South Florida Dairies, LLC
Barns 1 and 2
Environmental Improvement Project

October 28, 2025

Prepared by:

Royal Consulting Services, Inc.

211 West Warren Avenue
Longwood, FL 32750
Phone (407) 831-3095
Fax (407) 831-5095
Florida C.A. Lic. No. 7290

Table of Contents

List of Figures

List of Tables

Section 1 Background

Royal Consulting Services, Inc. (RCS), as an authorized agent for South Florida Dairies, LLC (SFD), is pleased to submit this unsolicited proposal on their behalf. RCS and SFD have teamed together to design and construct an environmental improvement project on SFD property in Okeechobee County, Florida. SFD Barns 1 and 2, located in Section 23, Township 35S, Range 35E of Okeechobee County, Florida, operate under Florida Department of Environmental Protection (FDEP) Permit No. FLA139149. The facility lies within the Taylor Creek tributary of the S-191 Basin, part of the Lake Okeechobee Watershed (LOW) and the South Florida Water Management District (SFWMD) Focus Area (See **Figure 1**).

Currently, Barn 1 operates as a confinement-based system with an average annual herd of up to 2,000 lactating cows, approximately 1,100 dry cows in a 97-acre Heavy Use Area (HUA), and 500 dry cows on shared, nutrient-managed pastures with Barn 2. Barn 2 operates as a mixed confinement and pasture-based dairy with a permitted herd of 3,240 lactating cows, of which approximately 1,270 are currently housed in confinement. The remaining lactating herd and approximately 1,500 dry cows are maintained in the Barn 2 HUA pastures. A site map is presented in **Figure 2**.

Discharges from both barns—including parlor wash water, runoff from freestall barns, and drainage from the HUA pastures—flow into a series of settling basins and then to the common 314-acre, two-stage waste storage pond (WSP) system shared by both barns. Treated effluent from the WSP is applied to forage crops via center pivot irrigation. These pivots are located just east of Otter Creek, a maintained ditch within the dairy. Approximately 383 acres of runoff from these irrigated fields are captured and treated in Stormwater Pond 1 (SP-1), a 72-acre pond with 165 acre-feet of storage. SP-1 discharges into Otter Creek approximately 5.7 miles upstream of Taylor Creek and 0.5 miles upstream of the SFWMD monitoring station TCNS207, where the six-month average total phosphorus (TP) and total nitrogen (TN) concentrations are 1.16 mg/L and 5.91 mg/L, respectively (DBHYDRO, 2025).

Section 2 Project Description and Purpose

To improve operational efficiency, water quality protection, and long-term nutrient sustainability, SFD is undertaking a comprehensive upgrade of the Barns 1 and 2 system. The project focuses on two key strategies:

1. Transitioning from a combined pasture- and confinement-based management system to a fully confinement-based operation, and
2. Expanding and enhancing the stormwater and irrigation infrastructure to increase reuse capacity, reduce offsite discharges, and improve nutrient utilization.

Together, these strategies provide a holistic approach to nutrient control and water conservation within the Taylor Creek Basin, aligning with regional watershed restoration goals for the LOW.

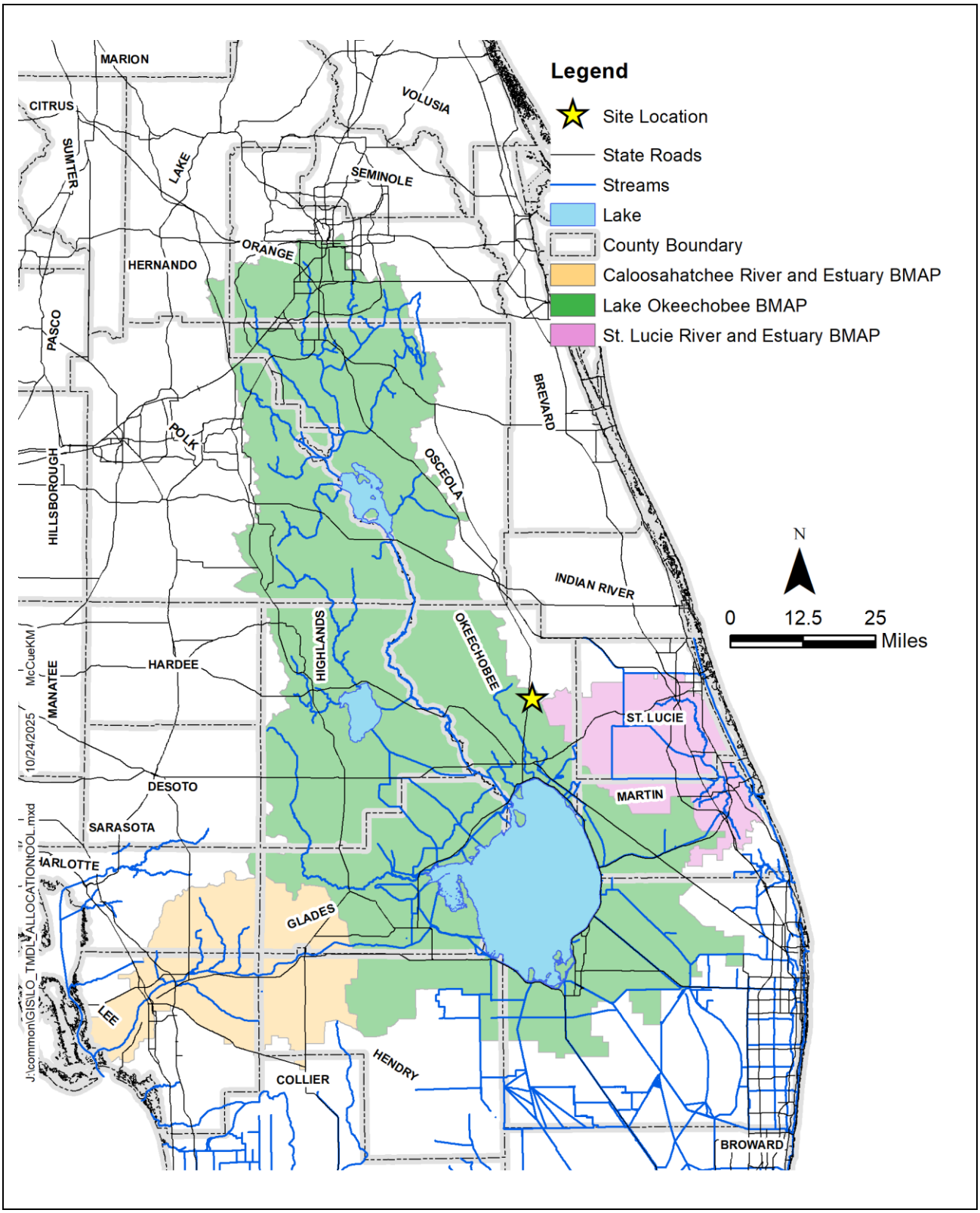


Figure 1 Site Location Map

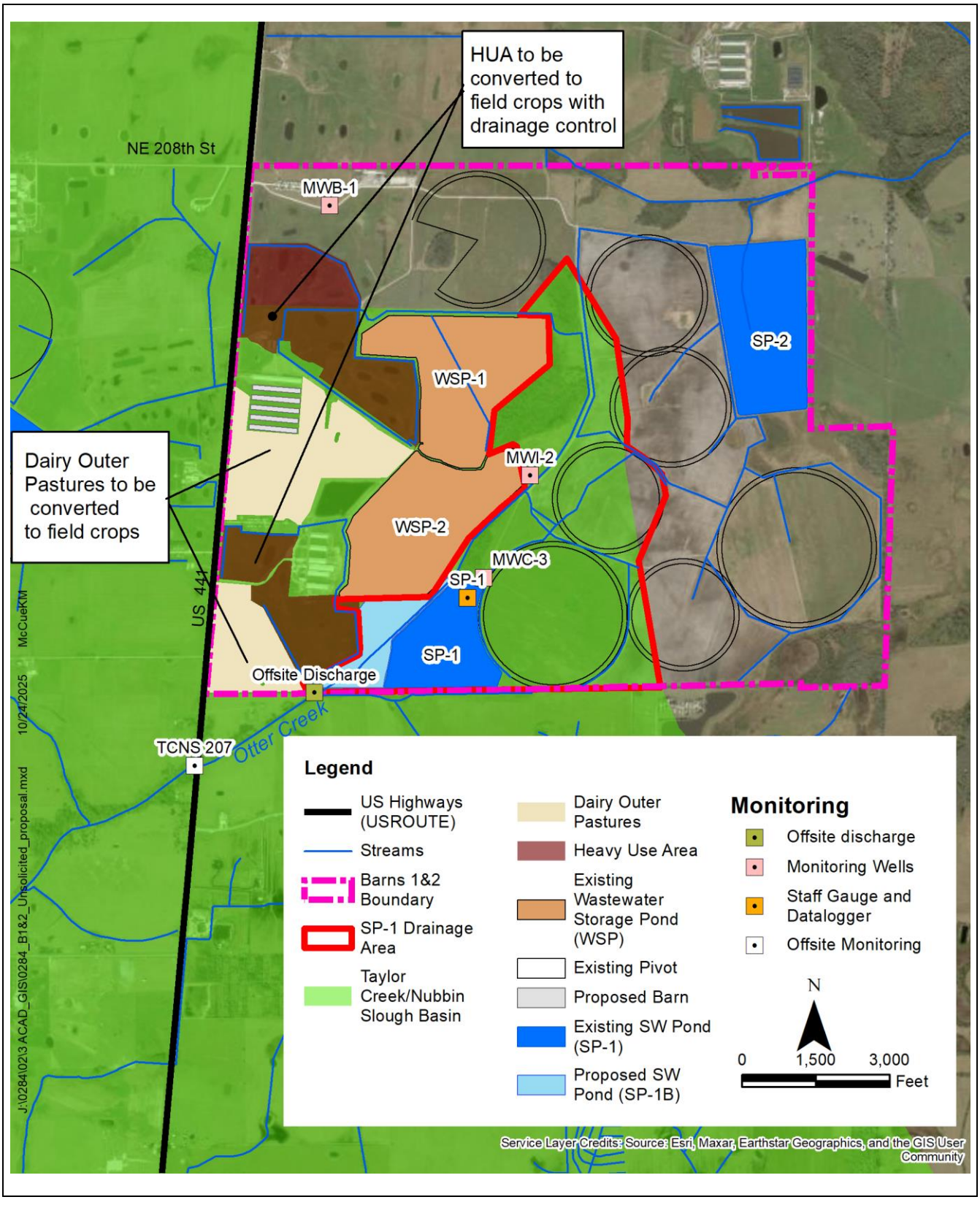


Figure 2 Site Map

2.1 Stormwater Management Enhancements

The proposed project will expand SP-1 to increase its contributing drainage area from 383 acres to 579 acres and integrate reuse irrigation to enhance nutrient recycling and reduce offsite discharges. The system will also be modified to allow drainage to be pumped directly to the WSP during periods of limited pond storage capacity. Between the additional evaporative losses in the ponds and the excess stormwater being reused for irrigation, the amount of stormwater leaving the dairy is estimated to be reduced by about 80%. In addition, due to the additional TP treatment being provided by increased attenuation in the ponds, TP is estimated to be reduced by over 85% (Bottcher, 2023 Proposed Stormwater Reuse and Phosphorus Mitigation Project for McArthur Dairy).

Utilizing the WSP for temporary storage provides several key advantages:

- Provides additional capacity to manage field drainage during high rainfall events.
- Reduces the frequency and volume of offsite discharges to Taylor Creek.
- Promotes natural nutrient attenuation and sediment settling within the storage system.
- Reduces dependence on groundwater withdrawals from the Floridan and Surficial aquifers.

To further improve water management efficiency and environmental performance, a new irrigation main is proposed beneath SR 441 to hydraulically connect WSP1 at Barns 1 and 2 with the WSP serving SFD Barn 4. This interconnection will allow redistribution of treated wastewater among all four SFD dairies, providing flexibility in irrigation scheduling and nutrient application. By enabling balanced water and nutrient reuse across multiple sites, the system reduces the likelihood of storage exceedance or offsite discharge, enhances nutrient utilization by crops, and decreases reliance on groundwater sources. A separate proposal detailing the corresponding improvements for SFD Barns 3 and 4 is provided under a companion submittal.

2.2 Conversion to Full Confinement and Nutrient Management Improvements

This proposal also includes transitioning all remaining lactating and dry cows from the HUA pastures into full confinement through construction of five 915-cow freestall barns. Once animal traffic is removed, the HUA pastures will be converted to hayfields and managed for phosphorus mining to restore soil nutrient balance.

Conversion to a full confinement-based system substantially reduces the potential for nutrient movement offsite by centralizing manure and wastewater within a controlled environment. By housing animals under roofed confinement and capturing all manure, wash water, and drainage for storage and managed land application, nutrient losses through runoff, leaching, and volatilization are greatly minimized. Centralized waste management allows for precise control of nutrient application timing and rates, aligning with crop nutrient demand and preventing soil nutrient overloading.

2.3 Overall Environmental Benefits

Collectively, these improvements will significantly reduce nutrient loading to the Taylor Creek Basin and, ultimately, the LOW. The combination of full confinement, enhanced storage, expanded stormwater management, and cross-facility reuse provides a robust, integrated system that:

- Minimizes offsite discharges of nitrogen and phosphorus.
- Promotes natural attenuation of nutrients within storage and reuse systems.
- Improves irrigation efficiency and nutrient uptake by crops.

- Reduces groundwater withdrawals and conserves freshwater resources.
- Enhances long-term sustainability and compliance with regional nutrient reduction goals.

These actions demonstrate SFD's commitment to implementing best available management practices and supporting watershed-scale improvements in water quality and resource conservation.

Section 3 Project Overview

The proposed improvements at SFD are designed to enhance water quality protection, increase wastewater reuse, and transition the operation toward full confinement and controlled nutrient management. The combined projects include the expansion of SP-1 and the construction of five new freestall barns and associated infrastructure on the east side of the facility. Together, these efforts will substantially reduce offsite discharges to Taylor Creek and support regional nutrient reduction goals for the LOW.

3.1 Design Components

The overall design (included in **Appendix A**) includes the following major components:

- Expansion of SP-1:

  Enlarging the existing SP-1 footprint by approximately 38 acres, with an additional four feet of vertical storage to increase capacity to approximately 110 acres (425 ac-ft). The expanded pond will provide improved stormwater detention, nutrient settling, and irrigation reuse capacity.

- Berm Construction and Elevation Improvements:

  Raising the existing SP-1 berm to an elevation of approximately 70.2 feet, and constructing new containment berms along the west and south sides to improve hydraulic separation and flood resilience.

- Drainage and Irrigation Pump Systems:
  - Installing a 24-inch axial-flow drainage pump with automated controls allowing discharge into either SP-1 or the WSP.
  - Adding two 1,200 gpm diesel-powered irrigation pumps for stormwater reuse with concrete foundations, fuel systems, and backflow control.

- Interconnected Irrigation Network:

  Constructing underground PVC piping to connect the new pumps to the existing center-pivot irrigation system.
  - 16-inch SDR 41 PVC Main – Approximately 2,580 linear feet. Primary stormwater transfer main from SP-1 and WSP pump stations to irrigation distribution network. Designed for high-capacity flow from the 24-inch drainage pump and irrigation reuse pumps.
  - 10-inch SDR 41 PVC Main – Approximately 3,304 linear feet. Secondary distribution main conveying reuse water to the existing and expanded center-pivot irrigation systems. Includes connections to multiple pump stations serving Barns 1 and 2.
  - PVC Connections for Fresh-Water Irrigation Pumps and Wells – Approximately 2,000 linear feet total (based on 1,000 ft per well). Connects two vertical turbine well pumps to

the irrigation main and provides fresh-water supply for flushing, cleaning, and blending with reuse water.

- PVC Connections for Stormwater Irrigation Pumps (SP-1 and SP-2) – Approximately 1,500 linear feet. Connects stormwater irrigation pumps to the existing spray fields for controlled reuse.
- A new 6, 460-foot irrigation mainline beneath SR 441 will connects WSP-1 (Barns 1 and 2) with the WSP at Barn 4, enabling flexible redistribution of reclaimed water among all four dairies to optimize reuse and reduce the potential for offsite discharge.

- Water-Level and Flow Monitoring Systems:

  Installing flow meters, hour meters, staff gauges, and a data-logging system with solar power to continuously record pumping rates, pond levels, and irrigation volumes, supporting adaptive nutrient management and compliance documentation.

- New Freestall Barn Construction:

  Developing five six-row freestall barns, each designed for approximately 915 cows, for a total housing capacity of 4,576 lactating and dry cows. Each barn includes structural, concrete, and electrical systems; stall installation; sand bedding; and integrated manure flush piping.

- Supporting Infrastructure and Utilities:
  - Two fresh-water wells with pumps and pressure tanks for flush and cooling systems.
  - Concrete drive lanes, turnarounds, and access roads surrounding the barn complex.
  - Outside fencing, lighting, and electrical extensions to support barn operations and safety.
  - A sand separation system with drying area for manure management and offsite solids reuse.

3.2 Environmental Benefits

Together, the SP-1 expansion and barn improvements provide a comprehensive, integrated system that:

- Reduces nutrient movement offsite by capturing and reusing stormwater and wastewater within the facility.
- Improves water-quality treatment through sedimentation, nutrient attenuation, and managed reuse.
- Enhances storage and hydraulic control, minimizing discharge frequency and volume to Taylor Creek.
- Supports groundwater conservation by increasing the use of reclaimed water for irrigation.
- Centralizes manure and wastewater handling in a controlled confinement environment, reducing runoff and leaching risks.

Section 4 Nutrient Load Reduction

4.1 SP-1 Expansion Nutrient Load Reduction Estimation

The on-farm nutrient load reduction for the SP-1 expansion was previously estimated by Soil & Water Engineering Technology, Inc. using the Basin Management Action Plan (BMAP) Nutrient Load estimation method (Soil & Water Engineering Technology, Inc. (SWET), 2023). **Equation 1** on the following page is an understanding of the calculation as provided in the document entitled: Methodology for Providing Updated Cost-Effective Estimates for Nutrient Reductions (SWET, 2008).

$$\boldsymbol{TP\ Load = AL * A * (1 - BMP)(1 - AF) * 2.205} \qquad \textbf{Equation 1}$$

Where:

AL = Areal Loading Rate (kg/ha/yr)

A = Area (hectares)

BMP = BMP Reduction Factor (%) (see Table A1-2)

AF = Edge of farm treatment Factor (%)

Equation 1 can be applied to both TP and TN using the appropriate values found for each land use type in the Lake Okeechobee BMAP load estimation tool shapefile.

The potential nutrient loading reduction to the watershed is provided primarily through the stormwater retention and reuse on the farm. These improvements provide a nutrient reduction and reuse benefit through the attenuation of water and the abatement of nutrient loading to Lake Okeechobee. Best Management Practice (BMP) efficiency for stormwater retention is typically estimated at 30% for both TP and TN (SWET, 2008). Since the proposed stormwater pond expansion includes providing the ability to discharge into the WSP during extreme events, offsite discharge is further reduced. Thus, an Edge-of-Farm Treatment efficiency of 80% was applied (SWET, 2023).

Calculation details are provided in **Table 1** and **Table 2** for both existing and proposed loading rates to Lake Okeechobee. As indicated, the project anticipates a total reduction in TP and TN of 1,370 and 7,495 lbs/year, respectively.

Table 1 Proposed Conditions Nutrient Load Calculations (TP)

Type	Area (ha)	Areal Loading (kg/ha/yr)	Edge of Farm Treatment Factor (%)	BMP (%)	Nutrient Load (lbs/yr)
Existing SP-1	155.00	4.01	0%	30%	959
Existing No Pond	79.31	4.01	0%	0%	701
Total Existing	--	--	--	--	1,660
Proposed SP-1 Expansion	232.31	4.01	80%	30%	290
Total TP Nutrient Load Reduction to Lake Okeechobee (lbs/yr)					**1,370**

Table 2 Proposed Conditions Nutrient Load Calculations (TN)

Type	Area (ha)	Areal Loading (kg/ha/yr)	Edge of Farm Treatment Factor (%)	BMP (%)	Nutrient Load (lbs/yr)
Existing SP-1	155.00	21.93	0%	30%	5,246
Existing No Pond	79.31	21.93	0%	0%	3,835
Total Existing	--	--	--	--	9,081
Proposed SP-1 Expansion	234.31	21.93	80%	30%	1,586
Total TN Nutrient Load Reduction to Lake Okeechobee (lbs/yr)					**7,495**

4.2 Barn 2 Full Confinement Transition

The report, *Evaluation of Effectiveness of Abatement Strategies Compared Against Pre-Drainage and Existing Conditions in the Lake Okeechobee Watershed*, authored by SWET, and published on May 28, 2019, evaluated the effectiveness of nutrient abatement strategies in the LOW using the Watershed Assessment Model (WAM), a GIS-based tool that simulated hydrology and water quality. These efforts, conducted to support the Lake Okeechobee BMAP, provided guidance for the SFWMD, the FDEP, and the Florida Department of Agriculture and Consumer Services (FDACS). The study compared current and historical conditions to identify cost-effective BMPs and projects for improving water quality across the watershed. Appendix A of the SWET report provides estimates of the nutrient load (Nitrogen and Phosphorus) for various land uses in pounds per acre per year (lbs/ac/yr). Nutrient load rates are provided for a base condition, and reduced rates are provided assuming fertility and drainage BMP implementation. The data in Appendix A was used to identify how the proposed changes in the land uses and fertility and water management BMPs implementation reduce nutrient loads.

The reduction of the potential nutrient loading to the watershed is provided primarily through the removal of animals from the HUA and outer dairy pasture and placing them inside the proposed freestall barns. Approximately 4,575 cows will be moved from the pastures to the barns removing direct animal waste deposition to the pastures and treatment of all animal waste excretion in the waste management system.

Calculation details are provided in **Table 3** for both existing and proposed loading rates to Lake Okeechobee. As indicated, the project anticipates a total reduction in TP and TN of 2,032 and 3,945 lbs/year, respectively.

Table 3 Existing vs Proposed Conditions Nutrient Load Calculations

Land Use	Acres	TN[1] (lbs/ac/yr)	TP[1] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)
Existing Conditions					
Dairy HIA - Drainage BMP	260.00	17	1.01	4,420	263
Dairy Outer Pasture	203.00	30.3	11.19	6,151	2,272
			Total Load	*10,571*	*2,534*
Proposed Conditions					
Field Crop with Drainage BMP	260.00	15.1	1.19	3,926	309
Field Crops - Nutrient Balance	203.00	13.3	0.95	2,700	193
			Total Load	*6,626*	*502*
			Nutrient Load Reduction	**3,945**	**2,032**
			% Reduction	**37%**	**80%**

1. Evaluation of Effectiveness of Abatement Strategies Compared Against Pre-Drainage and Existing Conditions in the Lake Okeechobee Watershed, Soil & Water Engineering Technology, Inc., 2019

Section 5 Permitting Plan

SFD has an existing Water Use Permit (WUP) through SFWMD Permit Number 47-00082-W. This permit includes irrigation via wastewater and stormwater reuse. As SFD will not be requesting additional water as part of this project, no modification to the SFWMD WUP is anticipated.

SFD Barns 1 and 2 operates under FDEP Concentrated Animal Feeding Operation Permit No. FLA13149-004-IW4A. A modification of this permit will be requested based on a revised and updated Nutrient Management Plan (NMP), which will recalculate the volumetric nutrient balance and water quality resulting from the proposed confinement barns and expanded stormwater pond. The revised NMP will also include a wetland delineation, Threatened and Endangered (T&E) Species Survey, and how any mitigation requirements for T&E or wetlands will be accomplished. For this project, no wetland or T&E mitigation is anticipated.

Section 6 Monitoring & Reporting Plan

A map of the wells and pump stations used in the water quality monitoring and water use and level monitoring protocols are shown in Figure 2. The monitoring plan will consist of the following:

- Water quality monitoring – Quarterly
    - Existing monitoring wells
    - WSP
    - SP-1
    - Offsite discharge location
- Pumpage record – Monthly
    - Flow meters will be installed on both the drainage pumps and irrigation pumps
    - Flow totals will be recorded monthly

- Water level
    - Staff gauge and solar powered data logger in SP-1 – Daily
    - Staff gauge in pump sump – Weekly

6.1 Water Quality Monitoring

In accordance with the NMP for Barns 1 and 2, the groundwater monitoring wells are tested on a quarterly basis and analyzed by a laboratory approved by the Florida Department of Health and Rehabilitation Services. At a minimum, water samples are analyzed for the following parameters:

- Total Nitrogen (as N)
- Nitrate Nitrogen (as N)
- Total Phosphorus (as P)
- Ortho Phosphorus (as P)
- pH
- Water Level
- Specific Conductance
- Fecal Coliform
- Temperature

This information is submitted quarterly to the FDEP and can be shared with the SFWMD as part of this project. During these quarterly events, water quality will also be collected from SP-1 and the offsite discharge location.

6.2 Water Use and Level Monitoring

As a requirement of SFD's WUP, pumpage and water level monitoring are already conducted on onsite wells, and WSP-1 and 2. Monthly meter readings are taken and the total monthly flow (in million gallons) is submitted quarterly.

For this project, additional meter readings will be collected from SP-1 drainage and irrigation pumps. In addition, water level monitoring via a solar powered data logger will be conducted on a daily basis from SP-1.

6.3 Final Report

At the conclusion of the five-year monitoring period, a comprehensive final water quality report will be submitted, summarizing the results, evaluating the effectiveness of implemented practices, and providing recommendations for ongoing management.

Section 7 Operations Plan

SFD proposes to construct a stormwater improvement project for their Barn 1 site. The existing system will be upgraded by the following work:

- Expand the stormwater pond to increase storage capacity.
- Add a new 24" diesel engine powered drainage pump.
- Provide an option to deliver stormwater into the existing dairy wastewater pond for irrigation reuse when appropriate.
- Provide two diesel engine-powered irrigation pumps for stormwater reuse.
- Install a "Field Overflow" riser to detain water on-site, allowing the drainage pumps to deliver it into the stormwater ponds rather than allowing it to flow off-site.

Section 8 Project Funding Plan & Cost Effectiveness

As discussed in Section 3, a reduction in TN for the SP-1 expansion components and full confinement transition was estimated at 7,495 and 3,945 lbs/yr, respectively. Similarly, the TP reduction for the SP-1 expansion components and full confinement transition was estimated at 1,370 and 2,032 lbs/yr, respectively. Resulting in an estimated total annual reduction of TP and TN for the project of 3,402 lbs TP and 11,440 lbs TN, respectively (see **Table 4**).

Table 4 Total Nutrient Reduction

Plan Component	TN Reduction (lbs/year)	TP Reduction (lbs/year)
SP-1 Expansion	7,495	1,370
Full Confinement Transition	3,945	2,032
Total	**11,440**	**3,402**

Tables 5 and **6** summarize the project funding plan and cost effectiveness for the SP-1 expansion components and full confinement transition, respectively. The expected life of the proposed vat solids separator is 20 years. Detailed cost estimates of the SP-1 expansion and full confinement transition are provided in **Appendix B.**

Table 5 Project Funding Plan for SP-1 Expansion

Component	Total Project
Present Cost	$2,580,700
Future Cost (F/P, 4.5%, 20 yrs)	$6,223,910
Annual Operation and Maintenance Costs ($/yr)	$0
Total Annual Average Costs (F/P, 4.5%, 20 yrs) / 20 + O&M	$311,196
TP Cost Effectiveness ($/lb/yr)[1]	$227
TN Cost Effectiveness ($/lb/yr)[1]	$42

Table 6 Project Funding Plan for the Transition to Full Confinement

Component	Total Project
Present Cost	$26,027,300
Future Cost (F/P, 4.5%, 20 yrs)	$62,770,404
Annual Operation and Maintenance Costs ($/yr)[1]	$100,000
Total Annual Average Costs (F/P, 4.5%, 20 yrs) / 20 + O&M	$3,238,520
TP Cost Effectiveness ($/lb/yr)[2]	$1,594
TN Cost Effectiveness ($/lb/yr)[2]	$821

Section 9 Implementation Schedule

Table 7 summarizes the implementation schedule for the proposed project.

Table 7 Implementation Schedule

Task No.	Task Title	Task Start Date	Task End Date
1	Site Assessment and Permitting	2025	2026
2	Engineering and Design	2025	2026
3	Infrastructure Construction	2026	2028
4	Monitoring and Reporting	2026	2031
5	Reporting and Compliance	2026	2031

Section 10 References

DBHYDRO (Environmental Data), 2025. South Florida Water Management District. South Florida Water Management District, https://www.sfwmd.gov/science-data/dbhydro.

Florida Department of Environmental Protection. *Notice of Permit Minor Revision (Permit Transfer): Transfer of McArthur Farms Dairy – Barns 1 & 2 (Permit No. FLA139149-008-IWF-MT).* Southeast District, 13 Mar. 2025.

Royal Consulting Services, Inc, 2015. McArthur Farms, Inc. Attachment A3 Water Demand Computation, December 2015. Submitted in support of SFWMD Water Use Permit application no. 141208-1.

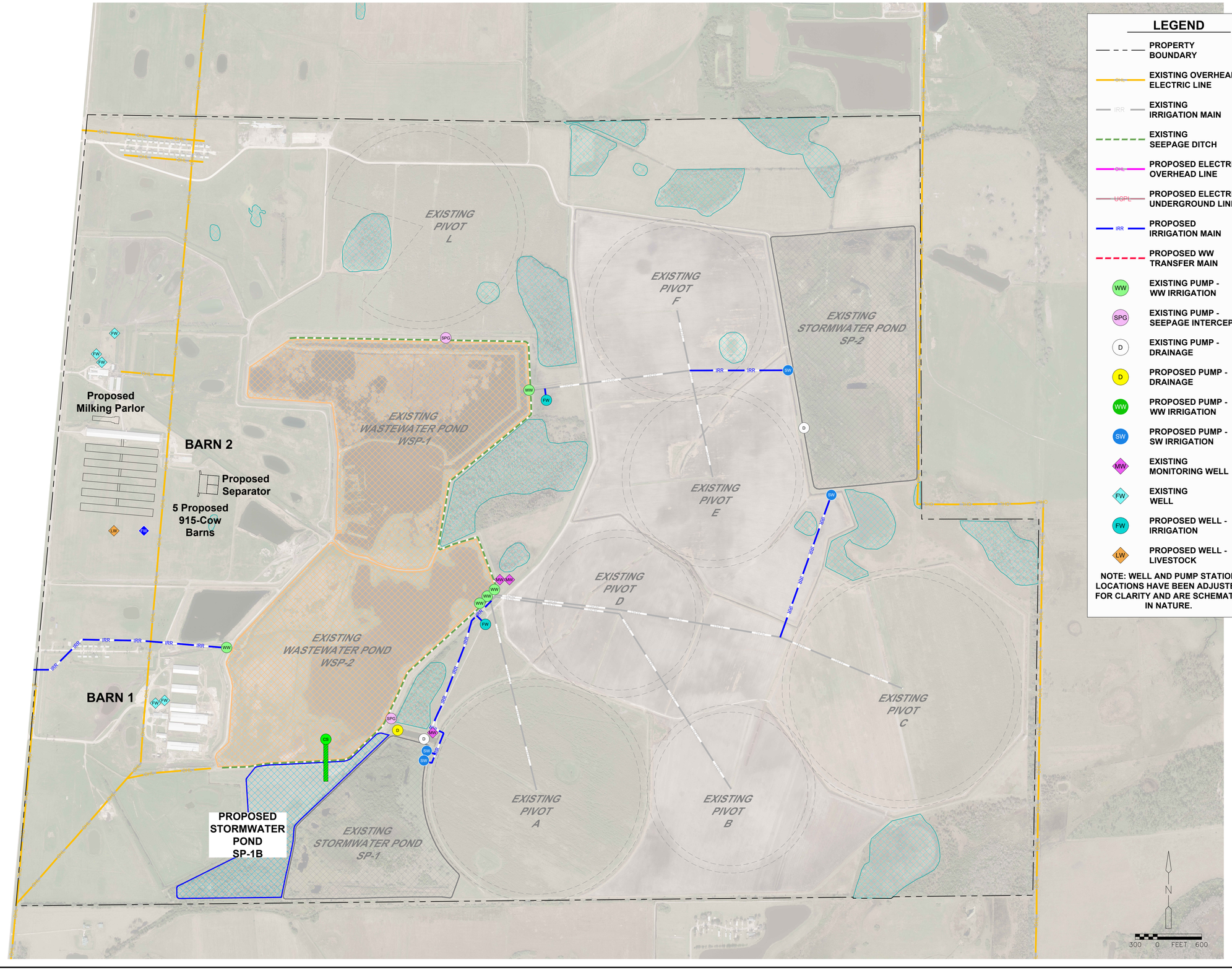
Royal Consulting Services, Inc. *Nutrient Management Plan: McArthur Farms Barns 1 & 2 CNMP.* Royal Consulting Services, Inc., 2014. PDF file.

Soil and Water Engineering Technology, Inc., 2008. Final Report Tasks 1, 2 and 3 Nutrient Loading Rates, Reduction Factors and Implementation Costs Associated with BMPs and Technologies. Prepared for South Florida Water Management District, July 14, 2008.

Soil and Water Engineering Technology, Inc., 2019. Evaluation of Effectiveness of Abatement Strategies Compared Against Pre-Drainage and Existing Conditions in the Lake Okeechobee Watershed. Prepared for South Florida Water Management District, May 28, 2019.

Soil and Water Engineering Technology, Inc., 2023. Proposed Stormwater Reuse and Phosphorus Mitigation Project for McArthur Dairy.

Appendix A
Conceptual Plans



LEGEND

- PROPERTY BOUNDARY
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING IRRIGATION MAIN
- EXISTING SEEPAGE DITCH
- PROPOSED ELECTRIC OVERHEAD LINE
- PROPOSED ELECTRIC UNDERGROUND LINE
- PROPOSED IRRIGATION MAIN
- PROPOSED WW TRANSFER MAIN
- EXISTING PUMP - WW IRRIGATION
- EXISTING PUMP - SEEPAGE INTERCEPT
- EXISTING PUMP - DRAINAGE
- PROPOSED PUMP - DRAINAGE
- PROPOSED PUMP - WW IRRIGATION
- PROPOSED PUMP - SW IRRIGATION
- EXISTING MONITORING WELL
- EXISTING WELL
- PROPOSED WELL - IRRIGATION
- PROPOSED WELL - LIVESTOCK

NOTE: WELL AND PUMP STATION LOCATIONS HAVE BEEN ADJUSTED FOR CLARITY AND ARE SCHEMATIC IN NATURE.

Job No. 0284-02-ES
Date: 10-20-2025
County: OKEECHOBEE
State: FLORIDA
Projection: N/A
Scale: AS SHOWN

811 Know what's below. Call before you dig.

Design: R.A.J.
Drawn: J.J.D.
Checked:
Approved:

Royal Consulting Services, Inc.
211 West Warren Avenue
Longwood, FL 32750
(407) 831-3095 phone
(407) 831-5095 fax
www.royalconsulting.com
Registry License No. 7280

Revision:

No.	Date:

These drawings have not been signed or sealed, and are considered DRAFT – FOR REVIEW PURPOSES ONLY
Printed or digital copies of this document are NOT considered signed and sealed for the purposes of construction or bidding.

DRAFT
For review purposes only

Richard A. Jones
FL P.E. No. 31118

SOUTH FLORIDA DAIRIES, LLC

MASTER PLANNING

CONCEPTUAL PLAN
BARNS 1 & 2

SHEET G-1

J:\02844\2023 ACAD_CES\ACAD\0284-02_MASTER-BASE_working_3D.dwg, C-2_Barns 1&2, 8-30, 8:30

Appendix B
Cost Estimates

South Florida Dairies

East Side New Barns

Environmental Improvements
RCS Project No. 0284-02-ES
By: Richard A. Jones, PE
Date: October 24, 2025
Barns for 4,576 Lactating and Dry Cows, Assume five 915 cow 6 row barns

Five x 915 Cow Barns

Description	Units	Quantity	Unit Cost	Total Cost
Mobilization and Demobilization	LS	1	$175,000.00	$175,000
Freestall Barns including:	Cow	4,575	$3,000.00	$13,725,000
Barn Structure				
Barn Erection Labor				
Concrete Work				
Reuse Pipe Work & Flush Valves				
Stalls				
Fences and Gates				
Water Troughs & Water Pipe				
Electric Materials and Labor				
Sand Bedding				
Misc. expenses such as freight & supplies				
48" Cow Comfort Fans	Ea.	480	$975.20	$468,096
New 25,000 Gallon Flush Tanks & Slabs	Ea.	5	$49,035.19	$245,176
12" PVC Flush Main	Ft	800	$148.75	$119,001
6" PVC Flush Tank Supply Main	Ft	1,000	$14.72	$14,717
6" PVC Fresh Water Supply Main	Ft	2,500	$14.72	$36,791
Fresh Water Well, Pump & Pressure Tank	LS	2	$172,500.00	$517,500
Outside Concrete Work Including:	LS	1	$1,032,540.00	$1,032,540
Main Street Walk Lane				
Concrete Apron & Turn Around West End of Barns				
Concrete Apron East End of Barns				
Outside Fences and Gates				
Earthwork for Barn Pad (Includes 15% compaction)				
Grub site (Assumed 6" deep)	CY	24,196	$1.50	$36,294
Excavate fill from borrow, load trucks	CY	675,481	$1.50	$1,013,222
Haul fill to barn pad	CY	675,481	$1.00	$675,481
Place fill in barn pad	CY	675,481	$1.00	$675,481
Compact barn pad fill	CY	675,481	$0.50	$337,741
Misc. Earthwork Requirements	Percent	1	$0.15	$405,289
Sod - 12' wide around each barn	SF	112,920	$0.35	$7,904
Construct Shell Rock Access Roads	LS	1	$186,198.33	$186,198
Extend Existing OHPL (FPL)	Ft	1,696	$20.00	$6,784
UGPL to Barn	Ft	250	$40.00	$2,000
				$19,680,215

Milking Parlor

Description	Units	Quantity	Unit Cost	Total Cost
2 X 50 Parallel Milking Parlor including:	LS	1	$3,000,000.00	$3,000,000
Building erected				
Flush valves, flush controls, flush pipework				
Milking equipment and ancillary equipment				
Refrigeration				
1200 Amp service, power distribution, control panels				
Lights, fans, office AC and infrastructure				
Fresh Water Well, Pump & Pressure Tank	Ea.	1	$85,000.00	$85,000
New 25,000 Gallon Flush Tanks & Slabs	Ea.	1	$49,035.19	$49,035
Earthwork for Building Pad	LS	1	$94,206.24	$94,206
Access Road & Parking	LS	1	$119,818.67	$119,819
Area Lighting	LS	1	$20,000.00	$20,000
				$3,368,060

Sand Separator

Description	Units	Quantity	Unit Cost	Total Cost
Concrete Work for 20' x 250' Long Sand Separator with 75' x 250' Sand Drying Area	LS	1	$417,443.33	$417,443
Earthwork for Sand Separator	CY	2,236	$4.33	$9,674
Sod - 10' wide around Separator	SF	20,000	$0.35	$7,000
				$434,117

Waste Water Transfer Pump & Main

Description	Units	Quantity	Unit Cost	Total Cost
1800 GPM Electric Centrifugal Pump	LS	1	$24,750.00	$24,750
OHPL Electric Service to Pump Station	Ft	280	20	$5,600
Electric Rack, Motor Controls, Electrician	LS	1	16,000	$16,000
Concrete Pump Station Slab & Roof	LS	1	5,520	$5,520
Pump Suction, Discharge, Valves	LS	1	7,906	$7,906
12" SDR 41 PVC Pipe Main, Installed	Ft	6,460	50	$323,000
PVC Fittings, Values Allowance	LS	1	11,305	$11,305
Jack & Bore	LS	1	120,000	$120,000
				$514,081

General Construction Services

Description	Units	Quantity	Unit Cost	Total Cost
Engineering	Ea.	5	$80,457.33	$402,287
Geotech/Survey/T&E/Permits/Monitoring	Ea.	5	$60,342.99	$301,715
Construction Oversight	Months	30	$15,000.00	$450,000
Mobilization / Startup	LS	1	$185,000.00	$185,000
Certification, Inspections, As Builts	LS	1	$50,000.00	$50,000
				$1,389,002

Summary	Proposed
Five x 915 Cow Barns	$19,680,215
Milking Parlor	$0
Sand Separator	$434,117
Waste Water Spray Fields	$0
Waste Water Transfer Pump & Main	$514,081
General Construction Services	$1,389,002
Project Subtotal	***$22,017,414***
Sales Tax	$1,643,767
Contingency 10%	$2,366,118
Total with Tax & Contingency	**$26,027,300**

Job No.: 0284-02-ES
Project: South Florida Dairies
SW Pond 1 Improvements & Expansion
Detail: Engineer's Cost Estimate
Date: 9/26/2025
By: RAJ

Royal Consulting Services, Inc.
211 West Warren Avenue
Longwood, FL 32750
(407) 831-3095 phone
(407) 831-5095 fax
www.royalconsulting.com

A	**Drainage Pump (SP-1 & WSP)**	**Units**	**Qty.**	****$/Unit**	**Total**
	24" Axial Flow Drainage Pump, Gear Drive, PTO				
1	Shaft, 80' of 24" Discharge Pipe and Flap Gate	(ea)	1	$57,500.00	$57,500
2	Pump Mounting Structure	(ls)	1	$41,400.00	$41,400
3	Labor & Machinery Costs	(ls)	1	$19,500.00	$19,500
4	Rip Rap for Stabilization, Placed	(yd^3)	120	$90.00	$10,800
5	Concrete Slab & Roof Over Pump	(ls)	1	$5,520.00	$5,520
6	Tier 4 Diesel Power Unit w/ PTO	(ea)	1	$54,280.00	$54,280
7	500 Gal Double Wall Fuel Tank	(ea)	1	$3,450.00	$3,450
8	Extend 24" Discharge Pipe WSP	(ft)	170	$373.75	$63,538
9	Fabricated 24" Tee, Two 24" Valves	(ls)	1	$23,538.00	$23,538
				Total	**$279,526**

B	**Stormwater Irrigation Pumps (From SP-1 & SP-2 to Existing Spray Fields)**	**Units**	**Qty.**	****$/Unit**	**Total**
1	1,200 GPM Diesel Centrifugal Pump Unit (Tier 4)	(ea)	3	$55,890.00	$167,670
2	Concrete Pump Station Slab & Roof	(ls)	2	$5,520.00	$11,040
3	Suction & Discharge Appurtenances	(ea)	3	$7,906.25	$23,719
4	500 Gal Double Wall Fuel Tank(s)	(ea)	3	$3,450.00	$10,350
5	Connection to underground PVC mains	(ft)	3	$3,000.00	$9,000
6	Control Valves, Backflow Valves, Fittings	(ls)	3	$15,450.00	$46,350
7	Pump Installation Labor	(days)	12	$1,700.00	$20,400
				Total	**$288,529**

C	**B-1 & B-2 Fresh Water Irrigation Pumps/Wells**	**Units**	**Qty.**	****$/Unit**	**Total**
1	12" Floridan Well	(ea)	2	$85,000.00	$170,000
2	Vertical Turbine Well Pump, Installed	(ls)	2	$40,000.00	$80,000
3	Right Angle Drive and PTO Shaft	(ea)	2	$7,500.00	$15,000
4	Tier 4 Diesel Power Unit w/ PTO	(ea)	2	$54,280.00	$108,560
5	500 Gal Double Wall Fuel Tank(s)	(ea)	2	$3,450.00	$6,900
6	Concrete Pump Station Slab & Roof	(ls)	2	$5,520.00	$11,040
7	Connection to underground PVC mains	(ft)	2	$3,000.00	$6,000
8	Control Valves, Backflow Valves, Fittings	(ls)	2	$30,475.00	$60,950
9	Pump Installation Labor	(days)	8	$1,700.00	$13,600
				Total	**$472,050**

E	**B-1 & B-2 PVC Mains and Control Valves**	**Units**	**Qty.**	****$/Unit**	**Total**
1	16" SDR 41 PVC Pipe, Installed	(ft)	2,580	$61.25	$158,025
2	10" SDR 41 PVC Pipe, Installed	(ft)	3,304	$24.50	$80,948
3	PVC Fittings, Budget	(ls)	1	$11,948.65	$11,949
4	Water Source Control Valves	(ea)	9	$841.00	$7,569
				Total	**$258,491**

F	**B-1 & B-2 Center Pivot Irrigation Systems**				
1	No new spray fields proposed	(ea)	1	$0.00	$0
				Total	**$0**

G	**Raise Existing SP-1 Berm to Elevation 70.2'**				
1	Strip Existing Berm	(yd^3)	11,431	$1.00	$11,431
2	Excavate and Haul Fill From Borrow Site	(yd^3)	35,612	$1.75	$62,321
3	Place and Compact Fill in Berm	(yd^3)	35,612	$3.50	$124,642
4	Finish Grade Berm	(ft)	4,988	$0.95	$4,739
5	Place Stripping on Side Slopes	(yd^3)	11,431	$1.50	$17,147
6	Sod top of berm	(ft^2)	93,636	$0.35	$32,773
7	Seed & mulch disturbed areas	(ft^2)	234,090	$0.06	$14,045
8	Construction survey	(ls)	1	$5,500.00	$5,500
9	Geotechnical Testing	(ls)	1	$5,000.00	$5,000
10	Erosion & Turbidity Control	(ls)	1	$6,500.00	$6,500
				Total	**$284,097**

H	**Construct Berm On West Side of SP-1A**				
1	Strip Berm Footprint	(yd^3)	1,959	$1.00	$1,959
2	Excavate Internal Borrow Ditch, Stockpile	(yd^3)	11,807	$1.75	$20,662
3	Place and Compact Fill in Berm	(yd^3)	11,737	$3.50	$41,080
4	Finish Grade Berm	(ft)	1,150	$0.95	$1,093

Job No.: 0284-02-ES
Project: South Florida Dairies
SW Pond 1 Improvements & Expansion
Detail: Engineer's Cost Estimate
Date: 9/26/2025
By: RAJ

Royal Consulting Services, Inc.
211 West Warren Avenue
Longwood, FL 32750
(407) 831-3095 phone
(407) 831-5095 fax
www.royalconsulting.com

5	Place Stripping on Berm for Stabilization	(yd^3)	1,959	$1.50	$2,939
6	Sod top of berm	(ft^2)	32,880	$0.35	$11,508
7	Seed & mulch disturbed areas	(ft^2)	8,000	$0.06	$480
8	Construction survey	(ls)	1	$5,500.00	$5,500
9	Geotechnical Testing	(ls)	1	$5,000.00	$5,000
10	Erosion & Turbidity Control	(ls)	1	$6,500.00	$6,500
				Total	**$96,720**

I Construct Berm on Two Sides of SP-1B

1	Clear and Grub Berm Path	(ac)	5	$800.00	$4,024
2	Strip Berm Footprint	(yd^3)	2,738	$1.00	$2,738
3	Excavate and Haul Fill from Borrow to Berm	(yd^3)	37,391	$1.75	$65,434
4	Place and Compact Fill in Berm	(yd^3)	37,391	$3.50	$130,869
5	Finish Grade Berm	(ft)	2,738	$0.95	$2,601
6	Place Stripping on Berm for Stabilization	(yd^3)	5,476	$1.50	$8,214
7	Sod top of Berm	(ft^2)	46,080	$0.35	$16,128
8	Seed & mulch disturbed areas	(ft^2)	115,200	$0.06	$6,912
9	Construction survey	(ls)	1	$5,500.00	$5,500
10	Geotechnical Testing	(ls)	1	$5,000.00	$5,000
11	Erosion & Turbidity Control	(ls)	1	$6,500.00	$6,500
				Total	**$253,920**

J Monitoring and Data Reporting

1	Staff Gauge in Ponds & Pump Sumps	(ea)	3	$2,500.00	$7,500
2	Irrigation Pumps Flow Meters	(ea)	5	$2,500.00	$12,500
3	Drainage Pump Hour Meter & Calibration	(ea)	1	$4,600.00	$4,600
4	Pond Stage Data Logger w/ Solar Charger	(ls)	1	$4,812.50	$4,813
					$29,413

K General Requirements

1	Administration	$35,100
2	Engineering (design update, certification and inspection)	$58,882
3	Construction Management	$110,500
4	Mobilization	$20,000
5	Start up costs	$18,500
	Total	**$242,982**

PROJECT TOTAL ^	$2,205,726
SALES TAX - 7%	$154,401
PROJECT CONTINGENCY - 10%	$220,573
TOTAL INCLUDING CONTINGENCY	**$2,580,700**