PEARCE DRAIN/GAP CREEK WATER QUALITY STUDY
TASK #5 FINAL REPORT
May 2022

Prepared for: Manatee County
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Wood Project No.: 600568.6

May 2022

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Engineering Certification

I hereby certify that I am a registered professional engineer in the State of Florida practicing with **Wood Environmental & Infrastructure Solutions, Inc.** (Wood) 5015 S. Florida Avenue, Suite 301 Lakeland, FL 33813, a Corporation authorized to operate as a business providing engineering consulting services (5392) by the State Department of Professional Regulation, Board of Engineers. I further certify that I or others under my direct supervision have prepared the engineering evaluations, findings, opinions, calculations, conclusions technical advice hereby represented in this report.

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Name: Thomas LaRoue
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Date: July 7th, 2022

Certification as to the following:

Project Name: Pearce Drain / Gap Creek Water Quality Study Task #5 Final Report, May 2022, Wood Project No. 600568.6

1.0 INTRODUCTION

A multi-year Cooperative Funding Initiative (CFI) involving the Southwest Florida Water Management District (District) and Manatee County (County) to develop a watershed management plan (WMP) for the Pearce Drain/Gap Creek (PDGC) watershed in Western Manatee County is currently underway. Wood Environment and Infrastructure Solutions, Inc. (Wood) was tasked with conducting the PDGC Water Quality Study to assist the County with the surface water resource assessment (SWRA) portion of the PDGC WMP. The SWRA will augment the ongoing WMP and provide inferences and insights to assist the County with water quality restoration planning, flood mitigation, and pollutant load reduction strategies within the PDGC Watershed.

The intent of the SWRA project was to synchronize with emerging WMP results and to add detail relevant to water quality planning. It is noted that the WMP is being performed by another contractor and was not fully complete at the time of the analyses outlined in this report. Information gathered by the WMP project was utilized wherever possible.

Task 1 of the Water Quality Study included a virtual kick-off meeting held with Wood, the County, and the District on 7/15/2021 and also included updates and project management activities. This report summarizes work completed for **Task 2,** which includes an inventory and summary of relevant data and literature, a summary of available water quality and hydrologic data, exploratory statistical analyses, a pollutant load model, and a preliminary summary of watershed and channel characteristics resulting from desktop assessments and field reconnaissance. The results of assessments and analyses from **Task 2** helped to inform best management practices (BMP) evaluation and development of conceptual plans in **Task 3.** A meeting was held with the County and District on 2/8/2022 to discuss preliminary options for conceptual designs of water quality projects in the PDGC watershed and to select up to three options for which to develop conceptual designs and preliminary load reduction and cost estimates in **Tasks 4-5**. This draft report (**Task 4**) summarizes the findings of **Tasks 1-3**, provides preliminary conceptual designs, load reduction estimates, and cost estimates for three selected options, and provides a summary of the project along with recommendations for future efforts. Upon review by the County and District, this draft report will be finalized in **Task 5**.

2.0 WATERSHED BACKGROUND

The PDGC watershed spans approximately 6,800 acres, primarily in southwest Manatee County and a small portion in Sarasota County (**Figure 2.1**). The watershed area primarily drains towards Pearce Drain Canal, then flows to Gap Creek and ultimately discharges to the Braden River. The watershed has interconnections to adjacent watersheds of Whitaker Bayou, Bowlees Creek, Braden River, and Sugarhouse/Glen Creek.

Major roadways located within the watershed include 53rd Ave. on the north, US-301 on the west, 45th St. on the east, and University Parkway on the south side of the watershed. Elevation throughout the PDGC watershed ranges between 5 to 35 feet (NAVD88) and generally slopes to the NE towards Gap Creek and the Braden River. Soils in the PDGC watershed fall predominantly into the A/D hybrid hydrologic soil group. The composition of soil hydrologic groups in the watershed is presented in **Table 2.1**.

Land use in the PDGC watershed is primarily urban, with a few agricultural and natural land use areas spread mostly in the southern portion of the watershed. Urban land uses include a mixture of residential and commercial/industrial development. A summary of the land-use composition of the watershed is presented in **Table 2.2**. Given the urbanization in the watershed, impervious surfaces with limited storage and conveyance contribute to the "flashiness" of the flow-sensitive system and make the area prone to recurring flooding. The watershed has experienced significant flooding during large storm events, including during Tropical Storm Hermine in September 2016 and multiple storm events in 2017. These included Tropical Storm Emily on July 31st; a subsequent tropical-level rain event driven by Hurricane Ida on August 26th; and, finally, Hurricane Irma on September 10th. The storm event related to Hurricane Ida resulted in the flooding of the Center Lakes subdivision. Hurricane Irma resulted in significant damage County-wide. The National Atmospheric Deposition Program (NADP) gage was damaged by the first 2 events.

The PDGC watershed has also experienced water quality problems. Following the FDEP Group 2/Cycle 2 assessment, Gap Creek was identified as "Impaired" for fecal indicator bacteria (*Escherichia coli* ("*E. coli*")) and macrophytes. Based on the "2020-2022 Biennial Assessment Draft Verified List" by FDEP, the WBID remains impaired for *E. coli* but will be delisted for Nutrients (Macrophytes) because it does not apply to the waterbody (as per 62-302.200(36)(b), F.A.C.). Although recent draft verified lists indicated that the waterbody would remain on the Planning List (requiring further study) for Nutrients (Chlorophyll-a) and Nutrients (Algal Mats), the County, on September 17, 2021, received approval of their application to FDEP to exclude Gap Creek from NNC evaluation. The county currently conducts ambient water quality monitoring in Gap Creek and maintains two automated precipitation and stream gauges in the Watershed.

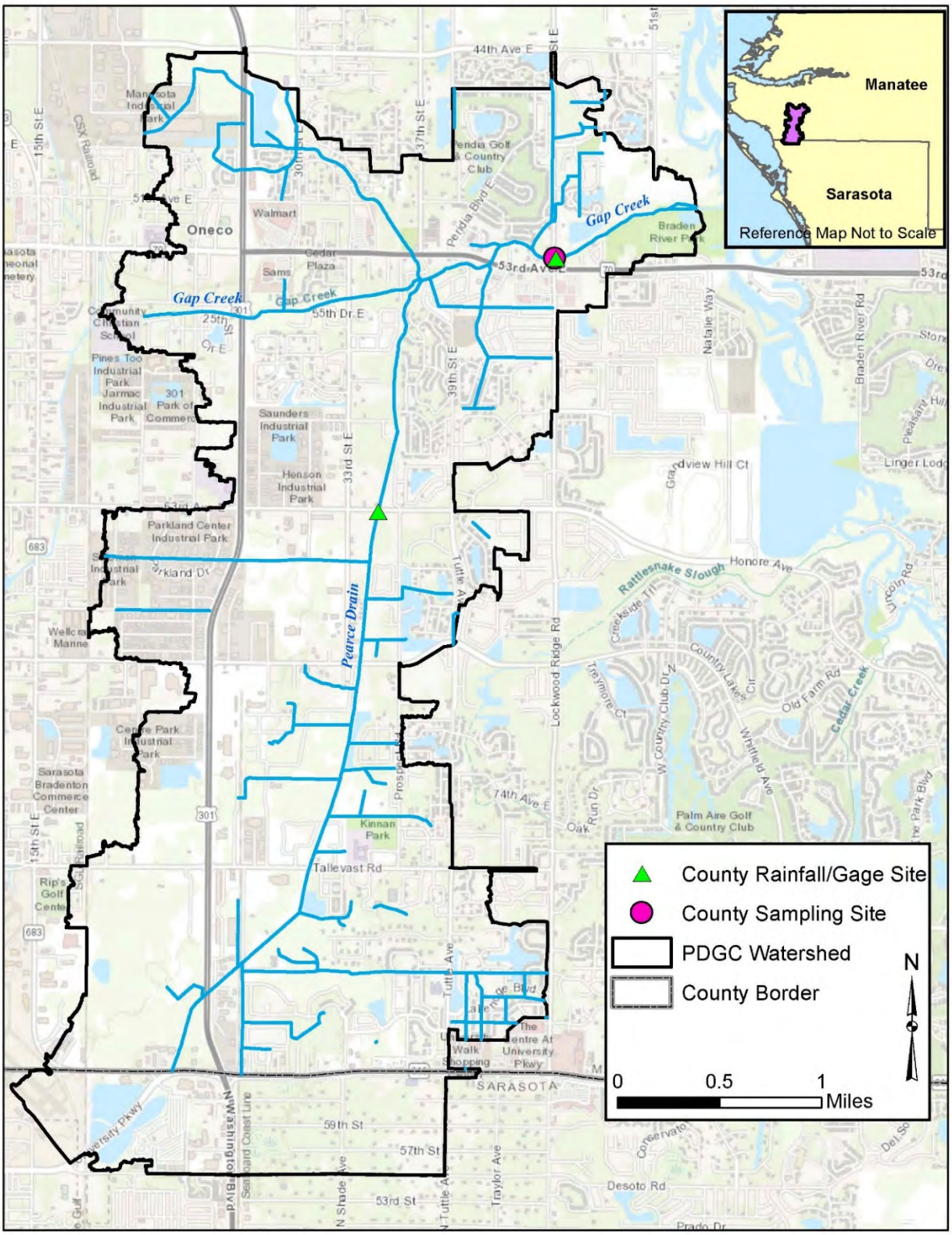
Table 2.1
PDGC Watershed Soil Composition

Hydrologic Soil Group (HSG)	Area (ac)	Percent (%)
A/D	4,306	67%
C/D	949	15%
B/D	770	12%
A	335	5%
Water	71	1%
TOTAL	**6,431**	**100%**

Table 2.2
PDGC Watershed Characteristics

Land Use	Area (ac)	Percent (%)
Urban and Built-Up	4,502	70%
Upland Forest	336	5%
Transportation, Communication, and Utilities	330	5%
Water	408	6%
Agriculture	424	7%
Wetlands	409	6%
Rangeland	13	< 0.5%
Barren Land	9	< 0.5%
TOTAL	**6,431**	**100%**

Figure 2.1
Map of PDGC Watershed



3.0 WATER QUALITY ASSESSMENT

3.1 Water Quality Data Retrieval and Processing

Water quality data from the Florida Department of Environmental Protection's (FDEP) Impaired Waters Rule (IWR) Stations shapefile were reviewed, and the stations within the PDGC watershed were identified. Period of record water quality data from these stations was then extracted from the IWR Run 61 Database, which compiles data from FDEP's STORET and WIN databases. The County also provided water quality data for a station ("GP") from January 2020 to July 2021, which was added to IWR data. Data collected from a basin-wide water quality sampling event conducted by the City and Wood in September 2021 was also incorporated. The combined dataset had consistent data (with limited gaps) between 2017 and 2021. Summary statistics for these data are presented in **Appendix A**.

The water quality data were first checked for fatal lab qualifier codes (B, F, G, H, K, L, N, O, Q, T, V, Y), and data were removed if they were qualified by these codes. Data with a non-detect value, ("U"-qualified) were converted to one-half the minimum detection limit (MDL). For the Impairment Assessment only, any data below the practical quantification limits (with "I" qualifier codes) were set to the concurrent MDL. The data were checked for duplicate values, and any duplicates were removed. Total nitrogen (TN) concentrations were calculated as the sum of total Kjeldahl nitrogen (TKN), nitrate, and nitrite (TN= TKN +NO_x), and were not used if one or more nitrogen species was missing. Due to the limited data for individual stations, analyses were conducted at the basin scale, with all data aggregated for FDEP Water Body ID (WBID) 1899. Medians were calculated for each quarter from 2017-2021 for trend and correlation analyses.

3.2 Impairment Assessment

Gap Creek (WBID 1899) is currently identified as "impaired" for *E. coli* and nutrients (Macrophytes). Based on the "2020-2022 Biennial Assessment Draft Verified List" by FDEP, the WBID remains impaired for *E. coli.* Genetic markers and chemical tracer data were used to confirm this impairment. The Draft Verified List also indicates that the WBID will be delisted for Nutrients (Macrophytes) because it does not apply to the waterbody (as per 62-302.200(36)(b), F.A.C.). The draft verified list also indicates that the waterbody will remain on the Planning List (requiring further study) for Nutrients (Chlorophyll-a) and Nutrients (Algal Mats).

Gap Creek (WBID 1899) would have been subject to the Numeric Nutrient Criteria (NNC) West Central Nutrient Watershed Region freshwater stream criteria of 1.65 mg/L TN, 0.49 mg/L TP, and 20 ug/L Chl-a (measured as annual geometric means, not to be exceeded more than once in three years). However, FDEP approved Manatee County's application on September 17, 2021, to exclude Gap Creek from NNC evaluation. The FDEP NNC exclusion for the Gap Creek WBID was based upon water quality data collected by FDEP and the Manatee County Parks and Natural Resources Department and upon the results of Stream Condition Index (Habitat Assessment) data collected by FDEP staff.

An informal NNC evaluation was conducted on the water quality data compiled in this report for informational purposes. **Table 3.1** shows that the only exceedance of the NNC occurred in 2017 for TP. The time series of annual geometric means (AGMs) for TN, TP, and Chl-a is presented in **Figure 3.1-Figure 3.2**.

Gap Creek is also subject to the two freshwater criteria for *E. coli*. The first criterion (which FDEP used to verify impairment of the WBID) requires individual *E. coli* counts to be less than or equal to 410 per 100 mL in 10% of samples. The second criterion is a monthly geometric mean of 126 counts per 100 mL (not to exceed ten samples over 30 days). Wood conducted an informal *E. coli* impairment evaluation for informational purposes.
Of the 41 samples between 2017 to 2021, 22 (54%) of samples were greater than 410. September 2021 was the only month with sufficient data to apply the monthly geometric mean criterion. The time series of the raw *E. coli* data are presented in **Figure 3.3**. The monthly geometric mean for September 2021 was 187 Counts/100mL. The results confirm the impairment of the waterbody for *E. coli* using both criteria.

Figure 3.1
Time Series of Chlorophyll-a AGMs at WBID 1899

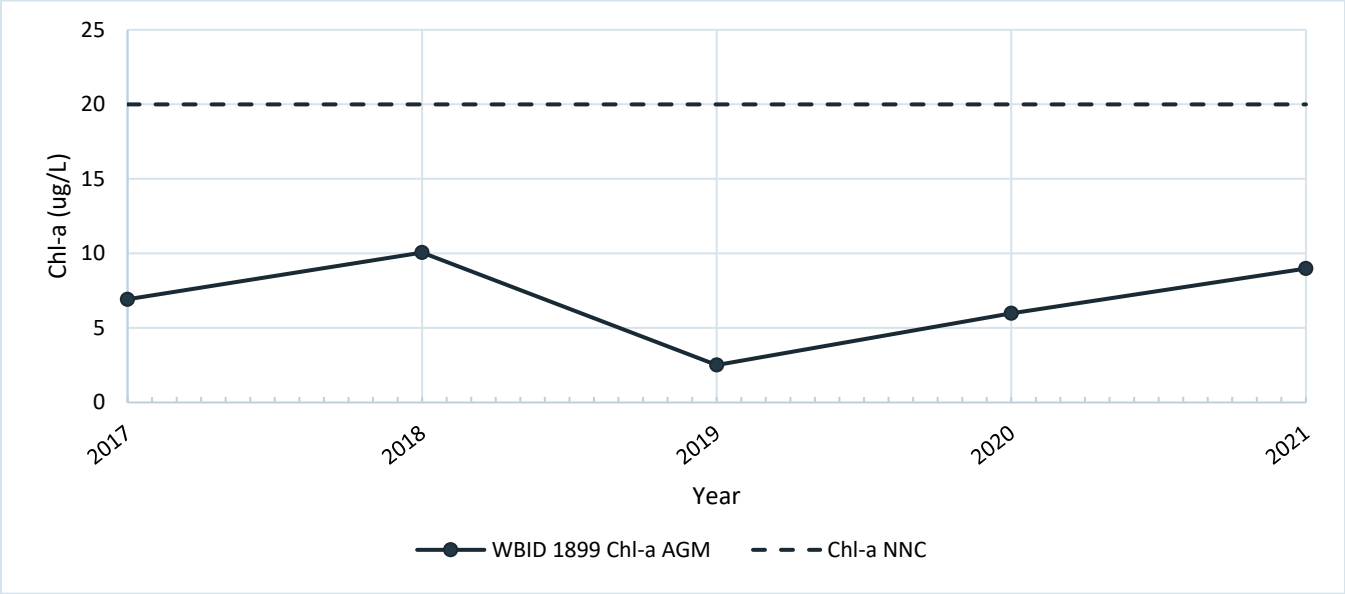


Figure 3.2
Time Series of TN and TP AGMs at WBID 1899

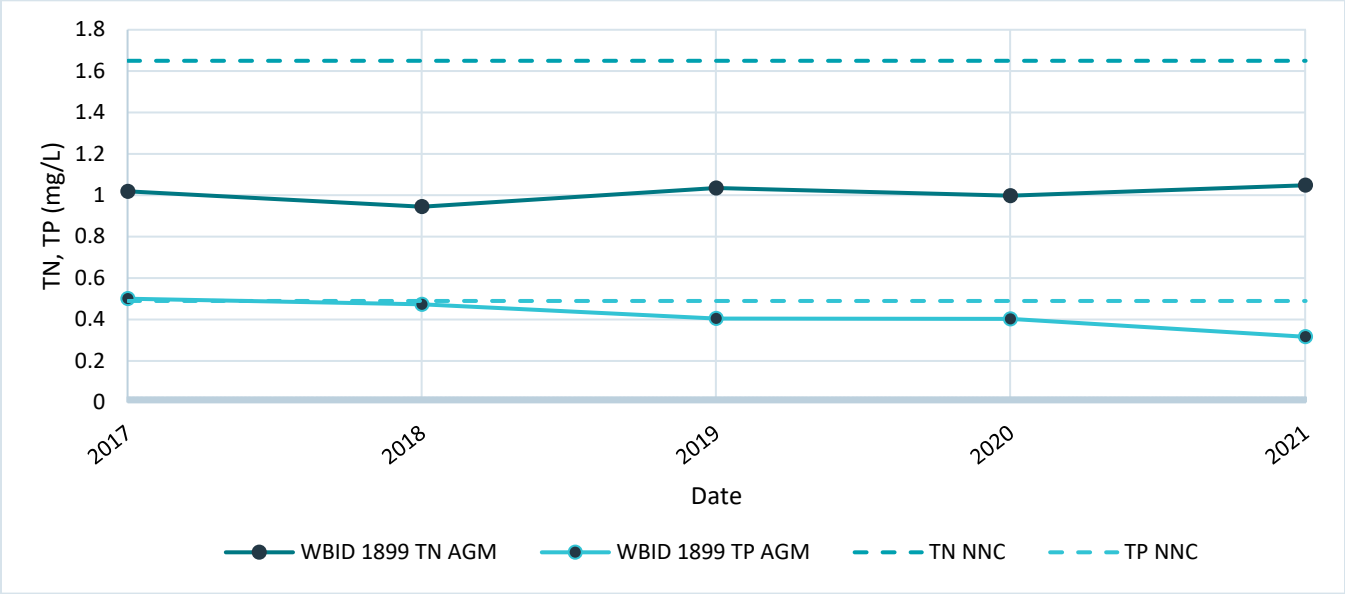


Figure 3.3
Time Series of E. coli at WBID 1899

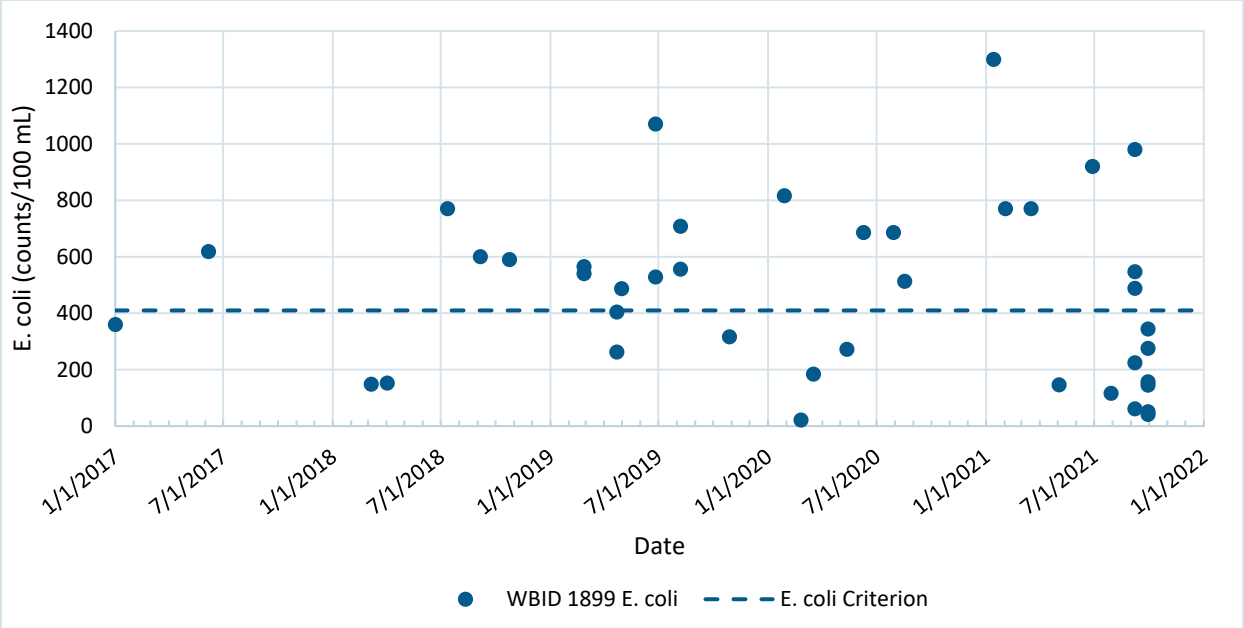


Table 3.1
Nutrient Concentrations at WBID 1899 Compared to NNC

Year	Chl-a AGM (ug/L)	Freshwater Chl-a NNC (ug/L)	TN AGM (mg/L)	Freshwater TN NNC (mg/L)	TP AGM (mg/L)	Freshwater TP NNC (mg/L)
2017	6.9	20	1.02	1.65	0.50	0.49
2018	10.1	20	0.95	1.65	0.47	0.49
2019	2.9	20	1.03	1.65	0.41	0.49
2020	6.0	20	1.00	1.65	0.40	0.49
2021	5.4	20	1.13	1.65	0.29	0.49

Note: Exceedances of NNC are identified in red.

3.3 Trend Analysis

Time series of daily average TN, TP, and Chl-a (**Figure 3.4-Figure 3.5**) for WBID 1899 were used to explore possible trends, relationships, or seasonality in the water quality data. The highest observed Chl-a concentrations (31.9-43.0 ug/L) were observed primarily in April and May each year. Less distinct seasonality was observed in the TN and TP data. The highest TN concentrations (1.3-1.4 mg/L) occurred between June and September each year, with concentrations peaking about a month earlier in each subsequent year between 2017-2021. The highest TP concentrations (0.54-0.78 mg/L) occurred between April and June each year. The time-series data suggest that Chl-a and TN are influenced by factors associated with seasonal variability (e.g., precipitation, temperature, etc.) more so than TP.

Figure 3.4
Time Series of Daily Average Chlorophyll-a Concentrations at WBID 1899

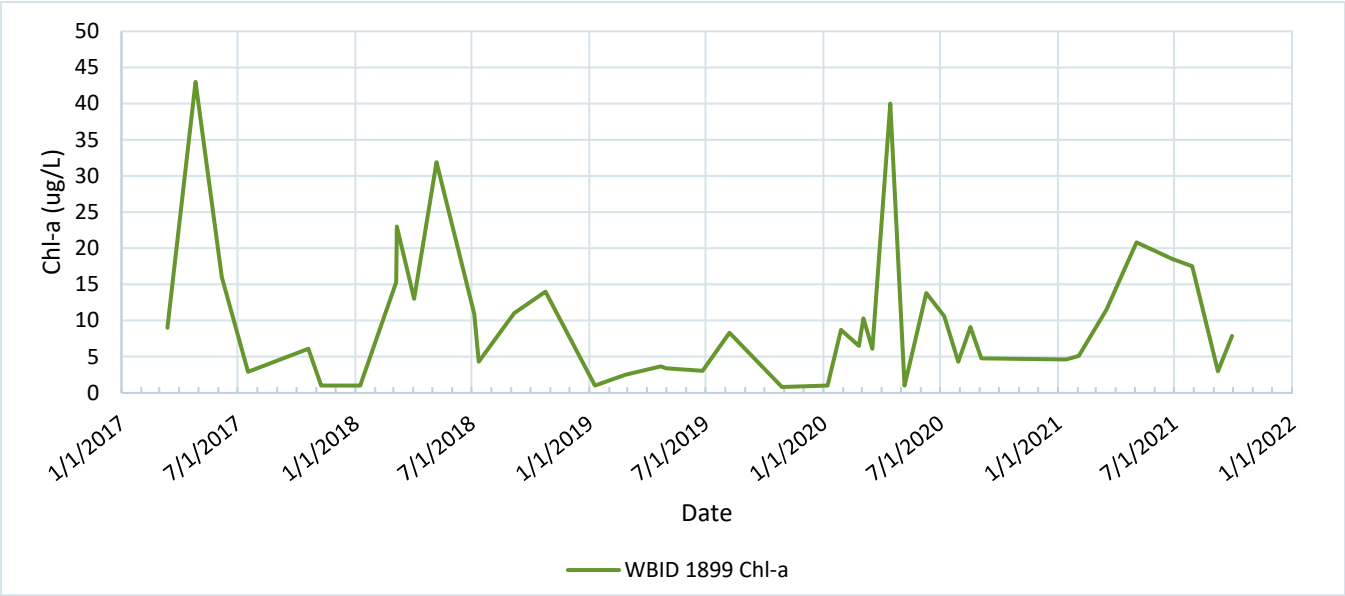
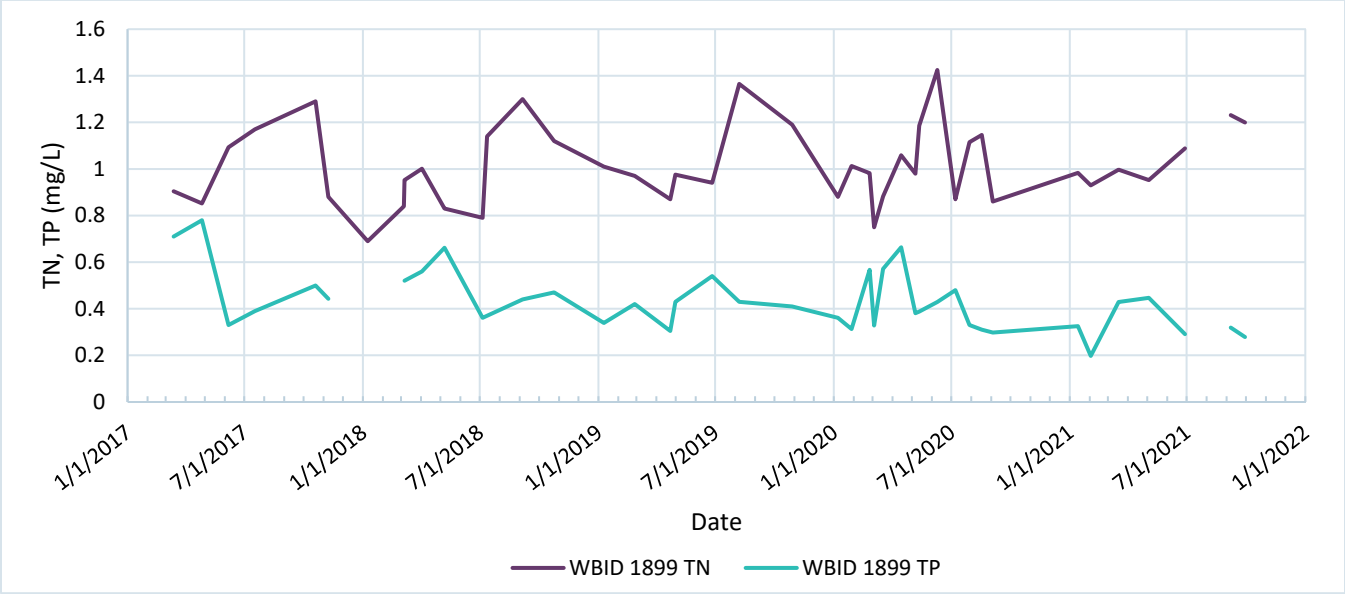


Figure 3.5
Time Series of Daily Average TN and TP Concentrations at WBID 1899



To further assess potential trends in water quality data, the nonparametric Seasonal Kendall trend test was used on the quarterly medians from this dataset, with quarters defined as "seasons". As part of the QA/QC and data processing approach for the Seasonal Kendall trend test, the water quality data were reviewed for erroneous data then checked for the presence of any temporal correlation with auto-correlation plots. If temporal correlations were detected, an adjusted trend value was used. Trends were considered significant at a p-value (alpha, α) of less than or equal to 0.05.

Table 3.2 shows the results of the trend analyses performed on quarterly median series of TN, TP, Chl-a, Total Suspended Solids (TSS), and dissolved oxygen (DO). The trend analyses suggest that there was a significant decreasing trend in TP and a significant increasing trend in DO from 2017 through 2020. There were insufficient data to calculate trends for *E. coli*.

Table 3.2
Seasonal Trend Analysis Results for WBID 1899

WBID	Parameter	tau	Selected p-value	Slope	Trend	POR
1899	TN (mg/L)*	0.176	0.325	0.950	No Significant Trend	2017-2021
1899	TP (mg/L)	-0.800	**0.001**	-0.048	**Significant Decreasing Trend**	2017-2021
1899	Chl-a (ug/L)	-0.330	0.203	-1.691	No Significant Trend	2017-2021
1899	TSS (mg/L)	-0.400	0.120	-0.531	No Significant Trend	2017-2021
1899	DO (mg/L)	0.533	**0.034**	0.562	**Significant Increasing Trend**	2017-2021

*Data were autocorrelated; trend test conducted on prewhitened data

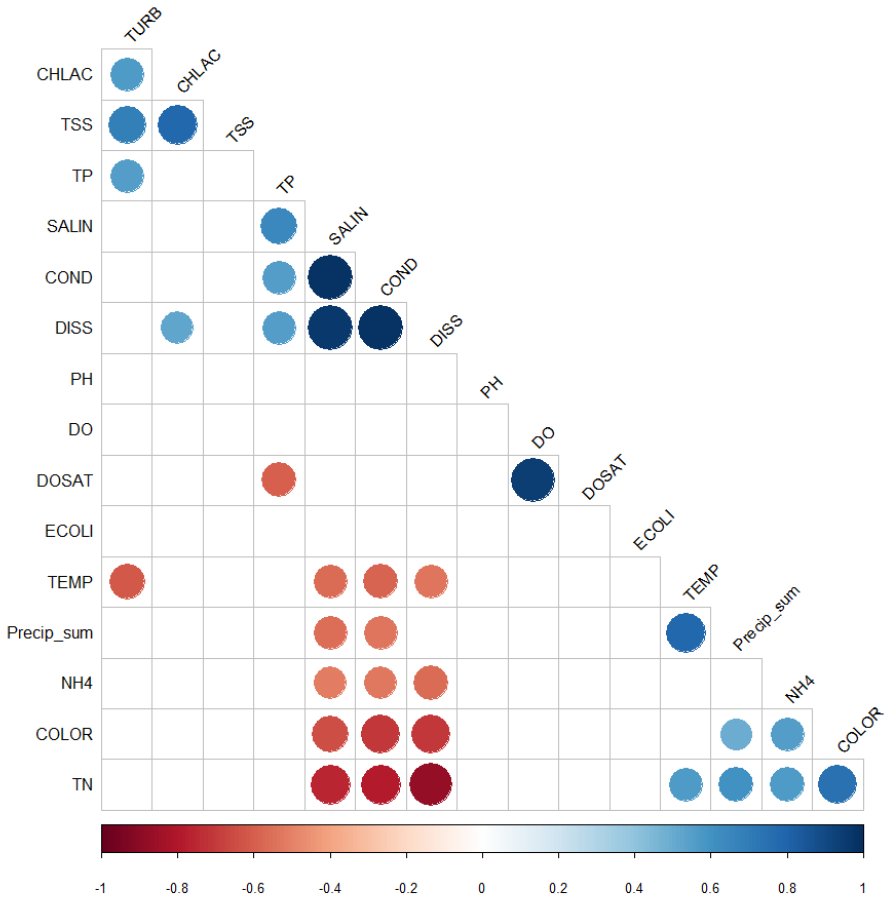
3.4 Correlations

To characterize patterns among water quality parameters Wood used the nonparametric Spearman's rho correlation analysis. This analysis was conducted using the quarterly median data as used in the trend analysis. In addition to the parameter used in the trend analyses, additional parameters were included in the correlation analyses. This included ammonia (NH4), turbidity (TURB), dissolved solids (DISS), DO saturation (DOSAT), conductivity (COND), salinity (SALIN), pH, temperature (TEMP), *E. coli* (ECOLI), and color. Stream velocity and flow were not included in the analysis due to large gaps in the record. Fifteen-minute rainfall data at District station 26252 ("Pearce Drain at 63rd Avenue East") was also summed for each quarter and included in the correlation datasets (Precip_sum).

Figure 3.6 shows the significant (P-value <=0.05) results of correlation analysis for WBID 1899. The red circles represent significant negative correlations, and the blue circles represent positive correlations. The strength of the correlation is indicated by the size and shading of each circle.

Chl-a was positively correlated with TSS, TURB, and DISS. TN was positively correlated with TEMP, Precip_sum, NH4, and Color while negatively correlated with SALIN, COND, and DISS. TP was positively correlated with TURB, SALIN, COND, and DISS while negatively correlated with DOSAT. These results indicate that TN appears to be associated with rainfall; suggesting that urban runoff (i.e., stormwater) could be a source of TN. In contrast, TP was not associated with rainfall but appears correlated with turbidity. This suggests that, at the watershed level, TP is attached to particulates in the water, and provides an indication that soil could be a source of the TP.

Figure 3.6
Spearman Correlation Results for WBID 1899



Note: CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance DISS – Dissolved Solids | DO – Dissolved Oxygen | DOSAT – Dissolved Oxygen Saturation | ECOLI – E. coli | NH4 – Ammonia| PH – pH Precip_sum – 15-min Rainfall Quarterly Sum | TEMP – Temperature | TURB – Turbidity | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | SALIN – Salinity

Circles represent statistically significant correlations, with blue representing positive correlations and red representing negative correlations. Larger and darker circles ( ) represent higher correlation coefficients, while smaller and lighter circles ( ) represent lower correlation coefficients.

3.5 Summary of Water Quality Assessment

An analysis of *E. coli* data collected in 2017 through 2021 for WBID 1899 confirmed the impairment determination made by FDEP for this parameter. WBID 1899 did not exceed freshwater nutrient impairment criteria, except for one exceedance of TP in 2017. Trend analysis identified significant decreasing and increasing trends in TP and DO, respectively, but did not show significant trends for TN, Chl-a, or TSS. Correlation results indicate that TN appears to be associated with rainfall; suggesting that urban runoff (i.e., stormwater) could be a source of TN. In contrast, TP was not associated with rainfall but appears correlated with turbidity. This suggests that, at the watershed level, TP is attached to particulates in the water, and provides an indication that soil could be a source of the TP.

4.0 FACTORS POTENTIALLY AFFECTING WATER QUALITY

4.1 Pollutant Gross Load from Stormwater Runoff

Stormwater runoff is collected and conveyed to the PDGC receiving waterbody through the existing storm sewer infrastructure. Additionally, stormwater runoff conveys to the receiving waterbody through overland flow. Quantification of the pollutant loads associated with stormwater runoff is an important component of the overall pollutant load contribution to the receiving body. Additionally, a gross load analysis allows for the identification of potential stormwater treatment areas as well as high pollutant yielding areas located throughout the watershed. The methodology for quantification of pollutant loads associated with stormwater runoff is described in the following sections.

Methodology for Pollutant Gross Load Estimate

The pollutant load modeling was accomplished using a Microsoft® Excel spreadsheet tool named Pollutant Loadings Assessment (PLA). This tool was developed in-house by Wood and is based on criteria developed by FDEP and the Water Management Districts when a Statewide Stormwater Rule was being considered (FDEP & WMDs, 2010). The PLA tool is based on, with some adjustments as described in the next paragraph, the modified U.S. Environmental Protection Agency's (EPA) Simple Method (Schueler, 1987). The Simple Method estimates stormwater pollutant loads as the product of annual runoff volume and pollutant concentrations.

The Simple Method is a three-step calculation (Ohrel, 2000):

1. Runoff coefficient calculation, Rv:

   $Rv = 0.05 + 0.009 * I$

   Where:

   Rv = Mean runoff coefficient

   I = Percent of site imperviousness

2. Runoff volume (acre-feet per year) (ac-ft./yr.) calculation:

   $R = (P * Pj * Rv / 12) * A$

   Where:

   R = Runoff volume (ac-ft./yr.)

   P = Annual rainfall depth (inches)

   Pj = Fraction of rainfall events that produce runoff (normally equal to 0.9)

   Rv = Mean runoff coefficient

   A = Study area (acres)

3. Annual pollutant loads (pounds per year)

   $L = 2.72 * R * C$

   Where:

   L = Annual pollutant load (lb./year)

   2.72 = Conversion factor (from mg/l to lb./ac-ft.)

   R = Runoff volume (ac-ft./yr.)

   C = Event mean concentration of the pollutant (mg/l)

Wood has modified the runoff volume calculation portion of the Simple Model (steps 1 and 2) to align with methodology accepted for use by FDEP and the Water Management Districts when Florida was considering a Statewide Stormwater Rule. The methodology was originally developed by Dr. Harvey Harper (ERD) and can be found in Chapter 4 and Appendix C of the 2007 report prepared for FDEP titled *Evaluation of Current Stormwater Design Criteria within the State of Florida* (Harper & Baker, 2007). This method is also used in the *March 2010 Draft*

Stormwater Quality Applicant's Handbook (FDEP & WMDs, 2010). The method utilized meteorological zones, hydrologic soil groups, land uses to estimate runoff coefficients. The runoff coefficients are then used with the Rational Method to determine the average runoff per year as shown in the equation below. The use of the PLA is described in detail in the following discussion.

$$Q = 0.083 * c * i * A$$

Where:

Q = Runoff Volume (ac-ft./yr.)

0.083 = Conversion factor (inches to feet)

c = Runoff coefficient determined based on Florida Meteorological Zones as classified in the draft Stormwater Quality Applicant's Handbook, March 2010 Draft.

i = Annual rainfall depth (in)

A = Area (ac)

The annual average rainfall of 48.09 inches was determined utilizing the 15-minute rainfall data from 2007-2019 at SWFWMD Station 26252 (Pearce Drain at 63rd Ave E).

This station is operated by Manatee County and 15-minute data is available from SWFWMD by request. Note that incomplete years (starting/ending partway through or gaps in the record) were excluded from the annual average calculations. While the 15-minute data were not strictly necessary for this current analysis, it was selected to facilitate pollutant load reduction calculations during future BMP analyses.

The runoff coefficient 'c' is determined based on the combination of non-directly connected impervious area curve number (NDCIA CN), percentage of directly connected impervious area (DCIA), and meteorological zone. These runoff coefficients are tabulated in the *March 2010 Draft Stormwater Quality Applicant's Handbook* (FDEP & WMDs, 2010). Among the five meteorological zones defined in Florida, Manatee County is within Zone 4. Published runoff coefficients for Zone 4 are tabulated in **Table B.1** in **Appendix B**. The CN and DCIA for the various land use and soil types were determined by using the lookup table provided in this report as **Table B.2** in **Appendix B**. SWFWMD 2020 Land Use Land Cover data were obtained from the District and utilized to represent existing land use conditions. Soils data were obtained from the Natural Resource Conservation Service Web Soil Survey.

The event mean concentrations (EMCs) used to estimate pollutant loads for PDGC are listed in **Table B.3** in **Appendix B**. EMCs were developed using land-use specific pollutant concentrations obtained from past monitoring activities conducted throughout the State of Florida and were derived from several sources as noted in the documentation. EMCs were developed for TN, TP, TSS, biological oxygen demand (BOD), lead (Pb), copper (Cu), and zinc (Zn).

This analysis was repeated to estimate pollutant loads under future conditions for the purpose of informing long-term planning and improvement alternatives analysis. Future conditions land use was estimated by modifying the existing conditions land use to reflect development based on the Manatee and Sarasota County future zoning.
Although the Simple Method is accepted as an appropriate and reasonably accurate planning level technique to estimate the pollution loading contributed by stormwater runoff, it does have several limitations (Ohrel, 2000):

- This method cannot be used to estimate the pollutant loads generated by base flow, only the loads generated during the storm.
- This technique may not accurately estimate pollutant loads for construction sites, heavily traveled highways, croplands, and undeveloped areas.

The method only accounts for watershed pollutants carried by stormwater runoff but does not account for loads caused by unnatural streambank erosion caused by urban stream syndrome (a secondary effect from the rainfall-

runoff response). Despite the above limitations, the Simple Method is an accepted tool for comparing pollutant loads of different drainage sub-basins for prioritization purposes.

Methodology to Account for BMP Load Reduction

Best Management Practice (BMP) areas were identified based on information gleaned from a combination of resources including SWFWMD Environmental Resource Permit (ERP) polygons, US Geological Survey National Hydrography Dataset (USGS NHD), the previous WMP model network and stormwater infrastructure inventory, aerial imagery, and LiDAR-based digital elevation model (DEM). The contributing area to each BMP was delineated using the previous WMP model subbasin or ERP polygon with manual edits completed as needed based on the DEM and stormwater infrastructure connectivity. BMP treatment type classification was generally based on the corresponding aerial imagery and Google StreetView where available/visible with confirmation of retention, detention, or underdrains for dry systems based on ERP documents (as applicable). BMPs treatment type classifications included dry retention, wet detention, dry detention, or dry detention with soil filtration to underdrain or side drain (e.g., manmade effluent filtration systems). Areas outside the BMP treatment areas were assigned a treatment type of "None". For the future conditions analysis, the developed areas identified during the land use analysis were assigned an assumed treatment type of wet detention.

To accurately quantify pollutant loading, a load reduction factor was applied to the raw stormwater loads where BMPs were present. The "Adjusted" pollutant load provides basin pollutant loads minus the treatment provided by the onsite BMP. Pollution removal rates were based on the recommendations in the *September 2021 Draft Statewide Best Management Practice (BMP) Efficiencies for Crediting Projects in Basin Management Action Plans (BMAPs) and Alternative Restoration Plans* (FDEP, 2021) as follows:

- Dry retention – Lookup as a function of non-DCIA CN and %DCIA, assuming 0.5 inches of retention volume (Harper & Baker, 2007; Table 5-6 for Zone 4)
- Wet detention – 33% for TN and 62% for TP, assuming 14-day hydraulic residence time (FDEP & WMDs, 2010; equations on Figure 13.2 and Figure 13.3 for Zone 4)
- Dry detention – 10% for TN and TP (FDEP, 2021)
- Dry detention with soil filtration to underdrain or side drain – 30% for TN and 40% for TP (Harper & Baker, 2007)

The total annual estimated "Adjusted" loading for the existing land use condition and future land use conditions (Standard BMP Efficiencies) are summarized in **Table 4.1**. Also provided in the below table is a "Reduced BMP Efficiencies" condition for Both Existing and Future conditions. This condition reduces the treatment as described below, assuming an "un-maintained" condition:

- Dry retention – Assumes all removal efficiencies are reduced by 10% (i.e., less infiltration due to sediment accumulation)
- Wet detention – No change; properly designed sumps can take decades of sediment and continue to have the same detention time.
- Dry detention – TN removal reduced from 10% to 5%. TP reduction is assumed to remain 10% since particulate fraction should still be captured
- Dry detention with soil filtration to underdrain or side drain – Both TN and TP removal reduced to 10%, assuming under/side drain becomes clogged, and system effectively reverts to dry retention without filtration

Table 4.1
Summary of Stormwater Runoff Estimates for PDGC Watershed Existing vs Future Land Use Conditions

Scenario	Estimated Annual TN Load (lbs/yr)	Estimated Annual TP Load (lbs/yr)	Estimated Annual BOD Load (lbs/yr)	Estimated Annual TSS Load (lbs/yr)
Existing Condition – Standard BMP Efficiencies	30,232	3,914	96,933	674,662
Existing Condition – Reduced BMP Efficiencies	30,286	3,927	97,065	675,682
Future Condition – Standard BMP Efficiencies	29,561	3,678	93,973	629,110
Future Condition – Reduced BMP Efficiencies	29,609	3,689	94,027	629,525

Note: The above Pollutant Loads are adjusted for urban BMPs as described in the text.

As shown in **Table 4.1**, the TN and TP pollutant loads are estimated to be reduced by approximately 2% and 6%, respectively, in the future condition (as compared to existing). This reduction reflects the previous assumption, which assumes a wet detention treatment for locations that exhibit a land-use change between existing and proposed conditions.

Methodology to Identify Pollutant Hot Spots Within PDGC

Hot spot maps (**Appendix B**) were generated to help visualize the spatial distribution of net stormwater runoff pollutant loads across the PDGC watershed. Calculated total nitrogen (TN) and total phosphorus (TP) loads for each unique combination of land use and soil were summed within each cell of a 200 ft x 200 ft grid covering the watershed. Load reductions from BMPs (wet/dry/dry detention ponds) were accounted for when generating the hot spot maps, however, septic and other groundwater loads were not included. A set of maps was created for existing and future conditions. Analysis of the hot spot maps will help quickly identify areas that are providing relatively high TN and TP loading within the watershed and would warrant appropriate BMPs to reduce loads to PDGC.

4.2 Additional Surface and Ground Water Loading

Septic Tank Pollutant Load Estimates

On-site treatment and disposal systems (OSTDS) or septic tanks may be a significant source of phosphorus and nitrogen loading within an ecosystem. Proper quantification of septic loading is necessary to provide a comprehensive representation of total system loading. The method for estimating septic loads generally follows the approach outlined in Pollutant Loading Estimates Development for the Charlotte Harbor National Estuary Program (Janicki Environmental, 2010) unless noted.

The following data and assumptions were used to estimate the OSTDS TN and TP loads:

- Number of current estimated active OSTDS within the watershed boundary:
  816, comprised of known septic (86) and likely septic (730) based on Florida Department of Health (FDOH) Water Management Inventory parcel data (2018) for Manatee and Sarasota Counties
- Septic tank failure rate per soil type:
  HSG A Soils 5%, non-A HSGs 10% based on the recommended range of 5-10% for Florida (CHEC, 2003)
- Number of people per household:
  2.7 people/household (US Census Bureau, 2010)
- Hydraulic load to OSTDS:
  60 gal/person/day (Polk County Utilities Division, 2014)
- Average effluent TN and TP concentrations**:**
  TN=40 mg/L, TP=10 mg/L (Metcalf & Eddy, 1972) assuming medium strength domestic sewage

- TN vertical and horizontal transfer rate:
  0.41 and 0.1, respectively (CHEC, 2003)
- TP vertical transfer rate:
  0.025 (CHEC, 2003) no horizontal transfer rate applied
- Delivery ratio from failed OSTDS to waterbody:
  TN = 0.8, TP = 0.5 (CHEC, 2003)

Note that these values are assumed typical values representative for the overall watershed area and that details at specific sites may differ. For example, expected failure rates may be higher in areas where the septic tank location is near the seasonal high water level and effective transfer rates and delivery ratios may decrease with distance from the receiving waterbody.

Pollutant loading from functioning and failed OSTDS were calculated separately to account for their different processes and pathways. It is assumed that the loads from functioning and failed systems leave the site via groundwater and surface water flow, respectively (Janicki Environmental, 2010). In either case, the total TN/TP load to a single OSTDS was calculated as the product of an estimated number of people per household, the average hydraulic load per person, and the average effluent TN/TP concentration. Since the exact location of failed systems was unknown, the load to each OSTDS was partitioned into a functioning and failed load based on the failure rate for their respective soil.

The resultant functioning load to groundwater was estimated by multiplying the load to the OSTDS by the proportion of functioning systems for that soil type (i.e., 100% minus % failure), the vertical transfer rate, and the horizontal transfer rate (if applicable). The vertical transfer rate accounts for the uptake of pollutants in the soil and drainfield prior to OSTDS discharge reaching the water table. The horizontal transfer rate accounts for further attenuation as the effluent moves laterally away from the site (Janicki Environmental, 2010).
Estimation of failed septic loads was calculated by multiplying the total loading to the OSTDS by the failure rate and the respective delivery ratio. The delivery ratio estimates the quantity of the pollutant that reaches the receiving body.

The total load to the receiving water body was calculated as the sum of the functioning and failed OSTDS loads. **Table 4.2** provides a summary of the annual estimated septic TN and TP loading within the PDGC watershed, including a breakdown of loads from functioning and non-functioning septic tanks.
There is much uncertainty in estimating septic tank influences given the allowable level of effort in the project scope and therefore the loading estimates in this report should be considered as an upper limit.

Table 4.2
Estimated Annual Pollutant Loads from Functioning and Non-Functioning OSTDS

Annual Load from Functioning OSTDS		Annual Load from Failed OSTDS		Overall Annual Load from OSTDS	
TN (lbs/yr)	TP (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)
599	91	1,211	189	1,810	281

Notes: Overall average assumed septic failure rate of 9.39% based on soils.
Reflects loading from all OSTDS within PDGC Watershed.

Atmospheric Deposition

The combustion of fossil fuels, electric power generation, residential and agricultural fertilizer applications, and other agricultural activities can generate atmospheric-derived nutrient loads received by surface water bodies (sensu Yates et al., 2011). The Tampa Bay Estuary Program (TBEP) suggested that 21% of total nitrogen loads on Tampa Bay and water bodies were from atmospheric deposition within areas of west-central Florida (Yates et al., 2011).

Wet atmospheric deposition of TN and TP directly to PDGC was calculated by multiplying the volume of precipitation onto PDGC by TN and TP concentration in rainfall. Daily precipitation data from USGS Station 02300042 (Ward Lake Near Bradenton, FL) and SWFWMD Station 25619 (ROMP TR 7-2 Oneco) and 25616 (Sarasota-Bradenton) were used to determine the median monthly rainfall for each month from 2001 through 2020. This depth was applied to the PDGC water surface area obtained from the Manatee County Water Atlas. The rainfall TN concentration is the sum of NH4 and NO_3 monthly rainfall-weighted average concentrations obtained from the National Atmospheric Deposition Program (NADP) Verna Site in Sarasota, Florida. TP rainfall concentration was estimated using relationships (TP = 0.0126*TN + 0.0011) developed between wet TP and wet TN concentrations as measured during the Tampa Bay Atmospheric Deposition (TBAD) study (Janicki Environmental, 2015). The dry deposition was estimated using a seasonal dry-to-wet deposition ratio derived from five years of concurrent wet and dry deposition measurements: 1.05 for the dry season (Nov-June) and 0.66 for the wet season (July-Oct) (Janicki Environmental, 2010). The total deposition on PDGC was calculated as the sum of the wet and dry deposition. **Table 4.3** summarizes annual TN and TP loading from an atmospheric deposition for the PDGC surface area. Based on the estimated atmospheric deposition from 2001 to 2020 the average annual TN and TP atmospheric deposition to PDGC is 131 lbs TN/yr and 2.3 lbs TP/yr.

Table 4.3
Annual TN and TP Atmospheric Deposition Summary for PDGC Surface Area

Year	Annual Rainfall[1] (in)	Average Wet Deposition TN Concentration[2] (mg/L)	Average Wet Deposition TP Concentration[2] (mg/L)	Annual Total N Deposition (lbs/yr)	Annual Total P Deposition (lbs/yr)
2001	45.51	0.40	0.0061	157	2.5
2002	64.22	0.26	0.0043	156	2.8
2003	64.92	0.28	0.0046	179	3.1
2004	54.34	0.20	0.0037	123	2.2
2005	49.22	0.33	0.0053	216	3.3
2006	46.17	0.33	0.0052	169	2.7
2007	35.84	0.26	0.0044	106	1.8
2008	39.44	0.22	0.0039	105	1.8
2009	41.39	0.25	0.0042	119	2.0
2010	45.03	0.23	0.0040	94	1.7
2011	43.26	0.24	0.0041	107	1.9
2012	53.35	0.24	0.0041	153	2.6
2013	55.12	0.19	0.0035	115	2.1
2014	55.07	0.23	0.0040	136	2.4
2015	43.06	0.25	0.0043	128	2.2
2016	56.42	0.20	0.0036	118	2.2
2017	64.55	0.20	0.0036	126	2.4
2018	50.69	0.18	0.0034	107	2.0
2019	48.83	0.20	0.0037	110	2.0
2020	61.15	0.25	0.0043	91	1.5
Average	**50.88**	**0.25**	**0.0042**	**131**	**2.3**

(1) Calculated as the sum of median monthly total rainfall measured at USGS 2300042 and SWFWMD 25616 & 25619

(2) Arithmetic average of monthly average concentrations for a given year

4.3 Summary of Surface Water Loading

Comparison of Surface Water Loading

Table 4.4 and **Table 4.5** summarize the existing and future estimated TN and TP contributions from the previous report sections. Based on the summary tables, over 90% of the estimated TN and TP for both the existing and future conditions is expected to derive from stormwater runoff; therefore, identification of nutrient pollutant load reduction opportunities associated with improved stormwater management may provide the most cost-effective public works projects for TN and TP load reduction to the receiving waters.

Table 4.4
Existing Condition Surface Water Pollutant Load Summary

Source	TN (lbs/yr)	TP (lbs/yr)
Existing Condition Stormwater Runoff – Standard BMP Efficiencies	30,232	3,914
OSTDS	1,810	281
Atmospheric Deposition	131	2.3
TOTAL	**32,173**	**4,197**

Table 4.5
Future Condition Surface Water Pollutant Load Summary

Source	TN (lbs/yr)	TP (lbs/yr)
Future Condition Stormwater Runoff - Standard BMP Efficiencies	29,561	3,678
OSTDS	1,810	281
Atmospheric Deposition	131	2.3
TOTAL	**31,502**	**3,961**

5.0 FIELD RECONNAISSANCE SUMMARY

A field reconnaissance site visit was conducted on 08/12/2021 to assess general stream characteristics, identify potential pollutant sources not visible with desktop analysis, identify sites for targeted water quality sampling, and assess public parcels and right of way (ROW) areas for potential use in water quality improvement BMPs. In **Figure 5.1** the "Sampling Sites" and "Additional Recon Sites" features show the areas visited during the site visit, and photographs from these sites are provided in **Appendix C**. The findings from the site visit identified several key areas that could support stream restoration, channel enhancement, regional stormwater treatment, or water quality BMPs. After the initial site visit, 12 sites were identified for water quality and flow sampling.

5.1 Gap Creek Sites

GC-1 – Gap Creek at 301

This segment is characterized by vegetated banks and mixed exotic shrubs, herbaceous, and trees (left bank). Water flows East underneath U.S. 301 via a culvert. A Florida Department of Transportation (FDOT) stormwater conveyance, running North to South, intersects Gap Creek to the East of U.S. 301. The conveyance discharge on the left bank of Gap Creek is partially armored with rip-rap. The FDOT conveyance appears to treat runoff from U.S. Hwy. 301 and drains directly into Gap Creek. There is potential at this site for a partnership between the County and FDOT to provide additional stormwater treatment prior to discharging into Gap Creek. There is an existing conservation easement on the property immediately downstream from the culvert, which may provide additional area for a meandering stream or mini eco-park. This site was selected for water quality and flow sampling.

GC-2 – Conservation Easement at 33rd

Gap Creek flows East through an existing conservation easement, starting east of U.S. 301 and ending at 33rd Street East. The GC-2 site is at the downstream end of the easement property. There are a series of conservation easements between this site and upstream site GC-1. The area between this site and GC-1 would be a prime location for an eco-park. There are approximately 20 ft of partially mowed flat surface area between the right bank and the fence line along this segment of Gap Creek. The left bank was unmown with mixed exotic herbaceous vegetation and trees. This site was selected for water quality and flow sampling.

GC-3 – Existing County Water Quality Station

The County currently collects water quality samples and occasional flow measurements at this location. Surrounding vegetation consists primarily of freshwater species, however, the presence of leatherleaf fern may indicate tidal influence. The bankfull at this site appears stable, despite the relatively steep bank slopes. Both the left and right banks underneath the bridge are armored with rip-rap and concrete up to the top of the banks. There is potential for stream restoration at this site, depending on the width of access. This site was selected for additional flow sampling, preferably 15 ft downstream or upstream of the bridge, along with ongoing water quality sampling.

GC-4 – Braden River Park Downstream of Ballfields

This site is upstream of the confluence of Gap Creek and the Braden River and is tidally influenced. The left stream bank is vegetated with primarily exotic herbaceous and woody species and mown grasses on the right bank. This segment of Gap Creek flows along a County Park with what appears to be well-fertilized ball fields and green spaces. Flow from this segment of Gap Creek could potentially be diverted in conjunction with downstream GC-5 to provide additional water quality treatment. The upstream station at GC-3 may not be sufficient to capture nutrient trends and tidal influences on the system, so this site was selected for water quality and flow sampling.

GC-5 – Braden River Park Pond

Gap Creek flows behind a County detention pond located in the County Park. This site is a former municipal landfill and may be linked, via groundwater influence, to the nearby Gap Creek. Existing stormwater swales that capture runoff from the ballfields appear to drain to the pond. There is a concrete flume leading into the pond, and approximately six ft of a concrete apron on each side of the flume. Any existing groundwater data will need to be reviewed to determine if this site is a good candidate for groundwater and/or stormwater BMPs. The pond is surrounded by dense vegetation and is a prime candidate for habitat enhancement. This site was selected for water quality sampling.

5.2 Pearce Drain Sites

PD-1 – University Parkway

The Headwaters of Pearce Drain begins near University Parkway, in Sarasota County. This site is just downstream of the headwaters, on the Manatee County side of University Parkway. Water flows from the headwaters through a culvert at the site. There is a culvert discharging stormwater from the West, on the left bank. The left bank is characterized by mowed grasses and the right bank is characterized by trees and herbaceous vegetation. This site was selected for water quality and flow sampling.

PD-2 – Tallevast Road

This segment of the Pearce Drain flows between a residential subdivision and a landscaping operation. There is an existing conservation easement behind the residential area on the right bank. There is potential for stream restoration at this site, and possibly the option to link the two existing stormwater ponds to Pearce Drain. There is limited access to construction equipment at this site, although the existing easement could potentially be temporarily expanded. There is a large stormwater outfall downstream of this site, on the left bank. There is also a series of culverts upstream of this site that appears to direct water from a tailings pond on the other side of the left bank. Additional review of ERPs and watershed boundaries will help determine what projects are feasible at this site. This site was selected for water quality and flow sampling.

PD-3 – Whitfield Ave

Pearce Drain flows downstream from PD-2 underneath the Whitfield Avenue Bridge. The banks appear vegetated with grasses and a few trees on the right bank. There is a small livestock operation upstream of the bridge and several small nursery operations to the East of this site. This site was selected for water quality and flow sampling.

PD-4 – 63rd Avenue Reclaim Water Facility

Upstream of the 63rd Avenue East bridge, the right bank was steep and unmown with mixed exotic herbaceous vegetation and some trees near the dock area. The left bank was less steep with unmown herbaceous vegetation. A County reclaimed water facility is located along the right bank. Pearce drain continues to flow downstream underneath 63rd Avenue East. Downstream of the bridge, the left bank is heavily vegetated with trees, while the right bank is primarily unmowed grass. Parallel to the right bank, downstream of the bridge, an artificial grassy berm contains a tree-lined stormwater pond. This site was selected for water quality and flow sampling.

PD-5 – Upstream of Stormwater Conveyance

This site is the confluence of Gap Creek and the Pearce Drain, although the actual confluence could not be located due to heavy vegetation. There is also a confluence of Gap Creek and an unnamed tributary at this site, upstream of the Pearce Drain confluence. Both banks are heavily vegetated and overgrown, with a heavy tree presence on the left bank. The right bank is extremely steep, and the site is a candidate for Vegetated Reinforced Slope Stabilization (VRSS). A newly constructed stormwater pond lies parallel to the right bank and likely captures runoff from the

newly built residential area upstream of the site. There is potential to incorporate the existing swale into the stormwater pond at this site. This site was selected for water quality and flow sampling.

5.3 Tributary Sites

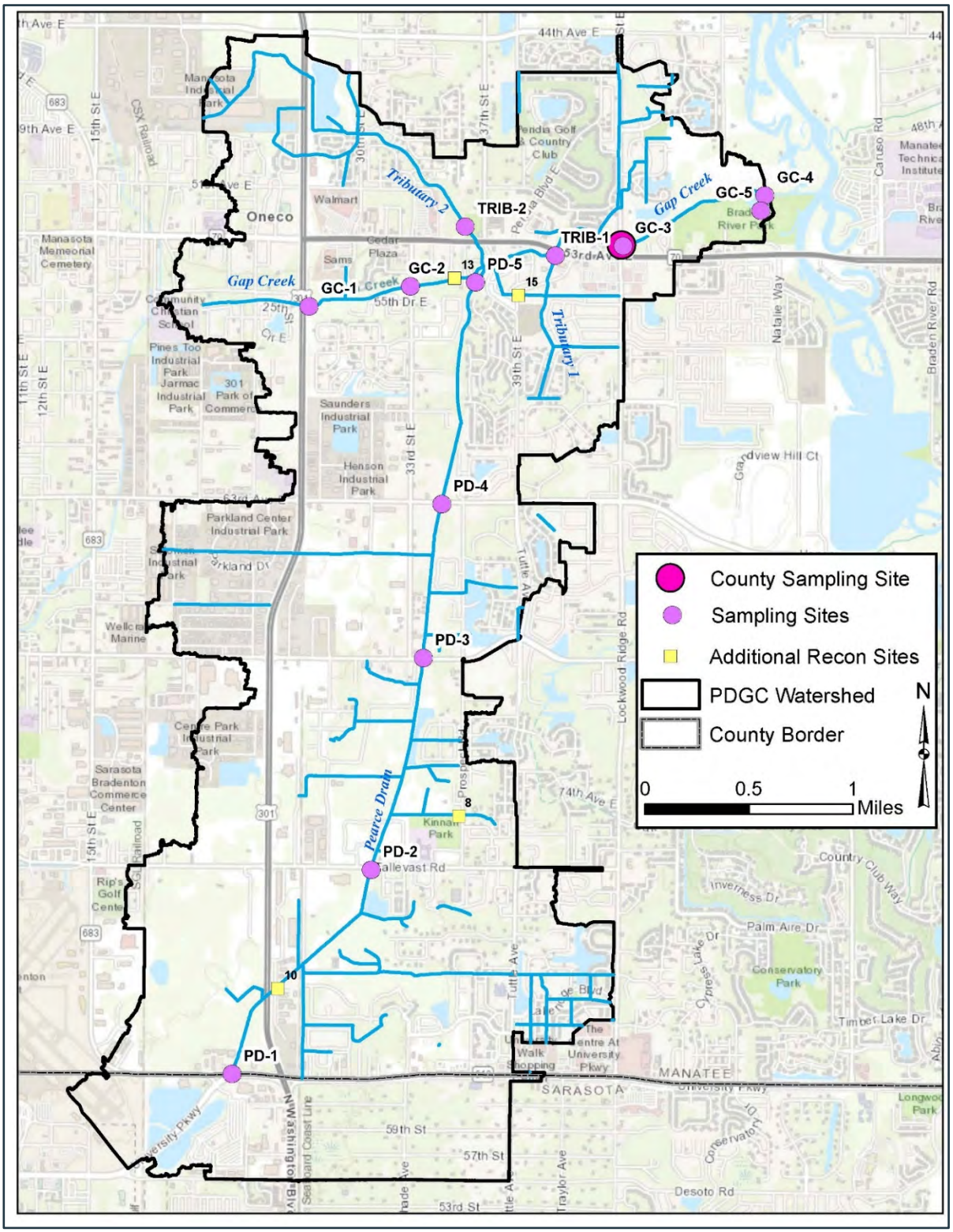
TRIB-1 – 53rd Ave East

This site represents the confluence between an unnamed tributary and Gap Creek. Looking upstream from 53rd Ave, the unnamed tributary flows from the South and intersects Gap Creek flowing to the East. Both banks of the tributary are somewhat steep with high herbaceous cover. There is a vegetated swale leading to a stormwater inlet, parallel to the right bank of the tributary, with a stormwater outfall on the right bank of the tributary, approximately 10 ft upstream of the confluence. The portion of Gap Creek upstream from the confluence is characterized by an open channel with herbaceous cover along both banks. This site was selected for water quality and flow sampling.

TRIB-2- John Marble Park

An unnamed tributary flow through John Marble Park and eventually intersects with Gap Creek, south of 53rd Avenue East. There is a conveyance at the site where water flows downstream. Both banks are heavily vegetated with herbaceous species, along with several trees. This site captures water quality upstream of Gap Creek and has been selected for water quality and flow sampling.

Figure 5.1
Map of Wood Field Reconnaissance and Sampling Sites



6.0 FOCUSED WATER QUALITY AND FLOW SAMPLING

6.1 Methodology for Water Quality and Flow Sampling

Water quality sampling was collected during the wet season and dry season conditions. According to the Manatee Water Atlas, June through September are the wettest months with average monthly rainfall ranging from 7.5 to 8.9 inches. November is one of the driest months, with a monthly average of 1.9 inches. Twelve preliminary water quality samples were collected during wet season conditions between September 7 and September 29, 2021, from twelve stations within the PDGC watershed (**Figure 5.1**). Twelve additional samples were collected during dry season (baseflow) conditions on November 16, 2021. Surface water samples were collected in accordance with DEP-SOP-001/01 FS 2100 and transported to a NELAC-certified analytical laboratory to be analyzed for aluminum, calcium, iron, lead, magnesium, potassium, sulfate, ammonia, TKN, nitrate + nitrite, orthophosphate, TP, Chl-a, *E. coli*, and color. In-situ surface water quality data measurements were taken to measure water temperature, DO, pH, specific conductance, salinity, and turbidity. In addition to water quality sampling, a Flowtracker2 handheld Acoustic Doppler Velocimeter was used to record real-time velocity and discharge from eleven station channels during the September sampling events, and from ten station channels during the November sampling event. Velocity measurements were not obtained at the detention pond, GC-5.

6.2 Results for Water Quality and Flow Sampling

Table 6.1 and **Table 6.2** provide summaries of in-situ water quality and discharge measurements taken at each station during the wet season events in September 2021.

Table 6.3
Summary of In-situ Station Water Quality Data, Dry Season

Station ID	Date	Turbidity (NTU)	Temperature (◦C)	Specific Conductance (µS/cm)	DO (%)	DO (mg/L)	pH
GC-1	11/17/2021	2.0	21.0	353	78.8	6.8	7.6
GC-2	11/16/2021	2.1	21.3	378	86.9	7.5	8.4
GC-3	11/16/2021	4.8	19.9	526	84.5	7.5	7.8
GC-4	11/16/2021	2.8	26.2	5026	86.7	6.7	8.0
GC-5	11/17/2021	3.4	19.8	148	51.1	4.5	7.8
PD-1	11/17/2021	2.6	20.5	686	83.5	7.3	8.4
PD-2	11/17/2021	2.4	20.6	687	90.7	7.9	8.5
PD-3	11/17/2021	2.3	20.5	568	83.2	7.3	8.4
PD-4	11/17/2021	2.0	19.5	576	87.2	7.8	7.9
PD-5	11/16/2021	2.7	16.8	547	91.8	8.7	8.3
TRIB-1	11/16/2021	1.1	18.8	543	95.6	8.7	7.6
TRIB-2	11/16/2021	3.7	17.5	326	93.7	8.7	7.3

Note: Sites shown in **Figure 5.1.**

Table 6. and **Table 6.4** provide summaries of in-situ water quality and discharge measurements taken at each station during the dry season events in November 2021. During the wet season sampling, water temperature ranged from 25.0 to 30.5 °C across Gap Creek sampling locations and pH was slightly acidic to alkaline. Dissolved oxygen values ranged from 5.1 to 7.2 mg/L suggesting aerobic conditions throughout the basin. Specific conductance was highest in the upper reaches of Pearce Drain (PD-1 and PD-2, 745 µS/cm) and lowest at the park pond (GC-5, 183 µS/cm). During the dry season sampling, water temperature ranged from 16.8 to 26.2°C across Gap Creek sampling locations and pH was slightly alkaline. Dissolved oxygen values ranged from 6.7 to 8.7 mg/L suggesting

predominantly aerobic conditions throughout the basin with the exception of a DO reading of 4.5 mg/L at GC-5. Specific conductance was highest in the upper reaches of Pearce Drain (PD-1 and PD-2, 686 and 687 µS/cm) and lowest at the park pond (GC-5, 148 µS/cm). The exception to this trend was at GC-4 where the highest specific conductance reading (5026 µS/cm) was obtained. Channel discharge measurements ranged from -0.10 to 18.58 cfs during the wet season event. The highest discharge was measured at station GC-4, which is the further downstream station in Gap Creek. A negative discharge was recorded at station PD-1. The client has indicated that, depending on water levels, staff have observed the flow direction change at PD-1. According to the Watershed Management Plan for PDGC (CDM Smith 2020), at high water levels, water in the stormwater lakes south of the PD-1 typically drain to Pearce Drain but when stages get too high, they can also discharge to the southwest over a weir and ultimately to Sarasota Bay. Channel discharge measurements ranged from -0.09 to 2.17 cfs during the dry season event in November 2021. All stations recorded lower flows during this event. A negative discharge was again recorded at station PD-1. The highest flows in the basin were measured at PD-4 and PD-5.

Table 6.1
Summary of In-situ Station Water Quality Data, Wet Season

Station ID	Date	Turbidity (NTU)	Temperature (◦C)	Specific Conductance (µS/cm)	DO (%)	DO (mg/L)	pH
GC-1	9/7/2021	4.2	30.5	419	84.3	6.1	6.1
GC-2	9/7/2021	1.8	30.5	424	70.0	5.1	6.5
GC-3	9/29/2021	2.6	26.2	604	87.2	6.8	8.8
GC-4	9/29/2021	3.8	27.4	612	85.9	6.6	8.7
GC-5	9/29/2021	2.6	25.0	183	63.6	5.1	8.0
PD-1	9/29/2021	4.0	26.9	745	88.0	6.8	8.7
PD-2	9/29/2021	2.7	26.9	745	87.1	6.8	8.8
PD-3	9/29/2021	2.4	26.8	601	77.1	6.0	8.8
PD-4	9/7/2021	3.5	31.0	496	94.0	6.8	6.2
PD-5	9/29/2021	2.1	30.0	578	87.1	6.4	8.8
TRIB-1	9/7/2021	1.6	27.2	536	93.2	7.2	6.6
TRIB-2	9/7/2021	3.3	27.6	311	87.7	6.7	6.1

Note: Sites shown in **Figure 5.1**.

Table 6.2
Summary of Station Discharge Measurements, Wet Season

Station ID	Date	Width (ft)	Mean Depth (ft)	Area (ft^2)	Average Velocity (ft/s)	Discharge (cfs)
GC-1	9/7/2021	9.0	0.72	6.8	0.13	1.03
GC-2	9/7/2021	16.0	1.03	17.5	0.04	0.99
GC-3	9/29/2021	33.0	1.98	67.2	0.17	12.03
GC-4	9/29/2021	54.0	2.66	149.1	0.10	18.58
PD-1	9/29/2021	13.0	0.64	8.3	-0.01	-0.10
PD-2	9/29/2021	20.0	0.93	19.5	0.04	1.07
PD-3	9/29/2021	20.0	1.11	23.3	0.07	2.04
PD-4	9/7/2021	15.0	0.88	14.1	0.43	7.27
PD-5	9/29/2021	11.0	1.35	16.3	0.17	3.89
TRIB-1	9/7/2021	4.0	0.31	1.4	0.50	0.90
TRIB-2	9/7/2021	11.0	0.44	4.6	0.35	2.08

Note: Sites shown in **Figure 5.1**.

Table 6.3
Summary of In-situ Station Water Quality Data, Dry Season

Station ID	Date	Turbidity (NTU)	Temperature (◦C)	Specific Conductance (µS/cm)	DO (%)	DO (mg/L)	pH
GC-1	11/17/2021	2.0	21.0	353	78.8	6.8	7.6
GC-2	11/16/2021	2.1	21.3	378	86.9	7.5	8.4
GC-3	11/16/2021	4.8	19.9	526	84.5	7.5	7.8
GC-4	11/16/2021	2.8	26.2	5026	86.7	6.7	8.0
GC-5	11/17/2021	3.4	19.8	148	51.1	4.5	7.8
PD-1	11/17/2021	2.6	20.5	686	83.5	7.3	8.4
PD-2	11/17/2021	2.4	20.6	687	90.7	7.9	8.5
PD-3	11/17/2021	2.3	20.5	568	83.2	7.3	8.4
PD-4	11/17/2021	2.0	19.5	576	87.2	7.8	7.9
PD-5	11/16/2021	2.7	16.8	547	91.8	8.7	8.3
TRIB-1	11/16/2021	1.1	18.8	543	95.6	8.7	7.6
TRIB-2	11/16/2021	3.7	17.5	326	93.7	8.7	7.3

Note: Sites shown in **Figure 5.1**.

Table 6.4
Summary of Station Discharge Measurements, Dry Season

Station ID	Date	Width (ft)	Mean Depth (ft)	Area (ft^2)	Average Velocity (ft/s)	Discharge (cfs)
GC-1	11/16/2021	9.0	0.92	9.2	0.01	0.13
GC-2	11/16/2021	14.0	0.87	13.0	0.01	0.20
GC-3	11/16/2021	33.0	2.17	73.7	0.02	1.19
PD-1	11/16/2021	16.0	0.44	7.5	-0.01	-0.09
PD-2	11/16/2021	19.0	0.62	12.4	0.04	0.56
PD-3	11/16/2021	17.5	0.39	7.1	0.14	1.27
PD-4	11/16/2021	13.5	0.67	9.6	0.19	2.12
PD-5	11/16/2021	13.0	1.26	17.7	0.09	2.17
TRIB-1	11/16/2021	5.0	0.11	0.7	0.26	0.33
TRIB-2	11/16/2021	9.0	0.16	1.6	0.11	0.25

Note: Sites shown in **Figure 5.1**. GC-4 flow was not obtained during the Dry Season sampling event.

Analytical results provided by a NELAC-certified laboratory and from the County's NELAC-certified laboratory from samples collected during the sampling events are provided in **Appendix D** and **Appendix E**, respectively. Nutrient concentration gradient maps for the dry and wet season can be found in **Appendix F**. Wet season TP ranged from 0.129 to 0.395 mg/L while dry season ranged from 0.101 to 0.394 mg/L. Wet season TN ranged from 0.671 to 1.555 mg/L while dry season TN ranged from 0.548 to 1.434 mg/L. None of these values exceeded NNC criteria. Wet season TP appeared to be highest at stations GC-2 and PD-3. TN concentrations were highest at PD-5 and GC-1. Dry season TP and TN concentrations were highest at station GC-3 and GC-1. TRIB-1 also had a high TN concentration. Wet season nutrient loadings at each station were higher than the station's corresponding dry season load. GC-3 and GC-4 had the highest TN and TP wet season loads while PD-4 and PD-5 had the highest TN and TP loads during the dry season. High nutrient concentrations and loads generated during seasonal sampling correspond well to the existing annual nutrient load hot spot maps found in **Appendix B.**

Gap Creek is subject to the two freshwater criteria for *E. coli*. The first criterion requires individual *E. coli* counts to be less than or equal to 410 per 100 mL in 10% of samples. The second criterion is a monthly geometric mean of 126 counts per 100 mL (not to exceed ten samples over 30 days). Because of the limited dataset, Wood could not apply these criteria to the dry and wet season data. However, *E. coli* counts during the wet season ranged from 41 to 980 per 100 mL and during the dry season ranged from 19 to 2419 per 100 mL. *E. coli* counts exceeded 410 per 100 mL during the wet and dry season at TRIB-1, TRIB-2, and GC-3. *E. coli* counts also exceeded this threshold during the dry season at PD-2.

The data were presented geospatially as part of **Task 3** (**Appendix F**) and were used in conjunction with pollutant load model hot spot maps to identify and prioritize potential BMPs and restoration projects within the watershed. The projects, discussed in the next section, were conceived to reduce nutrient loading and potentially provide additional benefits such as flood relief and/or recreation.

7.0 BMP ASSESSMENT AND CONCEPTUAL DESIGNS

The results of existing water quality data analyses, pollutant load modeling, stream reconnaissance and focused sampling events (in the wet and dry seasons) of tributary sites in the watershed were reviewed and synthesized to prioritize segments of Pearce Drain and Gap Creek that could benefit from water quality improvement projects. Watershed information such as land use, public parcels, and right-of-way (ROW) areas was also reviewed to select areas within the PDGC watershed that could reasonably support water quality BMP projects. Where possible, results from the hydrologic and hydraulic (H&H) modeling phase of the WMP (performed under a separate project by another contractor) were considered to avoid redundant project recommendations and to identify areas where water quality BMPs could potentially also be used to address stormwater quantity concerns.

A variety of potential water quality project options were presented to the County and District on 2/8/2022 (**Appendix G),** and after review and discussion, three options were selected for the development of conceptual designs and preliminary load reduction and cost estimates. The following sections discuss the preliminary conceptual designs, load reduction estimates, and cost estimates for the options chosen during the meeting. While only three conceptual designs are presented in detail (**Appendix H**), a summary of the other options that were not selected, along with guidelines for implementing low impact development (LID) throughout the watershed is also provided for potential future reference.

7.1 Braden River Park (GC-4)

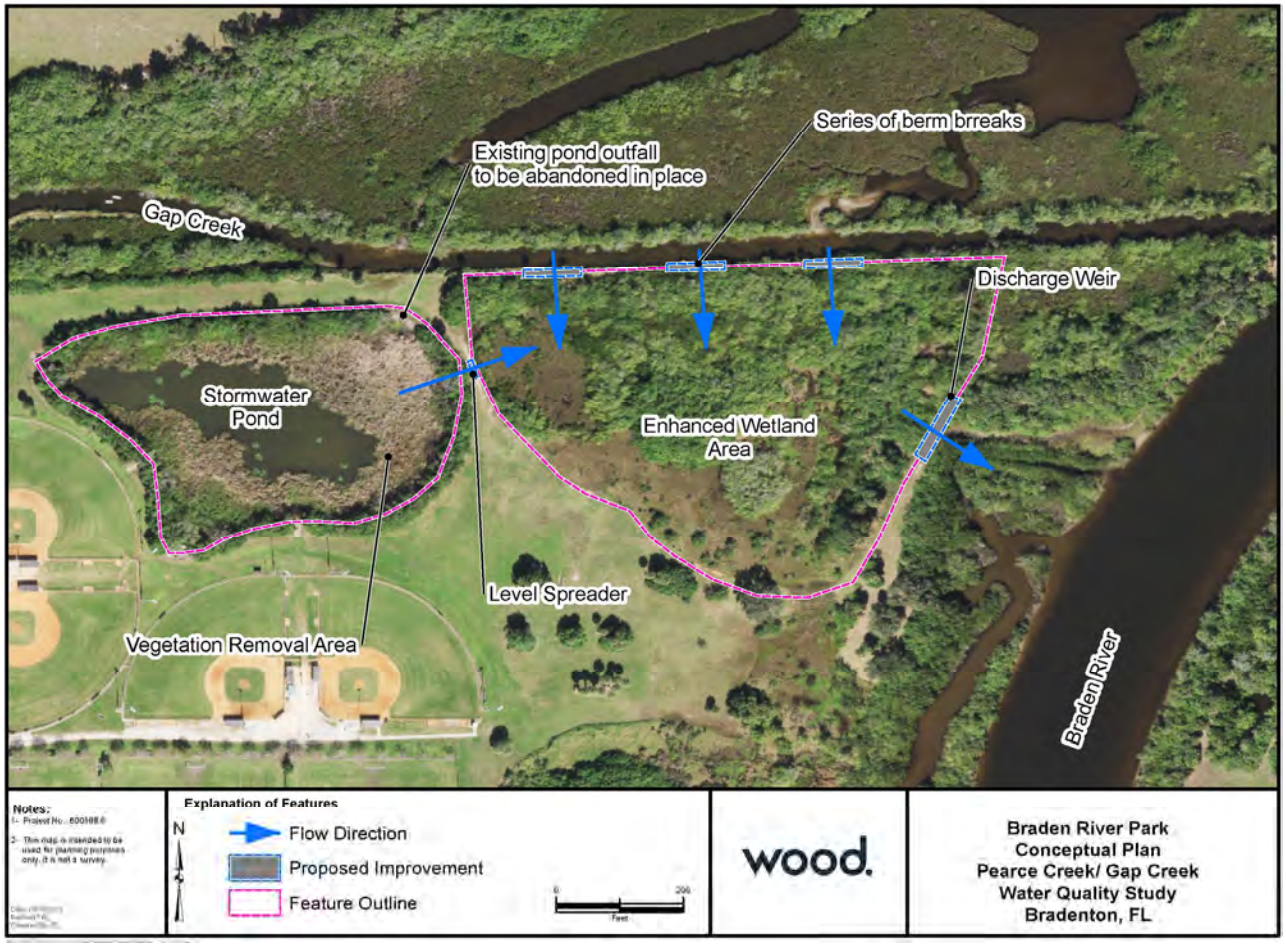
7.1.1 Conceptual Design

Gap Creek continues as a meandering path behind Braden River Park, located on Natalie Way and 51st Street East in Bradenton, Florida. This park includes an impervious parking lot and various sports fields. Braden River Park is

located at a former municipal landfill site and has restricted groundwater infiltration. In the northeast corner of the property, there is an existing stormwater pond and a wetland. The stormwater pond receives approximately 40 acres of urbanized runoff. The surface runoff is received by the pond through a series of bio-swales and concrete flumes. The stormwater pond is designed to be a wet detention area that is lined to prevent the surface water from seeping into the groundwater and interacting with the contamination from the former municipal landfill material and soil. Adjacent to the landfill is a wetland that is directly connected to the Braden River but not to the stormwater pond. This wetland has not been delineated but using our professional judgment it is approximately 9 acres. The project will provide additional treatment to the water discharging from the stormwater pond and rehydrate the wetland with a combination of water from Gap Creek and stormwater pond discharge. The overall conceptual plan is provided in **Figure 7.1.**

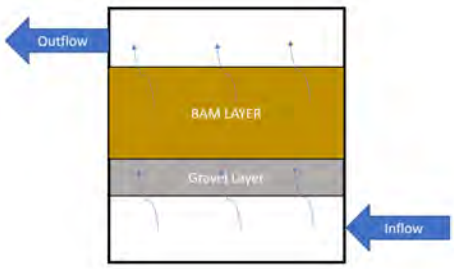
Figure 7.1

Conceptual Plan for Braden River Park Enhancement



To maximize the load reduction and rehydrate the existing wetland it is recommended that an Up-flow filter with a Bio-sorption Activated Media (BAM) layer be constructed and discharged through a spreader swale to the existing wetland. An Up-flow filter is a technology that is a low-cost, low-maintenance filtration system for stormwater treatment. Stormwater filters with a BAM in an Up-flow structure have the potential to eliminate many of the disadvantages associated with conventional downflow stormwater filters. The Up-flow filter does not require any pumps or additional power to function. A simple Up-flow filter is shown below in **Figure 7.2**.

Figure 7.2
General Up-flow Filter Example



The discharge of the Up-flow filter will be a level spreader. The purpose of level spreaders is to disperse concentrated runoff uniformly over a wide surface as sheet flow. Level spreaders are constructed at a zero percent grade across a slope consisting of a permanent concrete or vegetated area used to disperse or spread concentrated flow thinly. The main purpose is to spread potentially erosive concentrated flow over a wide area so that erosion does not occur at the outlet. The final design for the Up-flow filter and overland weir will determine the hydraulics of the system.

To maximize the performance of the Up-flow filter in the existing stormwater pond it is also recommended that vegetation be removed from the pond and replaced with Florida-friendly vegetation as well as vegetation proven to facilitate uptake of nutrients. Nutrients are taken up by roots mainly as inorganic ions from soils. The rate of uptake depends primarily on the concentration in the soil immediately adjacent to the root. The rate of nutrient uptake is independent of the rate of water uptake, but the concentrations of nutrients at root surfaces depend strongly on soil water content. Soil water content is important because it affects root growth and nutrient transport to the root surface in both the water flux and the diffusive flux towards or away from the roots.

The second part of the conceptual design will be to rehydrate the wetland that is located adjacent to the stormwater pond with water from Gap Creek and the stormwater pond. The full potential of the wetland will require an additional environmental investigation to determine the extent of invasive species and any removal required. Three categories cover most invasive plant removal: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. It is also possible to suffocate some type of invasive species through the means of rehydrating the wetland. Rehydrating the wetland with water from Gap Creek will require several berm breaks to be constructed on the northside of the wetland, south bank of Gap Creek. Constructing berm breaks rather than removing a large portion of the bank will save on the construction cost while still rehydrating the entire wetland. To ensure that the redirecting of flow from Gap Creek does not cause flooding concerns on the remainder of the County Property it is recommended that a weir is constructed to allow water to discharge out of the wetland at a specified elevation. Treatment wetlands are ecosystems dominated by aquatic plants that use natural processes to remove pollutants**.**

The proposed design also allows for the addition of a boardwalk within the wetland as well as educational kiosks identifying native plants, highlighting the role of wetlands for improved water quality and flood storage, and/or discussing the hydrologic connectivity of Gap Creek with the Manatee River watershed. In addition, a kayak launch into Braden River can be extended from the boardwalk.

7.1.2 Estimated Load Reductions

To calculate the estimated load reduction, the University of Central Florida's (UCF) Best Management Practices used for Treatment and calculations for Removal on an Annual basis Involving Nutrients in Stormwater (BMPTrains) model was utilized. BMPTrains is widely accepted by SWFWMD and FDEP for design, analysis, and review for ERP permits

and the BMAP and TMDL program estimates (**Appendix I**). The wet detention pond, assuming a 14-day residency time was calculated to have a removal efficiency of 33% of TN and 67% of TP. It should be noted that the permanent pool depth of the pond is approximately 1.5 deep based on the Environmental Resource Permit (ERP). As-built plans show a pond bottom of 2 ft and control orifice elevation of 3.5 ft; the permanent pool depth is below the minimum requirement of 6 ft (FDEP, 2010). The As-built plans also indicate the presence of a littoral shelf, which gets a 10% removal credit (FDEP, 2010). The wet detention pond and littoral shelf were modeled in BMPTrains. The BMPTrains has an Up-flow filter as one of the thirteen pre-determined technologies and when using the ECT3 BAM media, a common media used, it has a removal efficiency of 25% of both TN and TP. A wetland water treatment system has been found to lower concentrations and mass loads of biochemical oxygen demand (BOD), total suspended solids (TSS), and TN concentrations to 10 to 30 percent of the inflow concentrations. Removal of pollutants in treatment wetlands is limited by the form and inflow concentration of the constituents, water flow rates, and substrate type. Since our plans are conceptual, we treated the wetlands as a littoral zone. In many ways a wetland and littoral zone function the same with low water levels and extended residence time. A littoral zone commonly has a removal efficiency of 10% of TP and TN.

Bradenton, Florida is in Florida Meteorological Zone 4, and according to the SWFWMD, Manatee County has a mean annual rainfall of 53.44 inches. The ERP states that the catchment size is 30 acres, and the existing wet detention pond provides 2.50 acre-ft of treatment volume; this corresponds to 1-inch of runoff (SWFWMD, 1996). Since the area that shall be used for the enhanced wetland treatment is downstream of the 30-acre catchment and is already a pre-existing wetland, it is not assigned any nutrient generation. The BMPTrains model was set to run a treatment train consisting of the existing wet detention pond with littoral shelf, a proposed upflow BAM filter, and then routed through a rehabilitated/enhanced wetland. The treatment wetland is represented as a "User Defined" treatment, this is because a treatment wetland is not one of the pre-determined BMP technologies available.

According to the BMPTrains model, the existing condition of the wet detention pond with littoral shelf provides TN and TP removals of 40% and 63%, respectively, resulting in a yearly removal of approximately 26 pounds of TN and 2 pounds TP. The proposed system would provide TN and TP removal efficiencies of 51.6% and 69.8%, respectively, resulting in a yearly removal of approximately 33.5 pounds of TN and 2.2 pounds TP (**Table 7.1**). Wet detention ponds are required to discharge one half of the bleed down volume (runoff treatment volume) in 24 to 30 hours (FDEP, 2010). This translates into an ECT3 filter with a surface area of 283 ft^2 and a depth of 2 ft, for a total volume of 565.7 cubic feet (ft^3). Based on orthophosphate sorption capacity of ECT3 media, the filter should have a life span of 21 years.

Table 7.1

Braden River Park Enhancement Estimated Load Reduction

Component	Annual TN Removed (lbs/yr)	Annual TP Removed (lbs/yr)
BMPTrains: Existing treatment +BAM Filter +Wetland Enhancement	33.5	2.2
Total Over 20 Year Lifespan	**669.3**	**43.2**

7.1.3 Estimated Costs

The following cost estimates are based on the proposed BMP retrofits for Braden River Park above. **Table 7.2** includes the conceptual level cost estimate to fully implement the project, and includes engineering, permitting, survey, and construction. Water quality improvement projects focused on the removal of nutrients such as nitrogen

and phosphorus have been analysed for cost-effectiveness throughout the years to help government agencies allocate funds appropriately.

Table 7.2

Braden River Park Enhancement Estimated Construction Costs

Construction Component	Cost for Project
Mobilization/Demobilization	$ 111,000
Soil Tracking Prevention Device	$ 3,000
Clearing and Grubbing	$ 13,500
Regular Excavation	$ 40,000
Drop Structure/Up-flow Filter Retrofit	$ 40,000
BAM Replacement	$ 35,000
Overland Weir Rip-Rap	$15,000
Restoration Plantings and Seeding	$ 600,000
Construction Layout and As-built	$ 10,000
TOTAL (with 35% contingency)	**$ 1,171,125**

The line-item costs provided above are based off estimated quantities. Costs were obtained from the most recent 6 month and 12-month FDOT historical statewide moving averages (FDOT 2022) and from the material supplier Ferguson (https://acfenvironmental.com/).

7.2 Kinnan Park (ManCty-03)

7.2.1 Conceptual Design

Kinnan Park is located along the north and east side of Kinnan Elementary School (3415 Tallevast Rd, Sarasota, FL 34243). Pearce Drain Canal is approximately 500 ft to the west of the parcel boundary. Kinnan Park is currently an undeveloped parcel owned by Manatee County, however the County plans to develop the parcel for recreational purposes. The General Development Plans, provided by the County, for Kinnan Park show that all proposed facilities are located in the Eastern portion of the parcel, other than a walking trail loop in the Northwest portion (**Figure 7.3-A**). Manatee County has expressed interest in utilizing the Northwest region of the park for a water quality improvement and flood mitigation project. For this conceptual design, the seasonal high groundwater table (SHGWT) was assumed to be equal to the water surface elevation in the digital elevation map (derived from Lidar) of the ditch on the north side of the property, which based on review of the Lidar data is approximately 9.5 ft.

Figure 7.3-A
General Development Plan for Kinnan Park

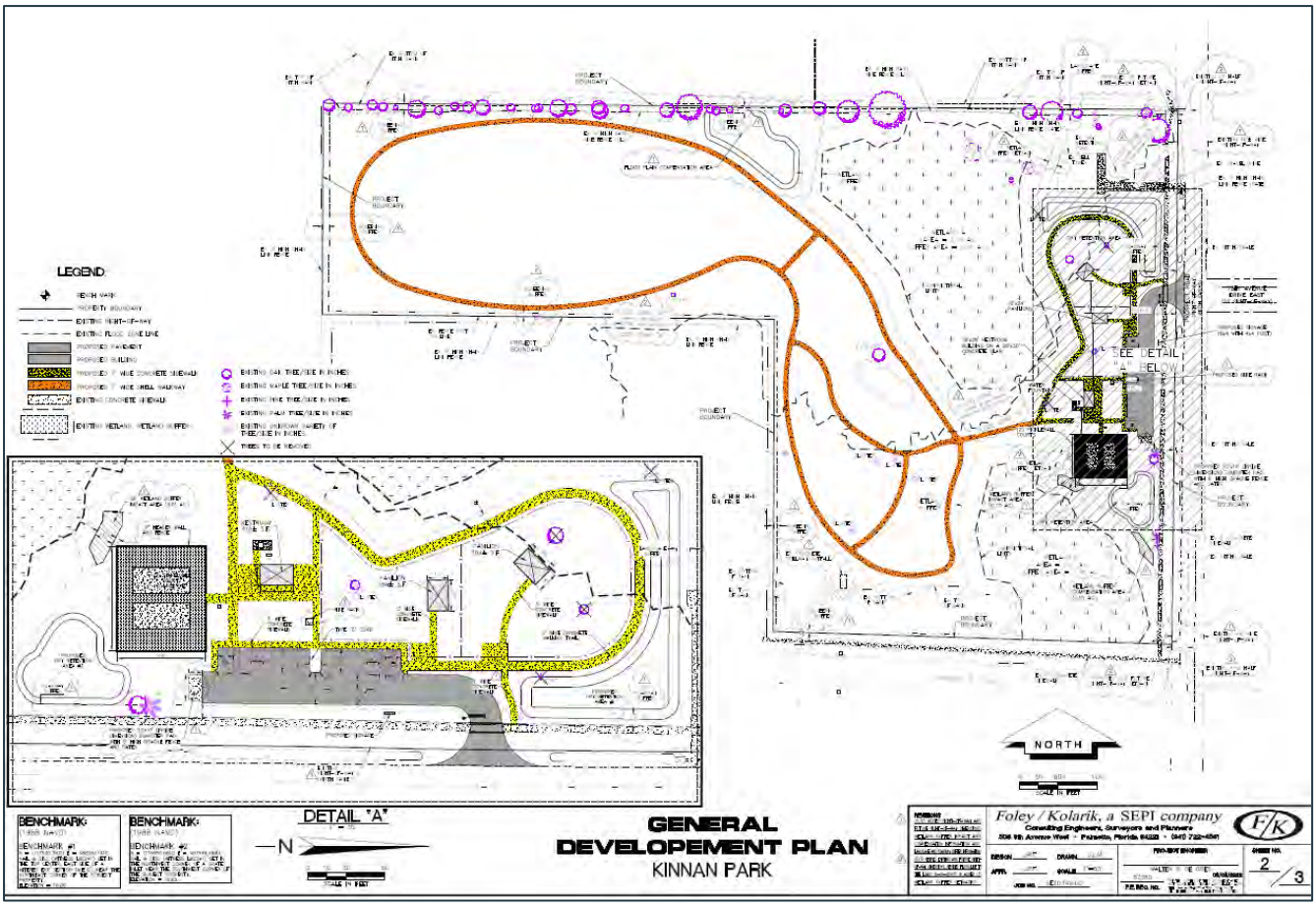
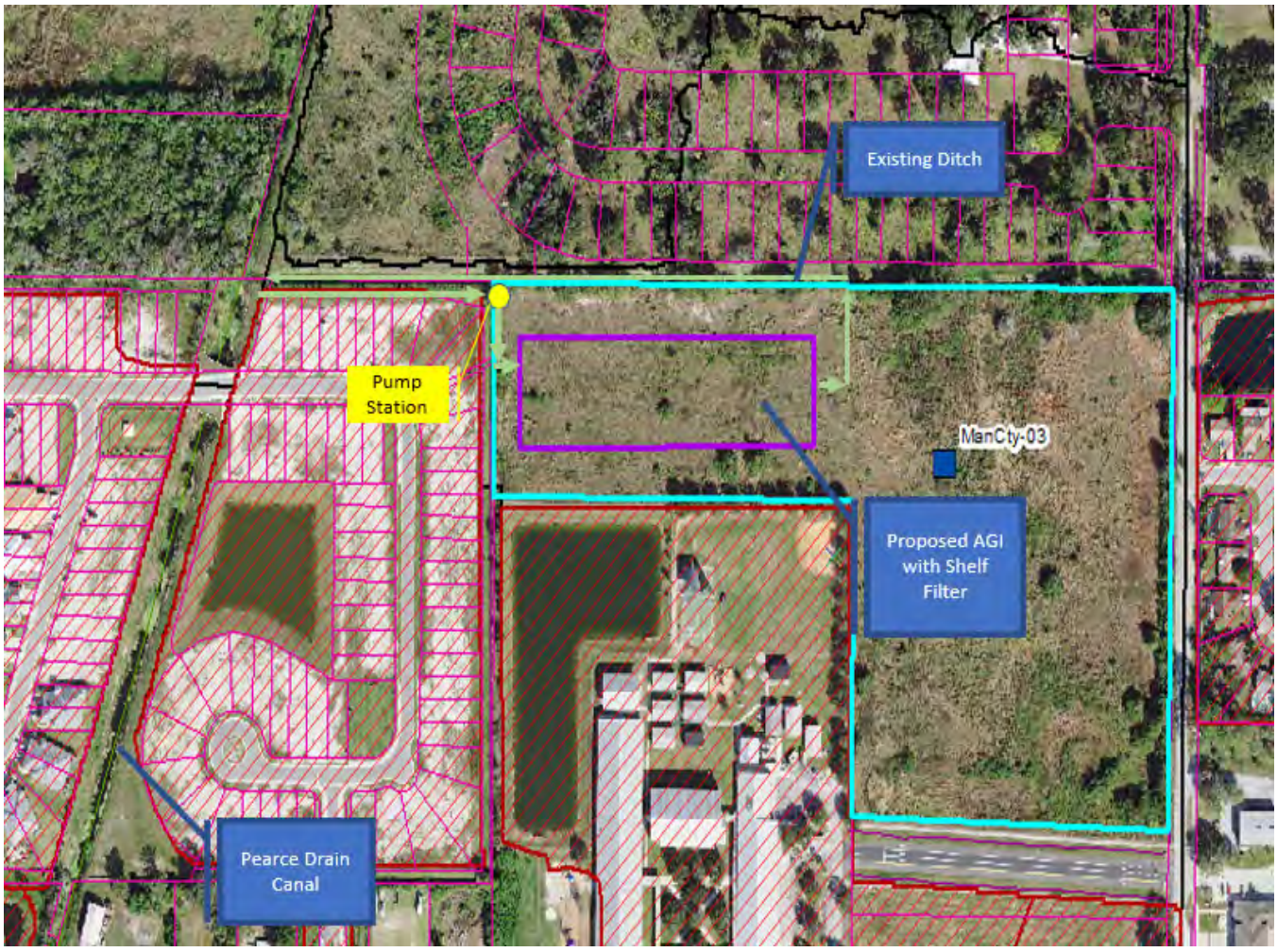


Figure 7.3-B

General Location of Proposed System at Kinnan Park



The water quality sampling site immediately upstream of the project area (PD-2) had elevated TN and TP concentrations, see **Table 7.3 and Appendix F**. Furthermore, the Pearce Drain Canal is known to have flooding issues, particularly the Centre Lake Subdivision, which is located approximately 1 mile downstream. To address both the water quality and flood mitigation concerns, a structural best management practice (BMP) is proposed that includes an above ground impoundment (AGI) and a biosorption activated media filter shelf. A pump station will move water from Pearce Drain Canal into the BMP. The BMP will have two different operating conditions, one for water quality and one for flood mitigation. The proposed AGI uses berms to enable additional water storage above the existing grade, thus, providing additional flood mitigation storage. The general location of the proposed system is outlined by the purple box in **Figure 7.3-B** but would, to the extent practical, be designed to match the walking trail loop shown in the **Figure 7.3-A.**

Table 7.3

Water Quality Upstream of Kinnan Park

Rainfall Season	Measure Seasonal Flow Rate (cfm)	Seasonal TN (mg/L)	Seasonal TP (mg/L)
Wet Season	3.06	1.352	0.357
Dry Season	1.67	0.892	0.348

Under water quality operating conditions, the system will function as a treatment train of wet detention followed by a downflow BAM filter using Iron-filings Based Green Environmental media (IFGEM) (FDEP, 2020; Wanielista, 2020). A process flow diagram of the treatment train is shown in **Figure 7.4-A.**

A profile view of the system is shown in **Figure 7.4-B.** Appropriate berm heights, berm slopes, free board, water levels, and increased storage in the system for flood and water quality operations will need to be modeled/calculated, which should consider wet season and dry season baseflows that will be routed through the system. A geotechnical analysis during final design will be required to complete design of the berms.

The required water quality flow rate can be achieved using a single electric pump. The flood mitigation flow rate could be achieved using two electric pumps operating in parallel, each with a flow rate of approximately 2 MGD. The flood mitigation pumping rate of 2 MGD will enable the flood mitigation storage volume of the AGI to be filled within 48 hours. Not included in the cost estimate is a portable electric generator that could be used to power the flood mitigation pumps if electrical service is interrupted for an extended period. To offset costs, on-grid solar panels could be installed inside the AGI or on top of the berm. The monetary cost analysis for installing solar panels and the electrical revenue they produce is not considered in the cost estimate.

As shown in **Figure 7.3-A**, the pre-existing General Development Plan for Kinnan Park includes walking paths in the vicinity of the proposed AGI filtration system. The top of the berms around the AGI are proposed to be 12 feet wide to allow sufficient width for service vehicle access and could accommodate recreational paths for walking and bicycling. This design is similar to other treatment related eco-parks, such as the Orlando Wetlands Park, SFWMD's STA-1W, and Pinellas County's proposed McKay Creek treatment at Walsingham Equestrian Park (City of Orlando, 2022; SFWMD, 2022; Pinellas County Public Works, 2020).

Figure 7.4-A
Process Flow Diagram for Conceptual BMP Kinnan Park

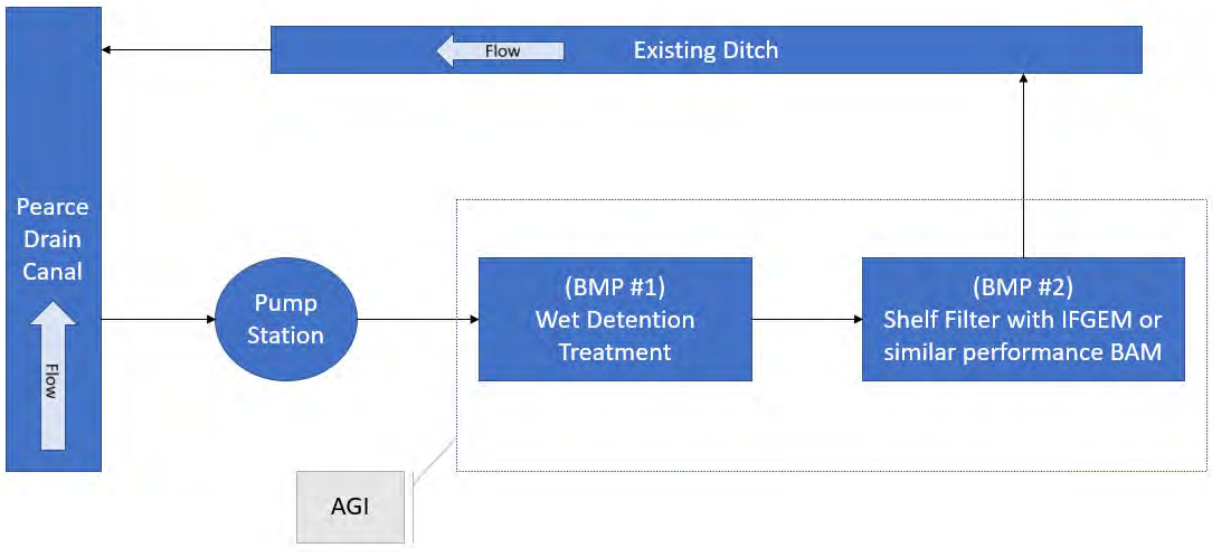
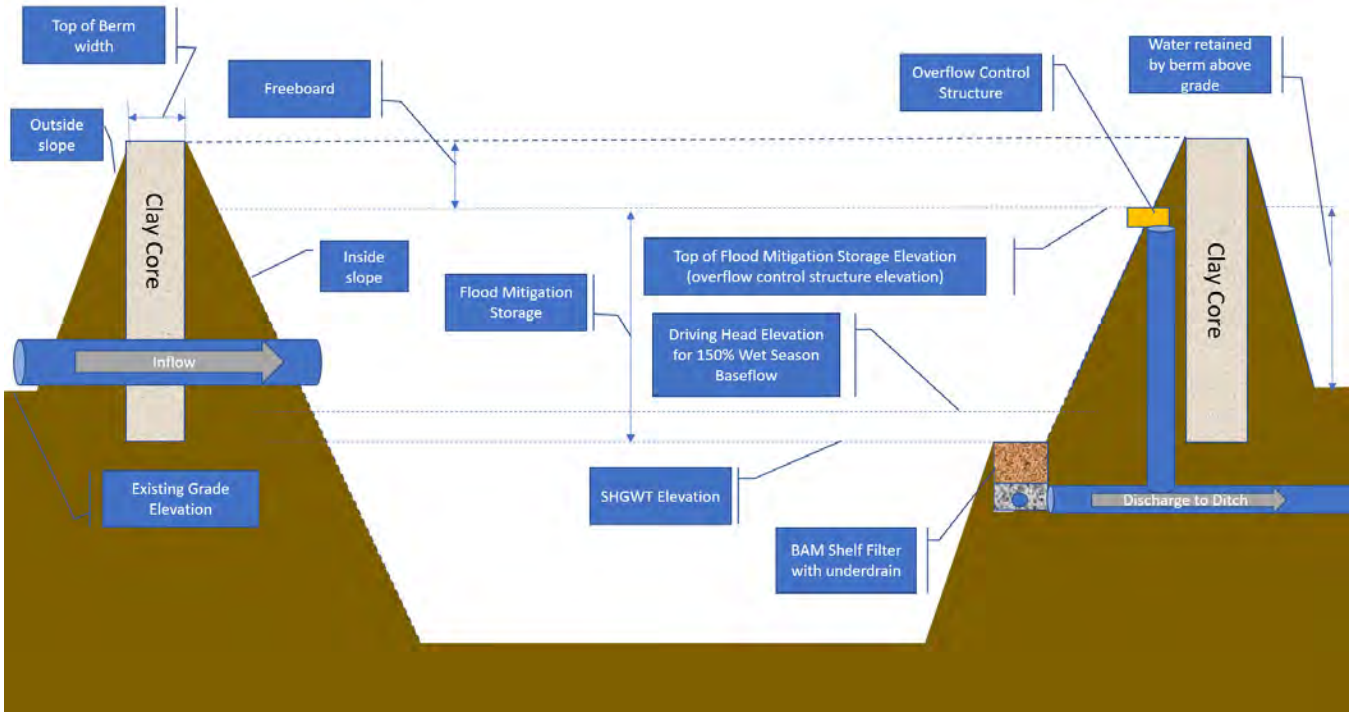


Figure 7.4-B
Profile Plan for Conceptual BMP Kinnan Park



***Not to scale.**

7.2.2 Estimated Load Reductions

The 1st BMP in the series is a wet detention pond. Total phosphorus and total nitrogen removal efficiencies for wet detention ponds were based on the equations provide by the FDEP (FDEP, 2020). The 2nd BMP in series is a BAM shelf filter using IFGEM as the selected filtration media. The removal efficiencies and ortho-phosphate sorption capacity specifications for IFGEM can be found in the BMP Trains Manual (Wanielista, 2020).

The BAM shelf filter is sized to treat approximately 150% of the wet season base flow of 3 cfm. The nutrient reductions shown in **Table 7.4** are based on a 6-month wet season with a flow rate of approximately 3 cfm and a 6-month dry season flow rate of approximately 1.7 cfm.

Additional nutrient removal per year is possible due to the 150% wet season base flow capacity of the BAM shelf filter and the ability to attenuate large amounts of water in the AGI. During storm events, the flow rate in the Pearce Drain Canal will increase. During these storm periods, the water quality pumping flow rate could be increased, thus providing additional nutrient treatment. This additional storm related nutrient treatment is not accounted for in **Table 7.4**. Additional flow modeling of Pearce Drain Canal would be required to account for storm related nutrient removal.

Table 7.4

Kinnan Park Enhancement Estimated Load Reductions

Component	Annual TN Removed (lbs/yr)	Annual TP Removed (lbs/yr)
BMP 1: Wet Detention	39	21
BMP 2: BAM Filter	43	6
Total per year	82	27
Total Over 20 Year Lifespan	**1633**	**543**
Overall Removal Efficiency of Treatment Train	**88%**	**99%**

7.2.3 Estimated Costs

The following cost estimates are based on proposed BMP retrofits for Kinnan Park. Table 7.5 shows the conceptual level cost estimate to complete the project, which includes Construction Costs. A 20-year lifespan is assumed for the system. The water quality pump is assumed to have a life span of five years. Costs were obtained from the most recent 6 month and 12-month FDOT historical statewide moving averages (FDOT 2022) and from the following material suppliers: Ferguson (https://acfenvironmental.com), Absolute Water Pumps), (www.abolutewaterpumps.com), and MWI Pumps (https://mwipumps.com). The estimate for adding the clay core to the berm was calculated using a 2016 unit quote and applying the CPI Inflation Calculator to adjust to 2022 costs.

The electricity required to operate the flood mitigation pumps is not included in this cost estimate. The flood mitigation pumps likely will only need to be run during unusually large rain events. Thus, the flood mitigation pumps will be run infrequently, and the cost associated with this electricity demand should be minimal. Due to the infrequent use, it is assumed that the lifespan of the flood mitigation pumps is 20 years, the same as the lifespan of the entire system.

The BAM will reach saturation of the ortho-phosphate sorption capacity at approximately 20 years at the projected flows and concentrations (Wanielista, 2020). Thus, no filtration media change is projected during the 20-year service life.

It is assumed that fill for the berms will come from the cut for the below grade portion of AGI and from elsewhere on the overall Kinnan Park project site; thus, off-site borrow is assumed to not be needed. Survey and geotechnical analyses would be needed to determine if a clay core is needed in the berm to prevent failure due to seepage; in this conceptual design a clay core has been included.

Table 7.5

Kinnan Park Enhancement Estimated Construction Costs

Construction Component	Cost for Project
	$ 127,870
Pump Station (Flood Mitigation & Water Quality)	$ 105,940
BAM (item, delivery, & install)	$ 25,121
Earthwork	$228,956
Clay Core (material, haul, placement/compaction)	$79,860
Discharge Structures (Filter Underdrain & Overflow Control)	$ 16,252
Sod	$ 31,371
Silt Fence (assume 75% of berm length)	$ 8,436
Mobilization and Demobilization	$ 62,381
Construction Surveys	$ 9,357
TOTAL (with 35% contingency)	**$ 938,984**

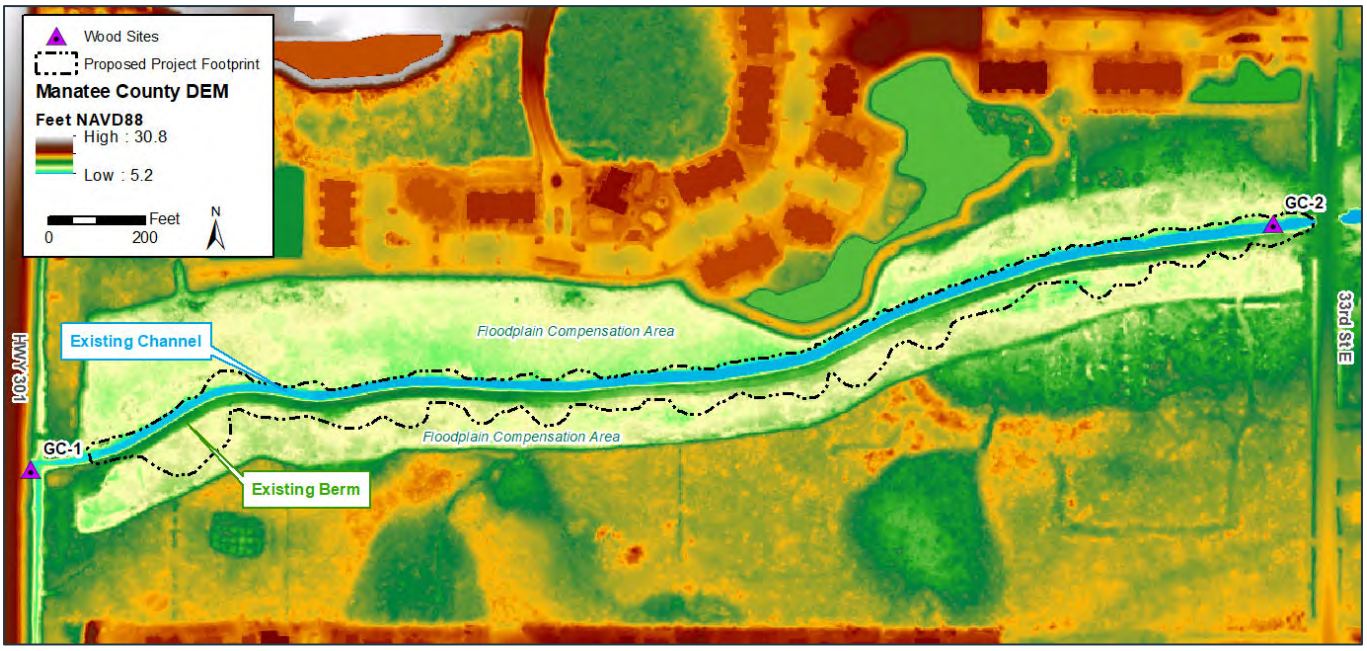
7.3 County Easement - Collins Dairy Drain (ManCty-02)

7.3.1 Conceptual Design

The ditched headwater reach of Gap Creek between U.S. 301 (GC-1) and 33rd Street East (GC-2) lies along the boundary of two private parcels (Venue at Lockwood Apartments to the north and BMG Park 30 Land Trust to the south), but within a Manatee County Conservation Easement area. In several sets of development plans, this reach of Gap Creek is referred to as Collins Dairy Drain. The Collins Dairy Drain channel is approximately 19 ft wide, has a drainage area of approximately 0.8 square miles, and runs approximately 0.5 miles through the project area from U.S. 301 to 33rd Street East.

The existing wetlands on either side of the channel appear to have been constructed or regraded as floodplain compensation areas for surrounding residential developments. The constructed berm along the southern bank (right bank) of the creek is approximately 3 ft above the wetland elevation and appears to limit the creek's access to its southern floodplain (**Figure 7.5**). In its existing condition, the southern wetland area appears to be in relatively poor condition with primarily exotic herbaceous vegetation and trees such as Brazilian pepper (*Schinus terebinthifolia*), paper bark tree (*Melaleuca quinquenervia*), and Australian Pine (*Casuarina equisetifolia*). The left bank of the creek bordering the northern wetland area also appears to be dominated by similar exotic vegetation.

Figure 7.5
Existing Channel, Berm, and Wetlands in Collins Dairy Drain Restoration Project Area



The Collins Dairy Drain project area includes several of the "hot spot" subbasins with high TN and TP loads (shown in **Appendix B**), and the sampling sites immediately upstream and downstream of the project area showed some of the highest TN and TP concentrations (**Appendix F**). The high nutrient loads, potential future increase in impervious drainage area, relatively poor condition of riparian buffer, and location within a County easement make this site a good candidate for stream restoration with natural channel design. Natural channels can provide energy dissipation, flood storage, water quality treatment, sediment management, improved habitat, and recreational benefits. Additionally, a natural stream designed to fit the hydrology of the landscape and watershed is self-sustaining and self-organizing, which can greatly reduce operation and maintenance compared to engineered conveyances.

The stream restoration design includes removing the existing berm, which currently disconnects the stream from its floodplain, constructing a meandering natural channel with regionally appropriate bottomland forest floodplains, and filling remaining ditch segments to convert them to native wetlands (bottomland forest or marsh). The restored channel would maintain the existing grade and slope of the channel bottom, as not to impact upstream or downstream flow. The channel geometry (cross-section shown in **Figure 7.6**, planform shown in **Figure 7.7**) was estimated using ICPR model basins and LiDAR data (from the watershed management plan, provided by County), and Florida-specific stream design criteria (Kiefer et al., 2015). The cross-section includes a bankfull channel that will hold routine flow and a 43-ft wide floodplain that will support wetland vegetation and accommodate flood pulses and elevated flow periods. Based on preliminary estimates, the proposed meander belt floodplain would sit approximately 2 ft below the current prevailing wetland elevation. The meander belt flood plain would tie into existing boundary elevations with gradual 4:1 (horizontal: vertical) slopes planted with bottomland forest vegetation to avoid potential slope erosion and to provide additional habitat and water quality benefits.

The proposed design also allows for addition of a trail, road, or boardwalk along the southern edge of the excavated floodplain compensation area should the County require an access trail to replace the existing berm (**Figure 7.7**). It should be noted that the conceptual design shows an optional potential trail corridor, but that the details of the trail design are not included or costed as part of this project. Should the County pursue land acquisition to utilize parcels surrounding the creek as public parks, the County access trail could also be used as a recreational trail. Depending on the intended uses, the trail type, size, and alignment could vary greatly.

Figure 7.6
Typical Proposed Cross Section of Collins Dairy Drain Channel

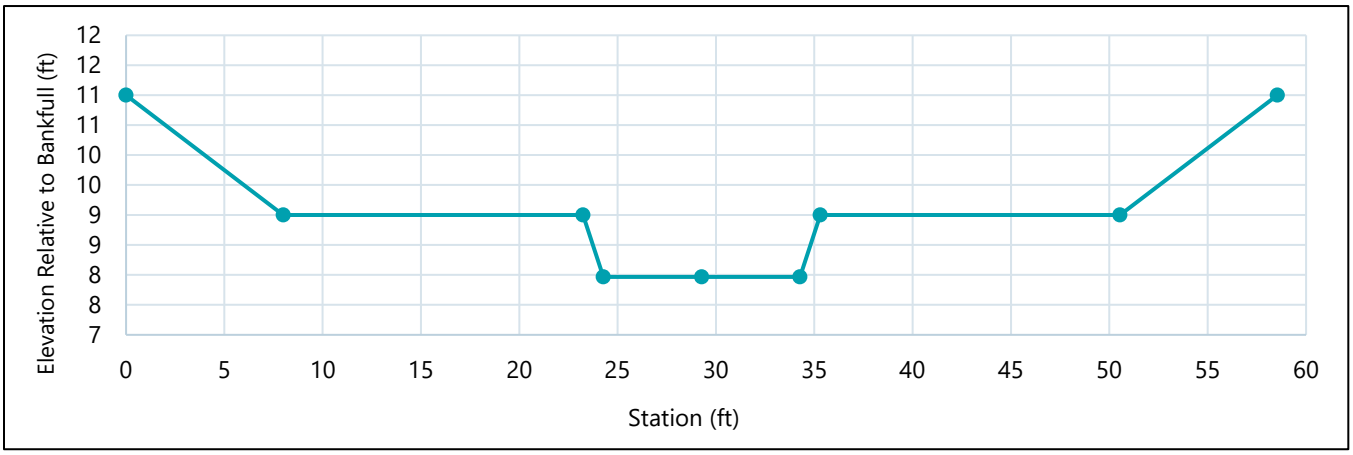
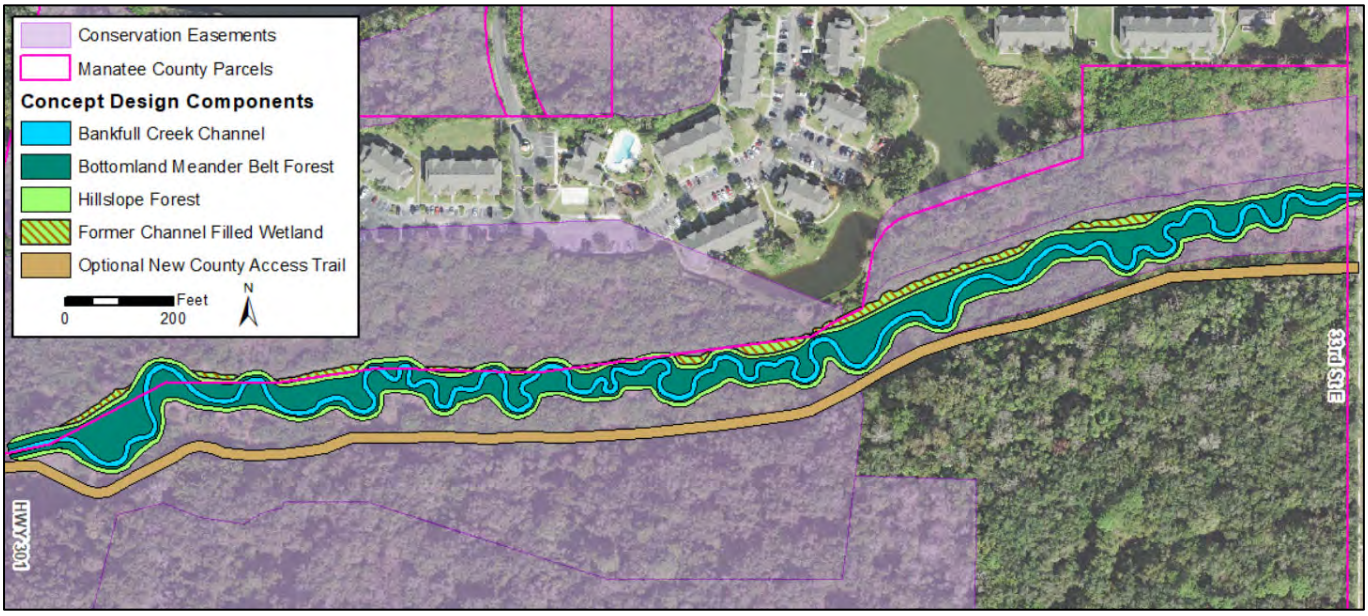


Figure 7.7
Conceptual Plan for Collins Dairy Drain Stream Restoration

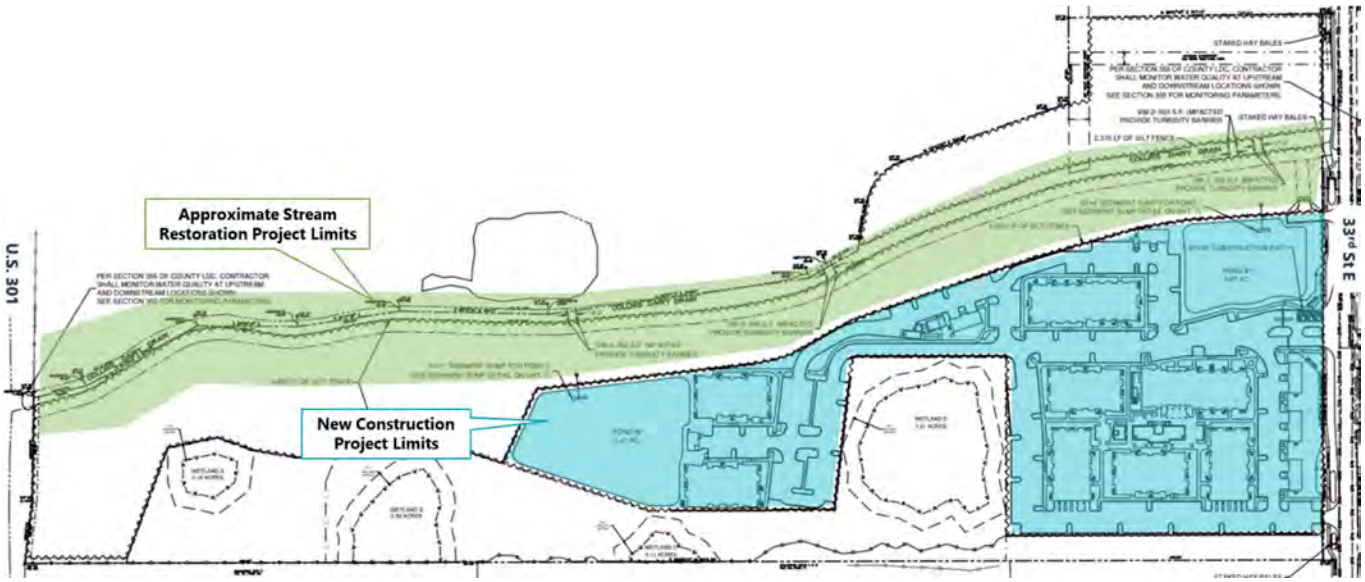


It should be noted that in August 2015, SWFWMD issued a permit for construction of apartments (The Preserve at Walden Lake) in the southeast section of the Land Trust parcel that is not within the conservation easement boundary, along with apartment units, parking areas, and a 1.5-acre wet pond within the conservation easement area (**Figure 7.8**). As of December 2021, construction had not been started on this project, but in 2020, an extension of the permit was granted through August 2025. While the proposed stream restoration project does not intersect proposed construction, the 2015 plans do include minor alterations to the Collins Dairy Drain channel and wetland grading (excavation) to provide further flood compensation for the new impervious area (and loss of existing forested impervious area). If the stream restoration project were to move forward, these two efforts would need to be coordinated, as the stream restoration could likely provide necessary increases in floodplain compensation.

Additionally, there is an opportunity for the County to coordinate with the developer to include LID components in the design for the development. Reducing proposed directly connected impervious area and including components such as rain gardens or enhanced bioswales would help to offset water quality and hydrologic impacts of the development.

If the Preserve at Walden Lake project does not move forward, it is recommended that the County acquire the southern parcel for use as a County urban ecology park. An ecology park has multiple components such as stream restoration and regional stormwater treatment opportunities including green infrastructure, low impact development (LID) BMPs, and educational signage explaining important LID or ecological features. This type of park that combines stream restoration, LID, and ecologically-based landscape architecture can combine hydrological, ecological, and water quality benefits with recreation (e.g., trails, benches, boardwalks) and educational opportunities, and serve as a valuable community amenity and an example for future parks or development.

Figure 7.8
Permitted Development Plans in Land Trust Parcel



Adapted from "Final Site Plans/Construction Plan for The Preserve at Walden Lake". Vickstrom Engineering Services. 2/25/2015.

7.3.2 Estimated Load Reductions

Values shown in **Table 7.7** were derived from applying stream restoration nutrient load reduction estimation protocols used for the Chesapeake Bay TMDL (Schueler et al., 2014) to urban canals in Sarasota County (Wood 2019). Three nitrogen removal mechanisms that stream restoration provides were examined, including erosion reduction resulting from the stabilization of banks (Protocol 1; P1), a hyporheic reduction from the hyporheic exchange during baseflow (Protocol 2; P2), and floodplain exchange from floodplain reconnection (Protocol 3; P3). For headwater streams like the Collins Dairy Drain segment of Gap Creek, the total estimated TN load reduction is 652 lb TN/mile/yr. Applied to the 0.5 mile in the project, this conceptual stream restoration project could remove approximately 326 lb TN/yr. It should be noted that stream restoration can also be an effective method to reduce TP; however, TP reduction estimation is highly site-specific and was not included in the study that estimated TN reductions. Wood is currently working with FDEP to develop methods to estimate regionally applicable TP reductions from stream restoration.

Table 7.7
Stream Restoration Estimated Annual TN Removal

Annual TN Removed (lb/yr/mile)				
Stream Category	**P1 - Erosion**	**P2 - Hyporheic**	**P3 - Floodplain**	**Total**
Headwater (<2 SM)	**51**	**539**	**62**	**652**
Mid-Order (2-20 SM)	51	742	79	872
Lowland (>20 SM)	51	1011	103	1165

7.3.3 Estimated Costs

Stream restoration costs can vary greatly based on site conditions and are sensitive to fluctuations in unit earthwork costs and contractor bid pricing, but the following costs are based on previous Wood stream restoration projects in Florida headwater creeks. Major construction costs associated with stream restoration include a temporary bypass system, valley and channel reconstruction, wetland establishment, and hillslope stabilization and afforestation along with fixed costs such as engineering, survey, mobilization, and demobilization. The retrofit construction cost estimate also includes costs for initial seeding, temporary erosion controls and blankets, large woody debris and toe wood, clearing, grubbing, and earthwork. The earthwork cost estimate is based on Florida Department of Transportation's (FDOT 2022) highest earthwork cost category, as a conservative estimate to allow for potentially long or difficult end haul distances and includes a 15% contingency adjustment for as-needed channel repairs. **Table 7.8** shows the cost per valley mile and the cost for the project length (0.5 mile).

Table 7.8
Stream Restoration Estimated Construction Costs

Construction Component	Cost Per Valley Mile	Cost for Project
Fixed Costs	$ 1,184,300	$ 592,150
Earthwork	$ 770,000	$ 385,000
RECP	$ 137,998	$ 68,999
Wetlands	$ 243,460	$ 121,730
Clearing	$ 15,840	$ 7,920
TOTAL (with 35% contingency)	**$ 3,174,657**	**$ 1,587,329**

Note: RECP=rolled erosion control product.
Wetland costs include establishment and maintenance amortized over 20 years.

Stream restoration provides substantial added value in financial, environmental, and social benefits. The major financial benefits are avoided routine maintenance and sediment removal costs. Routine annual urban canal maintenance can cost approximately $13,800 per mile (Wood, 2019). Amortized over 20 years, the maintenance cost for the 0.5 mile of Collins Dairy Drain would be approximately $54,400. Similarly, sediment transport and build-up downstream are issues in urban canals that can lead to dredging costs. In a canal system similar to that of Gap Creek (Sarasota County), approximately 420 tons (in excess of natural sediment loading rates) of sediment per mile of a stream can accumulate over ten years, which could cost approximately $12,600 per mile to remove. Amortized over 20 years and applied to the 0.5-mile project length, the next present value (NPV) of sediment removal is approximately $7,130.

Environmental benefits of stream restoration include creation or improvement of wetland habitat and function, creation or improvement of beneficial stream habitat for fish and other aquatic plant and animal species, and improvements to water quality. Wood assessed market values for wetland and stream habitat mitigation, and nitrogen removal as financial surrogates for the environmental benefits of stream restoration. Stream restoration creates and improves wetland habitat. The Uniform Mitigation Assessment Method (UMAM) was used to estimate

existing vs. proposed wetland scores (conservative estimates based on site reconnaissance and previous project experience) and calculate functional lift from restoration (**Table 7.9)**. Based on a value of $191,336 per mitigation credit for the Myakka River Offsite Mitigation Area (Wood, 2019), the net wetland value added by stream restoration in Collins Dairy Drain is approximately $202,000.

Table 7.9
Collins Dairy Drain Existing vs. Proposed UMAM and Functional Lift

Water Environment		Community Structure		Landscape Setting		Net Unit Lift
Existing	Proposed	Existing	Proposed	Existing	Proposed	
4	7	3	7	4	5	0.27

Similar to wetland mitigation crediting, some states also have markets for stream mitigation crediting. Based on an average of North Carolina (NC DEQ, 2022) and South Carolina (Wood, 2019) values, one mile of stream restoration would have a value of approximately $3,465,320. The 0.5 mile of restored headwater Collins Dairy Drain would have a value of approximately $1,732,660. The State of Florida does not currently have a stream mitigation market, so these values are not directly tradable, but rather represent an intrinsic value of stream habitat and benefits to society.

Table 7.10 summarizes the estimated costs and benefits for performing stream restoration on the Collins Dairy Drain reach of Gap Creek. These values are estimates of central tendency and are likely to fall into cost estimate ranges with a categorical accuracy range of -30% to +50% (AACE, 2012). These ranges were used to estimate the worst-case (maximum cost and minimum benefit) and best-case (minimum cost and maximum benefit) scenarios presented below.

Table 7.10
Collins Dairy Drain Estimated Range of Stream Restoration Value

Item	Mean	Worst Case	Best Case
Retrofit Cost	$ (1,175,799)	$ (1,763,699)	$ (823,060)
Avoided O&M Value	$ 100,858	$ 50,429	$ 131,115
Wetland Habitat Value	$ 202,051	$ 101,026	$ 262,667
Stream Habitat Value	$ 1,732,658	$ 866,329	$ 2,252,456
Water Quality Value	$ 1,747,092	$ 873,546	$ 2,271,220
Overall Return on Investment	**$ 2,606,860**	**$ 127,630**	**$ 4,094,398**

Note: Values represent net present value costs (amortized for a period over 20-years). Cost depicted in red; benefit values depicted in black.

7.4 Sea Level Rise Considerations

For this project, and other projects within Manatee County, work products are to be compliant with the Tampa Bay Regional Resiliency Coalition guidance for community resiliency to climate change and sea-level rise. The University of Florida GeoPlan Center Sea Level Scenario Sketch Planning Tool (Version 3, November 2020) was used to map projected sea-level rise scenario inundation depths in Manatee County, and specifically within the Pearce Drain/Gap Creek watershed for the year 2050. The tool uses NOAA projections that incorporate a variety of tidal, atmospheric, and hydrologic data in a bathtub model and yield an extent and depth of inundation (using mean higher high-water level-MHHW). The sea-level rise map in **Appendix J** shows the extent and depth of inundation for the most extreme scenario 2050 projection near the proposed conceptual projects.

The areas clearly impacted by sea-level rise begin at the extreme end of Gap Creek in the confluence with the Braden River and continue upstream along Gap Creek into the west edge of Braden River Park. The inundation depths along the edges of Gap Creek range from 0-40 inches, with typical values between 10-20 inches. There are no clear sea level rise inundation impacts along Pearce Drain, as the furthest extent of the Gap Creek inundation is approximately 1 mile downstream of the confluence with Pearce Drain.

It should be noted that the projected sea-level rise could shift tidal impacts further upstream, so in the design phases of these projects, sea-level rise projections should be included in hydraulic and hydrologic (H&H) modeling tasks. Especially for the Braden River Park Improvement project, sea level rise inundation, modeling results and tidal impacts will need to be considered when designing final channel and floodplain dimensions and vegetation communities.

The three proposed conceptual projects can improve the resilience of the neighborhoods within the watershed to climate change issues such as sea-level rise, more intense rain and flood pulses, and more extreme temperatures. Each of the projects generally increases storage area, helps to slow, treat, and infiltrate runoff, and can be designed with plant communities and channel morphology that adapt to pulses and fluctuations in water quality, flow, and fluvial forces. Increasing pond volume and installing an Up-flow filter, that functions at a wide range of conditions, can improve upgradient storage capacity and curb flood pulses for more intense rain events while still providing water quality treatment. Additionally, increasing wetland, forested, and other vegetated areas can help to alleviate the "heat island effect" that often results in urban areas having higher temperatures than rural or natural areas. The projects presented in the following section and widespread implementation of LID BMPs can help to further improve the community's resilience to climate change.

7.5 PDGC Projects Requiring Additional Coordination

The conceptual designs presented in **Sections 7.1 - 7.3** were selected by the County for load reduction and cost estimations. They were selected as priority projects because 1) their location within the watershed captures and treats nutrient loads in loading hot spots, 2) the parcel locations and sizes made the projects feasible, and 3) they can be constructed on County property. Several other potential project options could be feasible but would require land acquisition or further coordination with other entities, could require more detailed data and modeling, or are possibly better suited for future County initiatives. These projects are highly preliminary and conceptual, and do not include cost or load reduction estimates, but have been included for reference in case the County or District wish to pursue them in more detail in the future. A summary of each of these projects was included in the Task 3 deliverable, presented to the County on 02/08/22, and is included here as **Appendix G**.

7.5.1 Potential Stream Restoration and Flow Re-Routing Projects

As shown in **Figure 7.99**, at the 45th Street E bridge (ManCty-05, near Wood sample site GC-3), the County-owned parcel contains two stormwater treatment areas and approximately 400 ft of Gap Creek channel. Although there is limited room to provide additional storage, the southern stormwater treatment area/ mitigation wetland could be enhanced to provide additional water quality treatment to Gap Creek. Retrofit options for this area could include diverting the creek flow through the southern wetland mitigation area via a pump station, improving native vegetation and habitat in and around the pond, or adding enhanced treatment features such as Up-flow filters or other BAM treatment at the outflow structure prior to discharge into the creek. There is also an option to add aeration to the northern stormwater pond, however that would only be a feasible option if the majority of nitrogen in this pond is TKN. While this site is located on a County owned parcel, any future retrofits would require additional coordination with SWFWMD to ensure permit conditions are met.

Figure 7.9

Public Works Stormwater Park Improvements

As discussed in **Section 5.2**, the stream segment near the confluence of Gap Creek and Pearce Drain (adjacent to the Moss Creek subdivision and Wood sample site PD-5) is characterized by unstable and steep banks. The right bank is extremely steep, and the site is a candidate for Vegetated Reinforced Slope Stabilization (VRSS). The site conditions appear to be able to support VRSS and exotic vegetation removal along this segment of Gap Creek (Error! Reference source not found.**10**). This type of enhancement stabilizes and treats, which indirectly helps with flooding by reducing downstream sedimentation in addition to providing additional water quality treatment via the vegetated banks. A developer owns the parcels on either side of the creek, however this segment of Gap Creek flows through a County ROW just downstream of the site. Stream enhancement may be possible through a temporary site access agreement rather than complete land acquisition.

Figure 7.10

PD-5 Stream Enhancement

7.5.2 Potential Stormwater Pond Improvements

The Fiddler's Creek subdivision along Pearce Drain (ManCty-01) is an area with reported flooding issues. There is limited area available to expand storage volume along this segment of Pearce Drain due to the dense residential development. However, there are several retrofit options to provide additional water quality treatment. As shown in **Figure 7.1111**, stormwater from the existing pond could be routed into the floodplain compensation area to increase wet detention residence time for additional nutrient removal. Installation of a flow path guide wall would help prevent short circuiting of residence time. An additional treatment option is the inclusion of floating wetlands which also provide an aesthetically pleasing component.

Figure 7.11

Fiddler's Creek Stormwater Improvements

7.5.3 Other Potential Improvements

The segment of Gap Creek that flows underneath U.S. 301 (Wood sample site GC-1) receives nutrient inputs from FDOT swales intersecting the creek from both the North and the South Results of the pollutant load model showed high nutrient loading in this portion of the watershed. The County could coordinate with FDOT to enhance existing stormwater conveyances within the ROW as bioswales enhanced with BAM to treat and infiltrate runoff. A similar approach could be used to retrofit the existing storm sewer in the median to create a bioswale with underdrains (**Figure 7.12**). Another concept would include a bioswale on top of an underground vault system in the median. The water would infiltrate through the media and enter into the vault; thus, providing nutrient removal via the BAM and stormwater storage. Assuming the bottom of the vault is above the groundwater table, the retained volume of water then exits the vault via infiltration into the underlying soil, the same as with a dry retention pond. Water in excess of the retained volume will discharge out of the vault into the existing stormwater system. During large storm events, the runoff rate may exceed the BAM percolation rate and exceed the attenuation volume of the swale. In this case, water would enter the vault system via a control structure inlet. Maintenance of these underground vaults is minimal since water normally must percolate through at least 2 feet of BAM before entering the vault, resulting in minimal sediment entering the vault. To address sediments and debris that may enter the control structure during large events, sumps are located in the control structures; sediment and debris are removed from the sumps via a vacuum truck. It is recommended to inspect the sumps quarterly during the 1st year to establish a maintenance schedule for removing sediments and debris from the sumps. These enhancements could be incorporated in future FDOT projects along this segment of the road.

Figure 7.12
FDOT Bioswale Enhancement

7.6 Watershed-Wide LID Guidelines

Encouraging widespread LID practices in existing developments and future redevelopments is an effective strategy to mitigate existing water quality issues, improve resiliency, and prevent future watershed degradation in Pearce Drain/Gap Creek.

The overall goals of LID are to "slow, spread, and soak". In other words, the goal of LID is to prevent excess stormwater runoff by creating upgradient storage volumes, to reduce the volume of stormwater runoff by increasing the amount of pervious area, allowing stored water to infiltrate into the groundwater, and treating stored water (for nutrient removal) with vegetation or biosorption activated filter media before infiltration or discharge. Storing stormwater, slowing it down, and allowing it to infiltrate lessens peak flows, reduces erosion, sedimentation, and flooding, which in turn reduces nutrient runoff inputs to the creek. Nutrient removal from surface water and groundwater contributions to the creek can further improve water quality. A list of LID practices well-suited for the PDGC watershed and greater Manatee County area are provided below. While planning a new development (or redevelopment) with LID practices is typically easier and more cost-effective, the suggested BMPs can also be implemented to improve existing development.

7.6.1 Structural BMPs

Bioretention/Bioinfiltration: Bioretention/bio infiltration basins (commonly referred to as rain gardens) are shallow depressions used to capture, temporarily store, treat, and infiltrate stormwater runoff (**Figure 7.13)**. Organic mulch and soils, vegetation, and additional nutrient adsorption media facilitate pollutant removal and infiltration to

the groundwater. The basins can be underlain by layers of gravel or other porous media to hold additional runoff storage volume and can be engineered with underdrains and overflow pipes or weirs in case of emergency flooding issues. Because these BMPs can be designed and planted to fit a wide variety of applications and landscaping aesthetics, they are well-suited for use in parks and recreational areas, parking lots, or in front of schools or other public buildings. They can be planned in new developments or constructed in existing open areas.

Figure 7.13
Examples of Bioinfiltration Basins

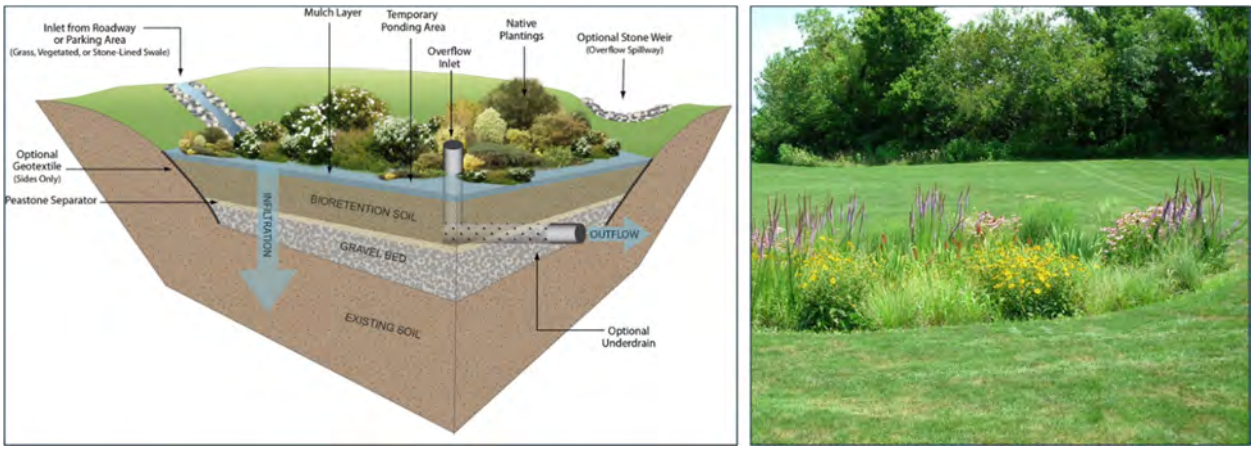


Photo Credit: Massachusetts Department of Environmental Protection Clean Water Toolkit (Left); Hamilton County Soil & Water Conservation District (Right).

Stormwater Treatment Wetlands: Constructed for pollutant removal, flood protection, and erosion control, constructed treatment wetlands also provide habitat for wildlife. Constructed wetlands typically include a fore-bay for pre-treatment of raw influent stormwater prior to entry into the wetland portion of the system to settle out and reduce suspended solids before further treatment by the constructed wetlands **(Figure 7.14).** Constructed treatment wetlands can be designed to fit a wide variety of aesthetics and applications and could be implemented in parks and recreational areas, along roadways, on public lands (schools, fire stations, etc.), or downstream of treated wastewater discharges (with intent to provide additional nutrient attenuation, not to replace existing wastewater treatment). While BMPs such as bio infiltration basins and dry ponds are designed to temporarily store water and return to dry conditions after infiltration and evapotranspiration, constructed treatment wetlands are designed to retain water levels that support wetland ecosystems. These BMPs should be implemented in areas that can hydrologically support wetlands (without creating offsite flooding impacts.)

Figure 7.14
Examples of Stormwater Treatment Wetlands

Photo Credit: City of Knoxville Plan ET Consortium (Left); Massachusetts DEP Clean Water Toolkit (Right).

Bioswales: Bioswales are shallow vegetated swales that capture runoff for stormwater conveyance and provide treatment and infiltration along with brief temporary storage **(Figure 7.15).** Similar to bioretention basins, bioswales can also be enhanced with underlain layers of BAM and/or gravel to enhance nutrient removal, add storage capacity, and improve infiltration. Because bioswales are typically long, narrow conveyances, they are ideal for application as medians, for parking lot drainage, or along roadsides. New developments can integrally design streets and parking lots to drain to central bioswale medians, but bioswales are also highly suitable for retrofitting existing developments, especially where the County maintains existing stormwater infrastructure within the right-of-way (ROW) along roadways.

Figure 7.15
Examples of Bioswales

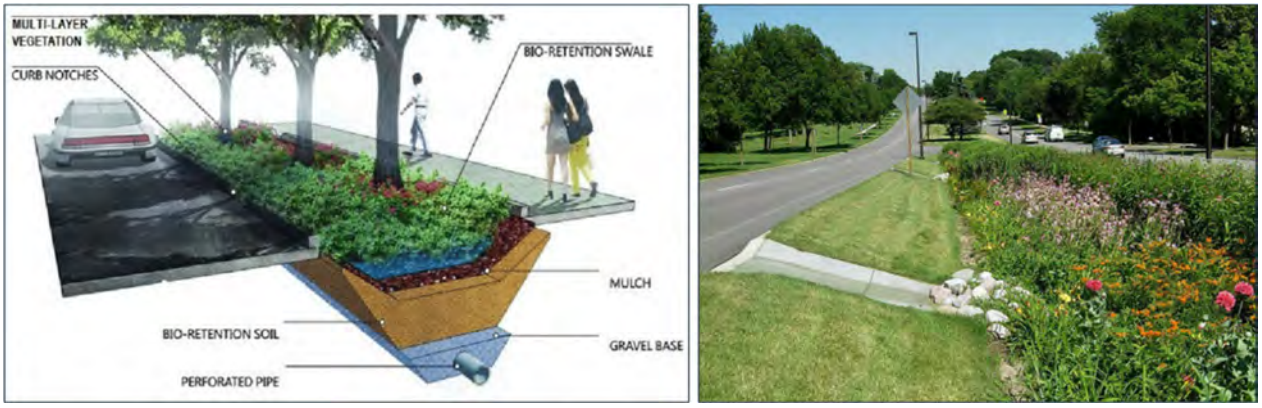


Photo Credit: Brankovic, 2019 (Left); Waugh, 2015 (Right).

Pervious Pavement: Allows stormwater infiltration through the drivable surface and serves to reduce the volume of runoff (compared to conventional directly connected impervious paved surfaces). Depending on site constraints, a wide variety of pervious paving options are available for surfaces such as parking lots, streets, driveways, and trails. Pervious concrete or asphalt look like traditional concrete or asphalt but are porous enough to allow for infiltration. Specially designed pervious pavers that look like bricks (**Figure 7.16,** left) allow infiltration through gaps. Pervious concrete, asphalt, and pavers can be designed to include gravel beds or BAM for additional storage, treatment, and infiltration. These engineered pervious paving systems do require routine maintenance to unclog void spaces and

ensure continued infiltration. Lower maintenance options include "drivable grass" or open-cell pavers that allow vegetation to grow, but still provide structural support (**Figure 7.16**, right).

Figure 7.16
Examples of Pervious Pavement Types

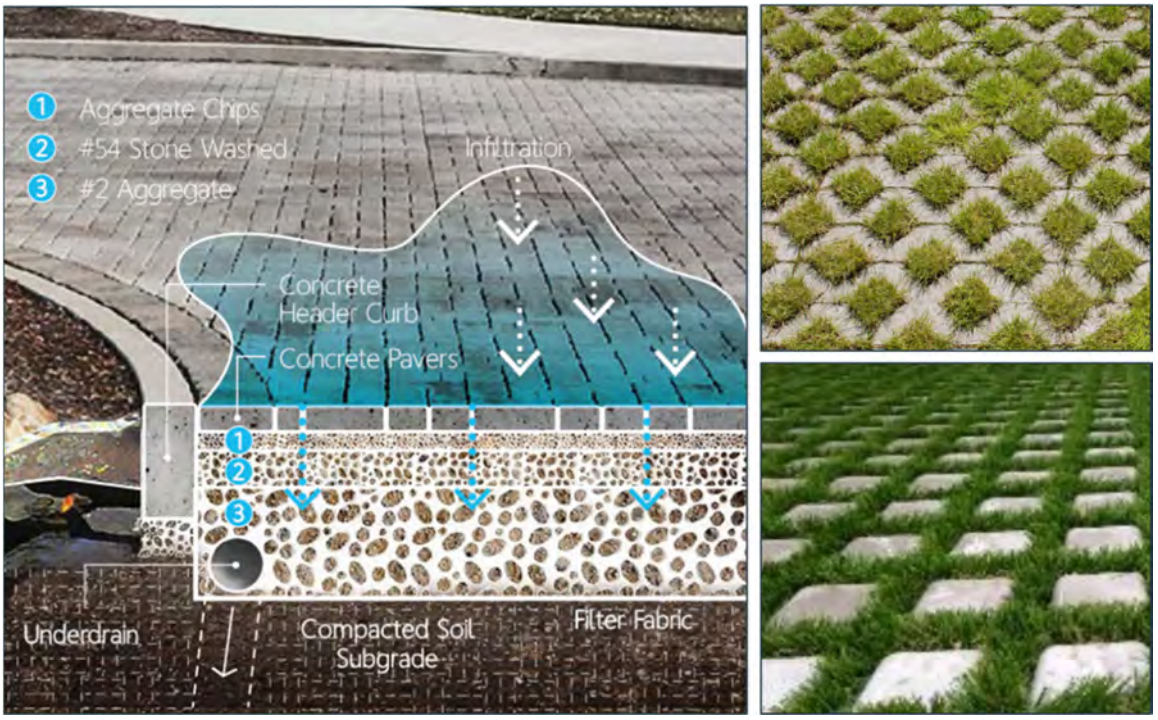


Photo Credit: City of Knoxville PlanET

Consortium (Left); Verity Supply (Top Right); Mutual Materials (Bottom Right).

Stormwater Irrigation Ponds: Stormwater irrigation ponds are wet ponds that include design elements specifically for the reuse of stormwater in the irrigation of onsite vegetation. The volume of demand translates to pollutant load removed. These pond systems would be well-suited for dispersed neighborhood ponds common in the PDGC Watershed. Stormwater runoff contained in the pond contains nutrients, so as an additional benefit, urban fertilizer usage can be reduced if stormwater is used for irrigation. Stormwater irrigation ponds would also be ideal for grassed areas near schools or recreational/sports fields.

7.6.2 Non-Structural BMPs

Sediment Removal from Stormwater Management Conveyance System: Sediment removal (or dredging) reduces the potential for sedimentation in drainage inlets, drainage conveyances, and outfalls from becoming entrained in the stormwater flows and discharging to the receiving waters. It also reduces pollutant load closer to the source. Sediment build-up appears to be an issue, especially in the downstream reached of PDGC, and cleaning out sediment could reduce impacts from flooding and nutrient loading.

Septic Removal/Replacement Program: Removing/replacing septic systems can improve wastewater treatment for homes and businesses, reduce the nutrient load from septic to groundwater, and subsequently reduce nutrient loading to the creek through groundwater seepage processes.

Public Education/Outreach: Public education, describing water conservation practices and stormwater infrastructure, and public outreach, including teacher training and community planting or clean-up days, can educate the public on personal choices that can improve water quality and help bolster support for future LID County projects (**Figure 7.17)**.

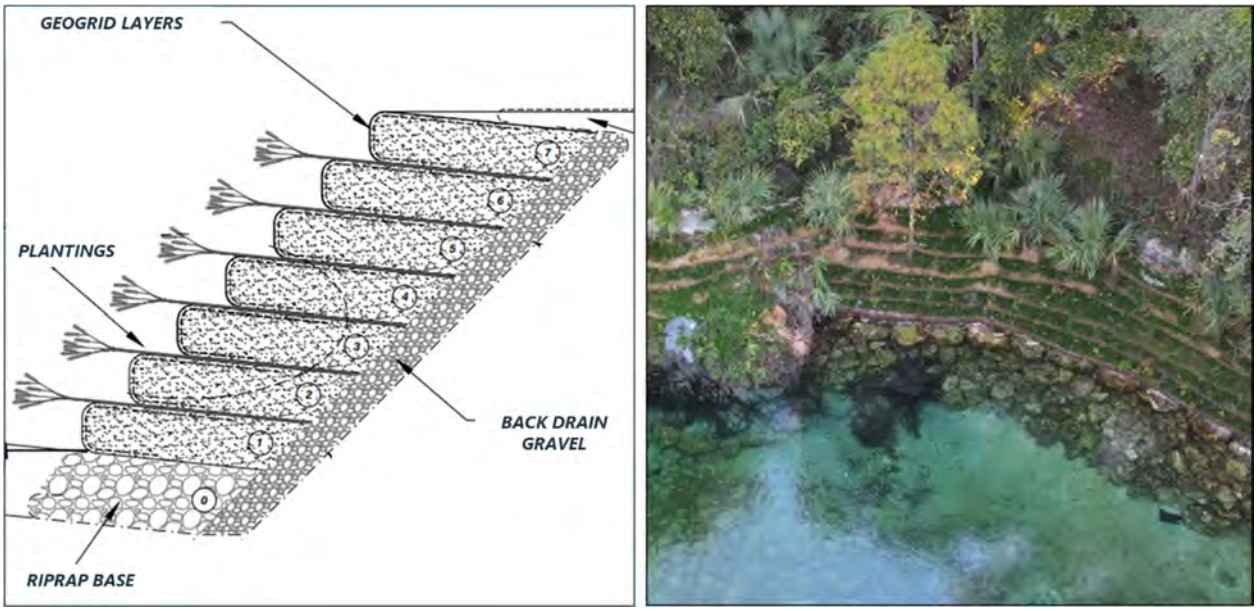
Figure 7.17
Examples of Public Education and Outreach Options

Photo Credit: Wood photo (Left); Wood photo (Top Right); Dane County Land & Water Resources Dept. (Bottom Right).

Removal or Disconnection of Existing Directly Connected Impervious Surfaces: Eliminating direct connection of impervious surfaces to conveyance systems and the associated outfalls provides opportunities for some of the stormwater runoff volume to infiltrate or otherwise have reduced pollutant loads by flowing through stable vegetated areas. In comparison to directly connected impervious areas, disconnecting the impervious areas can impede/slow runoff and curb peak storm flows.

Bank Erosion Stabilization/Vegetated buffer zones: Maintaining a well-vegetated buffer between urban land and the stream or utilizing a variety of natural and engineered materials (such as VRSS in **Figure 7.18**) to stabilize banks can minimize erosion impacts and subsequent sediment transport to surface waters. Vegetating canals within the drainage network can stabilize banks and prevent sediment and nutrients from reaching Pearce Drain or Gap Creek. Riparian buffers (and/or setbacks) that extend at least 50 to 75 ft from the bank of water conveyance features and within are recommended to help protect water quality and provide additional floodplain and/or upland habitat.

Figure 7.18
Examples of Vegetation Reinforced Soil Slope Stabilization (VRSS)



Source Control Measures

Pave Dirt Driveways, Parking Areas, and Roads: By identifying and paving compacted dirt areas heavily disturbed by vehicular traffic, the overall sediment and solids load within runoff can be reduced. Runoff can subsequently be captured and treated/infiltrated, and the sedimentation/pollutant source removed. The County can work with homeowners, businesses, and institutions to pave the long dirt driveways, parking and storage areas, and roads to prevent sediment loads to downstream waters. Similarly, areas with exposed soils that are not frequently used as a driving surface can be vegetated or mulched to reduce erosion and provide additional treatment.

Street Trees/Canopy Cover/Tree Wells: Tree cover intercepts precipitation volume, which reduces the treatment volume demand on down-gradient BMPs. Tree roots reduce soil erosion potential and provide nutrient uptake. Neighborhoods slated for redevelopment can be established with a variety of street trees in the medians and along the right of way. Street trees also provide shade and help to alleviate urban heat island effects. Infiltrating tree wells that are implemented with or without BAM can also be implemented in areas with appropriate soils and infiltration rates in areas of the watershed that would benefit from groundwater recharge. Stormwater can be directed into the tree wells and the process of retention and treatment would be similar to other LID-based concepts described above. The tree wells could be implemented as a stormwater treatment LID tool that directs treated stormwater to a water conveyance without infiltration as well.

8.0 SUMMARY AND RECOMMENDATIONS

The PDGC Creek watershed is a highly urbanized watershed consisting of residential, commercial, and industrial land uses. The large extent of impervious area and relatively poorly drained soils likely impact water quality within the watershed. An analysis of *E. coli* data conducted in this report confirmed the impairment determination made by FDEP for this parameter. Pearce Drain/Gap Creek did not exceed freshwater nutrient impairment criteria, except for one exceedance of TP in Gap Creek in 2017. Trend analysis identified significant decreasing and increasing trends in TP and DO, respectively.

The initial watershed assessment and site visit identified several areas within the watershed that are publicly owned that could potentially be used for low-impact development nutrient reduction BMPs. It also appears that several of

these areas may be amenable to nutrient reduction projects that would provide stream restoration and/or channel enhancement, regional stormwater treatment, flood relief, and recreational and educational opportunities.

Based on results of analysis and sampling, site assessment, public land availability, and discussion with the County and District, the three projects selected for development of conceptual designs, cost estimates, and load reduction estimates included: 1) Braden River Park stormwater treatment and wetland habitat enhancement (GC-4), 2) Kinnan Park stormwater treatment and flood storage (ManCty-03), and 3) Collins Dairy Drain stream restoration and flood storage (ManCty-02). Both the Braden River Park and Kinnan Park designs include BAM Up-flow filters that provide nutrient removal. The Kinnan Park provides for additional nutrient removal by diverting both detention pond discharge and Gap Creek into the treatment wetland. The Kinnan Park design provides for approximately 16 acre-ft of flood storage. The Collins Dairy Drain stream restoration projects includes construction of 0.5 mile-long natural, meandering channel with wetland floodplains, as well as the implementation of a hiking trail running parallel to the stream channel. While these projects have relatively high upfront costs, they also provide a suite of environmental, social, and financial benefits which includes flood storage. The total estimated costs and load reductions for these projects are presented in **Table 8.1**. It should be noted that these conceptual projects are designed to be modular, so one or all of the different components could be implemented or approached in phases (e.g., stream restoration can be constructed with or without park amenities, or the three could be designed/constructed in separate project phases).

Table 8.1

Summary of Estimated Load Reductions for Pearce Drain/Gap Creek Conceptual Designs

Concept Estimates	Braden River Park BAM Up-flow Filter, Wetland Enhancement, and Gap Creek Polishing	Kinnan Park AGI, BAM Up-flow Filter, and Pump Station	Collins Dairy Drain Stream Restoration and Park Amenities	Total
TN Load Reduction (lb/yr)	33.5	82	326	**441.5**
TP Load Reduction (lb/yr)	2.2	27	TBD*	**29.2**
Project Cost	$ 1,171,125	$ 938,984	$ 1,587,329	**$ 3,697,438**

Notes: *Stream restoration also reduces TP, but site-specific studies would be needed to quantify reduction.

The costs presented are total costs for all possible project components. Individual costs are detailed in **Section 7**.

The recommended conceptual designs will require more information to determine specific dimensions, construction options, and detailed costs. Project feasibility and alternatives assessment generally require the following items:

- Detailed channel plan view maps.
- Area survey in the wetlands and floodplain (1-foot contour) or equivalent DEM.
- Detailed, channel cross-section surveys, specifically located at selected riffles and crossing the entire floodplain.
- Vegetation zones and species lists across the floodplain.
- Channel bottom profiles along the thalweg.
- Survey and descriptions of stormwater outfalls to the creek.
- Maps of major subsurface utilities such as sewer pipes, water mains, and gas lines where they occur next to or across the riparian corridor, with their depths/elevations and setbacks.
- Land ownership maps.
- Easement maps.
- Flood studies.
- Maps of hazardous waste sites near the riparian corridor (if any).
- SHPO records (historical preservation and archaeological areas).
- Eagle nests and other protected species occurrences.

The additional project options and LID guidelines provided in **Sections 7.5** and **7.6** can be referenced for future initiatives or feasibility studies, and a wholistic, watershed approach featuring the widespread implementation of LID projects and concepts is recommended. Targeting water quality and flooding issues at the source is the most effective way to prevent erosion, sediment deposition, nutrient loading, and flooding issues from having more severe, compounded impacts in downstream reaches. Widespread LID projects and management practices can help to build a more resilient watershed that will be able to withstand acute or sustained changes in storm intensity, water quality loading, sea level rise-induced tidal shifts, droughts, and other spatial and temporal changes brought about by climate change.

In our pollutant load analysis, septic tanks were found to contribute approximately 1,800 lbs of TN per year. Septic tanks can contribute loads to both surface and groundwater and the Garden Lakes estate that abuts Pearce Drain may be a priority area for the County to consider. Also, depending on groundwater flow direction, septic contributions from Westwinds Village may be impacting Gap Creek. The County may want to consider conducting a Rapid Push Point survey for screening assessments at these two locations. Push points are an innovative, non-invasive, fast, and relatively inexpensive method to collect surficial groundwater samples and does not require monitoring well permitting. The data collected includes assessing groundwater nutrients and flow and can assist with the determination of septic hot-spots contributing to nutrient loading into PDGC.

Lastly, while two sampling events were completed as part of this work assignment to characterize the watershed, these just represent a snapshot in time. The County's monitoring program can be enhanced to further assess the potential sources and inflow into PDGC by adding additional stage/discharge and water quality monitoring stations. Currently, just one monitoring stations located in Gap Creek is part of the ambient program. Wood recommends that the 12 water quality stations established during this assessment be added as part of the County's ambient water quality program.

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APPENDIX A
Literature and Data Inventory

Table A.1 – Literature Provided by Manatee County

Date Received	Filename	Description
12/29/2020	Pearce_Report.pdf	Pearce Canal (Gap Creek) Floodplain Information Study conducted by Thomas Shoopman, with basin description, hydrologic data, and modelling results. Study evaluated PDGC watershed hydrology to determine the 25-Year and 100-Year flood elevations and stage hydrographs at the proposed Stonebriar Development located east of Prospect Road and south of Saunders Road.
12/29/2020	Pearce_Basin.pdf	PDF basin node map of PDGC with delineated subbasins from Shoopman Floodplain Information Study.
12/29/2020	WB_FloodplainJustificationReport_2011_0720.pdf	2011 Whitaker Bayou Floodplain Justification Report prepared by Singhoffen & Associates, Inc. for SWFWMD with information on modelling data and methodology and model simulation results.
12/29/2020	20201222_SWFWMD_PDGC_Final_Report_sealed.pdf	Collective Water Resources (Collective) performed a peer review of the PDGC WMP as requested by the District. This report includes peer review findings of Watershed Model Parameterization and Watershed Model Development and Floodplain Delineation task deliverables provided by the District.
8/19/2021	2nd Qtr 2021 Methane Monitoring Report.pdf	This report presents a summary of activities performed by Professional Service Industries, Inc. (PSI) at the Braden River Park Site during the Second Quarter 2021 Methane Monitoring Event.
12/29/2020	PDGC_Task2.3.1_TechMemo_Revised_2018Oct04.pdf	Revised CDM Smith tech memo for Task 2.3.1 of PDGC Flood Study, Summary of Model Parameterization and Initial Model Simulations. Included in the memorandum is a summary of the methodologies and data used for various model components, as well as the initial model setup and results.
12/29/2020	Pearce Drain 1984 Study.pdf	This report describes the work performed to prepare a master stormwater drainage plan for four basins in southwest Manatee County, including Bowlees Creek, Cedar Hammack Canal, Pearce Drain, and Palma Sola Drain. The report primarily summarizes the hydrologic and hydraulic analysis of the four basins and their principal conveyance channels.
12/29/2020	N759_PearceGapWatershed Evaluation (June 2018).pdf	Report presents a summary of the work completed for the watershed evaluation portion of the PDGC watershed management plan (Task 2.2). This includes compilation, review, and evaluation of existing watershed data, the development of watershed features, development of a Geographic Watershed Information System (GWIS) database, and development of a preliminary watershed model.

Date Received	Filename	Description
12/29/2020	N759_PearceGap_FloodplainJustification 20201228.pdf	The floodplain justification report documents the efforts and results related to watershed model parameterization, model development, and subsequent floodplain delineation and justification for the PDGC WMP.
12/29/2020	N759_PearceGap_LOS_AlternativesAnalysis_DRAFT.pdf	This report presents the results of both the flood protection level of service (FPLOS) analysis as well as the alternatives analysis.
12/29/2020	Pearce Drain Gap Creek Watershed Project Plan March 2018.pdf	Project planning document providing an overview of scope, project approach, schedule, etc for PDGC WMP previously completed by CDM Smith.

Table A.2 - Data Provided by Manatee County

Date Received	Filename	General Description
8/5/2021	Gap Creek POR 012020 080521 - SampleLoc_Results_AllParams_by_Date.xlsx	This report lists all results for a sample location (Gap Creek) that have been completed between January 2020 and August 2021. Report is from LIMS, which reflects historic data as well as Q1/2021 and later data not yet uploaded to WIN
8/5/2021	WIN_Stations_21FLMANA_GB_012320.xlsx	The actual station location data (Gap Creek) used to configure WIN
	Manatee_Sensors_Public (mymanatee.org)	Link to view real time stream and rainfall gage data (not downloadable) for Pearce Drain and Gap Creek
9/26/2021	T2116629(ELEMENT) .xlsx	AEL lab data from 09/07/21 sampling event, Pearce Drain and Gap Creek stations
8/20/2021	PDGC Station GP 2020 to Date SampleLoc_Results_AllParams_by_Date.pdf	This report lists all results for a sample location (Gap Creek) that have been completed between June 2020 and August 2021
10/21/2021	PDGC 092921 Results_By_COC_Root.xlsx	Excel format, one tab per station WQ report from County Lab. Sampling event 9/29/21
10/4/2021	20210907_PDGC-Flow-Summary.xlsx	Flow data from sampling event on 09/07/21. Flow meter files also included
10/4/2021	20210929_PDGC-Flow-Summary.xlsx	Flow data from sampling event on 09/29/21. Flow meter files also included
10/4/2021	GapCk_9_29_21_FieldPara.xlsx	Field parameters for each station sampled on 09/29/21
11/2/2021	T2118186(ELEMENT).xlsx	AEL lab data from 09/29/21 sampling event, Pearce Drain and Gap Creek stations
11/3/2021	PDGC 090721 Results_By_COC_Root.xlsx	Excel format, one tab per station WQ report from County Lab. Sampling event 9/07/21. Also includes field parameters
12/29/2020	2014_LABINS folder	High-resolution aerial imagery from FDEP's Land Boundary Information System (LABINS)
12/29/2020	2015_Manatee folder	2015 Manatee County aerial imagery
12/29/2020	2016_BradenRiver folder	2016 aerial imagery of Braden River watershed

Date Received	Filename	General Description
12/29/2020	2017_SWFWMD folder	2017 SWFWMD aerial imagery
12/29/2020	Historic folder	Historic aerial imagery files from FDOT (1980-1991) and UF (1970)
12/29/2020	DEM folder	Braden River watershed projected and mosaic DEMs
12/29/2020	DEM_UpdatedforTopovoids folder	Updated Braden River watershed projected DEMs to correct voids in topography surface
12/29/2020	DEM5FT folder	Braden River watershed projected and mosaic DEMs; 5ft resolution
12/29/2020	General folder	Various Geodatabases containing data for ArcHydro, field recon, land use, soils, surveys, and other geographic and planning characteristics
12/29/2020	GWIS folder	Geodatabases containing GWIS hydrologic data from SWFWMD
12/29/2020	LOS_FDE folder	Contains PDGC_FPLOS.gdb, which is a geodatabase containing various layers related to the flood protection study, including flood plains, structures, etc.
12/29/2020	Pearce_Bowlees_ERPCentroids_20170322 (shapefile)	Shapefile containing point features representing centroids for ERPs in Pearce Drain and Bowlees Creek watersheds
12/29/2020	GWIS folder	GWIS hydrology datasets in XML format
12/29/2020	ICPR_Pearce_Updated folder	ICPR modelling files from Shoopman floodplain information study
12/29/2020	Pearce_Basin folder	CAD files representing PDGC delineated basin node map
12/29/2020	SUBBASNR.xls	Data tables and calculations from Pearce Canal (Gap Creek) Floodplain Information Study
12/29/2020	DEM folder	DEM and DEM hillshade files from 2011 Whitaker Bayou Floodplain Justification Study
12/29/2020	ICPR Model folder	ICPR modelling files from 2011 Whitaker Bayou floodplain study
12/29/2020	Whitaker.accdb	Access database with model data and calculations from 2011 Whitaker Bayou floodplain study
12/29/2020	Field Recon folder	Field Recon datasets in XML format
12/29/2020	Land_Use folder	2011 SWFWMD landuse dataset in XML format
12/29/2020	Plans folder	ERP and Parcel data in XML format
12/29/2020	Reference folder	Geographical data (Roads, subdivisions, etc.) in XML format
12/29/2020	Existing Model folder	Model Files for PDGC ICPR model used in previous floodplain studies
12/29/2020	Alternative Models folder	Additional model files used in previous floodplain studies and excel spreadsheet of results
12/29/2020	PDGC_Atlas_10.1_20201204.mxd	Map with various model layers and boundaries from PDGC flood study
12/29/2020	PDGC_Atlas_10.6_20201204.mxd	Map with various model layers and boundaries from PDGC flood study

Date Received	Filename	General Description
12/29/2020	SWFWMD SCADA folder	SWFWMD rainfall and water elevation data collected from SCADA
12/29/2020	SWFWMD WMIS folder	SWFWMD rainfall and water elevation data collected from WMIS
12/29/2020	2017 Rainfall and Water Level.xlsx	2017 Wet Season Rainfall and Water Level data in excel spreadsheet
12/29/2020	2017 Rainfall and Water Level.pdf	2017 Wet Season Rainfall and Water Level data in pdf
12/29/2020	LandUseSoilsSummary.xlsx	Summary of FLUCCS land uses and SURGGO soils from PDGC watershed ArcGIS Clip
12/29/2020	SWFWMD FTP folder	SCADA and WMIS hydrology and rainfall data pulled from SWFWMD FTP site
12/29/2020	FieldNotes folder	PDGC survey field notes from watershed management plan preparation
12/29/2020	PDGC_SurveyPH1.mxd	MXD with surveyed structures, locations, and other metadata generated from field survey
12/29/2020	RadarRainfall folder	2016 and 2017 rainfall data in excel spreadsheets
12/29/2020	Florida_Parcels_2017v2_uncompressed.gdb	Geodatabase with 2017 Florida PA parcels
12/29/2020	ImperviousArea.shp	Shapefile of impervious areas within PDGC watershed
12/29/2020	Alternative ArcHydro Stage-Area folder	PDGC basin stage area shapefiles

Table A.3 – Summary Statistics of Wood and IWR Data from WBID 1899 Used in Water Quality Analyses

Parameter	Units	Start Date	Last Date	N	Min	Max	Mean	StdDev
Alkalinity	mg/L	3/13/2017	9/3/2020	30	85.2	205.0	159.9	28.9
Aluminum	µg/L	11/8/2017	9/29/2021	23	10.8	99.0	44.8	24.0
Bottom Depth	m	4/26/2017	9/29/2021	12	0.18	0.81	0.45	0.19
Calcium	mg/L	11/8/2017	9/29/2021	23	23.0	130.0	72.4	25.5
Color	PCU	3/13/2017	9/29/2021	57	33	110	62	20
Dissolved Iron as FE	µg/L	11/8/2017	9/29/2021	23	34.7	1300.0	321.2	325.8
Dissolved Oxygen	mg/L	3/13/2017	9/29/2021	52	0.35	11.10	6.30	1.87
Dissolved Oxygen Saturation	%	3/13/2017	9/29/2021	52	4.5	141.1	76.7	21.5
Dissolved Solids	mg/L	3/13/2017	7/29/2021	33	264	8730	790	1494
Escherichia coli	100ml	6/6/2017	9/29/2021	41	21	1299	468	309
Fecal Coliform	100ml	1/28/2020	7/29/2021	12	325	2419	1240	808
Flow	CFS	9/7/2021	9/29/2021	10	-0.103	18.582	4.774	6.133
Fluoride	mg/L	3/13/2017	10/28/2019	26	0.36	0.81	0.59	0.13
Hardness	mg/L	11/8/2017	9/3/2020	11	146.1	823.4	329.0	192.0
Lead	µg/L	9/7/2021	9/29/2021	12	3	3	3	0.00
Magnesium	mg/L	11/8/2017	9/29/2021	23	2.9	123.0	21.6	25.5
Manganese	µg/L	11/8/2017	9/3/2020	11	10.8	39.0	18.6	9.1
Nitrite Nitrogen	mg/L	11/8/2017	9/3/2020	11	0.004	0.039	0.016	0.011
Nitrogen Kjeldahl	mg/L	3/13/2017	9/29/2021	45	0.66	1.32	0.97	0.14
Chlorophyll-a, Corrected	µg/L	3/13/2017	9/29/2021	57	1.5	43.0	9.1	9.4
Nitrate-Nitrite	mg/L	3/13/2017	9/29/2021	55	0.002	0.434	0.140	0.100
Total Nitrogen	mg/L	3/13/2017	9/29/2021	56	0.67	1.56	1.05	0.20
Total Phosphorus	mg/L	3/13/2017	9/29/2021	54	0.13	0.78	0.40	0.13
Ortho Phosphate	mg/L	9/7/2021	9/29/2021	12	0.04	0.42	0.29	0.11
pH	SU	3/13/2017	9/29/2021	52	6.1	8.8	7.4	0.7
Diss. Orthophosphate P	mg/L	3/13/2017	9/3/2020	31	0.18	0.53	0.32	0.09
Potassium	mg/L	11/8/2017	9/29/2021	23	1.5	34.8	5.7	7.3
Salinity	ppt	3/13/2017	7/29/2021	40	0.19	17.50	1.43	3.47
Secchi Depth	m	3/13/2017	9/7/2021	45	0.1	1.0	0.5	0.2
Specific Conductance	µmhos/cm	3/13/2017	9/29/2021	52	183	28406	2062	5064
Stream Velocity	ft/sec	3/13/2017	9/29/2021	27	-0.011	1.420	0.281	0.336
Sulfate	mg/L	3/13/2017	9/29/2021	16	2.0	800.0	122.1	187.1
Temperature	deg C	3/13/2017	9/29/2021	52	13.4	31.0	25.2	4.2
Total Ammonia	mg/L	3/13/2017	9/29/2021	54	0.004	0.307	0.068	0.049
Total Organic Carbon	mg/L	3/13/2017	9/3/2020	31	11.0	17.0	13.8	1.4
Total Suspended Solids (TSS)	mg/L	3/13/2017	9/29/2021	57	0.80	19.30	4.26	3.06
Turbidity	NTU	3/13/2017	9/29/2021	56	1.6	16.0	4.4	2.7

Note: Data sources are IWR (FDEP), Manatee County, and Wood

APPENDIX B
Pollutant Load Model Tables and Figures

TABLE B.1 - Published Runoff Coefficients (c) for Meteorological Zone 4 Based on Non-DCIA CN and Percent DCIA

NDCIA CN	Percent DCIA																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	0.004	0.045	0.086	0.127	0.168	0.209	0.250	0.291	0.332	0.373	0.414	0.455	0.496	0.536	0.577	0.618	0.659	0.700	0.741	0.782	0.823
35	0.007	0.048	0.089	0.129	0.170	0.211	0.252	0.293	0.333	0.374	0.415	0.456	0.497	0.537	0.578	0.619	0.660	0.701	0.741	0.782	0.823
40	0.011	0.051	0.092	0.133	0.173	0.214	0.254	0.295	0.336	0.376	0.417	0.458	0.498	0.539	0.579	0.620	0.661	0.701	0.742	0.782	0.823
45	0.016	0.056	0.096	0.137	0.177	0.217	0.258	0.298	0.339	0.379	0.419	0.460	0.500	0.540	0.581	0.621	0.662	0.702	0.742	0.783	0.823
50	0.022	0.062	0.102	0.142	0.182	0.222	0.262	0.302	0.342	0.382	0.423	0.463	0.503	0.543	0.583	0.623	0.663	0.703	0.743	0.783	0.823
55	0.030	0.070	0.109	0.149	0.189	0.228	0.268	0.308	0.347	0.387	0.427	0.466	0.506	0.546	0.585	0.625	0.664	0.704	0.744	0.783	0.823
60	0.040	0.080	0.119	0.158	0.197	0.236	0.275	0.314	0.353	0.393	0.432	0.471	0.510	0.549	0.588	0.627	0.667	0.706	0.745	0.784	0.823
65	0.054	0.092	0.131	0.169	0.208	0.246	0.285	0.323	0.362	0.400	0.438	0.477	0.515	0.554	0.592	0.631	0.669	0.708	0.746	0.785	0.823
70	0.071	0.109	0.147	0.184	0.222	0.259	0.297	0.335	0.372	0.410	0.447	0.485	0.522	0.560	0.598	0.635	0.673	0.710	0.748	0.785	0.823
75	0.096	0.132	0.168	0.205	0.241	0.277	0.314	0.350	0.387	0.423	0.459	0.496	0.532	0.568	0.605	0.641	0.678	0.714	0.750	0.787	0.823
80	0.130	0.165	0.199	0.234	0.268	0.303	0.338	0.372	0.407	0.442	0.476	0.511	0.546	0.580	0.615	0.650	0.684	0.719	0.754	0.788	0.823
85	0.182	0.214	0.246	0.278	0.310	0.342	0.374	0.406	0.438	0.470	0.502	0.534	0.566	0.599	0.631	0.663	0.695	0.727	0.759	0.791	0.823
90	0.266	0.294	0.322	0.350	0.378	0.406	0.433	0.461	0.489	0.517	0.545	0.573	0.600	0.628	0.656	0.684	0.712	0.740	0.767	0.795	0.823
95	0.429	0.449	0.469	0.488	0.508	0.528	0.547	0.567	0.587	0.606	0.626	0.646	0.665	0.685	0.705	0.725	0.744	0.764	0.784	0.803	0.823
98	0.616	0.626	0.636	0.647	0.657	0.667	0.678	0.688	0.699	0.709	0.719	0.730	0.740	0.750	0.761	0.771	0.782	0.792	0.802	0.813	0.823

Source: Stormwater Quality Applicant's Handbook, Design Requirements for storm water Treatment Systems in Florida, March 2010 Draft

TABLE B.2 - Summary of Curve Numbers and Directly Connected Impervious Areas Based on Land use and Soil Group

FLUCCS	GENERALIZED LAND USE DESCRIPTION	HYDROLOGIC SOILS GROUP								DCIA (%)
		A	A/D	B	B/D	C	C/D	D	W	
1100	Residential Low Density	39	39	61	61	74	74	80	98	20
1200	Residential Med Density	39	39	61	61	74	74	80	98	18
1300	Residential High Density	39	39	61	61	74	74	80	98	28
1400	Commercial And Services	39	39	61	61	74	74	80	98	85
1500	Industrial	39	39	61	61	74	74	80	98	72
1600	Extractive	39	39	61	61	74	74	80	98	0
1700	Institutional	39	39	61	61	74	74	80	98	26
1800	Recreational	39	80	61	80	74	80	80	98	10
1820	Golf Courses	39	80	61	80	74	80	80	98	10
1900	Open Land	39	80	61	80	74	80	80	98	0
2100	Cropland And Pastureland	39	80	61	80	74	80	80	98	0
2400	Nurseries And Vineyards	67	89	78	89	85	89	89	98	5
2500	Specialty Farms	67	89	78	89	85	89	89	98	5
2600	Other Open Lands	39	80	61	80	74	80	80	98	0
3200	Shrub And Brushland	30	73	48	73	65	73	73	98	0
4100	Upland Coniferous Forest	32	79	58	79	72	79	79	98	0
4110	Pine Flatwoods	32	79	58	79	72	79	79	98	0
4200	Upland Hardwood Forests	32	79	58	79	72	79	79	98	0
4340	Upland Hardwood - Coniferous Mix	32	79	58	79	72	79	79	98	0
4400	Tree Plantation	32	79	58	79	72	79	79	98	0
5300	Reservoirs	98	98	98	98	98	98	98	98	100
6100	Wetland Hardwood Forests	98	98	98	98	98	98	98	98	100
6150	Stream And Lake Swamps (Bottomland)	98	98	98	98	98	98	98	98	100

TABLE B.2 - CONTINUED
Summary of Curve Numbers and Directly Connected Impervious Areas Based on Land use and Soil Group

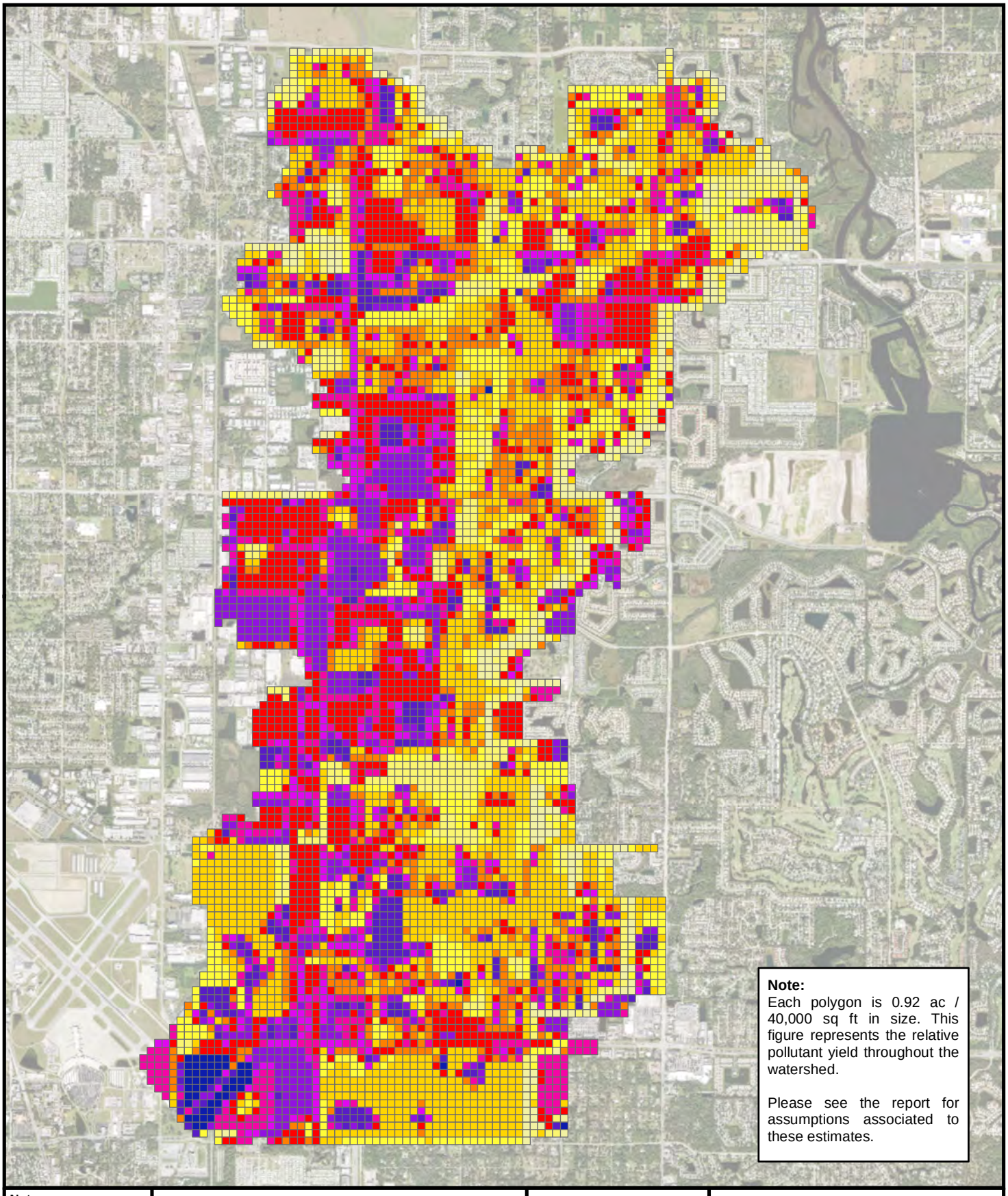
FLUCCS	GENERALIZED LAND USE DESCRIPTION	HYDROLOGIC SOILS GROUP								DCIA (%)
		A	A/D	B	B/D	C	C/D	D	W	
6210	Cypress	98	98	98	98	98	98	98	98	100
6300	Wetland Forested Mixed	98	98	98	98	98	98	98	98	100
6400	Vegetated Non-Forested Wetlands	98	98	98	98	98	98	98	98	100
6410	Freshwater Marshes	98	98	98	98	98	98	98	98	100
6420	Saltwater Marshes	98	98	98	98	98	98	98	98	100
6430	Wet Prairies	98	98	98	98	98	98	98	98	100
6440	Emergent Aquatic Vegetation	98	98	98	98	98	98	98	98	100
6530	Intermittent Ponds	98	98	98	98	98	98	98	98	100
7400	Disturbed	39	80	61	80	74	80	80	98	0
8100	Transportation	83	83	89	89	92	92	93	98	25
8300	Utilities	83	83	89	89	92	92	93	98	25

TABLE B.3 - Summary of Literature-Based Runoff Characterization for General Land use Categories in Florida

LAND USE CATEGORY	TYPICAL RUNOFF CONCENTRATION (MG/L)						
	TN	TP	BOD	TSS	Cu	Pb	Zn
Low-Density Residential[1]	1.5	0.18	4.7	23	0.008[4]	0.002[4]	0.031[4]
Single-Family	1.85	0.31	7.9	37.5	0.016	0.004	0.062
Multi-Family	1.91	0.48	11.3	77.8	0.009	0.006	0.086
Low-Intensity Commercial	0.93	0.16	7.7	57.5	0.018	0.005	0.094
High-Intensity Commercial	2.48	0.23	11.3	69.7	0.015	--	0.16
Light Industrial	1.14	0.23	7.6	60	0.003	0.002	0.057
Highway	1.37	0.17	5.2	37.3	0.032	0.011	0.126
Pasture	2.48	0.7	5.1	94.3	--	--	--
Citrus	2.31	0.16	2.55	15.5	0.003	0.001	0.012
Row Crops	2.47	0.51	--	19.8	0.022	0.004	0.03
General Agriculture[2]	2.42	0.46	3.8	43.2	0.013	0.003	0.021
Undeveloped / Rangeland / Forest	1.15	0.055	1.4	8.4	--	--	--
Mining / Extractive	1.18	0.15	7.6[3]	60.0[3]	0.003[3]	0.002[3]	0.057[3]
Wetland	1.01	0.09	2.63	11.2	0.001	0.001	0.006
Open Water / Lake	1.6	0.067	1.6	3.1		0.025[5]	0.028

1. Average of single-family and undeveloped loading rates.
2. Mean of pasture, citrus, and row crop land uses.
3. Runoff concentrations assumed equal to industrial values for these parameters.
4. Value assumed to be equal to 50% of single-family concentration.
5. Runoff concentrations assumed equal to wetland values for these parameters.

Notes: This table is a replica of the Table 4-17 in the Final Report of "Evaluation of Current Stormwater Design Criteria within the state of Florida" prepared for: Florida Department of Environmental Protection (June 2007). Prepared by Environmental Research & Design, Inc. Harvey H. Harper, Ph.D., P.E. & David M. Baker, P.E. Total N and Total P EMC values are from the Table 3.4 in March 2010 Draft Department of Environmental Protection and Water Management Districts Environmental Resource Permit Stormwater Quality Applicant's Handbook Design Requirements for Stormwater Treatment Systems in Florida. Wetland and Open Water/Lake EMC values are from Table 7 of the Final Report of "Evaluation of Alternative Stormwater Regulations for Southwest Florida". (Revised Sept 08, 2003) Submitted to Water Enhancement & Restoration Coalition, Inc. Prepared by Environmental Research & Design, Inc. Harvey H. Harper, Ph.D., P.E. & David M. Baker, P.E.



Notes:

1- Project No.: 600568x6

2- Data Source - ESRI Imagery
Wood

3- This map is intended to be used for planning purposes only. It is not a survey.

Date: 12/21/2021
Revised: MW
Checked By: TK

Explanation of Features

N

Estimated Annual Stormwater Runoff Load

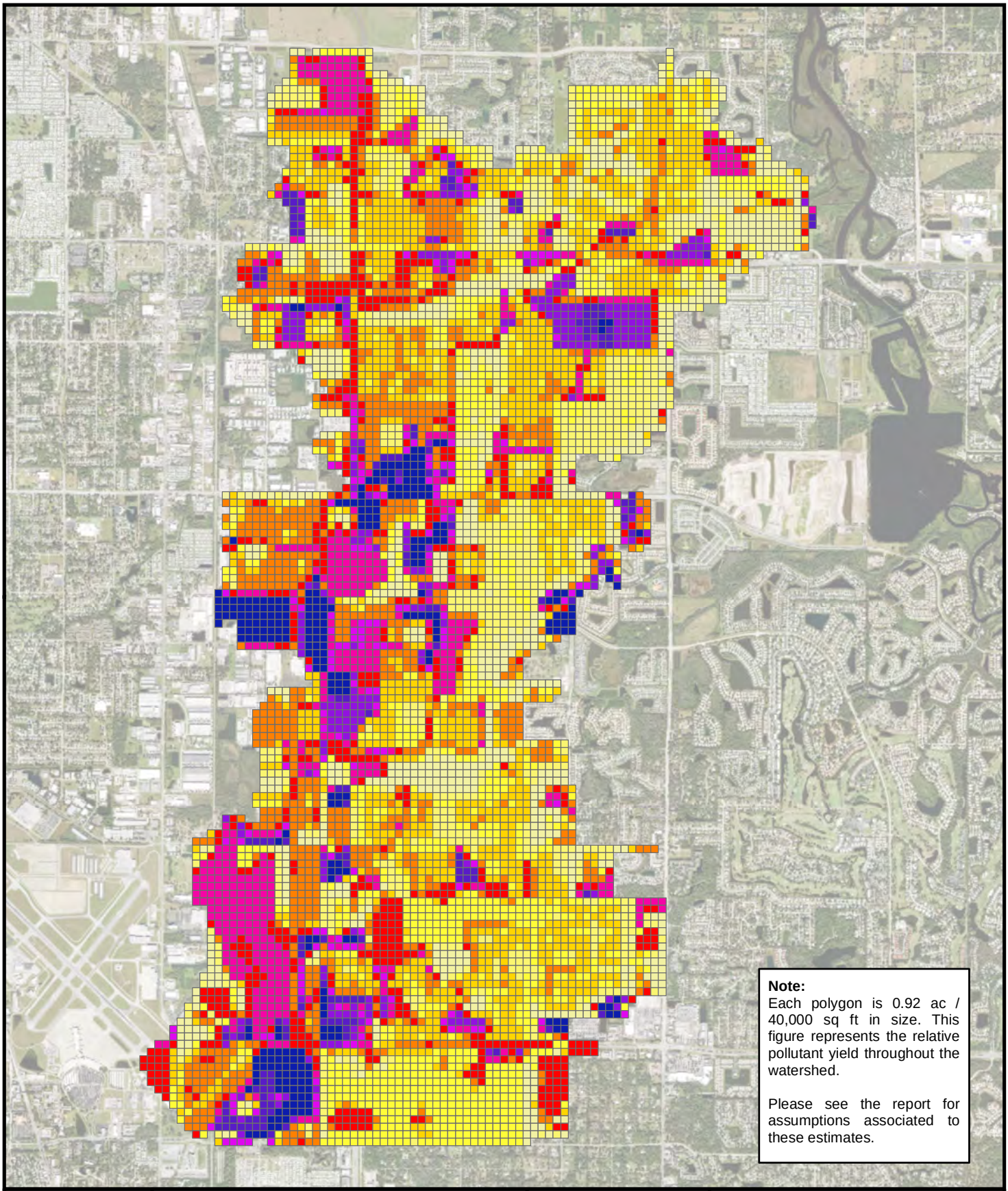
TN (lbs)					
0.00 - 0.90	1.80 - 2.58	4.11 - 4.89	6.52 - 7.64
0.91 - 1.79	2.59 - 3.34	4.90 - 5.66	7.65 - 10.21
	3.35 - 4.10	5.67 - 6.51	10.22 - 13.18

0 3,500 ft

wood.

Figure B1
Estimated Annual Stormwater Runoff TN Load (Existing)
PDGC Watershed
Manatee County, FL

Path: C:\Users\max.wallace\Wood PLC\Pearce Drain Gap Creek - General\13 GIS\13.2_MXD\Report\B1_ExCon_TN_8x11p.mxd



Notes:

1- Project No.: 600568x6

2- Data Source - ESRI Imagery
Wood

3- This map is intended to be used for planning purposes only. It is not a survey.

Date: 12/21/2021
Revised: MW
Checked By: TK

Explanation of Features

N

Estimated Annual Stormwater Runoff Load

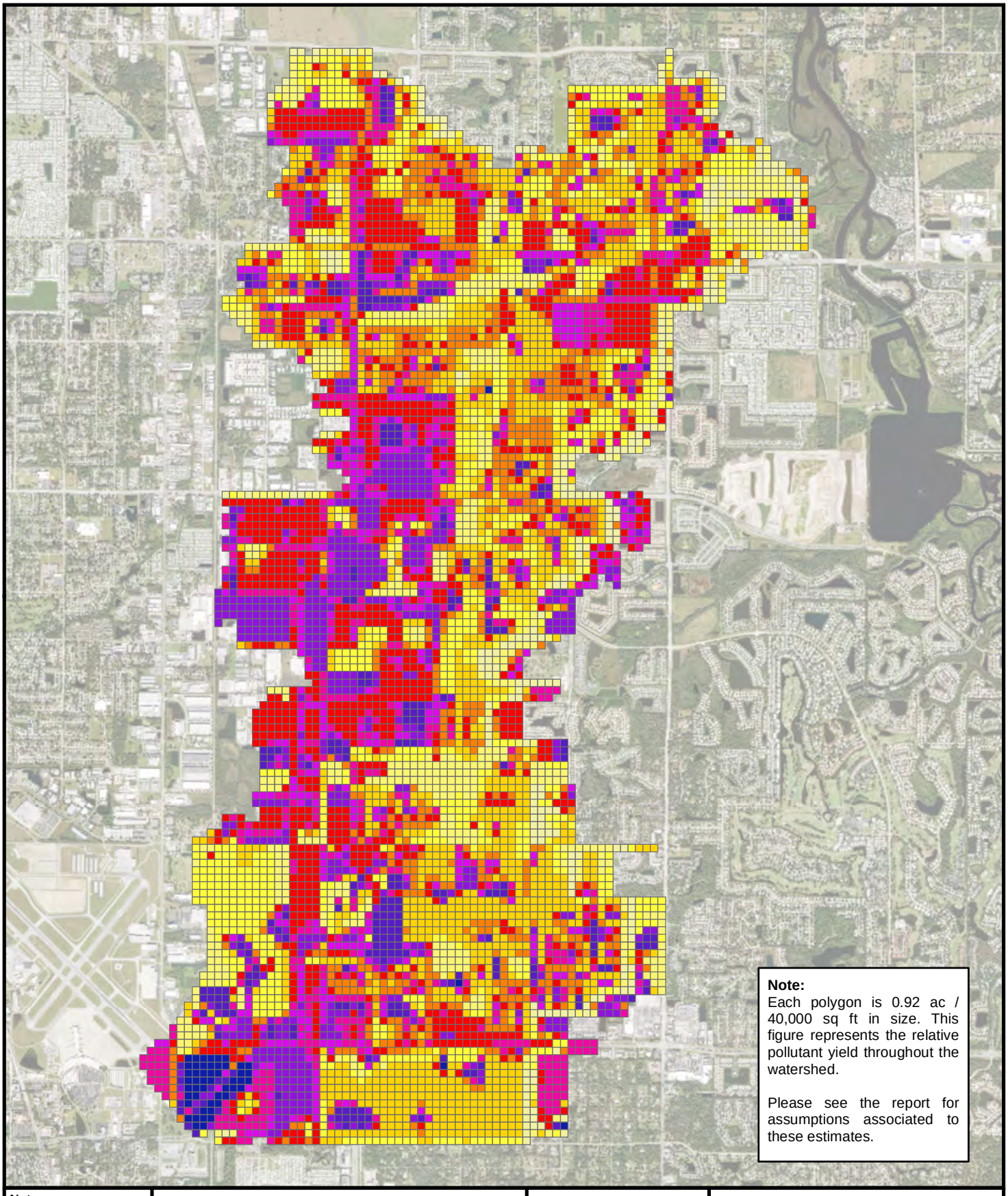
TP (lbs)					
0.00 - 0.13	0.14 - 0.26	0.27 - 0.38	0.39 - 0.49	0.50 - 0.62	0.63 - 0.79
0.80 - 0.94	0.95 - 1.07	1.08 - 1.21	1.22 - 1.33	1.34 - 1.66	

0 3,500 ft

wood.

Figure B2
Estimated Annual Stormwater Runoff TP Load (Existing)
PDGC Watershed
Manatee County, FL

Path: C:\Users\max.wallace\Wood PLC\Pearce Drain Gap Creek - General\13 GIS\13.2_MXD\Report\B2_ExCon_TP_8x11p.mxd



Notes:

1- Project No.: 600568x6

2- Data Source - ESRI Imagery
Wood

3- This map is intended to be used for planning purposes only. It is not a survey.

Date: 12/21/2021
Revised: MW
Checked By: TK

Explanation of Features

N

Estimated Annual Stormwater Runoff Load

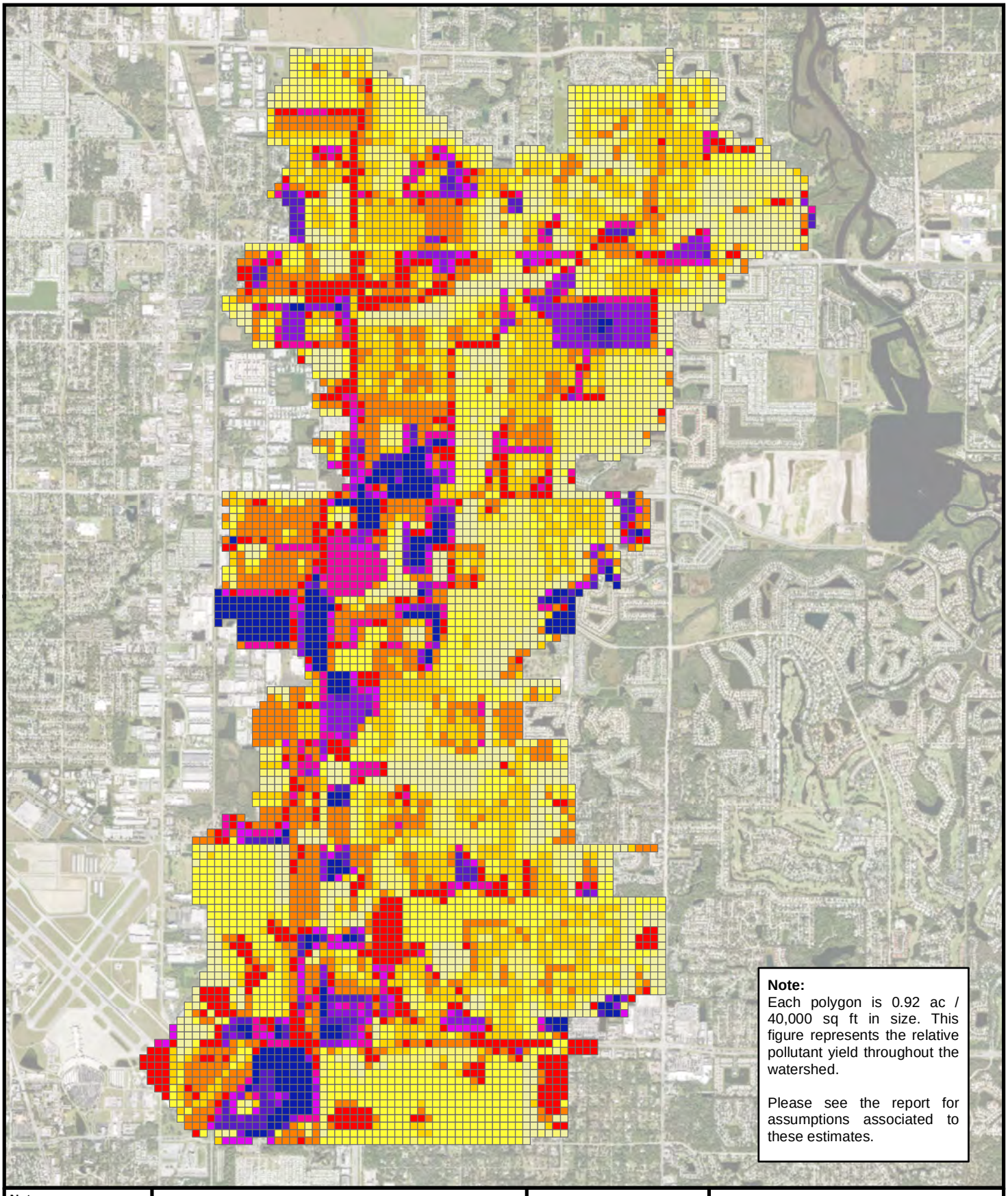
TN (lbs)					
0.00 - 0.80	1.71 - 2.55	4.09 - 4.89	6.55 - 7.65
0.81 - 1.70	2.56 - 3.29	4.90 - 5.68	7.66 - 10.21
	3.30 - 4.08	5.69 - 6.54	10.22 - 13.18

0 3,500 ft

wood.

Figure B3
Estimated Annual Stormwater Runoff TN Load (Future)
PDGC Watershed
Manatee County, FL

Path: C:\Users\max.wallace\Wood PLC\Pearce Drain Gap Creek - General\13 GIS\13.2_MXD\Report\B3_Fut_TN_8x11p.mxd



Notes:

1- Project No.: 600568x6

2- Data Source - ESRI Imagery
Wood

3- This map is intended to be used for planning purposes only. It is not a survey.

Date: 12/21/2021
Revised: MW
Checked By: TK

Explanation of Features

N

Estimated Annual Stormwater Runoff Load

TP (lbs)					
0.00 - 0.12	0.27 - 0.38	0.62 - 0.77	1.08 - 1.21		
0.13 - 0.26	0.39 - 0.48	0.78 - 0.93	1.22 - 1.33		
	0.49 - 0.61	0.94 - 1.07	1.34 - 1.69		

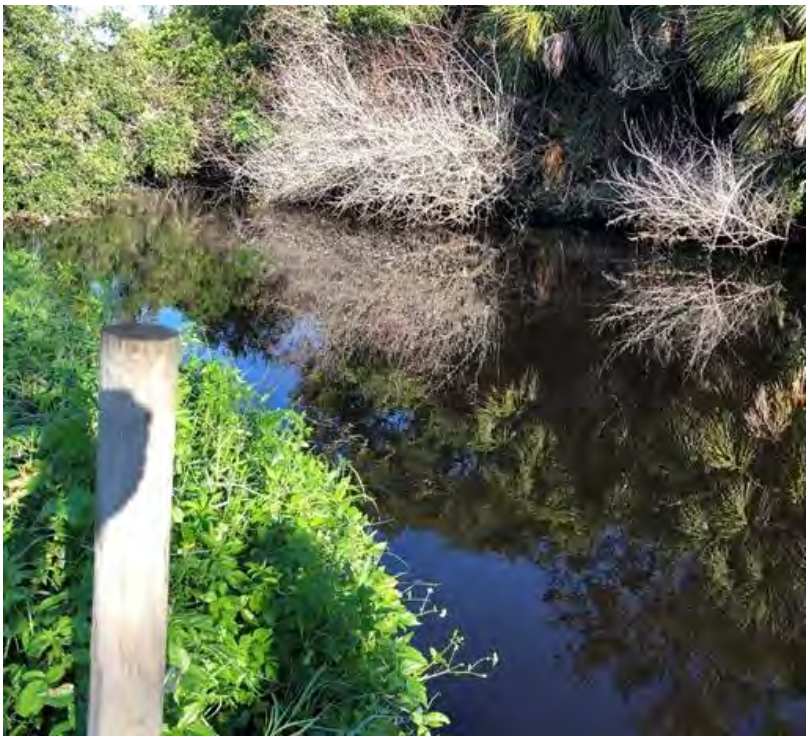
0 3,500 ft

wood.

Figure B4
Estimated Annual Stormwater Runoff TP Load (Future)
PDGC Watershed
Manatee County, FL

Path: C:\Users\max.wallace\Wood PLC\Pearce Drain Gap Creek - General\13 GIS\13.2_MXD\Report\B4_Fut_TP_8x11p.mxd

APPENDIX C
Site Visit Photos



Photograph #1: Gap Creek Looking Upstream from Dock at Braden River Park

Photograph #2: GC4- GC4- Gap Creek at Braden River Park Looking Downstream

Photograph #3: Braden River Park Open Area Along Right Bank of Gap Creek (Looking Upstream)

Photograph #4: Vegetated Swale Leading to Park Pond at Old Landfill near GC5

Photograph #5: GC5- Park Pond Paved Spillway

Photograph #6: GC5- Park Pond Erosion Control

Photograph #7: Pearce Drain at 63rd Ave E Looking Upstream from PD4

Photograph #8: PD4- Pearce Drain at 63rd Ave E Looking Upstream from Overpass

Photograph #9: PD3- Pearce Drain at Whitfield Ave Looking Upstream

Photograph #10: PD2- Pearce Drain County Conservation Easement Looking Upstream

Photograph #12: PD2- Pearce Drain County Conservation Easement Looking Downstream

Photograph #13: PD2- Pearce Drain County Conservation Easement Stormwater Outfall on Left Bank (downstream of Photo 12)

Photograph #14: PD2- Pearce Drain County Conservation Easement Culvert from Tailing Pond on Left Bank (upstream of Photo 10)

Photograph #15: Tailing Pond Impoundment Upflow Connection to Discharge upstream of PD2

Photograph #16: Unnamed Pearce Drain Tributary Culvert at 36th St E Looking Downstream

Photograph #17: Pearce Drain at 25th Court E

Photograph #18: Pearce Drain at 25th Court E Looking Downstream

Photograph #19: PD1- Pearce Drain at University Parkway (Downstream of Headwater)

Photograph #20: PD1- Pearce Drain at University Parkway on top of Culvert (Looking Downstream)

Photograph #21: PD1- Pearce Drain at University Parkway Looking Downstream

Photograph #22: GC1- Gap Creek at 301 Looking Downstream

Photograph #23: GC1- Gap Creek at 301 Looking Upstream

Photograph #24: DOT Conveyance Intersecting Gap Creek at 301 from the N at GC1

Photograph #25: DOT Swale Intersecting Gap Creek at 301 from the S at GC1

Photograph #26: PD5- Pearce Drain Looking Upstream from Confluence with Gap Creek

Photograph #27: Stormwater Pond Parallel to Pearce Drain near PD5 (Looking Upstream)

Photograph #28: Gap Creek at 37th Street E Looking Downstream at PD5

Photograph #29: Confluence of Gap Creek and Unnamed Tributary at 37th St E (Looking Downstream) at PD5

Photograph #30: Unnamed Tributary of Gap Creek along County Maintenance Yard (Looking Upstream)

Photograph #31: Unnamed Tributary of Gap Creek along County Maintenance Yard (Looking Downstream)

Photograph #32: TRIB2- Unnamed Tributary of Pearce Drain at Marble Park

Photograph #33: TRIB2- Unnamed Tributary of Pearce Drain at Marble Park Looking Downstream

Photograph #34: TRIB2- Conveyance at Unnamed Tributary of Pearce Drain Looking Upstream

Photograph #35: GC2- Gap Creek County Conservation Easement (Looking Downstream)

Photograph #36: GC2- Gap Creek County Conservation Easement (Looking Upstream)

Photograph #37: County Conservation Easement Along Gap Creek Looking Upstream from 33rd Street E at GC2

Photograph #38: TRIB1- Confluence of Gap Creek and Unnamed Tributary at 53rd Ave E

Photograph #39: TRIB1- Gap Creek at 53rd Ave E Looking Upstream

Photograph #40: TRIB1- Unnamed Tributary at 53rd Ave E Looking Upstream

Photograph #41: TRIB1- Unnamed Tributary at 53rd Ave E Looking Upstream on top of Gap Creek Confluence

Photograph #42: Stormwater Inlet Parallel to TRIB1 at 53rd Ave E (Looking Upstream)

Photograph #43: GC3- Gap Creek at 45th Street E Looking Upstream

Photograph #44: GC3- Gap Creek at 45th Street E Looking Downstream from Bridge

Photograph #45: GC3- Gap Creek at 45th Street E Looking Upstream

APPENDIX D
Sampling Laboratory Results: AEL

Advanced Environmental Laboratories, Inc
9610 Princess Palm Ave Tampa, FL 33619
Payments: P.O. Box 551580 Jacksonville, FL 32255-1580
Phone: (813)630-9616
Fax: (813)630-4327

September 26, 2021

Francesca Lauterman
Wood EIS
1101 Channelside
Suite 200
Tampa, FL 33602

RE: Workorder: T2116629 Pierce Drain

Dear Francesca Lauterman:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, September 08, 2021. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heidi Parker - Project Manager
HParker@AELLab.com

Enclosures

CERTIFICATE OF ANALYSIS

Advanced Environmental Laboratories, Inc.

Advanced Environmental Laboratories, Inc
9610 Princess Palm Ave Tampa, FL 33619
Payments: P.O. Box 551580 Jacksonville, FL 32255-1580
Phone: (813)630-9616
Fax: (813)630-4327

SAMPLE SUMMARY

Workorder: T2116629 Pierce Drain

Lab ID	Sample ID	Matrix	Date Collected	Date Received
T2116629001	TRIB 1	Water	9/7/2021 10:20	9/8/2021 13:40
T2116629002	TRIB 2	Water	9/7/2021 11:14	9/8/2021 13:40
T2116629003	CC2	Water	9/7/2021 12:14	9/8/2021 13:40
T2116629004	CC1	Water	9/7/2021 13:18	9/8/2021 13:40
T2116629005	PD4	Water	9/7/2021 14:20	9/8/2021 13:40
T2116629006	PD4 PD	Water	9/7/2021 14:20	9/8/2021 13:40

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629001** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **TRIB 1** Date Collected: 09/07/21 10:20

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.026**	**I**	**mg/L**	**1**	0.10	0.021	9/13/2021 16:58	T
Calcium	**76**		**mg/L**	**1**	1.0	0.20	9/13/2021 16:58	T
Iron	**0.38**		**mg/L**	**1**	0.10	0.0067	9/13/2021 16:58	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/13/2021 16:58	T
Magnesium	**9.9**		**mg/L**	**1**	0.10	0.080	9/13/2021 16:58	T
Potassium	**2.8**		**mg/L**	**1**	1.0	0.50	9/13/2021 16:58	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**54**		**mg/L**	**2**	10	2.0	9/14/2021 19:59	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.26**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:07	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.229**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629002** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **TRIB 2** Date Collected: 09/07/21 11:14

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.099**	**I**	**mg/L**	**1**	0.10	0.021	9/15/2021 17:36	T
Calcium	**37**		**mg/L**	**1**	1.0	0.20	9/15/2021 17:36	T
Iron	**1.2**		**mg/L**	**1**	0.10	0.0067	9/15/2021 17:36	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/15/2021 17:36	T
Magnesium	**9.0**		**mg/L**	**1**	0.10	0.080	9/15/2021 17:36	T
Potassium	**2.3**		**mg/L**	**1**	1.0	0.50	9/15/2021 17:36	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**200**		**mg/L**	**2**	10	2.0	9/14/2021 20:15	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.35**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:08	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.375**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629003** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **CC2** Date Collected: 09/07/21 12:14

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.021**	**U**	**mg/L**	**1**	0.10	0.021	9/13/2021 17:04	T
Calcium	**56**		**mg/L**	**1**	1.0	0.20	9/13/2021 17:04	T
Iron	**0.47**		**mg/L**	**1**	0.10	0.0067	9/13/2021 17:04	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/13/2021 17:04	T
Magnesium	**7.3**		**mg/L**	**1**	0.10	0.080	9/13/2021 17:04	T
Potassium	**2.5**		**mg/L**	**1**	1.0	0.50	9/13/2021 17:04	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**31**		**mg/L**	**2**	10	2.0	9/14/2021 20:31	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.42**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:09	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.395**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629004** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **CC1** Date Collected: 09/07/21 13:18

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.077**	**I**	**mg/L**	**1**	0.10	0.021	9/14/2021 13:08	T
Calcium	**54**		**mg/L**	**1**	1.0	0.20	9/14/2021 13:08	T
Iron	**0.34**		**mg/L**	**1**	0.10	0.0067	9/14/2021 13:08	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/14/2021 13:08	T
Magnesium	**7.0**		**mg/L**	**1**	0.10	0.080	9/14/2021 13:08	T
Potassium	**2.5**		**mg/L**	**1**	1.0	0.50	9/14/2021 13:08	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**19**		**mg/L**	**2**	10	2.0	9/14/2021 20:47	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.31**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:10	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.317**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629005** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **PD4** Date Collected: 09/07/21 14:20

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.065**	**I**	**mg/L**	**1**	0.10	0.021	9/14/2021 13:11	T
Calcium	**50**		**mg/L**	**1**	1.0	0.20	9/14/2021 13:11	T
Iron	**0.28**		**mg/L**	**1**	0.10	0.0067	9/14/2021 13:11	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/14/2021 13:11	T
Magnesium	**13**		**mg/L**	**1**	0.10	0.080	9/14/2021 13:11	T
Potassium	**3.9**		**mg/L**	**1**	1.0	0.50	9/14/2021 13:11	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**62**		**mg/L**	**2**	10	2.0	9/14/2021 22:07	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.30**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:10	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.278**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

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ANALYTICAL RESULTS

Workorder: T2116629 Pierce Drain

Lab ID: **T2116629006** Date Received: 09/08/21 13:40 Matrix: Water

Sample ID: **PD4 PD** Date Collected: 09/07/21 14:20

Sample Description: Location:

Parameters	Results	Qual	Units	DF	Adjusted PQL	Adjusted MDL	Analyzed	Lab
METALS								
Analysis Desc: E200.7 Analysis,Waters	Preparation Method: EPA 200.7 Analytical Method: EPA 200.7							
Aluminum	**0.061**	**I**	**mg/L**	**1**	0.10	0.021	9/14/2021 13:14	T
Calcium	**51**		**mg/L**	**1**	1.0	0.20	9/14/2021 13:14	T
Iron	**0.31**		**mg/L**	**1**	0.10	0.0067	9/14/2021 13:14	T
Lead	**0.0030**	**U**	**mg/L**	**1**	0.010	0.0030	9/14/2021 13:14	T
Magnesium	**13**		**mg/L**	**1**	0.10	0.080	9/14/2021 13:14	T
Potassium	**4.0**		**mg/L**	**1**	1.0	0.50	9/14/2021 13:14	T
WET CHEMISTRY								
Analysis Desc: IC,E300.0,Water	Analytical Method: EPA 300.0							
Sulfate	**62**		**mg/L**	**2**	10	2.0	9/14/2021 22:55	T
Analysis Desc: Orthophosphate,E365.1,Water	Analytical Method: EPA 365.1							
Orthophosphate	**0.29**		**mg/L**	**1**	0.020	0.013	9/8/2021 16:11	T
Analysis Desc: Total Phosphorus,E365.3,Analysis	Preparation Method: EPA 365.3 Analytical Method: EPA 365.3							
Total Phosphorus (as P)	**0.264**		**mg/L**	**1**	0.01	0.005	9/16/2021 11:51	G

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS QUALIFIERS

Workorder: T2116629 Pierce Drain

PARAMETER QUALIFIERS

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

LAB QUALIFIERS

G	DOH Certification #E82001(AEL-G)(FL NELAC Certification)
T	DOH Certification #E84589(AEL-T)(FL NELAC Certification)

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QUALITY CONTROL DATA

Workorder: T2116629 Pierce Drain

QC Batch: WCAt/6759 Analysis Method: EPA 365.1
QC Batch Method: EPA 365.1 Prepared:
Associated Lab Samples: T2116629001, T2116629002, T2116629003, T2116629004, T2116629005, T2116629006

METHOD BLANK: 4020372

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
WET CHEMISTRY				
Orthophosphate	mg/L	0.013	0.013	U

QC Batch: DGMt/2473 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Prepared: 09/10/2021 10:30
Associated Lab Samples: T2116629001, T2116629002, T2116629003

METHOD BLANK: 4021979

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
METALS				
Aluminum	mg/L	0.021	0.021	U
Calcium	mg/L	0.20	0.20	U
Iron	mg/L	0.0067	0.0067	U
Potassium	mg/L	0.50	0.50	U
Magnesium	mg/L	0.080	0.080	U
Lead	mg/L	0.0030	0.0030	U

QC Batch: DGMt/2483 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Prepared: 09/13/2021 12:00
Associated Lab Samples: T2116629004, T2116629005, T2116629006

METHOD BLANK: 4023631

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
METALS				
Aluminum	mg/L	0.021	0.021	U
Calcium	mg/L	0.20	0.20	U
Iron	mg/L	0.0067	0.0067	U
Potassium	mg/L	0.50	0.50	U
Magnesium	mg/L	0.080	0.080	U
Lead	mg/L	0.0030	0.0030	U

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QUALITY CONTROL DATA

Workorder: T2116629 Pierce Drain

QC Batch: WCAt/6915 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Prepared:
Associated Lab Samples: T2116629001, T2116629002, T2116629003, T2116629004, T2116629005, T2116629006

METHOD BLANK: 4027218

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
WET CHEMISTRY				
Sulfate	mg/L	1.0	1.0	U

QC Batch: WCAg/3800 Analysis Method: EPA 365.3
QC Batch Method: EPA 365.3 Prepared: 09/15/2021 12:10
Associated Lab Samples: T2116629001, T2116629002, T2116629003, T2116629004, T2116629005, T2116629006

METHOD BLANK: 4029660

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
WET CHEMISTRY				
Total Phosphorus (as P)	mg/L	0.005	0.005	U

METHOD BLANK: 4029666

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
WET CHEMISTRY				
Total Phosphorus (as P)	mg/L	0.005	0.005	U

QUALITY CONTROL DATA QUALIFIERS

Workorder: T2116629 Pierce Drain

QUALITY CONTROL PARAMETER QUALIFIERS

U The compound was analyzed for but not detected.

I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

[1] Samples were ran by AA

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: T2116629 Pierce Drain

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
T2116629001	TRIB 1			EPA 365.1	WCAt/6759
T2116629002	TRIB 2			EPA 365.1	WCAt/6759
T2116629003	CC2			EPA 365.1	WCAt/6759
T2116629004	CC1			EPA 365.1	WCAt/6759
T2116629005	PD4			EPA 365.1	WCAt/6759
T2116629006	PD4 PD			EPA 365.1	WCAt/6759
T2116629001	TRIB 1	EPA 200.7	DGMt/2473	EPA 200.7	ICPt/1852
T2116629003	CC2	EPA 200.7	DGMt/2473	EPA 200.7	ICPt/1852
T2116629002	TRIB 2	EPA 200.7	DGMt/2473	EPA 200.7	ICPt/1869
T2116629004	CC1	EPA 200.7	DGMt/2483	EPA 200.7	ICPt/1856
T2116629005	PD4	EPA 200.7	DGMt/2483	EPA 200.7	ICPt/1856
T2116629006	PD4 PD	EPA 200.7	DGMt/2483	EPA 200.7	ICPt/1856
T2116629001	TRIB 1			EPA 300.0	WCAt/6915
T2116629002	TRIB 2			EPA 300.0	WCAt/6915
T2116629003	CC2			EPA 300.0	WCAt/6915
T2116629004	CC1			EPA 300.0	WCAt/6915
T2116629005	PD4			EPA 300.0	WCAt/6915
T2116629006	PD4 PD			EPA 300.0	WCAt/6915
T2116629001	TRIB 1	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801
T2116629002	TRIB 2	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801
T2116629003	CC2	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801
T2116629004	CC1	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801
T2116629005	PD4	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801
T2116629006	PD4 PD	EPA 365.3	WCAg/3800	EPA 365.3	WCAg/3801

Advanced Environmental Laboratories, Inc.

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☐ Fort Myers: 13100 Westlinks Terrace, Ste. 10, FL 33913 • 239.674.8130 • Lab ID: E84492
☐ Jacksonville: 6681 Southpoint Pkwy., FL 32216 • 904.363.9350 • Lab ID: E82574
☐ Tallahassee: 2639 North Monroe St., Suite D, FL 32303 • 850.219.6274 • Lab ID: E811095
☐ Gainesville: 4965 SW 41st Blvd., FL 32608 • 352.377.2349 • Lab ID: E82001
☐ Miramar: 10200 USA Today Way, FL 33025 • 954.889.2288 • Lab ID: E82535
☒ Tampa: 9610 Princess Palm Ave., FL 33619 • 813.630.9616 • Lab ID: E84589

Client Name: Wood PLC	Project Name: RAPCR/PIERCE DRAIN
Address: 1101 Channelside Dr #200	Project Number:
Tampa, FL 33602	PO Number:
Phone: 813-289-0750	FDEP Facility No:
FAX:	FDEP Facility Addr:
Contact: Francesca Lauterman	
Sampled By:	Special Instructions:
Turn Around Time: Standard Rush	
AEL Profile #: 67749	ADaPT EQuIS Other

* T 2 1 1 6 6 2 9 *

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT	BOTTLE SIZE & TYPE	ANALYSIS REQUIRED: Mets,	SOH	OP	TP	LABORATORY I.D. NUMBER
							Preservation					
							Field-Filtered?					
TRIB 1	27.446299 -82.510609		9/7/21	10:20	SW							001
TRIB 2	27.448256 -82.517695		9/7/21	11:14	SW							002
EC2	27.444094 -82.521981		9/7/21	12:14	SW							003
EC1	27.442673 -82.527921		9/7/21	13:18	SW							004
POH	27.428908 -82.519449		9/7/21	14:20	SW							005
POH FD	27.428908 -82.519449		9/7/21	14:20	SW							006

Matrix Code: WW = wastewater SW = surface water GW = ground water DW = drinking water O = oil A = air SO = soil SL = sludge

Preservation Code: I = ice H=(HCl) S = (H2SO4) N = (HNO3) T = (Sodium Thiosulfate)

Received on Ice ☒ Yes ☐ No ☒ Temp taken from sample ☐ Temp from blank ☒ Where required, pH checked

Temp. when received (observed): 0 °C Temp. when received (corrected): 0 °C

DCN: AD-D051web Form last revised 08/07/2019

Device used for measuring Temp by unique identifier (circle IR temp gun used) J: 9A G: LT-1 LT-2 T: 10A A: 3A M: 3A S: 1V F: 1A

	Relinquished by:	Date	Time	Received by:	Date	Time
1		9/7/21	16:00		9/8/21	09:15
2		9/8/21	0920			
3		9/8/21	13:35		9/8/21	1340
4						

FOR DRINKING WATER USE:

(When PWS Information not otherwise supplied) PWS ID: _____

Contact Person: _____

Supplier of Water: _____

Site-Address: _____

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Phone: (813) 630-9616
Fax: (813) 630-4327

Workorder: Pearce Drain (T2118186)

October 21, 2021

Francesca Lauterman
Wood EIS
1101 Channelside
Suite 200
Tampa, FL 33602

RE: Workorder: T2118186 Pearce Drain

Dear Francesca Lauterman:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday September 30, 2021. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heidi Parker
HParker@aellab.com

Certificate of Analysis

NELAP Accredited E84589

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Workorder: Wood PLC (T2118186)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported
T2118186001	GC5	WA	EPA 200.7	09/29/2021 09:30	09/30/2021 14:15	6
T2118186001	GC5	WA	EPA 300.0	09/29/2021 09:30	09/30/2021 14:15	1
T2118186001	GC5	WA	EPA 365.1	09/29/2021 09:30	09/30/2021 14:15	1
T2118186001	GC5	WA	EPA 365.3	09/29/2021 09:30	09/30/2021 14:15	1
T2118186002	GC4	WA	EPA 200.7	09/29/2021 10:45	09/30/2021 14:15	6
T2118186002	GC4	WA	EPA 300.0	09/29/2021 10:45	09/30/2021 14:15	1
T2118186002	GC4	WA	EPA 365.1	09/29/2021 10:45	09/30/2021 14:15	1
T2118186002	GC4	WA	EPA 365.3	09/29/2021 10:45	09/30/2021 14:15	1
T2118186003	GC3	WA	EPA 200.7	09/29/2021 11:40	09/30/2021 14:15	6
T2118186003	GC3	WA	EPA 300.0	09/29/2021 11:40	09/30/2021 14:15	1
T2118186003	GC3	WA	EPA 365.1	09/29/2021 11:40	09/30/2021 14:15	1
T2118186003	GC3	WA	EPA 365.3	09/29/2021 11:40	09/30/2021 14:15	1
T2118186004	GC3 DUP	WA	EPA 200.7	09/29/2021 11:57	09/30/2021 14:15	6
T2118186004	GC3 DUP	WA	EPA 300.0	09/29/2021 11:57	09/30/2021 14:15	1
T2118186004	GC3 DUP	WA	EPA 365.1	09/29/2021 11:57	09/30/2021 14:15	1
T2118186004	GC3 DUP	WA	EPA 365.3	09/29/2021 11:57	09/30/2021 14:15	1
T2118186005	PD5	WA	EPA 200.7	09/29/2021 13:00	09/30/2021 14:15	6
T2118186005	PD5	WA	EPA 300.0	09/29/2021 13:00	09/30/2021 14:15	1
T2118186005	PD5	WA	EPA 365.1	09/29/2021 13:00	09/30/2021 14:15	1
T2118186005	PD5	WA	EPA 365.3	09/29/2021 13:00	09/30/2021 14:15	1
T2118186006	PD3	WA	EPA 200.7	09/29/2021 13:45	09/30/2021 14:15	6
T2118186006	PD3	WA	EPA 300.0	09/29/2021 13:45	09/30/2021 14:15	1
T2118186006	PD3	WA	EPA 365.1	09/29/2021 13:45	09/30/2021 14:15	1
T2118186006	PD3	WA	EPA 365.3	09/29/2021 13:45	09/30/2021 14:15	1
T2118186007	PD2	WA	EPA 200.7	09/29/2021 14:20	09/30/2021 14:15	6
T2118186007	PD2	WA	EPA 300.0	09/29/2021 14:20	09/30/2021 14:15	1
T2118186007	PD2	WA	EPA 365.1	09/29/2021 14:20	09/30/2021 14:15	1
T2118186007	PD2	WA	EPA 365.3	09/29/2021 14:20	09/30/2021 14:15	1
T2118186008	PD1	WA	EPA 200.7	09/29/2021 14:55	09/30/2021 14:15	6
T2118186008	PD1	WA	EPA 300.0	09/29/2021 14:55	09/30/2021 14:15	1
T2118186008	PD1	WA	EPA 365.1	09/29/2021 14:55	09/30/2021 14:15	1
T2118186008	PD1	WA	EPA 365.3	09/29/2021 14:55	09/30/2021 14:15	1

Certificate of Analysis

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Fax: (813) 630-4327

Workorder: Wood PLC (T2118186)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Lab Qualifiers

G	DOH Certification #E82001 (FL NELAC) AEL-Gainesville
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186001 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: GC5 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	0.021U	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:27	T
Calcium	**23**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:27	T
Iron	**1.3**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:27	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:27	T
Magnesium	**2.9**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:27	T
Potassium	**1.7**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:27	T
Wet Chemistry (EPA 300.0)								
Sulfate	2.0U	mg/L	10	2.0	2	10/07/2021 19:12	10/07/2021 19:12	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.04**	mg/L	0.02	0.013	1	09/30/2021 16:08	09/30/2021 16:08	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.142**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186002 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: GC4 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	**0.063I**	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:30	T
Calcium	**71**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:30	T
Iron	**0.40**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:30	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:30	T
Magnesium	**15**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:30	T
Potassium	**4.7**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:30	T
Wet Chemistry (EPA 300.0)								
Sulfate	**71**	mg/L	10	2.0	2	10/07/2021 19:28	10/07/2021 19:28	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	09/30/2021 16:09	09/30/2021 16:09	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.320**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186003 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: GC3 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	0.021U	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:33	T
Calcium	**77**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:33	T
Iron	**0.36**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:33	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:33	T
Magnesium	**14**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:33	T
Potassium	**3.9**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:33	T
Wet Chemistry (EPA 300.0)								
Sulfate	**80**	mg/L	10	2.0	2	10/07/2021 19:44	10/07/2021 19:44	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	09/30/2021 16:10	09/30/2021 16:10	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.306**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186004 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: GC3 DUP **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	0.021U	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:41	T
Calcium	**75**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:41	T
Iron	**0.36**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:41	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:41	T
Magnesium	**14**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:41	T
Potassium	**3.9**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:41	T
Wet Chemistry (EPA 300.0)								
Sulfate	**76**	mg/L	10	2.0	2	10/07/2021 20:00	10/07/2021 20:00	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	09/30/2021 16:11	09/30/2021 16:11	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.308**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

Certificate of Analysis

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Fax: (813) 630-4327

Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186005 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: PD5 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	**0.024I**	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:44	T
Calcium	**69**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:44	T
Iron	**0.36**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:44	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:44	T
Magnesium	**15**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:44	T
Potassium	**4.0**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:44	T
Wet Chemistry (EPA 300.0)								
Sulfate	**81**	mg/L	10	2.0	2	10/07/2021 21:21	10/07/2021 21:21	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	09/30/2021 16:12	09/30/2021 16:12	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.302**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Fax: (813) 630-4327

Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186006 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: PD3 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	**0.073I**	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:47	T
Calcium	**61**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:47	T
Iron	**0.21**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:47	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:47	T
Magnesium	**15**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:47	T
Potassium	**4.2**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:47	T
Wet Chemistry (EPA 300.0)								
Sulfate	**74**	mg/L	10	2.0	2	10/07/2021 21:36	10/07/2021 21:36	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.4**	mg/L	0.02	0.013	1	09/30/2021 16:13	09/30/2021 16:13	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.393**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186007 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: PD2 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	**0.053I**	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:50	T
Calcium	**76**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:50	T
Iron	**0.24**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:50	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:50	T
Magnesium	**21**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:50	T
Potassium	**4.5**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:50	T
Wet Chemistry (EPA 300.0)								
Sulfate	**125**	mg/L	10	2.0	2	10/07/2021 21:52	10/07/2021 21:52	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.4**	mg/L	0.02	0.013	1	09/30/2021 16:16	09/30/2021 16:16	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.357**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

Analytical Results

Lab ID: T2118186008 **Date Collected:** 9/29/2021 **Matrix:** Water
Sample ID: PD1 **Date Received:** 9/30/2021

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
Metals (EPA 200.7)								
Aluminum	0.021U	mg/L	0.10	0.021	1	10/01/2021 08:00	10/01/2021 16:53	T
Calcium	**130**	mg/L	1.0	0.20	1	10/01/2021 08:00	10/01/2021 16:53	T
Iron	**0.56**	mg/L	0.10	0.0067	1	10/01/2021 08:00	10/01/2021 16:53	T
Lead	0.0030U	mg/L	0.010	0.0030	1	10/01/2021 08:00	10/01/2021 16:53	T
Magnesium	**25**	mg/L	0.10	0.080	1	10/01/2021 08:00	10/01/2021 16:53	T
Potassium	**1.5**	mg/L	1.0	0.50	1	10/01/2021 08:00	10/01/2021 16:53	T
Wet Chemistry (EPA 300.0)								
Sulfate	**58**	mg/L	10	2.0	2	10/07/2021 22:08	10/07/2021 22:08	T
Wet Chemistry (EPA 365.1)								
Orthophosphate	**0.1**	mg/L	0.02	0.013	1	09/30/2021 16:19	09/30/2021 16:19	T
Wet Chemistry (EPA 365.3)								
Total Phosphorus (as P)	**0.129**	mg/L	0.01	0.005	1	10/06/2021 12:59	10/07/2021 11:47	G

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: ICPt/1922 **Analysis Method:** EPA 200.7
Preparation Method: EPA 200.7
Associated Lab IDs: T2118186001, T2118186002, T2118186003, T2118186004, T2118186005, T2118186006, T2118186007, T2118186008

Method Blank(4046846)

Parameter	Results	Units	PQL	MDL	Lab
Aluminum	0.021U	mg/L	0.10	0.021	T
Calcium	0.20U	mg/L	1.0	0.20	T
Iron	0.0067U	mg/L	0.10	0.0067	T
Potassium	0.50U	mg/L	1.0	0.50	T
Magnesium	0.080U	mg/L	0.10	0.080	T
Lead	0.0030U	mg/L	0.010	0.0030	T

Lab Control Sample (4046847)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Aluminum	mg/L	1	1.1	106	85 - 115	T
Calcium	mg/L	10	11	110	85 - 115	T
Iron	mg/L	1	1.1	108	85 - 115	T
Potassium	mg/L	10	10	104	85 - 115	T
Magnesium	mg/L	10	10	100	85 - 115	T
Lead	mg/L	1	1.1	107	85 - 115	T

Lab Control Sample (4046847)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Aluminum	mg/L	1	1.1	106	85 - 115	T
Calcium	mg/L	10	11	110	85 - 115	T
Iron	mg/L	1	1.1	108	85 - 115	T
Potassium	mg/L	10	10	104	85 - 115	T
Magnesium	mg/L	10	10	100	85 - 115	T
Lead	mg/L	1	1.1	107	85 - 115	T

Matrix Spike (4046848); Matrix Spike Duplicate (4046849)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Aluminum	mg/L	1	1.1	110	70 - 130	1.1	109	0	20	T
Calcium	mg/L	10	73	113	70 - 130	73	114	0	20	T
Iron	mg/L	1	1.2	110	70 - 130	1.2	109	0	20	T
Potassium	mg/L	10	11	104	70 - 130	11	104	0	20	T

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Workorder: Wood PLC (T2118186)

QC Batch: ICPt/1922 **Analysis Method:** EPA 200.7
Preparation Method: EPA 200.7
Associated Lab IDs: T2118186001, T2118186002, T2118186003, T2118186004, T2118186005, T2118186006, T2118186007, T2118186008

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Magnesium	mg/L	10	28	103	70 - 130	28	102	0	20	T
Lead	mg/L	1	1.1	107	70 - 130	1.1	105	1	20	T

Matrix Spike (4046850); Matrix Spike Duplicate (4046851)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Aluminum	mg/L	1	1.3	116	70 - 130	1.3	116	0	20	T
Calcium	mg/L	10	44	126	70 - 130	44	126	0	20	T
Iron	mg/L	1	1.5	114	70 - 130	1.5	112	1	20	T
Potassium	mg/L	10	14	109	70 - 130	14	109	0	20	T
Magnesium	mg/L	10	24	110	70 - 130	24	109	0	20	T
Lead	mg/L	1	1.1	109	70 - 130	1.1	109	0	20	T

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAg/3994 **Analysis Method:** EPA 365.3
Preparation Method: EPA 365.3
Associated Lab IDs: T2118186001, T2118186002, T2118186003

Method Blank(4055402)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005U	mg/L	0.01	0.005	G

Lab Control Sample (4055404)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Phosphorus (as P)	mg/L	0.10	.08	83	80 - 120	G

Matrix Spike (4055405); Matrix Spike Duplicate (4055406)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Phosphorus (as P)	mg/L	0.25	.26	97	80 - 120	.26	97	1	20	G

Method Blank(4055408)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005U	mg/L	0.01	0.005	G

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAg/3996 **Analysis Method:** EPA 365.3
Preparation Method: EPA 365.3
Associated Lab IDs: T2118186004, T2118186005, T2118186006, T2118186007, T2118186008

Method Blank(4055594)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005U	mg/L	0.01	0.005	G

Lab Control Sample (4055596)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Phosphorus (as P)	mg/L	0.10	.08	80	80 - 120	G

Matrix Spike (4055597); Matrix Spike Duplicate (4055598)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Phosphorus (as P)	mg/L	0.25	.54	91	80 - 120	.53	89	1	20	G

Method Blank(4055600)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005U	mg/L	0.01	0.005	G

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAt/7281 **Analysis Method:** EPA 365.1
Preparation Method: EPA 365.1
Associated Lab IDs: T2118186001, T2118186002, T2118186003, T2118186004, T2118186005, T2118186006

Method Blank(4045144)

Parameter	Results	Units	PQL	MDL	Lab
Orthophosphate	0.013U	mg/L	0.020	0.013	T

Lab Control Sample (4045145); Lab Control Sample Duplicate (4045146)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Orthophosphate	mg/L	0.50	.5	95	90 - 110			5		T

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAt/7303
Preparation Method: EPA 365.1
Associated Lab IDs: T2118186007, T2118186008
Analysis Method: EPA 365.1

Method Blank(4046361)

Parameter	Results	Units	PQL	MDL	Lab
Orthophosphate	0.013U	mg/L	0.020	0.013	T

Lab Control Sample (4046362); Lab Control Sample Duplicate (4046363)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Orthophosphate	mg/L	0.50	.5	99	90 - 110			4		T

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAt/7483 **Analysis Method:** EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: T2118186001, T2118186002, T2118186003, T2118186004, T2118186005, T2118186006, T2118186007, T2118186008

Method Blank(4057694)

Parameter	Results	Units	PQL	MDL	Lab
Sulfate	1.0U	mg/L	5.0	1.0	T

Lab Control Sample (4057695); Lab Control Sample Duplicate (4057696)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Sulfate	mg/L	25	26	104	90 - 110	26	105	1	10	T

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Workorder: Wood PLC (T2118186)

QC Results

QC Batch: WCAt/7483 **Analysis Method:** EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: T2118186005, T2118186006, T2118186007, T2118186008

Matrix Spike (4057699); Matrix Spike Duplicate (4057700)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Sulfate	mg/L	20	72	96	90 - 110	72	95	0	10	T

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Workorder: Wood PLC (T2118186)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPt/1922 - EPA 200.7			
T2118186001	GC5	DGMt/2621	EPA 200.7
T2118186002	GC4	DGMt/2621	EPA 200.7
T2118186003	GC3	DGMt/2621	EPA 200.7
T2118186004	GC3 DUP	DGMt/2621	EPA 200.7
T2118186005	PD5	DGMt/2621	EPA 200.7
T2118186006	PD3	DGMt/2621	EPA 200.7
T2118186007	PD2	DGMt/2621	EPA 200.7
T2118186008	PD1	DGMt/2621	EPA 200.7
WCAg/3994 - EPA 365.3			
T2118186001	GC5	WCAg/3993	EPA 365.3
T2118186002	GC4	WCAg/3993	EPA 365.3
T2118186003	GC3	WCAg/3993	EPA 365.3
WCAg/3996 - EPA 365.3			
T2118186004	GC3 DUP	WCAg/3995	EPA 365.3
T2118186005	PD5	WCAg/3995	EPA 365.3
T2118186006	PD3	WCAg/3995	EPA 365.3
T2118186007	PD2	WCAg/3995	EPA 365.3
T2118186008	PD1	WCAg/3995	EPA 365.3
WCAt/7281 - EPA 365.1			
T2118186001	GC5		
T2118186002	GC4		
T2118186003	GC3		
T2118186004	GC3 DUP		
T2118186005	PD5		
T2118186006	PD3		
WCAt/7303 - EPA 365.1			
T2118186007	PD2		
T2118186008	PD1		

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Workorder: Wood PLC (T2118186)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
WCAt/7483 - EPA 300.0			
T2118186001	GC5		
T2118186002	GC4		
T2118186003	GC3		
T2118186004	GC3 DUP		
T2118186005	PD5		
T2118186006	PD3		
T2118186007	PD2		
T2118186008	PD1		

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☐ **Fort Myers:** 13100 Westlinks Terrace, Ste. 10, FL 33913 • 239.674.8130 • Lab ID: E84492
☐ **Jacksonville:** 6681 Southpoint Pkwy., FL 32216 • 904.363.9350 • Lab ID: E82574
☐ **Tallahassee:** 2639 North Monroe St., Suite D, FL 32303 • 850.219.6274 • Lab ID: E811095
☐ **Gainesville:** 4965 SW 41st Blvd., FL 32608 • 352.377.2349 • Lab ID: E82001
☐ **Miramar:** 10200 USA Today Way, FL 33025 • 954.889.2288 • Lab ID: E82535
☑ **Tampa:** 9610 Princess Palm Ave., FL 33619 • 813.630.9616 • Lab ID: E84589

Client Name:	Wood PLC	Project Name:	
Address:	1101 Channelside Dr #200	Project Number:	
	Tampa, FL 33602	PO Number:	
Phone:	813-289-0750	FDEP Facility No:	
FAX:		FDEP Facility Addr:	
Contact:	Francesca Lauterman		
Sampled By:		Special Instructions:	
Turn Around Time:	Standard Rush		
AEL Profile #:	67719	ADaPT EQuIS Other	

T2118186

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT	Preservation	Field-Filtered?	BOTTLE SIZE & TYPE	ANALYSIS REQUIRED: Metals	SO4	OR	TR	LABORATORY I.D. NUMBER
GC5	GAP Creek Pond		9/29/21	0930	SW					X	X	X	X	001
GC4	GAP Creek		9/29/21	1035	SW									002
GC3	GAP Creek @ 45th ST		9/29	11:40	SW									003
GC3	GAP Creek @ 45th ST		9/29	11:57	SW									004
PD5	Pierce Drain @ 39th		9/29	13:20	SW									005
PD3	Pierce Drain @ Whitfield		9/29	1545	SW									006
PD2	Pierce Drain @ Telecast		9/29	1420	SW									007
PD1	Pierce Drain @ University		9/29	1455	SW									008

Matrix Code: **WW** = wastewater **SW** = surface water **GW** = ground water **DW** = drinking water **O** = oil **A** = air **SO** = soil **SL** = sludge

Preservation Code: I = ice H=(HCl) S = (H_2SO_4) N = (HNO_3) T = (Sodium Thiosulfate)

Received on Ice ☑ Yes ☐ No ☑ Temp taken from sample ☐ Temp from blank ☑ Where required, pH checked

Temp. when received (observed) 0 °C Temp. when received (corrected) 0 °C

DCN: AD-D051web Form last revised 08/07/2019

Device used for measuring Temp by unique identifier (circle IR temp gun used) J: 9A G: LT-1 LT-2 T: 10A A: 3A M: 3A S: 1V F: 1A

	Relinquished by:	Date	Time	Received by:	Date	Time
1	S. Browning	9/29/21	16:30		9302	09:20
2		9/30/21	0920			
3		9/30/21	14:10		9/30/21	1415
4						

FOR DRINKING WATER USE:

(When PWS Information not otherwise supplied) PWS ID:

Contact Person:

Supplier of Water:

Site-Address:

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

February 14, 2022

Francesca Lauterman
Wood EIS
1101 Channelside
Suite 200
Tampa, FL 33602

RE: Workorder: T2121967 PierceDrain/ GapCreek-AMENDED

Dear Francesca Lauterman:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday November 17, 2021. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heidi Parker

Heidi Parker, Project Manager
HParker@aellab.com

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported
T2121967001	Trlb2	WA	EPA 200.7	11/16/2021 09:16	11/17/2021 13:00	6
T2121967001	Trlb2	WA	EPA 300.0	11/16/2021 09:16	11/17/2021 13:00	1
T2121967001	Trlb2	WA	EPA 365.1	11/16/2021 09:16	11/17/2021 13:00	1
T2121967001	Trlb2	WA	EPA 365.3	11/16/2021 09:16	11/17/2021 13:00	1
T2121967002	PD5	WA	EPA 200.7	11/16/2021 09:46	11/17/2021 13:00	6
T2121967002	PD5	WA	EPA 300.0	11/16/2021 09:46	11/17/2021 13:00	1
T2121967002	PD5	WA	EPA 365.1	11/16/2021 09:46	11/17/2021 13:00	1
T2121967002	PD5	WA	EPA 365.3	11/16/2021 09:46	11/17/2021 13:00	1
T2121967003	Trlb1	WA	EPA 200.7	11/16/2021 10:23	11/17/2021 13:00	6
T2121967003	Trlb1	WA	EPA 300.0	11/16/2021 10:23	11/17/2021 13:00	1
T2121967003	Trlb1	WA	EPA 365.1	11/16/2021 10:23	11/17/2021 13:00	1
T2121967003	Trlb1	WA	EPA 365.3	11/16/2021 10:23	11/17/2021 13:00	1
T2121967004	GC2	WA	EPA 200.7	11/16/2021 11:00	11/17/2021 13:00	6
T2121967004	GC2	WA	EPA 300.0	11/16/2021 11:00	11/17/2021 13:00	1
T2121967004	GC2	WA	EPA 365.1	11/16/2021 11:00	11/17/2021 13:00	1
T2121967004	GC2	WA	EPA 365.3	11/16/2021 11:00	11/17/2021 13:00	1
T2121967005	GC3	WA	EPA 200.7	11/16/2021 12:49	11/17/2021 13:00	6
T2121967005	GC3	WA	EPA 300.0	11/16/2021 12:49	11/17/2021 13:00	1
T2121967005	GC3	WA	EPA 365.1	11/16/2021 12:49	11/17/2021 13:00	1
T2121967005	GC3	WA	EPA 365.3	11/16/2021 12:49	11/17/2021 13:00	1
T2121967006	GC4	WA	EPA 200.7	11/16/2021 13:56	11/17/2021 13:00	6
T2121967006	GC4	WA	EPA 300.0	11/16/2021 13:56	11/17/2021 13:00	1
T2121967006	GC4	WA	EPA 365.1	11/16/2021 13:56	11/17/2021 13:00	1
T2121967006	GC4	WA	EPA 365.3	11/16/2021 13:56	11/17/2021 13:00	1

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J4	Estimated Result

Lab Qualifiers

G	DOH Certification #E82001 (FL NELAC) AEL-Gainesville
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967001 **Date Collected:** 11/16/2021 09:16 **Matrix:** Water
Sample ID: TrIb2 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.032 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 14:51	T
Calcium	**43**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 14:51	T
Iron	**0.75**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 14:51	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 14:51	T
Magnesium	**11**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 14:51	T
Potassium	**3.1**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 14:51	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**34**	mg/L	10	2.0	2	11/23/2021 16:44	11/23/2021 16:44	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.1**	mg/L	0.02	0.013	1	11/17/2021 15:09	11/17/2021 15:09	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.326**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967002 **Date Collected:** 11/16/2021 09:46 **Matrix:** Water
Sample ID: PD5 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.029 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 14:54	T
Calcium	**72**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 14:54	T
Iron	**0.34**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 14:54	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 14:54	T
Magnesium	**18**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 14:54	T
Potassium	**4.1**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 14:54	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**120**	mg/L	10	2.0	2	11/23/2021 17:32	11/23/2021 17:32	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/17/2021 15:12	11/17/2021 15:12	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.293**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967003 **Date Collected:** 11/16/2021 10:23 **Matrix:** Water
Sample ID: Trlb1 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	0.021 U	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 14:56	T
Calcium	**92**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 14:56	T
Iron	**0.23**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 14:56	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 14:56	T
Magnesium	**15**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 14:56	T
Potassium	**3.0**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 14:56	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**100**	mg/L	10	2.0	2	11/23/2021 17:48	11/23/2021 17:48	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/17/2021 15:08	11/17/2021 15:08	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.247**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967004 **Date Collected:** 11/16/2021 11:00 **Matrix:** Water
Sample ID: GC2 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	0.021 U	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 10:00	T
Calcium	**59**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 10:00	T
Iron	**0.18**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 10:00	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 10:00	T
Magnesium	**8.9**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 10:00	T
Potassium	**2.6**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 10:00	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**40**	mg/L	10	2.0	2	11/23/2021 18:04	11/23/2021 18:04	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/17/2021 15:09	11/17/2021 15:09	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.345**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

Analysis Results Comments

Calcium

J4|Estimated Result

Magnesium

J4|Estimated Result

Potassium

J4|Estimated Result

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967005 **Date Collected:** 11/16/2021 12:49 **Matrix:** Water
Sample ID: GC3 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.13**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 10:00	T
Calcium	**70**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 10:00	T
Iron	**0.43**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 10:00	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 10:00	T
Magnesium	**16**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 10:00	T
Potassium	**3.9**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 10:00	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**96**	mg/L	10	2.0	2	11/23/2021 18:20	11/23/2021 18:20	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/17/2021 15:10	11/17/2021 15:10	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.394**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

Analytical Results

Lab ID: T2121967006 **Date Collected:** 11/16/2021 13:56 **Matrix:** Water
Sample ID: GC4 **Date Received:** 11/17/2021 13:00

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.029 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 10:00	T
Calcium	**78**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 10:00	T
Iron	**0.12**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 10:00	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 10:00	T
Magnesium	**120**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 10:00	T
Potassium	**39**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 10:00	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**340**	mg/L	120	25	25	11/23/2021 18:36	11/23/2021 18:36	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.1**	mg/L	0.02	0.013	1	11/17/2021 15:11	11/17/2021 15:11	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.223**	mg/L	0.01	0.005	1	12/02/2021 11:04	12/02/2021 15:32	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

QC Results

QC Batch: ICPt/2124
Preparation Method: EPA 200.7
Associated Lab IDs: T2121967001, T2121967002, T2121967003
Analysis Method: EPA 200.7

Method Blank(4123028)

Parameter	Results	Units	PQL	MDL	Lab
Aluminum	0.021 U	mg/L	0.10	0.021	T
Calcium	0.20 U	mg/L	1.0	0.20	T
Iron	0.0067 U	mg/L	0.10	0.0067	T
Potassium	0.50 U	mg/L	1.0	0.50	T
Magnesium	0.080 U	mg/L	0.10	0.080	T
Lead	0.0030 U	mg/L	0.010	0.0030	T

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

QC Results

QC Batch: ICPt/2125
Preparation Method: EPA 200.7
Associated Lab IDs: T2121967004, T2121967005, T2121967006
Analysis Method: EPA 200.7

Method Blank(4123034)

Parameter	Results	Units	PQL	MDL	Lab
Aluminum	0.021 U	mg/L	0.10	0.021	T
Calcium	0.20 U	mg/L	1.0	0.20	T
Iron	0.0067 U	mg/L	0.10	0.0067	T
Potassium	0.50 U	mg/L	1.0	0.50	T
Magnesium	0.080 U	mg/L	0.10	0.080	T
Lead	0.0030 U	mg/L	0.010	0.0030	T

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

QC Results

QC Batch: WCAg/4666 **Analysis Method:** EPA 365.3
Preparation Method: EPA 365.3
Associated Lab IDs: T2121967001, T2121967002, T2121967003, T2121967004, T2121967005, T2121967006

Method Blank(4122612)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005 U	mg/L	0.01	0.005	G

Method Blank(4122618)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005 U	mg/L	0.01	0.005	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

QC Results

QC Batch: WCAt/8392 **Analysis Method:** EPA 365.1
Preparation Method: EPA 365.1
Associated Lab IDs: T2121967001, T2121967002, T2121967003, T2121967004, T2121967005, T2121967006

Method Blank(4104692)

Parameter	Results	Units	PQL	MDL	Lab
Orthophosphate	0.013 U	mg/L	0.020	0.013	T

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FINAL

Workorder: PierceDrain/ GapCreek (T2121967)

QC Results

QC Batch: WCAt/8582 **Analysis Method:** EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: T2121967001, T2121967002, T2121967003, T2121967004, T2121967005, T2121967006

Method Blank(4113507)

Parameter	Results	Units	PQL	MDL	Lab
Sulfate	1.0 U	mg/L	5.0	1.0	T

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Workorder: PierceDrain/ GapCreek (T2121967)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPt/2124 - EPA 200.7			
T2121967001	Trlb2	DGMt/2954	EPA 200.7
T2121967002	PD5	DGMt/2954	EPA 200.7
T2121967003	Trlb1	DGMt/2954	EPA 200.7
ICPt/2125 - EPA 200.7			
T2121967004	GC2	DGMt/2955	EPA 200.7
T2121967005	GC3	DGMt/2955	EPA 200.7
T2121967006	GC4	DGMt/2955	EPA 200.7
WCAg/4666 - EPA 365.3			
T2121967001	Trlb2	WCAg/4665	EPA 365.3
T2121967002	PD5	WCAg/4665	EPA 365.3
T2121967003	Trlb1	WCAg/4665	EPA 365.3
T2121967004	GC2	WCAg/4665	EPA 365.3
T2121967005	GC3	WCAg/4665	EPA 365.3
T2121967006	GC4	WCAg/4665	EPA 365.3
WCAt/8392 - EPA 365.1			
T2121967001	Trlb2		
T2121967002	PD5		
T2121967003	Trlb1		
T2121967004	GC2		
T2121967005	GC3		
T2121967006	GC4		
WCAt/8582 - EPA 300.0			
T2121967001	Trlb2		
T2121967002	PD5		
T2121967003	Trlb1		
T2121967004	GC2		
T2121967005	GC3		
T2121967006	GC4		

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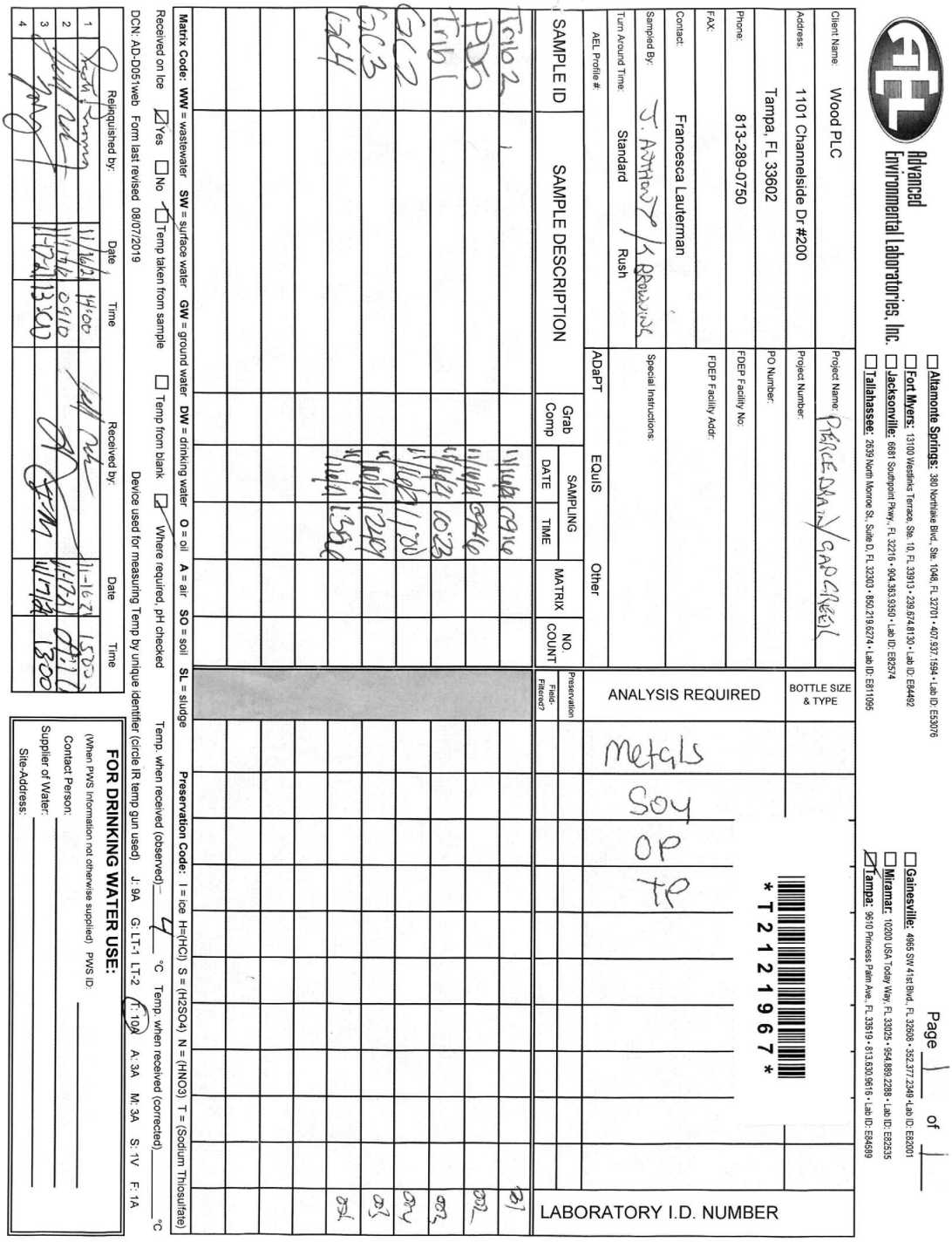
FINAL

Workorder: PierceDrain/ GapCreek (T2121967)



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☐ Fort Myers: 13100 Westlinks Terrace, Ste. 10, FL 33913 • 239.674.8130 • Lab ID: E84492
☐ Jacksonville: 6681 Southpoint Pkwy., FL 32216 • 904.363.9350 • Lab ID: E82574
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Page 1 of 1

Client Name: Wood PLC
Address: 1101 Channelside Dr #200
Tampa, FL 33602
Phone: 813-289-0750
FAX:
Contact: Francesca Lauterman
Sampled By: J. Arthur / K Brown
Turn Around Time: Standard / Rush
AEL Profile #:

Project Name: PIERCE DRAIN/ GAP CREEK
Project Number:
PO Number:
FDEP Facility No:
FDEP Facility Addr:
Special Instructions:

ADaPT EQuIS Other

SAMPLE ID	SAMPLE DESCRIPTION	Grab / Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT	Preservation Field-Filtered?	BOTTLE SIZE & TYPE	ANALYSIS REQUIRED	LABORATORY I.D. NUMBER
EQ02			11/16/21	1400					Metals	001
PDS			11/16/21	0915					SOM	002
Trip			11/16/21	0823					OP	003
GC2			11/16/21	1230					TP	004
GC3			11/16/21	1245						005
GC4			11/16/21	1330						006

* T 2 1 2 1 9 6 7 *

Matrix Code: WW = wastewater SW = surface water GW = ground water DW = drinking water O = oil A = air SO = soil SL = sludge
Preservation Code: I = Ice H=(HCl) S = (H2SO4) N = (HNO3) T = (Sodium Thiosulfate)

Received on Ice ☑ Yes ☐ No ☐ Temp taken from sample ☐ Temp from blank ☑ Where required, pH checked
Temp. when received (observed) 4 °C Temp when received (corrected) ____ °C
DCN: AD-D051web Form last revised 08/07/2019 Device used for measuring Temp by unique identifier (circle IR temp gun used) J: 9A G: LT-1 LT-2 (T-10) A: 3A M: 3A S: 1V F: 1A

	Relinquished by:	Date	Time	Received by:	Date	Time
1		11/16/21	14:00		11-16-21	1500
2		11/16/21	0910		11/16/21	0910
3		11-17-21	13:00		11/17/21	1300
4						

FOR DRINKING WATER USE:
(When PWS Information not otherwise supplied) PWS ID:
Contact Person:
Supplier of Water:
Site-Address:

Certificate of Analysis

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Advanced Environmental Laboratories, Inc.

Work Order: T2121967
Client: Wood PLC
Project ID: PierceDrain/ GapCreek

I. Receipt

No Exceptions were encountered.

II. Holding Times

Preparation:	All holding times were met.
Analysis:	All holding times were met.

III. Method

Analysis:	EPA 200.7
Preparation:	EPA 200.7

IV. Preparation

Sample preparation proceeded normally.

V. Analysis

Calibration:	All acceptance criteria were met.
Blanks:	All acceptance criteria were met.
Surrogates:	All acceptance criteria were met.
Spikes	The matrix spike (MS) and Matrix Spike Duplicate recoveries of Calcium, Potassium, and Magnesium for T2121967004 were outside control criteria. Recoveries in the Laboratory Control Sample (LCS) (MSD) were acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests a potential low bias in this matrix. No further corrective action is required.
Internal Standard:	All acceptance criteria were met.
Samples:	All acceptance criteria were met.
Other:	All acceptance criteria were met.
Serial Dilution:	All acceptance criteria were met.
Duplicates:	All acceptance criteria were met.

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Workorder: PierceDrain/ GapCreek (T2122069)

December 13, 2021

Francesca Lauterman
Wood EIS
1101 Channelside
Suite 200
Tampa, FL 33602

RE: Workorder: T2122069 PierceDrain/ GapCreek

Dear Francesca Lauterman:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday November 18, 2021. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heidi Parker

Heidi Parker, Project Manager
HParker@aellab.com

Certificate of Analysis

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Workorder: PierceDrain/ GapCreek (T2122069)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported
T2122069001	PD4	WA	EPA 200.7	11/17/2021 09:21	11/18/2021 14:05	6
T2122069001	PD4	WA	EPA 300.0	11/17/2021 09:21	11/18/2021 14:05	1
T2122069001	PD4	WA	EPA 365.1	11/17/2021 09:21	11/18/2021 14:05	1
T2122069001	PD4	WA	EPA 365.3	11/17/2021 09:21	11/18/2021 14:05	1
T2122069002	PD3	WA	EPA 200.7	11/17/2021 10:06	11/18/2021 14:05	6
T2122069002	PD3	WA	EPA 300.0	11/17/2021 10:06	11/18/2021 14:05	1
T2122069002	PD3	WA	EPA 365.1	11/17/2021 10:06	11/18/2021 14:05	1
T2122069002	PD3	WA	EPA 365.3	11/17/2021 10:06	11/18/2021 14:05	1
T2122069003	PD2	WA	EPA 200.7	11/17/2021 10:50	11/18/2021 14:05	6
T2122069003	PD2	WA	EPA 300.0	11/17/2021 10:50	11/18/2021 14:05	1
T2122069003	PD2	WA	EPA 365.1	11/17/2021 10:50	11/18/2021 14:05	1
T2122069003	PD2	WA	EPA 365.3	11/17/2021 10:50	11/18/2021 14:05	1
T2122069004	PD1	WA	EPA 200.7	11/17/2021 11:31	11/18/2021 14:05	6
T2122069004	PD1	WA	EPA 300.0	11/17/2021 11:31	11/18/2021 14:05	1
T2122069004	PD1	WA	EPA 365.1	11/17/2021 11:31	11/18/2021 14:05	1
T2122069004	PD1	WA	EPA 365.3	11/17/2021 11:31	11/18/2021 14:05	1
T2122069005	GC1	WA	EPA 200.7	11/17/2021 12:06	11/18/2021 14:05	6
T2122069005	GC1	WA	EPA 300.0	11/17/2021 12:06	11/18/2021 14:05	1
T2122069005	GC1	WA	EPA 365.1	11/17/2021 12:06	11/18/2021 14:05	1
T2122069005	GC1	WA	EPA 365.3	11/17/2021 12:06	11/18/2021 14:05	1
T2122069006	GC5	WA	EPA 200.7	11/17/2021 12:49	11/18/2021 14:05	6
T2122069006	GC5	WA	EPA 300.0	11/17/2021 12:49	11/18/2021 14:05	1
T2122069006	GC5	WA	EPA 365.1	11/17/2021 12:49	11/18/2021 14:05	1
T2122069006	GC5	WA	EPA 365.3	11/17/2021 12:49	11/18/2021 14:05	1

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Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Lab Qualifiers

G	DOH Certification #E82001 (FL NELAC) AEL-Gainesville
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069001 **Date Collected:** 11/17/2021 09:21 **Matrix:** Water
Sample ID: PD4 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	0.021 U	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 10:00	T
Calcium	**62**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 10:00	T
Iron	**0.15**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 10:00	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 10:00	T
Magnesium	**17**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 10:00	T
Potassium	**4.3**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 10:00	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**110**	mg/L	10	2.0	2	11/23/2021 23:25	11/23/2021 23:25	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/18/2021 15:27	11/18/2021 15:27	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.264**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069002 **Date Collected:** 11/17/2021 10:06 **Matrix:** Water
Sample ID: PD3 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.065 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 15:34	T
Calcium	**75**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 15:34	T
Iron	**0.14**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 15:34	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 15:34	T
Magnesium	**23**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 15:34	T
Potassium	**5.0**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 15:34	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**140**	mg/L	10	2.0	2	11/23/2021 23:41	11/23/2021 23:41	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.2**	mg/L	0.02	0.013	1	11/18/2021 15:26	11/18/2021 15:26	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.266**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069003 **Date Collected:** 11/17/2021 10:50 **Matrix:** Water
Sample ID: PD2 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.032 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 15:37	T
Calcium	**79**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 15:37	T
Iron	**0.17**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 15:37	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 15:37	T
Magnesium	**27**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 15:37	T
Potassium	**4.7**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 15:37	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**190**	mg/L	10	2.0	2	11/29/2021 15:30	11/29/2021 15:30	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	11/18/2021 15:25	11/18/2021 15:25	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.348**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069004 **Date Collected:** 11/17/2021 11:31 **Matrix:** Water
Sample ID: PD1 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	0.021 U	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 15:40	T
Calcium	**100**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 15:40	T
Iron	**0.24**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 15:40	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 15:40	T
Magnesium	**21**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 15:40	T
Potassium	**1.5**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 15:40	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**55**	mg/L	10	2.0	2	11/29/2021 15:46	11/29/2021 15:46	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.03**	mg/L	0.02	0.013	1	11/18/2021 15:23	11/18/2021 15:23	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.101**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069005 **Date Collected:** 11/17/2021 12:06 **Matrix:** Water
Sample ID: GC1 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	0.021 U	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 15:43	T
Calcium	**57**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 15:43	T
Iron	**0.18**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 15:43	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 15:43	T
Magnesium	**8.5**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 15:43	T
Potassium	**3.3**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 15:43	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	**25**	mg/L	10	2.0	2	11/29/2021 16:02	11/29/2021 16:02	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.3**	mg/L	0.02	0.013	1	11/18/2021 15:28	11/18/2021 15:28	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.388**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2122069)

Analytical Results

Lab ID: T2122069006 **Date Collected:** 11/17/2021 12:49 **Matrix:** Water
Sample ID: GC5 **Date Received:** 11/18/2021 14:05

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (EPA 200.7)								
Aluminum	**0.029 I**	mg/L	0.10	0.021	1	12/03/2021 10:00	12/07/2021 15:46	T
Calcium	**21**	mg/L	1.0	0.20	1	12/03/2021 10:00	12/07/2021 15:46	T
Iron	**0.89**	mg/L	0.10	0.0067	1	12/03/2021 10:00	12/07/2021 15:46	T
Lead	0.0030 U	mg/L	0.010	0.0030	1	12/03/2021 10:00	12/07/2021 15:46	T
Magnesium	**2.8**	mg/L	0.10	0.080	1	12/03/2021 10:00	12/07/2021 15:46	T
Potassium	**1.8**	mg/L	1.0	0.50	1	12/03/2021 10:00	12/07/2021 15:46	T
WET CHEMISTRY (EPA 300.0)								
Sulfate	2.0 U	mg/L	10	2.0	2	11/29/2021 16:18	11/29/2021 16:18	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	**0.04**	mg/L	0.02	0.013	1	11/18/2021 15:29	11/18/2021 15:29	T
WET CHEMISTRY (EPA 365.3)								
Total Phosphorus (as P)	**0.188**	mg/L	0.01	0.005	1	11/23/2021 13:59	11/24/2021 11:15	G

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FINAL

Workorder: PierceDrain/ GapCreek (T2122069)

QC Results

QC Batch: ICPt/2125 **Analysis Method:** EPA 200.7
Preparation Method: EPA 200.7
Associated Lab IDs: T2122069001, T2122069002, T2122069003, T2122069004, T2122069005, T2122069006

Method Blank(4123034)

Parameter	Results	Units	PQL	MDL	Lab
Aluminum	0.021 U	mg/L		0.021	T
Calcium	0.20 U	mg/L		0.20	T
Iron	0.0067 U	mg/L		0.0067	T
Potassium	0.50 U	mg/L		0.50	T
Magnesium	0.080 U	mg/L		0.080	T
Lead	0.0030 U	mg/L		0.0030	T

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Workorder: PierceDrain/ GapCreek (T2122069)

QC Results

QC Batch: WCAg/4577 **Analysis Method:** EPA 365.3
Preparation Method: EPA 365.3
Associated Lab IDs: T2122069001, T2122069002, T2122069003, T2122069004, T2122069005, T2122069006

Method Blank(4114419)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005 U	mg/L		0.005	G

Method Blank(4114425)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.005 U	mg/L		0.005	G

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Workorder: PierceDrain/ GapCreek (T2122069)

QC Results

QC Batch: WCAt/8468 **Analysis Method:** EPA 365.1
Preparation Method: EPA 365.1
Associated Lab IDs: T2122069001, T2122069002, T2122069003, T2122069004, T2122069005, T2122069006

Method Blank(4108621)

Parameter	Results	Units	PQL	MDL	Lab
Orthophosphate	0.013 U	mg/L		0.013	T

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Workorder: PierceDrain/ GapCreek (T2122069)

QC Results

QC Batch: WCAt/8583
Preparation Method: EPA 300.0
Associated Lab IDs: T2122069001, T2122069002
Analysis Method: EPA 300.0

Method Blank(4113513)

Parameter	Results	Units	PQL	MDL	Lab
Sulfate	1.0 U	mg/L		1.0	T

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Workorder: PierceDrain/ GapCreek (T2122069)

QC Results

QC Batch: WCAt/8751 **Analysis Method:** EPA 300.0
Preparation Method: EPA 300.0
Associated Lab IDs: T2122069003, T2122069004, T2122069005, T2122069006

Method Blank(4123179)

Parameter	Results	Units	PQL	MDL	Lab
Sulfate	1.0 U	mg/L		1.0	T

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Workorder: PierceDrain/ GapCreek (T2122069)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPt/2125 - EPA 200.7			
T2122069001	PD4	DGMt/2955	EPA 200.7
T2122069002	PD3	DGMt/2955	EPA 200.7
T2122069003	PD2	DGMt/2955	EPA 200.7
T2122069004	PD1	DGMt/2955	EPA 200.7
T2122069005	GC1	DGMt/2955	EPA 200.7
T2122069006	GC5	DGMt/2955	EPA 200.7
WCAg/4577 - EPA 365.3			
T2122069001	PD4	WCAg/4576	EPA 365.3
T2122069002	PD3	WCAg/4576	EPA 365.3
T2122069003	PD2	WCAg/4576	EPA 365.3
T2122069004	PD1	WCAg/4576	EPA 365.3
T2122069005	GC1	WCAg/4576	EPA 365.3
T2122069006	GC5	WCAg/4576	EPA 365.3
WCAt/8468 - EPA 365.1			
T2122069001	PD4		
T2122069002	PD3		
T2122069003	PD2		
T2122069004	PD1		
T2122069005	GC1		
T2122069006	GC5		
WCAt/8583 - EPA 300.0			
T2122069001	PD4		
T2122069002	PD3		
WCAt/8751 - EPA 300.0			
T2122069003	PD2		
T2122069004	PD1		
T2122069005	GC1		
T2122069006	GC5		

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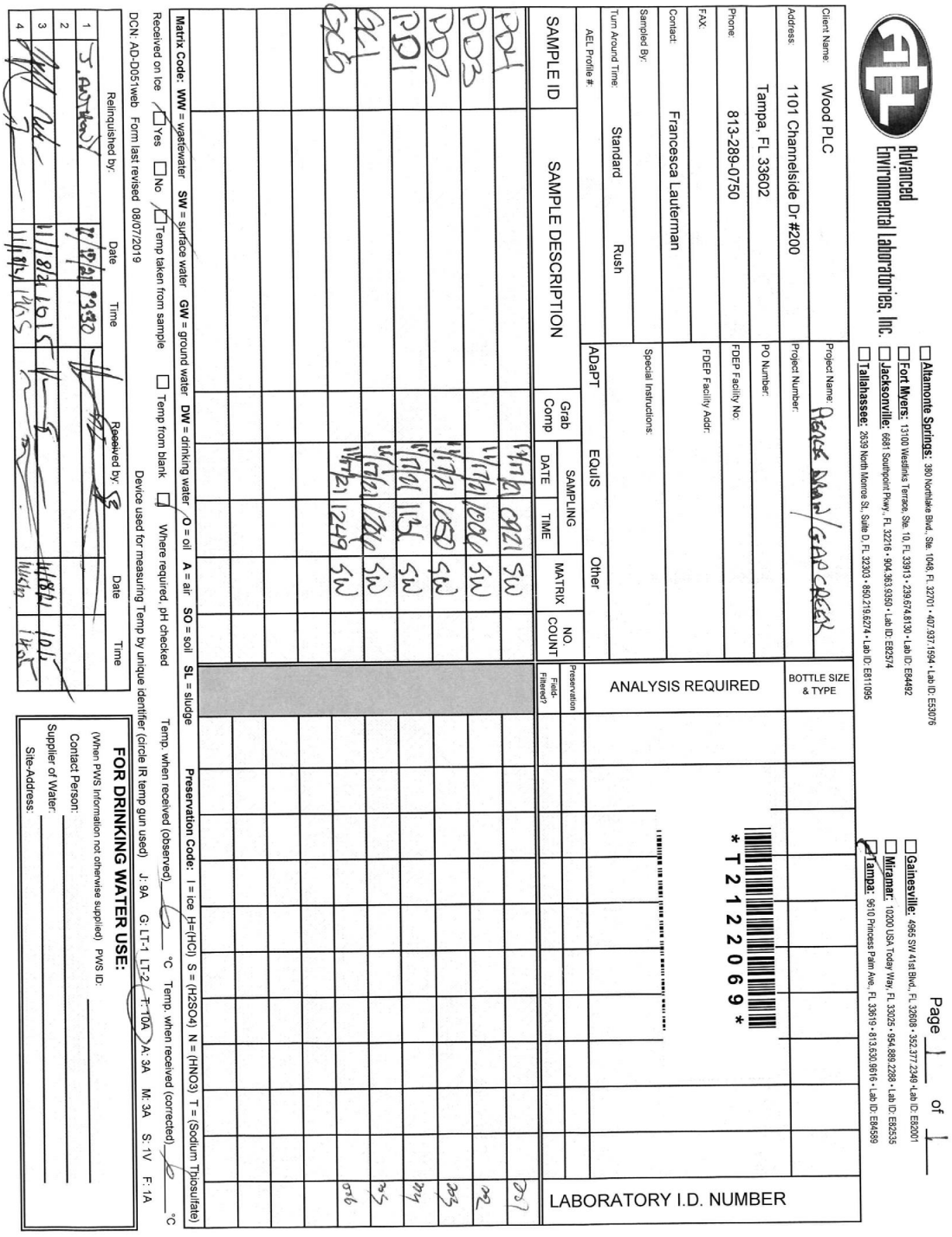
Workorder: PierceDrain/ GapCreek (T2122069)



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Advanced Environmental Laboratories, Inc.

Work Order: T2122069
Client: Wood PLC
Project ID: PierceDrain/ GapCreek

I. Receipt

No Exceptions were encountered.

II. Holding Times

Preparation:	All holding times were met.
Analysis:	All holding times were met.

III. Method

Analysis:	EPA 200.7
Preparation:	EPA 200.7

IV. Preparation

Sample preparation proceeded normally.

V. Analysis

Calibration:	All acceptance criteria were met.
Blanks:	All acceptance criteria were met.
Surrogates:	All acceptance criteria were met.
Spikes	The matrix spike (MS) and Matrix Spike Duplicate recoveries of Calcium, Potassium, and Magnesium for T2121967004 were outside control criteria. Recoveries in the Laboratory Control Sample (LCS) (MSD) were acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests a potential low bias in this matrix. No further corrective action is required.
Internal Standard:	All acceptance criteria were met.
Samples:	All acceptance criteria were met.
Other:	All acceptance criteria were met.
Serial Dilution:	All acceptance criteria were met.
Duplicates:	All acceptance criteria were met.

APPENDIX E
Sampling Laboratory Results: Manatee County

-

Client Report For:	Special Studies
Attention:	
Client Address:	
	,
Report Date:	November 03, 2021
LAB ID:	21090701
Comment:	

Approved By:_____ Date:November 03, 2021

Manatee

Client: Special Studies
Client Sample ID: (trib 1) Grab
Lab ID: 21090701-01
Collection Date: 9/7/2021 10:20:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	1.7	1	I	mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	65	5		PCU
Field pH	6.55			SU

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.33			m

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.2			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	93.2			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	488	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Manatee

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.6			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Flow ***FDEP FT1800*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.194			m/s

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.068	0.008		mg/L
Analysis Date/Time	9/8/2021 13:37			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.361	0.009		mg/L
Analysis Date/Time	9/9/2021 11:32			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.3			m

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	536			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Manatee

Temperature	27.2			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:41			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.772	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	0.8	0.625	I	mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	1.6	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (Equip. BLK) Equipment Blank
Lab ID: 21090701-02
Collection Date: 9/7/2021 10:24:00 AM
Matrix: QCMatrix-Water

Analyses

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.008	0.008	U	mg/L
Analysis Date/Time	9/8/2021 13:39			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.009	0.009	U	mg/L
Analysis Date/Time	9/9/2021 11:33			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:43			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.064	0.064	U	mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (trib 2) Grab
Lab ID: 21090701-03
Collection Date: 9/7/2021 11:14:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.3	1		mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	2			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	2			
Color	94	10		PCU
Field pH	6.06			SU

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.26			m

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	87.7			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	980	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Manatee

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.1			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Flow ***FDEP FT1800*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.127			m/s

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.077	0.008		mg/L
Analysis Date/Time	9/8/2021 13:42			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.165	0.009		mg/L
Analysis Date/Time	9/9/2021 11:34			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.3			m

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	311			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Manatee

Temperature	27.6	deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:44			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.011	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.2	0.625	I	mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.3	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (Field DUP) Field Duplicate
Lab ID: 21090701-04
Collection Date: 9/7/2021 11:18:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.2	1		mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Chlorophyll-a (RPD)	3.84			%

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	2			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	2			
Color	94	10		PCU
Color (RPD)	0.56			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	866	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
E. coli (RPD)	12.35			%
Field Chlorine	0			mgL

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.079	0.008		mg/L
Analysis Date/Time	9/8/2021 13:44			
Analyzed By	KH			
Total Dilution Factor	1			
Ammonia as N (RPD)	2.56			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.168	0.009		mg/L
Analysis Date/Time	9/9/2021 11:35			
Analyzed By	KH			
Total Dilution Factor	1			
Nitrate + Nitrite as N (RPD)	1.80			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:46			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.998	0.064		mg/L
Total Kjedahl Nitrogen - Freshwater (RPD)	1.29			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.1	0.625		mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Total Suspended Solids (RPD)	33.96			%

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.4	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Turbidity (RPD)	1.80			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Temperature	27.6			deg C

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit

Manatee

Specific Conductance (EC)	311	µS/cm
Analysis Date/Time	No Entry	
Analyzed By	LAW/SB	

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	87.7			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.1			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.26			m

Flow ***FDEP FT1800*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.127			m/s

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.3			m

Manatee

Client: Special Studies | **Client Sample ID:** (gc2) Grab

Lab ID: 21090701-05 | **Collection Date:** 9/7/2021 12:14:00 PM

Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.8	1		mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	2			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	2			
Color	97	10		PCU
Field pH	6.53			SU

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.57			m

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	5.1			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	70.0			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	224	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Manatee

pH ***FDEP FT1100*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.5			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Flow ***FDEP FT1800*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.219			m/s

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.083	0.008		mg/L
Analysis Date/Time	9/8/2021 13:46			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.136	0.009		mg/L
Analysis Date/Time	9/9/2021 11:36			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.6			m

Specific Conductance ***FDEP FT1200*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	424			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Temperature ***FDEP FT1400*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Manatee

Temperature	30.5			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:47			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.903	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.5	0.625	I	mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	1.8	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (gc1) Grab
Lab ID: 21090701-06
Collection Date: 9/7/2021 1:18:00 PM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.6	1		mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	2			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	2			
Color	98	10		PCU
Field pH	6.13			SU

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.39			m

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.1			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	84.3			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	116	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Manatee

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.1			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Flow ***FDEP FT1800*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.057			m/s

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.076	0.008		mg/L
Analysis Date/Time	9/8/2021 13:47			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.243	0.009		mg/L
Analysis Date/Time	9/9/2021 11:37			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.4			m

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	419			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Manatee

Temperature	30.5	deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:48			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.28	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	5.9	0.625		mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	4.2	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

PD$

Client: Special Studies
Lab ID: 21090701-07

Client Sample ID: (pd4) Grab
Collection Date: 9/7/2021 2:20:00 PM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B210908-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.5	1		mg/m3
Analysis Date/Time	09/08/2021 14:15			
Prep By	JP Nelson			
Prep Date/Time	09/08/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B210908-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	2			
Analysis Date/Time	09/08/2021 11:05			
Analyzed By	JP Nelson			
Total Dilution Factor	2			
Color	96	10		PCU
Field pH	6.22			SU

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Depth	0.49			m

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Dissolved Oxygen % Saturation	94.0			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210907-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	61	1		MPN/100 mL
Analysis Date/Time	09/08/2021 16:45			
Prep By	k harkinson			
Prep Date/Time	09/07/2021 16:30			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

PD$

pH ***FDEP FT1100*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	6.2			SU
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Flow ***FDEP FT1800*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Flow	0.151			m/s

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210907-001 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.166	0.008		mg/L
Analysis Date/Time	9/8/2021 13:49			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210907-007 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.125	0.009		mg/L
Analysis Date/Time	9/9/2021 11:38			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			
Transparency (Secchi Depth)	0.5			m

Specific Conductance ***FDEP FT1200*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	496			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

Temperature ***FDEP FT1400*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	LAW/SB			

PD$

Temperature	31.0	deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210907-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	9/15/2021 15:50			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.159	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B210908-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.5	0.1		NTU
Analysis Date/Time	09/07/2021 16:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210909-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.7	0.625		mg/L
Analysis Date/Time	09/09/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Client Report For:	Special Studies
Attention:	
Client Address:	
	,
Report Date:	October 21, 2021
LAB ID:	21092901
Comment:	

Approved By:_____ Date:October 21, 2021

Manatee

Client: Special Studies
Lab ID: 21092901-01

Client Sample ID: (GC5) Grab
Collection Date: 9/29/2021 9:38:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	4			
Chlorophyll-a	31.4	4		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	4			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	33	5		PCU
Field pH	8.04			SU

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	51	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.024	0.008	I	mg/L
Analysis Date/Time	9/30/2021 18:25			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			

Manatee

Nitrate + Nitrite as N	0.012	0.009	I	mg/L
Analysis Date/Time	9/30/2021 11:29			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 12:53			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.659	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.4	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.6	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	5.1			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	63.6			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.0			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	183			µS/cm

Manatee

Analysis Date/Time	No Entry
Analyzed By	S Browning, J Anthony

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Flow ***FDEP FT1800*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Flow	No Entry			m/s

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	25.0			deg C

Manatee

Client: Special Studies
Client Sample ID: (PD1) Grab
Lab ID: 21092901-09
Collection Date: 9/29/2021 2:55:00 PM
Matrix: Freshwater

Analyses

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.6	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	68	5		PCU
Field pH	8.74			SU

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	344	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.307	0.008		mg/L
Analysis Date/Time	9/30/2021 18:41			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.148	0.009		mg/L
Analysis Date/Time	9/30/2021 11:40			

Manatee

Analyzed By	KH
Total Dilution Factor	1
Manual Dilution Factor	1
Auto Dilution Factor	1

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 13:42			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.151	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	4.0	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	5.6	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	88.0			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.7			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	745			µS/cm

Manatee

Analysis Date/Time	No Entry
Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	26.9			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Client Sample ID: (PD2) Grab
Lab ID: 21092901-08
Collection Date: 9/29/2021 2:20:00 PM
Matrix: Freshwater

Analyses

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.087	0.008		mg/L
Analysis Date/Time	9/30/2021 18:39			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.434	0.009		mg/L
Analysis Date/Time	9/30/2021 11:39			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 13:04			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.918	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.7	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.7	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.4	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	69	5		PCU
Field pH	8.75			SU

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	157	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	87.1			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	745			µS/cm
Analysis Date/Time	No Entry			

Manatee

Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	26.9			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Client Sample ID: (PD3) Grab
Lab ID: 21092901-07
Collection Date: 9/29/2021 1:45:00 PM
Matrix: Freshwater

Analyses

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 13:03			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.056	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.1	0.625	I	mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.4	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.4	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	98	5		PCU
Field pH	8.85			SU

Manatee

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	41	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.13	0.008		mg/L
Analysis Date/Time	9/30/2021 18:37			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.092	0.009		mg/L
Analysis Date/Time	9/30/2021 11:38			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.0			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	77.1			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	601			µS/cm
Analysis Date/Time	No Entry			

Manatee

Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	26.8			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Client Sample ID: (PD5) Grab
Lab ID: 21092901-06
Collection Date: 9/29/2021 1:00:00 PM
Matrix: Freshwater

Analyses

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.1	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	73	5		PCU
Field pH	8.76			SU

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	275	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.095	0.008		mg/L
Analysis Date/Time	9/30/2021 18:35			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.239	0.009		mg/L
Analysis Date/Time	9/30/2021 11:37			

Manatee

Analyzed By	KH
Total Dilution Factor	1
Manual Dilution Factor	1
Auto Dilution Factor	1

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 13:01			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.316	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.0	0.625	I	mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	1.5	1	I	mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.4			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	87.1			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	578			µS/cm

Manatee

Analysis Date/Time	No Entry
Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	30.0			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Client Sample ID: (GC3) Field Duplicate
Lab ID: 21092901-05
Collection Date: 9/29/2021 11:35:00 AM
Matrix: Freshwater

Analyses

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 13:00			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.931	0.064		mg/L
Total Kjedahl Nitrogen - Freshwater (RPD)	1.39			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.3	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Total Suspended Solids (RPD)	3.08			%

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	68	5		PCU
Color (RPD)	0.62			%

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.6	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Turbidity (RPD)	0.77			

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.084	0.008		mg/L
Analysis Date/Time	9/30/2021 18:33			
Analyzed By	KH			

Manatee

Total Dilution Factor	1			
Ammonia as N (RPD)	10.17			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.1	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Chlorophyll-a (RPD)	2.86			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	579	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
E. coli (RPD)	5.68			%
Field Chlorine	0			mgL

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.26	0.009		mg/L
Analysis Date/Time	9/30/2021 11:36			
Analyzed By	KH			
Total Dilution Factor	1			
Nitrate + Nitrite as N (RPD)	6.35			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (GC3) Grab
Lab ID: 21092901-04
Collection Date: 9/29/2021 11:35:00 AM
Matrix: Freshwater

Analyses

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.2	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.6	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	547	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.093	0.008		mg/L
Analysis Date/Time	9/30/2021 18:31			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.244	0.009		mg/L
Analysis Date/Time	9/30/2021 11:35			
Analyzed By	KH			

Manatee

Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 12:59			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.944	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.2	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	68	5		PCU
Field pH	8.76			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	87.2			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	604			µS/cm

Manatee

Analysis Date/Time	No Entry
Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	26.2			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Lab ID: 21092901-03

Client Sample ID: (GC4) Grab
Collection Date: 9/29/2021 10:45:00 AM
Matrix: Freshwater

Analyses

Turbidity ***SM 2130 B*** ***Batch: B211018-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.8	0.1		NTU
Analysis Date/Time	09/30/2021 10:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211018-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	09/30/2021 08:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	72	5		PCU
Field pH	8.7			SU

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B210929-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	145	1		MPN/100 mL
Analysis Date/Time	09/30/2021 17:00			
Prep By	k harkinson			
Prep Date/Time	09/29/2021 16:40			
Analyzed By	k harkinson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.114	0.008		mg/L
Analysis Date/Time	9/30/2021 18:29			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.171	0.009		mg/L
Analysis Date/Time	9/30/2021 11:34			

Manatee

Analyzed By	KH
Total Dilution Factor	1
Manual Dilution Factor	1
Auto Dilution Factor	1

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 12:57			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.012	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B210929-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.9	0.625		mg/L
Analysis Date/Time	09/29/2021 17:00			
Analyzed By	k harkinson			
Total Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211018-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	8.5	1		mg/m3
Analysis Date/Time	09/30/2021 12:00			
Prep By	JP Nelson			
Prep Date/Time	09/30/2021 07:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.6			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	85.9			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.7			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	612			µS/cm

Manatee

Analysis Date/Time	No Entry
Analyzed By	S Browning, J Anthony

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	27.4			deg C

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	No Entry			
Depth	No Entry			m

Manatee

Client: Special Studies
Client Sample ID: (Equip. BLK) Equipment Blank
Lab ID: 21092901-02
Collection Date: 9/29/2021 9:42:00 AM
Matrix: QCMatrix-Water

Analyses

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B210929-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.008	0.008	U	mg/L
Analysis Date/Time	9/30/2021 18:27			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B210929-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.009	0.009	U	mg/L
Analysis Date/Time	9/30/2021 11:32			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B210929-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	10/19/2021 12:55			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.064	0.064	U	mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

-

Client Report For:	Special Studies
Attention:	
Client Address:	
	,
Report Date:	November 24, 2021
LAB ID:	21111603
Comment:	

Approved By:_____ Date:November 24, 2021

Manatee

Client: Special Studies
Client Sample ID: (TRIB2) Grab
Lab ID: 21111603-01
Collection Date: 11/16/2021 9:23:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	1.7	1	I	mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	37	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	8.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	93.7			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	2419	1	Z	MPN/100 mL
Analysis Date/Time	11/17/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/16/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	No Entry			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.3			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.075	0.008		mg/L
Analysis Date/Time	11/19/2021 12:56			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.246	0.009		mg/L
Analysis Date/Time	11/17/2021 18:36			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	326			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	17.5			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:25			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.779	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.8	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211116-003 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.7	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.1			PSS
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Depth ***Field Meter*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Client Sample ID: (Equip. BLK) Equipment Blank
Lab ID: 21111603-02
Collection Date: 11/16/2021 9:30:00 AM
Matrix: QCMatrix-Water

Analyses

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.009	0.008	I	mg/L
Analysis Date/Time	11/19/2021 12:58			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.009	0.009	U	mg/L
Analysis Date/Time	11/17/2021 18:38			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:26			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.064	0.064	U	mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Client: Special Studies
Lab ID: 21111603-03

Client Sample ID: (PD5) Grab
Collection Date: 11/16/2021 9:46:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.1	1		mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	41	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	8.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	91.8			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	248	1		MPN/100 mL
Analysis Date/Time	11/17/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/16/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	No Entry			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.3			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.07	0.008		mg/L
Analysis Date/Time	11/19/2021 13:00			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.23	0.009		mg/L
Analysis Date/Time	11/17/2021 18:41			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	547			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	16.8			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:28			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.715	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.1	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.7	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Client Sample ID: (TRIB1) Grab
Lab ID: 21111603-04
Collection Date: 11/16/2021 10:21:00 AM
Matrix: Freshwater

Analyses

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	8.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	95.6			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.6			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	543			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	18.8			deg C

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.065	0.008		mg/L
Analysis Date/Time	11/19/2021 13:02			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.45	0.009		mg/L
Analysis Date/Time	11/17/2021 18:43			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:30			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.782	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	1.1	1	I	mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	40	5		PCU
Field pH	No Entry			SU

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	0.625	0.625	U	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	1.1	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			

Manatee

E. coli	1046	1	MPN/100 mL
Analysis Date/Time	11/17/2021 15:45		
Prep By	JP Nelson		
Prep Date/Time	11/16/2021 15:45		
Analyzed By	JP Nelson		
Total Dilution Factor	1		
Field Chlorine	No Entry		mg/L

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Client Sample ID: (GC2) Grab
Lab ID: 21111603-05
Collection Date: 11/16/2021 10:59:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	12.2	1		mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	72	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.5			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	86.9			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	193	1		MPN/100 mL
Analysis Date/Time	11/17/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/16/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	No Entry			mg/L

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.054	0.008		mg/L
Analysis Date/Time	11/19/2021 13:04			
Analyzed By	KH			

Manatee

Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.112	0.009		mg/L
Analysis Date/Time	11/17/2021 18:45			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	378			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	21.3			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:32			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.955	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.5	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.1	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			

Manatee

Analyzed By	K Harkinson
Total Dilution Factor	1

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.4			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.2			PSS
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Lab ID: 21111603-06

Client Sample ID: (GC2 FD) Field Duplicate
Collection Date: 11/16/2021 10:59:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	12.2	1		mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Chlorophyll-a (RPD)	0.03			%

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	72	5		PCU
Color (RPD)	0.14			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	150	1		MPN/100 mL
Analysis Date/Time	11/17/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/16/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
E. coli (RPD)	25.07			%
Field Chlorine	No Entry			mgL

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.054	0.008		mg/L
Analysis Date/Time	11/19/2021 13:07			
Analyzed By	KH			
Total Dilution Factor	1			
Ammonia as N (RPD)	0.00			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.117	0.009		mg/L
Analysis Date/Time	11/17/2021 18:47			
Analyzed By	KH			
Total Dilution Factor	1			
Nitrate + Nitrite as N (RPD)	4.37			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:34			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.947	0.064		mg/L
Total Kjedahl Nitrogen - Freshwater (RPD)	0.84			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.0	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			
Turbidity (RPD)	4.47			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	2.6	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Total Suspended Solids (RPD)	3.92			%

Manatee

Client: Special Studies
Lab ID: 21111603-07

Client Sample ID: (GC3) Grab
Collection Date: 11/16/2021 12:49:00 PM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	6.1	1		mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	42	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.5			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	84.5			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-005*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	613	1		MPN/100 mL
Analysis Date/Time	11/17/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/16/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	No Entry			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.09	0.008		mg/L
Analysis Date/Time	11/19/2021 13:09			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.255	0.009		mg/L
Analysis Date/Time	11/17/2021 18:50			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	526			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	19.9			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:35			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.953	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	9.1	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	4.8	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.2			PSS
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	1.0			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	1.0			m

Manatee

Client: Special Studies
Client Sample ID: (GC4) Grab
Lab ID: 21111603-08
Collection Date: 11/16/2021 1:56:00 PM
Matrix: Saltwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211117-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	9.5	1		mg/m3
Analysis Date/Time	11/17/2021 13:30			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 07:30			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211117-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/17/2021 09:59			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	46	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.7			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Dissolved Oxygen % Saturation	86.7			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.0			SU
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	5026			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Temperature	26.2			deg C

Manatee

Turbidity ***SM 2130 B*** ***Batch: B211116-003*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.8	0.1		NTU
Analysis Date/Time	11/16/2021 17:20			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-008*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.055	0.008		mg/L
Analysis Date/Time	11/18/2021 15:44			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-009*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.055	0.009		mg/L
Analysis Date/Time	11/18/2021 14:04			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Saltwater ***EPA 351.2*** ***Batch: B211123-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 15:52			
Analyzed By	JPN			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Saltwater	0.493	0.127	I	mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.7	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit

Manatee

Salinity	2.7	PSS
Analysis Date/Time	No Entry	
Analyzed By	S Browning, J Anthony	

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Depth	1.0			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S Browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

-

Client Report For:	Special Studies
Attention:	
Client Address:	
	,
Report Date:	November 24, 2021
LAB ID:	21111701
Comment:	

Approved By:_____ Date:November 24, 2021

Manatee

Client: Special Studies
Client Sample ID: (PD4) Grab
Lab ID: 21111701-01
Collection Date: 11/17/2021 9:21:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.5	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	43	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	87.2			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	93	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.9			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.109	0.008		mg/L
Analysis Date/Time	11/19/2021 13:13			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.231	0.009		mg/L
Analysis Date/Time	11/17/2021 18:54			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	576			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	19.5			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:37			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.849	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	0.8	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211117-007 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.0	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Depth ***Field Meter*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Client Sample ID: (Equip. BLK) Equipment Blank
Lab ID: 21111701-02
Collection Date: 11/17/2021 9:25:00 AM
Matrix: QCMatrix-Water

Analyses

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.01	0.008	I	mg/L
Analysis Date/Time	11/19/2021 13:15			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.009	0.009	U	mg/L
Analysis Date/Time	11/17/2021 18:56			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:39			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.064	0.064	U	mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Client: Special Studies
Lab ID: 21111701-03

Client Sample ID: (PD3) Grab
Collection Date: 11/17/2021 10:06:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.9	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	46	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.3			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	83.2			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	29	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.4			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.073	0.008		mg/L
Analysis Date/Time	11/19/2021 13:17			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.084	0.009		mg/L
Analysis Date/Time	11/17/2021 18:59			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	568			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	20.5			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:41			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.735	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.9	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211117-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.3	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Client Sample ID: (PD2) Grab
Lab ID: 21111701-04
Collection Date: 11/17/2021 10:50:00 AM
Matrix: Freshwater

Analyses

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.9			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	90.7			%

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.5			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	687			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	20.6			deg C

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.101	0.008		mg/L
Analysis Date/Time	11/19/2021 13:24			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.167	0.009		mg/L
Analysis Date/Time	11/17/2021 19:02			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:47			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.725	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.0	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	39	5		PCU
Field pH	No Entry			SU

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.8	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Turbidity ***SM 2130 B*** ***Batch: B211117-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.4	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			

Manatee

E. coli	1299	1	MPN/100 mL
Analysis Date/Time	11/18/2021 15:45		
Prep By	JP Nelson		
Prep Date/Time	11/17/2021 15:45		
Analyzed By	JP Nelson		
Total Dilution Factor	1		
Field Chlorine	0		mg/L

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Lab ID: 21111701-05

Client Sample ID: (PD2 FD) Field Duplicate
Collection Date: 11/17/2021 10:50:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	2.0	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Chlorophyll-a (RPD)	0.50			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	1046	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
E. coli (RPD)	21.58			%
Field Chlorine	0			mgL

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.169	0.009		mg/L
Analysis Date/Time	11/17/2021 19:03			
Analyzed By	KH			
Total Dilution Factor	1			
Nitrate + Nitrite as N (RPD)	1.19			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:48			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.73	0.064		mg/L
Total Kjedahl Nitrogen - Freshwater (RPD)	0.69			%
Manual Dilution Factor	1			

Manatee

Auto Dilution Factor	1

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.8	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Total Suspended Solids (RPD)	0.00			%

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	39	5		PCU
Color (RPD)	0.64			%

Turbidity ***SM 2130 B*** ***Batch: B211117-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.2	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			
Turbidity (RPD)	7.69			

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.102	0.008		mg/L
Analysis Date/Time	11/19/2021 13:25			
Analyzed By	KH			
Total Dilution Factor	1			
Ammonia as N (RPD)	0.99			%
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Manatee

Client: Special Studies
Client Sample ID: (PD1) Grab
Lab ID: 21111701-06
Collection Date: 11/17/2021 11:31:00 AM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	3.0	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	34	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	7.3			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	83.5			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	19	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	8.4			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.125	0.008		mg/L
Analysis Date/Time	11/19/2021 13:27			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.16	0.009		mg/L
Analysis Date/Time	11/17/2021 19:04			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	686			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	20.5			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:49			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.771	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	1.9	0.625	I	mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211117-007*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.6	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.3			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Depth ***Field Meter*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	1.0			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	1.0			m

Manatee

Client: Special Studies
Lab ID: 21111701-07

Client Sample ID: (GC1) Grab
Collection Date: 11/17/2021 12:06:00 PM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	54.2	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	86	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	6.8			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	78.8			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	275	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.6			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.058	0.008		mg/L
Analysis Date/Time	11/19/2021 13:29			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.219	0.009		mg/L
Analysis Date/Time	11/17/2021 19:05			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	353			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	21.0			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:51			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	1.215	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	3.9	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211117-007 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	2.0	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0.2			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Depth ***Field Meter*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

Manatee

Client: Special Studies
Lab ID: 21111701-08

Client Sample ID: (GC5) Grab
Collection Date: 11/17/2021 12:49:00 PM
Matrix: Freshwater

Analyses

Chlorophyll-a (Pheophytin free) Wet ***EPA 445.0*** ***Batch: B211118-002*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Chlorophyll-a	21.8	1		mg/m3
Analysis Date/Time	11/18/2021 11:30			
Prep By	JP Nelson			
Prep Date/Time	11/18/2021 07:00			
Analyzed By	JP Nelson			
Total Dilution Factor	1			

Color ***SM 2120 C*** ***Batch: B211118-001*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/18/2021 08:05			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Color	21	5		PCU
Field pH	No Entry			SU

Dissolved Oxygen ***FDEP FT1500*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Dissolved Oxygen	4.5			mg/L
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Dissolved Oxygen % Saturation	51.1			%

Escherichia Coli ***SM 9223 B/QT*** ***Batch: B211117-006*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
E. coli	43	1		MPN/100 mL
Analysis Date/Time	11/18/2021 15:45			
Prep By	JP Nelson			
Prep Date/Time	11/17/2021 15:45			
Analyzed By	JP Nelson			
Total Dilution Factor	1			
Field Chlorine	0			mg/L

pH ***FDEP FT1100*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
pH	7.8			SU
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Manatee

Ammonia as Nitrogen ***EPA 350.1*** ***Batch: B211116-010*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Ammonia as N	0.065	0.008		mg/L
Analysis Date/Time	11/19/2021 13:31			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Nitrate and Nitrite as N ***EPA 353.2 (28 day hold time)*** ***Batch: B211116-011*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Nitrate + Nitrite as N	0.009	0.009	U	mg/L
Analysis Date/Time	11/17/2021 19:05			
Analyzed By	KH			
Total Dilution Factor	1			
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Specific Conductance ***FDEP FT1200*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Specific Conductance (EC)	148			µS/cm
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

Temperature ***FDEP FT1400*** ***Batch:*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Temperature	19.8			deg C

Total Kjedahl Nitrogen - Freshwater ***EPA 351.2*** ***Batch: B211116-012*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Analysis Date/Time	11/23/2021 11:52			
Analyzed By	KH			
Total Dilution Factor	1			
Total Kjedahl Nitrogen - Freshwater	0.565	0.064		mg/L
Manual Dilution Factor	1			
Auto Dilution Factor	1			

Total Suspended Solids ***SM 2540 D*** ***Batch: B211117-004*** ***Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Total Suspended Solids	4.8	0.625		mg/L
Analysis Date/Time	11/17/2021 14:15			
Analyzed By	JP Nelson			

Manatee

Total Dilution Factor	1

Turbidity ***SM 2130 B*** ***Batch: B211117-007 Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Limit Correction Factor	1			
Turbidity	3.4	0.1		NTU
Analysis Date/Time	11/17/2021 15:00			
Analyzed By	K Harkinson			
Total Dilution Factor	1			

Salinity ***FDEP FT1300*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Salinity	0			PSS
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			

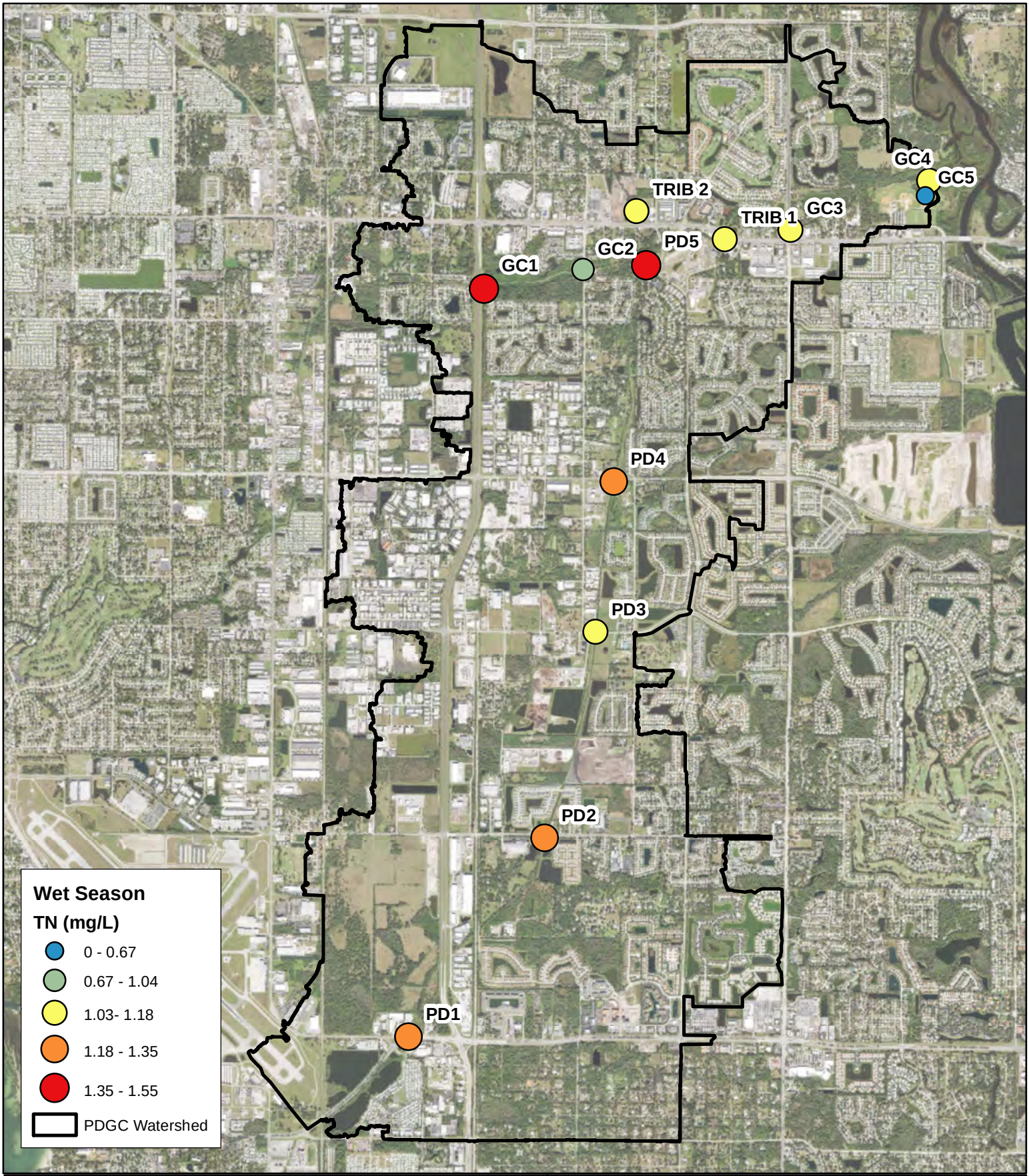
Depth ***Field Meter*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Depth	0.5			m

Transparency (Secchi Depth) ***FDEP FT1700*** ***Batch: Run: 1***

	Reported Results	Reporting Limit	Qual	Unit
Analysis Date/Time	No Entry			
Analyzed By	S browning, J Anthony			
Transparency (Secchi Depth)	0.5			m

APPENDIX F
Nutrient Concentration Gradient Maps



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

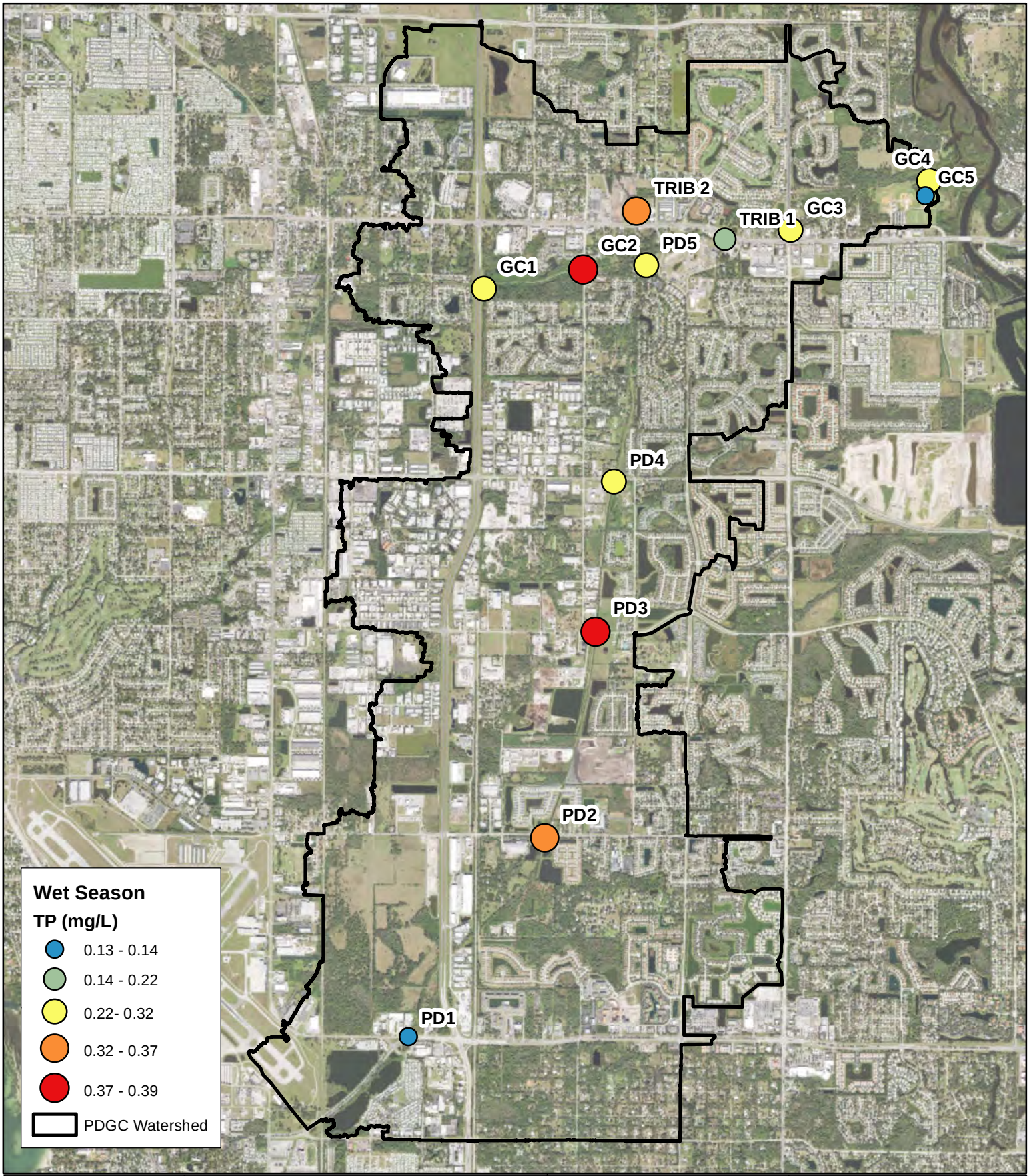
Date: 03/11/2022
Created by: FML

0 1 Miles

N

wood.

Pearce Drain Nutrient Concentrations Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

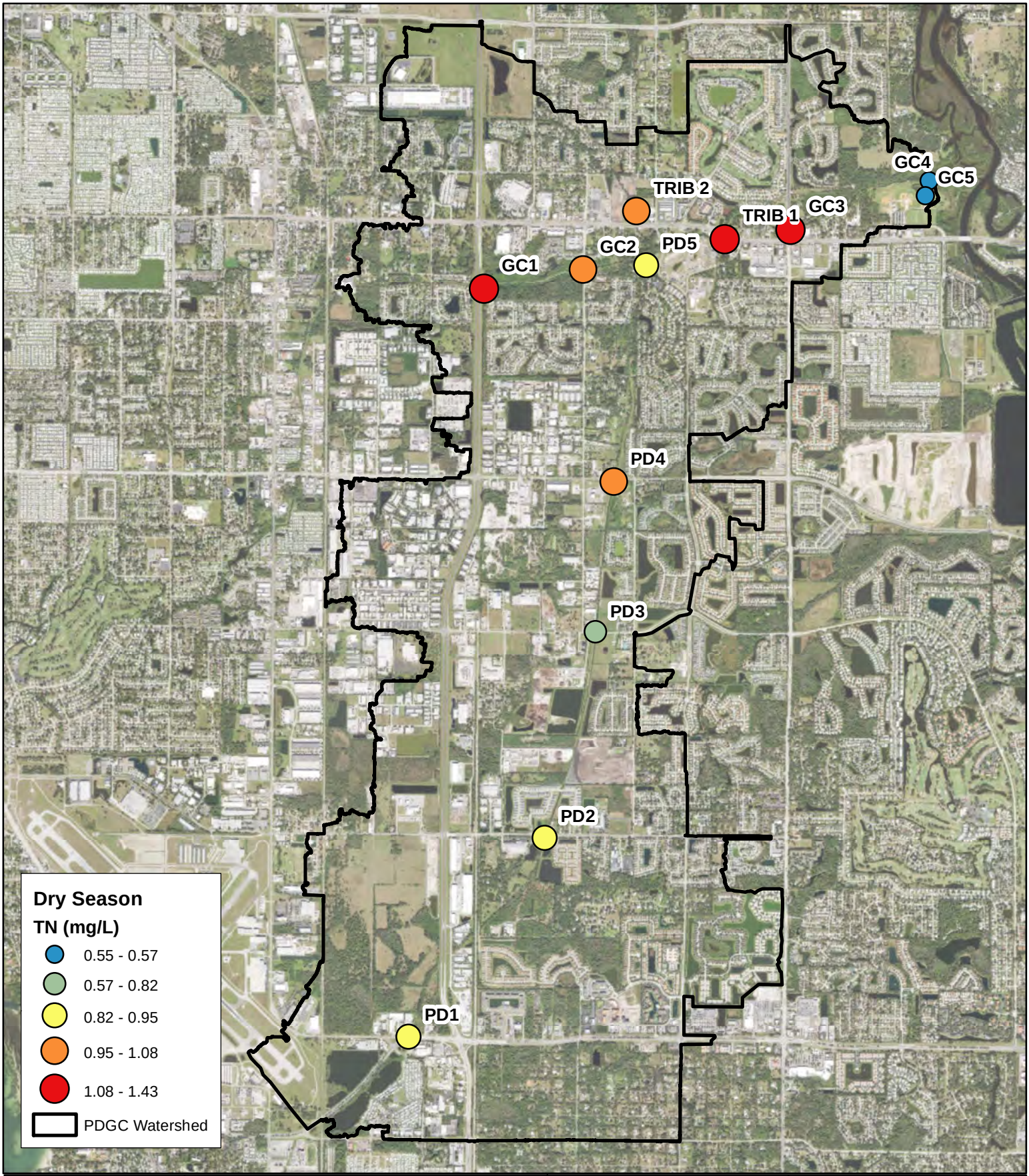
Date: 03/11/2022
Created by: FML

0 1 Miles

N

wood.

Pearce Drain Nutrient Concentrations Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

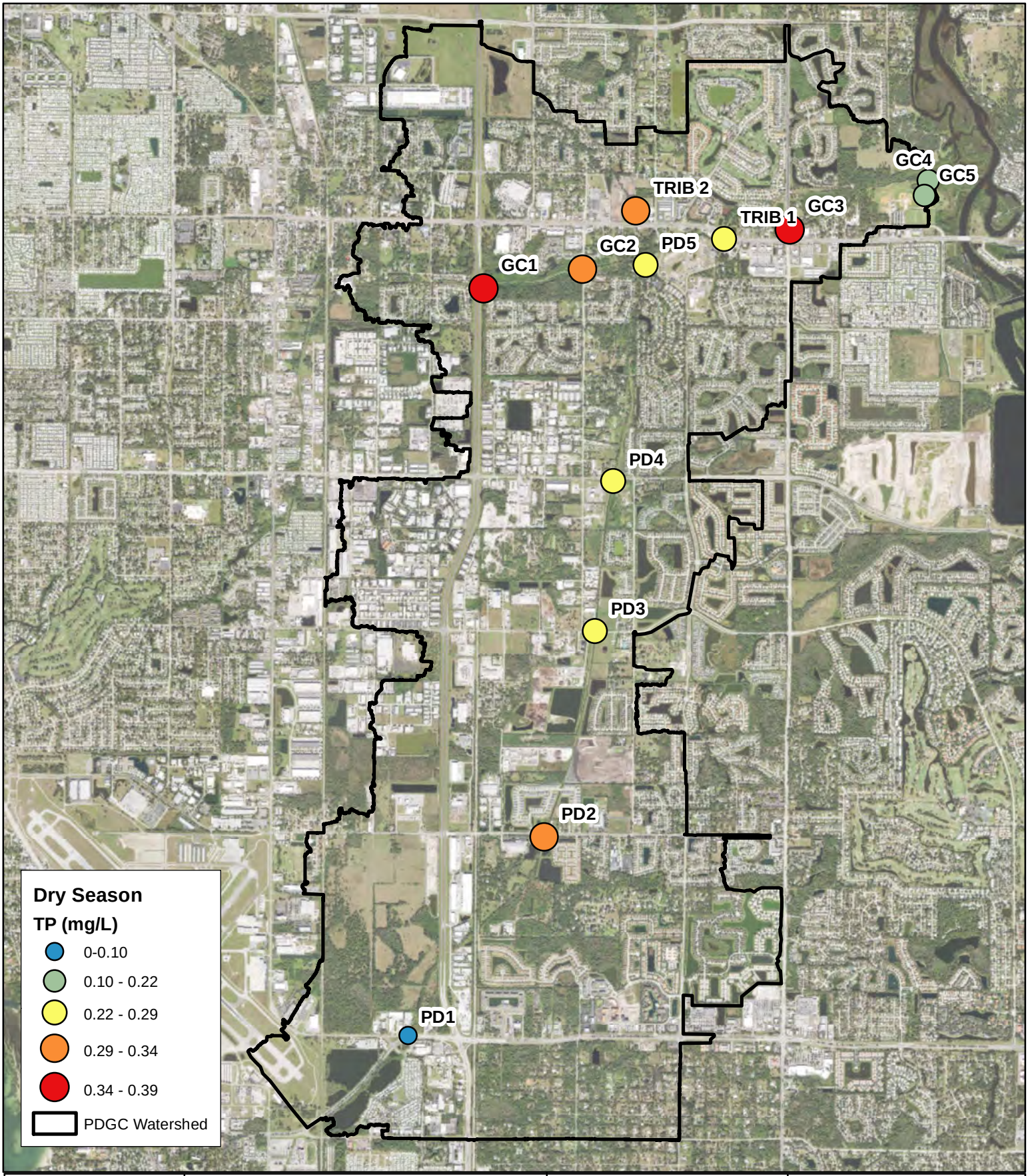
Date: 03/11/2022
Created by: FML

0 1 Miles

N

wood.

Pearce Drain Nutrient Concentrations Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

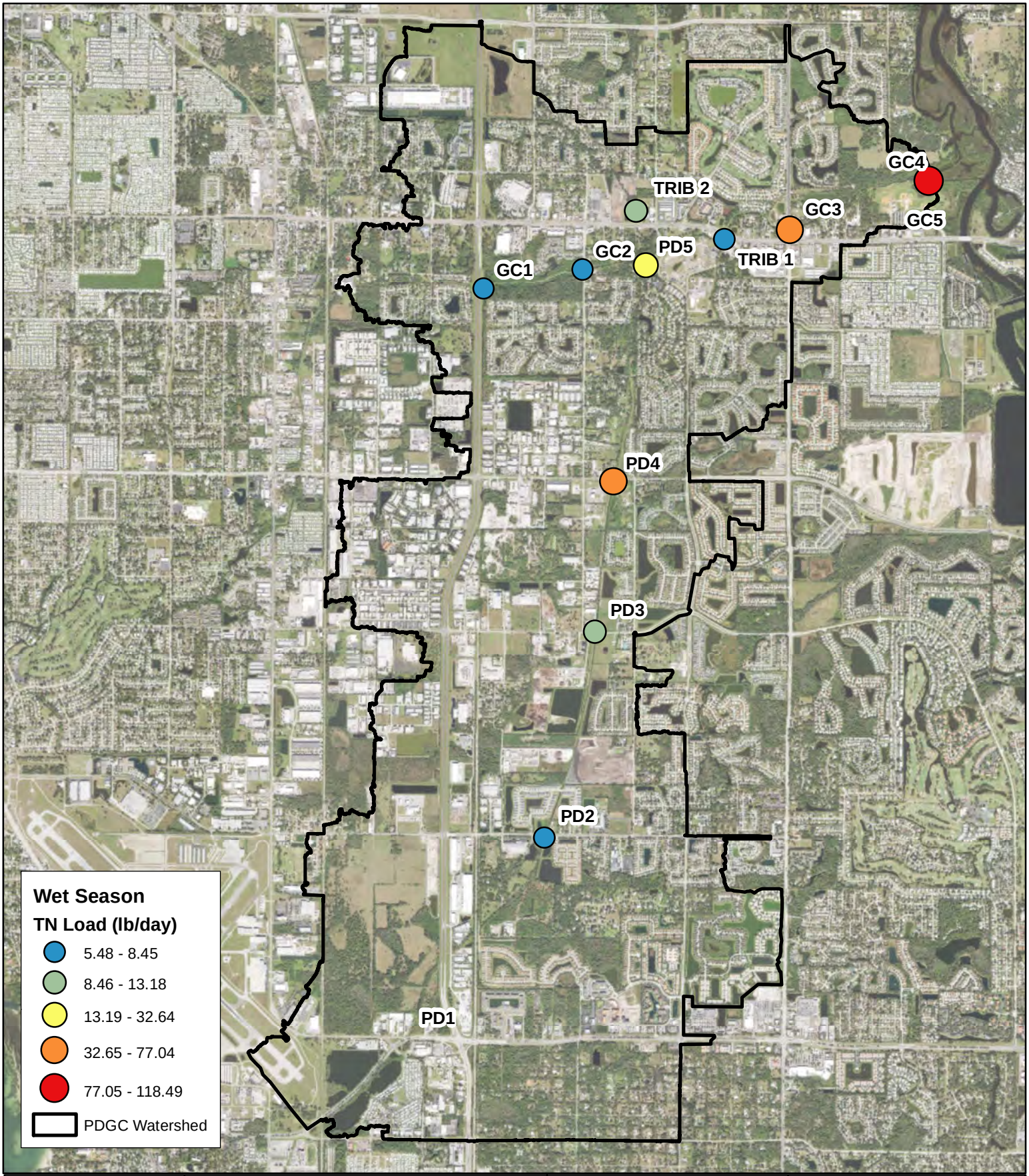
Date: 03/11/2022
Created by: FML

0 1 Miles

N

wood.

Pearce Drain Nutrient Concentrations Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

Date: 03/11/2022
Created by: FML

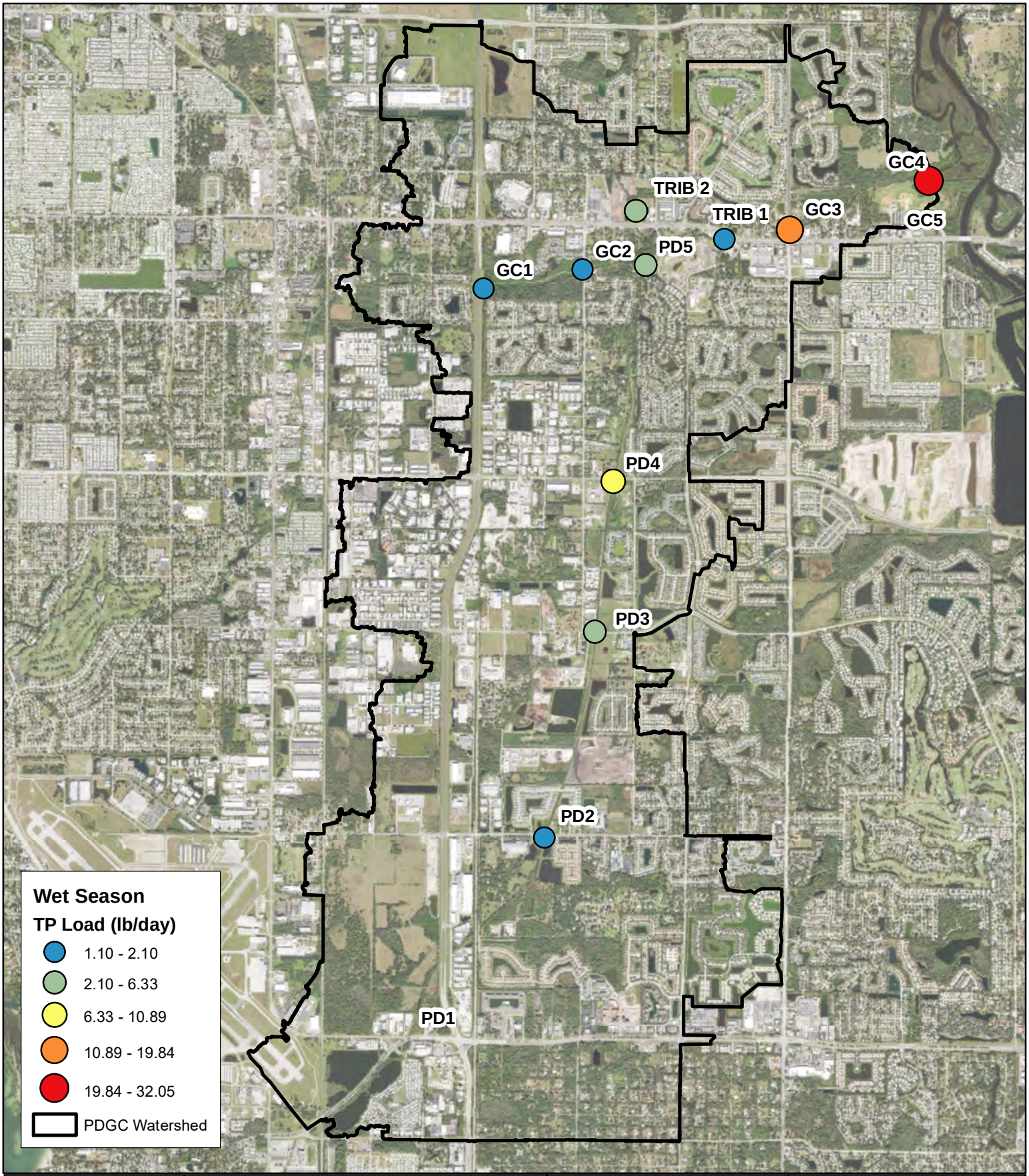
0 1 Miles

N

Stations that do not have a symbol represent stations where loads were not calculated due to a lack of flow data

wood.

Pearce Drain Nutrient Loads Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

Date: 10/11/2021
Created by: FML

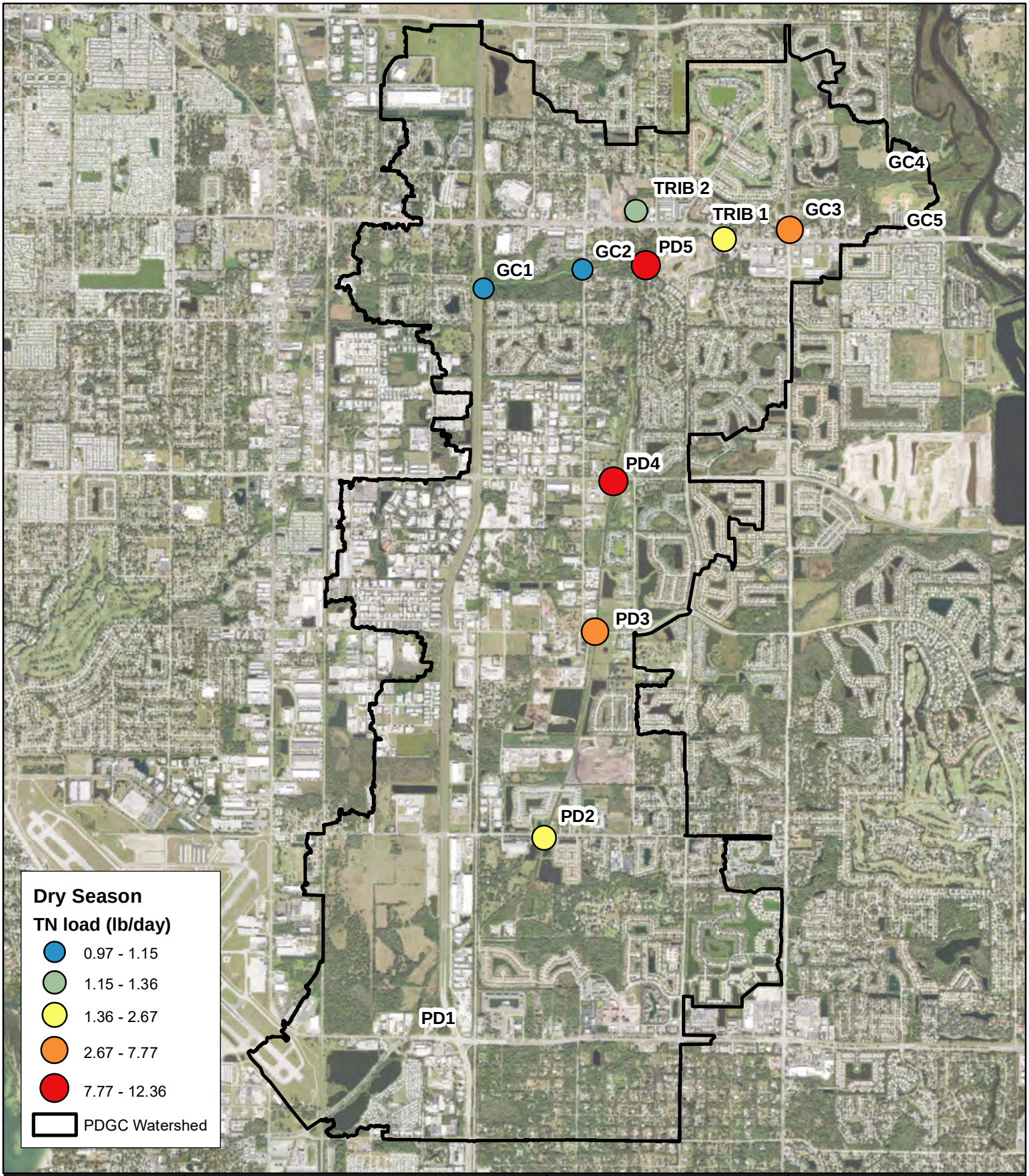
0 1 Miles

N

Stations that do not have a symbol represent stations where loads were not calculated due to a lack of flow data

wood.

Pearce Drain Nutrient Loads Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

Date: 10/11/2021
Created by: FML

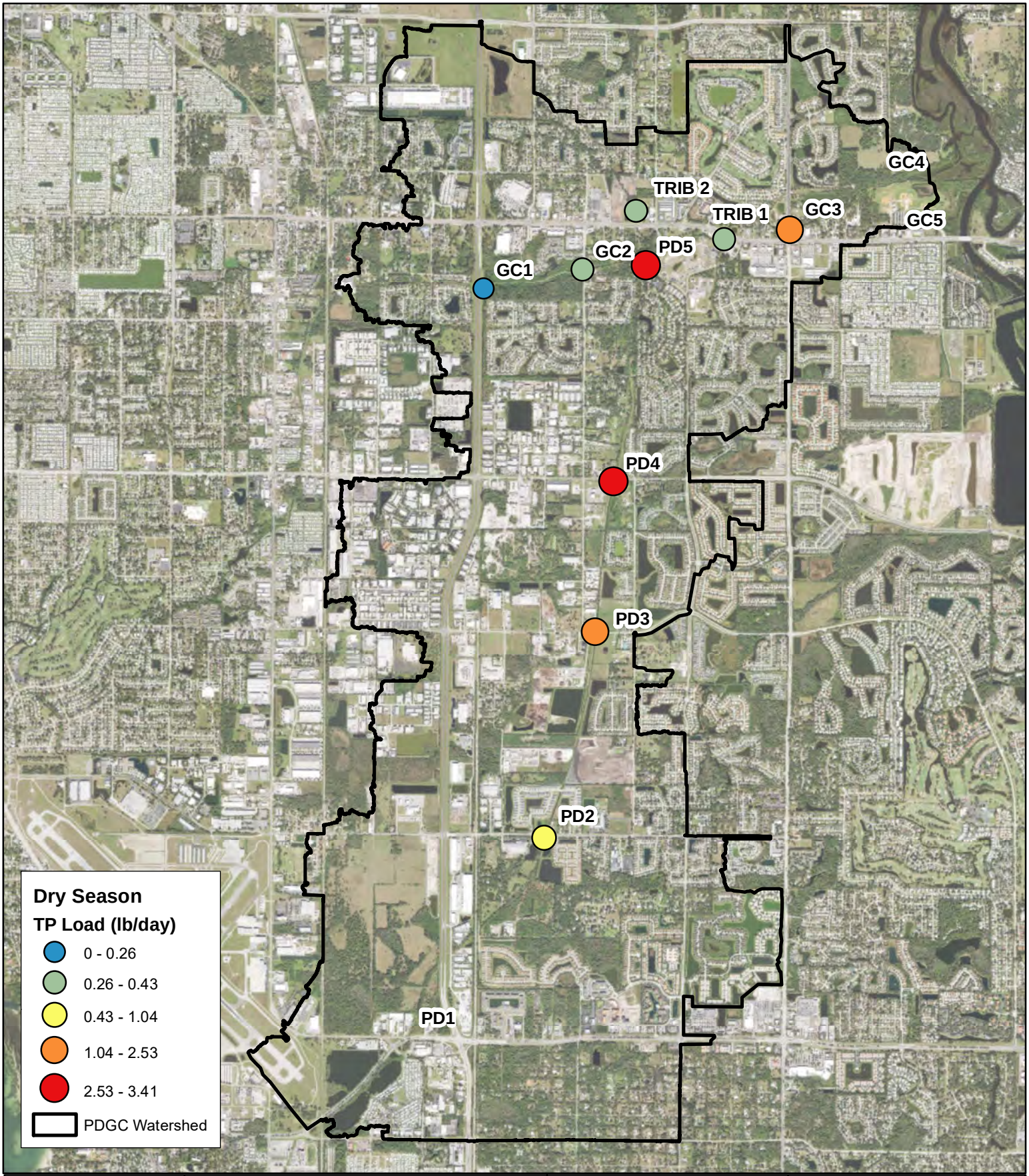
0 1 Miles

N

Stations that do not have a symbol represent stations where loads were not calculated due to a lack of flow data

wood.

Pearce Drain Nutrient Loads Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

Date: 10/11/2021
Created by: FML

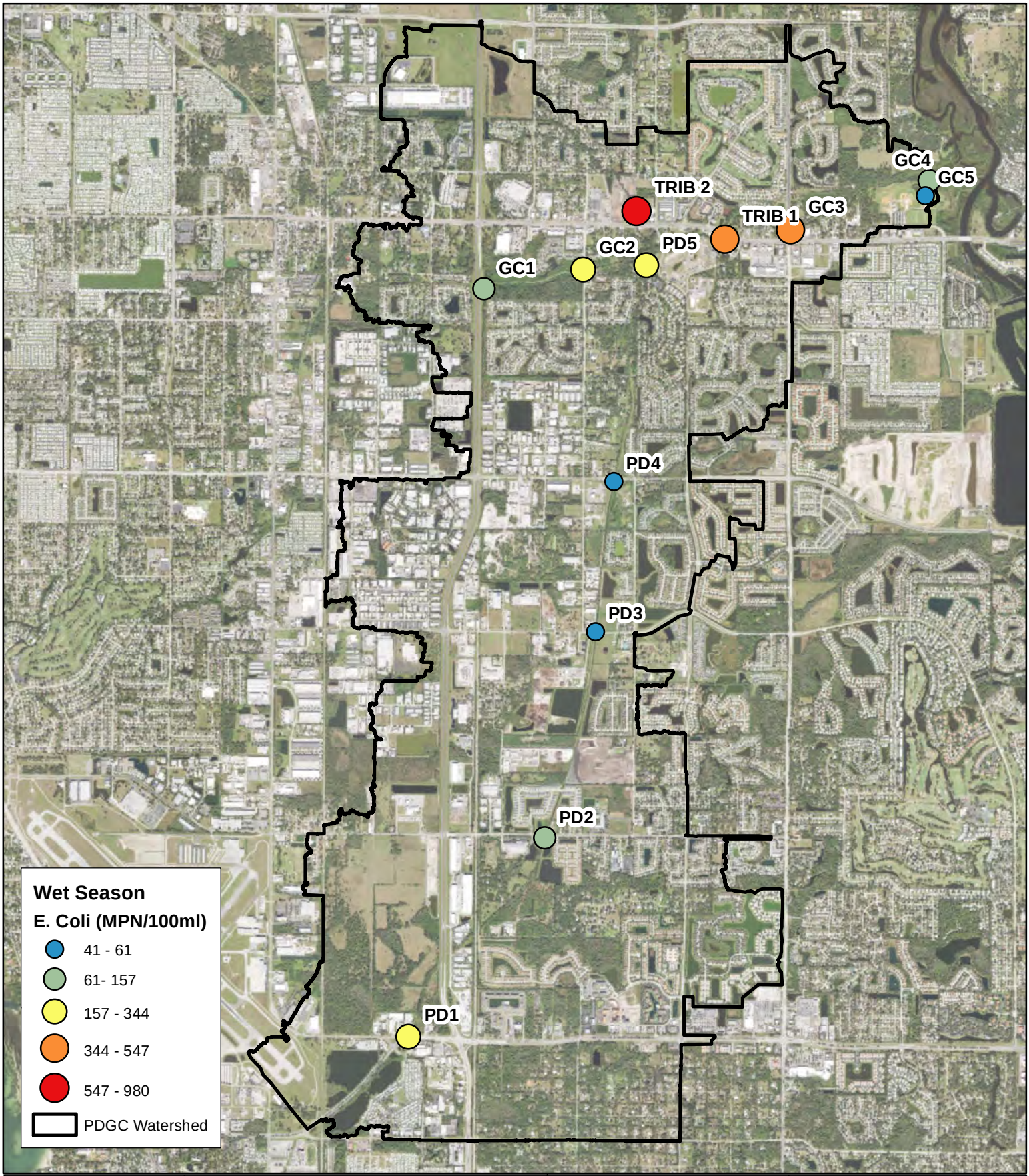
0 1 Miles

N

Stations that do not have a symbol represent stations where loads were not calculated due to a lack of flow data

wood.

Pearce Drain Nutrient Loads Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

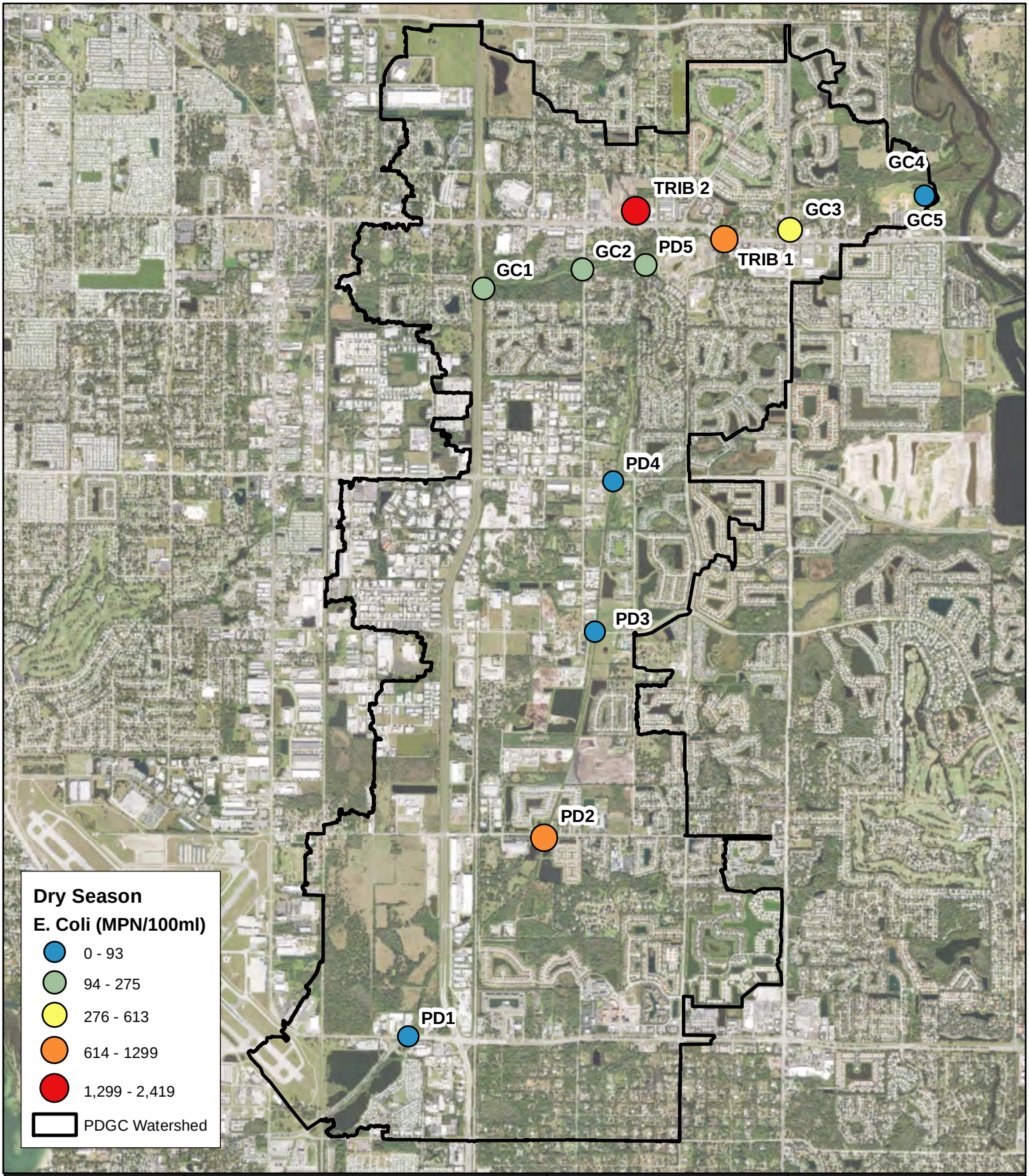
Date: 03/11/2022
Created by: FML

0 1 Miles

N

wood.

Pearce Drain Water Quality Concentrations Manatee County, Florida



1-Data source- Wood
ESRI Imagery
SWFWMD

2- This map is intended to be used for planning purposes only.

Date: 03/11/2022
Created by: FML

0 1 Miles

N

Stations that do not have a symbol represent stations where the parameter was not analyzed

wood.

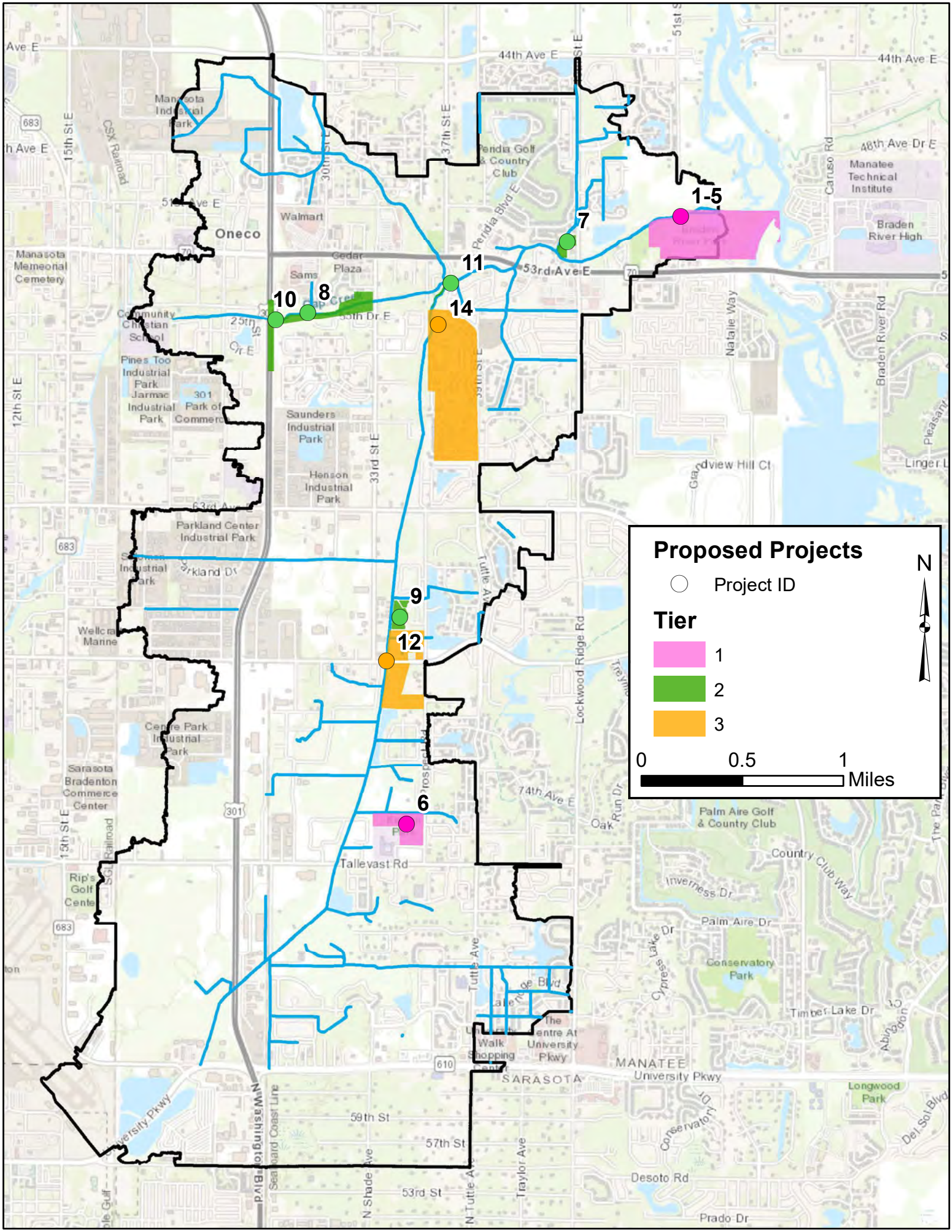
Pearce Drain Water Quality Concentrations Manatee County, Florida

APPENDIX G
Task 3: Conceptual BMP Summary

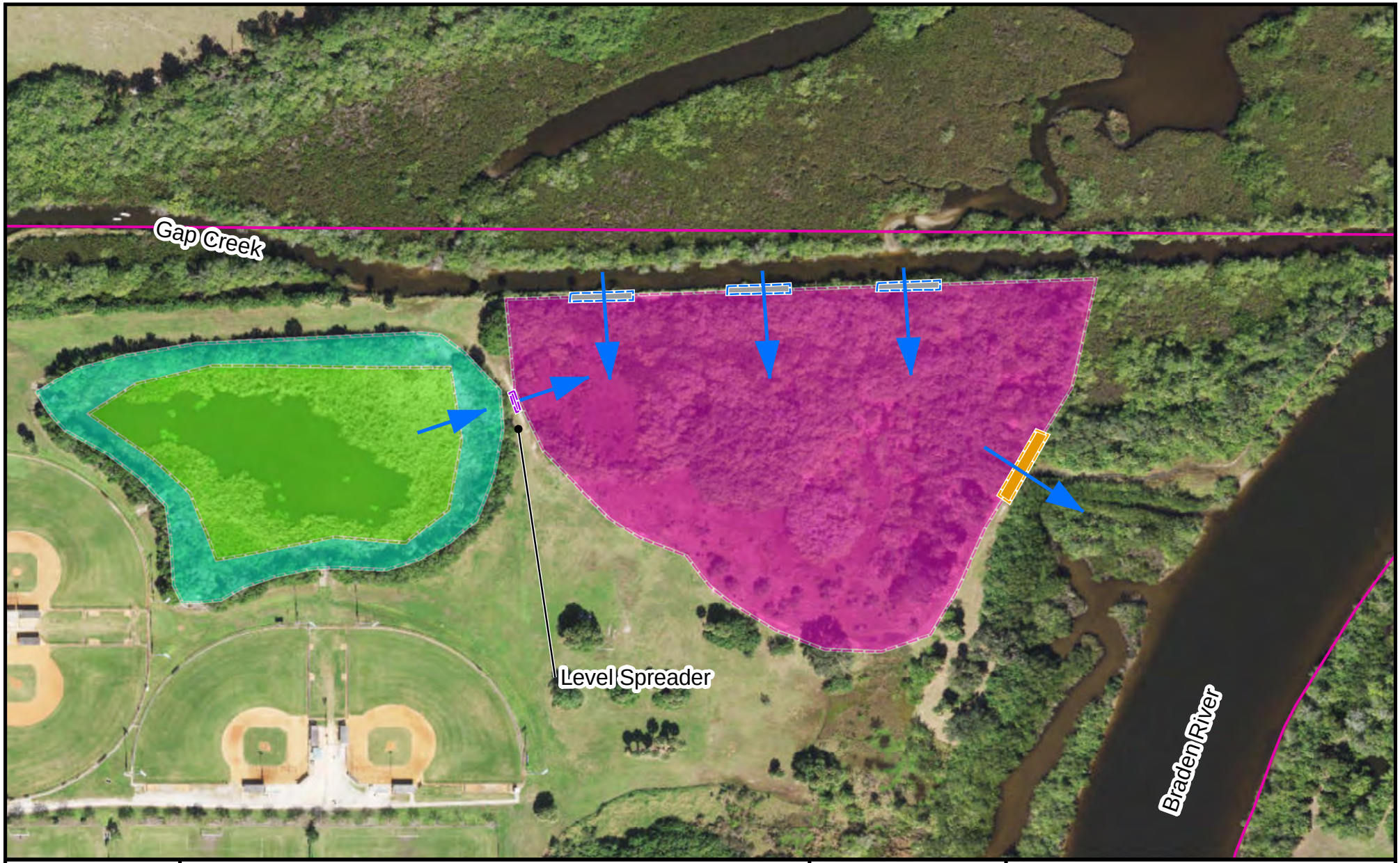
Conceptual BMP Alternatives

Project Number	Presentation Page	Project Name	Priority Tier	Benefits	Location
1	11	Enhance lithotrophic zone in Gap Creek	1	WQ	GC-4 Braden River Park
2	11	Route Gap Creek to Flood Plain Compensation Area (FPCA)	1	WQ	GC-4 Braden River Park
2A	11	Wetland Enhancements of FPCA	1	WQ	GC-4 Braden River Park
3	11	Removal of nuisance species in detention pond to increase storage	1	WQ SW	GC-4 Braden River Park
4A	12	BAM trenches between landfill edge and FPCA (Eastside)	1	WQ	GC-4 Braden River Park
4B	12	BAM trenches between landfill edge and Gap Creek (Northside)	1	WQ	GC-4 Braden River Park
4C	13	Redirect detention pond discharge to Eastside BAM trench	1	WQ	GC-4 Braden River Park
5A	15	Retrofit detention pond discharge to BAM filter and direct to FPCA	1	WQ	GC-4 Braden River Park
5B	15	Further polish pond discharge with wetland enhancements of FPCA	1	WQ	GC-4 Braden River Park
5C	15	Add nature trails in FPCA	1	NA	GC-4 Braden River Park
6	16	Storage and settling basin with BAM upflow filter	1	WQ SW	ManCty-03 Kinnan Park
7A	17	Divert Gap Creek into mitigation wetland and retrofit with BAM upflow filter	2	WQ	ManCty-05 The Stormwater Park
7B	17	Aerate adjacent stormwater pond	2	WQ	ManCty-05 The Stormwater Park
8	20	Natural channel design for flood storage and water quality treatment	1.5	WQ SW	ManCty-02 Lockwood Apartments
9	24	Reroute stormwater pond discharge to FPCA	2	WQ	ManCty-01 Fiddler's Creek
10A	26	BAM-enhanced bioswales with underdrain	2	WQ SW	GC-1 US 301 Swale
10B	27	BAM downflow filtration	2	WQ	GC-1 US 301 Median
10C	28	BAM filtration and attenuation vault	2	WQ SW	GC-1 US 301 Median
NA	29	No recommendations - requires land acquisition	2	NA	PD-3A Pearce Business Center
11	30	Vegetated Reinforced Slope Stabilization (VRSS) and exotics removal	2	WQ	PD-5 Moss Creek
12	32	Centre Lake subdivision upstream land acquisition	3	SW	Upstream of Centre Lake Subdivision
13	33	Watershed-wide LID	3	WQ SW	Watershed-wide
14	34	Septic to sewer conversion in Garden Lakes & Westwind Village	3	WQ	Garden Lakes Estates

Note: Priority Tier represents the level of coordination required (e.g., Tier ranking of 1 indicates the property is County-owned and requires no coordination). WQ = water quality; SW = stormwater storage


Proposed Projects
Project ID
Tier
1
2
3
N
0
0.5
1
Miles
1-5
7
11
10
8
14
9
12
6
Oneco
Walmart
Sams
Cedar Plaza
Manasota Memorial Cemetery
Community Christian School
Pines Too Industrial Park
Jarmac Industrial Park
301 Park of Commerce
Saunders Industrial Park
Henson Industrial Park
Parkland Center Industrial Park
Centre Park Industrial Park
Sarasota Bradenton Commerce Center
Wellcraft Marine
Rip's Golf Center
Tallevast Rd
Pendia Golf & Country Club
Manatee Technical Institute
Braden River High
Natalie Way
Braden River Rd
Grandview Hill Ct
Lockwood Ridge Rd
Palm Aire Golf & Country Club
Country Club Way
Inverness Dr
Palm Aire Dr
Conservatory Park
Timber Lake Dr
Longwood Park
The Centre At University Pkwy
MANATEE
SARASOTA
University Pkwy
Desoto Rd
Prado Dr
59th St
57th St
53rd St
44th Ave E
53rd Ave E
48th Ave Dr E
74th Ave E
63rd Ave E
51st Ave E
25th St Dr E
35th Dr E
15th St E
12th St E
37th St E
33rd St E
30th St E
Cypress Lake Dr
Oak Run Dr
Tuttle Ave
Seaboard Coast Line
CSX Railroad

APPENDIX H
Conceptual Designs



1- Data Source- Wood, ESRI Imagery, SWFWMD, Manatee County, FDOT

2- This map is intended to be used for planning purposes only. It is not a survey.

Date: 05/15/2022
Revised:TRL
Checked By: CL

Explanation of Features

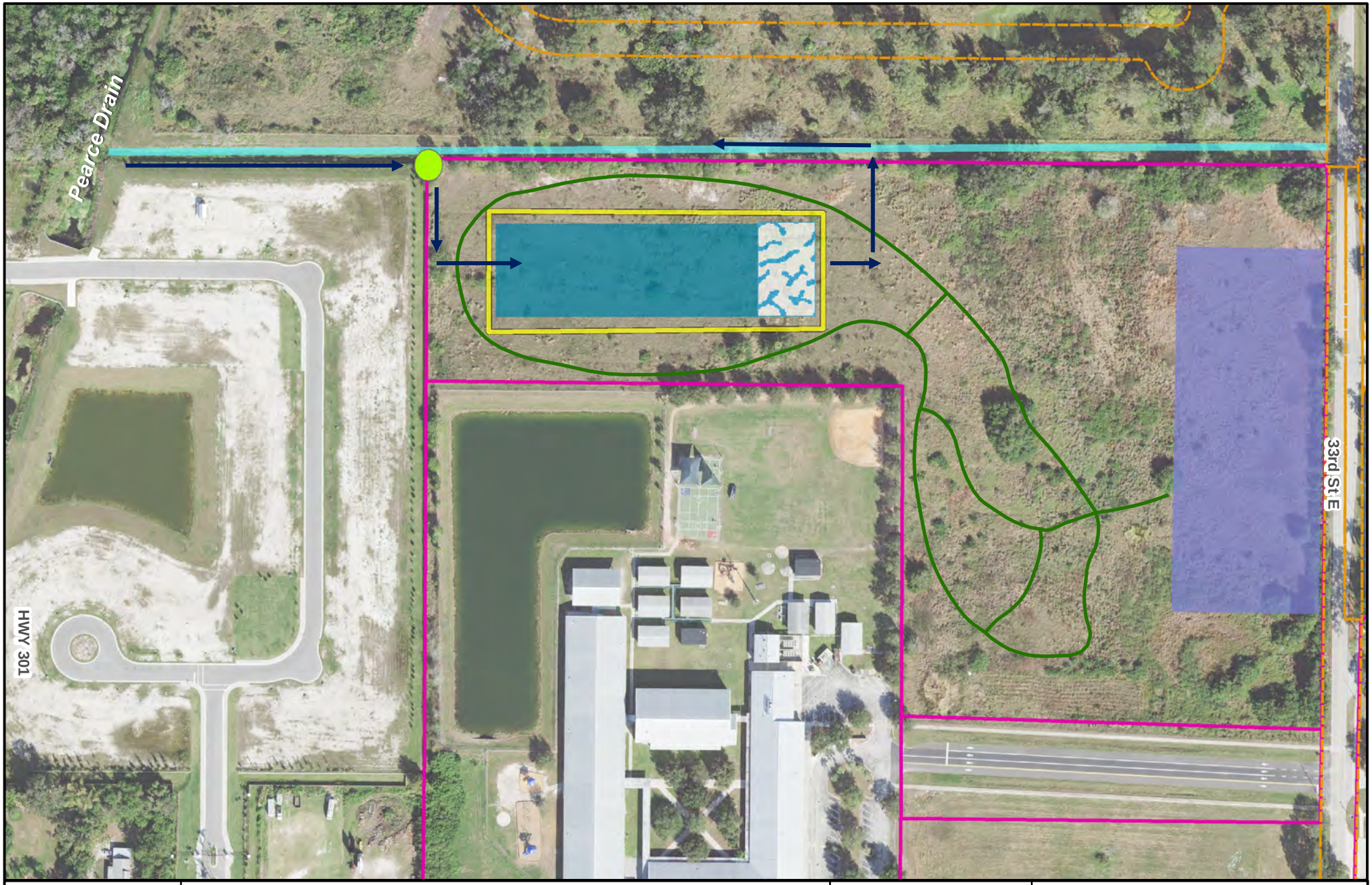
- Berm Break
- Discharge Weir
- Level Spread
- Existing Stormwater Pond
- Approximate Existing Wetland
- Vegetation Removal Area
- Manatee County Parcels
- Flow Direction

N

0 250 500 Feet

wood.

Pearce Drain/ Gap Creek
Braden River Park (GC-4)
Conceptual Design
Manatee County, FL



1-Data source- Wood ESRI Imagery,SWFWMD, Manatee County, FDOT

2- This map is intended to be used fro planning purposes only.

Date: 05/10/2022
Created by: CL

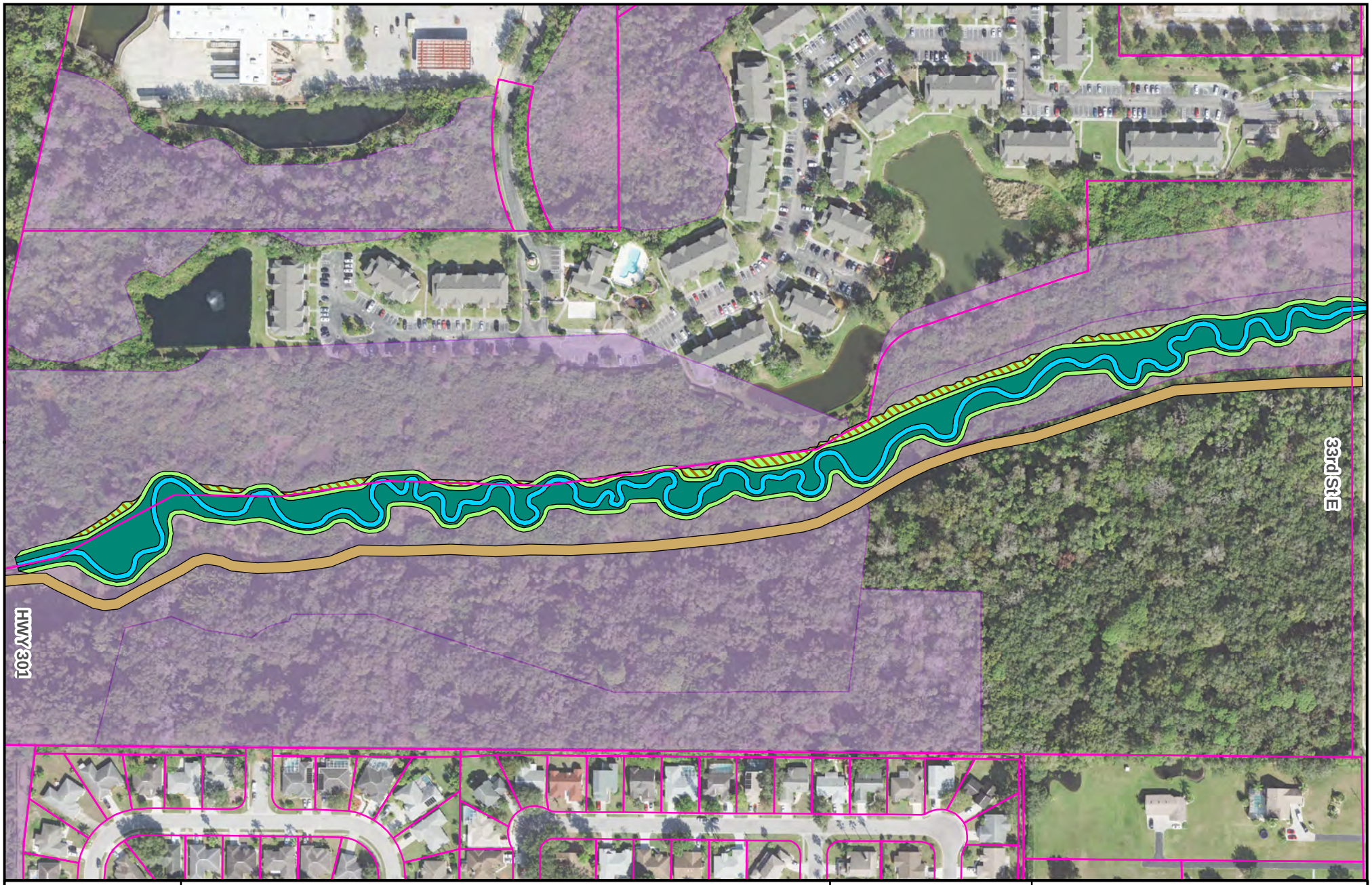
Proposed Park Facilities
Existing Ditch
Pump Station
Above Ground Impoundment
BAM Filter Shelf
Wet Detention Treatment
Proposed Park Trails
Public Right Of Ways
Manatee County Parcels

N

0 250 500 Feet

wood.

Pearce Drain/Gap Creek Kinnan Park (ManCty-03) Conceptual Design Manatee County, FL



1-Data source- Wood ESRI Imagery,SWFWMD, Manatee County, FDOT

2- This map is intended to be used fro planning purposes only.

Date: 03/16/2022
Created by: ML

Concept Design Components

- Bankfull Creek Channel
- Bottomland Meander Belt Forest
- Hillslope Forest
- Former Channel Filled Wetland
- Optional New County Access Trail
- Conservation Easements
- Manatee County Parcels

N

0 200 Feet

wood.

Pearce Drain/Gap Creek
Collins Dairy Drain (ManCty-02)
Stream Restoration
Conceptual Design
Manatee County, FL

APPENDIX I
BMPTrains Output Braden River Park

Complete Report (not including cost) Ver 5.1.0

Project: Braden River Park
Date: 5/25/2022 3:57:42 PM

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Pond drainge basin	Enhanced Wetland
Rainfall Zone	Florida Zone 4	Florida Zone 4
Annual Mean Rainfall	53.44	53.44

Pre-Condition Landuse Information

Landuse	Rangeland/Parkland: TN=1.150 TP=0.055	Undeveloped - Wet Flatwoods: TN=1.213 TP=0.021
Area (acres)	0.00	9.00
Rational Coefficient (0-1)	0.00	0.00
Non DCIA Curve Number	29.90	29.90
DCIA Percent (0-100)	0.00	0.00
Nitrogen EMC (mg/l)	1.150	1.213
Phosphorus EMC (mg/l)	0.055	0.021
Runoff Volume (ac-ft/yr)	0.000	0.158
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	0.000	0.236
Phosphorus Loading (kg/yr)	0.000	0.004

Post-Condition Landuse Information

Landuse	Rangeland/Parkland: TN=1.150 TP=0.055	Undeveloped - Wet Flatwoods: TN=1.213 TP=0.021
Area (acres)	30.00	9.00
Rational Coefficient (0-1)	0.18	0.82
Non DCIA Curve Number	77.00	98.00
DCIA Percent (0-100)	10.00	100.00
Wet Pond Area (ac)	4.16	0.00

Nitrogen EMC (mg/l)	1.150	1.213
Phosphorus EMC (mg/l)	0.055	0.021
Runoff Volume (ac-ft/yr)	20.759	32.986
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	29.436	49.335
Phosphorus Loading (kg/yr)	1.408	0.854

Catchment Number: 1 Name: Pond drainge basin

Project: Braden River Park
Date: 5/25/2022

Multiple BMP in Series Design Parameters

BMP in Series Number: 1
BMP Type: Wet Detention

Permanent Pool Volume (ac-ft)	0.796
Permanent Pool Volume (ac-ft) for 31 days residence	1.763
Annual Residence Time (days)	14
Littoral Zone Efficiency Credit	10
Wetland Efficiency Credit	

BMP in Series Number: 2
BMP Type: Filtration

Treatment Depth (in)	1.000
Hydraulic Capture Efficiency (%)	77
Media Type	B&G ECT3
Media N Reduction (%)	
Media P Reduction (%)	

BMP in Series Number: 3
BMP Type: User Defined BMP

Contributing Catchment Area (acres)	25.840
Provided Nitrogen Treatment Efficiency (%)	10
Provided Phosphorus Treatment Efficiency (%)	10

BMP in Series Number: 4
BMP Type: None

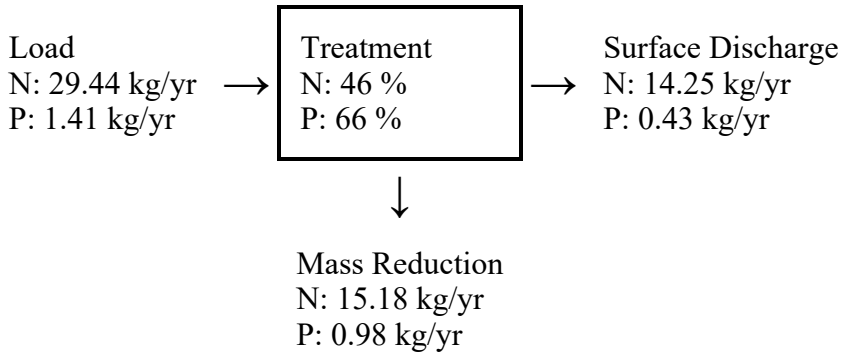
Watershed Characteristics

Catchment Area (acres)	30.00
Contributing Area (acres)	25.840
Non-DCIA Curve Number	77.00
DCIA Percent	10.00
Rainfall Zone	Florida Zone 4
Rainfall (in)	53.44

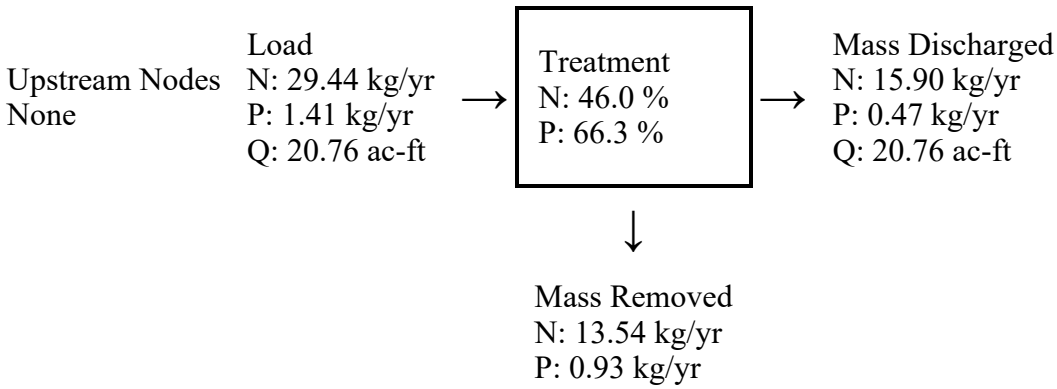
Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	46
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	66

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Catchment Number: 2 Name: Enhanced Wetland

Project: Braden River Park
Date: 5/25/2022

User Defined BMP Design

Contributing Catchment Area (acres)	9.000
Provided Nitrogen Treatment Efficiency (%)	10
Provided Phosphorus Treatment Efficiency (%)	10

Watershed Characteristics

Catchment Area (acres)	9.00
Contributing Area (acres)	9.000
Non-DCIA Curve Number	98.00
DCIA Percent	100.00
Rainfall Zone	Florida Zone 4
Rainfall (in)	53.44

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	10
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	10

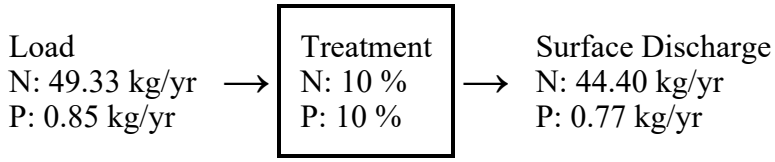
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

Groundwater Discharge (Stand-Alone)

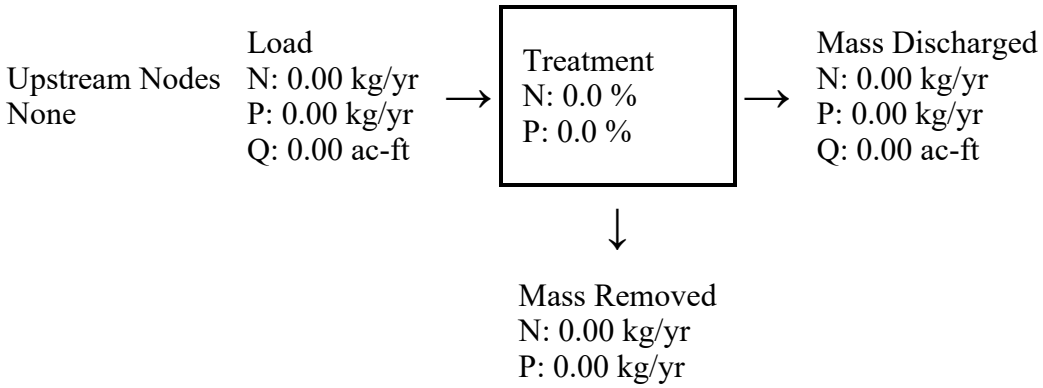
Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for User Defined BMP (stand-alone)



↓ Mass Reduction
N: 4.93 kg/yr
P: 0.09 kg/yr

Load Diagram for User Defined BMP (As Used In Routing)



Summary Treatment Report Version: 5.1.0

Project: Braden River Park

Analysis Type: BMP Analysis
BMP Types:
Catchment 1 - (Pond drainge basin) Multiple BMP
Catchment 2 - (Enhanced Wetland) User Defined BMP
Based on % removal values to the nearest percent

Date:5/25/2022

Routing Summary
Catchment 1 Routed to Outlet
Catchment 2 Routed to Outlet

Summary Report

Nitrogen

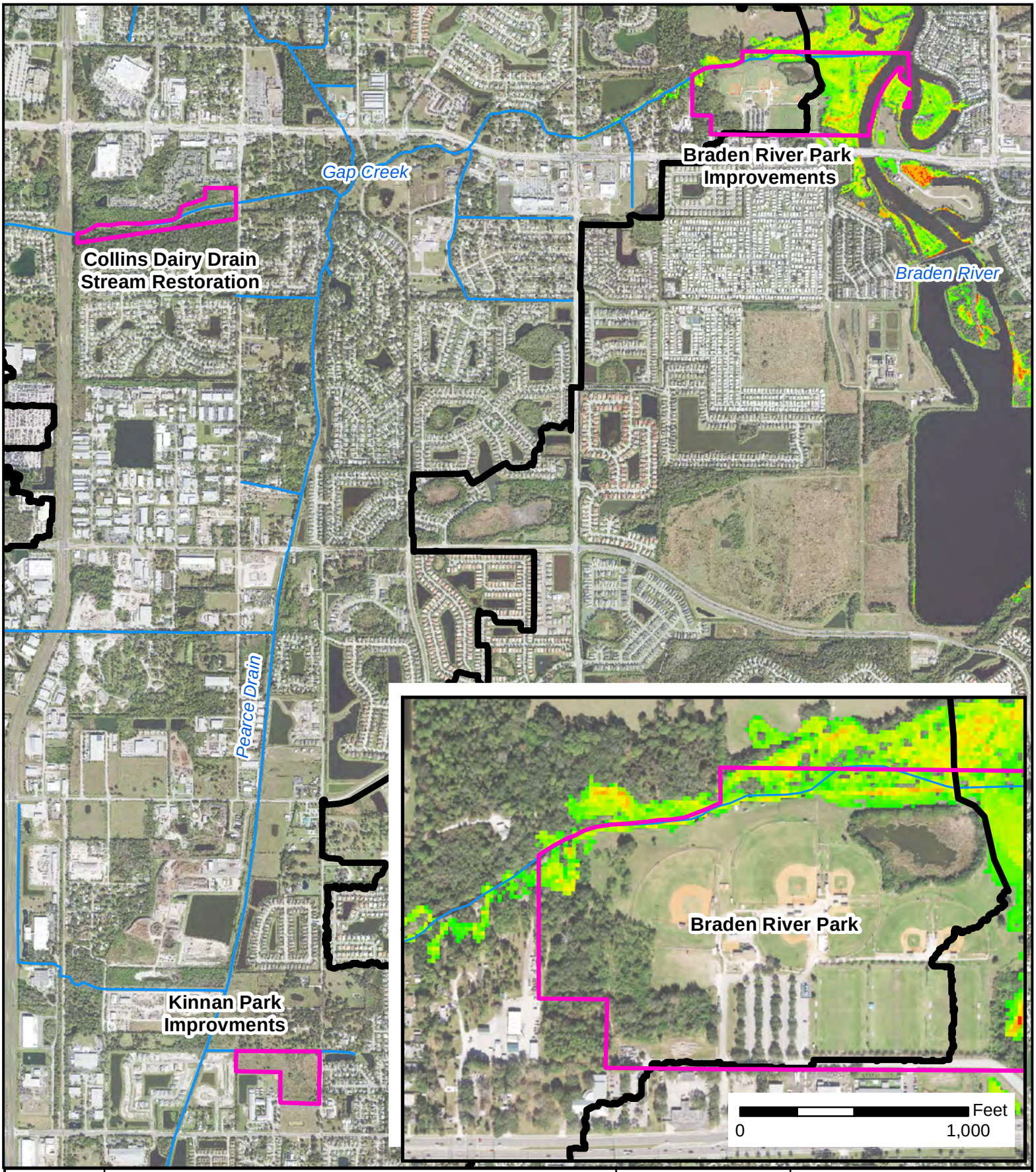
Surface Water Discharge		
Total N post load	29.44 kg/yr	
Percent N load reduction	46 %	
Provided N discharge load	15.9 kg/yr	35.06 lb/yr
Provided N load removed	13.54 kg/yr	29.85 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	1.408 kg/yr	
Percent P load reduction	66 %	
Provided P discharge load	.474 kg/yr	1.05 lb/yr
Provided P load removed	.934 kg/yr	2.059 lb/yr

APPENDIX J
Sea Level Rise Inundation Map



1-Data source- Wood ESRI Imagery,SWFWMD, Manatee County, FDOT, NOAA, University of Florida

2- This map is intended to be used fro planning purposes only.

Date: 03/16/2022
Created by: ML

Proposed Conceptual Project Areas

Pearce Drain/Gap Creek Watershed

Streams

Projected Inundation Depth

High : 60 (in.)

Low : 0 (in.)

N

0 0.5 Miles

wood.

Pearce Drain/Gap Creek 2050 NOAA MHHW Extreme Sea Level Rise Projection Manatee County, FL