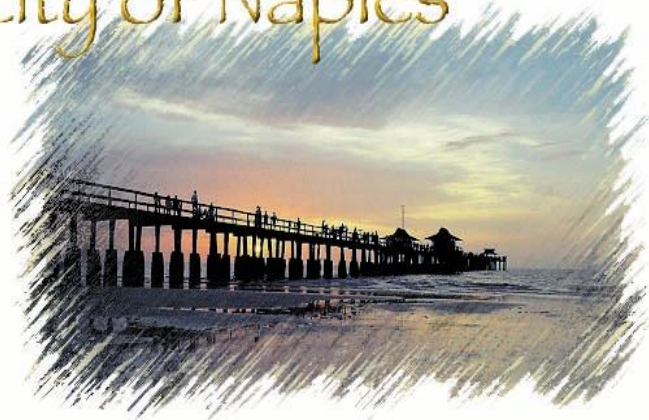


CITY OF NAPLES BEACH RESTORATION & WQ IMPROVEMENT PROJECT

City of Naples



ECE

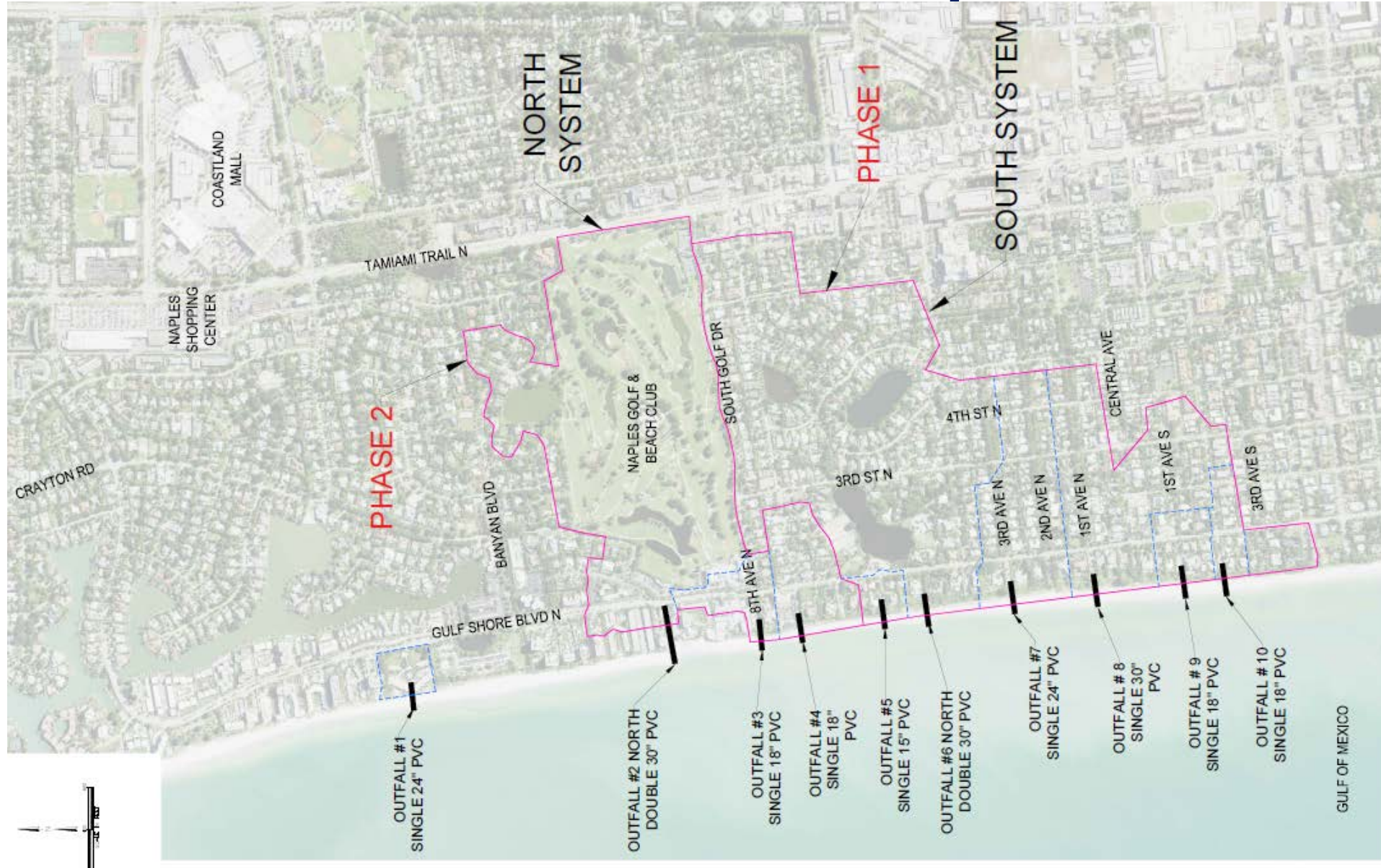


October 24, 2019

Agenda

- Project Background, Need, Goals & Objectives
- Project Overview
 - *Design Requirements*
 - *Project Components*
- Project Schedule
- Cost Estimate

Stormwater Outfalls at Naples Beach



Phase 2: Outfalls #2-4 (62 cfs); Phase 1: Outfalls #5-10 (152 cfs); 25-YR/3-Day Rain Event

Existing Conditions

- Outfalls identified as source of beach erosion and bacteria
- Frequent maintenance to secure/unclog pipes
- Flooding (tidal conditions, gravity dependency, back flows)
- Degrades aesthetics and impacts tourism
- Rising sea levels and the need for resiliency
 - *6 to 10 inches by 2030; 2.5 to 5 ft by 2100*

2 Gulf Shore Blvd
June 12, 2017



Existing Conditions



Existing Conditions



Beach Erosion & Aesthetics



Frequent Maintenance



Existing Conditions



Water Quality



Goals & Objectives

1. Reduce Flooding (including effects of sea level rise)
2. Improve Level of Service
 - *5-YR Rain Event – min. standard (City of Naples Comp plan)*
3. Improve Water Quality
4. Reduce Adverse Impacts to Beach Users (e.g. Swimming)
5. Reduce Impacts to Environmental Resources (e.g. Hardbottom)
6. Reduce Beach Erosion from Outfall Induced Scour
7. Improve Beach Access for Sea Turtles and Beach Users by Pipes & Support Pilings

Design Requirements

- Naples Beach Rainfall Conditions (Actual Measured)
- Improved Level of Service (25 Yr Return Period Rainfall)
- Replace Aging (>50yrs) Infrastructure (Improves Water Quality)
- Define & Evaluate Water Quality Conditions & Treatment
- Pump Station (Sizing and Components)
- Offshore Discharge to -15 ft prevents nearshore hardbottom and navigation impacts and maximizes freshwater mixing

Design Requirements Rainfall Events

Return Period	Rainfall (Inches)
5-Yr/1-Hr	2.8 (3.0)
5-Yr/1-Day	5.5
25-Yr/3-Day	11.5
100-Yr/3-Day	15.0

Source: SFWMD

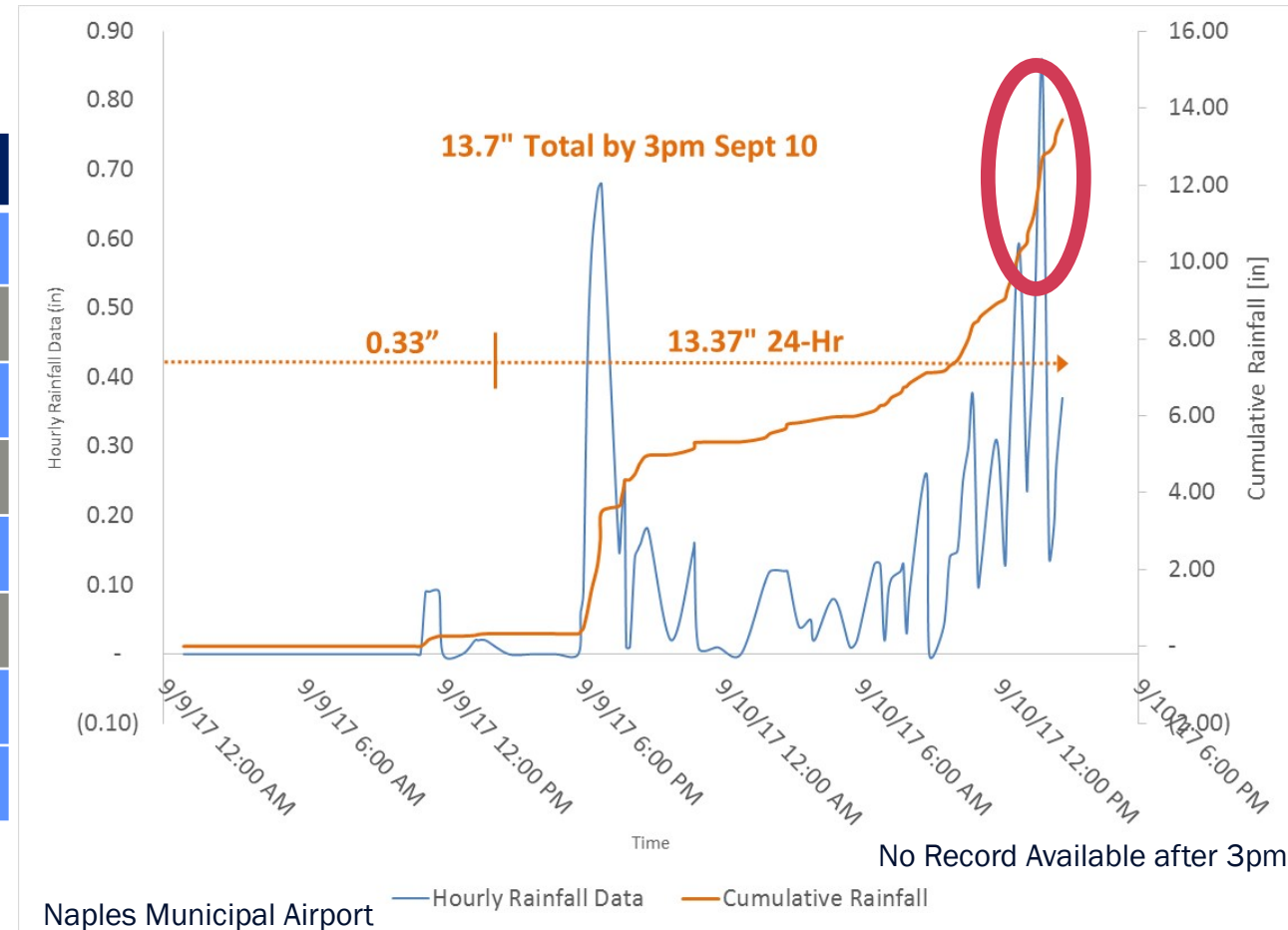
Historic “Legacy” Rainfall Events Exceeding 3 Inches*

Date	Max 24-Hr (Inches)
June 21, 2003	3.15
Aug 15, 2003	3.38
Oct 23, 2005	6.14
July 14, 2013	3.41
Aug 4, 2014	6.73
Jan 27, 2016	3.50
June 6, 2017**	4.13
Sept 9-10 (H-Irma)*	13+***

Sources: *Naples Municipal Airport Gauge

**City of Naples Rain Gauge #7

***No Record Available at Peak of Storm



Storm Surge

IRMA

NOAA/NOS/CO-OPS
Observed Water Levels at 8725110, Naples, Gulf of Mexico
From 2017/09/08 00:00 GMT to 2017/09/11 23:59 GMT

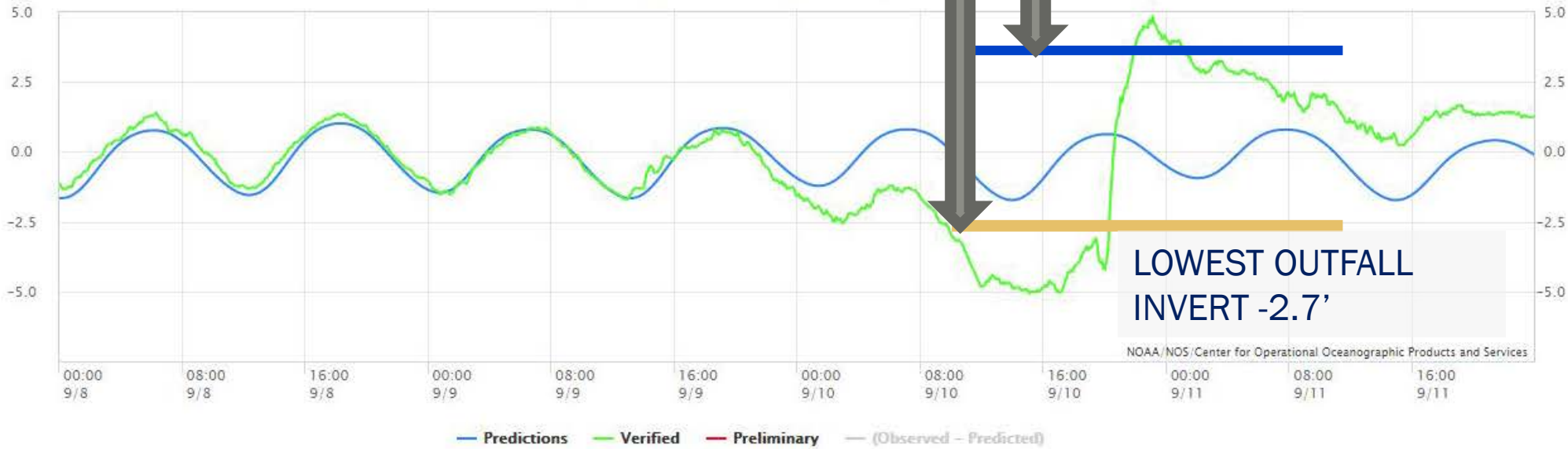
ROAD ELEV +3.5 TO +4.0'

LOWEST OUTFALL
INVERT -2.7'

Datums
(NAVD)

MHW
MSL
MLW

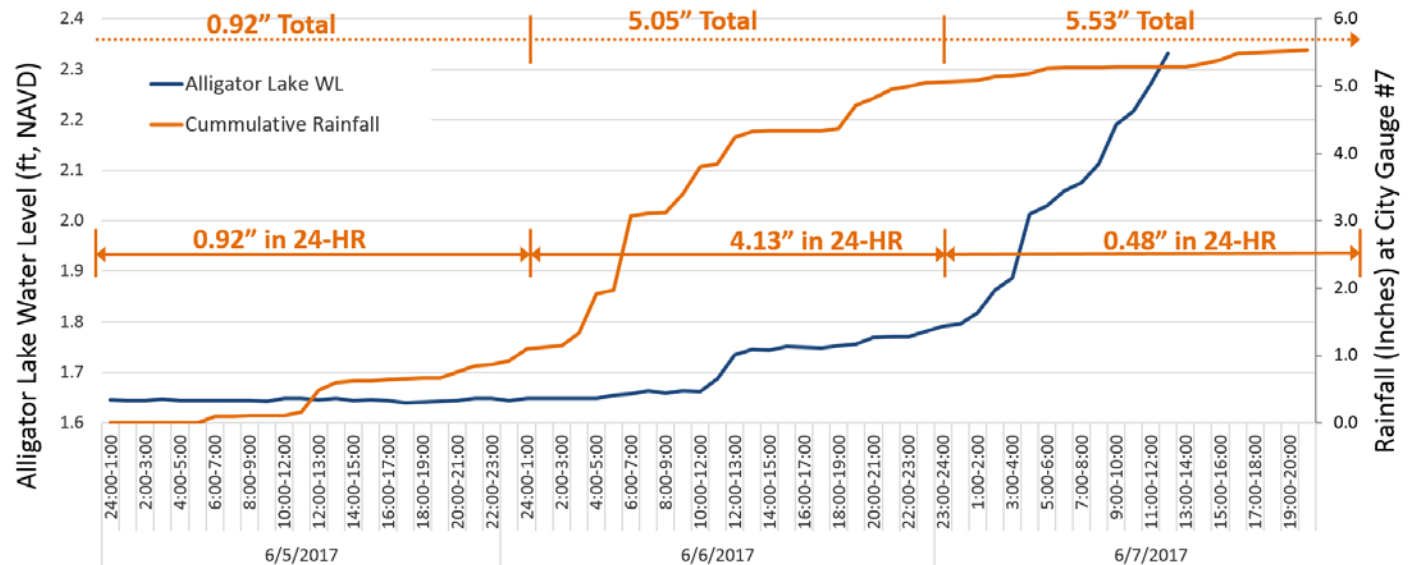
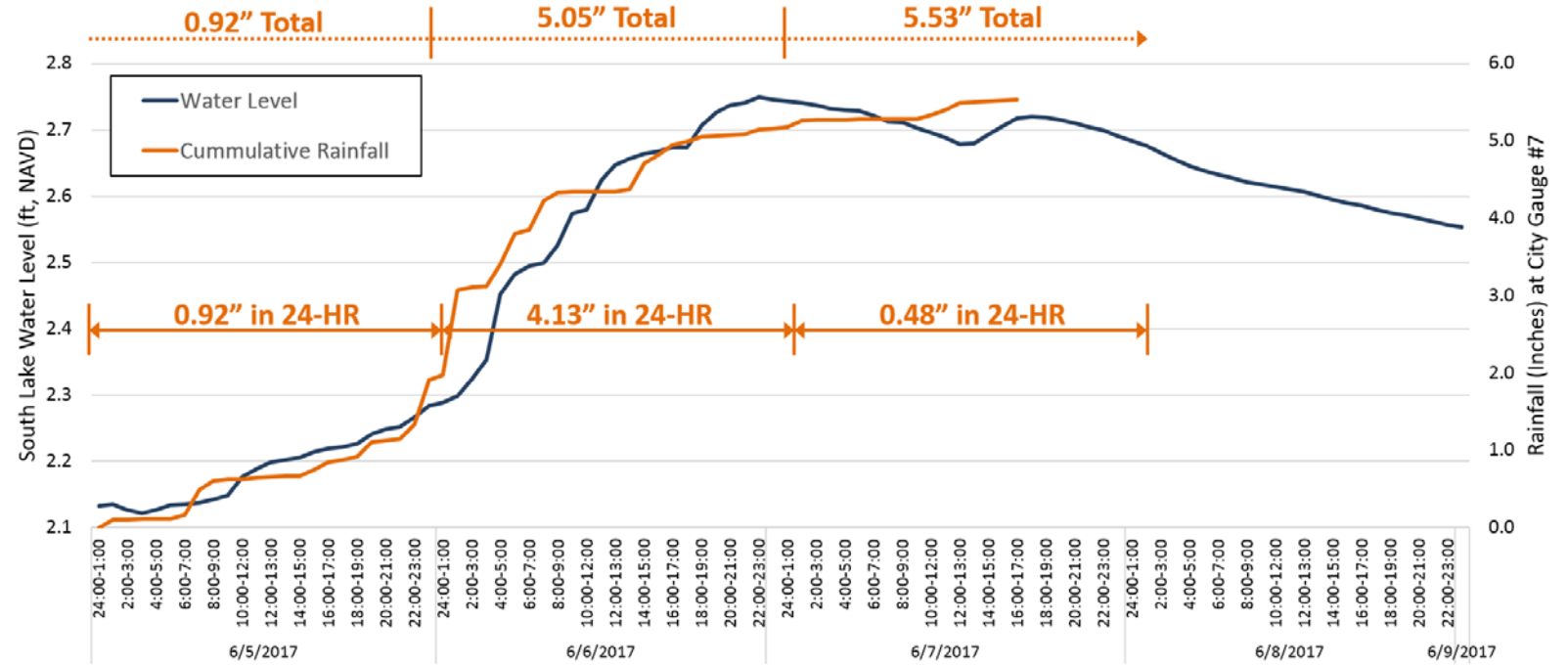
MHW
NAVD8
MTL
MLLW



Legacy Rain Event: June 2017

4.13" / 1-Day

Return Period	Rainfall (Inches)
5-Yr/1-Hr	2.8 (3.0)
5-Yr/1-Day	5.5
25-Yr/3-Day	11.5
100-Yr/3-Day	15.0



WQ Sampling Data: Sample Event #4 (June 27, 2017)

Parameters	Enterococci (State Limit = 70/100 ML)	Fecal Coliform (State Limit = 400/100 ML)	Total Suspended Solids (TSS)	Specific Conductance	Temperature	Salinity (GOM Avg = 36 ppt)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen	Nitrate+Nitrite as N	Nitrate Nitrogen	Nitrite Nitrogen	Copper (State Limit = 3.7 UG/L)
Sample Description	Result (#/100 ML)	Result(#/100 ML)	Result (MG/L)	Result (µS/cm)	Result (°C)	Result (ppt)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	UG/L
Outfall #4 At Outfall	1700	12000	50	49800	21.6	35.2	0.714	0.765	0.051	0.046	0.005	-
Outfall #4 50 ft Down Current	140	80	57	53500	20.8	38.9	0.615	0.635	0.020	0.020	0.002	-
Outfall #4 100 ft Down Current	120	120	50	53500	21.1	38.6	0.692	0.781	0.089	0.089	0.002	-
Outfall #6 At Outfall	8600	4300	226	29800	21.8	19.8	0.836	0.922	0.086	0.077	0.009	-
Outfall #6 50 ft Down Current	460	110	149	53100	21.4	38.0	0.761	0.808	0.047	0.042	0.005	-
Outfall #6 100 ft Down Current	440	230	173	53100	21.3	38.1	0.686	0.715	0.029	0.026	0.003	-
Outfall #7 At Outfall	52000	8000	20	4520	22.5	2.5	1.070	1.240	0.169	0.162	0.007	2.690
Outfall #7 50 ft Down Current	2100	140	93	52200	22.9	36.0	0.689	0.719	0.030	0.030	0.002	-
Outfall #7 100 ft Down Current	980	70	61	52700	22.2	37.0	0.674	0.694	0.020	0.016	0.004	-
Outfall #8 At Outfall	41000	8400	31	49200	25.5	31.8	0.728	0.851	0.123	0.120	0.003	-
Outfall #8 50 ft Down Current	270	60	11	53000	26.0	34.2	0.692	0.713	0.021	0.014	0.007	-
Outfall #8 100 ft Down Current	190	100	11	53500	25.1	35.2	0.668	0.719	0.051	0.051	0.002	-
Outfall #9 At Outfall	400	50	10616 ²	50200	21.6	35.5	0.742	0.810	0.068	0.061	0.007	-
Outfall #10 At Outfall	10	10	883 ²	54100	21.1	39.0	0.642	0.657	0.015	0.015	0.002	-
Alligator Lake Weir Structure	2900	900	2	10140	21.9	6.1	1.430	1.500	0.069	0.061	0.008	0.738
Alligator Lake East South Lake Outlets	3600	1100	6	8940	22.2	5.3	1.460	1.550	0.086	0.078	0.002	0.346

1. Data Collected on June 6th 2017

2. High Suspended Solids due to wave action mixing beach related debris and sediments

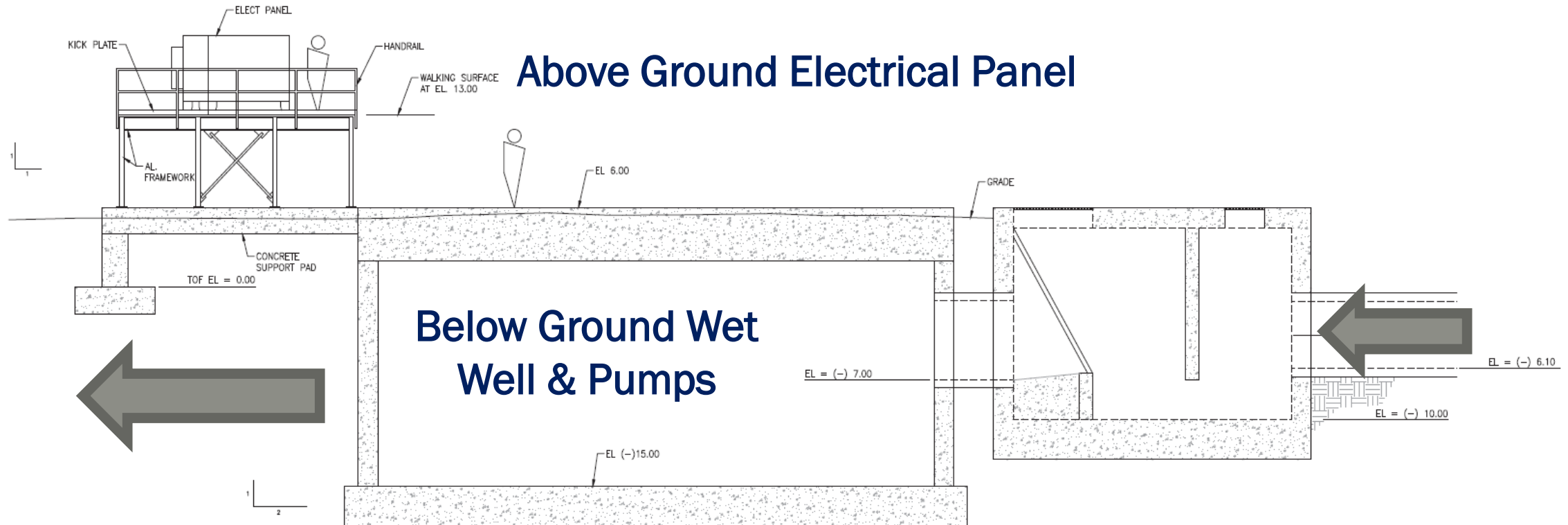
3. The conversion from conductivity to salinity was completed using the following website: http://www.chemiasoft.com/chemd/salinity_calculator

4. The average salinity of the Gulf of Mexico (36 ppt) was obtained from the following website: <https://www.britannica.com/science/salinity>

Project Key Components Overview



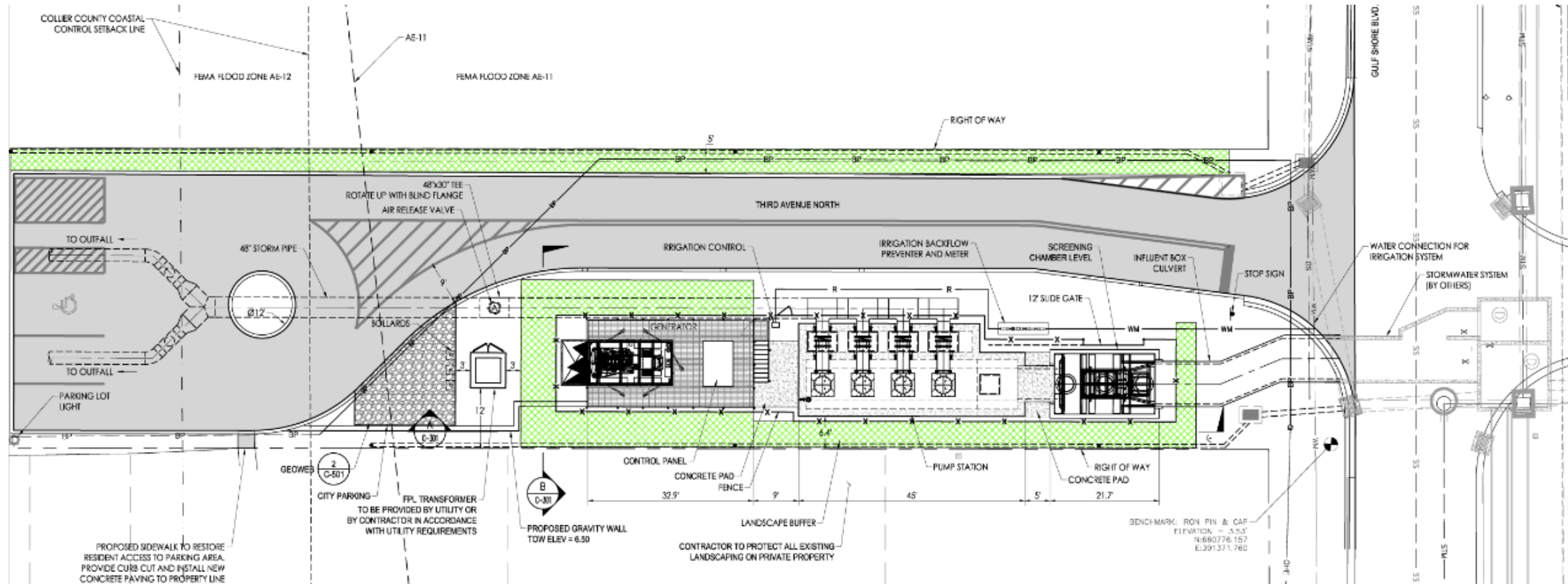
Project Overview: Pump Station



Typical Underground Pump Stations with Elevated Control Panel



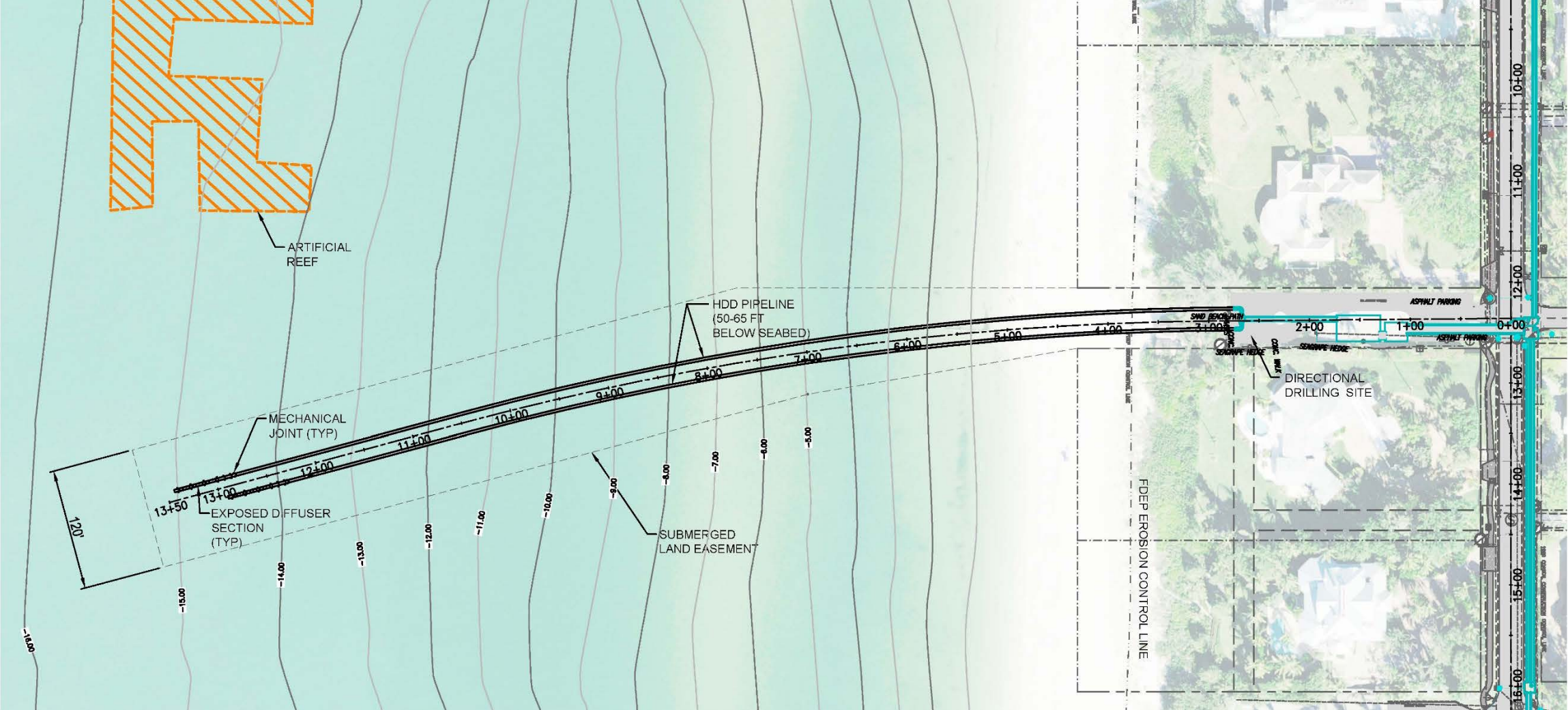
Generator at Pump Station Site



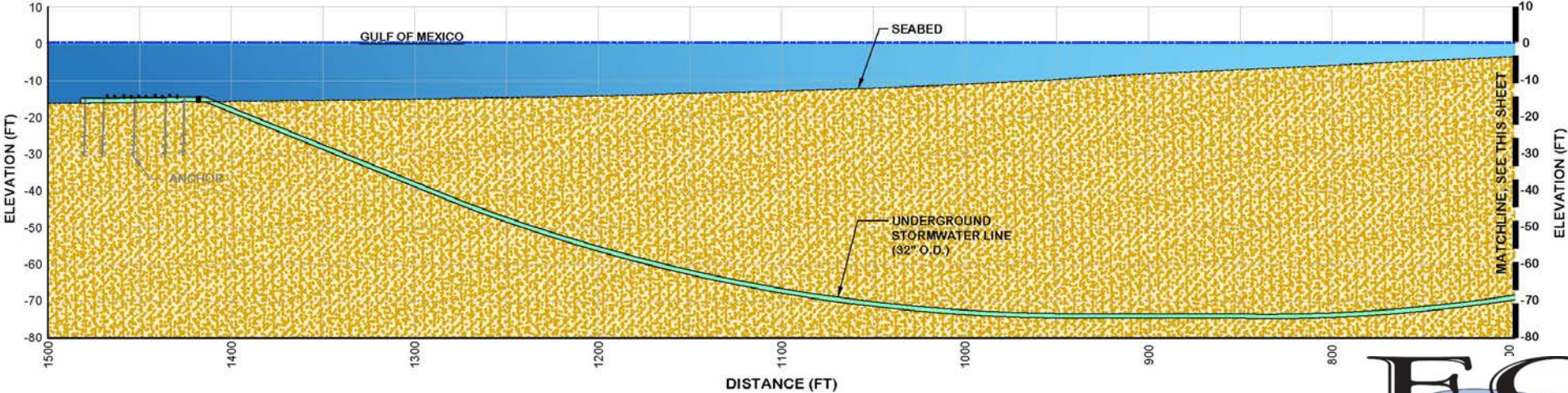
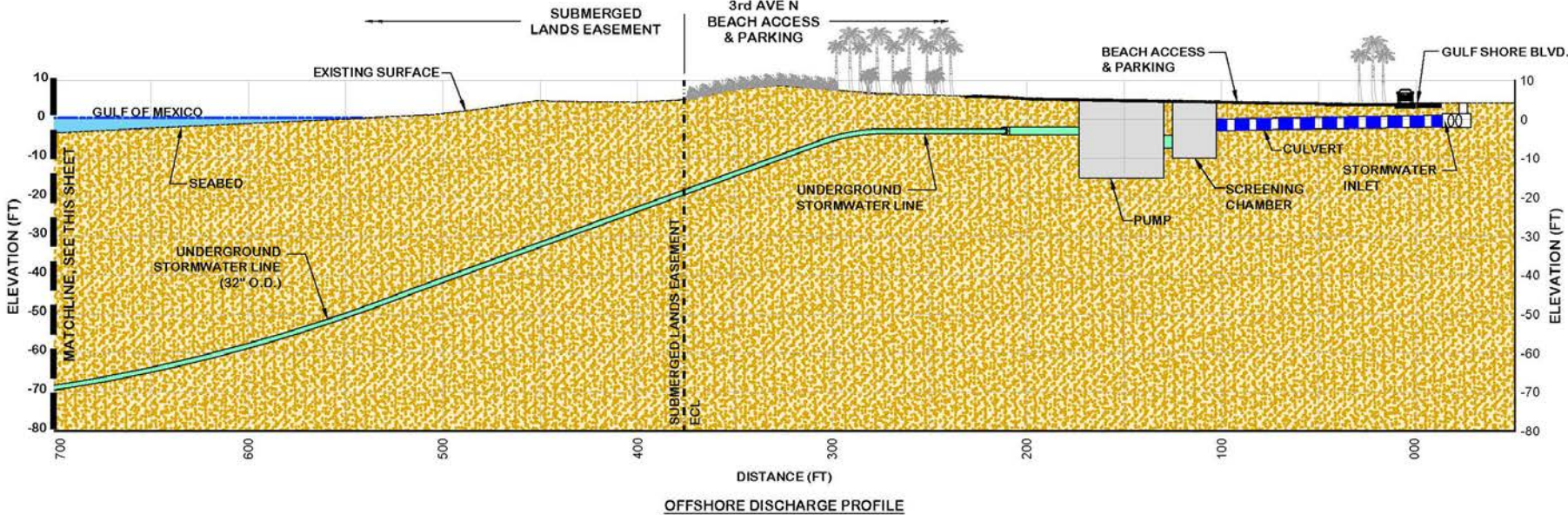
750kw Generator (30x12)

- 3600 Gal Sub Base Fuel Tank
- Level 3 Sound Enclosure

Project Overview: Offshore Discharge

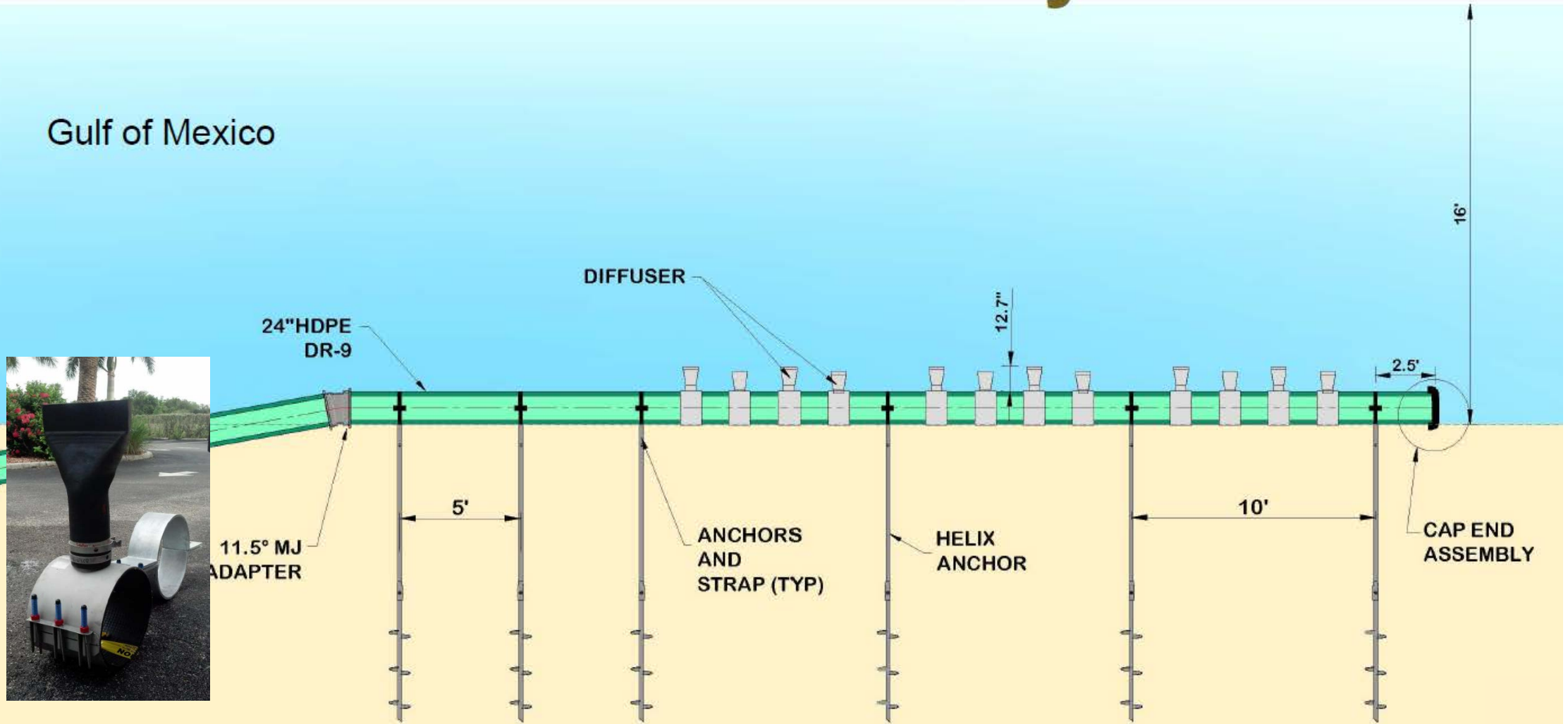


Project Overview: Offshore Discharge

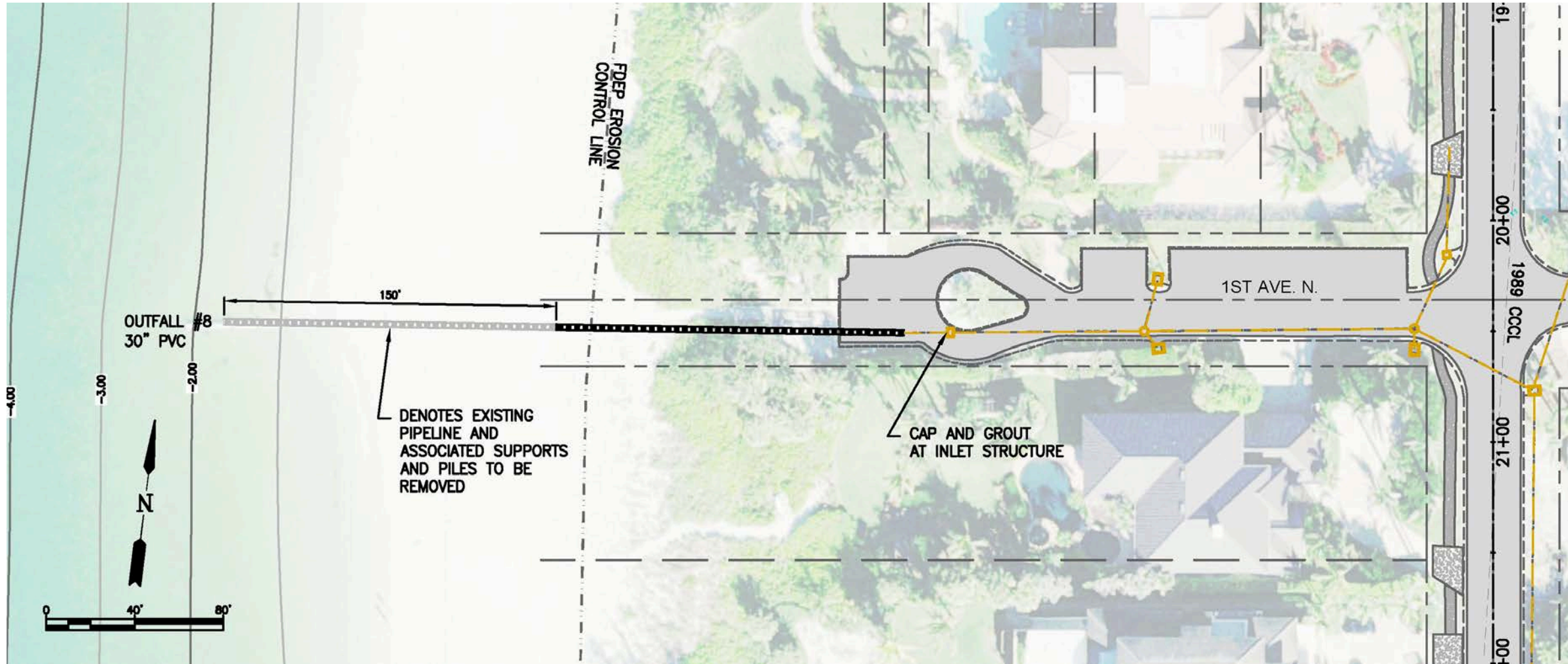


Offshore Diffuser System

Gulf of Mexico

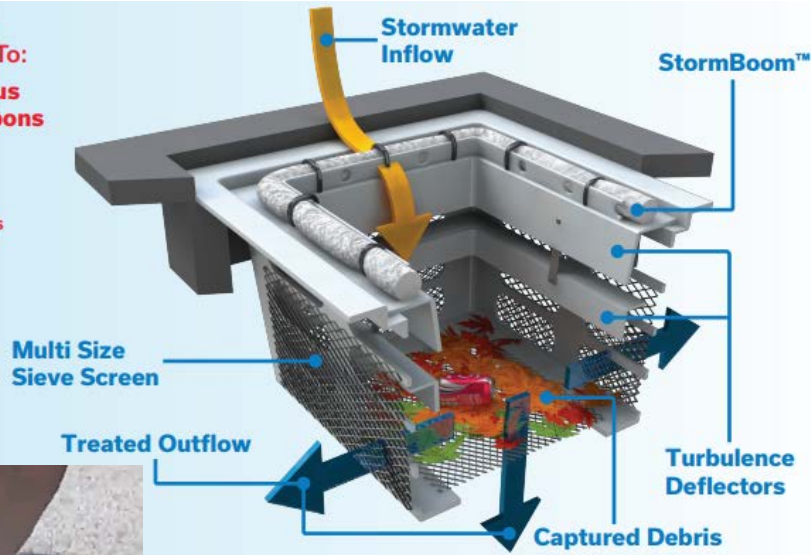


Project Overview: Outfall Removal



Project Overview: Pre-Treatment Inlet Inserts

GISB™ Removal Efficiencies Up To:
71% Phosphorus
51% Hydrocarbons
60% Nitrogen
90% TSS
*Varies Based on Size + Site Conditions



Source: Andy Holland, City of Naples
10 Filters @ GSB & Park Shore Dr
~1 CY (1,000 lbs) Annual Cleanout



Source: Suntree Technologies, Inc.



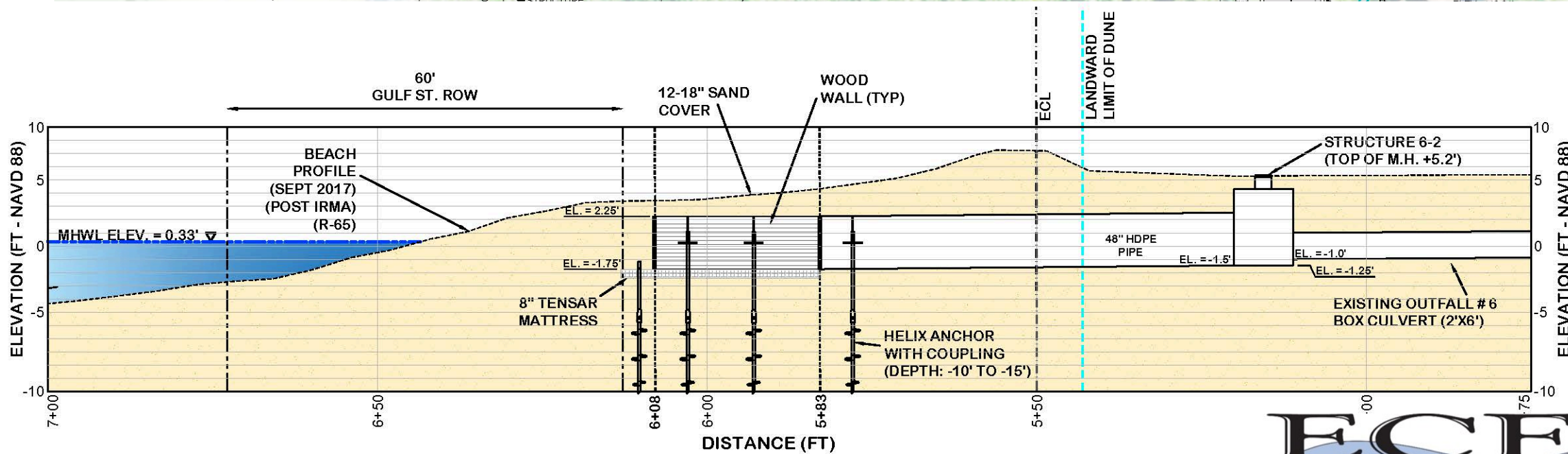
Source: Andy Holland, City of Naples
Inlet Baskets Installed Near Lake
Manor (6th Ave Near 10th St N)

Project Overview: Pre-Treatment @ Alligator Lake



Modify Existing Weir to Capture Coconuts

Project Overview: Overflow System (Modified Outfall #6)



Project Schedule

- 90% Design Complete

- Regulatory Permitting

- *SFWMD ERP Permit: Received 12/21/2019*
 - *Includes Submerged Lands Easement & Public Noticing (Nov 2018)*
- *SFWMD Dewatering Permit: Received 1/28/2019*
- *USACE Permit: Submitted October 2018, Expected October 2019*
- *State CCCL Permit: Received 1/11/2019*
- *City CCSL Permit: Received 5/21/2019*

Project Schedule

Sequence	Project Component	Duration	Start		Finish	
1	Directional Drill and Cap Offshore Discharge Pipelines.	6 weeks	3/15/2020		4/29/2020	
2A	Pump Station to Vault 1	6-9 Months	4/29/2020		10/26/2020	
2B	Storm Sewer Vault 1 to Vault 3 /Central Ave (Outfalls 7-8) and Drainage Structures Along Road Intersects East Side of GSB; West side to remain to convey s/w to outfalls; FPVC line from Structure 6-3 (Alligator Lake) to Vault 1; Outfall Diffuser System	4-6 Months	10/26/2020		2/23/2021	
2C	Vault 4 to Vault 5 (Outfall 9-10) and Drainage Structures Along Road Intersects East Side of GSB; West side to be constructed in phase 3; Construct Overflow system with pinch valve and rebuild beach outfall	4-6 Months	2/23/2021		6/23/2021	
3	Remove outfalls (4) and replace beach access parking area drainage to flow east to GSB.	2-3 Months	6/23/2021		8/22/2021	
4	Backup Generator	4-6 Months	2/23/2021		6/23/2021	

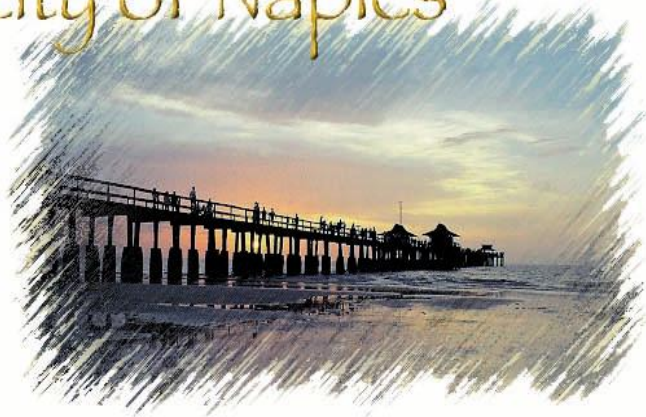
Funding Period: 12/1/19 to 6/30/21

COST ESTIMATE

ITEM NO.	DESCRIPTION OF ITEM	PROJECT COSTS (12/1/19 to 6/30/21)	PROJECT COSTS (7/1/21 to 6/30/23)	REQUESTED FUNDING AMOUNT	LOCAL MATCH	NOTES
1	MOB/DEMOB	\$ 374,900	\$ 80,000		\$ 454,900	
2	PRIMARY LINE CONSOLIDATION REDIRECTING STORMWATER TO LAKE SYSTEM FOR SW TREATMENT	\$ 870,800	\$ 200,000	\$ 765,950	\$ 304,850	INSTALLATION OF NEW SW PIPES REDIRECTING FLOWS TO LAKE TREATMENT SYSTEM TO REDUCE POLLUTANT LOADING & IMPROVED FLOOD PROTECTION. AN ADDITIONAL 2-FEET OF SW STORAGE IS BEING CREATED IN THE LAKE SYSTEM.
3	SECONDARY DRAINAGE STRUCTURES WITH SW FILTRATION DEVICES	\$ 330,100		\$ 330,100	\$ -	CATCH BASIN INSERTS AT EACH INTERSECTION, HYDRODYNAMIC SEPERATORS AT THREE LOCATIONS (1ST AVE N, 2ND AVE N AND 3RD AVE N), A SCREENING CHAMBER IS LOCATED AT THE PUMP STATION FOR ADDITIONAL GRIT REMOVAL PRIOR TO DISCHARGE OFFSHORE (NOT INCLUDED IN REQUESTED FUNDING AMOUNT), SWALE MODIFICATIONS AND CLEANOUT OVER TWO E-W BLOCKS AT 1ST AVE N, 2ND AVE N AND 3RD AVE N, AND A BIOSWALE SYSTEM (WITH POTENTIAL STRUCTURAL TREATMENT) WILL BE LOCATED AT CENTRAL AVE.
4	PUMP STATION WITH BAR SCREEN SEPARATORS	\$ 3,790,700			\$ 3,790,700	UV-TREATMENT WITHIN THE WETWELL PRIOR TO DISCHARGE; BAR SCREEN SEPARATOR TO REMOVE DEBRIS FROM THE FLOW OF WATER (DOES NOT INCLUDE \$175,000 FOR ADDITIONAL ULTRA-VIOLET TREATMENT CITY IS CONSIDERING AS AN OPTION)
5	OFFSHORE PIPELINE & DIFFUSER SYSTEM	\$ 2,804,500			\$ 2,804,500	
6	OVERFLOW SYSTEM	\$ 96,400			\$ 96,400	SYSTEM OVERFLOW TO MANAGE STORMS SURPASSING 25-YEAR, 3-DAY EVENT.
7	DEMOLITION	\$ 123,000	\$ 17,000		\$ 140,000	
8	PAVING & GRADING, INCLUDING RAISING THE ROAD	\$ 287,650	\$ 287,650		\$ 575,300	
9	PRE-TREATMENT	\$ 250,000		\$ 250,000	\$ -	ROADSIDE SWALES & EXFILTRATION SYSTEM
ELIGIBLE CONSTRUCTION COSTS		\$ 8,928,050	\$ 584,650	\$ 1,249,927	\$ 7,678,123	14% OF ELIGIBLE CONSTRUCTION COSTS REQUESTED
10	COMPLETE STREETS INITIATIVES (ROAD WIDENING TO ACCOMMODATE A BIKE LANE)	\$ -	\$ 250,000	\$ -	\$ 250,000	
		PROJECT COSTS (12/1/19 to 6/30/21)	PROJECT COSTS (7/1/21 to 6/30/23)	REQUESTED FUNDING AMOUNT	LOCAL MATCH	NOTES
TOTAL CONSTRUCTION COSTS		\$ 9,103,050	\$ 834,650	\$ 1,346,050	\$ 8,591,650	TOTAL CONSTRUCTION COST FOR PROJECT OVER 2-YR DURATION IS: \$9,937,700 (INCLUDES OPTIONAL UV TREATMENT \$175,000)
11	CONSTRUCTION ENGINEERING & INSPECTION SERVICES (CEI SERVICES)	\$ 400,000	\$ 40,000	\$ -	\$ 440,000	
TOTAL PROJECT COSTS AFTER DESIGN, ENGINEERING & PERMITTING		\$ 9,503,050	\$ 874,650	\$ 1,346,050	\$ 9,031,650	TOTAL COST FOR PROJECT POST DESIGN IS: \$10,377,700
Blue rows represent significant water quality improvement components.					Green cells represent requested grant amount.	

Thank You

City of Naples



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