PRELIMINARY ENGINEERING REPORT

for the

WATER SYSTEM IMPROVEMENTS PROJECT

Prepared for:

Taylor Coastal Water and Sewer District
Taylor County, Florida

Project No.: 50083282

July 15, 2020

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SECTION 1 – Project Planning

1.1 Location

Taylor Coastal Water and Sewer District (TCWSD), is located in coastal southwest Taylor County, Florida. TCWSD is located at 29°51'4"N and 83°35'36"W. TCWSD is a rural community located approximately 20 miles south of the City of Perry and 20 miles northwest of the City of Steinhatchee. TCWSD encompasses approximately 6.2 miles of the Taylor County coastline; as shown on **Figure 1** (Location Map). This area extends from Dekle Beach on the north end to Fish Island on the south end and is bounded on the west by the Gulf of Mexico and on the east approximately by Beach Road with some services along the Cedar Island East community. The project area is inhabited by approximately 1,230 residents, the majority of which are seasonal. TCWSD is located within Township 07 South, Range 07 East, Sections 22, 23, 26, 27, 31, 35, and 36, as well as Township 08 South, Range 07 East, Sections 01, 06, 07, 12, 13, and 18, as shown on **Figure 2** (Quad Map).

Currently, TCWSD owns and operates their own drinking water system. The current water system consists of three groundwater wells, disinfection system, hydro-pneumatic tanks, booster pump station and a pressurized water distribution system which serves approximately 1,242 residents. The three existing wells are 4", 6", and 8" in diameter. The 4" diameter well is no longer usable as it does not provide adequate pressure or capacity for the system. The 6" well is rarely used because it frequently tests positive for iron bacteria. The 8" well is the main method for pumping ground water into the distribution system. All three wells are in close proximity to each other which leads to occasional iron bacteria being found in the water from the 8" well. Also with the current system described above, TCWSD does not have adequate storage for normal daily operation per FDEP guidelines. The hydro-pneumatic tanks only hold 15,000 gallons of water (one 5,000 gallon tank and one 10,000 gallon tank) and both are aged and difficult to maintain and clean due to their style of construction. The booster pump station can also hold 5,000 gallons of water but is in constant need of repair due to broken valves and floats, as well as persistent leaks which contribute to treated water loss. The existing generators are sized for the existing system and may not be capable of handling any required system upgrades as described in this report. The customer meters are analog read meters that are often submerged after rain events, making them difficult for the operator to read. The chemical feed pumps are functioning properly at this time; however, it is preferred that the chlorination system be switched to gas due to degradation of the hypochlorite over time and the operational ease of gaseous chlorine. The system also loses a large amount of water due to the constant flushing that is required. There are a large number of dead-ends due to the configuration of streets and canals in the neighborhoods within the service area. Improvements to this water system are suggested to provide a reliable source of drinking water, provide adequate storage, and reduce system losses. These improvements are herein referred to as the ***Water System Improvements Project***.

Multiple options for upgrading the water storage and supply were analyzed. Options for supply included a new well, interconnection with a nearby system, and leaving the system as-is ("do-nothing" alternative). Several different storage options were considered that would not only provide adequate storage but assist in the maintenance of system pressure. These options are an elevated storage tank and ground storage with a booster pump station. Additionally, different methods for reducing system losses were analyzed. An in depth analysis was conducted on all alternatives and are discussed in this report.

In summary, the major components of the proposed project include increasing storage capacity, replacing failing infrastructure, and upgrading water production appurtenances. This is proposed to be accomplished through the construction of a new 100,000 gallon storage tank and booster pumps at the existing water treatment plant site, drilling a new 8" well on the wellhead protection area owned by TCWSD, replacing existing customer water meters with auto-read meters, installing ultrasonic meters and automatic flushing stations with meters, replacing chlorine and polymer feed pumps at the water treatment plant, building new buildings for motor control and chemical feed, replacing the generator, replacing the aged hydropneumatic tanks, abandoning the 4" and 6" wells, and decommissioning the booster station on the south end of the system. The alternatives for each of these project components are discussed at length in Sections 4 and 5. Rules, regulations, and standards to be followed are outlined throughout the report along with necessary calculations.

Due to limited financial resources, TCWSD is seeking funding from the U.S. Department of Agriculture's (USDA) Rural Development, the Florida Department of Environmental Protection (FDEP), the State Revolving Fund (SRF) Loan Program, and the Suwannee River Water Management District (SRWMD) for financial assistance regarding this important project.

1.2 Environmental Resources Present

Cultural resources are not known to be present within the proposed project area. Federal or State Historical landmarks have not been identified within the proposed project area. Negative impacts to cultural resources or historical sites are not expected within the proposed project area.

Federal Emergency Management Agency (FEMA) has identified areas within the planning area that have been designated as Flood Zone A and AE. However, the proposed water storage facility is approximately 22 feet above sea level and is not in a flood zone (**Figure 3**). It is not anticipated that flood zones will have any adverse impacts on the construction of this project. In addition, no wetlands have been identified on the proposed water storage site. A wetlands map can be found in **Figure 4.** Wetlands encountered within the proposed project areas will be protected from disturbance by utilizing proper methods of construction, buffer zones, and best management practices. The exact location of each wetland disturbed or encountered, if any, will be identified during the final design of the proposed project and any proposed work in these areas will be permitted as necessary.

1.3 Population Trends

As of the 2010 census, the Zip Code Tabulation area for 32348 had a population of approximately 12,442. Of those residents, 67% are considered white and 81% over the age of 18. The 2016 American Community Survey shows the population to be 12,513. This shows a growth rate of only 0.09% based upon the simple growth rate formula [$F=P(1+r)^t$] where F is the future value, P is the present value, r is the rate of change, and t is time in years. Because TCWSD is located in a high hazard coastal zone, growth is not expected in their service area; however for a conservative design, a growth rate of 1% per year for the next 20 years will be used.

Table 1.1
Population Data

	2010	2016	Percent Change
Population	12,442	12,513	0.09%

This is not the population for the service area but represents the general growth trend within the project area limits. The current served population within TCWSD is approximately 1,242. At 1% growth rate, the projected population served in 20 years is 1,516 which is an overall growth of nearly 22%.

1.4 Community Engagement

TCWSD has held several public meetings regarding this project and the benefits of the project to the water system. Updates and information on this project are given at each monthly regularly scheduled board meeting. At these meetings, the project status was given as well as discussions regarding proposed alternatives, goals for the projects, and cost comparisons. Minutes from these meetings can be made available upon request.

1.5 Environmental Resources Impacts

1.5.1 Cultural Resources

Minimal environmental impacts are expected from this proposed water system improvements project. All construction will be within the public right of way, easements, or on property owned by TCWSD. The proposed project will have no effects on historical properties. Should any prehistoric or historical artifacts be discovered during the construction process, all activities should cease and the Department of State shall be contacted.

1.5.2 Floodplains and Wetlands

The areas of the TCWSD community that have been deemed by the Federal Emergency Management Agency (FEMA) as Zone AE, Zone VE and Zone X are shown in **Figure 3** (FEMA Flood Zone Map). The proposed water storage facility is to be located outside of flood zones. As shown on **Figure 4** (National Wetlands Inventory Map), streams will not be encountered and easements will not be needed during the construction of this water system improvements project. It is not anticipated that wetlands will be disturbed in the construction of the proposed water improvements project as the pipelines will be placed in existing roadways and easements.

1.5.3 Land Use

The land uses within TCWSD consist of agriculture, mixed use, and conservation. The majority of the area is also classified as "Coastal High Hazard." The land use map can be found in **Figure 5**.

1.5.4 Soil Type

According to the Natural Resources Conservation Service (NRCS) soils map, the primary soil type in TCWSD consists of a fine sand and muck. The site for the water storage tank consists of a well-drained sand with a high infiltration rate, as shown on **Figure 6** (Soils Map). Further soil exploration will be performed during the design phase so the soil stratification within the community can be identified.

1.5.5 Coastal Resources

The water system improvements project is not located within the Coastal Construction Zone.

1.5.6 Socio-Economic Issues / Environmental Justice

TCWSD service has a seasonal population of approximately 1,265 people. According to the U.S. Census Bureau records, 17.3 percent of the individuals in the area live below poverty level. The median household income is $33,170. TCWSD will be aggressively pursuing grant funding for this project to ensure it will not create any negative effects on the citizens. This project will provide health benefits to minority and low income communities by providing a safer and more reliable drinking water system.

1.5.7 Biological Resources

This project is not expected to have a negative impact on any endangered or protected species. Per the Florida Natural Area Inventory (FNAI) and the Report from the U.S. Fish and Wildlife Service, it is unlikely that any rare, threatened, or endangered species inhabit the project area. The results from the FNAI and USFWS can be found in **Appendix A** and **Appendix B**, respectively. Should any evidence of any rare, threatened or endangered species be encountered during the construction process, all construction activities should cease and US Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission should be notified. A more detailed environmental report will be submitted as a supplement to this report. Any requirements provided by Fish and Wildlife during that process will be included in the final project.

1.5.8 Water Quality Issues

Water quality is not expected to be an issue with this water system improvements project.

1.5.9 Water/Energy/Waste Audit

No water/energy/waste audit has been prepared for TCWSD. The district self-performs a monthly water audit to reconcile any leaks or non-metered water consumption. A copy of these audits can be provided if requested.

1.5.7 Natural Resources

This project is not expected to create adverse effects upon flora/fauna, surface water bodies, groundwater, prime agricultural lands, and air quality. A portion of this project will require construction activities on the wellhead protection area and lands owned by TCWSD which are currently undisturbed natural areas. Caution will be used to prevent any adverse impacts from construction efforts on these lands.

SECTION 2 – Existing Facilities

2.1 Location Map

Taylor Coastal Water and Sewer District is in southwest Taylor County, as shown on **Figure 1**. TCWSD is a rural community located approximately 20 miles south of the City of Perry and 20 miles northwest of the City of Steinhatchee. TCWSD encompasses approximately 6.2 miles of coast line; as shown on **Figure 1**. TCWSD is located within Township 07 South, Range 07 East, Sections 22, 23, 26, 27, 31, 35, and 36, as well as Township 08 South, Range 07 East, Sections 01, 06, 07, 12, 13, and 18, as shown on **Figure 2**.

2.2 History

Per district records, the current water system was constructed between the years 1985 – 2002. In 1985, Taylor Beaches Water, Inc. installed water lines for approximately 130 customers in the Keaton Beach and Ezell Beach areas. In 1990, lines were extended to provide service to Dekle Beach and Boggy Bay. In 1996, Taylor Coastal Utilities, Inc. further extended lines to Cedar Island, Dark Island, and Cedar Island East. In 2002, service was extended to Sawgrass Bay Estates, Oak Ridge subdivision, and Jody Morgan Road. It was acquired by Taylor Coastal Water and Sewer District in 2003. The pumps, pipelines, and hydropneumatic tanks have been in service since they were installed. The 4" well was installed in 1983, the 8" well was installed in 1990, and the 6" well was installed in 1995. There have not been any major line breaks or replacements in the system since it was acquired by TCWSD. TCWSD has a large seasonal population which peaks in the summer months (May – September). The water demand ranges from 12,000 gpd up to 234,000 gpd throughout the year.

2.3 Condition of Existing Facilities

Currently, TCWSD owns and operates its own water treatment and distribution system which was constructed in the early 1990s. The system consists of three wells: one 4" diameter, one 6" diameter, and one 8" diameter. The 4" well is unusable due to pressure issues as it cannot overcome the system pressure to deliver flow. The 6" well does not provide a reliable source of drinking water due to multiple instances of iron bacteria contamination (**Appendix C**). The 8" well is the only reliable well in the system at this time. The 4" well only has a 90 gpm capacity but is unable to deliver flow due to system pressures being outside of its operating range. The 6" well has a capacity of 180 gpm and the 8" well has a capacity of 240 gpm. This is addressed in Section 6 and includes the decommissioning of the 4" and 6" wells. These wells either provide unreliable water or insufficient pressure and would be unsuitable to connect to the upgraded system.

After the groundwater is pumped by the wells, post check valve, it is mixed with a small amount of polymer in the discharge line of the well pump for iron sequestration (3 gpd capacity) and is then chlorinated by hypochlorite with a 30 gpd capacity pump. It then goes to a 10,000 gallon hydropneumatic storage tank before it enters the distribution system. The on/off pressure for the hydropneumatic tank is 42/62 psi. The 10,000 gallon hydropneumatic tank located at the water treatment facility site is outdated and cannot be bypassed for maintenance nor does it have sufficient accessibility for cleaning even if it were able to be bypassed due to the way it was constructed.

The existing water system also contains a booster pump station. With the use of a check valve, the water travels from the distribution system into a 5,000 gallon storage tank at the booster station site. A jet pump sends water from the storage tank into a 5,000 hydropneumatic tank. The on/off pressure for the hydro-pneumatic tank is 42/62 psi. Currently, the booster pump station does not operate properly. The pump does not keep prime and the hydropneumatic tank does not maintain system pressure. Furthermore, this station is located in an AE16 flood zone (base flood elevation is 16') and the site elevation is approximately 8' at grade. This booster station is undersized for both capacity and flow and would need to be completely reconstructed or replaced with a similar type of infrastructure if kept in service (further reviewed as an alternative in Section 5).

The current system does not provide adequate fire protection. The majority of the neighborhoods have 2"-4" lines and there are no fire hydrants in the nearby vicinity. There is also insufficient storage capacity for fire suppression. Hydrants that are present are padlocked to prevent draining the system.

The distribution system consists of 2", 3", 4" and 6" PVC pipe. These existing watermains are aged but in relatively good working condition per TCWSD staff. Line breaks are uncommon and generally are caused by contractors, homeowners, or work crews hitting the lines during unrelated work. The primary insufficiency for the water mains are the lack of looped areas within the system due to the geography of the area. The dead ends require additional flushing to maintain chlorine residual and therefore contribute to wasted finished water. These dead ends are manually flushed by the operator as necessary and are not metered.

The customer meters within the system are analog and staff is required to manually read them monthly. Many of the meter boxes fill with groundwater or runoff from rain and become difficult to read. The operator is required to use a glass jar to "scope" the meter during these times.

2.4 Financial Status of Existing Facilities

TCWSD currently pays approximately $79,096.20 in annual debt service (includes principle, coupon, and interest) for Water and Sewer Revenue bonds (Series 2005A, Series 2005B, and Series 2011A). This debt will reach maturation in 2044 for the Series 2005 bonds and 2050 for the Series 2011A. Of this amount, $21,327.22 is for the water system itself. Water sales for 2019 are summarized in **Table 2.4a**. Current operation and maintenance (O&M) costs for the water system are approximately $175,544.78 per year as seen in **Table 2.4b**. These were derived from the Profit and Loss Report attached in **Appendix D** and include the columns for Field Supervisor, Water, and half of the District Office costs (as they are split with sewer). The water system generated $219,535.64 (gross income) during 2019. A copy of the 2019 financial audit and P&L Report is attached in **Appendix D**. Information regarding the rates, utility deposits, account charges, account issues, fees, and other similar items is included in **Appendix R**. Rate changes are evaluated with assistance from Florida Rural Water Association.

Table 2.4a
12 Month Water Sales (2019)

Month	Gallons Sold
January	720,000
February	887,000
March	777,000
April	1,039,000
May	1,093,000
June	1,744,000
July	1,936,000
August	1,462,000
September	928,000
October	1,048,000
November	969,000
December	882,000
TOTAL	**13,485,000**

Table 2.4b
Current O&M Costs

Category	Expense
Personnel Costs	$ 87,342.27
Administrative Fees	$ 664.93
Office Expenses	$ 7,871.50
Utilities	$ 7,199.42
Insurance	$ 5,756.00
Supplies	$ 5,557.44
Repairs and Maintenance	$ 45,279.62
Fuel	$ 1,378.32
Accounting, Auditing, and Legal	$ 14,495.30
Total	**$ 175,544.78**

**O&M Data for 2019 (Jan - Dec) per Profit and Loss report included in Appendix D*

SECTION 3 – Need for Project

3.1 Health, Sanitation, and Security

The primary need for the proposed water system improvements project is to provide a safe and reliable source of drinking water to the distribution system. Additionally, there is a need to have adequate storage within the system located outside the 100-year floodplain.

TCWSD does not have sufficient capacity from a reliable well. The 4" well cannot provide adequate capacity or pressure for the system needs. Furthermore, the 4" well is difficult to access within the control building and will still be difficult to maintain with the proposed upgrades. Furthermore, its proximity to the existing 8" production well that is proposed to remain online is not desirable. The 6" well has tested positive for coliforms multiple times **(Appendix C)**. All three wells are located in very close proximity to each other. This causes bleeding of bacteria from the 6" well to the 8" well on occasion (see memo included in **Appendix C**). A new water source to supplement the existing 8" well is required to provide reliable drinking water to the system (see Section 6). Although iron is listed as a secondary drinking water standard per the Florida Department of Environmental Protection rule 62-550 (maximum concentration of 0.3 mg/L), it can affect the ability of rural residents to use rural water to drink, wash clothing, bathe, or cook. This is due to the excessive flushing required to reduce the concentration of iron to an acceptable level which reduces system pressure and the availability of water during times of flushing. Lab test results for TCWSD are returned as pass/fail for iron coliform bacteria. A failed test requires the operator to flush a large volume of water. Elimination of the unreliable well and establishing a new reliable water source should prevent the health and sanitary concern. Considering this, the project should meet the qualifications for a health and sanitary concern based upon RUS Staff Instruction 1780-2, Section 3(a)(8)(b). A memo provided by the water operator has been included in **Appendix D** and provides information regarding the positive iron bacteria samples that have been collected.

Furthermore, the existing storage within the system is insufficient. Currently, the system has 2 hydropneumatic tanks and a ground storage tank with a total of 20,000 gallons of finished water storage. Per Florida Administrative Code 62-555, the total finished water storage for the system (not including fire flow) should be 100,000 gallons (calculations attached as **Appendix P**). This deficiency should be rectified with the proposed project. The most recent sanitary survey is included in **Appendix Q** and includes data about the existing system. High service pumps will be required to provide sufficient pressure and flow to the system per the recommended alternative.

3.2 System Operation and Maintenance

As previously discussed, TCWSD's water system was constructed over many years as service was extended through the district. The storage tanks and wells have been in service since each one, respectively, was originally installed. The system as it is currently designed does not provide storage for high demands or fire protection if the capability was available. Furthermore, the booster pump system was designed in a way that the pump loses its prime whenever it stops running and the employees have to go out to the booster pump station to manually prime the pump in order for the station to deliver flow and pressure to the system. Calculations for required storage and production capacity are included in **Appendix P** which reveal insufficiencies in the existing system's storage and supply capacities.

Operation and maintenance (O&M) of the aging water distribution system is performed by TCWSD staff. The system is required to be staffed by a class C operator 2 hours per day per the operating permit. The majority of the O&M costs go to purchasing replacement parts for the water system.

The maintenance staff must also perform routine flushing at numerous dead ends within the system. The maintenance crew flushes each neighborhood on average once per month. The average amount of water flushed out of each dead end varies but is estimated by the operator based on previous tests of the flushing stations while metered. Currently, the system has 35 dead ends requiring flushing which results in approximately 31,000 gallons per month lost to flushing. Some months require up to 100,000 gallons of water for flushing depending on field test results for residual chlorine or customer complaints for water quality issues.

The existing water meters in the system have to be manually read. This can become difficult during periods of high rainfall as the meter boxes fill with water. TCWSD staff have to "scope" these flooded meters with a glass jar in order to provide the monthly readings. The existing meters are functioning properly; however the time it takes to read these meters keeps staff from being able to perform other necessary maintenance items. It is anticipated that the auto-read meters could be read within a few hours where the existing manual-read meters take approximately 4 days every month to read.

It is not currently possible for the District to monitor the total flow being delivered to any particular neighborhood. The ability to monitor flow in any particular area of the system would aid the district in quickly discovering water leaks as they have very few staff members available to track down leaks.

In order to flush the system to maintain proper chlorine residuals, the operator is required to manually visit each flushing station. These stations are not metered. Adding meters and an automatic flushing mechanism could decrease wasted water, increase the operator's available time to provide service to other maintenance items within the system, and assist with keeping system pressures more stable by flushing during non-peak nighttime hours.

3.3 Aging Infrastructure

As described in the previous section, the existing aged water system has issues which lead to unnecessary water losses and reduced levels of service to the customers. The list below recaps the primary issues:

- Booster station cannot deliver sufficient pressure, provide sufficient storage, or stay primed.
- Existing hydropneumatic tanks cannot be easily serviced and do not provide sufficient storage.
- 4" well cannot deliver pressure and flow to system.
- 6" well is not a reliable water source.
- Multiple dead end watermains require flushing, consuming excessive amounts of water and staff time.
- Inability to narrow down leaks to particular neighborhoods.
- Customer meters are difficult to read during seasons of intense rainfall.

The combination of these issues creates a system that is not operationally simplistic or efficient, especially for one its size and with the number of staff available. Furthermore, the water losses which could be reduced should upgrades be made available are allowing this precious resource to be wasted.

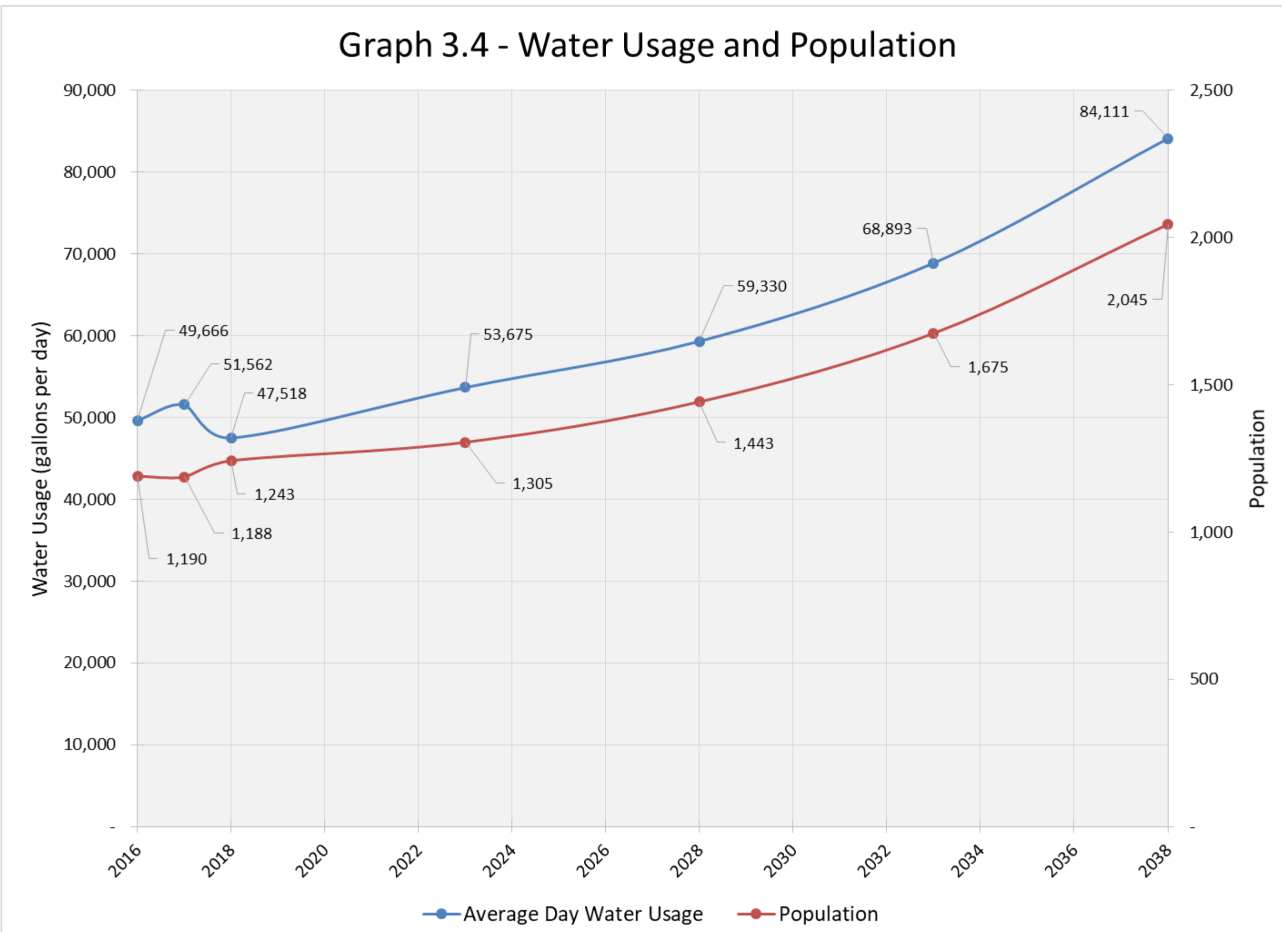
3.4 Reasonable Growth

Per the population projection in Section 1.3, growth is expected to be slow in this area. Furthermore, the District's boundaries for service are limited, thereby reducing their capacity for growth. The calculations included in this report conservatively account for growth in the area to ensure future capacity is available. Population and water use data showing the past 3 years through the next 20 years are included in **Table 3.4** and **Graph 3.4**.

Table 3.4 Population and Water Usage - Historical and Projected				
Year	**Average # of Accounts**	**Approximate Population Served**	**Average Water Usage (gpd)**	**Per Capita Water Usage (gpd)**
2016	476	1,190	49,666.00	41.74
2017	475	1,188	51,562.00	43.42
2018	497	1,243	47,518.00	38.24
2023	522	1,305	53,674.65	41.13
2028	577	1,443	59,330.03	41.13
2033	670	1,675	68,892.75	41.13
2038	818	2,045	84,110.85	41.13

**Approximate population assumes 2.5 persons per account serviced*

**Average per capita water usage projected from average of 2016-2018 data*



SECTION 4 – Water Storage Alternatives Considered

This section evaluates alternatives considered for the proposed water storage system. Three alternatives were considered for the proposed wastewater collection system.

Alternative No. 1 Elevated Storage Tank located at the existing Water Treatment Plant site

Alternative No. 2 Upgrade Existing Booster Station at Current Site

Alternative No. 3 Ground Storage Tank and Booster Pumps located at the existing Water Treatment Plant

4.1 Alternative No. 1 – Elevated Storage Tank located at the Existing Water Treatment Plant Site

4.1.1 Description

Alternative No. 1 is a new Elevated Storage Tank (EST) located at the existing water treatment plant site (Parcel-ID No. 06643-150). The EST will be a 100,000 gallon multi-legged storage tank with a high water line of 159.25'. This tank will provide the required storage for the water system, containing the amount needed for average daily use. This tank will also maintain the pressures in the system between 50 and 70 psi. Also included are replacing the customer meters with auto-read meters, installing ultrasonic "neighborhood" meters to monitor flow in specific areas, installing automatic flushing stations with meters, replacing the chemical feed system, and constructing a new chemical feed building. Alterations to the existing generator may be required to provide power at the site's chemical feed and controls. A map showing Alternate No. 1 is shown in **Appendix E**.

4.1.2 Design Criteria

Alternative No. 1 includes installation of a 100,000 gallon elevated storage tank to provide storage and pressure to the distribution system and to provide fire protection.

4.1.3 Map

A map of the project area and proposed Alternative No. 1 are included as **Appendix E**.

4.1.4 Environmental Impacts

Alternative No. 1 will not cause any adverse impacts to the environment. The site chosen for the elevated storage tank is on a developed site at the existing water treatment plant.

4.1.5 Land Requirements

All proposed activities will occur on the existing TCWSD property.

4.1.6 Potential Construction Problems

No construction problems are anticipated.

4.1.7 Cost Opinion

This Elevated Storage Tank is estimated to cost **$2,137,956.00** to construct. The total cost opinion for this alternative is **$9,373,834.00** which includes O&M and SLA costs. A detailed cost opinion is included in **Appendix F.**

4.1.8 Sustainability Considerations

Alternative No. 1 should provide an energy savings by utilizing an elevated storage structure. Furthermore, the operational simplicity inherent of elevated storage tanks will ensure that the operators can quickly and efficiently manage the infrastructure. This does create potential resiliency issues with an elevated structure near the coast that could be impacted by hurricanes.

4.1.9 Advantages and Disadvantages

Alternative No. 1 has the following advantages and disadvantages:

Advantages:

- Storage for fire suppression and the average amount of water used in a day
- No need for booster pumps or hydro-pneumatic tanks.
- TCWSD already owns the site
- This site is the only area in the system that is not in a Coastal High Hazard Zone
- Time saved with auto-read meters (saves ±30 hours per month)
- Better system monitoring with “neighborhood” meters
- Replacement of aged chemical system

Disadvantages:

- Increased O&M Costs due to height of the tank
- Steel structure near coastal saline environment
- Elevated structure in coastal wind zone

4.2 Alternative No. 2 – Upgrade Existing Booster Station at Current Site

4.2.1 Description

Alternative No. 2 is the replacement and upgrade of the existing Booster Station on Parcel 07039-035. This would include a 100,000 gallon ground storage tank (GST), 10,000 gallon hydropneumatic tank, and a booster station with three 220 gpm high service pumps. The GST would provide the required storage capacity for the system and the hydropneumatic tank would assist the system with maintaining pressure while preventing the pumps from cycling too often as well as providing a buffer to pressure spikes from pump cycles and valve operation. This station will maintain the pressures in the system between 49 and 69 psi. Also included are replacing the customer meters with auto-read meters, installing ultrasonic "neighborhood" meters to monitor flow in specific areas, installing automatic flushing stations with meters, replacing the chemical feed system, and constructing a new chemical feed building. The generator and booster pumps would need to be replaced to meet the calculated demands for the system. A map showing Alternative No. 2 is provided in **Appendix G**.

4.2.2 Design Criteria

Alternative No. 2 includes installation of a booster station as described in the previous section (4.2.1). FDEP and 10 States Standards guidelines were utilized in the proposed design. The calculations can be reviewed in **Appendix P**.

4.2.3 Map

The project area and layout for Alternative No. 2 is included as **Appendix G.**

4.2.4 Environmental Impacts

Alternative No. 2 will not cause any adverse impacts to the environment.

4.2.5 Land Requirements

All proposed activities will occur in the existing TCWSD property.

4.2.6 Potential Construction Problems

No construction problems are anticipated.

4.2.7 Cost Opinion

The elevated storage tank is estimated to cost the District **$2,344,626.00** to construct. The total cost opinion for this alternative is **$9,430,925.00** which includes O&M and SLA costs. A detailed cost opinion is included in **Appendix H.**

4.2.8 Sustainability Considerations

Alternative No. 2 may require more energy input than an elevated storage option; however, it provides operational simplicity which ensures that the operators can quickly and efficiently manage the infrastructure. All the infrastructure will be easy to access with equipment already owned by the District and will be at or below grade (with the exception of elevated electronic equipment due to its location in the floodplain), reducing issues that could arise with elevated structures. The elevated electrical equipment could be a concern and is not optimal. Locating this booster station on a parcel outside the floodplain would be a better consideration.

4.2.9 Advantages and Disadvantages

Alternative No. 2 has the following advantages and disadvantages:

Advantages:

- ❖ Provides system storage that is currently lacking
- ❖ Utilizes existing TCWSD property
- ❖ Removes faulty equipment from the system
- ❖ Time saved with auto-read meters (saves ±30 hours per month)
- ❖ Better system monitoring with "neighborhood" meters
- ❖ Replacement of aged chemical system

Disadvantages:

- ❖ Requires electrical equipment to be elevated
- ❖ Located within the 100 year floodplain
- ❖ This tank would be located in a coastal high hazard zone.

4.3 Alternative No. 3 – Ground Storage Tank and Booster Pumps Located at the Existing Water Treatment Plant

4.3.1 Description

Alternative No. 3 is a 100,000 gallon ground storage tank and booster pumps to provide required flow and pressure to the distribution system. This alternative will be located at the same site as the existing water treatment plant (Parcel-ID No. 06643-150). This tank will provide the required storage for the water system per Florida Administrative Code Chapter 62-555. This tank will also maintain the pressures in the system between 50 and 62 psi. A series of booster pumps will be required to transmit water from the ground storage tank into the distribution system along with a new hydropneumatic tank to maintain system pressure. The hydropneumatic tank will be used to reduce the number of starts on the constant speed pumps and maintain system pressure while pumps are not running. A new motor control center (MCC) building, chemical building, generator, and corrosion control equipment has also been included as the existing infrastructure may not be suitable to reuse due to site layout, equipment age, and the altered system conditions. Chemical equipment and a chemical building are included in this part of the project to allow the operator to dose the water post storage if determined to be necessary by field tests during operation. The chemical building is required as a retrofit of the existing site structures may not be possible due to the site layout and no dedicated chemical building currently exists on site. Also included are replacing the customer meters with auto-read meters, installing ultrasonic "neighborhood" meters to monitor flow in specific areas, installing automatic flushing stations with meters, replacing the chemical feed system, and constructing a new chemical feed building. The generator and booster pumps would need to be replaced to meet the calculated demands for the system. A map showing Alternate No. 3 is shown in **Appendix I**.

4.3.2 Design Criteria

Alternative No. 3 includes installation of a 150,000 gallon ground storage tank and booster pumps to provide storage and pressure to the distribution system.

4.3.3 Map

A map of the project area and proposed system for Alternative No. 3 are included as **Appendix I.**

4.3.4 Environmental Impacts

Alternative No. 3 will not cause any adverse impacts to the environment.

4.3.5 Land Requirements

All proposed activities will occur in the existing TCWSD property or right-of-way.

4.3.6 Potential Construction Problems

No construction problems are anticipated.

4.3.7 Cost Opinion

The ground storage tank and booster pump alternative is estimated to cost **$2,191,688.00** to construct. The total cost opinion for this alternative is **$9,277,987.00** which includes O&M and SLA costs. A detailed cost opinion is included in **Appendix J.**

4.3.8 Sustainability Considerations

Alternative No. 3 may require more energy input than elevated storage options; however, a non-elevated structure located outside the floodplain should provide additional benefits through its resiliency. Furthermore, the operational simplicity of ground storage tanks and booster stations will ensure that the operators can quickly and efficiently manage the infrastructure. All the infrastructure will be easy to access with equipment already owned by the District and will be at or below grade, reducing issues that could arise with elevated structures.

4.3.9 Advantages and Disadvantages

Alternative No. 3 has the following advantages and disadvantages:

Advantages:

- Typically lower O&M costs for a ground storage tank than an elevated storage tank.
- Time saved with auto-read meters (saves ±30 hours per month)
- Better system monitoring with "neighborhood" meters
- Replacement of aged chemical system

Disadvantages:

- Multiple pumps will be needed to meet the wide range of seasonal flows in the system.
- Additional pumps will need to be maintained in the system.

SECTION 5 – Water Supply Alternatives Considered

This section evaluates alternatives considered for the proposed water storage system. Three alternatives were considered for the proposed wastewater collection system.

Alternative No. 1 New Well at Wellhead Protection Area

Alternative No. 2 Connection to Nearby Water System

Alternative No. 3 Continue Operating System As-is

5.1 Alternative No. 1 – New Well at Wellhead Protection Area

5.1.1 Description

Alternative No. 1 is a new well located on the existing wellhead protection area (Parcel-ID No. 06643-150). This well shall provide the required supply for the water system as required by Florida Administrative Code 62-555.315 and Ten States Standards Section 3.2. The proposed additional pumping capacity is 240 gpm. It is also proposed that this well would replace the unreliable 4" and 6" wells so they may be properly abandoned. Furthermore, this well should be accompanied by proper chlorination and water treatment equipment. One issue with the existing well location is that it is in close proximity to the unreliable 4" and 6" wells (within approximately 100 ft.). It is proposed that this well would be placed on the far (northern) side of the wellhead protection area to provide as much space as possible between the supply wells. Also included in this project component is a well and motor control building and generator as this component will be located remotely from the storage and supply infrastructure. A map showing Alternate No. 1 is shown in **Appendix K**.

5.1.2 Design Criteria

Alternative No. 1 includes construction of a production well supplying 240 gpm which addresses needs for customer service and fire protection.

5.1.3 Map

A map of the project area and proposed Alternative No. 1 are included as **Appendix K**.

5.1.4 Environmental Impacts

Alternative No. 1 will not cause any adverse impacts to the environment. The site chosen for the well is on an existing wellhead protection area designated for this use. Geotechnical data and drilling information will be utilized during the design phase to prevent saltwater intrusion at the proposed well site.

5.1.5 Land Requirements
All proposed activities will occur on the existing TCWSD property.

5.1.6 Potential Construction Problems
No construction problems are anticipated.

5.1.7 Cost Opinion
This production well is estimated to cost **$1,102,555.00** to construct. The total cost opinion for this alternative is **$1,289,529.00** which includes O&M and SLA costs. A detailed cost opinion is included in **Appendix L.**

5.1.8 Sustainability Considerations
Alternative No. 1 should provide a resilient solution for water supply as it will be located outside the floodplain and allow for a more reliable drinking water source than the existing failing wells.

5.1.9 Advantages and Disadvantages
Alternative No. 1 has the following advantages and disadvantages:

Advantages:

- ❖ Provides flow for fire suppression and daily supply
- ❖ TCWSD already owns the site
- ❖ The site is already designated for the proposed use (wellhead protection area)
- ❖ This site is the only area in the system that is not in a Coastal High Hazard Zone

Disadvantages:

- ❖ Increased cost to run power to undeveloped area of Wellhead Protection Area

5.2 Alternative No. 2 – Connection to Nearby Water System

5.2.1 Description
Alternative No. 2 is a connection to a nearby potable water system (Big Bend Water Authority in Steinhatchee) for additional supply. In conjunction with this project, an in-line booster system and substantial upgrades to BBWA's system would likely be required.

5.2.2 Design Criteria
Alternative No. 2 includes installation of nearly 15 miles of 12" water main to connect to BBWA in Steinhatchee. In order to maintain system pressures and flow rates, an in-line booster system would likely be required along with substantial upgrades to the BBWA system.

5.2.3 Map

The project area and layout for Alternative No. 2 is included as **Appendix M.**

5.2.4 Environmental Impacts

Alternative No. 2 will not cause any adverse impacts to the environment.

5.2.5 Land Requirements

All activities will be conducted in the existing right-of-way but could require acquisition of utility easements as much of this project would be outside of the boundaries of TCWSD.

5.2.6 Potential Construction Problems

No construction problems are anticipated.

5.2.7 Cost Opinion

The system connection is estimated to cost the District **$3,414,643.00** to construct. The total cost opinion for this alternative is **$4,012,959.00** which includes O&M and SLA costs. A detailed cost opinion is included in **Appendix N.**

5.2.8 Sustainability Considerations

Alternative No. 2 should provide a resilient solution for water supply as it includes the redundancy of supply from a nearby water system. However, the energy required to provide the TCWSD system with water from the other water system could be detrimental to the system's sustainability. Furthermore, the additional 15 miles of pipe would have to be maintained by TCWSD's staff and could create operational challenges.

5.2.9 Advantages and Disadvantages

Alternative No. 2 has the following advantages and disadvantages:

Advantages:

- Would not require the District to construct another well

Disadvantages:

- All water from BBWA would have to be directly purchased by TCWSD
- Could require BBWA to upgrade their system
- Adjacent systems are located nearly 15 miles from each other

5.3 Alternative No. 3 – Continue Operating System As-is

5.3.1 Description
Alternative No. 3 is proposes to continue operating the system as-is.

5.3.2 Design Criteria
Alternative No. 3 includes no improvements to the existing system.

5.3.3 Map
No map is included as there are no improvements to the existing system.

5.3.4 Environmental Impacts
Alternative No. 3 will not cause any adverse impacts to the environment.

5.3.5 Land Requirements
All proposed activities will occur in the existing TCWSD property or right-of-way.

5.3.6 Potential Construction Problems
No construction problems are anticipated as no construction is proposed.

5.3.7 Cost Opinion
This is a no-cost option.

5.3.8 Sustainability Considerations
Alternative No. 3 does not create a more sustainable system as none of the core issues regarding aged infrastructure or operational simplicity are addressed.

5.3.9 Advantages and Disadvantages
Alternative No. 3 has the following advantages and disadvantages:

Advantages:

- Will not require additional funding to construct.

Disadvantages:

- Does not provide necessary improvements for the system.

SECTION 6 – Alternatives Selection

6.1 Discussion of Water Storage System Alternatives

A cost comparison was developed for each of the proposed water storage system alternatives. The cost comparison includes the project total construction and non-construction cost and the present worth cost of O&M costs over a 40 year period. Detailed Present Worth O&M Costs for the collection systems including short lived assets can be found in the Appendices with the Cost Opinion for each alternative. The operating, testing, and maintenance costs are based on costs from the current water system as well as costs of the new equipment. The cost comparison is shown below in **Table 6.1**

Table 6.1 Comparison Of Water Storage System Alternatives			
Alternative	**Present Worth of Construction Related Items**	**Present Worth O&M/SLA Costs**	**Present Worth Total Cost**
Alternative No. 1 – Elevated Storage Tank at Water Treatment Plant	**$ 2,137,956.00**	**$ 7,235,878.00**	**$ 9,373,834.00**
Alternative No. 2 - Ground Storage and Booster Station at Existing Site	**$ 2,344,626.00**	**$ 7,086,299.00**	**$ 9,430,925.00**
Alternative No. 3 – Ground Storage and Booster Station at Water Treatment Site	**$ 2,191,688.00**	**$ 7,086,299.00**	**$ 9,277,987.00**

[1]Present Worth O&M Costs = O&M Costs at 1.5% Real Federal Discount Rate for 40 years [(P/A, 1.5%, 40 Years) =29.9158]

Table 6.1 shows a present worth cost analysis for each reasonable alternative associated with the project so that a comparison can be made. As shown, the elevated storage tank at the existing water treatment plant is the most feasible option. Although more expensive, the ground storage and booster pump option should be easier for TCWSD to self-maintain and is the recommended alternative. The project scope and design details are discussed in detail in Section 7.

6.2 Discussion of Water Supply Alternatives

A cost comparison was developed for each of the proposed water supply alternatives. The cost comparison includes the project total construction and non-construction cost and the present worth cost of O&M costs over a 40 year period. Detailed Present Worth O&M Costs for the water supply including short lived assets can be found in the Appendices with the Cost Opinion for each alternative. The operating, testing, and maintenance costs are based on costs from the current water system as well as costs of the new equipment. A cost comparison is shown below in **Table 6.2**

Table 6.2
Comparison Of Water Supply Alternatives

Alternative	Present Worth of Construction Related Items	Present Worth O&M/SLA Costs	Present Worth Total Cost
Alternative No. 1 – New Well at Wellhead Protection Area	$ 1,102,555.00	$ 186,974.00	$ 1,289,529.00
Alternative No. 2 – Connection to Nearby Water System	$ 3,414,643.00	$ 598,316.00	$ 4,012,959.00
Alternative No. 3 – Continue Operating As-Is	$ -	$ -	$ -

[1]Present Worth O&M Costs = O&M Costs at 1.5% Real Federal Discount Rate for 40 years [(P/A, 1.5%, 40 Years) =29.9158]

Table 6.2 shows a present worth cost analysis for each reasonable alternative associated with the project so that a comparison can be made. As shown, the new well is the most feasible option and therefore is the recommended alternative. The project scope and design details are discussed in detail in Section 7.

SECTION 7 – Proposed Project

7.1 Project Design

It is recommended that TCWSD construct a new well and booster station as well as implement system improvements including auto-read meters and neighborhood flow meters. The existing water meters in the system have to be manually read. This can become difficult during periods of high rainfall as the meter boxes fill with water. TCWSD staff have to "scope" these flooded meters with a glass jar in order to provide the monthly readings. The existing meters are functioning properly; however, the time it takes to read these meters keeps staff from being able to perform other necessary maintenance items. It is anticipated that the auto-read meters could be read within a few hours where the existing manual-read meters take approximately 4 days every month to read. The proposed project will provide a reliable source of drinking water, appropriate system storage, operational simplicity, and adequate pressure for the entire system at any time of day. The proposed systems should be located within the existing roadways, right of way (County and State), and property owned by the TCWSD. All proposed improvements will be in compliance with the Recommended Standards for Wastewater Facilities and Chapter 62-555 Permitting and Construction of Public Water Systems, Florida Administrative Code (FAC).

7.1.1 Water Storage System Selection

The proposed water storage system is for TCWSD to construct a 100,000 gallon ground storage tank and booster station at the water treatment plant on property owned by TCWSD. The other alternatives do not appear to be economically feasible. This system will also include booster pumps and a hydropneumatic tank (or variable frequency drive booster pump package as determined during the design phase) to provide consistent water pressure as well as associated buildings, generators, chemical feed systems, and other required appurtenances. New auto-read customer meters and neighborhood meters are included in this alternative as well. These items will add to the operational simplicity of the system by providing assistance through technology to the small staff. The neighborhood meters will monitor flow into particular areas of the system and will assist the operator with finding any leaks or issues in the system more efficiently. The water storage system will be constructed, owned, and operated by the TCWSD. The Water Storage System location can be seen in **Appendix I** and the proposed opinion of probable costs is included in **Appendix J**. Cost opinions, O&M budget costs, and short lived assets for the alternatives not selected can be viewed in **Appendix F** and **Appendix H**.

7.1.2 Water Supply Selection

The proposed water supply project for TCWSD is to construct a new supply well on the existing wellhead protection area along with any required appurtenances including but not limited to water treatment equipment and a control building (Alternative 1). Alternative 2 would be cost prohibitive and would require TCWSD to rely on another water system for their supply. Alternative 3, although most affordable, would not meet the needs of the system addressed in this report. The supply well will be constructed, owned, and operated by the TCWSD. The supply well location can be seen in **Appendix K** and the cost opinion is included in **Appendix L**. Cost opinions, O&M budget costs, and short lived assets for the alternatives not selected can be viewed in **Appendix N** and **Appendix O**.

7.2 Total Project Cost Opinion

The cost opinion of the proposed storage and supply projects including construction and non-construction costs associated with the project is **$3,233,021.00**. Detailed cost opinions showing total construction and non-construction costs for the selected alternatives can be reviewed in **Appendices J & L**. A summary of these costs are included in **Table 7.2**.

Table 7.2
Cost Opinion Summary

Proposed Project	Project Costs
Alternative No. 3 – Ground Storage and Booster Station at Water Treatment Site	$ 2,191,688.00
Alternative No. 1 – New Well at Wellhead Protection Area	$ 1,102,555.00
Legal Fees	$ 15,000.00
Interim Financing[1]	$ 98,827.00
Project Total	**$ 3,408,070.00**

[1] Interim financing is based on 1.5 years of construction with a construction loan of 4%. Calculated by multiplying project costs by interest rate and time to construct (in years) and dividing that total by 2. This is an estimate as interim financing charges could vary greatly due to the timing of withdrawals.

7.3 Annual Operating Budget

7.3.1 Operations and Maintenance Costs

The tables below estimate the short lived assets (SLA) along with annual operating and maintenance expenses for the selected alternatives. **Table 7.3c** includes these costs along with the estimated costs for the recommended alternatives to determine the amount of funding required to cover the costs of O&M, reserve funds and debt service for three scenarios: 70% grant, 45% grant, and 0% grant.

Table 7.3a
System Short Lived Assets Summary

	Replacement Cost	Qty.	Typical Life Span	Annual SLA Reserve
Water Meters (Customer)	$ 285.00	530	15	$ 10,070.00
Chlorine Feed	$ 2,500.00	1	10	$ 250.00
Polymer Feed	$ 7,500.00	1	10	$ 750.00
Chemical Equipment	$ 10,000.00	1	10	$ 1,000.00
Water Meters (Neighborhood)	$ 23,350.00	9	15	$ 14,010.00
Booster Pumps	$ 30,000.00	4	20	$ 6,000.00
Generator	$ 75,000.00	1	20	$ 3,750.00
Alarms and Telemetry	$ 15,000.00	2	20	$ 1,500.00
Sensors and Transducers	$ 15,000.00	2	20	$ 1,500.00
Well Pump	$ 75,000.00	1	20	$ 3,750.00
			Total Annual SLA Reserve:	**$ 42,580.00**

Table 7.3b
Projected O&M Costs

Category	Expense
Personnel Costs	$ 87,342.27
Administrative Fees	$ 664.93
Office Expenses	$ 7,871.50
Utilities	$ 25,199.42
Insurance	$ 5,756.00
Supplies	$ 5,557.44
Repairs and Maintenance	$ 52,279.62
Fuel	$ 1,378.32
Accounting, Auditing, and Legal	$ 14,495.30
Total	**$ 200,544.78**

Table 7.3c
Loan Payback Analysis

Total Construction Related Costs					**$ 3,408,070.00**
	0% GRANT	**45% GRANT**	**80% GRANT**	**90% GRANT**	**100% GRANT**
Probable Cost of Improvements	**$ 3,408,070.00**	**$ 1,874,438.50**	**$ 681,614.00**	**$ 340,807.00**	**$ -**
Annual Debt Service*	**$ 62,708.49**	**$ 34,489.67**	**$ 12,541.70**	**$ 6,270.85**	**$ -**
Annual Debt Service Reserve (10%)	**$ 6,271.00**	**$ 3,449.00**	**$ 1,254.00**	**$ 627.00**	**$ -**
Total Annual O&M + SLA Reserve	**$ 243,124.78**	**$ 243,124.78**	**$ 243,124.78**	**$ 243,124.78**	**$ 243,124.78**
Existing Debt Service	**$ 21,327.22**	**$ 21,327.22**	**$ 21,327.22**	**$ 21,327.22**	**$ 21,327.22**
Total Annual Expense	**$ 333,431.49**	**$ 302,390.67**	**$ 278,247.70**	**$ 271,349.85**	**$ 264,452.00**

• Based on payback over 40-years at 1.5% interest

• Existing Debt Service is the annual rate for water only

7.3.2 Debt Repayment

Table 7.3d shows the proposed annual revenues that TCWSD would be receiving after construction with the proposed rate schedule and number of customers. The rate chart is included in **Appendix R**. As TCWSD has very few commercial users, they do not have a commercial rate. Projected use is not expected to increase with regards to a per customer basis. The table below and other revenue figures based on current rates and number of customers as TCWSD does not desire to raise rates at this time.

Table 7.3d
Proposed Annual Revenues

Customer Type	Water Rate Structure		Average Number of Customers	Average Monthly Water Usage Per Customer	Average Customer Monthly Bill	Avg. Monthly Revenue Generated (Jan. - Dec. 2018)
	Minimum Bill for Time Period	$ per add'l. 1,000 gal				
Residential	$ 30.15 first 3,000 gallons	Varies	495	2,435	$ 34.52	$ 17,088.92
Total Annual Water Operating Revenue (FY 2018):						$ 264,332.00
Total Projected Water Operating Revenue (post October 2018 rate increase):						$ 271,000.00

**Average monthly bill based on 2018 data. The base rate during this time period was $30.15. The rate increase to $30.90 (±2% increase) for the base bill was implemented October 1, 2018.*

**See rate chart for details on variably tiered rate structure*

**Average number of customers based on Monthly Operating Reports for 2018*

**Average water sold per month in 2018 was 1,205,333 gallons*

**TCWSD does not have enough commercial users to constitute a commercial rate structure thus all customers are considered residential.*

**Projected revenue based on FY 2018 operating revenue with additional 2% to account for rate increase.*

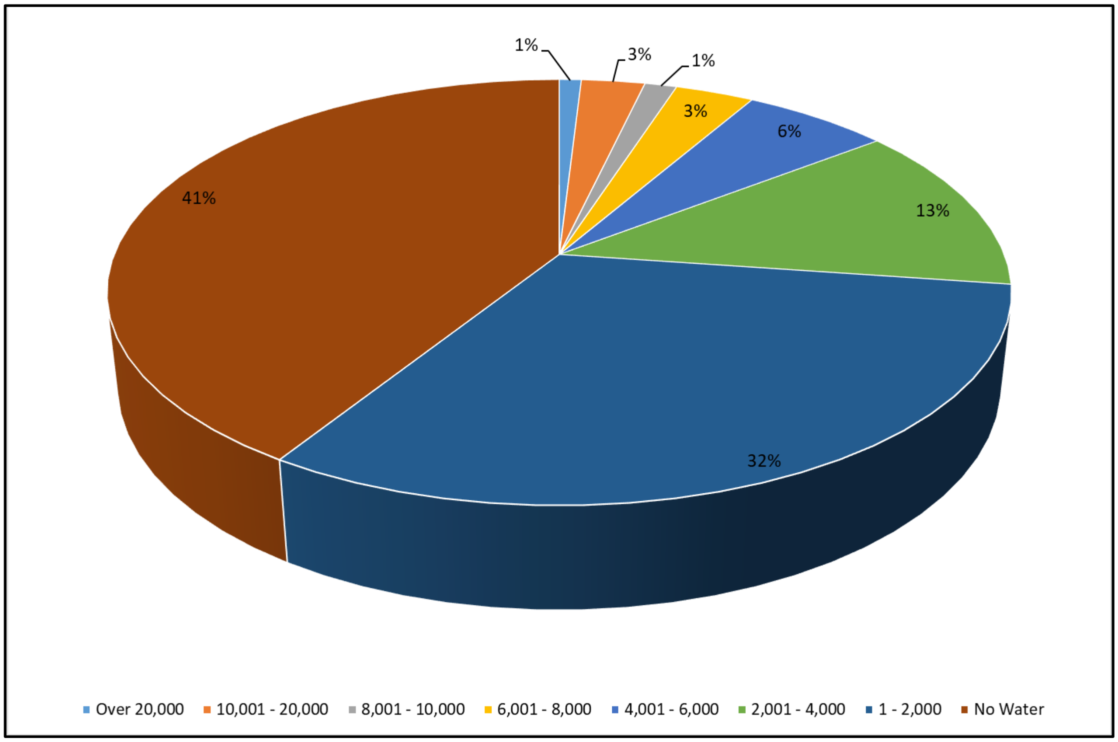
It should be noted that the average water usage in **Table 7.3d** is based on the total number of water services that showed usage each month. **Graph 7.3**, below, depicts the water usage per connection in 2018. As noted in this graph, approximately 41% of the meters did not use water any given month. This supports the fact that the system has a large portion of users that are seasonal.

Comparing the annual revenue generated in **Table 7.3d** and the annual expense for this project in **Table 7.3c**, it is observed that while the project appears to be affordable for the District with grant funding between 90% and 100%, the first-year costs appear to be restrictive. This is due to the interim financing charges. The District may be required to pull from reserves to fund the first year and replenish the reserves over the following years.

7.3.3 Reserves

Currently, TCWSD has one long-term outstanding debt for their water system. This debt is a loan from the USDA issued in 2005 for Water System Purchase and Infrastructure Upgrades with an annual debt service of $21,327.22. It is recommended that a debt service reserve be established at 10% of annual debt repayment which will make the annual debt service vary based on the amount of grant funds made available for this project, ranging from $0 at 100% grant to $63,998.79 at 45% grant.

Graph 7.3 – Water Usage per Connection (gallons per month)



7.4 Useful Life of Project

Estimates for the useful life of the proposed project components along with their proposed costs are included in **Appendix T**. The average useful life weighted by component cost is 31.4 years.

SECTION 8 – Conclusions and Recommendations

8.1 Proposed Recommended Project

It is recommended that Taylor Coastal Water and Sewer District pursue the recommended improvements discussed in Section 7 for the public's safety, health, and welfare. Per the recommendation in Section 7, this project includes construction of a new well and booster station as well as implementation of system improvements including auto-read meters, automated flushing stations, and neighborhood flow meters. Because all improvements will be located within District owned property, roadways, and rights of ways, special studies are not anticipated and easements will not be needed for this project. Coordination between TCWSD, Taylor County, FDEP SRF, USDA RD, and Dewberry will be important to ensure a smooth process.

When funding is secured, this project will proceed until construction completion.

Table 8.1
Project Schedule

Task Name	Beginning Month	Ending Month
Design	**0**	**12**
• Survey	0	2
• Geotechnical Investigation	3	5
• 30% Design	3	5
• 60% Design	6	8
• 90% Design	9	10
• 100% Design	11	11
• Bid Documents	12	12
Permitting Services	**6**	**11**
• FDEP Permits	6	11
• Taylor County Permits	6	11
Bidding Services	**13**	**15**
Construction	**16**	**33**
Total Project Duration	**0**	**33**

**Permitting Services run concurrently with the Design tasks*

8.2 Required Permits

Florida Department of Environmental Protection:

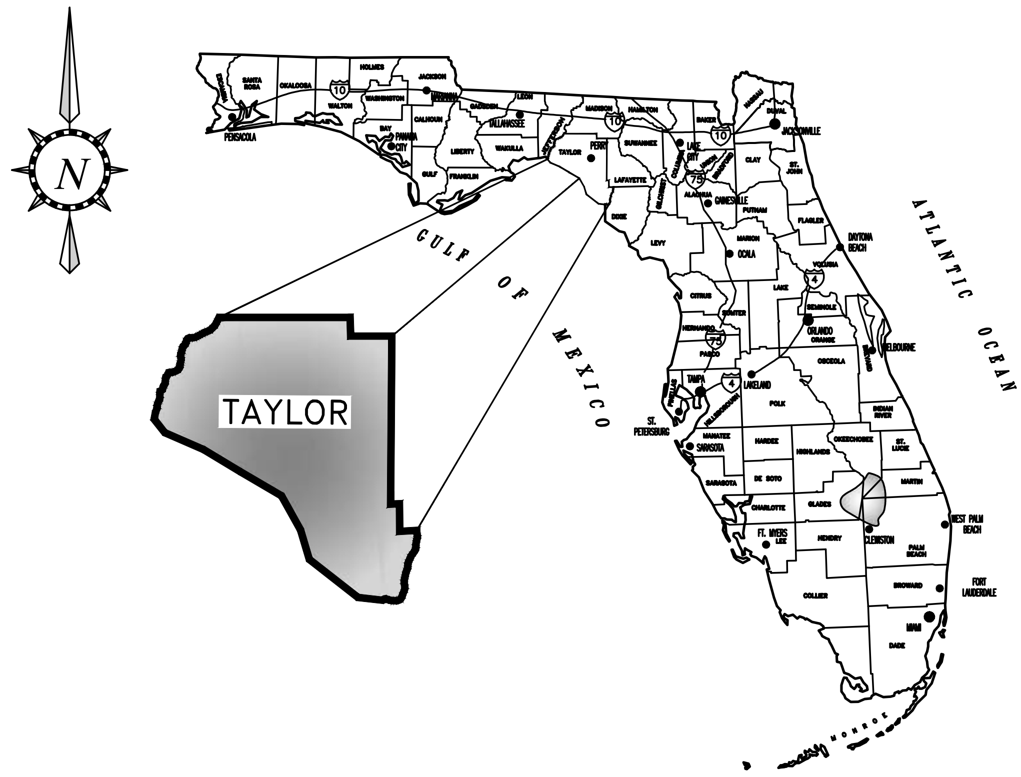
- 62-555.900(1) Application for a Specific Permit to Construct PWS Components

Taylor County Building Permit

Figure 1

Location Map

VICINITY MAP



LOCATION MAP

FIGURE 1: LOCATION MAP

WATER SYSTEM IMPROVEMENT PROJECT
TAYLOR COASTAL WATER AND SEWER

TAYLOR COUNTY, FLORIDA

Seal:

COA# 8794

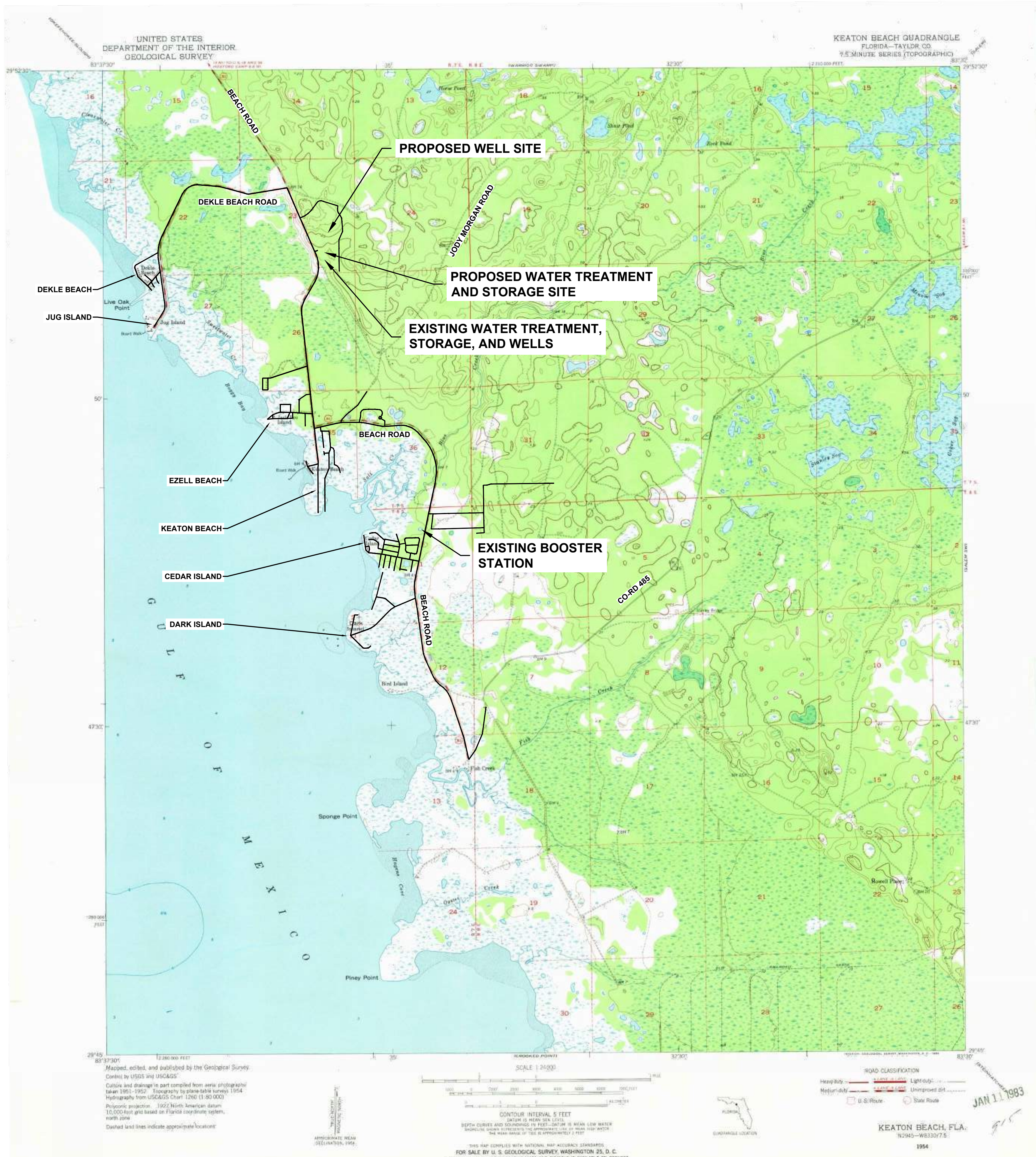
Dewberry

502 East Park Ave.
Tallahassee, Florida 32301
850.354.5183

Date: 09/2019	Project No.: 50083282	
Designed: T. BURCH	Sheet No.:	
Drawn: B. BEAUDETTE	FIGURE 1	
Checked: J. BAXLEY		

Figure 2

Quad Map



Seal:

Dewberry

20684 Central Ave. East,
Blountstown, FL 32424
850.674.3300

Date:	09/2019
Designed:	T. BURCH
Drawn:	B. BEAUDETTE
Checked:	J. BAXLEY
Project No.:	50083282
Sheet No.:	FIGURE 2

FIGURE 2: QUAD MAP

WATER SYSTEM IMPROVEMENT PROJECT
TAYLOR COASTAL WATER AND SEWER

TAYLOR COUNTY, FLORIDA

COA# 8794

Figure 3

Floodplain Maps

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane HARN North zone. The **horizontal datum** was NAD 83. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 2004.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for Pimple Creek and Rocky Creek in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

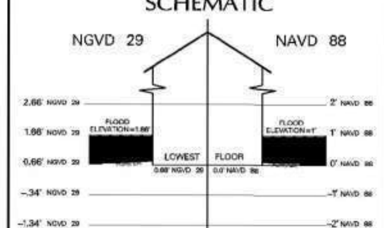
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

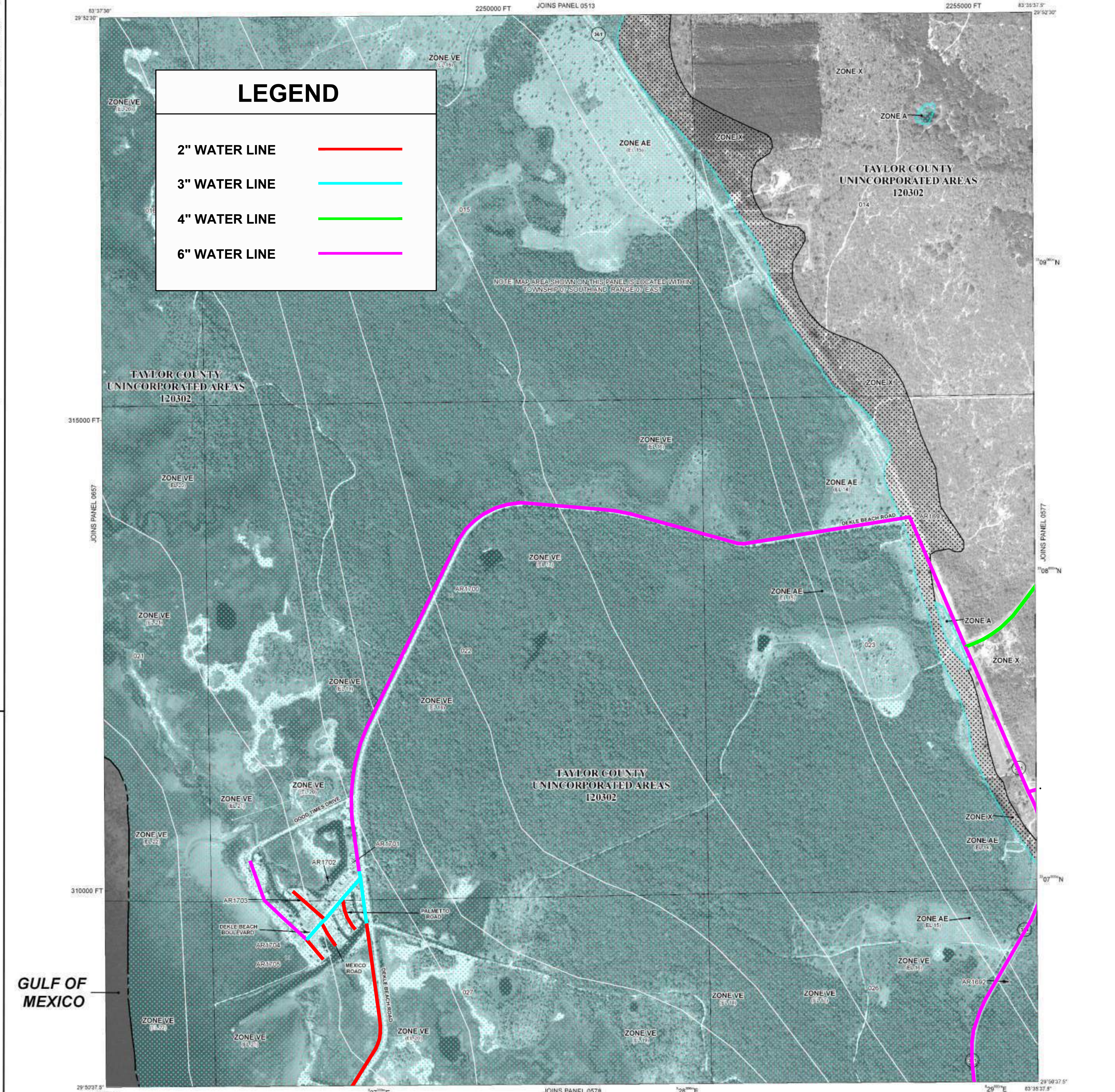
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

DATUM CONVERSION SCHEMATIC





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
76N	1000-meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000-foot grid ticks: Florida State Plane coordinate system, North zone (FIPSZONE 0903), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MAY 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0576D

FIRM
FLOOD INSURANCE RATE MAP

TAYLOR COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 576 OF 736
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR COUNTY	120302	0576	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12123C0576D

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane HARN North zone. The **horizontal datum** was NAD 83. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 2004.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for Pimple Creek and Rocky Creek in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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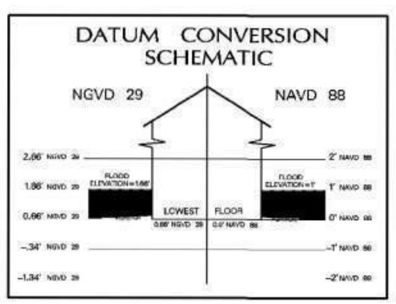

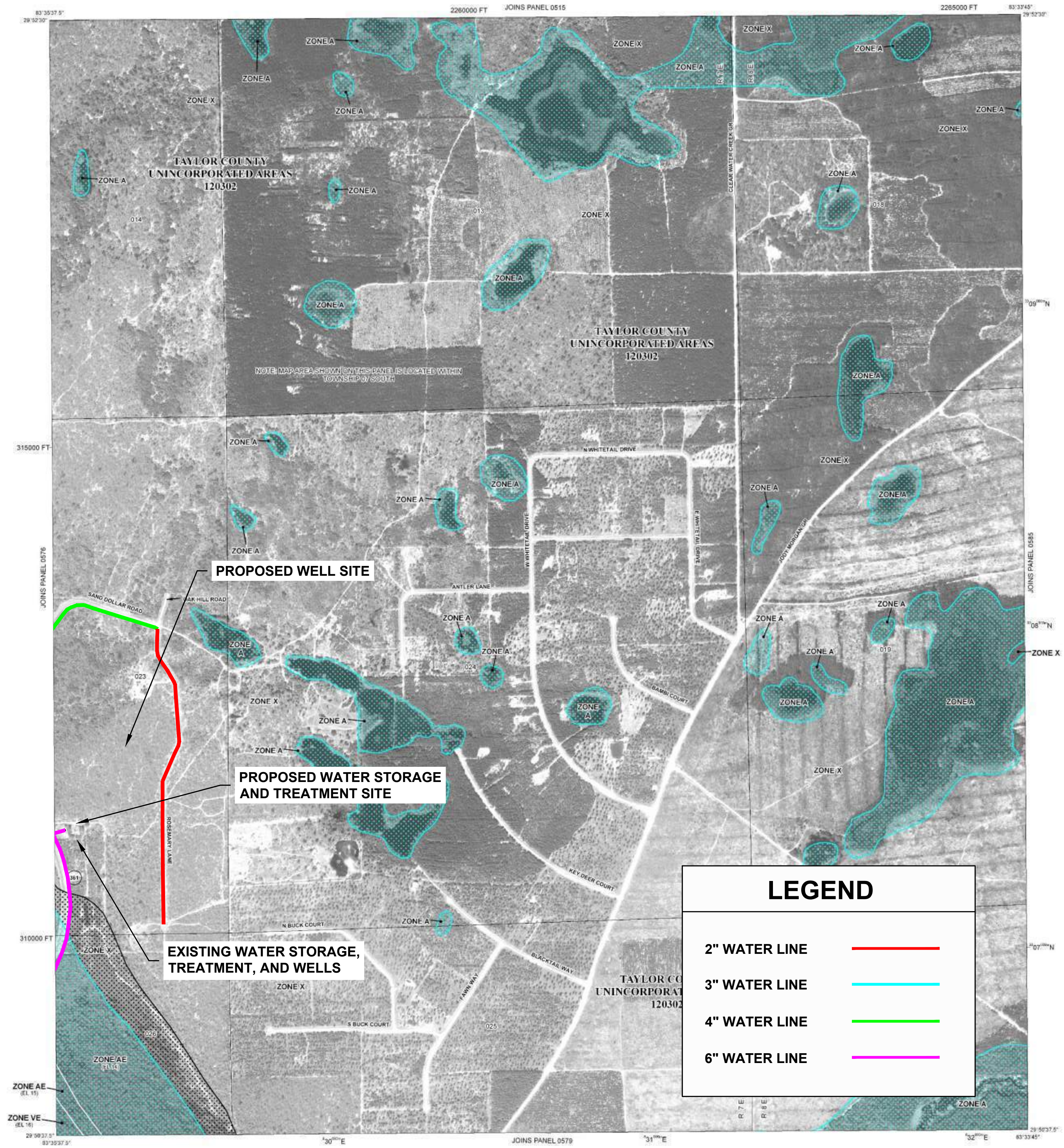

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
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ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
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FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- ~~~ 513 ~~~ — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A—A — Cross section line
- 23- - - -23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- ³⁴76⁰⁰⁰N — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, North zone (FIPSZONE 0903), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- • M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MAY 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0577D

FIRM

FLOOD INSURANCE RATE MAP

TAYLOR COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 577 OF 736

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR COUNTY	120302	0577	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12123C0577D

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

NOTES TO USERS

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Silver Spring, Maryland 20910-3282
(301) 713-3242

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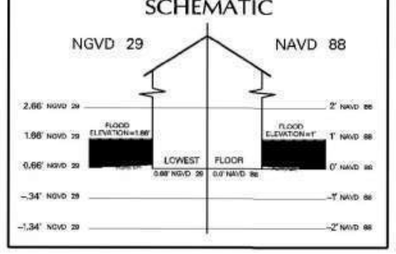

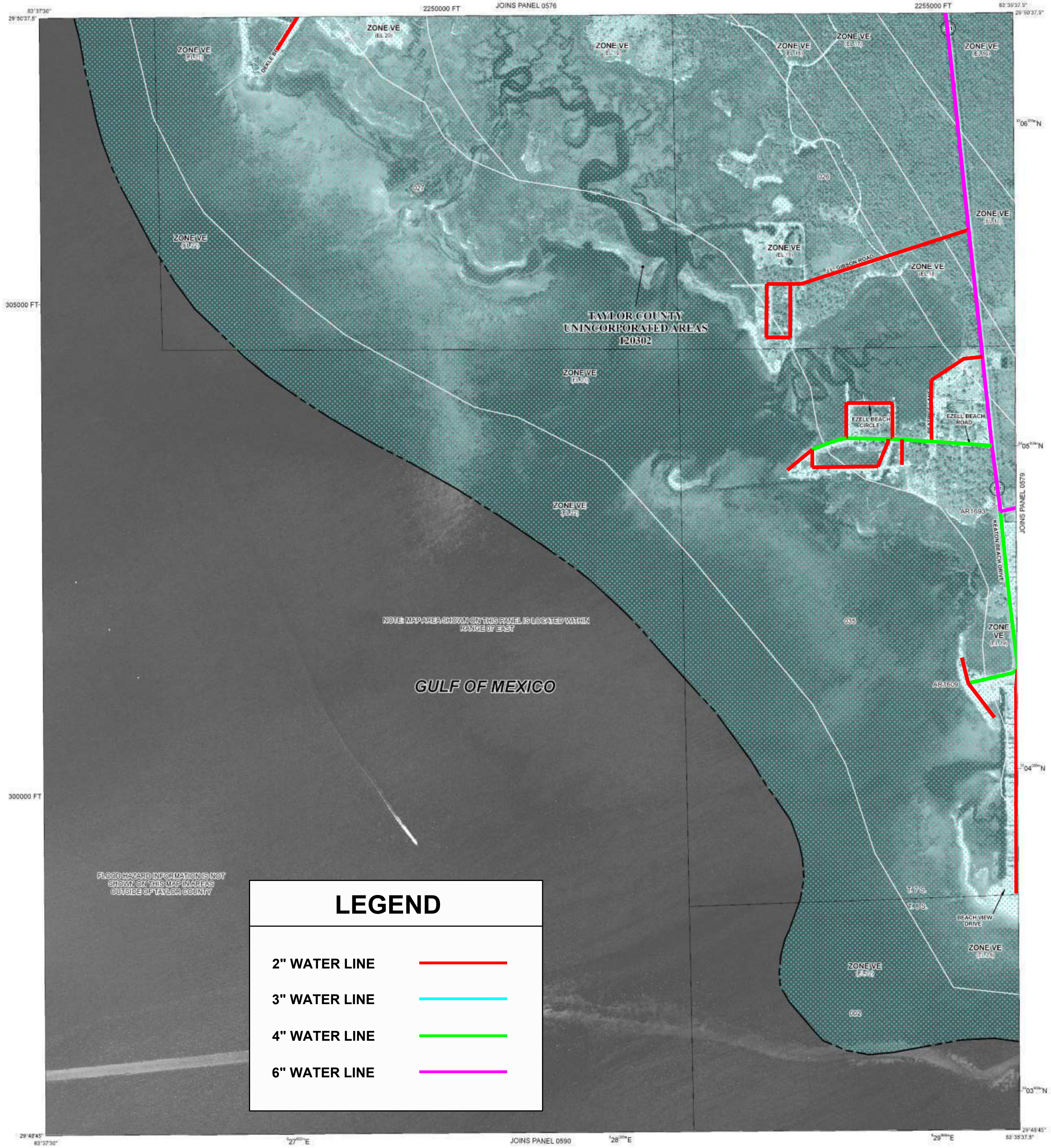

LEGEND

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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MAY 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0578D

FIRM
FLOOD INSURANCE RATE MAP

TAYLOR COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 578 OF 736
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR COUNTY	120302	0578	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12123C0578D

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

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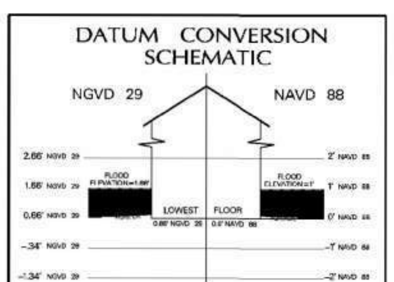
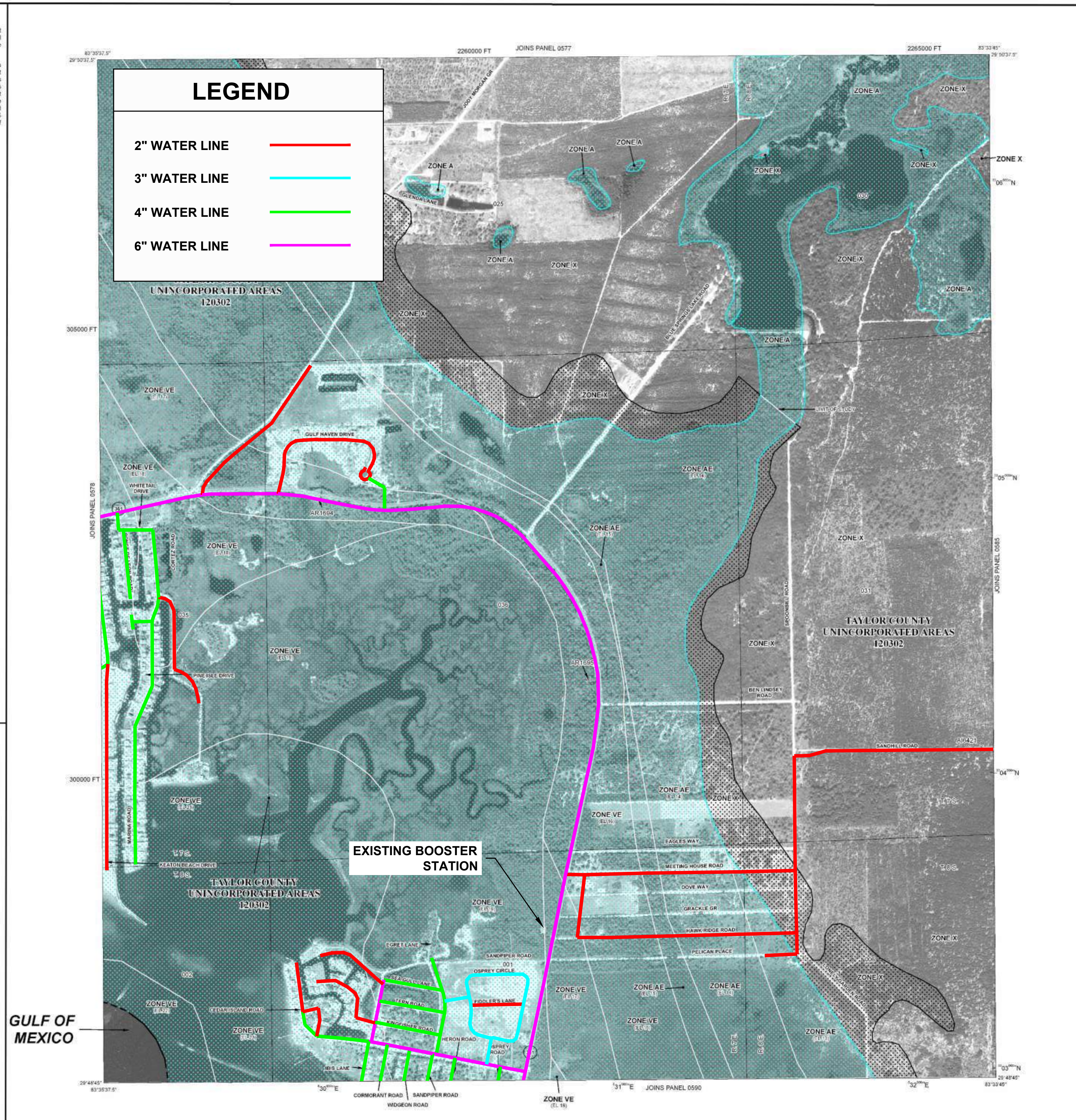
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
76N	1000-meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000-foot grid ticks: Florida State Plane coordinate system, North zone (FIPSZONE 0903), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MAY 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0579D

FIRM
FLOOD INSURANCE RATE MAP

TAYLOR COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 579 OF 736
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR COUNTY	120302	0579	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

NATIONAL FLOOD INSURANCE PROGRAM

MAP NUMBER
12123C0579D

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify **all** areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane HARN North zone. The **horizontal datum** was NAD 83. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 2004.

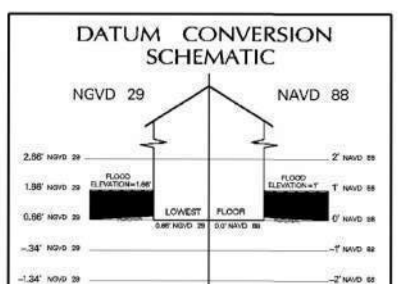
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for Pimple Creek and Rocky Creek in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

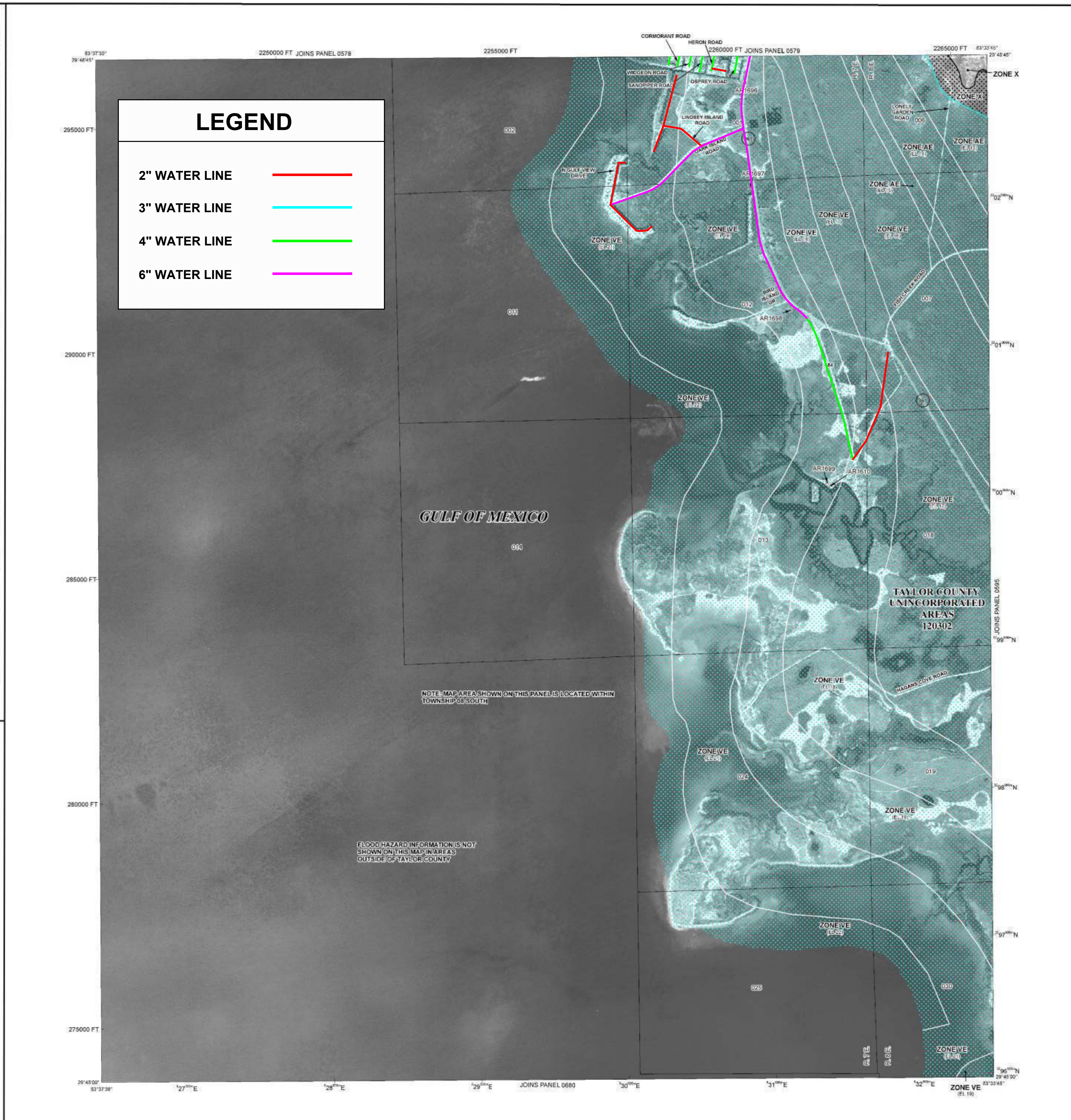
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A)—(A) Cross section line
- (23)- - -(23) Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 76N — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, North zone (FIPSZONE 0903), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
May 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0590D

FIRM
FLOOD INSURANCE RATE MAP

TAYLOR COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 590 OF 736
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR COUNTY	120302	0590	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12123C0590D

EFFECTIVE DATE
MAY 4, 2009

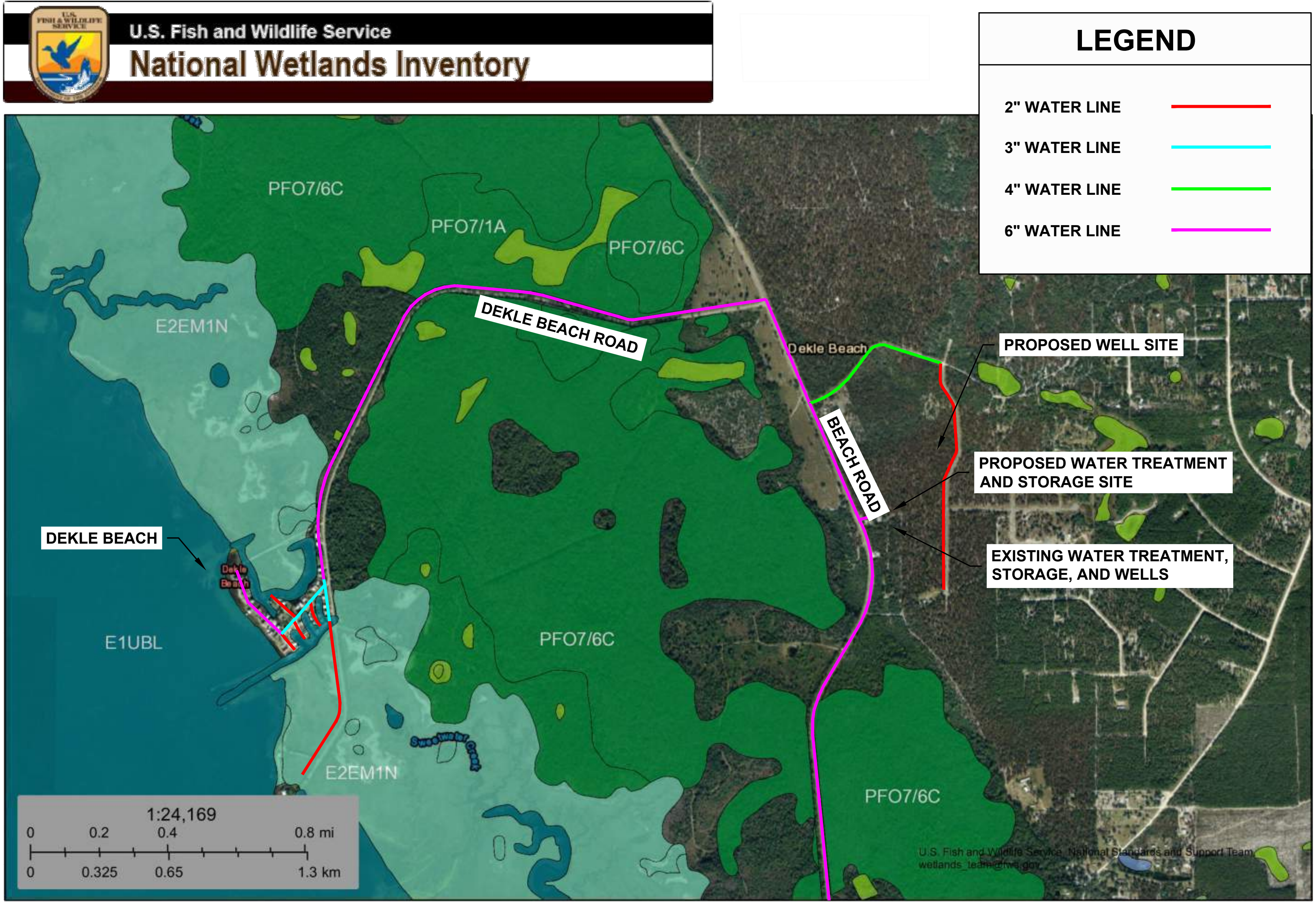
Federal Emergency Management Agency

Figure 4

Wetlands Maps

U.S. Fish and Wildlife Service

National Wetlands Inventory



February 2, 2018

Wetlands

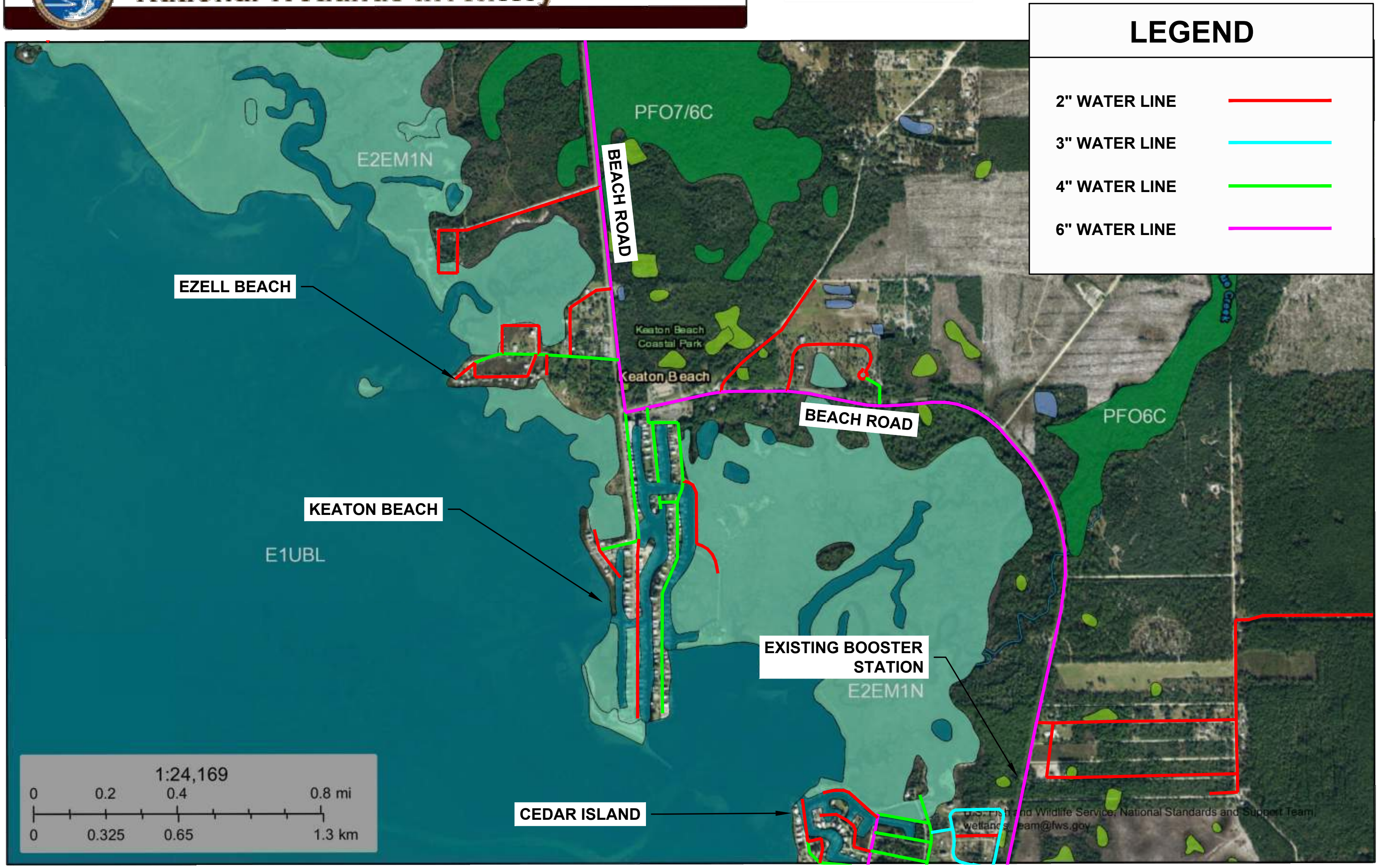
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service

National Wetlands Inventory



February 2, 2018

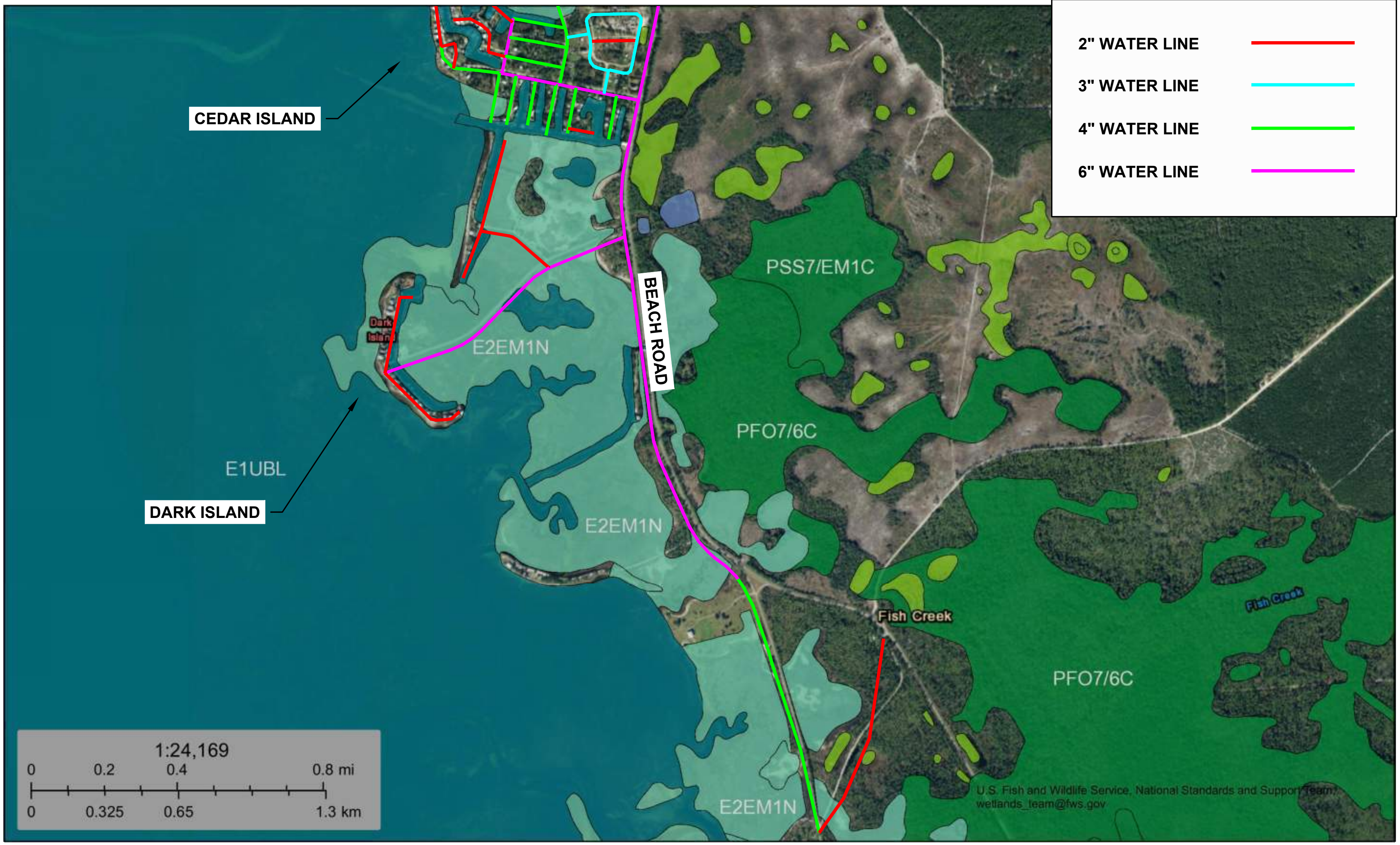
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service
National Wetlands Inventory



February 2, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure 5

Land Use Map

FUTURE LAND USE MAP CLASSIFICATIONS

- Conservation
- Public
- Agriculture - 1
- Agriculture - 2
- Agriculture - Rural Residential
- Mixed Use-Rural Residential
- Mixed Use-Urban Development Residential Medium-High Density (None)
- Mixed Use-Urban Development
- Sweetwater Resort Community
- Aviation Related Commercial
- Water Oriented Commercial
- Industrial

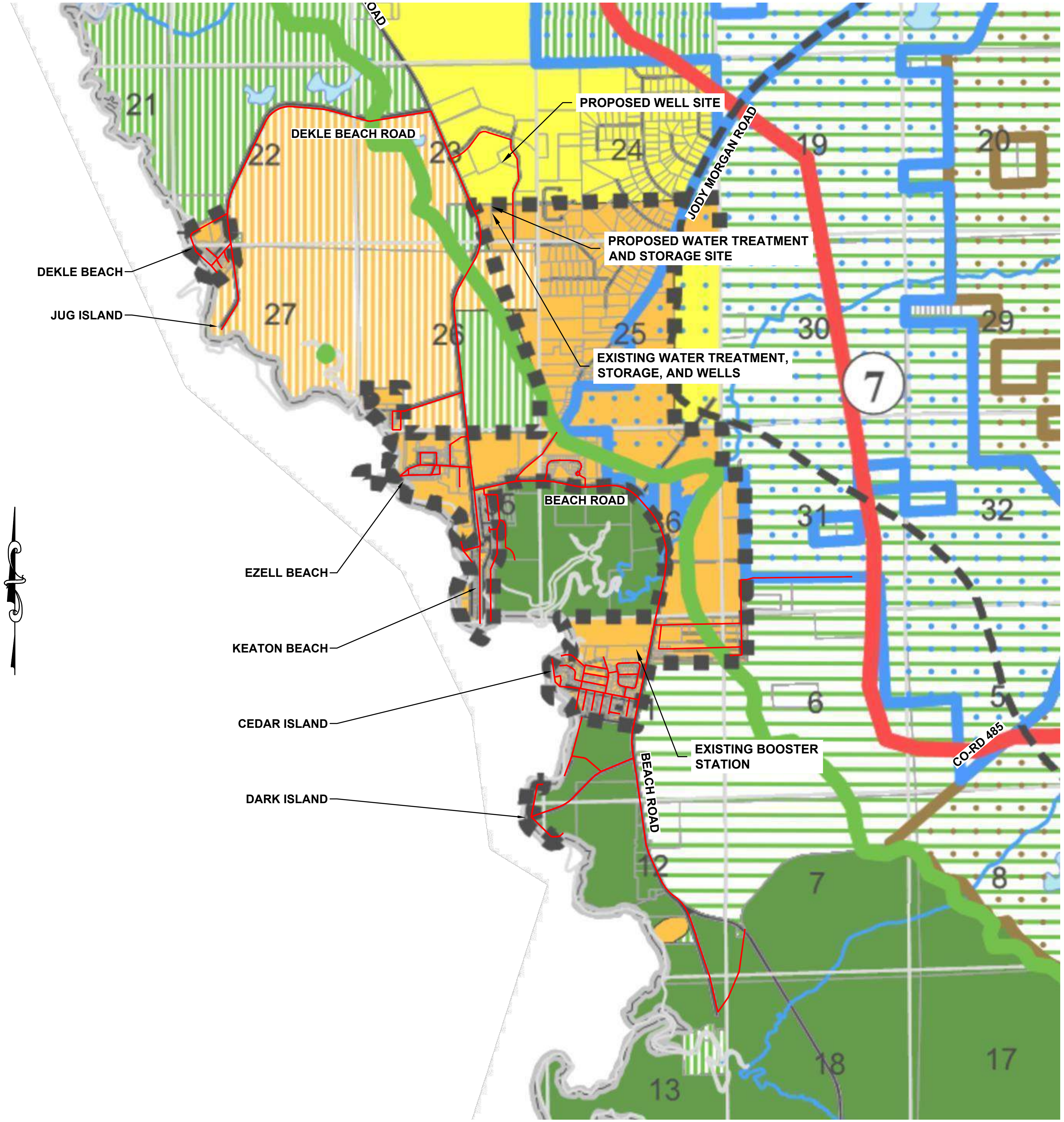
OPTION VISION 2060 PLAN OVERLAY

- Urban Village (None)
- Compact Mixed Use Village (None)
- Suburban Village
- Regional Employment Center
- Coastal Village Center (None)
- Coastal Village
- Coastal Settlement (None)
- Rural Village
- Rural Settlement (None)
- Conservation Community
- Ecological Village (None)
- Agriculture-Transfer

OTHER MAP FEATURES

- County Boundary Line
- Incorporated Area
- Designated Urban Development Area
- Lake
- River or Stream
- Coastal Management Area
- Coastal High Hazard Area
- Proposed Road
- 1 Urban Planning Area Identification Number
- 2 Rural Planning Area Identification Number

W:\FLUM_ZN\Taylor\TAFU11.mxd 7/8/2011



Dewberry

20684 Central Ave. East,
Blountstown, FL 32424
850.674.3300

Date: 09/2019
Designed: T. BURCH
Drawn: B. BEAUDETTE
Checked: J. BAXLEY

Project No.: 50083282
Sheet No.: FIGURE 5

Seal:

FIGURE 5: LAND USE MAP

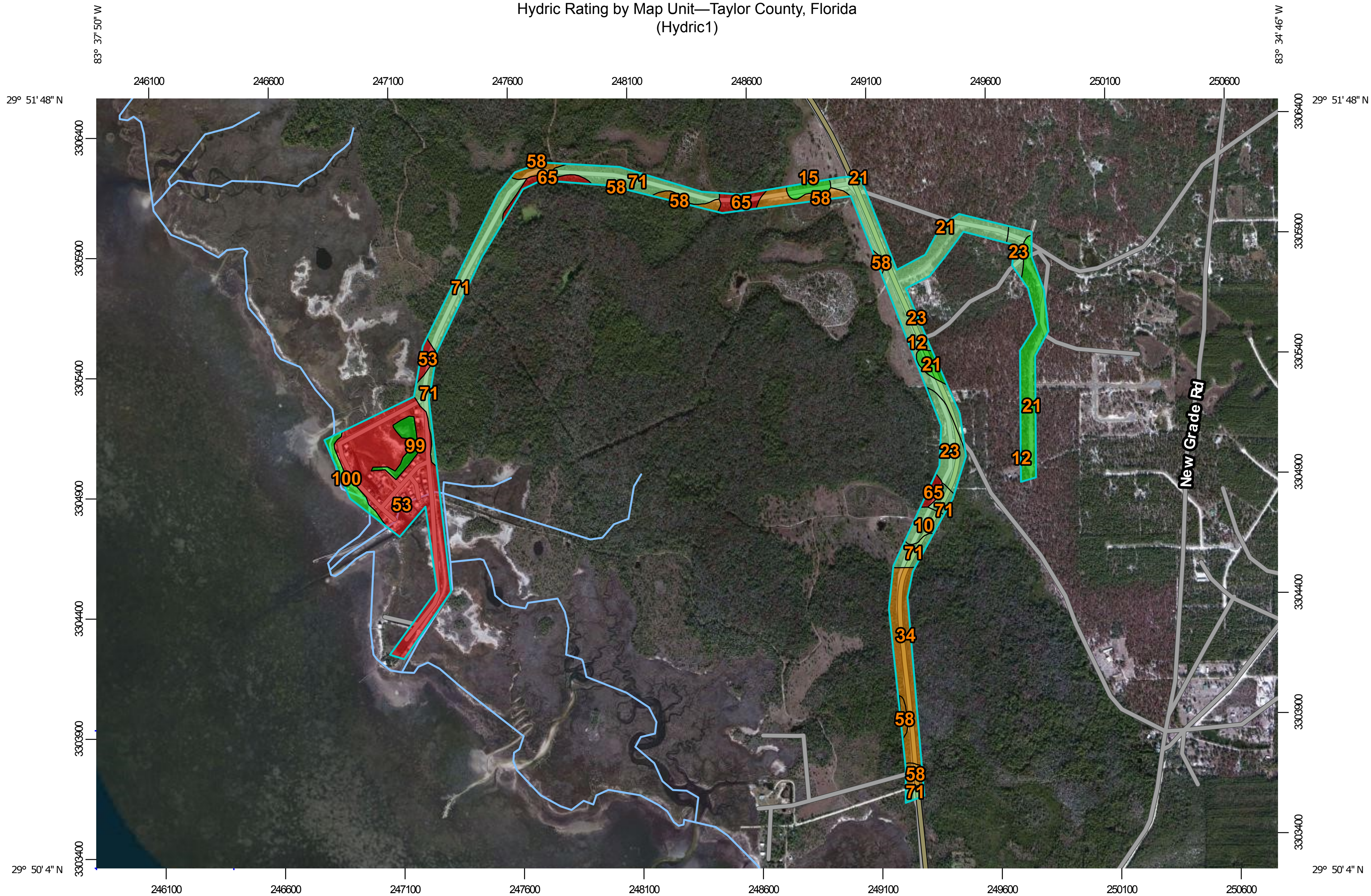
WATER SYSTEM IMPROVEMENT PROJECT
TAYLOR COASTAL WATER AND SEWER

TAYLOR COUNTY, FLORIDA

Figure 6

Hydric & Hydrological Soil Maps

Hydric Rating by Map Unit—Taylor County, Florida
(Hydric1)



Map Scale: 1:22,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 300, 600, 1200, 1800

Feet: 0, 1000, 2000, 4000, 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taylor County, Florida
Survey Area Data: Version 16, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Jan 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Mandarin-Hurricane complex, 0 to 3 percent slopes	6	3.4	1.9%
12	Ortega fine sand, 0 to 5 percent slopes	3	27.3	15.3%
15	Ridgewood fine sand, 0 to 3 percent slopes	0	2.4	1.3%
21	Kershaw fine sand, 0 to 8 percent slopes	0	17.4	9.8%
23	Melvina-Moriah-Lutterloh complex	4	10.4	5.8%
34	Clara and Bodiford soils, frequently flooded	97	14.4	8.1%
53	Bayvi muck, 0 to 1 percent slopes, frequently flooded	100	47.5	26.7%
58	Leon mucky fine sand	95	10.5	5.9%
65	Yellowjacket and Maurepas mucks, frequently flooded	100	6.9	3.9%
71	Leon fine sand, rarely flooded	6	31.0	17.4%
99	Water	0	3.5	1.9%
100	Waters of the Gulf of Mexico	0	3.5	2.0%
Totals for Area of Interest			**178.1**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

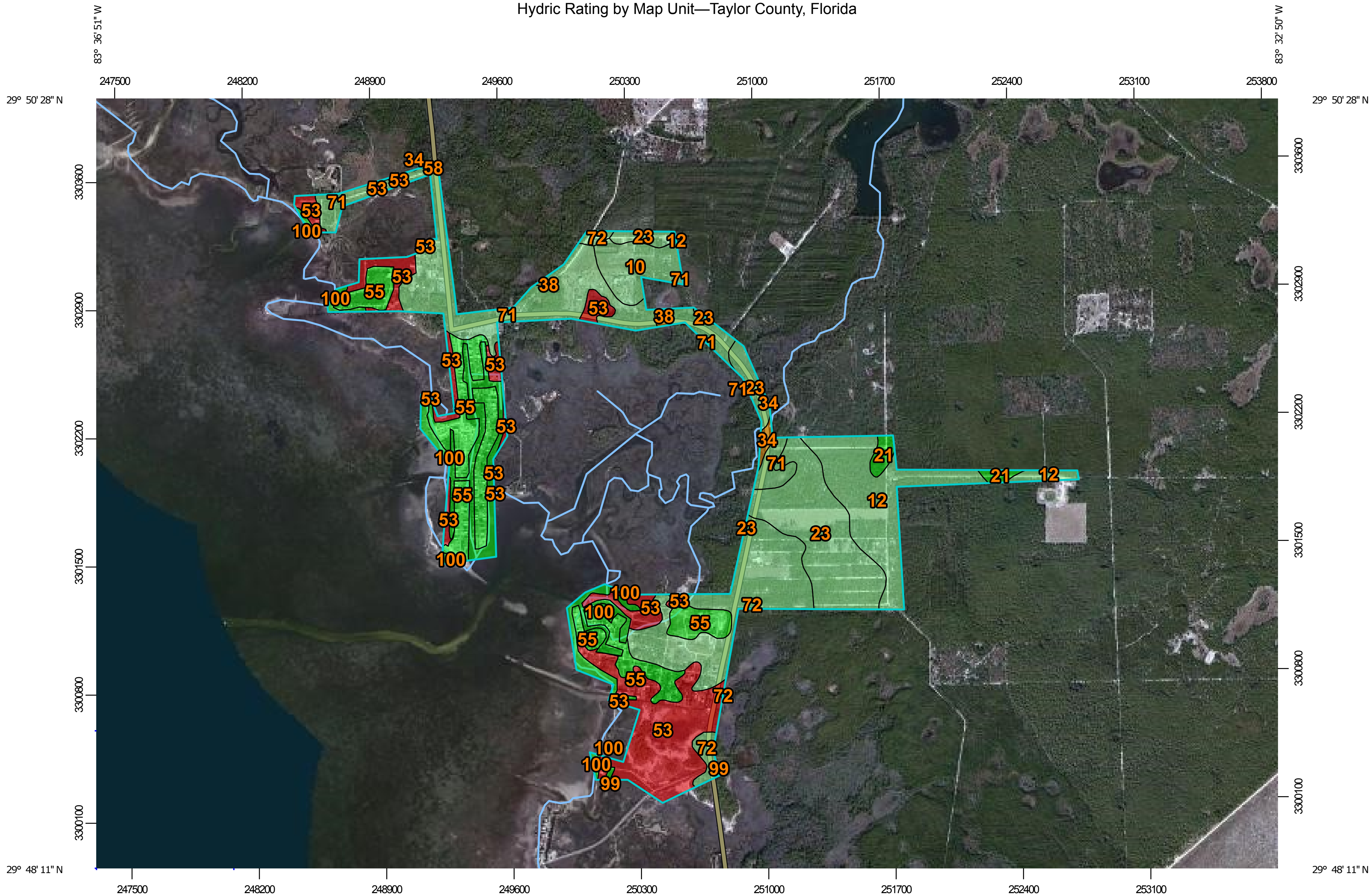
Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Rating by Map Unit—Taylor County, Florida



Map Scale: 1:29,700 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 400, 800, 1600, 2400

Feet: 0, 1000, 2000, 4000, 6000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
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Soil Rating Points

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
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Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taylor County, Florida
Survey Area Data: Version 16, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Jan 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Mandarin-Hurricane complex, 0 to 3 percent slopes	6	27.4	4.0%
12	Ortega fine sand, 0 to 5 percent slopes	3	74.0	10.9%
21	Kershaw fine sand, 0 to 8 percent slopes	0	8.0	1.2%
23	Melvina-Moriah-Lutterloh complex	4	94.9	14.0%
34	Clara and Bodiford soils, frequently flooded	97	2.9	0.4%
38	Clara and Meadowbrook soils, depressional	88	3.2	0.5%
53	Bayvi muck, 0 to 1 percent slopes, frequently flooded	100	117.7	17.4%
55	Arents, moderately wet, rarely flooded	0	96.8	14.3%
58	Leon mucky fine sand	95	0.6	0.1%
71	Leon fine sand, rarely flooded	6	109.7	16.2%
72	Chaires fine sand, rarely flooded	14	89.4	13.2%
99	Water	0	0.5	0.1%
100	Waters of the Gulf of Mexico	0	53.2	7.8%
Totals for Area of Interest			**678.2**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Rating by Map Unit—Taylor County, Florida

Map Scale: 1:16,300 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Lines

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Points

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taylor County, Florida
Survey Area Data: Version 16, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 9, 2010—Jan 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
13	Hurricane fine sand, 0 to 3 percent slopes	3	0.3	0.1%
37	Tooles and Meadowbrook soils, depressional	100	0.1	0.0%
53	Bayvi muck, 0 to 1 percent slopes, frequently flooded	100	126.6	56.1%
55	Arents, moderately wet, rarely flooded	0	8.9	3.9%
71	Leon fine sand, rarely flooded	6	66.7	29.6%
72	Chaires fine sand, rarely flooded	14	9.1	4.0%
99	Water	0	0.5	0.2%
100	Waters of the Gulf of Mexico	0	13.7	6.1%
Totals for Area of Interest			**225.8**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

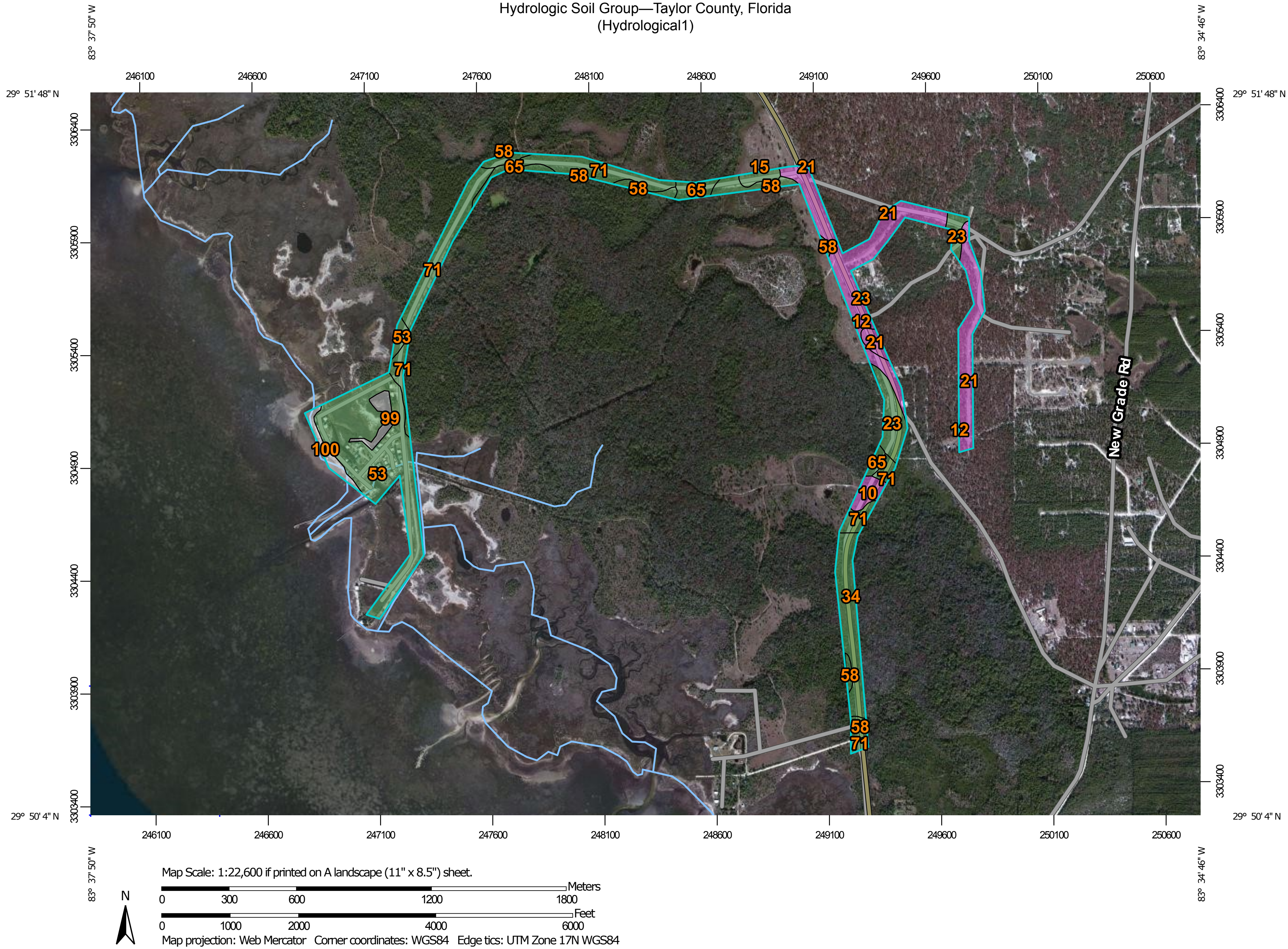
Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydrologic Soil Group—Taylor County, Florida
(Hydrological1)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taylor County, Florida
Survey Area Data: Version 16, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Jan 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Mandarin-Hurricane complex, 0 to 3 percent slopes	A	3.4	1.9%
12	Ortega fine sand, 0 to 5 percent slopes	A	27.3	15.3%
15	Ridgewood fine sand, 0 to 3 percent slopes	A/D	2.4	1.3%
21	Kershaw fine sand, 0 to 8 percent slopes	A	17.4	9.8%
23	Melvina-Moriah-Lutterloh complex	A/D	10.4	5.8%
34	Clara and Bodiford soils, frequently flooded	A/D	14.4	8.1%
53	Bayvi muck, 0 to 1 percent slopes, frequently flooded	A/D	47.5	26.7%
58	Leon mucky fine sand	A/D	10.5	5.9%
65	Yellowjacket and Maurepas mucks, frequently flooded	A/D	6.9	3.9%
71	Leon fine sand, rarely flooded	A/D	31.0	17.4%
99	Water		3.5	1.9%
100	Waters of the Gulf of Mexico		3.5	2.0%
Totals for Area of Interest			**178.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

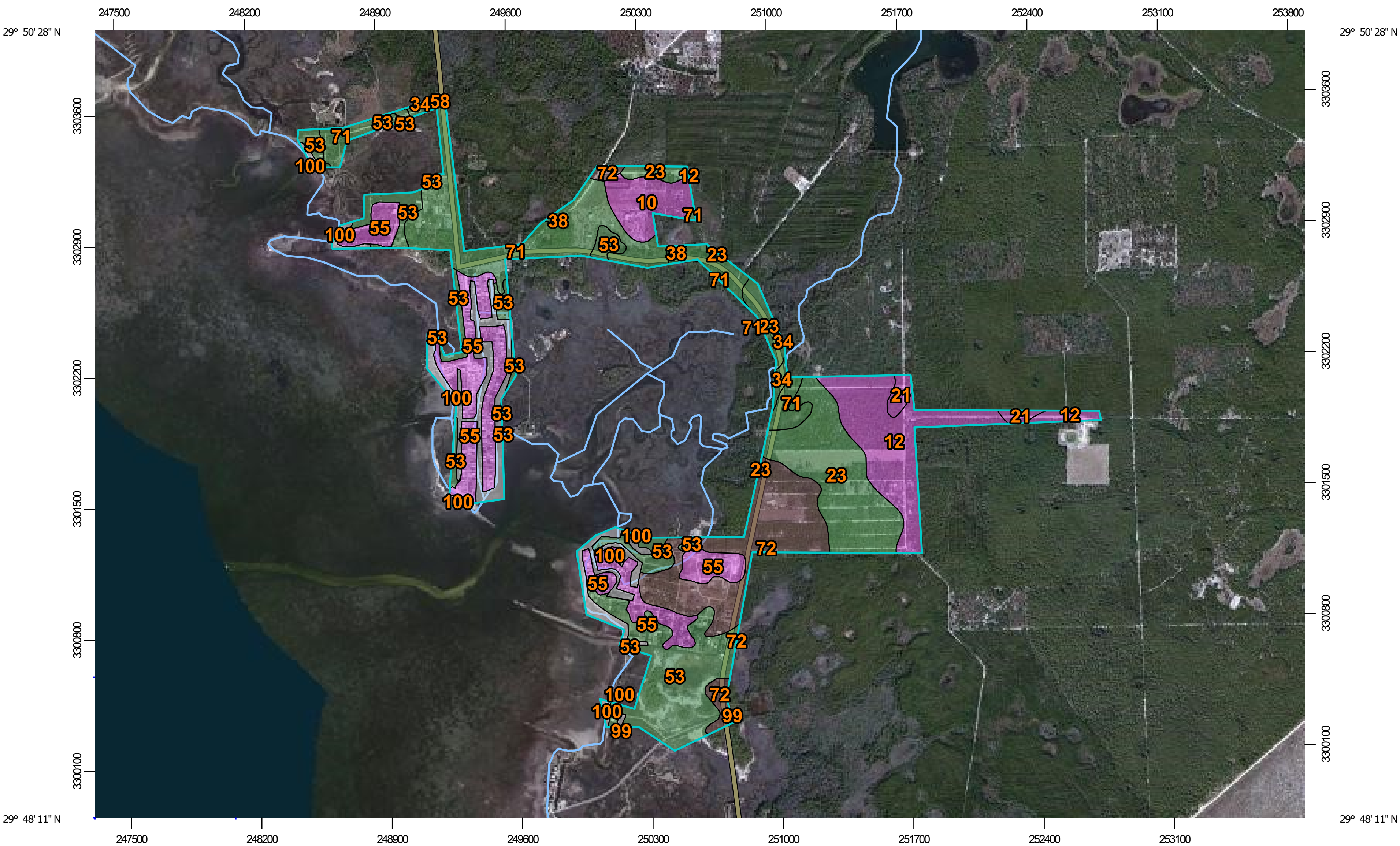
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group—Taylor County, Florida
(Hydrological 2)



Map Scale: 1:29,700 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 400, 800, 1600, 2400

Feet: 0, 1000, 2000, 4000, 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taylor County, Florida
Survey Area Data: Version 16, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Jan 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Mandarin-Hurricane complex, 0 to 3 percent slopes	A	27.4	4.0%
12	Ortega fine sand, 0 to 5 percent slopes	A	74.0	10.9%
21	Kershaw fine sand, 0 to 8 percent slopes	A	8.0	1.2%
23	Melvina-Moriah-Lutterloh complex	A/D	94.9	14.0%
34	Clara and Bodiford soils, frequently flooded	A/D	2.9	0.4%
38	Clara and Meadowbrook soils, depressional	A/D	3.2	0.5%
53	Bayvi muck, 0 to 1 percent slopes, frequently flooded	A/D	117.7	17.4%
55	Arents, moderately wet, rarely flooded	A	96.8	14.3%
58	Leon mucky fine sand	A/D	0.6	0.1%
71	Leon fine sand, rarely flooded	A/D	109.7	16.2%
72	Chaires fine sand, rarely flooded	B/D	89.4	13.2%
99	Water		0.5	0.1%
100	Waters of the Gulf of Mexico		53.2	7.8%
Totals for Area of Interest			**678.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher