



Celery Fields Regional Stormwater Facility Integrated Management Plan



Celery Fields

Regional Stormwater Facility

Integrated Management Plan

PREPARED FOR

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Public Utilities Stormwater
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Attachment A: Roles and Responsibilities for the Celery Fields Regional Stormwater Facility

Note: All referenced documents in this report are provided on the Sarasota County Water Atlas web site at <http://www.sarasota.wateratlas.usf.edu/lake/?wbodyid=18751&wbodyatlas=lake>.

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Introduction

The Celery Fields Regional Stormwater Facility (CFRSF) is a multi-functional regional stormwater facility located in the Phillippi Creek Drainage Basin, the largest drainage basin in Sarasota County. The primary function of the facility is flood storage. Flows are diverted from the upper reaches of Main C Canal into CFRSF, thereby reducing the demand on the downstream part of the drainage system. The CFRSF provides stormwater-runoff retention, flood protection, and an environmental filtration system that delivers cleaner water to Phillippi Creek and ultimately to Roberts Bay North and Sarasota Bay. The site is also well recognized for its diverse wildlife habitat that provides local, regional, and international birders with opportunities to view rare and interesting birds and other wildlife. With a network of trails, two wetland boardwalks with observation decks, an on-site Audubon Nature Center, and a unique observation mound with one of the highest elevations in Sarasota County, the CFRSF provides numerous recreational opportunities for birding, walking, hiking, running, dog walking, biking, fishing, health and fitness activities, and special events. The unique aspects of the site and its proximity to developed areas and schools also create numerous opportunities for environmental education.

Although the primary purpose of this facility is flood control, a management plan that integrates the various functions and uses is necessary to maximize the benefits and minimize any potential conflicts. Sarasota County held a series of meetings with the Sarasota Audubon and several county departments, including Stormwater, Utilities Operations and Maintenance, and Parks, Recreation and Natural Resources (PRNR), to discuss the elements and details of this integrated management plan. This plan focuses on the intent and management of the environmental and infrastructure features of the CFRSF, identifies strategies and potential challenges, and provides guidelines for decision making when conflicts cannot be resolved to the mutual benefit of all users and stakeholders.

Site Description

The approximately 400-acre CFRSF is located in Sarasota County (Sections 19, 20, 29, and 30 of Township 36 South, Range 19 East), south of Fruitville Road and east of Interstate 75 (**Figure 1**). The CFRSF is located in the Phillippi Creek drainage basin (35,771 acres) of the Roberts Bay North Watershed (41,505 acres) (**Figure 2**). The CFRSF is framed by a series of canals with Canal Main C on the west and Lateral Canal CA to the south. On the east side, the CFRSF is bordered by the By-Pass Canal on the north end, the Center Road drainage ditch in the central part, and the Raymond Road drainage ditch on the south end of this stormwater facility.

The drainage basin area for the CFRSF includes three areas with a total acreage greater than 3,500 acres (**Figure 3**). The CFRSF is separated by berms and control structures into four somewhat compartmentalized cells: North Cell (83 acres), Central Cell (160 acres), South Cell (131 acres), and Walker Tract (30 acres) (**Figure 4**). The North Cell includes two sedimentation ponds connected by a narrow ditch. The North Cell also contains a separate stormwater treatment area (littoral zone) that was created for the development located just north of the facility. The By-Pass Canal separates the North Cell from the Central Cell and is considered part of the North Cell for management purposes. The Central Cell includes an attenuation pond, cell berms and internal maintenance roads, twelve mitigation areas, two upland islands, several natural areas, a 30-acre observation mound, restroom facilities, parking area, and the Audubon Nature Center. The South Cell and Walker Tract include upland buffers, tree preserve islands, wetland mitigation areas, two boardwalks with observation decks, and a trail system along the berms of both cells.

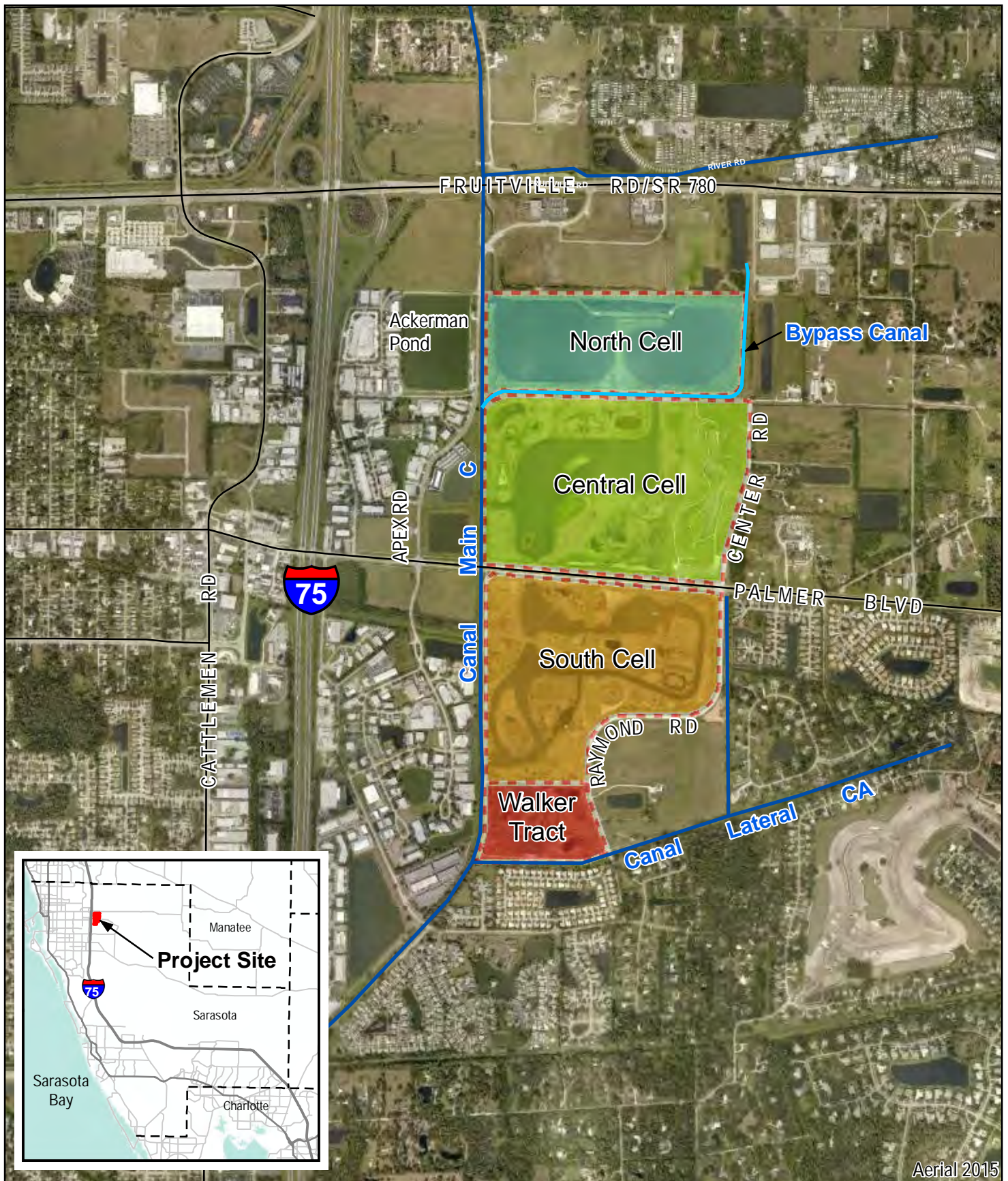


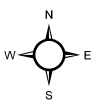
Figure 1.
Location map for the Celery Fields Regional
Stormwater Facility in Sarasota County, Florida
(Sections 19,20,29,30; Township 36S, Range 19E).



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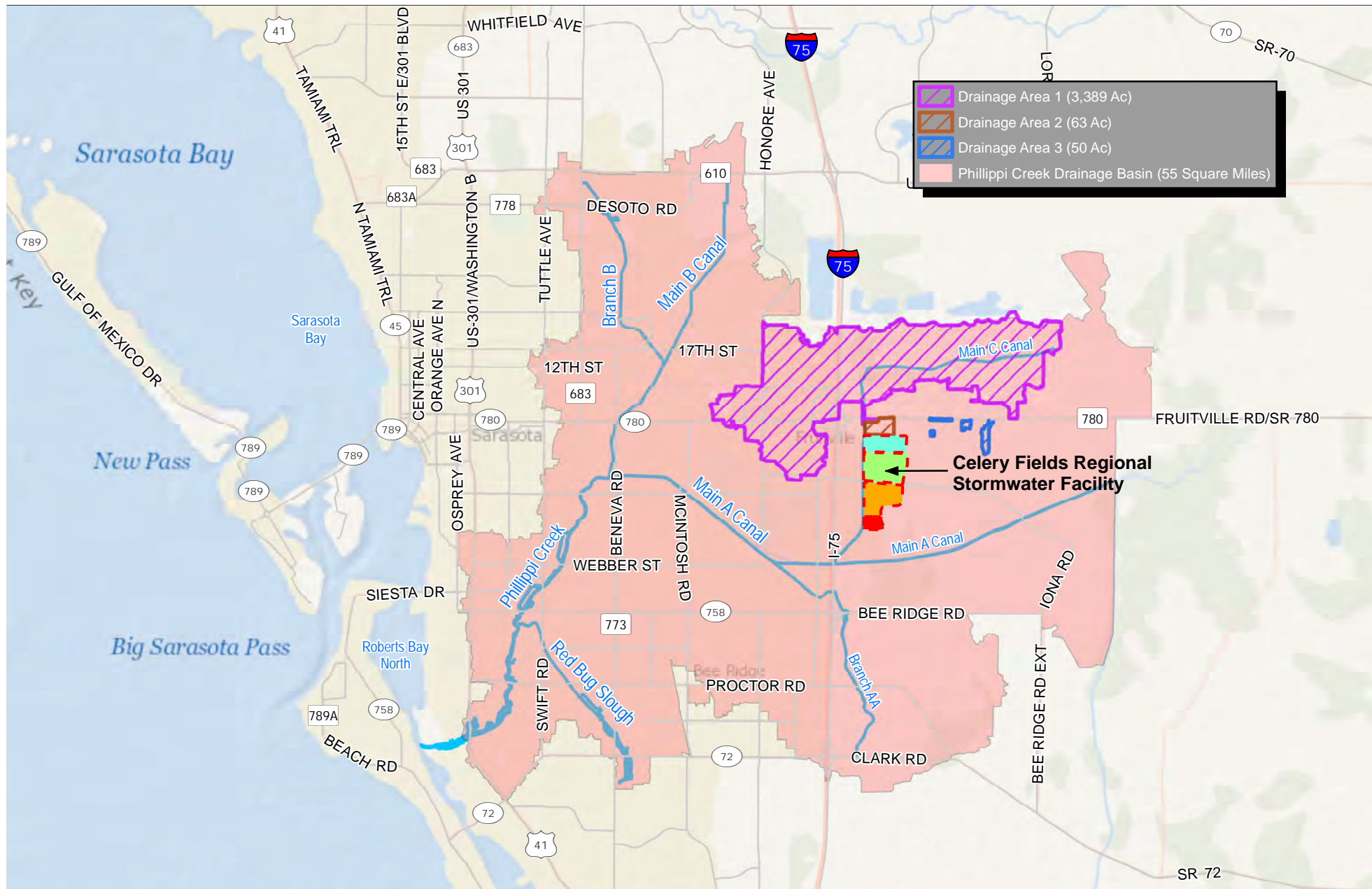
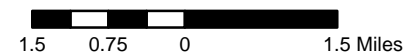


Figure 2.
 Phillippi Creek Drainage Basin, Main Waterways and
 Celery Fields Regional Stormwater Facility Location.



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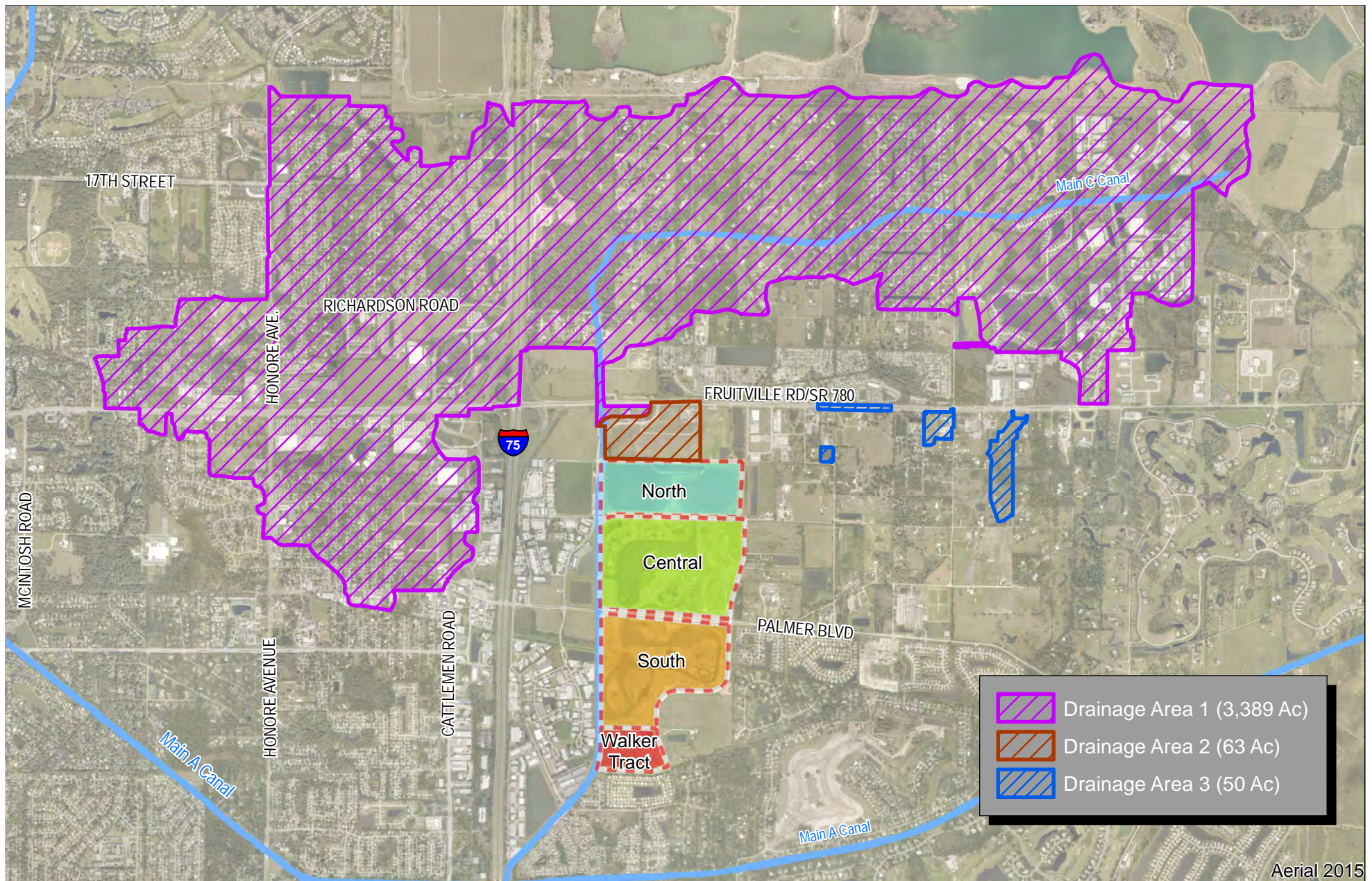
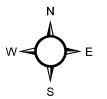
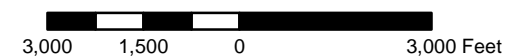


Figure 3.
Drainage areas for the
Celery Fields Regional Stormwater Facility.



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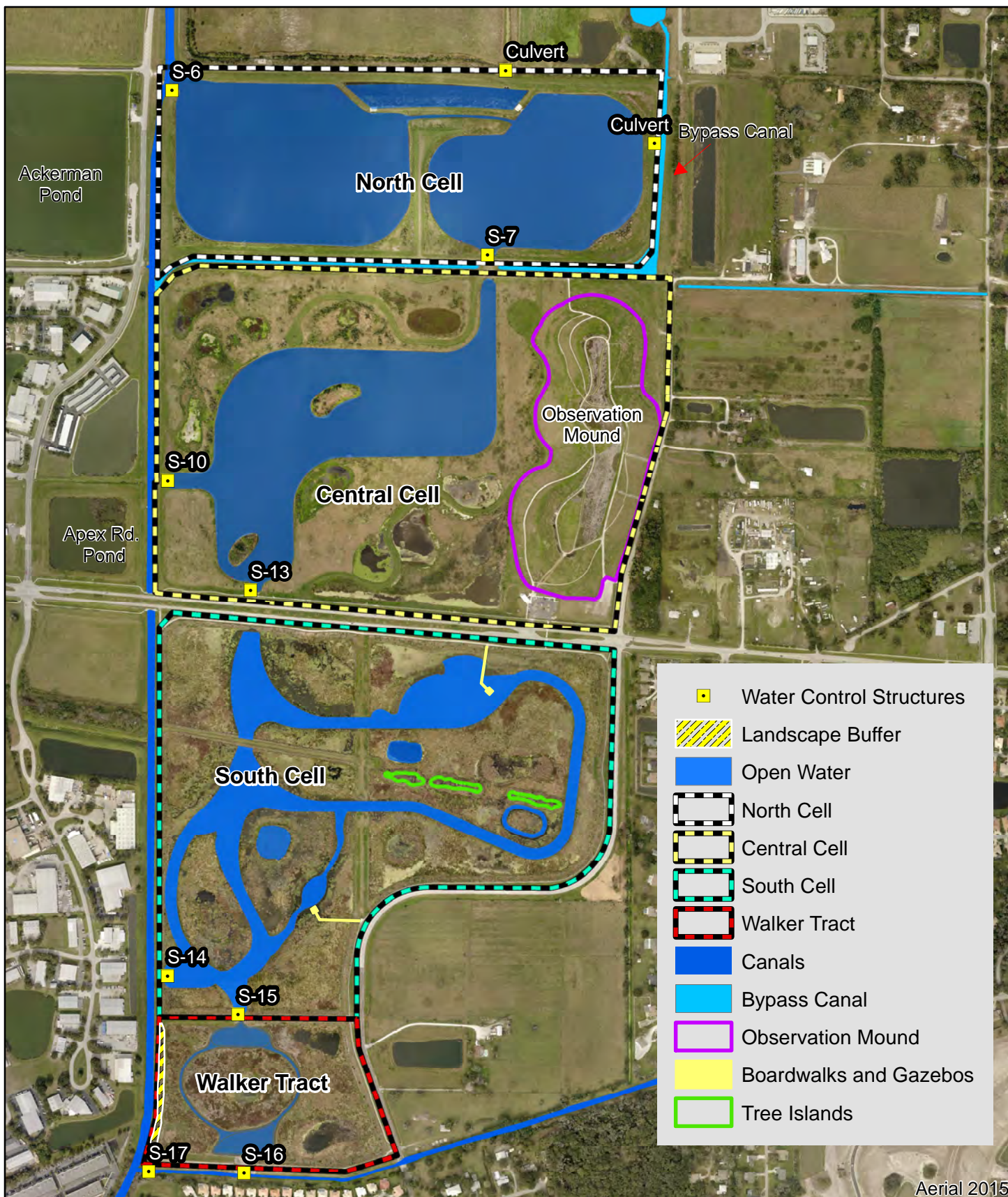


Figure 4.
Individual Cells and Control Structures for the
Celery Fields Regional Stormwater Facility.



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Water is managed through a series of water control structures (WCS) that help regulate water flow and levels in the CFRSF and potentially each of the individual cells. Each of the CFRSF cells is held at a control elevation of approximately 14.5 ft NGVD. The locations of WCSs and primary water flow directions are provided in **Figure 5**. The CFRSF has seven WCSs, identified as S-6, S-7, S-10, S-13, S-14, S-15, and S-16. The majority of incoming water flows into the CFRSF through WCS S-6, which diverts water from Main C Canal at the northwest corner of the facility. Water flows through the western half of the North Cell into the eastern half through an approximately 15-ft wide ditch. Water then travels south to the Central Cell through WCS S-7. From this structure, water enters the Central Cell and either flows through WCS S-10 to Canal Main C (under extreme weather conditions or during manual water level manipulations), or flows under Palmer Boulevard through WCS S-13 to the South Cell. In the South Cell, water then flows in a sinuous fashion to increase residence time. Water in the South Cell can be discharged directly into Canal Main C under extreme weather conditions or to lower the existing water level at WCS S-14. Water can also be discharged from the South Cell into the Walker Tract through WCS S-15. In the Walker Tract, water then flows in a circular fashion generally to the south where it discharges to Canal Lateral CA over a 50-ft wide fabri-form outflow weir (WCS S-16) located at the south end of the Walker Tract.

Water leaving the CFRSF through Canal Lateral CA flows through rip rap and a 16-ft wide channel weir control structure (WCS S-17) where it discharges back into Canal Main C. Lateral Canal CA is also designed to back up into the Walker Tract under high-flow conditions. Water from the CFRSF flows south through Canal Main C where it eventually discharges into Canal Main A, then to Phillippi Creek where it ultimately discharges into Roberts Bay North.

History

Most of the CFRSF, and some of the surrounding area, was described as a 500-acre sawgrass pond, a term historically used to describe an herbaceous marsh dominated by sawgrass, a native marsh wetland plant. This wetland formerly known as “Big Camp Sawgrass” was first drained for agriculture in the late 1880s when the upper end of Phillippi Creek was channelized and this fertile muck-dominated wetland was ditched to take advantage of the rich organic soils for cropland. Drainage intensified with efforts organized by the Sarasota Fruitville Drainage District in the 1920s as farmers experimented with different crops. Ultimately, the historical farmers settled on growing celery. Farming of celery on these former wetland soils continued until the 1990s when the site was purchased by Sarasota County for flood protection.



Celery production at Celery Fields in the 1940s.

In June 1992, an unnamed storm produced over 20 inches of rainfall over several days in Sarasota and Manatee Counties and caused significant flooding of canals, creeks, and other water bodies. Flooding of numerous roads, businesses, and residences caused significant property damage in both counties. The Phillippi Creek watershed in Sarasota County was particularly hard hit because of its size and the significant development within the drainage basin. Flooding from this and other storms prompted action by the Sarasota County Stormwater Environmental Utility to better prepare for 100-year storm events in the future. The CFRSF was one of many capital improvement projects designed to alleviate flooding in the Colonial Gables subdivision, among others located in the Phillippi Creek drainage basin. The CFRSF improvements were designed to address structure flooding downstream along Phillippi Creek and to reduce the risk of homes in the 100-year floodplain.

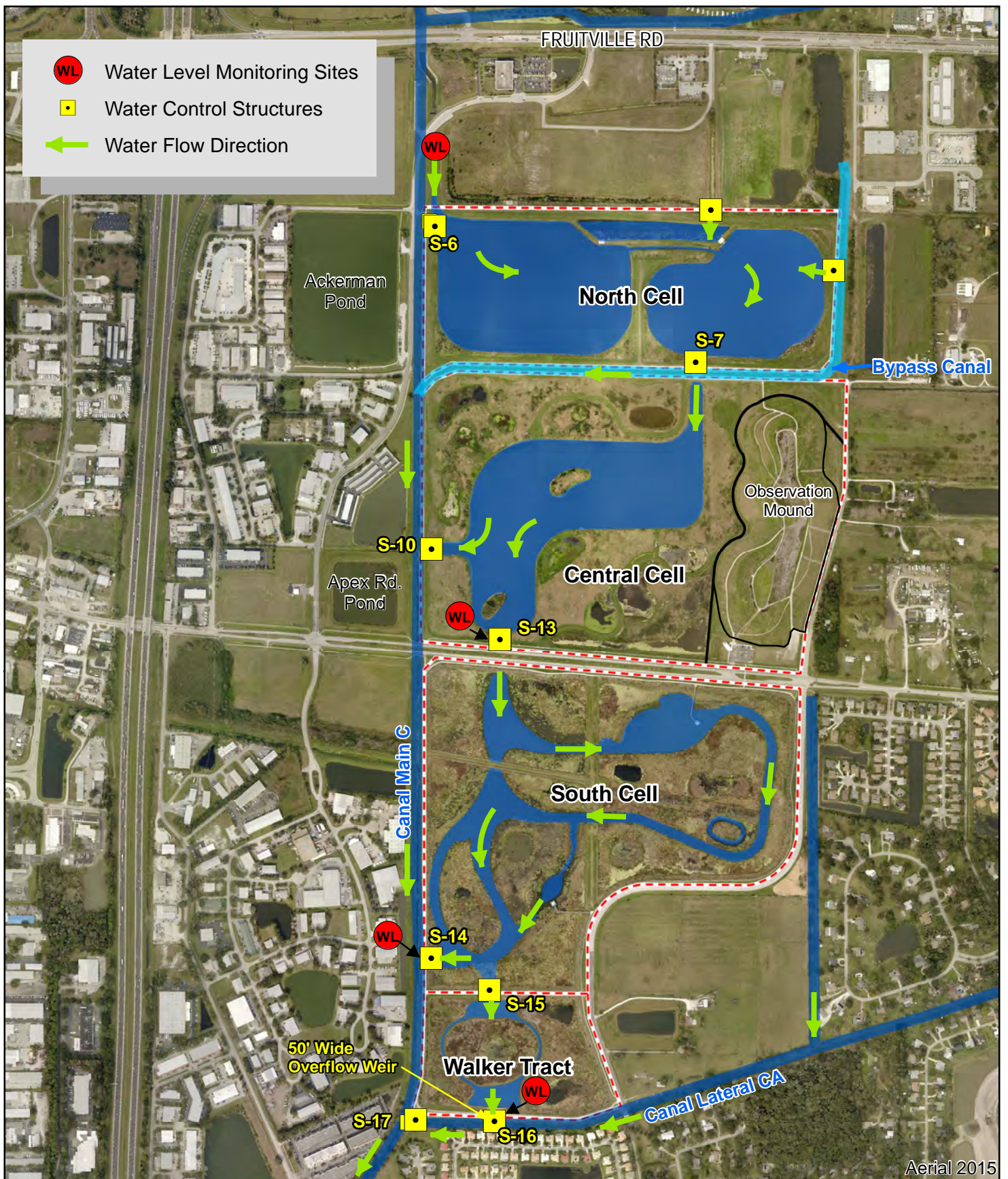


Figure 5.
Water control structures, water flow direction, and
water level monitoring sites for the Celery Fields Regional
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The CFRSF project was built in three phases over a period of nearly twenty years. Phase I of the project began in 1995 and involved the construction of the Central Cell and the replacement of an aged agricultural weir in the Main C Canal. Phase II of the project began in 1996 and included a diversion structure, modification to the Central Cell, and construction of the North and South Cells. Phase III (2009 to 2011) included the addition of Walker Tract, the 30-acre parcel located just south of the South Cell, to the CFRSF complex. The work of Phase III consisted of the creation and restoration of approximately 160 acres of open-water, wetland, and upland habitats and the construction of additional WCSs in both the South Cell and Walker Tract. The Phase III construction project was funded in part by a Total Maximum Daily Load (TMDL) water quality grant from the Florida Department of Environmental Protection (FDEP), cooperative funding from the Southwest Florida Water Management District (SWFWMD), and capital stormwater assessment fees established by Sarasota County for the Phillippi Creek watershed. Other Phase III improvements included the creation of the mound in the Central Cell, landscaping for the Palmer Boulevard right-of-way and the observation mound, Lateral Canal CA improvements, Walker Tract landscape buffer, additionally acquired parcel improvements, boardwalks, and numerous trail/sidewalk improvements in both cells. After Phase III was completed, restroom facilities and a parking area were constructed in 2014 and 2015. In 2015, the Audubon Nature Center was constructed with private funds on part of the County-owned Central Cell.

Required Functions and Operations

Flood Control

The primary function of the CFRSF is to provide flood control and stormwater attenuation. Sarasota County Stormwater Operations and Maintenance has operated the facility under a set of standard operating procedures since Phase I was completed in the mid-1990s. Over the years, Sarasota County has modified the standard operating procedures as more was learned about water flow and stages in Main C and Phillippi Creek, and as new phases were brought online. The latest Standard Operating Procedures and Maintenance (SOPM) manual for the CFRSF was updated in May 2015 and includes the operation of the entire facility and other related control structures downstream.

Generally, flood control management of the CFRSF is categorized into three different modes of operation: 1) Normal Operations; 2) Pre-Storm and Storm Event Operations; and 3) Maintenance Operations. Normal Operations include maintaining base water levels, Maintenance Operations provides for the adjustment of WCSs to aid in nuisance/exotic species control and to promote desirable wetland plant growth. Water levels are lowered in the facility prior to large storms (e.g., tropical storms and hurricanes) as early as feasible to allow for additional flood storage during storm events in the Pre-Storm and Storm Event Operations phase. Facility operations include managing water through or over WCSs S-6, S-10, S-13, S-14, S-15, and S-16 in the CFRSF and the Main C Weir just south of Porter Road. Although WCS S-16 is a fixed weir, water can be drained out of the Walker Tract through two 12-inch pipes located just west of the weir.

The SOPM has general directions for normal and storm event operation of structure windows, gates, stop logs, and water elevations that should be maintained. The SOPM manual also outlines the storm event recovery procedures. As water levels recede after recovery from storm event flows, the CFRSF and Main C gates can be returned to Normal Operations conditions.

Wetland Mitigation

The CFRSF has a long environmental permitting history that spanned over two decades and included issued permits through the U.S. Army Corps of Engineers (ACOE) and the Southwest Florida Water Management District (District). ACOE Permit SAJ-1994-04745(IP-MN) was originally issued in 1996, and authorized impacts to 264.8 acres of jurisdictional wetlands to construct Phase I of the CFRSF. A second ACOE permit was issued in 1997 for Phase II, and authorized impacts to additional 151.4 acres of jurisdictional wetlands. The 1997 ACOE permit was subsequently modified three times resulting in time extensions and mitigation plan changes. ACOE Permit Modification Number 4 allowed the mitigation for the phased project to be moved from the Central Cell to the South Cell as part of the Phase III work. The locations of different habitats that were created for wetland mitigation in the different cells are show in **Figure 6**.

The District issued permit 43013672 for the CFRSF, starting with Phase I in 1995. By 2015, a total of 23 modifications of the CFRSF permit had been issued or abandoned in various efforts to accommodate WCS modifications and numerous site improvements. In 1997, Modification 04 permitted 16.67 acres of marsh and littoral zone impacts for wetland habitats delineated north of Palmer Boulevard and required the creation of 15.49 acres in a total of 12 herbaceous wetlands in the Central Cell. During this phase of the project, the District did not assert jurisdiction over any wetlands in the historic agricultural fields south of Palmer Boulevard in the South Cell and Walker Tract areas. This permit was later modified in 2002 with permit modification 07 to allow the control elevation in the Central Cell at WCSs S-10 and S-14 to be lowered from 16.5 ft NGVD to 14.5 ft NGVD. In 2002, the District and County determined that the twelve wetland systems met the intent of the permitted mitigation at the lowered control elevation. This permit modification deleted the monitoring and reporting requirements and also allowed the mitigation success criteria to be revised to include the following in *Specific Condition 6, Wetlands Mitigation Success Criteria Mitigation Area*:

Mitigation is expected to offset adverse impacts to wetlands and other surface waters caused by regulated activities and to achieve viable, sustainable ecological and hydrological wetland functions. Wetlands constructed for mitigation purposes will be considered successful when the following criteria are met continuously for a period of at least one year without intervention in the form of irrigation or the addition or removal of vegetation.

- a. The mitigation can be reasonably expected to be developed into and maintained as a Palustrine Emergent Persistent Wetland, as determined by the USFWS Classification of Wetlands and Deepwater Habitats of the United States.
- b. Topography, water depth and water level fluctuation in the mitigation area are characteristic of the wetland/surface water type specified in criterion "a."
- c. The dominant and subdominant species of desirable wetland plants comprising each vegetation zone and stratum of the mitigation area shall be as follows:

ZONE	STRATUM	PERCENT COVER	DOMINANT SPECIES	SUBDOMINANT SPECIES
N/A	Herbaceous	60	<i>Rumex</i> spp.	<i>Bacopa</i> spp.

- d. Species composition of recruiting wetland vegetation are indicative of the wetland type specified in criterion "a."
- e. The wetland mitigation area can be determined to be a wetland or other surface water according to Chapter 62-340, F.A.C.

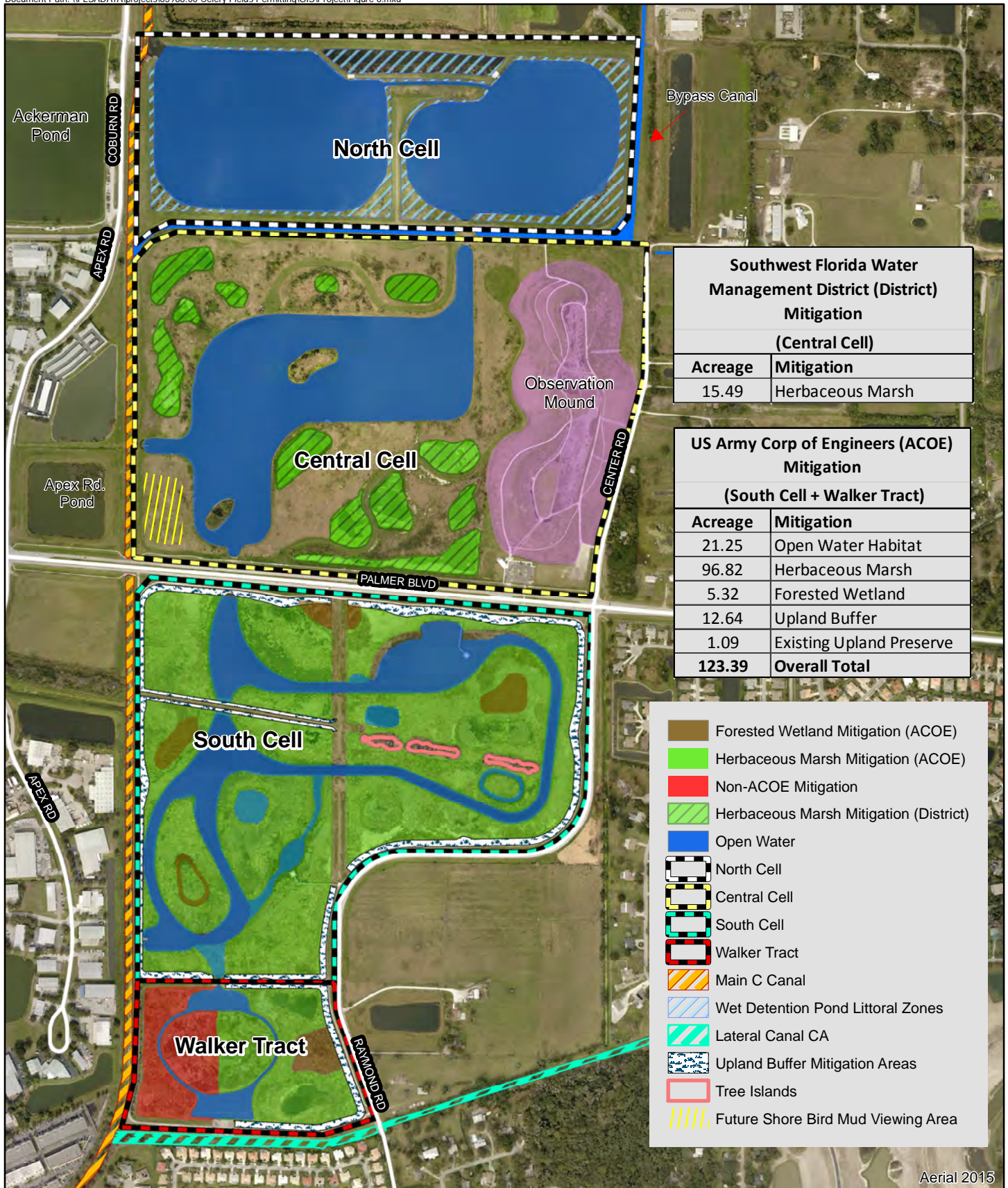


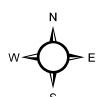
Figure 6.
Celery Fields Mitigation Areas.



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Special Condition 7 of the District permit modification states that the Permittee shall operate and maintain the wetland mitigation area(s) such that they remain in their current or intended condition for the life of the surface water management facility. Both the ACOE and District permits indicate that the Permittee must perform corrective actions in perpetuity for any parts of the wetland mitigation area(s) where conditions no longer meet the criteria set forth in the Wetland Mitigation Success Criteria Condition(s).

The active ACOE permit was re-issued under Permit No. SAJ-1994-4745(IP-MEP) with revisions to the original permit on August 7, 2007 for the CFRSF Phase III work. The ACOE permit for the Phase III work was subsequently modified three times to include monitoring frequency and reporting changes, mitigation plan modifications to include the Walker Tract, and an adaptive management resolution for noncompliance issues. The net result of these ACOE permit modifications and re-issuances is the authorization of wetland impacts totaling 416.2 acres of highly impacted wetlands. The final approved compensatory mitigation plan required the creation of 87.7 acres of open-water habitat, 96.82 acres of herbaceous wetland, and 5.32 acres of forested wetland. In addition, it required the creation and enhancement of 12.64 acres of upland buffer habitat and 1.09 acres of existing upland preservation. The plan and replanting guarantees called for over 600,000 wetland and upland plants be installed throughout the multitude of different habitats at varying depths.



Mitigation plantings at South Cell after initial planting (2010).

To comply with the ACOE permits for the CFRSF, semi-annual mitigation monitoring events are conducted in March and September of each year and summarized in annual reports due by January of the following year. ACOE Permit SAJ-1994-4745 (IP-MEP) for Phase III of the CFRSF project requires the following success criteria be evaluated and met:

- a. A minimum of 70% total cover of desirable wetland plant species in herbaceous wetland zones in South Cell and Walker Tract Mitigation Areas;
- b. A minimum of 50% total cover by desirable plant species of the water lily-dominated D-Zones of the South Cell Mitigation Area;
- c. A minimum of 30% canopy coverage and 30% desirable herbaceous vegetative cover for the forested wetland zones;
- d. Nuisance/exotic plants species must not exceed 10% total cover;
- e. Herbaceous wetland zones must be able to be classified as *Palustrine Emergent Wetland* according to the U.S. Fish and Wildlife Service's (USFWS) Classification of Wetlands and Deepwater Habitats of the United States (CWDHUS); and
- f. Forested wetland zones must be able to be classified as *Palustrine Scrub-Shrub Wetland* according to the USFWS's CWDHUS.

For the South Cell and Walker Tract mitigation areas of the CFRSF to be deemed successful, the permittee (Sarasota County) must implement a nuisance/exotic species maintenance program. Sarasota County has already complied with the intent of this condition by instituting a maintenance-control program for nuisance/exotic plant species for the CFRSF. The County has used a combination of in-house and contracted maintenance crews to control nuisance/exotic plant species. According to the permit, the final annual report can only be submitted to the ACOE once the mitigation areas have been deemed successful for three consecutive years.

North Cell Wet Detention Pond and Littoral Zone

A wet detention pond for the formerly proposed Sarasota County Field Operations Center (FOC) was constructed on the northern side of the North Cell (Figure 6) in 2004 under Florida Department of Environmental Protection (FDEP) Permit 58-0152847-001. Although the FOC development concept was abandoned, the stormwater system still serves the future development for the same area. The stormwater system also provides treatment for parts of Fruitville Road under District permit 4430721. This system consists of one inlet pipe on the northeast side and two discharge weirs to the North Cell sedimentation ponds on both sides of the separator ditch that connects the two open water compartments of the North Cell. The stormwater treatment system was required to have a vegetated littoral zone over 35% of the total pond area. The littoral zone must have at least 85% vegetative cover. The site was planted several times between 2005 and 2007, and the vegetation has remained relatively stable with a mixture of floating-leaved and emergent wetland plant species. The stormwater system is required to be inspected every two years to verify that the system is being operated consistent with its original intent for water quality treatment. Inspections also include reporting of any repairs or maintenance done in the facility.

Walker and Ziegler Tracts Restrictive Covenants

The Phase III work also included the removal of pesticide-impacted soils and the relocation of arsenic-impacted soils on two parcels of land (Walker Tract and Ziegler Tract) purchased for the CFRSF. Although the Ziegler Tract is located in the area partly under the current observation mound, the soil restrictions apply to the entire observation mound area because soils were received partly from the Walker Tract excavation. The preconstruction geotechnical soil monitoring revealed that the residual arsenic-impacted soils were above the Residential Soil Cleanup Target Level defined by Chapter 62-780, Florida Administrative Code in both of these parcels (*Site Rehabilitation Completion Reports for FDEP Sites #COM_255949/Project #292435 and #COM_173410/Project #240750, dated January 7, 2014, submitted by Ardaman & Associates, Inc.*). As required by the rule, soils with a concentration greater than 12 mg/kg were removed and properly disposed. Soils in both areas with concentrations between the residential limit of 2.1 mg/kg and below the Alternative Soils Cleanup Target Level of 5.5 mg/kg, were allowed to remain on site with some restrictions. Specifically, all soils that fell within this range must be protected with permanent engineering controls for the entire Walker Tract and for the observation mound, including 5 ft outward of the complete mound footprint. The soils were capped with 2 ft of clean fill with engineering controls maintained in perpetuity.

An Engineering Control Maintenance Plan was approved by Florida Department of Environmental Protection for these two areas to require routine annual inspections to verify that the cap remains intact and that any erosion repairs are conducted. The Declaration of Restrictive Covenants for both areas were approved by the Sarasota County Board of County Commissioners in May 2015 and recorded in the Official Records July 23, 2015. FDEP provided a No Further Action Report on August 14, 2015, and a Conditional Site Rehabilitation Completion Order was issued.

Native Habitat

The CFRSF provides a diversity of habitats with numerous wildlife benefits, as required by the regulatory permits. The various created and restored upland and wetland habitats provide food, water, cover, and nesting sites for a variety of wildlife, including birds, mammals, reptiles, amphibians, and fish. The goal for habitat management of the CFRSF will be to maintain numerous ecotones and micro-habitats for a diversity of wildlife species to coexist and thrive. Particular attention will be given to creating nesting opportunities for a number of wildlife species, especially some of the more rare and protected species with special needs. The plan also provides guidelines for a productive wetland and aquatic environment that will benefit native fish populations, which in turn will help support the wildlife species that depend on this prey source.

A variety of wetland communities exist throughout the CFRSF, including the littoral zones in the sedimentation ponds throughout the North and Central Cells, and the created wetlands in the Central Cell, South Cell and Walker Tract. The characteristic vegetation of these wetlands depends on the depth of the water and length of time a wetland holds water, which is known as the hydroperiod. For wildlife, the different wetland zones provide a diversity of vegetation for protection, a variety of food sources, and the environments necessary for different stages of their life cycles. The shallow ditches, canals, and open water areas also provide significant wildlife habitat, and many species congregate in those areas. The wetland and aquatic communities also remove nutrients from the surface water, control flow to receiving streams, provide input to the groundwater, contribute organic material for future growth and introduce oxygen to the water column. All of these functions are essential for healthy ecosystems.



Roseate spoonbills foraging in South Cell wetlands.

The value of upland buffers is well recognized for their functional capacities to protect wetlands from adverse actions occurring in adjacent upland or developed areas. These buffers serve to protect the physical, chemical, and biological properties of the aquatic and wetland resources. These valuable habitats also provide food, cover, and nesting opportunities for numerous wildlife species. Many wetland-dependent species require uplands at some stage of their life cycles for their continued survival. In the CFRSF, vegetated uplands of low to intermediate quality comprise a total of approximately 70 acres. In addition, there are native upland areas in the North and Central Cells including the surrounding berms, ruderal upland habitats, and the planted observation mound (approximately 10 acres), that provide some positive upland functions.

The Phase III restored ecosystems on the CFRSF have limited function because of the age and maturity of vegetation. This was recognized in the early design by incorporating tree preserve islands with mature trees, planting of more mature trees, and providing nesting boxes and platforms for specific species. A large grand tree elm was also preserved and protected on the south side of the Walker Tract to provide some wildlife value. In addition, osprey platforms were erected in both the Central and South Cells. Sarasota Audubon also seasonally installs several purple martin houses on permanent mounting posts located in the Central Cell near the restroom facilities and the Audubon Nature Center. PRNR has installed a bat house in the same location. The County and Sarasota Audubon have plans to install bird and possibly other wildlife accommodations to promote local native wildlife.

In addition to the diverse bird life documented by Sarasota Audubon, the site also provides home to numerous mammal, reptile, and amphibian wildlife. Fish are also an important food source for many of the wildlife species that use the CFRSF. Incidental observations throughout the facility and an informal qualitative fish survey conducted in the South Cell during August 2015 indicated that fish in the CFRSF are quite diverse and abundant.

Water Quality

Healthy waterways with good water quality provide innumerable benefits to the economy, property values, and quality of life for people living and working in our community. In recent years, the Phillippi Creek watershed (including the CFRSF and its drainage area) was formally designated as “impaired” by the U.S. Environmental Protection Agency and the FDEP in accordance with the Clean Water Act and related “Impaired Waters” rules. The goals of these water quality regulations are to ensure that our waterways are clean and suitable for

healthy recreation and potable water supply (in some cases) and to support the full life cycle of fish, shellfish, wading birds, and other water-dependent aquatic life. The TMDL plan to return Phillippi Creek to a healthy waterbody calls for a 98% reduction in Fecal Coliform bacteria and 70% reductions in Nitrogen, Phosphorus and Biochemical Oxygen Demand. These TMDLs are implemented through discharge permits as part of the National Pollutant Discharge Elimination System (NPDES) and usually include steps for water quality monitoring, identification of pollution sources, elimination of pollution sources, an implementation plan for capital projects or programs, public education, and annual reporting of progress toward the TMDL reductions. Best Management Practice (BMP) construction elements, water quality monitoring, and environmental education have been important components of CFRSF Phase III capital improvement project, partially funded by the State, to improve water quality in this impaired watershed.

Water quality treatment through detention ponds, sumps, wetlands, and other BMPs was an integral part of the design concept for Phase III. The primary pollutants of concern from water draining from the Phillippi Creek Basin to the CFRSF include total suspended solids, bacteria, biological oxygen demand, nitrogen, and phosphorus. Within the facility, the series of large ponds and the long meandering flow ways reduce the velocity of incoming water, thereby allowing the settling of suspended materials. Further treatment is provided by the large vegetated wetlands, created in the southern part of the CFRSF. Wetlands, known as “nature’s kidneys”, help purify and filter water that passes through them. Treated water is then discharged to downstream water bodies and ultimately to North Roberts Bay.

The large wet detention ponds constructed in Phases I and II were also designed and created to attenuate flood waters and produce water quality benefits. The design of the earlier phases was expanded to provide water quality improvements associated with Phase III. A BMP evaluation study partially funded by the FDEP grant and conducted for the entire CFRSF documented that the long residence time and the combination of different BMPs contributed to substantial reductions in the pollutant loads of nitrogen, phosphorus, and total suspended solids. To maximize the efficiency of the BMPs, the normal operation directs water through the entire system and water is only discharged through WCSs S-6, S-10 and S-14 for Storm and Maintenance Operations. To maximize the water quality benefits, these WCS gates and windows should remain closed as much as possible, while still maintaining the flood protection functions of the facility. The FDEP TMDL grant that provided the funding source for Phase III of this project requires the maintenance of the constructed BMPs for the life of the project.

Public Use

Recreational Use

Recreational uses for the CFRSF are plentiful, diverse, and have expanded since the County initially developed its recreational use plan in 2002. The Passive and Recreational Plan (Kimley-Horn and Associates, Inc., 2002) was produced before Phase III and subsequent recreational amenities were completed. The more recent additions included two boardwalks with viewing decks, trails in the South Cell and Walker Tract, recreational trails on the observation mound, restrooms, and parking lot, pedestrian crosswalk across Palmer Boulevard, and the privately-funded Audubon Nature Center, all of which make the CFRSF an attractive place for multiple recreational use. Potential future amenities could include a trail guide with named trails and distances for fitness minded patrons, recommendations for best wildlife viewing areas and a ‘Wildlife You May See’ ID.

One of the most common recreational uses for the CFRSF is bird watching. The CFRSF is listed on the Great Florida Birding Trail and is considered a birding “hotspot” with thousands of visitors each year just for this purpose. Birders come from all over the Country and even other countries to view the diversity of birds at this stormwater facility. The Celery Fields shelters an amazingly rich diversity of birds with over 220 species identified. By comparison, the greatest number of species spotted at any one spot in the United States is

249. Sarasota County hosts 300 bird species across a variety of habitats and 516 is the entire species list for Florida. Clearly the Celery Fields is a spectacular birding location by any measure. Sarasota Audubon Society has organized numerous activities around this user group and maintains a daily sightings board for birds, mammals, and reptiles.

The trail system for the CFRSF includes approximately 10 miles of unpaved multi-use trails including rustic grass trails, mound trails, crushed concrete paths, internal service roads, and perimeter sidewalks (**Figure 7**). The two boardwalks with viewing decks and gazebos expand recreational opportunities and improve visitor experience. These trails are designed for various recreational uses, including bird watching, hiking, running, biking, and leashed dog walking. The internal service or maintenance roads and grassed berms of the North and Central Cells are mowed often and serve as more rustic trails for some recreational users. Concrete sidewalks are available on the north side of Palmer Boulevard just north of the South Cell and along Raymond Road in the South Cell and Walker Tract. These sidewalk segments are integrated into the sidewalk network from the surrounding neighborhoods and other adjacent land uses and to the restroom facilities, parking lot, and the Audubon Nature Center in the Central Cell. The South Cell and Walker Tract trails also include a 12-ft wide crushed concrete path, perimeter grass trails, and interior grass service roads throughout the facility. A mortise fence in the South Cell and Walker Tract along Palmer Boulevard and Raymond Road was installed to protect the plants and wildlife in the mitigation areas from all-terrain vehicle use and other potential vandalism.

The CFRSF has also proven to be an excellent neighborhood amenity and a destination for locals and tourists. On any given day, numerous patrons can be observed using the amenities. The facility is also routinely used for workout events, health fitness classes, organized club functions, and sponsored events. The CFRSF's unique feature of an observation mound (second highest elevation in Sarasota) makes it a great location for viewing the surrounding area and sky, wildlife watching, exercising or just sitting and relaxing in the outdoors.



Boardwalk and observation deck along Raymond Road.



Sarasota Audubon Nature Center along Palmer Boulevard.

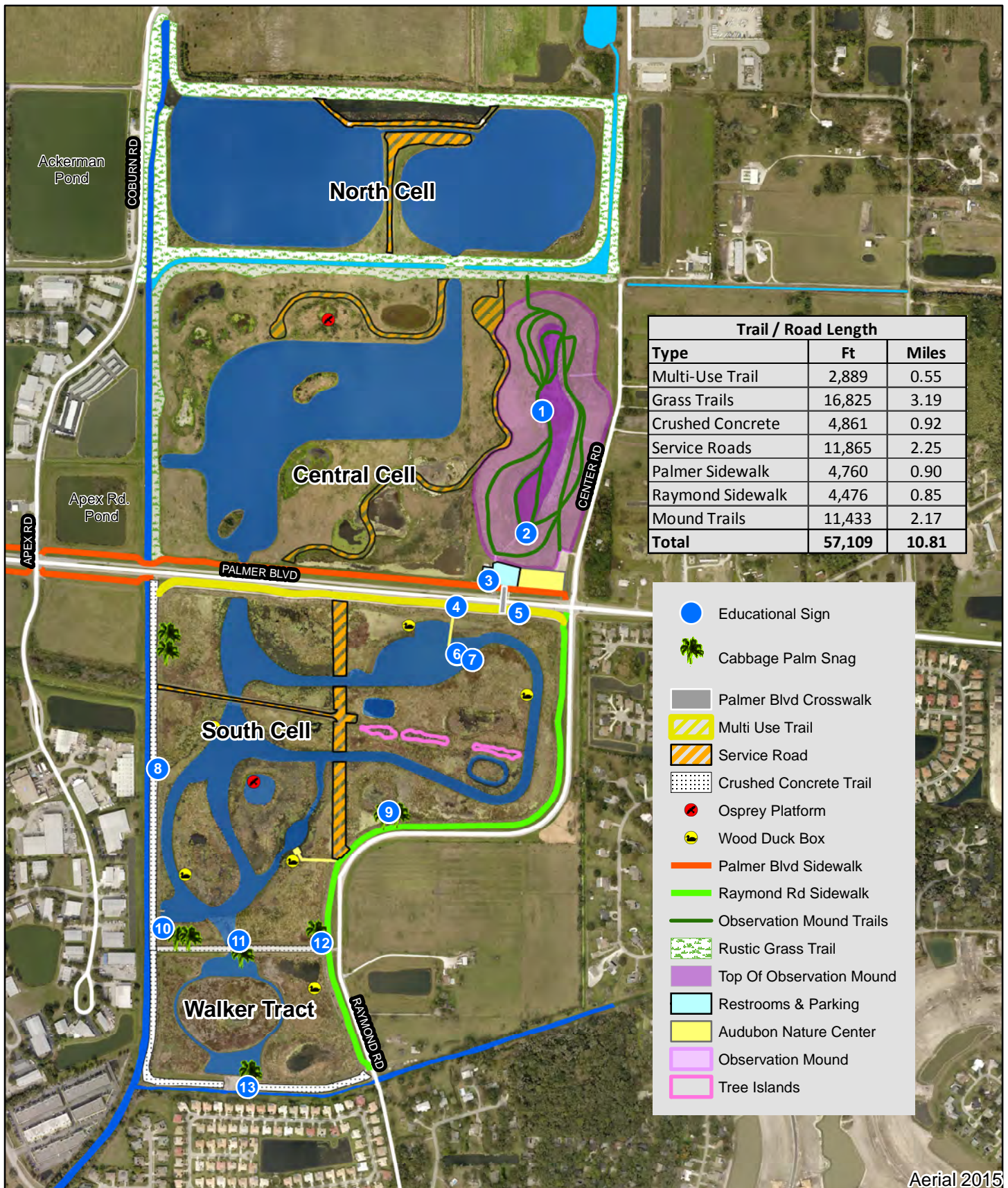


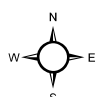
Figure 7.
Recreational Amenities for
Celery Fields Regional Stormwater Facility.



VHB

8043 Cooper Creek Boulevard, Suite 201
University Park, Florida 34201
941.351.8986

0 375 750 1,125 1,500 Feet



Environmental Education and the Audubon Nature Center

The CFRSF provides a unique location for environmental education. The FDEP Grant (DEP Agreement No. S0317) that funded construction of Phase III requires the implementation of passive environmental education program. Task 6 of the grant was completed during construction and included: “the construction of trails, educational kiosks, interpretive trail signage, and elevated boardwalk systems with wildlife observation decks.

Public information is to be distributed and shall include coverage of the project in the County's website and County's newsletter. The project will continue coverage as a news item in local sections of local newspapers. The ACOE permits also called for implementation of an environmental education program that included



Observation mound and restroom facilities in Central Cell.

educational signage and passive recreational use through the creation of elevated boardwalks with terminal gazebos, a hiking trail, and specific wildlife habitat improvements for native wildlife species.

The initial implementation of these items is complete, but these components must be maintained to stay in compliance with the grant agreement and ACOE permit. The trails and boardwalk are recreational components as well. The educational kiosk and interpretive signs are routinely maintained by Sarasota County Parks, Recreation and Natural Resources. Although the signs were designed and constructed of durable Novalloy materials that do not weather and fade significantly, the kiosks and signs are inspected and cleaned on an approximately quarterly basis.

Sarasota County granted Sarasota Audubon a 30-year lease in 2014 for one acre of land near the observation mound and restroom facilities to build and operate a Nature Center. The Audubon Nature Center (ANC) will serve as the Visitor Center for the CFRSF and will help promote birding and other ecotourism opportunities in the County. The ANC is generally open from 9 am to 1 pm, seven days per week. Sarasota Audubon has implemented two key programs. The In December 2012, the Bird Naturalist Program took effect. Every morning from November through April, a knowledgeable volunteer takes up position for approximately two hours at each of the boardwalks where he/she greets visitors and helps them identify birds and plants. In 2015, the Celery Fields Explorers Program was launched with funding from the Gulf Coast Community Foundation, the Natural Heritage Fund, and Sarasota Audubon. This program provides standards-based environmental education to Sarasota County school children, the majority of whom are from Title I schools. Sarasota Audubon will be responsible for the implementation and continuation of these programs.



School children on outdoor environmental education field trip.

The Parks, Recreation, and Natural Resources Department also promotes environmental education opportunities at the Celery Fields site. Examples of these opportunities include scheduled outdoor nature programs and environmental education classes including lunar eclipse and meteor shower viewing, adult education outreach, youth or home school programs, and Parks-sponsored educational programs and nature walks. It is reasonable to expect that Celery Fields field trips for students will likely be expanded in the future as the proximal location, various environmental education amenities, and high quality habitat values are discovered by environmental educators throughout Sarasota County.

Challenges and Opportunities

The success of the CFRSF as a multi-use facility comes with the challenge of how to best manage the facility to maximize its value to the Sarasota County public. Some of the uses are not compatible at certain times of the year and under certain circumstances, and there is a finite capacity for the CFRSF overall. The site's success also lends itself to opportunities to communicate and further enhance or expand the functions of the property.

Managing Water Levels for Flood Control, Water Quality, and Desirable Plant Communities

Public safety is a paramount concern for the CFRSF, and this is covered by the site's primary function of flood control. The water level control on the property will always be governed by the Pre-Storm and Storm-Event Operations phase. In other words, when there is a storm expected, the flood control function will take precedent. During the remainder of the year, there is flexibility in water level control to help maintain the site's other functions. The highest elevation at which water can be controlled is 14.5 ft NGVD, unless an equivalent volume is provided elsewhere in the CFRSF. At these times, some of the potential challenges to water level control include: maximizing water quality benefits (including managing water flows and levels in the Main C and the different CFRSF cells); managing water depths and flooding duration to simulate more natural wetland hydrologic conditions; and managing water levels to control erosion and nuisance/exotic species. Other opportunities to improve water quality treatment in the CFRSF include altering water flow regime to increase residence time and forcing water through vegetated areas and other BMPS in the North and Central Cells.

Balancing the Needs of Public Use with Wildlife Habitat

There will be some challenges associated with maintaining and maximizing the native habitats for fish and wildlife benefits, while maximizing the public use of the site. A desirable goal is to maximize the public's use of the property while minimizing the adverse effects from these activities on the native habitats and associated wildlife.

Improving the Facility to Accommodate Additional Users and More Wildlife

Potential future improvements could include additional parking and a designated school bus drop-off point that does not affect other uses of the CFRSF and Audubon Nature Center. Additional opportunities also exist in the CFRSF to improve the carrying capacity and the diversity of bird and other animal life, in particular in the North and Central Cells. There has been some discussion related to improving the wetland habitats in the Central Cell, in particular creating an unvegetated muck area that would draw shorebirds during the critical seasons. Additional wildlife amenities, like bird houses, osprey feeding platforms, turtle slides, and bat houses could be incorporated into the project in the future.

Expanding Environmental Education Opportunities

There also exists potential challenges to maximizing public use for recreation and environmental education. As the site's popularity and diversity of public uses continue to increase, it will be important to manage the conflicts for different human users by both location and time. This will be critical to maintaining the facilities and natural areas in a desirable condition for humans and wildlife, and managing the conflicts between human uses. Numerous opportunities exist to improve the site by providing additional recreational amenities to make the facility an interesting and recreation-friendly destination to spend quality time for a multitude of special interests. The property is also of sufficient size that incompatible uses could also be separated if the conflicts become untenable.

Coordinating with Other Adjacent Land Uses to Maximize Facility Benefits

Future opportunities exist to improve the CFRSF through a complete integration with future development and infrastructure improvements in adjacent private properties and County-owned and managed parcels. One such opportunity, called the Fruitville Initiative, exists just to the north of the CFRSF and is currently being evaluated, planned, and designed. The Fruitville Initiative is a public-private partnership to develop a coordinated plan for the development of lands north and south of Fruitville Road and immediately east of Interstate 75. The intent of the Initiative is for the County to encourage a preferred development outcome for six properties within the boundaries of a Special Planning Area in the Future Land Use Chapter of the Comprehensive Plan. Part of the stormwater conceptual permit and design for this project includes infrastructure improvements needed for stormwater conveyance and floodplain compensation. A piping concept plan for these improvements directly affects the CFRSF. Three 60-inch pipe connections will be installed from the By-Pass Canal into the Central Cell. During low-flow conditions, water would pass through as a normal by-pass. During storm events and high-flow conditions, By-Pass Canal water can enter into the CFRSF Central Cell through check valves to equalize flows and provide floodplain compensation for the upstream development. Other activities that directly improve the CFRSF could also be implemented to the mutual benefit of adjacent land uses and CFRSF functions. The effects of future infrastructure improvements should consider the importance of essential functions and other benefits of the facility and will include other CFRSF stakeholders for review and comment.

Operations and Management Responsibilities and Activities

Operations & Management Responsibilities

The CFRSF will have a single land manager that will serve as the point person for all coordination. This person will have intimate knowledge of the CFRSF's primary functions and maintenance responsibilities and will coordinate with other County staff and stakeholders. The land manager will be well versed in this management plan and will coordinate the implementation of the management activities that would affect the flood control, wildlife habitat, water quality, public use, and environmental education functions of the facility. Three department sections currently performing operational activities for the CFRSF are PRNR, Public Utilities Stormwater (STW), and Field Services (FS). Generally, STW owns the land and manages the stormwater component of the facility, and FS is responsible for mowing, maintenance, weed whacking, landscaping, and other operational responsibilities delegated by STW. PRNR is responsible for managing the public access areas. A Memorandum-of-Understanding (MOU) is being developed and will include a summary of the individual

department responsibilities with clarifications on managing and budgeting for routine maintenance and replacement costs. A list of management responsibilities from each area of the site is provided as **Attachment A** along with the designated County entity responsible for implementation. This list will supplement the MOU to be issued.

Water Level Management

Managing water flows and levels in the CFRSF is extremely important to complying with the mandatory functions of flood control for the Phillippi Creek drainage basin and complying with the wetland mitigation and other regulated requirements of the CFRSF. Water level management has a significant impact on fish and wildlife habitat and water quality improvements to downstream receiving waters of Phillippi Creek and Roberts Bay North. Altered water levels could potentially affect recreational and educational uses. As discussed earlier, the CFRSF is managed according to the SOPM where the site is actively managed for Normal Operations, Pre-Storm and Storm Event Operations, and Maintenance Operations. During the Maintenance Operations mode, WCSs in the CFRSF could be adjusted to assist with other benefits such as control of nuisance/exotic species, promotion of desirable wetland plant growth, increase bird and other wildlife use, and improve water quality.

When practical, water levels in the CFRSF should be manipulated to maintain more natural, fluctuating hydroperiods in the wetland areas. Without manipulation, water levels are controlled at 14.5 ft NGVD in all of the compartmentalized cells. Water levels do exceed the control elevation during times of heavy flow from the CFRSF. Because the Main C Canal was designed to drain a large drainage basin, small to intermediate-sized storm events even during the dry season may elevate water levels above the designed control elevation. Consequently, the water levels will often need to be manually dropped below the control elevation to mimic more natural hydrologic conditions of a wet and dry season. Wetlands need to periodically dry out between 60 and 120 days, typically during the end of the dry season, for good natural plant recruitment, wetland plant germination, and wetland tree growth. The lowered water levels during specified periods of the dry season allows fish and other aquatic prey to be concentrated for efficient utilization by wading birds and other wildlife. Lowered water levels also serve to concentrate floating-leaved exotic plants like water hyacinth and water lettuce, which provides for more effective maintenance with less herbicide and less non-target damage. The extended dry out period will oxidize the soils and help reduce nutrients from CFRSF discharges to downstream areas. Dewatering also serves the added purpose of increasing the water holding capacity of the site in anticipation of large storm events.



Water Control Structure S-14 in South Cell.

Water is diverted from Canal Main C up to the 20.87 ft NGVD control elevation of the overflow weir at WCS S-6. Water levels in the North and Central Cells are managed as one unit because these two cells are connected via a large open culvert at WCS S-7. The water levels in the North and Central Cells should be approximately the same during most periods. Water levels can be lowered in the North Cell/Central Cell complex through the WCS S-6 window down to the control structure control elevation of 14.42 ft NGVD. The permit issued for the facility allows for this bypassing of the entire CFRSF under emergency operations for preparation of storm events. The water levels in the North/Central Cell complex could also be dropped below the facility control

elevation of 14.5 ft NGVD by using the control gate at WCS S-10, which allows dewatering into Canal Main C down to 12.63 ft NGVD. The dewatering of the North/Central Cell complex through WCS S-10 is also required during pre-storm/storm operations.

Water level manipulations in the South Cell and Walker Tracts can be conducted independently from the North and Central Cells as long as water is not flowing over the control structure at WCS S-13 at Palmer Boulevard. South Cell can only be dewatered lower than the control elevation through an extra side control gate at WCS S-14 at elevation 12.01 ft NGVD into Canal Main C. The control structure at WCS S-15 is stationary and set at 14.5 ft NGVD. Water levels can be reduced below the control elevation in the Walker Tract to Lateral Canal CA through two 12-inch pvc pipes with check valves installed at south end of the Walker Tract located just west of the overflow weir (WCS S-16). The water levels within the South Cell and Walker Tract can be manipulated separately below the control elevation for habitat management purposes.

Recommendations for water level manipulations to improve wildlife habitat and water quality functions are dependent on the elevations of the wetland and upland habitats and the degree of isolation. The littoral zone in the wet detention pond in the North Cell is well maintained at the current control elevation and has periods of partial dry out with no assistance from any manual drawdowns. Much of the wetland and other habitat in the Central Cell is above the control elevation so dewatering the site would likely cause negative impacts to wetland hydrology and should be limited. Water levels in the South Cell and Walker Tract wetlands have the deepest wetland plant zones at 13.0 ft NGVD in the South Cell and 12.5 ft NGVD in the Walker Tract; consequently, it would be beneficial to drop the water levels to at least 0.5 ft above the lowest planted zone elevation or to completely dry them out, once every three years. This was most recently successfully accomplished in 2015. The dewatering of the South Cell and Walker Tract in 2015 improved emergent wetland habitats by allowing wetland seeds to germinate on saturated organic soils during the spring and summer growing season. Native desirable plant recruitment and overall coverage increased after this dry out period.

Management decisions regarding WCS adjustments for wildlife habitat and water quality improvements require an evaluation of historical WCS adjustment and its relationship to water level changes in each of the cells. Water levels are presently recorded hourly via pressure transducer dataloggers installed in the North Cell, Central Cell, South Cell, and Walker Tract. The data on Celery Fields Control Structure Operations Logs for each structure for all storms and intentional dewatering are recorded by STW staff. Data from 2015 revealed that the opening of WCS S-14 in the South Cell and the opening of the two 12-inch pipes in Walker Tract resulted in the dewatering of each of these cells by 1.5 ft in less than two days when no water was being discharged through WCS S-13 at Palmer Boulevard. This dewatering is significantly faster than water level declines in a natural hydroperiod, and some experimentation will be needed to fine tune the rate of dewatering in future years to accommodate this need. A better understanding of the North and Central Cell dewatering will also be developed after review of water level fluctuations associated with WCS management decisions.

Mowing, Landscaping, and Erosion Control

Mowing is an important management activity at the CFRSF. Many of the sodded areas are important for various reasons, including minimizing erosion and sediment discharges, maintaining habitat for various wildlife species, and maintaining trails and maintenance berms in good working conditions. Areas that are being mowed include road right-of-ways, internal and external berms and banks, trails and maintenance roads, and the observation mound. Periodic mowing and bush-hogging can be effective tools to manage the upland areas and maintain them in early succession stages with grasses being dominant. Without mowing, vegetation would likely transition to shrubby wooded areas potentially dominated by nuisance/exotic species.

The frequency of cutting, cutting height, and timing of mowing can have a significant impact on the health of the turf, wildlife and recreational use. The desired mowing specifications may vary from season to season and year to year depending on the specific objective(s) of the area mowed. Short mowing heights for sod and other vegetated recreational areas can have negative impacts on recreation by killing the grasses and other plants that help keep the soil secure on those recreational surfaces. Root systems of sod-forming surfaces and thick vegetation can aid water quality by controlling erosion and allowing uptake of nutrients. The nesting of ground nesting birds could be directly affected by mowers that could affect nesting behavior, break eggs, and injure young birds. This is usually a seasonal phenomenon and is dependent on the bird species using the site. In addition, overgrown vegetation can limit habitat use by certain birds, while other species prefer the cover that overgrown vegetation provides. In addition, some invertebrate species, like butterflies and bees, prefer the plant species that dominate when areas remained unmowed for longer periods. Sarasota Audubon would prefer some areas, especially on the observation mound banks to promote invertebrate and other wildlife. Recreation can also be affected by mowing. For instance, joggers may not prefer to run on trails and berms if the grass is too high thereby limiting its use for that purpose. Including various partners when mowing contracts are renewed would allow input by all stakeholders.

Many of the CFRSF areas are mowed at different frequencies depending on an established level of service and could be modified to accommodate specific species during critical time periods. The current level of service for mowing the CFRSF is summarized below:

Mowing Area	Frequency of Mowing	Cut Height Range
Road Right-of-Ways (sodded)	every 15 days during June through October, otherwise every 30 days	4 inches \pm 1 inch
Wet Detention Ponds Banks and Berms (sodded)	every 30 days	4 inches \pm 1 inch
Facility Banks and Berms (sodded and canal bunch grasses)	every 30 days	4 inches \pm 1 inch
Facility Recreational Trails (sodded)	every 15 days during June through October, otherwise every 30 days	4 inches \pm 1 inch
Main C Banks and Berms (mostly canal bunch grasses)	every 60 days	4 to 12 inches
Lateral Canal CA Banks (sodded)	every 30 days	4 inches \pm 1 inch
Observation Mound Top and Banks (sodded)	every 30 days	4 inches \pm 1 inch

The CFRSF Phase III work included landscaping of three separate areas with different general functions. A landscape buffer of mostly mature-sized red cedar, cypress, and cabbage palm trees, and various bunch grasses was installed along the internal side slopes on the west side of the Walker Tract to provide a visual buffer to the residential lots that border the CFRSF at the south end. The Palmer Boulevard right-of-way was planted with a mixture of trees, including dahoon holly, cypress, and cabbage palm, and the observation

mound was planted with these species, various shrubs, and numerous bunch grasses for an understory. Trees, shrubs, and other landscaping should be evaluated quarterly to verify that the desired functions and aesthetic values are continuing to be maintained. Particular emphasis should be placed on evaluating for plant disease, herbicide overspray, safety hazards, drought stress, vines and nuisance/exotic plant coverage, and mowing and management recommendations. Recommended maintenance work would then be performed within 30 days of the evaluation report.

Erosion can have a significant impact on the water quality within the CFRSF as well the water being discharged from the facility. This erosion can have a negative effect on the habitat value of wetlands and uplands. It can also have an impact on recreational use by making the recreational surfaces unsuitable or unsafe for use. In the South Cell and Walker Tract upland buffers, over 60,000 sand cordgrass and other grasses were planted to prevent erosion on the side slopes of the mitigation areas. As a result, there is very little erosion in those areas. In other CFRSF areas where the banks are not vegetated and relatively steep (like along some parts of the Main

C Canal and Lateral Canal CA banks), erosion is more common and contributes to poor water quality and soil loss in some of these areas. Some parts of the observation mound have also had erosion related to either the landscape irrigation or unstable side slopes after heavy rains. The observation mound was designed with drains that help prevent erosion. In addition, the observation mound and the entire Walker Tract are also under the provisions of the restricted covenants described earlier. Erosion should be monitored monthly through routine inspections of the sodded, landscaped, and other vegetated surfaces. The primary perimeter containment berms are to be inspected monthly and following major storm events to ensure bank integrity and to contain expected storm flows. Recommendations for resodding, replanting, or implementing special measures for mowing would be included in the routine inspection report for each of the cells.

Native and Nuisance Plant Management

A critical component in the maintenance of the site, particularly the natural communities, is the control of non-native, invasive plant species. Nuisance/exotic plant species tend to grow and spread at a rapid pace and can quickly clog ditches, flow ways, and discharge structures. Nuisance/exotic plant species may also alter the required native plant communities by displacing native species or changing community structure or ecological functions. Managing nuisance plants in the CFRSF is particularly challenging because of the significant upstream source for these plants. Floating-leaved plants like water lettuce and water hyacinth, and submersed plants like hydrilla and parrotfeather are constantly being reintroduced into the site through incoming stormwater from Canal Main C. A number of nuisance and exotic vines, like skunkvine, little bell, and balsampear, grow over and can suffocate trees and shrubs. In addition, a number of nuisance/exotic plants and grasses, such as cattail, primrose willow, Guineagrass, West Indian marshgrass, and torpedograss can outcompete native grasses in the uplands and other emergent plants in the wetlands. Some nuisance/exotic species are copious seed producers and others can reproduce vegetatively with just a small fragment of a donor plant.



Nuisance vines covering desirable vegetation in upland buffer.

These aggressive characteristics, as well as the absence of biological predators, typically give exotic species a competitive advantage over native plant species.

The nuisance/exotic species in the North and Central Cells have been maintained periodically and are in need of active and regular management. The South Cell and Walker Tract of CFRSF have been intensely managed for nuisance/exotic species since the Phase III work started in 2009. During this period, environmental scientists traversed the site quarterly to make observations regarding nuisance and exotic plant species presence and density. Maintenance inspection reports conducted from 2009 through 2015 indicated that over 30 nuisance/exotic species were observed and needed to be managed to protect native wetland and upland habitats. For the purposes of CFRSF management, nuisance and exotic plant species are defined as those plant species that are listed as either Category I or Category II in the Exotic Pest Plant Council's latest exotic pest plant list (<http://www.fleppc.org/list/list.htm>) and any other species that are a nuisance and can cause loss of the intended habitat functions and values.

Nuisance/exotic species can be controlled by herbicide applications, water level management, manual removal, or biological control. By far, the most common and most effective method of control is herbicide treatments. Manual removal of nuisance/exotic vines, especially in the upland buffers, tree preserve islands, and ruderal areas should be conducted to minimize damage to desirable trees, shrubs, and grasses. The goal for management of nuisance/exotic species is to limit their coverage to a maintenance control level (5% to 10%), whereby only a small amount of nuisance/exotic species exist throughout the site. In 2015, all four cells needed additional treatment before these areas could be considered in a maintenance control program. The maintenance control program requires routine inspections and maintenance (recommended at least quarterly) even when nuisance species coverages are low. The program minimizes costs and herbicide use. This philosophy is consistent with the requirements established in the Sarasota County Integrated Pest Management Plan (IPMP).

This practice promotes sustainable pest management methods that minimize health, environmental and economic risks. It requires certified applicators, approval of herbicides being used, and record keeping to document use of herbicides. One of the goals of the IPMP is to minimize the use of pesticides through application of integrated pest management practices and emphasizing proven, effective least-toxic and non-toxic approaches and products. All County personnel and maintenance contractors that are applying herbicides must verify that the chemical(s) being used are on an official list and must document the targeted species and amount of each herbicide being used.

Although the overall goal for land management of the site is to create conditions that would promote the natural propagation and proliferation of native species, especially herbaceous species, there may be a need to replant areas to maintain these habitats in good condition and in compliance with the regulatory permits. Prolonged inundation or drought, hurricanes, unplanned fires, vandalism, and other uncontrollable events could kill desirable plants. Furthermore, plants might need to be replanted in the mitigation areas and littoral zones to comply with the environmental and stormwater permits obtained for the site. In addition, there are areas in the CFRSF that were planted with landscape plants for aesthetic reasons that may need to be replanted if mortality is excessive. The landscaped shrubs and trees may also require periodic pruning to maintain their health and aesthetic value.

Native and Nuisance/Fisheries Management

A healthy fish community in the CFRSF is an extremely important factor in determining the numbers and diversity of birds and other wildlife using the facility. Many of the wildlife species that frequent the facility are

seeking fish as a primary food source. A healthy fish population can also increase opportunities for fishing, an important recreational activity for the CFRSF. Native fish populations indirectly affect recreational birding and wildlife viewing by creating more opportunities for birders and nature enthusiasts.

During a qualitative fisheries study in 2015, a team of scientists and volunteers used several deployments of large seine nets to find an abundant number of native and exotic fish species in the created wetland communities of the South Cell and Walker Tract. During the survey, over a dozen species of native fish species were observed with a significant proportion of smaller sized individuals. These small native fish species are particularly important to the CFRSF's productive food web from the aquatic and wetland environments throughout the site and in the adjacent Phillippi Creek canal system. These fish are also important prey for popular sportfish, such as the largemouth bass, black crappie, and bluegill. The fish survey also uncovered a high population of exotic, nuisance fish from South America, Africa, and Asia. Walking catfish, armored catfish, and exotic tilapia are known to have a significant effect on native fish species by competing for food and breeding sites and through direct predation.

Native fish populations can be affected by several factors over which land managers have some control: exotic fish density, vegetation composition, water quality, and water levels. Exotic fish need to be actively managed to keep native fish populations healthy and to provide an abundant food source for bird and other wildlife. Some species like tilapia, a good tasting fish that is available in restaurants nationwide, can be harvested voluntarily by licensed harvesters usually with cast nets at no cost to the County. Other species, like armored catfish, have no current market value; consequently, their removal would likely require funds for removal. Armored catfish, an algae-eating exotic fish, are not desirable prey for most wildlife and can dig into the banks of facility, thereby undermining them and causing erosion. In some waterbodies, the removal of these nuisance/exotic fish species is done to remove nutrients and improve water quality. The County does not currently have a program for removing or controlling nuisance/ exotic fish populations. These efforts could be done efficiently if timed with water level drawdowns that could concentrate problematic fish species.

Plant community composition can also affect fish populations. Shallow marshes with plenty of emergent species are often excellent places for native forage and game fish to live, feed, and breed. Conversion to open water habitats can sometimes have negative effects by reducing feeding areas and eliminating refugia from predators. A conversion to dense floating-leaved plants, such as water lettuce or water hyacinth can also have a negative effect by shading out algae that produce oxygen for the water column. Managing for a healthy plant community is not just good for the fisheries, it is also beneficial for the water quality, and good water quality helps with a healthy fish population. Conversely, poor water quality can also result in fish kills which can affect use of the facility. Fish kills like those that occurred at the CFRSF in 2010 can also lead to unsuitable conditions for humans, birds, and other wildlife. Water levels can also be actively managed to promote native fish populations and assist with removal on exotic/nuisance fish species. Drying out of the soil and then flooding after soil oxidation can have beneficial impacts to water quality and fish populations. Fisheries management should be an important consideration in managing the site for multiple benefits, especially wildlife, birding, and water quality.

Wildlife Habitat Enhancements

Wildlife habitat improvements were conducted throughout the site (Figure 7). An osprey nesting platform was installed in Planting Subzone D-3 of the South Cell in September 2010. Another osprey platform was installed in the Central Cell in the early 2000s but is currently in disrepair. In December 2010, nine cabbage palms (greater than 10-ft trunk length) were planted in the South Cell and Walker Tract to provide snags and perches for a variety of wading birds and birds-of-prey. In addition, a number of larger trees that were planted as part of the Palmer Boulevard right of way planting were installed inside and near the South Cell mitigation areas and serve as additional opportunities for snags and perches. A total of seven wood duck boxes were installed by County staff in 2012. These boxes were mounted on posts at approximately 18.5 ft NGVD, or approximately 4 feet above the control elevation for the entire facility. Sarasota County has cleaned out the wood duck boxes and replaced nesting materials since 2013. Starting in 2016, wood duck box maintenance and nesting material replacement should be conducted annually or every other year. Sarasota Audubon Society will likely take over this role with the use of volunteer naturalists in the future.



Sarasota County crews maintaining wood duck nesting box.

Prescribed Burning and Other Land Management

Fire has played a significant role in the maintenance of native upland and wetlands plant communities in Florida for centuries. Fire reduces fuel loads of built up vegetation and maintains plant communities in a stable, non-successional association. Without fire, fire-dependent plant communities succeed into different types of plant communities, some of which are not as productive for many native wildlife species. Many native plant species have adapted to and thrive under routine burning, and many nuisance/exotic species do not tolerate burning. Prescribed burning has been used to simulate the natural cycle of burning that has sustained many Florida ecosystems in the past.

Although extensive areas in the CFRSF could benefit from periodic fires, there are a number of woody species that are not well adapted to fire. The herbaceous marshes and herbaceous littoral zones could benefit the most from fire. In the upland buffers, tree preserve islands, and forested wetlands in the South Cell, fire would likely consume some of the dominant woody species, such as popash, live oak, American elm, and sugarberry. Consequently, prescribed fire in the South Cell would most likely need to be selective. Although the North Cell has little habitat to be improved by prescribed burning, the ruderal upland habitats and shallow marshes of the Central Cell could be significantly improved for wildlife by routine burning. Although burning improves the overall habitat for most wildlife species in the long term, the scheduling of burns should consider the temporary and seasonal impact on nesting or young birds with no or limited ability to flee the area. It is recommended that prescribed burning in select areas take place every 3 to 7 years. A prescribed burn professional should be consulted to develop a fire prescription that promotes the different habitats of the CFRSF and takes into consideration seasonal and temporary impacts to active breeding and other wildlife functions.

Public Use Management

Generally, the CFRSF is best managed for passive public uses with the most passive uses intended for the South Cell and Walker Tract and some activities restricted to the North and Central Cells. Fishing, kayaking, and canoeing will only be encouraged in the North and Central Cells. No motorized boats, vehicles, or off-road equipment will be permitted on the CFRSF unless approved for official County business. The CFRSF is designated as a dog-friendly site with leashed dogs permitted on sidewalks, trails, the observation mound, and the parking lot. More intensive public use events, like races and fitness challenges, will be restricted to the North Cell and Central Cell and to sidewalk segments to the greatest extent practicable. These guidelines can be passively expressed through the kiosks, signage, and site maps available at the site.

Recreational use of the CFRSF has expanded significantly since the Phase III work was completed in 2011 and since the observation mound, restroom facilities, and parking lot were opened in 2015. Additional public uses are expected to expand as other user groups realize the potential of CFRSF for different activities. For event requests, a system has been implemented that requires event planner/organizer to contact the County Contact Center at 941-861-5000 to request information on planning an event at Celery Fields. Upon receiving the request, the designated PRNR will request complete event information on a Special Event Planning Form.

The form requires details of the request, including the date and time of use, number of attendees, and details on the activity and cleanup measures. Events are typically limited to no more than 200 participants due to parking and site constraints. The request form is reviewed by Sarasota County PRNR staff and the Land Manager after careful consideration of the appropriateness of the requested activity. If there are conflicts or concerns, a solution would be sought, or the County would decline to permit the event. If the event is determined acceptable, the event planner/organizer is referred to the reservations office to obtain a Recreational Use Permit reserving open space. The reservations office will determine whether or not a Temporary Use Permit (TUP) is needed. County staff will visit the site during the special event to confirm compliance with conditions of the Recreational Use Permit and the TUP.



Health and fitness special event at Observation Mound.

Another significant public use for the facility that has expanded in recent years is environmental education. It is imperative that these uses be coordinated so that the environmental education experience is rewarding for school children and other visitors, and does not interfere with other public use, County functions, or management of the facility. The CFRSF will be open to the public daily from 7 am to 8 pm, and may be closed before, during, or after major storm events. The Audubon Nature Center will be opened routinely at seasonally varying times. Sarasota County will post the hours of operation and posted restrictions in several locations, including the entrance to the North Cell at the northwest corner of the facility, observation mound, parking facility, WCS S-13, the northwest corner of the South Cell at the crushed shell path, both boardwalk entrances, and on the maintenance road between the

South Cell and Walker Tract. Garbage and recyclable receptacles will be managed by PRNR. The garbage and recyclable receptacles shall be emptied at the same frequency as other passive recreation facilities managed by the County.

The CFRSF land manager shall have overall responsibility for coordinating the larger public use and environmental education aspects on the site. The goal will be to avoid conflicting events that overfill the parking lot, create conflict between participating user groups, and/or negatively impact the surrounding neighborhood.

Public Facilities

There are a variety of facilities and structures that control water level, public access, allow recreational use, or educate the public that must be maintained. Examples include the WCSs, pipes, benches, picnic tables, restrooms, trails, sidewalks, boardwalks, fencing, irrigation system, rainfall and water level monitoring equipment, kiosks, and signage.

The location and description of the WCSs and drainage pipes were discussed above. Although these structures have a long life cycle, they still need to be regularly inspected to identify cracks, erosion, wash-outs, sedimentation, and clogging by vegetation and other debris. These inspections should minimally occur semi-annually, but more frequently if there have been large storms or the site appears to be functioning differently than expected. Those structures with moveable gates and windows should be operated and lubricated three times per year (including once just prior to the start of the hurricane season) to make sure they are functioning as intended. Other stormwater conveyances related to the two secondary drainage areas for the CFRSF should also be inspected to confirm proper flow and culvert clearance.

Recreational components such as trails, benches, picnic tables, recreational signage, and the restrooms need to be regularly inspected to maintain their functionality and the safety for CFRSF patrons. It may also be appropriate to inspect key facility components, including the parking lot, in advance of and after large public use events. Minor repairs should occur as issues are identified and the amenities should be replaced based upon their life cycle duration. Other public access facilities such as the parking lot, fences, and the sidewalk should be inspected and maintained so they function as intended. Monthly inspections and repairs should be conducted for all of these facilities

The environmental education kiosks and signage were installed in association with construction, but these components must be maintained to stay in compliance with the grant agreement and ACOE permit. The trails and boardwalk are recreational components of the environmental education program as well, but were previously discussed. The kiosks and signs are inspected and cleaned as necessary to maintain educational information visibility and aesthetics. Long term maintenance will include replacing damaged structural components and the signs themselves as they weather and fade.

There are a few miscellaneous pieces of equipment on the site, including an irrigation system, and water level and rainfall recording equipment. The irrigation equipment was originally intended to be temporary and was used to irrigate the plantings until the initial grow-in period was complete. This equipment may be maintained if watering in the future is a desired option, or it can be removed. The County also maintains a continuous rain gauge and a few water level monitoring devices on the CFRSF. The monitoring equipment should be regularly inspected, cleaned, and calibrated to maximize the value of these data. These activities, and any required maintenance and repairs, should follow the equipment manufacturer's guidelines.

Attachment A

**Roles and Responsibilities for the Celery Fields
Regional Stormwater Facility**

Attachment A. Public Utilities Stormwater (STW), Parks, Recreation and Natural Resources (PRNR), Sarasota Audubon (AUD) and Field Services (FS)

Designated Management Areas and Amenities	Water Level Management	Irrigation	Mitigation & Other Permits Oversight	Nuisance & Exotic Species	Plant and Landscape Management	Wildlife Habitat Management	Erosion Control/ Maintenance	Mowing/ Weedeating	Security (Access & Gates)	Garbage Pickup	Recreation	Environmental Education
North Cell												
North Cell West and East Ponds	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR/AUD
North Cell Littoral Zone	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Lake Littoral Zones	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Upstream Culverts	STW	N/A	STW	STW	N/A	N/A	STW	N/A	STW	STW	N/A	N/A
Main C Adjacent Canal	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Main C Structures S-6 and S-7 and Culverts	STW	N/A	STW	STW	STW	N/A	STW	N/A	STW	STW	N/A	N/A
Main C Upstream (canal and structures)	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	N/A
Other Upstream Drainage	STW	N/A	N/A	STW	STW	STW	STW	N/A	STW	STW	N/A	N/A
Internal Berms, Banks, and Trails	N/A	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR/AUD
Bypass Canal	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
External Berms & Banks (to Coburn Rd.)	N/A	N/A	STW	STW	STW	N/A	STW	STW	STW	STW	N/A	N/A
Internal East Boundary Berm	N/A	N/A	N/A	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Water Level Monitoring Equipment	STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	STW	N/A	N/A	N/A
Central Cell												
Central Cell Pond	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	PRNR/AUD
Pond Islands	N/A	N/A	N/A	STW	STW	STW	STW	STW	N/A	STW	N/A	PRNR/AUD
Wetland Mitigation Areas	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	PRNR/AUD
Other Natural Areas	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	PRNR/AUD
Main C Adjacent Canal	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Control Structures S-10 and S-13	STW	N/A	STW	STW	N/A	N/A	STW	N/A	STW	STW	N/A	N/A
Internal Berms, Banks, and Trails	N/A	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR/AUD
Observation Mound	N/A	STW/PRNR	STW	STW	STW	STW/AUD	STW	STW	STW	STW/PRNR	PRNR	PRNR
Restroom Facilities and Parking Lot	N/A	PRNR	N/A	PRNR	PRNR	N/A	STW	PRNR	PRNR	PRNR	PRNR/AUD	PRNR/AUD
Audubon Facilities and Parking Lot	N/A	PRNR/AUD	N/A	STW	AUD	AUD	STW	STW	PRNR/AUD	AUD	PRNR/AUD	PRNR/AUD
Center Rd ROW and Ditch	N/A	N/A	N/A	STW	STW	STW	STW	STW	N/A	STW	N/A	N/A
Palmer Blvd ROW and Ditch	N/A	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	N/A	N/A
Palmer Blvd Sidewalk (Central Cell Side)	N/A	N/A	N/A	N/A	STW	STW	STW	N/A	N/A	N/A	PRNR	PRNR/AUD
Wildlife Habitat Amenities	N/A	N/A	STW	N/A	N/A	STW	STW	N/A	STW/AUD	N/A	N/A	PRNR/AUD
Water Level Monitoring Equipment	STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	STW	N/A	N/A	N/A
South Cell												
South Cell Open Water Zones	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	PRNR/AUD
Tree Preserve Islands	STW	N/A	N/A	STW	STW	STW	STW	N/A	STW	STW	PRNR	PRNR/AUD
Wetland Mitigation Areas	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	PRNR/AUD
Upland Buffer Mitigation Areas	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR/AUD
Main C Adjacent Canal	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	PRNR/AUD
Main C Upstream Other Drainage	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Control Structures S-14 and S-15	STW	N/A	STW	N/A	N/A	N/A	STW	N/A	STW	STW	N/A	N/A

Attachment A. Public Utilities Stormwater (STW), Parks, Recreation and Natural Resources (PRNR), Sarasota Audubon (AUD) and Field Services (FS)

Designated Management Areas and Amenities	Water Level Management	Irrigation	Mitigation & Other Permits Oversight	Nuisance & Exotic Species	Plant and Landscape Management	Wildlife Habitat Management	Erosion Control/ Maintenance	Mowing/ Weedeating	Security (Access & Gates)	Garbage Pickup	Recreation	Environmental Education
Internal Berms, Banks, and Trails	N/A	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR
Palmer Blvd Boardwalk and Gazebo	N/A	N/A	STW	N/A	N/A	N/A	STW/PRNR	N/A	PRNR	PRNR	PRNR	PRNR/AUD
Raymond Rd Boardwalk and Gazebo	N/A	N/A	STW	N/A	N/A	N/A	STW/PRNR	N/A	PRNR	PRNR	PRNR	PRNR/AUD
Palmer Blvd Median and ROW	N/A	N/A	N/A	FS	FS	STW	STW	FS	STW	STW	N/A	N/A
Raymond Rd ROW and Ditch	N/A	N/A	N/A	FS/STW	FS	STW	STW	FS	STW	STW	N/A	N/A
Crushed Concrete Path	N/A	N/A	N/A	STW	N/A	N/A	STW	STW	N/A	STW	PRNR	PRNR
Raymond Rd Sidewalk	N/A	N/A	N/A	STW	FS	N/A	STW	N/A	N/A	STW	PRNR	PRNR
Mortise Fence (Palmer and Raymond Rds)	N/A	N/A	N/A	N/A	N/A	N/A	STW/PRNR	FS	N/A	N/A	N/A	N/A
East of Raymond Road Vacant Land	N/A	N/A	N/A	FS	FS	STW	STW	FS	STW	STW	N/A	N/A
Environmental Educational Signage	N/A	N/A	STW	N/A	N/A	N/A	STW	STW	N/A	N/A	PRNR	STW/PRNR
Wildlife Habitat Amenities	N/A	N/A	STW	STW	N/A	STW	STW	N/A	STW	N/A	N/A	PRNR/AUD
Water Level Monitoring Equipment	STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	STW	STW	N/A	N/A
Walker Tract												
Walker Tract Open Water Zones	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	PRNR/AUD
Wetland Mitigation Areas	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	PRNR/AUD
Future Mitigation Area Wetlands	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	N/A	PRNR/AUD
Upland Buffer Mitigation Areas	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	STW	PRNR	PRNR/AUD
Main C Adjacent Canal	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	N/A
Structures S-16 and S-17 (Overflow Weir)	STW	N/A	STW	N/A	N/A	N/A	STW	N/A	STW	STW	N/A	STW
Peter's Drainage Pipes (Two 12-inch pipes)	STW	N/A	STW	N/A	N/A	STW	STW	N/A	N/A	N/A	N/A	N/A
Main C Weir and Downstream Main C Canal	STW	N/A	STW	STW	N/A	STW	STW	STW	STW	STW	N/A	N/A
Lateral Canal CA and Banks	STW	N/A	STW	STW	STW	STW	STW	STW	STW	STW	N/A	PRNR/AUD
Internal Berms, Banks, and Trails	N/A	N/A	STW	STW	STW	STW	STW	STW	STW	STW	PRNR	PRNR
Raymond Rd ROW and Ditch	N/A	N/A	N/A	N/A	FS/STW	N/A	STW	FS/STW	N/A	FS	N/A	N/A
Crushed Concrete Path	N/A	N/A	N/A	N/A	N/A	N/A	STW	STW	N/A	STW	PRNR	N/A
Raymond Rd Sidewalk	N/A	N/A	N/A	N/A	N/A	N/A	STW	N/A	N/A	STW	PRNR	N/A
Mortise Fence (Palmer and Raymond Rds)	N/A	N/A	N/A	N/A	N/A	N/A	STW/PRNR	FS	N/A	N/A	N/A	N/A
Environmental Educational Signage	N/A	N/A	STW	N/A	N/A	N/A	STW	STW	N/A	N/A	PRNR	STW/PRNR
Wildlife Habitat Amenities	N/A	N/A	STW	STW	N/A	STW	STW	N/A	STW	N/A	N/A	PRNR/AUD
Landscape Buffer (including Irrigation System)	N/A	STW	N/A	STW	STW	STW	STW	STW	N/A	STW	N/A	N/A
Grand Elm Tree	N/A	N/A	STW	N/A	STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Level Monitoring Equipment	STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	STW	STW	N/A	N/A



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