CONCEPTUAL DESIGN REPORT

FOR

WHITAKER BAYOU 32ND STREET GREENWAY PARK AND WATERSHED RESTORATION

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Sarasota Bay Estuary Program
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INTRODUCTION

Whitaker Bayou is an urbanized tributary of Sarasota Bay located within the limits of the City of Sarasota, in northwest Sarasota County (**Figure 1**). It runs through several underserved communities, older neighborhoods, and commercial and industrial zones. Similar to other urban watersheds, Whitaker Bayou has been negatively impacted by stormwater pollution, sedimentation, hardened shorelines, channelization, and inadequate public access. This has led to an increase in the volume of water and sediment discharged into Whitaker Bayou and ultimately delivered to Sarasota Bay, a Class III Outstanding Florida Waterbody. The increases in freshwater volumes and sediment loads have the potential to reduce water clarity, which in turn can reduce habitat quality and aquatic productivity within the bay.

The Sarasota Bay Estuary Program (SBEP) received a commitment for funding from the City of Sarasota Penny Surtax III in 2007/2008 for implementing the Whitaker Bayou Greenway Park and Watershed Restoration Plan. The SBEP proposed that the monies, which are planned to be dispersed in FY2014, be used for the following five project components along an eight mile stretch of Whitaker Bayou from MLK Park to 49th Street:

- Planning and permitting of restoration activities;
- Streambed restoration including dredging of contaminated soils;
- Riparian habitat improvements;
- Increased or improved public access; and
- Stormwater improvements using Low Impact Development (LID) technology.

Other opportunities that would be consistent with the overall plan include the development of community education programs, the installation of permeable trails, water quality monitoring, and additional property acquisitions.

This report summarizes the results of environmental evaluations conducted by Scheda Ecological Associates, Inc. (Scheda) and Brown and Caldwell (BC) to assist in providing the SBEP and its partners with stormwater and sediment management services for Whitaker Bayou. The scope of the project involved investigating opportunities to

reducing nutrient and sediment loading to Sarasota Bay in conjunction with improving native habitats.

The initial phase of the Whitaker Bayou master plan evaluated sites for their stormwater improvement and habitat restoration potential. Multiple locations from themouth of Whitaker Bayou to the industrialized areas near the Sarasota Kennel Club were identified. Specific Information collected included land use, soils types, National Wetland Inventory (NWI) wetlands, public/private ownership, and the presence of potential archeological resources. The maps generated from the initial assessment are included in **Appendix 1**. One site was ultimately selected to proceed with the development of a conceptual design. This design contained sufficient detail to determine how feasible the project would be with regard to permitting, costs, funding sources, and stormwater and habitat improvement potential. The site is referred to as 32nd Street. A general location map is presented in **Figure 2**.

Brown and Caldwell developed the load reduction calculations, runoff volumes, and projected costs for the project site. The conceptual site plans were also created by Brown and Caldwell with input from Scheda, the SBEP, the Southwest Florida Water Management District (SWFWMD), Sarasota County, and the City of Sarasota.

1.0 PROJECT SUMMARY

32nd Street

The 32nd Street Project Site (PID # 2020-12-0016) is located immediately adjacent to (west of) Whitaker Bayou and extends from North Riverside Drive to 32nd Street (**Photo 1**). It consists of an open parcel of City owned land and has been named Riverside Park by the Sarasota County Property Appraiser. It is located in an older, residential neighborhood common to the watershed. Although the site is labeled as a park, it is not currently maintained for recreation, nor are there any park amenities available or signs posted. The banks along this stretch of Whitaker Bayou are deeply incised and comprised mostly of non-native or opportunistic vegetation; however, the Bayou is still located within the “natural” or historic creek alignment. Whitaker Bayou becomes significantly channelized and ditched just upstream of this parcel. The vegetative community is mostly comprised of open grass areas with scattered cabbage palms (*Sabal palmetto*) and non-native tree species. Three corrugated metal pipes protrude from beneath the banks of Whitaker Bayou at 32nd Street, 31st Street, and between 31st Street and N. Riverside Drive (**Appendix 2**). Two vegetated ditches traverse the property from west to east, one between 32nd Street and 31st Street, and the other at

31st Street (**Photo 2**). These pipes and ditches discharge untreated stormwater directly into Whitaker Bayou from the surrounding residential neighborhoods. The approximate drainage area for the site is 31.6 acres.

According to the United States Department of Agriculture (USDA) Soil Survey for Sarasota County, one non-hydric and one hydric soil types occur within the limits of the project (**Figure 2**) and are described as follows:

10 – Eau Gallie and Myakka fine sands*. These nearly level, poorly drained soils are on broad flatwoods. Under natural conditions, the EauGallie and Myakka soils have a seasonal high water table at a depth of 6 to 18 inches for 1 to 3 months and within a depth of 40 inches or more during extended dry periods. The available water capacity is low. Natural fertility is low. Most areas of these soils support natural vegetation. Some areas have been cleared and planted to citrus trees. The natural vegetation is slash pine, longleaf pine, and scattered cabbage palm and oak. The understory includes inkberry, saw palmetto, chalky bluestem, creeping bluestem, pineland threeawn, and various other grasses. This is a non-hydric soil.*

12 – Felda fine sand, depressional*. This nearly level, very poorly drained soil is in depressions. The water table is within a depth of 12 inches for 2 to 4 months of the year and is at a depth of 12 to 40 inches during most of the remainder of the year. The available water capacity is low. Natural fertility and organic content also are low. The natural vegetation is bald cypress, pond cypress, cabbage palm, sand cordgrass, cutgrass, maidencane, and various other water-tolerant weeds and grasses. This is identified as a federal an state hydric soil.*

The conceptual design for the 32nd Street project (**Appendix 2**) consists of several treatment approaches that incorporate sediment and nutrient load reduction, habitat creation, and habitat enhancement. The stormwater outfall located at 32nd Street will be removed. A Type "E" inlet structure will be installed on the north side of 32nd Street, west of its intersection with Coconut Avenue. The existing pavement at this intersection will also be removed and replaced with permeable asphalt or pavers. The inlet structure will collect runoff and discharge into a vegetated bioretention area that will be constructed along the western property boundary. To maximize treatment and storage capacity, this area will have a 30-foot top width, a 2-foot depth, and 5H:1V side slopes. The western edge will be undulating to preserve native vegetation and to create sitting or picnic areas. The existing east/west ditches will be intercepted by the bioretention area to eliminate direct discharge of untreated stormwater into Whitaker Bayou. The

pipe located between 31st Street and N. Riverside will be removed. Water will also be re-directed into the bioretention area from N. Riverside where the existing pavement will be removed and replaced with a concrete flume and curb.

The bioretention area will be planted with native, emergent wetland vegetation to further treat the water prior to discharging into Whitaker Bayou. The bottom will also be augmented with organic soils to sustain the plantings and to assimilate nutrients. A single outfall point will be created to discharge treated water from the bioretention area into Whitaker Bayou. It will be located near the existing ditch outfall between 32nd and 31st Streets. A cascade made of natural stone material will be installed at the discharge of the bioretention area into Whitaker Bayou. A trash trap will be installed within the cascade that will require periodic maintainance.

The banks of Whitaker Bayou will be re-graded and contoured to create a more sinuous and natural shoreline for habitat improvement, bank stabilization, and additional treatment. The banks will be stabilized using native plantings and eco-friendly technology such as Envirolock, Filtrexx, or Geoweb. A linear, periodically exposed wetland will be constructed in-stream to create habitat and help slow flow velocities. Whitaker Bayou will flow on either side of the exposed wetland during regular flows. Several deeper wetland cells will be excavated near the west bank for additional water treatment and enhanced fisheries habitat.

A non-motorized vessel launch will be installed on the southern property boundary that can be accessed by N. Riverside Drive. Limited parking will be constructed at this location. Other amenities such as educational signs, benches, picnic tables, a canoe rack, and lighting would enhance recreational opportunities and improve safety. All non-native upland vegetation will be removed and the final design will be modified to preserve desirable vegetation.

The pollutant load reduction calculations for total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), and biological oxygen demand (BOD) are presented in **Appendix 3** and show substantial l loading reduction for each parameter. The Preliminary Opinion of Probable Cost (**Appendix 4**), which includes a 20 percent contingency, is **$427,800.00**.

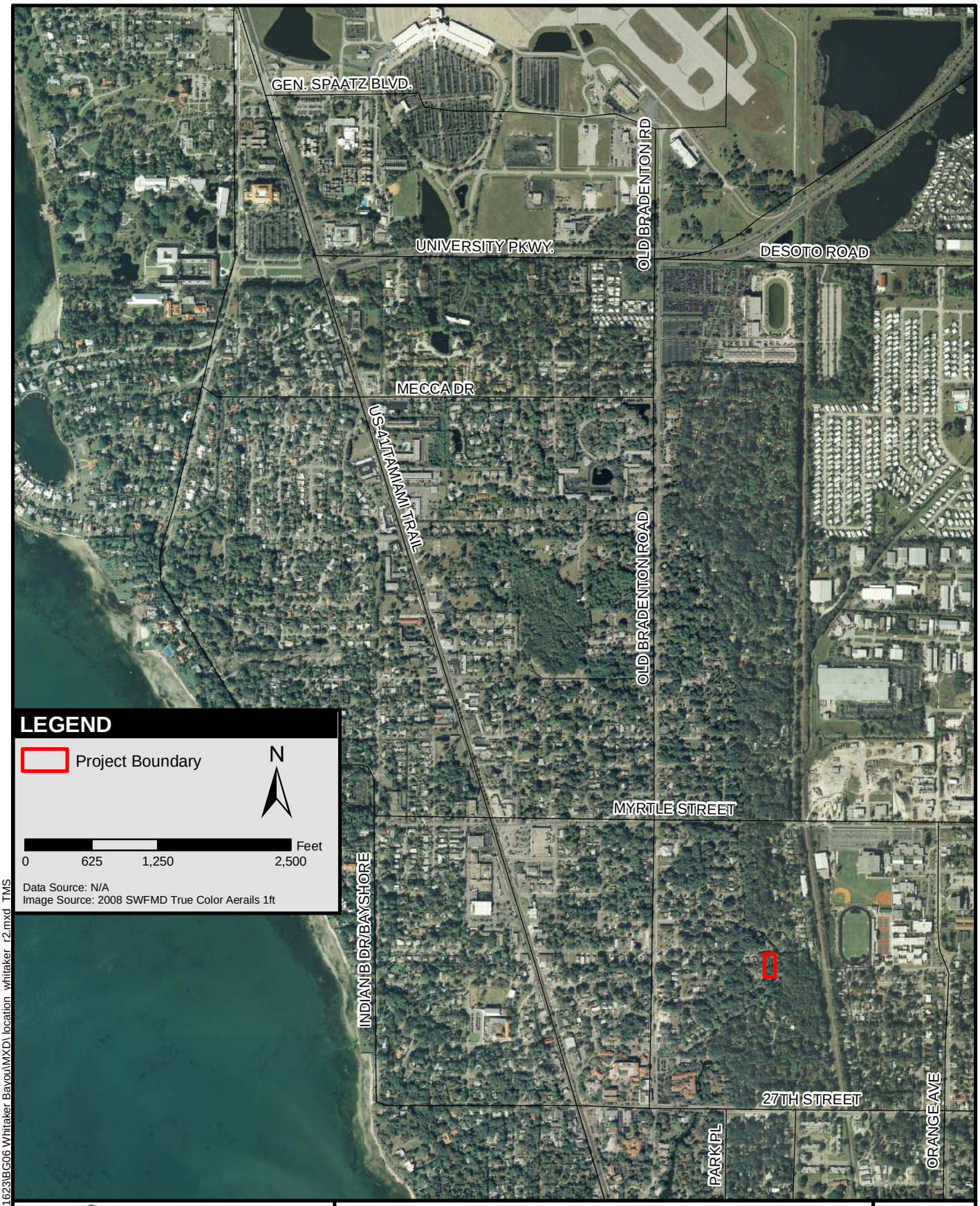
2.0 RECOMMENDATIONS

Stormwater retrofit projects are not easily accomplished in older, urbanized, coastal neighborhoods due to limited accessible project areas, loss of native shoreline and

wetland habitats, and the overall orientation of older developments. This conceptual design assessment was conducted to determine if the environmental benefits would be significant, or, at a minimum, provide educational opportunities and aesthetic improvements for public benefit.

The 32nd Street Project would improve existing, in-stream water quality and riparian habitat despite the relatively small size of the parcel. Additionally, public education, passive recreation, safety, and aesthetic improvements would also result from the construction of the project. The location of the site is ideal, as it is occurs immediately downstream of the channelized portion of Whitaker Bayou which traverses a large industrial and commercial area. It also demarcates the upper reach of the historic creek signature. Therefore, treatment would likely provide much needed downstream water quality improvements. This site is also suitably located for the development of an urban park; it is located in a residential neighborhood, easily accessible, City-owned, and in a relatively close proximity to MLK Park. The conceptual plan is also consistent with the goals established in the original funding requests and would provide an overall benefit to the residents of the community.

FIGURES



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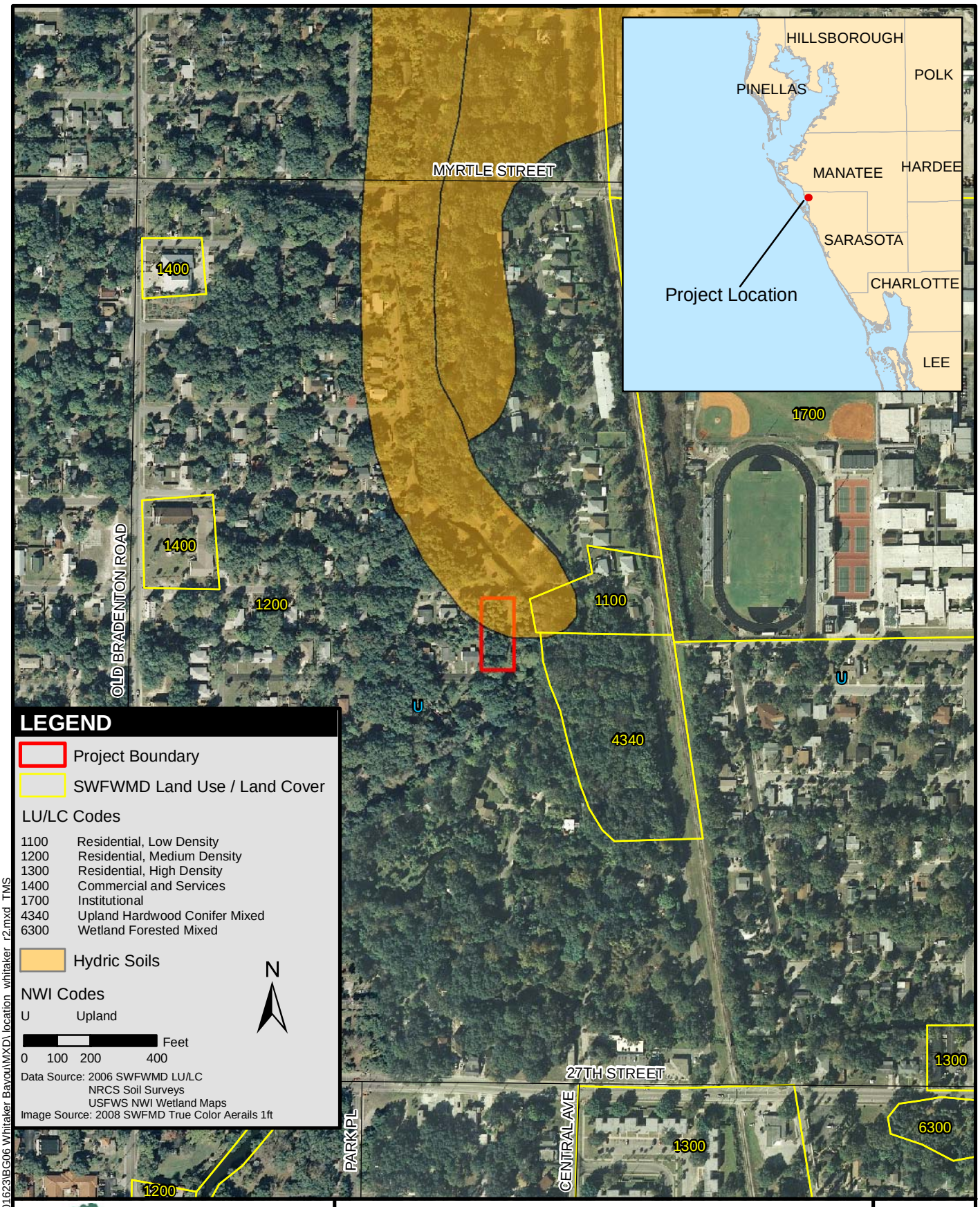
SARASOTA BAY ESTUARY PROGRAM
WHITAKER BAYOU
Sarasota County, Florida

32nd STREET VICINITY MAP

Figure 1



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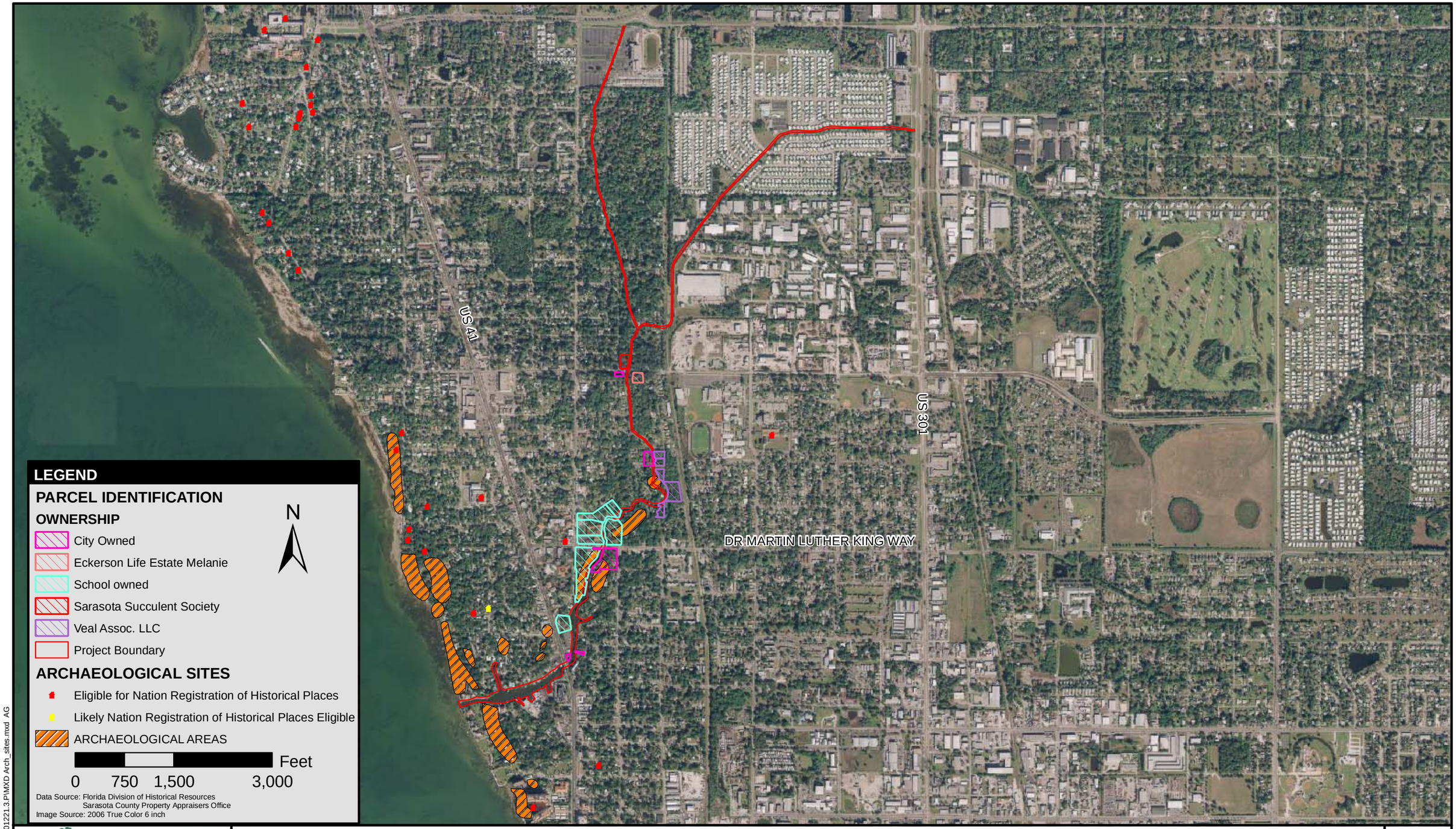
SARASOTA BAY ESTUARY PROGRAM
WHITAKER BAYOU
Sarasota County, Florida

32nd STREET PROJECT LOCATION MAP

Figure 2

APPENDIX 1



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Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

ARCHAEOLOGICAL SITES AND PROPERTY OWNERSHIP INFORMATION

Figure X

LEGEND

- Canoe/Kayak planned site
- Exotic plant removal
- Seawall removal
- City Wastewater Site
- Dredging of contaminated or exposed sediments
- Ball reef and or oyster restoration
- Restore natural shoreline

PARCEL IDENTIFICATION

OWNERSHIP

- City Owned
- Eckerson Life Estate Melanie
- Private Owned
- School owned
- Sarasota Succulent Society
- Veal Assoc. LLC
- Project Boundary

N

0 50 100 200 Feet

Data Source:
Image Source: 2006 True Color 6 inch

US 41

COCONUT ST.

Vacant and potential staging area for dredging, shoreline enhancement, wetland creation, marsh creation, and bioswale

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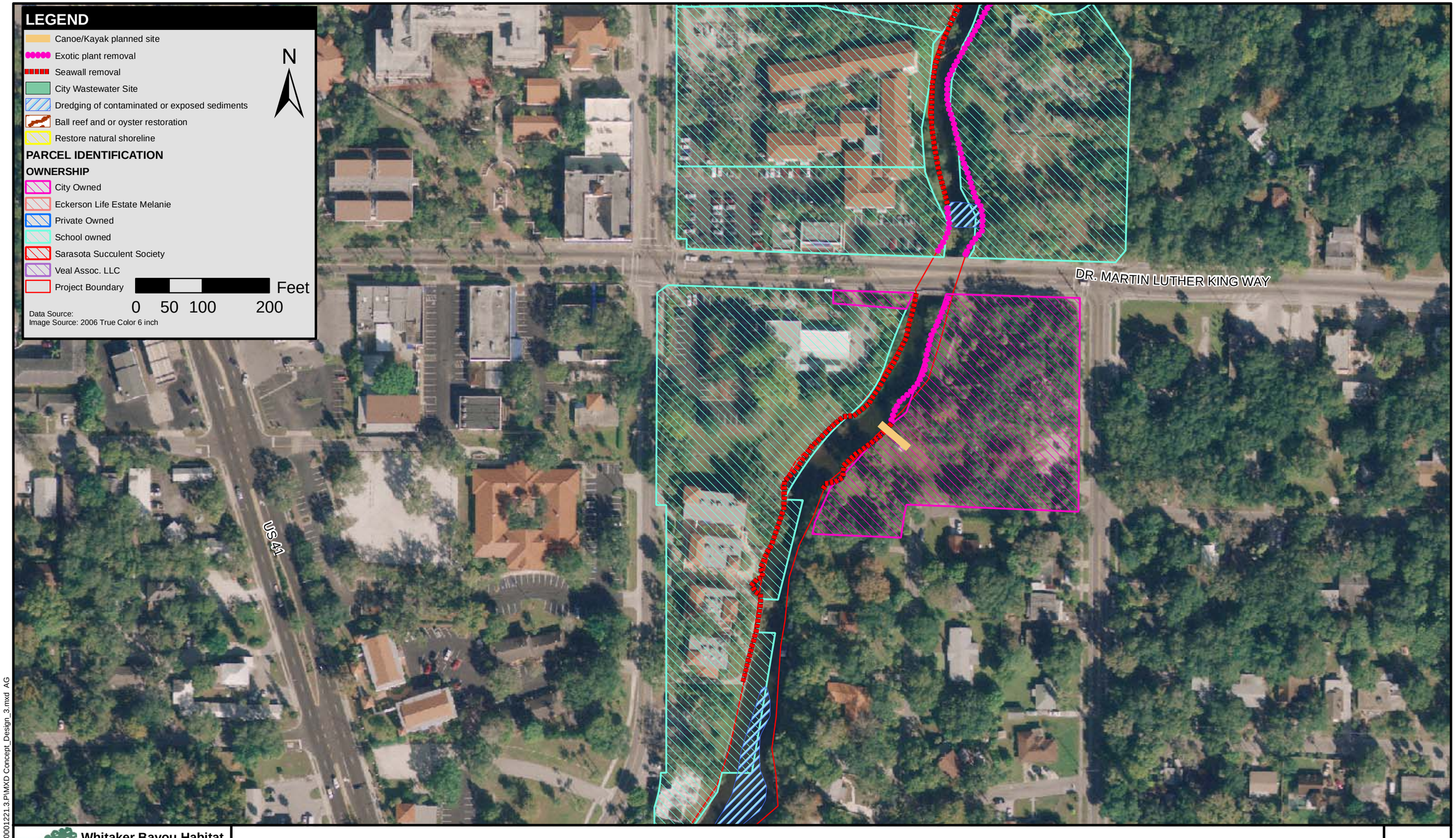
Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

CONCEPTUAL DESIGN

Figure X



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Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

CONCEPTUAL DESIGN

Figure X

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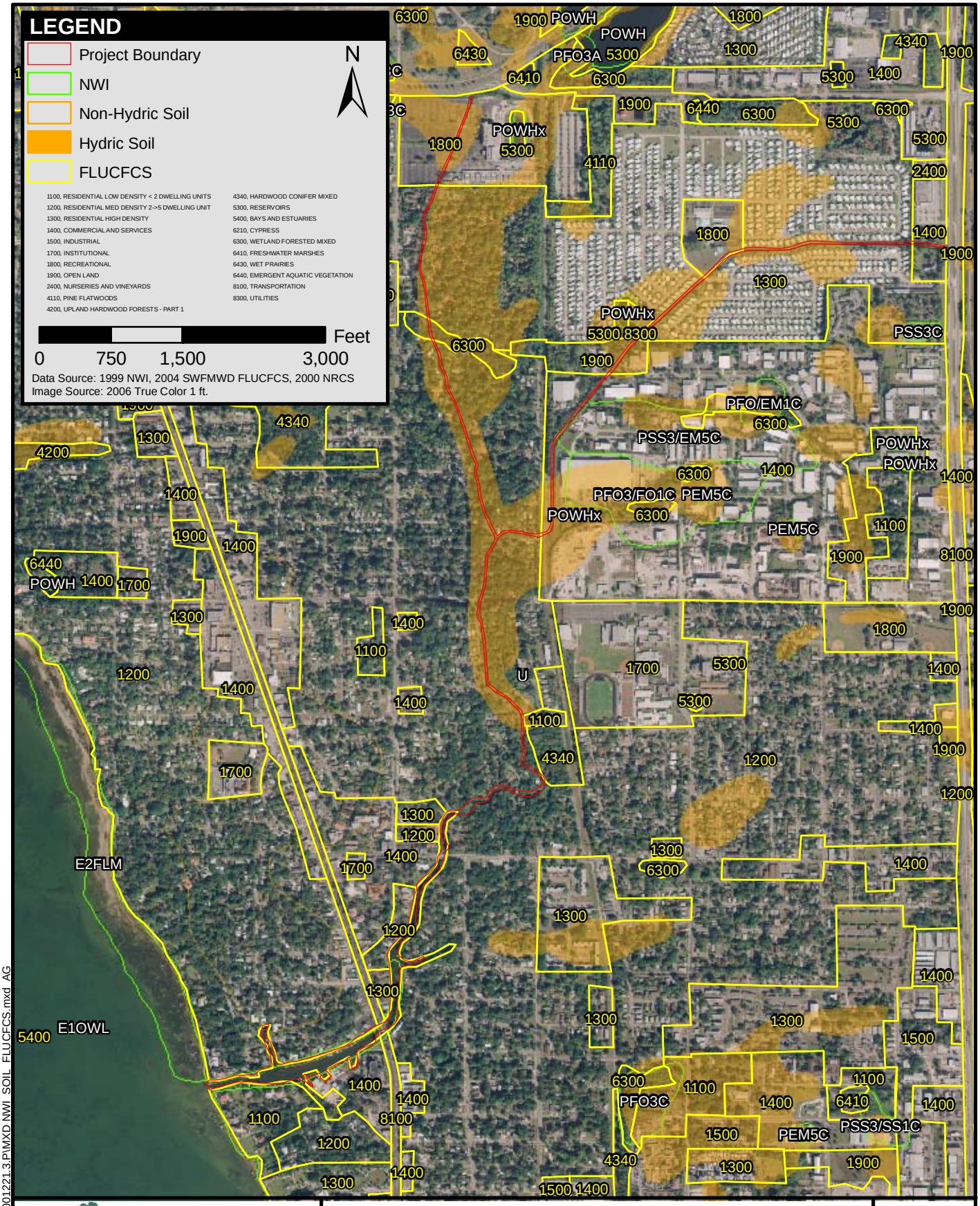
Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

WETLAND CONCEPTUAL DESIGN

Figure X



G:\x\PROJECTS\0001221.3.P\MXD NWI_SOIL_FLUCFCS.mxd AG

Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

NWI, SOILS, and FLUCFCS MAP

Figure 2

G:\x\PROJECTS\0001221.3.P_Whitaker_Bayou\MXD PRESENTATION.mxd AG

LEGEND

Project Boundary

PARCEL IDENTIFICATION

OWNERSHIP

- City Owned
- Eckerson Life Estate Melanie
- Private Owned
- School owned
- Sarasota Succulent Society
- Veal Assoc. LLC

N

Shoreline Enhancement	895.1	LINEAR FEET
Seawall removal/Shoreline Restoration	1441.4	LINEAR FEET
Grand Total	2336.5	LINEAR FEET

Dredging of Contaminated or Exposed soils	1.20	ACRES
Reef Ball Installation/Oyster Restoration	0.07	ACRES
Grand Total	1.27	ACRES

0 550 1,100 2,200 Feet

Data Source: Sarasota County Property Appraisers Office
Image Source: 2006 True Color 6 inch

US 41

US 301

Dredging of Contaminated and/or Exposed Sediments

Shoreline Enhancement

Streambed and Shoreline Restoration

Wetland Creation

Kayak/Canoe Planned Launch Site

Shoreline Enhancement

Seawall Removal/ Shoreline Restoration

Wetland Creation

Dredging of Contaminated and/or Exposed Sediments

Seawall Removal/ Shoreline Restoration

Shoreline Enhancement

Seawall Removal/ Shoreline Restoration

Kayak/Canoe Planned Launch Site

Seawall Removal/ Shoreline Restoration

Reef Ball Installation or Oyster Bed Restoration

Reef Ball Installation

Dredging of Contaminated and/or Exposed Sediments

Channel Marker Installation

City Wastewater treatment Outfall Removal

WHITAKER BAYOU HABITAT AND STORMWATER IMPROVEMENT PLAN
Sarasota County,Florida

WHITAKER BAYOU CONCEPTUAL PLAN

Figure X

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Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

CONCEPTUAL DESIGN

Figure X

G:\x\PROJECTS\0001221.9.PIMXD Concept_Design_4.mxd AG

Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

CONCEPTUAL DESIGN

Figure X

LEGEND

- Canoe/Kayak planned site
- Exotic plant removal
- Seawall removal
- City Wastewater Site
- Dredging of contaminated or exposed sediments
- Ball reef and or oyster restoration
- Restore natural shoreline

PARCEL IDENTIFICATION

- City Owned
- Eckerson Life Estate Melanie
- Private Owned
- School owned
- Sarasota Succulent Society
- Veal Assoc. LLC
- Project Boundary

N

0 50 100 200 Feet

Data Source:
Image Source: 2006 True Color 6 inch

Remove City of Sarasota's Domestic Wastewater Treatment Surface Water Outfall

Work with marina to improve stormwater runoff.

US 41

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Whitaker Bayou Habitat and Stormwater Improvement Plan Sarasota County,Florida

CONCEPTUAL DESIGN

Figure X

APPENDIX 2

32ND STREET STORMWATER RETROFIT
Figure 3

0 40 80
SCALE IN FEET

REGRADING / PLANTING OF TRIBUTARY BANKS ALONG PROPERTY BOUNDARY

WETLAND TREATMENT CELL
CONNECTED TO TRIBUTARY AT EL. 1.0
TOB EL. 5.0
BOT EL. 0.0

REMOVE EXISTING PIPE

REMOVE EXISTING PAVEMENT. INSTALL CONC. FLUME W/ CONC. CURB

PUBLIC ACCESS

REMOVE EXISTING PIPE

EDUCATIONAL SIGNAGE

REMOVE / REPLACE EXISTING PAVEMENT

SAVE EXISTING TREES

SAVE EXISTING TREES

SAVE TREES

SAVE EXISTING TREES

TYPE 'E' INLET

24" RCP

24" MES INV. 4.5

NATURAL STONE CASCADE FEATURE
CREST EL. 5.5

TRASH TRAP

VEGETATED BIORETENTION AREA
30 FT TOP WIDTH
SIDE SLOPES 5H:1V
2 FT DEPTH

APPROXIMATE DRAINAGE AREA:
31.6 AC

NOTE: FINAL DESIGN WILL BE MODIFIED TO SAVE DESIRED TREES.

CLARK DRIVE (Asphalt)

COCOANUT AVENUE (Asphalt)

32ND STREET (Asphalt)

31ST STREET (Unimproved)

N RIVERSIDE DRIVE (Asphalt)

Sarasota County

SARASOTA BAY ESTUARY PROGRAM
Restoring Our Bays

Brown AND Caldwell
Environmental Engineers and Consultants
5900 Pan American Boulevard, Suite A-3, North Port, FL 34287
941-429-5205

APPENDIX 3

	DRY SEASON							WET SEASON							TOTAL ANNUAL RUNOFF VOLUME (ac-ft)		
			Estim. CN:	56	Watersheds					Estim. CN:	56	Watersheds					
			Rainfall Runoff Depths [Inches]		32nd Street Area [AC]	40th Street Area [AC]	Marlin Drive Area [AC]			Rainfall Runoff Depths [Inches]		32nd Street Area [AC]	40th Street Area [AC]	Marlin Drive Area [AC]	32nd Street Area [AC]	40th Street Area [AC]	Marlin Drive Area [AC]
*Rainfall Event Range [Inches]	*Rainfall Interval Point [Inches]	*Number of Annual Events in Range	Zero Runoff: DCIA	1.57143 **NDCIA	31.57	19.39	16.06	*Rainfall Interval Point [Inches]	*Number of Annual Events in Range	Zero Runoff: DCIA	1.57143 **NDCIA	31.57	19.39	16.06	31.57	19.39	16.06
			Rainfall Runoff Volumes [Cubic Feet]							Rainfall Runoff Volumes [Cubic Feet]							
0.00-0.01	0.062	21.622	0.019	0.000	46088	28307	23446	0.061	24.794	0.018	0.000	51997	31936	26451			
0.11-0.20	0.168	6.203	0.050	0.000	35827	22005	18226	0.165	8.351	0.050	0.000	47372	29096	24099			
0.21-0.30	0.270	4.585	0.081	0.000	42560	26140	21651	0.270	5.847	0.081	0.000	54275	33335	27610			
0.31-0.40	0.374	2.342	0.112	0.000	30113	18495	15319	0.376	3.510	0.113	0.000	45373	27868	23082			
0.41-0.50	0.468	2.045	0.140	0.000	32903	20209	16738	0.471	3.200	0.141	0.000	51817	31826	26360			
0.51-1.00	0.726	5.654	0.218	0.000	141122	86676	71790	0.744	9.021	0.223	0.000	230744	141721	117382			
1.01-1.50	1.236	2.298	0.371	0.000	97650	59976	49675	1.246	3.848	0.374	0.000	164837	101242	83855			
1.51-2.00	1.751	1.226	0.525	0.004	74368	45676	37832	1.735	1.797	0.521	0.003	107876	66256	54878			
2.01-2.50	2.248	0.669	0.674	0.054	55816	34282	28394	2.266	0.830	0.680	0.056	70027	43010	35623			
2.51-3.00	2.744	0.336	0.823	0.152	37561	23069	19107	2.745	0.469	0.824	0.153	52458	32219	26686			
3.01-3.50	3.241	0.260	0.972	0.293	37689	23148	19173	3.182	0.273	0.955	0.274	38437	23607	19553			
3.51-4.00	3.632	0.103	1.090	0.428	17915	11003	9113	3.727	0.159	1.118	0.464	28829	17706	14666			
4.01-4.50	4.260	0.040	1.278	0.685	9000	5528	4579	4.293	0.077	1.288	0.700	17543	10775	8924			
4.51-5.00	4.540	0.044	1.362	0.814	10972	6739	5582	4.753	0.094	1.426	0.917	25238	15501	12839			
5.01-6.00	5.600	0.022	1.680	1.365	7678	4716	3906	5.549	0.094	1.665	1.337	32333	19859	16448			
6.01-7.00	0.000	0.000	0.000	0.000	0	0	0	6.540	0.037	1.962	1.925	16481	10122	8384			
7.01-8.00	7.800	0.018	2.340	2.754	10508	6454	5346	0.000	0.000	0.000	0.000	0	0	0			
8.01-9.00	0.000	0.000	0.000	0.000	0	0	0	8.445	0.057	2.534	3.207	37500	23032	19077			
>9.00	0.000	0.000	0.000	0.000	0	0	0	9.690	0.020	2.907	4.126	16119	9900	8200			
		Total Dry Season Runoff Volumes [AC-FT]:			15.79	9.70	8.03		Total Wet Season Runoff Volumes [AC-FT]:			25.01	15.36	12.72	**40.79**	**25.06**	**20.75**

* Information obtained from the "Wet and Dry Season Rainfall Distributions for Lemon Bay" contained in Table 5-2, pg. 5-6 of the Nonpoint Source Model Development and Basin Management Strategies for Lemon Bay Final Report prepared for the Southwest Florida Water Management District.

** TR55 Equation 2-7 was substituted into TR55 Equation 2.5; The derivative of the combined equation has a positve root at 1.57143 for the predetermined CN value of 56, meaning all rainfall depths less than or equal to 1.57143 inches produced zero rainfall runoff.

Pollutant	Pollutant Conc.* (mg/L)	Pre-Load (kg/yr)			Post Load (kg/yr)			Load Reduction (kg/yr)			Removal Efficiency			Cost over 20 years ($/kg Removed)		
		40th Street	Marlin Drive	32nd Street	40th Street	Marlin Drive	32nd Street	40th Street	Marlin Drive	32nd Street	40th Street	Marlin Drive	32nd Street	40th Street	Marlin Drive	32nd Street
														298,000	**229,000**	**428,000**
TSS	10.1	312.1	258.5	508.1	62.4	51.7	101.6	249.7	206.8	406.5	0.80	0.80	0.80	60	55	53
TP	0.5	15.5	12.8	25.2	8.5	4.5	12.6	7.0	8.3	12.6	0.45	0.65	0.50	2,143	1,377	1,701
TN	1.2	37.1	30.7	60.4	27.8	10.7	42.3	9.3	20.0	18.1	0.25	0.65	0.30	1,607	574	1,182
BOD	2.0	61.8	51.2	100.6	43.3	17.9	65.4	18.5	33.3	35.2	0.30	0.65	0.35	804	344	608

* Information obtained from the Nonpoint Source Model Development and Basin Management Strategies for Lemon Bay Final Report prepared for the Southwest Florida Water Management District.

APPENDIX 4

32nd STREET
STORMWATER IMPROVEMENTS
Preliminary Opinion of Probable Construction Cost (3-6-10)

Item No.	Description	Est. Qty.	Unit	Unit Cost ($)	Total Cost ($)
1	Mobilization and Demobilization (10% of the sum of Items)	1	LS	--	35,650.00
2	Maintenance of Traffic	1	LS	--	5,000.00
3	Project Construction Signs	1	EA	1,000.00	1,000.00
4	Orange Construction Barrier Fence	700	LF	1.50	1,050.00
5	Dewatering and Stormwater/Surface Water Diversion	1	LS	--	25,000.00
6	Tree Protection Fence	1,000	LF	1.00	1,000.00
7	One-Year Warranty and Maintenance	1	LS	--	7,500.00
8	Construction Stakeout and Surveys	1	LS	--	5,000.00
9	Clearing and Grubbing	0.9	AC	20,000.00	18,000.00
10	Silt Fence – Type C	900	LF	3.00	2,700.00
11	Floating Turbidity Barrier	350	LF	10.00	3,500.00
12	Construction Entrance/Exit Drives	1	EA	2,500.00	2,500.00
13	Grading Complete	1	LS	--	200,000.00
14	Stone Cascade Feature	1	LS	--	25,000.00
15	RCP Pipe	50	LF	65.00	3,250.00
16	Drop Inlet Structure	1	EA	3,500.00	3,500.00
17	Concrete MES	1	EA	750.00	750.00
18	Stone Rip-Rap	150	SY	50.00	7,500.00
19	Sodding	1,000	SY	4.00	4,000.00
20	Planting	0.9	AC	10,000.00	9,000.00
21	Trash Trap	1	EA	3,500.00	3,500.00
22	Pavement Removal/Replace with Concrete Flume/Curb	50	SY	100.00	5,000.00
23	Pavement Removal/Replacement	70	SY	75.00	5,250.00
24	Permanent Erosion Control Blanket	1,000	SY	15.00	15,000.00
25	Educational Signage	1	LS	--	2,500.00
	SUBTOTAL:				**356,500.00**
	20% CONTINGENCY:				**71,300.00**
	TOTAL AMOUNT:				**427,800.00**

Photo 1. 32nd Street Project Site facing north from N. Riverside Drive.

Photo 2. Existing east/west ditch from 31st Street traversing the Project Site.

S:\DATA\Projects\001623.30.P_Whittaker Bayou

Photo 3. Marlin Drive sign.

Photo 4. Marlin Drive; planted vegetation.

Y:\DATA\Projects\000874.10.C_District_1_GEC\BG 03 - Marco Island Bridge SAV Survey\Photos from Field Effort\Photos pages