

Stormwater Analysis Memo

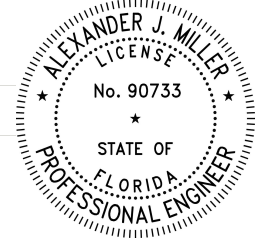
Date: Monday, April 08, 2024

Project: Lee County Solid Waste – Stormwater Analysis of Basin 6

To: Robbie Lanier – Technician Senior
Rebecca Rodriguez – Public Utilities Operations Manager
Lee County Public Utilities

From: Alexander Miller, PE
HDR Engineering, Inc.

Subject: Basin 6 Stormwater Analysis and Conceptual Design



Alexander J Miller
Digitally signed by Alexander J Miller
DN: cn=Alexander J Miller,
o=HDR Engineering, Inc., c=US
Reason: I am the author of this document
Email address: alexander.miller@hdr.com
Date: 2024.04.08 13:45:05 -0400

Introduction

Project Description

Lee County Division of Solid Waste (the County) is considering an expansion project on-site at the Solid Waste Energy Recovery Facility (10500 Buckingham Road, Fort Myers, Florida). The project would involve construction of a new administrative building, an expansion of the existing parking lot, and the filling and associated grading around two depressional areas (see Appendix B for preliminary site layout provided by the County). The County has tasked HDR with the preliminary stormwater design for the project to determine the feasibility of the preliminary proposed layout from a stormwater design and permitting perspective.

Purpose

The purpose of this memorandum is to outline the stormwater analysis performed for this project, including the existing conditions, previous permitting history, and proposed stormwater conceptual design required for the future building and parking lot expansion.

All elevations presented in this memorandum are in NAVD 88 unless otherwise stated.

$$\text{NAVD 88} + 1.15 \text{ ft} = \text{NGVD 29}$$

Background Information

Permitting History

The site is permitted through the Siting Coordination Office (SCO) under Florida Department of Environmental Protection (FDEP) permit number DEP-PA-90-30. Permitting requirements for stormwater are outlined in the site's Conditions of Certification and set through the requirements under F.A.C. 62-25, F.A.C. 62-330, and through the South Florida Water Management District (SFWM) Environmental Resource Permit (ERP) Handbook.

The Conditions of Certification were last modified in 2010 for the proposed improvements including the expansion of the Recovered Materials Processing Facility, relocation of the Construction and Debris Recycling area, and construction of a Vehicle Maintenance Facility. A 2009 master stormwater analysis was performed by HDR for this project. Excerpts from this approved stormwater report can be found in Appendix C.

In 2019, HDR prepared an update to the approved stormwater report for various projects within the Solid Waste Complex. Some of these proposed projects were never constructed and have been modified/removed from the County's master plan. The current proposed expansion (new admin building & parking lot) was not part of the 2019 stormwater update, but a similar project was considered within Basin 6 in a different location. Excerpts from the 2019 stormwater report update are included in Appendix D for reference.

Existing Conditions

The project is intended to take place in the northwest corner of the site and falls within Basin 6 from the master stormwater plan (Appendix C). The site is currently acting as a closed basin and has no positive drainage up to the 100-year, 24-hour event. Basin 6 has four existing depressional areas that retain runoff: two significant areas that cover the west/north side of the basin and the south/east side of the basin, and two small depressional areas within the existing parking areas. There are two existing parking facilities within the basin, one paved and one of dirt, that drain into these depressional areas. See Appendix A for the Existing Drainage Basin Map. Based on a desktop analysis and the previous 2019 Technical Memorandum (Appendix D), no critical wildlife habitat nor protected wildlife is anticipated within the project site.

Proposed Conditions

The proposed conditions include a new building with offices, restrooms, and conference space, as well as an extension of the existing parking lot and improvements to the ingress/egress turnouts. Two depressional areas with trees will be cleared and filled: one within the paved parking lot to the south will be partially filled, and one within the dirt parking lot to the north is anticipated to be fully filled for safety concerns for the trucks there. Minor grading may also occur surrounding the building and parking lot. See Appendix A for the Proposed Drainage Basin Map and Appendix B for the preliminary site layout provided by the County.

Stormwater Analysis

Methodology

A hydrologic and hydraulic (H&H) model was created for Basin 6 to determine whether the existing depressional areas could still function with the proposed site improvements. The model was created using the ICPR4 software. The depressional areas in Basin 6 are represented as stage/area nodes with weir links connecting them. A boundary stage, or tailwater condition, is set just southeast of the Basin 6 limits and uses peak stages from the stormwater master plan ICPR4 model developed in 2019 for the site.

Stormwater runoff to each depressional area was calculated with the SCS Curve Number method. Land usages were drawn in from recent aerials and include paved areas, open space (good condition), forested areas, and disturbed (compressed dirt parking area) zones. The hydrologic soil group (A/D) for the site was taken from the NRCS Web Soil Survey. During a field review, site staff noted that the area remains dry throughout the year and no wetland vegetation was observed in the depressional areas. Therefore, a hydrologic soil group of 'A' was used for curve number calculations.

A proposed condition model was developed from this existing condition model to represent the proposed site development. Storage around the proposed parking lot and building locations was removed from the nodes to represent the fill that would be added to the site. Proposed land usages, including the impervious building footprint and expansion of the paved parking lot, were drawn from a preliminary site layout provided by the County. The results of these analyses are presented below in Tables 1 and 2.

A recovery analysis of the existing and proposed dry retention systems was also conducted in ICPR4, although dry retention recovery is not mandated by the SFWMD ERP Handbook. Current soil exploration has not been performed. Old soil data taken from the 2009 master stormwater analysis for the adjacent basin (Basin 4) was used to perform preliminary dry retention pond recovery analysis. The analysis showed that the proposed improvements cause an increase in recovery time within the system. Results of this recovery analysis are presented in Appendix F.

Results

The results of the analysis show that all runoff from a 100-year, 72-hour design storm event is contained within Basin 6 in the existing condition; however, the proposed improvements raise peak stages above the existing berm elevations, causing off-site discharges. After discussion with the County, it was determined that a preliminary design involving elevating of the existing berm would be analyzed to determine if the project was still feasible.

Table 1: Existing Conditions Model Peak Stage Results

Node Name	Peak Stage 10-year/24-hour (ft.)	Peak Stage 25-year/72-hour (ft.)	Peak Stage 100-year/72-hour (ft.)	Top of Bank Elev. (ft.)	Warning Stage Description
Depression-C1	21.60	22.05	22.38	23.43	Pop-off to Depression-W
Depression-C2	23.17	23.22	23.23	23.12	Pop-off to Depression-N
Depression-E	20.59	20.92	21.18	21.56	Pop-off southeast into Basin 4
Depression-N	20.66	21.21	21.59	21.68	Lowest top of bank elevation
Depression-W	20.66	21.21	21.59	21.72	Lowest top of bank elevation

Table 2: Proposed Conditions Model Peak Stage Results

Node Name	Peak Stage 10-year/24-hour (ft.)	Peak Stage 25-year/72-hour (ft.)	Peak Stage 100-year/72-hour (ft.)	Top of Bank Elev. (ft.)	Warning Stage Description
Depression-E	20.69	21.07	21.37	21.56	Pop-off southeast into Basin 4
Depression-N	21.16	21.85	22.26	22.50	Lowest top of bank elevation
Depression-W	21.16	21.85	22.27	22.50	Lowest top of bank elevation

Stormwater Quality

The proposed site improvements will add approximately 0.20 acres of impervious area, for a total of 0.78 acres of impervious area within the 5.04-acre basin that is required to be treated; however, since the natural dry retention features of the basin are being used for stormwater management, the entire volume of runoff for the site can be considered treatment volume.

Treatment calculations using the two approaches set in the SFWMD ERP Handbook are provided in Appendix G. The required treatment volume for this basin is the higher of the two approaches, which in this case is 0.21 acre-feet in both the existing and proposed conditions. Since this is much less than the retention volume of the system, meeting treatment volumes should not be a concern for this proposed work. Existing and proposed treatment volume for these dry retention features are outlined in the below table. Both the existing retention volume of 2.71 ac-ft and the proposed retention volume of 2.85 ac-ft are well above the required 0.21 ac-ft of treatment volume.

Table 3: Existing and Proposed Retention Volumes

Retention Area	Required Treatment Volume (ac-ft)	Existing Retention Volume (ac-ft)	Proposed Retention Volume (ac-ft)
North/West	0.21	1.81	2.02
East		0.90	0.83

Conceptual Design

Berm Elevation

Using the results of the proposed conditions analysis, it was determined that a minimum berm elevation of 22.27-ft would be required to contain the 100-year, 72-hour design storm event and prevent off-site flows or impacts to the master stormwater plan of the site. It is recommended

that a **minimum berm elevation of 22.50-ft** be used for design purposes, which provides 3-inches of freeboard and accounts for some uncertainties in the analysis.

A preliminary berm design is provided below in Figure 1.

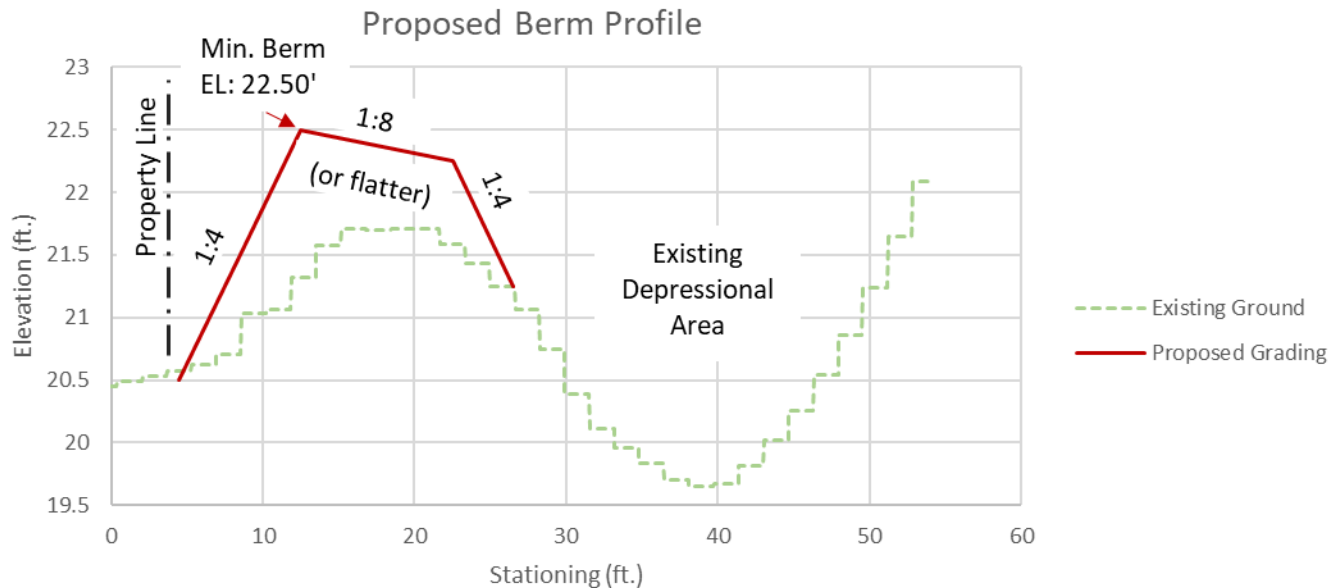


Figure 1: Preliminary Berm Design

Building Finished Floor Elevation

Per SFWMD and FEMA regulations, a building's finished floor elevation (FFE) needs to be at least 1-ft higher than the 100-year floodplain elevation. No FEMA regulatory floodplains exist within the project limits. The results of this analysis dictate a minimum FFE of 23.00-ft. However, since the previous stormwater management plan calls for a site-wide **minimum FFE of 23.60-ft.**, it is recommended to use that elevation.

Site Grading

Parking lot grading should match the existing high points as much as possible. The designer should ensure that positive sheet flow drainage can occur over the parking lot and building footprint and be collected within the associated depressional area. Due to the location of the building footprint, there is a potential for the hydraulic connection within the depressional area to be impacted. If the grading scheme during design expects an impact to this area, a 15-inch side drain with mitered end sections may be required. This pipe was included in the model for conservativeness, but is likely not required based on the footprint of the building.

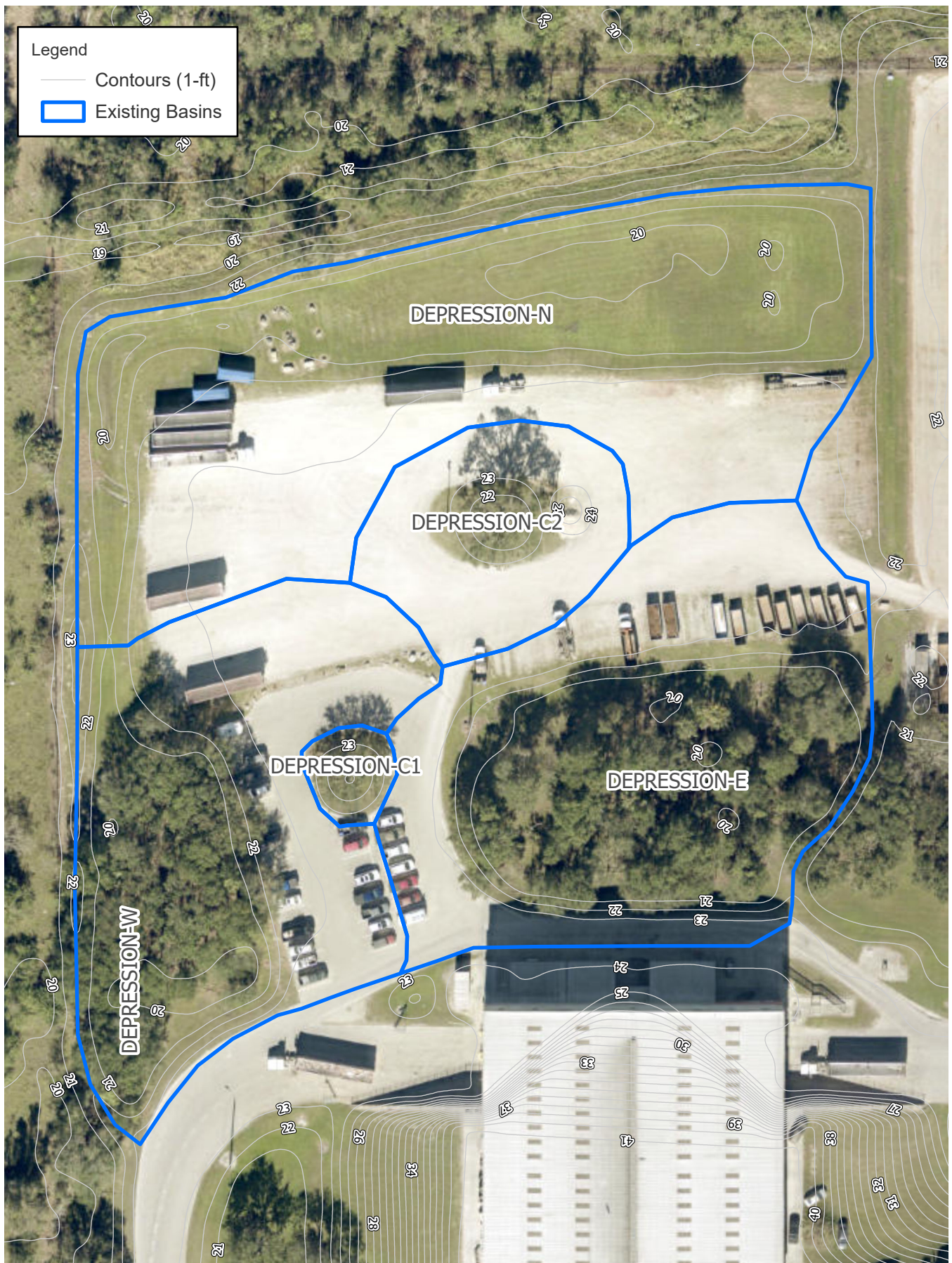
Per SFWMD criteria, the minimum parking lot and road elevation should be set above the 10-year, 24-hour design storm event peak stage. Although the basic-specific modeling dictates a minimum elevation of 21.00-ft, the previous stormwater master plan specifies a site-wide

minimum road elevation of 22.25-ft. It is recommended to use this 22.25-ft elevation for the minimum parking lot edge of pavement elevation in the design phase.

Conclusion

The proposed project, which includes the new building, expansion of the parking lot, and associated filling and paving, appears to be viable without impacting the site's master stormwater system. The existing depressional areas within Basin 6 can handle the increase in impervious area and loss of storage if the minimum berm elevation is raised to 22.50-ft.

Appendix A: Drainage Maps

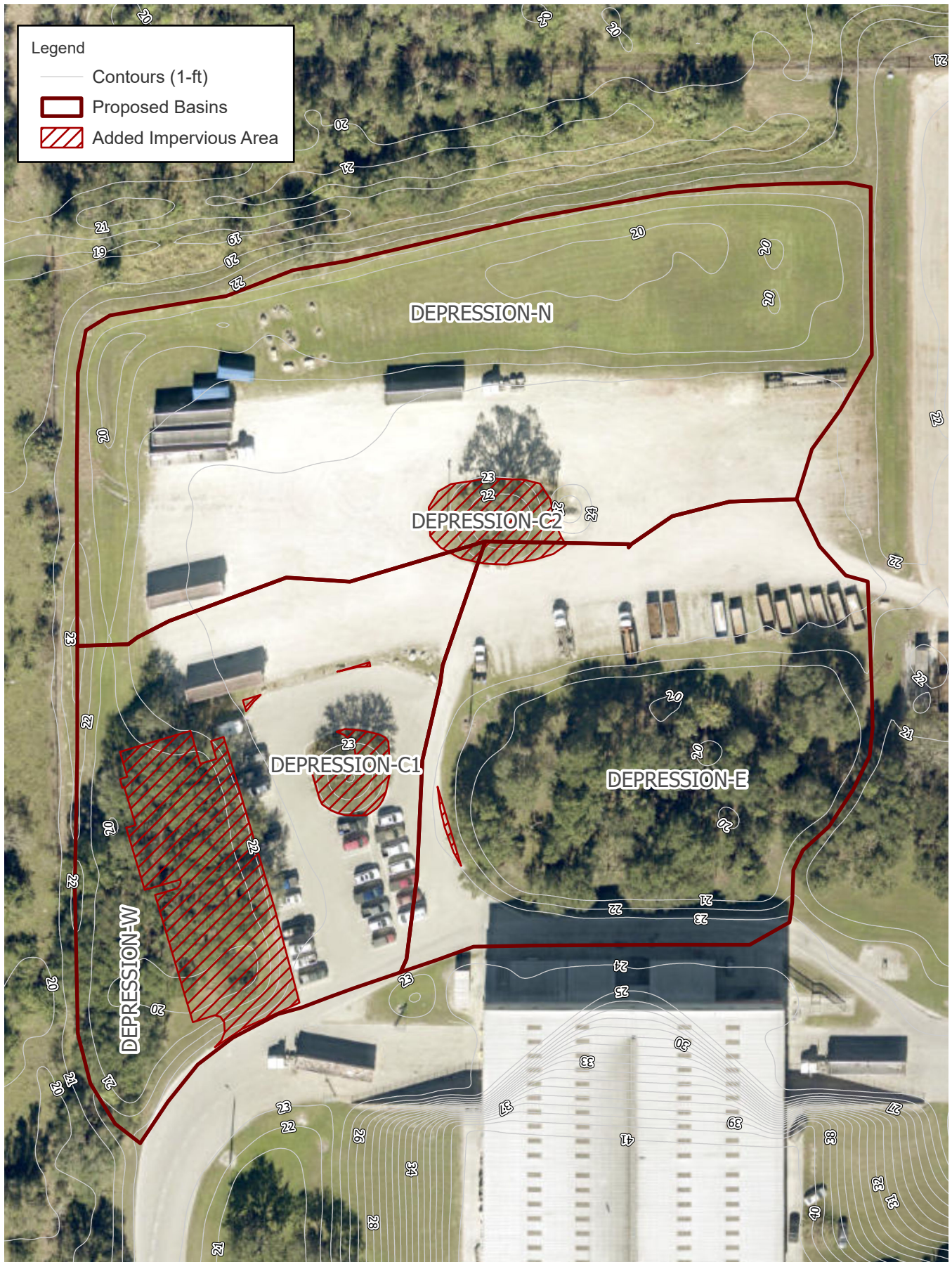


0 60 Feet



EXISTING DRAINAGE MAP

Figure 1



0 60 Feet



PROPOSED DRAINAGE MAP
Figure 2

Appendix B:
Preliminary Site Layout
(provided by
Lee County)

Appendix C:
Excerpts from
2009
Stormwater
Management
System Report



Lee County
Solid Waste Division

**Lee County Solid Waste Energy Recovery Facility
Stormwater Management System**

May 28, 2009

Prepared by
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(813) 282-2300

HDR Project No. 97583-096

M. L. Lamm
6/11/09

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	o NRCS Soil map and Properties
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SECTION 1

STORMWATER MANAGEMENT SYSTEM DESIGN NARRATIVE

1.1 Site and Project Description

The Solid Waste Energy Recovery Facility (SWERF) is located on a 280-acre site owned by Lee County and operated by Lee County Solid Waste Division (LCSWD) with frontage along Buckingham Road. The site address is 10500 Buckingham Road, Ft. Myers, Florida 33905 (Unincorporated Lee County). The portion of the site designated as the SWERF is a 150 acre parcel which is covered under the original, and now amended, Power Plant Site Certification. The site is located within Section 24, Township 44 South and Range 25 East in Lee County. A generalized aerial showing the project site is provided as Figure 2. The certified project boundary is depicted as being within the yellow line and the red line depicts the stormwater basins boundary. Refer to Figure 6 for a site plan showing the proposed construction locations.

The proposed improvements within the SWERF consist of expansion of the Recovered Materials Processing Facility (RMPF), relocation of the Construction and Debris (C&D) Recycling area, and construction of a Vehicle Maintenance Facility (VMF). The RMPF building will be expanded to the south and east by approximately 0.46 acres and also expanding the road/parking area to the south and east by approximately 2.52 acres. The RMPF expansion will consist of an additional tipping floor and equipment intended to receive, separate and process single-stream recyclable material (i.e., commingled fiber and containers) so that it can be further sorted and baled through the RMPF's existing two-stream sort lines and balers (i.e., fiber and containers). Upon completion of this project, all new and existing equipment will operate as a unified system. The conversion to single stream recycling capability is intended to enhance recycling participation rates, as well as gain efficiency in curbside pickup from residents and businesses in the County.

The C&D processing area will consist of approximately 5 acres of shell base with two (2) designated areas for concrete or asphalt materials. This area will be used to segregate and market recyclable construction materials therefore providing an environmental benefit of conserving landfill space. Finally, a 0.88 acre VMF will be constructed to provide covered space and improved facilities for the maintenance of vehicles associated with the LCSWD's fleet of residue (ash) haul vehicles, Municipal Solid Waste transfer vehicles and associated mobile equipment.

1.2 Basins Description

The SWERF site is divided into six (6) basins. These basins are delineated in Figure 6. The proposed improvements will occur within Basins 3, 4, and 5. The existing Stormwater Management System for this site was designed and permitted such that Basins 1 and 3 are combined and work together as one homogenous wet detention system and Basins 2 and 4 are combined and work together as one homogenous retention system. Basins 5 and 6 were previously designed and permitted as individual basins. This current analysis of the Stormwater Management System will be done as previously noted, with the exception that Basin 5 will be combined with Basins 2 and 4.

1.3 Zoning, District allowable discharge, and Design Storm Event

The site is zoned for an Industrial Planned Development and was designated as Public Facilities in the future land use map of the County's comprehensive land use plan, specifically to allow for the Facility construction and operation.

The adjacent property land uses consist of a County owned park, Buckingham Park, on the east side of the site. On the south side, across Buckingham Road, is a new residential development. On the west side, the site is bounded by the FP&L transmission corridor, and the north side is undeveloped property.

The site is located within South Florida Water Management District's (SFWMD) Six Mile Cypress Slough where the post-development discharge as set by the District is not to exceed 37 csm (cubic feet per second per mile or approximately 0.06 cfs per acre, see Allowable Discharge (25-yr, 3-day Storm) on Sheet 2 of the Stormwater Calculations, Attachment A) for a 25-year, 72-hour design storm event.

The project site is subject to the SFWMD regulatory criteria. As such, the SFWMD Environmental Resource Permit (ERP) Informational Manual IV, 2008, Basis of Review requires the use of 25-year 72-hour design storm in computing off-site discharge rates; the use of 100-year 72-hour design storm in computing minimum floor elevations; and the use of 10-year 24-hour design storm in computing minimum road and parking lot elevations. Based on the design aids included in the Basis of Review, the rainfall amount of 9.80 inches was selected for the 25-year 72-hour design storm; the rainfall amount of 12.20 inches was selected for the 100-year 72-hour design storm; and the rainfall amount of 6.40 inches was selected for the 10-year 72-hour design storm.

The existing control structure, located in Basin 1 is comprised of a 6 in. diameter orifice at elevation 21.40 ft. NGVD, which is designed to be continuously operational. The overflow at the control structure is a 3 ft. wide broad crested weir with slot bottom elevation at 24.10 ft. NGVD.

1.4 RESULTS

As shown in Attachments A thru E, the proposed improvements in Basins 1 and 3 will generate an off-site discharge rate for the 25-year, 72-hour storm event of 0.84 cfs which is lower than the permitted 2.56 cfs. Also, the proposed improvements in Basins 2, 4 and 5 will generate no off-site discharge rate from the 25-year, 72-hour storm event. Therefore this stormwater management system report demonstrates that, per SFWMD Chapter 40E-4 F.A.C. criteria, no adverse off-site flooding impacts will occur, and no adverse water quantity impacts will occur resulting from the proposed improvements.

SECTION 2

OPERATION AND MAINTENANCE PROCEDURES

5.1 Maintenance

The LCSWD will inspect and maintain the site to minimize impacts to the function and/or integrity of the stormwater system. The LCSWD will provide for site access control, erosion control, grass cover maintenance, and prevention of ponding. Primary focus during the inspection will be the condition of the surface vegetation, and stormwater system.

5.2 Stormwater Structures

All portions of the stormwater system will be visually inspected by LCSWD monthly in accordance with the current NPDES multi-sector generic permit for sector "O". The inspections will identify buildup of debris, surface sheen, erosion and sedimentation, and overgrown or exotic vegetation, and structural problems. Any problems identified by these inspections will be corrected within one (1) week. The detention basins will be inspected to estimate quantities of sediment within each pond. If the sediment occupies approximately 30 percent of the volume below the normal pool elevation, the sediment will be removed and properly disposed of. Vegetation in all portions of the conveyance systems will be removed on an as needed basis to prevent blockage.

5.3 Erosion Control

Avoiding erosion is probably the most cost-effective means of protecting the stormwater system. A relatively minor eroded area combined with a severe storm event can cause degradation. The best way to avoid erosion is to maintain a healthy stand of grass and keep drainage swales free of silt and sediment. Cleaning the drainage swales will prevent overflow and backflow and reduce the risk of erosion from these causes.

5.4 Grass

Grass cover maintenance will include mowing, fertilizing, seeding, mulching, and filling areas of subsidence. Mowing, fertilizing, seeding, mulching, and filling will continue to be performed as needed.

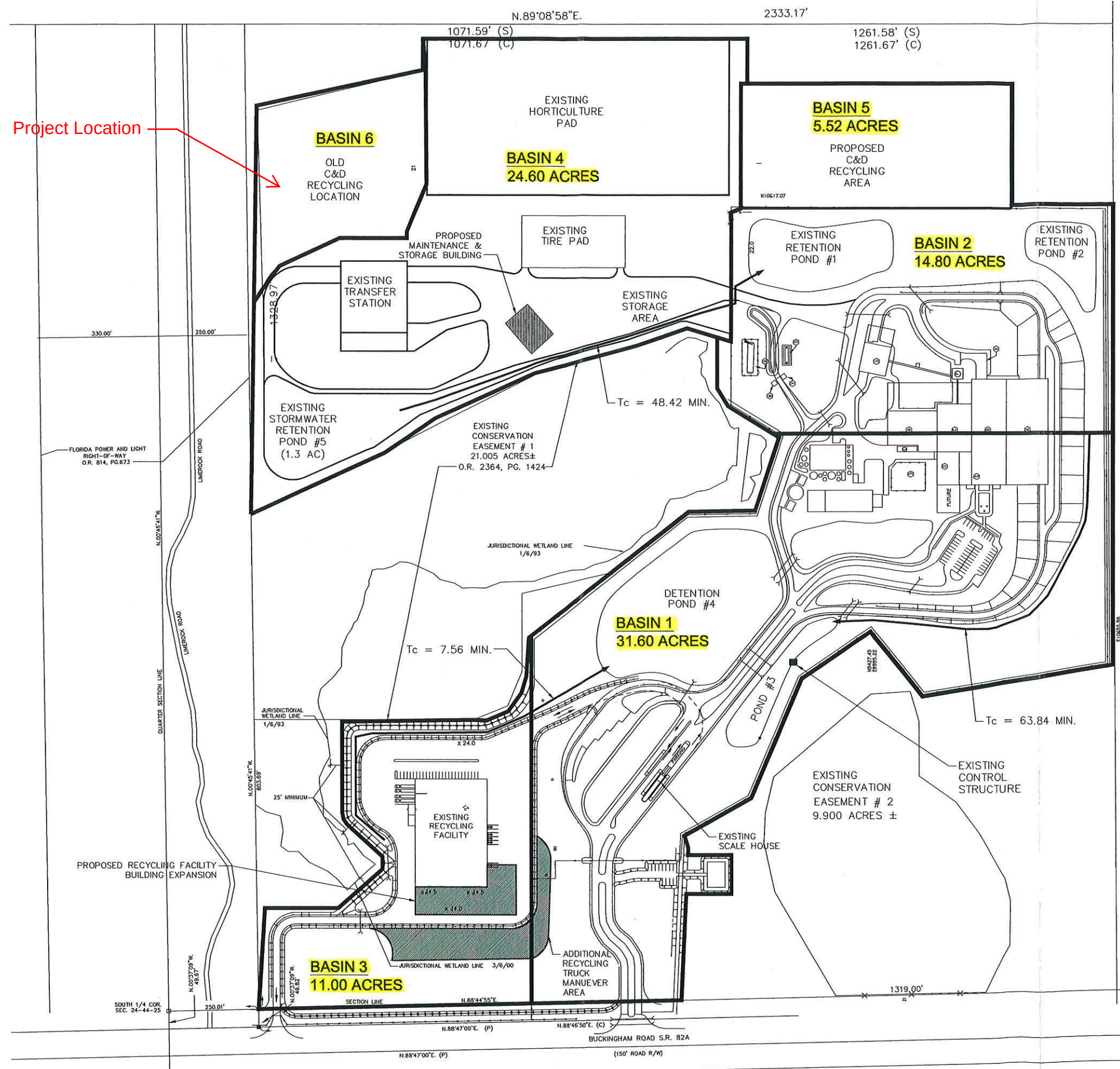
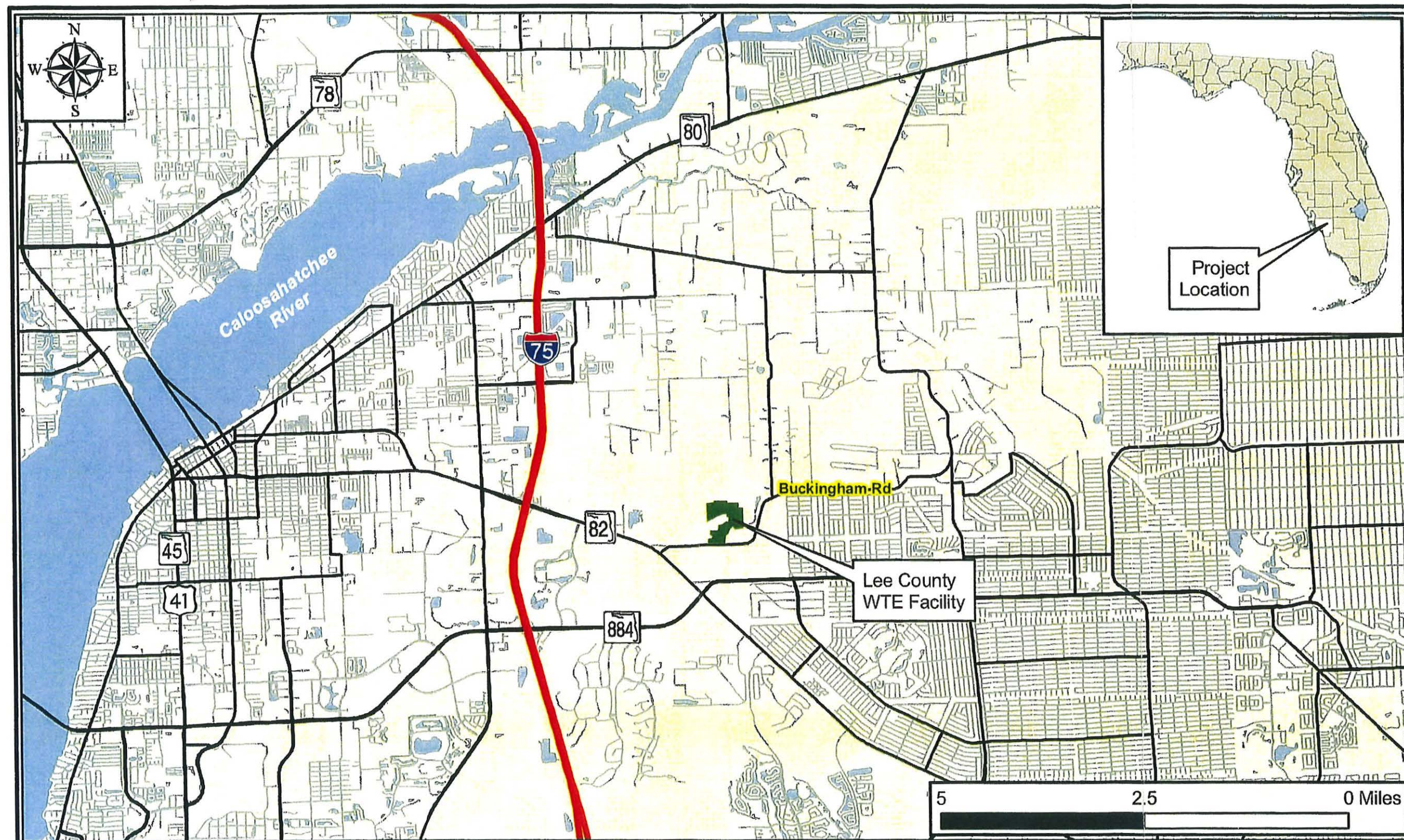


FIGURE 6
Basin Delineation / Site Plan
**Lee County Solid Waste Energy
Recovery Facility (SWERF)**

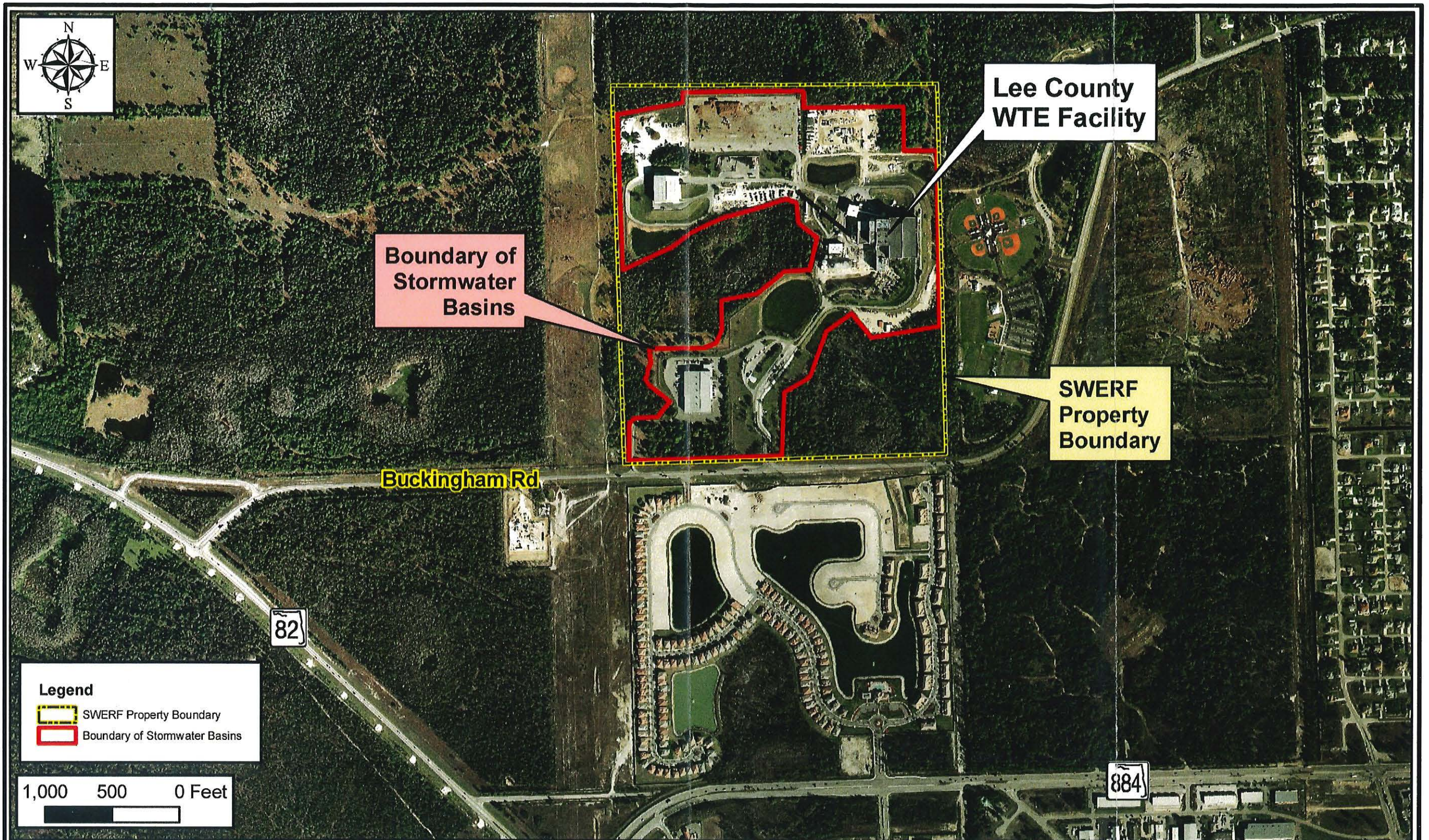


LEE COUNTY
SOUTHWEST FLORIDA

Lee County Solid Waste
Energy Recovery Facility

PROJECT VICINITY MAP

FIGURE 1



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : Lee County RMPF Expansion - Basin 4
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	3.56 ac	155,074.00 ft ²
Pond Volume between Bottom & DHWL	(24.1' - 21.4') (155,074)	418,699.00 ft ³
Pond Length to Width Ratio (L/W)	82 ft	1.00
Elevation of Effective Aquifer Base	(NRCS) 21.4 - 2.7'	18.7 ft
Elevation of Seasonal High Groundwater Table		21.40 ft
Elevation of Starting Water Level		21.40 ft
Elevation of Pond Bottom		21.40 ft
Design High Water Level Elevation		24.10 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis		0.01
Unsaturated Vertical Hydraulic Conductivity	$\frac{2}{3} K_{SAT}$	14.71 ft/d
Factor of Safety		2.00
Saturated Horizontal Hydraulic Conductivity	NRCS	22.06 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis		0.20
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench		1.00
Time Increment During Storm Event		2.00 hrs
Time Increment After Storm Event		12.00 hrs
Total Number of Increments After Storm Event		6.00

Runoff Hydrograph File Name: leecountyrmpf100yr72hrscsBASIN41.SC

Time of Peak Runoff: 60.39 hrs

Rate of Peak Runoff: 90.61 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
 Elevation of Water Level

Top Bottom Left Right

N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

N	N	N	N
0.00	0.00	0.00	0.00

Max. water level 30.39' @ 76.12 hrs.
 Recovery @ > 148.12 hrs
 Max. infiltration rate 0.206 ft/day

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : Lee County RMPF Expansion Basin 4
Rainfall Distribution : SFWMD (72 hrs)

Contributing Basin Area

44.92 ac.

SCS Curve Number

80.00

Time of Concentration

48.42 min.

Rainfall Depth

12.20 in.

Shape Factor

256

Percent DCIA

0.00 %

Wet season water table elevation = 21.4

Bottom pond = 21.4

Top pond = 24.1 (Max elev.)

$$\frac{1 \text{ mi}^2}{640 \text{ ac}} =$$

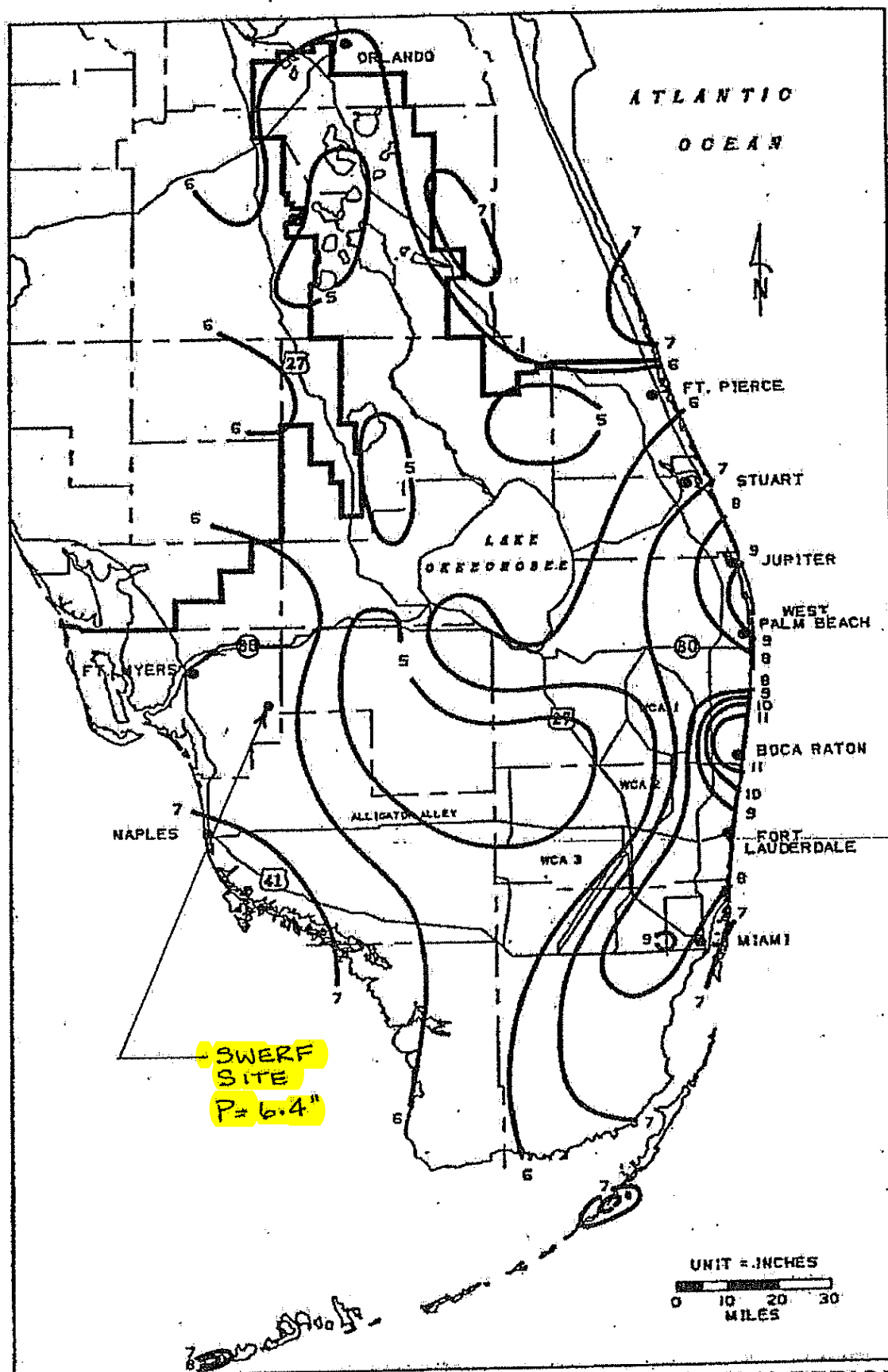


FIGURE C-4. 1-DAY RAINFALL: 10-YEAR RETURN PERIOD

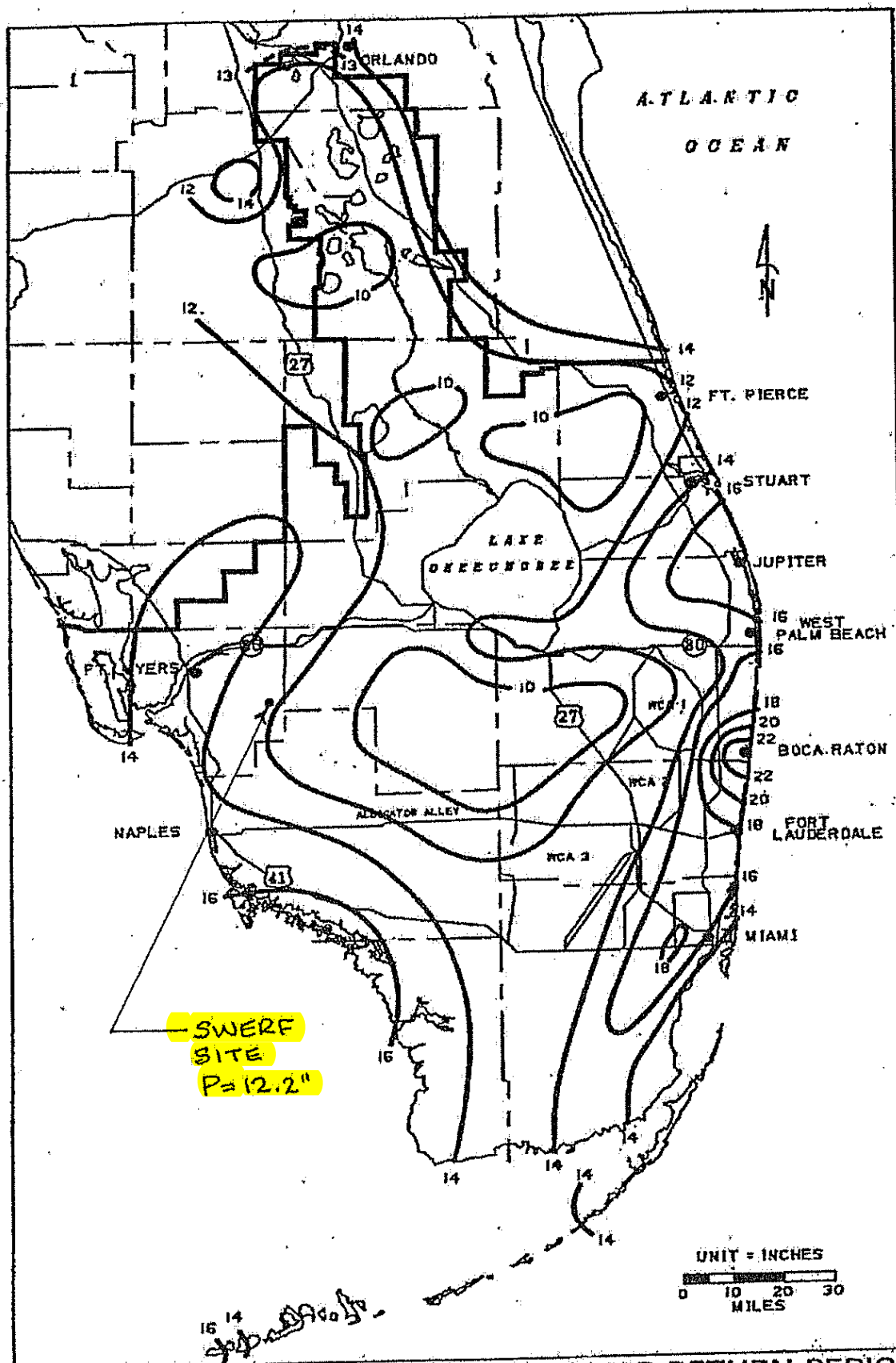


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD

Appendix D:
Excerpts from
2019 Stormwater
Management
System Update



Technical Memorandum

Date: June 24, 2019
Project: Lee County Solid Waste Complex
To: Lee County
From: HDR Engineering
Subject: Environmental Assessment

HDR performed an environmental assessment within the Lee County Solid Waste Complex (i.e. Buckingham Complex) for potential wetlands and/or surface waters as well as threatened or endangered species concerns. Five project areas were reviewed:

- Project Area 1 – SWERF Operator Maintenance Storage Shed
- Project Area 2 – SWERF Operator Spare Parts Storage Warehouse
- Project Area 3 – LCSW Fleet Maintenance Storage Building
- Project Area 4 – Entrance Road Turn-around
- Project Area 5 – Transfer Station Employee Building

Project Overview

The project is located in Lee County north of Buckingham Road (SR82A) in Section 24; Township 44S; Range 25E (**Figure 1**). The Buckingham Complex houses the majority of the County's Municipal Solid Waste (MSW) disposal and recycling operations of the Solid Waste System. The various solid waste components included in the complex are the County-operated Scale House where all incoming materials must be weighed and categorized, the Resource Recovery Facility (RRF) for incoming processible materials (primarily MSW), the Recyclable Materials Processing Facility (RMPF) for incoming recyclable materials, the horticultural area for yard waste, the "tire pad" for disposal of passenger and light truck tires, the Construction and Demolition Debris (C&DD) Facility for dedicated loads of construction and demolition materials, and the Buckingham Transfer Station (BTS) for processing during relatively rare peak periods or periods of major maintenance of the RRF or RMPF. The complex also contains the Vehicle Maintenance Shop (VMS) that is used for maintaining the Solid Waste Division's vehicles, trucks, and equipment.

The complex address is 10500 Buckingham Road, Fort Myers, FL 33905.

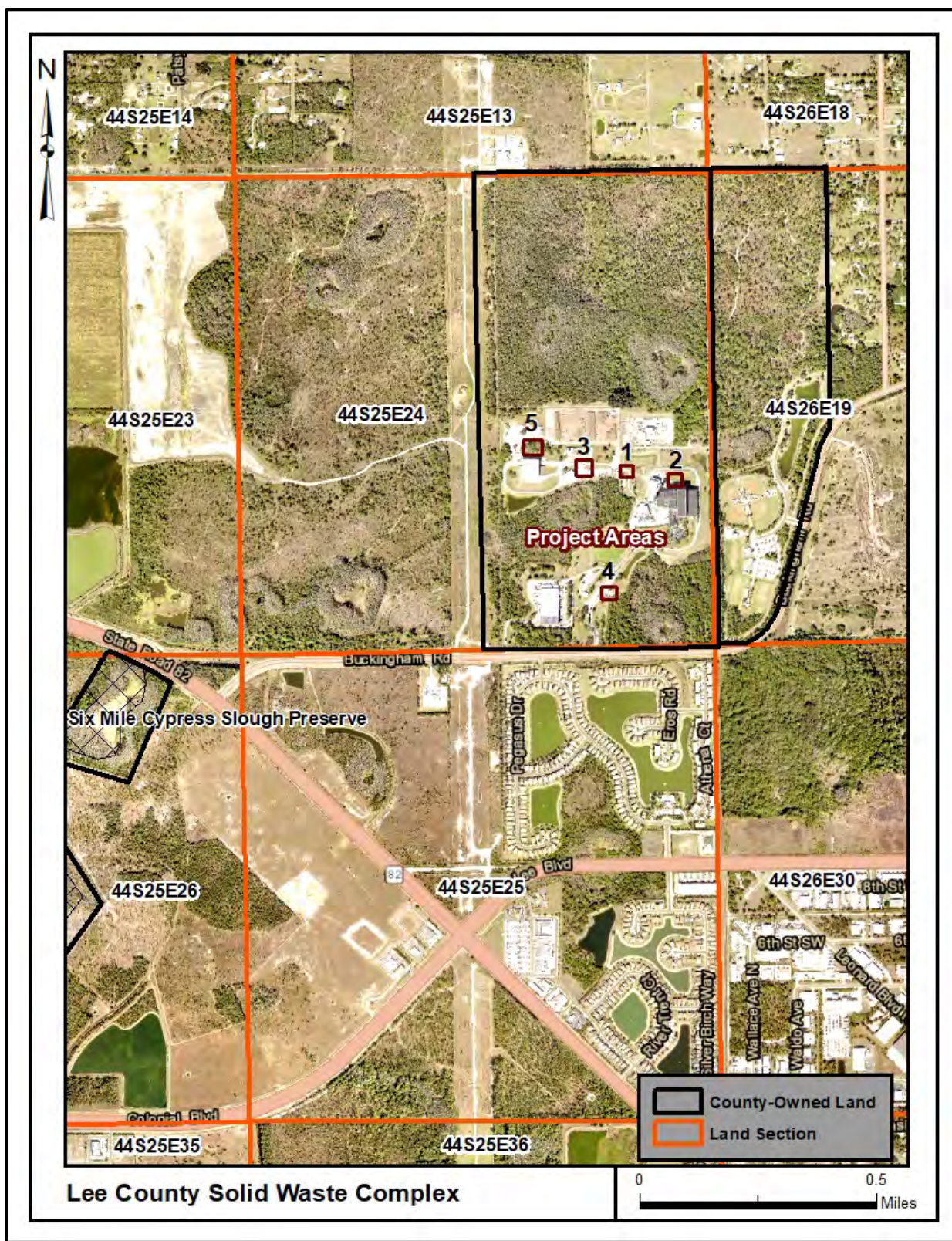


Figure 1. Location Map



Existing Conditions and Soils

The project site is an active solid waste processing complex with the aforementioned components.

Project Areas 1, 2, 3 and 4 were previously filled for development and hardened, sodded, and/or landscaped. Although these areas were mapped with hydric soils, the native soils were no longer present. These areas were landscaped uplands. Landscape vegetation included live oak (*Quercus virginiana*), slash pine (*Pinus elliotii*), and cabbage palm (*Sabal palmetto*).

Project Area 5 was a dry detention area surrounded by a parking lot, a graveled equipment storage lot, and a road. The soils were mapped with Boca fine sand (13), a non-hydric soil. Soil shovel tests confirmed the absence of hydric soils. Vegetation included laurel oaks (*Quercus laurifolia*), slash pine, and cabbage palm (*Sabal palmetto*).

A USDA Natural Resource Conservation Service (NRCS) soil survey map is provided as **Figure 2**.

Wetlands and Surface Waters

A field review was conducted to evaluate existing conditions and natural communities and to characterize habitat types. **Neither wetlands nor surface waters were observed.** Project Area 1 contained gravel and debris from a building that previously occupied the site footprint. Project Area 2 was a sodded field with landscaping. Project Area 3 was a parking lot for the VMS. Project Area 4 was an asphalt parking lot and a sodded field with landscaping. **Project Area 5 was a dry retention area with native trees.**

Protected Wildlife and Habitat

A desktop analysis was performed to evaluate wildlife records pertaining to protected species found in this region. This analysis was followed by a site inspection to characterize habitat and evaluate the area for the potential to support state and/or federally protected species. **Neither critical wildlife habitat nor protected wildlife was recorded for this site nor observed during the site review.**

The project site is within the U.S. Fish and Wildlife Service Consultation Areas of the red-cockaded woodpecker (*Leuconotopicus borealis*) and the Florida scrub-jay (*Aphelocoma coerulescens*) and is within the 18.6-mile core foraging buffer of wood stork (*Mycteria americana*) colonies along the Caloosahatchee River. Project Area 5 occurs at the outer limits of the USFWS secondary zone for the Florida panther (*Puma concolor coryi*). The potential presence of and impact to these and other protected wildlife is discussed below.



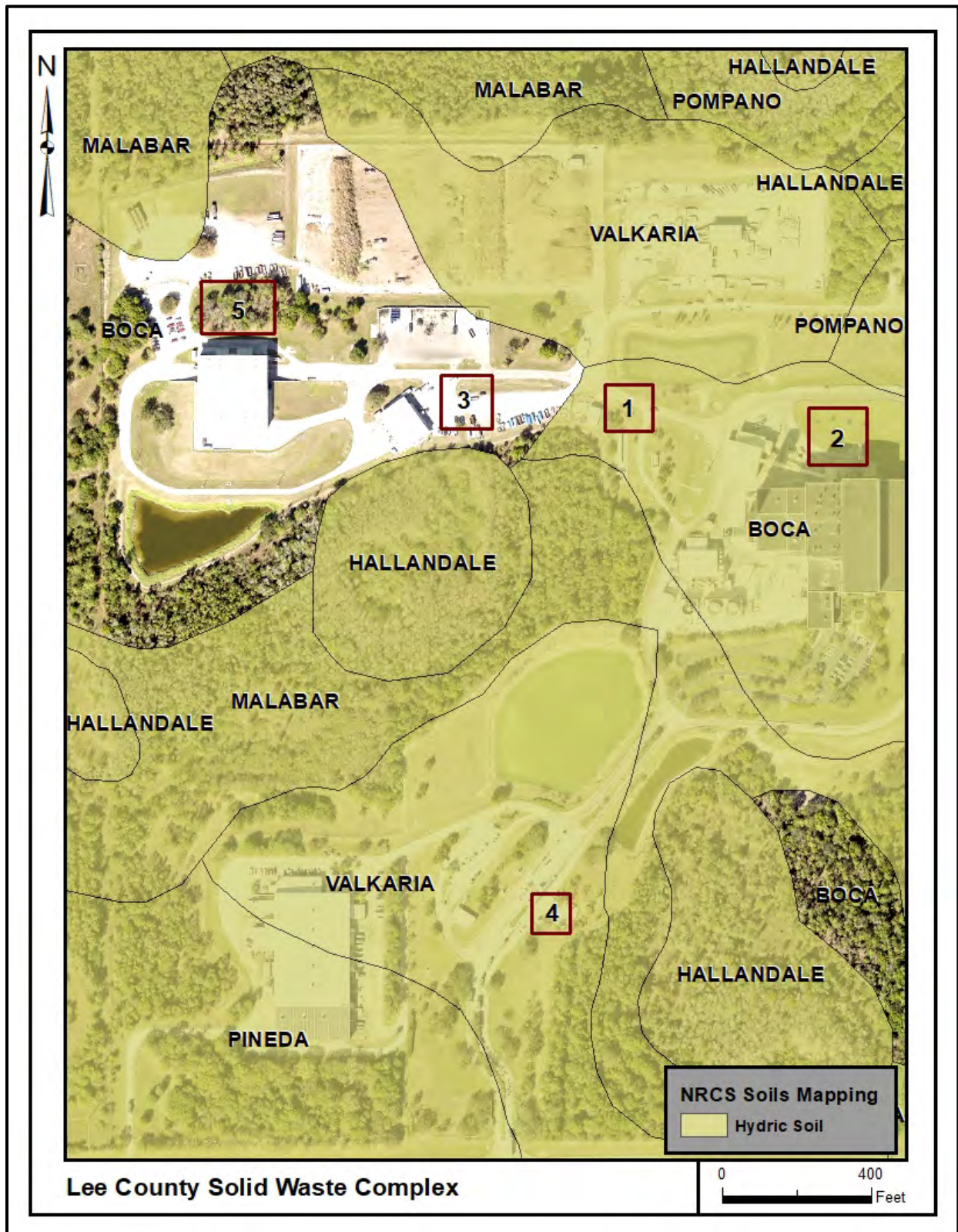


Figure 2. USDA NRCS Soil Survey Map



Based on existing conditions within each project area, impacts to protected wildlife would not be expected. Mature living pine trees needed to support the red-cockaded woodpecker were not present within the project areas. Scrub habitat necessary for the Florida scrub-jay was not observed. While the wood stork could utilize stormwater ponds and conservation wetlands within the solid waste complex – but not within the five project areas – for foraging and roosting, none were observed and given the absence of foraging habitat within the project areas, none would be expected. The five project areas were developed and under active operation as a solid waste processing complex; therefore, habitat to support the Florida panther was not present. The Eastern indigo snake (*Drymarchon corais couperi*) could potentially utilize this site. To protect this species during construction, contractors would adhere to the USFWS *Standard Protection Measures for the Eastern Indigo Snake* (USFWS, 2013), which requires that all workers be made aware of the potential presence of this species. Neither the gopher tortoise (*Gopherus polyphemus*) nor gopher tortoise burrows were observed.

Permitting

These proposed developments would not require a Section 404 dredge and fill permit from the U.S. Army Corps of Engineers (USACE) given the absence of Waters of the U.S. within the specific project areas.

The project is within the Tidal Caloosahatchee Watershed and the Orange River Drainage Basin, and is under the regulatory jurisdiction of the Florida Department of Environmental Protection (FDEP), South District in Fort Myers, Florida. Given the absence of jurisdictional wetlands or surface waters, the project would only need to address stormwater quantity and quality as part of the Environmental Resource Permitting. Since wetlands were not present, wetland mitigation would not be required.

Given the absence of habitat, protected species permitting would not be expected.

HDR Memo

Date: Friday, June 21, 2019

Project: Lee County Solid Waste Energy Recovery Facility (SWERF)

To: File

From: M.Oural/D.J. Castro

Subject: Lee County SWERF Additions - Stormwater Calculations

The stormwater calculations herein are an addition/modification to an existing permit Lee County Solid Waste Energy Recovery Facility (SWERF) within Section 24, Township 44 South and Range 25 East, Lee County, Florida. A number of new features are to be added on the property and pervious/impervious areas will be changed. The calculations included in this document show areas that are not fully determined/constructed yet and final areas may differ. Calculation methods and design criteria used are taken from previous renditions of this facility permit(s) to ensure no discrepancies from the initial design.

Features to be added (Attachment E):

1. SWERF Operator Maintenance Storage Shed – CLI Provided Drawings
2. SWERF Operator Spare Parts Storage Warehouse – CLI Provided Drawings
3. LCSW Fleet Maintenance Storage Building – 5,686 sq.ft.
4. New Entrance Turn-Around (minimal impacts)
5. Transfer Station Employee Building

The site is divided into basins 1 through 6, which make up two larger drainage basins. Basins 1 & 3 make up the first Drainage Basin (referred to as “Drainage Basin 1 & 3”), and Basins 2, 4, & 6 make up the second Drainage Basin (referred to as “Drainage Basin 2, 4, & 6”). Calculations included in this document analyze the runoff from 3 storm events for the Drainage Basin 2, 4, & 6 only. The storm events used are the 10-year 24-hour (used for road elevations), 25-year 72-hour (used for design), and the 100-year 72-hour (used for finished floor elevations). There are no planned improvements in Basins 3 and 5.

Note that the SWERF Operator Maintenance Storage Shed in Area 1 lies on the dividing line of two basins (2 & 4) and will be treated as half the total impervious area for Area 1 for basins 2 & 4 (0.02 acres for each basin).

Note that Area 2, the SWERF Operator Spare Parts Storage Warehouse, is 0.03 acres associated with building roofs.

Note that Area 3, the Fleet Maintenance Storage Building, (5,686 sq. ft. = 0.13 acres) has been separated as 0.1 acres associated with building roofs and 0.03 acres associated with roads and parking.

Note that Area 4 is a proposed turn-around that is 0.065 acres and is the only contributing impervious area associated with Drainage Basin 1 & 3. When compared to the impervious impact on Drainage Basin 2, 4, & 6 of 1.33 acres, it is relatively minute. Given the similar sizes of the two Drainage Basins, and the additional impervious areas associated with each, it can be concluded that Drainage Basin 1 & 3 will not see a sizeable impact in stormwater runoff due to the New Entrance Turn-Around.

Note that Area 5 is a Transfer Station Employee Building that is 0.13 acres, 0.1 acres associated with building roofs and 0.03 acres associated with roads and parking.

Cc: Rebecca Rodriguez, Lee County Solid Waste Division

Jason Fournier, Lee County Solid Waste Division

Kyle Perrin, HDR

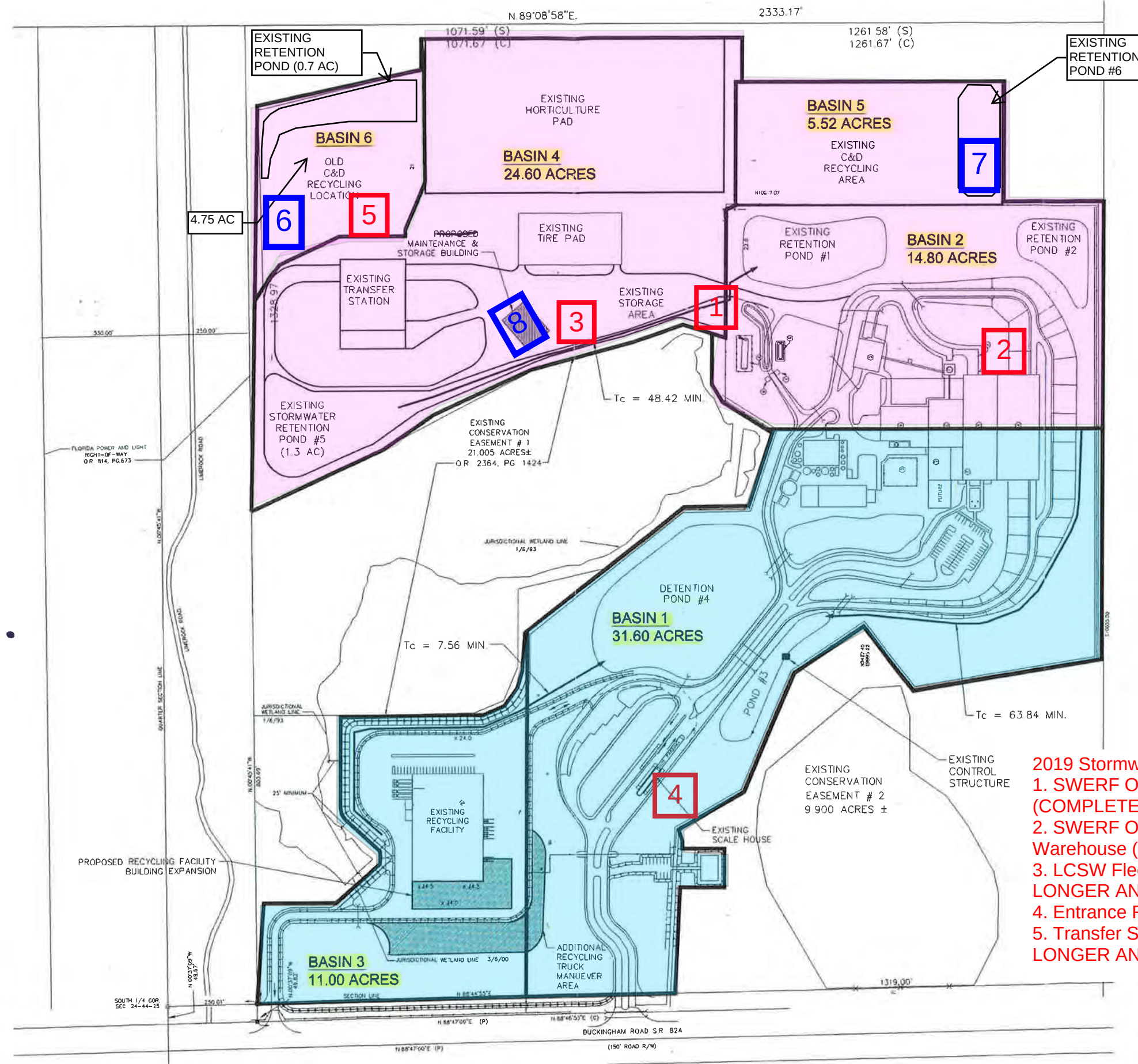
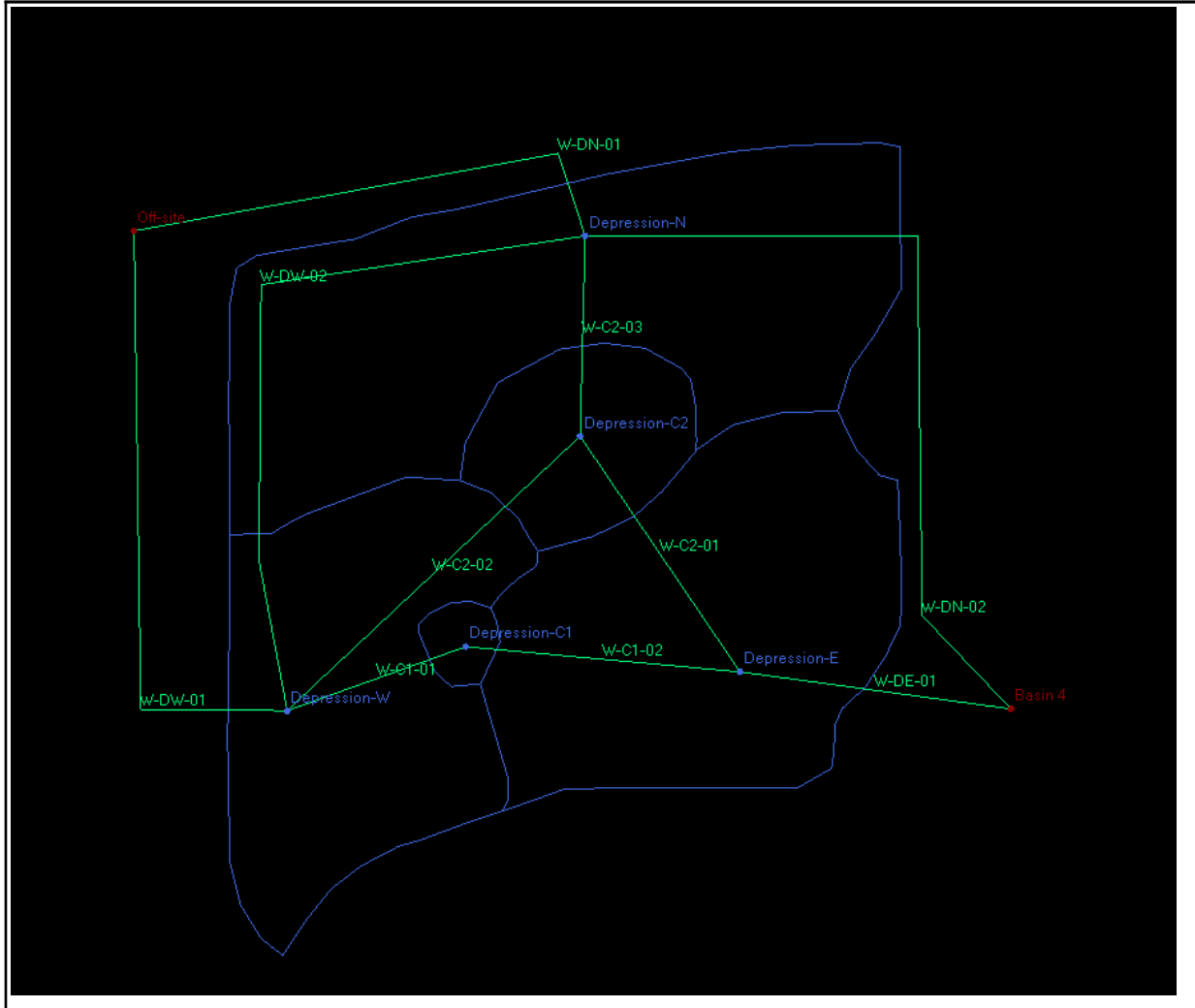


FIGURE 6
Basin Delineation / Site Plan
**Lee County Solid Waste Energy
Recovery Facility (SWERF)**

Appendix E: ICPR4 Report

Existing Condition

Background Image: Existing Diagram



Manual Basin: Depression-C1

Scenario: Existing
 Node: Depression-C1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 0.0629 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient	Reference ET
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Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.0128	Impervious	A			
0.0501	Forest	A			

Comment:

Manual Basin: Depression-C2

Scenario: Existing
 Node: Depression-C2
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 0.4222 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.3400	Disturbed	A			
0.0822	Forest	A			

Comment:

Manual Basin: Depression-E

Scenario: Existing
 Node: Depression-E
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 1.4434 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.2332	Impervious	A			
0.0054	Open Space	A			
0.8919	Forest	A			
0.3129	Disturbed	A			

Comment:

Manual Basin: Depression-N

Scenario: Existing
 Node: Depression-N
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 1.9191 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.1291	Open Space	A			
0.7899	Disturbed	A			

Comment:

Manual Basin: Depression-W

Scenario: Existing
 Node: Depression-W
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 1.1965 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.5706	Forest	A			
0.3266	Impervious	A			
0.0693	Open Space	A			
0.2300	Disturbed	A			

Comment:

Node: Basin 4

Scenario: Existing
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 21.50 ft
 Warning Stage: 0.00 ft
 Boundary Stage:

Comment: Boundary stage set at top of bank elevation

Node: Depression-C1

Scenario: Existing
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 0.00 ft

Stage [ft]	Area [ac]	Area [ft2]
20.69	0.0001	3
21.00	0.0067	290
21.50	0.0125	546
22.00	0.0173	753
22.50	0.0227	987
23.00	0.0311	1353
23.50	0.0445	1939
24.00	0.0630	2743
24.50	0.0631	2746
25.00	0.0631	2746

Comment:

Node: Depression-C2

Scenario: Existing
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 0.00 ft

Stage [ft]	Area [ac]	Area [ft2]
20.85	0.0001	3
21.00	0.0035	153
21.50	0.0196	853
22.00	0.0307	1337
22.50	0.0365	1590
23.00	0.0466	2031
23.50	0.2137	9309
24.00	0.4140	18034
24.50	0.4161	18127
25.00	0.4168	18157
25.50	0.4181	18213
26.00	0.4187	18240

Stage [ft]	Area [ac]	Area [ft2]
26.50	0.4197	18284
27.00	0.4203	18306
27.50	0.4208	18329
28.00	0.4215	18360
28.50	0.4221	18387
29.00	0.4221	18387

Comment:

Node: Depression-E

Scenario: Existing
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 19.31 ft
 Warning Stage: 21.60 ft

Stage [ft]	Area [ac]	Area [ft2]
19.31	0.0001	3
19.50	0.0011	46
20.00	0.0453	1974
20.50	0.5656	24639
21.00	0.6733	29330
21.50	0.7333	31942
22.00	0.7766	33827
22.50	0.8186	35659
23.00	0.8829	38461
23.50	1.1547	50298
24.00	1.4410	62768
24.50	1.4410	62768

Comment:

Node: Depression-N

Scenario: Existing
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 19.21 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.21	0.0001	3
19.50	0.0149	651
20.00	0.1921	8370
20.50	0.5634	24543

Stage [ft]	Area [ac]	Area [ft2]
21.00	0.7261	31627
21.50	0.8474	36912
22.00	0.9760	42515
22.50	1.1125	48459
23.00	1.3735	59830
23.50	1.6438	71603
24.00	1.9060	83025
24.50	1.9093	83168
25.00	1.9102	83206
25.50	1.9102	83206

Comment:

Node: Depression-W

Scenario: Existing
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 19.18 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.18	0.0001	3
19.50	0.0022	94
20.00	0.0890	3876
20.50	0.3802	16563
21.00	0.4434	19314
21.50	0.4844	21103
22.00	0.5345	23281
22.50	0.6175	26899
23.00	0.7611	33155
23.50	0.9740	42426
24.00	1.1890	51794
24.50	1.1890	51794

Comment:

Node: Off-site

Scenario: Existing
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 0.00 ft
 Boundary Stage:

Comment:

Weir Link: W-C1-01

Scenario:	Existing	Bottom Clip
From Node:	Depression-C1	Default: 0.00 ft
To Node:	Depression-W	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Irregular	Ref Node:
Invert:	23.43 ft	Discharge Coefficients
Control Elevation:	23.43 ft	Weir Default: 2.800
Cross Section:	X-0070W	Weir Table:
		Orifice Default: 0.600
		Orifice Table:

Comment:

Weir Link: W-C1-02

Scenario:	Existing	Bottom Clip
From Node:	Depression-C1	Default: 0.00 ft
To Node:	Depression-E	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Irregular	Ref Node:
Invert:	23.60 ft	Discharge Coefficients
Control Elevation:	23.60 ft	Weir Default: 2.800
Cross Section:	X-0080W	Weir Table:
		Orifice Default: 0.600
		Orifice Table:

Comment:

Weir Link: W-C2-01

Scenario:	Existing	Bottom Clip
From Node:	Depression-C2	Default: 0.00 ft
To Node:	Depression-E	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft

Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 23.57 ft
Control Elevation: 23.57 ft
Cross Section: X-0050W

Op Table:
Ref Node:
Discharge Coefficients
Weir Default: 2.800
Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-C2-02

Scenario: Existing
From Node: Depression-C2
To Node: Depression-W
Link Count: 1
Flow Direction: Both
Damping: 0.0000 ft
Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 23.54 ft
Control Elevation: 23.54 ft
Cross Section: X-0060W

Bottom Clip
Default: 0.00 ft
Op Table:
Ref Node:
Top Clip
Default: 0.00 ft
Op Table:
Ref Node:
Discharge Coefficients
Weir Default: 2.800
Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-C2-03

Scenario: Existing
From Node: Depression-C2
To Node: Depression-N
Link Count: 1
Flow Direction: Both
Damping: 0.0000 ft
Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 23.12 ft
Control Elevation: 23.12 ft
Cross Section: X-0040W

Bottom Clip
Default: 0.00 ft
Op Table:
Ref Node:
Top Clip
Default: 0.00 ft
Op Table:
Ref Node:
Discharge Coefficients
Weir Default: 2.800
Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-DE-01

Scenario: Existing
 From Node: Depression-E
 To Node: Basin 4
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 21.56 ft
 Control Elevation: 21.56 ft
 Cross Section: X-0010W

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Link: W-DN-01

Scenario: Existing
 From Node: Depression-N
 To Node: Off-site
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 21.68 ft
 Control Elevation: 21.68 ft
 Cross Section: X-0090W

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Link: W-DN-02

Scenario: Existing
 From Node: Depression-N
 To Node: Basin 4
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 22.49 ft
 Control Elevation: 22.49 ft
 Cross Section: X-0120W

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600

Orifice Table:

Comment:

Weir Link: W-DW-01

Scenario: Existing
 From Node: Depression-W
 To Node: Off-site
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 21.72 ft
 Control Elevation: 21.72 ft
 Cross Section: X-0100W

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 2.800

Weir Table:

Orifice Default: 0.600

Orifice Table:

Comment:

Weir Link: W-DW-02

Scenario: Existing
 From Node: Depression-W
 To Node: Depression-N
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 20.46 ft
 Control Elevation: 20.46 ft
 Cross Section: X-0110W

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 2.800

Weir Table:

Orifice Default: 0.600

Orifice Table:

Comment:

Node Max Conditions [Existing]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Basin 4	100yr-72hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-C	100yr-72hr	0.00	22.38	0.0008	0.13	0.00	929

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
1							
Depression-C 2	100yr-72hr	0.00	23.23	0.0010	1.70	1.69	5327
Depression-E	100yr-72hr	21.60	21.18	0.0008	3.85	0.00	30263
Depression-N	100yr-72hr	21.70	21.59	0.0010	7.92	0.82	37943
Depression-W	100yr-72hr	21.70	21.59	0.0010	4.52	0.27	21503
Off-site	100yr-72hr	0.00	0.00	0.0000	0.00	0.00	0
Basin 4	10yr-24hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-C 1	10yr-24hr	0.00	21.60	0.0003	0.05	0.00	588
Depression-C 2	10yr-24hr	0.00	23.17	0.0010	0.79	0.06	4433
Depression-E	10yr-24hr	21.60	20.59	0.0010	1.63	0.00	25524
Depression-N	10yr-24hr	21.70	20.66	0.0010	1.99	0.02	26846
Depression-W	10yr-24hr	21.70	20.66	0.0010	1.80	0.19	17450
Off-site	10yr-24hr	0.00	0.00	0.0000	0.00	0.00	0
Basin 4	25yr-72hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-C 1	25yr-72hr	0.00	22.05	0.0008	0.08	0.00	777
Depression-C 2	25yr-72hr	0.00	23.22	0.0010	1.27	1.26	5210
Depression-E	25yr-72hr	21.60	20.92	0.0007	2.65	0.00	28618
Depression-N	25yr-72hr	21.70	21.21	0.0010	6.70	0.36	33827
Depression-W	25yr-72hr	21.70	21.21	0.0010	2.66	1.15	20058
Off-site	25yr-72hr	0.00	0.00	0.0000	0.00	0.00	0

Simulation: 100yr-72hr

Scenario: Existing
Run Date/Time: 2/15/2023 7:58:25 AM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set: 100yr-72hr
Extern Hydrograph Set:
Curve Number Set: CN (A)

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Imperviousness
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

Dflt Damping (2D): 0.0050 ft
Min Node Srf Area: 100 ft2

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Smp/Man Basin Rain: Global
Opt:
OF Region Rain Opt: Global
Rainfall Name: ~SFWM-72
Rainfall Amount: 12.20 in
Storm Duration: 72.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area: 100 ft2

(2D):
Energy Switch (2D): Energy

(1D):
Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Existing
Run Date/Time: 2/15/2023 7:59:34 AM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000
	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]	
Min Calculation Time:	60.0000	0.1000	900.0000	
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:

Lookup Tables

Boundary Stage Set: 10yr-24hr
Extern Hydrograph Set:

Unit Hydrograph
Folder:

Curve Number Set: CN (A)

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Imperviousness
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	ET for Manual Basins: False
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	OF Region Rain Opt: Global
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
	Rainfall Amount: 6.40 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
Dflt Damping (2D): 0.0050 ft	Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2	Min Node Srf Area 100 ft2
(2D):	(1D):
Energy Switch (2D): Energy	Energy Switch (1D): Energy

Comment:

Simulation: 25yr-72hr

Scenario: Existing
Run Date/Time: 2/15/2023 8:00:05 AM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000
	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]	
Min Calculation Time:	60.0000	0.1000	900.0000	
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set: 25yr-72hr
Extern Hydrograph Set:
Curve Number Set: CN (A)

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Imperviousness
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Smp/Man Basin Rain Global
Opt:
OF Region Rain Opt: Global
Rainfall Name: ~SFWMD-72
Rainfall Amount: 9.80 in
Storm Duration: 72.0000 hr

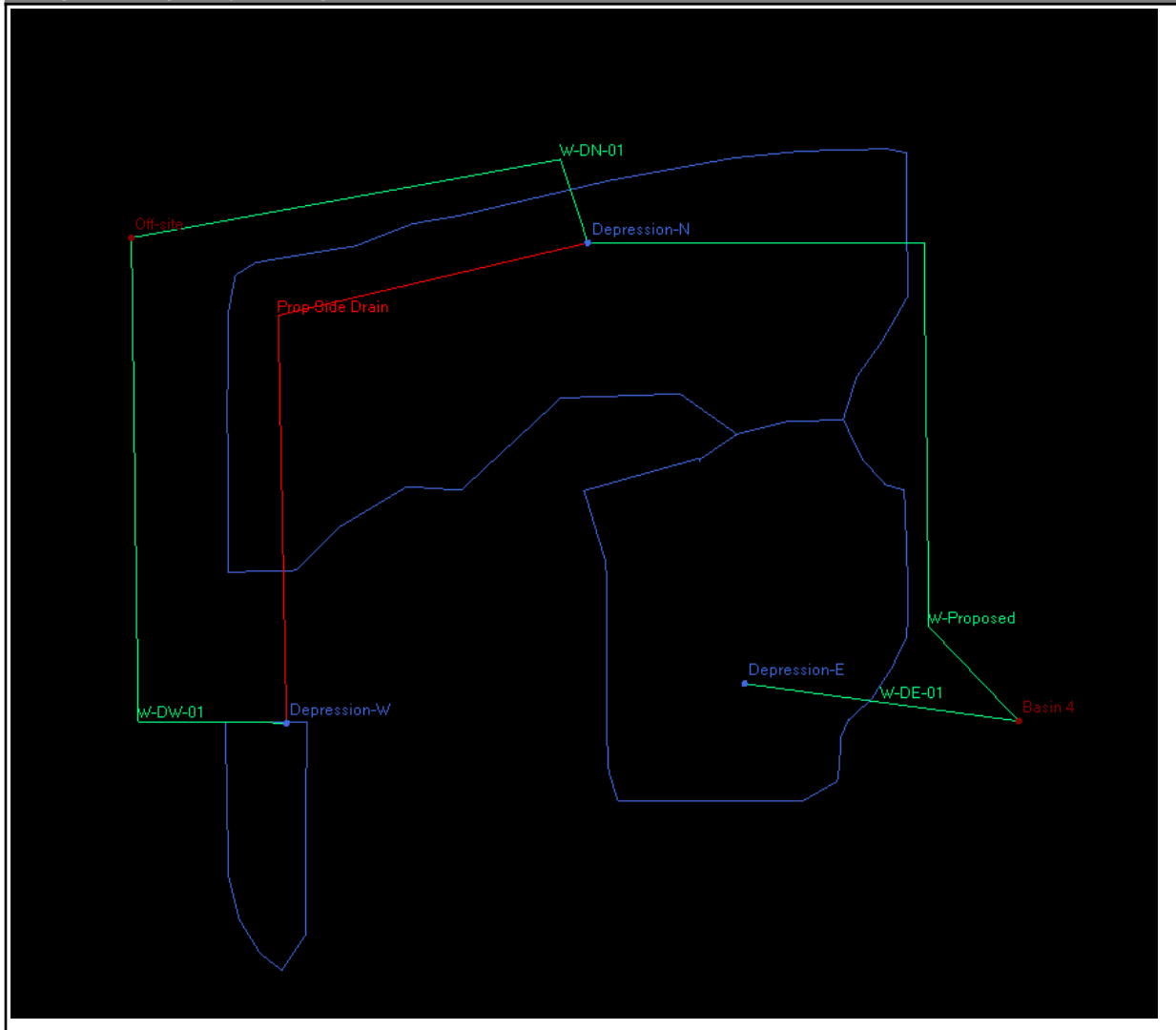
Dflt Damping (2D): 0.0050 ft
Min Node Srf Area 100 ft2
(2D):
Energy Switch (2D): Energy

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Proposed Condition

Background Image: Proposed Diagram



Manual Basin: Depression-E

Scenario: Proposed
Node: Depression-E
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.4918 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.2531	Impervious	A			
0.0054	Open Space	A			
0.8113	Forest	A			
0.4220	Disturbed	A			

Comment:

Manual Basin: Depression-N

Scenario: Proposed
 Node: Depression-N
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 2.1743 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.1291	Open Space	A			
1.0452	Disturbed	A			

Comment:

Manual Basin: Depression-W

Scenario: Proposed
 Node: Depression-W
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 10.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 1.3780 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.2635	Forest	A			
0.7938	Impervious	A			
0.0477	Open Space	A			
0.2730	Disturbed	A			

Comment:

Node: Basin 4

Scenario: Proposed
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 21.50 ft
 Warning Stage: 0.00 ft
 Boundary Stage:

Comment: Boundary stage set at top of bank elevation

Node: Depression-E

Scenario: Proposed
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 21.60 ft

Stage [ft]	Area [ac]	Area [ft2]
19.31	0.0001	3
19.50	0.0011	46
20.00	0.0453	1974
20.50	0.5338	23254
21.00	0.6215	27071
21.50	0.6544	28504
22.00	0.6840	29795
22.50	0.7136	31084
23.00	0.7576	33001
23.50	0.9130	39771
24.00	1.1735	51118
24.50	1.1735	51118

Comment:

Node: Depression-N

Scenario: Proposed
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.21	0.0001	3
19.50	0.0149	651
20.00	0.1921	8370
20.50	0.5658	24645
21.00	0.7316	31869
21.50	0.8549	37238
22.00	0.9854	42923
22.50	1.1291	49185
23.00	1.4088	61369
23.50	1.7688	77049
24.00	2.0577	89634
24.50	2.0614	89793
25.00	2.0615	89800
25.50	2.0615	89800

Comment:

Node: Depression-W

Scenario: Proposed
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 0.00 ft
Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.62	0.0001	3
20.00	0.0319	1391
20.50	0.1397	6084
21.00	0.1584	6902
21.50	0.1708	7442
22.00	0.1835	7993
22.50	0.1960	8539
23.00	0.2054	8946
23.50	0.2075	9041
24.00	0.2075	9041

Comment:

Node: Off-site

Scenario: Proposed
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 0.00 ft

Warning Stage: 0.00 ft
Boundary Stage:

Comment:

Pipe Link: Prop Side Drain		Upstream	Downstream
Scenario:	Proposed	Invert: 19.50 ft	Invert: 19.30 ft
From Node:	Depression-W	Manning's N: 0.0120	Manning's N: 0.0120
To Node:	Depression-N	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 1.25 ft	Max Depth: 1.25 ft
Flow Direction:	Both	Bottom Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	120.00 ft	Op Table:	Op Table:
FHWA Code:	0	Ref Node:	Ref Node:
Entr Loss Coef:	0.50	Manning's N: 0.0000	Manning's N: 0.0000
Exit Loss Coef:	1.00	Top Clip	
Bend Loss Coef:	0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location:	0.00 dec	Op Table:	Op Table:
Energy Switch:	Energy	Ref Node:	Ref Node:
		Manning's N: 0.0000	Manning's N: 0.0000

Comment:

Weir Link: W-DE-01		Bottom Clip
Scenario:	Proposed	Default: 0.00 ft
From Node:	Depression-E	Op Table:
To Node:	Basin 4	Ref Node:
Link Count:	1	Top Clip
Flow Direction:	Both	Default: 0.00 ft
Damping:	0.0000 ft	Op Table:
Weir Type:	Broad Crested Vertical	Ref Node:
Geometry Type:	Irregular	Discharge Coefficients
Invert:	21.56 ft	Weir Default: 2.800
Control Elevation:	21.56 ft	Weir Table:
Cross Section:	X-0010W	Orifice Default: 0.600
		Orifice Table:

Comment:

Weir Link: W-DN-01		Bottom Clip
Scenario:	Proposed	Default: 0.00 ft
From Node:	Depression-N	

To Node: Off-site
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 22.25 ft
 Control Elevation: 22.25 ft
 Cross Section: X-0090W

Op Table:
 Ref Node:
 Top Clip
 Default: 0.00 ft
 Op Table:
 Ref Node:
 Discharge Coefficients
 Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Link: W-DW-01

Scenario: Proposed
 From Node: Depression-W
 To Node: Off-site
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 22.25 ft
 Control Elevation: 22.25 ft
 Cross Section: X-0100W

Bottom Clip
 Default: 0.00 ft
 Op Table:
 Ref Node:
 Top Clip
 Default: 0.00 ft
 Op Table:
 Ref Node:
 Discharge Coefficients
 Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Link: W-Proposed

Scenario: Proposed
 From Node: Depression-N
 To Node: Basin 4
 Link Count: 1
 Flow Direction: None
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Trapezoidal
 Invert: 22.25 ft
 Control Elevation: 22.25 ft
 Max Depth: 99.00 ft
 Extrapolation Method: Normal Projection
 Bottom Width: 3.00 ft
 Left Slope: 4.000 (h:v)

Bottom Clip
 Default: 0.00 ft
 Op Table:
 Ref Node:
 Top Clip
 Default: 0.00 ft
 Op Table:
 Ref Node:
 Discharge Coefficients
 Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Right Slope: 4.000 (h:v)

Comment:

Node Max Conditions [Proposed]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Basin 4	100yr-72hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-E	100yr-72hr	21.60	21.37	0.0010	4.37	0.00	28140
Depression-N	100yr-72hr	21.70	22.26	0.0010	10.10	0.24	46242
Depression-W	100yr-72hr	21.70	22.27	0.0010	6.00	2.82	8286
Off-site	100yr-72hr	0.00	0.00	0.0000	0.31	0.00	0
Basin 4	10yr-24hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-E	10yr-24hr	21.60	20.69	0.0010	1.96	0.00	24671
Depression-N	10yr-24hr	21.70	21.16	0.0010	4.58	0.00	33605
Depression-W	10yr-24hr	21.70	21.16	0.0010	3.69	2.07	7079
Off-site	10yr-24hr	0.00	0.00	0.0000	0.00	0.00	0
Basin 4	25yr-72hr	0.00	21.50	0.0000	0.00	0.00	0
Depression-E	25yr-72hr	21.60	21.07	0.0010	3.08	0.00	27281
Depression-N	25yr-72hr	21.70	21.85	0.0010	7.52	0.00	41267
Depression-W	25yr-72hr	21.70	21.85	0.0010	4.63	2.34	7835
Off-site	25yr-72hr	0.00	0.00	0.0000	0.00	0.00	0

Simulation: 100yr-72hr

Scenario: Proposed

Run Date/Time: 3/10/2023 8:43:05 AM

Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.1000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
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Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set: 100yr-72hr
Extern Hydrograph Set:
Curve Number Set: CN (A)

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Imperviousness
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

Dflt Damping (2D): 0.0050 ft
Min Node Srf Area: 100 ft2
(2D):
Energy Switch (2D): Energy

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Smp/Man Basin Rain: Global
Opt:
OF Region Rain Opt: Global
Rainfall Name: ~SFWMD-72
Rainfall Amount: 12.20 in
Storm Duration: 72.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area: 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Proposed
Run Date/Time: 3/10/2023 8:43:15 AM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000
	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]	
Min Calculation Time:	60.0000	0.1000	900.0000	
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set: 10yr-24hr
Extern Hydrograph Set:
Curve Number Set: CN (A)

Green-Ampt Set:

Vertical Layers Set:
 Impervious Set: Imperviousness
 Roughness Set:
 Crop Coef Set:
 Fillable Porosity Set:
 Conductivity Set:
 Leakage Set:

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	ET for Manual Basins: False
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	OF Region Rain Opt: Global
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
	Rainfall Amount: 6.40 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
Dflt Damping (2D): 0.0050 ft	Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2	Min Node Srf Area 100 ft2
(2D):	(1D):
Energy Switch (2D): Energy	Energy Switch (1D): Energy

Comment:

Simulation: 25yr-72hr

Scenario: Proposed
 Run Date/Time: 3/10/2023 8:43:17 AM
 Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000
	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]	
Min Calculation Time:	60.0000	0.1000	900.0000	
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set: 25yr-72hr
Extern Hydrograph Set:
Curve Number Set: CN (A)

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Imperviousness
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

Dflt Damping (2D): 0.0050 ft
Min Node Srf Area 100 ft2
(2D):

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Smp/Man Basin Rain Global
Opt:
OF Region Rain Opt: Global
Rainfall Name: ~SFWMD-72
Rainfall Amount: 9.80 in
Storm Duration: 72.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2
(1D):

Energy Switch (2D): Energy

Energy Switch (1D): Energy

Comment:

Curve Number: CN (A) [Set]

Land Cover Zone	Soil Zone	Curve Number [dec]
Disturbed	A	72.0
Forest	A	30.0
Impervious	A	98.0
Open Space	A	39.0

Impervious: Imperviousness [Set]

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
Disturbed	0.00	0.00	0.00	0.000	0.000
Forest	0.00	0.00	0.00	0.000	0.000
Impervious	100.00	100.00	0.00	0.000	0.000
Open Space	0.00	0.00	0.00	0.000	0.000

Appendix F:

ICPR4

Recovery

Analysis

Node: Depression-E

Scenario: Recovery (Existing)
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 20.92 ft
Warning Stage: 21.60 ft

Stage [ft]	Area [ac]	Area [ft2]
19.31	0.0001	3
19.50	0.0011	46
20.00	0.0453	1974
20.50	0.5338	23254
21.00	0.6215	27071
21.50	0.6544	28504
22.00	0.6840	29795
22.50	0.7136	31084
23.00	0.7576	33001
23.50	0.9130	39771
24.00	1.1735	51118
24.50	1.1735	51118

Comment:

Node: Depression-N

Scenario: Recovery (Existing)
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 21.21 ft
Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
20.00	0.6566	28600
21.00	0.9426	41060
22.00	1.1610	50572
22.50	1.2556	54696
23.00	1.7273	75240
23.50	1.9001	82768
24.00	2.0615	89800
24.50	2.0615	89800

Comment:

Node: Depression-W

Scenario: Recovery (Existing)
Type: Stage/Area

Base Flow: 0.00 cfs
 Initial Stage: 21.21 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.62	0.0001	3
20.00	0.0319	1391
20.50	0.1397	6084
21.00	0.1584	6902
21.50	0.1708	7442
22.00	0.1835	7993
22.50	0.1960	8539
23.00	0.2054	8946
23.50	0.2075	9041
24.00	0.2075	9041

Comment:

Node: Groundwater

Scenario: Recovery (Existing)
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 0.00 ft
 Boundary Stage:

Comment:

Percolation Link: L-E-PERC

Scenario:	Recovery (Existing)	Surface Area Option:	Vary Based on Stage/Area Table
From Node:	Depression-E	Vertical Flow Termination:	Horizontal Flow Algorithm
To Node:	Groundwater	Perimeter 1:	620.00 ft
Link Count:	1	Perimeter 2:	780.00 ft
Flow Direction:	Both	Perimeter 3:	1420.00 ft
Aquifer Base Elevation:	13.00 ft	Distance P1 to P2:	25.00 ft
Water Table Elevation:	18.31 ft	Distance P2 to P3:	100.00 ft
Annual Recharge Rate:	0 ipy	# of Cells P1 to P2:	5
Horizontal Conductivity:	22.060 fpd	# of Cells P2 to P3:	10
Vertical Conductivity:	14.710 fpd		
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.

Percolation Link: L-N-PERC

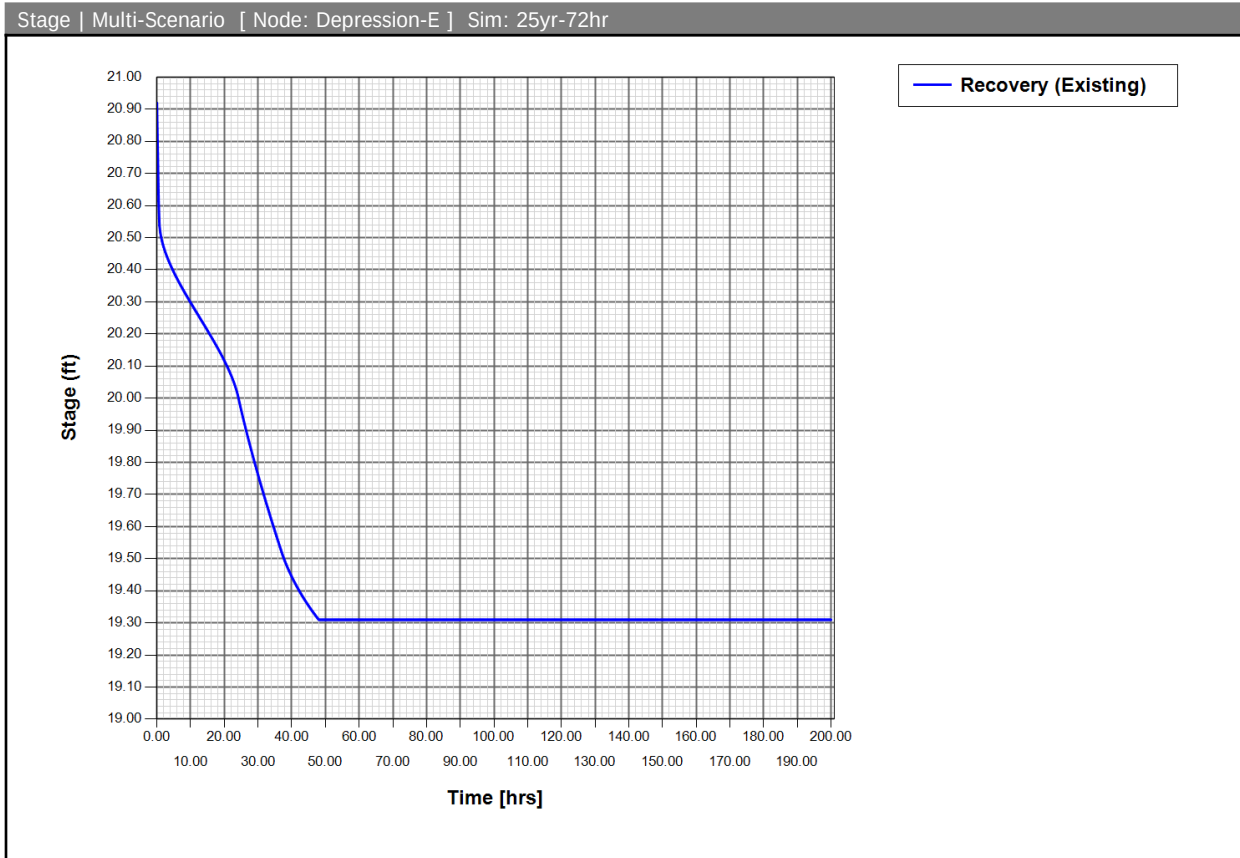
Scenario:	Recovery (Existing)	Surface Area Option:	Vary Based on Stage/Area
From Node:	Depression-N		Table
To Node:	Groundwater	Vertical Flow Termination:	Horizontal Flow Algorithm
Link Count:	1	Perimeter 1:	1370.00 ft
Flow Direction:	Both	Perimeter 2:	1540.00 ft
Aquifer Base Elevation:	14.00 ft	Perimeter 3:	2020.00 ft
Water Table Elevation:	19.00 ft	Distance P1 to P2:	25.00 ft
Annual Recharge Rate:	0 ipy	Distance P2 to P3:	100.00 ft
Horizontal Conductivity:	22.060 fpd	# of Cells P1 to P2:	5
Vertical Conductivity:	14.710 fpd	# of Cells P2 to P3:	10
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

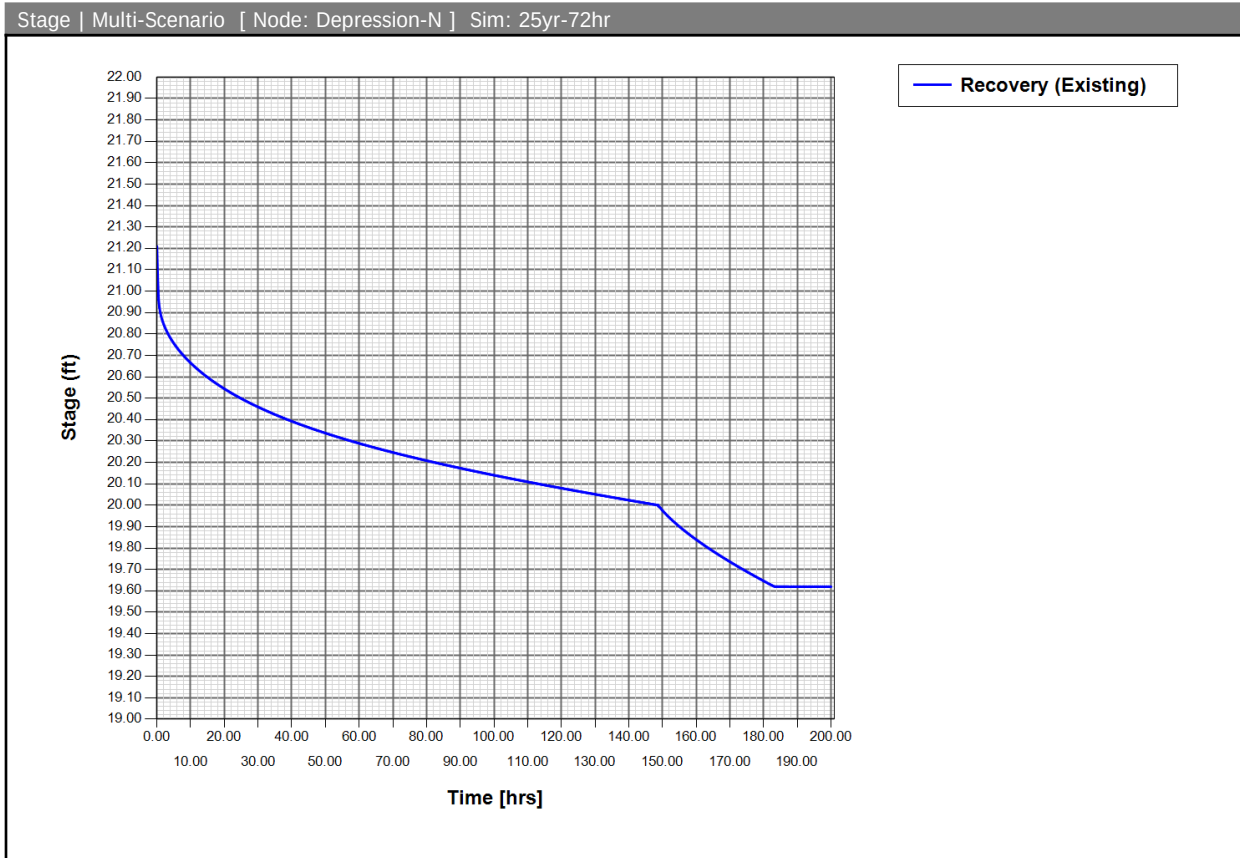
Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.

Percolation Link: L-W-PERC

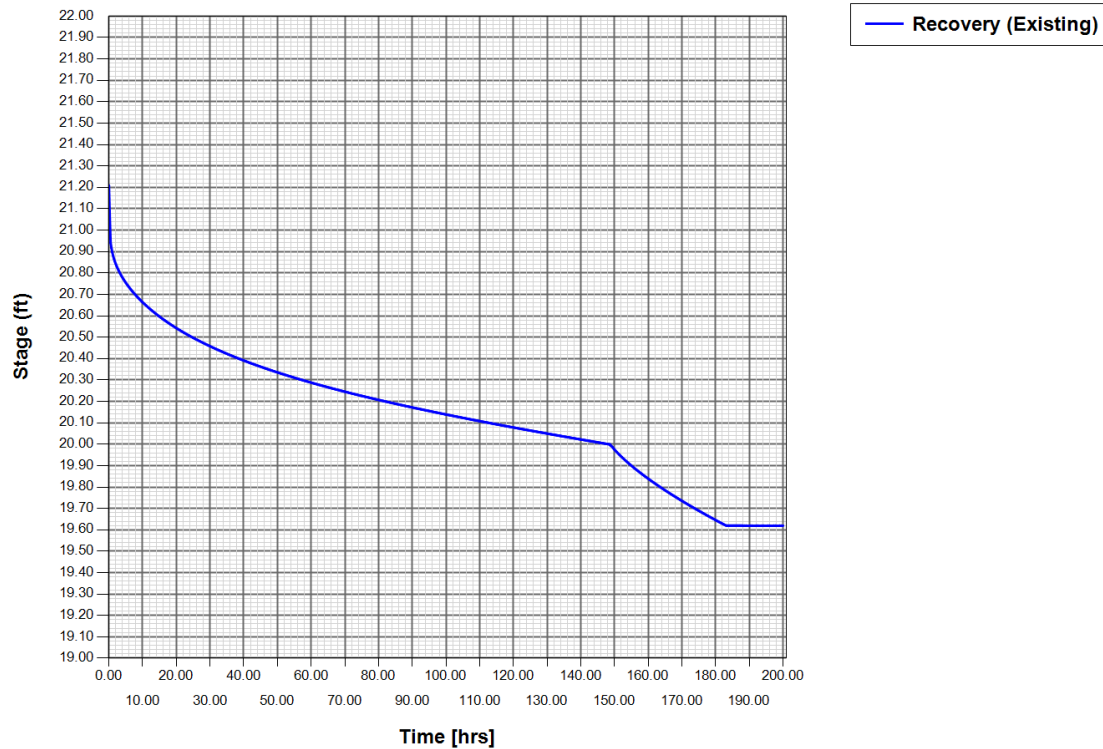
Scenario:	Recovery (Existing)	Surface Area Option:	Vary Based on Stage/Area
From Node:	Depression-W		Table
To Node:	Groundwater	Vertical Flow Termination:	Horizontal Flow Algorithm
Link Count:	1	Perimeter 1:	580.00 ft
Flow Direction:	Both	Perimeter 2:	760.00 ft
Aquifer Base Elevation:	14.00 ft	Perimeter 3:	1430.00 ft
Water Table Elevation:	18.62 ft	Distance P1 to P2:	25.00 ft
Annual Recharge Rate:	0 ipy	Distance P2 to P3:	100.00 ft
Horizontal Conductivity:	22.060 fpd	# of Cells P1 to P2:	5
Vertical Conductivity:	14.710 fpd	# of Cells P2 to P3:	10
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.





Stage | Multi-Scenario [Node: Depression-W] Sim: 25yr-72hr



Node: Depression-E

Scenario: Recovery (Proposed)

Type: Stage/Area

Base Flow: 0.00 cfs

Initial Stage: 21.07 ft

Warning Stage: 21.60 ft

Stage [ft]	Area [ac]	Area [ft2]
19.31	0.0001	3
19.50	0.0011	46
20.00	0.0453	1974
20.50	0.5338	23254
21.00	0.6215	27071
21.50	0.6544	28504
22.00	0.6840	29795
22.50	0.7136	31084
23.00	0.7576	33001
23.50	0.9130	39771
24.00	1.1735	51118

Stage [ft]	Area [ac]	Area [ft2]
24.50	1.1735	51118

Comment:

Node: Depression-N

Scenario: Recovery (Proposed)
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 21.54 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
20.00	0.6566	28600
21.00	0.9426	41060
22.00	1.1610	50572
22.50	1.2556	54696
23.00	1.7273	75240
23.50	1.9001	82768
24.00	2.0615	89800
24.50	2.0615	89800

Comment:

Node: Depression-W

Scenario: Recovery (Proposed)
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 21.54 ft
 Warning Stage: 21.70 ft

Stage [ft]	Area [ac]	Area [ft2]
19.62	0.0001	3
20.00	0.0319	1391
20.50	0.1397	6084
21.00	0.1584	6902
21.50	0.1708	7442
22.00	0.1835	7993
22.50	0.1960	8539
23.00	0.2054	8946
23.50	0.2075	9041
24.00	0.2075	9041

Comment:

Node: Groundwater

Scenario: Recovery (Proposed)
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 0.00 ft
 Warning Stage: 0.00 ft
 Boundary Stage:

Comment:

Percolation Link: L-E-PERC

Scenario:	Recovery (Proposed)	Surface Area Option:	Vary Based on Stage/Area Table
From Node:	Depression-E	Vertical Flow Termination:	Horizontal Flow Algorithm
To Node:	Groundwater	Perimeter 1:	620.00 ft
Link Count:	1	Perimeter 2:	780.00 ft
Flow Direction:	Both	Perimeter 3:	1420.00 ft
Aquifer Base Elevation:	13.00 ft	Distance P1 to P2:	25.00 ft
Water Table Elevation:	18.31 ft	Distance P2 to P3:	100.00 ft
Annual Recharge Rate:	0 ipy	# of Cells P1 to P2:	5
Horizontal Conductivity:	22.060 fpd	# of Cells P2 to P3:	10
Vertical Conductivity:	14.710 fpd		
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.

Percolation Link: L-N-PERC

Scenario:	Recovery (Proposed)	Surface Area Option:	Vary Based on Stage/Area Table
From Node:	Depression-N	Vertical Flow Termination:	Horizontal Flow Algorithm
To Node:	Groundwater	Perimeter 1:	1370.00 ft
Link Count:	1	Perimeter 2:	1540.00 ft
Flow Direction:	Both	Perimeter 3:	2020.00 ft
Aquifer Base Elevation:	14.00 ft	Distance P1 to P2:	25.00 ft
Water Table Elevation:	19.00 ft	Distance P2 to P3:	100.00 ft
Annual Recharge Rate:	0 ipy	# of Cells P1 to P2:	5
Horizontal Conductivity:	22.060 fpd	# of Cells P2 to P3:	10
Vertical Conductivity:	14.710 fpd		
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

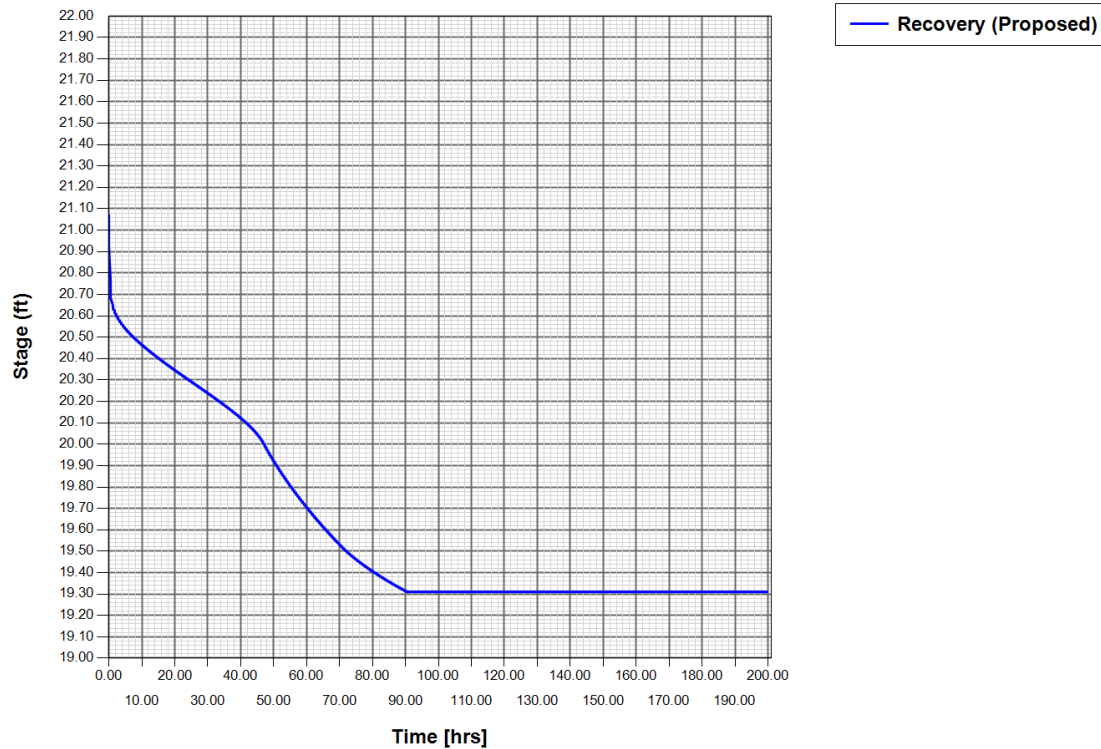
Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.

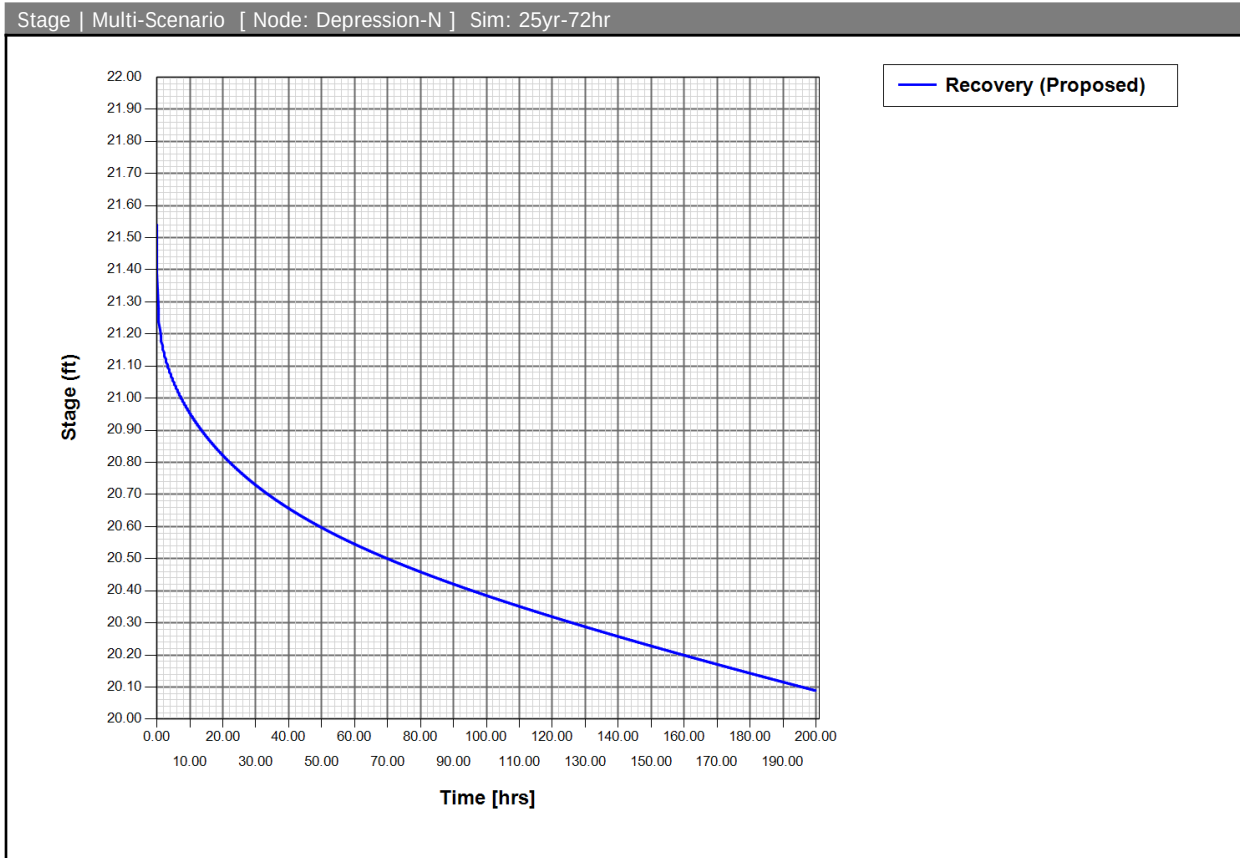
Percolation Link: L-W-PERC

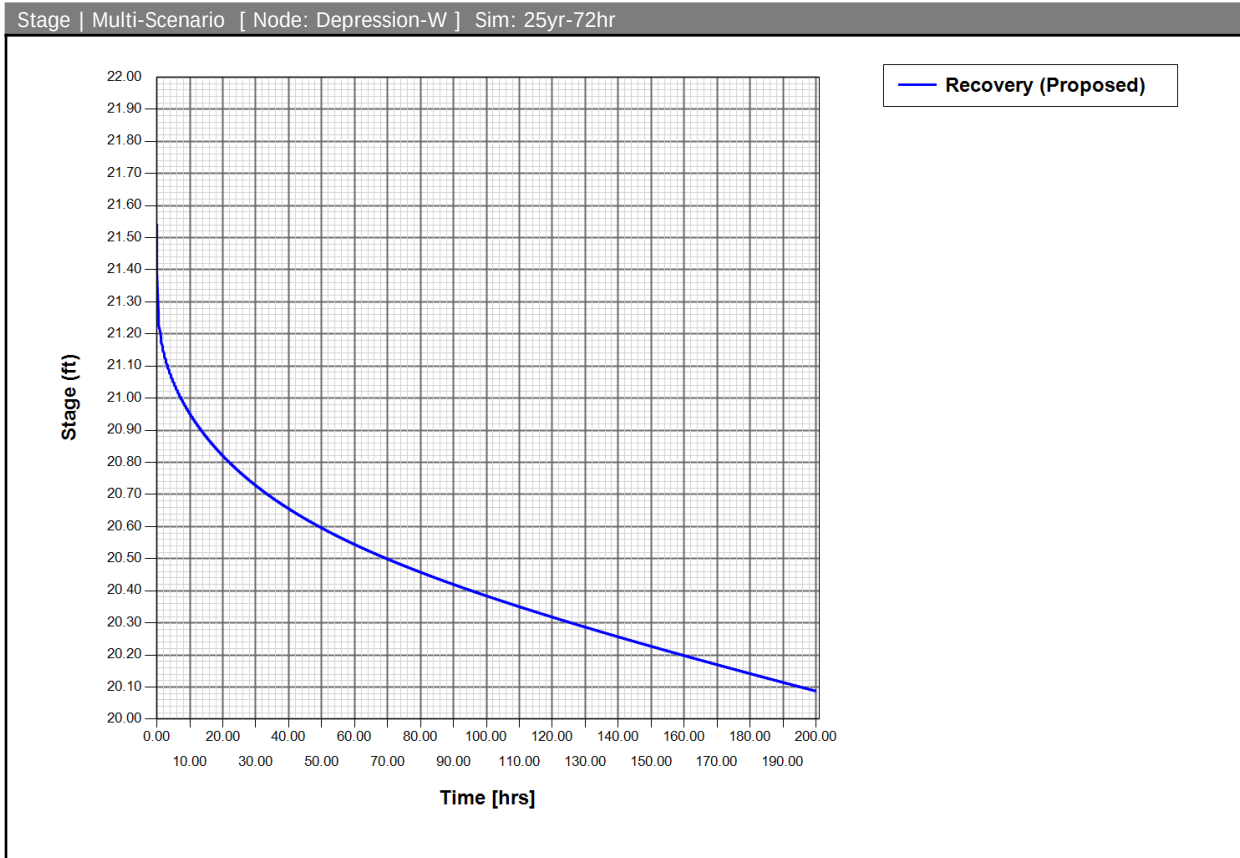
Scenario:	Recovery (Proposed)	Surface Area Option:	Vary Based on Stage/Area Table
From Node:	Depression-W	Vertical Flow Termination:	Horizontal Flow Algorithm
To Node:	Groundwater	Perimeter 1:	580.00 ft
Link Count:	1	Perimeter 2:	760.00 ft
Flow Direction:	Both	Perimeter 3:	1430.00 ft
Aquifer Base Elevation:	14.00 ft	Distance P1 to P2:	25.00 ft
Water Table Elevation:	18.62 ft	Distance P2 to P3:	100.00 ft
Annual Recharge Rate:	0 ipy	# of Cells P1 to P2:	5
Horizontal Conductivity:	22.060 fpd	# of Cells P2 to P3:	10
Vertical Conductivity:	14.710 fpd		
Fillable Porosity:	0.200		
Layer Thickness:	1.00 ft		

Comment: Percolation parameters taken from 2009 MODRET model in Basin 4. Estimated GWT elevation to be at least 1-ft below pond bottom per site visit.

Stage | Multi-Scenario [Node: Depression-E] Sim: 25yr-72hr







Appendix G: Water Quality Calculations

Existing Condition Treatment Volume Calculations

Approach A: 1" over Project Area

Total Project Area

5.04 ac.

Required Treatment Volume

(1" x Total Project Area x 50% for Retention)

0.21 ac-ft.

Approach B: 2.5" x % Impervious

Total Project Area

5.04 ac.

Roof Area

0 ac.

Pervious Area

4.46 ac.

Percentage of Impervious

(does not count roof area)

11.51%

Required Treatment Volume

(2.5" x % Impervious)

0.06 ac-ft.

Result:

0.21 ac-ft. of treatment volume is required

Proposed Condition Treatment Volume Calculations

Approach A: 1" over Project Area

Total Project Area

5.04 ac.

Required Treatment Volume

(1" x Total Project Area x 50% for Retention)

0.21 ac-ft.

Approach B: 2.5" x % Impervious

Total Project Area

5.04 ac.

Roof Area

0.08 ac.

Pervious Area

3.99 ac.

Percentage of Impervious

(does not count roof area)

19.56%

Required Treatment Volume

(2.5" x % Impervious)

0.10 ac-ft.

Result:

0.21 ac-ft. of treatment volume is required