# EVERGLADES FOUNDATION
# GEORGE BARLEY WATER PRIZE

# CONCEPTUAL DESIGN REPORT

**Prepared For:**

**THE EVERGLADES FOUNDATION**

**Prepared By:**

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**REI Project No. 168000**

REISS ENGINEERING

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|---|---|
| Document | Conceptual Design Report |
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This report is intended for review by the Everglades Foundation and other parties as considered necessary by the Everglades Foundation and Reiss Engineering, Inc. This report has been prepared under the supervision of Glenn Dunkelberger, FL P.E. Lic. 38310.

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Glenn Dunkelberger, P.E.

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Date

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# SECTION 1
# EXECUTIVE SUMMARY

The Everglades Foundation is implementing the fourth stage of the George Barley Water Prize at an 8-acre property near Lake Jesup in Oviedo, Florida. The fourth stage of the Prize include a 14-month duration test and is scheduled to begin in February 2020 and each of the final four competitors is to receive up to 1.25 million gallons a day of flow from Lake Jesup. The purpose of the George Barley Water Prize is to test four final competitors on the cost-effectiveness at removing phosphorous levels in Lake Jesup to 10 ug/L at a large scale.

In order to supply water from Lake Jesup to each of the four contestants, it is proposed to install one 4,500 feet pipeline on the bottom of the lake, with diffuser openings in the deepest area of the lake. Two pumps, equipped with variable frequency drives, each capable of pumping a maximum of 1,750 gallons per minute will withdraw water from the lake and discharge to a diversion tank from where the water will be available to each contestant at their respective treatment areas. The pumping system is designed to deliver between zero to 1.25 million gallons a day to each contestant. Following phosphorus removal treatment, the effluent will be directed to four monitoring chambers to monitor the water quality before being discharged back to the lake via a 100-foot diffuser.

Several permits from different agencies are required to implement the project: two (2) Environmental Resource Permits prior to installing the pipelines and infrastructure on site and for decommissioning the site from FDEP, one (1) NPDES permit from FDEP for discharging the treated effluents back to the Lake, one Seminole County ROW, one (1) building from Seminole County.

The total estimated cost for the project is approximately between 1.7 million and 2.6 million dollars.

# SECTION 2
# INTRODUCTION

## 2.1 Background

Human activities such as farming and mining have increased phosphorous levels in bodies of water to far beyond natural levels. As phosphorus is the limiting nutrient in eutrophication, greater numbers of lakes, rivers, and seas have experienced severe algal blooms and eutrophication. Florida's ecosystem is particularly affected by phosphorus induced eutrophication, with large quantities of both farming and phosphorus mining occurring in the state, and the health of the Everglades has been diminished. While it is far cheaper to prevent phosphorus pollution, the pollution has already occurred and accumulated. Current technologies of phosphorous removal are inefficient, cost prohibitive, or both. The Everglades Foundation has established the George Barley Water Prize to discover and draw attention to innovative, radical solutions to the problem of phosphorous pollution. Several domestic and international organizations, firms and universities have been participating in this contest organized by the Everglades Foundation for the past few years. The first three stages of the contest were at lab scale or small pilot scale.

The Everglades Foundation is now implementing the fourth stage of the George Barley Water Prize at an 8-acre property near Lake Jesup in Oviedo, Florida. The fourth stage of the Prize include a 14-month duration test and is scheduled to begin in February 2020 and each of the final four competitors is to receive up to 1.25 million gallons a day (MGD) of flow from Lake Jesup. The purpose of the George Barley Water Prize is to test four final competitors on the cost-effectiveness at removing phosphorous levels in Lake Jesup to 10 µg/L at a large scale.

For simplicity, the four invited contestants are described as teams and are as follows:

**TEAM 1:**

**Wetsus NAFRAD**

**TEAM 2:**

**ZeroPhos.**

**TEAM 3:**

**USGS Leetown Science Center**

**TEAM 4:**

**University of Idaho/WaterQuest**

Lake Jesup is quite shallow due to decades of build-up from decades of wastewater discharged directly into the lake, resulting in an average depth of 6 ft. Remediation projects by the St. Johns River Water Management District (SJRWMD), the Florida Department of Transportation, and the Army Corps of Engineers have helped to reduce the issues experienced by the lake, but issues with nutrient levels persist. Therefore, not only will the competitors demonstrate the effectiveness of their phosphorous removal technology but also will help in treating more than one billion gallons of water from Lake Jesup.

## 2.2 Purpose

This conceptual design report presents the conceptual design of the infrastructure and equipment necessary to supply 5.0 MGD of water to the contestants and to dispose of the treated effluents. Infrastructure to draw and pump 5.0 MGD of Lake Jesup water as well as the outfall were designed to meet the water demand from the contestants and to minimize impacts on the environment. The flow rate will be varied of the approximately 14 months of operation for the high of 5 MGD to a low flow rate of zero MGD. The average flow rate is targeted at 1 MGD.

# SECTION 3
# SITE DESCRIPTION

## 3.1 Location

The site of the contest is located near the south east corner of Lake Jesup (**Figure 3-1**) on land owned by the St. Johns River Water Management District (SJRWMD). Previously, the land was used to pilot-test a phosphorus removal treatment technology (Aquafiber). The previous pilot-test required road access and nearby electrical hookups, however the site was demolished and generally restored to its pre-development conditions. Currently, the access road to the site is compacted earth connected to a paved local road. While cleared of trees and large bushes, the site has been overtaken by grasses and wildlife.

## 3.2 Conceptual Layout

A conceptual layout for the intake pipeline, site, and outfall has been developed and is presented in **Figure 3-2.** Note that the location and design of the intake and outfall were based on historical lake levels from United States Geographical Survey (USGS) and the SJRWMD (station 014101650, Oviedo):

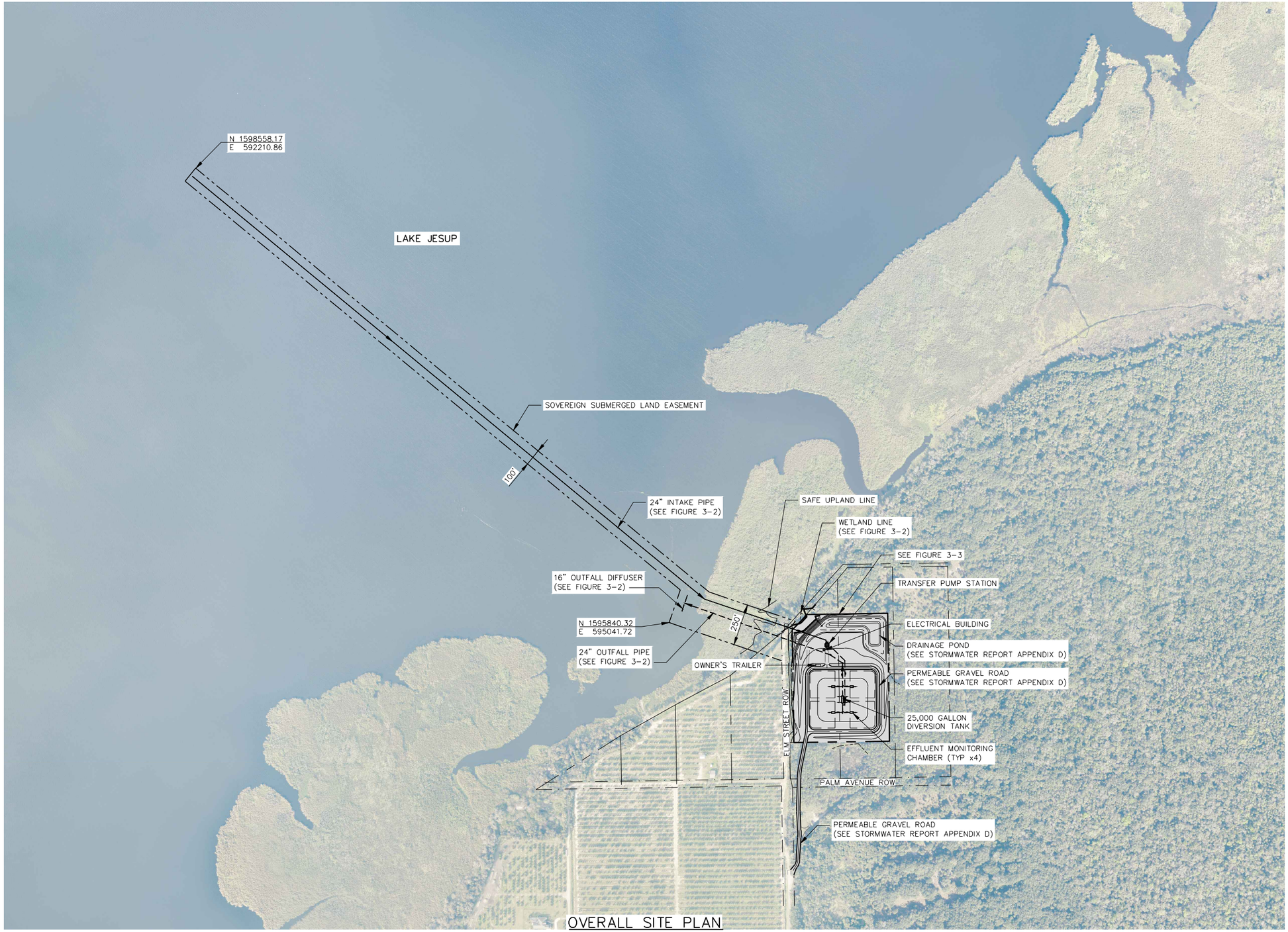
- Low level = 1 feet below sea level
- High level = 5 feet above sea level
- Flood level = 9 feet above sea level

Low level was based on data from 1/11/1996 to 1/10/2019 (**Appendix A**).

Water will be drawn from the deepest area of the Lake (based on the bathymetric survey of lake completed by DeGrove), pumped to the site and split between the four contestants. It is proposed to allocate approximately 25,000 square feet (sqft) area per contestant out of the 8-acre study site. Each team area will include a chemical storage area, a power panel area, and a treatment area.

Each contestant will be responsible:

- to layout their treatment in their allocated site location.
- for connecting their treatment to the diversion tank downstream of the flow meter associated to each contestant.
- for connecting the treated water line to the monitoring chamber associated to each contestant.
- for storage and disposal of all residual materials, solids and liquids.




OVERALL SITE PLAN

168000_GB Water Prize 6/14/2019 1:28 PM R:\Projects\168000 - George Barley Water Prize\Design\Drawings\FinalDesign_2018\M01.dwg

| | | | |
|---|---|---|---|
| RE | THE EVERGLADES FOUNDATION<br>EVERGLADES FOUNDATION GEORGE BARLEY WATER PRIZE | OVERALL SITE PLAN | FIGURE<br>3-1 |

NOTES

1. CONTESTANT RAW WATER CONNECTION
2. CONTESTANT TREATED WATER DISCHARGE LOCATION

0 40' 80'

WETLAND 2

WETLANDS

WETLAND LINE

S00° 51' 02"E 764.76' (M)

FOUND 2" REBAR ACCURITE LB4475"

FOUND 2" REBAR ACCURITE LB4475"

DRAINAGE POND
(SEE STORMWATER REPORT
APPENDIX D)

NE CONTESTANT AREA

SE CONTESTANT AREA

NW CONTESTANT AREA

SW CONTESTANT AREA

PERMEABLE GRAVEL ROAD
(SEE STORMWATER REPORT
APPENDIX D)

EFFLUENT
MONITORING
CHAMBER
(TYP. x4)

25,000 GALLON
DIVERSION TANK

24" OUTFALL

12" OUTFALL
(TYP x4)

16" RAW WATER FM

TRANSFER
PUMP STATION

MANHOLE
(TYP x2)

ELECTRICAL
BUILDING

OWNER'S
TRAILER

480.48' (M)

N89° 08' 58"E

S89° 08' 58"W 577.79'(M)

LOT 194

WETLAND LINE

WETLANDS

WETLAND 1

PALM AVENUE ROW

O.R. SWOPE LAND COMPANY'S
PLAT OF
BLACK HAMMOCK
PLAT BOOK 2, PAGE 110

LOT 193

NORTHEAST 1/4 OF SECTION 26

POINT OF BEGINNING

POINT OF COMMENCEMENT
(CORNER OF LOT 187
SOUTHEAST 1/4 OF SECTION 26

PERMEABLE GRAVEL ROAD
(SEE STORMWATER REPORT
APPENDIX D)

WETLAND 3

WETLAND LINE

729.13'

N89° 08' 58"E

24" RAW WATER INTAKE (HDPE)

SAFE UPLAND LINE

24" OUTFALL

WETLAND LINE/TOP OF BANK

N00° 51' 02"W 673.47'

DITCH

ELM STREET ROW

FOUND 1" IRON PIPE
NO I.D. (C.C.R. 095755)

25.98'

LAKE JESUP

168000_GB Water Prize 6/13/2019 6:56 PM R:\Projects\168000 - George Barley Water Prize\Design\Drawings\FinalDesign_2018\M04.dwg

| | | |
|---|---|---|
| THE EVERGLADES FOUNDATION<br>EVERGLADES FOUNDATION GEORGE BARLEY WATER PRIZE | CONCEPTUAL LAYOUT | FIGURE<br>3-2 |

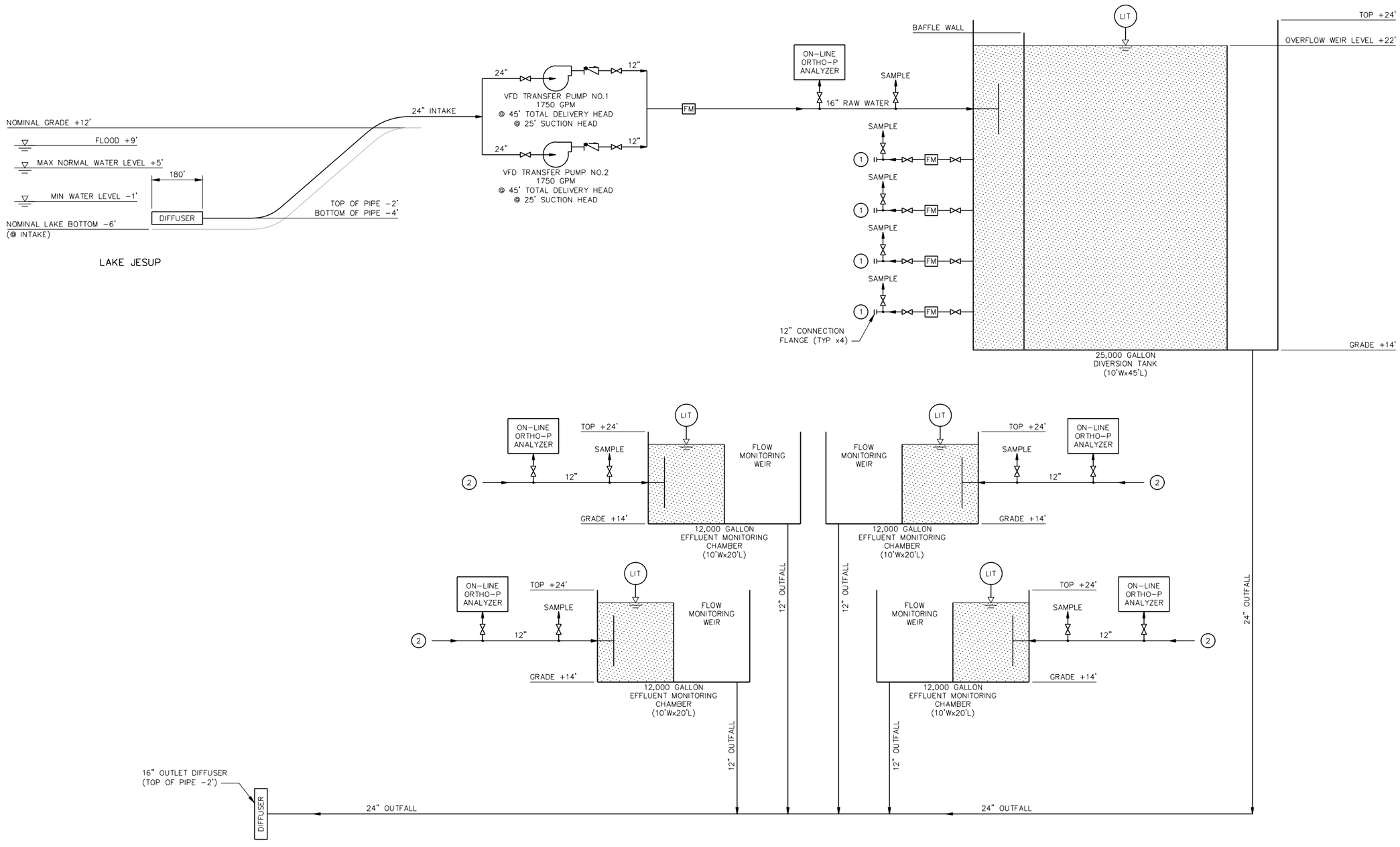
# SECTION 4
# CONCEPTUAL DESIGN

## 4.1 Flow Overview

A flow schematic is presented in **Figure 4-1**. Water enters the diffuser-type intake pipe and is drawn by suction pressure generated by two Transfer Pumps. The Transfer Pumps discharge the flow to a Diversion Tank through a manifolded pipe. Each contestant withdraws the desired flow from Diversion Tank. The tank level is maintained by either overflowing excess Transfer Pump flow to the Lake via the Diversion Tank overflow or by increasing the Transfer Pump discharge flow rate when the Diversion Tank is below overflow level. After each contestant's treatment process their effluent will be piped to an Effluent Monitoring Chamber (1 per contestant) which overflows by gravity to the outfall piping system for discharge to the lake.

The proposed facilities are described in the following sections:

- Raw Water Inlet Piping
- Raw Water Transfer Pumping system
- Diversion Tank
- Effluent monitoring tank (one per contestant)
- Outfall piping system




NOTES

1. ALL ELEVATIONS ARE FEET ABOVE/BELOW THE MEAN SEA LEVEL.
2. ALL PIPE HDPE (DIPS) DR26.

(1) CONTESTANT RAW WATER CONNECTION

(2) CONTESTANT TREATED WATER DISCHARGE LOCATION

THE EVERGLADES FOUNDATION
EVERGLADES FOUNDATION GEORGE BARLEY WATER PRIZE

FLOW SCHEMATIC

FIGURE 4-1

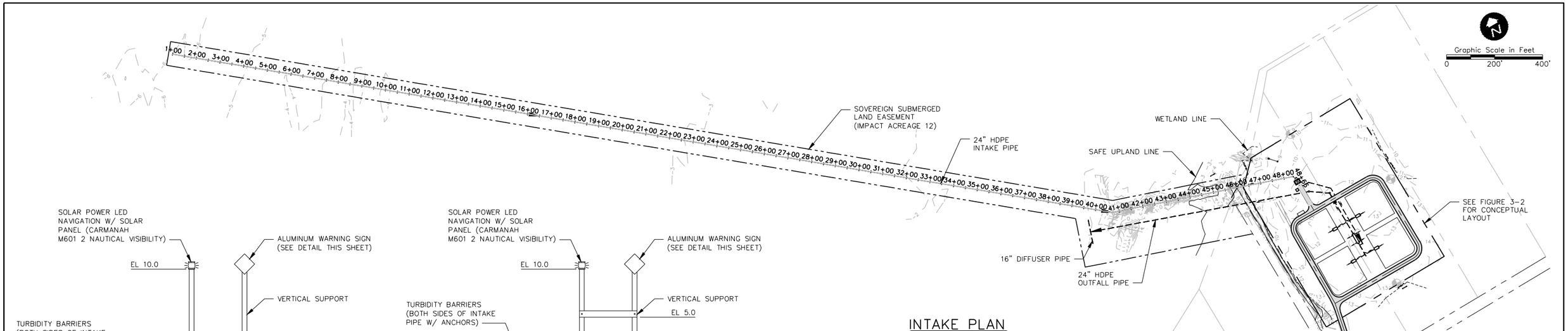
### 4.2 Intake Pipeline

The raw water intake pipeline will consist of one 24" pipe on the suction sides of the two Transfer Pumps. The design criteria of the intake pipeline are presented in **Table 4-1**. The design assumes the minimum water elevation of -1 ft. While in the lake the pipe will be located between two guide piles. The pipe will be routing on-grade after landfall to the Transfer Pump intake manifold. **Figure 4-2** shows the intake pipeline plan and profile.

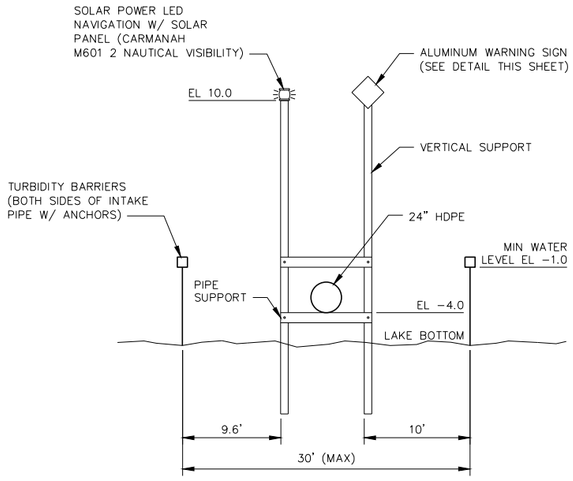
**Table 4-1. Intake Pipeline Design Criteria**

| Design Parameter | Unit | Value |
|---|---|---|
| **Diffuser-Type Intake Pipe** | | |
| Pipe type | | HDPE |
| Pipe diameter | in | 24 |
| Pipe length | ft | 180 |
| Hole diameter | in | 2 |
| **Diffuser to Pumps** | | |
| Pipe type | | HDPE |
| Pipe diameter | in | 24 |
| Pipe length (each) | ft | 4,500 |
| Pipe support (in lake) | | Guide Piles |
| **Transfer Pumps to Diversion Tank** | | |
| Pipe type | | HDPE |
| Pipe diameter | in | 16 |
| Pipe length | ft | 800 |
| Pipe support | | Buried |

For protection of the installation the piling will be fitted with navigation lights and the pilings will be surrounded with a floating warning barrier, such as a turbidity curtain type installation.

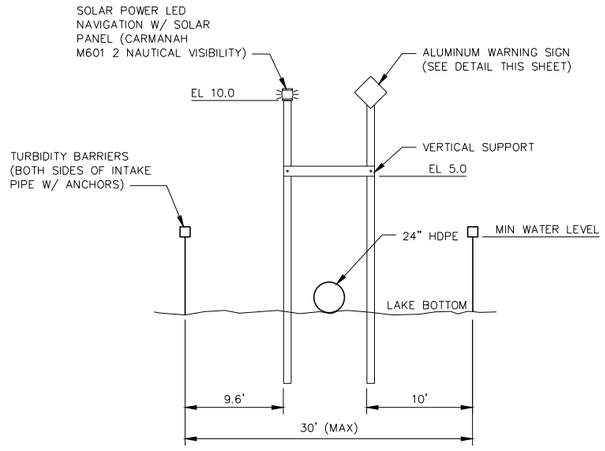



INTAKE PLAN



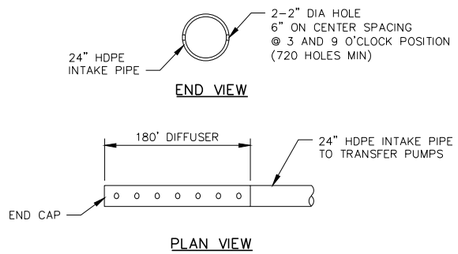

TYPE I STRUCTURE

NOTE: SEE STRUCTURAL DRAWINGS FOR CONSTRUCTION DETAILS.




TYPE II STRUCTURE

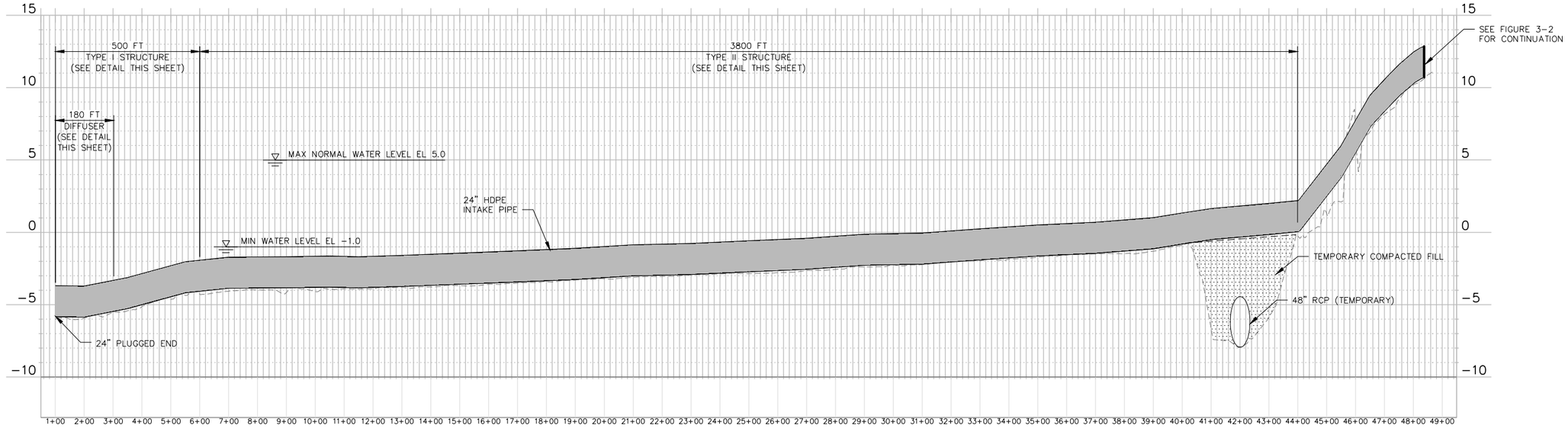
NOTE: SEE STRUCTURAL DRAWINGS FOR CONSTRUCTION DETAILS.




INTAKE DIFFUSER

NOTE: SUPPORTS NOT SHOWN.


ALUMINUM WARNING SIGN




INTAKE PROFILE

### 4.3 Intake Transfer Pumps

Both transfer Pumps are self-priming pumps to allow for the suction lift of up-to 25 ft of dynamic lift. They each will be rated at 1,750 gallons per minute (gpm), or a total required design flow of 5 MGD with both units running. The units will be electric motor drive with adjustable speed control. A single pump running at minimum speed will deliver 1,750 gpm. At the minimum pump speed, each contestant is provided with a flow of 0.5 MGD without an overflow of the Diversion Tank (as described in section **4.5**). The intake pumps, as well as other constructed facilities, will be located at or above the 9 ft elevation flood stage. The pumping unit will be completely enclosed to reduce noise and protect the unit from the environment. The picture embedded in the text is a generic picture of the type pump enclosure proposed. The flow rate to be used will be manually entered into the control system along with the number of pumps required to meet the input flow rate. The flow meter located on the combined pump discharge line will continuously monitor the flow and the control system will adjust the pump(s) speed to meet the desired flow rate. The design criteria of the Transfer Pumps are presented in **Table 4-2**.

**Table 4-2. Intake Transfer Pump Design Criteria**

| Design Parameter | Unit | Value |
|---|---|---|
| Number of Transfer Pump | # | 2 |
| Maximum Pump Capacity (each) | gpm | 1,750 |
| Total Maximum Capacity (2 units) | MGD | 5 |
| Total Delivery Head (includes discharge head and suction head) | ft | 45 |
| Suction Head | ft | -25 |
| Maximum Horsepower (each) | HP | 40 |

### 4.4 Diversion Tank

The transfer pump(s) discharge will be directed to a Diversion Tank. The tank will include an inlet baffle to reduce short-circuiting and promote a more homogenous raw water source. Each contestant will be provided with a 12-inch gravity drain connection that includes a flow meter and sampling location. The Diversion Tank has an overflow for any flow pumped to the Diversion Tank that is not taken by the contestants. The Diversion Tank overflow is collected in the Outfall Pipe and discharge system including a pipe diffuser discharge. The design criteria of the Diversion Tank are presented in **Table 4-3**.

**Table 4-3. Diversion Tank Design Criteria**

| Design Parameter | Unit | Value |
|---|---|---|
| Tank Volume | Gal | 35,000 |
| Tank Height | ft | 10 |
| Tank Width | ft | 10 |
| Tank Length | ft | 45 |
| Water Depth at Weir | ft | 8 |

## 4.5 Discharge Outfall

The contestant's treated effluent will each be collected in an Effluent Monitoring Chamber, each 12,000 gallons. The Effluent Monitoring Chamber discharges over a weir to allow for the flow rate to be continuously monitored. The discharge from the chamber is directed to the 24-inch diameter HDPE Outfall Pipe and discharges to the lake via the flow diffuser arrangement. Initially, the Outfall Pipe will be buried below grade. After approximately 500 ft the pipe will emerge from below grade and be routed on the surface to the diffuser outlet. The diffuser section will be constructed as a "tee" off the outfall pipe. The diffuser will be surrounded with rip-rap stone to dissipate the discharge flow energy. The design criteria of the Outfall are presented in **Table 4-4**.

**Table 4-4. Discharge Outfall Design Criteria**

| Design Parameter | Unit | Value |
|---|---|---|
| Outfall Pipe Diameter | in | 24 |
| Outfall Diffuser Diameter | in | 16 |
| Outfall Pipe Length | ft | 1000 |
| Outfall Diffuser Length | ft | 100 |
| Number of diffusers | # | 50 |
| Diffuser Diameter | in | 2 |

## 4.6 Electrical and Instrumentation

### *4.6.1 Electrical Design*

Electrical power system can deliver 277/480volt, 3 phase 60 Hertz. 120/240 volts, 1 and 3 phase or 120/208volts, 1 and 3 phase can be delivered. All are nominal voltage delivered by Duke Energy at 60 Hertz.

Three phase 480 volt 60 Hz power will be provided to each contestant at one metered location. Site power will originate at the Duke Energy power pole located near the current entrance road. Duke Energy will be contacted with load requirements (currently total site is estimated at 750 KW at 480 volt 3 phase) and requested to route new power lines to a location adjacent to the Utility Building.

The Utility Building will house the electrical gear, VFD's, and the central control system. The building will be a 100 square foot precast concrete design with HVAC.

### *4.6.1 Instrumentation*

All controls will be connected in a central programmable control unit with data storage. The control system will have standby power supplied and located in the Utility Building. The total raw water flow will be monitored with a flow meter on the Transfer Pump combined discharge. The Diversion Tank will have a level monitor. Each contestant's raw water will be individually metered for flow rate. The contestant's discharge flow rate will be monitored in the Effluent Monitoring chamber.

Individual Transfer Pumps will have internal controls supplied by the pump manufacturer. Select signals from the pumps will be shared with the central control unit. Each contestant will also receive their flow measurement signal and the Diversion Tank level. The number of units and the desired flow rate will be manually set in the controls of the Transfer Pumps. Should the flow to the contestants be less than the rate set, the excess flow will overflow the Diversion Tank. If more flow is taken by the contestants, the Diversion Tank level water depth will decrease. This decrease will be monitored with the water level instrumentation and signal the Transfer Pumps to increase their pumping rate. Appropriate alarms will be provided to indicate any inappropriate flow conditions.

## 4.7 Access and Site Roads

The proposed access road will be 2,500 LF starting at the property line and will include the loop around the site. The road is proposed to be 20 FT wide to allow access to large vehicles and to meet the Seminole County Fire Marshal Requirements. The road will be constructed using gravel.

### 4.8 Stormwater Management

The Stormwater Management system will be designed to provide stormwater quality and quantity for the Everglades Foundation George Barley Water Prize project, which satisfies the requirements established by the St. Johns River Water Management District (SJRWMD), and the Florida Department of Environmental Protection (FDEP). Because the project is temporary in nature and the site will be restored following its completion, the stormwater management system will be designed to minimize major grading and excavation, which will be within the envelop for the road, buildings, pipeline, and stormwater pond. No clearing and grading will be performed beyond thoses linits. This will be accomplished by creating a conveyance system that follows the existing contours of the property. A wet detention stormwater management pond was therefore designed to serve this proposed project. See **Appendix A** for stormwater design drawings at the site.

### 4.9 Structural

The following Building Codes and Standards will be complied with:

- 2017 Florida Building Code, Sixth Edition
- ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures
- ACI 318-14 Building Code Requirements for Structural Concrete
- AISC 360-10 Specification for Structural Steel Buildings
- ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

Wind Loads:

The wind design for the facility is based on ASCE 7-10 analysis method per the FBC.

**Table 4-5. 2017 FBC Wind Design Parameters**

| Design Parameter | Value |
|---|---|
| Ultimate Wind Speed, Vult (Vasd) | 145 mph (112 mph) |
| Exposure | D |
| Risk Category | III |
| Topographic Factor | 1.0 |

Dead Loads

The minimum design dead loads will be as follows:

- Structure self-weight
- The loads resulting from the weight of all fixed construction, equipment, equipment bases, etc.

Live Loads

The minimum design live load criteria will be as follows:

- Equipment Access Areas – 200 psf (pounds per square foot).
- Unrestricted Vehicular Areas – AASHTO HS 20.

Groundwater Loads

All below grade structures will be designed to be non-buoyant assuming groundwater to surface elevations and the structure empty.

Material of Construction

It is anticipated that the following materials may be used to construct the proposed facility:

| | |
|---|---|
| Cast-in -place concrete | f`c = 4,000 psi |
| Precast concrete structures | f`c = 5,000 psi (min) |
| Concrete Reinforcement | ASTM A615, Gr.60 |
| Timber | Treated Southern Pine, No.1 |
| Bolts | ASTM A307, Hot-dipped Galvanized |

Contestant Process Areas: A concrete slab-on-grade will be designed to accommodate each of contestant's specific requirements. The slab design will take into consideration equipment loading and geotechnical recommendations for subgrade preparation.

Intake Pipe Guides: Pipe guides will be designed to accommodate the 24-in diameter intake pipe. It is anticipated that the pipe supports will consist of timber or steel pilings with cross ties. Signage and navigation lighting will be coordinated with project requirements.

Pump Foundations: A foundation system will be designed for the electric powered pumps that serve the intake pipe. It is anticipated that the foundation will consist of a slab-on-grade cast over prepared subgrade.

Diversion Tank and Monitoring Chambers: The diversion tank will be a rectangular steel water retaining structure with an interior overflow weir.

### 4.10 Trailer

A standard 30 ft by 8 ft trailer will be provided for the Everglades Foundation's use on-site. **Figure 4-3** is a typical trailer layout. A septic tank will be provided for storage and removal of rest room wastewater. Appropriate office furniture will be provided as well as electric power. HVAC will be included in the trailer layout. No communication cables or Wifi will be available on-site.

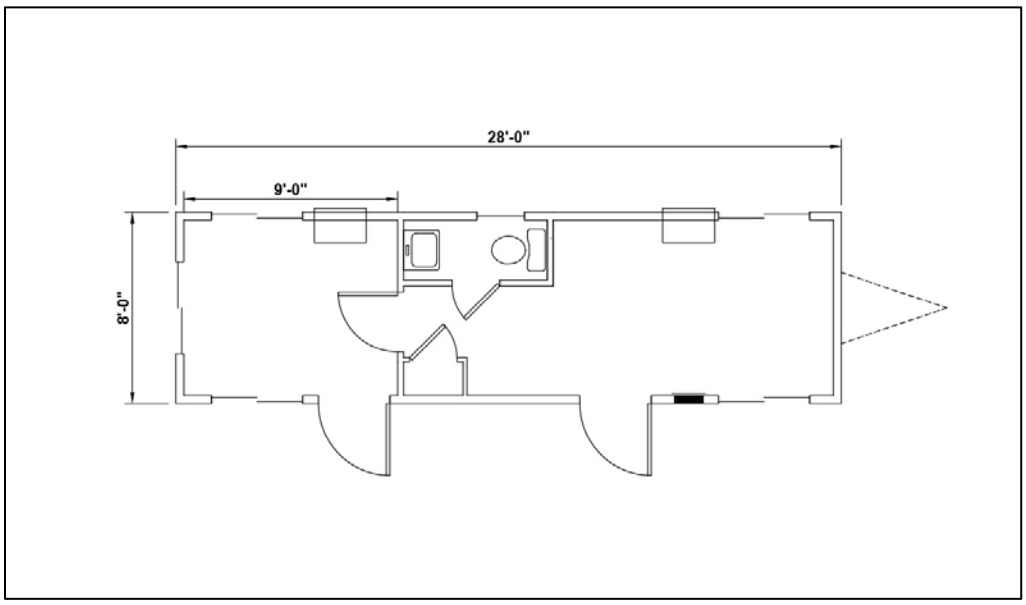



**Figure 4-3. Standard Trailer Layout**

### 4.11 Decommission

Once the 14-month contest is cover, the site will be restored to its original conditions as much as possible. As part of the site restoration, the following equipment will be removed and available for salvage:

- Remove intake pipelines, the outfall pipeline and pilings.
- Remove the access road and the concrete slabs.
- Remove the equipment on site:
  - The pumps.
  - The Diversion and Monitoring Chamber (steel tanks).
  - The electrical equipment.

Note that a State of Florida Environmental Resource Plan would also be required for decommissioning and restoring the site.

# SECTION 5
# CONSTRUCTION COST ESTIMATES

The engineering opinion of cost for the construction of infrastructure for the George Barley Water Prize contest are presented in **Table 5-1**. The cost opinion is deemed a "Class 4 Study" as defined by AACE International (Association for the Advancement of Cost Engineering).

**Table 5-1. Cost Opinion**

| ***Item*** | ***Material Cost*** | ***Installation*** | ***Total*** |
|---|---|---|---|
| Inlet Pipe (1 -24 HDPE), each @5,000 ft | $ 250,000 | $ 150,000 | $ 400,000 |
| Inlet Pumping (2) | $ 150,000 | $ 38,000 | $ 190,000 |
| Site Pump Discharge Piping | $ 25,000 | $ 25,000 | $ 50,000 |
| Diversion Tank | $ 175,000 | $ 18,000 | $ 190,000 |
| Site Roadway | $ 210,000 | | $ 210,000 |
| Site Civil | $ 260,000 | | $ 260,000 |
| Effluent Monitoring Chamber (4) | $ 240,000 | $ 24,000 | $ 260,000 |
| Outfall Pipe (16" & 24" HDPE), @1000 ft | $ 50,000 | $ 25,000 | $ 80,000 |
| On-Line Phosphate Analyzer (5) | $ 100,000 | $ 10,000 | $ 110,000 |
| Instrumentation | $ 35,000 | $ 55,000 | $ 90,000 |
| Electrical | $ 175,000 | $ 100,000 | $ 280,000 |
| Electrical Bldg, 100 sqft | $ 40,000 | $ 5,000 | $ 50,000 |
| Removal after 14 months | $ - | $ - | $ - |
| *Subtotal* | *$ 1,710,000* | *$ 450,000* | *$ 2,170,000* |
| **TOTAL Rounded with Contingency -20% / + 20%** | **$ 1,700,000** | **to** | **$ 2,600,000** |

# SECTION 6
# PERMITTING CONSIDERATIONS

Permits anticipated to be required for the project include the following:

- FDEP Environmental Resource Permit (ERP) for the construction of a stormwater management system and authorization to impact wetlands and surface waters.
- U.S. Army Corps of Engineers (AOCE) Nationwide Permit 7 (NWP 7) - Outfall Structures and Associated Intake for works in surface waters and wetlands.
- FDEP National Pollution Discharge Elimination System (NPDES) Permit to Discharge Process Wastewater from New or Existing Industrial Wastewater Facilities to Surface Waters
- FDEP NPDES Generic Permit For Stormwater Discharge from Large and Small Construction Activities
- Stormwater Notice of Intent/National Pollution Discharge Elimination System (NPDES) and a Storm Water Pollution Prevention Plan (SWPPP).
- FDEP Environmental Resource Permit (ERP) for decommissioning and restoring the site.
- Seminole County Building Permit and ROW permit.

# APPENDIX A

**SJRWMD WATER LEVEL OF LAKE JESUP - 01410650 STATION - OVIEDO**
**(ft NAVD88)**