
- Reducer
- Blow Off Valve
- Locate Station
- Dead end line, no blow off
- Line continues



SCALE: 1" = 200'

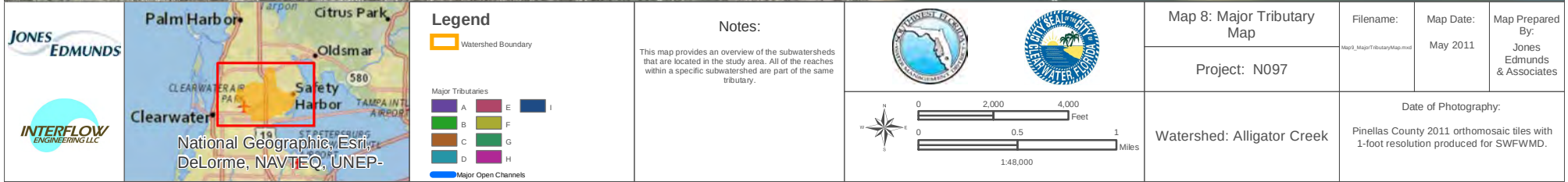
|    |    |
|----|----|
| 15 | 16 |
| 17 | 18 |
| 19 | 20 |

SHEET INDEX

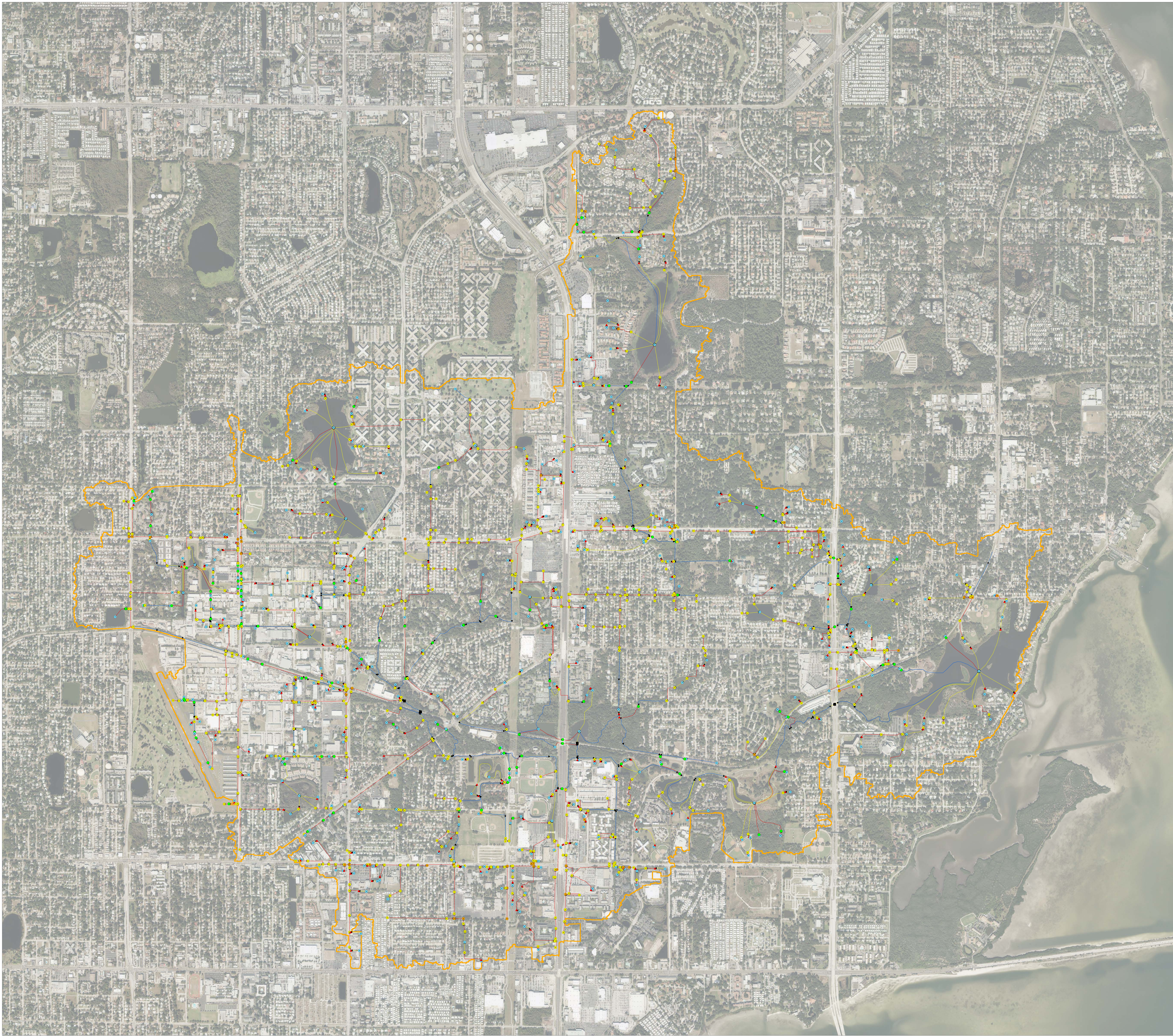
WATER: 6/28/2012

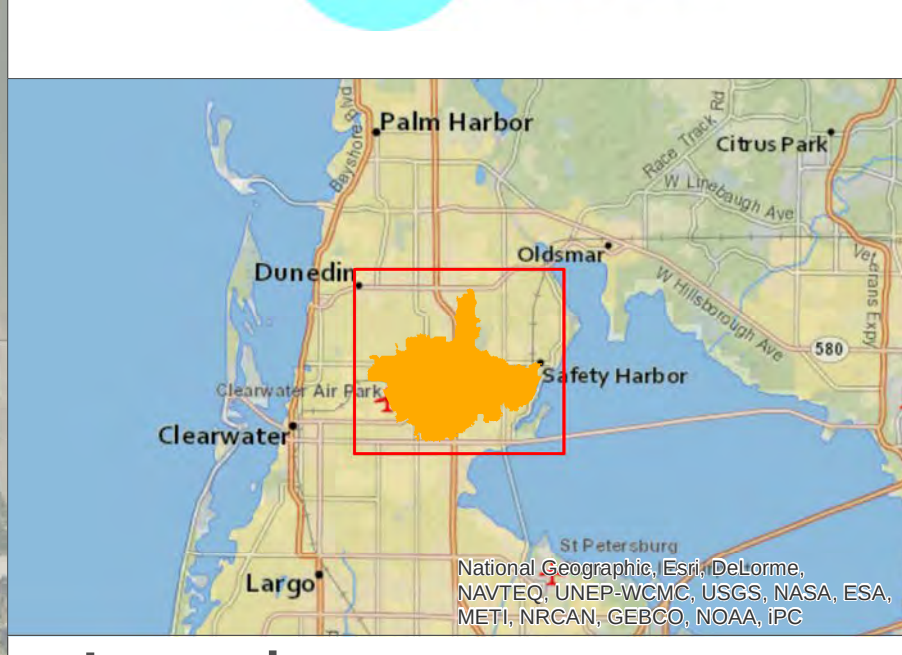
S 1/2 4-29-16  
WATER MAP  
SHEET 17 (265AB)











**Legend**

**Hydraulic Type Description**

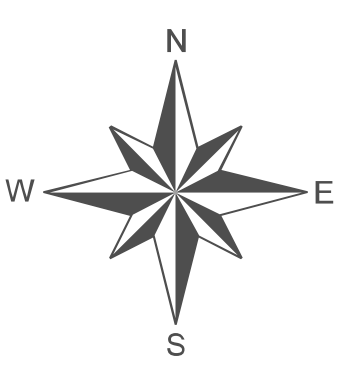
- Bridge
- ▲ Control Structure
- Culvert
- Inlet/Outlet
- Manhole
- Storage
- Flowline

**Hydraulic Type Description**

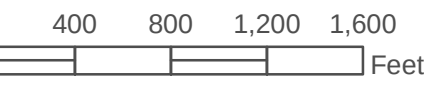
- Channel
- Conduit
- Watershed Boundary

Notes:

Potential hydraulic features were identified using points provided by Pinellas County and by analyzing topographic maps and aerial imagery. After identifying the potential hydraulic features, a prescreening process was completed by project engineer in the field. Once the prescreening process was completed, field crews were deployed to capture the hydraulic characteristics and spatial data for all the hydraulic features. These field crews used a combination of Global Positioning System (GPS) and Mobile Mapping to capture characteristics of the storm structures within the watersheds.



1:9,600





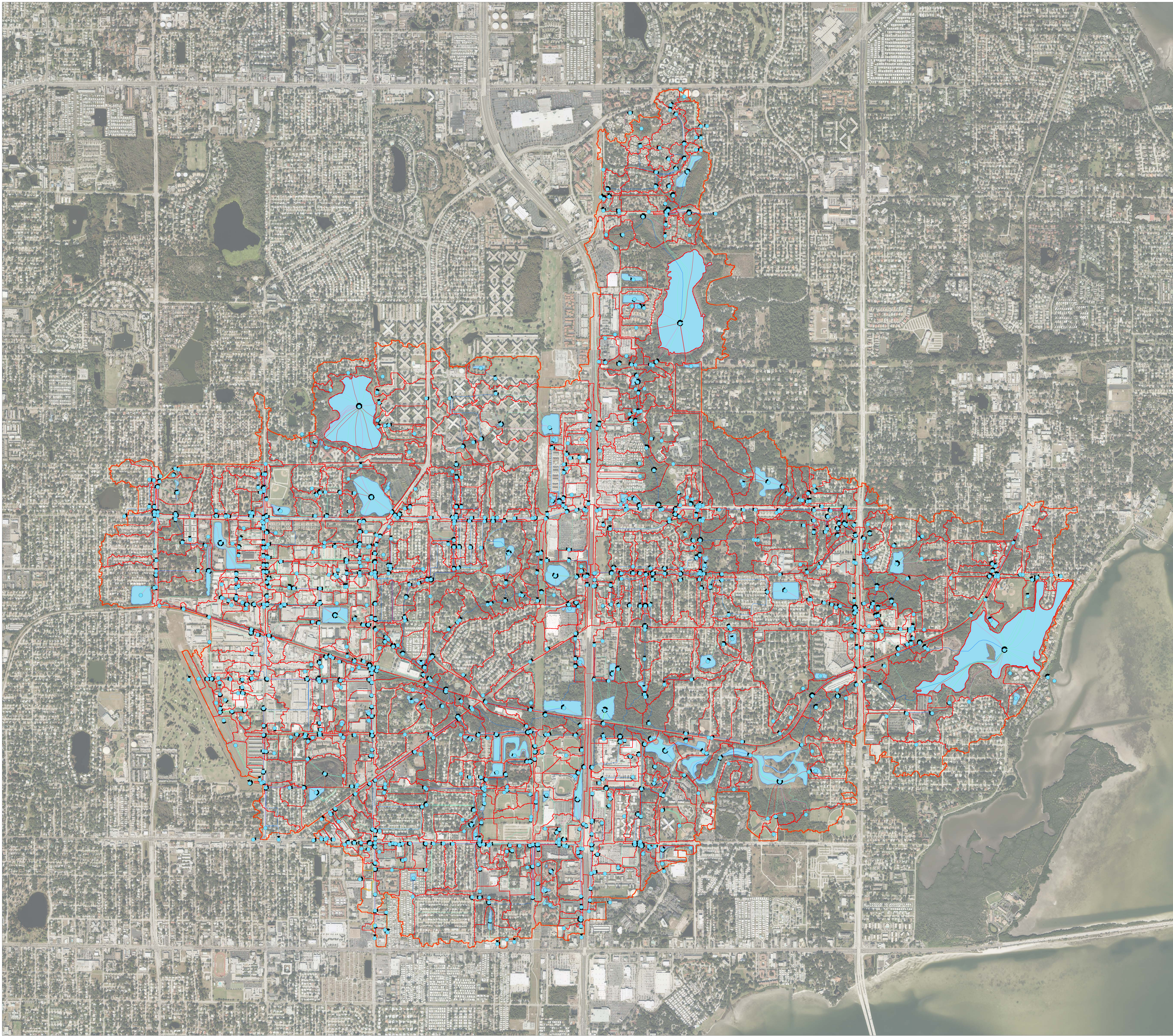
Map 13: Inventory Coverage Map

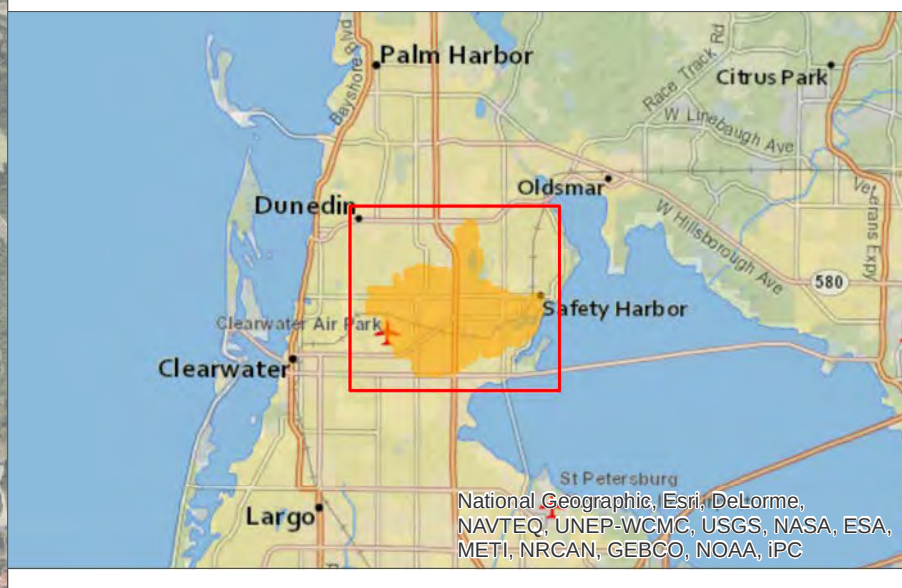
Project: N097

Watershed: Alligator Creek

|                                                                                                            |                           |                                                |
|------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------|
| Filename:<br>Map13_InventoryCoverageMap.mxd                                                                | Map Date:<br>October 2012 | Map Prepared By:<br>Jones Edmunds & Associates |
| Date of Photography:<br>Pinellas County 2011 orthomosaic files with 1-foot resolution produced for SWFWMD. |                           |                                                |





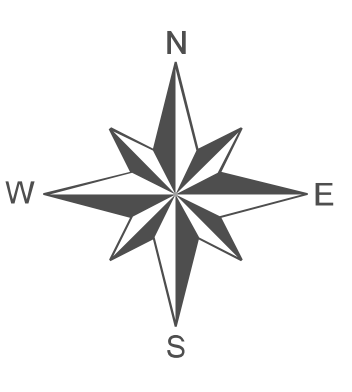


**Legend**

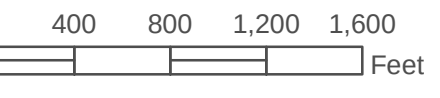
- Junction
- TYPE
  - RATING CURVE
  - BRIDGE
  - CHANNEL
  - DROP STRUCTURE
  - PIPE
  - WEIR
- ▭ Subbasin Boundaries
- ▭ Watershed Boundary
- ▭ Waterbodies

Notes:

This map contains the link-node diagram that was developed as part of this study. The link-node diagram is a symbolic representation of the hydraulics of the watershed.



1:9,600





Map 14: Junction-Reach Map

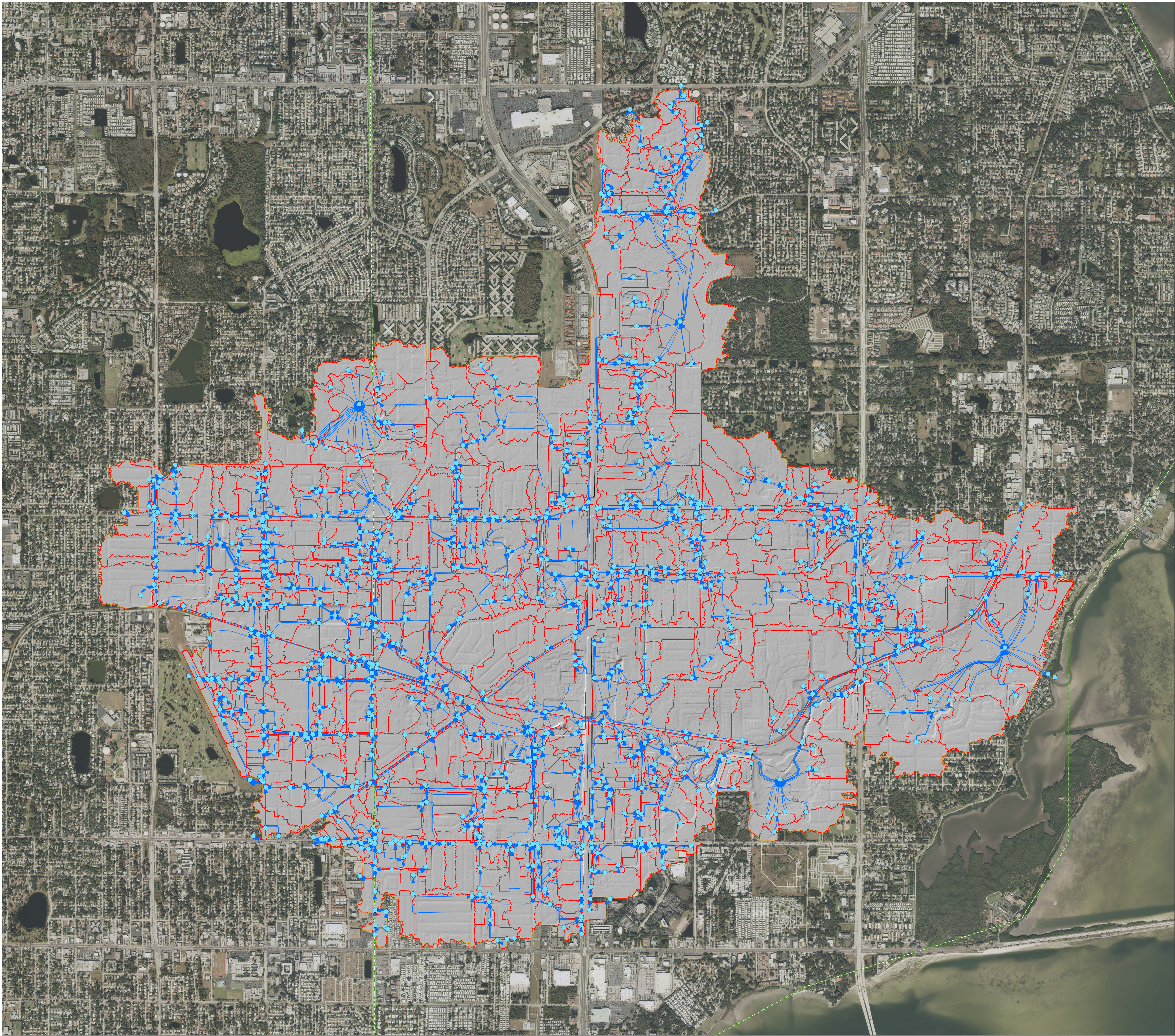
Project: N097

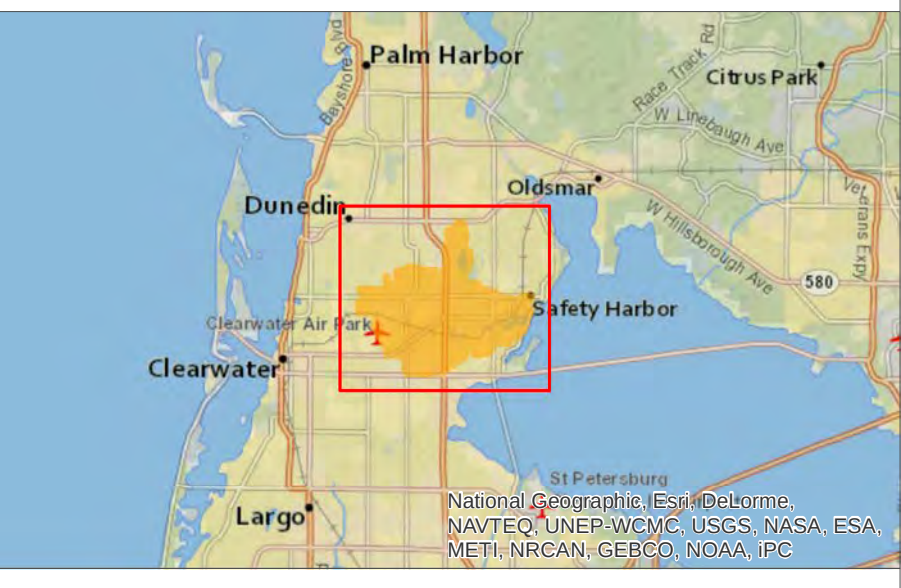
Watershed: Alligator Creek

|                                          |                           |                                                |
|------------------------------------------|---------------------------|------------------------------------------------|
| Filename:<br>Map14_Junction_ReachMap.mxd | Map Date:<br>October 2012 | Map Prepared By:<br>Jones Edmunds & Associates |
|------------------------------------------|---------------------------|------------------------------------------------|

Date of Photography:  
Pinellas County 2011 orthomosaic files with 1-foot resolution produced for SWFWMD.





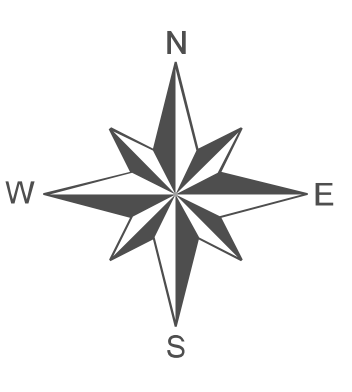


**Legend**

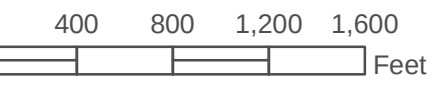
- Junction
- Flow Path
- ▭ Subbasin Boundaries
- ▭ Watershed Boundary
- - - Township/Range
- ▭ Section, Township, Range

**Notes:**

This map contains the link-node diagram and the hillshade coverage that were developed as part of this study. The link node diagram is a symbolic representation of the hydraulics of the watershed while the Hillshade coverage is a cartographic method for displaying topography.



1:9,600





Map 15: Junction-Reach  
Map with Subbasins and  
Hill Shading Backdrop

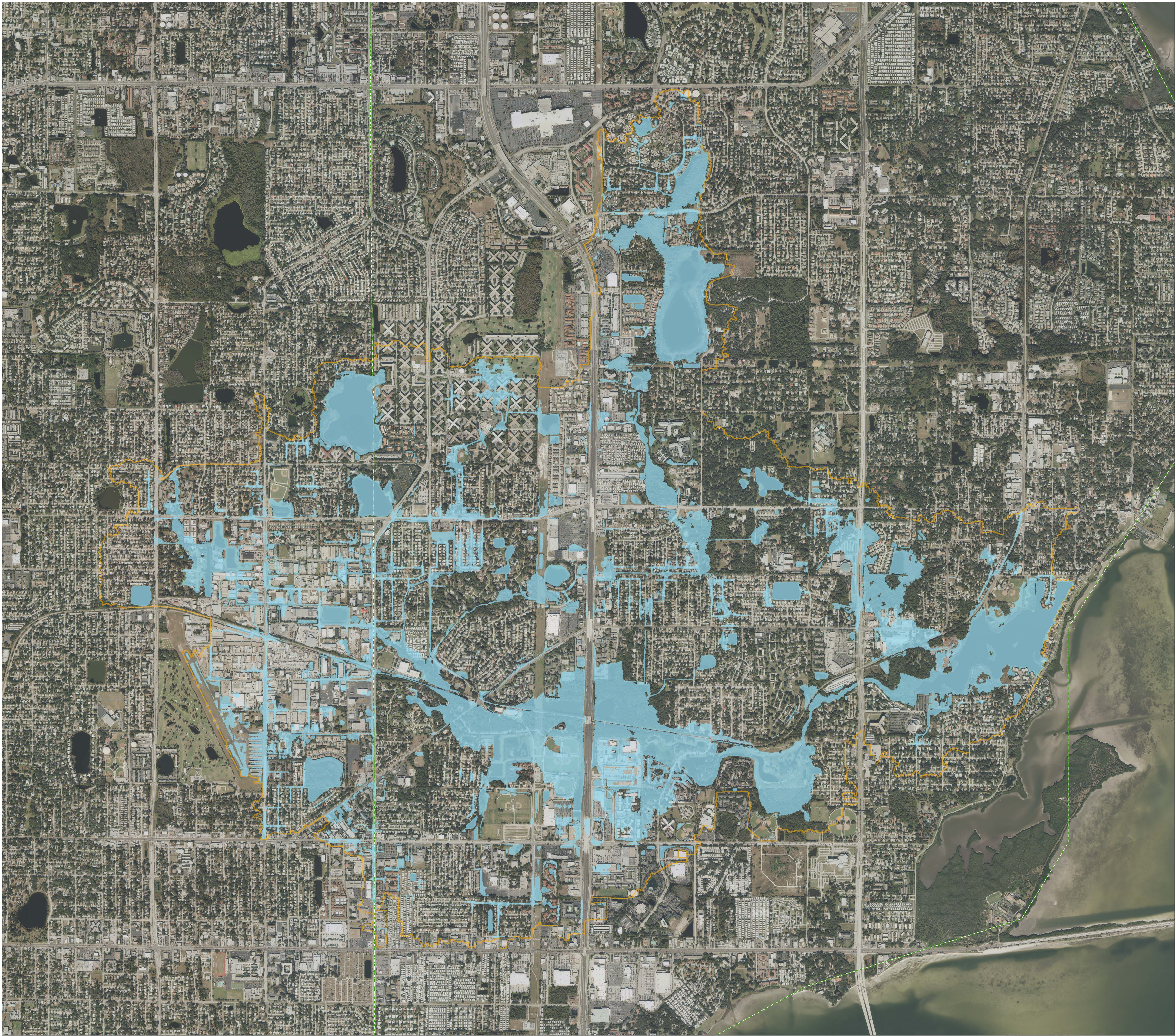
Project: N097

Watershed: Alligator Creek

|                                                                      |                           |                                                   |
|----------------------------------------------------------------------|---------------------------|---------------------------------------------------|
| Filename:<br><small>Map15_Junction_ReachMapWithHillshade.mxd</small> | Map Date:<br>October 2012 | Map Prepared By:<br>Jones Edmunds<br>& Associates |
|----------------------------------------------------------------------|---------------------------|---------------------------------------------------|

Date of Photography:  
Pinellas County 2011 orthomosaic tiles with  
1-foot resolution produced for SWFWMD.

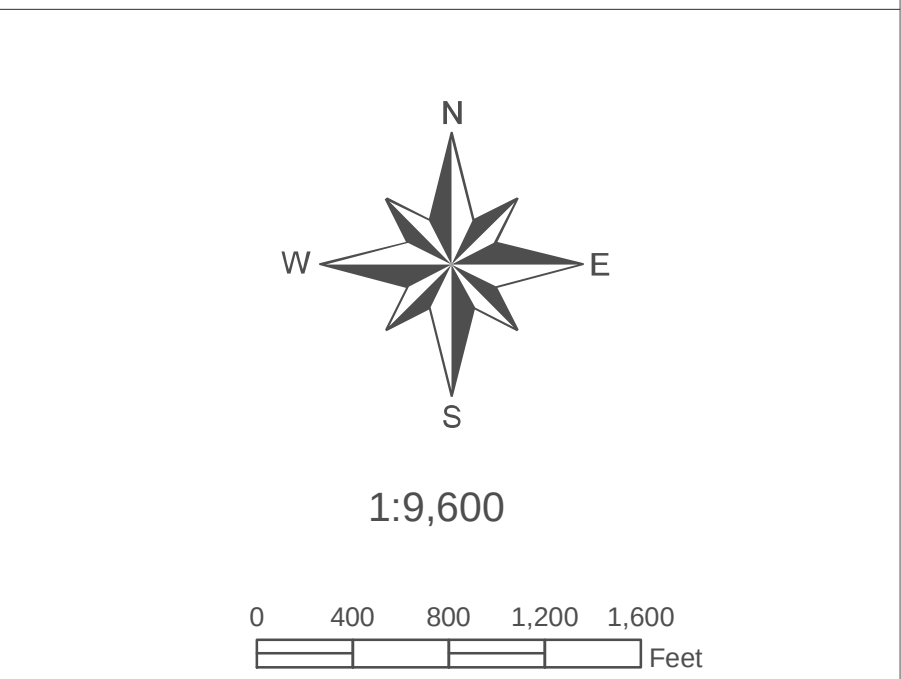




- Legend**
- 100 Year Floodplain
  - Watershed Boundary
  - Township/Range

Notes:

This map contains the link-node diagram that was developed as part of this study. The link-node diagram is a symbolic representation of the hydraulics of the Alligator Creek watershed.



Map 17: Floodplain Delineation Map

Project: N097

Watershed: Alligator Creek

|                                                                                                            |                           |                                                |
|------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------|
| Filename:<br><small>Map17_FloodplainDelineationMap.mxd</small>                                             | Map Date:<br>October 2012 | Map Prepared By:<br>Jones Edmunds & Associates |
| Date of Photography:<br>Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD. |                           |                                                |



***Appendix B***

***Water Sample Analytical Report***



# ANALYTICAL ANALYSIS REPORT



## PUBLIC UTILITIES LABORATORY

1605 HARBOR DR. CLEARWATER, FLORIDA  
33755

PH: (727) 462 6664 FAX: (727) 462 6206  
FDOH # E54021

CUSTOMER NAME: STORMWATER

MATRIX: WATER

COLLECTOR: EL

PROJECT ID: WBID

| SAMPLE<br>NUMBER | ANALYSIS<br>DATE         | ANALYST | SITE                 | PARAMETER      | METHOD     | RESULT | QUALIFIER | UNITS     | REPORTING<br>LIMIT | COLLECT<br>DATE | COLLET<br>TIME |
|------------------|--------------------------|---------|----------------------|----------------|------------|--------|-----------|-----------|--------------------|-----------------|----------------|
| 15041501-001     | 4/15/2015<br>11:30:00 AM | JO      | ABBEY CT.            | E. COLI        | SM 9223B   | 66     |           | CFU/100ML |                    | 4/15/2015       | 9:20:00 AM     |
| 15041501-001     | 4/15/2015<br>11:15:00 AM | JO      | ABBEY CT.            | ENTEROCOCCI    | ENTEROLERT | 275    |           | MPN/100ML | 1                  | 4/15/2015       | 9:20:00 AM     |
| 15041501-001     | 4/15/2015<br>11:00:00 AM | JO      | ABBEY CT.            | FECAL COLIFORM | SM 9222D   | 60     | B         | CFU/100ML |                    | 4/15/2015       | 9:20:00 AM     |
| 15041501-002     | 4/15/2015<br>11:30:00 AM | JO      | BOULEVARD<br>ESTATES | E. COLI        | SM 9223B   | 4839   | L         | CFU/100ML |                    | 4/15/2015       | 9:40:00 AM     |
| 15041501-002     | 4/15/2015<br>11:15:00 AM | JO      | BOULEVARD<br>ESTATES | ENTEROCOCCI    | ENTEROLERT | 290    |           | MPN/100ML | 1                  | 4/15/2015       | 9:40:00 AM     |
| 15041501-002     | 4/15/2015<br>11:00:00 AM | JO      | BOULEVARD<br>ESTATES | FECAL COLIFORM | SM 9222D   | 760    |           | CFU/100ML |                    | 4/15/2015       | 9:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:30:00 AM | JO      | McCORMICK            | E. COLI        | SM 9223B   | 66     |           | CFU/100ML |                    | 4/15/2015       | 7:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:15:00 AM | JO      | McCORMICK            | ENTEROCOCCI    | ENTEROLERT | 334    |           | MPN/100ML | 1                  | 4/15/2015       | 7:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:00:00 AM | JO      | McCORMICK            | FECAL COLIFORM | SM 9222D   | 50     | B         | CFU/100ML |                    | 4/15/2015       | 7:40:00 AM     |
| 15041501-004     | 4/15/2015<br>11:30:00 AM | JO      | SR 590               | E. COLI        | SM 9223B   | 356    |           | CFU/100ML |                    | 4/15/2015       | 9:05:00 AM     |
| 15041501-004     | 4/15/2015<br>11:15:00 AM | JO      | SR 590               | ENTEROCOCCI    | ENTEROLERT | 1298   |           | MPN/100ML | 1                  | 4/15/2015       | 9:05:00 AM     |
| 15041501-004     | 4/15/2015<br>11:00:00 AM | JO      | SR 590               | FECAL COLIFORM | SM 9222D   | 140    | B         | CFU/100ML |                    | 4/15/2015       | 9:05:00 AM     |
| 15041501-005     | 4/15/2015<br>11:30:00 AM | JO      | SUNNYDALE            | E. COLI        | SM 9223B   | 372    |           | CFU/100ML |                    | 4/15/2015       | 7:25:00 AM     |
| 15041501-005     | 4/15/2015<br>11:15:00 AM | JO      | SUNNYDALE            | ENTEROCOCCI    | ENTEROLERT | 551    |           | MPN/100ML | 1                  | 4/15/2015       | 7:25:00 AM     |
| 15041501-005     | 4/15/2015<br>11:00:00 AM | JO      | SUNNYDALE            | FECAL COLIFORM | SM 9222D   | 260    |           | CFU/100ML |                    | 4/15/2015       | 7:25:00 AM     |
| 15041501-006     | 4/15/2015<br>11:30:00 AM | JO      | SUNSET POINT         | E. COLI        | SM 9223B   | 2240   |           | CFU/100ML |                    | 4/15/2015       | 7:55:00 AM     |

U - RESULT IS BELOW THE DETECTION LIMIT

I - RESULT IS BETWEEN THE MDL AND PQL OR THE LOWEST STANDARD

Q - SAMPLE ANALYZED OUT OF HOLDING TIME

B - RESULTS BASED ON COLONY COUNTS OUTSIDE THE ACCEPTABLE RANGE

L - OFF-SCALE HIGH. ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN

APPROVED BY:

BARRY LeCAVALIER

FRIDAY, APRIL 17, 2015

PAGE 1 OF 2



City of Clearwater  
Public Utilities Laboratory  
1605 Harbor Drive, Clearwater, Florida 33755

Phone: (727) 462-6664 Ext. 243  
Contact: Barry LeCavalier



CHAIN OF CUSTODY

| Client Name: <u>IPP Storm Water</u>           |                          |                              |            |             |            |             |               |          |              | Project Name / Location: <u>WBID</u> |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  |                                                                                                                           | Matrix Codes:                                                              |               | SW - Surface Water |           |  |
|-----------------------------------------------|--------------------------|------------------------------|------------|-------------|------------|-------------|---------------|----------|--------------|--------------------------------------|----------------------------------------------------------------------------|----------------------|----------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------|--------------------|-----------|--|
| Sampler's Name (PRINT): <u>Emily Laurenti</u> |                          |                              |            |             |            |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  |                                                                                                                           | WW - Wastewater                                                            |               | GW - Ground Water  |           |  |
| Sampler's Signature: <u>Emily Laurenti</u>    |                          |                              |            |             |            |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  |                                                                                                                           | DW - Drinking Water                                                        |               | SO - Soil          |           |  |
|                                               |                          |                              |            |             |            |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  |                                                                                                                           | SL - Sludge/Biosolids                                                      |               | SA - Saline Water  |           |  |
| SAMPLE INFORMATION                            |                          |                              |            |             |            |             |               |          |              | CONDITION AT RECEIVING               |                                                                            | METALS               |                |                   | NUTRIENTS                                                                                                                                                                                             |                                                                                                                                     | OTHER TESTS                                                                                              |                                                                                                                                                                                                                  | BACTERIA                                                                                                                  |                                                                            | Special Tests |                    | Container |  |
| ITEM #                                        | SAMPLE ID OR DESCRIPTION | Initials                     | START DATE | ENDING DATE | START TIME | ENDING TIME | COMPOSITE (C) | GRAB (G) | # CONTAINERS | MATRIX<br>WW, DW, SL, SW, GW, SO, SA | PRESERVATIVES<br>(1) Sulfuric (2) Nitric (3) Ice (4) Hydrochloric (5) None | pH                   | TEMPERATURE °C | FILTERED          | (1) Aluminum<br>(2) Antimony<br>(3) Arsenic<br>(4) Barium<br>(5) Beryllium<br>(6) Cadmium<br>(7) Calcium<br>(8) Chromium<br>(9) Copper<br>(10) Iron<br>(11) Lead<br>(12) Magnesium<br>(13) Molybdenum | (1) Manganese<br>(2) Mercury<br>(3) Nickel<br>(4) Potassium<br>(5) Selenium<br>(6) Silver<br>(7) Sodium<br>(8) Thallium<br>(9) Zinc | (1) TKN<br>(2) TN<br>(3) NH3<br>(4) NO3<br>(5) NO2<br>(6) TP<br>(7) PO4<br>(8) SO4<br>(9) Cl<br>(10) NOx | (1) Alkalinity<br>(2) Hardness<br>(3) CBOD<br>(4) Oil & Grease<br>(5) TSS<br>(6) TS<br>(7) TVS<br>(8) TVSS<br>(9) Conductivity<br>(10) THM<br>(11) Vol. Fat Acids<br>(12) COD<br>(13) BOD<br>(14) TOC<br>(15) pH | (1) Total Coli<br>(2) Fecal Coli<br>(3) Presence/ Absence (Total & E. Coliform)<br>(4) HPC<br>5) E-coli<br>6) Enterococci | (1) Total Sulfide<br>(2) Dissolved Sulfide<br>(3) Ca Hardness<br>(4) Color | SIZE          | COMMENTS           |           |  |
| 1                                             | Weatherington            | EL                           | 4/15/15    | —           | 0805       | —           | G             | 1        | SW           | 3                                    |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 2                                                                                                                         |                                                                            |               |                    |           |  |
| 2                                             |                          |                              | 4/15/15    |             | 0805       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 5                                                                                                                         |                                                                            |               |                    |           |  |
| 3                                             |                          |                              | 4/15/15    |             | 0805       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 6                                                                                                                         |                                                                            |               |                    |           |  |
| 4                                             | Sunnydale                |                              | 4/15/15    |             | 0725       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 2                                                                                                                         |                                                                            |               |                    |           |  |
| 5                                             |                          |                              | 4/15/15    |             | 0725       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 5                                                                                                                         |                                                                            |               |                    |           |  |
| 6                                             |                          |                              | 4/15/15    |             | 0725       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 6                                                                                                                         |                                                                            |               |                    |           |  |
| 7                                             | McCormick                |                              | 4/15/15    |             | 0740       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 2                                                                                                                         |                                                                            |               | upstream           |           |  |
| 8                                             |                          |                              | 4/15/15    |             | 0740       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 5                                                                                                                         |                                                                            |               | of south.          |           |  |
| 9                                             |                          |                              | 4/15/15    |             | 0740       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 6                                                                                                                         |                                                                            |               | Comfort            |           |  |
| 10                                            | Sunset Point             |                              | 4/15/15    |             | 0755       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 2                                                                                                                         |                                                                            |               | downstream         |           |  |
| 11                                            |                          |                              | 4/15/15    |             | 0755       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 5                                                                                                                         |                                                                            |               | of southern        |           |  |
| 12                                            |                          |                              | 4/15/15    |             | 0755       |             |               |          |              |                                      |                                                                            |                      |                |                   |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                  | 6                                                                                                                         |                                                                            |               | comfort            |           |  |
| REMARKS:                                      |                          | RECEIVED BY: <u>J. Oring</u> |            |             |            |             |               |          |              |                                      |                                                                            | DATE: <u>4/15/15</u> |                | TIME: <u>1010</u> |                                                                                                                                                                                                       | RELINQUISHED BY: <u>Emily Laurenti</u>                                                                                              |                                                                                                          | DATE: <u>4/15/15</u>                                                                                                                                                                                             |                                                                                                                           | TIME: <u>10:10</u>                                                         |               |                    |           |  |

15 041501



*Appendix B*  
*Water Sample Analytical Reports*



# ANALYTICAL ANALYSIS REPORT



## PUBLIC UTILITIES LABORATORY

1605 HARBOR DR. CLEARWATER, FLORIDA  
33755

PH: (727) 462 6664 FAX: (727) 462 6206

FDOH # E54021

CUSTOMER NAME: STORMWATER

MATRIX: WATER

COLLECTOR: EL

PROJECT ID: WBID

| SAMPLE<br>NUMBER | ANALYSIS<br>DATE         | ANALYST | SITE                 | PARAMETER      | METHOD     | RESULT | QUALIFIER | UNITS     | REPORTING<br>LIMIT | COLLECT<br>DATE | COLLET<br>TIME |
|------------------|--------------------------|---------|----------------------|----------------|------------|--------|-----------|-----------|--------------------|-----------------|----------------|
| 15041501-001     | 4/15/2015<br>11:30:00 AM | JO      | ABBEY CT.            | E. COLI        | SM 9223B   | 66     |           | CFU/100ML |                    | 4/15/2015       | 9:20:00 AM     |
| 15041501-001     | 4/15/2015<br>11:15:00 AM | JO      | ABBEY CT.            | ENTEROCOCCI    | ENTEROLERT | 275    |           | MPN/100ML | 1                  | 4/15/2015       | 9:20:00 AM     |
| 15041501-001     | 4/15/2015<br>11:00:00 AM | JO      | ABBEY CT.            | FECAL COLIFORM | SM 9222D   | 60     | B         | CFU/100ML |                    | 4/15/2015       | 9:20:00 AM     |
| 15041501-002     | 4/15/2015<br>11:30:00 AM | JO      | BOULEVARD<br>ESTATES | E. COLI        | SM 9223B   | 4839   | L         | CFU/100ML |                    | 4/15/2015       | 9:40:00 AM     |
| 15041501-002     | 4/15/2015<br>11:15:00 AM | JO      | BOULEVARD<br>ESTATES | ENTEROCOCCI    | ENTEROLERT | 290    |           | MPN/100ML | 1                  | 4/15/2015       | 9:40:00 AM     |
| 15041501-002     | 4/15/2015<br>11:00:00 AM | JO      | BOULEVARD<br>ESTATES | FECAL COLIFORM | SM 9222D   | 760    |           | CFU/100ML |                    | 4/15/2015       | 9:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:30:00 AM | JO      | McCORMICK            | E. COLI        | SM 9223B   | 66     |           | CFU/100ML |                    | 4/15/2015       | 7:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:15:00 AM | JO      | McCORMICK            | ENTEROCOCCI    | ENTEROLERT | 334    |           | MPN/100ML | 1                  | 4/15/2015       | 7:40:00 AM     |
| 15041501-003     | 4/15/2015<br>11:00:00 AM | JO      | McCORMICK            | FECAL COLIFORM | SM 9222D   | 50     | B         | CFU/100ML |                    | 4/15/2015       | 7:40:00 AM     |
| 15041501-004     | 4/15/2015<br>11:30:00 AM | JO      | SR 590               | E. COLI        | SM 9223B   | 356    |           | CFU/100ML |                    | 4/15/2015       | 9:05:00 AM     |
| 15041501-004     | 4/15/2015<br>11:15:00 AM | JO      | SR 590               | ENTEROCOCCI    | ENTEROLERT | 1298   |           | MPN/100ML | 1                  | 4/15/2015       | 9:05:00 AM     |
| 15041501-004     | 4/15/2015<br>11:00:00 AM | JO      | SR 590               | FECAL COLIFORM | SM 9222D   | 140    | B         | CFU/100ML |                    | 4/15/2015       | 9:05:00 AM     |
| 15041501-005     | 4/15/2015<br>11:30:00 AM | JO      | SUNNYDALE            | E. COLI        | SM 9223B   | 372    |           | CFU/100ML |                    | 4/15/2015       | 7:25:00 AM     |
| 15041501-005     | 4/15/2015<br>11:15:00 AM | JO      | SUNNYDALE            | ENTEROCOCCI    | ENTEROLERT | 551    |           | MPN/100ML | 1                  | 4/15/2015       | 7:25:00 AM     |
| 15041501-005     | 4/15/2015<br>11:00:00 AM | JO      | SUNNYDALE            | FECAL COLIFORM | SM 9222D   | 260    |           | CFU/100ML |                    | 4/15/2015       | 7:25:00 AM     |
| 15041501-006     | 4/15/2015<br>11:30:00 AM | JO      | SUNSET POINT         | E. COLI        | SM 9223B   | 2240   |           | CFU/100ML |                    | 4/15/2015       | 7:55:00 AM     |

U - RESULT IS BELOW THE DETECTION LIMIT

I - RESULT IS BETWEEN THE MDL AND PQL OR THE LOWEST STANDARD

Q - SAMPLE ANALYZED OUT OF HOLDING TIME

B - RESULTS BASED ON COLONY COUNTS OUTSIDE THE ACCEPTABLE RANGE

L - OFF-SCALE HIGH. ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN

APPROVED BY:

BARRY LeCAVALIER

FRIDAY, APRIL 17, 2015

PAGE 1 OF 2



City of Clearwater  
Public Utilities Laboratory  
1605 Harbor Drive, Clearwater, Florida 33755

Phone: (727) 462-6664 Ext. 243  
Contact: Barry LeCavalier



CHAIN OF CUSTODY

| Client Name: <u>IPP Storm Water</u>           |                          |                |            |             |            |             |               |          |              | Project Name / Location: <u>WBID</u> |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   | Matrix Codes:                                                                 |      | SW - Surface Water |  |
|-----------------------------------------------|--------------------------|----------------|------------|-------------|------------|-------------|---------------|----------|--------------|--------------------------------------|-------------------------------------------------------------------------------|-------------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------|--------------------|--|
| Sampler's Name (PRINT): <u>Emily Laurenti</u> |                          |                |            |             |            |             |               |          |              | WW - Wastewater                      |                                                                               | GW - Ground Water |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |
| Sampler's Signature: <u>Emily Laurenti</u>    |                          |                |            |             |            |             |               |          |              | DW - Drinking Water                  |                                                                               | SO - Soil         |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |
|                                               |                          |                |            |             |            |             |               |          |              | SL - Sludge/Biosolids                |                                                                               | SA - Saline Water |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |
| SAMPLE INFORMATION                            |                          |                |            |             |            |             |               |          |              | CONDITION AT RECEIVING               |                                                                               | METALS            |                | NUTRIENTS |                                                                                                                                                                                                       | OTHER TESTS                                                                                                                         |                                                                                                          | BACTERIA                                                                                                                                                                                                          |                                                                                                                                                   | Special Tests                                                                 |      | Container          |  |
| ITEM #                                        | SAMPLE ID OR DESCRIPTION | Initials       | START DATE | ENDING DATE | START TIME | ENDING TIME | COMPOSITE (C) | GRAB (G) | # CONTAINERS | MATRIX<br>WW, DW, SL, SW, GW, SO, SA | PRESERVATIVES<br>(1) Sulfuric (2) Nitric (3) Ice<br>(4) Hydrochloric (5) None | pH                | TEMPERATURE °C | FILTERED  | (1) Aluminum<br>(2) Antimony<br>(3) Arsenic<br>(4) Barium<br>(5) Beryllium<br>(6) Cadmium<br>(7) Calcium<br>(8) Chromium<br>(9) Copper<br>(10) Iron<br>(11) Lead<br>(12) Magnesium<br>(13) Molybdenum | (1) Manganese<br>(2) Mercury<br>(3) Nickel<br>(4) Potassium<br>(5) Selenium<br>(6) Silver<br>(7) Sodium<br>(8) Thallium<br>(9) Zinc | (1) TKN<br>(2) TN<br>(3) NH3<br>(4) NO3<br>(5) NO2<br>(6) TP<br>(7) PO4<br>(8) SO4<br>(9) CI<br>(10) NOx | (1) Alkalinity<br>(2) Hardness<br>(3) CBOD<br>(4) Oil & Grease<br>(5) TSS<br>(6) TS<br>(7) TVS<br>(8) TVSS<br>(9) Conductivity<br>(10) THM<br>(11) Vol. Fat. Acids<br>(12) COD<br>(13) BOD<br>(14) TOC<br>(15) pH | (1) Total Coli.<br>(2) Fecal Coli.<br>(3) Presence/<br>Absence (Total<br>& E. Coliform)<br>(4) HPC<br><br><u>5E-coli</u><br><u>6) Enterococci</u> | (1) Total Sulfide<br>(2) Dissolved<br>Sulfide<br>(3) Ca Hardness<br>(4) Color | SIZE | COMMENTS           |  |
| 1                                             | Under US 19              | EL             | 4/15/15    |             | 0840       |             | G             | I        | SW           | 3                                    |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 2                                                                                                                                                 |                                                                               |      |                    |  |
| 2                                             |                          |                | 4/15/15    |             | 0840       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 5                                                                                                                                                 |                                                                               |      |                    |  |
| 3                                             |                          |                | 4/15/15    |             | 0840       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 6                                                                                                                                                 |                                                                               |      |                    |  |
| 4                                             | Abbey Ct.                |                | 4/15/15    |             | 0920       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 2                                                                                                                                                 |                                                                               |      |                    |  |
| 5                                             |                          |                | 4/15/15    |             | 0920       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 5                                                                                                                                                 |                                                                               |      |                    |  |
| 6                                             |                          |                | 4/15/15    |             | 0920       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 6                                                                                                                                                 |                                                                               |      |                    |  |
| 7                                             | SR 590                   |                | 4/15/15    |             | 0905       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 2                                                                                                                                                 |                                                                               |      |                    |  |
| 8                                             |                          |                | 4/15/15    |             | 0905       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 5                                                                                                                                                 |                                                                               |      |                    |  |
| 9                                             |                          |                | 4/15/15    |             | 0905       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 6                                                                                                                                                 |                                                                               |      |                    |  |
| 10                                            | Boulevard Estates        |                | 4/15/15    |             | 0940       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 2                                                                                                                                                 |                                                                               |      |                    |  |
| 11                                            |                          |                | 4/15/15    |             | 0940       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 5                                                                                                                                                 |                                                                               |      |                    |  |
| 12                                            |                          |                | 4/15/15    |             | 0940       |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   | 6                                                                                                                                                 |                                                                               |      |                    |  |
| REMARKS:                                      |                          | RECEIVED BY:   |            |             |            |             | DATE          |          | TIME         |                                      | RELINQUISHED BY:                                                              |                   |                |           |                                                                                                                                                                                                       | DATE                                                                                                                                |                                                                                                          | TIME                                                                                                                                                                                                              |                                                                                                                                                   |                                                                               |      |                    |  |
|                                               |                          | <u>J. Orms</u> |            |             |            |             | 4/15/15       |          | 1010         |                                      | <u>Emily Laurenti</u>                                                         |                   |                |           |                                                                                                                                                                                                       | 4/15/15                                                                                                                             |                                                                                                          | 10:10                                                                                                                                                                                                             |                                                                                                                                                   |                                                                               |      |                    |  |
|                                               |                          |                |            |             |            |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |
|                                               |                          |                |            |             |            |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |
|                                               |                          |                |            |             |            |             |               |          |              |                                      |                                                                               |                   |                |           |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                   |                                                                                                                                                   |                                                                               |      |                    |  |

15041501



# ANALYTICAL ANALYSIS REPORT



## PUBLIC UTILITIES LABORATORY

1605 HARBOR DR. CLEARWATER, FLORIDA  
33755

PH: (727) 462 6664 FAX: (727) 462 6206  
FDOH # E54021

CUSTOMER NAME: STORMWATER

PROJECT ID: WBID

MATRIX: WATER

COLLECTOR: EL

| SAMPLE<br>NUMBER | ANALYSIS<br>DATE         | ANALYST | SITE     | PARAMETER      | METHOD     | RESULT | QUALIFIER | UNITS     | REPORTING<br>LIMIT | COLLECT<br>DATE | COLLET<br>TIME |
|------------------|--------------------------|---------|----------|----------------|------------|--------|-----------|-----------|--------------------|-----------------|----------------|
| 15062503-006     | 6/25/2015<br>12:18:00 PM | JO      | McCAULEY | ENTEROCOCCI    | ENTEROLERT | 310    |           | MPN/100ML | 1                  | 6/25/2015       | 8:35:00 AM     |
| 15062503-006     | 6/25/2015<br>12:43:00 PM | JO      | McCAULEY | FECAL COLIFORM | SM 9222D   | 50     | B         | CFU/100ML |                    | 6/25/2015       | 8:35:00 AM     |

- U - RESULT IS BELOW THE DETECTION LIMIT
- I - RESULT IS BETWEEN THE MDL AND PQL OR THE LOWEST STANDARD
- Q - SAMPLE RECEIVED AND ANALYZED OUT OF HOLDING TIME
- B - RESULTS BASED ON COLONY COUNTS OUTSIDE THE ACCEPTABLE RANGE
- L - OFF-SCALE HIGH. ACTUAL VALUE IS KNOWN TO BE GREATER

APPROVED BY:

A handwritten signature in black ink, appearing to read "Barry LeCavalier".

BARRY LeCAVALIER

FRIDAY, JUNE 26, 2015

PAGE 2 OF 2



City of Clearwater  
Public Utilities Laboratory  
1605 Harbor Drive, Clearwater, Florida 33755

Phone: (727) 462-6664 Ext. 243  
Contact: Barry LeCavalier

CITY OF



CHAIN OF CUSTODY

| Client Name: Stormwater- Sarah Kessler |                          |              |            |             |            |             |               |          |              | Project Name / Location<br>WBID                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | Matrix Codes:<br>SW - Surface Water<br>WW - Wastewater<br>DW - Drinking Water<br>SL - Sludge/Biosolids<br>GW - Ground Water<br>SO - Soil<br>SA - Saline Water |      |          |  |  |  |  |  |  |  |
|----------------------------------------|--------------------------|--------------|------------|-------------|------------|-------------|---------------|----------|--------------|----------------------------------------------------------|----------------------------------------------------------------------------|-----------|----------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|--|--|--|--|--|--|--|
| Sampler's Name (PRINT): Emily Laurenti |                          |              |            |             |            |             |               |          |              | Sampler's Signature: <i>Emily Laurenti / Sarah Czeka</i> |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| SAMPLE INFORMATION                     |                          |              |            |             |            |             |               |          |              | CONDITION AT RECEIVING                                   | METALS                                                                     | NUTRIENTS | OTHER TESTS    | BACTERIA | Special Tests                                                                                                                                                                                         | Container                                                                                                                           |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| ITEM #                                 | SAMPLE ID OR DESCRIPTION | Initials     | START DATE | ENDING DATE | START TIME | ENDING TIME | COMPOSITE (C) | GRAB (G) | # CONTAINERS | MATRIX<br>WW, DW, SL, SW, GW, SO, SA                     | PRESERVATIVES<br>(1) Sulfuric (2) Nitric (3) Ice (4) Hydrochloric (5) None | pH        | TEMPERATURE °C | FILTERED | (1) Aluminum<br>(2) Antimony<br>(3) Arsenic<br>(4) Barium<br>(5) Beryllium<br>(6) Cadmium<br>(7) Calcium<br>(8) Chromium<br>(9) Copper<br>(10) Iron<br>(11) Lead<br>(12) Magnesium<br>(13) Molybdenum | (1) Manganese<br>(2) Mercury<br>(3) Nickel<br>(4) Potassium<br>(5) Selenium<br>(6) Silver<br>(7) Sodium<br>(8) Thallium<br>(9) Zinc | (1) TKN<br>(2) TN<br>(3) NH3<br>(4) NO3<br>(5) NO2<br>(6) TP<br>(7) PO4<br>(8) SO4<br>(9) Cl<br>(10) NOx | (1) Alkalinity<br>(2) Hardness<br>(3) CBOD<br>(4) Oil & Grease<br>(5) TSS<br>(6) TS<br>(7) TVS<br>(8) TVSS<br>(9) Conductivity<br>(10) THM<br>(11) Vol Fat Acids<br>(12) COD<br>(13) BOD<br>(14) TOC<br>(15) pH | (1) Total Coli<br>(2) Fecal Coli<br>(3) E-Coli<br>(4) Enterococci | (1) Total Sulfide<br>(2) Dissolved Sulfide<br>(3) Ca Hardness<br>(4) Color                                                                                    | SIZE | COMMENTS |  |  |  |  |  |  |  |
| 1                                      | Sharkey                  | EL           | 6/25/15    | —           | 0908       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 2                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 2                                      | "                        | "            | 6/25/15    | —           | 0908       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 3                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 3                                      | "                        | "            | 6/25/15    | —           | 0908       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 4                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 4                                      | McCauley                 | EL           | 6/25/15    | —           | 0835       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 2                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 5                                      | "                        | "            | 6/25/15    | —           | 0835       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 3                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 6                                      | "                        | "            | 6/25/15    | —           | 0835       | —           | G             | 1        | SW           | 3                                                        |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   | 4                                                                                                                                                             |      |          |  |  |  |  |  |  |  |
| 7                                      |                          |              |            |             |            |             |               |          |              |                                                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| 8                                      |                          |              |            |             |            |             |               |          |              |                                                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| 9                                      |                          |              |            |             |            |             |               |          |              |                                                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| 10                                     |                          |              |            |             |            |             |               |          |              |                                                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
| 11                                     |                          |              |            |             |            |             |               |          |              |                                                          |                                                                            |           |                |          |                                                                                                                                                                                                       |                                                                                                                                     |                                                                                                          |                                                                                                                                                                                                                 |                                                                   |                                                                                                                                                               |      |          |  |  |  |  |  |  |  |
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*Appendix C*  
*Additional Information and Resources for Septic Systems*



## Southwest Florida Water Management District (SWFWMD) Brochure

### How can I protect my drain field?

- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drain field.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drain field or damage the pipes, tank or other septic system components.
- Keep roof drains, basement sump pump drains and other rainwater or surface water drainage systems away from the drain field. Flooding the drain field with excessive water slows down or stops treatment processes and can cause plumbing fixtures to back up.

For more information, contact your local health department or visit [www.epa.gov/owm/septic/](http://www.epa.gov/owm/septic/).



This information will be made available in accessible formats upon request. Please contact the Communications Department at (850) 796-7211 or 1-800-423-1476 (FL only); ext. 4757; TDD only at 1-800-231-6103 (FL only).

### Protect your septic system!

- Inspect your system every 2 to 3 years and pump as recommended.
- Use water efficiently.
  - Fill the bathtub with only as much water as you need.
  - Turn off faucets while shaving or brushing your teeth.
  - Run the dishwasher and clothes washer only when they're full.
  - Use toilets to flush waste only (not kitty litter, diapers or other trash).
  - Make sure all faucets are completely turned off when not in use.
  - Maintain your plumbing to eliminate leaks.
  - Install aerators in the faucets in your kitchen and bathroom.
  - Replace old dishwashers, toilets and clothes washers with new, high-efficiency models.
- Don't dispose of household hazardous wastes in sinks or toilets.
- Care for your drain field. Avoid driving or parking vehicles on your drain field. Plant only grass over and near your drain field to avoid damage from roots.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

## Preventing Septic System Problems



### You should know that:

- As a homeowner you're responsible for maintaining your septic system.
- Maintaining your septic system protects your investment in your home.
- You should have your septic system inspected every 2 to 3 years and pumped as recommended.

If properly designed, constructed and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate ground water that might be a source of drinking water. And if you sell your home, your septic system must be in good working order.

Southwest Florida  
Water Management District  
WATERMATTERS.ORG • 1-800-423-1476  
VISCORP755-08

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

### Why should I maintain my septic system?

Septic systems are often taken for granted because they are out of sight and out of mind. Proper operation and maintenance of your septic system can save you money, protect your family's health and protect your watershed.

#### Save money

Failing septic systems are expensive to repair or replace, and poor maintenance is often the cause. Having your septic system inspected regularly (at least every 2 to 3 years) is a bargain when you consider the cost of replacing the entire system. Your system will need pumping (generally every 3 to 5 years), depending on how many people live in the house and the size of the system. An unusable septic system or one in disrepair will lower your property value and could pose a legal liability.

#### Protect health

When septic systems fail, household wastewater is released into the environment and can contaminate nearby wells, ground water and drinking water sources. Bacteria is a typical pollutant in household wastewater and can cause communicable diseases through direct or indirect body contact or ingestion of contaminated water or shellfish.

#### Protect the watershed

A watershed is an area of land that water flows across as it moves toward a common body of water, such as a stream, river, lake or coast. Everyone lives in a watershed and our actions

affect the health of the watershed. Because a septic system uses the environment to treat wastewater, it may release untreated or partially treated wastewater if the system fails. This inadequately treated wastewater contains nutrients such as nitrates and phosphates that can degrade lakes, streams and shorelines and contaminate our drinking water supplies.

### How does a septic system work?

Microbes in the soil digest, or remove, most contaminants from wastewater before it eventually reaches ground water. A typical septic system has four main components: a pipe from the house, a septic tank, a drain field and the soil.

The septic tank (see illustration below) is a buried, watertight container typically made of concrete, fiberglass or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum). It also allows partial decomposition of the solid materials. Compartments and a T-shaped outlet in the septic tank prevent the sludge and scum from



leaving the tank and traveling into the drain-field area. Screens are also recommended to keep solids from entering the drain field. The wastewater exits the septic tank and is discharged into the drain field for further treatment by the soil.

### How do I maintain my septic system?

#### Inspect regularly

You should have a typical septic system inspected at least every 2 to 3 years by a professional and your tank pumped as recommended. Alternative systems with electrical float switches, pumps or mechanical components need to be inspected more often.

#### Use water efficiently

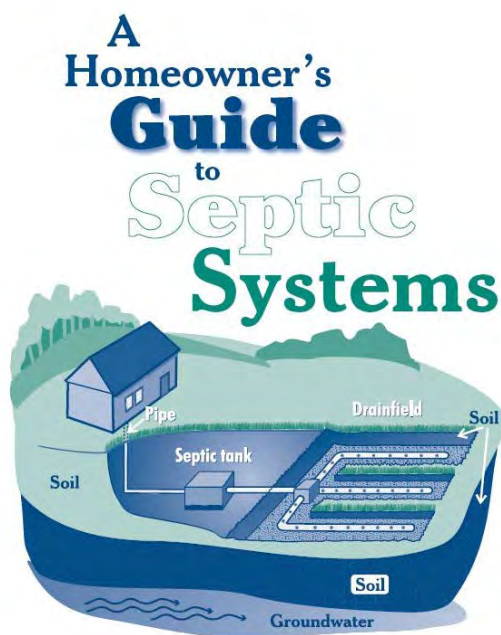
Average indoor water use in the typical single-family home in west-central Florida is approximately 60 gallons per person per day. Dripping faucets can waste up to 30 gallons of water per day. Leaky toilets can waste as much as 200 gallons each day. The more water a household conserves, the less water enters the septic system.

#### Flush responsibly

Dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels and other kitchen and bathroom items can clog and potentially damage septic system components. Flushing household chemicals, gasoline, oil, pesticides, antifreeze and paint can stress or destroy the biological treatment taking place in the system or might contaminate surface waters and ground water.



*Environmental Protection Agency (EPA) Brochure*



Full publication available at:

[http://www.epa.gov/owm/septic/pubs/homeowner\\_guide\\_long.pdf](http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf)



## Onsite Sewage Treatment and Disposal Systems: An Overview<sup>1</sup>

Gurpal S. Toor, Mary Lusk, and Tom Obreza<sup>2</sup>

*This publication is part of a series titled **Onsite Sewage Treatment and Disposal Systems**, commonly referred to as **septic systems**. This series is intended to give state and local government officials, soil scientists, consulting engineers, Extension agents, and citizens a basic understanding of onsite wastewater treatment and the behavior of different wastewater-borne contaminants coming from septic systems.*

### Introduction and Purpose

Domestic wastewater (sewage) contains a mixture of contaminants, including nitrogen, phosphorus, and disease-causing organisms called pathogens. It may also contain organic compounds of concern, such as pharmaceuticals or household chemicals. Before domestic wastewater is discharged to the environment, it must be treated to remove contaminants. This treatment (1) can occur centrally at one municipal sewage treatment plant that receives wastewater from a community, (2) may be distributed in space with several smaller treatment plants called a decentralized treatment system, or (3) may occur with onsite sewage treatment and disposal systems (hereafter referred to as septic systems) that treat wastewater from an individual home or business and dispose of it at that location.

Nearly one in four households in the United States and about one in three households in Florida depend on septic systems. In Florida, it is estimated that over 2.5 million septic systems are in use, discharging approximately 426

million gallons per day (Meeroff et al. 2008). The Florida Department of Health regulates septic systems and issues construction permits. A recent review of permitting records for Florida from 1990 to 2006 indicated that 95% of septic systems are residential systems. See Table 1 for detailed information on the number of septic systems serving other sources in Florida (Lowe et al. 2007).

These systems most commonly consist of a septic tank and a drain field (Figure 1). A drain field is also referred to as a leach field, soil infiltration or absorption system, or soil treatment unit (U.S. EPA 2011). Relatively simple in design, septic systems can be a cost-effective and reliable means of removing contaminants from household wastewater before discharging it into the environment. Public health and environmental protection depend on the degree to which a septic system can remove harmful biological and chemical contaminants from household wastewater. More advanced technologies have gained popularity in recent years as concerns have grown about protecting sensitive environments. The Florida Department of Health maintains design criteria for septic systems to ensure public health and environmental protection and to make sure that onsite systems are sited within properly functioning soils. These criteria include requirements for the size and placement of drain fields, which depend on soil type and expected waste volume (FDOH 2011).

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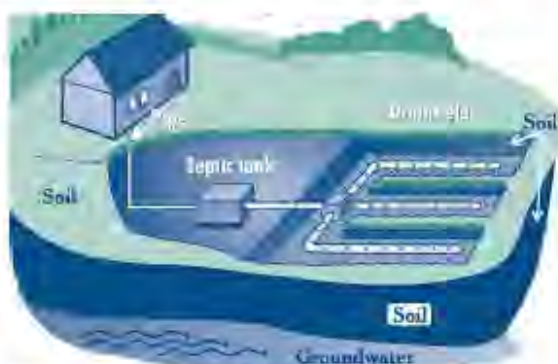


Figure 1. A conventional gravity onsite sewage treatment and disposal system or septic system. Source: U.S. EPA (2011).

This publication introduces common types of septic systems and briefly discusses onsite wastewater flow and the contaminants found in wastewater. Subsequent publications in this series take a closer look at the behavior and transport of contaminants like nitrogen, phosphorus, bacteria, protozoa, viruses, and organic chemicals in wastewater treated by septic systems.

## Functions and Types of Septic Systems

The basic functions of a septic system include the following:

- Receive wastewater (sewage) from the property, generally the building sewer.
- Separate solid waste materials from the wastewater in one or several tanks.
- Provide additional treatment and digestion of waste in one or several tanks.
- Dispose of the treated water. In Florida, disposal is through a drain field in nearly all cases. The drain field serves both as a means to receive and discharge the water and as a treatment unit.

Several septic system designs exist to carry out the above functions. A few of these technologies are described below.

## Conventional Septic Systems

Most septic systems in the United States are conventional gravity flow septic systems, which means that instead of a motorized pump, these rely on gravity to move household wastes through the treatment system. The components of a gravity flow system are a septic tank and a drain field.

Occasionally, the septic tank may be lower than the drain field, and a pump must be additionally installed to lift the wastewater into the drain field for disposal.

The septic tank consists of a buried watertight tank that receives wastewater from the home plumbing system (Figure 1). It works as follows:

- Wastewater enters the tank from the property's sewage pipes.
- Solid wastes settle to the bottom because of gravity and form what is called *sewage sludge*.
- Fats, oils, and grease float to the top and form what is called *scum*.
- Anaerobic bacteria in the septic tank carry out the first stage of treatment by breaking down degradable wastes in the scum, water, and sludge. This results in a reduction of sludge volume by 40%, biochemical oxygen demand by 60%, and suspended solids by 70% (Reneau et al. 1989). Gases resulting from this process escape through the plumbing vents, the drain field, or the top of the tank, and liquids become part of the remaining wastewater.
- The settled, anaerobically pretreated wastewater (called septic tank *effluent*) then flows out of the tank and moves by gravity into a drain field.
- In the drain field, the effluent enters the soil or similar material.
- Once in the soil, the water leaches, percolates, or moves downward through the soil and eventually becomes groundwater. Along the way, filtering and further removal of contaminants can occur.
- Periodic pumping of the septic system is necessary to remove built up *scum* and residual *sludge*.

If the septic system is working properly, the effluent that flows out of the septic tank is clarified, or contains few solids. However, it will still have an odor and carry contaminants. For further contaminant removal, the septic tank effluent must percolate through suitable unsaturated soil. This is accomplished with the soil treatment unit or drain field, which consists of a series of trenches, or perhaps a single bed, fitted with perforated pipes and chambers that receive wastewater from the septic tank and allow its seepage into the underlying soil. The importance of the unsaturated soil in providing treatment is the reason for increasing requirements over the last decades that the drain field be installed in unsaturated soil above groundwater. Old drain fields were frequently installed closer to or in the groundwater. Figure 1 shows how the drain field is typically configured in relation to the septic tank.



The soil underneath the drain field is the most important treatment component through which the effluent passes before it reaches groundwater. Thus, soil properties are important for properly siting a septic system. The thickness of unsaturated soil (i.e., depth to water table), permeability, texture, and clay mineralogy affect the degree to which the soil renovates the septic tank effluent. There must also be a 24-inch separation between the infiltrative surface of the soil treatment unit (typically the bottom of the drain field) and the wet season water table (the highest level of the saturated zone in the soil in a year with normal rainfall). It is also the level to which the water table can be expected to rise in a normal wet season.

### Low-Pressure Dosing Systems

One disadvantage of conventional gravity flow septic systems is that gravity flow limits how high and far effluent can move. The resulting uneven distribution of the effluent in the drain field can cause localized overloading of the soil in the drain field. This overloading can hamper treatment or cause clogging in drain field pipes. Furthermore, some areas have slowly permeable soils that may not be able to handle large volumes of effluent all at once. To overcome these problems, a low-pressure dosing system may be used as an alternative to the conventional gravity flow system. In this system, wastewater is treated in a septic tank just as in the conventional septic system, but before distribution to the drain field, wastewater is stored in a pump tank. From there, effluent is pumped evenly to the drain field at regular intervals in a controlled manner. Low-pressure dosing systems overcome problems associated with peak flows from gravity systems and allow utilization of large drain field placement in soils that otherwise might not be suitable.

### Aerobic Treatment Units

A different shortcoming of the conventional septic system is that the clarified septic tank effluent still contains biodegradable solids and liquids. These can lead to eventual clogging of a drain field installed in soil that otherwise could percolate the volume of wastewater. A useful alternative for these sites is the aerobic treatment unit (ATU). The ATU is a sewage treatment system that replaces the septic tank or is added after the septic tank of a conventional septic system. ATUs introduce air into the sewage and use an aerobic (high oxygen) process rather than the anaerobic process used in conventional septic systems (Figure 2). By aerating (adding oxygen from air) the waste, the treatment process rate is increased, and many contaminants will be reduced to levels considerably lower than from a conventional septic

tank. Effluent from an ATU is discharged into a drain field for further treatment in the soil, just as with a conventional septic tank system. ATUs usually refer to systems containing an aerator, but trickling or media filter technologies can also be included. ATUs require a higher energy input to power the aerator or pumps and regular operation and maintenance to maintain performance.

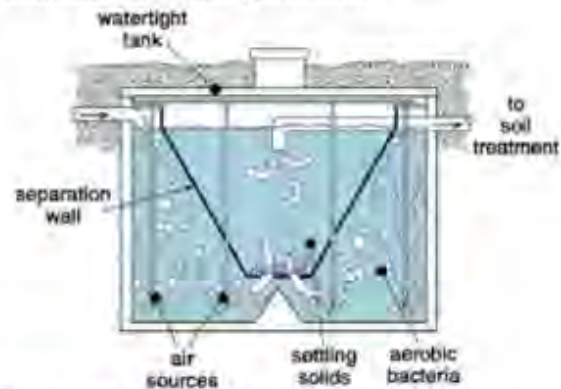


Figure 2. An aerobic treatment unit (ATU) for onsite sewage treatment. Source: FDOH (2011).

### Advanced Onsite Treatment System Design

Treatment better than that performed by conventional septic systems is sometimes referred to as “advanced treatment.” The previously mentioned ATUs are part of this group. Additionally, in Florida, technologies would generally fall into a category of performance-based treatment systems (PBTs), which are engineered systems designed to achieve specified levels of contaminant removal.

PBTs for nitrogen reduction are designed so that anaerobic treatment follows aerobic treatment to encourage greater nitrogen reduction from the wastewater. This reduction in nitrogen is made possible because aerobic treatment encourages the conversion of nitrogen in the waste to nitrate, which is subsequently converted to nitrogen gas in the anaerobic phase of treatment. The nitrogen gas can easily escape to the atmosphere, where it no longer poses a threat to the soil/water environment. In recent years, many ATU manufacturers have begun to incorporate advanced nitrogen removal technology into their design, and research continues on the effectiveness of these new technologies. In Florida, the Onsite Sewage Nitrogen Reduction Strategies Project (<http://www.doh.state.fl.us/environment/ostds/research/Nitrogen.html>) funded by the Florida Department of Health has a goal to research and



recommend technologies for greater nitrogen removal from septic systems.

A PBTS can also be fitted with a disinfection unit that reduces pathogen numbers in the effluent. Still another type of PBTS aims to clean up solids and biodegradable material in the wastewater with the goal of reducing drain field sizes in soils that can accommodate the wastewater. This reduction is feasible because wastes are ideally treated more completely by the PBTS than by a conventional septic tank or ATU.

## Wastewater Flow in Septic Systems

The design and siting of septic systems are important management considerations for protecting public health and environmental quality. To effectively manage wastewater from septic systems, we need accurate knowledge about the flow rates and constituents present in the wastewater. In particular, a good estimation of expected flow rates that are rarely exceeded is necessary to properly determine the size of the septic tank and drain field. Factors that can affect wastewater flow rates are the number of occupants in a dwelling, type of dwelling unit, geographic location, and household water use practices. Thus, wastewater flow patterns vary in volume and quality because of variations in water use within single locations and across geographic areas. Mayer et al. (1999) summarized indoor residential water use for major metropolitan areas across the United States (Table 2). The mean daily per capita indoor water use (gallons per person per day) across 12 study areas was 69 (ranging from 54 to 83), with the median daily per capita indoor use at 60. However, expected flow volumes for individual households are more useful than per person water use statistics. Therefore, many states base septic system designs on a set number of wastewater gallons per day per bedroom by assuming 2 people per bedroom and a daily per capita flow rate of 50-60 gallons. A few states, including Florida, also require increased wastewater design flows depending on the square footage of the home, as described in Florida Administrative Code, Rule 64E-6 (FL Department of State 2011).

## Wastewater Quality in Septic Systems

Sources of household wastewater include waste from garbage disposals, toilets, baths, sinks, dishwashers, and washing machines. Together they contribute numerous chemical and biological constituents to wastewater. Table 3 summarizes various types of wastewater contaminants and their main sources. Table 4 outlines nonpathogenic

contaminant contributions by different sources (garbage disposal, toilet, sinks, and appliances). Consult Table 5 for a more detailed breakdown of contaminants, including pathogens, commonly found in household wastewater.

The shallow sandy soils that cover much of Florida can be especially limited in their ability to remove contaminants from wastewater effluent—making proper septic system design and siting all the more critical. In the Florida Keys, for example, septic systems were shown to contribute 39% nitrogen and 42% phosphorus to oceanic surface waters (U.S. EPA 1996). In 1990, the Florida Department of Health began investigations in onsite technologies for reducing the environmental impacts from septic systems. Anderson et al. (1998) provide a comprehensive review of these technologies and report significant recent improvements in nutrient removal for new technologies. Subsequent papers in this series address specific environmental concerns associated with nutrients as well as pathogens and organic contaminants, and discuss how these contaminants behave in the soil drain field environment and how they can be mitigated.

## Summary

More than one-third of Florida households rely on septic systems, which most commonly consist of a septic tank and a drain field. When properly designed and maintained, these systems can be a cost-effective and reliable means to protect public health and the environment from contaminants, including nitrogen, phosphorus, pathogens, and toxic organic chemicals. Nitrogen pollution from septic systems is of particular concern in Florida. Research is ongoing on new technologies to improve nitrogen removal from septic systems. This publication reviewed the functions of septic systems, design alternatives, and typical flow and quality characteristics of domestic wastewater. Subsequent publications in this series discuss the behavior of individual contaminants in septic systems.

Consult the following EDIS articles in this series for more information on these topics:

SS550/SL348 - Onsite Sewage Treatment and Disposal Systems: Nitrogen

SS551/SL349 - Onsite Sewage Treatment and Disposal Systems: Phosphorus

SS552/SL350 - Onsite Sewage Treatment and Disposal Systems: Bacteria and Protozoa



SS553/SL351 - Onsite Sewage Treatment and Disposal Systems: Viruses

SS554/SL352 - Onsite Sewage Treatment and Disposal Systems: Toxic Organic Chemicals

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*Florida Institute of Food & Agricultural Services (IFAS)*

*Home and Garden Column*

*Care of Septic Systems*

Now, while it is not raining all the time, is the perfect time to think of care and feeding of a septic system. According to the Florida Department of Health officials, nearly 1/3 of our state population is served by onsite sewage treatment and disposal systems commonly called septic systems. Though invisible most of the time, they can become unsightly, inconvenient and smelly if not cared for properly. They are especially troublesome during the rainy season when soils flood. If you get a city water bill with a sewer charge, you are on a central community treatment system. However homes on lots larger than ½ acre in size may instead have a special individual treatment tank and drain field located underground near the house.

No matter which type of system you have, you can still have problems if you don't pay attention to what is out of sight and down the drain. A septic system is designed to let the soil and natural microbes in the soil treat and filter wastes and water on the property so the underground water supply does not get polluted. This is a natural biological process. However, there is a concern that septic tanks may be a source of nutrient contamination, such as nitrogen, getting into our lakes and streams.

Wastewater is produced through washing, bathing, doing laundry, cooking, cleaning, and flushing toilets. It is estimated that about 40 to 50 gallons of wastewater are produced by each of us each day. Officials of Osceola County Health Department determine the size tank needed as well as the size of the drain field to allow proper filtering and function of the system. Proper design and installation are important to keep the plumbing working. Soil drainage and the depth to water in the ground, called the water table, determines the proper drain field size as well as the elevation of the tank and drain field. Elevated septic tanks create noticeable mounds in yards and depending on the year the house was built and the specific regulations in place at the time, houses in a neighborhood may have septic tanks at several different elevations.

Realize they are elevated for a reason. Water flows downhill and if there is not a downhill outside your house, the water in your house won't leave and all the mess stays inside, toilets don't flush and showers don't drain. When you buy or rent your home, there is usually a booklet to help you understand how your dishwasher or oven works. Rarely is there information on how to care for your septic system. These hints should reduce problems and help you avoid costly repairs when you least expect them.

- Don't flush it if it hasn't been eaten. No feminine products, no matter what the package says. Don't put leftovers down the drain. Bacteria decompose fine, partially digested food best.
- Don't use a garbage disposal, or use it sparingly if you have a septic system.
- No paper towels, newspaper, or toys get flushed. No grease, oil, or fat should be poured down the drain.
- Water conservation indoors reduces wastewater to be disposed of outside. Take quick showers. Fix dripping faucets or leaky toilets to avoid excess water entering the system. Spread the interval



between loads of laundry over several days instead of having a "wash day." This allows the wastewater to move through the system slowly.

- If purchasing a new dishwasher or washing machine, select ENERGY STAR rated models that conserve water while saving energy.
- Use chemical cleaners sparingly and don't pour waste chemicals such as paints or solvents, down the drain. Dispose of them at our county solid waste recycling drop of locations.
- Enzymes and special additives are not needed to make your septic system work. All the good bacteria you need are present in our own bodies and we pass it along to the septic system whenever we flush the toilet.
- Don't drive over or pave over the drain field. Don't plant trees in the area as the roots can clog the system and slow the flow.
- It is recommended to have your tank inspected every 3 to 5 years. The best time to schedule it is when you don't have an emergency.
- Avoid surprises when summer rains arrive. Take care of you septic system now.

### *Pinellas County Health Department Individual Sewage Disposal System Ordinance*

#### **Sec. 66-36. - Definitions.**

The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Individual sewage disposal system means any facility serving individual buildings for the disposal of human excreta and sewage waste and shall include, but is not limited to, septic tanks.

Mobile home means a structure, transportable in one or more sections, which is eight feet or more in width and is 32 feet or more in length, built on a permanent chassis, and designated to be used as a dwelling with or without a permanent foundation when connected to the required utilities and includes the plumbing, heating, air conditioning and electrical systems contained therein.

Mobile home park means a place set aside and offered by a person or public body for the parking or accommodation of six or more mobile homes utilized for sleeping or eating for either direct or indirect remuneration to the owner, lessor or operator of such place.

Private swimming pool means a swimming pool used only by an individual citizen and his family or house guests and shall not include any type of cooperative housing or joint tenancy of five or more families.

Public swimming pool means any swimming pool that is not a private swimming pool.

Recreational vehicle means a vehicular, portable structure built on a chassis, designed as a temporary dwelling for travel, recreation or vacation, having a transportable body width not exceeding eight feet and a length not exceeding 35 feet.

Recreational vehicle park means a place set aside and offered by a person or public body for the parking and accommodation of six or more recreational vehicles utilized for sleeping or eating for either direct or indirect remuneration to the owner, lessor or operator of such place, and also includes buildings and sites set aside for group camping and similar recreational facilities.



Septic tank means any watertight tank or receptacle used as a reservoir for receiving or disposing sewage wastes.

Swimming pool means a structure of concrete, masonry or other approved material and finish, located either indoors or outdoors, used or designed to be used for bathing or swimming purposes by humans, and filled with a controlled water supply, together with buildings, appurtenances and equipment used in connection therewith, which includes, but is not limited to, conventional pools, spa-type pools, special purpose pools, and water recreation attractions.

(Ord. No. 74-8, § 1, 7-30-74; Ord. No. 84-12, § 1, 5-1-84; Ord. No. 97-66, § 1, 8-12-97; Ord. No. 10-66, § 2, 11-30-10)

Cross reference— Definitions generally, § 1-2.

**Sec. 66-37. - Purpose.**

The purpose of this division is to protect the health, safety and general welfare of the citizens of the county and to prevent disease through the maintenance of sanitary health conditions. In order to accomplish the foregoing purpose it is deemed necessary to establish a system of permits for the activities described in this division.

(Ord. No. 74-8, § 2, 7-30-74)

**Sec. 66-38. - Prohibitions and duties.**

- (a) No person shall operate or maintain any public swimming pool, mobile home park or recreational vehicle park without first obtaining and maintaining on, an annual basis, a valid permit from the health department.
- (b) Any person who operates or maintains any public swimming pool must complete a course of instruction and training conducted or approved by the health department.
- (c) No construction, extension, or alteration of a public swimming pool shall take place before the complete plans for such establishment showing existing and proposed facilities have been approved and an initial operating permit obtained, in writing, from the health department.
- (d) No person shall install or cause to be installed any individual sewage disposal system without first obtaining a permit from the health department.
- (e) Permits issued under this division shall not be transferable from one person to another or from one physical location to another unless permission is first obtained from the health department.
- (f) Permits issued under this division shall be conspicuously displayed at the location of the facility.

(Ord. No. 74-8, § 3, 7-30-74; Ord. No. 84-12, § 2, 5-1-84; Ord. No. 97-66, § 2, 8-12-97; Ord. No. 10-66, § 3, 11-30-10)

**Sec. 66-39. - Inspections and permits.**



- (a) The health department shall inspect the facilities of each applicant for a permit under this division prior to issuing any of the required permits.
- (b) The health department regularly shall inspect the operations and facilities of each person holding a permit required by subsection 66-38(a), but in no case less than once each year.
- (c) The health department shall issue a permit under this division to each applicant or renewal applicant who meets the minimum requirements set by law and shall deny permits to those applicants who do not meet such requirements. "Minimum requirements set by law" shall mean all requirements set by F.S. ch. 514; regulations adopted as found in the Florida Administrative Code 64E-9; and county ordinances, as amended.
- (d) Any conflicts between the other provisions of this Code and the F.S. ch. 514 and the Florida Administrative Code 64E-9 shall be resolved in favor of this Code. Compliance with all provisions and any future amendments thereto is required hereby as if said provisions were herein set forth in full. However, pools not to be used for and expressly prohibiting diving may be of any width and length.
- (e) An applicant may apply for a variance from any specific requirement mandated under subsection 66-39(c) of this Code. The Pinellas County Swimming Pool Board for Examining Adjustments and Appeals shall review any variance application under this subsection. The Board may vary the application of any provision of this Code to any particular case when, in its opinion, the enforcement thereof would do manifest injustice and would be contrary to the spirit and purpose of this Code or the technical codes or public interest, and the board also finds all of the following:
  - (1) There are special conditions and circumstances that exist which are peculiar to the building, structure, service system, or individual involved.
  - (2) That the special conditions and circumstances do not result from the action or inaction of the applicant.
  - (3) That the variance granted is the minimum variance that will resolve the issue.
  - (4) That the granting of the variance will be in harmony with the general intent and purpose of the law and will not be detrimental to the public health, safety, and general welfare.
- (f) In order to stagger the processing of permits throughout the year, a permit issued under this division to any new applicant may be valid for any specific period up to one year. Permits issued thereafter shall be valid for a period of one year.
- (g) The health department shall collect a fee for each permit issued under this division, at rates set by the board of county commissioners or as otherwise set by law. If a permit is issued for less than a full year, the fee shall be prorated.

(Ord. No. 74-8, § 4, 7-30-74; Ord. No. 84-12, § 3, 5-1-84; Ord. No. 97-66, § 3, 8-12-97; Ord. No. 10-66, § 4, 11-30-10)

**Sec. 66-40. - Pool permits; fees.**

- (a) There shall exist an annual operating permit and an accompanying annual fee for all public swimming pools as defined by this chapter.



- (b) The following additional permits and fees shall be required for pools exempted from regulation by the department of health pursuant to the provisions of F.S. ch. 514:
  - (1) Any new construction for such pools shall not commence until a construction permit is obtained through the health department; and
  - (2) An initial operating permit shall be required before any person may begin use of the pool; and
  - (3) An annual operating permit fee shall be due in addition to the operating fee charged in (a) above.
- (c) All fees for permits shall be set by the board of county commissioners pursuant to a resolution.

(Ord. No. 97-66, § 4, 8-12-97)

**Sec. 66-41. - Area embraced.**

All territory within the legal boundaries of Pinellas County, Florida, including all incorporated and all unincorporated areas, shall be embraced by the provisions of this division.

(Ord. No. 74-8, § 6, 7-30-74; Ord. No. 97-66, § 5, 8-12-97)

Charter reference— Conflicts between county and municipal ordinances, §§ 2.01, 2.04.

Secs. 66-42—66-50. - Reserved.



## *Additional Resources*

### *Pet Waste References*

#### *Pooches for the Planet Program*

Nanette Holland O'Hara  
Tampa Bay Estuary Program  
(727) 893-2765  
[nanette@tbep.org](mailto:nanette@tbep.org)

#### *Institute of Food & Agricultural Services (IFAS)*

- [http://solutionsforyourlife.ufl.edu/hot\\_topics/lawn\\_and\\_garden/dogs\\_and\\_lawns.shtml](http://solutionsforyourlife.ufl.edu/hot_topics/lawn_and_garden/dogs_and_lawns.shtml)
- <http://sarasota.ifas.ufl.edu/compost-info/tutorial/dog-waste.shtm>
- <http://soils.ifas.ufl.edu/campuswaterquality/help/pets.shtml>

#### *Environmental Protection Agency (EPA)*

- <http://water.epa.gov/polwaste/npdes/swbmp/Pet-Waste-Management.cfm>

### *Septic System Information References*

#### *Environmental Protection Agency (EPA)*

- [http://www.epa.gov/owm/septic/pubs/homeowner\\_guide\\_long.pdf](http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf)

#### *Pinellas County*

- <http://pinellas.floridahealth.gov/programs-and-services/environmental-health/onsite-sewage-disposal/index.html>
- <http://www.pinellas.wateratlas.usf.edu/upload/documents/StormwaterNewsletterFeb2010.pdf>

#### *Florida Department of Environmental Protection (FDEP)*

- <http://www.dep.state.fl.us/water/wastewater/dom/septic.htm>