Kimley»Horn

# MEMORANDUM

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| To: | Jennifer Marshall, PE<br>FDOT Chief Engineer of Production |
| From: | Victor Gallo, PE – Project Manager<br>Armando Orozco, PE – Deputy Project Manager<br>Kimley-Horn & Associates, Inc. |
| Date: | January 14th, 2026 |
| Subject: | New Stormwater Rule Evaluation for State Road 544 Project Development and Environment (PD&E) Study |

## Introduction & Objective

This project is located on SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County. This technical memorandum provides a revised analysis of the State Road 544 PD&E Study from October 2023 (FPID: 440273-1-22-01), following the new nutrient reduction stormwater rule as set forth in Chapter 62-330, F.A.C., and the ERP Applicant's Handbook Volume 1 (A.H. Vol. 1). The project's aim is to improve regional mobility and accommodate the future traffic needs of SR 544. The proposed improvements primarily consist of widening the existing two-lane divided limited access facility into a curb-and-gutter four-lane with roundabouts, and sidewalks on both sides of the roadway. The total length of this project is approximately 7.96 miles.

The objective of this task is to review the pond site alternatives developed in the original Pond Siting Report (PSR), utilizing traditional first flush treatment volume design and performance standards, and to assess the modifications required to meet the new nutrient reduction criteria established by the updated stormwater rule. The new stormwater rule focuses on the reduction of total nitrogen (TN) and total phosphorus (TP) in surface water discharges, as determined by Best Management Practice (BMP) nutrient reduction rates based on the existing ambient water quality conditions of the downstream Water of the State within the boundaries of HUC 12 sub watershed, as outlined in Sections 8.3.2 through 8.3.5 of the A.H. Vol I.

This technical memorandum aims to provide findings and mitigative alternatives regarding the impacts of the new stormwater rule, set forth in Chapter 62-330, F.A.C., on stormwater management systems for curb and gutter typical sections. No changes in volumetric attenuation are expected, so attenuation volumes were not evaluated. The minimum nutrient reduction rate performance standards for all sites, as specified in Section 8.3 of the updated A.H. Vol. I, are summarized in **Table 1.** Please note that due to the ambiguity in the new stormwater rule regarding the impaired classification, FDOT developed two scenarios to evaluate any additional potential impact to the work program.

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## New Stormwater Rule

Florida's new stormwater rule shifts from a volumetric first flush treatment volume approach to nutrient reduction performance modeling to meet minimum post-development nutrient reduction targets as written in Part II of A.H. Vol. 1. The new water quality design and performance standards are not in effect for current ERP application to analyze regulatory agency's interpretation of the standards. To address the potential ambiguities, two scenarios were developed to document the impacts to the work program. Scenario 1 maintains the assumption of historical precedence of impairment for nutrient response water quality parameters, with the exception of nitrate/nitrite, and will be used as the basis for impaired waters post-development minimum nutrient reduction rate standards (TN and TP). Scenario 2 includes the added risk of any water quality impairment as the basis to require the higher nutrient reduction efficiencies because of the ambiguity of the new rule. This memo also presumes the use of the new water quality standards without the use of any grandfathering provisions within the Rule to truly assess the future impacts on the Department's Work Program once this Rule takes full effect.

**Table 1** summarizes the new stormwater performance standard requirements in Section 8.3 of the A.H. Vol. I. This section provides further performance requirements for redevelopment projects as well; however, only performance requirements pertaining to the SR 544 project were included in **Table 1**. The original PSR for SR 544 (dated October 2023) was utilized to facilitate modeling nutrient reduction calculations. Nutrient loading analyses were performed for predevelopment and post-development conditions to determine the percent increase in loading. The increase in loading was not larger than the post-development minimum nutrient reduction rates. Therefore, the minimum post-development nutrient reduction rates control.

**Table 1: New Water Quality Performance Standard Requirements**

| Downstream Ambient Water Quality | Post. Dev. TP Minimum Reduction Rate % | Post. Dev. TN Minimum Reduction Rate % | Nutrient Loading Analysis | Presumptive TSS Removal Efficiencies % | A.H. Section |
|---|---|---|---|---|---|
| All Sites | 80 | 55 | Post ≤ Pre | 80 | 8.3.2 |
| Impaired Waters | 80 | 80 | Post ≤ Pre | 80 | 8.3.4 |
| OFW | 90 | 80 | Post ≤ Pre | 95 | 8.3.3 |
| Impaired + OFW | 95 | 95 | Post ≤ Pre | 95 | 8.3.4 |

## Methodology

BMPTrains 2020 Version 4.3.5 was employed to evaluate the post-development minimum nutrient reduction rates provided by the stormwater alternatives originally sized and sited in the PSR. Based on findings, an alternative was evaluated in conjunction with the originally sited ponds in treatment trains to upgrade the facilities to meet new standards. These were modeled in series to determine combined BMP nutrient reduction rates for each roadway sub basin, and the combined HUC 12 sub watershed nutrient reduction. Side bank filters were added to the original pond sites in the wet detention ponds to provide additional treatment while creating a surface water discharge using detention with filtration BMPs.

The BMP model's primary focus was on the nutrient reduction rate of TN and TP, verifying reasonable assurance with the new required nutrient reduction criteria as set forth in Chapter 62-330 F.A.C. and the A.H. Vol. I. Within the pond's BMPTrains, separate catchments were created for each pond alternative (as set forth in the original PSR). The pre/post Event Mean Concentration (EMC) values were sourced from the A.H. Vol. 1, Table 9.2. The treatment section in BMPTrains incorporated the relevant treatments of retention systems and wet detention ponds, with multiple treatment options applied in series where applicable. Nutrient reduction rates were analyzed for each basin for Scenario 1; Scenario 2 did not need to be analyzed since only nutrient impairments exist downstream of the project limits. To determine combined nutrient reduction rates, BMPTrains was used to calculate stand-alone nutrient reduction rates, treatment trains in series were then combined using Equation 9-5 of the A.H. Vol. I.

For wet ponds, limits to the average residence time throughout the State were used to calculate BMP nutrient reduction rates for both TN and TP. Appendix O of the A.H Vol. I identifies the maximum average annual residence time as 200 days, which yields maximum nutrient reduction rates of 43% and 80% for TN and TP respectively. BMPTrains along with equations and limitations in Appendix O of the A.H. Vol. 1 were used to determine nutrient reduction rates of wet ponds. Please note that ponds were regraded to maximize the mean depth of the permanent pool volume (PPV). The regrading was done in accordance with FDOT standards, and in no case was the regrading done outside of the footprint of the original PSR.

For dry retention systems, the average annual effectiveness is calculated using an annual average runoff volume that can be captured in the retention system. The annual average capture volume is related to the provided retention depth that is retained in the dry retention pond. The retention depth is calculated as rainfall inches over the contributing basin area. The treatment nutrient reduction rate is determined from the Appendix O tables that presume annual capture rate based on the basin's retention depth, Directly Connected Impervious Area (DCIA), and the non-DCIA Curve Number (CN). BMPTrains interpolates between the 80 adopted tables in Appendix O of the A.H Vol I. which are used to determine the nutrient reduction rates of dry retention systems. The retention volumes of the dry retention ponds match the original PSR volumes.

ICPR 4.07.04 recovery analyses were conducted to assess the recovery performance of dry retention systems. In all instances, the systems achieved full recovery within the stipulated 72-hour period, providing reasonable assurance with Appendix O of the A.H. Vol I. In the absence of geotechnical data, assumptions regarding soil properties were made using the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey to facilitate the completion of these analyses. Refer to **Appendix C** for ICPR recovery models.

For side bank filters, the detention with media filtration method in Appendix O in the A.H Vol. I was used to determine the BMP nutrient reduction rate of the side banks. Refer to Alternative 1 in the following narrative for more details on methodology and approach. For side bank filters, the "find depth" tool was used to

determine the minimum depth to achieve 80% nutrient reduction; however, in design the vertical head over the center line of the underdrain pipe must be 0.5-ft at minimum to adhere to SFWMD A.H. Vol. 2. Ponds 3 and 5 were exceptions to this method due to having less available space for retention volume and lower annual capture rates.

## Analysis & Results

The original PSR presents a total of 12 stormwater pond alternatives, with one alternative per basin. For projects under this evaluation, two scenarios were analyzed to assess the performance of the ponds and other available BMPs, as detailed in the following narrative. Scenario 1 includes basins that are impaired for either TN, TP, or a nutrient response variable. Scenario 2 includes basins with any verified water quality impairment, including bacteria and mercury. Verified impairments for both scenarios were identified using Waters Not Attaining Standards (WNAS) assessment categories 4a, 4b, and 5 published by FDEP's 2022-2024 Biennial Assessment. However, there are no additional impairments outside of nutrients for these basins; therefore, only Scenario 1 was analyzed. During this evaluation, stormwater ponds are considered to not meet performance standards unless they satisfy both TN and TP post-development minimum nutrient reduction rate requirements. Additionally, none of the basins in this project discharge to an Outstanding Florida Water (OFW).

Out of the 12 originally proposed facilities, two meet criteria for the new stormwater rule without any modifications. These are ponds 1 and 10, both of which are dry ponds. The remaining 10 ponds were unable to meet both TN and TP minimum post-development nutrient reduction rate requirements – 7 are wet ponds, 1 dry pond and 2 are dry linear swales. To address the nutrient reduction deficiency of these facilities, an alternative was developed to optimize the sited footprint while enhancing the systems to meet the nutrient reduction requirements of the new stormwater rule and eliminate additional right-of-way requirements. This alternative is composed of adding side bank filters in series with the treatment provided by the PPV of each wet pond. Each wet pond was able to be optimized and updated to meet the requirements of the new stormwater rule. Basins 5 & 7 were of most concern due to their original sizing being smaller than the rest of the facilities. Some facilities were unable to meet the nutrient reduction for their corresponding roadway basin. To address these deficiencies and avoid the need for additional right-of-way acquisition, compensatory treatment (as outlined in A.H. Volume 1 Section 9.7) was employed at the HUC-12 sub watershed level, separated further by waterbody outfall and local jurisdictional boundaries to achieve water quality objectives as directed by District 1 in the Original PSR. This approach aligns with the new stormwater rule given that all roadway sub-basins within project limits reside in the same HUC-12 sub watershed (Lake Hamilton). Roadway sub basins 1 and 1A drain to Lake Connie, which is identified as impaired for TN and TP. The remaining roadway sub basins do not discharge to impaired water bodies. The nutrient reduction matrices in **Appendix A** reflect composite minimum nutrient reduction rates at the HUC 12 sub watershed level for this reason. Refer to **Table 2** for a summary of impairment findings. For a detailed list of impairments, refer to **Appendix A**.

**Table 2: Summary of Findings for Scenario 1**

| Total No. Ponds | Sub-basins Not Meeting Nutrient Reduction Requirements | Sub-basins Impaired for Total Nitrogen | Sub-basins Impaired for Total Phosphorus |
|---|---|---|---|
| 12 | 10 | 2 | 2 |

Note: Only nutrient impaired WBIDs are identified downstream of the project within the HUC12; thus, only Scenario 1 is considered.

### Alternative 1 – Side Bank Filters

Side bank filters refer to the earthen banks above the NWL of a wet pond that can be used for treatment with the implementation of a weir or grate control structure to mechanically control the stage and volume of water above the permanent pool volume. Refer to **Figure 1**.

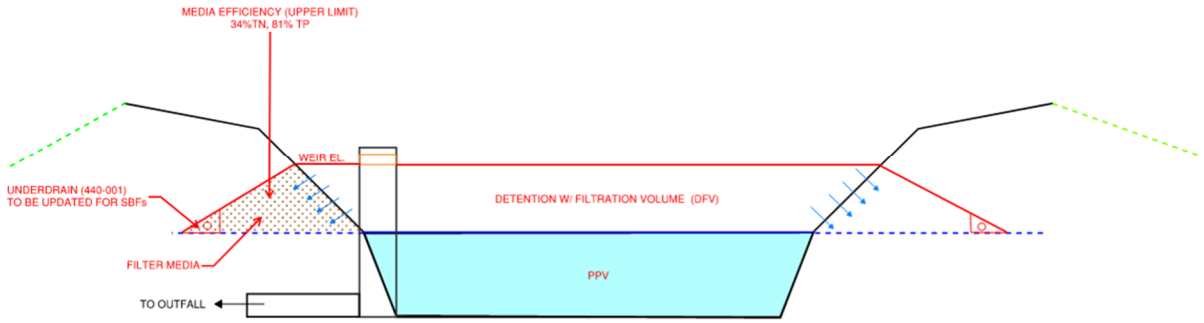



**Figure 1: Side Bank Filter Section**

The *detention with media filtration* in Appendix O in the A.H Vol. I was used to determine the BMP nutrient reduction rate of the side banks. The following equation was used to determine the efficiency rate of side bank filters.

***Detention with Filtration BMP Efficiency = Retention BMP Efficiency[1] X Media Efficiency[2]***

1. Retention volume measured from NWL up the assumed weir or grate elevation of the control structure, treated as “dry retention”. This elevation is higher than the “treatment volume” for the first-flush method, but below the Design High Water (DHW) estimated in the original PSR.
2. Efficiency of filter media. Upper limits for Total Nitrogen and Phosphorus are 34% and 81% respectively. This assumes 3-feet deep select soils to match the results in BDV24-977-25.

Side bank filters were integrated in series with the PPV of the wet detention ponds. The original PSR pond depths were modified to increase the mean depth of the permanent pool, thereby improving nutrient reduction. These filters were paired with the nutrient reduction limitations of wet ponds (43% TN and 80% TP).

Based on the detention with filtration equation, side bank filters can provide an additional 27% TN and 65% TP nutrient reduction for this project except for Ponds 3 and 5, which have a lower annual capture rate. This additional reduction bridges the gap between the wet pond’s performance limitations and the minimum regular site requirements (55% TN / 80% TP). For TN, only 23% additional reduction is needed, which the side bank filters can meet and exceed. TP is generally less of a concern, as the minimum reduction is more easily achieved; however, the surplus efficiency from the filters helps compensate for ponds that cannot meet the nutrient reduction requirements for their corresponding roadway sub-basins at the HUC 12 sub watershed level.

Split BMPs were sized for Pond 3 and Pond 8 for them to meet the required nutrient reduction rate. The original pond sites proposed in the original PSR were optimized to include additional treatment using a treatment train of a dry retention BMP and the permanent pool volume of a wet pond. Pond 8 was utilized to provide treatment to bridge the gap between the new minimum nutrient reduction rate and the nutrient

reduction rate provided by the ponds in the original PSR for the Lake Hamilton outfall. For the dry BMPs at least 1-foot of separation from the pond bottom elevation and the NWL was provided. The retention BMP and PPV are placed in series to enhance nutrient reduction rates, and the entire facility would be used for storage of stormwater to meet attenuation pre-post requirements. **Figure 2** shows the cross-section of the dry retention BMP and wet pond treatment train.

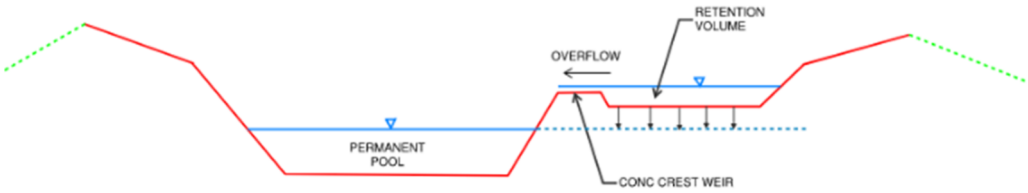



**Figure 2: Cross Section of Split BMP**

The split BMP would also include a flow diversion structure that would connect to the stormwater trunkline. A flow diversion structure would direct stormwater towards the dry BMP at a higher elevation while also routing it to the wet pond, ensuring sufficient flow during larger storm events. A key element of determining hydraulic feasibility is in modeling and preliminarily sizing the flow diversion structure weir to balance the optimization of nutrient reduction, meet attenuation pre-post requirements, without introducing flood risks. This alternative can be evaluated in detail in the design phase, if needed. **Figure 3** shows a diagram of a flow diversion structure.

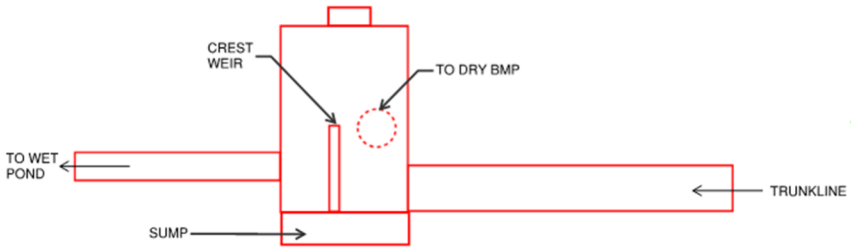



**Figure 3: Flow Diversion Structure Sketch**

Please refer to **Appendix A** for hydraulic evaluation sheets for the split BMPs of Pond 3 and 8.

## Other Alternatives

Linear treatment swales were considered alongside the roadway to provide additional treatment for each basin. In this alternative, the curb and gutter typical section would be maintained by incorporating closed flume inlets or open flumes. The swales feature a 5-foot bottom, with an additional 2-feet on either side for the front and back slopes. Swale blocks were added where necessary to further enhance treatment nutrient reduction rates. This alternative was removed because the addition of swales blocks could introduce base clearance issues to the adjacent roadway based on proposed ditch blocks. However, this can still be an option to evaluate further in design with associated profiles and geotechnical investigation as outlined in the Drainage Manual. Moreover, it would require additional right-of-way acquisition in areas where the typical width is not sufficient to fit a swale.

Regional retention dry BMPs were evaluated for compensatory treatment, as the project boundaries are located within the same Lake Hamilton HUC-12 sub watershed. This alternative would require additional right-of-way acquisition for the regional treatment facilities; therefore, it was removed as an alternative.

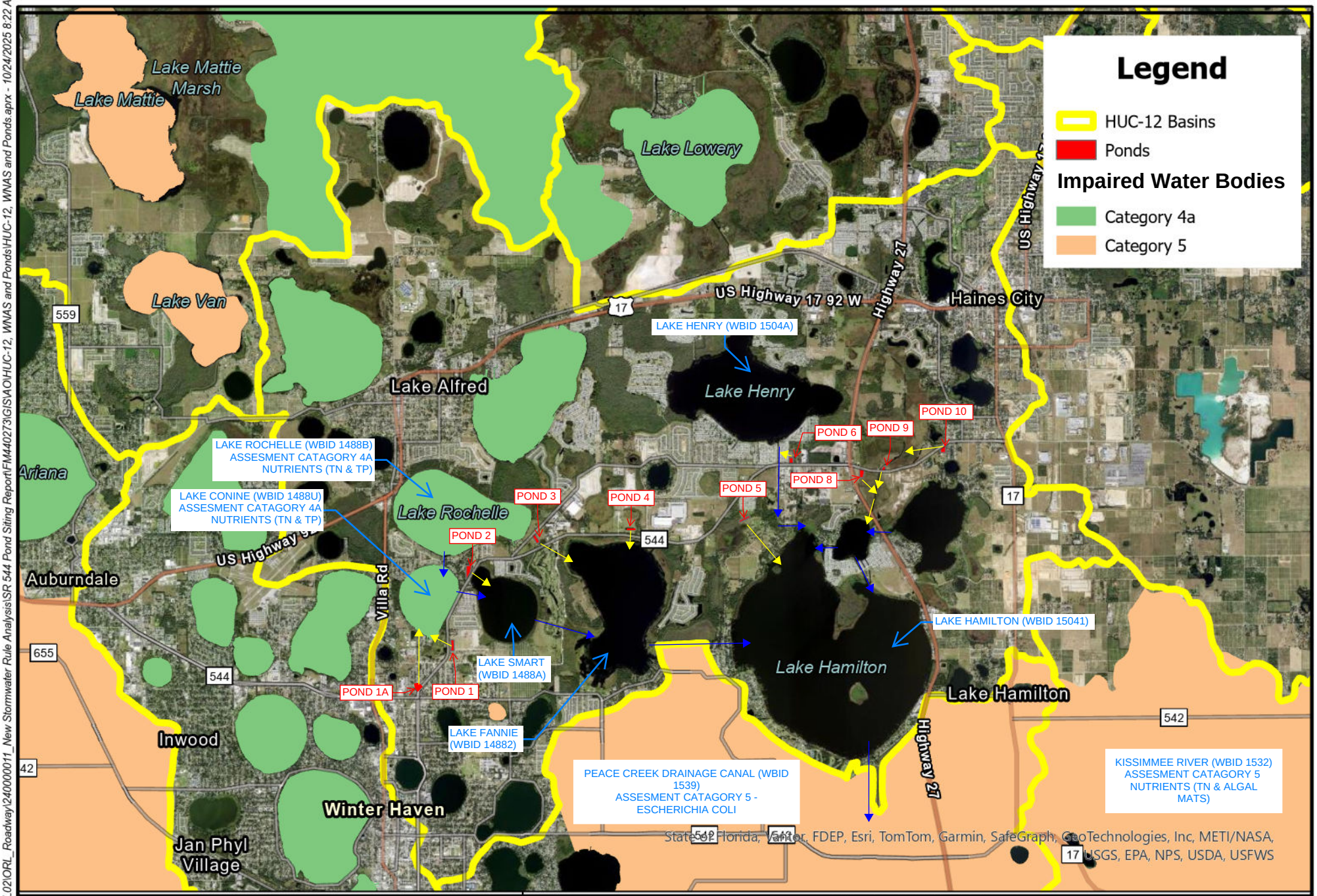
## Conclusion

In conclusion, 10 of the 12 stormwater ponds will not meet the required post-development minimum nutrient reduction rates outlined in the new rule if left to operate independently as originally sited in the PSR. However, Alternative 1 satisfies the criteria of the new stormwater rule when combined with the treatment trains. Additional right-of-way acquisition is not expected to be necessary to achieve the post-development minimum reduction rate standards.

# APPENDIX A

## Matrices

## Exhibits and Basin Information




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HUC-12 BASIN EXHIBIT

SR 544
POLK COUNTY, FLORIDA

| Scale: As Noted | FPID 440273-1 | October, 2025 | Figure 1 |
|---|---|---|---|

\\kimley-horn.com\FL_ORL02\ORL_Roadway\240000011_New Stormwater Rule Analysis\SR 544 Pond Siting Report\FM440273\GIS\AO\HUC-12, WNAS and Ponds\HUC-12, WNAS and Ponds aprx - 10/24/2025 8:22 AM - K

| Biennial Assessment 2022/24 of Impaired Waters | | | | | | |
|---|---|---|---|---|---|---|
| WBID | WATERBODY NAME | PARAMETER GROUP | PARAMETER IWR | IR ASSESSMENT CATEGORY | ASSESSMENT STATUS | COMMENTS |
| 1488U | LAKE CONINE | Nutrients | Nutrients (Total Nitrogen) | 4a | TMDL Complete | This waterbody has a site-specific (Hierarchy 1) DEP adopted nutrient TMDL and is impaired for this parameter because it exceeds the 1.05 mg/L criterion expressed as an annual geometric mean never to be exceeded . This parameter will remain in category 4a (TMDL Complete). |
| | | | Nutrients (Total Phosphorus) | 4a | TMDL Complete | This waterbody has a site-specific (Hierarchy 1) DEP adopted nutrient TMDL and is impaired for this parameter because it exceeds the 0.03 mg/L criterion expressed as an annual geometric mean never to be exceeded. This parameter will remain in category 4a (TMDL Complete). |
| | | | Nutrients (Chlorophyll-A) | 2t | Not Impaired (TMDL Complete) | The waterbody has a site-specific (Hierarchy 1) DEP adopted nutrient TMDL and is not impaired for this parameter because it does not exceed the 20 µg/L criterion expressed as an annual geometric mean more than once in a three year period. |

| Nutrient Loading Analysis | | | | | | | |
|---|---|---|---|---|---|---|---|
| Basin | Pond ID | Nitrogen | | | Phosphorus | | |
| | | Pre Loading (kg/yr) | Post Loading (kg/yr) | Loading Change (%) | Pre Loading (kg/yr) | Post Loading (kg/yr) | Loading Change (%) |
| 1A | 1A | 7.73 | 9.309 | 17% | 1.07 | 1.288 | 17% |
| 1 | 1 | 32.445 | 55.51 | 42% | 4.49 | 7.683 | 42% |
| 2 | 2 | 16.479 | 26.441 | 38% | 2.281 | 3.659 | 38% |
| 3 | 3 | 26.652 | 46.59 | 43% | 3.689 | 6.448 | 43% |
| 4 | 4 | 37.42 | 62.209 | 40% | 5.179 | 8.61 | 40% |
| 5 | 5 | 36.711 | 67.542 | 46% | 5.081 | 9.348 | 46% |
| 6 | 6 | 11.944 | 21.809 | 45% | 1.653 | 3.018 | 45% |
| 7 | 7 | 50.726 | 48.393 | -5% | 7.021 | 6.698 | -5% |
| 8A | 8A | 6.179 | 7.993 | 23% | 0.855 | 1.106 | 23% |
| 8 | 8 | 50.627 | 66.281 | 24% | 7.007 | 9.173 | 24% |
| 9 | 9 | 11.852 | 23.766 | 50% | 1.64 | 3.289 | 50% |
| 10 | 10 | 29.024 | 47.345 | 39% | 4.017 | 6.553 | 39% |

NOTE ON POND 7 - CN CALCULATIONS IN ORIGINAL PSR INDICATE A REDUCTION IN IMPERVIOUS AREA IN THIS BASIN, LEADING TO A DECREASE IN NUTRIENT LOADING.

# APPENDIX A1

## Alternative 1

## NUTRIENT REDUCTION RATES MATRIX - ALTERNATIVE 1

| HUC-12 | | | | | BMP Series Train | | | | | | Nitrogen | | | | | | | Phosphorus | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HUC-12 ID | HUC-12 Name | Outfall | Basin | Pond ID | BMP Element 1 | BMP Element 2 | BMP Element 3 | WBID | Basin Impairment | Impairments or WNAS | BMP Element 1 Nutrient Reduction Rate | SBF Retention Nutrient Reduction Rate[1] | Media Efficiency[2] | BMP Element 2 Nutrient Reduction Rate | BMP Element 3 Nutrient Reduction Rate | Req. Nitrogen Treatment (New Rule) | Nitrogen Combined Efficiency Rate | BMP Element 1 Nutrient Reduction Rate | SBF Retention Nutrient Reduction Rate[1] | Media Efficiency[2] | BMP Element 2 Nutrient Reduction Rate | BMP Element 3 Nutrient Reduction Rate | Req. Phosphorus Treatment (New Rule) | Phosphorus Combined Efficiency Rate |
| 31001010201 | Lake Hamilton | Lake Conine | 1A | Pond 1A | Dry Pond | | | WBID 1504B - Lake Hamilton Drain, 1488U - Lake Connie | Impaired Waters | Total Nitrogen and Total Phosphorus | 56% | - | - | - | - | 80% | 56% | 56% | - | - | - | - | 80% | 56% |
| | | Lake Conine | 1 | Pond 1 | Dry Pond | | | | Impaired Waters | | 86% | - | - | - | - | 80% | 86% | 86% | - | - | - | - | 80% | 86% |
| | | Lake Smart | 2 | Pond 2 | Wet Pond | Side Bank Filter | | WBID 1504B - Lake Hamilton Drain, 1488A - Lake Smart | No Verified Impairments | None | 43% | 80% | 34% | 27% | - | 55% | 58% | 79% | 80% | 81% | 65% | - | 80% | 93% |
| | | Lake Fannie | 3 | Pond 3 | Wet Pond (Split BMP) | Side Bank Filter | Dry Pond (Split BMP) | WBID 1504B - Lake Hamilton Drain, 14882 - Lake Fannie | No Verified Impairments | None | 42% | 49% | 34% | 17% | 18% | 55% | 60% | 73% | 49% | 81% | 40% | 18% | 80% | 87% |
| | | Lake Fannie | 4 | Pond 4 | Wet Pond | Side Bank Filter | | | No Verified Impairments | None | 42% | 80% | 34% | 27% | - | 55% | 58% | 73% | 80% | 81% | 65% | - | 80% | 90% |
| | | Lake Hamilton | 5 | Pond 5 | Wet Pond | Side Bank Filter | | WBID 1504 - Lake Hamilton Outlet, 15041 - Lake Hamilton | No Verified Impairments | None | 38% | 76% | 34% | 26% | - | 55% | 54% | 65% | 76% | 81% | 62% | - | 80% | 87% |
| | | Lake Hamilton | 6 | Pond 6 | Wet Pond | Side Bank Filter | | WBID 1504 - Lake Hamilton Outlet, 15041 - Lake Henry | No Verified Impairments | None | 43% | 80% | 34% | 27% | - | 55% | 58% | 80% | 80% | 81% | 65% | - | 80% | 93% |
| | | Lake Hamilton | 7 | Pond 7 | Dry Swale | | | | No Verified Impairments | None | 44% | - | - | - | - | 55% | 44% | 44% | - | - | - | - | 80% | 44% |
| | | Lake Hamilton | 8 | Pond 8 | Wet Pond (Split BMP) | Side Bank Filter | Dry Pond (Split BMP) | WBID 1500A - Lake Hamilton Canal, 15002 - Middle Lake Hamilton | No Verified Impairments | None | 42% | 80% | 34% | 27% | 48% | 55% | 78% | 72% | 80% | 81% | 65% | 48% | 80% | 95% |
| | | Lake Hamilton | 8A | Pond 8A | Dry Swale | | | | No Verified Impairments | None | 55% | - | - | - | - | 55% | 55% | 55% | - | - | - | - | 80% | 55% |
| | | Lake Hamilton | 9 | Pond 9 | Wet Pond | Side Bank Filter | | | No Verified Impairments | None | 42% | 80% | 34% | 27% | - | 55% | 58% | 74% | 80% | 81% | 65% | - | 80% | 91% |
| | | Lake Hamilton | 10 | Pond 10 | Dry Pond | | | WBID 1500A - Lake Hamilton Canal, 15001 - Little Lake Hamilton | No Verified Impairments | None | 89% | - | - | - | - | 55% | 89% | 89% | - | - | - | - | 80% | 89% |

1. Retention volumes used are congruent to 80% reduction using the "get depth" tool in BMPTrains. Larger retention volumes could be used in design if modeling shows no adverse impacts to water quantity.
2. Upper limit media efficiency per FDOT research study BDV24-977-25

See next sheet for HUC-12 nutrient reduction calculations

## Alternative 1 - Nutrient Loading & Nutrient Reduction Analysis Summary (Per Outfall within Lake Hamilton HUC 12 Subwatershed)

| Basins | Outfall[1] | Pre-Dev. Loading (kg/yr) | | Post-Dev. Loading (kg/yr) | | BMP Series Train Description | | | Annual Capture Efficiency Rate | | | | | | Provided BMP Efficiency Rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | TN | | | TP | | | | |
| | | TN | TP | TN | TP | | | | BMP1 | BMP2 | BMP3 | BMP1 | BMP2 | BMP3 | TN | TP |
| 1A | Lake Conine | 7.73 | 1.07 | 9.309 | 1.288 | Dry Pond | | | 56% | | | 56% | | | **56%** | **56%** |
| 1 | Lake Conine | 32.445 | 4.49 | 55.51 | 7.683 | Dry Pond | | | 86% | | | 86% | | | **86%** | **86%** |
| 2 | Lake Smart | 16.479 | 2.281 | 26.441 | 3.659 | Wet Pond | Side Bank Filter | | 43% | 27% | | 79% | 65% | | **58%** | **93%** |
| 3 | Lake Fannie | 26.652 | 3.689 | 46.59 | 6.448 | Wet Pond (Split BMP) | Side Bank Filter | Dry Pond (Split BMP) | 42% | 17% | 18% | 73% | 40% | 18% | **60%** | **87%** |
| 4 | Lake Fannie | 37.42 | 5.179 | 62.209 | 8.61 | Wet Pond | Side Bank Filter | | 42% | 27% | | 73% | 65% | | **58%** | **90%** |
| 5 | Lake Hamilton | 36.711 | 5.081 | 67.542 | 9.348 | Wet Pond | Side Bank Filter | | 38% | 26% | | 65% | 62% | | **54%** | **87%** |
| 6 | Lake Hamilton | 11.944 | 1.653 | 21.809 | 3.018 | Wet Pond | Side Bank Filter | | 43% | 27% | | 80% | 65% | | **58%** | **93%** |
| 7 | Lake Hamilton | 50.726 | 7.021 | 48.393 | 6.698 | Dry Swale | | | 44% | | | 44% | | | **44%** | **44%** |
| 8 | Lake Hamilton | 50.627 | 7.007 | 65.212 | 9.025 | Wet Pond (Split BMP) | Side Bank Filter | Dry Pond (Split BMP) | 42% | 27% | 48% | 72% | 65% | 48% | **78%** | **95%** |
| 8A | Lake Hamilton | 6.179 | 0.855 | 7.993 | 1.106 | Dry Swale | | | 55% | | | 55% | | | **55%** | **55%** |
| 9 | Lake Hamilton | 11.852 | 1.64 | 23.766 | 3.289 | Wet Pond | Side Bank Filter | | 42% | 27% | | 74% | 65% | | **58%** | **91%** |
| 10 | Lake Hamilton | 29.024 | 4.017 | 47.345 | 6.553 | Dry Pond | | | 89% | | | 89% | | | **89%** | **89%** |

1. Water of the State Outfalls for Compensatory Treatment [2024 AH Volume 1, Section 9.7]

| | TN | TP | Basins |
|---|---|---|---|
| *Minimum BMP Efficiency:* | 80% | 80% | 1A & 1 |
| *Minimum BMP Efficiency:* | 55% | 80% | 2 |
| *Minimum BMP Efficiency:* | 55% | 80% | 3-4 |
| *Minimum BMP Efficiency:* | 55% | 80% | 5-10 |

| | | Minimum Required Treatment Summary | | | | | | | | | | | | Provided Treatment Summary | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basins | Outfall[1] | Pre-Dev. Nutrient Loading (kg/yr) | | Post-Dev. Nutrient Loading (kg/yr) | | Development Loading Increase (kg/yr) | | Post-Dev. BMP Load Allowable (kg/yr) | | Project-Specific Nutrient Reduction Rate | | Required Nutrient Reduction Rate | | Post-Dev. BMP Nutrient Loading (kg/yr) | | Provided BMP Efficiency Rate | | Provided Pre-Development Reductions | |
| | | TN | TP | TN | TP | TN | TP | TN | TP | TN | TP | TN | TP | TN | TP | TN | TP | TN | TP |
| 1A & 1 | Lake Connie | 40.2 | 5.6 | 64.8 | 9.0 | 24.6 | 3.4 | 13.0 | 1.8 | 38% | 38% | **80%** | **80%** | 11.9 | 1.6 | **82%** | **82%** | 70% | 70% |
| 2 | Lake Smart | 16.5 | 2.3 | 26.4 | 3.7 | 10.0 | 1.4 | 11.9 | 0.7 | 38% | 38% | **55%** | **80%** | 11.0 | 0.3 | **58%** | **93%** | 33% | 88% |
| 3-4 | Lake Fannie | 64.1 | 8.9 | 108.8 | 15.1 | 44.7 | 6.2 | 49.0 | 3.0 | 41% | 41% | **55%** | **80%** | 44.7 | 1.7 | **59%** | **89%** | 30% | 81% |
| 5-10 | Lake Hamilton | 197.1 | 27.3 | 282.1 | 39.0 | 85.0 | 11.8 | 126.9 | 7.8 | 30% | 30% | **55%** | **80%** | 100.4 | 7.2 | **64%** | **82%** | 49% | 74% |

# Side Bank Filters

Note: Ponds were regraded to optimize mean depth of permanent pool volume.

| Pond 2 | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| 126.00 | 2.02 | 0.00 | Pond Bottom |
| 130.00 | 2.28 | **8.59** | Control |
| 130.29 | 2.30 | **0.66** | SBF* |
| | | | |

| Pond 6 | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| 120.00 | 0.68 | 0.00 | Pond Bottom |
| 129.00 | 1.00 | **7.55** | Control |
| 129.50 | 1.00 | **0.50** | SBF* |
| | | | |

| Pond 4 | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| 114.00 | 0.55 | 0.00 | Pond Bottom |
| 126.00 | 1.17 | **10.34** | Control |
| 127.28 | 1.32 | **1.59** | SBF* |
| | | | |

| Pond 9 | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| 111.00 | 0.21 | 0.00 | Pond Bottom |
| 123.00 | 0.49 | **4.18** | Control |
| 124.05 | 0.54 | **0.54** | SBF* |
| | | | |

| Pond 5 | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| 115.00 | 0.14 | 0.00 | Pond Bottom |
| 123.00 | 0.82 | **3.84** | Control |
| 124.50 | 1.00 | **1.37** | SBF* |
| | | | |

* This is the side bankfilter available volume. Please note, the actual available head for each side bank filter surpasses the minimum 0.5 feet required for underdrains.

# Split Pond BMPs

| Wet Pond 3 Stage Storage | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| | | | |
| 115.00 | 0.41 | 0.00 | Pond Bottom |
| 127.00 | 0.81 | **7.32** | Control |
| 127.53 | 0.85 | **0.44** | SBF |
| 130.00 | 1.51 | | Inside Berm Elev. |

| Dry Pond 3 Retention Stage Storage | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| | | | |
| 128.00 | 0.36 | 0.00 | BMP Bottom |
| 128.40 | 0.38 | **0.15** | Weir El. |
| 129.00 | 0.41 | | BMP Top |
| 130.00 | | | LEOP |

| Wet Pond 8 Stage Storage | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| | | | |
| 110.00 | 0.61 | 0.00 | Pond Bottom |
| 122.00 | 1.00 | **9.66** | Control |
| 123.43 | 1.10 | **1.50** | SBF |
| 125.50 | 1.23 | | Inside Berm Elev. |

| Dry Pond 8 Retention Stage Storage | | | |
|---|---|---|---|
| **Stage** *ft-NAVD* | **Area** *acres* | **Volume** *ac-ft* | **Description** |
| | | | |
| 123.00 | 0.56 | 0.00 | BMP Bottom |
| 124.00 | 0.62 | **0.59** | Weir El. |
| 124.50 | 0.66 | | BMP Top |
| 126.60 | | | LEOP |




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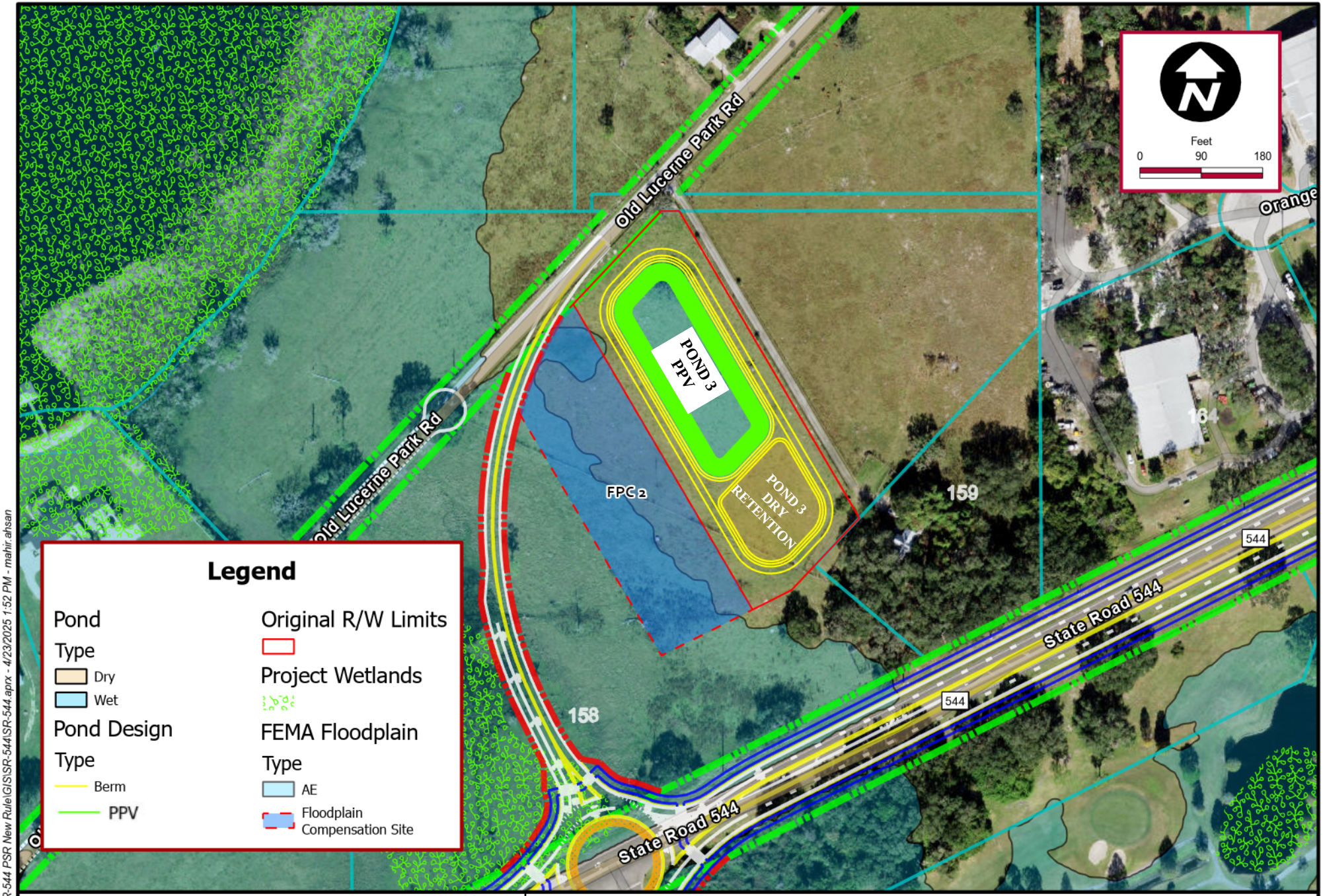
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Alternative 1

# SR-544 NEW RULES POND SITING ANALYSIS
# POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | October, 2025 | Figure 1 |
|---|---|---|---|




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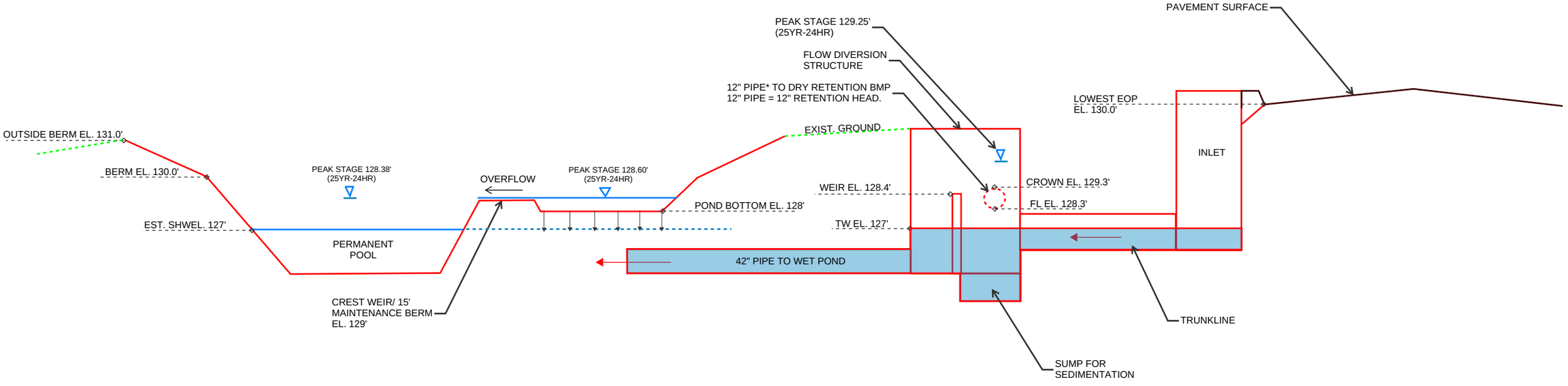
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ALTERNATIVE 1- WET & DRY SYSTEM COMBO

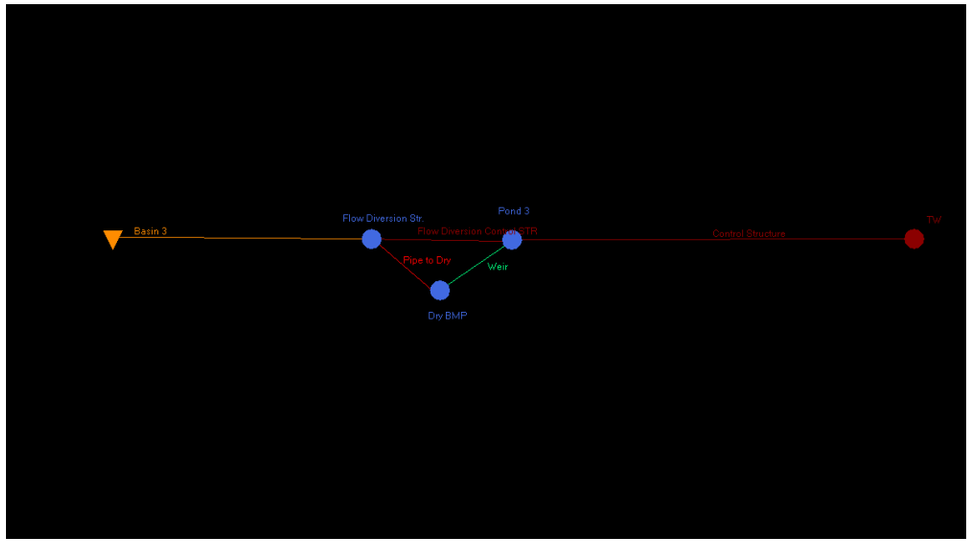
# SR-544 NEW RULES POND SITING ANALYSIS
# POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | April, 2025 | Figure 2 |
|---|---|---|---|

# POND 3 (SPLIT BMP) HYDRAULIC EVALUATION




NODAL DIAGRAM




NODE PEAK STAGES

| | Node Name | Maximum Stage [ft] |
|---|---|---|
| | Dry BMP | 128.60 |
| | Flow Diversion Str. | 129.25 |
| | Pond 3 | 128.38 |

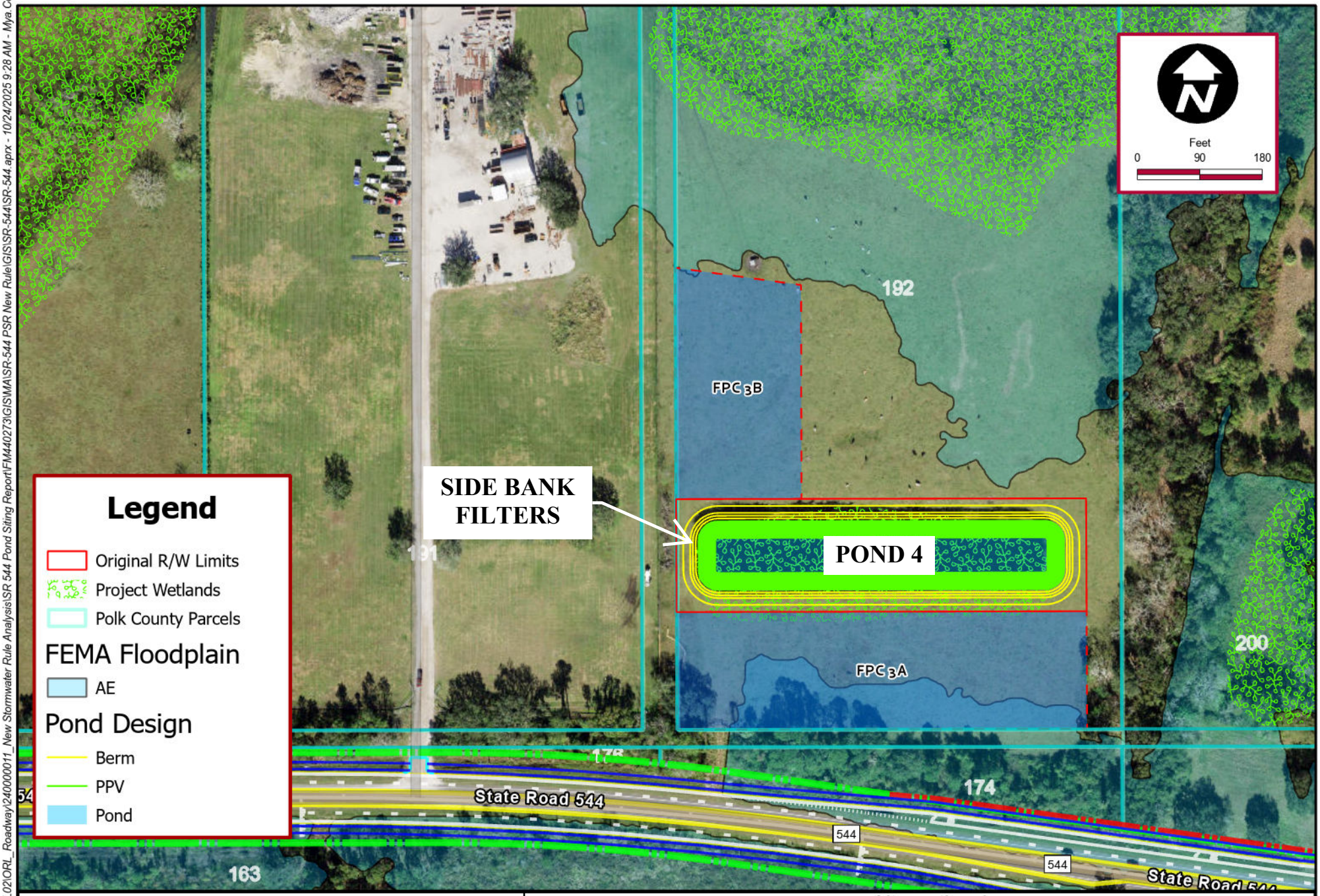
PRE VS. POST

| | Scenario | Maximum Flow Rate [cfs] |
|---|---|---|
| | Pre Basin 3 | 57.80 |

| | Scenario | Maximum Flow Rate [cfs] |
|---|---|---|
| | Post Basin 3 | 57.17 |

PEAK DISCHARGE

| | From Node Name | To Node Name | Maximum Flow Rate [cfs] |
|---|---|---|---|
| | ~~D~Control Structure~N | TW | 57.53 |
| | ~D~Flow Diversion Control STR~N | Pond 3 | 65.62 |
| | Flow Diversion Str. | Dry BMP | 2.37 |
| | Dry BMP | Pond 3 | 0.00 |




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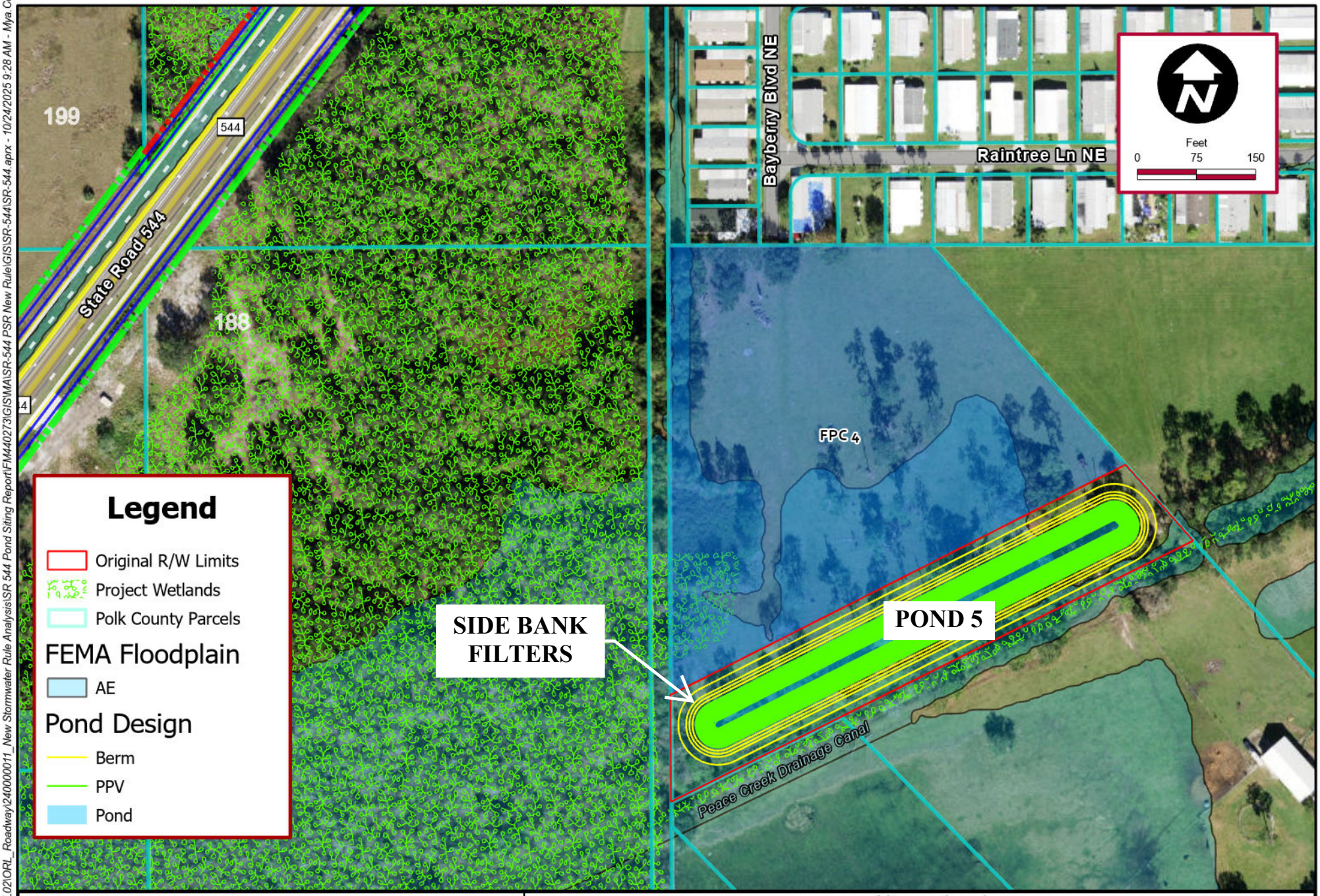
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POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | October, 2025 | Figure 3 |
|---|---|---|---|




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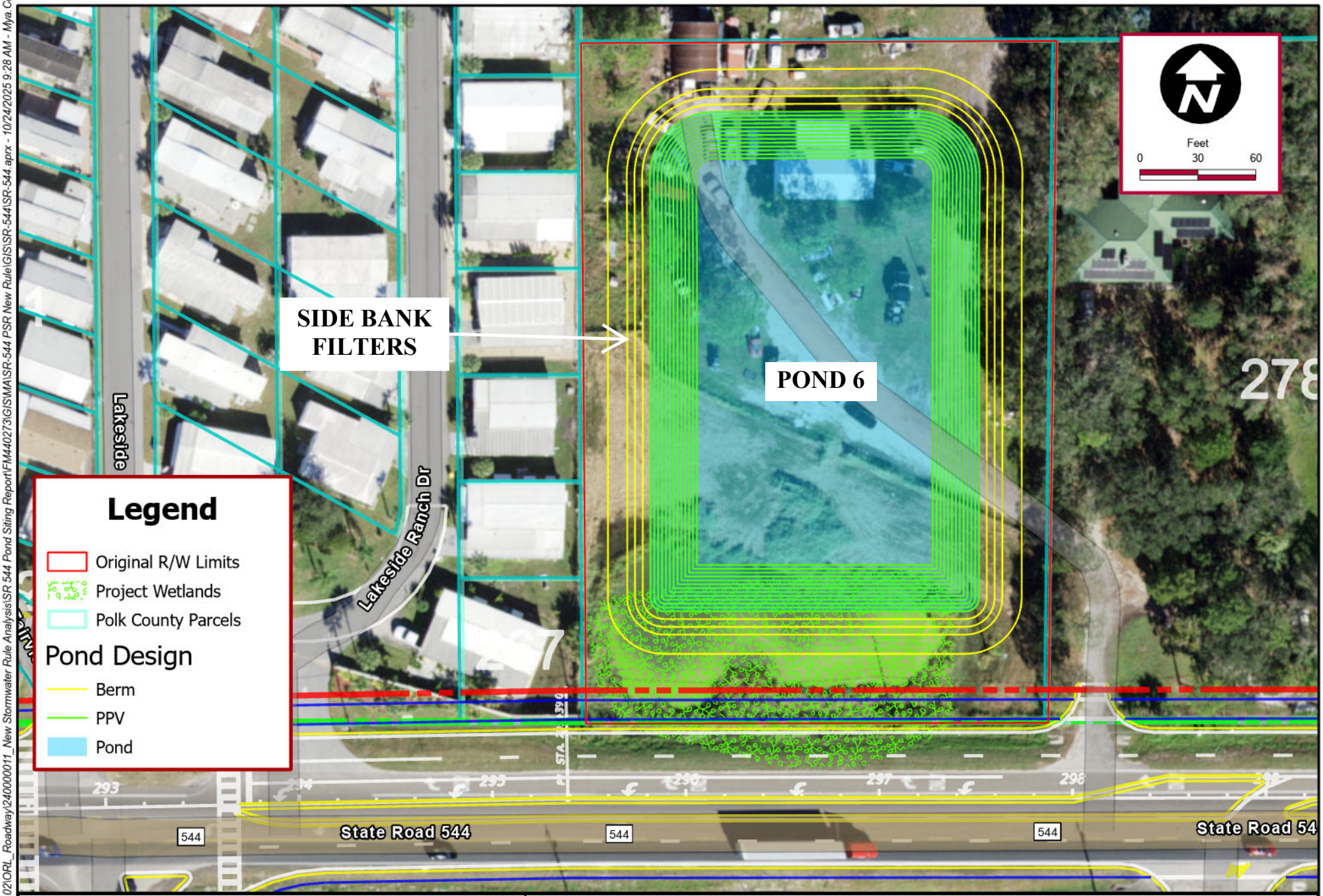
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# SR-544 NEW RULES POND SITING ANALYSIS
# POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | October, 2025 | Figure 4 |
|---|---|---|---|



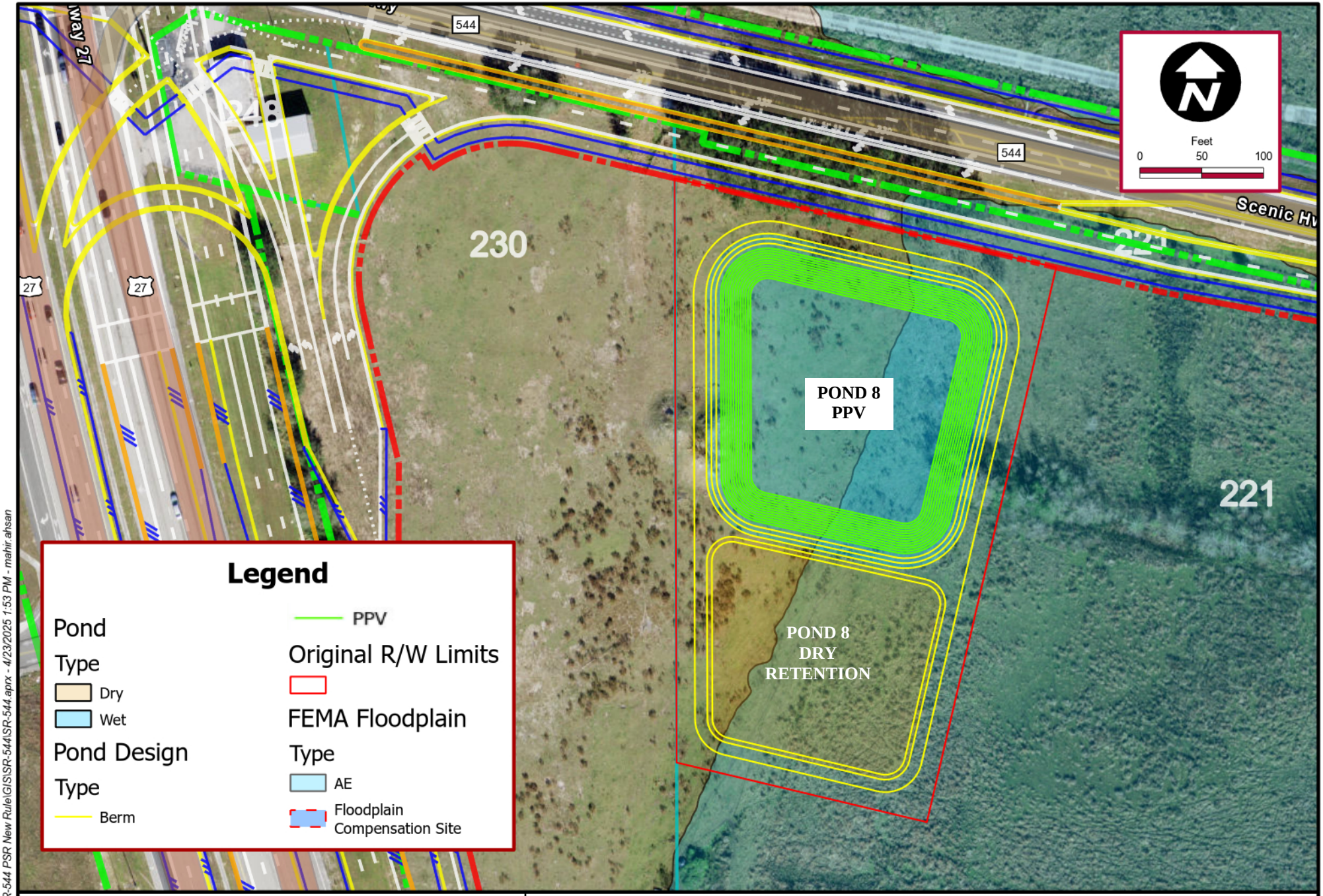

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POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | October, 2025 | Figure 5 |
|---|---|---|---|




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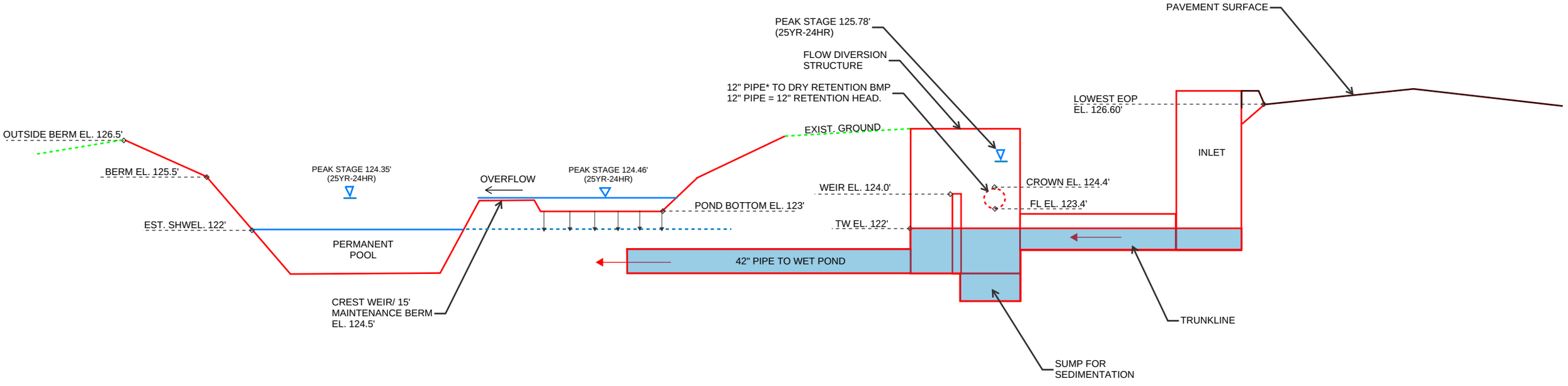
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ALTERNATIVE 1- WET & DRY SYSTEM COMBO

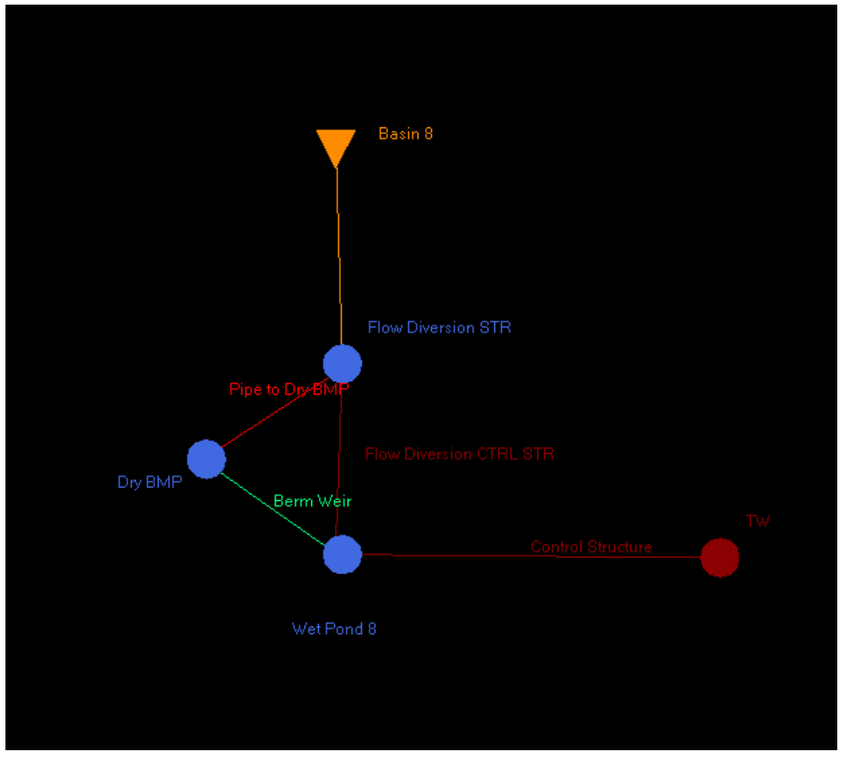
SR-544 NEW RULES POND SITING ANALYSIS
POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | April, 2025 | Figure 6 |
|---|---|---|---|

# POND 8 (SPLIT BMP) HYDRAULIC EVALUATION




NODAL DIAGRAM




NODE PEAK STAGES

| Scenario | Node Name | Maximum Stage [ft] |
|---|---|---|
| Post Basin 8 | Dry BMP | 124.46 |
| Post Basin 8 | Flow Diversion STR | 125.78 |
| Post Basin 8 | Wet Pond 8 | 124.35 |

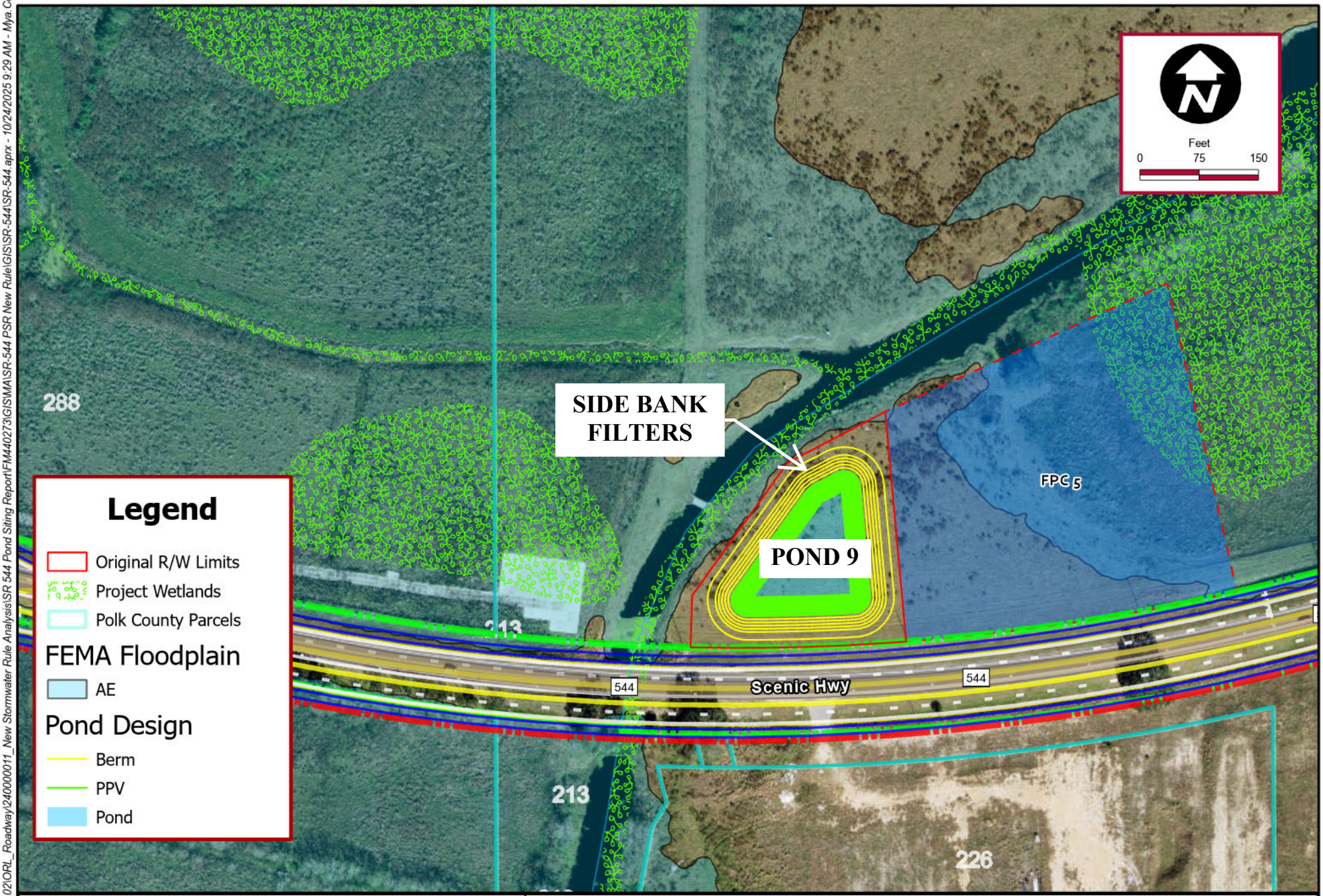
PEAK DISCHARGE

| From Node Name | To Node Name | Maximum Flow Rate [cfs] |
|---|---|---|
| Dry BMP | Wet Pond 8 | 0.00 |
| ~~D~Control Structure~N | TW | 65.99 |
| Flow Diversion CTRL STR~N | Wet Pond 8 | 80.74 |
| Flow Diversion STR | Dry BMP | 5.38 |

PRE VS. POST

| Scenario | Maximum Flow Rate [cfs] |
|---|---|
| Pre Basin 8 | 74.41 |

| Scenario | Maximum Flow Rate [cfs] |
|---|---|
| Post Basin 8 | 70.81 |




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# SR-544 NEW RULES POND SITING ANALYSIS
# POLK COUNTY, FLORIDA

| Scale: As Noted | Project No: 240000011 | October, 2025 | Figure 7 |
|---|---|---|---|

# APPENDIX B

BMPTrains

# BMPTrains Reports

# Basin 1A

## Site and Catchment Information

Analysis: Specified Removal Efficiency

| | |
|---|---|
| Catchment Name | Basin 1A |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 52.50 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.34 |
| Rational Coefficient (0-1) | 0.49 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 60.26 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 5.015 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 7.730 |
| Phosphorus Loading (kg/yr) | 1.070 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.34 |
| Rational Coefficient (0-1) | 0.59 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 72.65 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 6.040 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 9.309 |

| | |
|---|---|
| Phosphorus Loading (kg/yr) | 1.288 |

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.515 |
| Retention Volume (ac-ft) | 0.100 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 2.34 |
| Contributing Area (acres) | 2.340 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 72.65 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 80 |
| Provided TN Treatment Efficiency (%) | 56 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 56 |

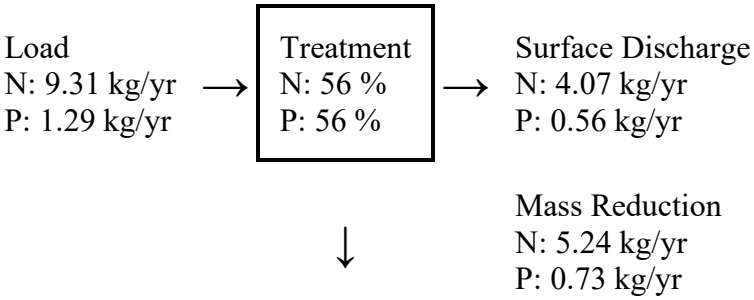
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 5.244 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.726 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)


Load
N: 9.31 kg/yr
P: 1.29 kg/yr
Treatment
N: 56 %
P: 56 %
Surface Discharge
N: 4.07 kg/yr
P: 0.56 kg/yr
Mass Reduction
N: 5.24 kg/yr
P: 0.73 kg/yr

# Basin 1

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2025 11:19:14 AM

## Site and Catchment Information

Analysis: Specified Removal Efficiency

| | |
|---|---|
| Catchment Name | Basin 1 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 52.50 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.76 |
| Rational Coefficient (0-1) | 0.31 |
| Non DCIA Curve Number | 67.99 |
| DCIA Percent (0-100) | 33.48 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 21.051 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 32.445 |
| Phosphorus Loading (kg/yr) | 4.490 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.76 |
| Rational Coefficient (0-1) | 0.52 |
| Non DCIA Curve Number | 67.92 |
| DCIA Percent (0-100) | 62.15 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 36.016 |
| Groundwater N (kg/yr) | 0.000 |

| | |
|---|---|
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 55.510 |
| Phosphorus Loading (kg/yr) | 7.683 |

# Catchment Number: 1 Name: Basin 1

**Project:** SR 544
**Date:** 9/22/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 1.234 |
| Retention Volume (ac-ft) | 1.621 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 15.76 |
| Contributing Area (acres) | 15.760 |
| Non-DCIA Curve Number | 67.92 |
| DCIA Percent | 62.15 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 80 |
| Provided TN Treatment Efficiency (%) | 86 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 86 |

**Media Mix Information**

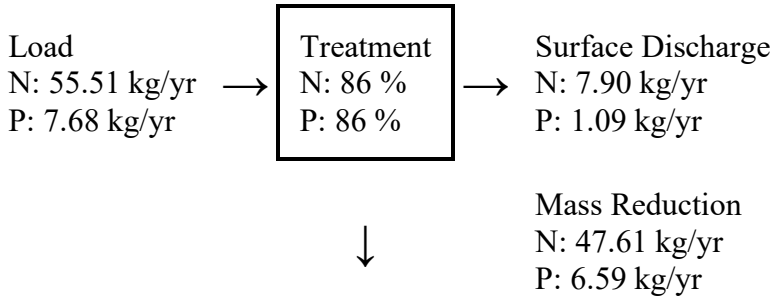
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 47.614 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 6.590 |

TP Concentration (mg/L) 0.000

# Load Diagram for Retention (stand-alone)



# Basin 2

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 2 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 11.33 |
| Pre Rational Coefficient (0-1) | 0.22 |
| Pre Non DCIA Curve Number | 67.99 |
| Pre DCIA Percent (0-100) | 21.71 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 10.692 |
| Pre Nitrogen Loading (kg/yr) | 16.479 |
| Pre Phosphorus Loading (kg/yr) | 2.281 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 11.33 |
| Post Rational Coefficient (0-1) | 0.42 |
| Post Non DCIA Curve Number | 70.58 |
| Post DCIA Percent (0-100) | 47.56 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 17.156 |
| Post Nitrogen Loading (kg/yr) | 26.441 |
| Post Phosphorus Loading (kg/yr) | 3.659 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 8.590 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.457 |
| Annual Residence Time (days) | 183 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 11.33 |
| Contributing Area (acres) | 9.420 |
| Non-DCIA Curve Number | 70.58 |
| DCIA Percent | 47.56 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 43 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 79 |

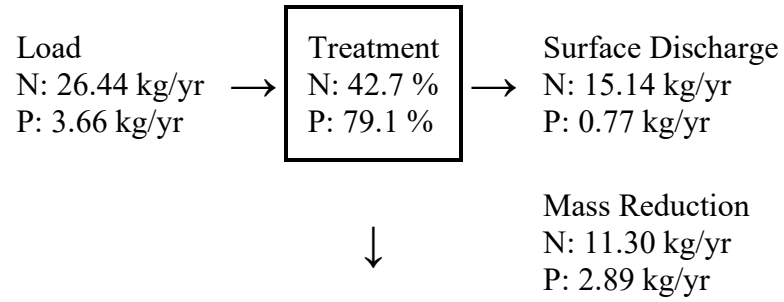
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.848 |
| Retention Volume (ac-ft) | 0.666 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 11.33 |
| Contributing Area (acres) | 9.420 |
| Non-DCIA Curve Number | 70.58 |
| DCIA Percent | 47.56 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 80 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

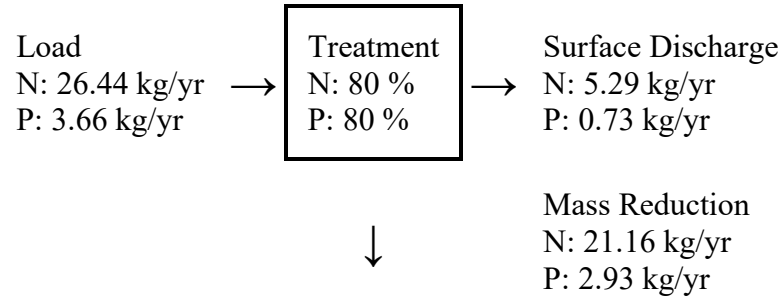
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 21.156 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 2.928 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 3- Split BMP

Project: SR 544

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 3 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 16.14 |
| Pre Rational Coefficient (0-1) | 0.24 |
| Pre Non DCIA Curve Number | 72.11 |
| Pre DCIA Percent (0-100) | 23.46 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 17.002 |
| Pre Nitrogen Loading (kg/yr) | 26.204 |
| Pre Phosphorus Loading (kg/yr) | 3.627 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 16.14 |
| Post Rational Coefficient (0-1) | 0.45 |
| Post Non DCIA Curve Number | 73.30 |
| Post DCIA Percent (0-100) | 51.40 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 30.229 |
| Post Nitrogen Loading (kg/yr) | 46.590 |
| Post Phosphorus Loading (kg/yr) | 6.448 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 7.320 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 2.567 |
| Annual Residence Time (days) | 88 |
| Littoral Zone Efficiency Credit | |

Wetland Efficiency Credit

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 16.14 |
| Contributing Area (acres) | 15.330 |
| Non-DCIA Curve Number | 73.30 |
| DCIA Percent | 51.40 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 42 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 73 |

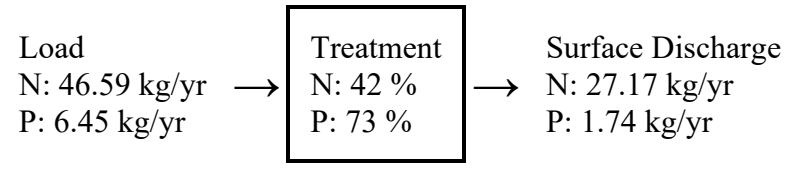
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



↓

Mass Reduction
N: 19.42 kg/yr
P: 4.70 kg/yr

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.345 |
| Retention Volume (ac-ft) | 0.441 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 16.14 |
| Contributing Area (acres) | 15.330 |
| Non-DCIA Curve Number | 73.30 |
| DCIA Percent | 51.40 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 49 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 49 |

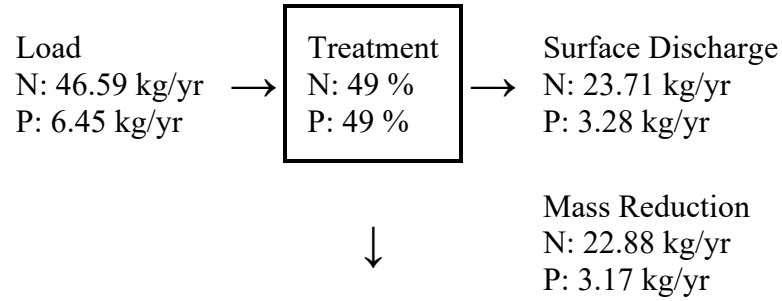
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 22.877 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 3.166 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.110 |
| Retention Volume (ac-ft) | 0.140 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 16.14 |
| Contributing Area (acres) | 15.330 |
| Non-DCIA Curve Number | 73.30 |
| DCIA Percent | 51.40 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 18 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 18 |

**Media Mix Information**

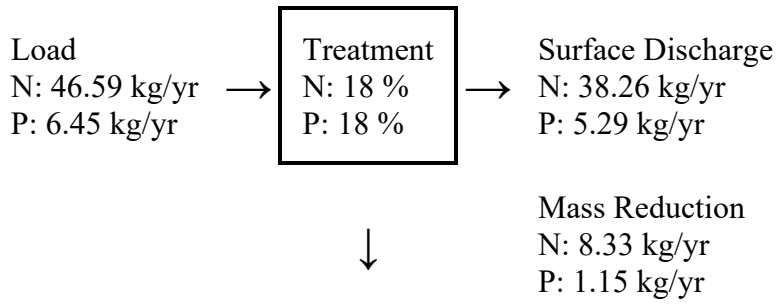
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 8.333 |
| TN Concentration (mg/L) | 0.000 |

| | |
|---|---|
| TP Mass Load (kg/yr) | 1.153 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 4

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 4 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 20.75 |
| Pre Rational Coefficient (0-1) | 0.27 |
| Pre Non DCIA Curve Number | 77.90 |
| Pre DCIA Percent (0-100) | 23.88 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 24.279 |
| Pre Nitrogen Loading (kg/yr) | 37.420 |
| Pre Phosphorus Loading (kg/yr) | 5.179 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 20.75 |
| Post Rational Coefficient (0-1) | 0.47 |
| Post Non DCIA Curve Number | 77.82 |
| Post DCIA Percent (0-100) | 52.33 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 40.362 |
| Post Nitrogen Loading (kg/yr) | 62.209 |
| Post Phosphorus Loading (kg/yr) | 8.610 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 10.340 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.428 |
| Annual Residence Time (days) | 94 |
| Littoral Zone Efficiency Credit | |

Wetland Efficiency Credit

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.75 |
| Contributing Area (acres) | 19.640 |
| Non-DCIA Curve Number | 77.82 |
| DCIA Percent | 52.33 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 42 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 73 |

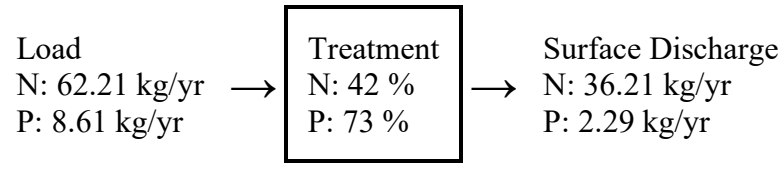
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



↓

Mass Reduction
N: 26.00 kg/yr
P: 6.32 kg/yr

**Project:** SR 544
**Date:** 10/22/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.972 |
| Retention Volume (ac-ft) | 1.591 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.75 |
| Contributing Area (acres) | 19.640 |
| Non-DCIA Curve Number | 77.82 |
| DCIA Percent | 52.33 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 80 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

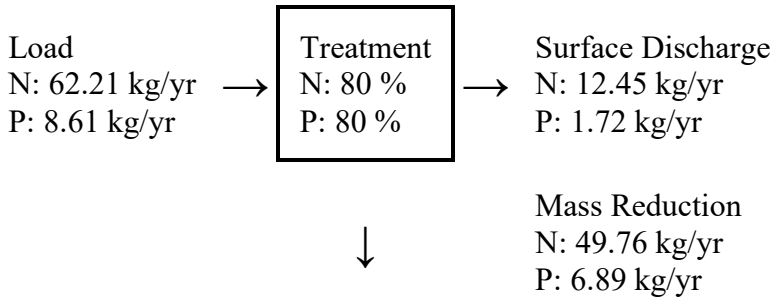
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 49.762 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 6.887 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 5

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 5 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 20.69 |
| Pre Rational Coefficient (0-1) | 0.26 |
| Pre Non DCIA Curve Number | 71.85 |
| Pre DCIA Percent (0-100) | 26.59 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 23.819 |
| Pre Nitrogen Loading (kg/yr) | 36.711 |
| Pre Phosphorus Loading (kg/yr) | 5.081 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 20.69 |
| Post Rational Coefficient (0-1) | 0.50 |
| Post Non DCIA Curve Number | 70.85 |
| Post DCIA Percent (0-100) | 58.24 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 43.823 |
| Post Nitrogen Loading (kg/yr) | 67.542 |
| Post Phosphorus Loading (kg/yr) | 9.348 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 3.840 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.722 |
| Annual Residence Time (days) | 32 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.69 |
| Contributing Area (acres) | 20.150 |
| Non-DCIA Curve Number | 70.85 |
| DCIA Percent | 58.24 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 38 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 65 |

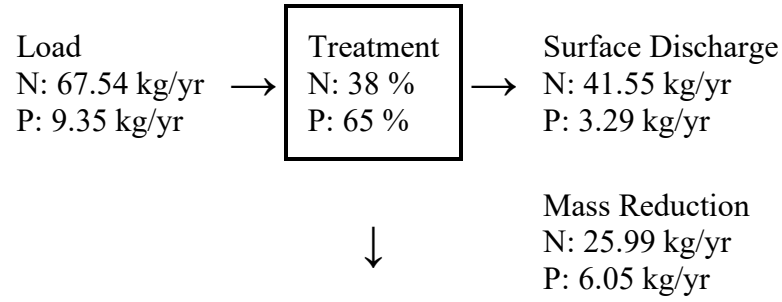
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.820 |
| Retention Volume (ac-ft) | 1.377 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.69 |
| Contributing Area (acres) | 20.150 |
| Non-DCIA Curve Number | 70.85 |
| DCIA Percent | 58.24 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 76 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 76 |

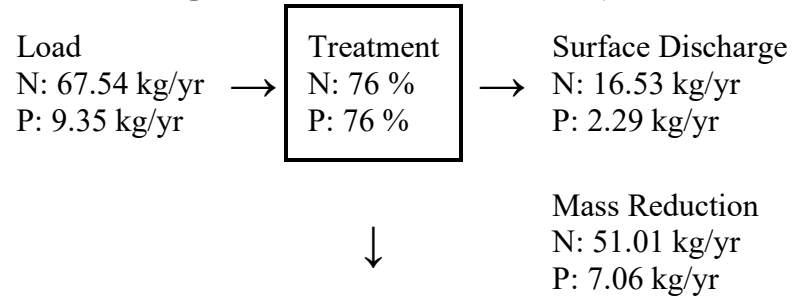
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 51.014 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 7.060 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 6

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 6 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 7.60 |
| Pre Rational Coefficient (0-1) | 0.23 |
| Pre Non DCIA Curve Number | 61.12 |
| Pre DCIA Percent (0-100) | 25.78 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 7.749 |
| Pre Nitrogen Loading (kg/yr) | 11.944 |
| Pre Phosphorus Loading (kg/yr) | 1.653 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 7.60 |
| Post Rational Coefficient (0-1) | 0.47 |
| Post Non DCIA Curve Number | 59.27 |
| Post DCIA Percent (0-100) | 56.50 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 14.150 |
| Post Nitrogen Loading (kg/yr) | 21.809 |
| Post Phosphorus Loading (kg/yr) | 3.018 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 7.550 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.202 |
| Annual Residence Time (days) | 195 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 7.60 |
| Contributing Area (acres) | 6.880 |
| Non-DCIA Curve Number | 59.27 |
| DCIA Percent | 56.50 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 43 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

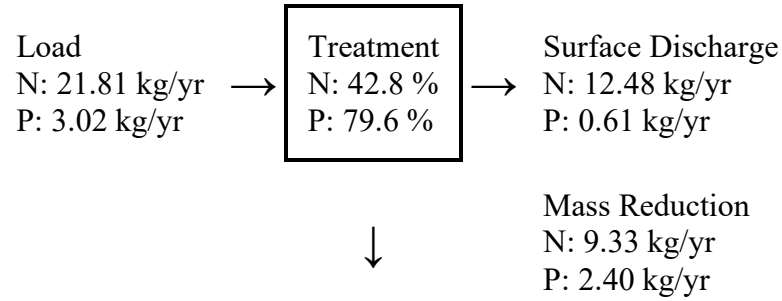
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.881 |
| Retention Volume (ac-ft) | 0.505 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 7.60 |
| Contributing Area (acres) | 6.880 |
| Non-DCIA Curve Number | 59.27 |
| DCIA Percent | 56.50 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 80 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

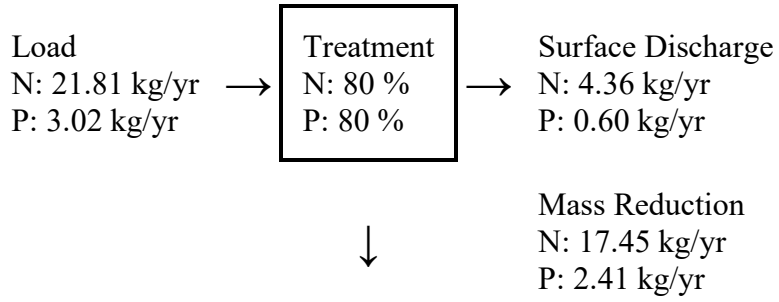
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 17.448 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 2.415 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 7

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2025 11:22:42 AM

## Site and Catchment Information

Analysis: Specified Removal Efficiency

| | |
|---|---|
| Catchment Name | Basin 7 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 52.50 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.15 |
| Rational Coefficient (0-1) | 0.50 |
| Non DCIA Curve Number | 39.99 |
| DCIA Percent (0-100) | 61.07 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 32.913 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 50.726 |
| Phosphorus Loading (kg/yr) | 7.021 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.15 |
| Rational Coefficient (0-1) | 0.47 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 58.24 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |

| | |
|---|---|
| Runoff Volume (ac-ft/yr) | 31.399 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 48.393 |
| Phosphorus Loading (kg/yr) | 6.698 |

# Catchment Number: 1 Name: Basin 7

**Project:** SR 544
**Date:** 9/22/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.293 |
| Retention Volume (ac-ft) | 0.370 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 15.15 |
| Contributing Area (acres) | 15.150 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 58.24 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 44 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 44 |

**Media Mix Information**

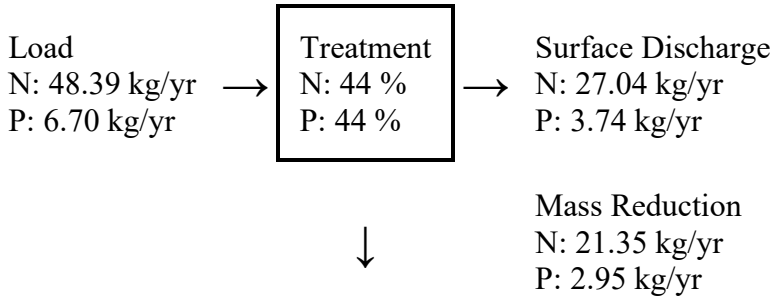
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 4.514 |
| TN Mass Load (kg/yr) | 21.351 |

| | |
|---|---|
| TN Concentration (mg/L) | 1.250 |
| TP Mass Load (kg/yr) | 2.955 |
| TP Concentration (mg/L) | 0.173 |

# Load Diagram for Retention (stand-alone)



# Basin 8A

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2025 11:23:34 AM

## Site and Catchment Information

Analysis: Specified Removal Efficiency

| | |
|---|---|
| Catchment Name | Basin 8A |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 52.50 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.59 |
| Rational Coefficient (0-1) | 0.35 |
| Non DCIA Curve Number | 74.40 |
| DCIA Percent (0-100) | 37.84 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 4.009 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 6.179 |
| Phosphorus Loading (kg/yr) | 0.855 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.59 |
| Rational Coefficient (0-1) | 0.46 |
| Non DCIA Curve Number | 72.67 |
| DCIA Percent (0-100) | 52.51 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |

| | |
|---|---|
| Runoff Volume (ac-ft/yr) | 5.186 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 7.993 |
| Phosphorus Loading (kg/yr) | 1.106 |

# Catchment Number: 1 Name: Basin 8A

**Project:** SR 544
**Date:** 9/22/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.415 |
| Retention Volume (ac-ft) | 0.090 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 2.59 |
| Contributing Area (acres) | 2.590 |
| Non-DCIA Curve Number | 72.67 |
| DCIA Percent | 52.51 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 55 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 55 |

**Media Mix Information**

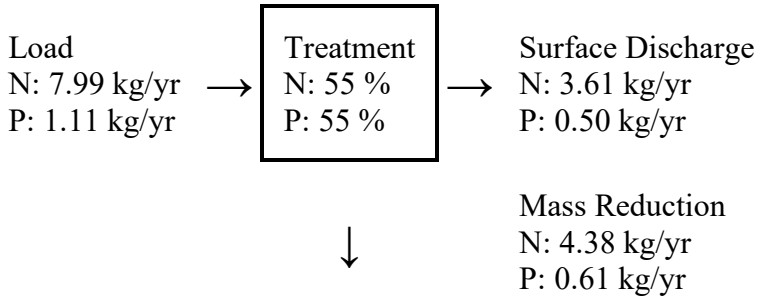
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 4.385 |

| | |
|---|---|
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.607 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# Basin 8 – Split BMP

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 8 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 21.54 |
| Pre Rational Coefficient (0-1) | 0.35 |
| Pre Non DCIA Curve Number | 61.82 |
| Pre DCIA Percent (0-100) | 40.52 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 32.848 |
| Pre Nitrogen Loading (kg/yr) | 50.627 |
| Pre Phosphorus Loading (kg/yr) | 7.007 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 21.54 |
| Post Rational Coefficient (0-1) | 0.48 |
| Post Non DCIA Curve Number | 59.10 |
| Post DCIA Percent (0-100) | 57.84 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 43.005 |
| Post Nitrogen Loading (kg/yr) | 66.281 |
| Post Phosphorus Loading (kg/yr) | 9.173 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 9.660 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.652 |
| Annual Residence Time (days) | 82 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 21.54 |
| Contributing Area (acres) | 20.460 |
| Non-DCIA Curve Number | 59.10 |
| DCIA Percent | 57.84 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 42 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 72 |

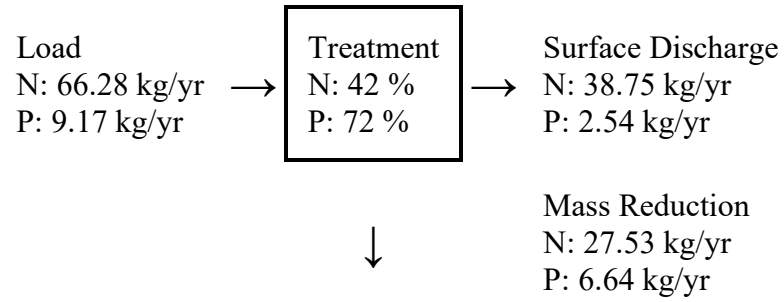
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.898 |
| Retention Volume (ac-ft) | 1.530 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 21.54 |
| Contributing Area (acres) | 20.460 |
| Non-DCIA Curve Number | 59.10 |
| DCIA Percent | 57.84 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 80 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

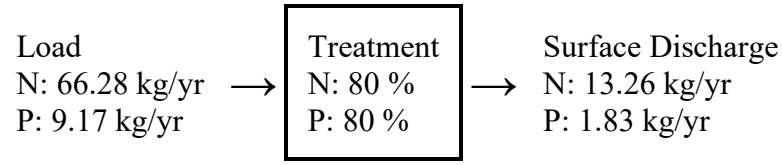
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 53.024 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 7.339 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



↓

Mass Reduction
N: 53.02 kg/yr
P: 7.34 kg/yr

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.346 |
| Retention Volume (ac-ft) | 0.590 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 21.54 |
| Contributing Area (acres) | 20.460 |
| Non-DCIA Curve Number | 59.10 |
| DCIA Percent | 57.84 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 48 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 48 |

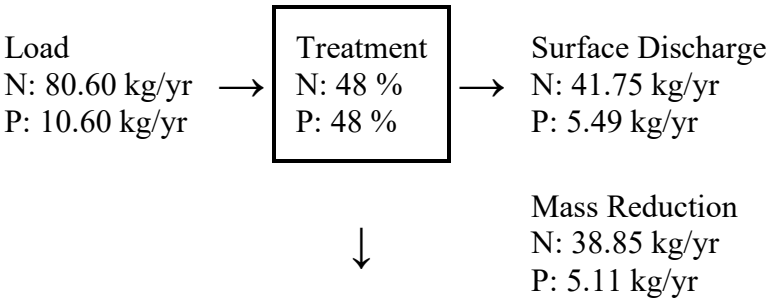
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 38.851 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 5.112 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)


Load
N: 80.60 kg/yr
P: 10.60 kg/yr
Treatment
N: 48 %
P: 48 %
Surface Discharge
N: 41.75 kg/yr
P: 5.49 kg/yr
Mass Reduction
N: 38.85 kg/yr
P: 5.11 kg/yr

# Basin 9

# Catchment Information

**Analysis: Specified Removal Efficiency Required Removal N: 55% P: 80%**

| | |
|---|---|
| Catchment Name | Basin 9 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall (in) | 52.50 |
| **Pre-Condition Landuse Information** | |
| Pre-Condition Landuse | User Defined Values |
| Pre Condition Area (acres) | 9.18 |
| Pre Rational Coefficient (0-1) | 0.19 |
| Pre Non DCIA Curve Number | 50.59 |
| Pre DCIA Percent (0-100) | 22.11 |
| Pre Nitrogen EMC (mg/l) | 1.250 |
| Pre Phosphorus EMC (mg/l) | 0.173 |
| Pre Runoff Volume (ac-ft/yr) | 7.690 |
| Pre Nitrogen Loading (kg/yr) | 11.852 |
| Pre Phosphorus Loading (kg/yr) | 1.640 |
| **Post-Condition Landuse Information** | |
| Post-Condition Landuse | User Defined Values |
| Post Condition Area (acres) | 9.18 |
| Post Rational Coefficient (0-1) | 0.40 |
| Post Non DCIA Curve Number | 50.94 |
| Post DCIA Percent (0-100) | 48.44 |
| Post Nitrogen EMC (mg/l) | 1.250 |
| Post Phosphorus EMC (mg/l) | 0.173 |
| Post Runoff Volume (ac-ft/yr) | 15.420 |
| Post Nitrogen Loading (kg/yr) | 23.766 |
| Post Phosphorus Loading (kg/yr) | 3.289 |

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 4.180 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.310 |
| Annual Residence Time (days) | 99 |
| Littoral Zone Efficiency Credit | |

Wetland Efficiency Credit

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 9.18 |
| Contributing Area (acres) | 8.800 |
| Non-DCIA Curve Number | 50.94 |
| DCIA Percent | 48.44 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 42 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 74 |

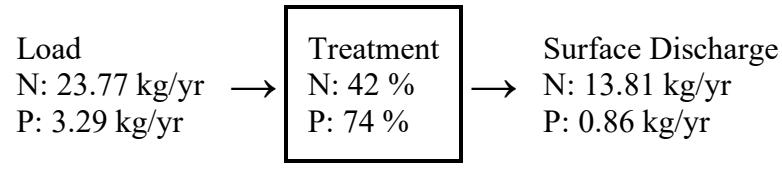
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)



↓

Mass Reduction
N: 9.96 kg/yr
P: 2.43 kg/yr

**Project:** SR 544
**Date:** 10/22/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.737 |
| Retention Volume (ac-ft) | 0.540 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 9.18 |
| Contributing Area (acres) | 8.800 |
| Non-DCIA Curve Number | 50.94 |
| DCIA Percent | 48.44 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 80 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 80 |

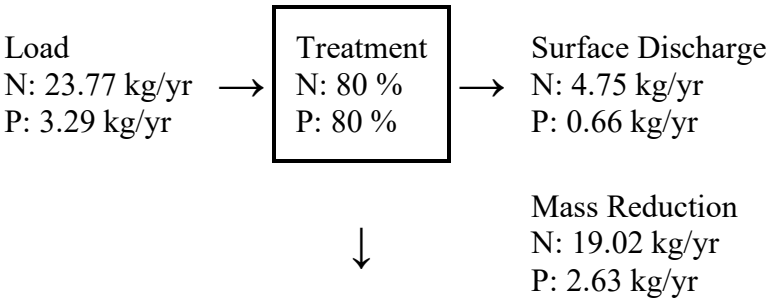
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 19.016 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 2.632 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)


Load
N: 23.77 kg/yr
P: 3.29 kg/yr
Treatment
N: 80 %
P: 80 %
Surface Discharge
N: 4.75 kg/yr
P: 0.66 kg/yr
Mass Reduction
N: 19.02 kg/yr
P: 2.63 kg/yr

# Basin 10

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2025 11:24:35 AM

## Site and Catchment Information

Analysis: Specified Removal Efficiency

| | |
|---|---|
| Catchment Name | Basin 10 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 52.50 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 14.26 |
| Rational Coefficient (0-1) | 0.30 |
| Non DCIA Curve Number | 40.41 |
| DCIA Percent (0-100) | 36.71 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |
| Runoff Volume (ac-ft/yr) | 18.831 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 29.024 |
| Phosphorus Loading (kg/yr) | 4.017 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 14.26 |
| Rational Coefficient (0-1) | 0.49 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 60.57 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.250 |
| Phosphorus EMC (mg/l) | 0.173 |

| | |
|---|---|
| Runoff Volume (ac-ft/yr) | 30.719 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 47.345 |
| Phosphorus Loading (kg/yr) | 6.553 |

**Project:** SR 544
**Date:** 10/24/2025

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 1.288 |
| Retention Volume (ac-ft) | 1.530 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 14.26 |
| Contributing Area (acres) | 14.260 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 60.57 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 52.50 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 55 |
| Provided TN Treatment Efficiency (%) | 89 |
| Required TP Treatment Efficiency (%) | 80 |
| Provided TP Treatment Efficiency (%) | 89 |

**Media Mix Information**

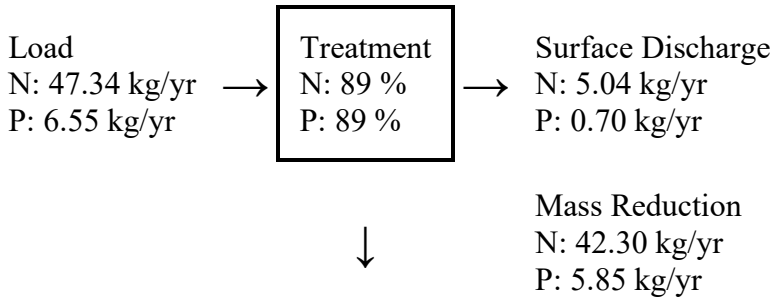
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 42.300 |
| TN Concentration (mg/L) | 0.000 |

| | |
|---|---|
| TP Mass Load (kg/yr) | 5.854 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)



# APPENDIX C

ICPR Reports

## Node: GWT

Scenario: Pond 1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 129.00 ft
Warning Stage: 1333.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 129.00 |
| 0 | 0 | 0 | 80.0000 | 129.00 |

Comment:

## Node: Pond 1

Scenario: Pond 1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 131.61 ft
Warning Stage: 133.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 130.00 | 0.9100 | 39640 |
| 131.61 | 1.1100 | 48352 |

Comment:

## Node: GWT

Scenario: Pond 10
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 126.80 ft
Warning Stage: 133.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 126.80 |
| 0 | 0 | 0 | 80.0000 | 126.80 |

Comment:

## Node: Pond 10

Scenario: Pond 10
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 130.00 ft
Warning Stage: 133.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 128.00 | 0.7000 | 30492 |
| 130.00 | 0.8400 | 36590 |

Comment:

## Node: GWT

Scenario: Pond 1A
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 145.00 ft
Warning Stage: 149.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 145.00 |
| 0 | 0 | 0 | 80.0000 | 145.00 |

Comment:

## Node: Pond 1A

Scenario: Pond 1A
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 147.80 ft
Warning Stage: 149.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 146.50 | 0.0600 | 2614 |
| 147.80 | 0.0800 | 3485 |

Comment:

## Node: GWT

Scenario: Pond 7
Type: Time/Stage

Base Flow: 0.00 cfs
Initial Stage: 127.00 ft
Warning Stage: 131.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 127.00 |
| 0 | 0 | 0 | 80.0000 | 127.00 |

Comment:

## Node: Pond 7 - Swale

Scenario: Pond 7
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 129.94 ft
Warning Stage: 131.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 128.00 | 0.0600 | 2614 |
| 129.94 | 0.3300 | 14375 |

Comment:

## Node: GWT

Scenario: Pond 8A
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 123.00 ft
Warning Stage: 126.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 123.00 |
| 0 | 0 | 0 | 80.0000 | 123.00 |

Comment:

## Node: Pond 8A - Swale

Scenario: Pond 8A
Type: Stage/Area
Base Flow: 0.00 cfs

Initial Stage: 124.60 ft
Warning Stage: 126.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 124.00 | 0.1100 | 4792 |
| 124.60 | 0.2000 | 8712 |

Comment:

Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 1 | Surface Area Option: | Use 1st Point in Stage/Area Table |
| From Node: | Pond 1 | | |
| To Node: | GWT | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Link Count: | 1 | Perimeter 1: | 1743.00 ft |
| Flow Direction: | Both | Perimeter 2: | 2002.00 ft |
| Aquifer Base Elevation: | 77.00 ft | Perimeter 3: | 3037.00 ft |
| Water Table Elevation: | 129.00 ft | Distance P1 to P2: | 30.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P2 to P3: | 120.00 ft |
| Horizontal Conductivity: | 10.000 fpd | # of Cells P1 to P2: | 6 |
| Vertical Conductivity: | 5.000 fpd | # of Cells P2 to P3: | 24 |
| Fillable Porosity: | 0.300 | | |
| Layer Thickness: | 1.00 ft | | |

Comment:

Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 10 | Surface Area Option: | Use 1st Point in Stage/Area Table |
| From Node: | Pond 10 | | |
| To Node: | GWT | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Link Count: | 1 | Perimeter 1: | 1336.00 ft |
| Flow Direction: | Both | Perimeter 2: | 1516.00 ft |
| Aquifer Base Elevation: | 77.00 ft | Perimeter 3: | 2414.00 ft |
| Water Table Elevation: | 126.80 ft | Distance P1 to P2: | 20.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P2 to P3: | 100.00 ft |
| Horizontal Conductivity: | 10.000 fpd | # of Cells P1 to P2: | 4 |
| Vertical Conductivity: | 5.000 fpd | # of Cells P2 to P3: | 20 |
| Fillable Porosity: | 0.450 | | |
| Layer Thickness: | 1.00 ft | | |

Comment:

Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 1A | Surface Area Option: | Use 1st Point in Stage/Area Table |
| From Node: | Pond 1A | | |

| | | | |
|---|---|---|---|
| To Node: | GWT | | |
| Link Count: | 1 | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Flow Direction: | Both | Perimeter 1: | 692.00 ft |
| Aquifer Base Elevation: | 77.00 ft | Perimeter 2: | 1642.00 ft |
| Water Table Elevation: | 145.00 ft | Perimeter 3: | 10190.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P1 to P2: | 50.00 ft |
| Horizontal Conductivity: | 10.000 fpd | Distance P2 to P3: | 450.00 ft |
| Vertical Conductivity: | 5.000 fpd | # of Cells P1 to P2: | 10 |
| Fillable Porosity: | 0.300 | # of Cells P2 to P3: | 45 |
| Layer Thickness: | 1.00 ft | | |

Comment:

## Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 7 | Surface Area Option: | Use 1st Point in Stage/Area Table |
| From Node: | Pond 7 - Swale | | |
| To Node: | GWT | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Link Count: | 1 | Perimeter 1: | 1283.00 ft |
| Flow Direction: | Both | Perimeter 2: | 1861.00 ft |
| Aquifer Base Elevation: | 72.00 ft | Perimeter 3: | 7058.00 ft |
| Water Table Elevation: | 127.00 ft | Distance P1 to P2: | 50.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P2 to P3: | 450.00 ft |
| Horizontal Conductivity: | 10.000 fpd | # of Cells P1 to P2: | 10 |
| Vertical Conductivity: | 5.000 fpd | # of Cells P2 to P3: | 45 |
| Fillable Porosity: | 0.300 | | |
| Layer Thickness: | 1.00 ft | | |

Comment:

## Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 8A | Surface Area Option: | Use 1st Point in Stage/Area Table |
| From Node: | Pond 8A - Swale | | |
| To Node: | GWT | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Link Count: | 1 | Perimeter 1: | 1172.00 ft |
| Flow Direction: | Both | Perimeter 2: | 1572.00 ft |
| Aquifer Base Elevation: | 72.00 ft | Perimeter 3: | 5170.00 ft |
| Water Table Elevation: | 123.00 ft | Distance P1 to P2: | 50.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P2 to P3: | 450.00 ft |
| Horizontal Conductivity: | 10.000 fpd | # of Cells P1 to P2: | 10 |
| Vertical Conductivity: | 5.000 fpd | # of Cells P2 to P3: | 45 |
| Fillable Porosity: | 0.300 | | |
| Layer Thickness: | 1.00 ft | | |

Comment:

## Simulation: norain

Scenario: Pond 1
Run Date/Time: 12/9/2025 12:54:32 PM
Program Version: ICPR4 4.07.04

## General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 0.00 in |
| Edge Length Option: | Automatic | Storm Duration: | 72.0000 hr |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: norain

| | |
|---|---|
| Scenario: | Pond 10 |
| Run Date/Time: | 12/9/2025 12:55:34 PM |
| Program Version: | ICPR4 4.07.04 |

## General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|---|---|---|---|---|
| 0 | 0 | 0 | 80.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 0.00 in |
| Edge Length Option: | Automatic | Storm Duration: | 72.0000 hr |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: norain

Scenario: Pond 1A
Run Date/Time: 12/9/2025 12:56:32 PM
Program Version: ICPR4 4.07.04

## General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:

| | |
|---|---|
| Green-Ampt Set: | |
| Vertical Layers Set: | |
| Impervious Set: | |
| 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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 0.00 in |
| Edge Length Option: | Automatic | Storm Duration: | 72.0000 hr |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: Pond 7

| | |
|---|---|
| Scenario: | Pond 7 |
| Run Date/Time: | 12/9/2025 12:57:30 PM |
| Program Version: | ICPR4 4.07.04 |

## General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

## Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
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

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global
OF Region Rain Opt: Global
Rainfall Name: ~FLMOD
Rainfall Amount: 0.00 in
Storm Duration: 72.0000 hr
Dflt Damping (1D): 0.0050 ft

| | | | |
|---|---|---|---|
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: Pond 8A

Scenario: Pond 8A
Run Date/Time: 12/9/2025 12:58:20 PM
Program Version: ICPR4 4.07.04

### General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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

#### Lookup Tables

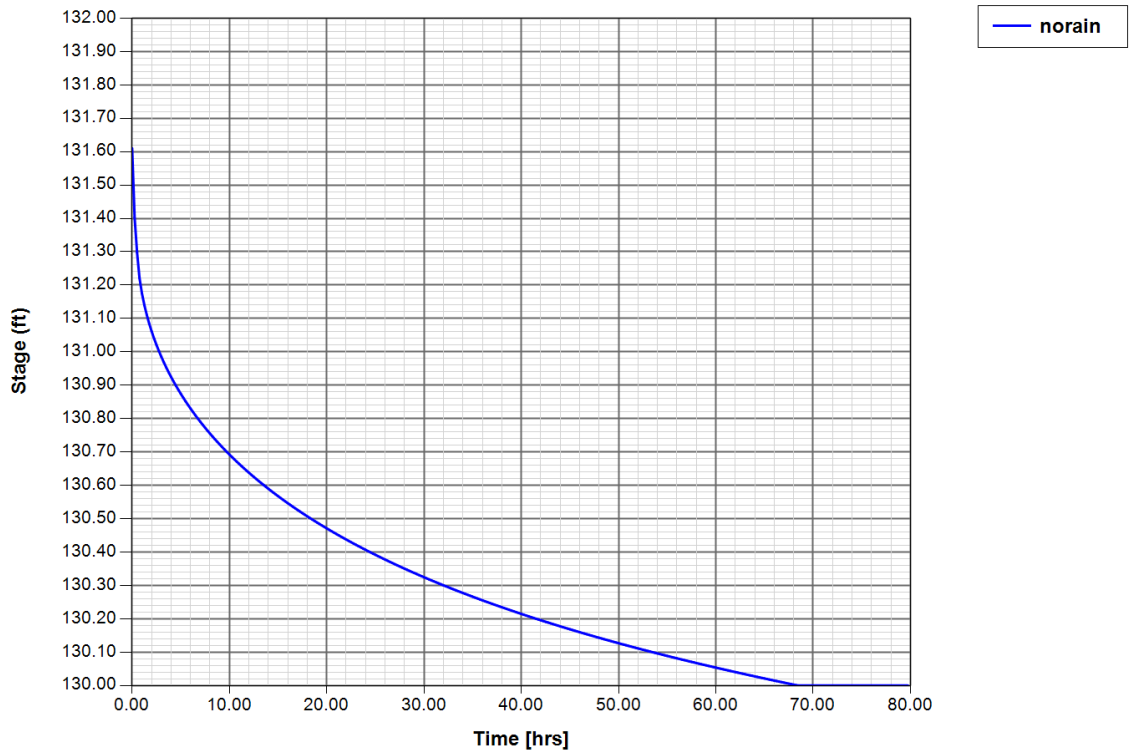
| | | | |
|---|---|---|---|
| Rainfall Folder: | | Boundary Stage Set: | |
| Reference ET Folder: | | Extern Hydrograph Set: | |
| Unit Hydrograph Folder: | | Curve Number Set: | |
| | | Green-Ampt Set: | |
| | | Vertical Layers Set: | |
| | | Impervious Set: | |
| | | Roughness Set: | |
| | | Crop Coef Set: | |
| | | Fillable Porosity Set: | |
| | | Conductivity Set: | |
| | | Leakage Set: | |

## Tolerances & Options

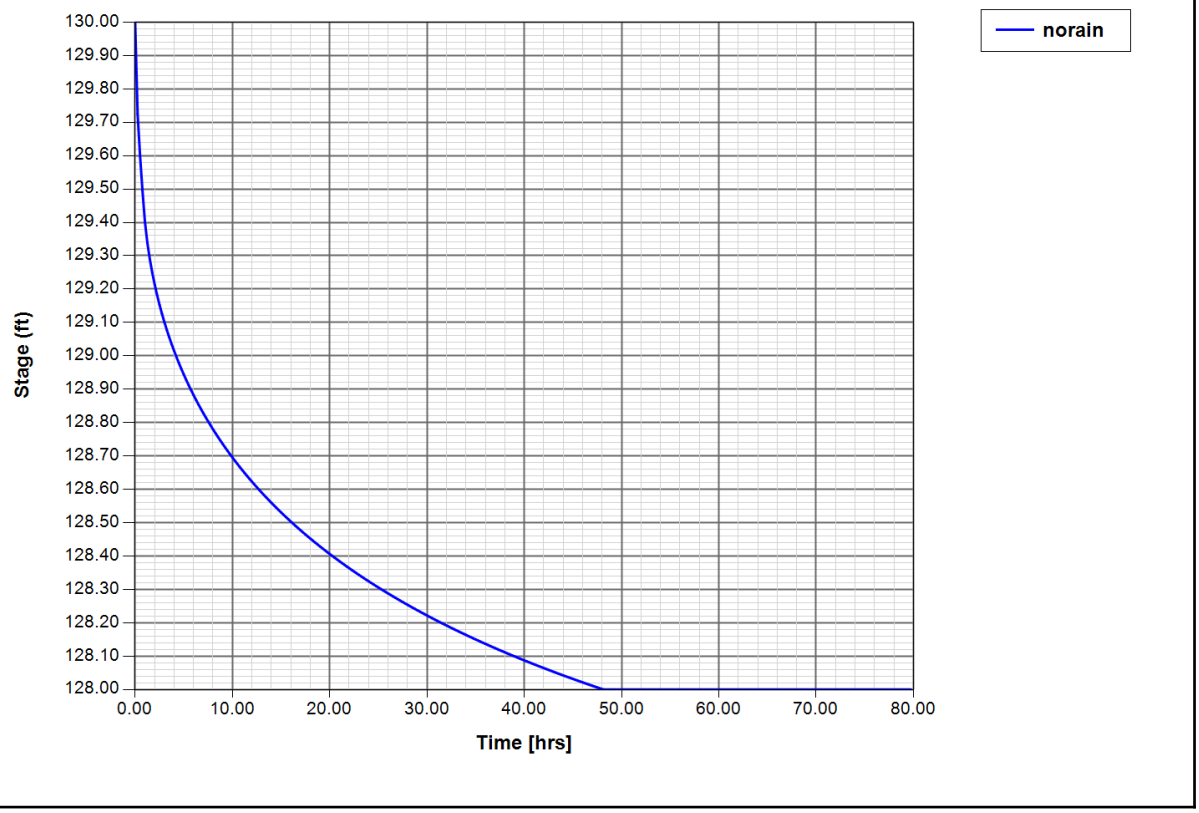
| | | | |
|---|---|---|---|
| Time Marching: | SAOR | IA Recovery Time: | 24.0000 hr |
| Max Iterations: | 6 | ET for Manual Basins: | False |
| Over-Relax Weight Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 0.00 in |
| Edge Length Option: | Automatic | Storm Duration: | 72.0000 hr |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

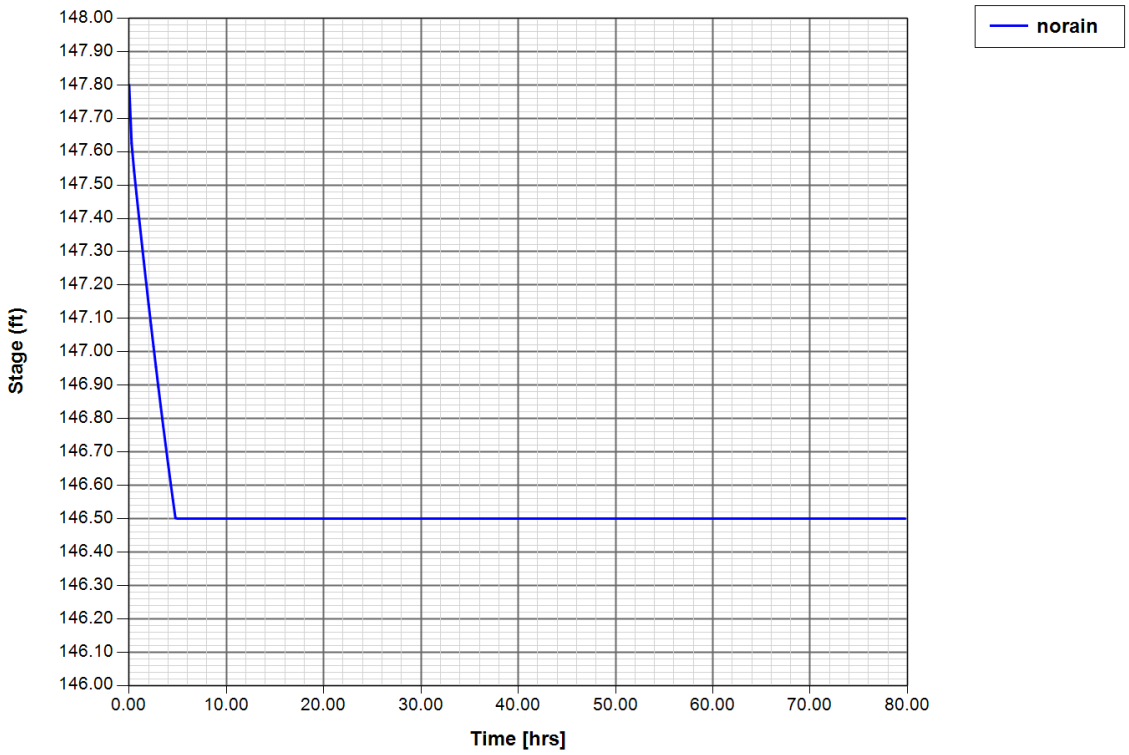
Stage [ Node: Pond 1 ]



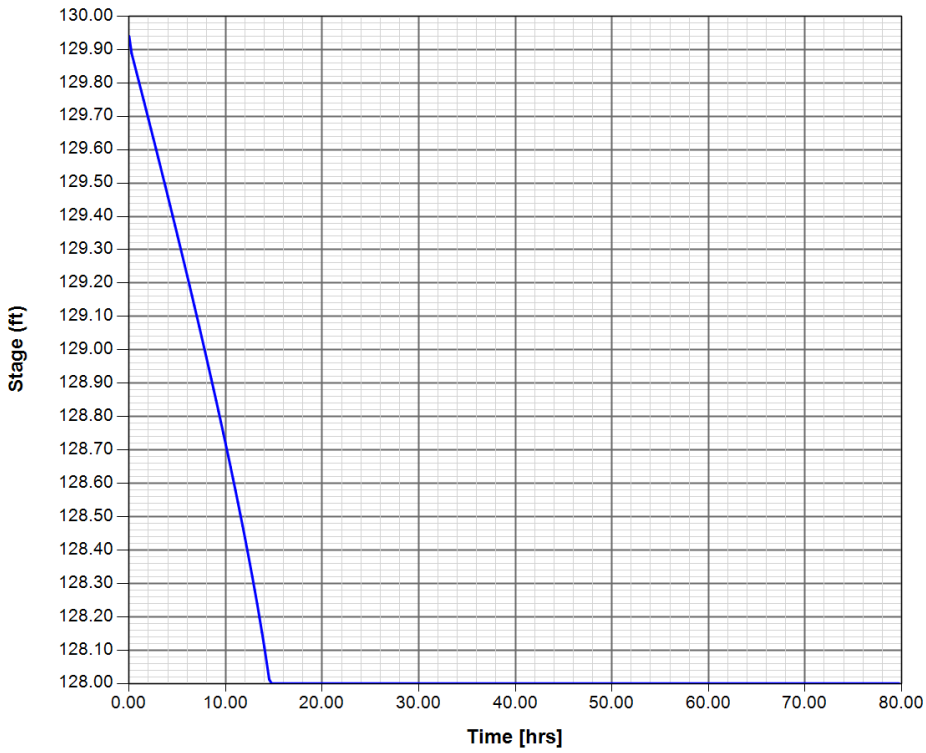
Stage [ Node: Pond 10 ]



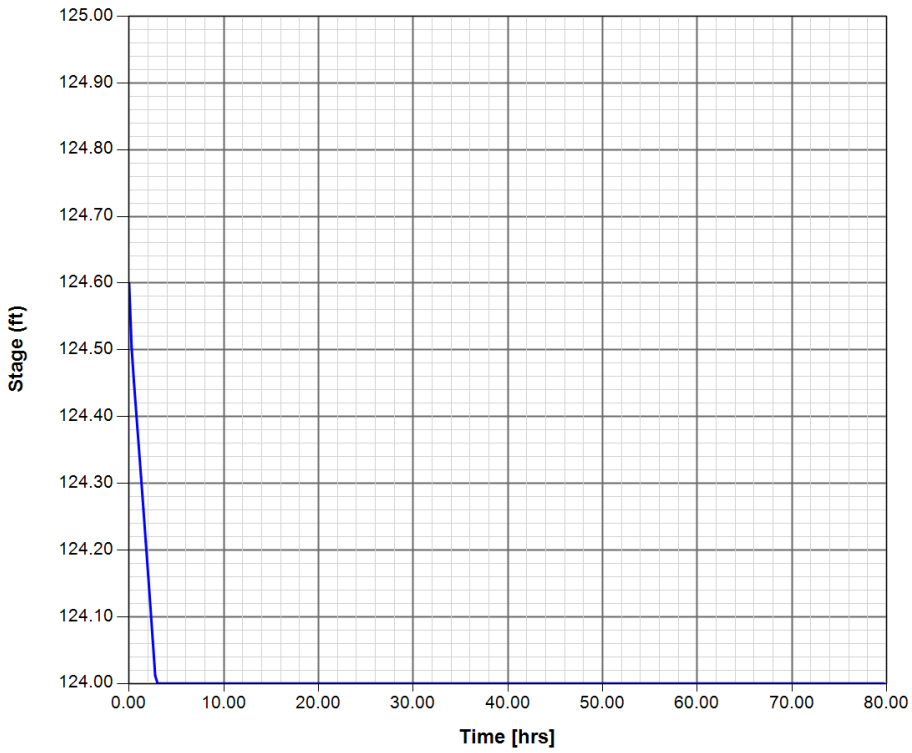
Stage [ Node: Pond 1A ]



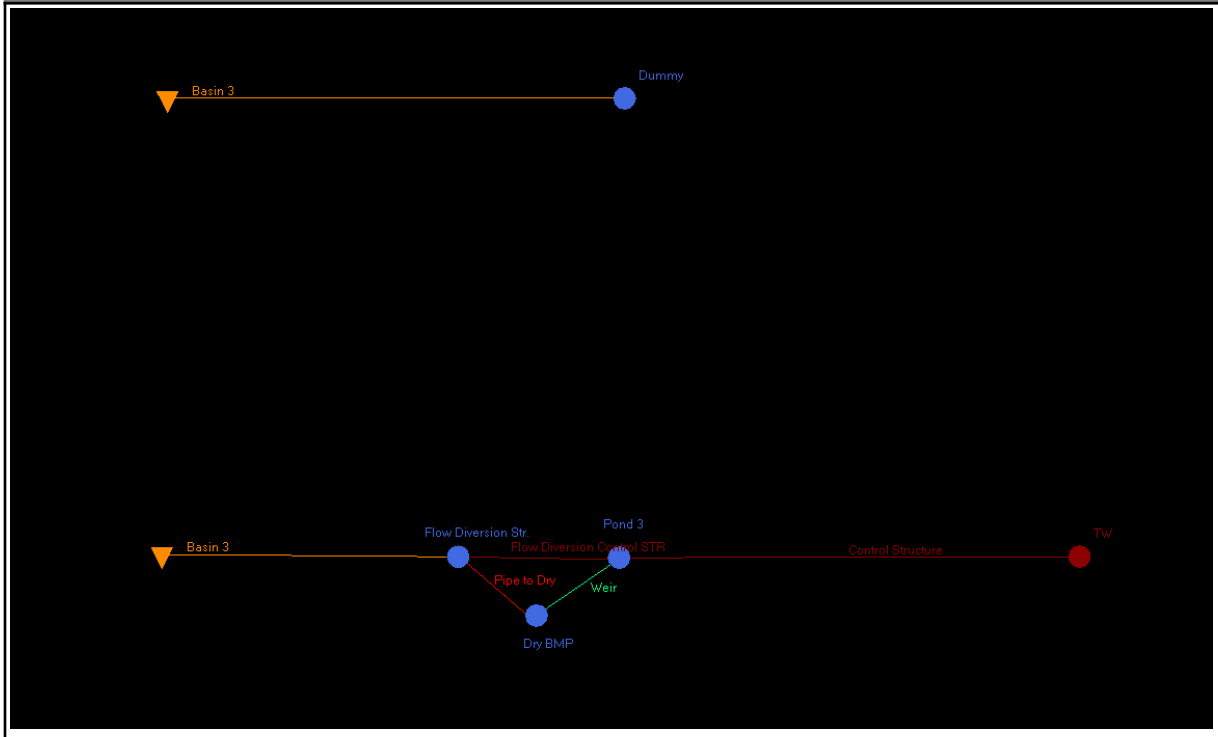
Stage [ Node: Pond 7 - Swale ]



Stage [ Node: Pond 8A - Swale ]



## Background Image: Basin 3




## Simple Basin: Basin 3

| | |
|---|---|
| Scenario: | Post Basin 3 |
| Node: | Flow Diversion Str. |
| 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: | 16.1400 ac |
| Curve Number: | 87.9 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

Comment:

Simple Basin Runoff Summary [Post Basin 3]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | 25Yr-24hr | 68.00 | 12.0500 | 7.67 | 6.21 | 16.1400 | 87.9 | 0.00 | 0.00 |

## Simple Basin: Basin 3

| | |
|---|---|
| Scenario: | Pre Basin 3 |
| Node: | Dummy |
| 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: | 16.1400 ac |
| Curve Number: | 78.2 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

Comment:

Simple Basin Runoff Summary [Pre Basin 3]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | 25Yr-24hr | 57.80 | 12.0500 | 7.67 | 5.09 | 16.1400 | 78.2 | 0.00 | 0.00 |

## Node: Dry BMP

| | |
|---|---|
| Scenario: | Post Basin 3 |
| Type: | Stage/Area |
| Base Flow: | 0.00 cfs |
| Initial Stage: | 128.00 ft |
| Warning Stage: | 0.00 ft |

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 128.00 | 0.3600 | 15682 |
| 128.40 | 0.3800 | 16553 |

Comment:

## Node: Flow Diversion Str.

Scenario: Post Basin 3
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.00 ft
Warning Stage: 131.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 131.00 | 0.0010 | 44 |
| 123.00 | 0.0010 | 44 |

Comment:

## Node: Pond 3

Scenario: Post Basin 3
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.00 ft
Warning Stage: 131.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 127.00 | 0.8100 | 35284 |
| 127.53 | 0.8500 | 37026 |
| 129.00 | 0.9600 | 41818 |
| 130.00 | 1.5100 | 65776 |
| 131.00 | 1.7800 | 77537 |

Comment:

## Node: TW

Scenario: Post Basin 3
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 127.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 127.00 |
| 0 | 0 | 0 | 24.0000 | 127.00 |

Comment:

## Node: Dummy

Scenario: Pre Basin 3
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.00 ft
Warning Stage: 0.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 127.00 | 0.0001 | 4 |
| 130.00 | 0.0002 | 9 |

Comment:

Node Max Conditions [Post Basin 3]

| 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] |
|---|---|---|---|---|---|---|---|
| Dry BMP | 25Yr-24hr | 0.00 | 128.60 | 0.0005 | 2.37 | 0.17 | 16563 |
| Flow Diversion Str. | 25Yr-24hr | 131.00 | 129.25 | 0.0010 | 68.00 | 67.99 | 100 |
| Pond 3 | 25Yr-24hr | 131.00 | 128.38 | 0.0010 | 65.62 | 57.54 | 39793 |
| TW | 25Yr-24hr | 0.00 | 127.00 | 0.0000 | 57.53 | 0.00 | 0 |

## Drop Structure Link: Control Structure

Scenario: Post Basin 3
From Node: Pond 3
To Node: TW
Link Count: 1
Flow Direction: Both
Solution: Combine
Increments: 0
Pipe Count: 1
Damping: 0.0000 ft
Length: 100.00 ft
FHWA Code: 0
Entr Loss Coef: 0.50
Exit Loss Coef: 0.30
Bend Loss Coef: 0.00
Bend Location: 0.00 dec

### Upstream Pipe

Invert: 120.00 ft
Manning's N: 0.0120

#### Geometry: Circular

Max Depth: 3.50 ft

#### Bottom Clip

Default: 0.00 ft
Op Table:
Ref Node:
Manning's N: 0.0000

#### Top Clip

Default: 0.00 ft
Op Table:
Ref Node:
Manning's N: 0.0000

### Downstream Pipe

Invert: 119.00 ft
Manning's N: 0.0120

#### Geometry: Circular

Max Depth: 3.50 ft

#### Bottom Clip

Default: 0.00 ft
Op Table:
Ref Node:
Manning's N: 0.0000

#### Top Clip

Default: 0.00 ft
Op Table:
Ref Node:
Manning's N: 0.0000

Energy Switch: Energy

Pipe Comment:

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 1 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | **Top Clip** | |
| Weir Type: | Horizontal | Default: | 0.00 ft |
| Geometry Type: | Rectangular | Op Table: | |
| Invert: | 127.53 ft | Ref Node: | |
| Control Elevation: | 127.53 ft | **Discharge Coefficients** | |
| Max Depth: | 3.40 ft | Weir Default: | 3.200 |
| Max Width: | 8.70 ft | Weir Table: | |
| Fillet: | 0.00 ft | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment:

Drop Structure Comment:

Link Min/Max Conditions [Post Basin 3]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Control Structure - Pipe | 25Yr-24hr | 57.53 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 |
| Control Structure - Weir: 2 | 25Yr-24hr | 57.54 | 0.00 | 0.08 | 2.80 | 2.80 | 2.80 |

| Drop Structure Link: Flow Diversion Control STR | | Upstream Pipe | | Downstream Pipe | |
|---|---|---|---|---|---|
| | | Invert: | 123.00 ft | Invert: | 120.00 ft |
| Scenario: | Post Basin 3 | Manning's N: | 0.0120 | Manning's N: | 0.0120 |
| From Node: | Flow Diversion Str. | **Geometry: Circular** | | **Geometry: Circular** | |
| To Node: | Pond 3 | Max Depth: | 4.00 ft | Max Depth: | 4.00 ft |
| Link Count: | 1 | **Bottom Clip** | | | |
| Flow Direction: | Both | Default: | 0.00 ft | Default: | 0.00 ft |
| Solution: | Combine | Op Table: | | Op Table: | |
| Increments: | 0 | Ref Node: | | Ref Node: | |
| Pipe Count: | 1 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Damping: | 0.0000 ft | **Top Clip** | | | |
| Length: | 150.00 ft | Default: | 0.00 ft | Default: | 0.00 ft |
| FHWA Code: | 0 | Op Table: | | Op Table: | |

| | | | | | |
|---|---|---|---|---|---|
| Entr Loss Coef: | 0.50 | Ref Node: | | Ref Node: | |
| Exit Loss Coef: | 0.30 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Bend Loss Coef: | 0.00 | | | | |
| Bend Location: | 0.00 dec | | | | |
| Energy Switch: | Energy | | | | |

Pipe Comment:

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 1 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | **Top Clip** | |
| Weir Type: | Sharp Crested Vertical | Default: | 0.00 ft |
| Geometry Type: | Rectangular | Op Table: | |
| Invert: | 128.40 ft | Ref Node: | |
| Control Elevation: | 128.40 ft | **Discharge Coefficients** | |
| Max Depth: | 999.00 ft | Weir Default: | 3.200 |
| Max Width: | 35.00 ft | Weir Table: | |
| Fillet: | 0.00 ft | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment: Weir in flow diversion structure

Drop Structure Comment:

Link Min/Max Conditions [Post Basin 3]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Flow Diversion Control STR - Pipe | 25Yr-24hr | 65.62 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 |
| Flow Diversion Control STR - Weir: 1 | 25Yr-24hr | 65.63 | 0.00 | -0.24 | 2.42 | 2.42 | 2.42 |

| Pipe Link: Pipe to Dry | | Upstream | | Downstream | |
|---|---|---|---|---|---|
| Scenario: | Post Basin 3 | Invert: | 128.30 ft | Invert: | 128.20 ft |
| From Node: | Flow Diversion Str. | Manning's N: | 0.0120 | Manning's N: | 0.0120 |
| To Node: | Dry BMP | Geometry: Circular | | Geometry: Circular | |
| Link Count: | 1 | Max Depth: | 1.00 ft | Max Depth: | 1.00 ft |
| Flow Direction: | Both | Bottom Clip | | | |
| Damping: | 0.0000 ft | Default: | 0.00 ft | Default: | 0.00 ft |

| | | | | | |
|---|---|---|---|---|---|
| Length: | 20.00 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: | 0.30 | 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:

Link Min/Max Conditions [Post Basin 3]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pipe to Dry | 25Yr-24hr | 2.37 | -0.17 | -0.16 | 3.73 | 4.32 | 3.69 |

Weir Link: Weir

| | | | |
|---|---|---|---|
| Scenario: | Post Basin 3 | Bottom Clip | |
| From Node: | Dry BMP | Default: | 0.00 ft |
| To Node: | Pond 3 | Op Table: | |
| Link Count: | 1 | Ref Node: | |
| Flow Direction: | Both | Top Clip | |
| Damping: | 0.0000 ft | Default: | 0.00 ft |
| Weir Type: | Horizontal | Op Table: | |
| Geometry Type: | Irregular | Ref Node: | |
| Invert: | 129.00 ft | Discharge Coefficients | |
| Control Elevation: | 129.00 ft | Weir Default: | 2.800 |
| Cross Section: | Pond 3 Berm Weir | Weir Table: | |
| | | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Comment:

Link Min/Max Conditions [Post Basin 3]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Weir | 25Yr-24hr | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Weir Cross Section: Pond 3 Berm Weir

Scenario: Post Basin 3

Lid: No

Bottom Point Table

| Order | Station [ft] | Elevation [ft] |
|---|---|---|
| 0 | 0.00 | 129.00 |
| 1 | 110.00 | 129.00 |

Comment:

## Simulation: 25Yr-24hr

Scenario: Post Basin 3
Run Date/Time: 1/14/2026 4:17:22 PM
Program Version: ICPR4 4.07.04

### 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 |
| 0 | 0 | 0 | 24.0000 | 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: | |
| Extern Hydrograph Set: | |
| Curve Number Set: | |
| Green-Ampt Set: | |
| Vertical Layers Set: | |
| Impervious Set: | |
| 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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 7.67 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 (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: 25Yr-24hr

| | |
|---|---|
| Scenario: | Pre Basin 3 |
| Run Date/Time: | 12/10/2025 12:03:25 PM |
| Program Version: | ICPR4 4.07.04 |

## 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 |
| 0 | 0 | 0 | 24.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

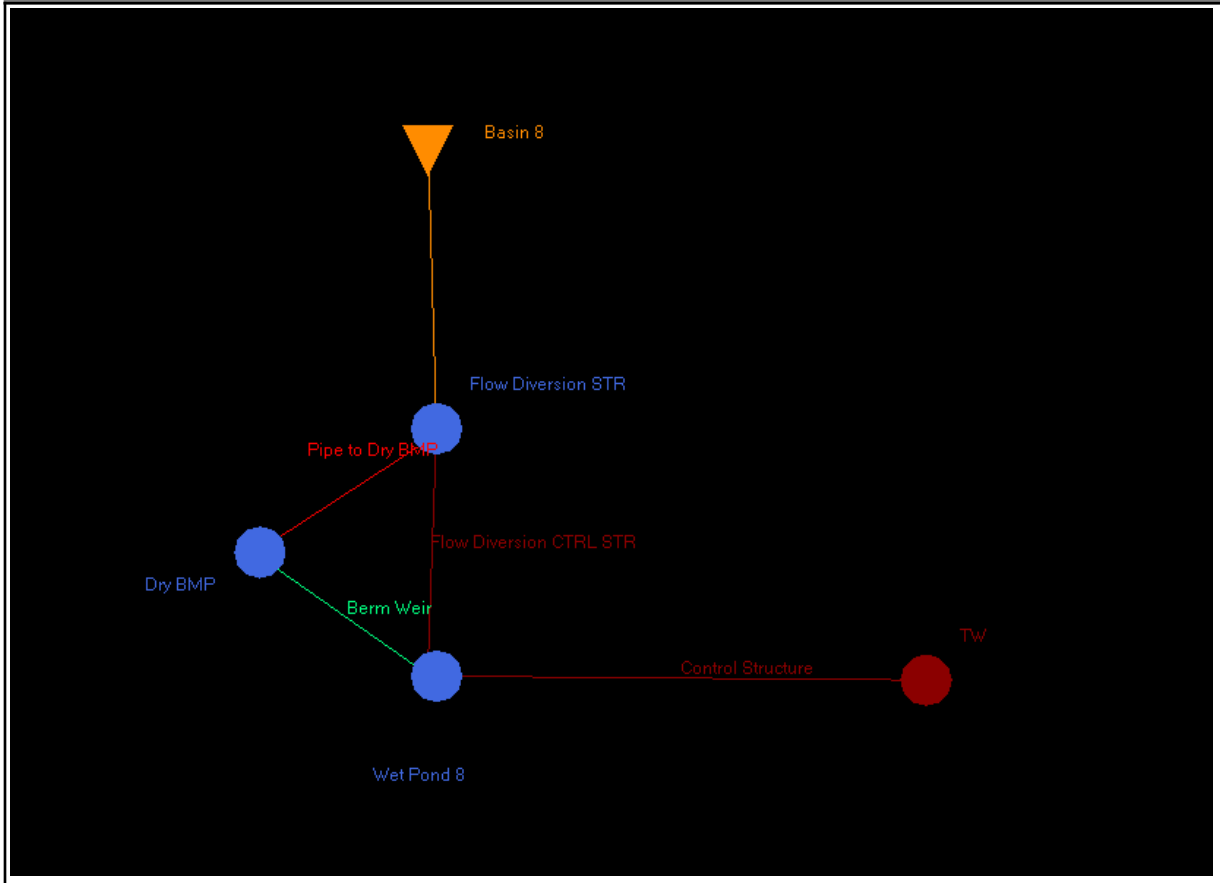
## Tolerances & Options

| | | | |
|---|---|---|---|
| Time Marching: | SAOR | IA Recovery Time: | 24.0000 hr |
| Max Iterations: | 6 | ET for Manual Basins: | False |
| Over-Relax Weight Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain | Global |

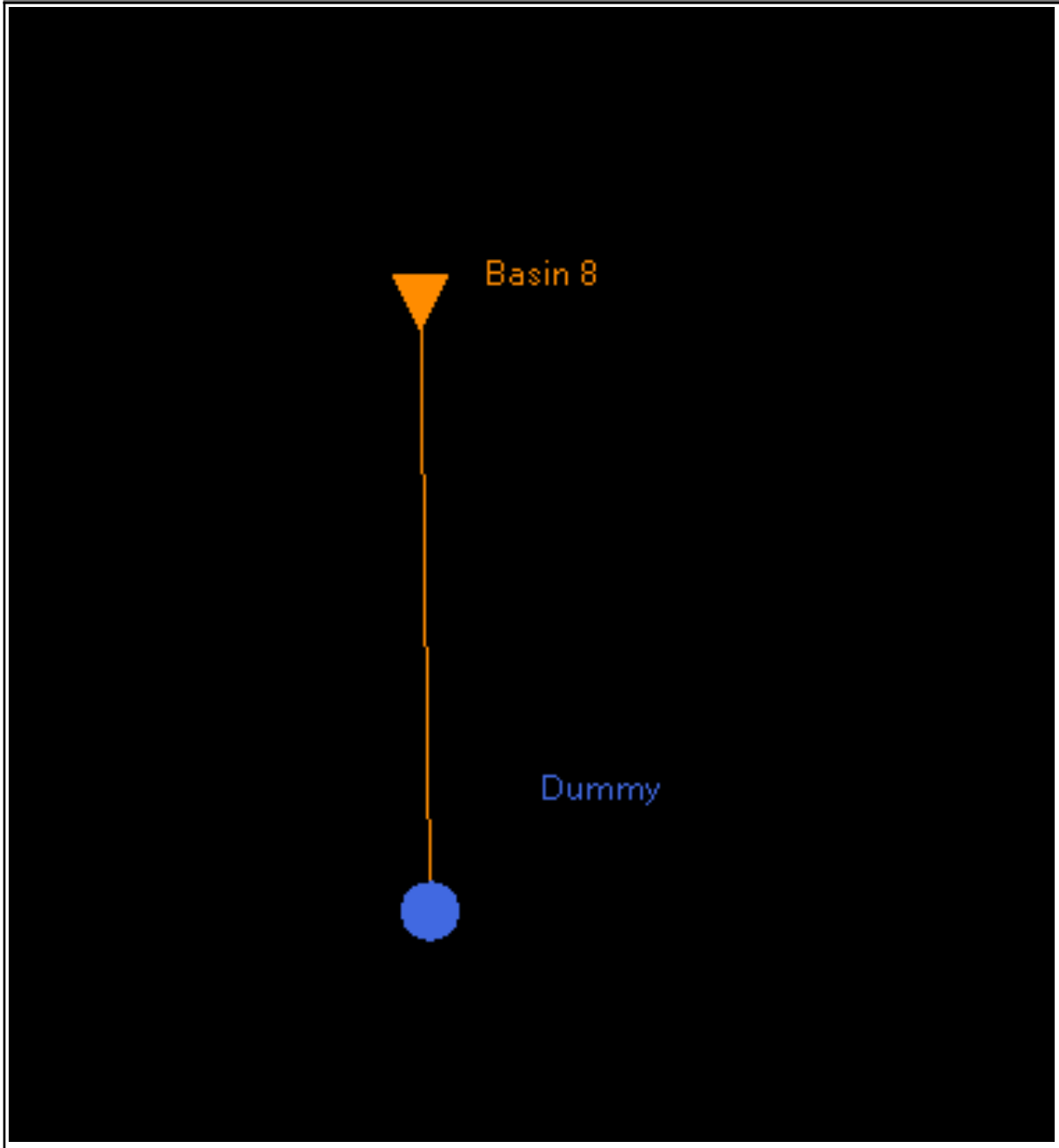
| | | | |
|---|---|---|---|
| | | Opt: | |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 7.67 in |
| Edge Length Option: | Automatic | Storm Duration: | 24.0000 hr |
| | | | |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

Background Image: Post 8



Background Image: pre 8




Simple Basin: Basin 8

Scenario: Post Basin 8
Node: Flow Diversion STR

| | |
|---|---|
| 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: | 21.5400 ac |
| Curve Number: | 84.3 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

Comment:

Simple Basin Runoff Summary [Post Basin 8]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| Basin 8 | 25Yr-24hr | 86.17 | 12.0500 | 7.67 | 5.79 | 21.5400 | 84.3 | 0.00 | 0.00 |

## Simple Basin: Basin 8

| | |
|---|---|
| Scenario: | Pre Basin 8 |
| Node: | Dummy |
| 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: | 21.5400 ac |
| Curve Number: | 76.5 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

Comment:

Simple Basin Runoff Summary [Pre Basin 8]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| Basin 8 | 25Yr-24hr | 74.41 | 12.0500 | 7.67 | 4.89 | 21.5400 | 76.5 | 0.00 | 0.00 |

## Node: Dry BMP

Scenario: Post Basin 8
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 123.00 ft
Warning Stage: 125.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 123.00 | 0.5600 | 24394 |
| 124.00 | 0.6200 | 27007 |

Comment:

## Node: Flow Diversion STR

Scenario: Post Basin 8
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 122.00 ft
Warning Stage: 125.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 125.00 | 0.0010 | 44 |
| 118.00 | 0.0010 | 44 |

Comment:

## Node: TW

Scenario: Post Basin 8
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 122.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

| Year | Month | Day | Hour | Stage [ft] |
|---|---|---|---|---|
| 0 | 0 | 0 | 0.0000 | 122.00 |
| 0 | 0 | 0 | 24.0000 | 122.00 |

Comment:

## Node: Wet Pond 8

Scenario: Post Basin 8
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 122.00 ft
Warning Stage: 124.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 122.00 | 1.0000 | 43560 |
| 123.43 | 1.1000 | 47916 |
| 124.00 | 1.1500 | 50094 |
| 125.50 | 1.2300 | 53579 |

Comment:

Node Max Conditions [Post Basin 8]

| 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] |
|---|---|---|---|---|---|---|---|
| Dry BMP | 25Yr-24hr | 125.00 | 124.46 | 0.0009 | 5.38 | 1.45 | 27029 |
| Flow Diversion STR | 25Yr-24hr | 125.00 | 125.78 | 0.0010 | 86.17 | 86.11 | 100 |
| TW | 25Yr-24hr | 0.00 | 122.00 | 0.0000 | 65.99 | 0.00 | 0 |
| Wet Pond 8 | 25Yr-24hr | 124.00 | 124.35 | 0.0010 | 80.74 | 66.00 | 50900 |

## Weir Link: Berm Weir

Scenario: Post Basin 8
From Node: Dry BMP
To Node: Wet Pond 8
Link Count: 1
Flow Direction: Both
Damping: 0.0000 ft
Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 124.50 ft
Control Elevation: 124.50 ft
Cross Section: Pond 8 Berm

### 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:

Link Min/Max Conditions [Post Basin 8]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Berm Weir | 25Yr-24hr | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Drop Structure Link: Control Structure | | Upstream Pipe | | Downstream Pipe | |
|---|---|---|---|---|---|
| Scenario: | Post Basin 8 | Invert: | 115.00 ft | Invert: | 114.00 ft |
| From Node: | Wet Pond 8 | Manning's N: | 0.0120 | Manning's N: | 0.0120 |
| To Node: | TW | Geometry: Circular | | Geometry: Circular | |
| Link Count: | 1 | Max Depth: | 4.00 ft | Max Depth: | 4.00 ft |
| Flow Direction: | Both | Bottom Clip | | | |
| Solution: | Combine | Default: | 0.00 ft | Default: | 0.00 ft |
| Increments: | 0 | Op Table: | | Op Table: | |
| Pipe Count: | 1 | Ref Node: | | Ref Node: | |
| Damping: | 0.0000 ft | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Length: | 100.00 ft | Top Clip | | | |
| FHWA Code: | 0 | Default: | 0.00 ft | Default: | 0.00 ft |
| Entr Loss Coef: | 0.50 | Op Table: | | Op Table: | |
| Exit Loss Coef: | 0.30 | Ref Node: | | Ref Node: | |
| Bend Loss Coef: | 0.00 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Bend Location: | 0.00 dec | | | | |
| Energy Switch: | Energy | | | | |

Pipe Comment:

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 1 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | Top Clip | |
| Weir Type: | Horizontal | Default: | 0.00 ft |
| Geometry Type: | Rectangular | Op Table: | |
| Invert: | 123.43 ft | Ref Node: | |
| Control Elevation: | 123.43 ft | Discharge Coefficients | |
| Max Depth: | 3.00 ft | Weir Default: | 3.200 |
| Max Width: | 8.75 ft | Weir Table: | |
| Fillet: | 0.00 ft | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment:

Drop Structure Comment:

Link Min/Max Conditions [Post Basin 8]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Control Structure - Pipe | 25Yr-24hr | 65.99 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 |
| Control Structure - Weir: 2 | 25Yr-24hr | 66.00 | 0.00 | 0.10 | 3.06 | 3.06 | 3.06 |

| Drop Structure Link: Flow Diversion CTRL STR | | Upstream Pipe | | Downstream Pipe | |
|---|---|---|---|---|---|
| | | Invert: | 118.00 ft | Invert: | 117.00 ft |
| Scenario: | Post Basin 8 | Manning's N: | 0.0120 | Manning's N: | 0.0120 |
| From Node: | Flow Diversion STR | Geometry: Circular | | Geometry: Circular | |
| To Node: | Wet Pond 8 | Max Depth: | 3.50 ft | Max Depth: | 3.50 ft |
| Link Count: | 1 | Bottom Clip | | | |
| Flow Direction: | Both | Default: | 0.00 ft | Default: | 0.00 ft |
| Solution: | Combine | Op Table: | | Op Table: | |
| Increments: | 0 | Ref Node: | | Ref Node: | |
| Pipe Count: | 1 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Damping: | 0.0000 ft | Top Clip | | | |
| Length: | 95.00 ft | Default: | 0.00 ft | Default: | 0.00 ft |
| FHWA Code: | 0 | Op Table: | | Op Table: | |
| Entr Loss Coef: | 0.30 | Ref Node: | | Ref Node: | |
| Exit Loss Coef: | 0.50 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Bend Loss Coef: | 0.00 | | | | |
| Bend Location: | 0.00 dec | | | | |
| Energy Switch: | Energy | | | | |

Pipe Comment:

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 1 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | Top Clip | |
| Weir Type: | Sharp Crested Vertical | Default: | 0.00 ft |
| Geometry Type: | Rectangular | Op Table: | |
| Invert: | 124.00 ft | Ref Node: | |
| Control Elevation: | 124.00 ft | Discharge Coefficients | |
| Max Depth: | 999.00 ft | Weir Default: | 3.200 |
| Max Width: | 30.00 ft | Weir Table: | |
| Fillet: | 0.00 ft | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment:

Drop Structure Comment:

Link Min/Max Conditions [Post Basin 8]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Flow Diversion CTRL STR - Pipe | 25Yr-24hr | 80.74 | 0.00 | -0.12 | 0.00 | 0.00 | 0.00 |
| Flow Diversion CTRL STR - Weir: 1 | 25Yr-24hr | 80.74 | 0.00 | -0.19 | 2.50 | 2.50 | 2.50 |

| Pipe Link: Pipe to Dry BMP | | Upstream | | Downstream | |
|---|---|---|---|---|---|
| Scenario: | Post Basin 8 | Invert: | 123.40 ft | Invert: | 123.30 ft |
| From Node: | Flow Diversion STR | Manning's N: | 0.0120 | Manning's N: | 0.0120 |
| To Node: | Dry BMP | Geometry: Circular | | Geometry: Circular | |
| Link Count: | 1 | Max Depth: | 1.00 ft | Max Depth: | 1.00 ft |
| Flow Direction: | Both | Bottom Clip | | | |
| Damping: | 0.0000 ft | Default: | 0.00 ft | Default: | 0.00 ft |
| Length: | 50.00 ft | Op Table: | | Op Table: | |
| FHWA Code: | 0 | Ref Node: | | Ref Node: | |
| Entr Loss Coef: | 0.30 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Exit Loss Coef: | 0.50 | 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:

Link Min/Max Conditions [Post Basin 8]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pipe to Dry BMP | 25Yr-24hr | 5.38 | -1.45 | 0.12 | 6.85 | 7.05 | 6.95 |

Weir Cross Section: Pond 8 Berm

Scenario: Post Basin 8
Lid: No

Bottom Point Table

| Order | Station [ft] | Elevation [ft] |
|---|---|---|
| 0 | 0.00 | 124.50 |
| 1 | 112.00 | 124.50 |

Comment:

## Simulation: 25Yr-24hr

Scenario: Post Basin 8
Run Date/Time: 1/14/2026 2:33:02 PM
Program Version: ICPR4 4.07.04

### 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: | |
| Extern Hydrograph Set: | |
| Curve Number Set: | |
| Green-Ampt Set: | |
| Vertical Layers Set: | |
| Impervious Set: | |
| 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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 7.67 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 (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

## Simulation: 25Yr-24hr

| | |
|---|---|
| Scenario: | Pre Basin 8 |
| Run Date/Time: | 12/10/2025 4:06:41 PM |
| Program Version: | ICPR4 4.07.04 |

### 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

## Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global

| | | | |
|---|---|---|---|
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 7.67 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 (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

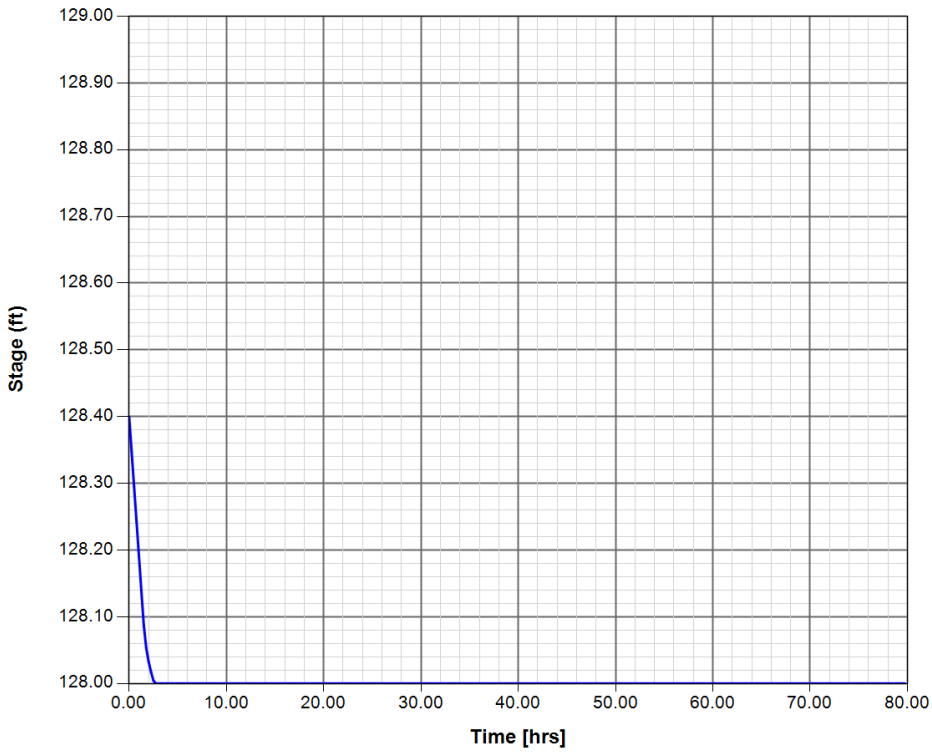
## Node: Pond 3

Scenario: Pond 3
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 128.40 ft
Warning Stage: 130.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 128.00 | 0.3600 | 15682 |
| 128.40 | 0.3800 | 16553 |
| 129.00 | 0.4100 | 17860 |

Comment:

## Stage [ Node: Pond 3 ]




## Node: Pond 8

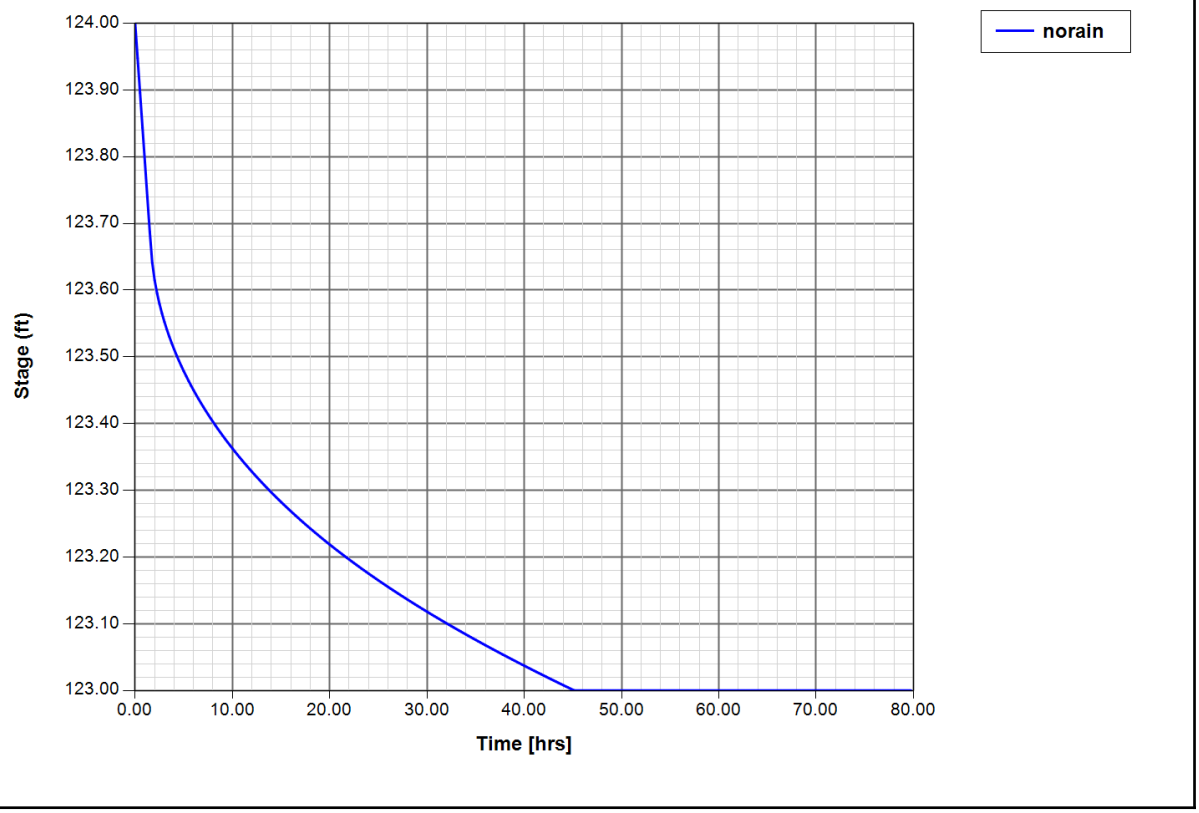
Scenario: Pond 8
Type: Stage/Area

Base Flow: 0.00 cfs
Initial Stage: 124.00 ft
Warning Stage: 126.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 123.00 | 0.5600 | 24394 |
| 124.00 | 0.6200 | 27007 |
| 124.50 | 0.6600 | 28750 |

Comment:

Stage [ Node: Pond 8 ]




Percolation Link: GWT

Scenario: Pond 3
From Node: Pond 3
To Node: GWT
Link Count: 1
Flow Direction: Both
Surface Area Option: Vary Based on Stage/Area Table
Vertical Flow Termination: Horizontal Flow Algorithm
Perimeter 1: 501.00 ft
Perimeter 2: 576.00 ft

| | | | |
|---|---|---|---|
| Aquifer Base Elevation: | 73.00 ft | | |
| Water Table Elevation: | 127.00 ft | Perimeter 3: | 1205.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P1 to P2: | 12.00 ft |
| Horizontal Conductivity: | 10.000 fpd | Distance P2 to P3: | 100.00 ft |
| Vertical Conductivity: | 5.000 fpd | # of Cells P1 to P2: | 2 |
| Fillable Porosity: | 0.300 | # of Cells P2 to P3: | 20 |
| Layer Thickness: | 1.00 ft | | |

Comment:

## Percolation Link: GWT

| | | | |
|---|---|---|---|
| Scenario: | Pond 8 | Surface Area Option: | Vary Based on Stage/Area Table |
| From Node: | Pond 8 | | |
| To Node: | GWT | Vertical Flow Termination: | Horizontal Flow Algorithm |
| Link Count: | 1 | Perimeter 1: | 661.00 ft |
| Flow Direction: | Both | Perimeter 2: | 762.00 ft |
| Aquifer Base Elevation: | 72.00 ft | Perimeter 3: | 1233.00 ft |
| Water Table Elevation: | 122.00 ft | Distance P1 to P2: | 16.00 ft |
| Annual Recharge Rate: | 0 ipy | Distance P2 to P3: | 75.00 ft |
| Horizontal Conductivity: | 10.000 fpd | # of Cells P1 to P2: | 3 |
| Vertical Conductivity: | 5.000 fpd | # of Cells P2 to P3: | 15 |
| Fillable Porosity: | 0.300 | | |
| Layer Thickness: | 1.00 ft | | |

Comment:

## Simulation: norain

| | |
|---|---|
| Scenario: | Pond 3 |
| Run Date/Time: | 1/14/2026 4:30:53 PM |
| Program Version: | ICPR4 4.07.04 |

### General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

## Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
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 (2D): 100 ft2
Energy Switch (2D): Energy

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global
OF Region Rain Opt: Global
Rainfall Name: ~FLMOD
Rainfall Amount: 0.00 in
Storm Duration: 72.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

## Simulation: norain

Scenario: Pond 8
Run Date/Time: 1/14/2026 4:31:36 PM
Program Version: ICPR4 4.07.04

### General

Run Mode: Normal

| | Year | Month | Day | Hour [hr] |
|---|---|---|---|---|
| Start Time: | 0 | 0 | 0 | 0.0000 |
| End Time: | 0 | 0 | 0 | 80.0000 |

| | 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 |
| 0 | 0 | 0 | 80.0000 | 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

#### Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:

| | | | |
|---|---|---|---|
| Folder: | | | |
| | | Green-Ampt Set: | |
| | | Vertical Layers Set: | |
| | | Impervious Set: | |
| | | 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 Fact: | 0.5 dec | | |
| dZ Tolerance: | 0.0010 ft | Smp/Man Basin Rain Opt: | Global |
| Max dZ: | 1.0000 ft | OF Region Rain Opt: | Global |
| Link Optimizer Tol: | 0.0001 ft | Rainfall Name: | ~FLMOD |
| | | Rainfall Amount: | 0.00 in |
| Edge Length Option: | Automatic | Storm Duration: | 72.0000 hr |
| Dflt Damping (2D): | 0.0050 ft | Dflt Damping (1D): | 0.0050 ft |
| Min Node Srf Area (2D): | 100 ft2 | Min Node Srf Area (1D): | 100 ft2 |
| Energy Switch (2D): | Energy | Energy Switch (1D): | Energy |

Comment:

# APPENDIX D

## Original PSR

# POND SITING REPORT

Florida Department of Transportation

District 1

SR 544 PD&E Study

Limits of Project: From Martin Luther King Boulevard to SR 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

ETDM Number: 5873

Date: October 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

# PROFESSIONAL ENGINEER CERTIFICATION

## POND SITING REPORT

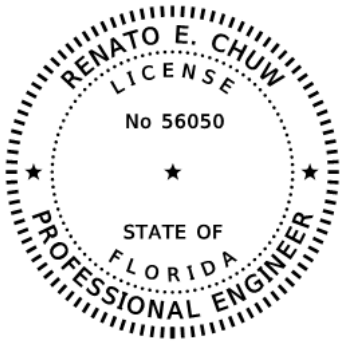
**Project:** S.R. 544 PD&E Study

**ETDM Number:** 5873

**Financial Project ID:** 440273-1-22-01

This Pond Siting Report contains engineering information that fulfills the purpose and need for the S.R. 544 Project Development & Environment Study from Martin Luther King Boulevard NW to SR 17. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Inwood Consulting Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.




This item has been digitally signed and sealed by Renato Chuw, PE on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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Appendix J Geotechnical Report
Appendix K Correspondence

# Executive Summary

The State Road (SR) 544 (Lucerne Park Road) Project Development and Environment (PD&E) Study evaluated capacity, safety, and multi-modal improvements on Lucerne Park Road from MLK Boulevard to SR 17, a distance of approximately eight miles. This project involves the widening of SR 544 from two lanes to four lanes to meet future travel demands, improve safety and provide for bicycle and pedestrian features, such as a shared use path.

The purpose of this Pond Siting Report is to discuss, analyze, and identify the stormwater management plan for the proposed roadway improvements based on environmental, hydrological, hydraulic, and economic factors. Stormwater management for water quality treatment and runoff attenuation will be provided using wet detention and dry retention ponds. The design of the drainage and stormwater facilities will comply with the standards set forth by the FDOT Drainage Manual, the Southwest Florida Water Management District (SWFWMD) Environmental Resource Permit Applicant's Handbook, Polk County stormwater criteria, and Lake Region Lakes Management District (LRLMD).

Proposed pond sites have been identified along the project limits. The analysis estimates right-of-way needs using a volumetric approach which accounts for water quality treatment and water quantity for runoff attenuation. The total pond cost estimate found in this report is a budget tool used by the Department to estimate total acquisition costs associated with each pond site and to budget the appropriate funds for acquisition.

Please note that the volumetric analysis of the pond sites was performed with preliminary data, reasonable engineering judgment, and assumptions. Pond sites and configurations may change during final design as more detailed information on Seasonal High Water Table (SHWT), wetland hydrologic information (as applicable), and a final roadway design profile become available. Please refer to **Table 1-1** for a **Summary of Proposed Stormwater & Floodplain Compensation Pond Sites**.

**Table 1-1: Summary of Proposed Stormwater & Floodplain Compensation Pond Sites**

| Basin/Pond Number | Pond Access Easement Area (ac) | Pond Right-of-Way Area (ac) | Total Required Right-of-Way Area (ac) | Total Pond Cost ($)* |
|---|---|---|---|---|
| 1A | N/A | 0.37 | 0.37 | 232,792 |
| 1 | N/A | 2.83 | 2.83 | 1,005,782 |
| 2 | N/A | 3.83 | 3.83 | 1,311,478 |
| 3 | 0.23 | 2.50 | 2.73 | 1,732,875 |
| 4 | 0.11 | 2.21 | 2.32 | 1,065,540 |
| 5 | 0.46 | 1.95 | 2.41 | 1,258,256 |
| 6 | N/A | 1.87 | 1.87 | 1,053,930 |
| 7 | N/A | 0.70 | 0.70 | 550,241 |
| 8 | N/A | 2.75 | 2.75 | 1,773,443 |
| 8A | N/A | 0.57 | 0.57 | 259,168 |
| 9 | N/A | 1.25 | 1.25 | 417,565 |
| 10 | N/A | 2.28 | 2.28 | 747,288 |
| FPCA 1 | N/A | 0.74 | 0.74 | 277,723 |
| FPCA 2 | N/A | 1.62 | 1.62 | 643,156 |
| FPCA 3 | N/A | 3.62 | 3.62 | 1,249,748 |
| FPCA 4 | N/A | 4.84 | 4.84 | 827,595 |
| FPCA 5 | N/A | 3.22 | 3.22 | 742,230 |
| **Totals:** | | | **37.95** | **15,129,811** |

*The cost evaluation for the stormwater management facility alternatives in this report include stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork excavation and grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

# 1.0 Project Overview

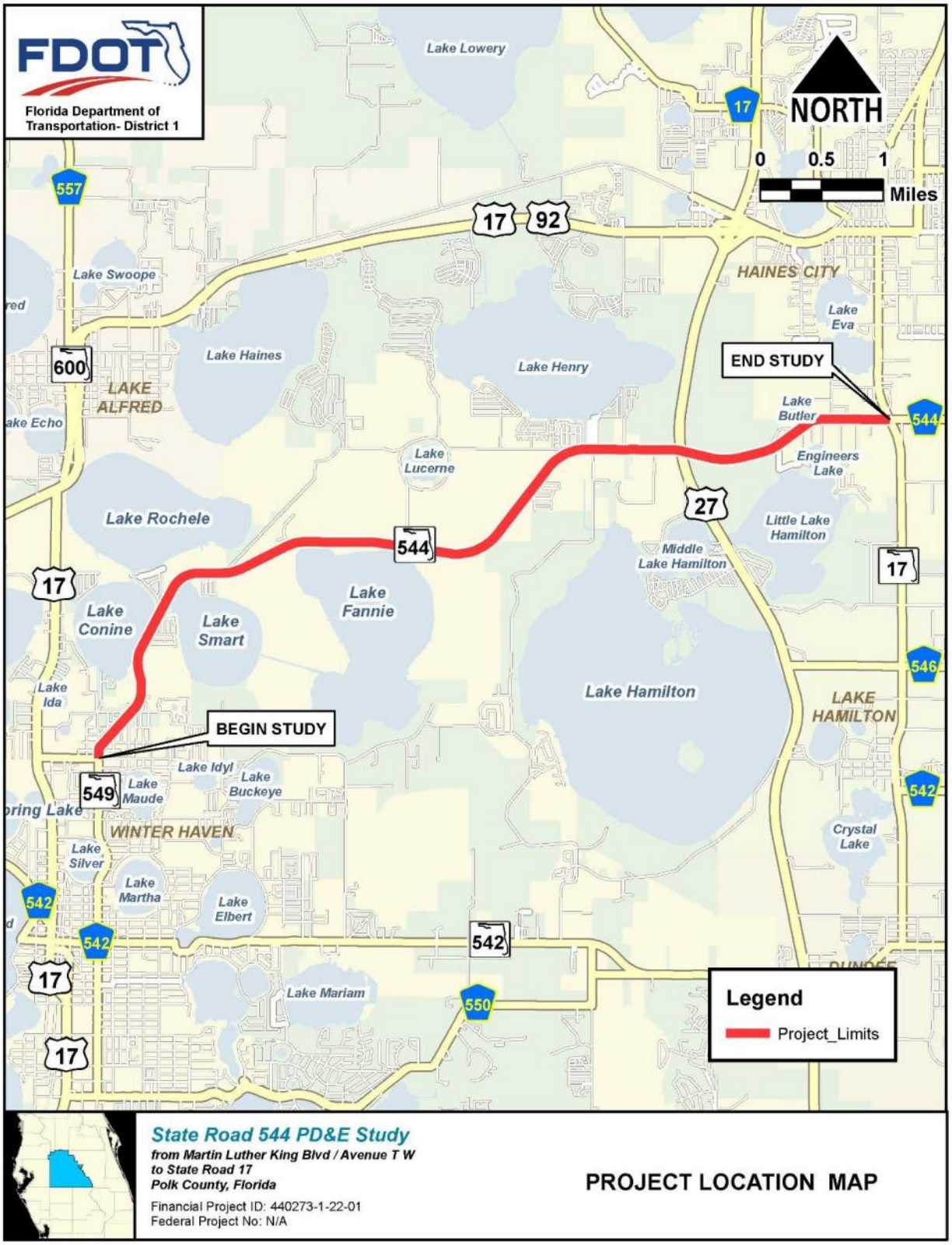
This project involves capacity and multi-modal improvements to SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County, a length of 7.96 miles. The project location map is provided as **Figure 1-1**. The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system; however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing right-of-way along SR 544 (Lucerne Park Road) ranges from 50 feet to 85 feet from Martin Luther King Boulevard to Avenue Y, 90 feet to 170 feet from Avenue Y to US 27, and 60 feet to 140 feet from US 27 to SR 17.

In addition to widening from two to four lanes, the proposed improvements may include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional right-of-way may be required depending on the proposed improvements and specific right-of-way requirements will be determined during this Project Development and Environment (PD&E) Study.

**Figure 1-1: Project Location**



## 1.1 Project Purpose and Need

The purpose of this project is to address roadway capacity deficiency along SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County to accommodate future travel demand as a result of projected population and employment growth in the area. Other goals of the project include enhancing mobility options and multi-modal access as well as supporting local economic development initiatives. The need for the project is based on the following criteria:

### 1.1.1 Improve Operational Conditions and Accommodate Projected Travel Demand

This project is anticipated to improve traffic operations along SR 544 (Lucerne Park Road) by increasing operational capacity to meet the projected travel demand as a result of Polk County population and employment growth and increased regional travel in the corridor.

The project segment occurs within two of the eight Polk County planning areas [Central Planning Area and East Planning Area] as depicted in Momentum 2040 [the Polk Transportation Planning Organization's (TPO) Long Range Transportation Plan (LRTP)]. Of the eight planning areas, the East Planning Area is expected to experience the highest increase in population growth between 2010 and 2040 with a 29% increase in single-family dwelling units and a 34% increase in multi-family dwelling units. The Central Planning Area is anticipated to experience the second highest increase in single family dwelling units (25% increase) during the same time period. Accordingly, the Central Planning Area will experience the highest increase in employment growth between 2010 and 2040 with a 42% increase in industrial employment, 34% increase in commercial employment, and a 32% increase in service employment. Likewise, the East Planning Area will experience the second highest increase in commercial employment (26% increase) and the third highest increase in service employment (21% increase) during the same time period. Countywide employment is expected to increase by 79% between 2010 and 2040. Growth within the project area may be attributed to the numerous developments that have been approved and continue to be approved by the City of Haines City.

The greater SR 544 corridor serves commuters of the area as it provides access to regional transportation facilities [including US 92, US 17, US 27, and SR 17] as well as residential and commercial hubs within central Polk County. The project segment of SR 544 (Lucerne Park Road) specifically facilitates local commuter traffic between the population and employment centers of Winter Haven and Haines City. Identified as a Secondary Freight Network Highway Corridor by the Polk TPO, SR 544 additionally serves as a freight distribution route as it connects to a Strategic Intermodal System (SIS) Highway Corridor [US 27], Regional Freight Network Highway Corridors as designated by the Polk TPO [US 92, US 27, and SR 17], and another designated Polk TPO Secondary Freight Network Highway Corridor [US 17]. Truck traffic composes between 7.0% and 9.9 % of the total daily traffic present along the project segment of SR 544 (Lucerne Park Road). As such, this roadway plays an important role in facilitating truck traffic and the distribution of goods to both local and regional destinations.

While the roadway currently operates at an acceptable LOS, conditions are anticipated to deteriorate below established standards if no improvements occur by 2040 as the roadway lacks the capacity to accommodate the projected travel demand. With the proposed improvement, the corridor is expected to continue to operate at acceptable LOS or improved LOS.

### 1.1.2 Enhance Mobility Options and Multi-Modal Access

Notable pedestrian and bicycle traffic in the corridor was observed in the field despite the fact that sidewalks and bicycle lanes are intermittent and disconnected along the corridor. In addition, a large transit dependent population is present, composed primarily of minority and low-income populations as well as housing units with no vehicle available. Compared to the demographic characteristics for Polk County, the project analysis area [which consists of United States census block groups within a 500-foot buffer surrounding the project] contains a significantly higher minority population percentage [20.1% higher], a higher percentage of housing units with no vehicle available [1.2% higher], and a notably lower median family income [$11,246 less]. This indicates a population with a higher propensity to walk, bike, or take transit to access essential services. The need for multi-modal options within the corridor is critical as growth in the area has created a latent demand for increased bicycle and pedestrian activity.

It should be noted that a portion of the project segment [from Ave T to Old Lucerne Park Road] is identified by the Polk TPO as a Future Complete Streets Corridor. A Complete Street is defined as a corridor that is designed to provide safe access and travel for all users [pedestrians, bicyclists, motorists, and transit riders] of all ages and abilities. Some of the treatments proposed as part of the Future Complete Streets Corridor have been applied to a section immediately south/adjacent to the project corridor [from Ave T to Ave O] and to the westernmost/southernmost section of the project segment [Ave T to Ave Y]. These treatments included the reconstruction of driveways to meet Americans with Disabilities Act (ADA) standards, the addition of pedestrian street lighting, and the construction of crosswalks on intersecting minor streets. New or enhanced sidewalks, landscaping, enhanced bus stops, improved signage, as well as a shared use path [Old Dixie Trail - ETDM Project #14328] are some of the additional improvements being considered/evaluated along the project corridor.

Overall, the proposed project is anticipated to meet the mobility needs of the area by alleviating future congestion on the corridor, providing multimodal travel options, and improving east-west access within east-central Polk County. The proposed bicycle and pedestrian facilities are to enhance multi-modal access and connections between community points of interest and to the regional trail network.

### 1.1.3 Support Economic Development

One Florida Opportunity Zone [formerly titled Florida Enterprise Zone] borders the northern portion of the project corridor from Old Lucerne Park Road to US 27. This program provides tax incentives for investments in low-income communities. In addition, the easternmost/northernmost section of the project corridor occurs within the Haines City Community Redevelopment Area. Further, the westernmost/ southernmost section of the project [Ave T to Ware Ave] occurs within the Florence Villa Community Redevelopment Area; the Winter Haven Community Redevelopment Agency fosters and promotes community redevelopment activities within this designated district of the City of Winter Haven. Community Redevelopment Areas are recognized as special districts under Florida Statute created to encourage investment within the district through a series of strategic and timely public investments; activities that occur within them are detailed in customized redevelopment plans and include: infrastructure improvements, streetscaping or beautification treatments, affordable housing, recreation and park facility improvements, economic development/redevelopment strategies, transportation improvements, and neighborhood enhancement.

The enhanced roadway operational conditions resulting from the project along with the bicycle and pedestrian facilities proposed for the corridor are intended to provide infrastructure to support commerce and customers as well as modal options to serve the Florida Opportunity Zone and other communities along the corridor. It will also renew the aesthetic appeal of the surrounding area, thereby stimulating economic growth/revitalization and investment in the adjacent communities. As such, the project aligns with the economic development initiatives of the proximate, local communities.

## 1.2 Alternatives Analysis Summary

In order to meet the Purpose and Need for the project, four-lane roadway typical sections were developed and discussed with FDOT District One's Planning Studio. It was decided that due to the high speeds along SR 544, on-road bicycle lanes would not be considered. Therefore, a single 4-lane divided roadway typical section was developed for a majority of the project that includes 12-foot-wide outside travel lanes and 11-foot wide inside travel lanes separated by a 22-foot raised median. 10-foot shared use paths would be provided along both sides of the road. However due to constrained right-of-way conditions and potential impacts to existing residences and businesses, additional typical sections were considered at each end of the project corridor.

Below is a summary of the roadway improvements considered for each evaluation segment and the intersection improvements considered for the nine study intersections.

### 1.2.1 Segment 1 – Martin Luther King Boulevard to North of Avenue Y

Four alternative typical sections were considered through this historic minority neighborhood including a two-lane urban typical, a three-lane urban typical, a four-lane undivided rural typical and a five-lane urban typical section. Due to impacts to dozens of residences, churches and businesses associated with the four lane and five lane typical sections, they were eliminated from consideration and this section of SR 544 is considered constrained by the Polk Transportation Planning Organization. The two-lane and three-lane typicals that were considered, include 8-foot-wide sidewalks along both sides of the road and raised median refuge areas at the mid-block crosswalk locations. These options were presented to the Florence Villa community at two separate neighborhood meetings and there was support for both alternatives.

### 1.2.2 Segments 2 through 7 – North of Avenue Y to LaVista Drive

For a majority of the corridor, from Avenue Y to LaVista Drive, the four-lane divided typical section described earlier was considered. Additional right-of-way would be needed to accommodate this typical section in most areas, so alternatives included widening to the north side of the road and to the south side of the road. Items affecting the comparison of north side vs. south side widening include planned development, publicly owned parks and recreation areas and a proposed Duke Energy transmission line that will be constructed adjacent to the SR 544 right-of-way in a new easement that Duke Energy is in the process of acquiring.

### 1.2.3 Segment 8 – LaVista Drive to SR 17

The proposed four lane divided typical section was considered in Segment 8 and alignments evaluated widening to the north, to the south, and centered widening. However, due to the large number of residential relocations that would result with any of these three options, two additional alternatives were considered. The first one considered maintaining the existing four-lane undivided roadway and adding eight-foot sidewalks along each

side of the road. The other option considered a four-lane divided roadway with a reduced median width and eight-foot wide sidewalks located at the back of curb on both sides of the road.

Nine project intersections were evaluated using FDOT's Intersection Control Evaluation (ICE) process.

### 1.2.4 Martin Luther King Boulevard intersection

The proposed improvements at the Martin Luther King Boulevard intersection include maintaining the existing traffic signal but adding a new southbound right turn lane at the intersection.

### 1.2.5 Avenue Y intersection

Several alternatives were considered for the Avenue Y intersection including a traffic signal and several roundabouts, including two mini-roundabout alternatives.

### 1.2.6 Old Lucerne Park Road (west end)

Intersection improvement options at the Old Lucerne Park Road (west end) included a traffic signal and a roundabout. However, due to residential impacts and access issues to some residences in the northwest and northeast quadrants, a concept to realign Old Lucerne Park Road (west end) to align with Vista Del Lago Drive was considered. Both a traffic signal and roundabout were considered for this new intersection.

### 1.2.7 Lucerne Loop Road intersection

Both a traffic signal and a roundabout were considered for this intersection.

### 1.2.8 Old Lucerne Park Road (east end)

Several alternatives were considered for the intersection of Old Lucerne Park Road with SR 544. In addition to the skew of Old Lucerne Park Road at the intersection, new developments are planned on the south side of SR 544 across from the intersection and in the northwest quadrant of the intersection. Both a traffic signal and roundabout were evaluated at this intersection.

### 1.2.9 Lake Hamilton Drive intersection

Several alternatives were considered for this intersection, but a traffic signal was considered as the only viable alternative. This option includes realigning the two internal roads for the developments on the north side of SR 544 so that they would intersect SR 544 at a single location for the north leg of the intersection. Also, the ICE process identified the signalized thru-cut option as a viable alternative.

### 1.2.10 Brenton Manor Avenue intersection

Because of the proximity of this intersection to the US 27 intersection with SR 544 and the two options that were found to be viable at the US 27 intersection, the intersection type at Brenton Manor Avenue is tied to the concepts considered at US 27. Both a roundabout (paired with the single point urban interchange at US 27) and a traffic signal (paired with the northwest quadrant roadway concept at US 27) were evaluated.

### 1.2.11 US 27 intersection

Two concepts were found to be viable for consideration at the US 27 intersection with SR 544. These include a quadrant roadway in the northwest quadrant of the intersection that would include an intersection at Brenton Manor Avenue (traffic signal) and a new intersection at US 27. The other viable option is a single point urban interchange.

### 1.2.12 SR 17 intersection

The only concept identified for the SR 17 intersection was a traffic signal. Only improvements on the west leg of the intersection would be involved.

## 1.3 Description of Preferred Alternative

Below is a summary of the preferred alternative for each roadway segment and intersection.

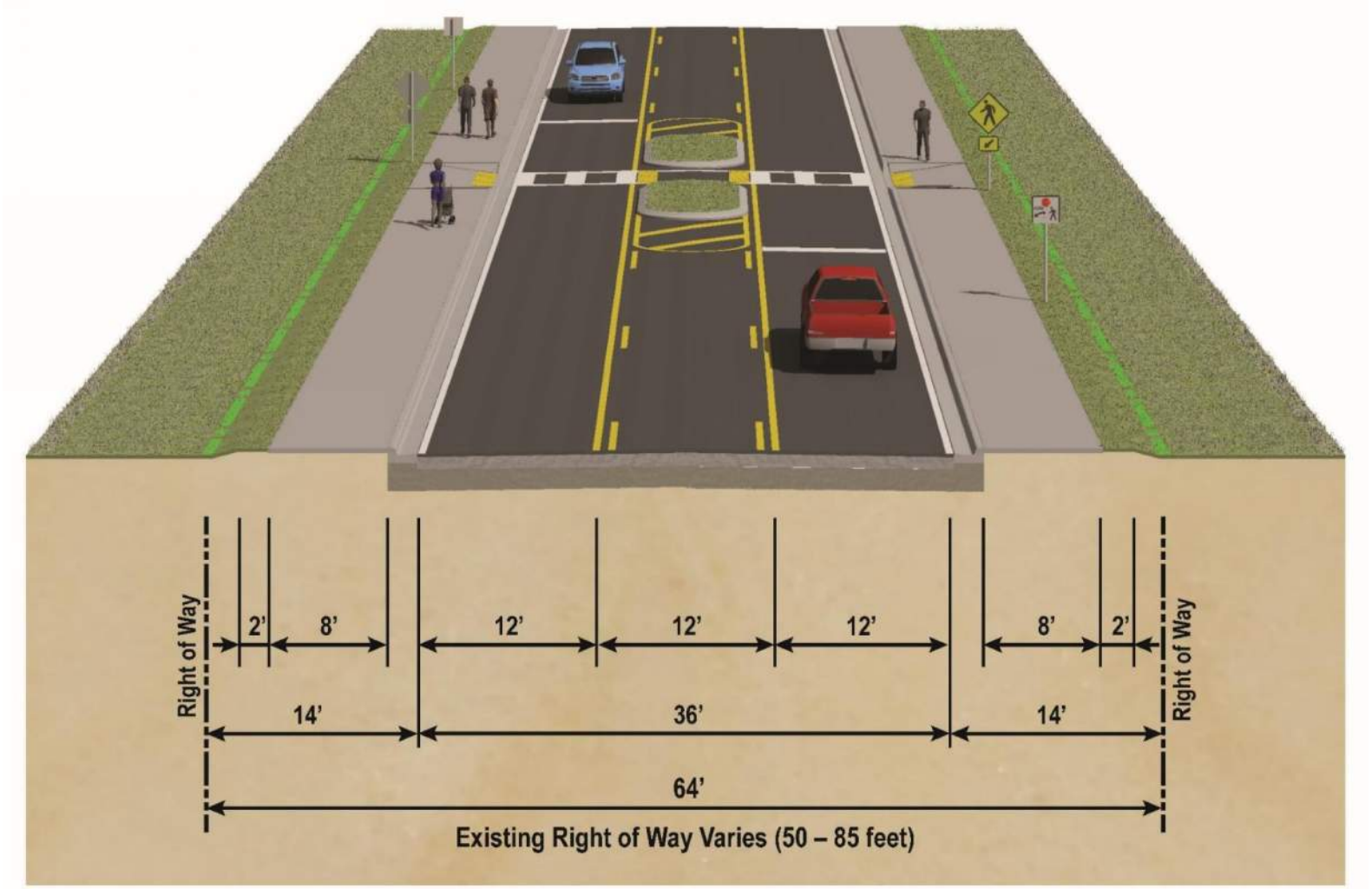
### 1.3.1 Segment 1 – Martin Luther King Boulevard to North of Avenue Y

The preferred typical section in Segment 1 is the three-lane typical section with a best fit alignment. It is slightly wider and will have minor right-of-way impacts (no residential relocations) than the two-lane alternative but will provide additional safety and capacity for turning vehicles with the center turn lane. Figure 1-2 illustrates this typical section.

The preferred improvement at the Martin Luther King Boulevard intersection is to maintain the existing traffic signal but add a new southbound right turn lane at the intersection. Improvements also include realigning the 1st Street NW intersection with SR 544 farther away from the Martin Luther King Boulevard intersection.

The mini-roundabout with the 90-foot inscribed diameter is recommended at Avenue Y. This concept will minimize impacts to the residences, businesses and church located at this intersection while providing an opportunity for an entrance feature to the historic Florence Villa neighborhood and speed control for vehicles entering the neighborhood.

**Figure 1-2: Segment 1 Preferred Typical Section**



### 1.3.2 Segment 2 – North of Avenue Y to East of Lake Conine Canal

The four-lane divided roadway is proposed with widening to the south side of the road. This alignment is recommended to avoid impacts to the Lake Conine Wetland Restoration Area and due to the proximity of the road to Lake Conine and wetlands along the lake. Figure 1-3 illustrates the proposed four-lane divided roadway typical section for Segments 2 through 7.

### 1.3.3 Segment 3 – East of Lake Conine Canal to East of Old Lucerne Park Road (west end)

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to existing residential developments on the south side of SR 544 and due to the proximity of the road to Lake Smart and wetlands along the lake.

The preferred concept at the Old Lucerne Park Road (west end) intersection is to realign Old Lucerne Park Road (west end) to align with Vista Del Lago Drive and to provide a roundabout at the intersection. The roundabout will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

### 1.3.4 Segment 4 – East of Old Lucerne Park Road (west end) to East of Lucerne Loop Road

The four-lane divided roadway is proposed with centered widening. The existing road right-of-way can accommodate the proposed four-lane divided roadway in this segment.

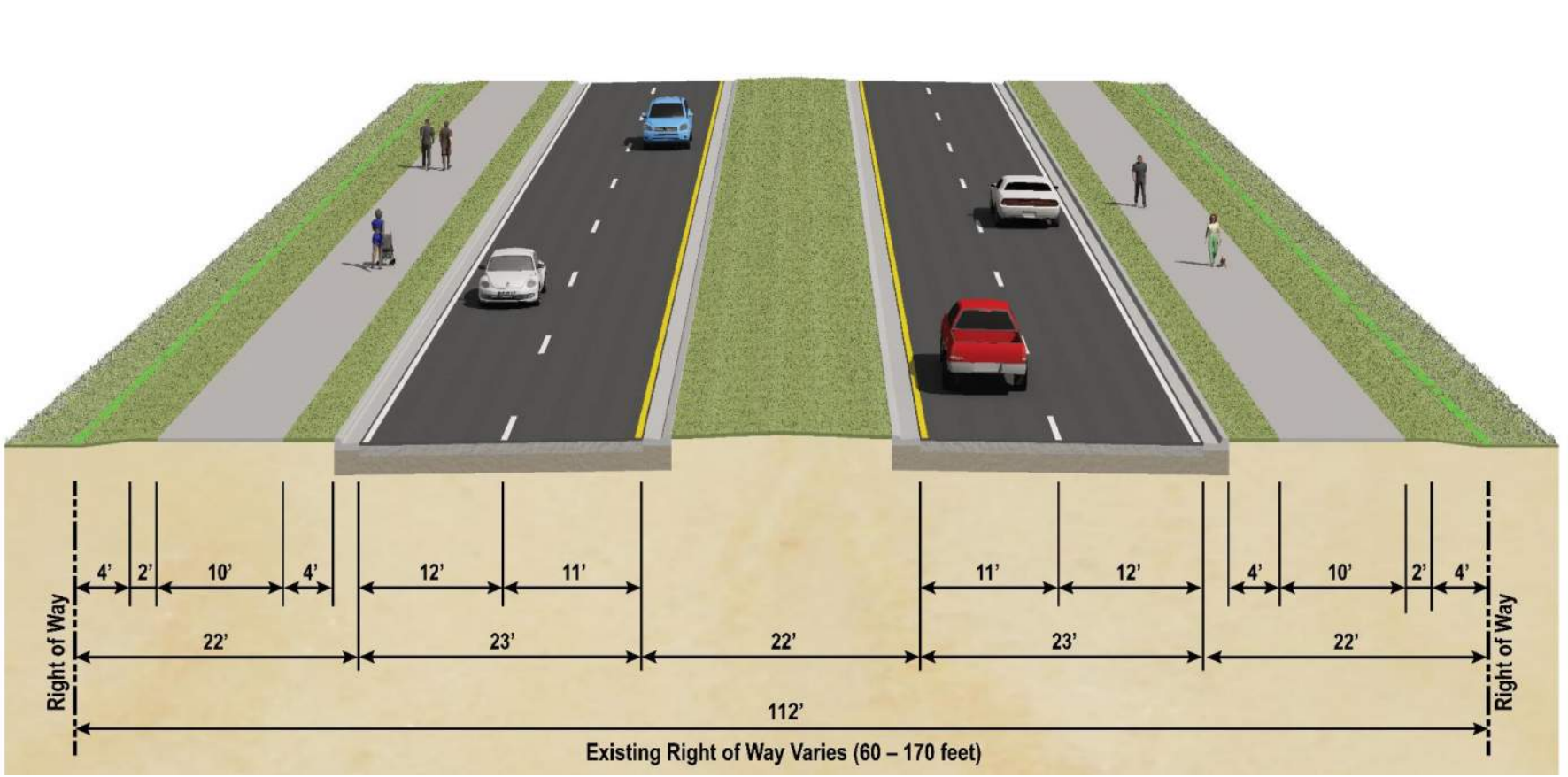
The preferred improvement at the Lucerne Loop Road intersection is the roundabout. It will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

### 1.3.5 Segment 5 – East of Lucerne Loop Road to East of Lake Hamilton Canal

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Lake Region Lakes Management District boat ramp on the south side of the road and also to avoid impacts to the proposed Duke Energy transmission easement/poles on the south side of the road.

The preferred improvement at the Old Lucerne Park Road (east end) intersection is the roundabout. It will help with speed control SR 544 and increase safety when compared to the traffic signal option at this skewed intersection.

**Figure 1-3: Segment 2 through Segment 7 Preferred Typical Section**



### 1.3.6 Segment 6 – East of Lake Hamilton Canal to West of Brenton Manor Avenue

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Duke Energy transmission easement/poles and existing commercial development on the south side of the road.

The signalized thru-cut alternative is recommended at the Lake Hamilton Drive intersection. This option includes realigning the two internal roads for the developments on the north side of SR 544 so that they intersect SR 544 in a single location (north leg of the intersection).

### 1.3.7 Segment 7 – West of Brenton Manor Avenue to LaVista Drive

The four-lane divided roadway is proposed with widening to the north side of the road west of US 27 and to the south side of the road east of US 27. This alignment is recommended to avoid impacts to Duke Energy transmission easement/poles that switch from the south side of the road to the north side of the road through the US 27 intersection.

The preferred intersection improvement at Brenton Manor Avenue is the roundabout. This intersection concept is paired with the recommended single point urban interchange at US 27.

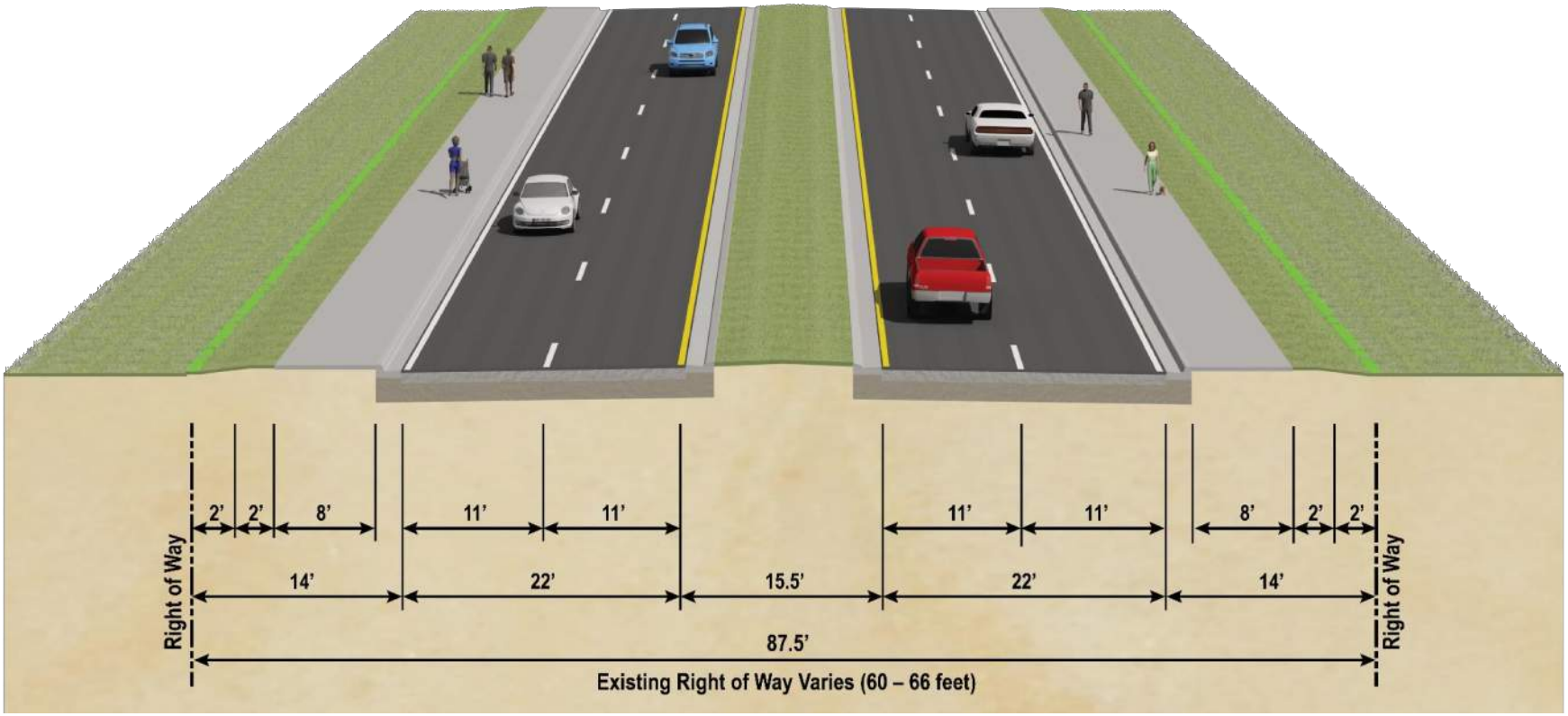
The single point urban interchange is the recommended improvement at the US 27 intersection due to the lower predicted life cycle crash costs with this concept compared to the northwest quadrant roadway with three signalized intersections.

### 1.3.8 Segment 8 – LaVista Drive to SR 17

The reduced four-lane divided roadway is proposed with centered widening through this segment. This alignment is recommended to minimize residential relocations through this segment of the project but providing access control with the raised median. Figure 1-4 illustrates this typical section.

The preferred concept for the SR 17 intersection is a traffic signal with only improvements to the west leg of the intersection.

**Figure 1-4: Segment 8 Preferred Typical Section**



# 2.0 Design Criteria

The design of the stormwater management facilities for the project is governed by the rules set forth by the SWFWMD, FDOT, Polk County, and Lake Region Lakes Management District, where applicable. Water treatment and attenuation requirements will comply with the guidelines as defined in Chapter 62-330 of the Florida Administrative Code (F.A.C) and the SWFWMD Environmental Resource Permit Applicant's Handbook (Volume II).

Wet detention and dry retention ponds will provide for water quality improvements as well as water quantity attenuation for the project runoff. The stormwater ponds are designed and sized for the most conservative typical section for each segment. Please refer to the sections below for the water quality, water quantity, and detention/retention pond facilities configuration criterion used for the project.

## 2.1 SWFWMD Criteria

- **Water Quality**:
  - Wet Detention Ponds: Treatment will be provided for one inch (1") over the Directly Connected Impervious Areas (DCIA) for alterations to existing public roadway projects.
    - An outfall control structure shall be designed to drawdown the system's treatment volume in no less than 120 hours (5 days) with no more than one half the total volume being discharged within the first 60 hours (2.5 days). Only that volume which drains below the overflow elevation within 36 hours may be counted as part of the volume required for water quantity storage.
  - Dry Retention Ponds: Treatment will be provided for one-half inch (0.5") over DCIA for alterations to existing public roadway projects.
    - The entire treatment volume is to be infiltrated within 72 hours after a storm event.

The project traverses three (3) Waterbody IDs (WBIDs) within SWFWMD: 1504B Lake Hamilton Drain, 1504 Lake Hamilton Outlet, and 1500A Lake Hamilton Canal. Additionally, the corridor is adjacent to or nearby six (6) WBIDs which ultimately receive runoff from SR 544: 1488U Lake Connie, 1488A Lake Smart, 14882 Lake Fannie, 15041 Lake Hamilton, 15002 Middle Lake Hamilton, and 15102 Lake Butler. According to the current FDEP 303(d) list of impaired water bodies, WBID 1488A Lake Smart is impaired for nutrients. Additionally, Lake Hamilton was recently delisted and now falls under the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see Section 5.2.2 for more information). Since the majority of the project outfalls to Lake Hamilton, nutrient loading analysis has been performed for the entirety of the project limits. Please refer to the **WBID Map**, **Figure 6** in **Appendix A** for more information.

- **Water Quantity**:
  - For a project or portion of a project located within an open drainage basin, the allowable discharge is:
    - Historic discharge, which is the peak rate at which runoff leaves the parcel of land by gravity under existing site conditions, or the legally allowable discharge at the time of permit application; or
    - Amounts determined in previous District permit actions relevant to the project.

Offsite discharges and peak stages for the existing and proposed conditions shall be computed using the SWFWMD's 25-year/24-hour rainfall maps and the Natural Resources Conservation Service (NRCS) Type II Florida Modified 24-hour rainfall distribution with and Antecedent Moisture Condition (AMC) II.

- For a project or portion of a project located within a closed drainage basin, the required retention volume shall be:
  - The post development runoff volume less the pre-development runoff volume

The runoff volume is computed using the SWFWMD's 100-year/24-hour rainfall map and the NRCS type II Florida Modified 24-hour rainfall distribution with an AMC II. The total post development volume leaving the site shall be no more than the total pre-development volume leaving the site for the design 100-year storm. The rate of runoff leaving the site shall not cause adverse offsite impacts. Maintenance of pre-development offsite low flow may be required in hydrologically sensitive areas.

- **Detention/Retention Pond Configuration**:
  - Littoral Zone – Manmade wet detention systems shall include a minimum of 35 percent littoral zone, concentrated at the outfall and shall be no deeper than 3.5 feet below the design overflow elevation.
  - Width – Wet detention water quality treatment systems shall be designed with a 100 feet minimum width for linear areas in excess of 200 feet length. Area and width requirements will be waived for projects to be operated by single owner entities, or entities with full time maintenance staffs (i.e. FDOT).
  - Depth – The detention facility shall not be excavated to a depth that breaches the aquitard such that it would allow for lesser quality water to pass, either way, between the two systems. In those geographical areas of the district where there is not an aquitard present, the depth of the pond shall not be excavated to within two feet of the underlying limestone which is part of a drinking water aquifer.
  - Side Slopes – All retention and detention facilities should have stabilized side slopes no steeper than 1V:4H out to a depth of two feet below the control elevation, unless for purposes of public safety, side slopes designed or permitted steeper than 1V:4H will require a six foot chain link fence or other protection sufficient to prevent accidental incursion into the retention or detention area.
  - Bottom Elevation – For wet detention systems, the bottom elevation of the pond must be at least one foot below the control elevation.
  - Maintenance Access – Perimeter maintenance and operation easements, with a minimum width of 20 feet and slopes no steeper than 1V:4H, should be provided landward of the control elevation water line. Widths less than 20 feet are allowed when it can be demonstrated that equipment can enter and perform the necessary maintenance for the system.

## 2.2 FDOT Criteria

- **Water Quality**: That which is specified in Section 2.1 above.
- **Water Quantity**: Critical Duration as defined by Chapter 14-86 F.A.C.
  - Open Basins:

- Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the critical duration (1-hour through 3-day) storm and up to the 100-year storm. This applies only to basins subject to historical flooding.

– Closed Basins:
  - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the critical duration (1-hour through 10-day) storm and up to the 100-year storm.
  - The retention volume must recover at a rate such that one-half of the volume is available in seven days, with the total volume available in 30 days.

- **Detention/Retention Pond Configuration**:
  – Maintenance Berm: Provide a minimum 20 feet of horizontal clearance between the top edge of the control elevation and the right-of-way line. Provide at least 15 feet adjacent to the pond at a slope of 1:8 or flatter. Create the inside edge of the maintenance berm to have a minimum radius of 30 feet and be a minimum of one foot above the maximum design stage elevation.
  – Freeboard: Provide at least one foot of clearance between the maximum design stage of the pond and the inside edge of the berm. For linear treatment swales, the minimum freeboard is 0.5 foot.
  – Side Slopes: Provide a slope of 1V:4H or flatter. Install fences around ponds only when a documented maintenance need for restricted access has been demonstrated (Section 5.4.4.2 from the FDOT Drainage Manual) or when pond side slopes above the normal water level are steeper than 1V:4H and are unavoidable. A design variation is required to install fences around stormwater management facilities.
  – Permanent (Normal) Pool Depth: For facilities designed to be wet, provide a minimum permanent pool depth of six feet to minimize aquatic growth.

## 2.3 Polk County Criteria

- **Water Quality**: That which is specified in Section 2.1 above.
- **Water Quantity**:
  – Open Basins:
    - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the 25-year/24-hour storm.
  – Closed Basins:
    - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the 100-year/24-hour storm.
- **Detention/Retention Pond Configuration**:
  – Maintenance Berm: Provide a “sufficient” easement, with slopes no steeper than 1V:4H around stormwater management systems for proper operation and maintenance.

# 3.0 Data Collection

The design team collected and reviewed data from the following sources:

- FDOT Drainage Manual, January 2023
- FDOT Drainage Design Guide, January 2023
- Polk County Land Development Code – Chapter 7, Section 740 (July 2023)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel Nos. 12105C0365G, 12105C0355G, 12105C0358G, 12105C0359G, and 12105C0380G for Polk County, dated 12/22/2016
- United States Geological Survey (USGS) Quadrangle Maps
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soils Survey of Polk County, FL (Current)
- Field Reconnaissance (July 2020)
- Existing Permit Databases (SWFWMD)
- 1-ft LIDAR Data Source: United States Geological Survey (USGS) 2018-2020
- Lake Hamilton Chain of Lakes Pollutant Reduction Plan (2010)
- FDOT Straight Line Diagram (August 2021)

# 4.0 Existing Drainage Conditions

## 4.1 Topography & Hydrologic Features

Topography along the project is generally hilly with flat areas surrounding the water bodies. Existing ground elevations vary between 125 feet and 220 feet along the roadway corridor, with the highest elevations occurring at the beginning and end of the project limits. All elevations mentioned in this report are in reference to the North American Vertical Datum of 1988 (NAVD) unless otherwise stated. Where information was available only in the National Geodetic Vertical Datum of 1929 (NGVD), it was converted to NAVD using the conversion NAVD = NGVD – 0.88 feet. Please refer to the **USGS Quadrangle Map**, **Figure 2** in **Appendix A**. SR 544 does not traverse any OFWs. It traverses three (3) different water body IDs (WBIDs) and ultimately outfalls to an additional six (6) nearby WBIDs, which have all been reviewed for impairments. Please refer to **Table 4-1: Summary of WBIDs and Impairments** for more information. Please refer to the **WBID Map**, **Figure 6** in **Appendix A**. There are seventeen (17) existing cross drains underneath SR 544 and one (1) bridge within the project limits allowing for conveyance of offsite and onsite runoff to flow beneath the road toward its historical path. The cross drains include two major conveyances – one 12'x12' concrete box culvert that is traversed by boat traffic and one 26' wide bridge culvert. The size and geometry of all cross drains and bridges have been estimated from the FDOT straight line diagram (dated 8/23/2021), 1-foot LiDAR contours, existing plans, and during field reconnaissance but should be verified during design. Please refer to **Table 4-2** for a **Summary of Existing Cross Drains and Bridges.**

**Table 4-1: Summary of WBIDs and Impairments**

| WBID | Waterbody Name | Impaired | Limiting Nutrients |
|---|---|---|---|
| 1504B | Lake Hamilton Drain | No | N/A |
| 1488U | Lake Conine | No | N/A |
| 1488A | Lake Smart | Yes | TN |
| 14882 | Lake Fannie | No | N/A |
| 1504 | Lake Hamilton Outlet | No | N/A |
| 15041 | Lake Hamilton | Yes* | N/A |
| 1500A | Lake Hamilton Canal | No | N/A |
| 15002 | Middle Lake Hamilton | No | N/A |
| 15102 | Lake Butler | No | N/A |

*Lake Hamilton was delisted from the Comprehensive Verified List in the 2020-2022 delist cycle due to ongoing restoration activities of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan.

**Table 4-2: Summary of Existing Cross Drains and Bridges**

| Structure No. | Station | Description | Remarks |
|---|---|---|---|
| CD-1 | 35+67 | Single 36" RCP | |
| CD-2 | 46+53 | Single 36" RCP | |
| CD-3 | 61+81 | Single 30" RCP | |
| CD-4 | 70+74 | Single 24" RCP | |
| CD-5 | 75+15 | 12' x 12' CBC | Canal connecting Lake Smart to Lake Conine |
| CD-6 | 86+68 | Single 30" RCP | |
| CD-7 | 120+14 | Double 30" RCP | |
| CD-8 | 133+61 | Single 36" RCP | |
| CD-9 | 154+93 | Single 54" RCP | |
| CD-10 | 183+65 | Single 36" RCP | |
| CD-11 | 187+13 | Single 48" RCP | |
| CD-12 | 233+56 | Single 36" RCP | |
| CD-13 | 252+10 | Triple 24" RCP | |
| Bridge | 289+31 | 100' Bridge | Lake Henry Canal |
| CD-14 | 296+21 | Single 30" RCP | |
| CD-15 | 348+10 | 26' Bridge Culvert | Lake Hamilton Creek |
| CD-16 | 365+13 | Single 30" RCP | |
| CD-17 | 389+17 | Single 15" RCP | |

## 4.2 Soils Data and Geotechnical Investigations

The soil survey of Polk County, Florida (dated 2020) published by the USDA NRCS has been reviewed within the project vicinity. USDA Soil Survey Geographic database (SSURGO) data was also obtained from NRCS to create a soils map for the project limits using GIS ArcMap. The soil survey map for the project vicinity is illustrated in **Figure 3** of **Appendix A.**

The soils encountered along the project limits are within Hydrologic Soil Groups (HSG) A, A/D, B/D, C, and C/D. Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sand or gravel and have a high rate of water transmission. Group B soils have moderately low runoff potential when thoroughly wetted. They consist chiefly of sandy soils with loam, silt, or sandy clay loam. Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission. If a soil is assigned to a dual HSG, the first letter is for drained areas and the second is for un-drained areas. Soils are only assigned a dual class if they are group D in their natural condition. According to the Soil Survey, there are 24 different soil types located along the project limits within Polk County. **Table 4-3 – USDA NRCS Soil Survey Information for Polk County** summarizes and lists the soil types and relevant

information. The ground water depth varies from +2 feet above the ground to >6 feet below the ground, along the project.

**Table 4-3: USDA NRCS Soil Survey Information for Polk County**

| Soil No. | USDA Soil Name | Seasonal High Ground Water | | HSG | Soil Classification | | |
|---|---|---|---|---|---|---|---|
| | | Depth* (feet) | Duration (months) | | Depth (inches) | Unified | AASHTO |
| 3 | Candler sand | >6.0 | --- | A | 0-6 | SP-SM, SP | A-3 |
| | | | | | 6-63 | SP-SM, SP | A-2-3, A-3 |
| | | | | | 63-80 | SP-SM | A-2-4, A-3 |
| 7 | Pomona fine sand | 0.5-1.5, 0.0-1.0 | --- | A/D | 0-6 | SP-SM, SP | A-2-4, A-3 |
| | | | | | 6-21 | SP-SM, SP | A-2-4, A-3 |
| | | | | | 21-26 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 26-48 | SP-SM, SP | A-2-4, A-3 |
| | | | | | 48-73 | SC-SM, SC, SM | A-2, A-4, A-6 |
| | | | | | 73-80 | SP-SM, SM | A-2-4, A-3 |
| 13 | Samsula muck | +2.0-0.0 | --- | A/D | 0-24 | PT | A-8 |
| | | | | | 24-32 | PT | A-8 |
| | | | | | 32-35 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 35-44 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 44-80 | SP-SM, SM | A-2-4, A-3 |
| 14 | Sparr sand | 1.5-3.5 | --- | A/D | 0-8 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 8-57 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 57-80 | SC-SM, SC | A-2-4, A-2-6, A-7-6 |
| 15 | Tavares fine sand | 3.5-6.0 | --- | A | 0-5 | SP-SM, SP | A-2-4, A-3 |
| | | | | | 5-80 | SP-SM, SP, SM | A-2-4, A-3 |
| 16 | Urban land | --- | --- | --- | | | |
| 17 | Smyrna and Myakka fine sands | 0.5-1.5, 0.0-1.0 | --- | A/D | 0-7 | SP-SM, SP | A-3 |
| | | | | | 7-25 | SP-SM, SP | A-3 |
| | | | | | 25-36 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 36-80 | SP-SM, SP | A-3 |
| 21 | Immokalee sand | 0.5-1.5, 0.0-1.0 | --- | B/D | 0-7 | SP-SM, SP | A-3 |
| | | | | | 7-39 | SP-SM, SP | A-3 |
| | | | | | 39-58 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 58-66 | SP-SM, SP | A-3 |
| | | | | | 66-80 | SP-SM, SM | A-2-4, A-3 |
| 23 | Ona-Ona, wet, fine sand | 0.5-1.5, 0.0-1.5 | --- | B/D | 0-9 | SP-SM, SP | A-3 |
| | | | | | 9-16 | SP-SM, SM | A-2-4 |
| | | | | | 16-80 | SP-SM, SM | A-2-4, A-3 |
| 25 | Placid and Myakka fine sands | +2.0-0.0 | --- | A/D | 0-18 | SP-SM, SM, SP | A-2-4, A-3 |
| | | | | | 18-80 | SP-SM, SM, SP | A-2-4, A-3 |
| 26 | Lochloosa fine sand | 2.5-5.0 | --- | C | 0-6 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 6-36 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 36-65 | SC-SM, SC | A-2-6, A-4, A-6 |
| | | | | | 65-80 | SC-SM, SC | A-2-6 A-4, A-6 |
| 30 | Pompano fine sand | 0.0-0.5 | --- | A/D | 0-15 | SP-SM, SP | A-3 |
| | | | | | 15-80 | SP-SM, SP | A-3 |

| Soil No. | USDA Soil Name | Seasonal High Ground Water | | HSG | Soil Classification | | |
|---|---|---|---|---|---|---|---|
| | | Depth* (feet) | Duration (months) | | Depth (inches) | Unified | AASHTO |
| 31 | Adamsville fine sand | 1.5-3.5 | --- | A/D | 0-7 | SP-SM, SM, SP | A-2-4, A-3 |
| | | | | | 7-20 | SP-SM, SM, SP | A-2-4, A-3 |
| | | | | | 20-80 | SP-SM, SM, SP | A-2-4, A-3 |
| 32 | Kaliga muck | +2.0-0.0 | --- | C/D | 0-25 | PT | A-8 |
| | | | | | 25-35 | SC, SM | A-2-4, A-4, A-7-6 |
| | | | | | 35-60 | CL, SC-SM | A-4, A-6 |
| | | | | | 60-80 | CL, SC, SM | A-4, A-6 |
| 35 | Hontoon muck | +2.0-0.0 | --- | A/D | 0-75 | PT | A-8 |
| | | | | | 75-80 | SC-SM, SC, SM | A-2-4, A-6 |
| 36 | Basinger mucky fine sand | +2.0-0.0 | --- | A/D | 0-7 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 7-19 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 19-39 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 39-80 | SP-SM, SM | A-2-4, A-3 |
| 40 | Wauchula fine sand | 0.5-1.5, 0.0-1.0 | --- | C/D | 0-7 | SP-SM | A-2-4, A-3 |
| | | | | | 7-18 | SP-SM | A-3, A-2-4 |
| | | | | | 18-26 | SP-SM, SM | A-2-4, A-4 |
| | | | | | 26-33 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 33-70 | SC-SM, SC, SM | A-2-4, A-2-6, A-4, A-6 |
| | | | | | 70-80 | SC-SM, SC | A-2-4, A-2-6 |
| 42 | Felda fine sand | 0.0-1.0 | --- | A/D | 0-5 | SP-SM, SP | A-3 |
| | | | | | 5-22 | SP-SM, SP | A-3 |
| | | | | | 22-50 | SC-SM, SC, SM | A-2-4, A-2-6 |
| | | | | | 50-80 | SP-SM, SP | A-2-4, A-2-6 |
| 47 | Zolfo fine sand | 1.5-3.5 | --- | A | 0-5 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 5-59 | SP-SM, SM | A-2-4, A-3 |
| | | | | | 59-80 | SP-SM, SM | A-2-4, A-3 |
| 49 | Adamsville-Urban Land complex | 2.0-3.5 | --- | A | 0-6 | SP-SM | A-2-4, A-3 |
| | | | | | 6-80 | SP-SM, SP | A-2-4, A-3 |
| 50 | Candler-Urban Land complex | >6.0 | --- | A | 0-6 | SP-SM, SP | A-3 |
| | | | | | 6-63 | SP-SM, SP | A-3 |
| | | | | | 63-80 | SP-SM | A-2-4, A-3 |
| 59 | Arents-Urban Land complex | 1.5-3.0 | --- | A | 0-80 | SP-SM, SP | A-2-4, A-3 |
| 63 | Tavares-Urban Land complex | 3.5-6.0 | --- | A | 0-8 | SP-SM, SP | A-3 |
| | | | | | 8-80 | SP-SM, SP | A-3 |
| 76 | Millhopper fine sand | 3.5-6.5 | --- | A | 0-7 | SP-SM, SM | A-2-4 |
| | | | | | 7-59 | SC-SM, SP-SM, SM | A-2-4 |
| | | | | | 59-64 | CL, SC | A-2-4, A-6 |
| | | | | | 64-80 | CL, SC | A-7-6, A-6 |

*Seasonal High Ground Water Table: Depth is referenced below existing grade, except where indicated as "+".

### 4.2.1 Contamination Screening

Contamination Screening was conducted by AIM. As a result of the contamination screening evaluation, 39 sites have been assigned Contamination Risk Potential Ratings (CRPR). The CRPR rating system was developed by FDOT and incorporates four levels of risk: No, Low, Medium, and High. Of the 39 sites, 30 were identified as Low/No

Risk, 6 as Medium Risk, and 3 as High Risk sites. High Risk sites were identified near pond sites 1A and 7 and Medium Risk sites were identified near pond sites 1 and 10. All other pond sites are Low/No risk for contamination.

The sites, business operations and/or facilities identified, to date, and the risk rankings given to them are preliminary. It should be understood that these risk rankings may change pending receipt of information which indicates a discharge occurred on-site or in nearby surrounding areas. Variables that may change the risk ranking include a facility's non-compliance to environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change, additional assessment of the facilities should be conducted.

For any sites with a risk ranking of "Medium" or "High", Level II field screening should be conducted if it is determined during the project's design that construction activities could be within their vicinity. Please refer to **Appendix I - Contamination Screening Evaluation Report** for relevant excerpts from the CSER.

## 4.3 Environmental Characteristics

### 4.3.1 Land Use Data

The project corridor is predominately residential, commercial, and industrial with higher density urban areas located near the project beginning and end. Areas of undeveloped forest and wetland, agriculture, and open lakes are also present along the corridor. Several major trucking facilities existing along the corridor including a Walmart Distribution Center and the Century Commercial truck parking facility. Please see **Figures 4A and 4B** for the **Existing and Proposed Land Use Maps** in **Appendix A**. The widening of SR 544 does not alter the existing or future land uses in the area.

### 4.3.2 Cultural Features

A Phase I cultural resource assessment survey (CRAS) has been conducted by Archaeological Consultants, Inc. The Area of Potential Effects (APE) was defined to include footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200 feet of the existing right-of-way were identified. Additionally, the historical APE included resources with 100 feet of the proposed pond sites. The archaeological survey consisted of systematic shovel testing and pedestrian survey of the project corridor and pond footprints (i.e., the archaeological APE). A total of 84 shovel tests were conducted within the pond sites and 134 shovel tests were conducted within the project corridor. No Pre-Contact period or historic archaeological sites were discovered.

The architectural survey resulted in the identification and evaluation of 108 historic resources within the SR 544 APE, of which three are located within the pond site footprints. Resource 8PO05391 (Peace Creek Drainage Canal) is located within Pond 5, 8PO10054 (1966 Frame Vernacular style building) is located adjacent to Pond 5, and 8PO10075 (1974 Masonry Vernacular style building) is located adjacent to Pond 6. All three resources appear ineligible for listing in the National Register of Historic Places (NRHP).

The CRAS narrative is located in **Appendix G**.

### 4.3.3 Natural and Biological Features

The proposed project has potential to involve several State and/or Federally listed protected wildlife species. These species and their anticipated involvement are identified in the Natural Resources Evaluation Report located in Appendix H.

The project corridor was evaluated for the presence of potentially occurring protected species. A species-specific survey was conducted for the Audubon's crested caracara, during which no caracara were observed. The preferred alternative "may affect, but is not likely to adversely affect" the continued existence of the caracara. Due to the lack of suitable habitat or defined conservation measures for the species, the preferred alternative "may affect, but is not likely to adversely affect" the continued existence of the eastern black rail, eastern indigo snake, Everglade snail kite, wood stork, and federally protected plant species. Full acoustic and roost surveys were conducted to determine Florida bonneted bat activity within the study corridor. No evidence of roosting or foraging was detected and the project is therefore anticipated to have "no effect" on the Florida bonneted bat. The project is also considered to have "no effect" on the Florida grasshopper sparrow and Florida scrub-jay. The project "may affect and is likely to adversely affect" the sand skink and blue-tailed mole skink until a species-specific survey has been completed. "No adverse effect is anticipated" for state listed species including the Florida burrowing owl, Florida pine snake, Florida sandhill crane, gopher tortoise, short-tailed snake, southeastern American kestrel, imperiled wading birds, and state listed plant species.

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area. A wetland assessment was performed for these wetlands and other surface waters in accordance with the Uniform Mitigation Assessment Method (UMAM) as described in Chapter 62-345, FAC to determine the functional value provided by the wetlands and other surface waters. Other surface waters classified as upland cut ditches and permitted reservoirs were included in the assessment; however, mitigation will not be required for impacts to these other surface waters. Based on the wetland assessment, approximately 8.66 acres of direct impacts to wetlands are associated with the preferred alternative. Direct wetland impacts of 3.86 acres are associated with the preferred pond alternatives and floodplain compensation sites.

## 4.4 Floodplains/Floodways

According to the Federal Emergency Management Agency (FEMA), the relevant Flood Insurance Rate Map (FIRM) panel numbers are 12105C0365G, 12105C0355G, 12105C0358G, 1210C0359G, and 12105C380G, dated 12/22/2016.

According to the FEMA FIRMs, portions the project intersect Zone AE of the 100-year floodplain. These areas are associated with the various lakes in the region and have a 1% probability of flooding every year. Predicted flood water elevations range from 124.2 FT to 132.2 FT NAVD across the project limits, varying by lake. There are no federally regulated floodways within the project limits. Please refer to **Appendix A – Figure 5** for the **FEMA Floodplains Map**.

### 4.4.1 Flooding History and Maintenance Concern

A flooding complaint was identified by FDOT near SR 544, immediately east of the Lake Henry Canal. The complaint was logged by residents of the adjacent Lakeside Ranch Estates mobile home community who reported flooding issues on their properties. FDOT investigated the complaint and determined that the issues were a result of poor

maintenance of the drainage along SR 544 and the associated outfall ditch. On the north side of SR 544, there is a depressional area that collects water from SR 544 via an open ditch system and a cross drain underneath SR 544 (CD-14). Note, this depressional area is not a permitted stormwater pond and is recommended to be utilized and expanded as the Pond 6 site. An outfall ditch exists between the depressional area and Lake Henry to the north and is intended to allow the depression to overflow into the lake when needed. However, FDOT determined that lack of maintenance through this area is preventing the outfall from performing and causing stormwater to instead stage up into adjacent properties. A resolution to this issue has not been documented. The original flooding investigation document is located in **Appendix K – Correspondence**.

## 4.5 Existing Drainage Permits

There are currently fifty-two (52) SWFWMD permits within the project limits that are adjacent to or along SR 544 and may be impacted by the proposed improvements. The sections below briefly describe the permitted condition and the impacts to the permit associated with the proposed improvements. Generally, permits are listed in order from the beginning of the project to the end (west to east).

### 4.5.1 Permit No. 13706.001

This permit was issued in 2002 for the resurfacing of SR 544 from north of Avenue Y to west of US 27. The project also includes extension of several cross drains. All improvements associated with this permit will be impacted by the proposed SR 544 widening. This permit was used to collect cross drain data. Relevant information from this permit can be found in **Appendix F**.

### 4.5.2 Permit No. 8491.000 and 8491.001

These permits were issued in 1990 and 2007 for the construction of a church building with associated parking at the northwest corner of the intersection of Avenue Y and SR 544. Both permits are marked as deleted in the SWFWMD system; however, it appears that at least the building was constructed at some point between 1990 and 2007. It is unclear whether the permitted retention pond, located near the back of the parcel, was ever constructed. The widening of SR 544 is anticipated to impact a portion of the church parcel including a conveyance ditch that drains from Avenue Y.

### 4.5.3 Permit No. 40341.000 and 40341.001

These permits were issued in 2011 and 2017 for the construction of the Lake Conine Treatment Wetland, a Polk County Parks project, providing regional stormwater treatment improvements on the south side of Lake Conine. This project was discussed with SWFWMD as a potential opportunity for joint-use, but SWFWMD indicated that the treatment system does not have any additional capacity or credits to be used for SR 544. See **Section 6.0** for more information. It is not anticipated that this permit will be impacted by the widening of SR 544.

### 4.5.4 Permit No. 18182.000

This permit was issued in 1998 for the expansion of the Pentecostal Church of God in Winter Haven including an additional building, parking area, and dry retention pond. The site also has a previously constructed dry retention pond at the front of the parcel that serves the original buildings and parking area, for which no permit was found. The widening of SR 544 is not anticipated to impact the newer pond but is likely to impact the original ponds.

### 4.5.5 Permit No. 43213.000

This permit was issued in 2018 for the construction of the Lake Smart Properties single-family residential development. The proposed development will have two dry retention ponds, one of which is located adjacent to SR 544. There may be minor impacts to this pond – and therefore the permit – associated with the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

### 4.5.6 Permit No. 9134.000

This permit was issued in 1991 for the Winter Ridge Condominium Complex and associated roads and facilities. The project area is served by a wet detention pond located along the western and northern property lines and adjacent to both the SR 544 right-of-way and the canal that connects Lake Smart and Lake Conine. This pond will likely be impacted to some extent by the widening of SR 544 as well as potential box culvert extension or replacement in the canal. Relevant information from this permit can be found in **Appendix F**.

### 4.5.7 Permit No. 29579.000

This permit was issued in 2006 for The Rock of Winter Haven's Lake Rochelle Landing residential development. The permit was deleted and the project was never constructed; however, surveyed information in the plans was used to collect cross drain data.

### 4.5.8 Permit No. 25800.000 and 25800.001

These permits were issued in 2004 and 2005, respectively, for Lake Rochelle Estates single-family residential development and associated improvements to SR 544 for the addition of a turn lane. The project area is served by three dry retention ponds, two of which will be likely impacted by the widening of SR 544. The two ponds, Ponds 1A and 1B, also discharge into the SR 544 right-of-way via a control structure located in Pond 1B. Additionally, the SR 544 improvements under Permit 25800.001 will be impacted. Relevant information from these permits can be found in **Appendix F**.

### 4.5.9 Permit No. 32476.001

This permit was issued in 2022 for the Water's Edge single-family residential development. This permit replaces a former expired permit on the same site under the name Blue Lake (32476.000). The project area is served by two dry retention ponds located adjacent to Lake Rochelle. It is not anticipated that this permit will be impacted by the widening of SR 544. A separate permit is anticipated (but has not been filed) for a new turn lane on SR 544. This permit will be impacted by the widening of SR 544.

### 4.5.10 Permit No. 28977.000

This permit was issued in 2006 for the Lake Smart Estates residential development. The project area is served by two wet detention ponds, which are not expected to be impacted by the widening of SR 544.

### 4.5.11 Permit No. 23595.000

This permit was issued in 2002 for the Villas at Lake Smart residential development including the construction of Vista Del Lago Drive for access. At the intersection of Vista Del Lago Drive and SR 544, a roundabout is proposed

which may impact permitted stormwater collection systems. The ponds associated with Villas at Lake Smart are not expected to be impacted. This permit was used to collect cross drain information.

### 4.5.12 Permit No. 29879.000

This permit was issued in 2006 for the Willowbrook residential development surrounding an existing golf course. The permit has been modified several times for subsequent project phases, however it does not appear that any phases have begun construction. The widening of SR 544 may result in intersection improvements that impact this permit if the project is constructed prior to the SR 544 project.

### 4.5.13 Permit No. 3144.000

This permit was issued in 1988 for Phases I & II of the Winter Haven Industrial Park. This permit has a total of 17 revisions to date, most recently in 2017. The project area is served by several ponds that were constructed over multiple phases and are not anticipated to be impacted by the widening of SR 544.

### 4.5.14 Permit No. 3368.000

This permit was issued in 1988 and amended in 1992 for Phase II of Sandpiper Sales, part of the Winter Haven Industrial Park. The project area is served by two ponds which are not expected to be impacted by the widening of SR 544.

### 4.5.15 Permit No. 17984.000

This permit was issued in 1998 for the construction of the Lucerne Fire Station for the City of Winter Haven. The project area is served by one retention pond that is not anticipated to impacted by the widening of SR 544. This permit was used for the collection of cross drain data.

### 4.5.16 Permit No. 45207.000

This permit was issued in 2021 for PB of Central FL. The project area is served by three dry retention ponds which are not expected to be impacted by the widening of SR 544.

### 4.5.17 Permit No. 43262.001

This permit was issued in 2022 for the construction of “Keep it Safe” Storage. The project area consists of a building, parking area, wet detention pond and floodplain compensation area. Impacts to this permit, including the buildings and pond, are anticipated due to the widening of SR 544 and proposed roundabout at this intersection. Relevant information from this permit can be found in **Appendix F**.

### 4.5.18 Permit No. 8506.000

This general permit was issued in 1990 for TECO Substation at Lucerne Park by the Tampa Electric Company. No documents are available for this permit. The parcel is likely to be slightly impacted by the proposed roundabout at this intersection but it does not appear that any on-site stormwater systems will be impacted.

### 4.5.19 Permit No. 7726.000

This general permit was issued in 1990 for the initial construction of Lucerne Loop Road by the City of Winter Haven. There are no documents available for this permit, but the intersection at SR 544 was amended under Permit No. 13706.001 (see below) which is anticipated to be impacted by the widening of SR 544.

### 4.5.20 Permit No. 13706.000 and 13706.003

These permits were issued in 1995 and 2008, respectively, for improvements at the intersection of SR 544 and Lucerne Loop Road. The first permit includes construction of a stormwater pond at the northeast corner of this intersection and the second permit modifies the pond slightly. It is anticipated that this pond, and therefore these permits, will be impacted by the widening of SR 544 and the proposed roundabout at this intersection. However, the parcel on which the pond sits has additional space available and the pond can be reshaped to maintain its current capacity. Relevant information from Permit No. 13706.003 can be found in **Appendix F**.

### 4.5.21 Permit No. 7322.002

This permit was issued in 1996 for the construction of Walmart Food Distribution Center No. 71. It is a revision to a previous permit that was deleted. The project area is served by multiple retention ponds, which are not anticipated to be impacted by the widening of SR 544.

### 4.5.22 Permit No. 30509.000

This permit was issued in 2006 for the Lakeside Landings residential development. The permit was modified several times to include additional project phases. The project area is served by multiple wet detention ponds, which are not anticipated to be impacted by the widening of SR 544.

### 4.5.23 Permit No. 43208.000

This permit was issued in 2018 for the construction of Tucker Paving office buildings and parking areas. The project also includes a proposed turn-lane addition on SR 544, but a permit for this does not appear to have been filed yet. The project area is served by several retention ponds which may be impacted due to the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

### 4.5.24 Permit No. 30448.002

This permit was issued in 2021 for Phase I construction of the Winter Haven Commerce Center. This permit is a revision to a previous permit. The project area is served by one retention pond which is not anticipated to be impacted by the widening of SR 544.

### 4.5.25 Permit No. 2235.000 and 2235.001

These permits were issued in 1987 and 1988, respectively, for the construction of Brookhaven Village residential development. These permits are not expected to be impacted by the widening of SR 544.

### 4.5.26 Permit No. 27164.001 and 27614.002

These permits were issued in 2007 and 2019, respectively, for the construction of Lucerne Professional and Blackwell Framing commercial buildings. These projects are served by their own stormwater ponds. The dry

retention pond that serves Lucerne Professional may be impacted by the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

### 4.5.27 Permit No. 45204.000

This permit was issued in 2021 for the construction of The Harbor at Lake Henry residential development. One wet detention pond serves the project area and is not likely to be impacted by the widening of SR 544.

### 4.5.28 Permit No. 11867.002

This permit was issued in 2021 for the construction of stormwater improvements for MTI Enterprises. It is not anticipated that this permit will be impacted by the widening of SR 544. This permit was used for the collection of cross drain data.

### 4.5.29 Permit No. 18195.000

This permit was issued in 1998 for the construction of StoreRight and was modified several times for various expansions. The project area is served by a wet detention pond and this permit is not expected to be impacted by the widening of SR 544.

### 4.5.30 Permit No. 3257.000 and 3257.003

These permits were issued in 1988 and 2021, respectively for the construction and expansion of Winter Haven Storage. The project area is served by dry retention ponds located adjacent to the SR 544 right-of-way; however, it is not anticipated that these ponds will be impacted by the widening of SR 544.

### 4.5.31 Permit No. 34264.001

This permit was issued in 2014 for the construction of Dollar General. The project area is served by two dry retention ponds, one of which is located is adjacent to the SR 544 right-of-way, but is not anticipated to be impacted by the widening of SR 544.

### 4.5.32 Permit No. 7611.000

This permit was issued in 1998 for the construction of PDQ Carwash (now “Wash Me”) and later modified to include the addition of an ice cream stand. The project area is served by two dry retention ponds. One of the ponds is located adjacent to the SR 544 right-of-way and is anticipated to be impacted by the proposed roundabout at the intersection of SR 544 and Brenton Manor Ave. Relevant information from this permit can be found in **Appendix F**.

### 4.5.33 Permit No. 9344.000

This permit was issued in 1991 for the construction of the First National Bank of Polk County. The project area is served by three retention ponds. One of the ponds is located adjacent to the SR 544 right-of-way and is expected to be impacted by the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

### 4.5.34 Permit No. 10159.001

This permit was issued in 2007 for mass grading of the commercial site at the southwest corner of SR 544 and US 27. The mass grading permit included leveling of the ground and a proposed stormwater pond for future

development. It appears that the grading was completed, but the pond was never constructed. Subsequent permits within this area created additional changes to this site which are detailed in the following sections.

### 4.5.35 Permit No. 10159.004

This permit was issued in 2013 for intersection improvements at SR 544 and US 27. The improvements include the addition of two turn lanes, along with a new FDOT maintained dry retention pond for stormwater attenuation. The turn lanes were exempt from treatment requirements; however, the previous mass grading permit filled in a historic depression and this pond was designed to replace the lost capacity.

### 4.5.36 Permit No. 10159.005

This permit was issued in 2013 for the construction of Race Trac convenience store and gas station at the southwest corner of SR 544 and US 27. It is a revision to the original mass grading permit. This permit includes construction of a dry retention pond that serves the Race Trac site and access road improvements. The Race Trac property is anticipated to be impacted by the widening of SR 544; however, it is not anticipated that the stormwater pond will be impacted.

### 4.5.37 Permit No. 10159.008

This permit was issued in 2020 for the construction of Century Commercial Vehicle Parking at the southwest corner of SR 544 and US 27. This permit includes relocating the FDOT pond that was constructed under Permit No. 10159.004 to the south to accommodate a parking lot area. Additionally, this permit includes construction of a new stormwater pond to serve the proposed parking areas. The proposed widening of SR 544 may require modifications to the permitted conveyance system that drains to the FDOT pond in order to keep consistent the amount of runoff collected in the pond. As part of the SR 544 widening project, a new stormwater management facility is proposed on the north side of SR 544 (Swale 7). During the design phase, it should be considered how to best utilize the existing pond along with the proposed new pond in this basin. As of the date of this report, the parcel is currently under construction. Relevant information from this permit can be found in **Appendix F**.

### 4.5.38 Permit No. 23431.000

This permit was issued in 2002 for the widening of US 27 from SR 544 to Blue Heron Boulevard with the construction of new stormwater ponds. Two of the stormwater ponds are anticipated to be impacted by the widening of SR 544 and the associated proposed improvements at the US 27 intersection. Pond 2 is a wet detention pond location approximately 2000 feet north of SR 544. This pond is not anticipated to be impacted by the proposed improvements, but it is anticipated that the basin limits will be modified. Pond 10 is a dry retention swale system located just south of SR 544. The proposed improvements will eliminate this pond. Please see Sections 5.3.8 through 5.3.9 for more information regarding the basins in this area. Relevant information from this permit can be found in **Appendix F**.

### 4.5.39 Permit No. 33368.000

This permit was issued in 2007 for the widening of US 27 from CR 546 to south of SR 544 with the construction of new stormwater ponds. One of the stormwater ponds is anticipated to be impacted by the widening of SR 544 and the associated proposed improvements at the US 27 intersection. Pond 2 is a wet detention pond location approximately 4000 feet north of SR 544. This pond is not anticipated to be impacted by the proposed

improvements, but it is anticipated that the basin limits will be modified. Please see Section 5.3.10 for more information regarding the basin in this area. Relevant information from this permit can be found in **Appendix F**.

### 4.5.40 Permit No. 17482.000

This permit was issued in 1998 for improvements to a bank facility at the northeast intersection of SR 544 and US 27. A permitted treatment system does not appear to be present based on available documents. The entire property, and therefore this permit, are anticipated to be impacted by the widening of SR 544 and associated intersection improvements at US 27.

### 4.5.41 Permit No. 43156.000 and 43156.001

This permit and modification were issues in 2017 and 2018, respectively, for the construction of Bellaviva, a single-family residential development located on the south side of SR 544 which is served by multiple stormwater ponds, two of which are adjacent to the SR 544 right-of-way. The widening of SR 544 is not anticipated to impact these permits.

### 4.5.42 Permit No. 21355.000

This permit was issued in 2000 for the construction of the First Presbyterian Church of Haines City and an associated dry retention stormwater pond. The pond is adjacent to the SR 544 and may have minor impacts due to the widening of SR 544.

### 4.5.43 Permit No. 13875.001

This permit modification was issued in 1995 (the original permit was denied) for the construction of the La Vista Subdivision single-family residential development. There are no documents available for the permit, however, a retention pond near the back of the site is visible in aerials. There may be minor impacts to the properties within this permit but impacts to the stormwater management system are not anticipated.

### 4.5.44 Permit No. 24585.000

This permit was issued in 2003 for the construction of the Estates at Lake Butler single-family residential development. The project area is served by a series of dry retention ponds located adjacent to the SR 544 right-of-way, which are anticipated to have minor impacts due to the widening of SR 544.

### 4.5.45 Permit No. 30115.001

This permit was issued in 2013 for the construction of the Peninsular Heights single-family residential development. The project was never constructed. If the project is constructed prior to the widening of SR 544, impacts to the stormwater management system are not anticipated.

### 4.5.46 Permit No. 29791.000 and 29791.001

This permit and modification were issued in 2006 and 2013, respectively, for the construction of the Peninsular Ridge single-family residential development. The project site is served by a dry retention pond located adjacent to the SR 544 right-of-way. There may be minor impacts to this pond due to the widening of SR 544.

### 4.5.47 Permit No. 9486.000

This permit was issued in 1991 for the Na-Dell Heights Subdivision single-family residential development. No documents are available, however, stormwater ponds are visible toward the back of the property in aerials. It is not anticipated that this permit will be impacted by the widening of SR 544.

### 4.5.48 Permit No. 13334.000

This permit was issued in 1995 for the Haines City Senior Center. No documents are available, however, a stormwater pond is visible on the property adjacent to the SR 544 right-of-way. There may be minor impacts to the pond due to the widening of SR 544.

### 4.5.49 Permit No. 17938.000 and 17938.002

This permit and modification were issued in 1998 and 2005, respectively, for the construction of an additional access road for Alta Visa Elementary School and a subsequent classroom addition. No documents are available, however, a stormwater pond is visible toward the back of the property in aerials. It is not anticipated that this permit will be impacted by the widening of SR 544.

### 4.5.50 Permit No. 20694.000

This permit was issued in 2000 for the construction of Kingdom Hall Haines City. The project site is served by a dry retention pond located adjacent to the SR 544 right-of-way. There may be minor impacts to this pond due to the widening of SR 544.

### 4.5.51 Permit No. 12168.001

This permit was issued in 2003 for the Lamb of God Lutheran Church. No documents are available, however, there appear to be two small retention ponds near the front of the property (adjacent to SR 544) and a larger pond near the back of the property. One of the ponds adjacent to the SR 544 right-of-way may have minor impacts due to the widening of SR 544.

### 4.5.52 Permit No. 40900.001

This permit was issued in 2012 for the reconstruction of SR 17 from SR 544 to US 17/92, including the addition of a closed drainage system. SR 17 is the terminus of this Study, and while it is not anticipated that the existing stormwater management system along SR 17 will be impacted by the widening of SR 544, improvements at this intersection could result in minor impacts to the permitted system.

## 4.6 Existing Drainage Basins

### 4.6.1 Basin 1A

Basin 1A begins at Avenue T (station 04+80) and continues north to station 13+84. Runoff from SR 544 is collected in curb inlets which discharge north to ditches located in Basin 1. There is no permitted stormwater treatment system for this basin. This is an open basin that outfalls to Lake Conine.

### 4.6.2 Basin 1

Basin 1 begins at station 13+84 and continues north to the high point over CD-5 (station 75+00), which is a navigable box culvert connecting Lake Conine with Lake Smart. From the beginning of the basin to Avenue Y (station 29+00), runoff from SR 544 is collected in curb inlets which discharge north to roadside ditches that collect runoff throughout the remainder of the basin. There is no permitted stormwater treatment system for this basin. There are five (5) cross drains located within the basin limits. CD-1 through CD-4 convey stormwater from the east side of SR 544 to the wetlands and Lake Conine located on the west side. CD-5 is a 12' x 12' CBC that connects Lake Conine with Lake Smart. This is an open basin that outfalls to Lake Conine.

### 4.6.3 Basin 2

Basin 2 begins at station 75+00 and continues northwest to a high point at station 106+50. Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain located within the basin limits, CD-6, which conveys stormwater from the west side of SR 544 to Lake Smart. This is an open basin that outfalls to Lake Smart.

### 4.6.4 Basin 3

Basin 3 begins at station 106+50 and continues northwest to a high point at station 155+00. Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There are three (3) cross drains located within the basin limits. CD-7 and CD-8 convey stormwater from the south side of SR 544 to wetlands along the south side. CD-9 conveys stormwater from the north side of SR 544 into Lake Fannie. This is an open basin that outfalls to Lake Fannie.

### 4.6.5 Basin 4

Basin 4 begins at station 155+00 and continues west to a high point just west of Lakeside Landing Boulevard (station 218+50). Runoff from SR 544 is collected in roadside ditches. A portion of the intersection of SR 544 and Lucerne Loop Road is treated in a stormwater pond located at the northeast corner of the intersection and permitted under Permit No. 12706.003. The remainder of this basin is not treated. There are two (2) cross drains located within the basin limits, CD-10 and CD-11, which convey stormwater from the north side of SR 544 into Lake Fannie. This is an open basin that outfalls to Lake Fannie.

### 4.6.6 Basin 5

Basin 5 begins at station 218+50 and continues northwest to the bridge over Lake Henry Canal (station 289+00). Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There are two (2) cross drains located within the basin limits, CD-12 and CD-13, which convey stormwater from the north side of SR 544 into wetlands along the south side. This is an open basin. From the beginning of the basin limits to Old Lucerne Park Road, the ditches drain to the wetlands and from Old Lucerne Park Road to the end of the basin, they drain directly into Lake Henry Canal. Both the wetlands and the canal outfall to Lake Hamilton.

### 4.6.7 Basin 6

Basin 6 begins at station 289+00 and continues west to a high point at station 314+10. Runoff from SR 544 is collected in roadside ditches which drain to an existing depressional area located on the north side of the road at approximately station 295+50. This depressional area is not a permitted stormwater retention pond and is the subject of a flooding complaint logged by FDOT in 2015 (please refer to **Appendix K – Correspondence** for documentation). The complaint indicates that the depression is intended to drain to the north into the Lake Henry Canal through a series of ditches, but that lack of maintenance has caused the ditches and depression to become overgrown and a private road has cut off the natural drainage path, resulting in the depression overtopping into nearby properties instead. The study concluded that FDOT was not contributing to the flooding issue. There is one (1) cross drain located within the basin limits, CD-14, which conveys stormwater from the south side of SR 544 into the depression. Currently, this basin functions as a closed basin with stormwater collecting in the depressional area; however, it is intended to operate as an open basin that outfalls to the Lake Henry Canal and into Lake Hamilton.

### 4.6.8 Basin 7

Basin 7 begins at station 314+10 and continues west to US 27 (station 331+50). Along the north side of SR 544, runoff is directed into roadside ditches, while along the south side of SR 544, curb and gutter is present and collects runoff in curb inlets. SR 544 drains to a permitted dry detention pond (the ditches on the north are collected in a DBI and routed to the pond) that is located to the south of SR 544 in between the South State Bank and the Race Trac. The pond was originally permitted under SWFWMD Permit No. 10159.004 in 2013 (a modification to previous permits that were never constructed) in a temporary location to accommodate runoff from intersection improvements conducted by FDOT and to mitigate flooding that had been caused by the developer of the site filling in an existing depressional area without constructing their new stormwater pond. In 2021, a permit modification was issued under Permit No. 10159.008 for the development of the parcel into a commercial truck parking site, which includes the permanent relocation of the FDOT stormwater pond further south within the same parcel. As of the date of this report, the parcel is currently under construction. This is a closed basin and the relocated FDOT pond will not have an outfall structure.

### 4.6.9 Basin 8

Basin 8 begins at station 331+50 and continues west to the high point over CD-15 (station 348+00). Along the south side of SR 544, stormwater runoff is collected in roadside ditches. From the beginning of the basin to approximately station 336+50, stormwater runoff to the north side of SR 544 is collected in curb inlets, and for the remainder of the basin it is collected in roadside ditches. Basin 8 encompasses the limits of an existing basin, Basin 10, which was permitted under Permit No. 23431.000 and contains a dry treatment swale system (Pond 10). This swale system will be completely eliminated by the proposed intersection improvements at SR 544 and US 27. A portion of Basin 8 overlaps the existing Basin 1, which was also permitted under Permit No. 23421.000 but is treated through compensation in another basin and does not contain its own treatment system. The remainder of Basin 8 does not have a permitted treatment system. There are no cross drains located within this basin, however, the bridge culvert CD-15 is located at the basin divide. CD-15 conveys the Lake Hamilton Creek underneath SR 544. This is an open basin that outfalls to Lake Hamilton Creek.

### 4.6.10 Basin 8A

Basin 8A covers the portion of US 27 located south of Basin 8 that will be impacted by the proposed intersection improvements at SR 544 and US 27. The basin is approximately 540 feet long, but no station numbers have been assigned to US 27. Stormwater is collected in roadside ditches that drain south to Lake Hamilton Creek. There are no cross drains located within this basin. This is an open basin that outfalls to Lake Hamilton Creek.

### 4.6.11 Basin 9

Basin 9 begins at station 348+00 and continues west to Lake Hamilton Drive (station 374+00). Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain within the basin limits (excluding the bridge culvert at the basin divide), CD-16, which conveys stormwater from the south side of SR 544 to the ditch on the north side. This is an open basin that outfalls to Lake Hamilton Creek.

### 4.6.12 Basin 10

Basin 10 begins at station 374+00 and continues west to the end of the project at SR 17 (station 424+50). From the beginning of the basin to approximately station 393+00, runoff from SR 544 is collected in roadside ditches. For the remainder of the basin, runoff is collected in curb inlets which discharge into the ditches at the west end of the basin. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain within the basin limits, CD-17, which conveys stormwater from the south side of SR 544 to Lake Butler. This is an open basin that outfalls to Lake Butler.

# 5.0 Proposed Drainage Conditions

The stormwater runoff from the project limits will be collected and conveyed via curb and gutter to the proposed offsite detention ponds. The ponds will discharge at or near the same cross drains that carry the roadway runoff in the existing condition, or directly into canals or wetlands where appropriate. The proposed ponds have been sized to achieve the required water quality treatment and water quantity attenuation and serve as a budget tool for right-of-way estimation for the project to the Department.

## 5.1 Proposed Basins

There are currently twelve (12) proposed drainage basins within the project limits. One (1) pond site alternative has been identified and analyzed for each basin.

The onsite roadway basin areas draining to the ponds were determined to be the areas within the proposed right-of-way limits. The limits of the proposed basins begin and end at the same locations as the existing condition. Basin 1 was split into two smaller basins, Basin 1A and Basin 1. Additionally, another basin (Basin 8A) was added to provide a pond alternative for minor improvements on US 27, south of the intersection with SR 544. Attenuation in the proposed ponds is provided in all basins. Please refer to the Basin Maps in **Appendix B** for the pond locations. **Table 5-1: Summary of Proposed Drainage Basins** provides a summary of the proposed basin limits.

**Table 5-1: Summary of Proposed Drainage Basins**

| Basin Name | From Station | To Station |
|---|---|---|
| 1A | 04+80 | 13+84 |
| 1 | 13+84 | 75+00 |
| 2 | 75+00 | 106+50 |
| 3 | 106+50 | 155+00 |
| 4 | 155+00 | 218+50 |
| 5 | 218+50 | 289+00 |
| 6 | 289+00 | 314+10 |
| 7 | 314+10 | 331+50 |
| 8 | 331+50 | 348+00 |
| 8A | N/A | N/A |
| 9 | 348+00 | 374+00 |
| 10 | 374+00 | 424+50 |

## 5.2 Methodology of Pond Determination

### 5.2.1 General Process

The pond sizing analysis assumes that all ponds will be designed using wet detention or dry retention pond design criteria as appropriate. Most ponds were sized on the assumption that offsite runoff would bypass the pond site alternative toward its historical path, with the exception of Ponds 1, 2, and 7A which are sized to provide attenuation for offsite runoff that flows directly toward the pond location. The report focuses on the preliminary estimate of required pond volumes necessary for each roadway drainage basin. A 20% upsize in the required pond right-of-way area has been applied for all the ponds to account for preliminary parameters such as the estimated average wet seasonal water elevations, ground elevations and potential natural contouring of the ponds.

In Segment 1, within the Florence Villa historical area, the ponds were sized to accommodate two (2) 12-foot travel lanes, one (1) 12-foot turn lane, curb and gutter, and two (2) 8-foot sidewalks, one on each side. In Segments 2-7, the remainder of the project limits, the ponds were sized to accommodate two (2) 11-foot travel lanes, two (2) 12-foot travel lanes, curb and gutter, and two (2) 10-foot shared use paths, one on each side.

The locations of potential pond sites were selected by first considering proximity to the outfall location, then by considering site features such as estimated average wet seasonal water elevations, soil types, land use, and aesthetic features. The majority of selected pond sites are vacant parcels including vacant or unused agricultural lands, vacant residential properties, and vacant commercial properties. Two of the selected pond sites (Ponds 4 and 6) utilize existing depressional areas that appear to be former borrow pits or livestock watering areas but are not permitted stormwater ponds. It is not anticipated that any of the pond site alternatives will alter existing or future land uses of surrounding properties or significantly impact existing landscapes. During the final design, additional consideration should be given to aesthetic features to comply with the Highway Beautification Act including softening of the pond contours, landscaping, and other aesthetics features.

The following parameters were considered in determining the size and location of the potential pond sites:

- Hydrologic and hydraulic factors such as existing ground elevations, soil types, estimated average wet seasonal water elevations (AWSWE) stormwater conveyance feasibility and allowable hydraulics grade line (HGL);
- Environmental resource impacts including wetlands and threatened or endangered species;
- Floodplain Impacts;
- Major utility conflict potential;
- Parcel descriptions and land usage;
- Impacts to cultural resources;
- Impacts to contamination sites;

### 5.2.2 Nutrient Loading Analysis

The proposed project limits intersect WBIDs 1504B, 1488U, 1488A, 14882, 1504, 15041, 1500A, 15002, and 15102. According to the Comprehensive Verified List, only WBID 1488A (Lake Smart) is impaired for nutrients (TN). However, all of these WBIDs eventually outfall to WBID 15041 (Lake Hamilton) which was delisted during the 2020-2022 delist cycle due to ongoing restoration activities of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan. In order to be consistent with the goals of reducing nutrients in Lake Hamilton, nutrient loading analysis has been performed on all basins to ensure no adverse effects to the downstream waters. All analysis was performed using BMPTRAINS 2020 software, developed by the University of Central Florida Stormwater Management Academy. Results of the analysis are included in **Appendix D – Nutrient Loading Analysis** and summarized below in **Table 5-2**. All of the ponds showed a reduction in the phosphorus loading when compared to the pre-development condition. When reviewed individually, several of the ponds were unable to provide sufficient reduction in nitrogen loading; however, when reviewed for the entire project, the total nitrogen output is less than the pre-development output and nitrogen loading requirements are met. Additionally, for the three individual basins that outfall to Lake Smart (Basins 1, 1A, and 2), nitrogen loading requirements were met. During the design phase, it is recommended that additional best management practices (BMPs) be considered to increase nitrogen removal. Other BMPs include the use of Bio-sorption Activated Media (BAM), pre-treatment swales, or baffle boxes.

More information on the Lake Hamilton Chain of Lakes Pollutant Reduction Plan can be found at the following link: https://polk.wateratlas.usf.edu/upload/documents/WinterHavenChainWQMgmtPlanPart2.pdf

**Table 5-2: Summary of Nutrient Removal**

| Basin | Pre-Development Nitrogen Loading (kg/yr) | Post-Development Nitrogen Loading (kg/yr) | Nitrogen Removal Met? | Pre-Development Phosphorus Loading (kg/yr) | Post-Development Phosphorus Loading (kg/yr) | Phosphorus Removal Met? |
|---|---|---|---|---|---|---|
| 1A | 7.66 | 1.74 | YES | 0.997 | 0.227 | YES |
| 1 | 34.02 | 0.90 | YES | 4.773 | 0.123 | YES |
| 2 | 14.93 | 14.31 | YES | 1.976 | 0.593 | YES |
| 3 | 23.76 | 36.48 | NO | 3.095 | 2.560 | YES |
| 4 | 33.93 | 33.38 | YES | 4.419 | 2.211 | YES |
| 5 | 33.28 | 39.69 | NO | 4.335 | 3.164 | YES |
| 6 | 10.83 | 11.46 | NO | 1.411 | 0.653 | YES |
| 7 | 45.99 | 23.88 | YES | 5.991 | 3.110 | YES |
| 8 | 45.90 | 34.66 | YES | 5.979 | 2.174 | YES |
| 8A | 5.60 | 1.54 | YES | 0.730 | 0.200 | YES |
| 9 | 10.75 | 12.94 | NO | 1.400 | 0.907 | YES |
| 10 | 26.31 | 0.81 | YES | 3.428 | 0.105 | YES |
| **TOTAL:** | **292.96** | **211.79** | **YES** | **38.534** | **16.027** | **YES** |

## 5.3 Stormwater Pond Evaluation

The following sections detail each proposed basin and the proposed pond site location. The full Pond Site Evaluation Matrix is available in **Appendix E**. Please note that since there is only one pond site per basin, the Matrix is provided to summarize the features of each pond, not to compare alternatives. The estimated total costs for each pond site include the cost of right-of-way acquisition, construction, and wetland mitigation unless otherwise noted in the Pond Site Evaluation Matrix.

### 5.3.1 Basin 1A

Basin 1A begins at Avenue T (station 04+80) and continues north to station 13+84. Runoff from SR 544 is collected in curb inlets which discharge north to ditches located in Basin 1. This is an open basin that outfalls to Lake Conine. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton), which is impaired for nutrients. A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 1A, is a dry retention pond that is sized to provide treatment and attenuation for Basin 1A. Pond 1A is located west of SR 544 at approximately station 09+00 (LT). This pond site sits within a remnant parcel created by the realignment of 1st Street North. The pond size has no impacts to wetland or floodplains. According to the Polk County Soil Survey, the site consists of Tavares-Urban Land Complex (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 151.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 1A will be a dry pond with the bottom elevation set at 146.50 feet NAVD, which is one and a half feet above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.31 acres of area; however, the full remnant parcel of 0.37 acres is recommended to be used. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall back into the SR 544 right-of-way and the outfall will be conveyed to Lake Conine through Basin 1.

### 5.3.2 Basin 1

Basin 1 begins at station 13+84 and continues north to the high point over CD-5 (station 75+00), which is a navigable box culvert connecting Lake Conine with Lake Smart. This is an open basin that outfalls to Lake Conine. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 1, is a dry retention pond that is sized to provide treatment and attenuation for Basin 1. Pond 1 is located east of SR 544 at approximately station 41+00 (RT). This pond site sits within two (2) parcels (26-28-16-000000-013020 and 26-28-16-000000-031060). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Candler sand (HSG A) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 135.00 feet NAVD near the front of the site, adjacent to the R/W. This parcel is steeply sloped upward, and the existing ground elevation at the back of the proposed pond site is at approximately 151.00 feet NAVD. An additional 48’ buffer has been provided along the back of the pond site in order to tie up to an elevation of 151.00 at a 1:3 slope. Additionally, since the back of the parcel slopes toward the pond and runoff from the

offsite areas will naturally flow toward the pond, the offsite area has been included in the attenuation calculation. With the data compiled from NRCS soil data and available permits, it was determined that Pond 1 will be a dry pond with the bottom elevation set at 130.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 2.83 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-2) which drains to Lake Conine.

### 5.3.3 Basin 2

Basin 2 begins at station 75+00 and continues northwest to a high point at station 106+50. Runoff from SR 544 is collected in roadside ditches. This is an open basin that outfalls to Lake Smart. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 2, is a wet detention pond that is sized to provide treatment and attenuation for Basin 2. Pond 2 is located west of SR 544 at approximately station 86+00 (LT). This pond site sits within one (1) parcel (26-28-09-530000-000042). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Candler sand (HSG A) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 131.00 feet NAVD near the front of the site, adjacent to the R/W. This parcel is steeply sloped upward, and the existing ground elevation at the back of the proposed pond site is at approximately 138.00 feet NAVD. An additional 21' buffer has been provided along the back of the pond site in order to tie up to an elevation of 138.00 at a 1:3 slope. Additionally, since the back of the parcel slopes toward the pond and runoff from the offsite areas will naturally flow toward the pond, the offsite area has been included in the attenuation calculation. With the data compiled from NRCS soil data and available permits, it was determined that Pond 2 will be a wet pond with the control elevation set at 130.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 3.83 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-6) which drains to Lake Smart.

### 5.3.4 Basin 3

Basin 3 begins at station 106+50 and continues northwest to a high point at station 155+00. This is an open basin that outfalls to Lake Fannie. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 3, is a wet detention pond that is sized to provide treatment and attenuation for Basin 3. Pond 3 is located north of SR 544 at approximately station 131+00 (LT). This pond site sits within one (1) parcel (26-28-10-530500-002601). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 3 consists of Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 128.50 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 3 will be a wet pond with the control elevation set at 127.00 feet NAVD. Preliminary pond sizing calculations indicate that this

pond requires 2.50 acres of area and will require a 0.23 acre easement, for a total area of 2.73 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-8) which drains to the wetland system around Lake Fannie.

### 5.3.5 Basin 4

Basin 4 begins at station 155+00 and continues west to a high point just west of Lakeside Landing Boulevard (station 218+50). This is an open basin that outfalls to Lake Fannie. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 4, is a wet detention pond that is sized to provide treatment and attenuation for Basin 4. Pond 4 is located north of SR 544 at approximately station 183+00 (LT) and utilizes an existing wet depressional area that appears to be a former borrow pit. This pond site sits within one (1) parcel (26-28-02-521500-002400). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Wauchula fine sand (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 128.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 4 will be a wet pond with the control elevation set at 126.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 2.21 acres of area and will require a 0.11 acre easement, for a total area of 2.32 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-10) which drains to Lake Fannie.

### 5.3.6 Basin 5

Basin 5 begins at station 218+50 and continues northwest to the bridge over Lake Henry Canal (station 289+00). This is an open basin that outfalls to Lake Hamilton. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 5, is a wet detention pond that is sized to provide treatment and attenuation for Basin 5. Pond 5 is located south of SR 544 at approximately station 250+00 (RT). This pond site sits within one (1) parcel (26-28-12-531502-000100). The pond site has approximately 1.05 acres of impacts to wetlands and 1.41 acre-ft of impacts to Zone AE floodplains (BFE 124.30). According to the Polk County Soil Survey, the site consists of Immokalee sand (HSG B/D) and Kaliga muck (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD in the upland portion (east side of the parcel) and 123.00 feet within the floodplain area (western side). With the data compiled from NRCS soil data and available permits, it was determined that Pond 5 will be a wet pond with the control elevation set at 123.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.76 acres of area and a 0.46 acre easement for a total of 2.22. However, the full remnant parcel of 1.95 acres is recommended to be used, and with the 0.46 acre easement the total recommended pond area is 2.41 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to the wetland system that drains to Lake Hamilton.

### 5.3.7 Basin 6

Basin 6 begins at station 289+00 and continues west to a high point at station 314+10. This basin is intended to operate as an open basin that outfalls to the Lake Henry Canal (see **Section 4.6.7** for more information). Construction of a new stormwater pond and proper maintenance will allow this basin to function as an open basin as it did historically, and will help alleviate some of the flooding issues in the area. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 6, is a wet detention pond that is sized to provide treatment and attenuation for Basin 6. Pond 6 is located north of SR 544 at approximately station 297+00 (LT) and would expand an existing wet depressional area that appears to be used currently as a water source for livestock. This pond site sits within one (1) parcel (27-28-06-000000-033070). The pond site has approximately 0.33 acres of impacts to wetlands and no floodplain impacts. According to the Polk County Soil Survey, the site consists of Adamsville fine sand (HSG C) and Basinger mucky find sand (HSG D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 130.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 6 will be a wet pond with the control elevation set at 129.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.69 acres of area; however, the full parcel of 1.87 acres is recommended to be used. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to the Lake Hamilton via the Lake Henry Canal.

### 5.3.8 Basin 7

Basin 7 begins at station 314+10 and continues west to US 27 (station 331+50). This basin includes a portion of the SPUI intersection at US 27. This is a closed basin. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Swale 7 (Pond 7), is a dry retention swale that is sized to provide treatment and attenuation for Basin 7. Additionally, the swale is sized to provide an additional 0.28 ac-ft of attenuation to replace the existing FDOT pond, under the assumption that the FDOT pond would be removed after improvements are completed on SR 544 (see Section 4.6.8 for more information on the existing pond). Swale 7 is located north of SR 544 at approximately station 323+00 (LT). This pond site sits within one (1) parcel (27-28-06-000000-013010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Tavares fine sand (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 129.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Swale 7 will be a dry swale with the bottom elevation set at 128.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.70 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** An emergency outfall will discharge to the existing depressional area located adjacent to the swale.

### 5.3.9 Basin 8

Basin 8 begins at station 331+50 and continues west to the high point over CD-15 (station 348+00). This basin includes the majority of the SPUI intersection at US 27 and encompasses an existing basin (Basin 10) permitted under Permit No. 2341.000 for the widening of US 27. This is an open basin that outfalls to Lake Hamilton Creek. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 8, is a wet detention pond that is sized to provide treatment and attenuation for Basin 8. Additionally, the pond is sized to provide an additional 0.58 ac-ft of attenuation to replace the existing permitted FDOT pond which will be removed for the proposed SPUI (see Section 4.6.9 for more information on the existing pond). Pond 8 is located south of SR 544 at approximately station 338+00 (RT). This pond site sits within one (1) parcel (27-28-06-000000-012070). The pond site has approximately 1.59 acres of impacts to wetlands and 1.72 acre-ft of impacts to Zone AE floodplains (BFE 124.20). According to the Polk County Soil Survey, the site for Pond 8 consists of Samsula muck (HSG B/D) and Smyrna and Myakka fine sands (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD at the west side of the property and 122.0 feet at the east side. An additional 21’ buffer has been provided in order to tie back to the existing elevations on either side of the pond site. With the data compiled from NRCS soil data and available permits, it was determined that Pond 8 will be a wet pond with the control elevation set at 122.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 2.75 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to Little Lake Hamilton via the Lake Hamilton Creek.

### 5.3.10 Basin 8A

Basin 8A encompasses the southern end of the US 27 improvements associated with the SPUI intersection. This area falls under Permit No. 33368.000 where compensating treatment is provided in an existing pond located south of the project. This is an open basin that outfalls to the Haines City Drainage Canal. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

Due to the proposed improvements in this basin and the current lack of direct treatment or attenuation, a separate pond alternative has been identified. The proposed pond site for this basin, Swale 8A (Pond 8A) is a dry retention swale that is sized to provide treatment and attenuation for Basin 8A. Swale 8A is located south of SR 544 (west of US 27) at approximately station 331+00 (RT) and 1800 feet south of SR 544. This pond site sits within the existing US 27 right-of-way. The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Smyrna and Myakka fine sands (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Swale 8A will be a dry swale with the bottom elevation set at 124.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.57 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** The swale will outfall to the Haines City Drainage Canal.

### 5.3.11 Basin 9

Basin 9 begins at station 348+00 and continues west to Lake Hamilton Drive (station 374+00). This is an open basin that outfalls to Lake Hamilton Creek. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 9, is a wet detention pond that is sized to provide treatment and attenuation for Basin 9. Pond 9 is located north of SR 544 at approximately station 351+00 (LT). This pond site sits within one (1) parcel (27-28-05-000000-031010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 9 consists of Smyrna and Myakka fine sands (HSG B/D) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 9 will be a wet pond with the control elevation set at 123.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.25 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to Little Lake Hamilton via the Lake Hamilton Creek.

### 5.3.12 Pond 10

Basin 10 begins at station 374+00 and continues west to the end of the project at SR 17 (station 424+50). This is an open basin that outfalls to Lake Butler. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 10, is a dry retention pond that is sized to provide treatment and attenuation for Basin 10. Pond 10 is located south of SR 544 at approximately station 387+00 (RT). This pond site sits within one (1) parcel (27-28-05-000000-031010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 10 consists of Candler sand (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 133.00 feet. With the data compiled from NRCS soil data and available permits, it was determined that Pond 10 will be a dry pond with the bottom elevation set at 128.00 feet NAVD, which is 1.2 feet above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 1.64 acres of area; however, in order to avoid a small remnant parcel, a full parcel take of 2.28 acres is recommended. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-17) which drains to Lake Butler.

## 5.3.13 Floodplain Compensation

Six (6) Floodplain Impact Areas (FIAs) have been identified within the project limits. Each FIA consists of a floodplain or multiple floodplain areas that are hydraulically connected. For the FIA located just west of the US 27 intersection, it is recommended that the County considers amendment of the current FEMA floodplain map which was approved in 2016 and does not reflect recent development within the area (including the construction and relocation of the existing FDOT pond). A Floodplain Compensation Site (FPC) has not been sited for this FIA. For each of the other five FIAs, one (1) FPC site has been identified. All of the proposed FPCs are offsite scraped down areas adjacent to or hydraulically connected to the 100-year floodplain. Compensation is provided between the SHWT of the FPC site and the lowest of either the pond top of bank or the 100-year floodplain elevation. The majority of the floodplains within the project limits are Zone AE floodplains with Base Flood Elevations (BFEs) ranging from 124.20 FT to 132.20 FT NAVD across the project limits and are associated with various lakes. A few areas of Zone A floodplains are present, mainly associated with roadside ditches or existing detention ponds. Elevations for these floodplain areas have been estimated from LIDAR data or adjacent Zone AE BFEs. More information about the floodplain compensation sites is provided in the following sections.

Floodplain compensation alternatives have been sized as a conservative measure for right of way estimation; however, it is recommended that alternative approaches are considered during the design phase. This may include developing a floodplain model to demonstrate no increase in the 100-year floodplain elevations associated with the improvements along SR 544, combining FPCs, or utilizing capacity in stormwater ponds. All calculations and parameters for each alternative are located in the Location Hydraulics Report.

### 5.3.13.1 FPC 1

FPC 1 is a scraped down area located south of SR 544 at approximately station 102+00 (RT). This site is located within one (1) parcel (26-28-09-530000-000110). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 58+00 to 99+00. These floodplains are associated with Lake Conine, Lake Smart, and a roadside ditch. The 100-year floodplain elevation throughout this area ranges from 129.90 feet to 130.0 feet NAVD and the impacts total approximately 0.99 ac-ft of floodplain volume. It is anticipated that there will be 0.09 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Samsula muck (HSG B/D) and Adamsville fine sand (HSG C). The estimated SHWT elevation for this site is 128.00 feet. The 100-year floodplain elevation that intersects the site is 129.90 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 131.00 feet NAVD. With the data compiled it was determined that FPC 1 will be a 0.74 acre site which will provide approximately 1.07 acre-feet of compensating volume.

### 5.3.13.2 FPC 2

FPC 2 is a scraped down area located north of SR 544 at approximately station 129+00 (LT). This site is located within one (1) parcel (26-28-10-530500-002601). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 118+00 to 130+00. These floodplains are associated with Lake Rochelle and Lake Smart. The 100-year floodplain elevation throughout this area ranges from 128.3 feet to 130.10 feet NAVD and the impacts total approximately 3.35 ac-ft of floodplain volume. It is anticipated that there will be no wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Adamsville fine sand (HSG C). The estimated SHWT elevation for this site is 127.00 feet. The 100-year floodplain

elevation that intersects the site is 130.10 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 130.50 feet NAVD. With the data compiled it was determined that FPC 2 will be a 1.62 acre site which will provide approximately 3.64 acre-feet of compensating volume.

### 5.3.13.3 FPC 3 (A & B)

FPC 3 is a set of two scraped down areas (A & B) located north of SR 544 at approximately station 183+00 (LT). This site is located within one (1) parcel (26-28-02-521500-002400). The site was split into two areas to allow the proposed pond site also on this parcel (Pond 4) to utilize the existing wet depressional area located in between the proposed FPC areas. This approach was discussed with the Department. This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 147+00 to 206+00. These floodplains are associated with Lake Fannie and various roadside ditches. The 100-year floodplain elevation throughout this area ranges from 127.20 feet to 128.50 feet NAVD and the impacts total approximately 6.53 ac-ft of floodplain volume. It is anticipated that there will be no wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Wauchula fine sand (HSG B/D). The estimated SHWT elevation for this site is 126.00 feet. The 100-year floodplain elevation that intersects the site is 128.30 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 129.00 feet NAVD. With the data compiled it was determined that FPC 3 will consist of a 2.29 acre FPC (A) and a 1.33 acre FPC (B) for a total area of 3.62 acres, which will provide approximately 6.53 acre-feet of compensating volume.

### 5.3.13.4 FPC 4

FPC 4 is a scraped down area located south of SR 544 at approximately station 252+00 (RT). This site is located within one (1) parcel (26-28-12-531502-000100). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 227+00 to 259+00 and for impacts created by Pond 5. These floodplains are associated with a wetland system that drains to Lake Hamilton. The 100-year floodplain elevation throughout this area ranges from 124.30 feet to 128.90 feet NAVD and the impacts total approximately 4.57 ac-ft of floodplain volume. It is anticipated that there will be 0.76 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Immokalee sand (HSG B/D) and Kaliga muck (HSG B/D). The estimated SHWT elevation for this site is 123.00 feet. The 100-year floodplain elevation that intersects the site is 124.30 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 124.00 feet NAVD. With the data compiled it was determined that FPC 4 will be a 4.84 acre site which will provide approximately 5.11 acre-feet of compensating volume.

### 5.3.13.5 FPC 5

FPC 5 is a scraped down area located north of SR 544 at approximately station 354+00 (LT). This site is located within one (1) parcel (27-28-05-000000-031010). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 337+00 to 367+00 and for impacts created by Pond 8. These floodplains are associated with Lake Hamilton Creek. The 100-year floodplain elevation throughout this area is 124.20 feet NAVD and the impacts total approximately 3.14 ac-ft of floodplain volume. It is anticipated that there will be 1.66 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Smyrna and Myakka fine sands (HSG B/D) and Hontoon muck (HSG B/D). The estimated SHWT elevation for this site is 123.00 feet. The 100-year floodplain elevation that intersects the site is 124.20 feet NAVD. According

to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 124.00 feet NAVD. With the data compiled it was determined that FPC 5 will be a 3.22 acre site which will provide approximately 3.16 acre-feet of compensating volume.

# 6.0 Environmental Look Arounds (ELAs)

Environmental Look Arounds (ELAs) provide a unique opportunity to team up with regional stakeholders to explore watershed wide stormwater needs and alternative permitting approaches for the project. Areas of potential cooperation are documented in this report for future follow up as the design moves forward.

During the course of the project, meetings were held with FDOT Drainage, Southwest Florida Water Management District (SWFWMD), and the Lake Region Lakes Management District (LRLMD) regarding the proposed pond site alternatives and potential for ELA opportunities. Key discussions from these meetings are summarized below and meeting minutes from each meeting are located in **Appendix K – Correspondence**.

No significant ELA opportunities were identified for this project. There are no adjacent FDOT or municipal projects that would serve for development of a joint-use pond. Some opportunities with LRLMD initially seemed feasible, but were eliminated due to potential setbacks.

Preliminary Pond Site Coordination Meeting

This meeting was held on November 2nd, 2020 with representatives from FDOT and Inwood. Inwood presented their preliminary pond site alternatives. For several basins, Inwood proposed that it would be feasible to combine basins and reduce the overall number of stormwater ponds required by utilizing compensating treatment. However, FDOT indicated that due to nutrient impairments in the area, it was their preference to site a pond site alternative for each basin. At the time of this meeting, the proposed alternative for Basin 7 was to expand the existing FDOT pond rather than site a new pond. Inwood moved forward with changes as recommended. Inwood mentioned at this meeting that they would be scheduling an ELA meeting with LRLMD.

Pond Site Coordination Meeting

This meeting was held on August 12, 2021, with representatives from FDOT and Inwood to discuss updates to the pond sites since the initial coordination meeting. Inwood summarized changes to the proposed pond sites which resulted from the first meeting's recommendations, changes to the roadway concepts, and new permits in the area that caused several sites to move. In Basin 7, it was discussed that the existing FDOT pond would now be relocated as part of an ongoing site development project, and FDOT would prefer to site a separate alternative for this basin. Since two different intersection alternatives at US 27 were being evaluated at the time within this basin, a pond alternative was developed for each. FDOT concurred with all other pond sites with minor changes anticipated as concepts are refined.

SWFWMD Pre-Application Meeting

This meeting was held on September 1, 2021 with representatives from SWFWMD, FDOT, and Inwood to discuss SWFWMD permitting requirements and potential ELA opportunities. Inwood briefly discussed the Lake Conine Stormwater Park, which is a wetland treatment project located adjacent to SR 544 near the beginning of the project. Prior to the study beginning, Inwood had discussed this project with SWFWMD and LRLMD who indicated that it was not designed to provide credits to other projects and would not be an ELA opportunity for SR 544.

LRLMD ELA Meeting

This meeting was held on November 30th, 2021 with representatives from LRLMD, FDOT, and Inwood with the goal of identifying potential regional stormwater opportunities. Inwood inquired about the Lake Conine Stormwater Park and it was confirmed by LRLMD that this was not available for joint-use opportunity. Inwood also mentioned that previously, the LRLMD had indicated that they were open to participate in a joint-use pond within one of their boat ramp sites, particularly the Lake Fannie boat ramp. However, since these sites are Section 4(f) resources, it was decided that this opportunity would not be pursued. LRLMD was not aware of any other potential joint-use opportunities within the area.

# 7.0 Total Pond Cost Estimate

The total pond cost estimate for each alternative site includes construction costs of the stormwater facility, any costs associated with mitigation of wetland impacts and preliminary right of way cost estimates which include any administrative costs and legal fees. The total pond cost estimate for each alternative is available in **Appendix E – Pond Alternatives Evaluation Matrix**. The preliminary right-of-way cost estimates are a budget tool used by the Department to estimate total acquisition costs associated with each pond site and to budget the appropriate funds for acquisition. Right-of-way cost estimates are not real estate appraisals and do not reflect market value. In addition, FDOT used appraisals that comply with the Uniform Standards of Professional Appraisal Practice (USPAP) for acquisition purposes.

# 8.0 Conclusions and Recommendations

Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data calculations, reasonable engineering judgment, and assumptions. Pond sizes and configurations may change during final design as more detailed information on SHWT, wetland normal pool elevation, final roadway profile design, etc. become available. Please refer to **Table 8-1** for **Preferred Stormwater Pond Requirements** and **Table 8-2** for **Preferred FPC Site Requirements**.

**Table 8-1: Preferred Stormwater Pond Requirements**

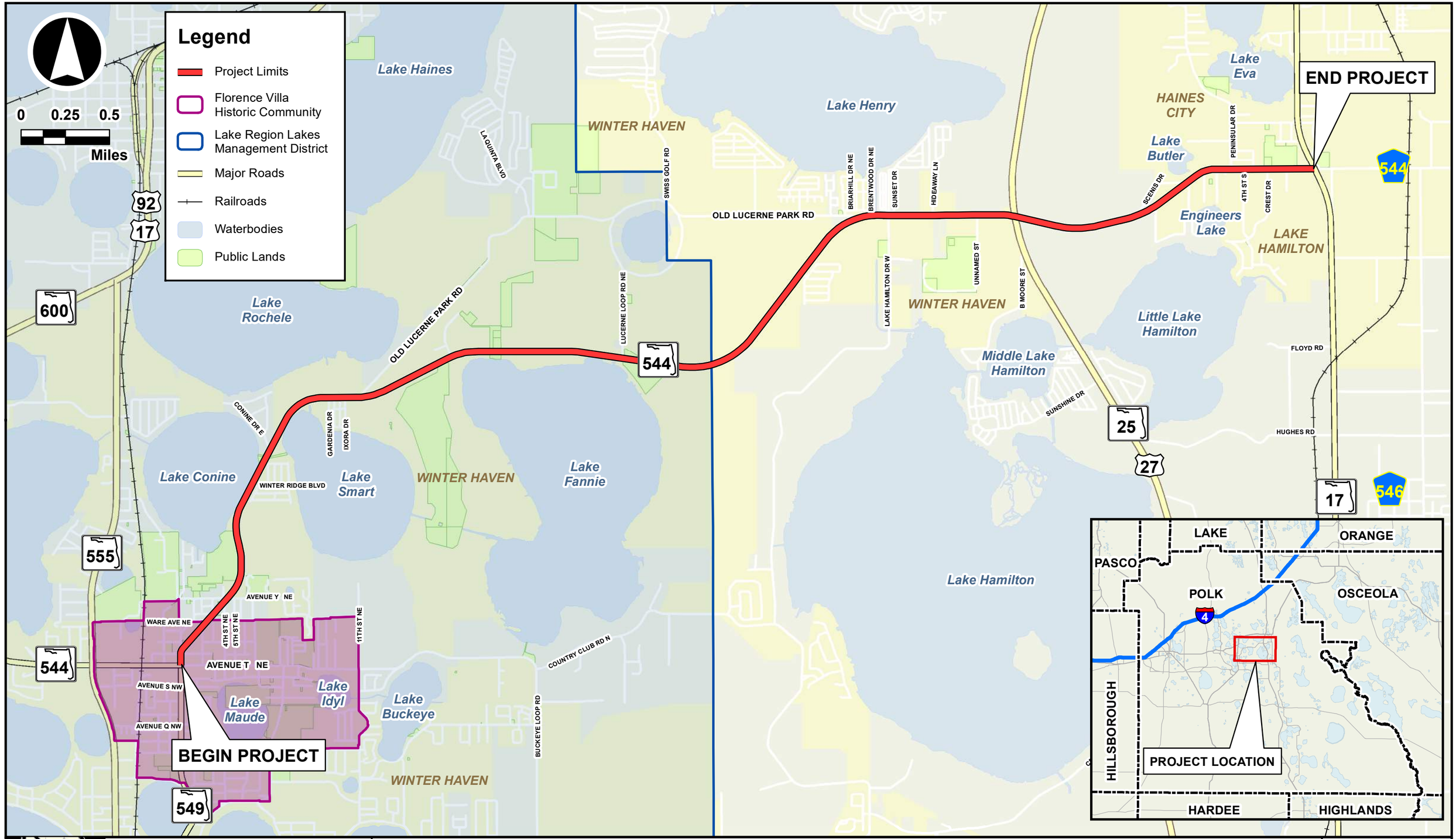
| Basin | From Station | To Station | Required Treatment + Attenuation (ac-ft) | Provided Treatment + Attenuation (ac-ft) | Pond R/W Area (including easements) (ac) |
|---|---|---|---|---|---|
| 1A | 04+80 | 13+84 | 0.09 | 0.20 | 0.37 |
| 1 | 13+84 | 75+00 | 1.62 | 3.29 | 2.83 |
| 2 | 75+00 | 106+50 | 2.53 | 3.10 | 3.83 |
| 3 | 106+50 | 155+00 | 2.49 | 2.51 | 2.73 |
| 4 | 155+00 | 218+50 | 2.50 | 2.50 | 2.32 |
| 5 | 218+50 | 289+00 | 3.06 | 3.08 | 2.41 |
| 6 | 289+00 | 314+10 | 1.68 | 1.68 | 1.87 |
| 7 | 314+10 | 331+50 | 0.37 | 0.39 | 0.70 |
| 8 | 331+50 | 348+00 | 3.60 | 4.02 | 2.75 |
| 8A | N/A | N/A | 0.06 | 0.19 | 0.57 |
| 9 | 348+00 | 374+00 | 2.13 | 2.14 | 1.25 |
| 10 | 374+00 | 424+50 | 2.46 | 3.37 | 2.28 |

**Table 8-2: Preferred FPC Site Requirements**

| FIA | From Station | To Station | Required Floodplain Compensation (ac-ft) | Provided Floodplain Compensation (ac-ft) | FPC R/W Area (incl. easements) (ac) |
|---|---|---|---|---|---|
| 1 | 58+00 | 99+00 | 0.99 | 1.07 | 0.74 |
| 2 | 118+00 | 131+00 | 3.35 | 3.64 | 1.62 |
| 3 | 147+00 | 206+00 | 6.53 | 6.53 | 3.62 |
| 4 | 227+00 | 259+00 | 4.57 | 5.11 | 4.84 |
| 5 | 335+00 | 367+00 | 3.14 | 3.16 | 3.22 |

# *APPENDIX A*

**Exhibits**




FDOT Florida Department of Transportation
District 1

**State Road 544 PD&E Study**
*from Martin Luther King Blvd / Avenue T W*
*to State Road 17*
*Polk County, Florida*

Financial Project ID: 440273-1-22-01

# PROJECT LOCATION MAP

**Figure 1**

## Legend

- Project Limits
- Major Roads
- Railroads
- USGS Quadrangle Source: USGS 2018

0 0.25 0.5 Miles

END PROJECT

BEGIN PROJECT

WINTER HAVEN

DUNDEE

Copyright:© 2013 National Geographic Society, i-cubed

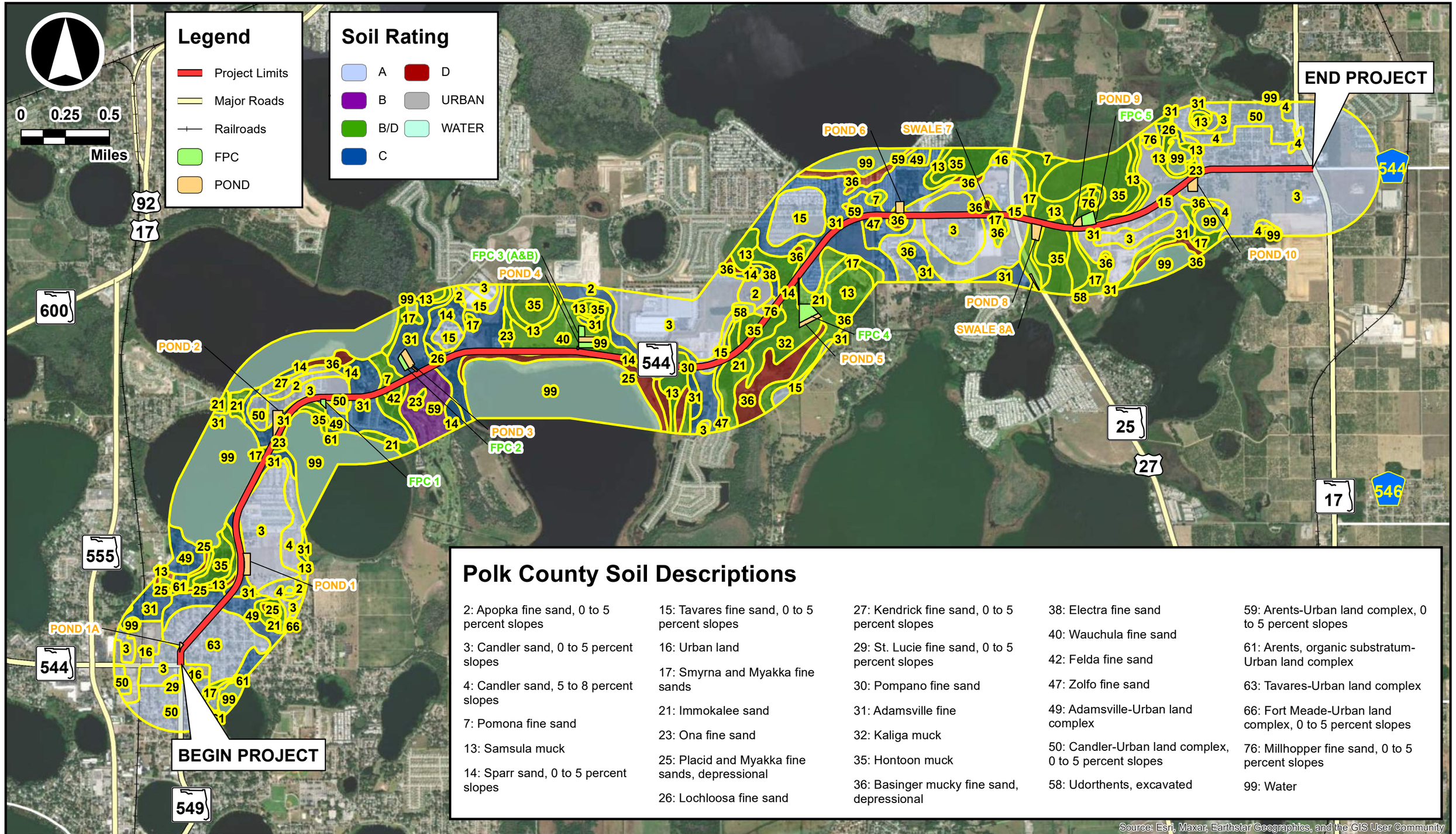
Florida Department of Transportation
District 1

***State Road 544 PD&E Study***
***from Martin Luther King Blvd / Avenue T W***
***to State Road 17***
***Polk County, Florida***

Financial Project ID: 440273-1-22-01

# USGS QUADRANGLE MAP

***Figure 2***




## Polk County Soil Descriptions

2: Apopka fine sand, 0 to 5 percent slopes

3: Candler sand, 0 to 5 percent slopes

4: Candler sand, 5 to 8 percent slopes

7: Pomona fine sand

13: Samsula muck

14: Sparr sand, 0 to 5 percent slopes

15: Tavares fine sand, 0 to 5 percent slopes

16: Urban land

17: Smyrna and Myakka fine sands

21: Immokalee sand

23: Ona fine sand

25: Placid and Myakka fine sands, depressional

26: Lochloosa fine sand

27: Kendrick fine sand, 0 to 5 percent slopes

29: St. Lucie fine sand, 0 to 5 percent slopes

30: Pompano fine sand

31: Adamsville fine

32: Kaliga muck

35: Hontoon muck

36: Basinger mucky fine sand, depressional

38: Electra fine sand

40: Wauchula fine sand

42: Felda fine sand

47: Zolfo fine sand

49: Adamsville-Urban land complex

50: Candler-Urban land complex, 0 to 5 percent slopes

58: Udorthents, excavated

59: Arents-Urban land complex, 0 to 5 percent slopes

61: Arents, organic substratum-Urban land complex

63: Tavares-Urban land complex

66: Fort Meade-Urban land complex, 0 to 5 percent slopes

76: Millhopper fine sand, 0 to 5 percent slopes

99: Water

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

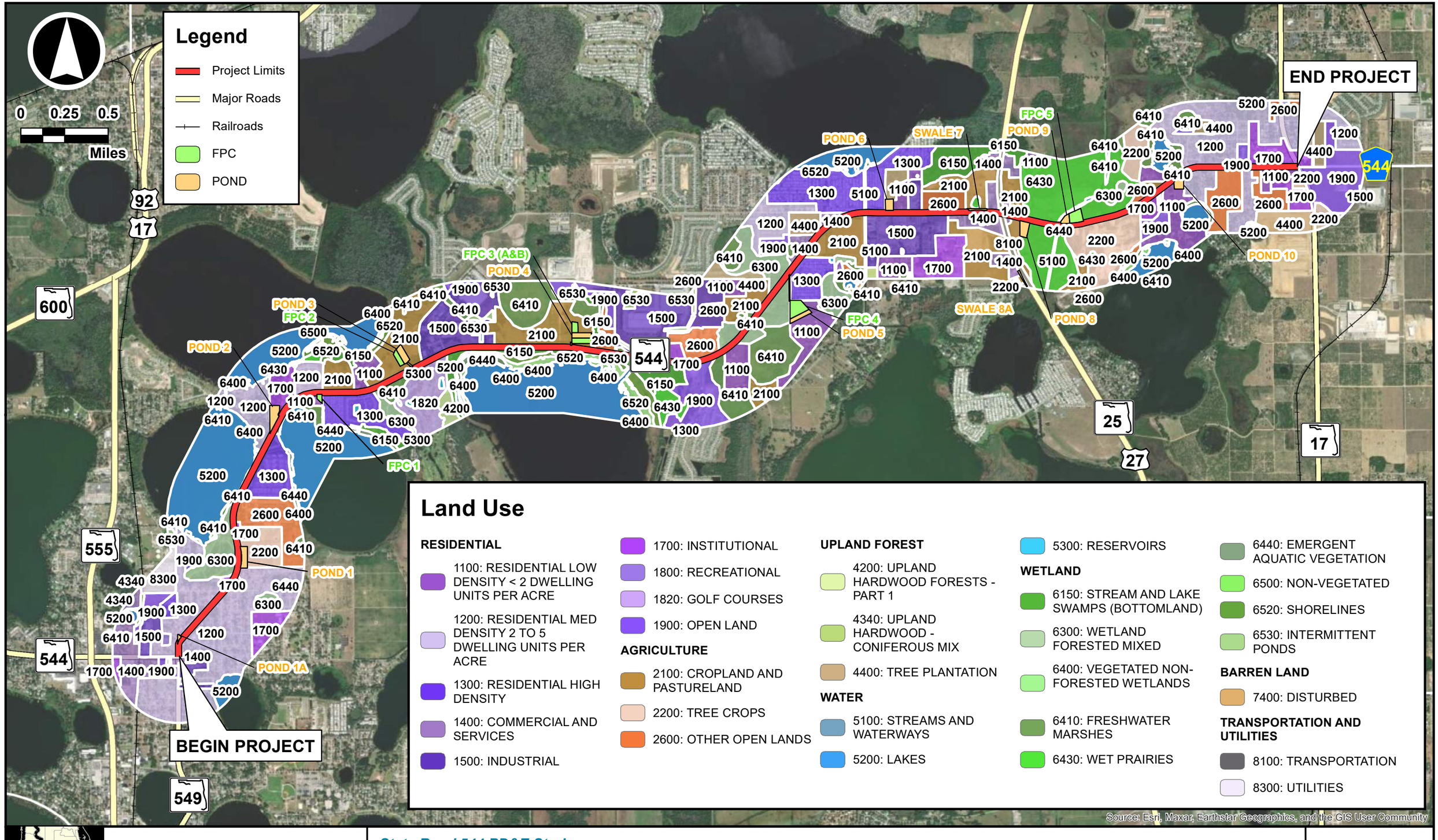
Florida Department of Transportation
District 1

***State Road 544 PD&E Study***
***from Martin Luther King Blvd / Avenue T W to State Road 17***
***Polk County, Florida***

Financial Project ID: 440273-1-22-01

# NRCS SOILS MAP

***Figure 3***




## Land Use

**RESIDENTIAL**

- 1100: RESIDENTIAL LOW DENSITY < 2 DWELLING UNITS PER ACRE
- 1200: RESIDENTIAL MED DENSITY 2 TO 5 DWELLING UNITS PER ACRE
- 1300: RESIDENTIAL HIGH DENSITY
- 1400: COMMERCIAL AND SERVICES
- 1500: INDUSTRIAL
- 1700: INSTITUTIONAL
- 1800: RECREATIONAL
- 1820: GOLF COURSES
- 1900: OPEN LAND

**AGRICULTURE**

- 2100: CROPLAND AND PASTURELAND
- 2200: TREE CROPS
- 2600: OTHER OPEN LANDS

**UPLAND FOREST**

- 4200: UPLAND HARDWOOD FORESTS - PART 1
- 4340: UPLAND HARDWOOD - CONIFEROUS MIX
- 4400: TREE PLANTATION

**WATER**

- 5100: STREAMS AND WATERWAYS
- 5200: LAKES
- 5300: RESERVOIRS

**WETLAND**

- 6150: STREAM AND LAKE SWAMPS (BOTTOMLAND)
- 6300: WETLAND FORESTED MIXED
- 6400: VEGETATED NON-FORESTED WETLANDS
- 6410: FRESHWATER MARSHES
- 6430: WET PRAIRIES
- 6440: EMERGENT AQUATIC VEGETATION
- 6500: NON-VEGETATED
- 6520: SHORELINES
- 6530: INTERMITTENT PONDS

**BARREN LAND**

- 7400: DISTURBED

**TRANSPORTATION AND UTILITIES**

- 8100: TRANSPORTATION
- 8300: UTILITIES

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

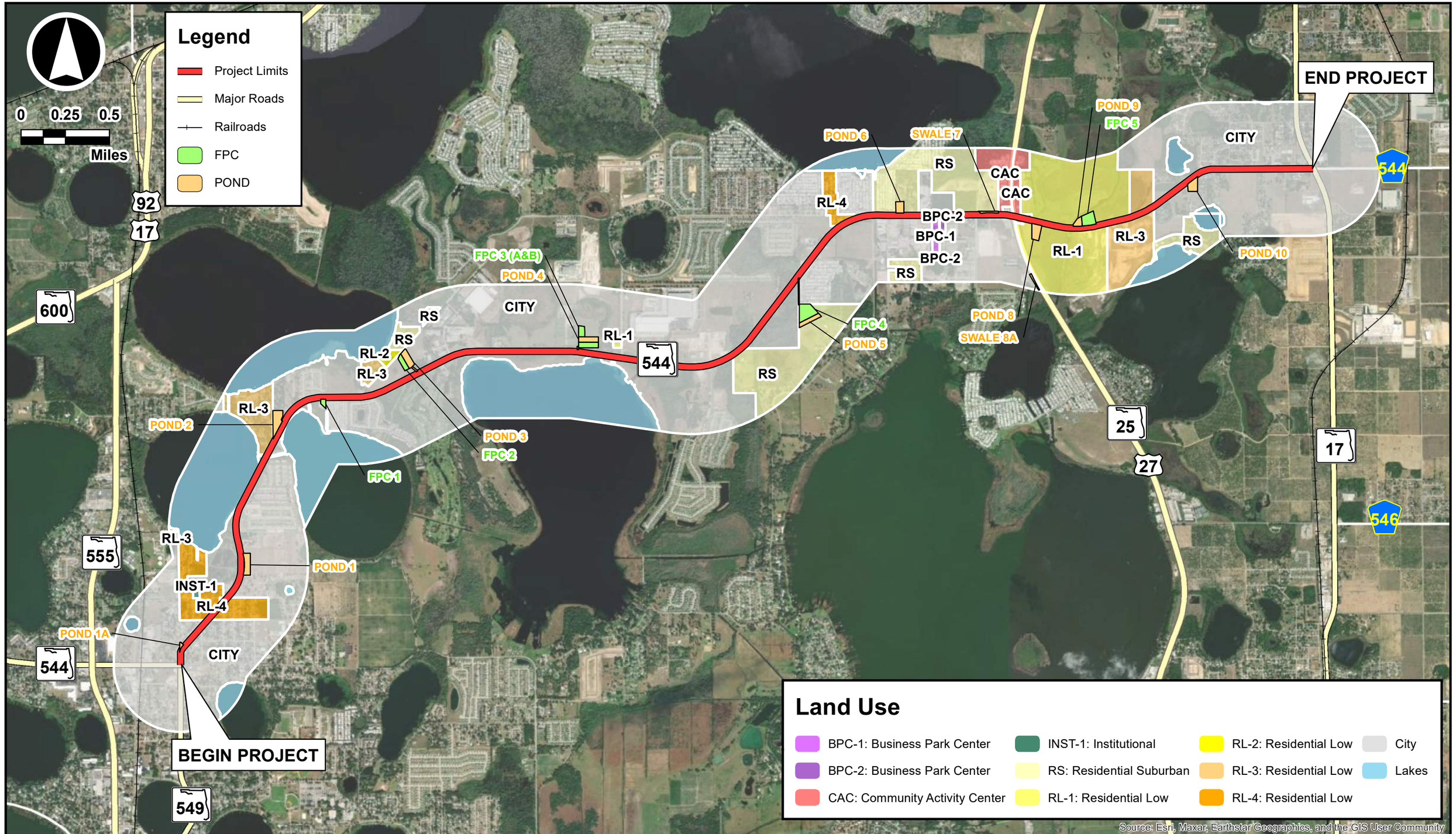
Florida Department of Transportation
District 1

*State Road 544 PD&E Study*
*from Martin Luther King Blvd / Avenue T W*
*to State Road 17*
*Polk County, Florida*

Financial Project ID: 440273-1-22-01

# EXISTING LAND USE MAP (SWFWMD)

*Figure*
*4A*




## Land Use

- BPC-1: Business Park Center
- BPC-2: Business Park Center
- CAC: Community Activity Center
- INST-1: Institutional
- RS: Residential Suburban
- RL-1: Residential Low
- RL-2: Residential Low
- RL-3: Residential Low
- RL-4: Residential Low
- City
- Lakes

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

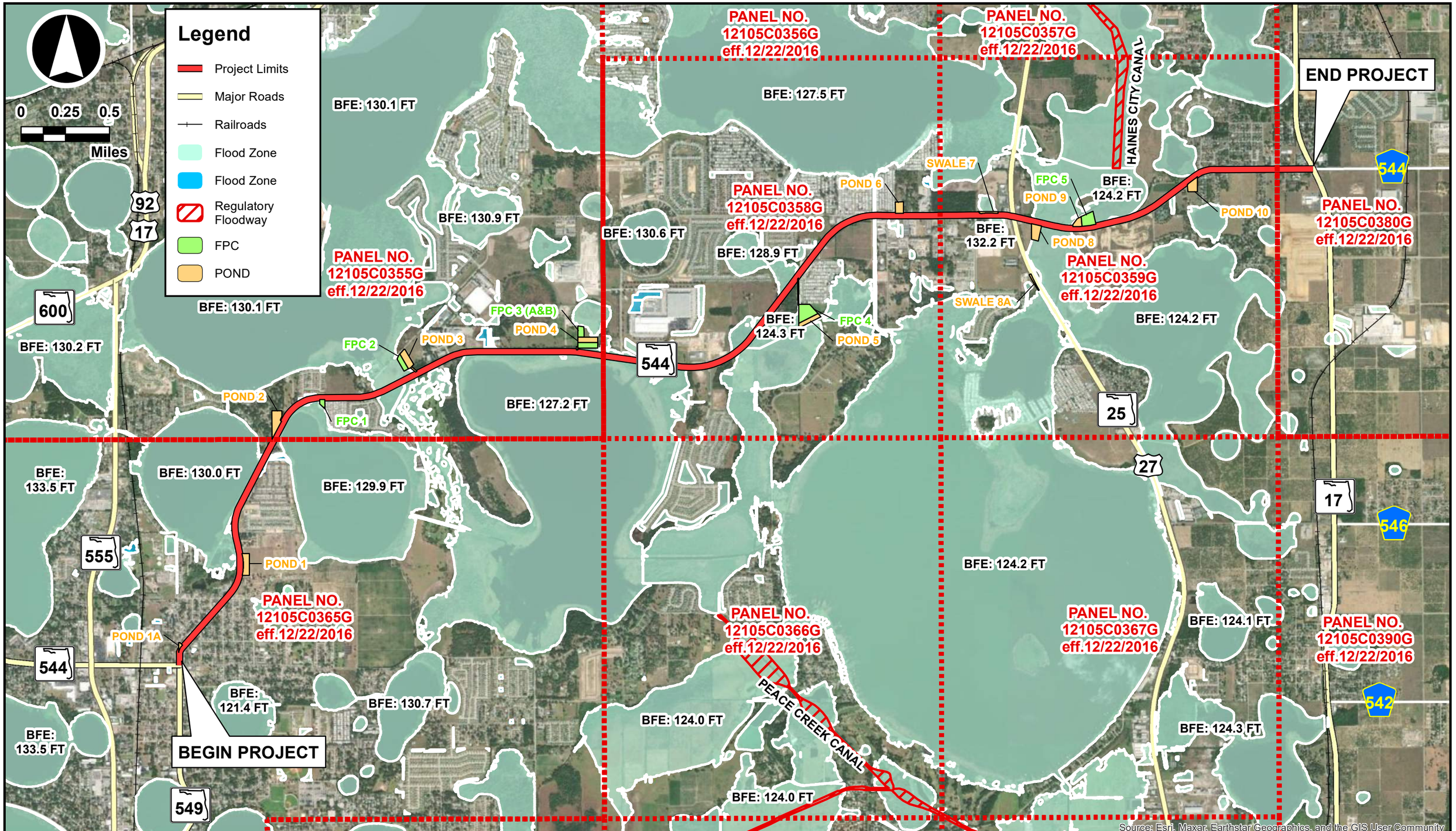
Florida Department of Transportation
District 1

*State Road 544 PD&E Study*
*from Martin Luther King Blvd / Avenue T W*
*to State Road 17*
*Polk County, Florida*

Financial Project ID: 440273-1-22-01

# PROPOSED LAND USE MAP (POLK COUNTY)

*Figure 4B*




FDOT

Florida Department of Transportation
District 1

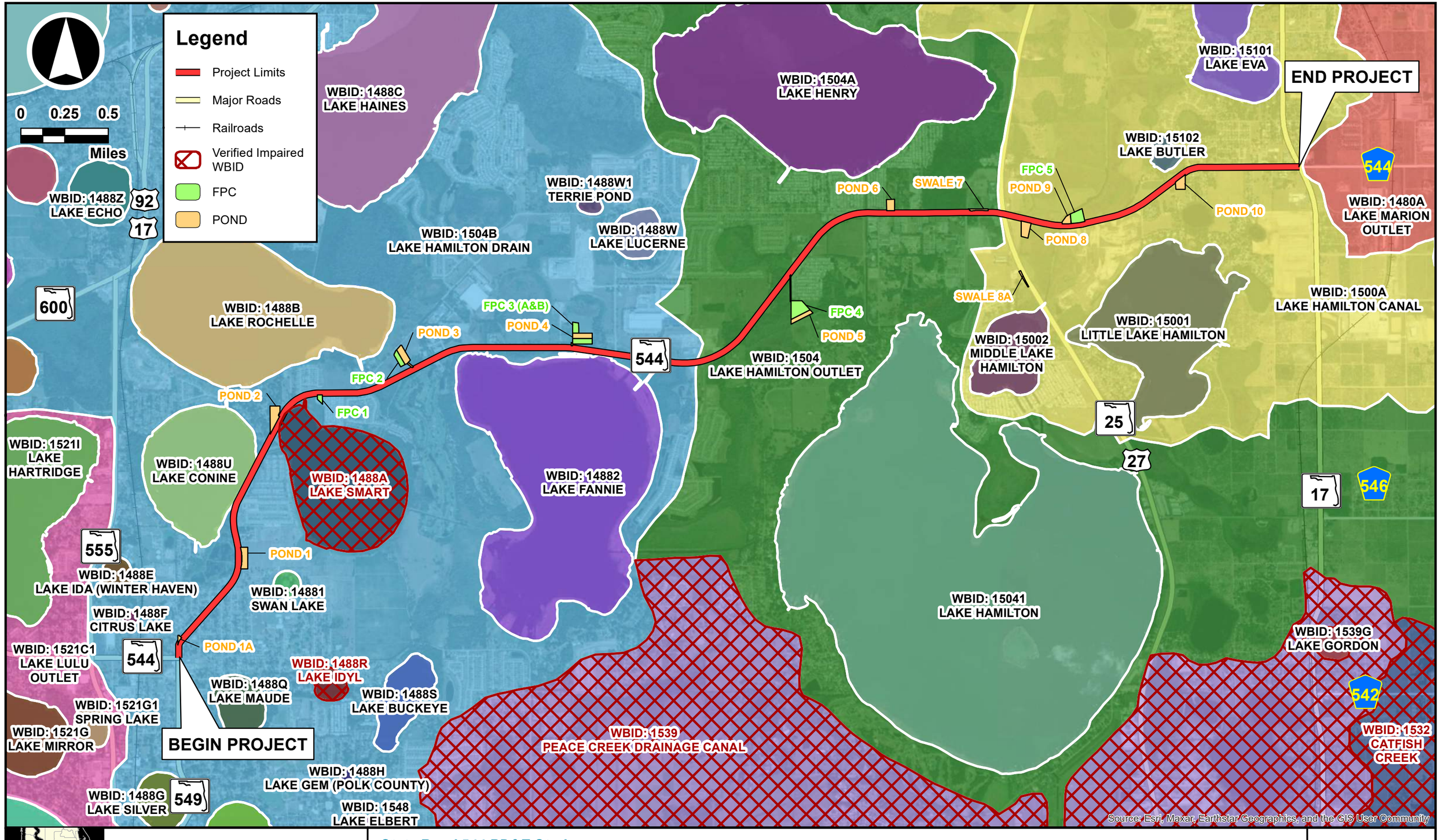
***State Road 544 PD&E Study***

***from Martin Luther King Blvd / Avenue T W to State Road 17***
***Polk County, Florida***

Financial Project ID: 440273-1-22-01

# FEMA FLOODPLAINS MAP

***Figure 5***




Florida Department of Transportation
District 1

***State Road 544 PD&E Study***
***from Martin Luther King Blvd / Avenue T W***
***to State Road 17***
***Polk County, Florida***

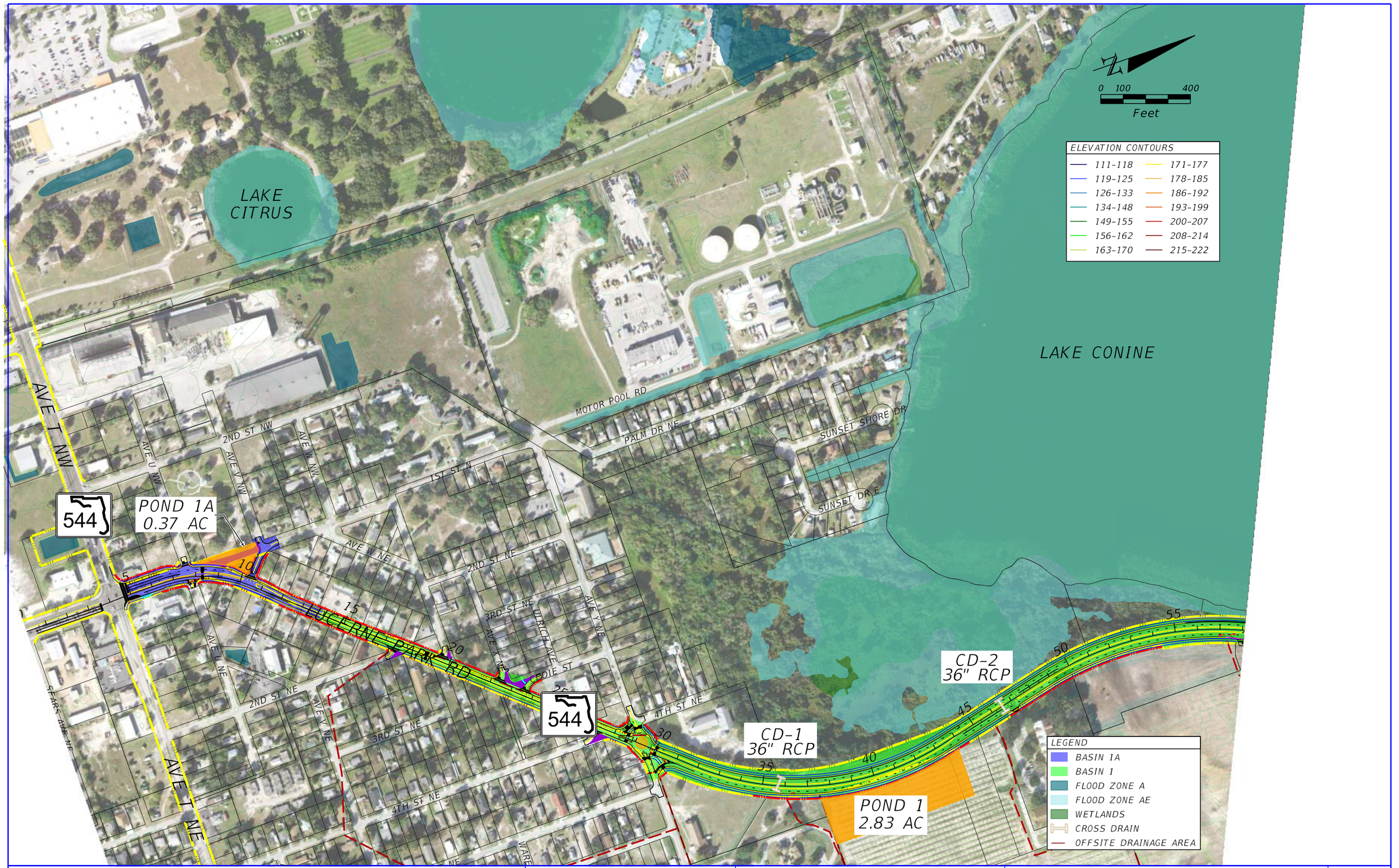
Financial Project ID: 440273-1-22-01

# WBID MAP

***Figure 6***

# *APPENDIX B*

**Basin Maps**




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 1

dduffy 8/8/2023 10:07:15 AM Default F:\Projects\DT1-022-01\drainage\PLANRD01.dgn




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

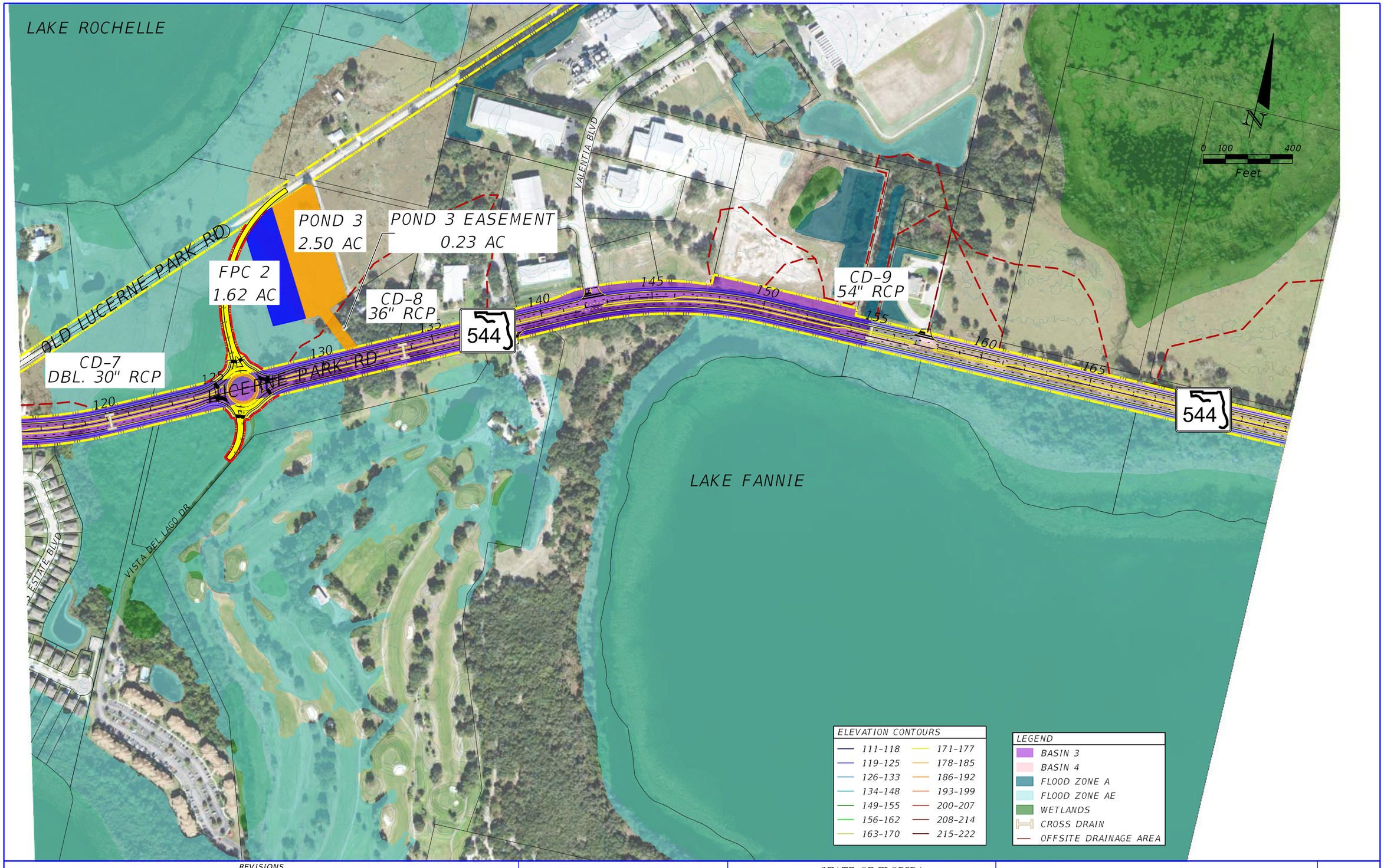
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 2

dduffy 8/8/2023 10:07:47 AM Default F:\Projects\DT1-022-01\drainage\PLANRD01.dgn




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 3

FPC 3B
1.33 AC

POND 4
EASEMENT
0.11 AC

POND 4
2.21 AC

FPC 3A
2.29 AC

CD-10
36" RCP

CD-11
48" RCP

LUCERNE PARK RD

544

LAKESIDE LANDING BLVD

LAKE FANNIE

N

0 100 400
Feet

175 180 185 190 195 200 205 210 215 220 225 230

ELEVATION CONTOURS

| | |
|---|---|
| 111-118 | 171-177 |
| 119-125 | 178-185 |
| 126-133 | 186-192 |
| 134-148 | 193-199 |
| 149-155 | 200-207 |
| 156-162 | 208-214 |
| 163-170 | 215-222 |

LEGEND

- BASIN 4
- BASIN 5
- FLOOD ZONE A
- FLOOD ZONE AE
- WETLANDS
- CROSS DRAIN
- OFFSITE DRAINAGE AREA

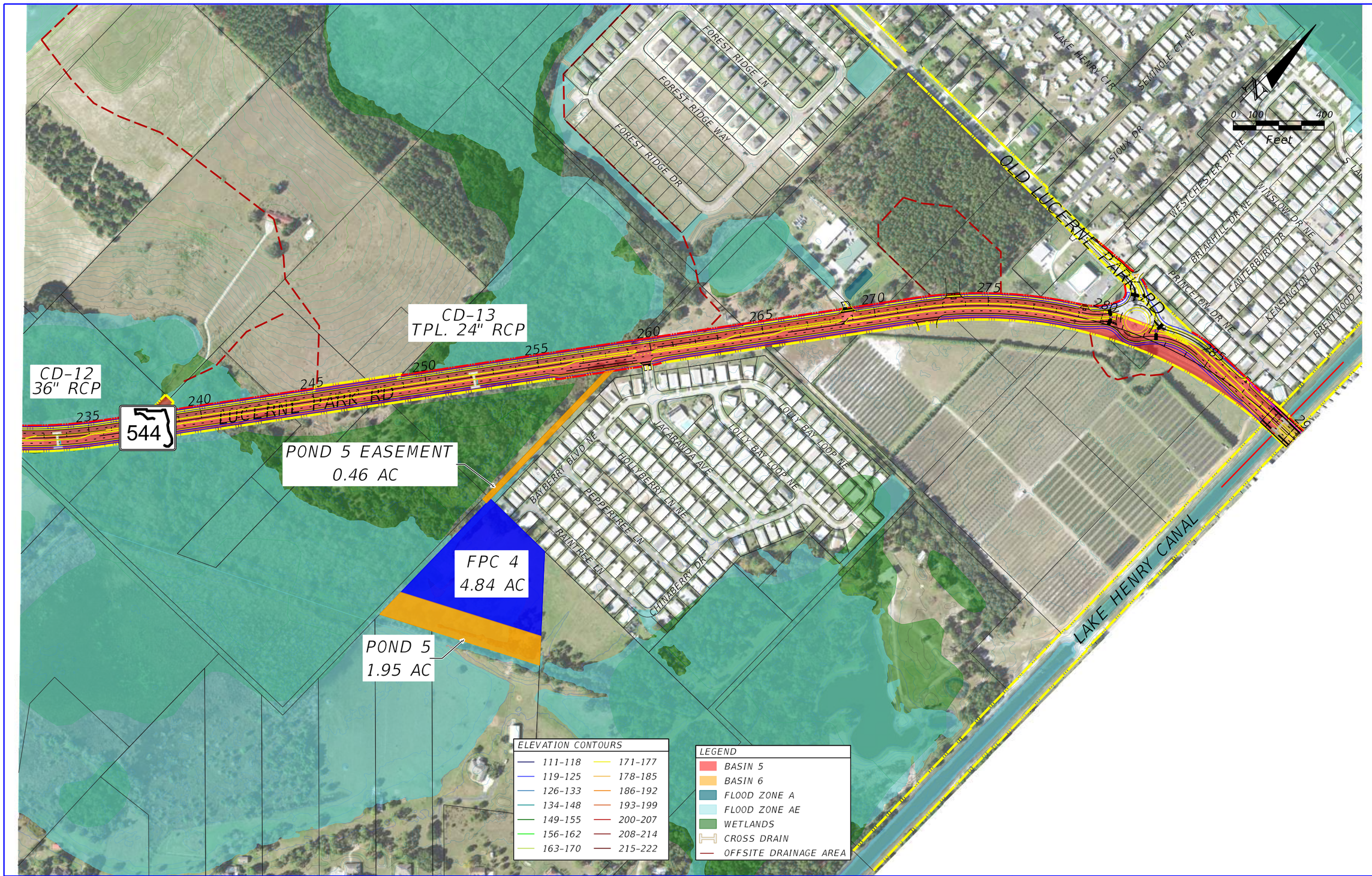
| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 4




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 5



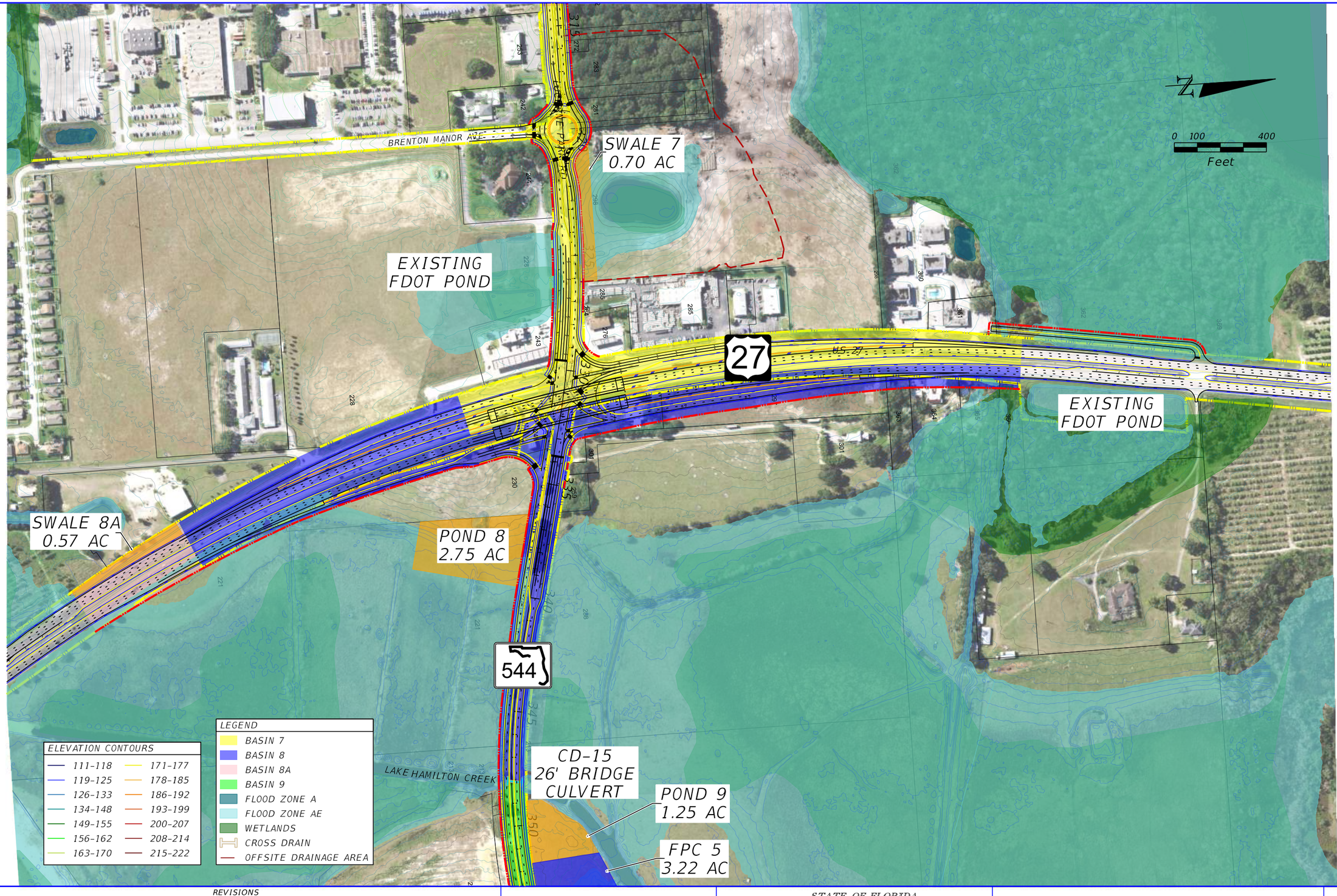

| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 6



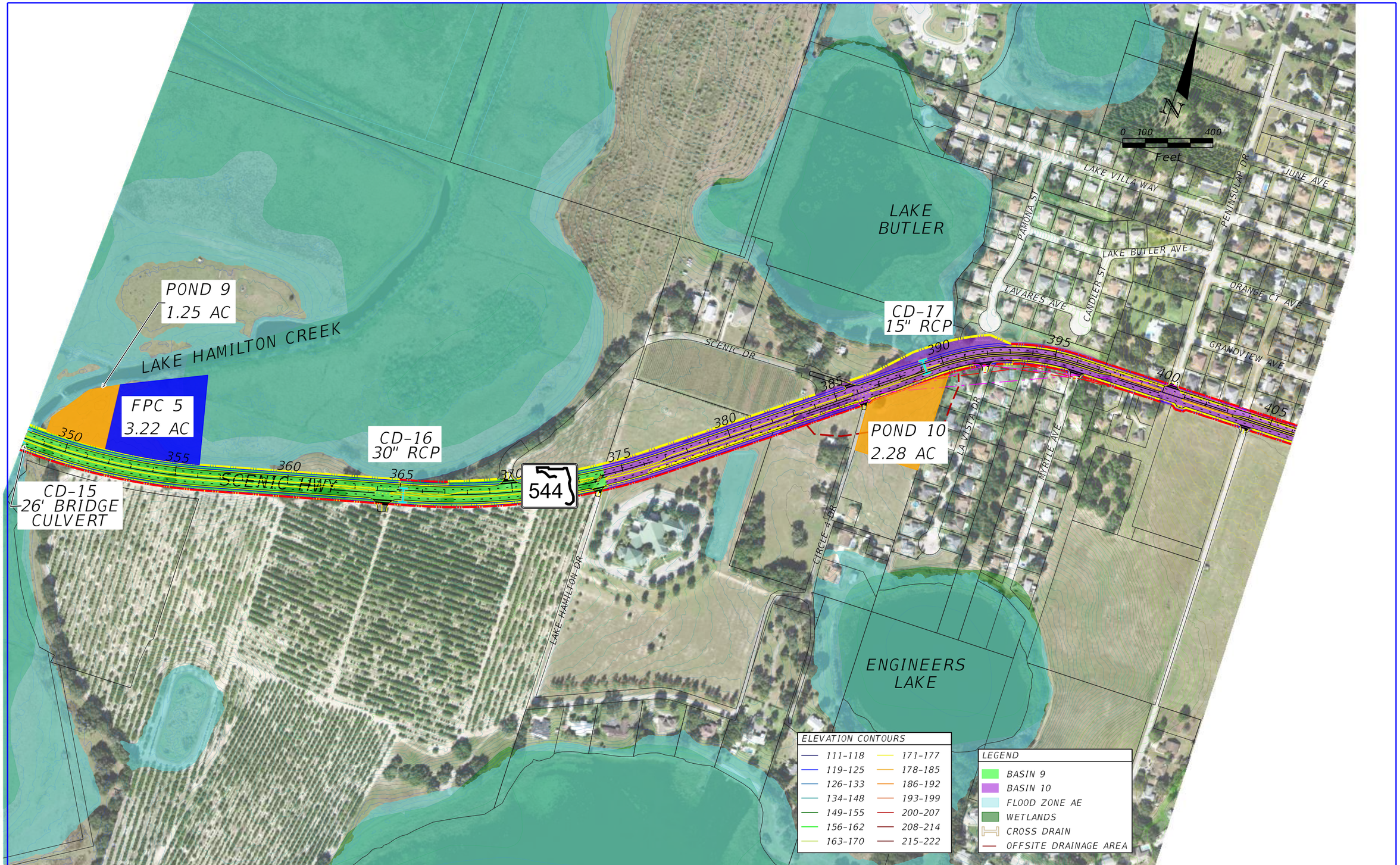

| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 7



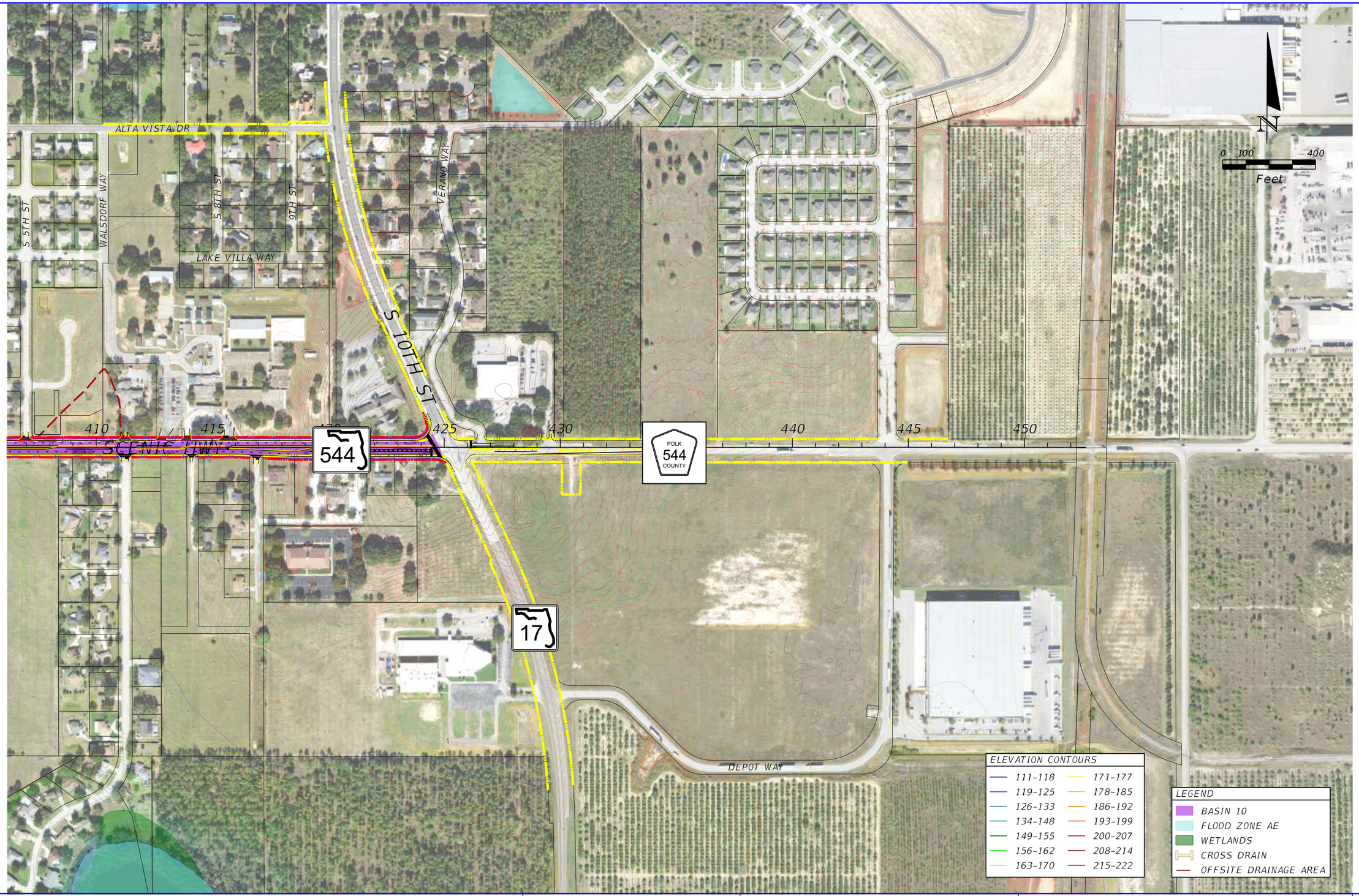

| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 8




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# BASIN MAPS

SHEET NO. 9

# *APPENDIX C*

**Pond Design Calculations**

# *BASIN 1A*

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

**Station Limits:** From: 004+80
To: 013+84

Roadway Length = 904 ft
*Areas mesaured in Microstation

## EXISTING CONDITION

**Roadway Impervious** **Area:** 1.54 ac

**Roadway Pervious:** 0.80 ac

**Total Area:** **2.34 ac**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 1.41 ac | 138.2 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 0.62 ac | 24.2 |
| Impervious areas; Streets & roads | A | 98 | 0.13 ac | 12.7 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 0.18 ac | 8.8 |
| | | Total: | 2.34 ac | 183.9 |

CN = Total CN*Area / Total Area = **78.6**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = | **4.54 in** | **11.19 in** | **4.09 in** |

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **2.72 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

**Station Limits:** From: 004+80 To: 013+84

Roadway Length = 904 ft
*Areas mesaured in Microstation

## PROPOSED CONDITION

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.17 ac | Dry Pond |
| Water Surface Area: | 0.00 ac | |
| Total Pond Area: | 0.17 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **1.70 ac** |
| Pervious Area: | **0.64 ac** |
| Water Surface Area: | **0.00 ac** |
| Total Area: | **2.34 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 1.70 ac | 166.6 |
| Proposed Roadway Pervious | A | 39 | 0.47 ac | 18.5 |
| Proposed Ponds (Water Surface) | A | 100 | 0.00 ac | 0.0 |
| Proposed Pond Pervious | A | 39 | 0.17 ac | 6.4 |
| | | Total: | 2.34 ac | 191.6 |

CN = Total CN*Area / Total Area = **81.9**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = | **4.90 in** | **11.65 in** | **4.43 in** |

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ 2.22 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Dry Retention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Dry Retention** | | | |
| | **0.50 in** | x DCIA = | 0.07 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.07 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

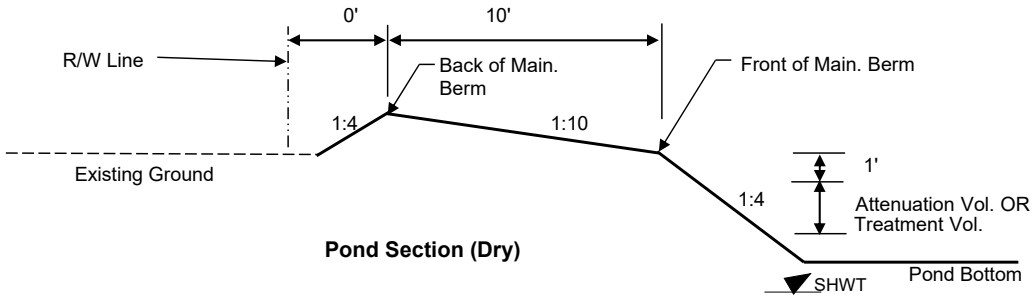
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 0.89 ac-ft | 2.18 ac-ft | 0.80 ac-ft |
| $Q_{post}$ = | 0.96 ac-ft | 2.27 ac-ft | 0.86 ac-ft |
| **ΔQ =** | **0.07 ac-ft** | **0.09 ac-ft** | **0.07 ac-ft** |

**Attenuation $V_{req}$ =** **0.09 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 151.00 |
| Pond Tie-In Width = | 0.0 ft | @ 1:4 | Normal Water Elevation = | 145.00 |
| Maximum Storage Depth (**SD**) = | 5.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 149.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 450 ft | |
| Estimated Energy Losses = | 0.5 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 147.55 ft | |




**Pond Section (Dry)**

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 151.00 | Pond R/W | 0.17 ac | 120.0 ft | 120.0 ft | |
| 151.00 | Back of Main. Berm | 0.17 ac | 120.0 ft | 120.0 ft | 0.46 ac-ft |
| 150.50 | | 0.17 ac | 120.0 ft | 120.0 ft | 0.38 ac-ft |
| 150.00 | Front of Main. Berm | 0.11 ac | 100.0 ft | 100.0 ft | 0.31 ac-ft |
| 149.00 | Provided Treat.Vol. OR Att.Vol | 0.10 ac | 92.0 ft | 92.0 ft | 0.20 ac-ft |
| 147.80 | Req'd Treat.Vol OR Att. Vol | 0.08 ac | 82.4 ft | 82.4 ft | 0.09 ac-ft |
| 147.55 | Estimated Storm Sewer TW | 0.07 ac | 80.4 ft | 80.4 ft | 0.07 ac-ft |
| 147.55 | Top of Treatment Vol. | 0.07 ac | 80.4 ft | 80.4 ft | 0.07 ac-ft |
| 146.50 | Pond Bottom | 0.06 ac | 72.0 ft | 72.0 ft | 0.00 ac-ft |

Required Treatment OR Attenuation Vol.= 0.09 ac-ft
Required Treatment OR Attenuation Stage= 147.55 ft

Provided Treatment OR Attenuation Vol.= 0.20 ac-ft
Provided Treatment OR Attenuation Stage= 149.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.07 ac-ft
Estimated Storm Sewer TW EL.= 147.55 ft

HGL requirements met

Required Treatment Vol. = 0.07 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 0.20 ac**

**Note: Parcel area occupied by pond site is 0.37 acres**

# *BASIN 1*

Inwood consulting engineers
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(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

| | | | Soil |
|---|---|---|---|
| **Station Limits:** | From: 013+84 | Roadway Length = 1166 ft | Type A |
| | To: 025+50 | R/W Width = 64 ft | |
| | From: 025+50 | Roadway Length = 400 ft | Type C |
| | To: 029+50 | R/W Width = 64 ft | |
| Typical Section Changes | From: 029+50 | Roadway Length = 2550 ft | Type C |
| | To: 055+00 | R/W Width = 112 ft | |
| | From: 055+00 | Roadway Length = 600 ft | Type A |
| | To: 061+00 | R/W Width = 112 ft | |
| | From: 061+00 | Roadway Length = 1400 ft | Type C |
| | To: 075+00 | R/W Width = 112 ft | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 5.28 ac |
| **Roadway Pervious:** | | 8.72 ac |
| **Pond Area:** | | 1.76 ac |
| **Offsite Area:** | | 20.74 ac |
| **Total Area:** | | **36.50 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 1.75 ac | 171.8 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 1.50 ac | 58.6 |
| Impervious areas; Streets & roads | C | 98 | 3.52 ac | 345.3 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 7.22 ac | 534.3 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 20.74 ac | 1016.3 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 1.76 ac | 86.3 |
| | | Total: | 36.50 ac | 2212.6 |

CN = Total CN*Area / Total Area = **60.6**

Denotes Pond Area

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **6.50 in** | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **2.66 in** | **8.40 in** | **2.31 in** |

Inwood consulting engineers
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**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

| | | | | Soil |
|---|---|---|---|---|
| **Station Limits:** | From: 013+84 | Roadway Length = 1166 ft | | Type A |
| | To: 025+50 | R/W Width = 64 ft | | |
| | From: 025+50 | Roadway Length = 400 ft | | Type C |
| | To: 029+50 | R/W Width = 64 ft | | |
| | From: 029+50 | Roadway Length = 2550 ft | | Type C |
| | To: 055+00 | R/W Width = 112 ft | | |
| | From: 055+00 | Roadway Length = 600 ft | | Type A |
| | To: 061+00 | R/W Width = 112 ft | | |
| | From: 061+00 | Roadway Length = 1400 ft | | Type C |
| | To: 075+00 | R/W Width = 112 ft | | |

## PROPOSED CONDITION

**Roadway Area (From 13+84 to 29+50):**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 12.0 ft | 2 | 24.0 ft |
| Turn Lane | 12.0 ft | 1 | 12.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | 8.0 ft | 2 | 16.0 ft |
| Curb&Gutter E | | | 0.0 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | | | 0.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 56.0 ft |

| | |
|---|---|
| Impervious Roadway Area: | 2.01 ac |
| Pervious Roadway Area: | 0.29 ac |
| Total Roadway Area: | 2.30 ac |

**Roadway Area (From 29+50 to 75+00):**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

| | |
|---|---|
| Impervious Roadway Area: | 7.78 ac |
| Pervious Roadway Area: | 3.92 ac |
| Total Roadway Area: | 11.70 ac |

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 1.76 ac | Dry Pond |
| Water Surface Area: | 0.00 ac | |
| Total Pond Area: | 1.76 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **9.80 ac** |
| Pervious Area: | **5.97 ac** |
| Water Surface Area: | **0.00 ac** |
| Offsite Area: | **20.74 ac** |
| Total Area: | **36.50 ac** |

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**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 2.53 ac | 247.5 |
| Proposed Roadway Pervious | A | 39 | 0.73 ac | 28.5 |
| Impervious areas; Streets & roads | C | 98 | 7.27 ac | 712.4 |
| Proposed Roadway Pervious | C | 74 | 3.47 ac | 257.1 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 20.74 ac | 1016.3 |
| Proposed Ponds (Water Surface) | A | 100 | 0.00 ac | 0.0 |
| Proposed Pond Pervious | A | 39 | 1.76 ac | 68.7 |
| | | | Total: 36.50 ac | 2330.4 |

CN = Total CN*Area / Total Area = **63.8**

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 5.66 in | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **2.99 in** | **8.94 in** | **2.61 in** |

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**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Dry Retention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Dry Retention** | | | |
| | **0.50 in** | x DCIA = | 0.41 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.41 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

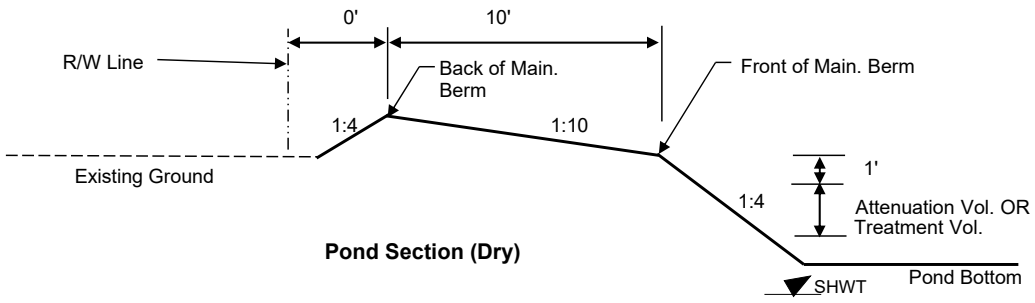
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 8.10 ac-ft | 25.56 ac-ft | 7.03 ac-ft |
| $Q_{post}$ = | 9.08 ac-ft | 27.18 ac-ft | 7.94 ac-ft |
| **ΔQ =** | **0.98 ac-ft** | **1.62 ac-ft** | **0.91 ac-ft** |

**Attenuation $V_{req}$ =** **1.62 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 135.00 |
| Pond Tie-In Width = | 0.0 ft | @ 1:4 | Normal Water Elevation = | 129.00 |
| Maximum Storage Depth (**SD**) = | 5.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 133.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 200 ft | |
| Estimated Energy Losses = | 0.2 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 131.80 ft | |




**Pond Section (Dry)**

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**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 135.00 | Pond R/W | 1.76 ac | 650.0 ft | 118.0 ft | |
| 135.00 | Back of Main. Berm | 1.76 ac | 650.0 ft | 118.0 ft | 6.32 ac-ft |
| 134.50 | | 1.76 ac | 650.0 ft | 118.0 ft | 5.44 ac-ft |
| 134.00 | Front of Main. Berm | 1.42 ac | 630.0 ft | 98.0 ft | 4.65 ac-ft |
| 133.00 | Provided Treat.Vol. OR Att.Vol | 1.29 ac | 622.0 ft | 90.0 ft | 3.29 ac-ft |
| 131.61 | Req'd Treat.Vol OR Att. Vol | 1.11 ac | 610.9 ft | 78.9 ft | 1.62 ac-ft |
| 130.94 | Estimated Storm Sewer TW | 1.02 ac | 605.5 ft | 73.5 ft | 0.91 ac-ft |
| 130.44 | Top of Treatment Vol. | 0.96 ac | 601.5 ft | 69.5 ft | 0.41 ac-ft |
| 130.00 | Pond Bottom | 0.91 ac | 598.0 ft | 66.0 ft | 0.00 ac-ft |

Required Treatment OR Attenuation Vol.= 1.62 ac-ft
Required Treatment OR Attenuation Stage= 131.61 ft

Provided Treatment OR Attenuation Vol.= 3.29 ac-ft
Provided Treatment OR Attenuation Stage= 133.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.91 ac-ft
Estimated Storm Sewer TW EL.= 130.94 ft

HGL requirements met

Required Treatment Vol. = 0.41 ac-ft

| | |
|---|---|
| **PROPOSED POND R/W (Safety Factor of 20%) =** | **2.11 ac** |
| **PROPOSED POND R/W PLUS 48' TIE-IN AT 1:3 SLOPE ON BACK OF POND =** | **2.83 ac** |

# *BASIN 2*

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
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**Made by:** DLD
**Checked by:** REC
**DATE:** August 3, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 075+00 | Roadway Length = 1050 ft | | Type D |
| To: 085+50 | R/W Width = 112 ft | | |
| From: 085+50 | Roadway Length = 1550 ft | | Type C |
| To: 101+00 | R/W Width = 128 ft | | |
| From: 101+00 | Roadway Length = 550 ft | | Type A |
| To: 106+50 | R/W Width = 118 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 2.46 ac |
| **Roadway Pervious:** | | 6.29 ac |
| **Pond Area:** | | 2.58 ac |
| **Offsite Area:** | | 9.73 ac |
| **Total Area:** | | **21.06 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 0.43 ac | 42.1 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 1.06 ac | 41.4 |
| Impervious areas; Streets & roads | C | 98 | 1.21 ac | 118.6 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 3.35 ac | 248.3 |
| Impervious areas; Streets & roads | D | 98 | 0.82 ac | 80.3 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 1.88 ac | 150.4 |
| Residential Areas (2.0 acre, 12% Impervious) | A | 46 | 9.73 ac | 447.6 |
| Brush-weed-grass mixture; Good condition (> 75% ground cover) | C | 65 | 2.58 ac | 167.9 |
| | | Total: | 21.06 ac | 1296.5 |

CN = Total CN*Area / Total Area = **61.6**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = 1000/CN - 10 = **6.24 in** | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | **2.76 in** | **8.56 in** | **2.40 in** |

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 075+00 | Roadway Length = 1050 ft | | Type D |
| To: 085+50 | R/W Width = 112 ft | | |
| From: 085+50 | Roadway Length = 1550 ft | | Type C |
| To: 101+00 | R/W Width = 128 ft | | |
| From: 101+00 | Roadway Length = 550 ft | | Type A |
| To: 106+50 | R/W Width = 118 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

Impervious Roadway Area: 5.39 ac
Pervious Roadway Area: 3.36 ac
Total Roadway Area: 8.74 ac

**Pond Area:**

Pervious Pond Area : 0.67 ac
Water Surface Area: 1.91 ac Wet Pond
Total Pond Area: 2.58 ac

**Total Area:**

Impervious Area: **5.39 ac**
Pervious Area: **4.03 ac**
Water Surface Area: **1.91 ac**
Offsite Area: **9.73 ac**
Total Area: **21.06 ac**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 0.94 ac | 92.2 |
| Proposed Roadway Pervious | A | 39 | 0.55 ac | 21.4 |
| Impervious areas; Streets & roads | C | 98 | 2.65 ac | 259.8 |
| Proposed Roadway Pervious | C | 74 | 1.91 ac | 141.6 |
| Impervious areas; Streets & roads | D | 98 | 1.80 ac | 176.0 |
| Proposed Roadway Pervious | D | 80 | 0.90 ac | 72.3 |
| Residential Areas (2.0 acre, 12% Impervious) | A | 46 | 9.73 ac | 447.6 |
| Proposed Ponds (Water Surface) | C | 100 | 1.91 ac | 190.9 |
| Proposed Pond Pervious | C | 74 | 0.67 ac | 49.9 |
| | | Total: | 21.06 ac | 1451.7 |

CN = Total CN*Area / Total Area = **68.9**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 4.51 in | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | **3.51 in** | **9.75 in** | **3.10 in** |

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**DATE:** August 3, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 0.45 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.45 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

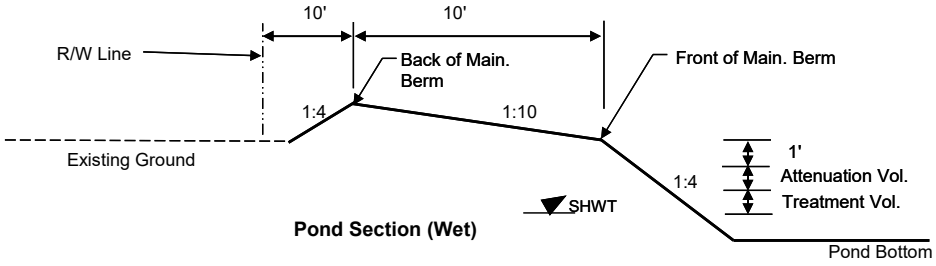
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 4.84 ac-ft | 15.02 ac-ft | 4.21 ac-ft |
| $Q_{post}$ = | 6.16 ac-ft | 17.10 ac-ft | 5.44 ac-ft |
| **ΔQ =** | **1.32 ac-ft** | **2.08 ac-ft** | **1.23 ac-ft** |

**Attenuation $V_{req}$ =** **2.08 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 131.00 |
| Pond Tie-In Width = | 10.0 ft | @ 1:4 | Normal Water Elevation = | 130.00 |
| Maximum Storage Depth (**SD**) = | 2.50 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 132.00 |

### Hydraulic Grade Line (HGL) check

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 50 ft | |
| Estimated Energy Losses = | 0.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 130.95 ft | |




**Pond Section (Wet)**

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**DATE:** August 3, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 131.00 | Pond R/W | 2.95 ac | 600.0 ft | 214.0 ft | |
| 133.50 | Back of Main. Berm | 2.58 ac | 580.0 ft | 194.0 ft | 7.59 ac-ft |
| 133.00 | | 2.41 ac | 570.0 ft | 184.0 ft | 6.34 ac-ft |
| 132.50 | Front of Main. Berm | 2.24 ac | 560.0 ft | 174.0 ft | 5.18 ac-ft |
| 131.50 | Provided Treat.Vol.+Att.Vol | 2.10 ac | 552.0 ft | 166.0 ft | 3.10 ac-ft |
| 131.22 | Req'd Treat.Vol+Att. Vol | 2.07 ac | 549.8 ft | 163.8 ft | 2.53 ac-ft |
| 130.81 | Estimated Storm Sewer TW | 2.01 ac | 546.5 ft | 160.5 ft | 1.68 ac-ft |
| 130.22 | Top of Treatment Vol. | 1.94 ac | 541.7 ft | 155.7 ft | 0.45 ac-ft |
| 130.00 | Normal Water Level | 1.91 ac | 540.0 ft | 154.0 ft | 0.00 ac-ft |
| 128.00 | | 1.66 ac | 524.0 ft | 138.0 ft | |
| 122.00 | Pond Bottom | 0.98 ac | 476.0 ft | 90.0 ft | |

Required Treatment+Attenuation Vol.= 2.53 ac-ft
Required Treatment+Attenuation Stage= 131.22 ft

Provided Treatment+Attenuation Vol.= 3.10 ac-ft
Provided Treatment+Attenuation Stage= 131.50 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.68 ac-ft
Estimated Storm Sewer TW EL.= 130.81 ft

HGL requirements met

Required Treatment Vol. = 0.45 ac-ft

| | |
|---|---|
| **PROPOSED POND R/W (Safety Factor of 20%) =** | **3.54 ac** |
| **PROPOSED POND R/W PLUS 21' TIE-IN AT 1:3 SLOPE ON BACK OF POND =** | **3.83 ac** |

# *BASIN 3*

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(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 106+50 | Roadway Length = 300 ft | | Type A |
| To: 109+50 | R/W Width = 118 ft | | |
| From: 109+50 | Roadway Length = 800 ft | | Type C |
| To: 117+50 | R/W Width = 130 ft | | |
| From: 117+50 | Roadway Length = 950 ft | | Type D |
| To: 127+00 | R/W Width = 130 ft | | |
| From: 127+00 | Roadway Length = 2800 ft | | Type C |
| To: 155+00 | R/W Width = 130 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 3.79 ac |
| **Roadway Pervious:** | | 10.61 ac |
| **Pond Area:** | | 1.74 ac |
| **Total Area:** | | **16.14 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 0.23 ac | 22.9 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 0.58 ac | 22.6 |
| Impervious areas; Streets & roads | C | 98 | 2.81 ac | 275.4 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 7.93 ac | 587.1 |
| Impervious areas; Streets & roads | D | 98 | 0.74 ac | 72.7 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 2.09 ac | 167.5 |
| Brush-weed-grass mixture; Good condition (> 75% ground cover) | C | 65 | 1.74 ac | 113.4 |
| | | Total: | 16.14 ac | 1261.5 |

CN = Total CN*Area / Total Area = **78.2**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **2.79 in** | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | | |
| Runoff (Q) = | **4.49 in** | **11.13 in** | **4.04 in** |

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 106+50 | Roadway Length = 300 ft | | Type A |
| To: 109+50 | R/W Width = 118 ft | | |
| From: 109+50 | Roadway Length = 800 ft | | Type C |
| To: 117+50 | R/W Width = 130 ft | | |
| From: 117+50 | Roadway Length = 950 ft | | Type D |
| To: 127+00 | R/W Width = 130 ft | | |
| From: 127+00 | Roadway Length = 2800 ft | | Type C |
| To: 155+00 | R/W Width = 130 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

Impervious Roadway Area: 8.29 ac
Pervious Roadway Area: 6.10 ac
Total Roadway Area: 14.39 ac

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.67 ac | |
| Water Surface Area: | 1.07 ac | Wet Pond |
| Total Pond Area: | 1.74 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **8.29 ac** |
| Pervious Area: | **6.77 ac** |
| Water Surface Area: | **1.07 ac** |
| Total Area: | **16.14 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 0.51 ac | 50.3 |
| Proposed Roadway Pervious | A | 39 | 0.30 ac | 11.7 |
| Impervious areas; Streets & roads | C | 98 | 6.16 ac | 603.4 |
| Proposed Roadway Pervious | C | 74 | 4.59 ac | 339.4 |
| Impervious areas; Streets & roads | D | 98 | 1.62 ac | 159.2 |
| Proposed Roadway Pervious | D | 80 | 1.21 ac | 96.8 |
| Proposed Ponds (Water Surface) | C | 100 | 1.07 ac | 107.1 |
| Proposed Pond Pervious | C | 74 | 0.67 ac | 49.9 |
| | | Total: | 16.14 ac | 1417.7 |

CN = Total CN*Area / Total Area = **87.9**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.38 in | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | | |
| Runoff (Q) = | **5.58 in** | **12.47 in** | **5.09 in** |

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 0.69 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.69 ac-ft**

### Required Attenuation Volume:

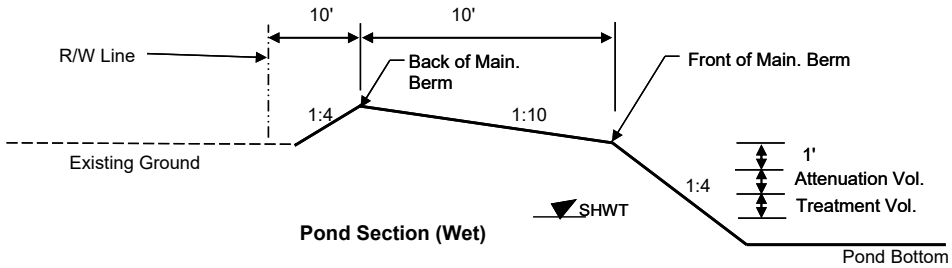
| Total Runoff (ac-ft) | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 6.04 ac-ft | 14.97 ac-ft | 5.44 ac-ft |
| $Q_{post}$ = | 7.50 ac-ft | 16.77 ac-ft | 6.85 ac-ft |
| **ΔQ =** | **1.46 ac-ft** | **1.80 ac-ft** | **1.41 ac-ft** |

**Attenuation $V_{req}$ =** **1.80 ac-ft** (use largest value)

| | | | | |
|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 128.50 |
| Pond Tie-In Width = | 10.0 ft | @ 1:4 | Normal Water Elevation = | 127.00 |
| Maximum Storage Depth (**SD**) = | 3.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 130.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 300 ft | |
| Estimated Energy Losses = | 0.3 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 128.70 ft | |




**Pond Section (Wet)**

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(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 128.50 | Pond R/W | 2.08 ac | 600.0 ft | 151.0 ft | |
| 131.00 | Back of Main. Berm | 1.74 ac | 580.0 ft | 131.0 ft | 5.33 ac-ft |
| 130.50 | | 1.58 ac | 570.0 ft | 121.0 ft | 4.50 ac-ft |
| 130.00 | Front of Main. Berm | 1.43 ac | 560.0 ft | 111.0 ft | 3.75 ac-ft |
| 129.00 | Provided Treat.Vol.+Att.Vol | 1.31 ac | 552.0 ft | 103.0 ft | 2.51 ac-ft |
| 128.99 | Req'd Treat.Vol+Att. Vol | 1.30 ac | 552.0 ft | 103.0 ft | 2.49 ac-ft |
| 128.68 | Estimated Storm Sewer TW | 1.27 ac | 549.5 ft | 100.5 ft | 2.10 ac-ft |
| 127.55 | Top of Treatment Vol. | 1.13 ac | 540.4 ft | 91.4 ft | 0.69 ac-ft |
| 127.00 | Normal Water Level | 1.07 ac | 536.0 ft | 87.0 ft | 0.00 ac-ft |
| 125.00 | | 0.85 ac | 520.0 ft | 71.0 ft | |
| 119.00 | Pond Bottom | 0.25 ac | 472.0 ft | 23.0 ft | |

Required Treatment+Attenuation Vol.= 2.49 ac-ft
Required Treatment+Attenuation Stage= 128.99 ft

Provided Treatment+Attenuation Vol.= 2.51 ac-ft
Provided Treatment+Attenuation Stage= 129.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.10 ac-ft
Estimated Storm Sewer TW EL.= 128.68 ft

HGL requirements met

Required Treatment Vol. = 0.69 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 2.50 ac**

# *BASIN 4*

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**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 155+00 | Roadway Length = 250 ft | | Type C |
| To: 157+50 | R/W Width = 130 ft | | |
| From: 157+50 | Roadway Length = 4050 ft | | Type D |
| To: 198+00 | R/W Width = 130 ft | | |
| From: 198+00 | Roadway Length = 500 ft | | Type C |
| To: 203+00 | R/W Width = 138 ft | | |
| From: 203+00 | Roadway Length = 1100 ft | | Type D |
| To: 214+00 | R/W Width = 130 ft | | |
| From: 214+00 | Roadway Length = 275 ft | | Type C |
| To: 216+75 | R/W Width = 138 ft | | |
| From: 216+75 | Roadway Length = 175 ft | | Type A |
| To: 218+50 | R/W Width = 138 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 4.96 ac |
| **Roadway Pervious:** | | 14.17 ac |
| **Pond Area:** | | 1.63 ac |
| **Total Area:** | | **20.75 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | C | 98 | 0.80 ac | 78.4 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 2.40 ac | 177.7 |
| Impervious areas; Streets & roads | D | 98 | 4.02 ac | 393.9 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 11.35 ac | 908.0 |
| Impervious areas; Streets & roads | A | 98 | 0.14 ac | 13.4 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 0.42 ac | 16.3 |
| Woods; Fair condition (Woods grazed but not burned, and with some forest litter) | D | 79 | 1.63 ac | 128.7 |
| | | Total: | 20.75 ac | 1716.4 |

CN = Total CN*Area / Total Area = **82.7**

Denotes Pond Area

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = | **2.09 in** | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | Runoff (Q) = | **4.99 in** | **11.77 in** | **4.53 in** |

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**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 155+00 | Roadway Length = 250 ft | | Type C |
| To: 157+50 | R/W Width = 130 ft | | |
| From: 157+50 | Roadway Length = 4050 ft | | Type D |
| To: 198+00 | R/W Width = 130 ft | | |
| From: 198+00 | Roadway Length = 500 ft | | Type C |
| To: 203+00 | R/W Width = 138 ft | | |
| From: 203+00 | Roadway Length = 1100 ft | | Type D |
| To: 214+00 | R/W Width = 130 ft | | |
| From: 214+00 | Roadway Length = 275 ft | | Type C |
| To: 216+75 | R/W Width = 138 ft | | |
| From: 216+75 | Roadway Length = 175 ft | | Type A |
| To: 218+50 | R/W Width = 138 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

| | |
|---|---|
| Impervious Roadway Area: | 10.86 ac |
| Pervious Roadway Area: | 8.27 ac |
| Total Roadway Area: | 19.13 ac |

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.52 ac | |
| Water Surface Area: | 1.11 ac | Wet Pond |
| Total Pond Area: | 1.63 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **10.86 ac** |
| Pervious Area: | **8.79 ac** |
| Water Surface Area: | **1.11 ac** |
| Total Area: | **20.75 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | C | 98 | 1.75 ac | 171.8 |
| Proposed Roadway Pervious | C | 74 | 1.45 ac | 107.2 |
| Impervious areas; Streets & roads | D | 98 | 8.81 ac | 863.2 |
| Proposed Roadway Pervious | D | 80 | 6.56 ac | 524.9 |
| Impervious areas; Streets & roads | A | 98 | 0.30 ac | 29.3 |
| Proposed Roadway Pervious | A | 39 | 0.26 ac | 9.9 |
| Proposed Ponds (Water Surface) | D | 100 | 1.11 ac | 110.9 |
| Proposed Pond Pervious | D | 80 | 0.52 ac | 41.6 |
| | | Total: | 20.75 ac | 1858.9 |

CN = Total CN*Area / Total Area = **89.6**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.17 in | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | **5.77 in** | **12.69 in** | **5.28 in** |

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 0.91 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.91 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

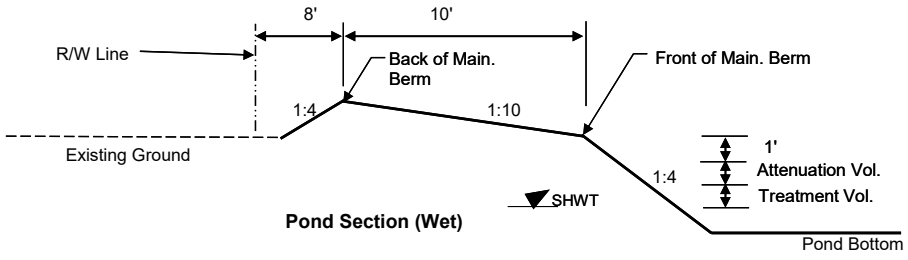
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 8.64 ac-ft | 20.36 ac-ft | 7.83 ac-ft |
| $Q_{post}$ = | 9.98 ac-ft | 21.95 ac-ft | 9.14 ac-ft |
| **ΔQ =** | **1.35 ac-ft** | **1.60 ac-ft** | **1.31 ac-ft** |

**Attenuation $V_{req}$ =** **1.60 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 128.00 |
| Pond Tie-In Width = | 8.0 ft | @ 1:4 | Normal Water Elevation = | 126.00 |
| Maximum Storage Depth (**SD**) = | 3.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 129.00 |

### Hydraulic Grade Line (HGL) check

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 100 ft | |
| Estimated Energy Losses = | 0.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 127.90 ft | |




**Pond Section (Wet)**

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 128.00 | Pond R/W | 1.84 ac | 380.0 ft | 211.0 ft | |
| 130.00 | Back of Main. Berm | 1.63 ac | 364.0 ft | 195.0 ft | 5.24 ac-ft |
| 129.50 | | 1.50 ac | 354.0 ft | 185.0 ft | 4.46 ac-ft |
| 129.00 | Front of Main. Berm | 1.38 ac | 344.0 ft | 175.0 ft | 3.74 ac-ft |
| 128.00 | Provided Treat.Vol.+Att.Vol | 1.29 ac | 336.0 ft | 167.0 ft | 2.50 ac-ft |
| 128.00 | Req'd Treat.Vol+Att. Vol | 1.29 ac | 336.0 ft | 167.0 ft | 2.50 ac-ft |
| 127.78 | Estimated Storm Sewer TW | 1.27 ac | 334.2 ft | 165.2 ft | 2.22 ac-ft |
| 126.73 | Top of Treatment Vol. | 1.17 ac | 325.8 ft | 156.8 ft | 0.91 ac-ft |
| 126.00 | Normal Water Level | 1.11 ac | 320.0 ft | 151.0 ft | 0.00 ac-ft |
| 124.00 | | 0.94 ac | 304.0 ft | 135.0 ft | |
| 118.00 | Pond Bottom | 0.51 ac | 256.0 ft | 87.0 ft | |

Required Treatment+Attenuation Vol.= 2.50 ac-ft
Required Treatment+Attenuation Stage= 128.00 ft

Provided Treatment+Attenuation Vol.= 2.50 ac-ft
Provided Treatment+Attenuation Stage= 128.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.22 ac-ft
Estimated Storm Sewer TW EL.= 127.78 ft

HGL requirements met

Required Treatment Vol. = 0.91 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 2.21 ac**

# *BASIN 5*

Inwood consulting engineers
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**Made by:** DLD
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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 218+50 | Roadway Length = 500 ft | | Type A |
| To: 223+50 | R/W Width = 154 ft | | |
| From: 223+50 | Roadway Length = 300 ft | | Type C |
| To: 226+50 | R/W Width = 154 ft | | |
| From: 226+50 | Roadway Length = 1700 ft | | Type D |
| To: 243+50 | R/W Width = 112 ft | | |
| From: 243+50 | Roadway Length = 400 ft | | Type A |
| To: 247+50 | R/W Width = 112 ft | | |
| From: 247+50 | Roadway Length = 200 ft | | Type C |
| To: 249+50 | R/W Width = 112 ft | | |
| From: 249+50 | Roadway Length = 1050 ft | | Type D |
| To: 260+00 | R/W Width = 116 ft | | |
| From: 260+00 | Roadway Length = 2900 ft | | Type C |
| To: 289+00 | R/W Width = 120 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 5.50 ac |
| **Roadway Pervious:** | | 14.02 ac |
| **Pond Area:** | | 1.16 ac |
| **Total Area:** | | **20.69 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 0.70 ac | 68.8 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 2.09 ac | 81.7 |
| Impervious areas; Streets & roads | C | 98 | 2.65 ac | 260.1 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 6.91 ac | 511.3 |
| Impervious areas; Streets & roads | D | 98 | 2.15 ac | 210.4 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 5.02 ac | 401.7 |
| Brush-weed-grass mixture; Poor condition (< 50% ground cover) | D | 83 | 1.16 ac | 96.7 |
| | | Total: | 20.69 ac | 1630.6 |

CN = Total CN*Area / Total Area = **78.8**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **2.69 in** | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | **4.56 in** | **11.22 in** | **4.11 in** |

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**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 218+50 | Roadway Length = 500 ft | | Type A |
| To: 223+50 | R/W Width = 154 ft | | |
| From: 223+50 | Roadway Length = 300 ft | | Type C |
| To: 226+50 | R/W Width = 154 ft | | |
| From: 226+50 | Roadway Length = 1700 ft | | Type D |
| To: 243+50 | R/W Width = 112 ft | | |
| From: 243+50 | Roadway Length = 400 ft | | Type A |
| To: 247+50 | R/W Width = 112 ft | | |
| From: 247+50 | Roadway Length = 200 ft | | Type C |
| To: 249+50 | R/W Width = 112 ft | | |
| From: 249+50 | Roadway Length = 1050 ft | | Type D |
| To: 260+00 | R/W Width = 116 ft | | |
| From: 260+00 | Roadway Length = 2900 ft | | Type C |
| To: 289+00 | R/W Width = 120 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

Impervious Roadway Area: 12.06 ac
Pervious Roadway Area: 7.47 ac
Total Roadway Area: 19.53 ac

**Pond Area:**

Pervious Pond Area : 0.63 ac
Water Surface Area: 0.54 ac Wet Pond
Total Pond Area: 1.16 ac

**Total Area:**

Impervious Area: **12.06 ac**
Pervious Area: **8.10 ac**
Water Surface Area: **0.54 ac**
Total Area: **20.69 ac**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 1.54 ac | 150.8 |
| Proposed Roadway Pervious | A | 39 | 1.26 ac | 49.0 |
| Impervious areas; Streets & roads | C | 98 | 5.81 ac | 569.9 |
| Proposed Roadway Pervious | C | 74 | 3.75 ac | 277.4 |
| Impervious areas; Streets & roads | D | 98 | 4.70 ac | 460.9 |
| Proposed Roadway Pervious | D | 80 | 2.46 ac | 197.1 |
| Proposed Ponds (Water Surface) | D | 100 | 0.54 ac | 53.7 |
| Proposed Pond Pervious | D | 80 | 0.63 ac | 50.2 |
| | | Total: | 20.69 ac | 1809.1 |

CN = Total CN*Area / Total Area = **87.4**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.44 in | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | **5.53 in** | **12.41 in** | **5.04 in** |

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(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 1.00 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **1.00 ac-ft**

### Required Attenuation Volume:

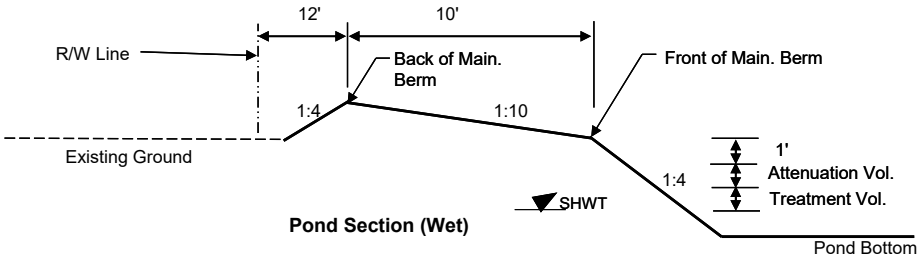
| Total Runoff (ac-ft) | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 7.87 ac-ft | 19.35 ac-ft | 7.08 ac-ft |
| $Q_{post}$ = | 9.53 ac-ft | 21.40 ac-ft | 8.70 ac-ft |
| **ΔQ =** | **1.67 ac-ft** | **2.05 ac-ft** | **1.61 ac-ft** |

**Attenuation $V_{req}$ =** **2.05 ac-ft** (use largest value)

| | | | | |
|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 126.00 |
| Pond Tie-In Width = | 12.4 ft | @ 1:4 | Normal Water Elevation = | 123.00 |
| Maximum Storage Depth (**SD**) = | 5.10 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 129.00 |

### Hydraulic Grade Line (HGL) check

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 1100 ft | |
| Estimated Energy Losses = | 1.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 126.90 ft | |




**Pond Section (Wet)**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 126.00 | Pond R/W | 1.47 ac | 400.0 ft | 160.0 ft | |
| 129.10 | Back of Main. Berm | 1.16 ac | 375.2 ft | 135.2 ft | 4.82 ac-ft |
| 128.60 | | 1.05 ac | 365.2 ft | 125.2 ft | 4.26 ac-ft |
| 128.10 | Front of Main. Berm | 0.94 ac | 355.2 ft | 115.2 ft | 3.76 ac-ft |
| 127.10 | Provided Treat.Vol.+Att.Vol | 0.85 ac | 347.2 ft | 107.2 ft | 3.08 ac-ft |
| 127.14 | Req'd Treat.Vol+Att. Vol | 0.86 ac | 347.5 ft | 107.5 ft | 3.06 ac-ft |
| 126.55 | Estimated Storm Sewer TW | 0.81 ac | 342.8 ft | 102.8 ft | 2.62 ac-ft |
| 124.36 | Top of Treatment Vol. | 0.64 ac | 325.3 ft | 85.3 ft | 1.00 ac-ft |
| 123.00 | Normal Water Level | 0.54 ac | 314.4 ft | 74.4 ft | 0.00 ac-ft |
| 121.00 | | 0.40 ac | 298.4 ft | 58.4 ft | |
| 117.00 | Pond Bottom | 0.16 ac | 266.4 ft | 26.4 ft | |

Required Treatment+Attenuation Vol.= 3.06 ac-ft
Required Treatment+Attenuation Stage= 127.14 ft

Provided Treatment+Attenuation Vol.= 3.08 ac-ft
Provided Treatment+Attenuation Stage= 127.10 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.62 ac-ft
Estimated Storm Sewer TW EL.= 126.55 ft

HGL requirements met

Required Treatment Vol. = 1.00 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 1.76 ac**

**Note: Remnant area in parcel after allocation to FPC 4 is 1.95 acres.**

# *BASIN 6*

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 289+00 | Roadway Length = 550 ft | | Type C |
| To: 294+50 | R/W Width = 112 ft | | |
| From: 294+50 | Roadway Length = 400 ft | | Type D |
| To: 298+50 | R/W Width = 112 ft | | |
| From: 298+50 | Roadway Length = 150 ft | | Type C |
| To: 300+00 | R/W Width = 112 ft | | |
| From: 300+00 | Roadway Length = 1410 ft | | Type A |
| To: 314+10 | R/W Width = 112 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 1.96 ac |
| **Roadway Pervious:** | | 4.49 ac |
| **Pond Area:** | | 1.14 ac |
| **Total Area:** | | **7.60 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | C | 98 | 0.55 ac | 53.5 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | C | 74 | 1.25 ac | 92.8 |
| Impervious areas; Streets & roads | D | 98 | 0.31 ac | 30.6 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 0.72 ac | 57.3 |
| Impervious areas; Streets & roads | A | 98 | 1.10 ac | 107.9 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 2.52 ac | 98.5 |
| Residential Areas (1.0 acre, 20% Impervious) | D | 84 | 1.14 ac | 96.1 |
| | | Total: | 7.60 ac | 536.6 |

CN = Total CN*Area / Total Area = **70.6**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **4.16 in** | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | | |
| Runoff (Q) = | **3.68 in** | **10.01 in** | **3.27 in** |

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**Made by:** DLD
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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 289+00 | Roadway Length = 550 ft | | Type C |
| To: 294+50 | R/W Width = 112 ft | | |
| From: 294+50 | Roadway Length = 400 ft | | Type D |
| To: 298+50 | R/W Width = 112 ft | | |
| From: 298+50 | Roadway Length = 150 ft | | Type C |
| To: 300+00 | R/W Width = 112 ft | | |
| From: 300+00 | Roadway Length = 1410 ft | | Type A |
| To: 314+10 | R/W Width = 112 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

| | |
|---|---|
| Impervious Roadway Area: | 4.29 ac |
| Pervious Roadway Area: | 2.16 ac |
| Total Roadway Area: | 6.45 ac |

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.41 ac | |
| Water Surface Area: | 0.73 ac | Wet Pond |
| Total Pond Area: | 1.14 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **4.29 ac** |
| Pervious Area: | **2.57 ac** |
| Water Surface Area: | **0.73 ac** |
| Total Area: | **7.60 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 2.41 ac | 236.3 |
| Proposed Roadway Pervious | A | 39 | 1.21 ac | 47.3 |
| Impervious areas; Streets & roads | C | 98 | 1.20 ac | 117.3 |
| Proposed Roadway Pervious | C | 74 | 0.60 ac | 44.6 |
| Impervious areas; Streets & roads | D | 98 | 0.68 ac | 67.0 |
| Proposed Roadway Pervious | D | 80 | 0.34 ac | 27.5 |
| Proposed Ponds (Water Surface) | D | 100 | 0.73 ac | 73.0 |
| Proposed Pond Pervious | D | 80 | 0.41 ac | 33.1 |
| | | Total: | 7.60 ac | 646.3 |

CN = Total CN*Area / Total Area = **85.1**

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = | 1.76 in | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | Runoff (Q) = | **5.26 in** | **12.09 in** | **4.78 in** |

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 0.36 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.36 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

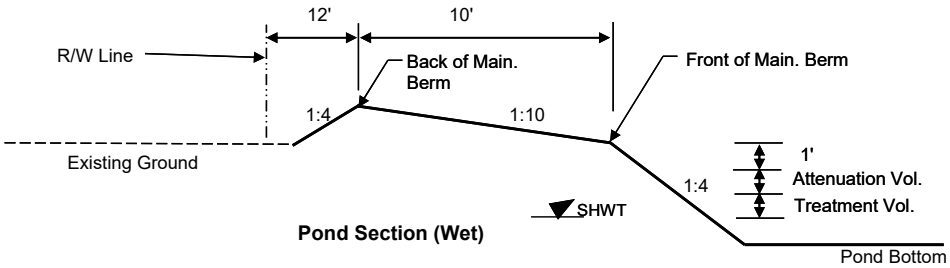
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 2.33 ac-ft | 6.34 ac-ft | 2.07 ac-ft |
| $Q_{post}$ = | 3.33 ac-ft | 7.66 ac-ft | 3.03 ac-ft |
| **ΔQ =** | **1.00 ac-ft** | **1.32 ac-ft** | **0.96 ac-ft** |

**Attenuation $V_{req}$ =** **1.32 ac-ft** (use largest value)

| | | | | |
|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 130.00 |
| Pond Tie-In Width = | 12.0 ft | @ 1:4 | Normal Water Elevation = | 129.00 |
| Maximum Storage Depth (**SD**) = | 3.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 134.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 100 ft | |
| Estimated Energy Losses = | 0.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 132.90 ft | |




**Pond Section (Wet)**

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**Made by:** DLD
**Checked by:** REC

**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 130.00 | Pond R/W | 1.41 ac | 292.0 ft | 210.0 ft | |
| 133.00 | Back of Main. Berm | 1.14 ac | 268.0 ft | 186.0 ft | 3.56 ac-ft |
| 132.50 | | 1.04 ac | 258.0 ft | 176.0 ft | 3.01 ac-ft |
| 132.00 | Front of Main. Berm | 0.95 ac | 248.0 ft | 166.0 ft | 2.51 ac-ft |
| 131.00 | Provided Treat.Vol.+Att.Vol | 0.87 ac | 240.0 ft | 158.0 ft | 1.68 ac-ft |
| 131.00 | Req'd Treat.Vol+Att. Vol | 0.87 ac | 240.0 ft | 158.0 ft | 1.68 ac-ft |
| 130.57 | Estimated Storm Sewer TW | 0.84 ac | 236.6 ft | 154.6 ft | 1.32 ac-ft |
| 129.43 | Top of Treatment Vol. | 0.76 ac | 227.4 ft | 145.4 ft | 0.36 ac-ft |
| 129.00 | Normal Water Level | 0.73 ac | 224.0 ft | 142.0 ft | 0.00 ac-ft |
| 127.00 | | 0.60 ac | 208.0 ft | 126.0 ft | |
| 121.00 | Pond Bottom | 0.29 ac | 160.0 ft | 78.0 ft | |

Required Treatment+Attenuation Vol.= 1.68 ac-ft
Required Treatment+Attenuation Stage= 131.00 ft

Provided Treatment+Attenuation Vol.= 1.68 ac-ft
Provided Treatment+Attenuation Stage= 131.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.32 ac-ft
Estimated Storm Sewer TW EL.= 130.57 ft

HGL requirements met

Required Treatment Vol. = 0.36 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 1.69 ac**

**Note: Parcel area occupied by pond site is 1.87 acres.**

# *BASIN 7 - SWALE*

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

**Station Limits:** From: 314+50 To: 331+50

Roadway Length = 1700 ft
*Areas measured in Microstation

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 9.25 ac |
| **Roadway Pervious:** | | 5.31 ac |
| **Pond Area:** | | 0.59 ac |
| **Total Area:** | | **15.15 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 9.25 ac | 906.5 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 5.31 ac | 207.1 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 0.59 ac | 28.7 |
| | | Total: | 15.15 ac | 1142.3 |

CN = Total CN*Area / Total Area = **75.4**

Denotes Pond Area

**Runoff:**

| | | | SWFWMD (100yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|---|
| Soil Capacity (S) = | $\frac{1000}{CN} - 10 =$ | **3.26 in** | Precipitation (P) = | 9.00 in | 18.00 in | 6.50 in |
| Runoff (Q) = | $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | Runoff (Q) = | **6.00 in** | **14.60 in** | **3.76 in** |

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**Checked by:** REC
**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

**Station Limits:** From: 314+50 To: 331+50

Roadway Length = 1700 ft
*Areas measured in Microstation

## PROPOSED CONDITION

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.59 ac | Dry Pond |
| Water Surface Area: | 0.00 ac | |
| Total Pond Area: | 0.59 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **8.82 ac** |
| Pervious Area: | **6.33 ac** |
| Water Surface Area: | **0.00 ac** |
| Total Area: | **15.15 ac** |

**Curve Number:**

Proposed Sidewalk

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 8.82 ac | 864.4 |
| Proposed Roadway Pervious | A | 39 | 5.74 ac | 223.9 |
| Proposed Ponds (Water Surface) | A | 100 | 0.00 ac | 0.0 |
| Proposed Pond Pervious | A | 39 | 0.59 ac | 22.8 |
| | | Total: | 15.15 ac | 1111.1 |

CN = Total CN*Area / Total Area = **73.4**

**Runoff:**

| | SWFWMD (100yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Precipitation (P) = | 9.00 in | 18.00 in | 6.50 in |

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.63 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

| | | | |
|---|---|---|---|
| Runoff (Q) = | **5.75 in** | **14.27 in** | **3.54 in** |

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**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**
FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Dry Retention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Closed** |

| | |
|---|---|
| **Dry Retention** | |
| **0.50 in** x DCIA = | 0.37 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.37 ac-ft**

### Required Attenuation Volume:

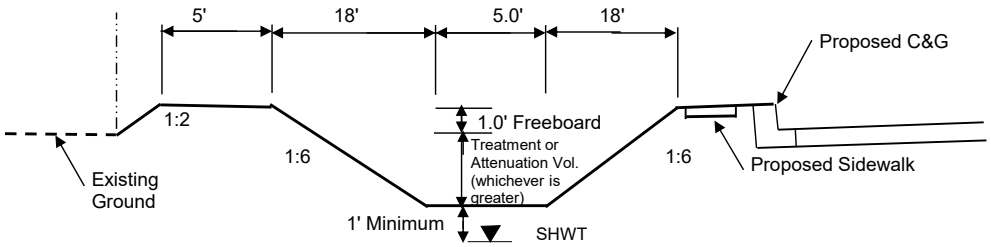
| Total Runoff (ac-ft) | SWFWMD (100yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 7.58 ac-ft | 18.43 ac-ft | 4.74 ac-ft |
| $Q_{post}$ = | 7.26 ac-ft | 18.01 ac-ft | 4.47 ac-ft |
| **ΔQ =** | **-0.32 ac-ft** | **-0.42 ac-ft** | **-0.27 ac-ft** |

**Attenuation $V_{req}$ =** **0.00 ac-ft** (use largest value)
**Original Permitted Attenuation $V_{req}$ =** **0.28 ac-ft**
**Total Attenuation $V_{req}$ =** **0.28 ac-ft**

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 0.0 ft | @ 1:20 | Existing Ground Elevation = | 129.00 |
| Pond Tie-In Width = | 4.0 ft | @ 1:2 | Normal Water Elevation = | 127.00 |
| Maximum Storage Depth (**SD**) = | 3.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 132.50 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.050% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 50 ft | |
| Estimated Energy Losses = | 0.0 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 131.48 ft | |




**Dry Retention Linear Swale**

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**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 129.00 | Pond R/W | 0.59 ac | 510.0 ft | 50.0 ft | |
| 131.00 | Back of Main. Berm | 0.55 ac | 520.0 ft | 46.0 ft | 0.82 ac-ft |
| 131.00 | | 0.55 ac | 520.0 ft | 46.0 ft | 0.82 ac-ft |
| 131.00 | Front of Main. Berm | 0.49 ac | 520.0 ft | 41.0 ft | 0.82 ac-ft |
| 130.00 | Provided Treat.Vol. OR Att.Vol | 0.34 ac | 508.0 ft | 29.0 ft | 0.39 ac-ft |
| 129.94 | Req'd Treat.Vol OR Att. Vol | 0.33 ac | 507.3 ft | 28.3 ft | 0.37 ac-ft |
| 129.94 | Estimated Storm Sewer TW | 0.33 ac | 507.3 ft | 28.3 ft | 0.37 ac-ft |
| 129.94 | Top of Treatment Vol. | 0.33 ac | 507.3 ft | 28.3 ft | 0.37 ac-ft |
| 128.00 | Pond Bottom | 0.06 ac | 484.0 ft | 5.0 ft | 0.00 ac-ft |

Required Treatment OR Attenuation Vol.= 0.37 ac-ft

Provided Treatment OR Attenuation Vol.= 0.39 ac-ft
Provided Treatment OR Attenuation Stage= 130.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.37 ac-ft
Estimated Storm Sewer TW EL.= 129.94 ft

HGL requirements met

Required Treatment Vol. = 0.37 ac-ft

**PROPOSED SWALE R/W (Safety Factor of 20%) = 0.70 ac**

# *BASIN 8*

Inwood consulting engineers
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(407) 971-8850 (phone)
(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC
**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

| | | | Soil |
|---|---|---|---|
| **Station Limits:** | From: 331+50 | Roadway Length = 350 ft | Type A |
| | To: 335+00 | R/W Width = 140 ft | |
| | From: 335+00 | Roadway Length = 1300 ft | Type D |
| | To: 348+00 | R/W Width = 140 ft | |

*Areas measured in Microstation

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 8.73 ac |
| **Roadway Pervious:** | | 10.75 ac |
| **Pond Area:** | | 2.06 ac |
| **Total Area:** | | **21.54 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 5.56 ac | 544.9 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 5.33 ac | 207.9 |
| Impervious areas; Streets & roads | D | 98 | 3.17 ac | 310.7 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 5.42 ac | 433.6 |
| Brush-weed-grass mixture; Good condition (> 75% ground cover) | D | 73 | 2.06 ac | 150.6 |
| | | Total: | 21.54 ac | 1647.6 |

CN = Total CN*Area / Total Area = **76.5**

Denotes Pond Area

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **3.08 in** | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **4.31 in** | **10.88 in** | **3.87 in** |

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

| | | | | Soil |
|---|---|---|---|---|
| **Station Limits:** | From: 331+50 | Roadway Length = 350 ft | | Type A |
| | To: 335+00 | R/W Width = 140 ft | | |
| | From: 335+00 | Roadway Length = 1300 ft | | Type D |
| | To: 348+00 | R/W Width = 140 ft | | |
| | | *Areas measured in Microstation | | |

## PROPOSED CONDITION

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.65 ac | |
| Water Surface Area: | 1.41 ac | Wet Pond |
| Total Pond Area: | 2.06 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **12.46 ac** |
| Pervious Area: | **7.67 ac** |
| Water Surface Area: | **1.41 ac** |
| Total Area: | **21.54 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 6.98 ac | 684.0 |
| Proposed Roadway Pervious | A | 39 | 3.91 ac | 152.5 |
| Impervious areas; Streets & roads | D | 98 | 5.48 ac | 537.0 |
| Proposed Roadway Pervious | D | 80 | 3.11 ac | 248.8 |
| Proposed Ponds (Water Surface) | D | 100 | 1.41 ac | 141.4 |
| Proposed Pond Pervious | D | 80 | 0.65 ac | 51.9 |
| | | Total: | 21.54 ac | 1815.7 |

CN = Total CN*Area / Total Area = **84.3**

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = | 1.86 in | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | Runoff (Q) = | **5.17 in** | **11.99 in** | **4.70 in** |

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 1.04 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **1.04 ac-ft**

---

### Required Attenuation Volume:

Total Runoff (ac-ft)

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 7.74 ac-ft | 19.54 ac-ft | 6.94 ac-ft |
| $Q_{post}$ = | 9.28 ac-ft | 21.52 ac-ft | 8.43 ac-ft |
| **ΔQ =** | **1.55 ac-ft** | **1.98 ac-ft** | **1.49 ac-ft** |

**Attenuation $V_{req}$ =** 1.98 ac-ft (use largest value)

**Attenuation Vol. from Existing Pond 10 =** 0.58 ac-ft

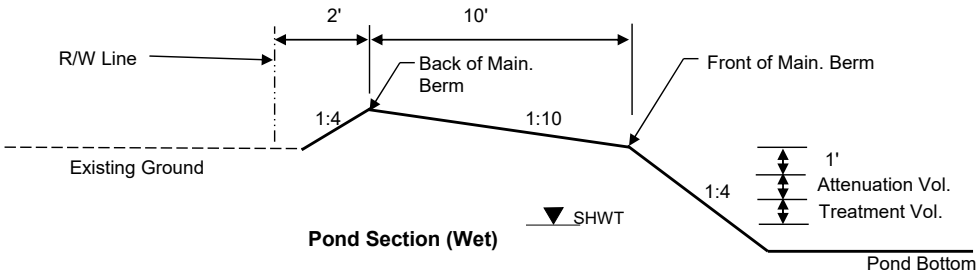
**Total Attenuation $V_{req}$ =** **2.56 ac-ft**

---

| | | | | |
|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 126.00 |
| Pond Tie-In Width = | 2.0 ft | @ 1:4 | Normal Water Elevation = | 122.00 |
| Maximum Storage Depth (**SD**) = | 3.50 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 126.60 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 2000 ft | |
| Estimated Energy Losses = | 2.0 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 123.60 ft | |




**Pond Section (Wet)**

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 126.00 | Pond R/W | 2.12 ac | 430.0 ft | 215.0 ft | |
| 126.50 | Back of Main. Berm | 2.06 ac | 426.0 ft | 211.0 ft | 7.51 ac-ft |
| 126.00 | | 1.92 ac | 416.0 ft | 201.0 ft | 6.52 ac-ft |
| 125.50 | Front of Main. Berm | 1.78 ac | 406.0 ft | 191.0 ft | 5.59 ac-ft |
| 124.50 | Provided Treat.Vol.+Att.Vol | 1.67 ac | 398.0 ft | 183.0 ft | 4.02 ac-ft |
| 126.00 | Req'd Treat.Vol+Att. Vol | 1.84 ac | 410.0 ft | 195.0 ft | 3.60 ac-ft |
| 123.59 | Estimated Storm Sewer TW | 1.58 ac | 390.7 ft | 175.7 ft | 2.53 ac-ft |
| 122.65 | Top of Treatment Vol. | 1.48 ac | 383.2 ft | 168.2 ft | 1.04 ac-ft |
| 122.00 | Normal Water Level | 1.41 ac | 378.0 ft | 163.0 ft | 0.00 ac-ft |
| 120.00 | | 1.22 ac | 362.0 ft | 147.0 ft | |
| 114.00 | Pond Bottom | 0.71 ac | 314.0 ft | 99.0 ft | |

Required Treatment+Attenuation Vol.= 3.60 ac-ft
Required Treatment+Attenuation Stage= 126.00 ft

Provided Treatment+Attenuation Vol.= 4.02 ac-ft
Provided Treatment+Attenuation Stage= 124.50 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.53 ac-ft
Estimated Storm Sewer TW EL.= 123.59 ft

HGL requirements met

Required Treatment Vol. = 1.04 ac-ft

| | |
|---|---|
| **PROPOSED POND R/W (Safety Factor of 20%) =** | **2.55 ac** |
| **PROPOSED POND R/W PLUS 21' TIE-IN AT 1:3 SLOPE ON BACK OF POND =** | **2.75 ac** |

# *BASIN 8A - SWALE*

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

**Station Limits:** From: N/A
To: N/A

*Areas measured in Microstation

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 0.98 ac |
| **Roadway Pervious:** | | 1.14 ac |
| **Pond Area:** | | 0.47 ac |
| **Total Area:** | | **2.59 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | D | 98 | 0.98 ac | 96.0 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 1.14 ac | 90.8 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | B | 69 | 0.47 ac | 32.7 |
| | | Total: | 2.59 ac | 219.6 |

CN = Total CN*Area / Total Area = **84.8**

Denotes Pond Area

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **1.79 in** | Precipitation (P) = | 7.00 in | 18.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **5.23 in** | **16.01 in** | **4.75 in** |

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

**Station Limits:** From: N/A
To: N/A

*Areas measured in Microstation

## PROPOSED CONDITION

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 0.47 ac | Dry Pond |
| Water Surface Area: | 0.00 ac | |
| Total Pond Area: | 0.47 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **1.36 ac** |
| Pervious Area: | **1.23 ac** |
| Water Surface Area: | **0.00 ac** |
| Total Area: | **2.59 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | D | 98 | 1.36 ac | 133.3 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 0.76 ac | 60.4 |
| Proposed Pond Pervious | B | 61 | 0.47 ac | 28.9 |
| | | Total: | 2.59 ac | 222.7 |

CN = Total CN*Area / Total Area = **86.0**

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.63 in | Precipitation (P) = | 7.00 in | 18.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **5.36 in** | **16.18 in** | **4.88 in** |

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PROJECT : **SR 544 PD&E**
FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Dry Retention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Dry Retention** | **0.50 in** | x DCIA = | 0.06 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.06 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

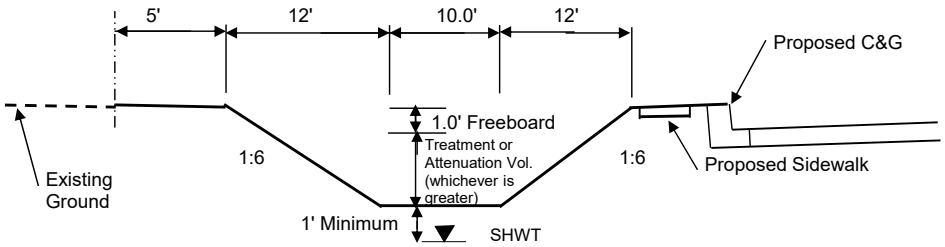
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/10day) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 1.13 ac-ft | 3.46 ac-ft | 1.03 ac-ft |
| $Q_{post}$ = | 1.16 ac-ft | 3.49 ac-ft | 1.05 ac-ft |
| **ΔQ =** | **0.03 ac-ft** | **0.04 ac-ft** | **0.03 ac-ft** |

**Attenuation $V_{req}$ =** **0.04 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 0.0 ft | @ 1:20 | Existing Ground Elevation = | 126.00 |
| Pond Tie-In Width = | 0.0 ft | @ 1:2 | Normal Water Elevation = | 123.00 |
| Maximum Storage Depth (**SD**) = | 2.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 126.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.050% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 50 ft | |
| Estimated Energy Losses = | 0.0 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 124.98 ft | |




**Dry Retention Linear Swale**

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 126.00 | Pond R/W | 0.47 ac | 530.0 ft | 39.0 ft | |
| 126.00 | Back of Main. Berm | 0.47 ac | 520.0 ft | 39.0 ft | 0.52 ac-ft |
| 126.00 | | 0.47 ac | 520.0 ft | 39.0 ft | 0.52 ac-ft |
| 126.00 | Front of Main. Berm | 0.41 ac | 520.0 ft | 34.0 ft | 0.52 ac-ft |
| 125.00 | Provided Treat.Vol. OR Att.Vol | 0.26 ac | 508.0 ft | 22.0 ft | 0.19 ac-ft |
| 124.60 | Estimated Storm Sewer TW | 0.20 ac | 503.2 ft | 17.2 ft | 0.09 ac-ft |
| 124.40 | Req'd Treat.Vol OR Att. Vol | 0.17 ac | 500.8 ft | 14.8 ft | 0.06 ac-ft |
| 124.40 | Top of Treatment Vol. | 0.17 ac | 500.8 ft | 14.8 ft | 0.06 ac-ft |
| 124.00 | Pond Bottom | 0.11 ac | 496.0 ft | 10.0 ft | 0.00 ac-ft |

Required Treatment OR Attenuation Vol.= 0.06 ac-ft

Provided Treatment OR Attenuation Vol.= 0.19 ac-ft
Provided Treatment OR Attenuation Stage= 125.00 ft

Estimated Treat. Vol.+Storm Sewer Att.= 0.09 ac-ft
Estimated Storm Sewer TW EL.= 124.40 ft

HGL requirements met

Required Treatment Vol. = 0.06 ac-ft

**PROPOSED SWALE R/W (Safety Factor of 20%) = 0.57 ac**

# *BASIN 9*

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 348+00 | Roadway Length = 200 ft | | Type D |
| To: 350+00 | R/W Width = 140 ft | | |
| From: 350+00 | Roadway Length = 550 ft | | Type A |
| To: 355+50 | R/W Width = 140 ft | | |
| From: 355+50 | Roadway Length = 350 ft | | Type D |
| To: 359+00 | R/W Width = 140 ft | | |
| From: 359+00 | Roadway Length = 1500 ft | | Type A |
| To: 374+00 | R/W Width = 140 ft | | |

## EXISTING CONDITION

| | | |
|---|---|---|
| **Roadway Impervious** | **Area:** | 2.03 ac |
| **Roadway Pervious:** | | 6.33 ac |
| **Pond Area:** | | 0.82 ac |
| **Total Area:** | | **9.18 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | D | 98 | 0.43 ac | 42.1 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | D | 80 | 1.34 ac | 107.1 |
| Impervious areas; Streets & roads | A | 98 | 1.60 ac | 156.8 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 4.99 ac | 194.6 |
| Brush-weed-grass mixture; Good condition (> 75% ground cover) | D | 73 | 0.82 ac | 60.1 |
| | | Total: | 9.18 ac | 560.6 |

CN = Total CN*Area / Total Area = **61.1**

Denotes Pond Area

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = | **2.71 in** | **8.48 in** | **2.35 in** |

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **6.37 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

| **Station Limits:** | | | Soil |
|---|---|---|---|
| From: 348+00 | Roadway Length = 200 ft | | Type D |
| To: 350+00 | R/W Width = 140 ft | | |
| From: 350+00 | Roadway Length = 550 ft | | Type A |
| To: 355+50 | R/W Width = 140 ft | | |
| From: 355+50 | Roadway Length = 350 ft | | Type D |
| To: 359+00 | R/W Width = 140 ft | | |
| From: 359+00 | Roadway Length = 1500 ft | | Type A |
| To: 374+00 | R/W Width = 140 ft | | |

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

Impervious Roadway Area: 4.45 ac
Pervious Roadway Area: 3.91 ac
Total Roadway Area: 8.36 ac

**Pond Area:**

Pervious Pond Area : 0.44 ac
Water Surface Area: 0.38 ac Wet Pond
Total Pond Area: 0.82 ac

**Total Area:**

Impervious Area: **4.45 ac**
Pervious Area: **4.35 ac**
Water Surface Area: **0.38 ac**
Total Area: **9.18 ac**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 3.51 ac | 343.6 |
| Proposed Roadway Pervious | A | 39 | 3.08 ac | 120.2 |
| Impervious areas; Streets & roads | D | 98 | 0.94 ac | 92.2 |
| Proposed Roadway Pervious | D | 80 | 0.83 ac | 66.2 |
| Proposed Ponds (Water Surface) | D | 100 | 0.38 ac | 38.4 |
| Proposed Pond Pervious | D | 80 | 0.44 ac | 35.2 |
| | | Total: | 9.18 ac | 695.7 |

CN = Total CN*Area / Total Area = **75.8**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.19 in | | | |
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | | | |
| Runoff (Q) = | **4.23 in** | **10.78 in** | **3.79 in** |

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**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Wet Detention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Wet Detention** | **N/A** | x Impervious = | 0.00 ac-ft |
| | **1.00 in** | x DCIA = | 0.37 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.37 ac-ft**

### Required Attenuation Volume:

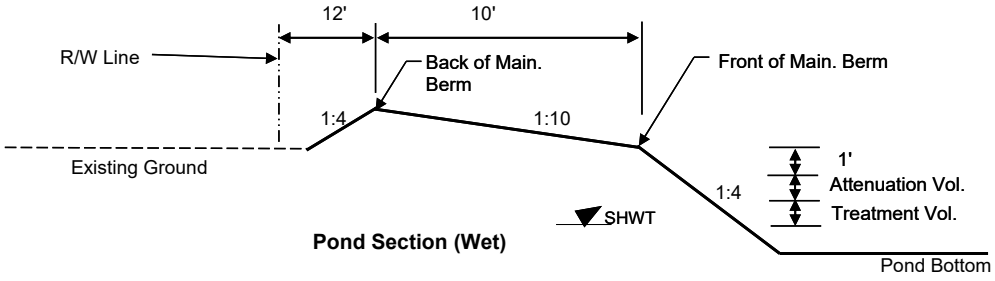
| Total Runoff (ac-ft) | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 2.07 ac-ft | 6.49 ac-ft | 1.80 ac-ft |
| $Q_{post}$ = | 3.24 ac-ft | 8.25 ac-ft | 2.90 ac-ft |
| **ΔQ =** | **1.17 ac-ft** | **1.76 ac-ft** | **1.10 ac-ft** |

**Attenuation $V_{req}$ =** **1.76 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 126.00 |
| Pond Tie-In Width = | 12.0 ft | @ 1:4 | Normal Water Elevation = | 123.00 |
| Maximum Storage Depth (**SD**) = | 5.00 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 128.00 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 100 ft | |
| Estimated Energy Losses = | 0.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 126.90 ft | |




**Pond Section (Wet)**

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**DATE:** July 28, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 126.00 | Pond R/W | 1.05 ac | 220.0 ft | 207.0 ft | |
| 129.00 | Back of Main. Berm | 0.82 ac | 196.0 ft | 183.0 ft | 3.35 ac-ft |
| 128.50 | | 0.74 ac | 186.0 ft | 173.0 ft | 2.96 ac-ft |
| 128.00 | Front of Main. Berm | 0.66 ac | 176.0 ft | 163.0 ft | 2.61 ac-ft |
| 127.00 | Provided Treat.Vol.+Att.Vol | 0.60 ac | 168.0 ft | 155.0 ft | 2.14 ac-ft |
| 127.09 | Req'd Treat.Vol+Att. Vol | 0.60 ac | 168.7 ft | 155.7 ft | 2.13 ac-ft |
| 125.82 | Estimated Storm Sewer TW | 0.53 ac | 158.6 ft | 145.6 ft | 1.47 ac-ft |
| 123.71 | Top of Treatment Vol. | 0.42 ac | 141.7 ft | 128.7 ft | 0.37 ac-ft |
| 123.00 | Normal Water Level | 0.38 ac | 136.0 ft | 123.0 ft | 0.00 ac-ft |
| 121.00 | | 0.29 ac | 120.0 ft | 107.0 ft | |
| 115.00 | Pond Bottom | 0.10 ac | 72.0 ft | 59.0 ft | |

Required Treatment+Attenuation Vol.= 2.13 ac-ft
Required Treatment+Attenuation Stage= 127.09 ft

Provided Treatment+Attenuation Vol.= 2.14 ac-ft
Provided Treatment+Attenuation Stage= 127.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.47 ac-ft
Estimated Storm Sewer TW EL.= 125.82 ft

HGL requirements met

Required Treatment Vol. = 0.37 ac-ft

**PROPOSED SWALE R/W (Safety Factor of 20%) = 1.25 ac**

# *BASIN 10*

Inwood consulting engineers
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(407) 971-8955 (fax)

**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

**Station Limits:**

From: 374+00
To: 400+00
Roadway Length = 2600 ft
R/W Width = 112 ft

From: 400+00
To: 424+50
Roadway Length = 2450 ft
R/W Width = 112 ft

## EXISTING CONDITION

**Roadway Impervious** **Area:** 5.24 ac

**Roadway Pervious:** 7.75 ac

**Pond Area:** 1.28 ac

**Total Area:** **14.26 ac**

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 5.24 ac | 513.1 |
| Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%) | A | 39 | 7.75 ac | 302.2 |
| Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%) | A | 49 | 1.28 ac | 62.5 |
| | | Total: | 14.26 ac | 877.8 |

CN = Total CN*Area / Total Area = **61.6**

Denotes Pond Area

**Runoff:**

| | | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|---|
| Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **6.25 in** | Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$ | Runoff (Q) = | **2.76 in** | **8.56 in** | **2.40 in** |

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**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

**Station Limits:**

From: 374+00 To: 400+00 — Roadway Length = 2600 ft, R/W Width = 112 ft
From: 400+00 To: 424+50 — Roadway Length = 2450 ft, R/W Width = 112 ft

## PROPOSED CONDITION

**Roadway Area:**

| Description | Width | Quantity | Total Width |
|---|---|---|---|
| Travel Lane | 23.0 ft | 2 | 46.0 ft |
| Inside Shoulder | | | 0.0 ft |
| Outside Shoulder | | | 0.0 ft |
| Sidewalk | | | 0.0 ft |
| Curb&Gutter E | 2.3 ft | 2 | 4.5 ft |
| Curb&Gutter F | 2.0 ft | 2 | 4.0 ft |
| Trail | 10.0 ft | 2 | 20.0 ft |
| Barrier Wall | | | 0.0 ft |
| | | Total Impervious Width | 74.5 ft |

| | |
|---|---|
| Impervious Roadway Area: | 8.64 ac |
| Pervious Roadway Area: | 4.35 ac |
| Total Roadway Area: | 12.98 ac |

**Pond Area:**

| | | |
|---|---|---|
| Pervious Pond Area : | 1.28 ac | Dry Pond |
| Water Surface Area: | 0.00 ac | |
| Total Pond Area: | 1.28 ac | |

**Total Area:**

| | |
|---|---|
| Impervious Area: | **8.64 ac** |
| Pervious Area: | **5.62 ac** |
| Water Surface Area: | **0.00 ac** |
| Total Area: | **14.26 ac** |

**Curve Number:**

| Land Use Description | Soil Group | CN | Area | CN*Area |
|---|---|---|---|---|
| Impervious areas; Streets & roads | A | 98 | 8.64 ac | 846.4 |
| Proposed Roadway Pervious | A | 39 | 4.35 ac | 169.6 |
| Proposed Ponds (Water Surface) | A | 100 | 0.00 ac | 0.0 |
| Proposed Pond Pervious | A | 39 | 1.28 ac | 49.7 |
| | | Total: | 14.26 ac | 1065.7 |

CN = Total CN*Area / Total Area = **74.7**

**Runoff:**

| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| Precipitation (P) = | 7.00 in | 14.00 in | 6.50 in |
| Runoff (Q) = | **4.12 in** | **10.63 in** | **3.68 in** |

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.38 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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**Made by:** DLD
**Checked by:** REC

**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

## POND SIZING

### Required Treatment Volume (TV)

**Selection criteria**

| | |
|---|---|
| Permitting Agency | **SWFWMD** |
| StormW.Mgmt. | **Dry Retention** |
| Online/Offline | **Online** |
| OFW | **No** |
| Open/Closed Basin | **Open** |

| | | | |
|---|---|---|---|
| **Dry Retention** | | | |
| | **0.50 in** | x DCIA = | 0.36 ac-ft |

**Treatment $V_{req}$ = Largest of Trt. Vol. =** **0.36 ac-ft**

### Required Attenuation Volume:

Total Runoff (ac-ft)

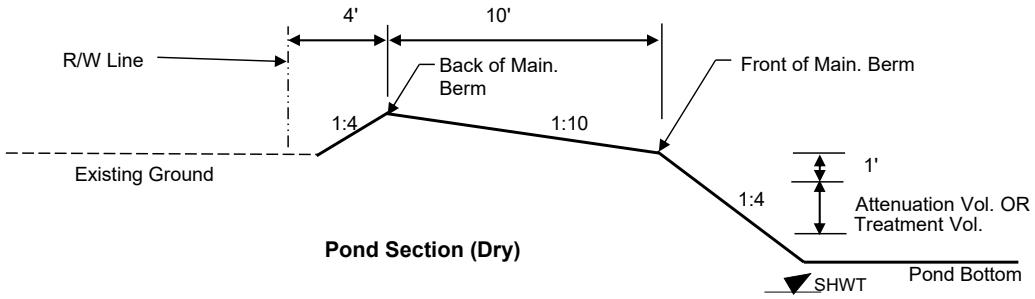
| | SWFWMD (25yr/24 hr) | FDOT Critical Duration (100yr/72hr) | Storm Sewer Design (10yr/24hr) |
|---|---|---|---|
| $Q_{pre}$ = | 3.28 ac-ft | 10.17 ac-ft | 2.85 ac-ft |
| $Q_{post}$ = | 4.90 ac-ft | 12.63 ac-ft | 4.38 ac-ft |
| **ΔQ =** | **1.62 ac-ft** | **2.46 ac-ft** | **1.53 ac-ft** |

**Attenuation $V_{req}$ =** **2.46 ac-ft** (use largest value)

| | | | | | |
|---|---|---|---|---|---|
| Maintenance Area Width = | 10.0 ft | @ 1:10 | Existing Ground Elevation = | 133.00 |
| Pond Tie-In Width = | 4.0 ft | @ 1:4 | Normal Water Elevation = | 126.80 |
| Maximum Storage Depth (**SD**) = | 6.20 ft | with 1.0 ft freeboard | Lowest EOP Elevation = | 131.50 |

**Hydraulic Grade Line (HGL) check**

| | | |
|---|---|---|
| HGL Slope = | 0.100% | Use 0.05% for very flat terrain to 0.1% for flat terrain |
| Distance from Pond to Lowest EOP = | 50 ft | |
| Estimated Energy Losses = | 0.1 ft | |
| HGL Clearance = | 1.0 ft | Use 1.0 foot as a standard HGL clearance (no junction losses) |
| Allowable Storm Sewer Tailwater EL = | 130.45 ft | |




**Pond Section (Dry)**

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**DATE:** August 7, 2023
**Job Number:** DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

**Pond Stage / Storage Calculations**

| ELEVATION | DESCRIPTION | AREA | DIMENSIONS | | STORAGE |
|---|---|---|---|---|---|
| | | | LENGTH | WIDTH | |
| 133.00 | Pond R/W | 1.36 ac | 290.0 ft | 205.0 ft | |
| 134.00 | Back of Main. Berm | 1.28 ac | 282.0 ft | 197.0 ft | 5.63 ac-ft |
| 133.50 | | 1.28 ac | 282.0 ft | 197.0 ft | 4.99 ac-ft |
| 133.00 | Front of Main. Berm | 1.06 ac | 262.0 ft | 177.0 ft | 4.41 ac-ft |
| 132.00 | Provided Treat.Vol. OR Att.Vol | 0.99 ac | 254.0 ft | 169.0 ft | 3.37 ac-ft |
| 131.05 | Req'd Treat.Vol OR Att. Vol | 0.91 ac | 246.4 ft | 161.4 ft | 2.46 ac-ft |
| 130.00 | Estimated Storm Sewer TW | 0.84 ac | 238.0 ft | 153.0 ft | 1.53 ac-ft |
| 128.50 | Top of Treatment Vol. | 0.73 ac | 226.0 ft | 141.0 ft | 0.36 ac-ft |
| 128.00 | Pond Bottom | 0.70 ac | 222.0 ft | 137.0 ft | 0.00 ac-ft |

Required Treatment OR Attenuation Vol.= 2.46 ac-ft
Required Treatment OR Attenuation Stage= 131.05 ft

Provided Treatment OR Attenuation Vol.= 3.37 ac-ft
Provided Treatment OR Attenuation Stage= 132.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 1.53 ac-ft
Estimated Storm Sewer TW EL.= 130.00 ft

HGL requirements met

Required Treatment Vol. = 0.36 ac-ft

**PROPOSED POND R/W (Safety Factor of 20%) = 1.64 ac**

**Note: Parcel area occupied by site is 2.28 acres.**

# *APPENDIX D*

**Nutrient Loading Analysis (BMPTRAINS)**

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/20/2023 2:24:46 PM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 1A |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.34 |
| Rational Coefficient (0-1) | 0.54 |
| Non DCIA Curve Number | 41.25 |
| DCIA Percent (0-100) | 65.81 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 5.217 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 7.655 |
| Phosphorus Loading (kg/yr) | 0.997 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.34 |
| Rational Coefficient (0-1) | 0.59 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 72.65 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 5.753 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 8.440 |
| Phosphorus Loading (kg/yr) | 1.099 |

# Catchment Number: 1 Name: Basin 1A

**Project:** SR 544
**Date:** 9/20/2023

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 1.025 |
| Retention Volume (ac-ft) | 0.200 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 2.34 |
| Contributing Area (acres) | 2.340 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 72.65 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 9 |
| Provided TN Treatment Efficiency (%) | 79 |
| Required TP Treatment Efficiency (%) | 9 |
| Provided TP Treatment Efficiency (%) | 79 |

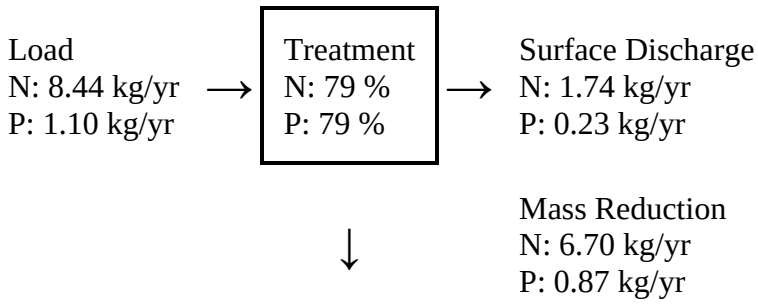
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

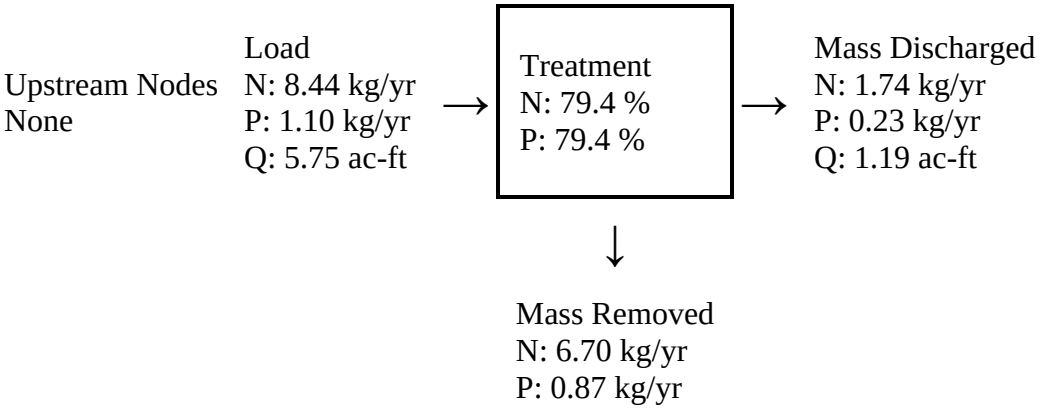
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 6.700 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.873 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




## Load Diagram for Retention ( As Used In Routing)



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/20/2023

**BMP Types:**

Catchment 1 - (Basin 1A) Retention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 7.66 kg/yr | |
| Total N post load | 8.44 kg/yr | |
| Target N load reduction | 9 % | |
| Target N discharge load | 7.66 kg/yr | |
| Percent N load reduction | 79 % | |
| Provided N discharge load | 1.74 kg/yr | 3.84 lb/yr |
| Provided N load removed | 6.7 kg/yr | 14.77 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | .997 kg/yr | |
| Total P post load | 1.099 kg/yr | |
| Target P load reduction | 9 % | |
| Target P discharge load | .997 kg/yr | |
| Percent P load reduction | 79 % | |
| Provided P discharge load | .227 kg/yr | .5 lb/yr |
| Provided P load removed | .873 kg/yr | 1.924 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/20/2023 1:54:02 PM

## Site and Catchment Information

Analysis: Net Improvement

| Catchment Name | Basin 1 | Offsite Area |
|---|---|---|
| Rainfall Zone | Florida Zone 2 | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values | Agricultural - Pasture: TN=3.510TP=0.686 |
|---|---|---|
| Area (acres) | 15.76 | 20.74 |
| Rational Coefficient (0-1) | 0.30 | 0.01 |
| Non DCIA Curve Number | 64.78 | 49.00 |
| DCIA Percent (0-100) | 33.48 | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 | 3.510 |
| Phosphorus EMC (mg/l) | 0.155 | 0.686 |
| Runoff Volume (ac-ft/yr) | 19.621 | 1.210 |
| Groundwater N (kg/yr) | 0.000 | 0.000 |
| Groundwater P (kg/yr) | 0.000 | 0.000 |
| Nitrogen Loading (kg/yr) | 28.789 | 5.236 |
| Phosphorus Loading (kg/yr) | 3.750 | 1.023 |

## Post-Condition Landuse Information

| Landuse | User Defined Values | Agricultural - Pasture: TN=3.510TP=0.686 |
|---|---|---|
| Area (acres) | 15.76 | 20.74 |
| Rational Coefficient (0-1) | 0.52 | 0.01 |
| Non DCIA Curve Number | 67.92 | 49.00 |

| | | |
|---|---|---|
| DCIA Percent (0-100) | 62.15 | 0.00 |
| Wet Pond Area (ac) | 0.00 | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 | 3.510 |
| Phosphorus EMC (mg/l) | 0.155 | 0.686 |
| Runoff Volume (ac-ft/yr) | 34.301 | 1.210 |
| Groundwater N (kg/yr) | 0.000 | 0.000 |
| Groundwater P (kg/yr) | 0.000 | 0.000 |
| Nitrogen Loading (kg/yr) | 50.329 | 5.236 |
| Phosphorus Loading (kg/yr) | 6.556 | 1.023 |

# Catchment Number: 1 Name: Basin 1

**Project:** SR 544
**Date:** 9/20/2023

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 2.505 |
| Retention Volume (ac-ft) | 3.290 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 15.76 |
| Contributing Area (acres) | 15.760 |
| Non-DCIA Curve Number | 67.92 |
| DCIA Percent | 62.15 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 43 |
| Provided TN Treatment Efficiency (%) | 96 |
| Required TP Treatment Efficiency (%) | 43 |
| Provided TP Treatment Efficiency (%) | 96 |

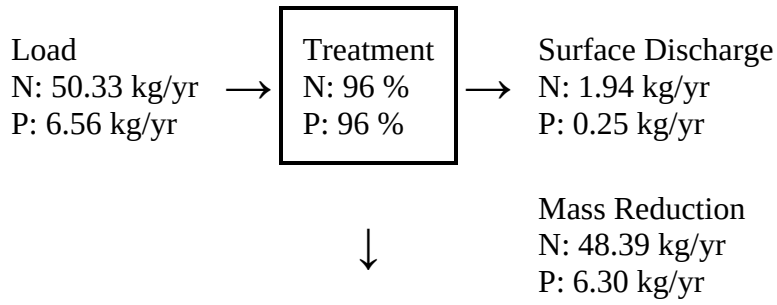
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

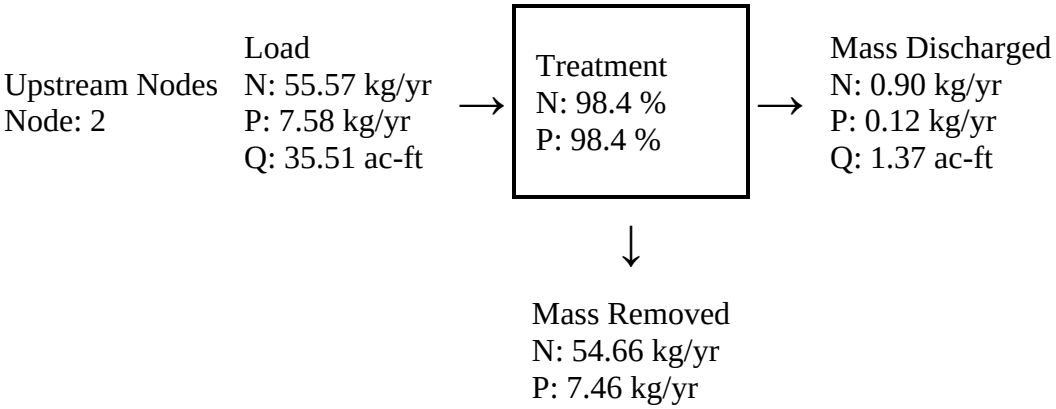
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 48.393 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 6.303 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




## Load Diagram for Retention ( As Used In Routing)



# Catchment Number: 2 Name: Offsite Area

**Project:** SR 544
**Date:** 9/20/2023

**None Design**

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.74 |
| Contributing Area (acres) | 20.740 |
| Non-DCIA Curve Number | 49.00 |
| DCIA Percent | 0.00 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | |
| Provided TN Treatment Efficiency (%) | |
| Required TP Treatment Efficiency (%) | |
| Provided TP Treatment Efficiency (%) | |

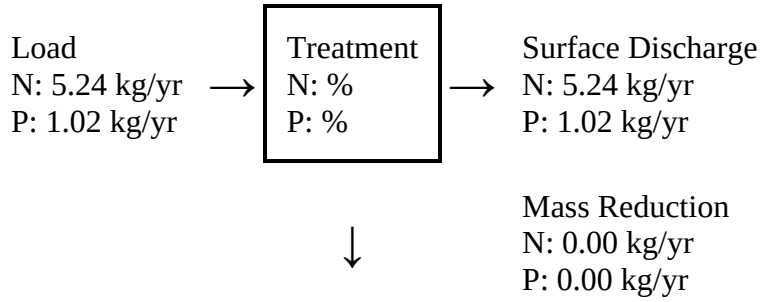
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | 0.000 |
| Media P Reduction (%) | 0.000 |

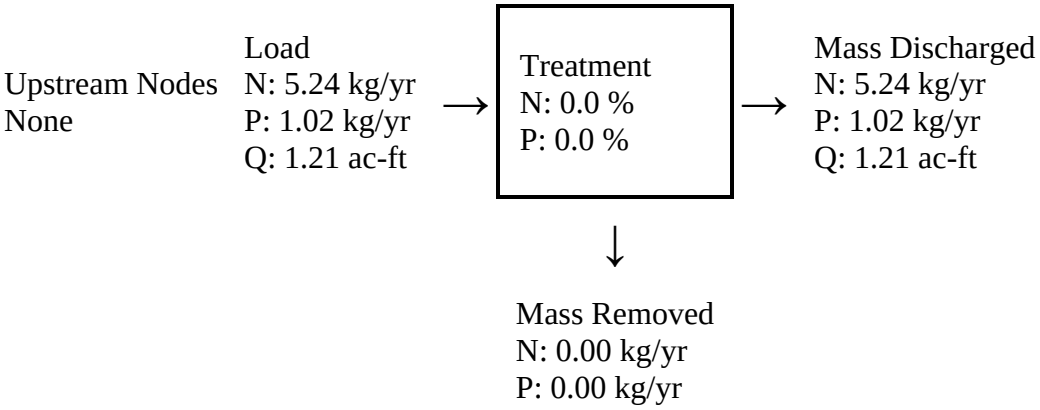
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for None (stand-alone)




## Load Diagram for None ( As Used In Routing)



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/20/2023

**BMP Types:**

Catchment 1 - (Basin 1) Retention

Catchment 2 - (Offsite Area) None

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Catchment 2 Routed to Catchment 1

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 34.02 kg/yr | |
| Total N post load | 55.57 kg/yr | |
| Target N load reduction | 39 % | |
| Target N discharge load | 34.02 kg/yr | |
| Percent N load reduction | 98 % | |
| Provided N discharge load | .9 kg/yr | 1.99 lb/yr |
| Provided N load removed | 54.66 kg/yr | 120.53 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 4.773 kg/yr | |
| Total P post load | 7.579 kg/yr | |
| Target P load reduction | 37 % | |
| Target P discharge load | 4.773 kg/yr | |
| Percent P load reduction | 98 % | |
| Provided P discharge load | .123 kg/yr | .27 lb/yr |
| Provided P load removed | 7.456 kg/yr | 16.44 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/20/2023 2:21:52 PM

## Site and Catchment Information

Analysis: Net Improvement

| Catchment Name | Basin 2 | Offsite Area |
|---|---|---|
| Rainfall Zone | Florida Zone 2 | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values | Single-Family: TN=2.070 TP=0.327 |
|---|---|---|
| Area (acres) | 11.33 | 9.73 |
| Rational Coefficient (0-1) | 0.20 | 0.01 |
| Non DCIA Curve Number | 59.79 | 46.00 |
| DCIA Percent (0-100) | 21.71 | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 | 2.070 |
| Phosphorus EMC (mg/l) | 0.155 | 0.327 |
| Runoff Volume (ac-ft/yr) | 9.397 | 0.446 |
| Groundwater N (kg/yr) | 0.000 | 0.000 |
| Groundwater P (kg/yr) | 0.000 | 0.000 |
| Nitrogen Loading (kg/yr) | 13.788 | 1.138 |
| Phosphorus Loading (kg/yr) | 1.796 | 0.180 |

## Post-Condition Landuse Information

| Landuse | User Defined Values | Single-Family: TN=2.070 TP=0.327 |
|---|---|---|
| Area (acres) | 11.33 | 9.73 |
| Rational Coefficient (0-1) | 0.42 | 0.01 |
| Non DCIA Curve Number | 70.58 | 46.00 |

| | | |
|---|---|---|
| DCIA Percent (0-100) | 47.56 | 0.00 |
| Wet Pond Area (ac) | 1.91 | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 | 2.070 |
| Phosphorus EMC (mg/l) | 0.155 | 0.327 |
| Runoff Volume (ac-ft/yr) | 16.339 | 0.446 |
| Groundwater N (kg/yr) | 0.000 | 0.000 |
| Groundwater P (kg/yr) | 0.000 | 0.000 |
| Nitrogen Loading (kg/yr) | 23.974 | 1.138 |
| Phosphorus Loading (kg/yr) | 3.123 | 0.180 |

# Catchment Number: 1 Name: Basin 2

**Project:** SR 544
**Date:** 9/20/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 11.500 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.388 |
| Annual Residence Time (days) | 257 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 11.33 |
| Contributing Area (acres) | 9.420 |
| Non-DCIA Curve Number | 70.58 |
| DCIA Percent | 47.56 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 42 |
| Provided TN Treatment Efficiency (%) | 43 |
| Required TP Treatment Efficiency (%) | 42 |
| Provided TP Treatment Efficiency (%) | 82 |

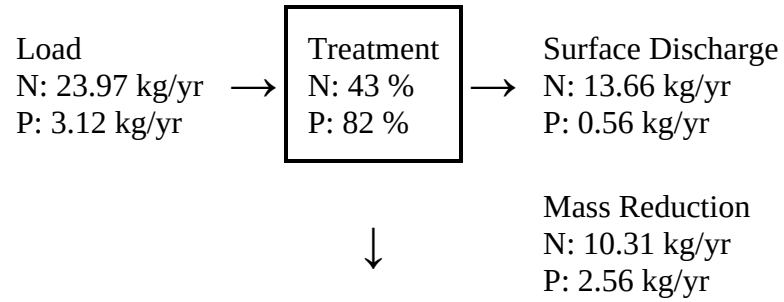
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

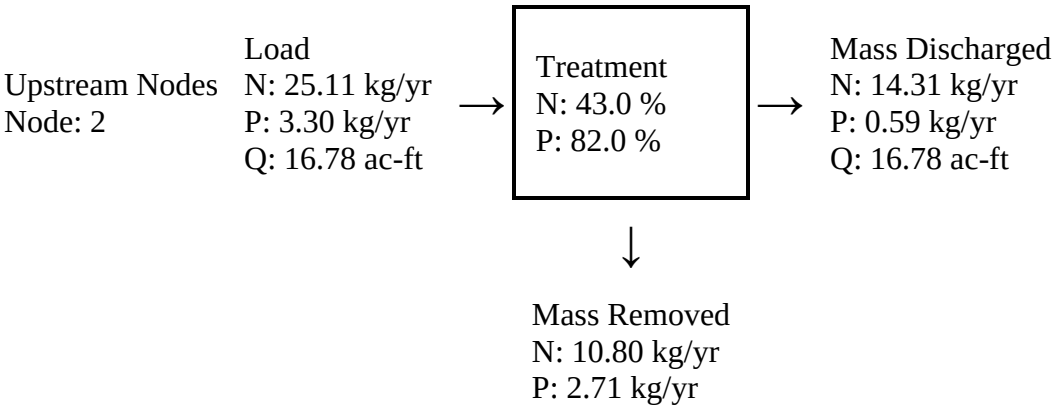
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Catchment Number: 2 Name: Offsite Area

**Project:** SR 544
**Date:** 9/20/2023

**None Design**

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 9.73 |
| Contributing Area (acres) | 9.730 |
| Non-DCIA Curve Number | 46.00 |
| DCIA Percent | 0.00 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | |
| Provided TN Treatment Efficiency (%) | |
| Required TP Treatment Efficiency (%) | |
| Provided TP Treatment Efficiency (%) | |

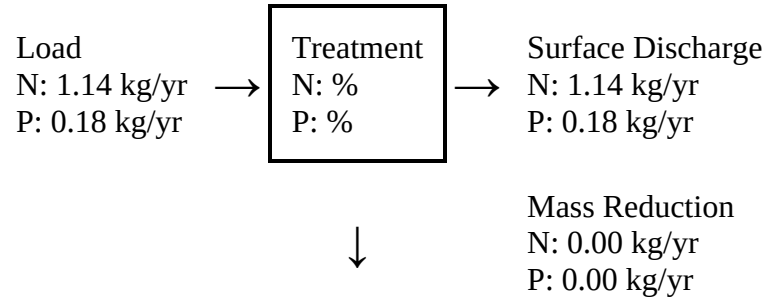
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | 0.000 |
| Media P Reduction (%) | 0.000 |

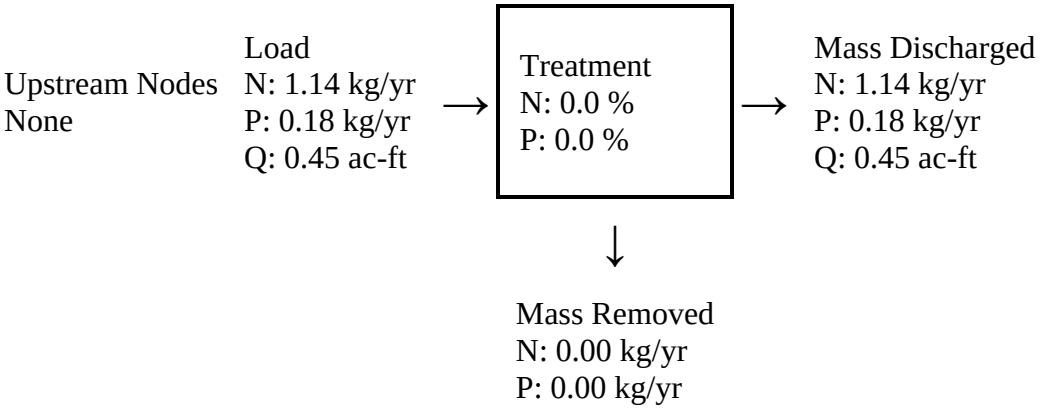
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

## Load Diagram for None (stand-alone)




### Load Diagram for None ( As Used In Routing)




# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/20/2023

**BMP Types:**

Catchment 1 - (Basin 2) Wet Detention

Catchment 2 - (Offsite Area) None

**Routing Summary**

Catchment 1 Routed to Outlet

Catchment 2 Routed to Catchment 1

Based on % removal values to the nearest percent

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

# Summary Report

## Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 14.93 kg/yr | |
| Total N post load | 25.11 kg/yr | |
| Target N load reduction | 41 % | |
| Target N discharge load | 14.93 kg/yr | |
| Percent N load reduction | 43 % | |
| Provided N discharge load | 14.31 kg/yr | 31.55 lb/yr |
| Provided N load removed | 10.8 kg/yr | 23.82 lb/yr |

## Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 1.976 kg/yr | |
| Total P post load | 3.302 kg/yr | |
| Target P load reduction | 40 % | |
| Target P discharge load | 1.976 kg/yr | |
| Percent P load reduction | 82 % | |
| Provided P discharge load | .593 kg/yr | 1.31 lb/yr |
| Provided P load removed | 2.709 kg/yr | 5.974 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 10/11/2023 1:04:13 PM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 3 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 16.14 |
| Rational Coefficient (0-1) | 0.24 |
| Non DCIA Curve Number | 72.11 |
| DCIA Percent (0-100) | 23.46 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 16.192 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 23.759 |
| Phosphorus Loading (kg/yr) | 3.095 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 16.14 |
| Rational Coefficient (0-1) | 0.66 |
| Non DCIA Curve Number | 71.87 |
| DCIA Percent (0-100) | 79.83 |
| Wet Pond Area (ac) | 1.07 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 41.394 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 60.736 |
| Phosphorus Loading (kg/yr) | 7.911 |

# Catchment Number: 1 Name: Basin 3

**Project:** SR 544
**Date:** 10/11/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 5.210 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.516 |
| Annual Residence Time (days) | 46 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 16.14 |
| Contributing Area (acres) | 15.070 |
| Non-DCIA Curve Number | 71.87 |
| DCIA Percent | 79.83 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 61 |
| Provided TN Treatment Efficiency (%) | 40 |
| Required TP Treatment Efficiency (%) | 61 |
| Provided TP Treatment Efficiency (%) | 68 |

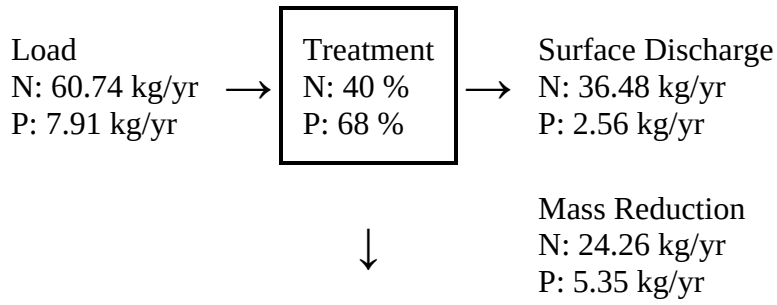
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

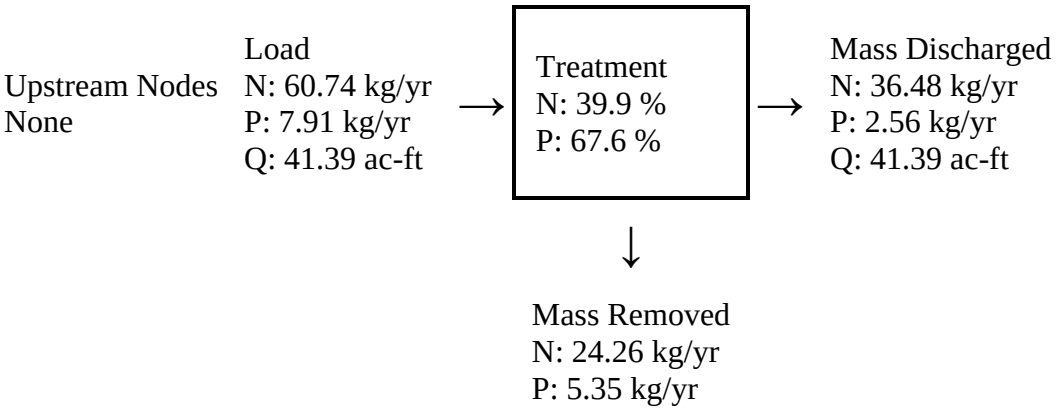
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:10/11/2023

**BMP Types:**

Catchment 1 - (Basin 3)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 23.76 kg/yr | |
| Total N post load | 60.74 kg/yr | |
| Target N load reduction | 61 % | |
| Target N discharge load | 23.76 kg/yr | |
| Percent N load reduction | 40 % | |
| Provided N discharge load | 36.48 kg/yr | 80.43 lb/yr |
| Provided N load removed | 24.26 kg/yr | 53.49 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 3.095 kg/yr | |
| Total P post load | 7.911 kg/yr | |
| Target P load reduction | 61 % | |
| Target P discharge load | 3.095 kg/yr | |
| Percent P load reduction | 68 % | |
| Provided P discharge load | 2.56 kg/yr | 5.65 lb/yr |
| Provided P load removed | 5.351 kg/yr | 11.799 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:09:42 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 4 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 20.75 |
| Rational Coefficient (0-1) | 0.27 |
| Non DCIA Curve Number | 77.90 |
| DCIA Percent (0-100) | 23.88 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 23.123 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 33.927 |
| Phosphorus Loading (kg/yr) | 4.419 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 20.75 |
| Rational Coefficient (0-1) | 0.47 |
| Non DCIA Curve Number | 77.82 |
| DCIA Percent (0-100) | 52.33 |
| Wet Pond Area (ac) | 1.11 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 38.440 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 56.402 |
| Phosphorus Loading (kg/yr) | 7.347 |

# Catchment Number: 1 Name: Basin 4

**Project:** SR 544
**Date:** 9/22/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 6.410 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.265 |
| Annual Residence Time (days) | 61 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.75 |
| Contributing Area (acres) | 19.640 |
| Non-DCIA Curve Number | 77.82 |
| DCIA Percent | 52.33 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 40 |
| Provided TN Treatment Efficiency (%) | 41 |
| Required TP Treatment Efficiency (%) | 40 |
| Provided TP Treatment Efficiency (%) | 70 |

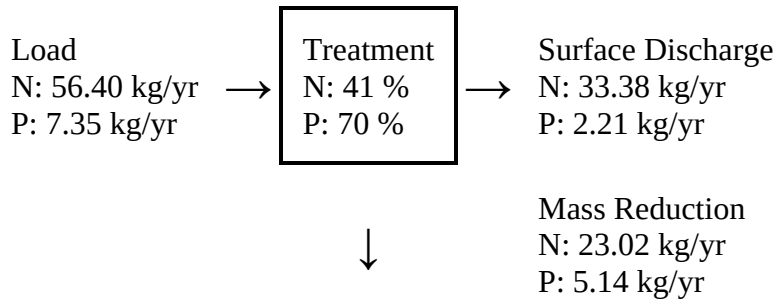
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

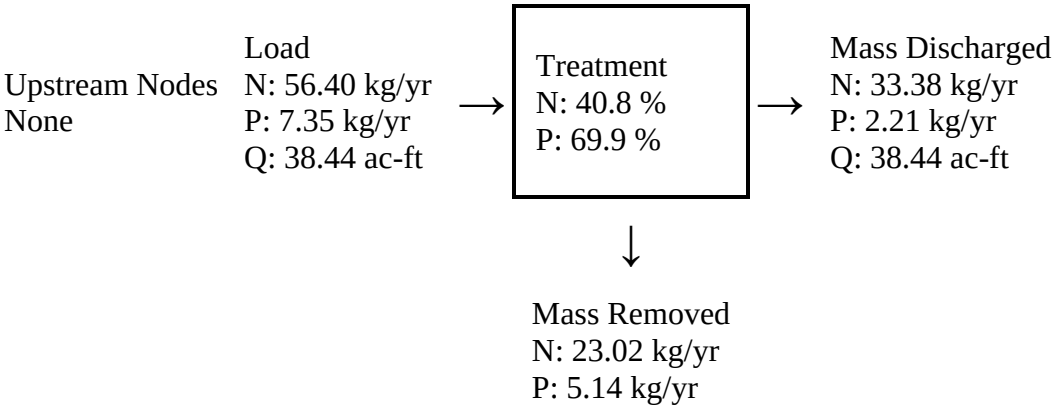
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 4)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 33.93 kg/yr | |
| Total N post load | 56.4 kg/yr | |
| Target N load reduction | 40 % | |
| Target N discharge load | 33.93 kg/yr | |
| Percent N load reduction | 41 % | |
| Provided N discharge load | 33.38 kg/yr | 73.61 lb/yr |
| Provided N load removed | 23.02 kg/yr | 50.76 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 4.419 kg/yr | |
| Total P post load | 7.347 kg/yr | |
| Target P load reduction | 40 % | |
| Target P discharge load | 4.419 kg/yr | |
| Percent P load reduction | 70 % | |
| Provided P discharge load | 2.211 kg/yr | 4.87 lb/yr |
| Provided P load removed | 5.136 kg/yr | 11.324 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:14:46 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 5 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 20.69 |
| Rational Coefficient (0-1) | 0.26 |
| Non DCIA Curve Number | 71.85 |
| DCIA Percent (0-100) | 26.59 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 22.685 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 33.285 |
| Phosphorus Loading (kg/yr) | 4.335 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 20.69 |
| Rational Coefficient (0-1) | 0.50 |
| Non DCIA Curve Number | 70.85 |
| DCIA Percent (0-100) | 58.24 |
| Wet Pond Area (ac) | 0.54 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 41.736 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 61.238 |
| Phosphorus Loading (kg/yr) | 7.976 |

# Catchment Number: 1 Name: Basin 5

**Project:** SR 544
**Date:** 9/22/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 2.060 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.545 |
| Annual Residence Time (days) | 18 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 20.69 |
| Contributing Area (acres) | 20.150 |
| Non-DCIA Curve Number | 70.85 |
| DCIA Percent | 58.24 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 46 |
| Provided TN Treatment Efficiency (%) | 35 |
| Required TP Treatment Efficiency (%) | 46 |
| Provided TP Treatment Efficiency (%) | 60 |

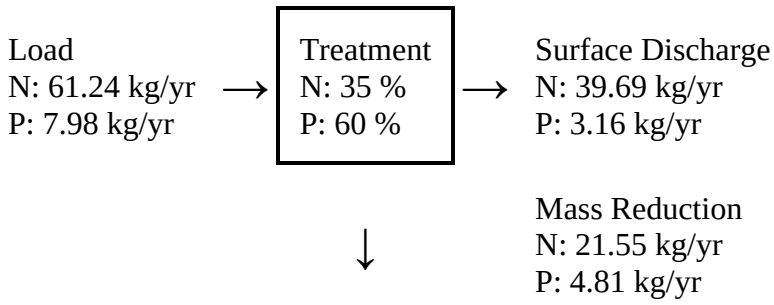
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

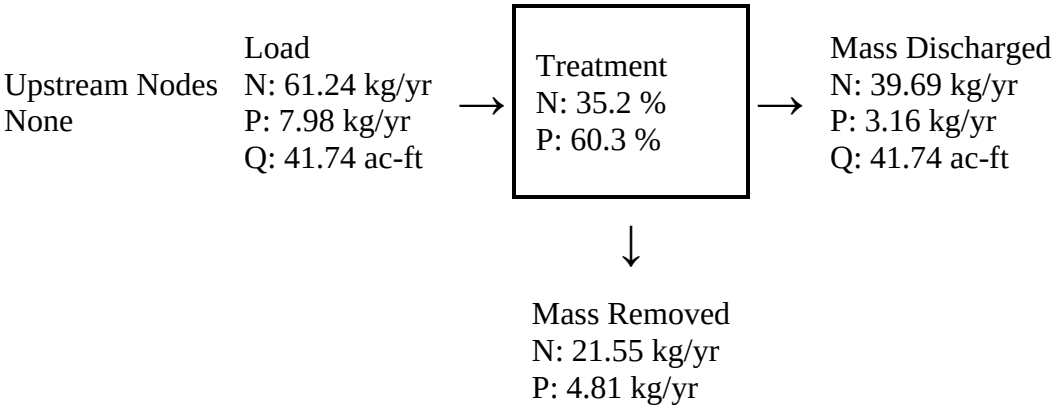
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 5)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 33.28 kg/yr | |
| Total N post load | 61.24 kg/yr | |
| Target N load reduction | 46 % | |
| Target N discharge load | 33.28 kg/yr | |
| Percent N load reduction | 35 % | |
| Provided N discharge load | 39.69 kg/yr | 87.51 lb/yr |
| Provided N load removed | 21.55 kg/yr | 47.52 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 4.335 kg/yr | |
| Total P post load | 7.976 kg/yr | |
| Target P load reduction | 46 % | |
| Target P discharge load | 4.335 kg/yr | |
| Percent P load reduction | 60 % | |
| Provided P discharge load | 3.164 kg/yr | 6.98 lb/yr |
| Provided P load removed | 4.812 kg/yr | 10.611 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:17:09 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 6 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 7.60 |
| Rational Coefficient (0-1) | 0.23 |
| Non DCIA Curve Number | 61.12 |
| DCIA Percent (0-100) | 25.78 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 7.380 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 10.829 |
| Phosphorus Loading (kg/yr) | 1.411 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 7.60 |
| Rational Coefficient (0-1) | 0.47 |
| Non DCIA Curve Number | 59.27 |
| DCIA Percent (0-100) | 56.50 |
| Wet Pond Area (ac) | 0.72 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 13.477 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 19.774 |
| Phosphorus Loading (kg/yr) | 2.576 |

# Catchment Number: 1 Name: Basin 6

**Project:** SR 544
**Date:** 9/22/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 4.000 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.145 |
| Annual Residence Time (days) | 108 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 7.60 |
| Contributing Area (acres) | 6.880 |
| Non-DCIA Curve Number | 59.27 |
| DCIA Percent | 56.50 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 45 |
| Provided TN Treatment Efficiency (%) | 42 |
| Required TP Treatment Efficiency (%) | 45 |
| Provided TP Treatment Efficiency (%) | 75 |

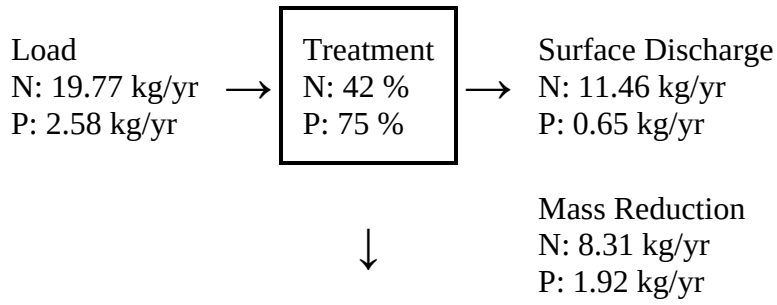
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

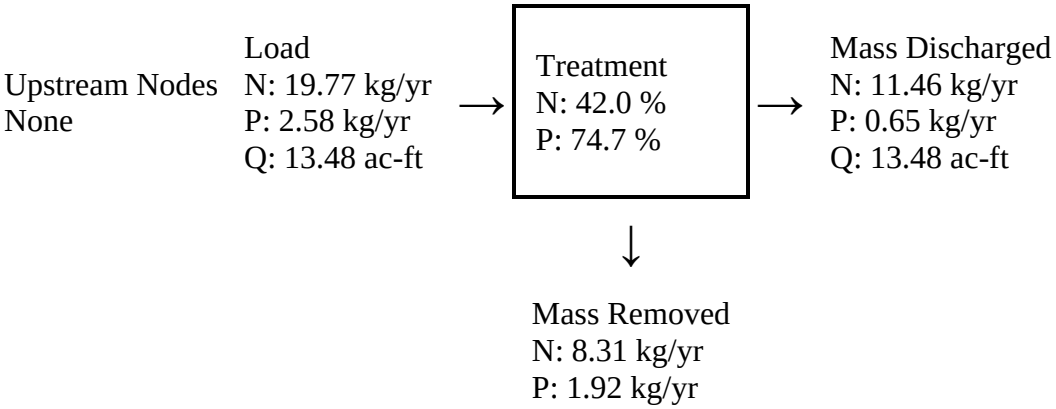
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 6)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 10.83 kg/yr | |
| Total N post load | 19.77 kg/yr | |
| Target N load reduction | 45 % | |
| Target N discharge load | 10.83 kg/yr | |
| Percent N load reduction | 42 % | |
| Provided N discharge load | 11.46 kg/yr | 25.27 lb/yr |
| Provided N load removed | 8.31 kg/yr | 18.33 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 1.411 kg/yr | |
| Total P post load | 2.576 kg/yr | |
| Target P load reduction | 45 % | |
| Target P discharge load | 1.411 kg/yr | |
| Percent P load reduction | 75 % | |
| Provided P discharge load | .653 kg/yr | 1.44 lb/yr |
| Provided P load removed | 1.923 kg/yr | 4.24 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:24:43 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 7 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.15 |
| Rational Coefficient (0-1) | 0.50 |
| Non DCIA Curve Number | 39.99 |
| DCIA Percent (0-100) | 61.07 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 31.345 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 45.992 |
| Phosphorus Loading (kg/yr) | 5.991 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 15.15 |
| Rational Coefficient (0-1) | 0.47 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 58.24 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 29.904 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 43.877 |
| Phosphorus Loading (kg/yr) | 5.715 |

# Catchment Number: 1 Name: Basin 7

**Project:** SR 544
**Date:** 9/22/2023

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.309 |
| Retention Volume (ac-ft) | 0.390 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 15.15 |
| Contributing Area (acres) | 15.150 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 58.24 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | |
| Provided TN Treatment Efficiency (%) | 46 |
| Required TP Treatment Efficiency (%) | |
| Provided TP Treatment Efficiency (%) | 46 |

**Media Mix Information**

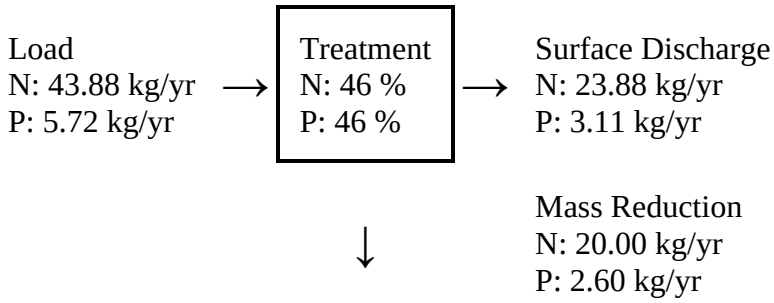
| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

**Groundwater Discharge (Stand-Alone)**

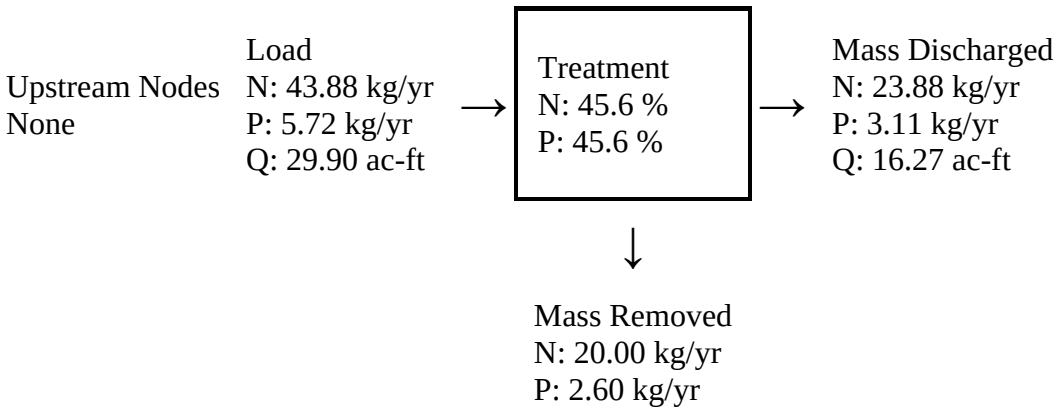
| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |

| | |
|---|---|
| TN Mass Load (kg/yr) | 19.998 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 2.605 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




## Load Diagram for Retention ( As Used In Routing)



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 7) Retention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 45.99 kg/yr | |
| Total N post load | 43.88 kg/yr | |
| Target N load reduction | % | |
| Target N discharge load | 45.99 kg/yr | |
| Percent N load reduction | 46 % | |
| Provided N discharge load | 23.88 kg/yr | 52.65 lb/yr |
| Provided N load removed | 20 kg/yr | 44.1 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 5.991 kg/yr | |
| Total P post load | 5.715 kg/yr | |
| Target P load reduction | % | |
| Target P discharge load | 5.991 kg/yr | |
| Percent P load reduction | 46 % | |
| Provided P discharge load | 3.11 kg/yr | 6.86 lb/yr |
| Provided P load removed | 2.605 kg/yr | 5.744 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:27:03 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 8 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 21.54 |
| Rational Coefficient (0-1) | 0.35 |
| Non DCIA Curve Number | 61.82 |
| DCIA Percent (0-100) | 40.52 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 31.284 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 45.902 |
| Phosphorus Loading (kg/yr) | 5.979 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 21.54 |
| Rational Coefficient (0-1) | 0.48 |
| Non DCIA Curve Number | 59.10 |
| DCIA Percent (0-100) | 57.84 |
| Wet Pond Area (ac) | 1.41 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 40.296 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 59.125 |
| Phosphorus Loading (kg/yr) | 7.701 |

# Catchment Number: 1 Name: Basin 8

**Project:** SR 544
**Date:** 9/22/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 8.440 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 3.422 |
| Annual Residence Time (days) | 76 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 21.54 |
| Contributing Area (acres) | 20.130 |
| Non-DCIA Curve Number | 59.10 |
| DCIA Percent | 57.84 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 22 |
| Provided TN Treatment Efficiency (%) | 41 |
| Required TP Treatment Efficiency (%) | 22 |
| Provided TP Treatment Efficiency (%) | 72 |

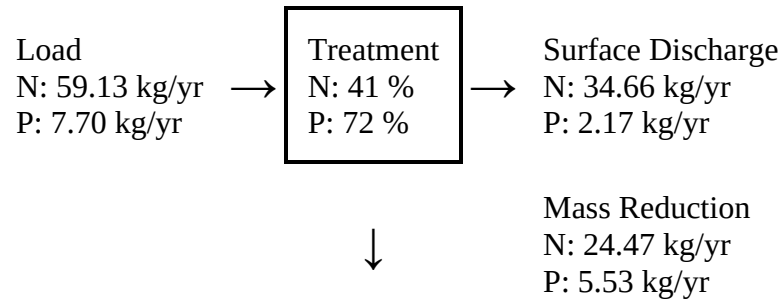
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

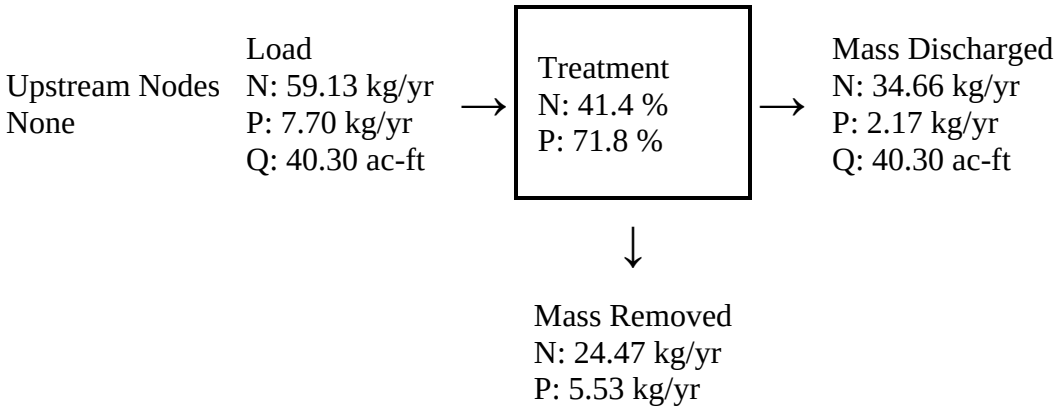
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 8)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 45.9 kg/yr | |
| Total N post load | 59.13 kg/yr | |
| Target N load reduction | 22 % | |
| Target N discharge load | 45.9 kg/yr | |
| Percent N load reduction | 41 % | |
| Provided N discharge load | 34.66 kg/yr | 76.42 lb/yr |
| Provided N load removed | 24.47 kg/yr | 53.95 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 5.979 kg/yr | |
| Total P post load | 7.701 kg/yr | |
| Target P load reduction | 22 % | |
| Target P discharge load | 5.979 kg/yr | |
| Percent P load reduction | 72 % | |
| Provided P discharge load | 2.174 kg/yr | 4.79 lb/yr |
| Provided P load removed | 5.527 kg/yr | 12.187 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:29:31 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 8A |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.59 |
| Rational Coefficient (0-1) | 0.35 |
| Non DCIA Curve Number | 74.40 |
| DCIA Percent (0-100) | 37.84 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 3.818 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 5.603 |
| Phosphorus Loading (kg/yr) | 0.730 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 2.59 |
| Rational Coefficient (0-1) | 0.46 |
| Non DCIA Curve Number | 72.67 |
| DCIA Percent (0-100) | 52.51 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 4.939 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 7.247 |
| Phosphorus Loading (kg/yr) | 0.944 |

# Catchment Number: 1 Name: Basin 8A

**Project:** SR 544
**Date:** 9/22/2023

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 0.880 |
| Retention Volume (ac-ft) | 0.190 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 2.59 |
| Contributing Area (acres) | 2.590 |
| Non-DCIA Curve Number | 72.67 |
| DCIA Percent | 52.51 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 23 |
| Provided TN Treatment Efficiency (%) | 79 |
| Required TP Treatment Efficiency (%) | 23 |
| Provided TP Treatment Efficiency (%) | 79 |

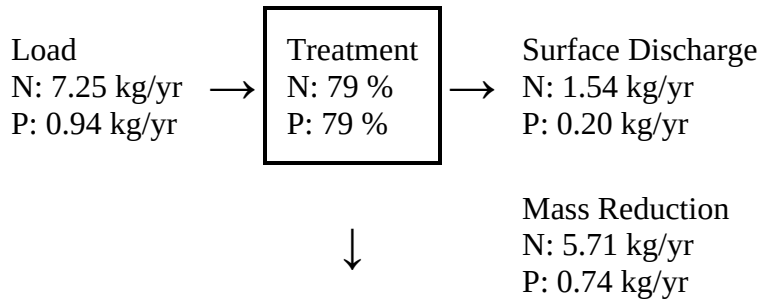
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

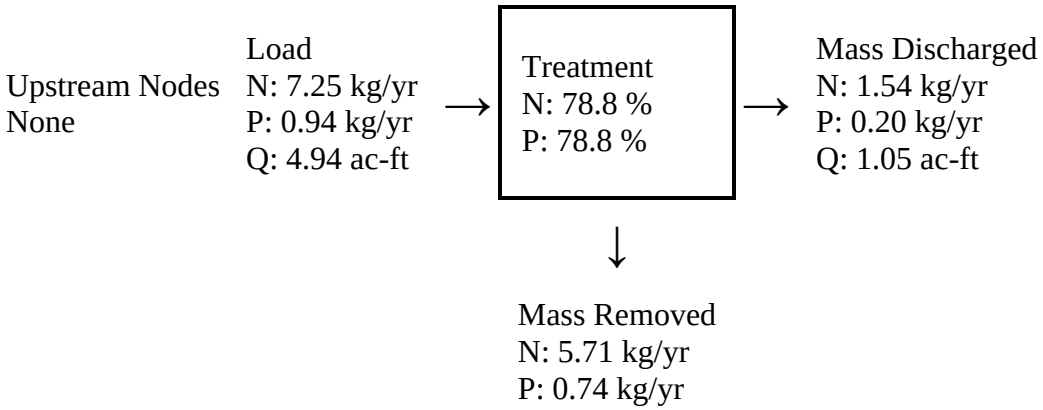
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 5.711 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.744 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




**Load Diagram for Retention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 8A) Retention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 5.6 kg/yr | |
| Total N post load | 7.25 kg/yr | |
| Target N load reduction | 23 % | |
| Target N discharge load | 5.6 kg/yr | |
| Percent N load reduction | 79 % | |
| Provided N discharge load | 1.54 kg/yr | 3.39 lb/yr |
| Provided N load removed | 5.71 kg/yr | 12.59 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | .73 kg/yr | |
| Total P post load | .944 kg/yr | |
| Target P load reduction | 23 % | |
| Target P discharge load | .73 kg/yr | |
| Percent P load reduction | 79 % | |
| Provided P discharge load | .2 kg/yr | .44 lb/yr |
| Provided P load removed | .744 kg/yr | 1.64 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:31:42 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 9 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 9.18 |
| Rational Coefficient (0-1) | 0.19 |
| Non DCIA Curve Number | 50.59 |
| DCIA Percent (0-100) | 22.11 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 7.324 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 10.746 |
| Phosphorus Loading (kg/yr) | 1.400 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 9.18 |
| Rational Coefficient (0-1) | 0.40 |
| Non DCIA Curve Number | 50.94 |
| DCIA Percent (0-100) | 48.44 |
| Wet Pond Area (ac) | 0.38 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 14.686 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 21.548 |
| Phosphorus Loading (kg/yr) | 2.807 |

# Catchment Number: 1 Name: Basin 9

**Project:** SR 544
**Date:** 9/22/2023

**Wet Detention Design**

| | |
|---|---|
| Permanent Pool Volume (ac-ft) | 1.860 |
| Permanent Pool Volume (ac-ft) for 31 days residence | 1.247 |
| Annual Residence Time (days) | 46 |
| Littoral Zone Efficiency Credit | |
| Wetland Efficiency Credit | |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 9.18 |
| Contributing Area (acres) | 8.800 |
| Non-DCIA Curve Number | 50.94 |
| DCIA Percent | 48.44 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 50 |
| Provided TN Treatment Efficiency (%) | 40 |
| Required TP Treatment Efficiency (%) | 50 |
| Provided TP Treatment Efficiency (%) | 68 |

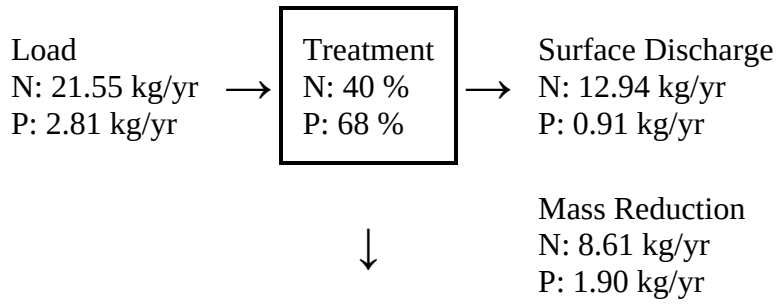
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

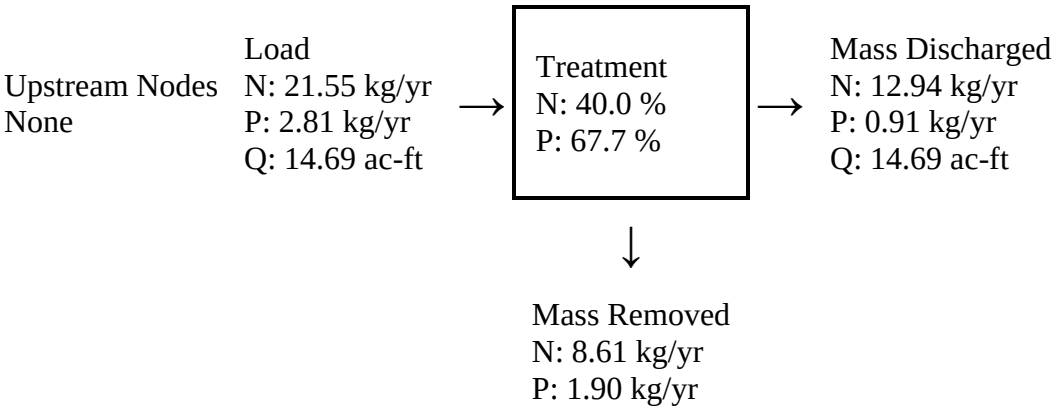
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 0.000 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 0.000 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Wet Detention (stand-alone)




**Load Diagram for Wet Detention ( As Used In Routing)**



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 9)

Wet Detention

Based on % removal values to the nearest percent

**Routing Summary**

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 10.75 kg/yr | |
| Total N post load | 21.55 kg/yr | |
| Target N load reduction | 50 % | |
| Target N discharge load | 10.75 kg/yr | |
| Percent N load reduction | 40 % | |
| Provided N discharge load | 12.94 kg/yr | 28.53 lb/yr |
| Provided N load removed | 8.61 kg/yr | 18.99 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 1.4 kg/yr | |
| Total P post load | 2.807 kg/yr | |
| Target P load reduction | 50 % | |
| Target P discharge load | 1.4 kg/yr | |
| Percent P load reduction | 68 % | |
| Provided P discharge load | .907 kg/yr | 2 lb/yr |
| Provided P load removed | 1.9 kg/yr | 4.189 lb/yr |

# Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:33:56 AM

## Site and Catchment Information

Analysis: Net Improvement

| | |
|---|---|
| Catchment Name | Basin 10 |
| Rainfall Zone | Florida Zone 2 |
| Annual Mean Rainfall | 50.00 |

## Pre-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 14.26 |
| Rational Coefficient (0-1) | 0.30 |
| Non DCIA Curve Number | 40.41 |
| DCIA Percent (0-100) | 36.71 |
| Nitrogen EMC (mg/l) | 1.190 |
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 17.935 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 26.315 |
| Phosphorus Loading (kg/yr) | 3.428 |

## Post-Condition Landuse Information

| Landuse | User Defined Values |
|---|---|
| Area (acres) | 14.26 |
| Rational Coefficient (0-1) | 0.49 |
| Non DCIA Curve Number | 39.00 |
| DCIA Percent (0-100) | 60.57 |
| Wet Pond Area (ac) | 0.00 |
| Nitrogen EMC (mg/l) | 1.190 |

| | |
|---|---|
| Phosphorus EMC (mg/l) | 0.155 |
| Runoff Volume (ac-ft/yr) | 29.256 |
| Groundwater N (kg/yr) | 0.000 |
| Groundwater P (kg/yr) | 0.000 |
| Nitrogen Loading (kg/yr) | 42.926 |
| Phosphorus Loading (kg/yr) | 5.591 |

# Catchment Number: 1 Name: Basin 10

**Project:** SR 544
**Date:** 9/22/2023

**Retention Design**

| | |
|---|---|
| Retention Depth (in) | 2.836 |
| Retention Volume (ac-ft) | 3.370 |

**Watershed Characteristics**

| | |
|---|---|
| Catchment Area (acres) | 14.26 |
| Contributing Area (acres) | 14.260 |
| Non-DCIA Curve Number | 39.00 |
| DCIA Percent | 60.57 |
| Rainfall Zone | Florida Zone 2 |
| Rainfall (in) | 50.00 |

**Surface Water Discharge**

| | |
|---|---|
| Required TN Treatment Efficiency (%) | 39 |
| Provided TN Treatment Efficiency (%) | 98 |
| Required TP Treatment Efficiency (%) | 39 |
| Provided TP Treatment Efficiency (%) | 98 |

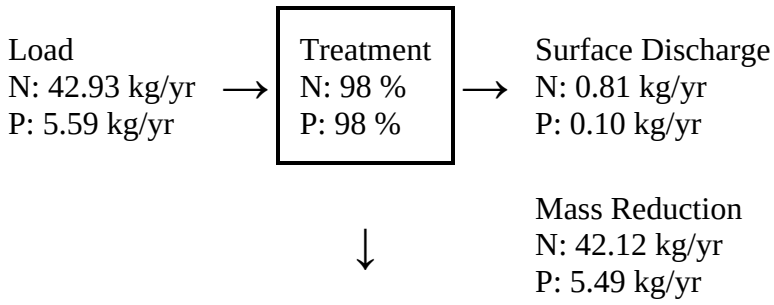
**Media Mix Information**

| | |
|---|---|
| Type of Media Mix | Not Specified |
| Media N Reduction (%) | |
| Media P Reduction (%) | |

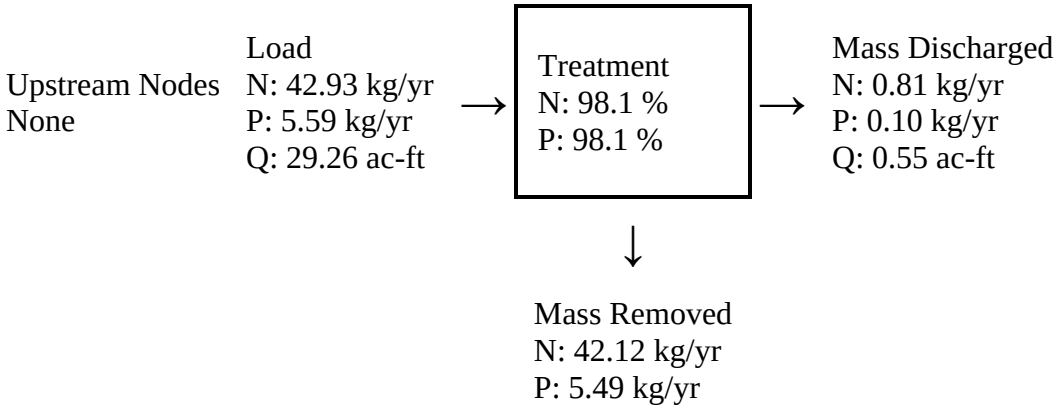
**Groundwater Discharge (Stand-Alone)**

| | |
|---|---|
| Treatment Rate (MG/yr) | 0.000 |
| TN Mass Load (kg/yr) | 42.121 |
| TN Concentration (mg/L) | 0.000 |
| TP Mass Load (kg/yr) | 5.486 |
| TP Concentration (mg/L) | 0.000 |

# Load Diagram for Retention (stand-alone)




## Load Diagram for Retention ( As Used In Routing)



# Summary Treatment Report Version: 4.3.5

Project: SR 544

**Analysis Type:** Net Improvement

Date:9/22/2023

**BMP Types:**

Catchment 1 - (Basin 10) Retention

Based on % removal values to the nearest percent

**Routing Summary**
Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

## Summary Report

### Nitrogen

**Surface Water Discharge**

| | | |
|---|---|---|
| Total N pre load | 26.31 kg/yr | |
| Total N post load | 42.93 kg/yr | |
| Target N load reduction | 39 % | |
| Target N discharge load | 26.31 kg/yr | |
| Percent N load reduction | 98 % | |
| Provided N discharge load | .81 kg/yr | 1.78 lb/yr |
| Provided N load removed | 42.12 kg/yr | 92.88 lb/yr |

### Phosphorus

**Surface Water Discharge**

| | | |
|---|---|---|
| Total P pre load | 3.428 kg/yr | |
| Total P post load | 5.591 kg/yr | |
| Target P load reduction | 39 % | |
| Target P discharge load | 3.428 kg/yr | |
| Percent P load reduction | 98 % | |
| Provided P discharge load | .105 kg/yr | .23 lb/yr |
| Provided P load removed | 5.486 kg/yr | 12.097 lb/yr |

# *APPENDIX E*

## Pond Alternatives Evaluation Matrix

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
(407) 971-8850 phone (407) 971-8955 fax

# SR 544 PD&E

FDOT

## SUMMARY OF POND SITES

### ENGINEERING DATA & ANALYSIS

| Pond | Location | Existing Ground Elevation (ft) | Pond Type | Soil Names & Hydrologic Groups | Estimated SHWT Elevation (ft) | Lowest Edge of Existing Roadway (ft) | Distance From Lowest Edge of Proposed Roadway (ft) | Estimated Allowable $DHW_{25yr/24hr}$ (ft) | Estimated Allowable Treatment & Attenuation Depth (ft) | Outfall Location | Roadway Drainage Area Excluding Pond (ac) | Required Treatment & Attenuation Volume (ac-ft) | Required Pond Access Area (ac) | Required Pond Area (ac) | Required Pond Area Including Access (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pond 1A | Sta.09+00 (LT.) Existing R/W | 151.00 | Dry Retention | Tavares-Urban land complex (HSG A) | 145.00 | 149.00 | 450 | 149.00 | 4.00 | Lake Conine via Basin 1 | 2.17 | 0.09 | 0.00 | 0.20 | 0.20 |
| Pond 1 | Sta.41+00 (RT.) Parcel No. 26-28-16-000000-013020, & 26-28-16-000000-031060 | 135.00 | Dry Retention | Candler sand (HSG A) & Adamsville fine sand (HSG C) | 129.00 | 133.00 | 200 | 133.00 | 4.00 | Lake Conine | 14.00 | 1.62 | 0.00 | 2.83 | 2.83 |
| Pond 2 | Sta.86+00 (LT.) Parcel No. 26-28-09-530000-000042 | 131.00 | Wet Detention | Candler sand (HSG A) & Adamsville fine sand (HSG C) | 130.00 | 132.00 | 50 | 131.50 | 1.50 | Lake Smart | 8.74 | 2.53 | 0.00 | 3.83 | 3.83 |
| Pond 3 | Sta.131+00 (LT.) Parcel No. 26-28-10-530500-002601 | 128.50 | Wet Detention | Adamsville fine sand (HSG C) | 127.00 | 130.00 | 300 | 129.00 | 2.00 | Lake Fannie | 13.32 | 2.49 | 0.23 | 2.50 | 2.73 |
| Pond 4 | Sta.183+00 (LT.) Parcel No. 26-28-02-521500-002400 | 128.00 | Wet Detention | Wauchula fine sand (HSG B/D) | 126.00 | 129.00 | 100 | 128.00 | 2.00 | Lake Fannie | 19.13 | 2.50 | 0.11 | 2.21 | 2.32 |
| Pond 5 | Sta. 250+00 (RT.) Parcel No. 26-28-12-531502-000100 | 126.00 | Wet Detention | Immokalee sand (HSG B/D) & Kaliga muck (HSG B/D) | 123.00 | 0.00 | 1100 | 127.10 | 4.10 | Lake Hamilton via Wetlands | 19.53 | 3.06 | 0.46 | 1.76 | 2.22 |
| Pond 6 | Sta. 297+00 (LT.) Parcel No. 27-28-06-000000-033070 | 130.00 | Wet Detention | Adamsville fine sand (HSG C) & Basinger mucky fine sand (HSG D) | 129.00 | 129.00 | 100 | 131.00 | 2.00 | Lake Hamilton via Lake Henry Canal | 6.45 | 1.68 | 0.00 | 1.69 | 1.69 |
| Swale 7 | Sta. 323+00 (LT.) Parcel No. 27-28-06-000000-013010 | 129.00 | Dry Retention | Tavares fine sand (HSG A) | 127.00 | 132.50 | 50 | 130.00 | 3.00 | Existing Depression | 14.56 | 0.37 | 0.00 | 0.70 | 0.70 |
| Pond 8 | Sta. 338+00 (RT.) Parcel No. 27-28-06-000000-012070 | 126.00 | Wet Detention | Samsula muck, frequently ponded (HSG B/D) & Smyrna and Myakka fine sands (HSG B/D) | 122.00 | 126.60 | 2000 | 124.50 | 2.50 | Little Lake Hamilton via Creek | 19.48 | 3.60 | 0.00 | 2.75 | 2.75 |
| Swale 8A | Sta. 331+00 (RT.) Existing R/W | 126.00 | Dry Retention | Samsula muck, frequently ponded (HSG B/D) & Smyrna and Myakka fine sands (HSG B/D) | 123.00 | 126.00 | 50 | 125.00 | 2.00 | Haines City Drainage Canal | 2.12 | 0.06 | 0.00 | 0.57 | 0.57 |
| Pond 9 | Sta. 351+00 (LT.) Parcel No. 27-28-05-000000-031010 | 126.00 | Wet Detention | Smyrna and Myakka fine sands (HSG B/D) & Adamsville fine sand (HSG C) | 123.00 | 128.00 | 100 | 127.00 | 4.00 | Little Lake Hamilton via Creek | 8.36 | 2.13 | 0.00 | 1.25 | 1.25 |
| Pond 10 | Sta. 387+00 (RT.) Parcel No. 27-28-05-000000-031010 | 133.00 | Dry Retention | Candler sand (HSG A) | 126.80 | 131.50 | 50 | 132.00 | 5.20 | Lake Butler | 12.98 | 2.46 | 0.00 | 1.64 | 1.64 |

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
(407) 971-8850 phone (407) 971-8955 fax

# SR 544 PD&E

FDOT

## SUMMARY OF POND SITES

### IMPACT & COST ANALYSIS

| Pond | Pond Floodplain Impacts (ac-ft) | FEMA Floodzone | Arch. / Historical Impact Potential | Wetland Impacts (ac) | Environmental Impact Risk | Threatened or Endangered Species Impacts | Hazardous Materials & Contamination Potential | Major Utility Conflict Potential (Y/N) | Existing Land Use | Future Land Use | Total Area Provided for Pond (ac) | Total Pond Costs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pond 1A | 0 | N/A | Low | 0.00 | Low | Gopher tortoise, eastern indigo snake | High | Y | Residential Med Density 2 to 5 Dwelling Units Per Acre | City | 0.37 | $232,792 |
| Pond 1 | 0 | N/A | Low | 0.00 | Medium | Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, sand skink, blue-tailed mole skink, Florida sandhill crane | Medium | N | Tree Crops | City | 2.83 | $1,005,782 |
| Pond 2 | 0 | N/A | Low | 0.00 | Medium | Southeastern American kestrel, southern fox squirrel | Low | N | Institutional | City | 3.83 | $1,311,478 |
| Pond 3 | 0 | N/A | Low | 0.00 | Medium | Florida sandhill crane, southeastern American kestrel | Low | N | Cropland and Pastureland | City | 2.73 | $1,732,875 |
| Pond 4 | 0 | N/A | Low | 0.00 | Medium | Wood stork, wading birds, Florida sandhill crane | Low | N | Cropland and Pastureland | City | 2.32 | $1,065,540 |
| Pond 5 | 1.41 | AE | Low | 1.05 | High | Wood stork, wading birds, southeastern American kestrel, southern fox squirrel | Low | N | Residential Low Density <2 Dwelling Units Per Acre | Residential | 2.41 | $1,258,256 |
| Pond 6 | 0 | N/A | Low | 0.33 | Medium | Wood stork, wading birds, Florida sandhill crane | Low | N | Residential Low Density <2 Dwelling Units Per Acre | Residential | 1.87 | $1,053,930 |
| Swale 7 | 0 | N/A | Low | 0.00 | Medium | Wood stork, wading birds, Florida sandhill crane | High | N | Cropland and Pastureland | Residential | 0.70 | $550,241 |
| Pond 8 | 1.72 | AE | Low | 1.59 | High | Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane | Low | N | Cropland and Pastureland | Residential | 2.75 | $1,773,443 |
| Swale 8A | 0 | N/A | Low | 0.00 | Low | Gopher tortoise, eastern indigo snake | Low | N | Cropland and Pastureland | Residential | 0.57 | $259,168 |
| Pond 9 | 0 | N/A | Low | 0.00 | High | Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane | Low | Y | Wet Prairies, & Emergent Aquatic Vegetation | City | 1.25 | $417,565 |
| Pond 10 | 0 | N/A | Low | 0.00 | Medium | Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel | Medium | N | Residential Low Density <2 Dwelling Units Per Acre | City | 2.28 | $747,288 |

Note: The cost evaluation for the stormwater management facility alternatives in this report include stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork excavation and grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

The potential occurrence of any listed species within each proposed pond site was valued as low, medium, or high based on FLUCFCS type, FNAI reports, and data gathered during field reviews. A determination of low was given for areas that are developed and exhibited minimal to no available habitat for listed species. A determination of medium was given for areas where suitable habitat was identified within one quarter mile of the pond site, or suboptimal habitat was observed within the pond site. A determination of high was given for direct observations of listed species, or areas with greater than one mile of contiguous suitable habitat.

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
(407) 971-8850 phone (407) 971-8955 fax

# SR 544 PD&E

FDOT

## SUMMARY OF FLOODPLAIN COMPENSATION SITES

### ENGINEERING DATA & ANALYSIS

| Alternatives | Location | Existing Ground Elevation (ft) | Soil Names & Hydrologic Groups | Estimated SHWT Elevation (ft) | Estimated 100-Year Floodplain Elevation | Roadway Floodplain Impacts (ac-ft) | Pond Floodplain Compensation (ac-ft) | FEMA Floodzone | Outfall Location | Required Pond Access Area (ac) | Required Pond Area (ac) | Required Pond Area Including Access (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FPC 1 | Sta. 102+00 (RT.) Parcel No. 26-28-09-530000-000110 | 131.00 | Samsula muck, frequently ponded (HSG B/D) & Adamsville fine sand (HSG C) | 128.00 | 129.90 | 0.99 | 1.07 | AE | Lake Smart | 0.00 | 0.74 | 0.74 |
| FPC 2 | Sta. 129+00 (LT.) Parcel No. 26-28-10-530500-002601 | 130.00 | Adamsville fine sand (HSG C) | 127.00 | 130.10 | 3.35 | 3.64 | AE | Lake Fannie | 0.00 | 1.62 | 1.62 |
| FPC 3 A & B | Sta. 183+00 (LT.) Parcel No. 26-28-02-521500-002400 | 129.00 | Wauchula fine sand (HSG B/D) | 126.00 | 128.30 | 6.53 | 10.14 | AE | Lake Fannie | 0.00 | 3.62 | 3.62 |
| FPC 4 | Sta. 252+00 (RT.) Parcel No. 26-28-12-531502-000100 | 124.00 | Immokalee sand (HSG B/D) & Kaliga muck (HSG B/D) | 123.00 | 124.30 | 4.57 | 5.27 | AE | Lake Hamilton via Wetlands | 0.00 | 4.84 | 4.84 |
| FPC 5 | Sta. 364+00 (LT.) Parcel No. 27-28-05-000000-031010 | 124.00 | Smyrna and Myakka fine sands (HSG B/D) & Hontoon muck, frequently ponded (HSG B/D) | 123.00 | 124.20 | 3.31 | 3.31 | AE | Little Lake Hamilton via Creek | 0.00 | 3.22 | 3.22 |

### IMPACT & COST ANALYSIS

| Alternatives | Arch. / Historical Impact Potential | Wetland Impacts (ac) | Environmental Impact Risk | Threatened or Endangered Species Impacts | Hazardous Materials & Contamination Potential | Major Utility Conflict Potential (Y/N) | Existing Land Use | Future Land Use | Total Area Provided for FPC (ac) | Total Pond Costs |
|---|---|---|---|---|---|---|---|---|---|---|
| FPC 1 | Low | 0.09 | Medium | Wood stork, wading birds, Florida sandhill crane | Low | N | Residential Low Density <2 Dwelling Units Per Acre | City | 0.74 | $277,723 |
| FPC 2 | Low | 0.00 | Medium | Florida sandhill crane, southeastern American kestrel | Low | N | Cropland and Pastureland | City | 1.62 | $624,156 |
| FPC 3 A & B | Low | 0.00 | Medium | Gopher tortoise, eastern indigo snake, wood stork, wading birds, Florida sandhill crane | Low | N | Cropland and Pastureland | City | 3.62 | $1,249,748 |
| FPC 4 | Low | 0.76 | High | Wood stork, wading birds, southeastern American kestrel, southern fox squirrel | Low | N | Residential Low Density <2 Dwelling Units Per Acre | Residential | 4.84 | $827,595 |
| FPC 5 | Low | 1.66 | High | Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane | Low | Y | Wet Prairies, & Emergent Aquatic Vegetation | Residential | 3.22 | $742,230 |

Note: The cost evaluation for the stormwater management facility alternatives in this report include stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork excavation and grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

The potential occurrence of any listed species within each proposed pond site was valued as low, medium, or high based on FLUCFCS type, FNAI reports, and data gathered during field reviews and species-specific surveys. A determination of low was given for areas that exhibited minimal to no available habitat for listed species. A determination of medium was given for areas where suitable habitat was identified within one quarter mile of the pond site, or suboptimal habitat was observed within the pond site. A determination of high was given for direct observations of listed species, or areas with greater than one mile of contiguous suitable habitat.

# *APPENDIX F*

**Existing Permits**

*PERMIT NO. 13706.001*

# SR 544 Resurfacing

Southwest Florida Water Management District

2379 Broad St., Brooksville, Florida 34604-6899
(352) 796-7211 or 1-800-423-1476 (FL only)
SUNCOM 628-4150 TDD only 1-800-231-6103 (FL only)
*On the Internet at:* WaterMatters.org

An Equal Opportunity Employer

**Tampa Service Office**
7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 or
1-800-836-0797 (FL only)
SUNCOM 578-2070

**Bartow Service Office**
170 Century Boulevard
Bartow, Florida 33830-7700
(863) 534-1448 or
1-800-492-7862 (FL only)
SUNCOM 572-6200

**Sarasota Service Office**
6750 Fruitville Road
Sarasota, Florida 34240-9711
(941) 377-3722 or
1-800-320-3503 (FL only)
SUNCOM 531-6900

**Lecanto Service Office**
3600 West Sovereign Path
Suite 226
Lecanto, Florida 34461-8070
(352) 527-8131
SUNCOM 667-3271

**Ronnie E. Duncan**
Chair, Pinellas
**Thomas G. Dabney, II**
Vice Chair, Sarasota
**Heidi B. McCree**
Secretary, Hillsborough
**Watson L. Haynes, II**
Treasurer, Pinellas
**Edward W. Chance**
Manatee
**Monroe "Al" Coogler**
Citrus
**Maggie N. Dominguez**
Hillsborough
**Pamela L. Fentress**
Highlands
**Ronald C. Johnson**
Polk
**Janet D. Kovach**
Hillsborough
**John K. Renke, III**
Pasco

**E. D. "Sonny" Vergara**
Executive Director
**Gene A. Heath**
Assistant Executive Director
**William S. Bilenky**
General Counsel

September 3, 2002

File of Record
Permit No _____

Eduardo A. Ponce', P.E.
Florida Department of Transportation
Post Office Box 1249
Bartow, FL 33831-1249

Subject: **Notice of Final Agency Action - Approval**
Environmental Resource Noticed General Construction

| | |
|---|---|
| Project Name: | FDOT - S.R. 544 from Avenue Y NE to West of U.S. 27 |
| Permit No: | 47013706.001 |
| County: | Polk |
| Sec/Twp/Rge: | 6/28S/27E and 1,9,10,11,12,16/28S/26E |
| Expiration Date: | August 5, 2007 |

Dear Mr. Ponce':

The District acknowledges your intent to use a Noticed General Construction Permit for the project referenced above. Plans and information received will be kept on file in the Bartow Service Office in support of this determination. The proposed construction must be completed before the expiration date indicated above.

The proposed construction is subject to general conditions of Rule 40D-400.215, Florida Administrative Code (F.A.C.) (Exhibit A, copy enclosed) and the specific conditions of Rule 40D-400.447, F.A.C. Deviations from these conditions may subject you to enforcement action and possible penalties. You are responsible for conducting construction in a manner which satisfies all criteria.

Final approval is contingent upon no objection to the District's action being received by the District within the time frames described below.

You or any person whose substantial interests are affected by the District's action regarding a permit may request an administrative hearing in accordance with Sections 120.569 and 120.57, F.S., and Chapter 28-106, Florida Administrative Code (F.A.C.), of the Uniform Rules of Procedure. *A request for hearing must: (1) explain how the substantial interests of each person requesting the hearing will be affected by the District's action, or proposed action, (2) state all material facts disputed by the person requesting the hearing or state that there are no disputed facts, and (3) otherwise comply with Chapter 28-106, F.A.C.* Copies of Sections 28-106.201 and 28-106.301, F.A.C. are enclosed for your reference. A request for hearing must be filed with (received by) the Agency Clerk of the District at the District's Brooksville address within 21 days of receipt of this notice. Receipt is deemed to be the fifth day after the date on which this notice is deposited in the United States mail. Failure to file a request for hearing within this time period shall constitute a waiver of any right you or such person may have to request a hearing under Sections 120.569 and 120.57, F.S. Mediation pursuant to Section 120.573, F.S., to settle an administrative dispute regarding the District's action in this matter is not available prior to the filing of a request for hearing.

If you have questions, please contact Sherry M. Windsor, E.I., at the Bartow Service Office.

Sincerely,

Brian S. Starford, P.G., Director
Bartow Regulation Department

BSS:SMW:po
Enclosures: Rule 40D-400.447, F.A.C.
Exhibit A
Approved Construction Drawings
Notice of Authorization to Commence Construction
Noticing Packet (42.00-039)
Sections 28-106.201 and 28-106.301, F.A.C.
cc: File of Record 47013706.001
Joey Murphy, City of Winter Haven
Pat Moylan, Polk County
J. Whealton

## EXHIBIT "A"

**GENERAL CONDITIONS**:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this section are binding upon the Permittee for all noticed general permits in this chapter. These conditions are enforceable under part IV of Chapter 373, F.S.

2. The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit. A violation of the permit is a violation of part IV of Chapter 373, F.S., and may result in suspension or revocation of the Permittee's right to conduct such activity under the general permit. The District may also begin legal proceedings seeking penalties or other remedies as provided by law for any violation of these conditions.

3. This general permit does not eliminate the necessity to obtain any required federal, state, local and special District authorizations prior to the start of any construction, alteration, operation, maintenance, removal or abandonment authorized by this permit.

4. This general permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee, or convey any rights or privileges other than those specified in the general permit and this chapter.

5. This general permit does not relieve the Permittee from liability and penalties when the permitted activity causes harm or injury to human health or welfare; animal, plant or aquatic life; or property. It does not allow the Permittee to cause pollution in contravention of Florida Statutes and District rules.

6. The Permittee is hereby advised that Section 253.77, F.S., states that a person may not commence any excavation, construction, or other activity involving the use of sovereign or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required lease, license, easement, or other form of consent authorizing the proposed use. Therefore, the Permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on sovereignty lands or other state-owned lands.

7. The Board may modify or revoke the authorization to conduct activities pursuant to this noticed general permit at any time if it determines that a stormwater management system, dam, impoundment, reservoir, appurtenant work, or works has become a danger to the public health or safety of its operation has become inconsistent with the objectives of he District or is in violation of any rule or order of the District, or the provisions of this noticed general permit.

8. This permit shall not be transferred to a third party except pursuant to section 40D-4.351, F.A.C. The Permittee transferring the general permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to sale, conveyance, or other transfer of ownership or control of the permitted system or the real property at which the permitted system is located.

9. Upon reasonable notice to the Permittee, District staff with proper identification shall have permission to enter, inspect, sample and test the permitted system to insure conformity with the plans and specifications approved by the permit.

10. The Permittee shall maintain any permitted system in accordance with the plans submitted and authorized by this permit.

11. A Permittee's right to conduct a specific activity under this noticed general permit is authorized for a duration of five years.

12. Construction, alteration, operation, maintenance, removal and abandonment approved by this general permit shall be conducted in a manner which does not cause violations of state water quality standards, including any antidegradation provisions of sections 62-4.242(1)(a) and (b), 62-4.242(2) and (3), and 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters. The Permittee shall implement best management practices for erosion, turbidity, and other pollution control to prevent violation of state water quality standards. Temporary erosion control measures such as sodding, mulching, and seeding shall be implemented and shall be maintained on all erodible ground areas prior to and during construction. Permanent erosion control measures such as sodding and planting of wetland species shall be completed within seven days of any construction activity. Turbidity barriers shall be installed and maintained at all locations where the possibility of transferring suspended solids into wetlands or surface waters exists due to the permitted activity. Turbidity barriers shall remain in place and shall be maintained in a functional condition at all locations until construction is completed, soils are stabilized and vegetation has been established. Thereafter the Permittee shall be responsible for the removal of the barriers. The Permittee shall correct any erosion or shoaling that causes adverse impacts to the water resources.

13. The Permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any system authorized by the general permit.

14. The Permittee shall immediately notify the District in writing of any previously submitted information that is later discovered to be inaccurate.

**40D-400.447 General Permit to the Florida Department of Transportation, Counties and Municipalities for Minor Activities Within Existing Rights-of-Way or Easements.**

(1) A general permit is hereby granted to the Florida Department of Transportation, Counties and Municipalities to conduct the activities described below:

(a) The extension of existing culverts and crossing approaches to accommodate widening of the roadway where excavation or deposition of material shall not exceed 1000 cubic yards in wetlands and other surface waters and the area from which material is excavated or to which material is deposited shall not exceed a total of 0.25 acres at any one location (project site). The 1000 cubic yardage limitation shall be separately applied to excavation and deposition of material.

(b) Relocation, recontouring, widening, or reconstruction of existing highway drainage ditches through uplands provided the floor elevation of the ditch is not deepened below the original design elevation and provided that the work does not cause a change in the hydrology of any wetlands which are connected to or which are adjacent to the ditch.

(c) Culvert placement, replacement and maintenance associated with existing roadways, in streams with an average discharge of less than 10 cubic feet per second at the culvert location or streams draining less than 10 square miles, provided that construction does not cause scour in the downstream waters or increase the velocity of the water downstream, does not reduce existing flood conveyance of the stream for the 100 year flood flow and does not reduce existing flood storage within the 10 year flood plain. The material excavated or deposited as fill shall not exceed 1000 cubic yards in wetlands and other surface waters. The cross sectional area of the culvert shall not be reduced unless the reduced cross section provides for an equal or greater discharge capability. In the case of a culvert installed as a wildlife crossing, the cross sectional area shall not be reduced.

(d) Construction of temporary bypass lanes and stream channel diversions necessary to complete projects detailed in paragraph (c) above, provided the area used for the temporary bypass lanes and temporary diversion is restored to its previous contours and elevations.

(e) Channel clearing and shaping, not to exceed a combined total of 0.5 acres of dredging and filling in wetlands and other surface waters, to facilitate maximum hydraulic efficiency of structures authorized by paragraph (c) above, where the spoil material is used on an upland portion of the project or is deposited on a self-contained, upland spoil site. Escape of spoil material or return water from the spoil deposition area into wetlands or other surface waters is prohibited.

(f) Repair of existing concrete bridge pilings by the construction of pile jackets, provided that the permanent outer form is composed of inert materials and the quantity of material shall not exceed 300 cubic yards of dredging or 300 cubic yards of filling per project. Although the bottom sediments within the forms may be removed by jetting or pumping, and may not be recoverable, proper turbidity control measures shall be employed as necessary to prevent violations of state water quality standards.

(2) This general permit shall be subject to the following specific conditions:

(a) The permittee shall use erosion and sediment control best management practices, including turbidity curtains or similar devices, in strict adherence to these practices as described in Chapter 6, The Florida Land Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental Regulation, 1988) incorporated by reference to prevent violation of state water quality standards.

(b) Immediately following completion of slope construction, the fill areas and any disturbed banks of wetlands or other surface waters shall be stabilized with vegetation or riprap to prevent erosion. Temporary erosion controls for all exposed soils within wetlands and other surface waters shall be completed within seven calendar days of the most recent construction activity. Prevention of erosion of exposed earth into wetlands and other surface waters is a construction priority and completed slopes shall not remain unstabilized while other construction continues.

(c) In addition to complying with the notice provisions of section 40D-400.211, F.A.C., at least 90 days prior to commencement of construction, the permittee shall provide written notification to the appropriate District office of the date the permitted construction activities are planned to begin and within 90 days following completion of construction the permittee shall provide written notification to the District of the date construction activities are completed.

(d) The permittee shall limit stream channel relocation to streams which have an average annual discharge of 10 cubic feet per second or less. The length of relocated channels or those significantly altered shall be limited to 200 feet per stream. A stream channel shall be altered only when such a measure will reduce the long term adverse water quality impacts and will maintain or restore the stream's natural hydraulic capability.

(e) This general permit shall not apply to ditch construction in Class I or Class II surface waters, Outstanding National Resource Waters or waters designated as Outstanding Florida Waters.

(3) This general permit does not authorize the construction of additional traffic lanes. Systems which require additional traffic lanes must first obtain a general or individual environmental resource permit under chapters 40D-4 or 40D-40, F.A.C., as applicable, before the start of construction.

Specific Authority 373.044, 373.113, 373.118, F.S., Law Implemented 373.413, 373.416, 373.426, F.S. History--New: 10-3-95.

Imaged As Is

## PART II HEARINGS INVOLVING DISPUTED ISSUES OF MATERIAL FACT

**28-106.201 Initiation of Proceedings.**

**(1)** Unless otherwise provided by statute, initiation of proceedings shall be made by written petition to the agency responsible for rendering final agency action. The term "petition" includes any document that requests an evidentiary proceeding and asserts the existence of a disputed issue of material fact. Each petition shall be legible and on 8 1/2 by 11 inch white paper. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced.

**(2)** All petitions filed under these rules shall contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and

(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

**(3)** Upon receipt of a petition involving disputed issues of material fact, the agency shall grant or deny the petition, and if granted shall, unless otherwise provided by law, refer the matter to the Division of Administrative Hearings with a request that an administrative law judge be assigned to conduct the hearing. The request shall be accompanied by a copy of the petition and a copy of the notice of agency action.

(4) A petition shall be dismissed if it is not in substantial compliance with subsection (2) of this rule or it has been untimely filed. Dismissal of a petition shall, at least once, be without prejudice to petitioner's filing a timely amended petition curing the defect, unless it conclusively appears from the face of the petition that the defect cannot be cured.

(5) The Agency shall promptly give written notice to all parties of the action taken on the petition, shall state with particularity its reasons if the petition is not granted, and shall state the deadline for filing an amended petition if applicable.

*Specific Authority 120.54(3), 120.54(5) FS.*
*Law Implemented 120.54(5), 120.569, 120.57 FS.*
*History—New 4-1-97, Amended 9-17-98.*

## PART III PROCEEDINGS AND HEARINGS NOT INVOLVING DISPUTED ISSUES OF MATERIAL FACT

**28-106.301 Initiation of Proceedings.**

**(1)** Initiation of a proceeding shall be made by written petition to the agency responsible for rendering final agency action. The term "petition" includes any document which requests a proceeding. Each petition shall be legible and on 8 1/2 by 11 inch white paper or on a form provided by the agency. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced.

**(2)** All petitions filed under these rules shall contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

(e) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and

(f) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

**(3)** If the petition does not set forth disputed issues of material fact, the agency shall refer the matter to the presiding officer designated by the agency with a request that the matter be scheduled for a proceeding not involving disputed issues of material fact. The request shall be accompanied by a copy of the petition and a copy of the notice of agency action.

**(4)** A petition shall be dismissed if it is not in substantial compliance with subsection (2) of this Rule or it has been untimely filed. Dismissal of a petition shall, at least once, be without prejudice to petitioner's filing a timely amended petition curing the defect, unless it conclusively appears from tthe face of the petition that the defect cannot be cured.

**(5)** The agency shall promptly give written notice to all parties of the action taken on the petition, shall state with particularity its reasons if the petition is not granted, and shall state the deadline for filing an amended petition if applicable.

*Specific Authority 120.54(5) FS.*
*Law Implemented 120.54(5), 120.569, 120.57 FS.*
*History—New 4-1-97, Amended 9-17-98.*

## PROFESSIONAL CERTIFICATION*
## FOR THE ENGINEERING EVALUATION REPORT

| | |
|---|---|
| MSSW/ERP Permit Number: | 47013706.001 |
| Date Application Received: | August 5, 2002 |
| Permittee's Name: | Florida Department of Transportation |
| Address: | Post Office Box 1249<br>Bartow, FL 33831-1249 |
| Project Name: | FDOT - S.R. 544 from Avenue Y NE to West of U.S. 27 |
| Project Description: | Road Project |
| Project Size: | 0.07 Acre |
| Activity: | Construction |
| Section(s)/Township/Range: | 6/28S/27E and 1,9,10,11,12,16/28S/26E |

**Imaged As Is**

I HEREBY CERTIFY that the engineering features described in the referenced application to construct and/or operate a surface water management system associated with the indicated project have been evaluated regarding provision of reasonable assurance of compliance with Part IV, Chapter 373, Florida Statutes, and Chapters 40D-4, 40D-40 or 40D-400, Florida Administrative Code (F.A.C.), as applicable. I have not evaluated and do not make any certifications as to other aspects of the proposal.

This evaluation was conducted within limited time frames and focused on a summary review of the construction plans, permit abstract and conditions, engineering worksheet, and District rule requirements relative to the Conditions of Issuance. Ongoing responsible oversight of degreed engineering staff was provided during the detailed project review.

William A. Hartmann 9/5/02 (Seal)
William A. Hartmann, P.E., Surface Water Regulation Manager
FL P.E. #36694
Bartow Regulation Department
Southwest Florida Water Management District

* When required by Section 61G15-26.001(1), F.A.C., a professional engineer's seal, signature and date (i.e., "Professional Certification") means that the work indicated has been conducted under the responsible supervision, direction or control of a person licensed by the State to practice engineering, who by authority of their license is required to have some specialized knowledge of engineering. Professional Certification is not a guaranty or warranty of fitness or suitability, either explicit or implied.

Appv'l: Meets rule reqts for 40D-400.447 F.A.C. Activities recognized under this authorization include resurfacing of an existing roadway (U.S. 27) and extending existing culverts (cross-drains) @ 5 locations. The appropriate sed. & erosion control measures will be in place prior to initiation of construction

## CERTIFICATE OF MAILING

I hereby certify that a copy of the FAA letter on Application No. 47013706.001 was mailed by United States Mail to the below listed parties this Sept 3, 2002.

FAA Expiration Date: September 29 2002
(Enter date 26 days from the date of mailing)

| | | |
|---|---|---|
| **Permittee** | Eduardo A. Ponce', P.E., District Permit Engineer<br>Florida Department of Transportation<br>Post Office Box 1249<br>Bartow, FL 33831-1249 | **Agent:** |
| **Engineer/Consultant** | Eduardo A. Ponce', P.E.<br>Florida Department of Transportation<br>Post Office Box 1249<br>Bartow, FL 33831-1249 | **Applicant:** |
| **FAA Request(s):** | See cc's on letter | **Requests for RAIs/FAA:** |

**Required Noticing: (w/ Letter & Copy of the Permit)**

**Documents sent by Regular US Mail to Permittee/Consultant**
FAA Transmittal Letter
Sections 28-106.201 and 28-106.301, F.A.C.
Noticing Packet
Approved Permit with Conditions

**Documents sent by Regular US Mail to FAA Requestors and others**
FAA Transmittal Letter
Sections 28-106.201 and 28-106.301, F.A.C.
Approved Permit with Conditions

( ) ERP - Eminent Domain Property Owners (EPOs) **mailed regular U.S. Mail** (see list)
( ) WRP - Adjacent Waterfront Property Owners (AWPOs) **if requested**

Administrative Section
Bartow Regulation Department

# MSW/ERP PERMIT ROUTING SLIP
## SWFWMD BARTOW REGULATION DEPARTMENT

**BOARD MONTH** N/A

| MSW/ERP PERMIT NO.: | DEFAULT DATE: | INTENDED ISSUE DATE (21 days from complete date) |
|---|---|---|
| 47013706.001 | September 4, 2002 | September 3, 2002 |

**RUSH OR MISC INFO.**

FDOT SR 544 Avenue Y NE to West of US27

| ROUGH DRAFT | INITIALS | DATE SIGNED | FINAL REVIEW | INITIALS | DATE SIGNED |
|---|---|---|---|---|---|
| REVIEW ES | | 3SEP02 | REVIEW ES | | 3Sep |
| REVIEW PE/PC | SMW | 9-3-02 | REVIEW PE/PC | SMW | 9-3-02 |
| PERMIT COORD | | 9/3/02 | ES MANAGER | | 9-3-02 |
| | | | SW MANAGER | William G. Hartmann | 9/3/02 |
| | | | ADMIN. REVIEW | | |
| | | | DEPT DIRECTOR | | 9/3/02 |

( X ) APPROVAL ( ) DENIAL ( ) CZM DEADLINE

( X ) ERP TYPE: NOTICED GENERAL

( X ) ERP NOTICED GENERAL RULE: 40D-400.447

( ) Letter Mods: MSW/ERP No._____ ISSUE DATE:_____ EXP DATE:_____

PROJECT NAME:_____

( ) Permit Mods: MSW/ERP No._____ ISSUE DATE:_____ EXP. DATE:_____

| | | | |
|---|---|---|---|
| I | Water Quantity/Quality: | ( X ) | No ponds, see engineer's comments below. |
| II | Env. Considerations: | ( X ) | There are no wetlands within the project area. |
| III | Wetlands: | ( ) | Field Work Copy (Worksheets, permit, etc.) |
| | | ( ) | Wetlands Adjacent to project area. |

Comments:

- The extension/replacement of five existing drainage structures located within the proposed 5.5 mile resurfacing of SR 544 from north of Avenue Y to 0.6 mile west of US27. This project proposed 0.07 acre of wetland impacts, 404.3 cubic yards of fill in wetlands, and 15.5 cubic yards of excavation in wetlands, meeting the criteria specified under Rule 40D-400.447, F.A.C. for a Noticed General Permit. No adverse impacts are anticipated.
- Please generate Eng. Certification for W.A.H.

cc: Pat Moylan, Polk County
Joey Murphy, City of Winter Haven
J. Whealton

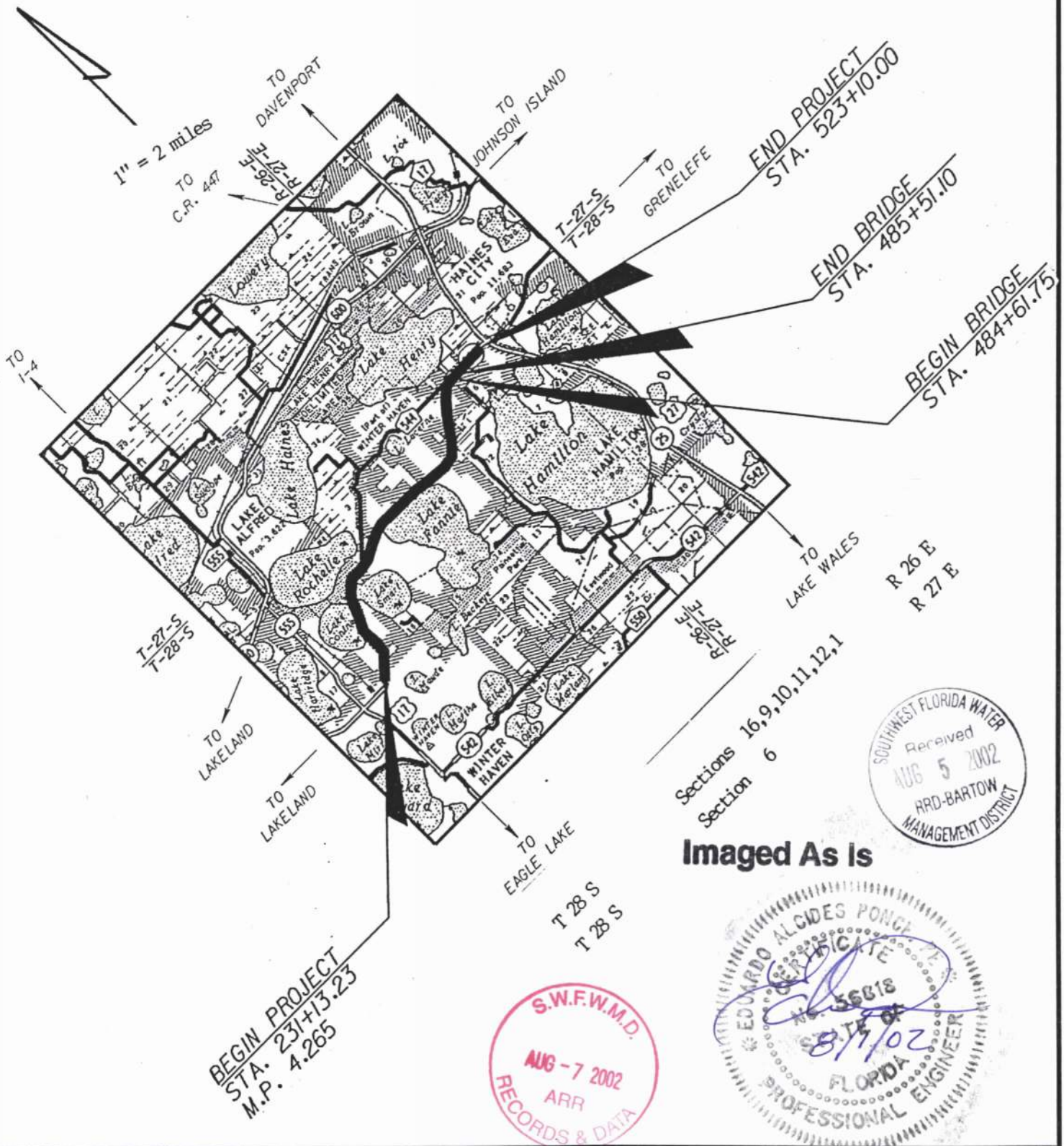
REVIEWER, have you purged your work file for File of Record and is the permit number on the purged data? ( ) Yes ( X ) No

Typist Initials and Date: Pat 9/3/02

File of Record

Permit No. 4701376.001

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02




SOUTHWEST FLORIDA WATER
Received
AUG 5 2002
ARD-BARTOW
MANAGEMENT DISTRICT

**Imaged As Is**

EDUARDO ALCIDES PONCE
LICENSE
No. 56818
STATE OF
FLORIDA
PROFESSIONAL ENGINEER
8/1/02

S.W.F.W.M.D.
AUG - 7 2002
ARR
RECORDS & DATA

| | | |
|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 1 of 12** |

## GENERAL NOTES

1. The Florida Department of Transportation proposes to resurface approximately 5.5 miles of SR 544 from North of Ave. "Y" NE to 0.6 Mi. West of US 27. Five existing drainage structures will be extended or replaced in conjunction with the resurfacing project..

2. Strict adherence to Section 104 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction used in conjunction with this application provide reasonable assurance that water quality will not be violated.

3. Types of equipment involved in the construction will include: gradeall, dump trucks, bulldozer, pumps and front end loader. The equipment will be trucked or self propelled to the site.

4. Turbidity curtains, silt fences, sand bags, hay bales or some combination of these items will be used as directed by the project engineer to maintain State Water Quality Standards.

5. Excavated material that is suitable will be used in construction of the shoulders. Unsuitable material will be disposed of and contained in upland sites provided by the contractor.

6. Traffic will be maintained on SR 544 during construction.

7. Fill material shall be of satisfactory material that is clean and compactable into a suitable and enduring roadway.

8. During the construction or extension of multiple opening structures, the contractor, as directed by the Project Engineer, shall be required to phase construct drainage structures in order to maintain adequate water flow.

9. All elevations shown in this permit application are referenced to U.S.G.S. National Vertical Datum of 1929.

10. The following volume of earthwork is required for the project. (The following volume represents fill or excavation within waters of the State.)

Sta. 242+14.01
Juris. Fill = 10 cy (0.0044 A.)

Sta. 271+03.47
Juris. Fill = 372 cy (0.04 A.)
Juris. Exc. = 14.5 cy (0.008 A.)

Sta. 282+64.11
Juris. Fill = 5.3 cy (0.0018 A.)
Juris. Exc. = 1 cy (0.001 A.)

Sta. 429+41.06
Juris. Fill = 9 cy (0.0024 A.)

Sta. 447+90.35
Juris. Fill = 8 cy (0.0026 A.)

TOTAL: Juris. Fill = 404 cy (0.05 A.)
Juris. Exc. = 15.5 cy (0.018 A.)

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AUG 5 2002
RRD-BARTOW

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

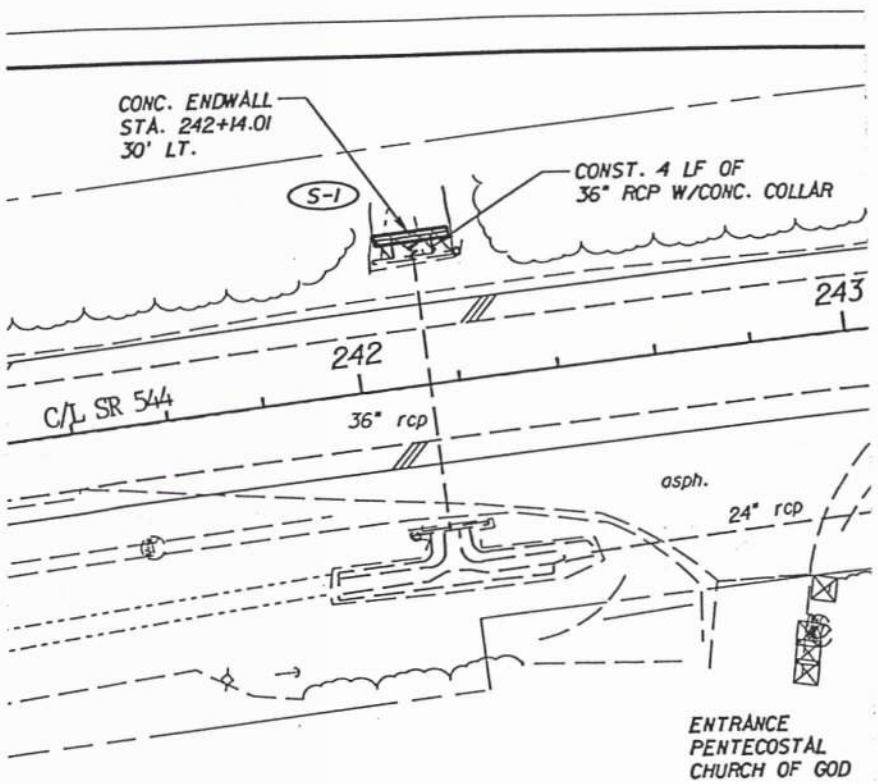
REGISTERED PROFESSIONAL ENGINEER CERTIFICATE No. 56618 STATE OF FLORIDA 8/1/02

STATEMENT OF CERTIFICATION FOR SOVEREIGN SUBMERGED LANDS
Pursuant to Section 339.135, F.S., the Florida Department of Community affairs has determined that this project is not inconsistent with the local comprehensive plan for the affected area.

Juris. Fill = \\\

Juris. Exc. = ///

1" = 40'




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MANAGEMENT DISTRICT

SOUTHWEST FLORIDA WATER
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APPROVED CONSTRUCTION
DRAWINGS
APPROVED BY SMW 9-3-02

Imaged As Is

Plan View

Sta. 242 + 14.01

S.W.F.W.M.D.
AUG - 7 2002
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RECORDS & DATA

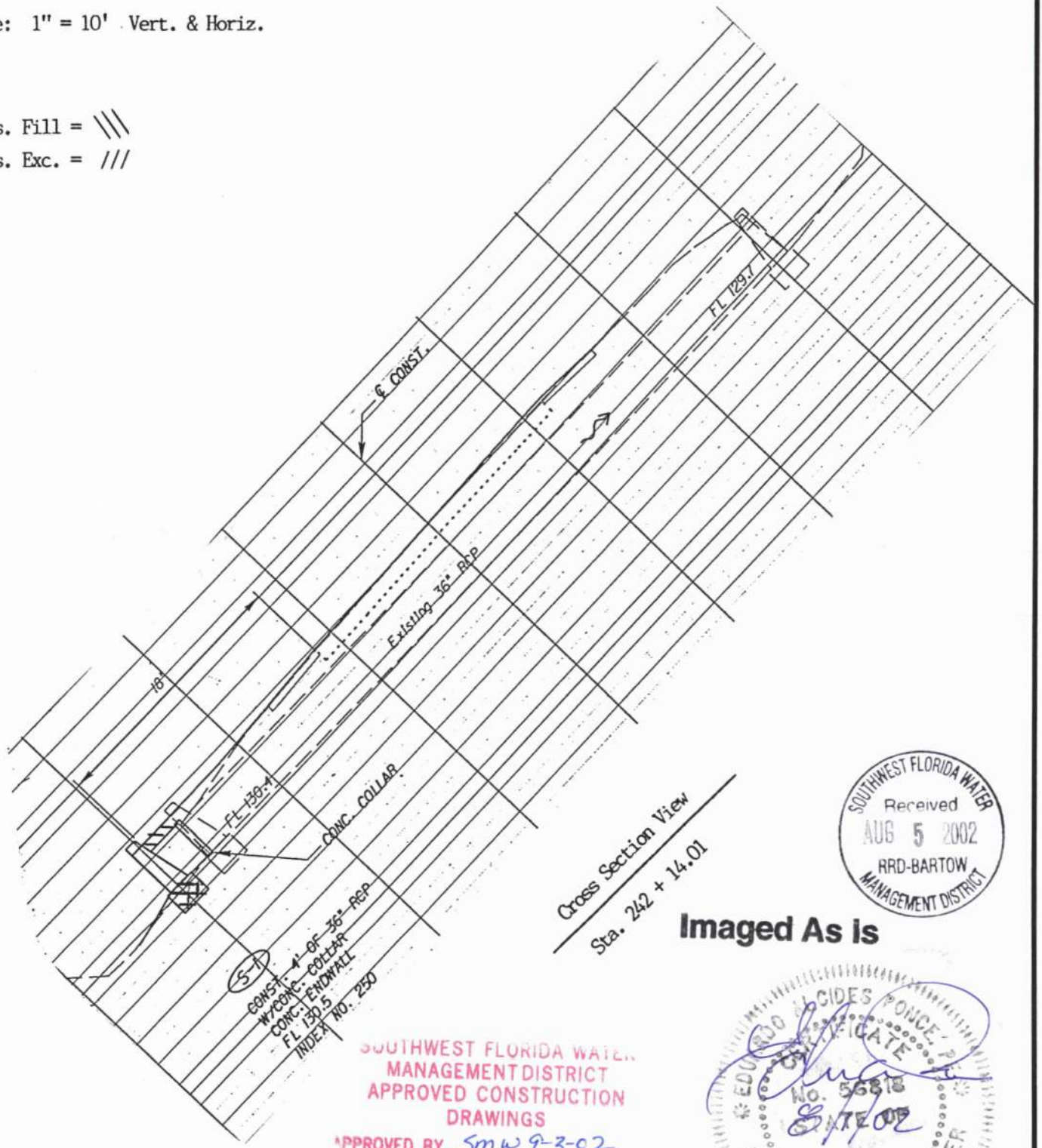
EDUARDO ALCIDES PONCE, P.E.
CERTIFICATE NO. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

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|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 3 of 12** |

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///




Cross Section View

Sta. 242 + 14.01

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

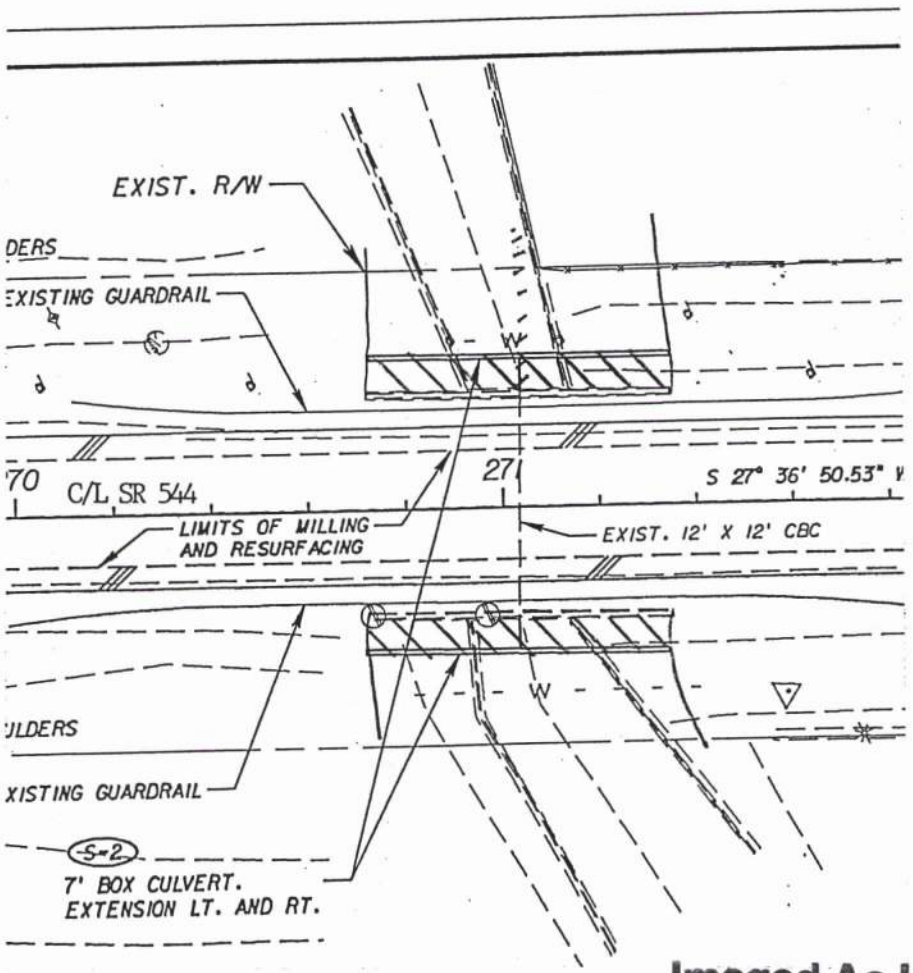
EDUARDO ALCIDES POUCE-P
CERTIFICATE
No. 56818
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

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|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 4 of 12** |

Juris. Fill = \\\

Juris. Exc. = ///

1" = 40'




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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

S.W.F.W.M.D.
AUG - 7 2002
ARR
RECORDS & DATA

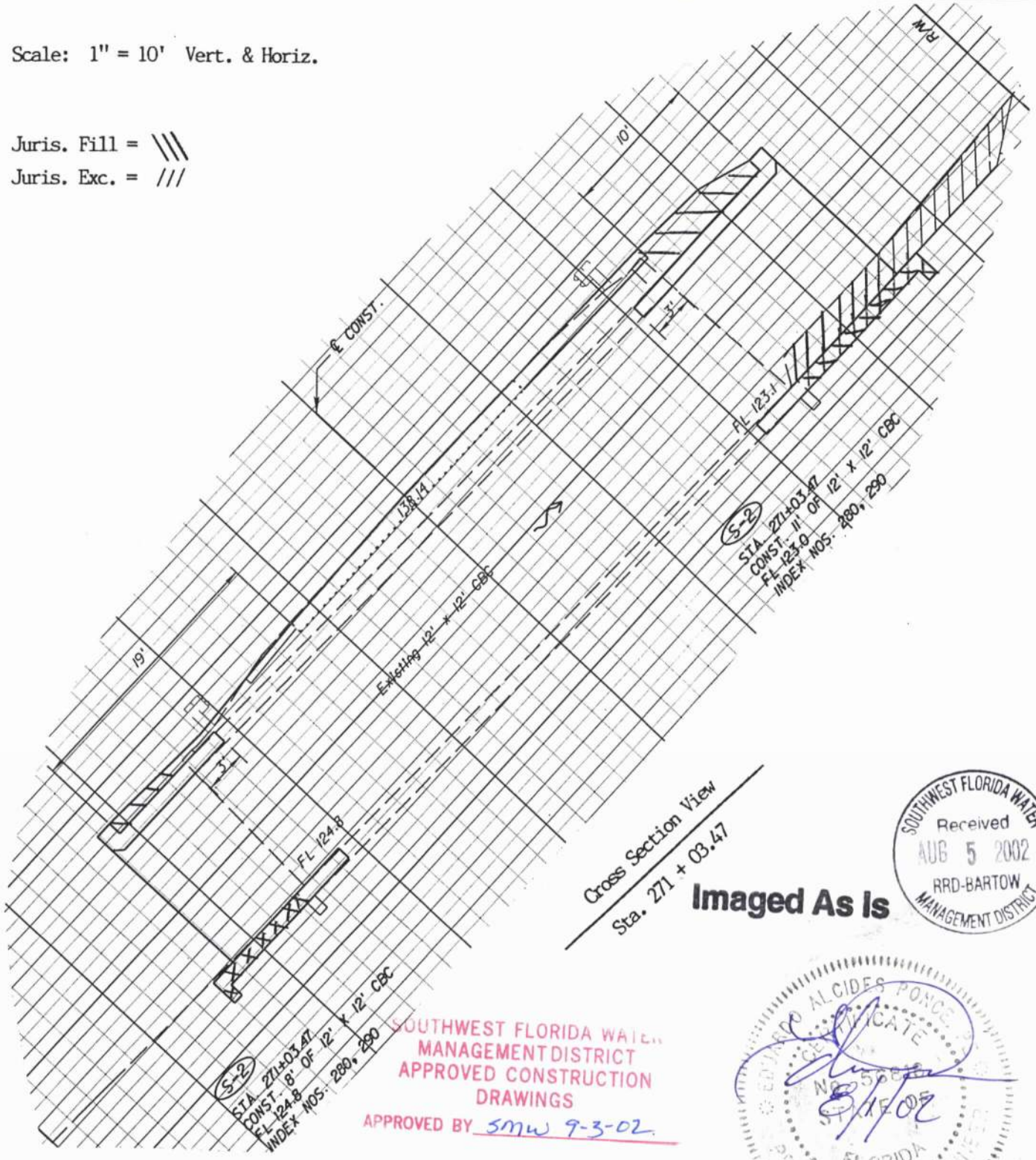
EDUARDO ALCIDES PONCE, P.E.
CERTIFICATE NO. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

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|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 5 of 12** |

CD-5

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\
Juris. Exc. = ///




Cross Section View
Sta. 271 + 03.47

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AUG 5 2002
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

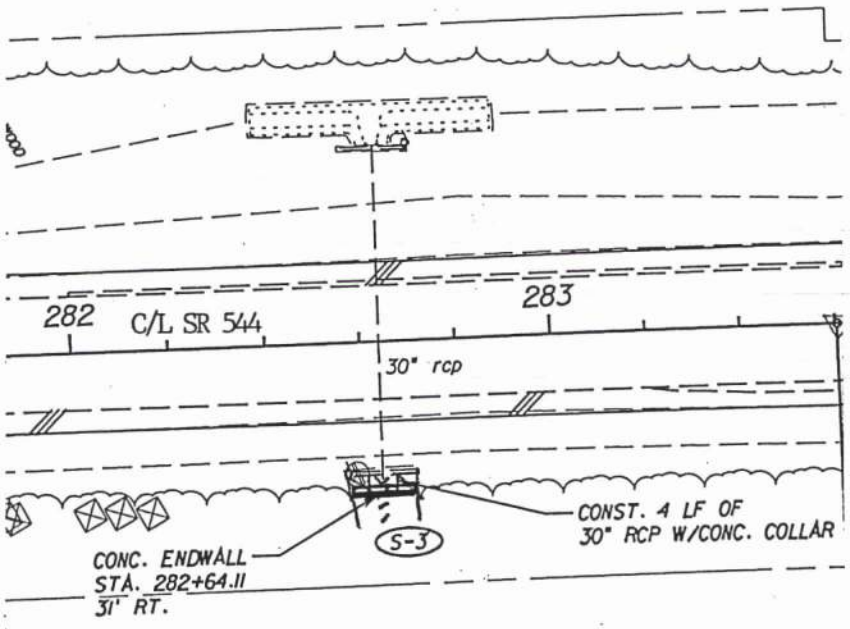
ALCIDES PONCE
CERTIFICATE NO. 55660
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

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| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 6 of 12** |

Juris. Fill = \\\

Juris. Exc. = ///

1" = 40'




Plan View

Sta. 282 + 64.11

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MANAGEMENT DISTRICT

**Imaged As Is**

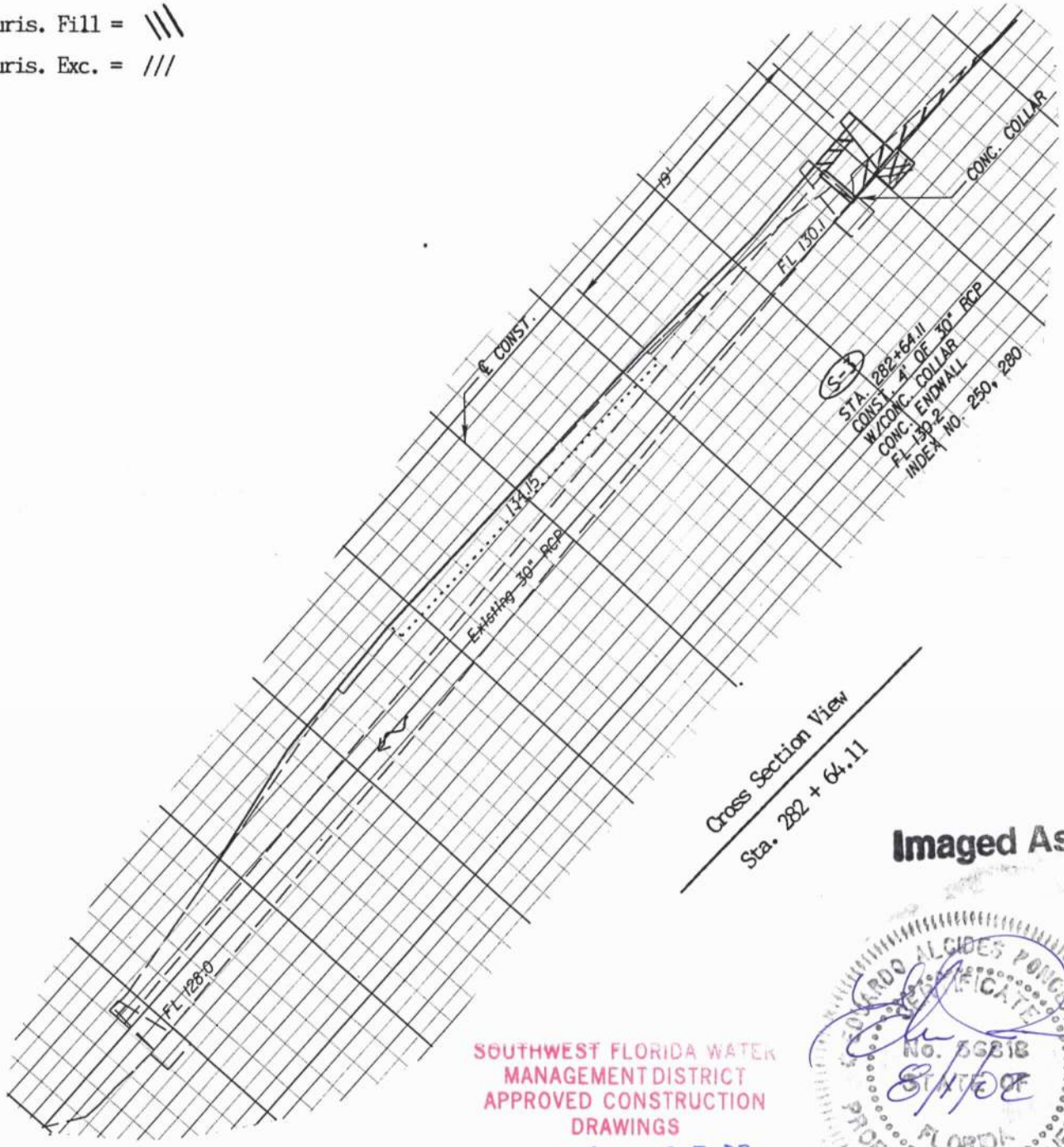
SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT
APPROVED CONSTRUCTION
DRAWINGS
APPROVED BY SMW 9-3-02

EDUARDO ALCIDES PONCE
CERTIFICATE
NO. 56818
STATE OF
FLORIDA
PROFESSIONAL ENGINEER
8/1/02

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///




Cross Section View
Sta. 282 + 64.11

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

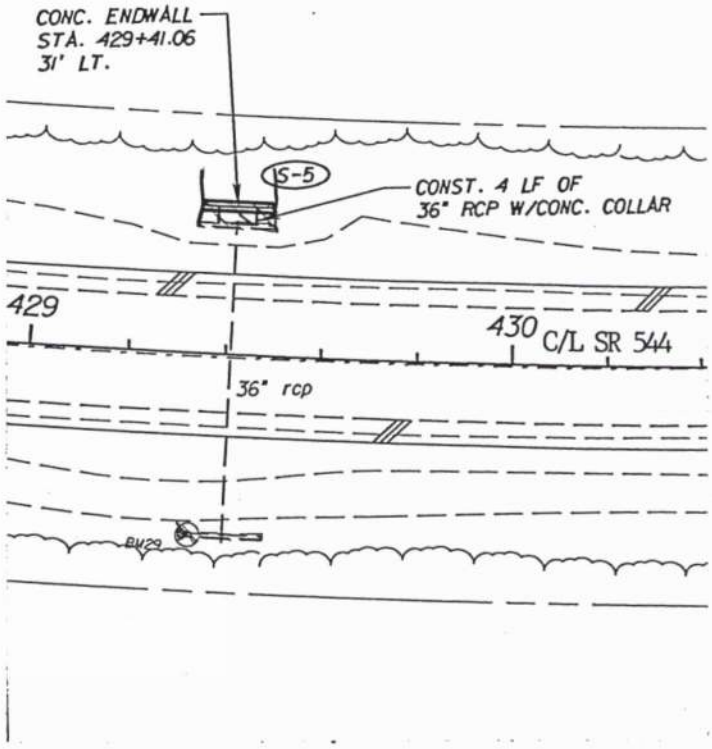
EDUARDO ALCIDES PONCE
CERTIFICATE
NO. 55818
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

| | | |
|---|---|---|
| Applicant: Florida Department of Transportation<br>FPID: 1976971 Polk County<br>SR 544 from N. of Ave. "Y" NE to W. of US 27 | July 2002 | Sheet 8 of 12 |

CD-10

Juris. Fill = \\\
Juris. Exc. = ///

1" = 40'




Plan View

Sta. 429 + 41.06

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

S.W.F.W.M.D.
AUG -7 2002
ARR
RECORDS & DATA

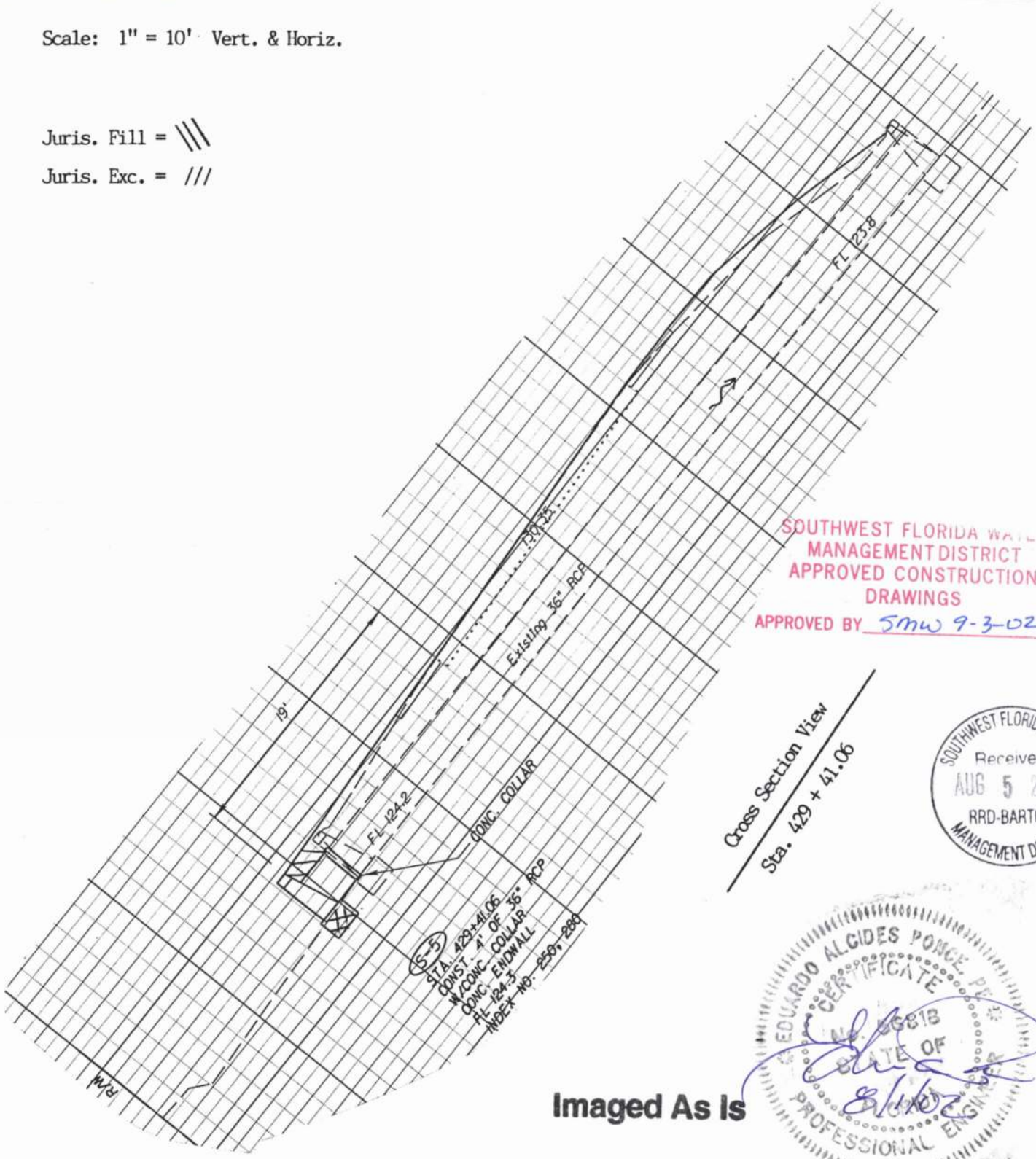
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|---|---|---|
| Applicant: Florida Department of Transportation<br>FPID: 1976971 Polk County<br>SR 544 from N. of Ave. "Y" NE to W. of US 27 | July 2002 | Sheet 9 of 12 |

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///




SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

Cross Section View
Sta. 429 + 41.06

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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AUG 5 2002
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EDUARDO ALCIDES PONCE, P.E.
CERTIFICATE NO. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

**Imaged As Is**

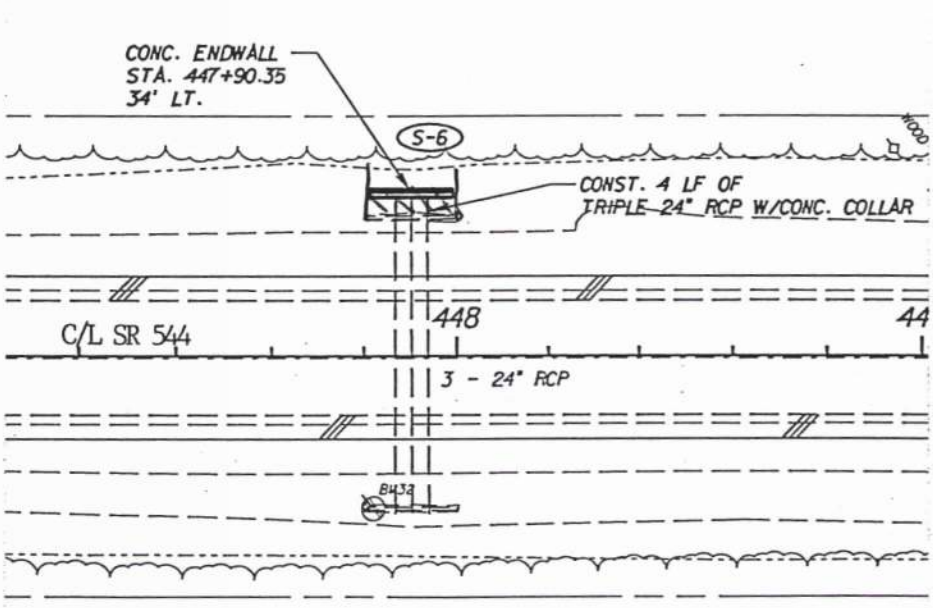
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|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 10 of 12** |

CD-13

Juris. Fill = \\\

Juris. Exc. = ///

1" = 40'




Plan View

Sta. 447 + 90.35

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SOUTHWEST FLORIDA WATER
Received
AUG 5 2002
RRD-BARTOW
MANAGEMENT DISTRICT

SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT
APPROVED CONSTRUCTION
DRAWINGS
APPROVED BY SMW 9-3-02



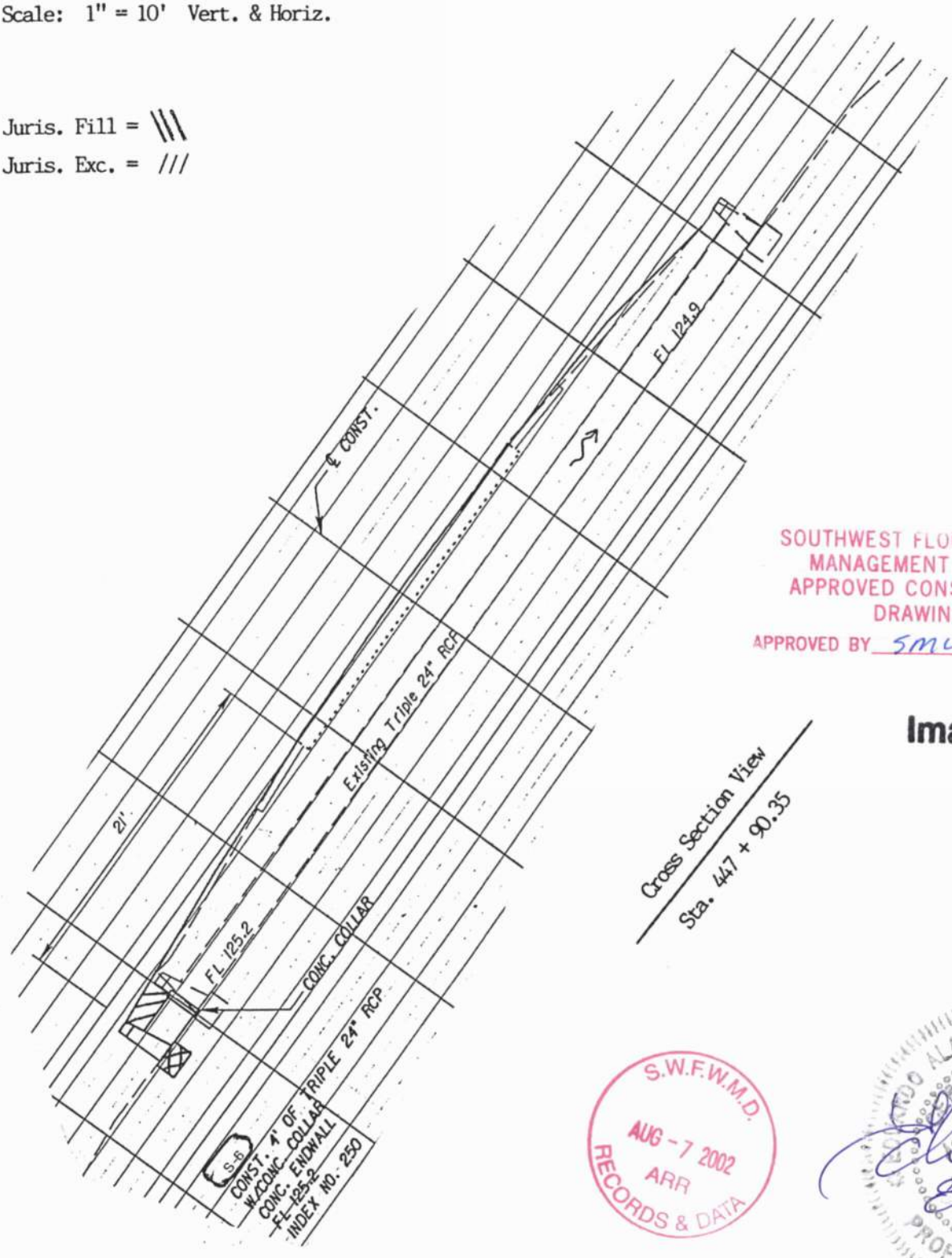

8/1/02

| | | |
|---|---|---|
| Applicant: Florida Department of Transportation<br>FPID: 1976971 Polk County<br>SR 544 from N. of Ave. "Y" NE to W. of US 27 | July 2002 | Sheet 11 of 12 |

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///




Cross Section View
Sta. 447 + 90.35

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

**Imaged As Is**

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
RRD-BARTOW

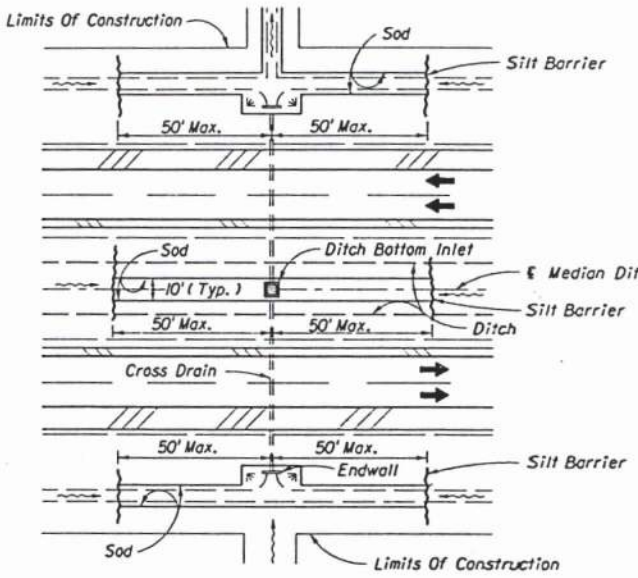
S.W.F.W.M.D.
AUG - 7 2002
ARR
RECORDS & DATA

EDUARDO ALCIDES PONCE
CERTIFICATE NO. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

| | | |
|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **July 2002** | **Sheet 12 of 12** |

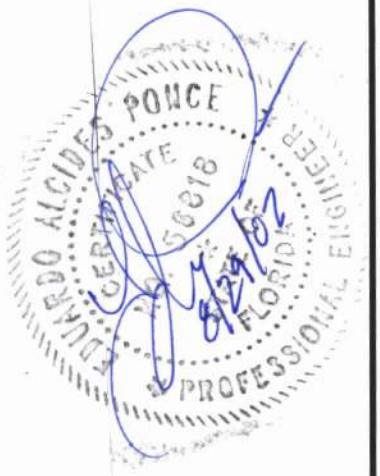
# EROSION AND SEDIMENT CONTROL DETAILS
# PIPE CULVERT EXTENSION

## IN ACCORDANCE WITH FDOT STANDARD INDEX 102

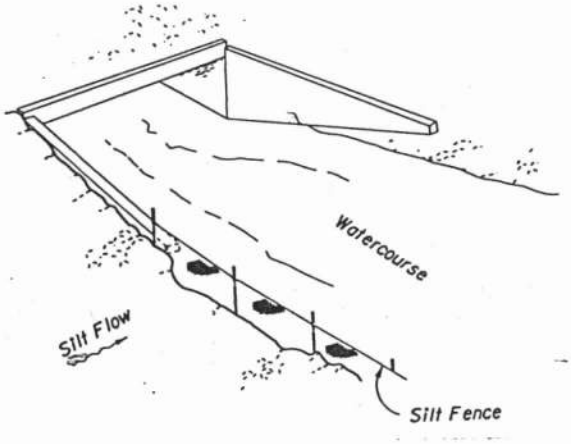


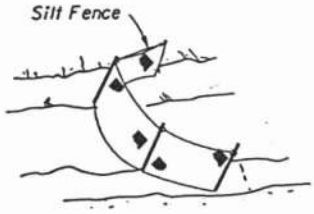

DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

Imaged As Is




SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02




Silt Fence Protection in Ditches with Intermittent Flow

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 29 2002
RRD-BARTOW

Typical Installation: STA 242+14.01, STA 271+03.47, STA 282+64.11, STA 429+41.06, STA 447+90.35

All Erosion and Sediment Control Best Management Practices shall be in compliance with the FDOT Standard Specifications for Road and Bridge Construction, Section 104-5, and the National Pollution Discharge Elimination System, 33 USC 1342.

| | | |
|---|---|---|
| **Applicant: Florida Department of Transportation**<br>**FPID: 1976971 Polk County**<br>**SR 544 from N. of Ave. "Y" NE to W. of US 27** | **August 2002** | **Sheet 1 of 1** |

# *PERMIT NO. 43213.000*

# Lake Smart Properties

**SECTION 3.3**

**Pre-Basin 100**

## SCS Runoff Volume Calculations

From NEH 4

Curve Number (CN) = 67.5
Rainfall Depth (P) = 7.0 inches
Potential Storage
Abstraction (S) = 4.81 — S = (1000/CN) - 10
Runoff Depth (Q) = **3.36** inches — $Q = ((P - 0.2S)^2) / (P + 0.8S)$

Drainage Area (A) = 1,028,887 sq. ft. = **23.62** acres
Runoff Volume (V) = **287,959** cu. ft. = **6.61** acre ft. — V = Q A

## SCS Peak Runoff Rate

Peak Runoff Rate = **47.99** cfs

| Time (Hrs) | Type II Fl. Mod. | Accum. Rain (In.) | Hist. Runoff (Ft.) | Hist. Runoff (Ac.-Ft.) | Hist. Runoff (cfs) |
|---|---|---|---|---|---|
| 0.0 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.5 | 0.006 | 0.04 | 0.02 | 0.04 | 0.96 |
| 1.0 | 0.012 | 0.08 | 0.04 | 0.08 | 0.96 |
| 1.5 | 0.019 | 0.13 | 0.06 | 0.13 | 1.12 |
| 2.0 | 0.025 | 0.18 | 0.08 | 0.17 | 0.96 |
| 2.5 | 0.032 | 0.22 | 0.11 | 0.21 | 1.12 |
| 3.0 | 0.039 | 0.27 | 0.13 | 0.26 | 1.12 |
| 3.5 | 0.047 | 0.33 | 0.16 | 0.31 | 1.28 |
| 4.0 | 0.054 | 0.38 | 0.18 | 0.36 | 1.12 |
| 4.5 | 0.062 | 0.43 | 0.21 | 0.41 | 1.28 |
| 5.0 | 0.071 | 0.50 | 0.24 | 0.47 | 1.44 |
| 5.5 | 0.080 | 0.56 | 0.27 | 0.53 | 1.44 |
| 6.0 | 0.089 | 0.62 | 0.30 | 0.59 | 1.44 |
| 6.5 | 0.099 | 0.69 | 0.33 | 0.65 | 1.60 |
| 7.0 | 0.110 | 0.77 | 0.37 | 0.73 | 1.76 |
| 7.5 | 0.122 | 0.85 | 0.41 | 0.81 | 1.92 |
| 8.0 | 0.134 | 0.94 | 0.45 | 0.89 | 1.92 |
| 8.5 | 0.148 | 1.04 | 0.50 | 0.98 | 2.24 |
| 9.0 | 0.164 | 1.15 | 0.55 | 1.08 | 2.56 |
| 9.5 | 0.181 | 1.27 | 0.61 | 1.20 | 2.72 |
| 10.0 | 0.201 | 1.41 | 0.68 | 1.33 | 3.20 |
| 10.5 | 0.226 | 1.58 | 0.76 | 1.49 | 4.00 |
| 11.0 | 0.258 | 1.81 | 0.87 | 1.71 | 5.12 |
| 11.5 | 0.308 | 2.16 | 1.03 | 2.04 | 8.00 |
| 11.6 | 0.368 | 2.58 | 1.24 | 2.43 | 47.99 |
| 11.7 | 0.428 | 3.00 | 1.44 | 2.83 | 47.99 |
| 11.8 | 0.487 | 3.41 | 1.64 | 3.22 | 47.19 |
| 11.9 | 0.547 | 3.83 | 1.84 | 3.62 | 47.99 |
| 12.0 | 0.607 | 4.25 | 2.04 | 4.01 | 47.99 |
| 12.1 | 0.629 | 4.40 | 2.11 | 4.16 | 17.60 |
| 12.2 | 0.652 | 4.56 | 2.19 | 4.31 | 18.40 |
| 12.3 | 0.674 | 4.72 | 2.26 | 4.46 | 17.60 |

| | | | | | |
|---|---|---|---|---|---|
| 12.4 | 0.697 | 4.88 | 2.34 | 4.61 | 18.40 |
| 12.5 | 0.719 | 5.03 | 2.41 | 4.75 | 17.60 |
| 13.0 | 0.757 | 5.30 | 2.54 | 5.00 | 6.08 |
| 13.5 | 0.785 | 5.50 | 2.64 | 5.19 | 4.48 |
| 14.0 | 0.807 | 5.65 | 2.71 | 5.33 | 3.52 |
| 14.5 | 0.826 | 5.78 | 2.77 | 5.46 | 3.04 |
| 15.0 | 0.842 | 5.89 | 2.83 | 5.57 | 2.56 |
| 15.5 | 0.857 | 6.00 | 2.88 | 5.67 | 2.40 |
| 16.0 | 0.870 | 6.09 | 2.92 | 5.75 | 2.08 |
| 16.5 | 0.882 | 6.17 | 2.96 | 5.83 | 1.92 |
| 17.0 | 0.893 | 6.25 | 3.00 | 5.90 | 1.76 |
| 17.5 | 0.904 | 6.33 | 3.04 | 5.98 | 1.76 |
| 18.0 | 0.913 | 6.39 | 3.07 | 6.04 | 1.44 |
| 18.5 | 0.923 | 6.46 | 3.10 | 6.10 | 1.60 |
| 19.0 | 0.931 | 6.52 | 3.13 | 6.15 | 1.28 |
| 19.5 | 0.940 | 6.58 | 3.16 | 6.21 | 1.44 |
| 20.0 | 0.948 | 6.64 | 3.18 | 6.27 | 1.28 |
| 20.5 | 0.955 | 6.69 | 3.21 | 6.31 | 1.12 |
| 21.0 | 0.962 | 6.73 | 3.23 | 6.36 | 1.12 |
| 21.5 | 0.969 | 6.78 | 3.25 | 6.41 | 1.12 |
| 22.0 | 0.976 | 6.83 | 3.28 | 6.45 | 1.12 |
| 22.5 | 0.983 | 6.88 | 3.30 | 6.50 | 1.12 |
| 23.0 | 0.989 | 6.92 | 3.32 | 6.54 | 0.96 |
| 23.5 | 0.995 | 6.97 | 3.34 | 6.58 | 0.96 |
| 24.0 | 1.000 | 7.00 | 3.36 | 6.61 | 0.80 |

**Post-Basin 100**

## SCS Runoff Volume Calculations

From NEH 4

Curve Number (CN) = 78.0
Rainfall Depth (P) = 7.0 inches
Potential Storage
Abstraction (S) = 2.82 S = (1000/CN) - 10
Runoff Depth (Q) = **4.47** inches $Q = ((P - 0.2S)^2) / (P + 0.8S)$

Drainage Area (A) = 1,028,887 sq. ft. **23.62** acres
Runoff Volume (V) = **383,674** cu. ft. = **8.81** acre ft. V = Q A

## SCS Peak Runoff Rate

Peak Runoff Rate = **63.95** cfs

| Time (Hrs) | Type II Fl. Mod. | Accum. Rain (In.) | Hist. Runoff (Ft.) | Hist. Runoff (Ac.-Ft.) | Hist. Runoff (cfs) |
|---|---|---|---|---|---|
| 0.0 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.5 | 0.006 | 0.04 | 0.03 | 0.05 | 1.28 |
| 1.0 | 0.012 | 0.08 | 0.05 | 0.11 | 1.28 |
| 1.5 | 0.019 | 0.13 | 0.09 | 0.17 | 1.49 |
| 2.0 | 0.025 | 0.18 | 0.11 | 0.22 | 1.28 |
| 2.5 | 0.032 | 0.22 | 0.14 | 0.28 | 1.49 |
| 3.0 | 0.039 | 0.27 | 0.17 | 0.34 | 1.49 |
| 3.5 | 0.047 | 0.33 | 0.21 | 0.41 | 1.71 |
| 4.0 | 0.054 | 0.38 | 0.24 | 0.48 | 1.49 |
| 4.5 | 0.062 | 0.43 | 0.28 | 0.55 | 1.71 |
| 5.0 | 0.071 | 0.50 | 0.32 | 0.63 | 1.92 |
| 5.5 | 0.080 | 0.56 | 0.36 | 0.70 | 1.92 |
| 6.0 | 0.089 | 0.62 | 0.40 | 0.78 | 1.92 |
| 6.5 | 0.099 | 0.69 | 0.44 | 0.87 | 2.13 |
| 7.0 | 0.110 | 0.77 | 0.49 | 0.97 | 2.34 |
| 7.5 | 0.122 | 0.85 | 0.55 | 1.07 | 2.56 |
| 8.0 | 0.134 | 0.94 | 0.60 | 1.18 | 2.56 |
| 8.5 | 0.148 | 1.04 | 0.66 | 1.30 | 2.98 |
| 9.0 | 0.164 | 1.15 | 0.73 | 1.44 | 3.41 |
| 9.5 | 0.181 | 1.27 | 0.81 | 1.59 | 3.62 |
| 10.0 | 0.201 | 1.41 | 0.90 | 1.77 | 4.26 |
| 10.5 | 0.226 | 1.58 | 1.01 | 1.99 | 5.33 |
| 11.0 | 0.258 | 1.81 | 1.15 | 2.27 | 6.82 |
| 11.5 | 0.308 | 2.16 | 1.38 | 2.71 | 10.66 |
| 11.6 | 0.368 | 2.58 | 1.65 | 3.24 | 63.95 |
| 11.7 | 0.428 | 3.00 | 1.92 | 3.77 | 63.95 |
| 11.8 | 0.487 | 3.41 | 2.18 | 4.29 | 62.88 |
| 11.9 | 0.547 | 3.83 | 2.45 | 4.82 | 63.95 |
| 12.0 | 0.607 | 4.25 | 2.72 | 5.35 | 63.95 |
| 12.1 | 0.629 | 4.40 | 2.81 | 5.54 | 23.45 |
| 12.2 | 0.652 | 4.56 | 2.92 | 5.74 | 24.51 |
| 12.3 | 0.674 | 4.72 | 3.02 | 5.94 | 23.45 |

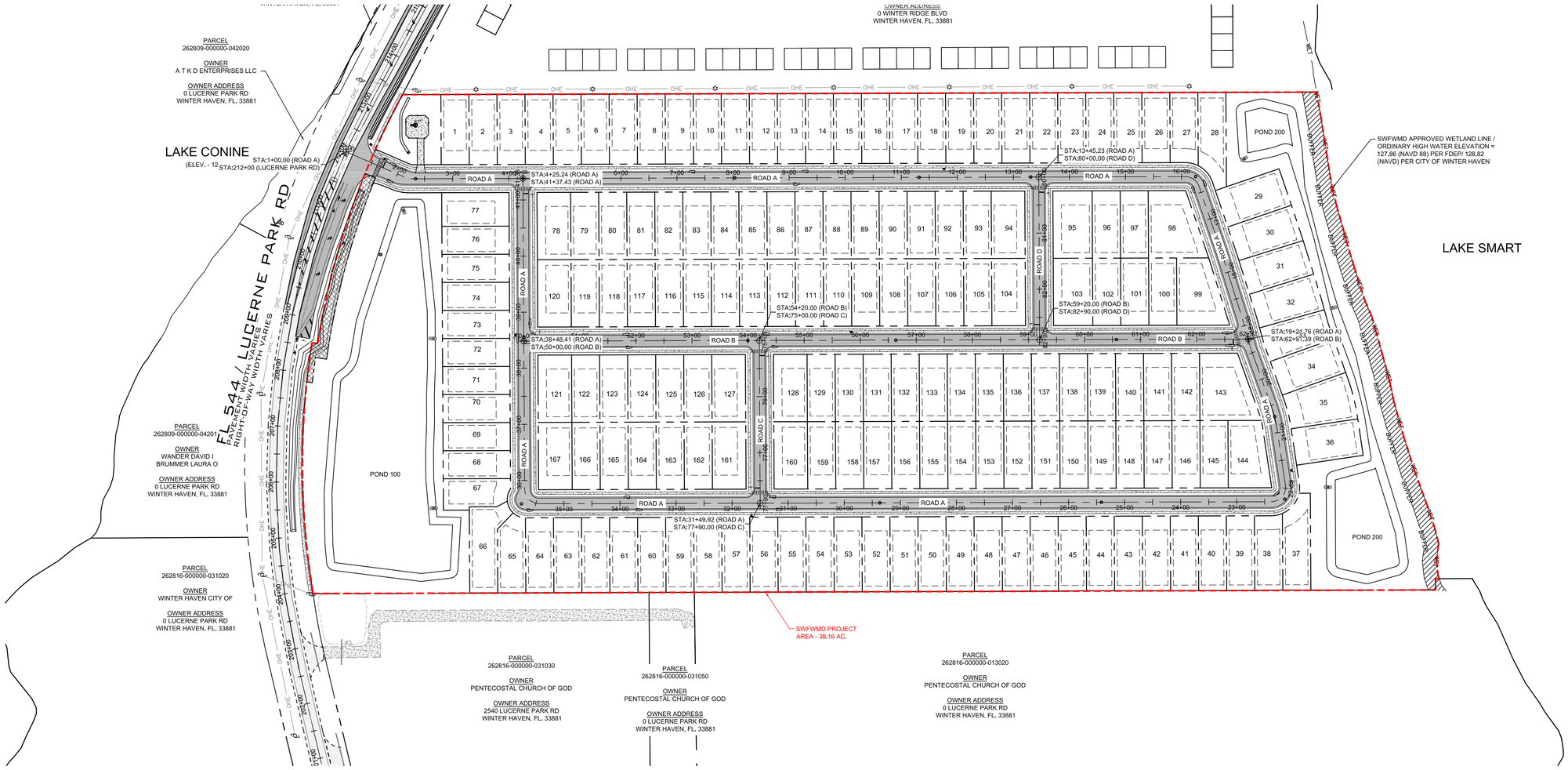
| | | | | | |
|---|---|---|---|---|---|
| 12.4 | 0.697 | 4.88 | 3.12 | 6.14 | 24.51 |
| 12.5 | 0.719 | 5.03 | 3.22 | 6.33 | 23.45 |
| 13.0 | 0.757 | 5.30 | 3.39 | 6.67 | 8.10 |
| 13.5 | 0.785 | 5.50 | 3.51 | 6.91 | 5.97 |
| 14.0 | 0.807 | 5.65 | 3.61 | 7.11 | 4.69 |
| 14.5 | 0.826 | 5.78 | 3.70 | 7.28 | 4.05 |
| 15.0 | 0.842 | 5.89 | 3.77 | 7.42 | 3.41 |
| 15.5 | 0.857 | 6.00 | 3.83 | 7.55 | 3.20 |
| 16.0 | 0.870 | 6.09 | 3.89 | 7.66 | 2.77 |
| 16.5 | 0.882 | 6.17 | 3.95 | 7.77 | 2.56 |
| 17.0 | 0.893 | 6.25 | 4.00 | 7.87 | 2.34 |
| 17.5 | 0.904 | 6.33 | 4.05 | 7.96 | 2.34 |
| 18.0 | 0.913 | 6.39 | 4.09 | 8.04 | 1.92 |
| 18.5 | 0.923 | 6.46 | 4.13 | 8.13 | 2.13 |
| 19.0 | 0.931 | 6.52 | 4.17 | 8.20 | 1.71 |
| 19.5 | 0.940 | 6.58 | 4.21 | 8.28 | 1.92 |
| 20.0 | 0.948 | 6.64 | 4.24 | 8.35 | 1.71 |
| 20.5 | 0.955 | 6.69 | 4.27 | 8.41 | 1.49 |
| 21.0 | 0.962 | 6.73 | 4.30 | 8.47 | 1.49 |
| 21.5 | 0.969 | 6.78 | 4.34 | 8.53 | 1.49 |
| 22.0 | 0.976 | 6.83 | 4.37 | 8.60 | 1.49 |
| 22.5 | 0.983 | 6.88 | 4.40 | 8.66 | 1.49 |
| 23.0 | 0.989 | 6.92 | 4.43 | 8.71 | 1.28 |
| 23.5 | 0.995 | 6.97 | 4.45 | 8.76 | 1.28 |
| 24.0 | 1.000 | 7.00 | 4.47 | 8.81 | 1.07 |

**Project Name:** Lake Smart **Pond 100** **Date:** 7/21/17

**Project No.:** 1352.02

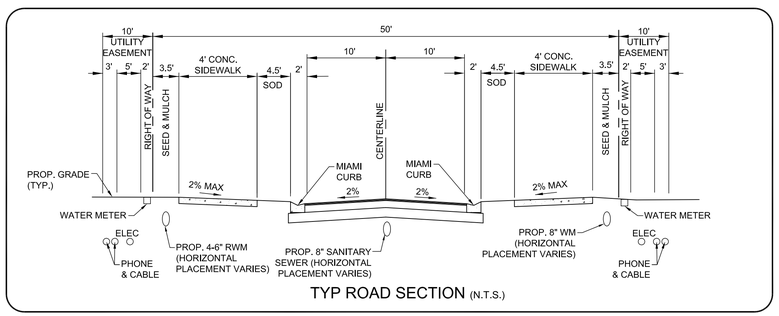
| Pond Feature | Elevation/Stage (ft) | Area (sf) | Area (acres) | Incremental Volume (cf) | Total Volume (cf) | Incremental Volume (ac-ft) | Total Volume (ac-ft) |
|---|---|---|---|---|---|---|---|
| **Bottom** | 134.00 | 85889.06 | 1.97 | 0.00 | 0.00 | 0.00 | 0.00 |
| **1/2" Treament** | 134.55 | 89382.00 | 2.05 | 48199.54 | 48199.54 | 1.11 | 1.11 |
| Increment | 135.00 | 92264.88 | 2.12 | 40870.55 | 89070.09 | 0.94 | 2.04 |
| **25-Year DHWL** | 135.70 | 96792.04 | 2.22 | 66169.92 | 155240.01 | 1.52 | 3.56 |
| Increment | 136.00 | 98752.02 | 2.27 | 29331.61 | 184571.62 | 0.67 | 4.24 |
| Increment | 137.00 | 105350.75 | 2.42 | 102051.39 | 286623.00 | 2.34 | 6.58 |
| **TOB** | 137.50 | 108692.07 | 2.50 | 53510.71 | 340133.71 | 1.23 | 7.81 |

| Sim | Node Name | Warning Stage [ft] | Maximum Stage [ft] | Maximum Total Inflow Rate [cfs] |
|---|---|---|---|---|
| 100yr24hr | Pond 200 | 140.00 | 139.56 | 40.00 |
| 25yr24hr | Outfall 100 | 129.90 | 129.90 | 12.42 |
| 25yr24hr | Pond 100 | 137.50 | 135.70 | 55.99 |
| 25yr24hr | Pre | 160.00 | 160.00 | 41.27 |
| 25yr24hr | Swale | 131.65 | 130.78 | 12.43 |

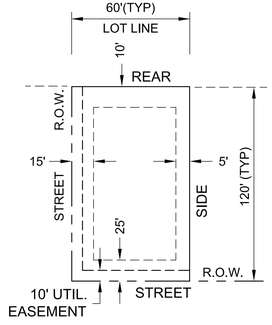



0 50 100 200

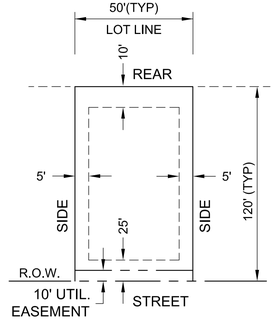
SCALE: 1" = 100'




TYP ROAD SECTION (N.T.S.)

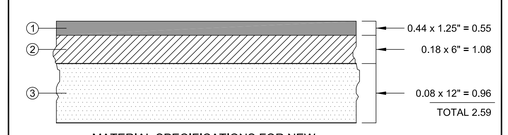



TYPICAL 7,200 S.F.
CORNER LOT
N.T.S.




TYPICAL 6,000 S.F.
WIDE LOT
N.T.S.

LOTS ADJACENT TO LAKE SMART SHALL MAINTAIN A MINIMUM 40' SETBACK FROM THE HIGH WATER ELEVATION OF 128.82 (NAVD)




MATERIAL SPECIFICATIONS FOR NEW CONSTRUCTION WITHIN ON SITE RIGHT-OF-WAY (SEE NOTE)

1. 1 1/4" TYPE S-3 ASPHALTIC CONCRETE, F.D.O.T. SPEC. #320
2. 6" LIMEROCK BASE , COMPACTED TO 98% AASHTO - T180 (L.B.R. 100), F.D.O.T. SPEC. #200 , PRIME @ 0.10 GALS. PER SQ. YD., F.D.O.T. SPEC. #300.
3. 12" TYPE "B" STABILIZATION, LBR 40 (MIN.), F.D.O.T. SPEC. 160-7 , COMPACTED TO 98% AASHTO T-180.

NOTE:

FOR MATERIAL SPECIFICATION FOR NEW CONSTRUCTION WITHIN FDOT R.O.W. REFER TO THE FDOT PLANS

GENERAL SITE NOTES

1. CONTRACTOR TO REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED LAYOUT OF SPECIFIC BUILDINGS AND SITE FEATURES.
2. CONTRACTOR TO PROVIDE CONCRETE PAVING ALTERNATE FOR PROPOSED ASPHALT PAVING PER TYPICAL CONCRETE SECTION.

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

| | |
|---|---|
| DESIGNED BY: | JH |
| DRAFTED BY: | AH |
| CHECKED BY: | MJ |

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

DATE: Dec 21, 2017
JOB NO.: 1325.02


Engineers, Land Planners
Construction Managers

5904 Hillside Heights Drive
Lakeland, Florida 33812
Phone (863) 619-6131
Fax (863) 619-6103
Certificate of Authorization No. 26932
www.jsk-consulting.com

JSK CONSULTING
CREATING • IMPLEMENTING • SOLVING


# LAKE SMART PROPERTIES

LUCERNE PARK RD
WINTER HAVEN, FL 33881

## OVERALL GEOMETRY PLAN

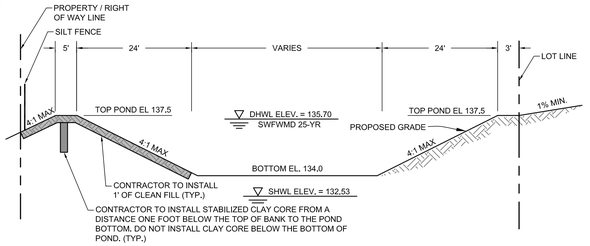
THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW K. JOHNSON, P.E. USING A SHA-1 AUTHENTICATION CODE.

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

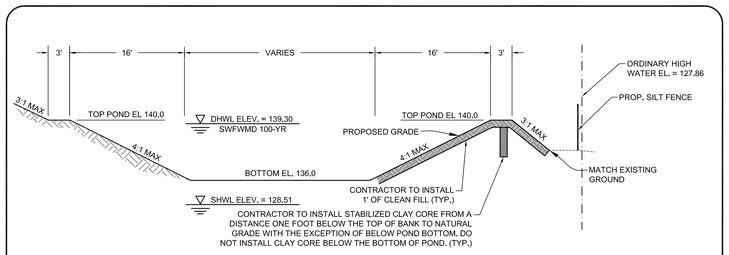
DATE

SHEET NUMBER
C500

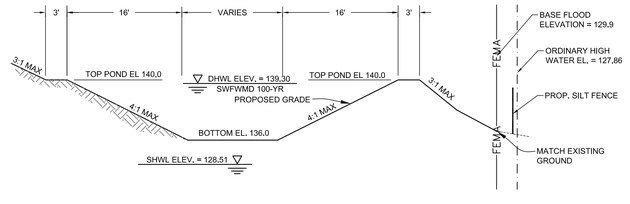
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Thursday, December 21, 2017 11:30:07 AM



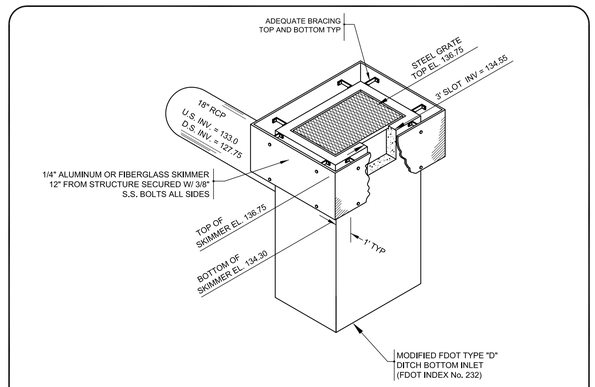

B POND 100 SECTION
N.T.S.




C POND 200 SECTION
N.T.S.




J POND 200 SECTION
N.T.S.




CONTROL STRUCTURE 'CS-1' DETAIL
N.T.S.

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

| | | | |
|---|---|---|---|
| DESIGNED BY: | JH | DATE | Dec 21, 2017 |
| DRAFTED BY: | AH | JOB NO. | 1325.02 |
| CHECKED BY: | MJ | DESCRIPTION | |

| NO. | DATE |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

Engineers, Land Planners
Construction Managers

5904 Hillside Heights Drive
Lakeland, Florida 33813
Phone (863) 619-6131
Fax (863) 619-6103
Certificate of Authorization No. 26932
www.jdsconsulting.com

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CREATING • IMPLEMENTING • SOLVING

**LAKE SMART PROPERTIES**

LUCERNE PARK RD
WINTER HAVEN, FL 33881

POND CROSS SECTION

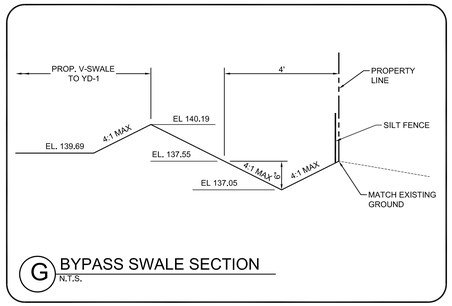
THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY MATTHEW K. JOHNSON, P.E. USING A SHA-1 AUTHENTICATION CODE.

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

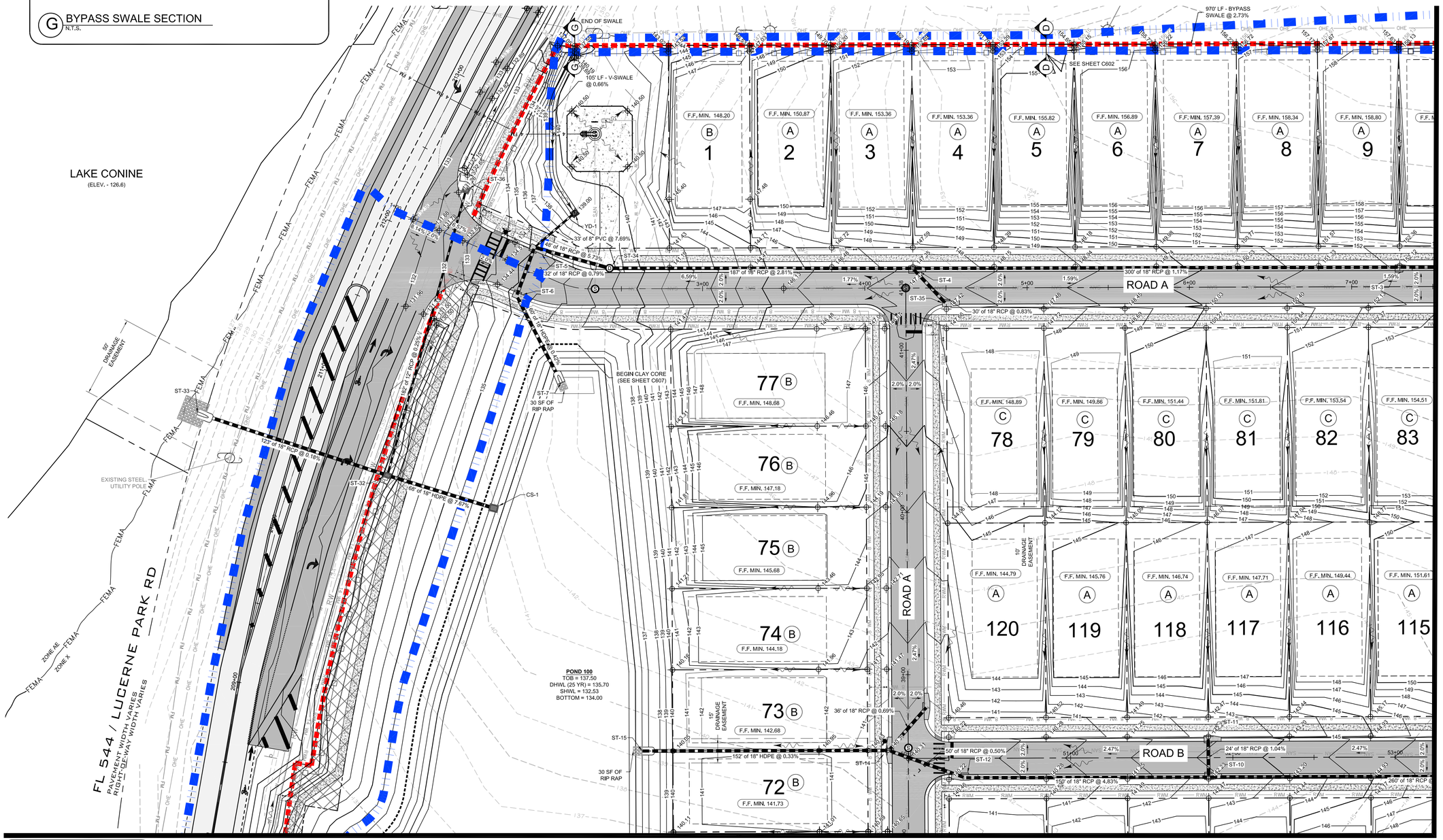
DATE

SHEET NUMBER
C607

P:\1325.02 - Lake Smart\ENGINEERING\1325.02 - GRADING.dwg
Thursday, December 21, 2017 11:59:51 AM




G BYPASS SWALE SECTION
N.T.S.




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

0 15 30 60
SCALE: 1" = 30'

| | | | | |
|---|---|---|---|---|
| DESIGNED BY: | JH | DATE | Dec 21, 2017 | |
| DRAFTED BY: | AH | JOB NO. | 1325.02 | |
| CHECKED BY: | MJ | DESCRIPTION | | |
| NO. | DATE | | | |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

Engineers, Land Planners
Construction Managers
5904 Hillside Heights Drive
Lakeland, Florida 33812
Phone (863) 619-6131
Fax (863) 619-6103
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LAKE SMART PROPERTIES

LUCERNE PARK RD
WINTER HAVEN, FL 33881

GRADING AND DRAINAGE 1

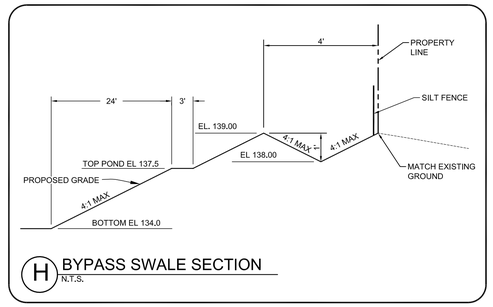
THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW K. JOHNSON, P.E. USING A SHA-1 AUTHENTICATION CODE

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

DATE

SHEET NUMBER
C601

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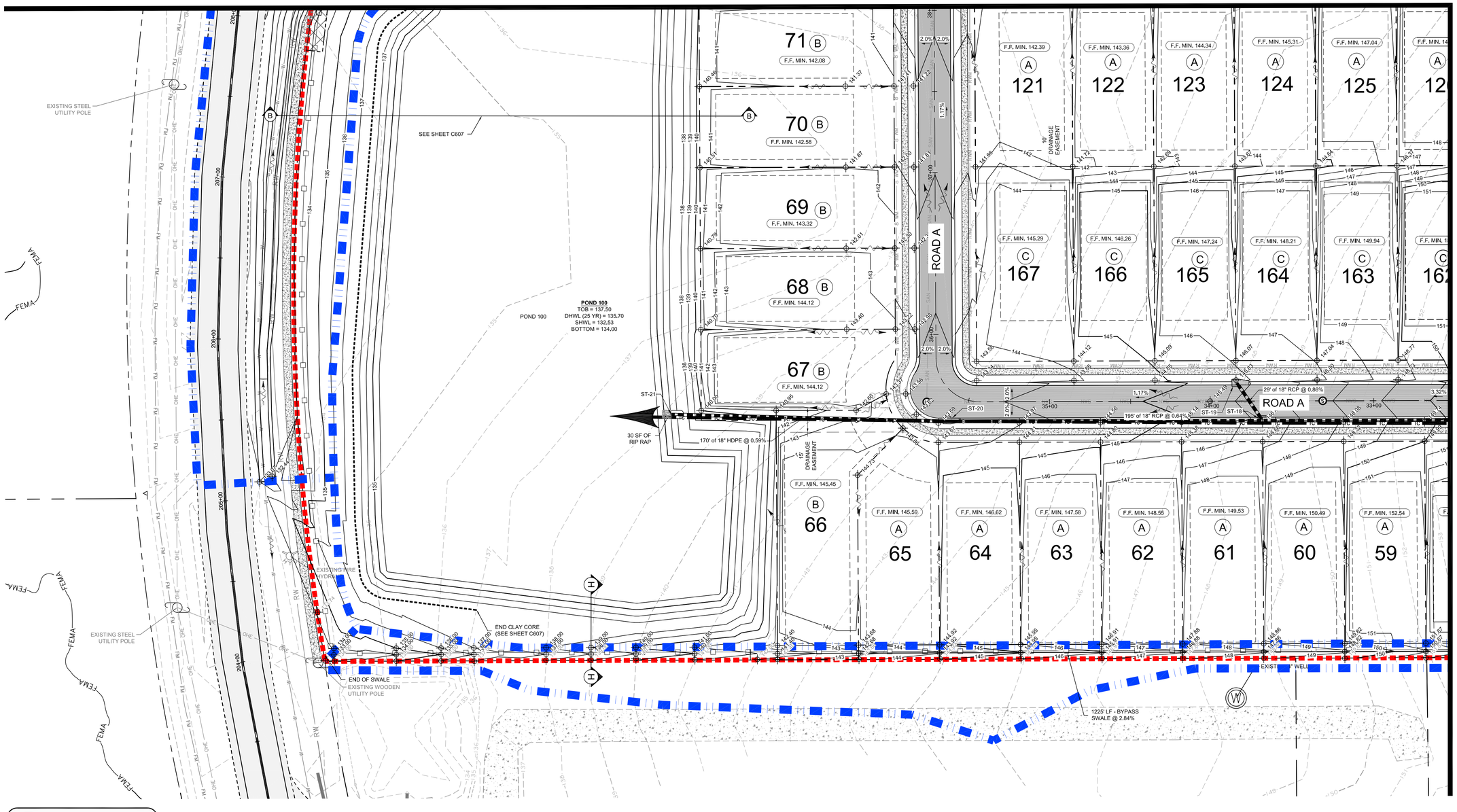



H BYPASS SWALE SECTION
N.T.S.




0 15 30 60
SCALE: 1" = 30'

MATCHLINE SEE SHEET C601




MATCHLINE SEE SHEET C605

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

| | | | |
|---|---|---|---|
| DESIGNED BY: | JH | | |
| DRAFTED BY: | AH | DATE | Dec 21, 2017 |
| CHECKED BY: | MJ | JOB NO. | 1325.02 |

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |


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**LAKE SMART PROPERTIES**

LUCERNE PARK RD
WINTER HAVEN, FL 33881

GRADING AND DRAINAGE 4

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW K. JOHNSON, P.E. USING A SHA-1 AUTHENTICATION CODE.

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

DATE

SHEET NUMBER
C604

P:\1325.02 – Lake Smart\ENGINEERING\1325.02 – GRADING.dwg
Thursday, December 21, 2017 - 11:32:31 AM

*PERMIT NO. 9134.000*

# Winter Ridge Condominiums

Lake Point Landing

Lake Conine

County Park and Boat ramp

Lake Smart
**100 YR. FLOOD ELEV. 130.3'**

Canal

1/2 EROSION PROTECTION

INVERT OF 200' LONG SPREADER SWALE

CONC. SPLASH PAD 5/17

3/17 CONTROL STRUCTURE

LITTORAL ZONE

STORMWATER MANAGEMENT POND

EL. 123.00
I.E. 124.50

EL. 121.50
I.E. 123.00

100 YR FLOOD BOUNDARY

CITY OF WINTER HAVEN HIGH WATER LINE EL. 129.55 (40' BLDG. SETBACK REQUIRED)

SCALE: 1"=50'

N

0 50 100

4 S.R. 544 East E.O.P.

Exist. 24" RCP Culvert
I.E. 128.49

A/17

CONTROL EL.= 131.00
FIXED TOP EL.= 138.50
FIXED BOTTOM EL.= 124.50

Exist. E.O.P.

COMMERCIAL TRACT

STREET A

STREET B

STREET C

STREET D

CB #18 T/GRATE 133.15 INV.EL. 127.10

CB #16 T/GRATE 135.50 INV.EL. 130.00(S) 125.00(N)

CB #19 T/GRATE 138.50 INV.EL. 131.10

CB #17 T/GRATE 143.50 INV.EL. 138.00

CB #9 GRATE 137.5 INV.EL. 129.29

CB #10 T/GRATE 132.50 INV.EL. 126.50(S) 126.00(N)

CB #11 T/GRATE 134.25 INV.EL. 128.50

CB #12 T/GRATE 136.87 INV.EL. 130.00(S) 129.50(N)

JUNCTION BOX TOP EL. 128.77(S) 125.50(E) 123.44(W)

FILE OF RECORD PERMIT NO. 40913400

SHORELINE

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MAY 17 1991
RECEIVED
BARTOW, FLORIDA

WETLAND JURISDICTIONAL LINE

PERMITTEE SHALL NOTIFY IN WRITING THE BARTOW PERMITTING DEPARTMENT, SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, WHEN CONSTRUCTION BEGINS.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS
APPROVED
JUN 14 1991

MATCHLINE

NOTES:
1) ALL CATCH BASINS TO BE D.O.T TYPE "E" INLETS.(C.B.)
2) ALL DRAINAGE AREAS TO BE RESERVED FOR WATER MANAGEMENT PURPOSES WILL BE MAINTAINED, OPERATED, AND PRESERVED AS PERMITTED AND SHOWN ON THE APPROVED CONSTRUCTION PLANS.
3) NO CONSTRUCTION SHALL BE PERMITTED WATERWARD OF THE WETLAND JURISDICTIONAL LINE, EXCEPT DOCK CONSTRUCTION. SEE CERTIFIED WETLAND LIMITS SURVEY FOR EXACT LINE LOCATION.
4) ALL ROOF DRAINS FROM BUILDINGS SHALL DRAIN TOWARD ADJACENT PAVED AREA. BUILDINGS WITH ⊕ AND ARROW MUST DRAIN IN THE DIRECTION OF ARROW. BUILDINGS WITH * AND NO ARROW MAY DRAIN TO REAR, IF OWNER ELECTS AND INSTALLS SUITABLE EROSION CONTROL.

| BM# | SECT. # | ELEV. | LOCATIONS: |
|---|---|---|---|
| N.E. 52 | 9 | 137.115 | Bridge at Lake Conine and Lake Smart, DOT bronze disc in wingwall, south end of bridge, 15.0 east EOP Lucerne Park Road. |

PERMIT SET
NOT FOR CONSTRUCTION

910015-P/4-11-91

| NO. | REVISION DESCRIPTION | BY | CHK | DATE |
|---|---|---|---|---|
| 1 | DECREASED DISTANCE & MOVED TO THE SOUTH AND REVISED STRUCTURE & PIPE SIZE TO ACCOMODATE SWMM | LdB | LdB | 5/1/91 |

DESIGNED DCL
DRAWN JAS
CHECKED LdB
APPROVED DMD
JOB NO. 910015.00
DATE APRIL 1991

ENVISORS, Inc
ENGINEERING AND PLANNING
(813) 324-1112
WINTER HAVEN, FLA.

GUY T. RIZZO
LAKE SMART VILLAGE, CONDOMINIUM DEVELOPMENT

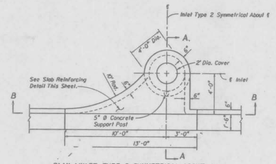
PAVING, GRADING, AND DRAINAGE PLAN
1 OF 2

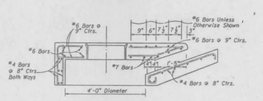
FLORIDA P.E. NO. 13097

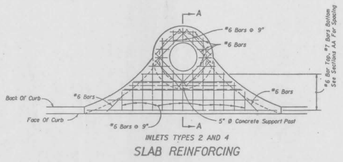
DATE: 5/16/91

SHEET NO. 6 OF SHEETS 13

MAY 16 1991



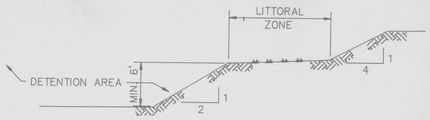




## TYPE 2 INLET DETAIL

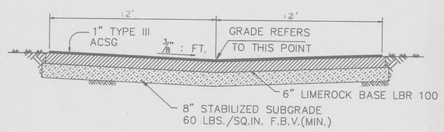


NOTES:
1) RESERVED PARKING SIGN TO BE TYPE "B" U.S. GOVERNMENT REGULATORY SIGN FOR H.D.
2) PLACE SIGN @ CENTER OF PARKING STALLS.

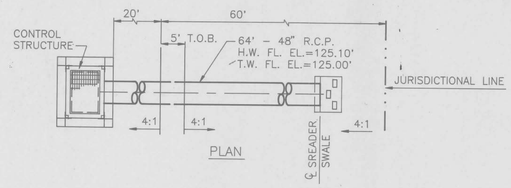
HANDICAPPED PARKING SIGN (2)
N.T.S.

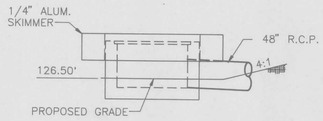



TYPICAL SECTION AT WET DETENTION POND
N.T.S.

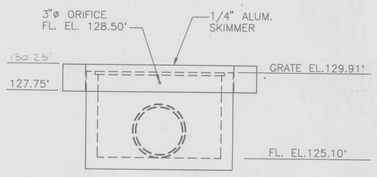



INVERTED CROWN ROAD SECTION
N.T.S.

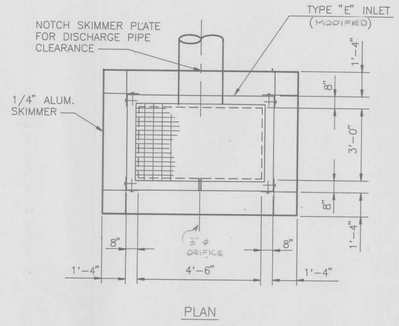


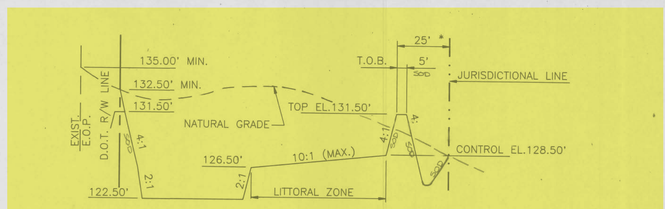

SIDE ELEVATION



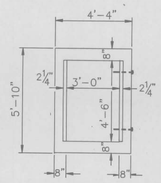

FRONT ELEVATION

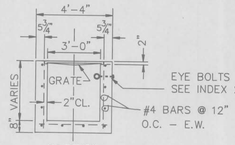



STORMWATER MANAGEMENT POND STRUCTURE (3)
N.T.S.

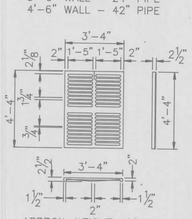


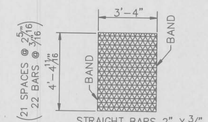

STORMWATER MANAGEMENT POND (A/6)
N.T.S.



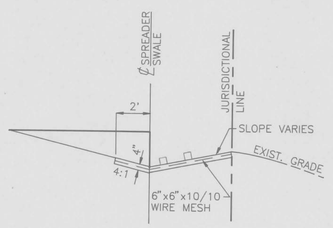



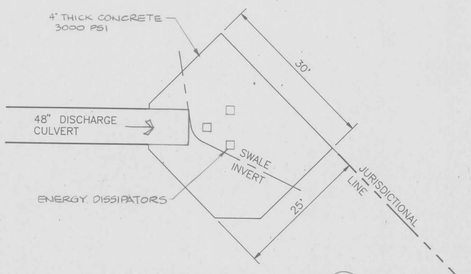

RECOMMENDED MAXIMUM PIPE SIZE
3'-0" WALL – 24" PIPE
4'-6" WALL – 42" PIPE



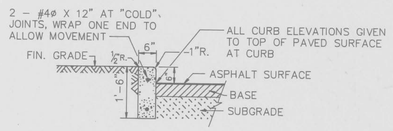




TYPE "E" INLET (2)
N.T.S.
STRUCTURES CALLED OUT AS C.B.




CONC. SPLASH PAD FOR CONTROL STRUCTURE DISCHARGE (5/6)




VERTICAL CURB (4)
1/2" = 1'-0"

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED
JUN 14 1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MAY 17 1991
RECEIVED
BARTOW, FLORIDA

FILE OF RECORD
PERMIT NO. 409-13400

PERMITTEE SHALL NOTIFY IN WRITING THE BARTOW PERMITTING DEPARTMENT, SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, WHEN CONSTRUCTION BEGINS.

PERMIT SET
NOT FOR CONSTRUCTION

MAY 16 1991

910015-D

| NO. | REVISION DESCRIPTION | BY | CHK | DATE |
|---|---|---|---|---|
| 1 | CONSOLIDATED SWIM POOL DETAIL REMOVED WATER SLIDE DETAIL | | | 5/14/90 |

DESIGNED DCL
DRAWN JAS
CHECKED LdB
APPROVED DMD
JOB NO. 910015.00
DATE APRIL 1991

ENVISORS, Inc
ENGINEERING & PLANNING
WINTER HAVEN, FLA.
(813) 324-1112

GUY T. RIZZO
LAKE SMART VILLAGE, CONDOMINIUM DEVELOPMENT

PAVING, GRADING, AND DRAINAGE DETAILS

FLORIDA P.E. NO. 13097
DATE: 5/14/91

SHEET NO.
17
OF 15 SHEETS

ENgineering ad VISORS, Inc.

# STORMWATER MANAGEMENT COMPUTATIONS

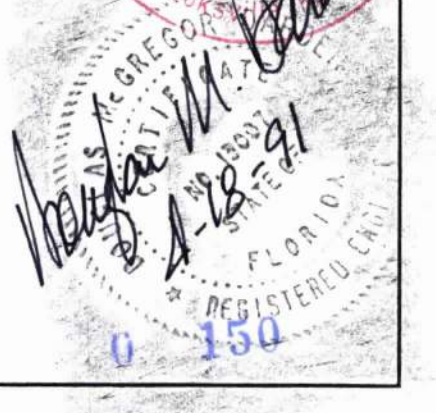
*For*

LAKE SMART VILLAGE

WINTER HAVEN, FLORIDA

S9, T28, R26

Southwest Florida Water Management District
RECEIVED
APR 22 1991
PROCESSING & RECORDS
Brooksville, Florida




0 150

BASIN 10

AREA = 34.71 ACRES

CN (PRE) = $\frac{(100)(0.30)_{\text{EXIST. PAV'T}} + (85)(6.10)_{\text{HYD "C"}} + (67)(28.31)_{\text{HYD "A"}}}{34.71} = 70$

TIME OF CONCENTRATION = 800' @ 1.0 F.P.S. = 13 MIN (PRE); = 10 MIN (POST)

CN (POST) = $\frac{(100)(2.24) + (98)(18.30) + (39)(14.17)}{34.71} = 74$

- IMPERVIOUS = 18.30 ACRES

  * STRU.S 73 X 6000 SQ. FT. = 10.06 ACRES

  * ROADS = 7.20 ACRES

  * FUTURE COMMERCIAL = 1 AC @ 80% IMP; FUTURE TENNIS COURT = 0.17 AC; CLUB HOUSE = 0.07 AC

- AVERAGE RETENTION = 2.24 ACRES

RETENTION 100

TOP ELEVATION = 131.50'

TOP AREA = 2.58 ACRES

CREST ELEVATION = 129.91'

(TOP OF 17-25 F.A.C. 1" TREATMENT ZONE = CREST ELEVATION)

TREATMENT ZONE TOP AREA =

CONTROL ELEVATION = 128.50

CONTROL ELEVATION AREA = 1.89 ACRES

MAXIMUM STORAGE = 6.70 AC-FT 2.31 IN/AC

D. E. R. REQUIRED STORAGE = (1 INCH/ACRE) = 2.89 AC-FT (125,888 CU. FT.)

Southwest Florida Water Management District
RECEIVED
APR 22 1991
PROCESSING & RECORDS
Brooksville, Florida

**Table 2-2b.—Runoff curve numbers for cultivated agricultural lands[1]**

| Cover description | | | Curve numbers for hydrologic soil group— | | | |
|---|---|---|---|---|---|---|
| Cover type | Treatment[2] | Hydrologic condition[3] | A | B | C | D |
| Fallow | Bare soil | — | 77 | 86 | 91 | 94 |
| | Crop residue cover (CR) | Poor | 76 | 85 | 90 | 93 |
| | | Good | 74 | 83 | 88 | 90 |
| Row crops | Straight row (SR) ( TYP. GROVE) | Poor | 72 | 81 | 88 | 91 |
| | | Good | 67 | 78 | 85 | 89 |
| | SR + CR | Poor | 71 | 80 | 87 | 90 |
| | | Good | 64 | 75 | 82 | 85 |
| | Contoured (C) | Poor | 70 | 79 | 84 | 88 |
| | | Good | 65 | 75 | 82 | 86 |
| | C + CR | Poor | 69 | 78 | 83 | 87 |
| | | Good | 64 | 74 | 81 | 85 |
| | Contoured & terraced (C&T) | Poor | 66 | 74 | 80 | 82 |
| | | Good | 62 | 71 | 78 | 81 |
| | C&T + CR | Poor | 65 | 73 | 79 | 81 |
| | | Good | 61 | 70 | 77 | 80 |
| Small grain | SR | Poor | 65 | 76 | 84 | 88 |
| | | Good | 63 | 75 | 83 | 87 |
| | SR + CR | Poor | 64 | 75 | 83 | 86 |
| | | Good | 60 | 72 | 80 | 84 |
| | C | Poor | 63 | 74 | 82 | 85 |
| | | Good | 61 | 73 | 81 | 84 |
| | C + CR | Poor | 62 | 73 | 81 | 84 |
| | | Good | 60 | 72 | 80 | 83 |
| | C&T | Poor | 61 | 72 | 79 | 82 |
| | | Good | 59 | 70 | 78 | 81 |
| | C&T + CR | Poor | 60 | 71 | 78 | 81 |
| | | Good | 58 | 69 | 77 | 80 |
| Close-seeded or broadcast legumes or rotation meadow | SR | Poor | 66 | 77 | 85 | 89 |
| | | Good | 58 | 72 | 81 | 85 |
| | C | Poor | 64 | 75 | 83 | 85 |
| | | Good | 55 | 69 | 78 | 83 |
| | C&T | Poor | 63 | 73 | 80 | 83 |
| | | Good | 51 | 67 | 76 | 80 |

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Crop residue cover* applies only if residue is on at least 5% of the surface throughout the year.

[3]Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotations, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

*Poor*: Factors impair infiltration and tend to increase runoff.

*Good*: Factors encourage average and better than average infiltration and tend to decrease runoff.

Imaged As Is



0 152

LAKE SMART VILLAGE
EVI JOB #: 910015.00

## Table 2-2a.—Runoff curve numbers for urban areas[1]

| Cover description | | Curve numbers for hydrologic soil group— | | | |
|---|---|---|---|---|---|
| Cover type and hydrologic condition | Average percent impervious area[2] | A | B | C | D |
| *Fully developed urban areas (vegetation established)* | | | | | |
| Open space (lawns, parks, golf courses, cemeteries, etc.)[3]: | | | | | |
| Poor condition (grass cover < 50%) | | 68 | 79 | 86 | 89 |
| Fair condition (grass cover 50% to 75%) | | 49 | 69 | 79 | 84 |
| Good condition (grass cover > 75%) | | 39 | 61 | 74 | 80 |
| Impervious areas: | | | | | |
| Paved parking lots, roofs, driveways, etc. (excluding right-of-way) | | 98 | 98 | 98 | 98 |
| Streets and roads: | | | | | |
| Paved; curbs and storm sewers (excluding right-of-way) | | 98 | 98 | 98 | 98 |
| Paved; open ditches (including right-of-way) | | 83 | 89 | 92 | 93 |
| Gravel (including right-of-way) | | 76 | 85 | 89 | 91 |
| Dirt (including right-of-way) | | 72 | 82 | 87 | 89 |
| Western desert urban areas: | | | | | |
| Natural desert landscaping (pervious areas only)[4] | | 63 | 77 | 85 | 88 |
| Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders) | | 96 | 96 | 96 | 96 |
| Urban districts: | | | | | |
| Commercial and business | 85 | 89 | 92 | 94 | 95 |
| Industrial | 72 | 81 | 88 | 91 | 93 |
| Residential districts by average lot size: | | | | | |
| 1/8 acre or less (town houses) | 65 | 77 | 85 | 90 | 92 |
| 1/4 acre | 38 | 61 | 75 | 83 | 87 |
| 1/3 acre | 30 | 57 | 72 | 81 | 86 |
| 1/2 acre | 25 | 54 | 70 | 80 | 85 |
| 1 acre | 20 | 51 | 68 | 79 | 84 |
| 2 acres | 12 | 46 | 65 | 77 | 82 |
| *Developing urban areas* | | | | | |
| Newly graded areas (pervious areas only, no vegetation)[5] | | 77 | 86 | 91 | 94 |
| Idle lands (CN's are determined using cover types similar to those in table 2-2c). | | | | | |

POST-DEV. LAWN AREAS

[1]Average runoff condition, and $I_a = 0.2S$.

[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

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0 153

LAKE SMART VILLAGE
EVI JOB # : 910015.00

SCS TR-55

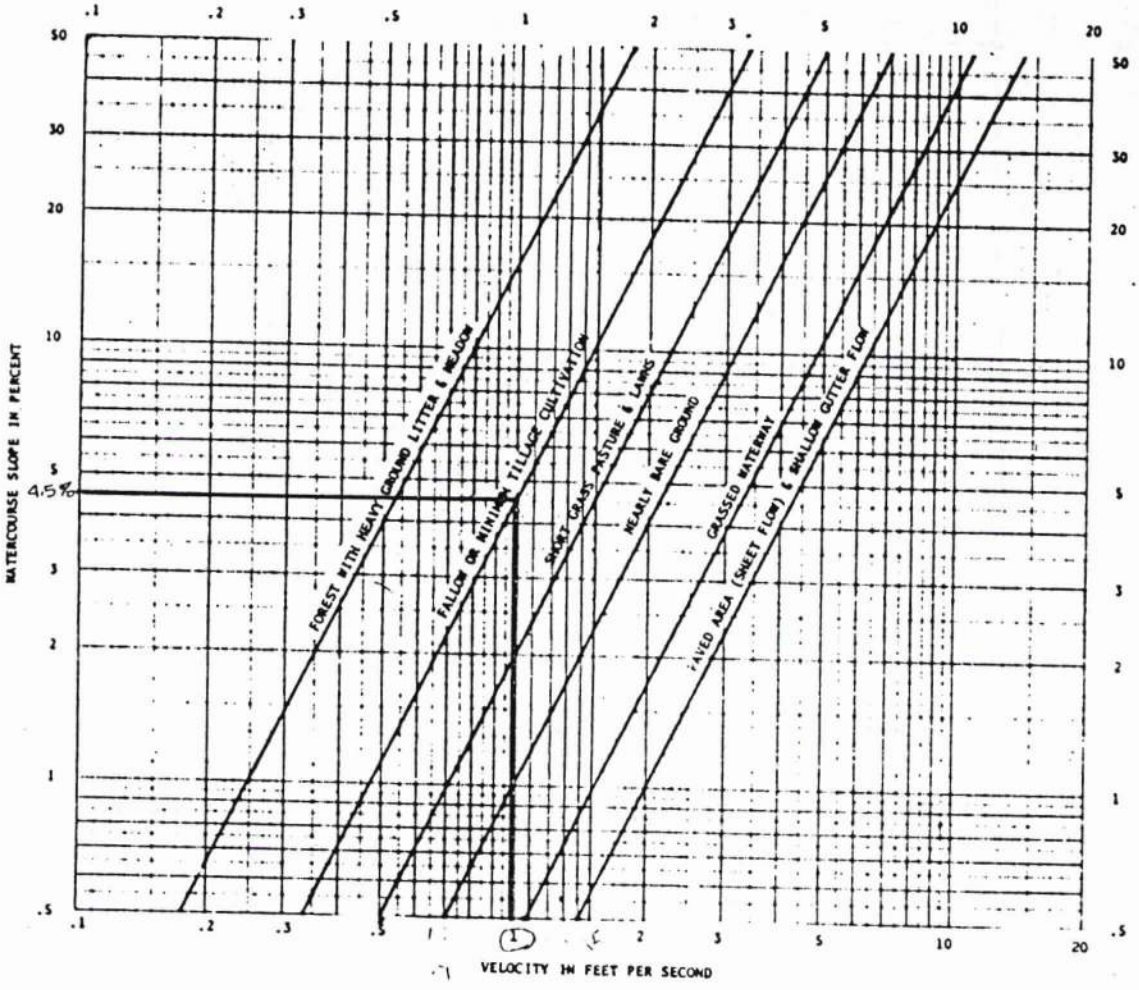



Figure 3-1.--Average velocities for estimating travel time for overland flow.



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LAKE SMART VILLAGE
EVI JOB #:910015.00

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LAKE SMART VILLAGE PRE-DEV 25YR/24HR BASIN 1

BASIN INPUT DATA

| | | |
|---|---|---|
| BASIN AREA | 34.71 | ACRES |
| SCS CURVE NUMBER | 70.00 | |
| INITIAL ABSTRACTION | 0.86 | INCHES |
| TIME OF CONCENTRATION | 13.00 | MINUTES |
| SCS SHAPE FACTOR | 256 | |

OUTPUT SUMMARY

| | | |
|---|---|---|
| STORM RAINFALL | 7.00 | INCHES |
| STORM DURATION | 24.00 | HOURS |
| TOTAL RUNOFF | 3.59 | INCHES |
| PEAK RUNOFF RATE | 68.26 | CFS (PEAK ALLOWABLE DISCHARGE POST-DEV) |
| TIME OF PEAK | 12.05 | HOURS |
| UNIT GRAPH VOLUME | 0.99 | INCHES |

REFERENCE FILES

| | |
|---|---|
| INPUT DATA | B:LAST1.DAT |
| OUTPUT TO DISK | |
| RAINFALL DISTRIBUTION | B:FLAMUD.RAI |
| UNIT HYDROGRAPH | UNIT1.UHG |



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LAKE SMART VILLAGE POST-DEV 25YR/24HR BASIN 10

BASIN INPUT DATA

| | | |
|---|---|---|
| BASIN AREA | 34.71 | ACRES |
| SCS CURVE NUMBER | 74.00 | |
| INITIAL ABSTRACTION | 0.70 | INCHES |
| TIME OF CONCENTRATION | 10.00 | MINUTES |
| SCS SHAPE FACTOR | 256 | |

OUTPUT SUMMARY

| | | |
|---|---|---|
| STORM RAINFALL | 7.00 | INCHES |
| STORM DURATION | 24.00 | HOURS |
| TOTAL RUNOFF | 4.02 | INCHES |
| PEAK RUNOFF RATE | 84.00 | CFS |
| TIME OF PEAK | 12.00 | HOURS |
| UNIT GRAPH VOLUME | 1.00 | INCHES |

REFERENCE FILES

| | |
|---|---|
| INPUT DATA | B:LASIFI.DAT |
| OUTPUT TO DISK | 9115 |
| RAINFALL DISTRIBUTION | B:FLAMOD.RA1 |
| UNIT HYDROGRAPH | UNIT1.UHG |

```
Version D2.10 Copyright IBM Corp. 1981, 1982, 1983
60891 Bytes free

Ok
RUN"VOLUME
ENTER TOP ELEVATION OF POND? 131.5
ENTER BOTTOM ELEVATION OF POND? 128.5
ENTER TOP AREA OF POND? 2.58
ENTER BOTTOM AREA OF POND? 1.89
ENTER ELEVATION THAT YOU WISH TO HAVE THE VOLUME CALCULATION PERFORMED? 128.5
VOLUME = 0
ENTER NEXT ELEVATION(0 TO END)? 129
VOLUME = .97375
ENTER NEXT ELEVATION(0 TO END)? 129.5
VOLUME = 2.005
ENTER NEXT ELEVATION(0 TO END)? 129.91
VOLUME = 2.89354
ENTER NEXT ELEVATION(0 TO END)? 130.5
VOLUME = 4.24
ENTER NEXT ELEVATION(0 TO END)? 131
VOLUME = 5.44375
ENTER NEXT ELEVATION(0 TO END)? 131.5
VOLUME = 6.705
ENTER NEXT ELEVATION(0 TO END)?
1LIST   2RUN   3 L O A D "          4 S A V E "          5
O N B T R O F F K E Y                O S
```

DRAWDOWN CALCULATION

NODE 100

| ELEV | H | VOL | Q | AVG Q | DELTA T | TOTAL T | |
|---|---|---|---|---|---|---|---|
| 129.82 | 1.37 | %117495 | %1028 | %1045 | 8.0 | 8.0 | |
| 129.72 | 1.27 | %109103 | 992 | %1010 | 8.3 | 16.3 | |
| 129.63 | 1.18 | %100710 | 954 | 973 | 8.6 | 25.0 | |
| 129.53 | 1.08 | 92318 | 915 | 935 | 9.0 | 33.9 | INT'L STAGE 129.51 @ 36 HRS |
| 129.44 | 0.99 | 83925 | 875 | 895 | 9.4 | 43.3 | |
| 129.35 | 0.90 | 75533 | 832 | 854 | 9.8 | 53.2 | |
| 129.25 | 0.80 | 67140 | 787 | 810 | 10.4 | 63.5 | |
| 129.16 | 0.71 | 58748 | 740 | 764 | 11.0 | 74.5 | |
| 129.06 | 0.61 | 50355 | 689 | 714 | 11.7 | 86.3 | |
| 128.97 | 0.52 | 41963 | 634 | 661 | 12.7 | 98.9 | |
| 128.88 | 0.43 | 33570 | 574 | 604 | 13.9 | 112.8 | |
| 128.78 | 0.33 | 25178 | 507 | 540 | 15.5 | 128.4 | |
| 128.69 | 0.24 | 16785 | 429 | 468 | 17.9 | 146.3 | |
| 128.59 | 0.14 | 8393 | 334 | 381 | 22.0 | 168.3 | |
| 128.50 | 0.05 | 0 | 197 | 265 | 31.7 | 200.0 | |

ORIFICE DIAMETER USED = 3 IN.
COEFFICIENT OF DISCHARGE = .62
TOTAL VOLUME DRAWNDOWN = 125888



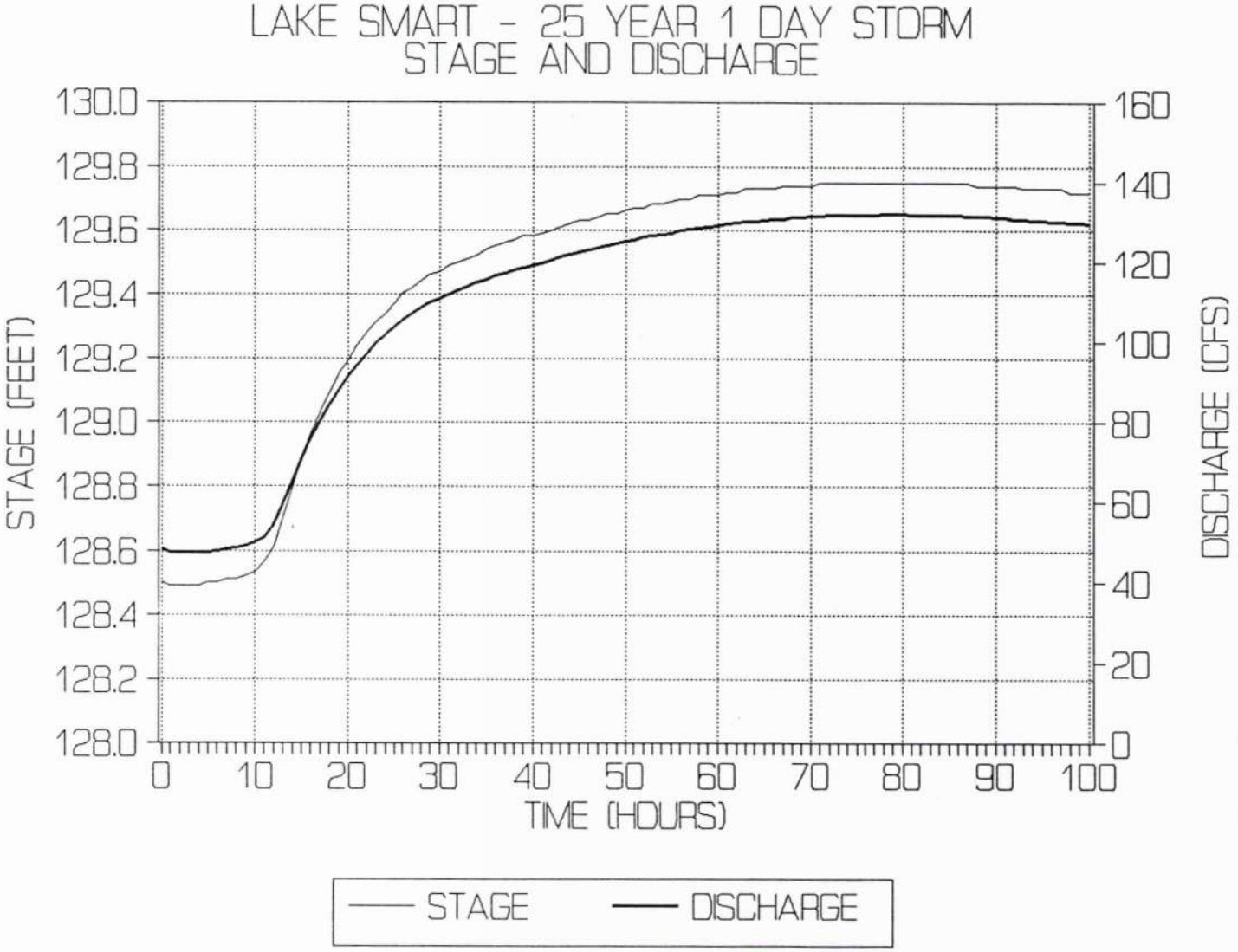
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BASIN / NODE RELATIONSHIPS

| INDEX | NODE | SUB-BASINS | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 100 | 10 | 0 | 0 | 0 | 0 | 0 |
| 2 | 990 | 99 | 0 | 0 | 0 | 0 | 0 |



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LAKE SMART - 25 YEAR 1 DAY STORM
STAGE AND DISCHARGE
STAGE (FEET)
130.0
129.8
129.6
129.4
129.2
129.0
128.8
128.6
128.4
128.2
128.0
DISCHARGE (CFS)
160
140
120
100
80
60
40
20
0
0
10
20
30
40
50
60
70
80
90
100
TIME (HOURS)
STAGE
DISCHARGE

LAKE SMART

1 DAY - 25 YEAR RETURN P

| TIME (HOURS | STAGE (FEET) | DISCHAR (CFS) |
|---|---|---|
| * 0 | 128.50 | 48.02 |
| 1 | 128.49 | 47.57 |
| 2 | 128.49 | 47.39 |
| 3 | 128.49 | 47.35 |
| 4 | 128.49 | 47.41 |
| 5 | 128.50 | 47.55 |
| 6 | 128.50 | 47.78 |
| 7 | 128.51 | 48.08 |
| 8 | 128.51 | 48.47 |
| * 9 | 128.52 | 49.01 |
| * 10 | 128.53 | 49.72 |
| * 11 | 128.56 | 51.20 |
| * 12 | 128.61 | 54.41 |
| 13 | 128.70 | 59.35 |
| 14 | 128.79 | 64.94 |
| * 15 | 128.88 | 70.45 |
| * 16 | 128.96 | 75.69 |
| 17 | 129.03 | 80.30 |
| * 18 | 129.09 | 84.31 |
| 19 | 129.15 | 87.94 |
| * 20 | 129.19 | 91.23 |
| 21 | 129.24 | 94.22 |
| * 22 | 129.28 | 96.94 |
| 23 | 129.31 | 99.43 |
| * 24 | 129.34 | 101.68 |
| 25 | 129.37 | 103.69 |
| 26 | 129.40 | 105.46 |
| 27 | 129.42 | 107.04 |
| 28 | 129.44 | 108.45 |
| 29 | 129.46 | 109.73 |
| 30 | 129.47 | 110.90 |
| 31 | 129.49 | 111.98 |
| 32 | 129.50 | 112.97 |

* POINTS USED FOR TAILWATER CONDITIONS IN ICPR MODELING

LAKE SMART

1 DAY - 25 YEAR RETURN P

| TIME (HOURS | STAGE (FEET) | DISCHAR (CFS) |
|---|---|---|
| 33 | 129.51 | 113.91 |
| 34 | 129.52 | 114.79 |
| 35 | 129.54 | 115.63 |
| 36 | 129.55 | 116.43 |
| 37 | 129.56 | 117.19 |
| 38 | 129.57 | 117.91 |
| 39 | 129.58 | 118.61 |
| 40 | 129.58 | 119.28 |
| 41 | 129.59 | 119.40 |
| 42 | 129.60 | 120.58 |
| 43 | 129.61 | 121.20 |
| 44 | 129.62 | 121.81 |
| 45 | 129.63 | 122.39 |
| 46 | 129.63 | 122.95 |
| 47 | 129.64 | 123.51 |
| 48 | 129.65 | 124.05 |
| 49 | 129.65 | 124.56 |
| 50 | 129.66 | 125.07 |
| 51 | 129.67 | 125.55 |
| 52 | 129.67 | 126.02 |
| 53 | 129.68 | 126.48 |
| 54 | 129.68 | 126.91 |
| 55 | 129.69 | 127.33 |
| 56 | 129.70 | 127.73 |
| 57 | 129.70 | 128.11 |
| 58 | 129.71 | 128.48 |
| 59 | 129.71 | 128.82 |
| 60 | 129.71 | 129.15 |
| 61 | 129.72 | 129.46 |
| 62 | 129.72 | 129.75 |
| 63 | 129.73 | 130.03 |
| 64 | 129.73 | 130.28 |
| 65 | 129.73 | 130.52 |

LAKE SMART

1 DAY - 25 YEAR RETURN P

| TIME (HOURS | STAGE (FEET) | DISCHAR (CFS) |
|---|---|---|
| 66 | 129.73 | 130.74 |
| 67 | 129.74 | 130.93 |
| 68 | 129.74 | 131.12 |
| 69 | 129.74 | 131.28 |
| 70 | 129.74 | 131.43 |
| 71 | 129.75 | 131.56 |
| 72 | 129.75 | 131.68 |
| 73 | 129.75 | 131.77 |
| 74 | 129.75 | 131.85 |
| 75 | 129.75 | 131.92 |
| 76 | 129.75 | 131.97 |
| 77 | 129.75 | 132.00 |
| 78 | 129.75 | 132.02 |
| 79 | 129.75 | 132.03 |
| 80 | 129.75 | 132.02 |
| 81 | 129.75 | 132.00 |
| 82 | 129.75 | 131.96 |
| 83 | 129.75 | 131.91 |
| 84 | 129.75 | 131.85 |
| 85 | 129.75 | 131.77 |
| 86 | 129.75 | 131.69 |
| 87 | 129.75 | 131.59 |
| 88 | 129.74 | 131.48 |
| 89 | 129.74 | 131.36 |
| 90 | 129.74 | 131.23 |
| 91 | 129.74 | 131.10 |
| 92 | 129.74 | 130.95 |
| 93 | 129.73 | 130.79 |
| 94 | 129.73 | 130.63 |
| 95 | 129.73 | 130.46 |
| 96 | 129.73 | 130.29 |
| 97 | 129.73 | 130.10 |
| 98 | 129.72 | 129.92 |

LAKE SMART

1 DAY - 25 YEAR RETURN P

| TIME (HOURS | STAGE (FEET) | DISCHAR (CFS) |
|---|---|---|
| 99 | 129.72 | 129.72 |
| 100 | 129.72 | 129.52 |

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LAKE SMART VILLAGE
4/10/90

**********
*** CONTROL DATA ***
**********

| | | |
|---|---|---|
| Simulation time increment (mins) | --> | 3 |
| Simulation duration (hrs) | --> | 24 |
| Starting time (hrs) | --> | 0 |
| Print interval | --> | 20 |

**********
*** NODE AND INITIALIZATION DATA ***
**********

| NODE # | NODE TYPE | INITIAL STAGE | |
|---|---|---|---|
| 100 | 1 | 129.510 | (SEE DRAWDOWN CALCULATIONS) |
| 990 | 2 | 128.500 | (SEE FLOOD STUDY DATA) |

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**********
*** STAGE/STORAGE/TIME DATA ***
**********

NODE # 100

| | | | | | |
|---|---|---|---|---|---|
| STAGE | 128.500 | 129.000 | 129.500 | 129.910 | 130.500 |
| STORAGE | 0.000 | 0.970 | 2.000 | 2.890 | 4.240 |
| STAGE | 131.000 | 131.500 | 0.000 | 0.000 | 0.000 |
| STORAGE | 5.440 | 6.700 | 0.000 | 0.000 | 0.000 |
| STAGE | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| STORAGE | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

NODE # 990

| | | | | | |
|---|---|---|---|---|---|
| STAGE | 128.500 | 128.520 | 128.530 | 128.560 | 128.610 |
| TIME | 0.000 | 9.000 | 10.000 | 11.000 | 12.000 |
| STAGE | 128.880 | 128.960 | 129.090 | 129.190 | 129.280 |
| TIME | 15.000 | 16.000 | 18.000 | 20.000 | 22.000 |
| STAGE | 129.340 | 0.000 | 0.000 | 0.000 | 0.000 |
| TIME | 24.000 | 0.000 | 0.000 | 0.000 | 0.000 |

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**********
*** REACH DATA ***
**********

NOTE: Type 1 for sharp crested weir/gate and orifice
      Type 2 for broad crested weir/gate and orifice
   *  Type 3 for culvert
   *  Type 4 for trapezoidal channel
   *  Type 5 for parabolic channel
      Type 6 for rating curve

* (Negative type indicates riser)

| REACH # | FROM NODE | TO NODE | REACH TYPE |
|---|---|---|---|
| 1 | 100 | 990 | 1 |

REACH # 1  from node # 100  -- to node # 990

-> Sharp Crested Weir/Gate and Orifice <-

| | | |
|---|---|---|
| Crest elevation (feet) | --> | 129.91 |
| Crest length (feet) | --> | 15 |
| Weir discharge coefficient | --> | 3.13 |
| Weir exponent | --> | 1.5 |
| % to effective submergence | --> | 0 |
| Gate opening (feet) | --> | 999 |
| # of end contractions | --> | 8 |
| Discharge coef for gate under ori flw | -> | 0 |
| Circular orifice centerline (feet) | --> | 128.62 |
| Orifice diameter (feet) | --> | .25 |
| Orifice discharge coefficient | --> | .62 |
| # identical orifices | --> | 1 |



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**********
*** INFLOW HYDROGRAPHS ***
**********

INFLOW HYDROGRAPHS TO BE READ FROM DISK FILE

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| NODE # | TIME (hrs) | STAGE (feet) | STORAGE (acft) | INFLOW (cfs) | OUTFLOW (cfs) # 1 | OUTFLOW (cfs) TOTAL |
|---|---|---|---|---|---|---|
| 100 | 0.00 | 129.51 | 2.02 | 0.00 | 0.23 | 0.23 |
| 990 | 0.00 | 128.50 | 0.00 | 0.23 | ------ | 0.00 |
| 100 | 1.00 | 129.50 | 2.00 | 0.00 | 0.23 | 0.23 |
| 990 | 1.00 | 128.50 | 0.02 | 0.23 | ------ | 0.00 |
| 100 | 2.00 | 129.49 | 1.98 | 0.00 | 0.23 | 0.23 |
| 990 | 2.00 | 128.50 | 0.04 | 0.23 | ------ | 0.00 |
| 100 | 3.00 | 129.48 | 1.97 | 0.00 | 0.23 | 0.23 |
| 990 | 3.00 | 128.51 | 0.06 | 0.23 | ------ | 0.00 |
| 100 | 4.00 | 129.47 | 1.95 | 0.00 | 0.23 | 0.23 |
| 990 | 4.00 | 128.51 | 0.08 | 0.23 | ------ | 0.00 |
| 100 | 5.00 | 129.46 | 1.93 | 0.00 | 0.22 | 0.22 |
| 990 | 5.00 | 128.51 | 0.09 | 0.22 | ------ | 0.00 |
| 100 | 6.00 | 129.46 | 1.91 | 0.00 | 0.22 | 0.22 |
| 990 | 6.00 | 128.51 | 0.11 | 0.22 | ------ | 0.00 |
| 100 | 7.00 | 129.45 | 1.89 | 0.10 | 0.22 | 0.22 |
| 990 | 7.00 | 128.52 | 0.13 | 0.22 | ------ | 0.00 |
| 100 | 8.00 | 129.45 | 1.90 | 0.62 | 0.22 | 0.22 |
| 990 | 8.00 | 128.52 | 0.15 | 0.22 | ------ | 0.00 |
| 100 | 9.00 | 129.48 | 1.97 | 1.45 | 0.23 | 0.23 |
| 990 | 9.00 | 128.52 | 0.17 | 0.23 | ------ | 0.00 |
| 100 | 10.00 | 129.55 | 2.11 | 2.69 | 0.24 | 0.24 |
| 990 | 10.00 | 128.53 | 0.19 | 0.24 | ------ | 0.00 |
| 100 | 11.00 | 129.71 | 2.45 | 6.28 | 0.25 | 0.25 |
| 990 | 11.00 | 128.56 | 0.21 | 0.25 | ------ | 0.00 |
| 100 | 12.00 | 130.68 | 4.68 | 84.00 | 30.90 | 30.90 |
| 990 | 12.00 | 128.61 | 0.57 | 30.90 | ------ | 0.00 |
| 100 | 13.00 | 130.76 | 4.86 | 19.02 | 35.31 | 35.31 |
| 990 | 13.00 | 128.70 | 4.29 | 35.31 | ------ | 0.00 |



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| NODE # | TIME (hrs) | STAGE (feet) | STORAGE (acft) | INFLOW (cfs) | OUTFLOW (cfs) # 1 | OUTFLOW (cfs) TOTAL |
|---|---|---|---|---|---|---|
| 100 | 14.00 | 130.37 | 3.95 | 9.46 | 14.76 | 14.76 |
| 990 | 14.00 | 128.79 | 6.21 | 14.76 | ------ | 0.00 |
| 100 | 15.00 | 130.24 | 3.64 | 6.64 | 8.94 | 8.94 |
| 990 | 15.00 | 128.88 | 7.17 | 8.94 | ------ | 0.00 |
| 100 | 16.00 | 130.18 | 3.50 | 5.42 | 6.63 | 6.63 |
| 990 | 16.00 | 128.96 | 7.80 | 6.63 | ------ | 0.00 |
| 100 | 17.00 | 130.14 | 3.42 | 4.77 | 5.41 | 5.41 |
| 990 | 17.00 | 129.03 | 8.30 | 5.41 | ------ | 0.00 |
| 100 | 18.00 | 130.12 | 3.36 | 3.85 | 4.60 | 4.60 |
| 990 | 18.00 | 129.09 | 8.71 | 4.60 | ------ | 0.00 |
| 100 | 19.00 | 130.10 | 3.32 | 3.46 | 4.04 | 4.04 |
| 990 | 19.00 | 129.14 | 9.07 | 4.04 | ------ | 0.00 |
| 100 | 20.00 | 130.09 | 3.30 | 3.52 | 3.74 | 3.74 |
| 990 | 20.00 | 129.19 | 9.39 | 3.74 | ------ | 0.00 |
| 100 | 21.00 | 130.07 | 3.26 | 2.93 | 3.27 | 3.27 |
| 990 | 21.00 | 129.24 | 9.68 | 3.27 | ------ | 0.00 |
| 100 | 22.00 | 130.06 | 3.24 | 2.94 | 3.05 | 3.05 |
| 990 | 22.00 | 129.28 | 9.94 | 3.05 | ------ | 0.00 |
| 100 | 23.00 | 130.06 | 3.23 | 2.69 | 2.92 | 2.92 |
| 990 | 23.00 | 129.31 | 10.19 | 2.92 | ------ | 0.00 |



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| NODE # | TIME (hrs) | STAGE (feet) | STORAGE (acft) | INFLOW (cfs) | OUTFLOW (cfs) # 1 | OUTFLOW (cfs) TOTAL |
|---|---|---|---|---|---|---|
| 100 | 24.00 | 130.05 | 3.21 | 1.91 | 2.59 | 2.59 |
| 990 | 24.00 | 129.34 | 10.42 | 2.59 | ------ | 0.00 |

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*** PEAK CONDITIONS SUMMARY ***

| NODE # | PEAK STAGE (feet) | PEAK STORAGE (actt) | TIME TO PEAK (hrs) | PEAK OUTFLOW (cfs) | TIME TO PEAK (hrs) | TOP OF POND (FEET) |
|---|---|---|---|---|---|---|
| 100 | 131.01 | 5.45 | 12.50 | 51.06 | 12.50 | 131.50 |
| 990 | 129.34 | 10.42 | 24.00 | 0.00 | 0.05 | DUMMY NODE * |

| FROM NODE | TO NODE | PEAK OUTFLOW (cfs) | TIME TO PEAK (hrs) | |
|---|---|---|---|---|
| 100 | 990 | 51.06 | 12.50 | (PEAK ALLOWABLE DISCHARGE = 68.26 C.F.S. SEE PRE-DEV HYDROGRAPH) |

* FOR OUTFALL & TAILWATER MODELING

# HYDRAULIC ANALYSIS

Run date: 04-12-1991
File: 91151.ST3

Return Period = 10 Yrs
Rainfall file: Your_County

**LINE 1 / Q = 39.4 / HT = 36 / WID = 36 / N = .013 / L = 272 / JLC = 0**

(1) / Outfall

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.00 | 36.00 | 125.50 | 5.57 | 131.48 | 0.00 | 3 | 7.07 |
| UPSTRM | 131.95 | 36.00 | 125.70 | 5.57 | 132.43 | 0.00 | 6.3 | 7.07 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.074 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.348 |
| Time of conc (min) | = 4 | Critical depth (in) | = 23.99 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 39.3 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 39.36 | Natural ground elev (ft) | = 135 |
| Line capac. (cfs) | = 18.1 | Line storage (cuft) | = 1922 |

**LINE 2 / Q = 1.4 / HT = 15 / WID = 15 / N = .013 / L = 4 / JLC = 0**

(2) / DNLN = 1

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.95 | 14.37 | 130.75 | 1.15 | 131.97 | 5.72 | 3 | 1.21 |
| UPSTRM | 131.95 | 14.37 | 130.75 | 1.15 | 131.97 | 6.00 | 3.99 | 1.21 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.046 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.050 |
| Time of conc (min) | = 0 | Critical depth (in) | = 5.66 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 1.3 | Confluence angle (deg) | = 90 |
| Default Q (cfs) | = 1.39 | Natural ground elev (ft) | = 136 |
| Line capac. (cfs) | = 1.4 | Line storage (cuft) | = 5 |



Imaged As Is

LINE 3 / Q = 0.8 / HT = 15 / WID = 15 / N = .013 / L = 32 / JLC = 0

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(3) / DNLN = 2

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 132.09 | 4.19 | 131.75 | 2.50 | 132.19 | 13.69 | 3 | 0.30 |
| UPSTRM | 132.23 | 5.71 | 131.75 | 1.77 | 132.27 | 14.57 | 3 | 0.43 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.014 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.259 |
| Time of conc (min) | = 0 | Critical depth (in) | = 4.19 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = .7 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = .76 | Natural ground elev (ft) | = 136 |
| Line capac. (cfs) | = 0.8 | Line storage (cuft) | = 12 |

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LINE 4 / Q = 38.0 / HT = 30 / WID = 30 / N = .013 / L = 124 / JLC = 0

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(4) / DNLN = 1

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.95 | 30.00 | 128.00 | 7.74 | 132.88 | 0.00 | 4.5 | 4.91 |
| UPSTRM | 142.04 | 24.42 | 140.00 | 8.87 | 143.26 | 23.34 | 4.3 | 4.28 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 9.677 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 8.371 |
| Time of conc (min) | = 3 | Critical depth (in) | = 24.71 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 37.9 | Confluence angle (deg) | =-60 |
| Default Q (cfs) | = 37.97 | Natural ground elev (ft) | = 146.8 |
| Line capac. (cfs) | = 127.6 | Line storage (cuft) | = 570 |

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Imaged As Is

**LINE 5 / Q = 28.0 / HT = 30 / WID = 30 / N = .013 / L = 220 / JLC = 0**

(5) / DNLN = 4

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 142.04 | 24.42 | 140.00 | 6.41 | 142.67 | 22.37 | 4.3 | 4.37 |
| UPSTRM | 143.21 | 20.55 | 141.50 | 7.82 | 144.16 | 27.87 | 3.5 | 3.58 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.682 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.677 |
| Time of conc (min) | = 2 | Critical depth (in) | = 21.23 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 28 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 28.03 | Natural ground elev (ft) | = 147.5 |
| Line capac. (cfs) | = 33.9 | Line storage (cuft) | = 875 |

**LINE 6 / Q = 15.8 / HT = 24 / WID = 24 / N = .013 / L = 220 / JLC = 0**

(6) / DNLN = 5

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 143.41 | 16.88 | 142.00 | 6.64 | 144.09 | 21.82 | 3.5 | 2.38 |
| UPSTRM | 144.89 | 22.64 | 143.00 | 5.14 | 145.30 | 11.12 | 3 | 3.07 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.455 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.548 |
| Time of conc (min) | = 0 | Critical depth (in) | = 16.88 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 15.7 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 15.79 | Natural ground elev (ft) | = 148 |
| Line capac. (cfs) | = 15.2 | Line storage (cuft) | = 599 |

LINE 7 / Q = 2.0 / HT = 15 / WID = 15 / N = .013 / L = 88 / JLC = 0

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(7) / DNLN = 6

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 144.89 | 13.64 | 143.75 | 1.72 | 144.93 | 8.37 | 3 | 1.18 |
| UPSTRM | 144.96 | 13.51 | 143.84 | 1.74 | 145.01 | 8.98 | 4.91 | 1.16 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.098 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.087 |
| Time of conc (min) | = 0 | Critical depth (in) | = 6.82 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 2 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 2.02 | Natural ground elev (ft) | = 150 |
| Line capac. (cfs) | = 2.0 | Line storage (cuft) | = 103 |

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# HYDRAULIC ANALYSIS

Run date: 04-12-1991
File: 91152.ST3

Return Period = 10 Yrs
Rainfall file: Your_County

**LINE 1 / Q = 60.6 / HT = 48 / WID = 48 / N = .013 / L = 120 / JLC = 0**

(8) / Outfall

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.00 | 48.00 | 124.00 | 4.82 | 131.36 | 0.00 | 3.5 | 12.56 |
| UPSTRM | 131.21 | 48.00 | 124.50 | 4.82 | 131.58 | 0.00 | 7 | 12.57 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.417 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.178 |
| Time of conc (min) | = 7 | Critical depth (in) | = 27.63 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 60.6 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 60.62 | Natural ground elev (ft) | = 135.5 |
| Line capac. (cfs) | = 92.7 | Line storage (cuft) | = 1508 |

**LINE 2 / Q = 8.1 / HT = 15 / WID = 15 / N = .013 / L = 196 / JLC = 0**

(9) / DNLN = 1

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.21 | 15.00 | 127.25 | 6.57 | 131.88 | 0.00 | 7 | 1.23 |
| UPSTRM | 134.27 | 15.00 | 132.25 | 6.57 | 134.94 | 0.00 | 6 | 1.23 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 2.551 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 1.558 |
| Time of conc (min) | = 0 | Critical depth (in) | = 13.73 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 8 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 8.06 | Natural ground elev (ft) | = 139.5 |
| Line capac. (cfs) | = 10.3 | Line storage (cuft) | = 241 |



Imaged As Is

LINE 3 / Q = 46.8 / HT = 42 / WID = 42 / N = .013 / L = 196 / JLC = 0

(10) / DNLN = 1

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.21 | 42.00 | 125.00 | 4.87 | 131.58 | 0.00 | 7 | 9.62 |
| UPSTRM | 131.64 | 42.00 | 126.00 | 4.86 | 132.01 | 0.00 | 3 | 9.62 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.510 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.216 |
| Time of conc (min) | = 6 | Critical depth (in) | = 25.13 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 46.7 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 46.8 | Natural ground elev (ft) | = 132.5 |
| Line capac. (cfs) | = 71.9 | Line storage (cuft) | = 1886 |

LINE 4 / Q = 41.7 / HT = 36 / WID = 36 / N = .013 / L = 176 / JLC = 0

(11) / DNLN = 3

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 131.64 | 36.00 | 126.50 | 5.90 | 132.18 | 0.00 | 3 | 7.07 |
| UPSTRM | 132.33 | 36.00 | 128.50 | 5.90 | 132.87 | 0.00 | 2.75 | 7.07 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 1.136 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.390 |
| Time of conc (min) | = 5 | Critical depth (in) | = 24.68 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 41.6 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 41.67 | Natural ground elev (ft) | = 134.25 |
| Line capac. (cfs) | = 71.1 | Line storage (cuft) | = 1244 |



Imaged As Is

LINE 5 / Q = 39.3 / HT = 36 / WID = 36 / N = .013 / L = 112 / JLC = 0

(12) / DNLN = 4

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 132.33 | 36.00 | 128.50 | 5.56 | 132.81 | 0.00 | 2.75 | 7.07 |
| UPSTRM | 132.71 | 36.00 | 129.50 | 5.56 | 133.19 | 0.00 | 4.5 | 7.07 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.893 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.347 |
| Time of conc (min) | = 4 | Critical depth (in) | = 23.97 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 39.2 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 39.29 | Natural ground elev (ft) | = 137 |
| Line capac. (cfs) | = 63.0 | Line storage (cuft) | = 792 |

LINE 6 / Q = 31.7 / HT = 30 / WID = 30 / N = .013 / L = 392 / JLC = 0

(13) / DNLN = 5

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 132.71 | 30.00 | 130.00 | 6.46 | 133.36 | 0.00 | 4.5 | 4.91 |
| UPSTRM | 139.83 | 21.92 | 138.00 | 8.25 | 140.88 | 26.62 | 5 | 3.84 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 7.041 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 1.919 |
| Time of conc (min) | = 2 | Critical depth (in) | = 22.57 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 31.6 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 31.69 | Natural ground elev (ft) | = 145.5 |
| Line capac. (cfs) | = 58.6 | Line storage (cuft) | = 1715 |



Imaged As Is

LINE 7 / Q = 22.9 / HT = 24 / WID = 24 / N = .013 / L = 196 / JLC = 0

(14) / DNLN = 6

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 140.19 | 20.34 | 138.50 | 8.04 | 141.20 | 17.08 | 5 | 2.85 |
| UPSTRM | 142.32 | 24.00 | 139.00 | 7.29 | 143.15 | 0.00 | 5 | 3.14 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.255 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.995 |
| Time of conc (min) | = 1 | Critical depth (in) | = 20.34 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 22.9 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 22.91 | Natural ground elev (ft) | = 146 |
| Line capac. (cfs) | = 11.4 | Line storage (cuft) | = 587 |

LINE 8 / Q = 12.1 / HT = 24 / WID = 24 / N = .013 / L = 204 / JLC = 0

(15) / DNLN = 7

| | HGL | DEPTH | INVERT | VEL | EGL | T WID | COVER | AREA |
|---|---|---|---|---|---|---|---|---|
| DNSTRM | 142.32 | 24.00 | 139.00 | 3.87 | 142.55 | 0.00 | 5 | 3.14 |
| UPSTRM | 142.91 | 24.00 | 139.50 | 3.87 | 143.14 | 0.00 | 4.5 | 3.14 |

| | | | |
|---|---|---|---|
| Drainage area (ac) | = 0 | Slope of invert (%) | = 0.245 |
| Runoff coefficient | = 0 | Slope energy grade line (%) | = 0.289 |
| Time of conc (min) | = 0 | Critical depth (in) | = 14.81 |
| Inlet time (min) | = 0 | Req'd length curb inlet (ft) | = 0.0 |
| Intensity (in/hr) | = 0.00 | Req'd grate area (sf) | = 0.0 |
| Cumulative C*A | = 0.0 | Depth at inlet opening (in) | = 0 |
| Flow contrib (cfs) | = 12.1 | Confluence angle (deg) | = 0 |
| Default Q (cfs) | = 12.15 | Natural ground elev (ft) | = 146 |
| Line capac. (cfs) | = 11.2 | Line storage (cuft) | = 641 |



Imaged As Is

***PERMIT NO. 25800.000***

# Lake Rochelle Estates




LEGEND

- BASIN BOUNDARY
- TURBIDITY BARRIER
- FLOW DIRECTION
- CONTROL AREA RETENTION POND
- SOIL BORING
- WETLANDS AREA
- UPLAND BUFFER AREA

SCALE: 1" = 50'

I CERTIFY THAT I HAVE REVIEWED THIS STORM WATER MANAGEMENT & EROSION CONTROL PLAN

DAVID MAGNESS, APPLICANT EMP NO. 449239000

ROBERT E. LAZENBY, IV P.E. # 52006, P.S.M. #6069
AUTORIZATION #1022

DATE:

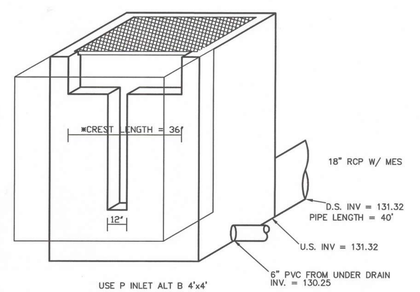
STATE OF FLORIDA
ROBERT E. LAZENBY IV
No. 52006

DRAWN BY: DAVE

DATE: 08/14/03

REVISION
(1) REL4 SWFWMD RAI 10/28/03

NOTE: USE FIBERGLASS OR POLYETHELENE FOR SKIMMER 30" FROM FACE OF INLET




CONTROL STRUCTURE (CONTSTR1) FOR POND1B

REMAINING DRAINAGE DETAILS ON CONSTRUCTION DETAILS SHEET

| POND | TOP EL. | CONT EL. | TOP AREA | CONT AREA |
|---|---|---|---|---|
| POND1A | 136.50 | 132.75 | 0.676 AC. | 0.394 AC. |
| POND1B | 136.50 | 132.75 | 0.214 AC. | 0.093 AC. |
| POND2 | 133.50 | 130.00 | 0.380 AC. | 0.236 AC. |
| POND3 | 130.65 | 129.65 | 0.190 AC. | 0.059 AC. |

| BASIN | AREA | REQ. TREATMENT VOL | CN | TC |
|---|---|---|---|---|
| POND1 | 6.65 AC. | 0.277 AC.FT. | 69.1 | 10.00 MIN. |
| POND2 | 7.54 AC. | 0.314 AC.FT. | 70.0 | 10.00 MIN. |
| POND3 | 1.89 AC. | 0.079 AC.FT. | 68.8 | 10.00 MIN. |

- ADD SSL CONDITION TO PERMIT
128.5

## STORM DRAINAGE INLET HYDRAULICS

| FROM INLET | TO INLET | HYDRAULICS |
|---|---|---|
| INLET-1 | INLET-2 | 34' – 15" RCP AT 0.53% |
| INLET-2 | POND1A | 39' – 15" RCP AT 0.71% |
| INLET-3 | INLET-4 | 136' – 15" RCP AT 0.27% |
| INLET-4 | INLET-5 | 30' – 15" RCP AT 0.93% |
| INLET-5 | POND1A | 142' – 24" RCP AT 0.26% |
| INLET-7 | INLET-8 | 130' – 15" RCP AT 0.19% |
| INLET-8 | INLET-9 | 156' – 15" RCP AT 0.65% |
| INLET-9 | INLET-10 | 100' – 24" RCP AT 0.24% |
| INLET-10 | INLET-11 | 165' – 24" RCP AT 0.42% |
| INLET-11 | INLET-12 | 44' – 30" RCP AT 0.24% |
| INLET-12 | POND2 | 43' – 30" RCP AT 0.37% |
| INLET-13 | GRATE | 27' – 15" ADSN12 AT 0.50% |

## STORM DRAINAGE INLETS

| INLET # | TYPE | GRATE | INVERT | LOCATION |
|---|---|---|---|---|
| INLET-1 | C | 135.50 | E 131.67 | 14.00' LT. STA 11+00.00 |
| INLET-2 | C | 136.38 | W 131.49 E 130.28 | 18.00' RT. STA 11+00.00 |
| INLET-3 | C | 139.74 | E 134.27 | 14.00' RT. STA 31+02.55 |
| INLET-4 | C | 138.39 | W 133.90 S 133.90 | 14.00' RT. STA 29+63.56 |
| INLET-5 | C | 138.38 | N 133.62 S 130.87 | 14.00' LT. STA 29+67.12 |
| INLET-6 | C | 137.10 | E 131.42 | 162.25' LT. STA 17+61.55 |
| INLET-7 | C | 139.43 | W 131.17 E 131.17 | 28.92' LT. STA 17+63.04 |
| INLET-8 | C | 136.29 | W 130.96 E 130.96 | 14.00' RT. STA 18+61.48 |
| INLET-9 | D | 134.53 | W 129.95 E 129.20 | 14.00' RT. STA 20+24.97 |
| INLET-10 | D | 134.04 | W 128.96 E 128.96 | 14.00' RT. STA 21+29.56 |
| INLET-11 | D | 133.22 | W 128.27 N 127.77 | 14.00' RT. STA 23+06.51 |
| INLET-12 | D | 133.14 | S 127.66 N 127.16 | 27.72' LT. STA 23+16.90 |
| INLET-13 | C | 134.40 | N 129.79 | 140.16' LT. STA 23+57.45 |

NOTES:

EROSION CONTROL

1. CONTRACTOR TO INSTALL TURBIDITY BARRIERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND INSPECTION OF SAID TURBIDITY BARRIERS TO ENSURE THEIR PROPER FUNCTION. SEDIMENTS MAY NOT BE ALLOWED TO ACCUMULATE MORE THAN HALF WAY UP THE FACE OF THE SILT SCREEN. SEDIMENTS MUST BE PROPERLY DISPOSED OF. AFTER REMOVAL OF SILT FENCES, ALL DISTURBED AREAS SHALL BE GRASSED & MULCHED.

2. RETENTION PONDS & BASIN CONTROLL SHALL BE THE FIRST ITEM CONSTRUCTED. SIDE SLOPES SHOULD BE IMMEDIATELY SODDED UPON COMPLETION. NO AREAS OUTSIDE THE STORM WATER FACILITIES SHALL BE CLEARED UNTIL THE RECEIVING STORM WATER FACILITIES ARE COMPLETED. THE MAINTENANCE ENTITY SHALL BE RESPONSIBLE FOR MAINTAINING THE GRASS & REMOVING ALL SEDIMENTS, TRASH, DEBRIS FROM THE STORM WATER FACILITIES. FACILITIES SHALL BE INSPECTED BY A PROFESSIONAL ENGINEER AT INTERVALS OUTLINED IN THE ENVIRONMENTAL RESOURCE PERMIT OR 18 MONTHS AT A MINIMUM. DEBRIS AND VEGETATION SHALL BE CONTROLLED IN THE GRAVEL BED OF THE UNDER DRAIN SYSTEMS BY A DISTRICT APPROVED HERBECIDE. OUTLETS OF ALL PIPES SHALL BE INSPECTED REGULARLY AND ANY BLOCKAGES REMOVED. ALL FLOW DOWN SWALES MUST BE MAINTAINED WITH ANY FENCING CONSTRUCTED TO ALLOW FLOW THROUGH OR UNDER THE FENCE.

3. THEL EXISTING WELL SHALL BE PROPERLY ABANDONED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH SWFWMD RULE 40D-3.531.

4. FOR SUGGESTED MINIMUM FLOOR ELEVATIONS AND LOT GRADING DETAILS SEE SHEET 5 OF 6.

5. THE 25 YEAR / 24 HOUR CALCULATED PEAK STAGE IS BASED ON A TYPE II FLORIDA MODIFIED STORM DISTRIBUTION FOR A RAINFALL OF 7.0 INCHES WITH A DURATION OF 24 HOURS. FURTHERMORE THE SCS PARAMETERS SUCH AS CURVE NUMBER AND TIME OF CONCENTRATION ARE BASED ON THE EXISTING CONDITIONS OF BASIN AT THE TIME OF STUDY.

6. GROUNDWATER AND SEASONAL HIGH WATER ELEVATIONS WERE PROVIDED TO ALPHA ENGINEERING BY FTE, INC. AND WERE CONSIDERED THE BEST AVAILABLE DATA. ALPHA ENGINEERING DOES NOT GUARANTEE THE ACCURACY NOR ASSUME ANY LIABILITY FOR THE INACCURACY OF SAID DATA.

7. WARNING AND DISCLAIMER OF LIABILITY
THIS PROJECT WAS DESIGNED TO BE IN COMPLIANCE WITH CITY OF WINTERHAVEN MUNICIPAL CODE. THE DEGREE OF FLOOD PROTECTION AND SURFACE AND GROUND WATER PROTECTION REQUIRED BY THIS CODE IS CONSIDERED REASONABLE FOR REGULATORY PURPOSES AND IS BASED ON SCIENTIFIC AND ENGINEERING CONSIDERATIONS. LARGER FLOODS CAN AND WILL OCCUR ON RARE OCCASIONS.
FLOOD HEIGHTS MAY BE INCREASED BY MAN MADE OR NATURAL CAUSES. THIS CODE DOES NOT IMPLY THAT LAND OUTSIDE AREAS OF SPECIAL FLOOD HAZARDS OR USES PERMITTED WITHIN SUCH AREA WILL BE FREE FROM FLOODING OR FLOOD DAMAGES. THIS CODE SHALL NOT CREATE LIABILITY ON THE PART OF THE CITY OF WINTERHAVEN, ALPHA ENGINEERING & SURVEYING, OR BY ANY OFFICER OR EMPLOYEE THEREOF FOR ANY FLOOD DAMAGES OR ADVERSE EFFECTS OF CHANGES IN QUANTITY OR QUALITY OF SURFACE OR GROUND WATER THAT RESULT FROM RELIANCE ON THIS ORDINANCE OR ANY ADMINISTRATIVE DECISION MADE THEREUNDER.

8. ALL BERMS OF FILLED AREAS TO BE STABILIZED TO 98% PROCTOR DENSITY AND SODDED.

9. FOR EXISTING STRUCTURES (UTILITY, AND MISCELANEOUS LOCATIONS, SEE SHEET 2 OF 6. ALL EXISTING STRUCTURES, UTILITY POLES, WELLS, STORAGE TANKS, ETC. ARE TO BE PROPERLY REMOVED IN ACCORDANCE WITH ALL APPLICABLE STANDARDS.

10. THERE ARE NO IMPACTS TO ARMY CORE OR SWFWMD JURISDICTIONAL WETLANDS WITHIN THIS PROJECT AREA.

11. THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTERHAVEN AT LEAST ONE WEEK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

12. AS-BUILT DRAWINGS AND CERTIFICATION OF COMPLETION SHALL BE SUBMITTED, SIGNED, SEALED, AND DATED BY THE ENGINEER OF RECORD INDICATING ANY DEPARTURES FROM THE APPROVED PLANS DURING CONSTRUCTION.

13. THE HIGHEST GROUNDWATER WITHIN THE ROADWAY SHALL BE AT LEAST 1.5 FEET BELOW THE LIMEROCK BASE.

14. BASIN BOUNDARIES ARE TO CONSTRUCTED TO CONTROL WATER AS SHOWN ON PLAN WHETHER A WATER CONTROL FEATURE IS SPECIFIED OR NOT. IN THE EVENT OF CONFUSION CAUSED BY OMMISION BY ENGINEER, CONTRACTOR TO CONTACT ENGINEER FOR DIRECTION.

15. BEFORE ANY DEPARTURES NO MATTER HOW MINOR ARE MADE FROM THE APPROVED CONSTRUCTION PLANS THE CONTRACTOR SHALL NOTIFY THE ENGINEER DESCRIBING THE PROPOSED CHANGES. THE ENGINEER SHALL APPROVE ALL CHANGES IN WRITING AND AS BUILT DRAWINGS WILL REFLECT ALL CHANGES.

16. ALL CONSTRUCTED FACILITIES SHALL COMMENCE FROM HORIZONTAL AND VERTICAL CONTROL AS SHOWN ON THE BOUNDARY & TOPOGRAPHICAL SURVEY SHEET 2 OF 6.

17. A CERTIFIED "AS BUILT" SURVEY LOCATING ALL CONSTRUCTED FACILITIES PERFORMED BY A REGISTERED SURVEYOR AND MAPPER SHALL BE DELIVERED TO THE ENGINEER.

18. CONTRACTOR SHALL TAKE ELEVATIONS AT TERMINATIONS OF ALL STORM LINES INTO THE STORM INLETS BEFORE THE TOP RISERS ARE SET. THE ELEVATIONS SHALL BE TAKEN WITH REFERENCE TO ONE OF THE CONTROL BENCH MARKS OR FROM MANHOLE LAYOUT BENCH MARK SET BY A REGISTERED SURVEYOR AND MAPPER. THE PROCEDURES USED FOR TAKING ELEVATIONS SHALL DERIVE FROM INSTRUCTIONS AND DIRECTION AS SPECIFIED BY THE SURVEYOR AND MAPPER. THE CONTRACTOR SHALL DELIVER HIS FIELD NOTES TO THE SURVEYOR AND MAPPER WHO WILL BE FOR USING THE INFORMATION IN PREPARING HIS AS BUILT SURVEY.

19. AN AS BUILT SURVEY SHALL BE DELIVERED TO THE ENGINEER, SHOWING ITEMS DESCRIBED NOTE 18 BEFORE LIME ROCK IS PUT IN PLACE. THE ENGINEER SHALL DETERMINE IF THE UNDERGROUND FACILITIES ARE ACCEPTABLE AND SHALL NOTIFY THE CONTRACTOR IN WRITING WHETHER CORRECTIVE MEASURES ARE NEEDED OR THAT WORK IS ACCEPTABLE FOR CONTINUATION OF CONSTRUCTION.

20. RETENTION PONDS AND DRAINAGE STRUCTURES SHALL BE STAKED OUT UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR AND MAPPER. THE SURVEYOR SHALL FIRST STAKE OUT THE TOP OF BANK OR LIMITS OF FILL AND EXCAVATION FOR THE CONTRACTOR. THE CONTRACTOR SHALL THEN MAKE BEST ATTEMPT TO CONSTRUCT PONDS AS SHOWN ON PLANS AND NOTIFY SURVEYOR UPON COMPLETION. THE SHALL THEN RESTAKE TOP AND BOTTOM OF POND. THE CONTRACTOR SHALL FINISH GRADE THE POND TO FINAL STAKES. IF SOD IS PROPOSED CONTRACTOR SHALL BRING TOP OF POND TO WITHIN 2 INCHES OF GRADE TO ALLOW FOR SOD. CONTRACTOR SHALL THEN IMMEDIATELY NOTIFY SURVEYOR TO COMPLETE ASBUILT OF POND. SURVEYOR SHALL DELIVER AS BUILT SURVEY FOR PONDS TO ENGINEER. ENGINEER WILL DETERMINE IF POND IS ACCEPTABLE AND NOTIFY CONTRACTOR IN WRITING WHETHER TO IMMEDIATELY PROCEED WITH SODDING OR THAT ADDITIONAL GRADING IS NECESSARY.

21. SOIL BORINGS REPORT AVAILABLE FROM ENGINEER ON REQUEST.

22. STORM WATER SYSTEM IS SIZED FOR 3000 SQUARE FEET OF IMPERVIOUS AREA PER LOT.

23. THERE MUST BE A MINIMUM OF 6" CLEARANCE FROM THE BOTTOM OF DRAINAGE INLETS TO THE INVERTS OF STORM PIPES.

24. ALL INLET GRATES SHALL BE TRAFFIC BEARING & FDOT APPROVED.

FIRM PANEL 12105C 0355F DATED 12/20/2000, HAS GRAPHICALLY DEPICTED THIS SITE AS LYING IN FLOOD ZONE "X", ACCORDING TO BEST FIT OF THE GRAPHICAL MONUMENTATION SHOWN. A BASE FLOOD ELEVATION FOR LAKE ROCHELLE IS SHOWN ON THIS FIRM PANEL AS ZONE "AE" BEING 130.6. THIS BASE FLOOD ENCROACHES INTO THE PROPERTY AS DELINEATED BY THE SURVEYED 130.6 CONTOUR LINE.


ALPHA
ENGINEERING & SURVEYING, INC.
4506SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8511 FAX 646-4977


# DRAINAGE PLAN

# LAKE ROCHELLE ESTATES

| | |
|---|---|
| SECTION | 09 |
| TOWNSHIP | 28 S. |
| RANGE | 26 E. |
| DWG: LREDR | |

Sequence # 9
Map/Grid

NOV 03 2003

RECEIVED
BRD Review

SHEET NO.
4
OF 6 SHEETS




SCALE: 1" = 50'




**DESIGN NOTES**

1. THE FINISHED BUILDING PAD AREA SHALL BE CONSTRUCTED TO A MINIMUM ELEVATION OF 0.25' BELOW THE PROPOSED FINISHED FLOOR ELEVATION FOR TYPE "A" AND "B" GRADED LOTS.
2. ALL FILLED AREAS SHALL COMPACTED TO 98% MAXIMUM PROCTOR DENSITY.
3. REFER TO THE CONSTRUCTION DETAILS SHEET 14 OF 15 FOR TYPE "A" AND "B" GRADING DETAILS

EXISTING GROUND CONTOUR ------137------

FINISHED GROUND CONTOUR ——138——

STATE OF FLORIDA
No. 52008
REGISTERED
PROFESSIONAL ENGINEER
12/31/03

ROBERT E. LAZENBY, IV
P.E. #52008
RYAN M. LAZENBY
P.E. #57517

DRAWN BY: R.M.L.

DATE: 08/15/03

REVISION
01 R.M.L. 11-05-03 REVISE BOUNDARY GRADING PER PLAT

ALPHA ENGINEERING & SURVEYING, INC.
4506 SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

# GRADING PLAN

# LAKE ROCHELLE ESTATES

18745

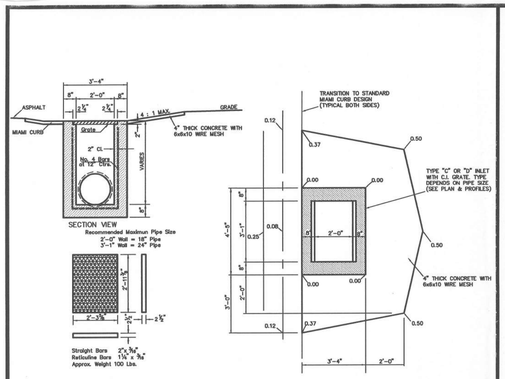
| | |
|---|---|
| SECTION | 09 |
| TOWNSHIP | 28 S. |
| RANGE | 26 E. |

DWG: LOT LAYOUT

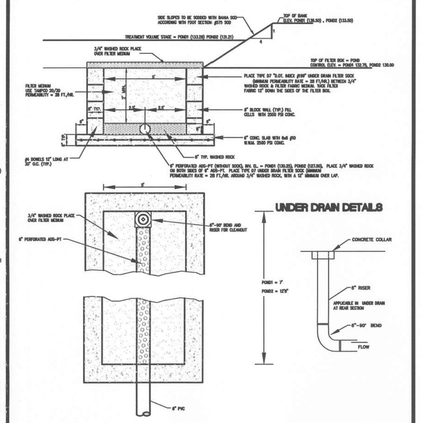
SHEET NO. 5

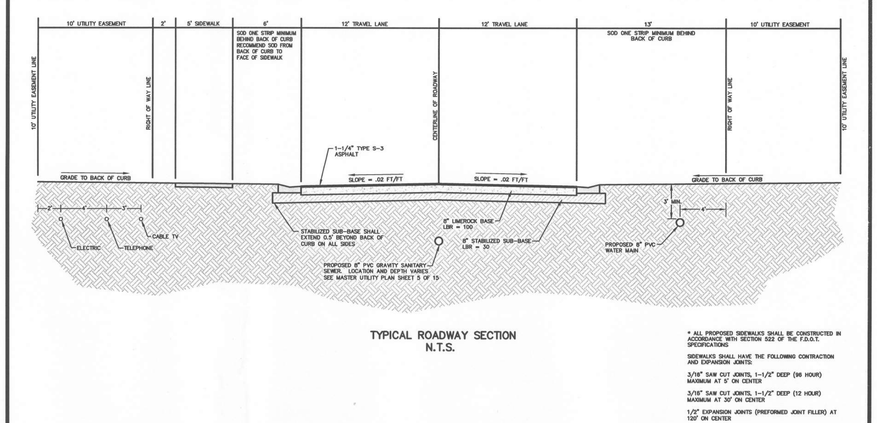
OF 6 SHEETS

Southwest Florida Water Management District
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MODIFIED TYPE "C" INLET DETAIL
N.T.S.




TYPICAL ROADWAY SECTION
N.T.S.

* ALL PROPOSED SIDEWALKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 522 OF THE F.D.O.T. SPECIFICATIONS

SIDEWALKS SHALL HAVE THE FOLLOWING CONTRACTION AND EXPANSION JOINTS:

3/16" SAW CUT JOINTS, 1-1/2" DEEP (96 HOUR) MAXIMUM AT 5' ON CENTER

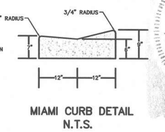
3/16" SAW CUT JOINTS, 1-1/2" DEEP (12 HOUR) MAXIMUM AT 30' ON CENTER

1/2" EXPANSION JOINTS (PREFORMED JOINT FILLER) AT 120' ON CENTER

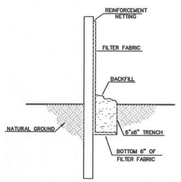
* PROVIDE 1/8"-1/4" CONSTRACTION JOINTS AT 10' CENTERS. CURB EXPANSION JOINTS SHALL BE LOCATED IN ACCORDANCE WITH SECTION 520 OF THE F.D.O.T. STANDARD SPECIFICATIONS

USE 3,000 PSI CONCRETE – 1.625 CU.FT./FT.

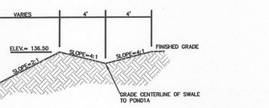
TOP OF FINISHED PAVEMENT TO BE 1/4" ABOVE LIP OF GUTTER

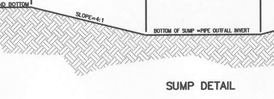



MIAMI CURB DETAIL
N.T.S.




TURBIDITY DETAIL
N.T.S.

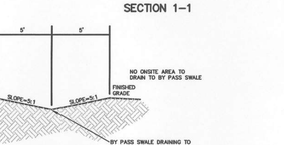


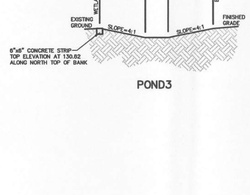




POND 3 WEIR



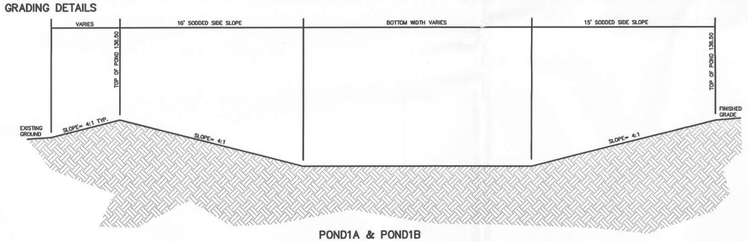

SUMP AT UNDERDRAIN 2 OUTFALL



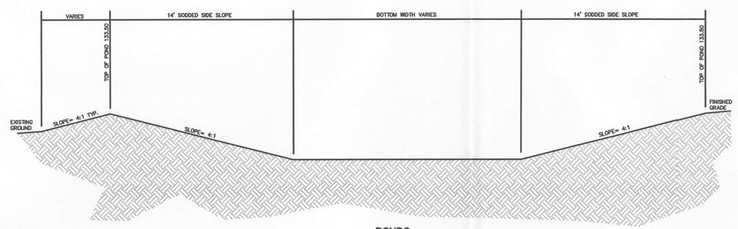




CONTROL STRUCTURE "STR2"

GRADING DETAILS



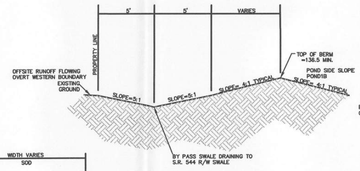

POND1A & POND1B



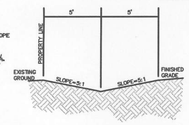

POND2




SECTION 2-2



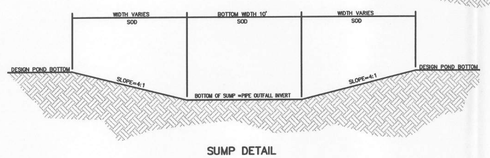

SECTION 3-3




SECTION 1-1



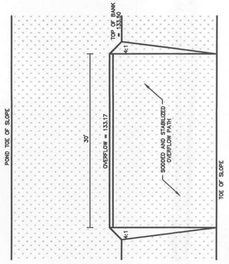

POND3



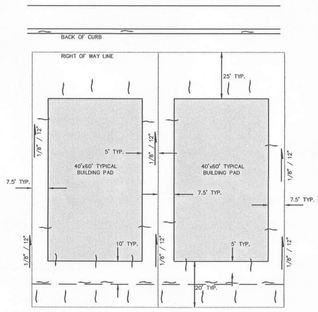

SUMP DETAIL



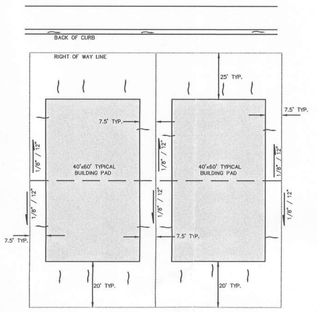

SECTION 4-4



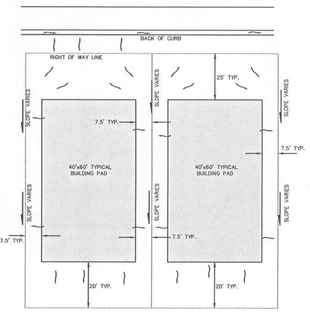

EMERGENCY OVERFLOW POND2



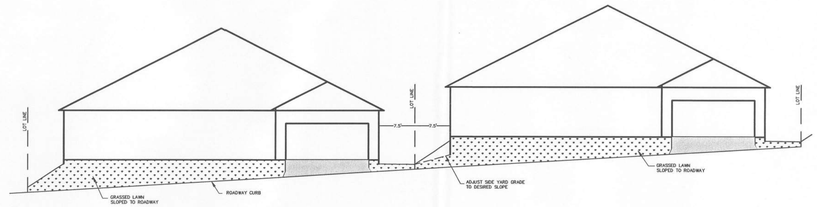

TYPE "A" GRADING



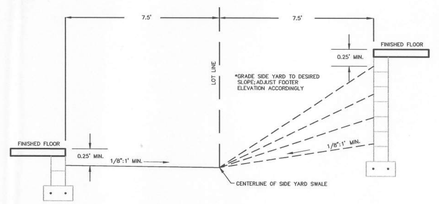

TYPE "B" GRADING




TYPE "C" GRADING




TYPICAL FRONT ELVATION GRADING DETAIL




SIDE YARD SWALE TRANSITION DETAIL

Southwest Florida Water Management District
NOV 03 2003
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KRD-Bartow

STATE OF FLORIDA
No. 52005
REGISTERED ENGINEER
DATE
LOCAL

ROBERT M. LAZENBY, P.E.
P.E. #52005
RYAN M. LAZENBY, P.E.
P.E. #57917

| REVISION | DATE |
|---|---|
| REVISED PER SWFWMD RAI 10-28-03 | |

DESIGNED BY: R.M.L.
DATE: 08/25/03

ALPHA ENGINEERING & SURVEYING, INC.
4509 SOUTH FLORIDA AVENUE
LAKELAND, FLORIDA 33813
(863) 644-2417 FAX 644-2417

# CONSTRUCTION DETAILS

LAKE ROCHELLE ESTATES

18745

| | |
|---|---|
| SECTION | 09 |
| TOWNSHIP | 28 S. |
| RANGE | 26 E. |

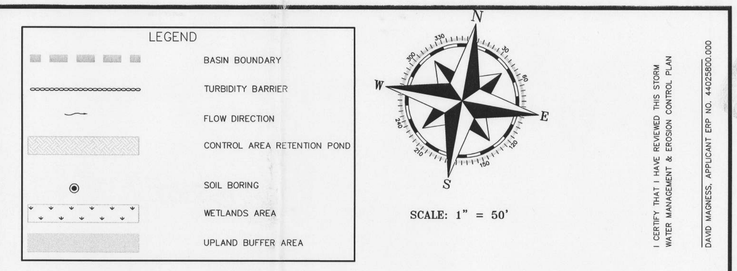
DWG: CONST. DET.

SHEET NO.
6
OF 6 SHEETS

*PERMIT NO. 25800.001*

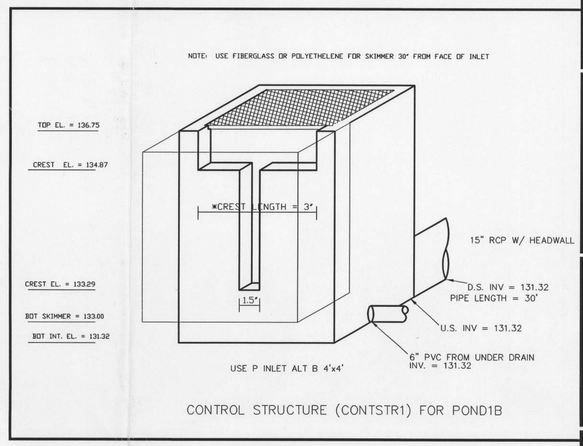
# Lake Rochelle Estates
# Turn Lane Addition




I CERTIFY THAT I HAVE REVIEWED THIS STORM WATER MANAGEMENT & EROSION CONTROL PLAN

DAVID MAGNESS, APPLICANT ERP NO. 44025803.000




CONTROL STRUCTURE (CONTSTR1) FOR POND1B

REMAINING DRAINAGE DETAILS ON CONSTRUCTION DETAILS SHEET

| POND | TOP EL. | CONT EL. | TOP AREA | CONT AREA |
|---|---|---|---|---|
| POND1A | 136.50 | 132.75 | 0.676 AC. | 0.394 AC. |
| POND1B | 136.50 | 132.75 | 0.214 AC. | 0.093 AC. |
| POND2 | 133.50 | 130.00 | 0.380 AC. | 0.236 AC. |
| POND3 | 130.65 | 129.65 | 0.190 AC. | 0.059 AC. |

| BASIN | AREA | REQ. TREATMENT VOL. | CN | TC |
|---|---|---|---|---|
| POND1 | 6.65 AC. | 0.277 AC.FT. | 69.1 | 10.00 MIN. |
| POND2 | 7.54 AC. | 0.314 AC.FT. | 70.0 | 10.00 MIN. |
| POND3 | 1.89 AC. | 0.079 AC.FT. | 68.8 | 10.00 MIN. |

## STORM DRAINAGE INLET HYDRAULICS

| FROM INLET | TO INLET | HYDRAULICS |
|---|---|---|
| INLET-1 | INLET-2 | 34' – 15" RCP AT 0.53% |
| INLET-2 | POND1A | 39' – 15" RCP AT 0.71% |
| INLET-3 | INLET-4 | 136' – 15" RCP AT 0.27% |
| INLET-4 | INLET-5 | 30' – 15" RCP AT 0.93% |
| INLET-5 | POND1A | 142' – 24" RCP AT 0.26% |
| INLET-6 | INLET-7 | 130' – 15" RCP AT 0.19% |
| INLET-7 | INLET-8 | 101' – 15" RCP AT 0.21% |
| INLET-8 | INLET-9 | 156' – 15" RCP AT 0.65% |
| INLET-9 | INLET-10 | 100' – 24" RCP AT 0.24% |
| INLET-10 | INLET-11 | 165' – 24" RCP AT 0.42% |
| INLET-11 | INLET-12 | 44' – 30" RCP AT 0.24% |
| INLET-12 | POND2 | 43' – 30" RCP AT 0.37% |
| INLET-13 | GRATE | 27' – 15" ADSN12 AT 0.50% |

## STORM DRAINAGE INLETS

| INLET # | TYPE | GRATE | INVERT | LOCATION |
|---|---|---|---|---|
| INLET-1 | C | 135.50 | E 131.67 | 14.00' LT. STA 11+00.00 |
| INLET-2 | C | 136.38 | W 131.49 E 130.28 | 18.00' RT. STA 11+00.00 |
| INLET-3 | C | 139.74 | E 134.27 | 14.00' RT. STA 31+02.55 |
| INLET-4 | C | 138.39 | W 133.90 S 133.90 | 14.00' RT. STA 29+63.56 |
| INLET-5 | C | 138.38 | N 133.62 S 130.87 | 14.00' LT. STA 29+67.12 |
| INLET-6 | C | 137.10 | E 131.42 | 162.25' LT. STA 17+61.55 |
| INLET-7 | C | 139.43 | W 131.17 E 131.17 | 28.92' LT. STA 17+63.04 |
| INLET-8 | C | 136.29 | W 130.96 E 130.96 | 14.00' RT. STA 18+61.48 |
| INLET-9 | D | 134.53 | W 129.95 E 129.20 | 14.00' RT. STA 20+24.97 |
| INLET-10 | D | 134.04 | W 128.96 E 128.96 | 14.00' RT. STA 21+29.56 |
| INLET-11 | D | 133.22 | W 128.27 N 127.77 | 14.00' RT. STA 23+06.51 |
| INLET-12 | D | 133.14 | S 127.66 N 127.16 | 27.72' LT. STA 23+16.90 |
| INLET-13 | C | 134.40 | N 129.79 | 140.16' LT. STA 23+57.45 |

NOTES:

EROSION CONTROL

1. CONTRACTOR TO INSTALL TURBIDITY BARRIERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND INSPECTION OF SAID TURBIDITY BARRIERS TO ENSURE THEIR PROPER FUNCTION. SEDIMENTS MAY NOT BE ALLOWED TO ACCUMULATE MORE THAN HALF WAY UP THE FACE OF THE SILT SCREEN. SEDIMENTS MUST BE PROPERLY DISPOSED OF. AFTER REMOVAL OF SILT FENCES, ALL DISTURBED AREAS SHALL BE GRASSED & MULCHED.

2. RETENTION PONDS & BASIN CONTROLL SHALL BE THE FIRST ITEM CONSTRUCTED. SIDE SLOPES SHOULD BE IMMEDIATELY SODDED UPON COMPLETION. NO AREAS OUTSIDE THE STORM WATER FACILITIES SHALL BE CLEARED UNTIL THE RECEIVING STORM WATER FACILITIES ARE COMPLETED. THE MAINTENANCE ENTITY SHALL BE RESPONSIBLE FOR MAINTAINING THE GRASS & REMOVING ALL SEDIMENTS, TRASH, DEBRIS FROM THE STORM WATER FACILITIES. FACILITIES SHALL BE INSPECTED BY A PROFESSIONAL ENGINEER AT INTERVALS OUTLINED IN THE ENVIRONMENTAL RESOURCE PERMIT OR 18 MONTHS AT A MINIMUM. DEBRIS AND VEGETATION SHALL BE CONTROLLED IN THE GRAVEL BED OF THE UNDER DRAIN SYSTEMS BY A DISTRICT APPROVED HERBICIDE. OUTLETS OF ALL PIPES SHALL BE INSPECTED REGULARLY AND ANY BLOCKAGES REMOVED. WHEN FILTER HAS DEGRADED TO THE POINT OF NOT DRAWING DOWN VOLUME WITHIN 36 DRY HOURS OF A RAINFALL THE FILTER MEDIA SHALL BE REPLACED PER SPECS SHOWN IN THESE PLANS. USED FILTER MEDIA SHALL BE PROPERLY DISPOSED OF. ALL FLOW DOWN SWALES MUST BE MAINTAINED WITH ANY FENCING CONSTRUCTED TO ALLOW FLOW THROUGH OR UNDER THE FENCE.

3. THE EXISTING WELL SHALL BE PROPERLY ABANDONED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH SWFWMD RULE 40D-3.531.

4. FOR SUGGESTED MINIMUM FLOOR ELEVATIONS AND LOT GRADING DETAILS SEE SHEET 5 OF 6.

5. THE 25 YEAR / 24 HOUR CALCULATED PEAK STAGE IS BASED ON A TYPE II FLORIDA MODIFIED STORM DISTRIBUTION FOR A RAINFALL OF 7.0 INCHES WITH A DURATION OF 24 HOURS. FURTHERMORE THE SCS PARAMETERS SUCH AS CURVE NUMBER AND TIME OF CONCENTRATION ARE BASED ON THE EXISTING CONDITIONS OF BASIN AT THE TIME OF STUDY.

6. GROUNDWATER AND SEASONAL HIGH WATER ELEVATIONS WERE PROVIDED TO ALPHA ENGINEERING BY FTE, INC. AND WERE CONSIDERED THE BEST AVAILABLE DATA. ALPHA ENGINEERING DOES NOT GUARANTEE THE ACCURACY NOR ASSUME ANY LIABILITY FOR THE INACCURACY OF SAID DATA.

7. WARNING AND DISCLAIMER OF LIABILITY
THIS PROJECT WAS DESIGNED TO BE IN COMPLIANCE WITH CITY OF WINTERHAVEN MUNICIPAL CODE. THE DEGREE OF FLOOD PROTECTION AND SURFACE AND GROUND WATER PROTECTION REQUIRED BY THIS CODE IS CONSIDERED REASONABLE FOR REGULATORY PURPOSES AND IS BASED ON SCIENTIFIC AND ENGINEERING CONSIDERATIONS. LARGER FLOODS CAN AND WILL OCCUR ON RARE OCCASIONS.
FLOOD HEIGHTS MAY BE INCREASED BY MAN MADE OR NATURAL CAUSES. THIS CODE DOES NOT IMPLY THAT LAND OUTSIDE AREAS OF SPECIAL FLOOD HAZARDS OR USES PERMITTED WITHIN SUCH AREA WILL BE FREE FROM FLOODING OR FLOOD DAMAGES. THIS CODE SHALL NOT CREATE LIABILITY ON THE PART OF THE CITY OF WINTERHAVEN, ALPHA ENGINEERING & SURVEYING, OR BY ANY OFFICER OR EMPLOYEE THEREOF FOR ANY FLOOD DAMAGES OR ADVERSE EFFECTS OF CHANGES IN QUANTITY OR QUALITY OF SURFACE OR GROUND WATER THAT RESULT FROM RELIANCE ON THIS ORDINANCE OR ANY ADMINISTRATIVE DECISION MADE THEREUNDER.

8. ALL BERMS OF FILLED AREAS TO BE STABILIZED TO 98% PROCTOR DENSITY AND SODDED.

9. FOR EXISTING STRUCTURES, UTILITY, AND MISCELANEOUS LOCATIONS, SEE SHEET 2 OF 6.
ALL EXISTING STRUCTURES, UTILITY POLES, WELLS, STORAGE TANKS, ETC. ARE TO BE PROPERLY REMOVED IN ACCORDANCE WITH ALL APPLICABLE STANDARDS.

10. THERE ARE NO IMPACTS TO ARMY CORE OR SWFWMD JURISDICTIONAL WETLANDS WITHIN THIS PROJECT AREA.

11. THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTERHAVEN AT LEAST ONE WEEK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

12. AS-BUILT DRAWINGS AND CERTIFICATION OF COMPLETION SHALL BE SUBMITTED, SIGNED, SEALED, AND DATED BY THE ENGINEER OF RECORD INDICATING ANY DEPARTURES FROM THE APPROVED PLANS DURING CONSTRUCTION.

13. THE HIGHEST GROUNDWATER WITHIN THE ROADWAY SHALL BE AT LEAST 1.5 FEET BELOW THE LIMEROCK BASE.

14. BASIN BOUNDARIES ARE TO CONSTRUCTED TO CONTROL WATER AS SHOWN ON PLAN WHETHER A WATER CONTROL FEATURE IS SPECIFIED OR NOT. IN THE EVENT OF CONFUSION CAUSED BY OMMISION BY ENGINEER, CONTRACTOR TO CONTACT ENGINEER FOR DIRECTION.

15. BEFORE ANY DEPARTURES NO MATTER HOW MINOR ARE MADE FROM THE APPROVED CONSTRUCTION PLANS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER DESCRIBING THE PROPOSED CHANGES. THE ENGINEER SHALL APPROVE ALL CHANGES IN WRITING AND AS BUILT DRAWINGS WILL REFLECT ALL CHANGES.

16. ALL CONSTRUCTED FACILITIES SHALL COMMENCE FROM HORIZONTAL AND VERTICAL CONTROL AS SHOWN ON THE BOUNDARY & TOPOGRAPHICAL SURVEY SHEET 2 OF 6.

17. A CERTIFIED "AS BUILT" SURVEY LOCATING ALL CONSTRUCTED FACILITIES PERFORMED BY A REGISTERED SURVEYOR AND MAPPER SHALL BE DELIVERED TO THE ENGINEER.

18. CONTRACTOR SHALL TAKE ELEVATIONS AT TERMINATIONS OF ALL STORM LINES INTO THE STORM INLETS BEFORE THE TOP RISERS ARE SET. THE ELEVATIONS SHALL BE TAKEN WITH REFERENCE TO ONE OF THE CONTROL BENCH MARKS OR FROM MANHOLE LAYOUT BENCH MARK SET BY A REGISTERED SURVEYOR AND MAPPER. THE PROCEDURES USED FOR TAKING ELEVATIONS SHALL DERIVE FROM INSTRUCTIONS AND DIRECTION AS SPECIFIED BY THE SURVEYOR AND MAPPER. THE CONTRACTOR SHALL DELIVER HIS FIELD NOTES TO THE SURVEYOR AND MAPPER WHO WILL BE FOR USING THE INFORMATION IN PREPARING HIS AS BUILT SURVEY.

19. AN AS BUILT SURVEY SHALL BE DELIVERED TO THE ENGINEER, SHOWING ITEMS DESCRIBED NOTE 18 BEFORE LIME ROCK IS PUT IN PLACE. THE ENGINEER SHALL DETERMINE IF THE UNDERGROUND FACILITIES ARE ACCEPTABLE AND SHALL NOTIFY THE CONTRACTOR IN WRITING WHETHER CORRECTIVE MEASURES ARE NEEDED OR THAT WORK IS ACCEPTABLE FOR CONTINUATION OF CONSTRUCTION.

20. RETENTION PONDS AND DRAINAGE STRUCTURES SHALL BE STAKED OUT UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR AND MAPPER. THE SURVEYOR SHALL FIRST STAKE OUT THE TOP OF BANK OR LIMITS OF FILL AND EXCAVATION FOR THE CONTRACTOR. THE CONTRACTOR SHALL THEN MAKE BEST ATTEMPT TO CONSTRUCT PONDS AS SHOWN ON PLANS AND NOTIFY SURVEYOR UPON COMPLETION. THE SHALL THEN RESTAKE TOP AND BOTTOM OF POND. THE CONTRACTOR SHALL FINISH GRADE THE POND TO FINAL STAKES. IF SOD IS PROPOSED CONTRACTOR SHALL BRING TOP OF POND TO WITHIN 2 INCHES OF GRADE TO ALLOW FOR SOD. CONTRACTOR SHALL THEN IMMEDIATELY NOTIFY SURVEYOR TO COMPLETE ASBUILT OF POND. SURVEYOR SHALL DELIVER AS BUILT SURVEY FOR PONDS TO ENGINEER. ENGINEER WILL DETERMINE IF POND IS ACCEPTABLE AND NOTIFY CONTRACTOR IN WRITING WHETHER TO IMMEDIATELY PROCEED WITH SODDING OR THAT ADDITIONAL GRADING IS NECESSARY.

21. SOIL BORINGS REPORT AVAILABLE FROM ENGINEER ON REQUEST.

22. STORM WATER SYSTEM IS SIZED FOR 3000 SQUARE FEET OF IMPERVIOUS AREA PER LOT.

23. THERE MUST BE A MINIMUM OF 6" CLEARANCE FROM THE BOTTOM OF DRAINAGE INLETS TO THE INVERTS OF STORM PIPES.

24. ALL INLET GRATES SHALL BE TRAFFIC BEARING & FDOT APPROVED.

Southwest Florida Water Management District

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED

RECEIVED
BRO-Bartow
AUG 26 2004

File of Record
Permit No. 44025803.001

FIRM PANEL 12105C 0355F DATED 12/20/2000, HAS GRAPHICALLY DEPICTED THIS SITE AS LYING IN FLOOD ZONE "X", ACCORDING TO BEST FIT OF THE GRAPHICAL MONUMENTATION SHOWN. A BASE FLOOD ELEVATION FOR LAKE ROCHELLE IS SHOWN ON THIS FIRM PANEL AS ZONE "AE" BEING 130.6. THIS BASE FLOOD ENCROACHES INTO THE PROPERTY AS DELINEATED BY THE SURVEYED 130.6 CONTOUR LINE.

ROBERT E. LAZENBY, IV P.E. # 52006, P.S.M. # 5575
DATE:
STATE OF FLORIDA
AUTORIZATION #1022

DRAWN BY: DAVE
DATE: 08/14/03

| REVISION |
|---|
| (1) REL4 SWFWMD RAI 10/28/03 |
| (2) REL4 SWFWMD RAI 11/21/03 |
| (3) REL4 SWFWMD RAI 12/02/03 |

ALPHA ENGINEERING & SURVEYING, INC.
4505SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

# DRAINAGE PLAN

# LAKE ROCHELLE ESTATES

| | |
|---|---|
| SECTION | 09 |
| TOWNSHIP | 28 S. |
| RANGE | 26 E. |
| DWG: LREDR | |
| SHEET NO. | 4 |
| OF | 6 SHEETS |

| STATE PROJ. NO. | SHEET NO. |
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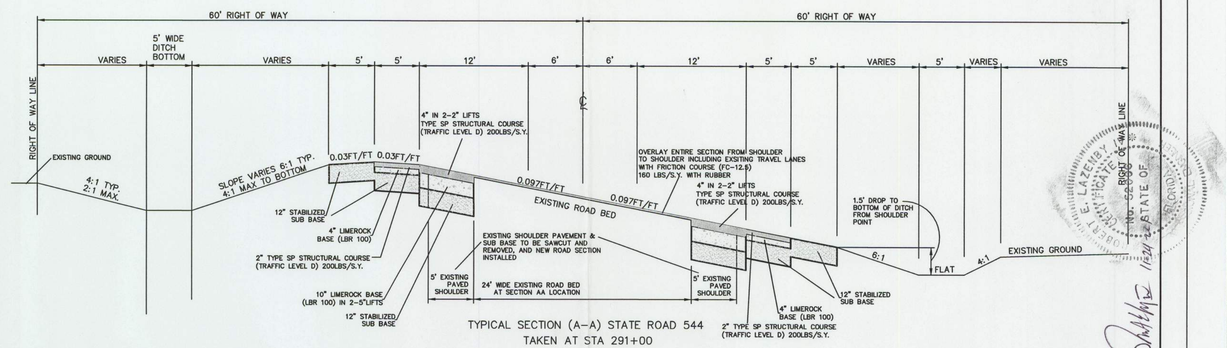
FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY:
DATE:

ALPHA
ENGINEERING & SURVEYING, INC.
4008 S. FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

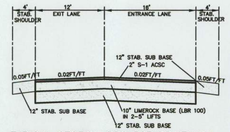
CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

LAKE ROCHELLE ESTATES
STATE ROAD 544

| STATE PROJ. NO. | SHEET NO. |
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TYPICAL SECTION (A–A) STATE ROAD 544
TAKEN AT STA 291+00




TYPICAL SECTION PROJECT DRIVEWAY SOUTH OF RIGHT OF WAY LINE

NOTES:

1. ALL CONSTRUCTION WITHIN FDOT RIGHT OF WAY IS TO BE IN ACCORDANCE WITH CURRNET FDOT STANDARD SPECIFICATIONS FOR ROADWAY CONSTRUCTION AND THE ROADWAY AND TRAFFIC DESIGN STANDARD INDEX.
2. ALL EXISTING SIGNS SHALL BE PROTECTED DURING CONSTRUCTION AND REPLACED IN ORIGINAL LOCATION UNLESS OTHERWISE DESIGNATED ON THESE PLANS.
3. SOD ALL DISTURBED RIGHT-OF-WAY AREAS.
4. CIVIL ENGINEER (CE) INSPECTOR WILL BE REQUIRED TO BE HIRED BY THE GENERAL CONTRACTOR OR DEVELOPER TO OVERSEE AND CERTIFY ALL CONSTRUCTION. ENGINEER OF RECORD MAY ACT AS CE INSPECTOR UNDER SEPARATE CONTRACT.
5. PRIOR TO THE START OF CONSTRUCTION, A PRE CONSTRUCTION CONFERENCE WITH FDOT STAFF, ENGINEER OF RECORD, GENERAL CONTRACTOR, PAVING CONTRACTOR, AND THE C.E. INSPECTOR, WILL BE REQUIRED TO BE ATTENDED AT THE BARTOW MAINTENANCE OFFICE.
6. ALL CONSTRUCTION STAKEOUT SURVEYING TO BE PERFORMED UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR, REGISTERED IN THE STATE OF FLORIDA.
7. A PERFORMANCE BOND FOR ALL PROPOSED WORK BASED ON AN ESTIMATE BY THE ENGINEER OF RECORD, MUST BE ISSUED TO THE FDOT PRIOR TO THE PRECONSTRUCTION CONFERENCE.
8. EROSION AND TURBIDITY TO BE CONTROLLED IN ACCORDANCE TO BEST MANAGEMENT PRACTICES.
9. TRAFFIC CONTROL & MAINTENANCE PER INDEX 604
10. NO LANE CLOSURE IS ALLOWED BETWEEN 4:00 P.M. AND 9:00 A.M. FDOT RESERVES THE RIGHT TO REQUIRE DIFFERENT HOURS OF LANE CLOSURE INCLUDING NIGHT TIME WORK.

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FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY:
DATE:

ALPHA
ENGINEERING & SURVEYING, INC.
4008 S. FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

LAKE ROCHELLE ESTATES
STATE ROAD 544
TYPICAL SECTION AND NOTES

| STATE PROJ. NO. | SHEET NO. |
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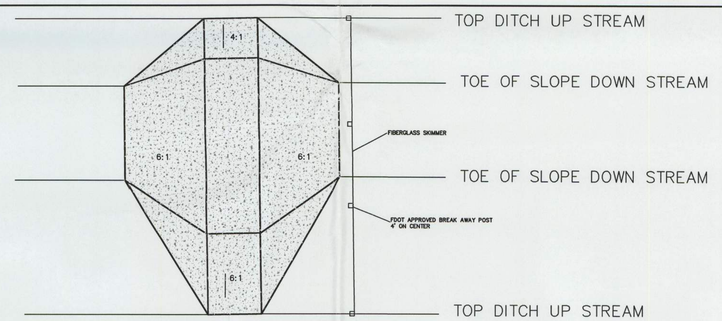
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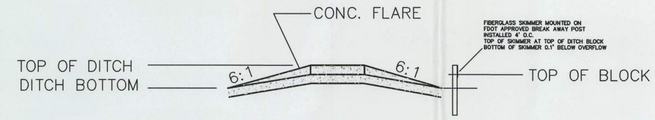
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LAKELAND, FLORIDA 33813
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LAKE ROCHELLE ESTATES
STATE ROAD 544
KEY SHEET

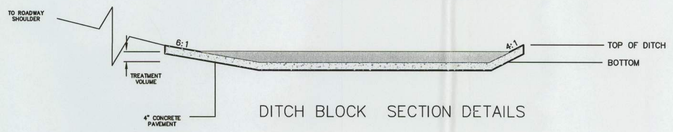
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DITCH BLOCK 1 PLAN VEIW




DITCH BLOCK SECTION DETAILS




DITCH BLOCK SECTION DETAILS

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED
44075800.001 1/18/2005

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FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY:
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ALPHA
ENGINEERING & SURVEYING, INC.
4008 S. FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

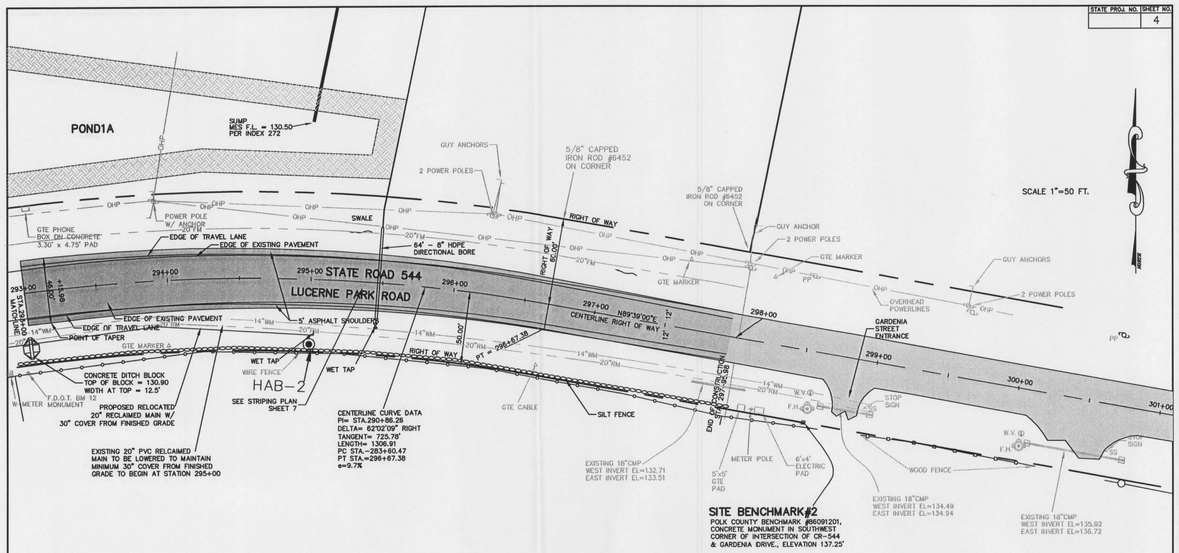
LAKE ROCHELLE ESTATES
STATE ROAD 544
DRAINAGE DETAILS # 4

Southwest Florida Water Management District

NOV 2 4 2004

RECEIVED
SWFWMD-Bartow

STATE PROJ. NO. | SHEET NO.
4




LEGEND

OHP————=OVERHEAD POWER LINES

F.H. = FIRE HYDRANT
EL=ELEVATION
F.I.R.= FOUND IRON ROD
F.C.M.= FOUND CONCRETE MONUMENT
W.V. = WATER VALVE COVER
BM = BENCH MARK
GTE = VERIZONE PHONE COMPANY
SS = STOP SIGN
U/G = UNDER GROUND
PP = POWER POLE
CONC. = CONCRETE
C.M.P. = CORRUGATED METAL PIPE

NOTE: EXISTING SPEED LIMIT IS 55 MILES PER HOUR BOTH DIRECTIONS.

NEW ASPHALT

EXISTING ASPHALT

REVISIONS

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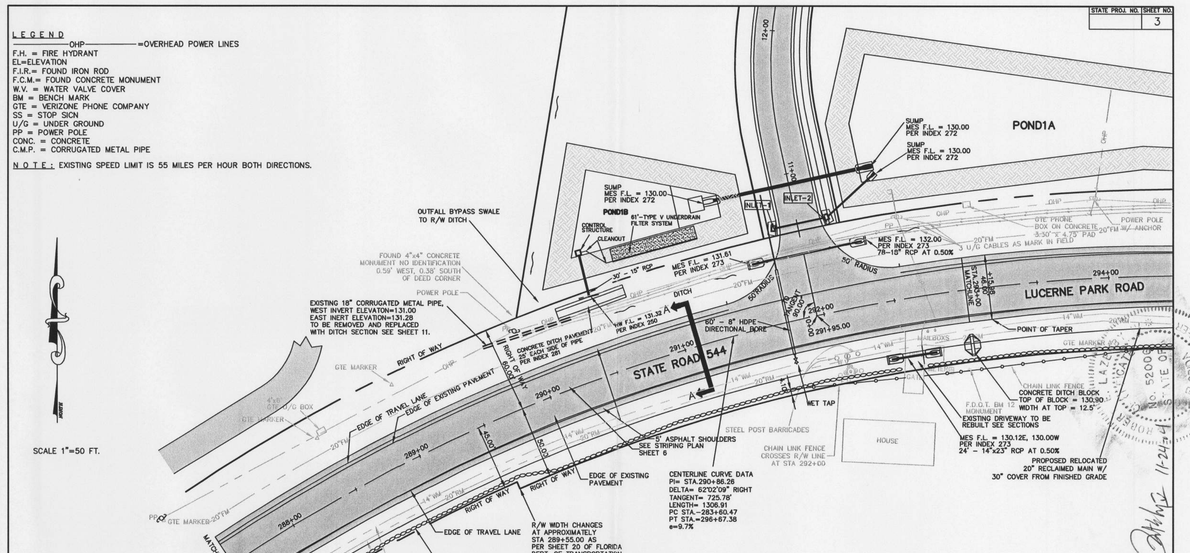
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CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

LAKE ROCHELLE ESTATES
STATE ROAD 544

# DRIVEWAY LAYOUT

STATE PROJ. NO. | SHEET NO.
3




LEGEND

OHP————=OVERHEAD POWER LINES

F.H. = FIRE HYDRANT
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NOTE: EXISTING SPEED LIMIT IS 55 MILES PER HOUR BOTH DIRECTIONS.

NEW ASPHALT

EXISTING ASPHALT

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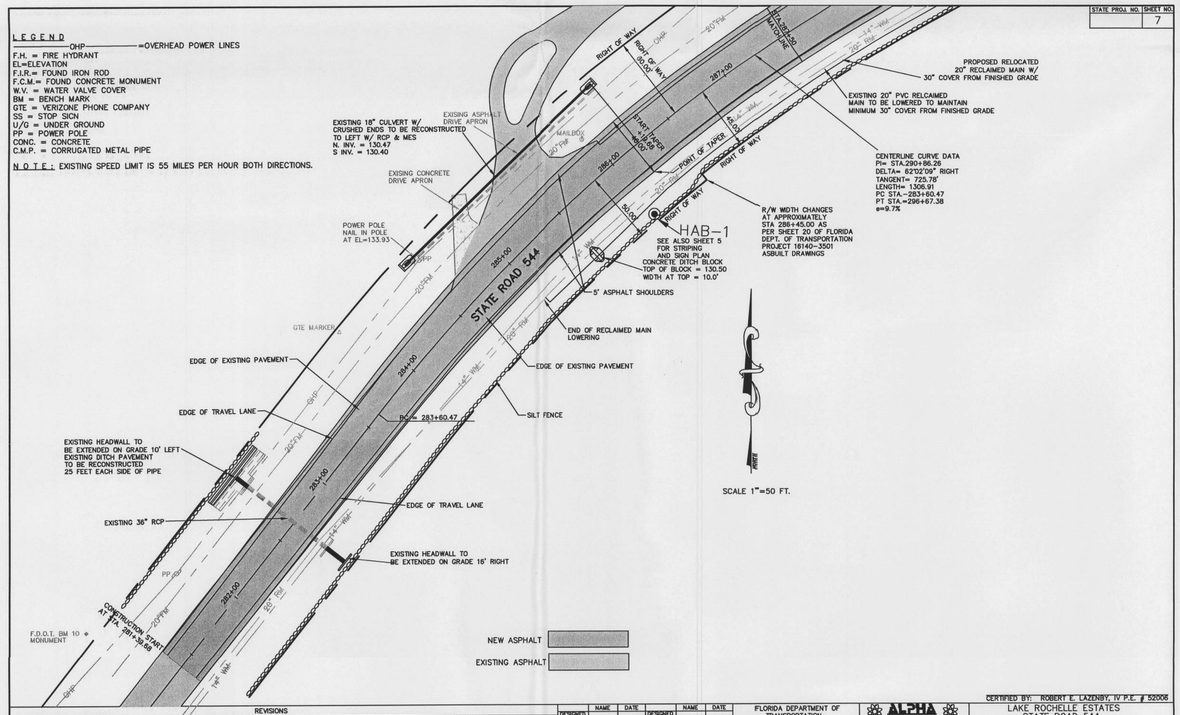
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LAKELAND, FLORIDA 33813
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LAKE ROCHELLE ESTATES
STATE ROAD 544

# DRIVEWAY LAYOUT

STATE PROJ. NO. | SHEET NO.
7




NEW ASPHALT

EXISTING ASPHALT

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| SUPERVISED BY: | | | | | |

FLORIDA DEPARTMENT OF TRANSPORTATION
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ENGINEERING & SURVEYING, INC.
4508 S. FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

LAKE ROCHELLE ESTATES
STATE ROAD 544

# DRIVEWAY LAYOUT

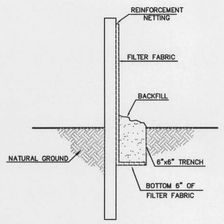
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## CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

NOTES
1. SILT FENCES SHALL BE INSTALLED AT THE DESIGNATED LOCATIONS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE FENCES TO FUCNTION AS DESIGNED. MINIUMUM MAINTENANCE SHALL OCCUR AT PERIODS NO LONGER THAN TWO WEEKS APART OR WHEN SILTATION COVERS MORE THAN 50% OF THE HEIGHT OF THE SILT FENCE.

2. ALL DISTURBED AREAS WITHIN THE RIGHT OF WAY SHALL BE RESODDED WITH LIKE SOD.

3. SEE SHEETS 2-4 ON THIS PLAN FOR LOCATION OF SILT FENCES.




TURBIDITY / SILT FENCE DETAIL
N.T.S.

I HAVE REVIEWED THIS CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

DAVID MAGNESS
D. MAGNESS CONSTRUCTION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED 1/18/2005
4402580.000.01

REVISIONS

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FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY:
DATE:

ALPHA
ENGINEERING & SURVEYING, INC.
4508 S. FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

LAKE ROCHELLE ESTATES
STATE ROAD 544

Southwest Florida Water Management District

NOV 2 4 2004

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RRD-Bartow

# DRAINAGE CERTIFICATION

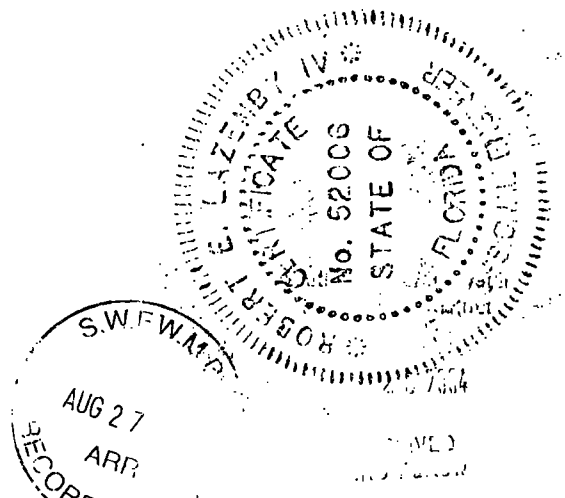
## LAKE ROCHELLE ESTATES

## ADICPR INPUT

## Revised 5/14/04

8-24-04

Certified by: Robert E. Lazenby IV P.E. # 52006




Alpha Engineering & Surveying, Inc.
4506 South Florida Avenue...Lakeland, Florida 33813...(864) 646-8571

44025800.001

The proposed modification will keep the onsite portion of the project unchanged. The control structure in pond 1b named control structure # 1 will be modified per changes required by the FDOT drainage connection permit designed for critical storm and duration. The modification will modify the permit to include FDOT improvements on the adjacent State Road 544 right of way which consist of adding a left turn lane to the project driveway. The additional impervious area added for the left turn lane will be approximately 15000 square feet. Water quantity for the proposed FDOT improvement will be provided by over compensating attenuation volume in the onsite ponds 1A & 1B. Water quality will be provided without retention catchments by using infiltration to treat the first inch of rainfall by initial abstraction in the grassed right of way.

PRE BASIN ANALYSIS
Basin: Pre
Onsite Area = 6.60 acre

Land Use: Citrus Grove A soils fair to poor cover, CN = 49

Time of Concentration: = 10.0min
L = 325ft, S = 0.025ft/ft, wooded low storage, v = 38ft/min

Offsite in SR544 R/W area = 4.17 acre
Impervious = 1.27 acre CN = 98, grassed green space C soils = 2.90 CN = 74

CN = 6.60(49) + 1.27(98) + 2.90(74) / 10.77 = 61.51

S.W.F.W.M.D.
AUG 27 2004
ARR
RECORDS & DATA

Southwest Florida Water
Management District

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LAKE ROCHELLE ESTATES

POST BASIN ANALYSIS

Basin: Pond1
Onsite Area = 6.65 acre

| Land Use | Area | CN |
|---|---|---|
| Road, Curb, Sidewalk | 0.99 acre | 98 |
| Houses (25 x 3000sqft/Ho) | 1.72 acre | 98 |
| Avg Retention | 0.66 acre | 100 |
| Greenspace / Lawns | 3.28 acre | 39 |

Composite CN = (0.99 + 1.72)98 + (0.66)100 + (3.28)39 / 6.65 = 69.1

Offsite in SR544 R/W area = 4.17 acre
Impervious = 1.62 acre CN = 98, grassed green space C soils = 2.55 CN = 74

CN = + 1.62(98) + 2.55(74) / 10.82 = 83.32

Time of Concentration = 10.0 Min.

Pre development peak discharge rate = 19.81 cfs (from basin summary)
Post development peak discharge rate = 14.07 cfs (from node maximum conditions max inflow)

Treatment volume = runoff from first one inch of rainfall
impervious area = 1.62 acres x 1in x 1ft/12 in = 0.135 acft
grassed area = 2.55 acre x 0.023in* x 1ft/12in = 0.005 acft
Total treatment volume = 0.14 acft

Initial abstraction for grassed acre = 0.2S
S = 1000/74 - 10 = 3.5135

2.55 acre x .2 x 3.5135 x1/12 = 0.149 acft

* runoff for grassed area = (1-.2(3.5135))^2 / (1+.8(3.5135) = 0.023 in

S.W.F.W.M.D.
AUG 27 2004
ARR
RECORDS & DATA

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Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
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LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / 24 HOUR

********** Basin Summary - ROCHELLE **********

| *** | | | |
|---|---|---|---|
| Basin Name: | ONSITE | SR544 | PRE |
| Group Name: | BASE | BASE | BASE |
| Node Name: | POND1A | SR544 | PRE |
| Hydrograph Type: | UH | UH | UH |
| Unit Hydrograph: | UH323 | UH323 | UH323 |
| Peaking Factor: | 323.00 | 323.00 | 323.00 |
| Spec Time Inc (min): | 1.33 | 1.33 | 1.33 |
| Comp Time Inc (min): | 1.33 | 1.33 | 1.33 |
| Rainfall File: | FLMOD | FLMOD | FLMOD |
| Rainfall Amount (in): | 7.00 | 7.00 | 7.00 |
| Storm Duration (hr): | 24.00 | 24.00 | 24.00 |
| Status: | ONSITE | ONSITE | ONSITE |
| Time of Conc. (min): | 10.00 | 10.00 | 10.00 |
| Lag Time (hr): | 0.00 | 0.00 | 0.00 |
| Area (acres): | 6.65 | 4.17 | 10.77 |
| Vol of Unit Hyd (in): | 1.00 | 1.00 | 1.00 |
| Curve Number: | 69.10 | 83.32 | 61.51 |
| DCIA (%): | 0.00 | 0.00 | 0.00 |
| Time Max (hrs): | 12.02 | 12.02 | 12.04 |
| Flow Max (cfs): | 15.92 | 14.05 | 19.81 |
| Runoff Volume (in): | 3.50 | 5.03 | 2.73 |
| Runoff Volume (cf): | 84408 | 76172 | 106638 |

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LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / 24 HOUR

********** Node Maximum Conditions - ROCHELLE **********

(Time units - hours)

| Node Name | Group Name | Max Time Conditions | Max Stage (ft) | Warning Stage (ft) | Max Delta Stage (ft) | Max Surface Area (sf) | Max Time Inflow | Max Inflow (cfs) | Max Time Outflow | Max Outflow (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|
| POND1A | BASE | 17.07 | 134.92 | 132.75 | 0.0030 | 24291.63 | 12.00 | 15.70 | 12.01 | 3.33 |
| POND1B | BASE | 17.08 | 134.92 | 136.50 | 0.0030 | 7112.09 | 12.01 | 3.33 | 17.08 | 0.84 |
| SR544 | BASE | 24.00 | 132.01 | 133.00 | 0.0000 | 0.00 | 12.00 | 14.07 | 0.00 | 0.00 |

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LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / HOUR

********** Link Maximum Conditions - ROCHELLE **********

(Time units - hours)

| Link Name | Group Name | Max Time Flow | Max Flow (cfs) | Max Delta Q (cfs) | Max Time U/S Stage | Max US Stage (ft) | Max Time D/S Stage | Max DS Stage (ft) |
|---|---|---|---|---|---|---|---|---|
| CONTSTR1 | BASE | 17.08 | 0.84 | 0.00 | 17.08 | 134.92 | 24.00 | 132.01 |
| PIPEATOB | BASE | 12.01 | 3.33 | -0.31 | 17.07 | 134.92 | 17.08 | 134.92 |

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LAKE ROCHELLE ESTATES MODIFICATION

********** Input Report **********

--------Class: Node--------

Name: POND1A Base Flow(cfs): 0 Init Stage(ft): 132.75
Group: BASE Warn Stage(ft): 132.75
Comment:

| Stage(ft) | Area(ac) |
|---|---|
| 132.75 | 0.394 |
| 136.5 | 0.676 |

--------Class: Node--------

Name: POND1B Base Flow(cfs): 0 Init Stage(ft): 132.75
Group: BASE Warn Stage(ft): 136.5
Comment:

| Stage(ft) | Area(ac) |
|---|---|
| 132.75 | 0.093 |
| 136.5 | 0.214 |

--------Class: Node--------

Name: SR544 Base Flow(cfs): 0 Init Stage(ft): 132
Group: BASE Warn Stage(ft): 133
Comment:

| Time(hrs) | Stage(ft) |
|---|---|
| 0 | 132 |
| 24 | 132.01 |

--------Class: Pipe--------

Name: PIPEATOB From Node: POND1A Length(ft): 101
Group: BASE To Node: POND1B Count: 1

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| | | | Equation: | Average K |
| Geometry: | Circular | Circular | Flow: | Both |
| Span(in): | 30 | 30 | Entrance Loss Coef: | 0.5 |
| Rise(in): | 30 | 30 | Exit Loss Coef: | 1 |
| Invert(ft): | 130 | 130 | Bend Loss Coef: | 0 |
| Manning's N: | 0.012 | 0.012 | Outlet Cntrl Spec: | Use dc or tw |
| Top Clip(in): | 0 | 0 | Inlet Cntrl Spec: | Use dn |
| Bottom Clip(in): | 0 | 0 | Stabilizer Option: | None |

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall 1 1

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall 1 1

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LAKE ROCHELLE ESTATES MODIFICATION

********** Input Report ************************************************************
--------Class: Drop Structure----------------------------------------------------
Name: CONTSTR1 From Node: POND1B Length(ft): 30
Group: BASE To Node: SR544 Count: 1

Outlet Cntrl Spec: Use dc or tw Inlet Cntrl Spec: Use dn
Upstream Geometry: Circular Downstream Geometry: Circular

| | UPSTREAM | DOWNSTREAM |
|---|---|---|
| Span(in): | 15 | 15 |
| Rise(in): | 15 | 15 |
| Invert(ft): | 131.32 | 131.32 |
| Manning's N: | 0.012 | 0.012 |
| Top Clip(in): | 0 | 0 |
| Bottom Clip(in): | 0 | 0 |

Entrance Loss Coef: 0.5 Flow: Both
Exit Loss Coef: 1 Equation: Aver Conveyance

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall 1 1
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall 1 1

*** Weir 1 of 2 for Drop Structure CONTSTR1 *** [TABLE]
Count: 1 Bottom Clip(in): 0
Type: Mavis Top Clip(in): 0
Flow: Both Weir Discharge Coef: 3.13
Geometry: Rectangular Orifice Discharge Coef: 0.6

Span(in): 1.5 Invert(ft): 133.29
Rise(in): 18.96 Control Elev(ft): 133.29

*** Weir 2 of 2 for Drop Structure CONTSTR1 *** [TABLE]
Count: 1 Bottom Clip(in): 0
Type: Horiz Top Clip(in): 0
Flow: Both Weir Discharge Coef: 3.13
Geometry: Circular Orifice Discharge Coef: 0.6

Span(in): 3 Invert(ft): 134.87
Rise(in): 999 Control Elev(ft): 134.87

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LAKE ROCHELLE ESTATES MODIFICATION

********** Input Report **********
--------Class: Simulation--------
C:\ICPR2\ROCHELLE\ROCHELLE
Execution: Both
Header: LAKE ROCHELLE ESTATES MODIFICATION

---------HYDRAULICS---------HYDROLOGY---------
Max Delta Z (ft): 1
Delta Z Factor: 0.01 Override Defaults: No
Time Step Optimizer: 0
Drop Structure Optimizer: 0
Sim Start Time(hrs): 0
Sim End Time(hrs): 24
Min Calc Time(sec): 1
Max Calc Time(sec): 5

| To Hour: | PInc(min): | To Hour: | PInc(min): |
|---|---|---|---|
| 24 | 15 | 24 | 15 |

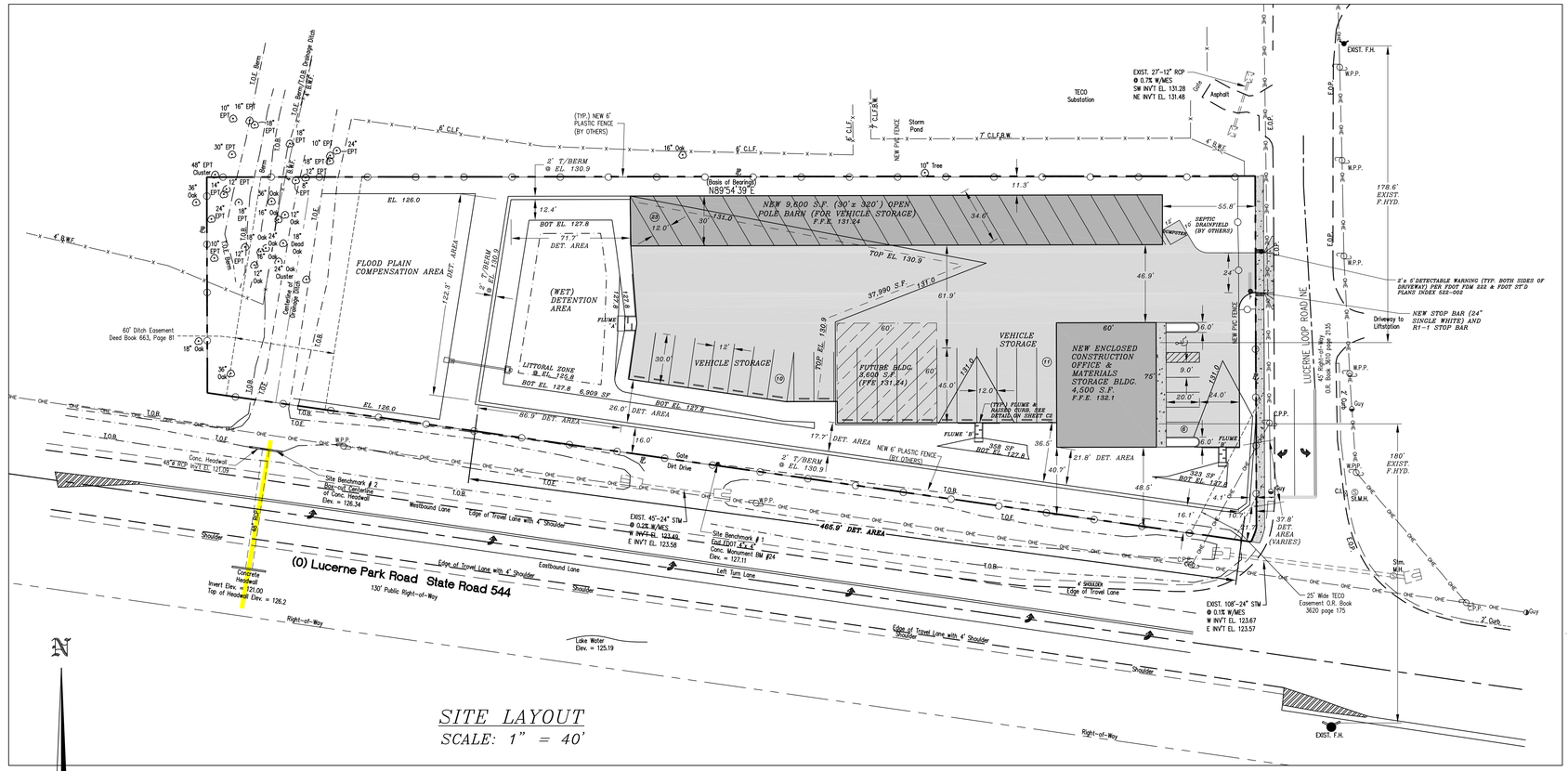
---------GROUP SELECTIONS---------
+ BASE [08/24/04]

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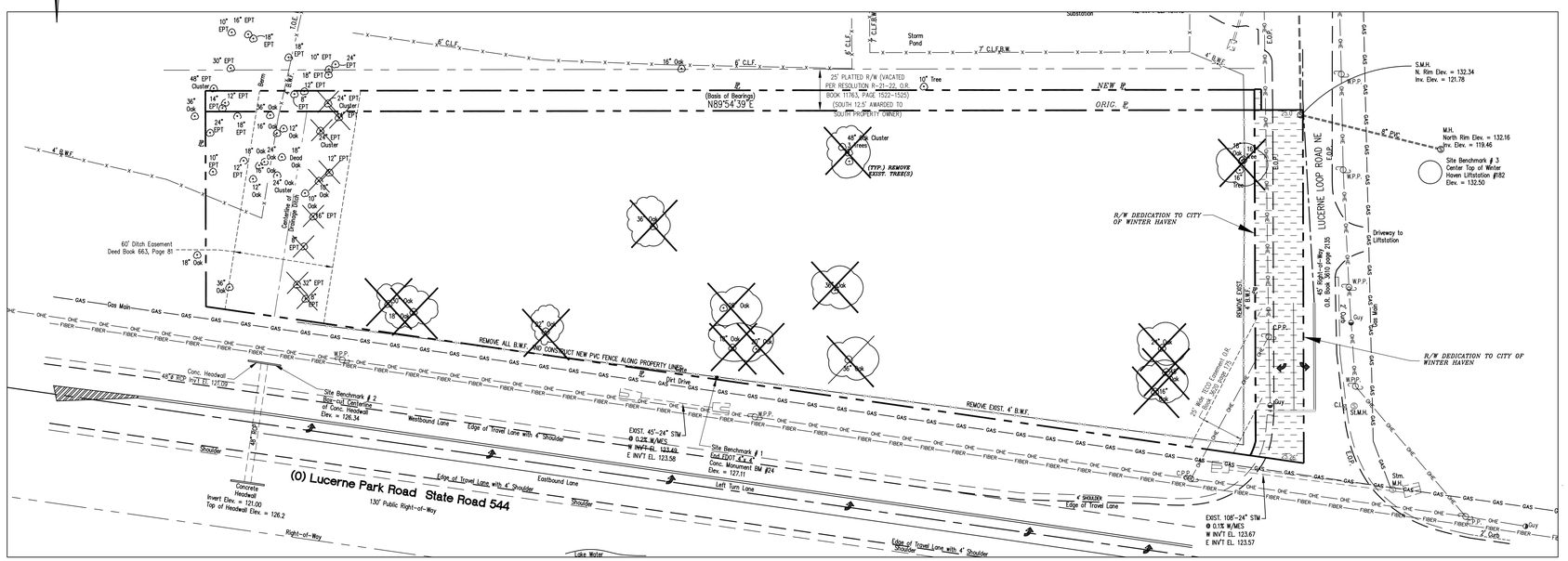
44025800.001

*PERMIT NO. 43262.001*

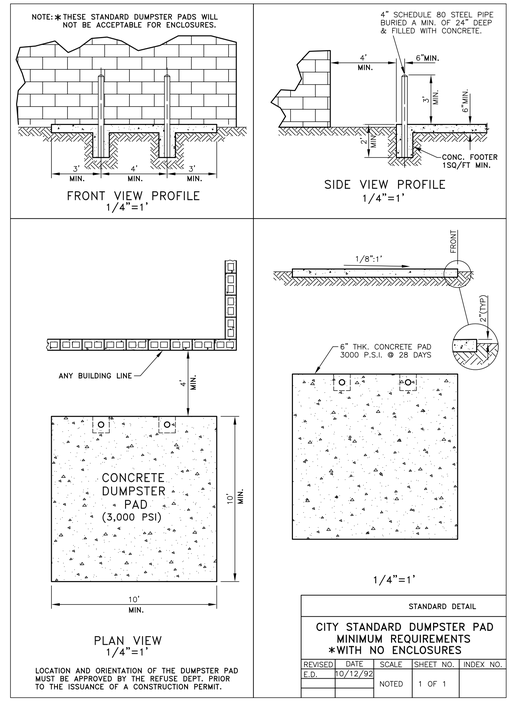
**"Keep it Safe" Storage**




SITE LAYOUT
SCALE: 1" = 40'



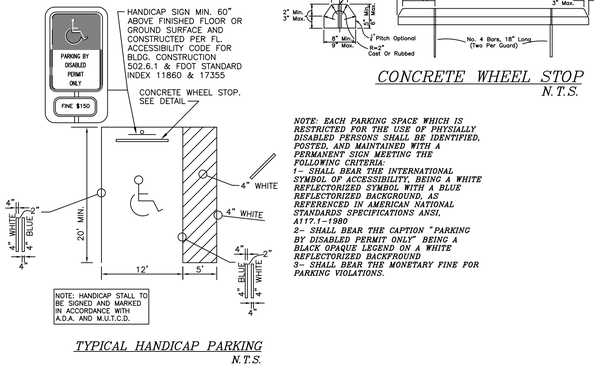

DEMO PLAN
SCALE: 1" = 40'



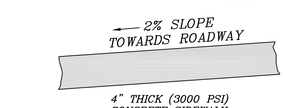

STANDARD DETAIL

CITY STANDARD DUMPSTER PAD MINIMUM REQUIREMENTS *WITH NO ENCLOSURES

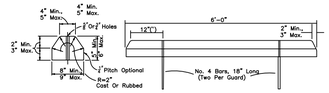
| REVISED | DATE | SCALE | SHEET NO. | INDEX NO. |
|---|---|---|---|---|
| F.D. | 10/12/92 | NOTED | 1 OF 1 | |




TYPICAL HANDICAP PARKING
N.T.S.




5' WIDE CONCRETE SIDEWALK
N.T.S.




CONCRETE WHEEL STOP
N.T.S.

DESIGNED BY: SER
APPROVED BY: DRN
REVISIONS

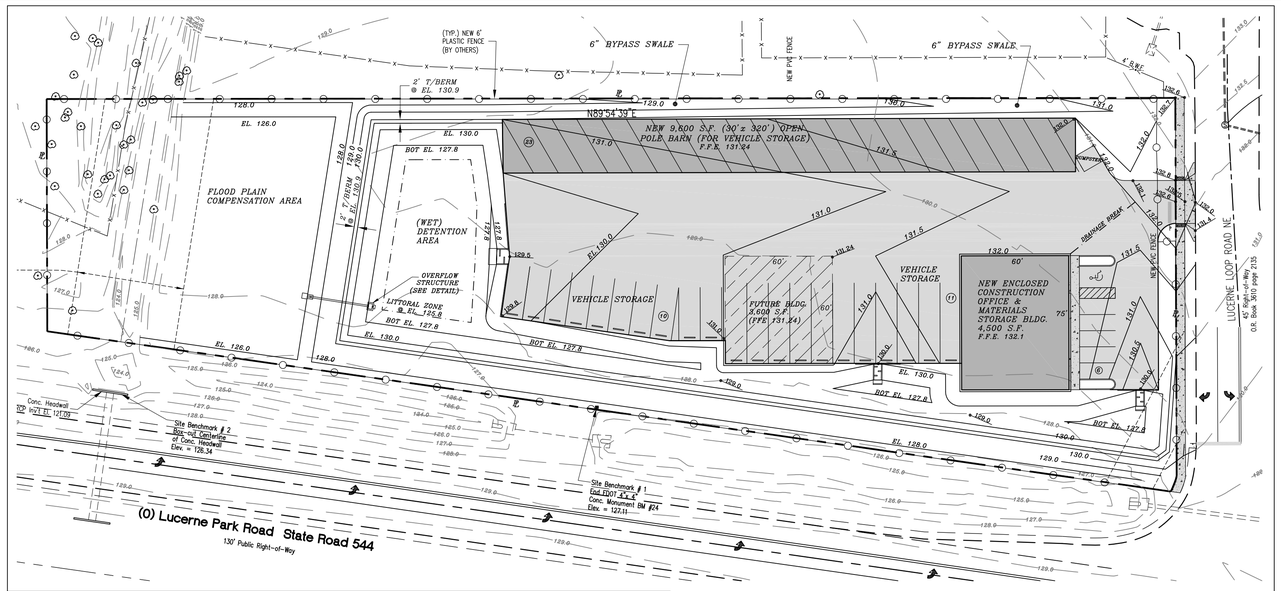
DAVID NORRIS ENGINEERING
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COMMERCIAL PLANS • INSPECTIONS • PERMITTING
"SPECIALIZING IN CHURCH DESIGN"
112 COLEMAN ROAD 33880
WINTER HAVEN, FLORIDA
OFFICE (863)299-4805
PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

JOB NO. 20-14

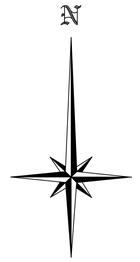
KEEP IT SAFE STORAGE

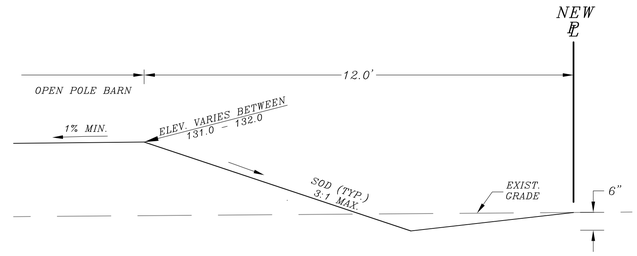
SITE LAYOUT & DEMO PLAN

SHEET C1

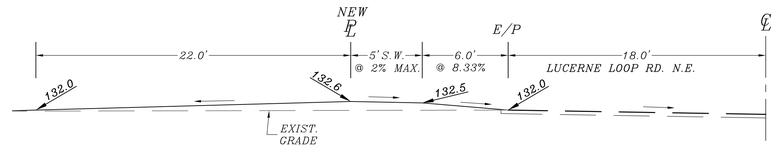



## GRADING PLAN
SCALE: 1" = 40'

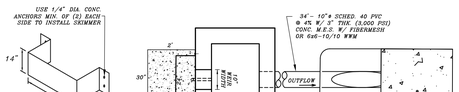





## TYP. SECTION – 6" BYPASS SWALE
SCALE: 1" = 2'

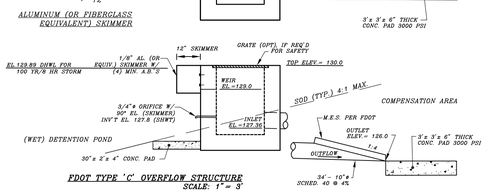



## TYP. ℄ SECTION – NEW 24' DRIVEWAY
SCALE: 1" = 2'

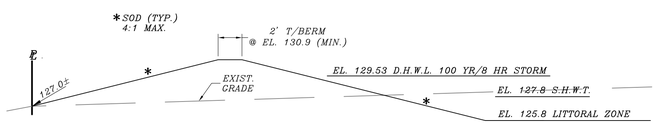



ALUMINUM (OR FIBERGLASS EQUIVALENT) SKIMMER



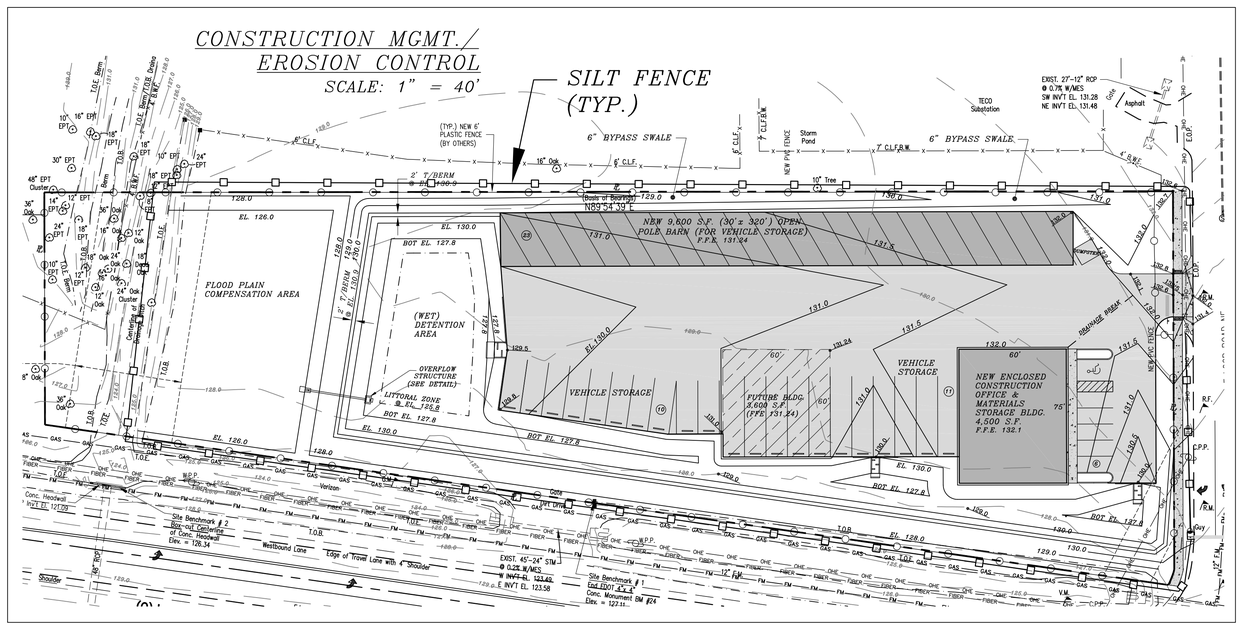




FDOT TYPE 'C' OVERFLOW STRUCTURE
SCALE: 1" = 3'




TYP. (WET) DETENTION POND SECTION
(ALONG S. ℄)
SCALE: 1" = 6'

## CONSTRUCTION MGMT./ EROSION CONTROL
SCALE: 1" = 40'




TEMPORARY EROSION AND SEDIMENTATION CONTROL SPECIFICATIONS 1.01 DESCRIPTION:

A) The work specified on this Section consists of designing, providing, maintaining, and removing temporary erosion and sedimentation controls as necessary.

B) Temporary erosion controls include, but are not limited to, grassing, setting watering and re-seeding on-site surfaces and spoil and barrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the owner.

C) Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces that will stop sedimentation pollution.

D) The contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

A) Florida Building Code

B) Florida Department of Transportation Specifications

STORM WATER MANAGEMENT MAINTENANCE/OPERATION INSTRUCTIONS

Sediment: Sediment deposition should be continually monitored in the basin. The sediment shall be removed when reaching 2"–3" accumulative depth.

Inlets: Pipe inlets should be inspected after each storm, and accumulated debris and sediment should be removed. Erosion during construction will be either eliminated or maintained within acceptable limits as established by the owner.

Outlets: Pipe outlets should be inspected after each storm to determine whether outflow is causing erosion. Wherever such erosion is detected, effective measures would be taken to stabilize and protect the affected area.

Vegetation: Trees should be kept off dam and emergency spillway area. Vegetation should be maintained for critical area stabilization.

Insects: Precautions should be taken to minimize the production of fast breeding insects in and around the pond area. Possible control measures include controlling the growth of grass at shorelines, varying the water depth every few days, and stocking the pond with larvae eating fish.

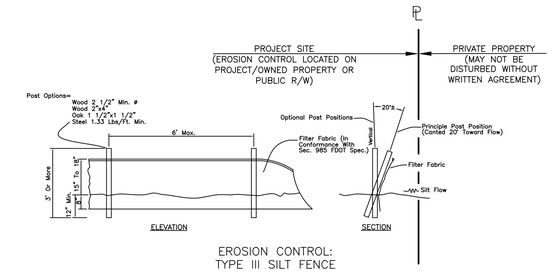
Safety Inspection: All permanent impoundments should be inspected periodically by a qualified professional engineer to ensure the they remain structurally sound and mechanically efficient. An annual safety inspection is recommended where the potential for downstream damage and loss of life due to impoundment failure is high. All structures should be inspected following major storms as well. The entire drainage system must be inspected every 1–5 yrs. as required by the Water Management District.

2.01 EROSION CONTROL:

A) Minimum procedures for grassing are:
1) Scarify slopes to a depth of not less than six inches and remove large clods, rocks, stumps roots larger than 1/2" in diameter, and debris.
2) Sow seed within (24) hours after the ground is scarified with either mechanical seed drills or rotory hand seeders.
3) Apply mulch loosely and to a thickness of between 3/4" and 1 1/2".
4) Apply netting over mulched areas on sloped surfaces.
5) Roll and water seeded area in a manner that will encourage sprouting of seeds and growing of grass. Re-seed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

2.02 SEDIMENTATION CONTROL: Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved description and working drawings.

2.03 PERFORMANCE: Should any of the temporary erosion and sediment control measures employed be the contractor fail to produce results which comply with the requirements of the Florida DOT Specifications, the Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense. NOTE: Hay bales are not acceptable for erosion, sedimentation, and turbidity control. Muck-grown sod is not acceptable for use in retention area banks and bottom.




EROSION CONTROL: TYPE III SILT FENCE

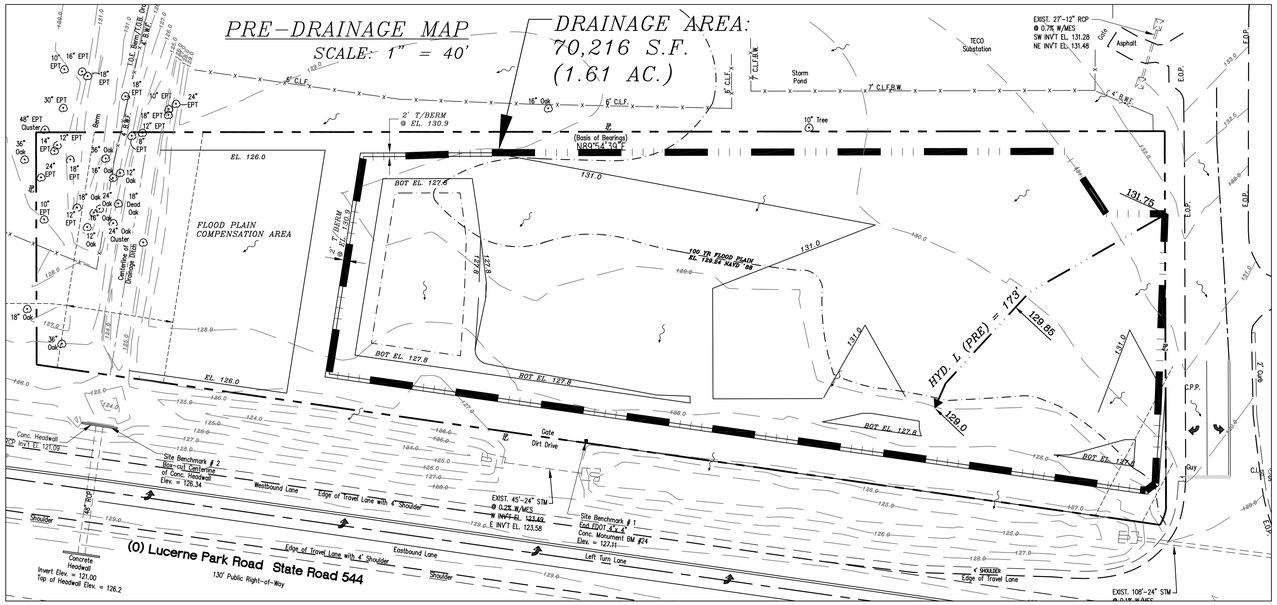
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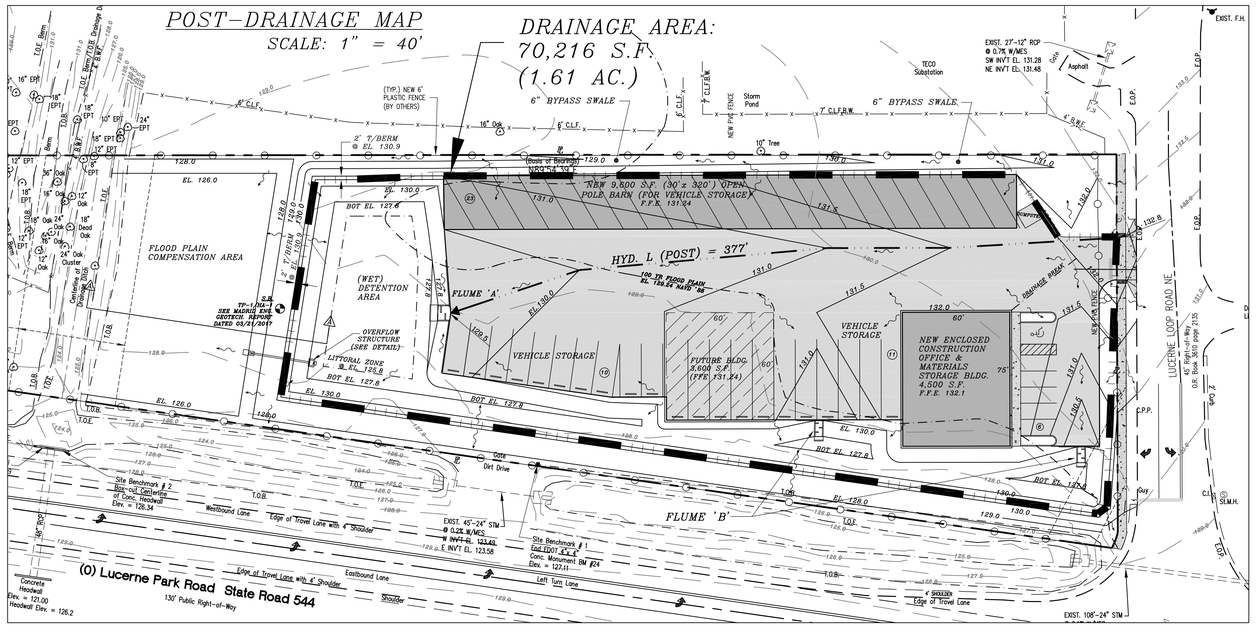
REVISIONS | DESIGNED BY: SER | APPROVED BY: DRN

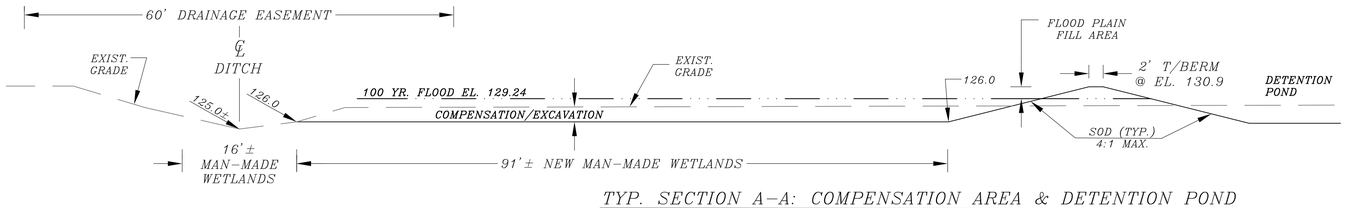
JOB NO. 20-14

KEEP IT SAFE STORAGE
GRADING & CONSTRUCTION MANAGEMENT PLAN

SHEET C2




TYP. SECTION A-A: COMPENSATION AREA & DETENTION POND
SCALE: 1" = 10'




FLUME 'A' DETAIL
SCALE: 1" = 4'




FLUME(S) 'B' DETAIL
SCALE: 1" = 4'

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PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

DESIGNED BY: SER
APPROVED BY: DRN

REVISIONS

JOB NO.
20-14

KEEP IT SAFE STORAGE

PRE/POST-DRAINAGE MAPS

SHEET
C3

Design #6

# Drainage Design Parameters

Date: 11-15-21

Project Name: GREENLAND SERVICES (LAKE FANNIE) Job No.: 20-14

Design for: ~~Polk Co.~~ X SWFWMD ✓ FDOT ✓ City of W.H. ✓

Open Basin: ✓ ~~Closed Basin:~~ X

(Post) D.A.: 77,404 S.F. 1.77 Ac. (Pre) D.A.: SAME S.F. SAME Ac.

½" R.O. = N/A C.F. N/A Ac.-Ft. 1" R.O. = 6450 C.F. .148 Ac.-Ft.

Soils: SCS # 40, Wauchula Fine Sand Type: B/D

SHWT = 0-1' Permeability= 6-20 in/hr

CN (Pre)= 80

CN (Post)= 95

TC (Pre) = 10 min. TC (Post) = 10 min.

P = N/A in (25 yr/24 hr) P = N/A in (100 yr/24 hr)

(SEE F.D.O.T. RAINFALL)

Pond: (Dry) Retention N/A (Wet) Detention ✓

| | S.F. area | C.F./Ac-Ft volume |
|---|---|---|
| Soil Brg. EL: 128.8 | 22,400 − 6,100 = 16,360 / 22 = 740.91 | 1.2 8891 |
| Aquifer EL: 124.5 (126.5) | (4860) | .25 11,509 6427 .75 5483, 11,583 6543 |
| SHWT EL: 127.8 | | .72 5378 11,435 6312 ≈ 6321 |
| Bottom EL: 127.8 / 128.52 | 6100 | 0 |
| Weir EL: 129.0 / 129.5 | 14,991 / 18,695 | 12,655 / 21,076 > 6450 O.K. |
| EL: 130.0 | 22,400 | 31,350 |
| T/POND = 130.9 | 29,068 | 54,511 |

L/W = 580 / 15.24 = 38.06 for L = 580'

H = .74

W = 15.24 (W = ½" Vol. / L x H)

130.9 − 127.8 = 3.1 x 4 = 12.4

127.8 .72 128.52

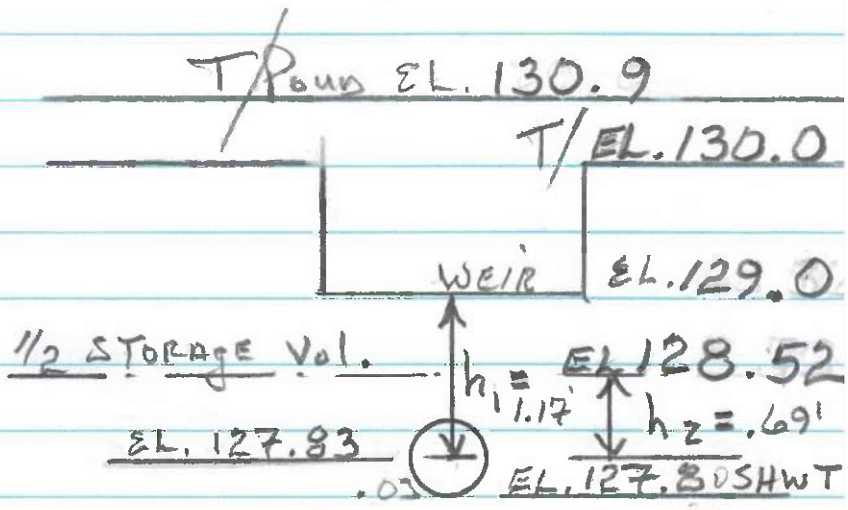
6542 / .74(580) = 15.24

Greenland - Lk Fannie #20-14

# Drawdown Calcs for 3/4" ϕ Orifice

Total Storage Vol = 12,655 C.F. / $A_R$ = 14,991

1/2 Stor. Vol = 6,328 C.F.
$A_R$ = 11,435




$h_1$ = 129.0 - 127.83 = 1.17'

$h_2$ = 128.52 - 127.83 = .69'

[.25]

Avg. Pond Surface Area

$\frac{14,991 + 11,435}{2}$ = 13,213 S.F.

$$t = \frac{2(13,213)\left[(1.17)^{.5} - (.69)^{.5}\right]}{.61\ (.003068)\ 8.025}$$

1.08166 - .83066

$A_o$ (3/4" ϕ) = .003068 ft

= 442,440 sec / 3600

= 122.9 Hr.

> 60 O.K.

## Runoff curve number (CN)

Project : GREENLAND - LK. FANNIE
Location :
By :
Checked :
JOB # 20-14
DRN 8/27/21

Check One : ☐ Present ☑ Developed

**Runoff curve number**

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN Figure 2-2 | CN Figure 2-3 | CN Figure 2-4 | Area ☑ acres ☐ sq. mi. ☐ % | Product of CN x Area |
|---|---|---|---|---|---|---|
| #40/B/D Woodland A & S. | | 80 | | | .26 | 20.8 |
| Impervious Area | | 98 | | | 1.24 | 121.52 |
| D Retention Area | Area @ 24,127.8 / SHWT | 100 | | | .27 | 27.0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Totals | 1.77 | 169.32 |
| CN (weighted) = | total product / total area | | | Use CN | 95 | 95.66 |

TR 55 Urban Hydrology for Small Watersheds

(PRE)

# Time of concentration (Tc) or travel time (Tt)

Project : Greenland - Lk. Fannie  By : DEND  JOB # 20-14
Location : Polk County, FL  Checked : _____  Date: 8/27/21

Check One : ☐ Present ☐ Developed _____

Check One : ☑ Tc ☑ Tt through subarea

**Notes:** Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.

**Sheet flow** (Applicable to Tc only)

| | | Segment ID | AB | | | |
|---|---|---|---|---|---|---|
| 1. | Surface description (Table 3-1) | | GRASS | | | |
| 2. | Mannings roughness coeff., n (Table 3-1) | | 0.15 | | | |
| 3. | Flow length, L (total L < 300 ft.) | ft | 100.00 | | | |
| 4. | Two-yr 24-hr rainfall, P2 | in | 4.70 | | | |
| 5. | Calculated Land slope, s 2.2/100 | ft/ft | .022 | | | |
| 5a. | Land Elevation For Upper End Of Flow Path | | 132.5 | | | |
| 5b. | Land Elevation For Lower End Of Flow Path | | 130.3 | | | |
| 6. | Compute Tt [Eq. 3-3] | hr | .13 | + 0 | = | .13 hours |

$= .007(.15 \times 100)^{.8} / (P_2)^{.5}(S)^{.4} = .007(15)^{.8} / (4.7)^{.5}(.022)^{.4} = (.007)(8.727) / (2.168)(.217) = .017$

**Shallow concentrated flow**

| | | Segment ID | BC | | | |
|---|---|---|---|---|---|---|
| 7. | Surface description (Paved or Unpaved) | | Unpaved | | | |
| 8. | Flow length, L 1,3' / 110' | ft | 110 | | | |
| 9. | Calculated Watercourse slope, s | ft/ft | .017 | | | |
| 9a. | Land Elevation For Upper End Of Flow Path | | 130.3 | | | |
| 9b. | Land Elevation For Lower End Of Flow Path | | 129.0 | | | |
| 10. | Average velocity, V (Figure 3-1) | ft/s | 1.8 | | | |
| 11. | Tt = L/3600V Compute Tt | hr | .017 | + .13 | = | .147 hours |

$= 110' / (3600)(1.8) =$ .017 + .13 = .147

**Channel Flow**

| | | Segment ID | CD | | | |
|---|---|---|---|---|---|---|
| 12. | Cross sectional flow area, a | sf | | | | |
| 13. | Wetted perimeter, Pw | ft | | | | |
| 14. | Hydraulic radius, r = a/Pw Compute r | ft | | | | |
| 15. | Channel slope, s | ft/ft | | | | |
| 16. | Manning's roughness coeff., n | | | | | |
| 17 | V = 1.49(r^0.667)(s^0.50)/n Compute V | ft/s | | | | |
| 18. | Flow length, L | ft | | | | |
| 19. | Tt = L/3600V Compute Tt | hr | | + | = | X hours |

20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19) .147 hours

×60

8.82

**Reference:** Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

**Use Time of Concentration =** 10 minutes

Use

| Design Storm | Discharge Rate (CFS) (pre/post) | Peak Pond Stage (ft) | Design Storm | Discharge Rate (CFS) (pre/post) | Peak Pond Stage (ft) | Basin & Pond Config Info | |
|---|---|---|---|---|---|---|---|
| **FDOT 2 yr, 1 hr** | 2.66 | 128.94 | **FDOT 10 yr, 8 hr** | 3.23 | 129.56 | **Basin Information** | |
| | 0.02 | | | 1.14 | | Pre Area (Ac.) | 1.77 |
| **FDOT 2yr, 2 hr** | 2.20 | 129.09 | **FDOT 10 yr, 24 hr** | 1.07 | 129.43 | Pre CN | 80 |
| | 0.09 | | | 0.78 | | Pre Tc (min) | 10 |
| **FDOT 2 yr, 4 hr** | 1.64 | 129.22 | **FDOT 10 yr, 72 hr** | 0.74 | 129.40 | Pre PRF | 256 |
| | 0.30 | | | 0.68 | | | |
| **FDOT 2 yr, 8 hr** | 1.84 | 129.25 | **FDOT 25 yr, 1 hr** | 5.65 | 129.37 | Post Area (Ac.) | 1.77 |
| | 0.36 | | | 0.62 | | Post CN | 95 |
| **FDOT 2 yr, 24 hr** | 0.60 | 129.26 | **FDOT 25 yr, 2 hr** | 4.98 | 129.52 | Post Tc (min) | 10 |
| | 0.36 | | | 1.01 | | Post PRF | 256 |
| **FDOT 2 yr, 72 hr** | 0.46 | 129.29 | **FDOT 25 yr, 4 hr** | 3.33 | 129.66 | | |
| | 0.44 | | | 1.44 | | **Pond Information** | |
| **FDOT 5 yr, 1 hr** | 3.75 | 129.13 | **FDOT 25 yr, 8 hr** | 3.94 | 129.69 | Top of Pond | 130.9 |
| | 0.14 | | | 1.55 | | Bottom of Pond | 126.5 |
| **FDOT 5 yr, 2 hr** | 3.29 | 129.29 | **FDOT 25 yr, 24 hr** | 1.30 | 129.51 | SHWT | 127.8 |
| | 0.44 | | | 0.99 | | Orifice | 0.75" (@SHWT) |
| **FDOT 5 yr, 4 hr** | 2.27 | 129.41 | **FDOT 25 yr, 72 hr** | 0.88 | 129.45 | Weir (10") | 10"@129.00 |
| | 0.71 | | | 0.81 | | Grate Top (Type "C") | 130.0 |
| **FDOT 5 yr, 8 hr** | 2.61 | 129.43 | **FDOT 50 yr, 1 hr** | 6.65 | 129.48 | | |
| | 0.77 | | | 0.90 | | **Notes:** | |
| **FDOT 5 yr, 24 hr** | 0.85 | 129.36 | **FDOT 50 yr, 2 hr** | 5.86 | 129.62 | Routings were based upon using | |
| | 0.59 | | | 1.32 | | the high tailwater of 125.09 for the | |
| **FDOT 5 yr, 72 hr** | 0.65 | 129.36 | **FDOT 50 yr, 4 hr** | 3.86 | 129.76 | 48" diameter outfall pipe under | |
| | 0.60 | | | 1.79 | | Lucerne Park Road. The peak pond | |
| **FDOT 10 yr, 1 hr** | 4.45 | 129.23 | **FDOT 50 yr, 8 hr** | 4.58 | 129.80 | stage for the 100 yr., 8 hr. event did | |
| | 0.31 | | | 1.91 | | not increase and all post discharge | |
| **FDOT 10 yr, 2 hr** | 3.95 | 129.39 | **FDOT 50 yr, 24 hr** | 1.52 | 129.58 | rates for all storm events were less | |
| | 0.66 | | | 1.20 | | than the pre-development values. | |
| **FDOT 10 yr, 4 hr** | 2.76 | 129.53 | **FDOT 50 yr, 72 hr** | 1.01 | 129.49 | Grate overflow set at 130.0 is | |
| | 1.04 | | | 0.93 | | slightly above the routed peak | |

| | | |
|---|---|---|
| **FDOT 100 yr, 1 hr** | 7.67<br>1.20 | 129.58 |
| **FDOT 100 yr, 2 hr** | 6.75<br>1.63 | 129.72 |
| **FDOT 100 yr, 4 hr** | 4.42<br>1.14 | 129.86 |
| **FDOT 100 yr, 8 hr** | 5.13<br>2.23 | 129.89 |
| **FDOT 100 yr, 24 hr** | 1.67<br>1.34 | 129.63 |
| **FDOT 100 yr, 72 hr** | 1.19<br>1.10 | 129.55 |

MAX stage of 129.89 for the 100 yr., 8 hr. event.

## Simple Basin: POST

| | |
|---|---|
| Scenario: | Scenario1 |
| Node: | POND 1 |
| 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: | 1.7700 ac |
| Curve Number: | 95.0 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

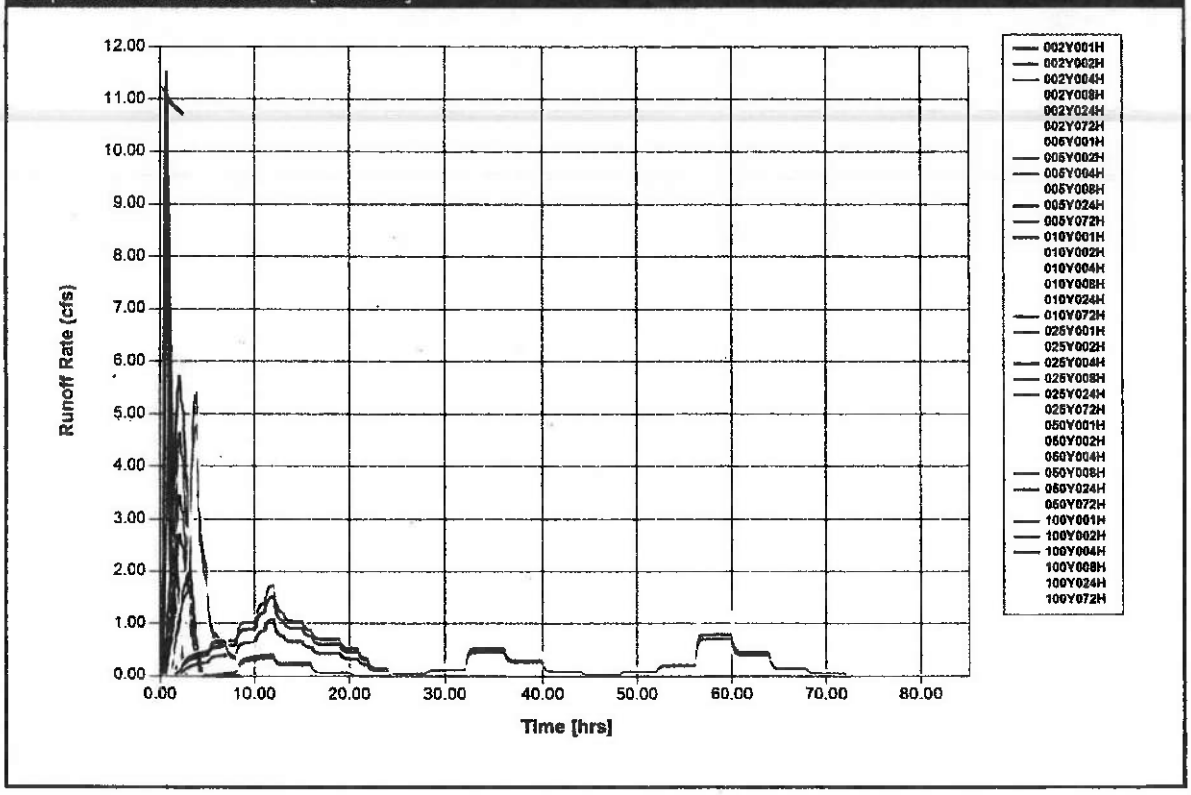
Comment:

### Simple Basin Runoff Summary [Scenario1]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| POST | 002Y001H | 5.61 | 0.6500 | 2.40 | 1.86 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 002Y002H | 4.48 | 0.8333 | 2.80 | 2.25 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 002Y004H | 2.71 | 2.0500 | 3.30 | 2.74 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 002Y008H | 2.73 | 4.0000 | 3.80 | 3.23 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 002Y024H | 0.84 | 12.0000 | 4.90 | 4.32 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 002Y072H | 0.52 | 59.9167 | 6.00 | 5.41 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y001H | 7.01 | 0.6500 | 2.90 | 2.35 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y002H | 5.80 | 0.8333 | 3.50 | 2.94 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y004H | 3.44 | 2.0500 | 4.10 | 3.53 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y008H | 3.49 | 4.0000 | 4.80 | 4.22 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y024H | 1.08 | 12.0000 | 6.20 | 5.60 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 005Y072H | 0.70 | 59.9167 | 8.00 | 7.39 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y001H | 7.86 | 0.6500 | 3.20 | 2.64 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y002H | 6.55 | 0.8333 | 3.90 | 3.33 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y004H | 3.99 | 2.0333 | 4.70 | 4.12 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y008H | 4.10 | 4.0000 | 5.60 | 5.01 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y024H | 1.30 | 12.0000 | 7.40 | 6.80 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 010Y072H | 0.79 | 59.9167 | 9.00 | 8.39 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y001H | 9.27 | 0.6500 | 3.70 | 3.13 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y002H | 7.68 | 0.8333 | 4.50 | 3.92 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y004H | 4.63 | 2.0333 | 5.40 | 4.81 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y008H | 4.79 | 4.0000 | 6.50 | 5.90 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y024H | 1.51 | 12.0000 | 8.60 | 7.99 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 025Y072H | 0.92 | 59.9167 | 10.50 | 9.88 | 1.7700 | 95.0 | 0.00 | 0.00 |

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| POST | 050Y001H | 10.39 | 0.6500 | 4.10 | 3.53 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 050Y002H | 8.61 | 0.8333 | 5.00 | 4.41 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 050Y004H | 5.18 | 2.0333 | 6.00 | 5.41 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 050Y008H | 5.39 | 4.0000 | 7.30 | 6.70 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 050Y024H | 1.73 | 12.0000 | 9.80 | 9.18 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 050Y072H | 1.06 | 59.9167 | 12.00 | 11.38 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y001H | 11.52 | 0.6333 | 4.50 | 3.92 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y002H | 9.55 | 0.8333 | 5.50 | 4.91 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y004H | 5.72 | 2.0333 | 6.60 | 6.00 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y008H | 5.92 | 4.0000 | 8.00 | 7.39 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y024H | 1.87 | 12.0000 | 10.60 | 9.98 | 1.7700 | 95.0 | 0.00 | 0.00 |
| POST | 100Y072H | 1.23 | 59.9167 | 14.00 | 13.37 | 1.7700 | 95.0 | 0.00 | 0.00 |

Simple Basin Runoff Rate: POST [Scenario1]



## Simple Basin: PRE_Greenland

| | |
|---|---|
| Scenario: | Scenario1 |
| Node: | PRE |
| 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: | 1.7700 ac |
| Curve Number: | 80.0 |
| % Impervious: | 0.00 |
| % DCIA: | 0.00 |
| % Direct: | 0.00 |
| Rainfall Name: | |

Comment:

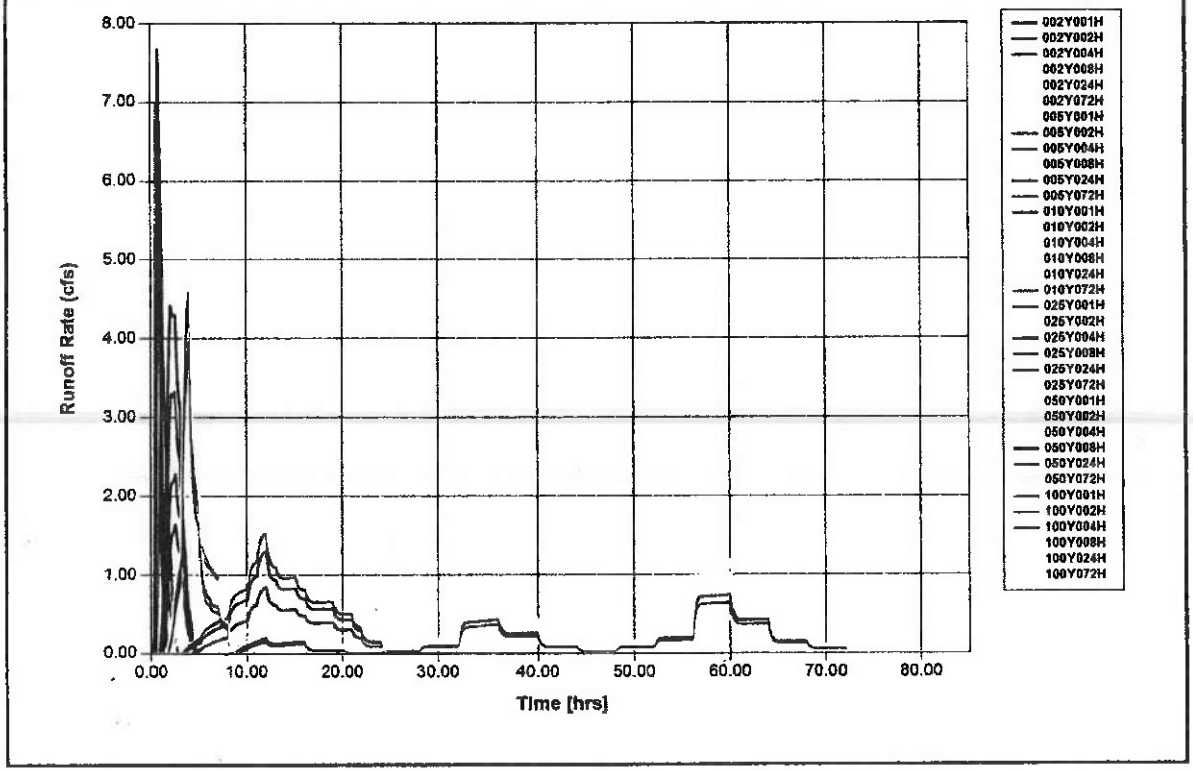
Simple Basin Runoff Summary [Scenario1]

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| PRE_Greenland | 002Y001H | 2.66 | 0.7333 | 2.40 | 0.82 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 002Y002H | 2.20 | 0.8833 | 2.80 | 1.10 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 002Y004H | 1.64 | 2.5167 | 3.30 | 1.48 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 002Y008H | 1.84 | 4.0167 | 3.80 | 1.88 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 002Y024H | 0.60 | 12.0000 | 4.90 | 2.80 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 002Y072H | 0.46 | 59.9500 | 6.00 | 3.78 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y001H | 3.75 | 0.7167 | 2.90 | 1.17 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y002H | 3.29 | 0.8833 | 3.50 | 1.63 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y004H | 2.27 | 2.5167 | 4.10 | 2.12 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y008H | 2.61 | 4.0167 | 4.80 | 2.72 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y024H | 0.85 | 12.0000 | 6.20 | 3.96 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 005Y072H | 0.65 | 59.9333 | 8.00 | 5.62 | 1.7700 | 80.0 | 0.00 | 0.00 |

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| PRE_Greenland | 010Y001H | 4.45 | 0.7000 | 3.20 | 1.40 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 010Y002H | 3.95 | 0.8667 | 3.90 | 1.96 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 010Y004H | 2.76 | 2.5000 | 4.70 | 2.63 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 010Y008H | 3.23 | 4.0167 | 5.60 | 3.42 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 010Y024H | 1.07 | 12.0000 | 7.40 | 5.06 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 010Y072H | 0.74 | 59.9333 | 9.00 | 6.56 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y001H | 5.65 | 0.7000 | 3.70 | 1.79 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y002H | 4.98 | 0.8667 | 4.50 | 2.46 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y004H | 3.33 | 2.5000 | 5.40 | 3.24 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y008H | 3.94 | 4.0000 | 6.50 | 4.23 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y024H | 1.30 | 12.0000 | 8.60 | 6.18 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 025Y072H | 0.88 | 59.9333 | 10.50 | 7.99 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y001H | 6.65 | 0.6833 | 4.10 | 2.12 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y002H | 5.86 | 0.8667 | 5.00 | 2.89 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y004H | 3.86 | 2.0667 | 6.00 | 3.78 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y008H | 4.58 | 4.0000 | 7.30 | 4.97 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y024H | 1.52 | 12.0000 | 9.80 | 7.32 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 050Y072H | 1.01 | 59.9167 | 12.00 | 9.44 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 100Y001H | 7.67 | 0.6833 | 4.50 | 2.46 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 100Y002H | 6.75 | 0.8667 | 5.50 | 3.33 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 100Y004H | 4.42 | 2.0667 | 6.60 | 4.32 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 100Y008H | 5.13 | 4.0000 | 8.00 | 5.62 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Greenland | 100Y024H | 1.67 | 12.0000 | 10.60 | 8.09 | 1.7700 | 80.0 | 0.00 | 0.00 |
| PRE_Gree | 100Y072H | 1.19 | 59.9167 | 14.00 | 11.38 | 1.7700 | 80.0 | 0.00 | 0.00 |

| Basin Name | Sim Name | Max Flow [cfs] | Time to Max Flow [hrs] | Total Rainfall [in] | Total Runoff [in] | Area [ac] | Equivalent Curve Number | % Imperv | % DCIA |
|---|---|---|---|---|---|---|---|---|---|
| nland | | | | | | | | | |

Simple Basin Runoff Rate: PRE_Greenland [Scenario1]



Node: POND 1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.80 ft
Warning Stage: 130.90 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|---|---|---|
| 126.50 | 0.1100 | 4792 |
| 127.80 | 0.1400 | 6098 |
| 129.30 | 0.4000 | 17424 |
| 129.50 | 0.4300 | 18731 |
| 130.00 | 0.5100 | 22216 |
| 130.90 | 0.6700 | 29185 |

Comment: Pond bottom excavated to 126.5 and seasonal high water table elevation set at 127.8. Warning stage is set at top of pond of 130.9.

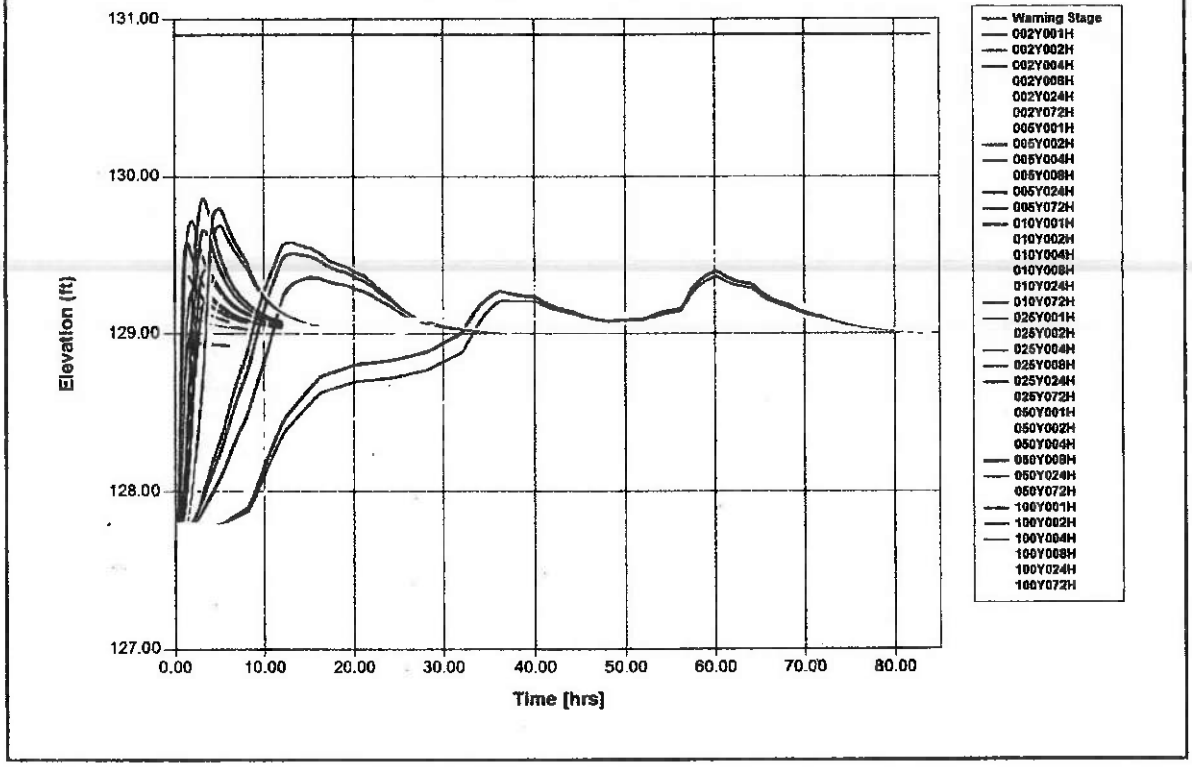
Node Max Conditions w/ Times [Scenario1]

| 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] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| POND 1 | 002Y001H | 130.90 | 128.94 | 0.0010 | 5.61 | 0.02 1.66 | 14734 | 1.7344 | 1.0186 | 0.6499 | 1.6901 |
| POND 1 | 002Y002H | 130.90 | 129.09 | 0.0010 | 4.48 | 0.09 2.20 | 15854 | 2.4773 | 1.3644 | 0.8339 | 2.4327 |
| POND 1 | 002Y004H | 130.90 | 129.22 | 0.0010 | 2.71 | 0.30 1.64 | 16853 | 3.9234 | 1.7768 | 2.0497 | 3.8873 |
| POND 1 | 002Y008H | 130.90 | 129.25 | 0.0010 | 2.73 | 0.36 1.84 | 17077 | 6.2737 | 3.3106 | 3.9989 | 6.2404 |
| POND 1 | 002Y024H | 130.90 | 129.26 | 0.0010 | 0.84 | 0.38 0.60 | 17146 | 16.2713 | 3.3305 | 12.0001 | 16.2046 |
| POND 1 | 002Y072H | 130.90 | 129.29 | 0.0010 | 0.52 | 0.44 0.46 | 17360 | 60.1647 | 57.2245 | 59.9147 | 60.1480 |
| POND 1 | 005Y001H | 130.90 | 129.13 | 0.0010 | 7.01 | 0.14 3.75 | 16156 | 1.5596 | 0.4143 | 0.6500 | 1.5527 |
| POND 1 | 005Y002H | 130.90 | 129.29 | 0.0010 | 5.80 | 0.44 3.29 | 17364 | 2.1859 | 0.9959 | 0.8334 | 2.1669 |
| POND 1 | 005Y004H | 130.90 | 129.41 | -0.0010 | 3.44 | 0.71 2.27 | 18138 | 3.6193 | 4.1655 | 2.0493 | 3.6104 |
| POND 1 | 005Y008H | 130.90 | 129.43 | 0.0010 | 3.49 | 0.77 2.61 | 18287 | 5.3124 | 1.6711 | 3.9998 | 5.2918 |
| POND 1 | 005Y024H | 130.90 | 129.36 | 0.0010 | 1.08 | 0.59 0.85 | 17818 | 15.2322 | 11.0589 | 11.9983 | 15.2155 |
| POND 1 | 005Y07 | 130.90 | 129.36 | 0.0010 | 0.70 | 0.60 0.65 | 17841 | 60.1382 | 9.6096 | 59.9049 | 60.1382 |

| 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] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2H | | | | | | | | | | |
| POND 1 | 010Y00 1H | 130.90 | 129.23 | 0.0010 | 7.86 | 0.31 4.45 | 16879 | 1.4832 | 0.5266 | 0.6498 | 1.4654 |
| POND 1 | 010Y00 2H | 130.90 | 129.39 | 0.0010 | 6.55 | 0.66 3.45 | 18003 | 2.1269 | 1.2950 | 0.8336 | 2.1087 |
| POND 1 | 010Y00 4H | 130.90 | 129.53 | -0.0010 | 3.99 | 1.04 2.76 | 18936 | 3.4921 | 4.7358 | 2.0338 | 3.4837 |
| POND 1 | 010Y00 8H | 130.90 | 129.56 | 0.0010 | 4.10 | 1.14 3.23 | 19161 | 5.1765 | 1.2260 | 3.9997 | 5.1642 |
| POND 1 | 010Y02 4H | 130.90 | 129.43 | 0.0010 | 1.30 | 0.78 1.01 | 18302 | 15.0550 | 8.5878 | 11.9956 | 14.9883 |
| POND 1 | 010Y07 2H | 130.90 | 129.40 | 0.0010 | 0.79 | 0.68 0.74 | 18061 | 60.1310 | 8.7188 | 59.9143 | 60.1143 |
| POND 1 | 025Y00 1H | 130.90 | 129.37 | 0.0010 | 9.27 | 0.62 5.05 | 17901 | 1.4044 | 0.5638 | 0.6500 | 1.3931 |
| POND 1 | 025Y00 2H | 130.90 | 129.52 | 0.0010 | 7.68 | 1.01 4.48 | 18868 | 2.0535 | 1.0440 | 0.8334 | 2.0446 |
| POND 1 | 025Y00 4H | 130.90 | 129.66 | 0.0010 | 4.63 | 1.44 3.33 | 19840 | 3.3393 | 1.3782 | 2.0334 | 3.3196 |
| POND 1 | 025Y00 8H | 130.90 | 129.69 | 0.0010 | 4.79 | 1.55 3.14 | 20071 | 5.1121 | 3.1675 | 3.9997 | 5.1121 |
| POND 1 | 025Y02 4H | 130.90 | 129.51 | 0.0010 | 1.51 | 0.99 1.30 | 18817 | 13.1888 | 2.8580 | 11.9992 | 13.1555 |
| POND 1 | 025Y07 2H | 130.90 | 129.45 | 0.0010 | 0.92 | 0.81 0.88 | 18375 | 60.1203 | 8.8867 | 59.9036 | 60.1036 |
| POND 1 | 050Y00 1H | 130.90 | 129.48 | 0.0010 | 10.39 | 0.90 6.05 | 18603 | 1.3617 | 0.3463 | 0.6499 | 1.3523 |
| POND 1 | 050Y00 2H | 130.90 | 129.62 | 0.0010 | 8.61 | 1.32 5.86 | 19571 | 1.9673 | 0.6666 | 0.8333 | 1.9588 |
| POND 1 | 050Y00 4H | 130.90 | 129.76 | 0.0010 | 5.18 | 1.79 3.86 | 20563 | 3.2744 | 2.3941 | 2.0338 | 3.2572 |
| POND 1 | 050Y00 8H | 130.90 | 129.80 | 0.0010 | 5.39 | 1.91 4.58 | 20809 | 5.0762 | 3.3422 | 3.9997 | 5.0631 |
| POND 1 | 050Y02 4H | 130.90 | 129.58 | 0.0010 | 1.73 | 1.20 1.55 | 19311 | 13.0542 | 2.3418 | 11.9937 | 13.0042 |
| POND 1 | 050Y07 2H | 130.90 | 129.49 | -0.0010 | 1.06 | 0.93 1.01 | 18675 | 60.1193 | 64.5143 | 59.9026 | 60.1026 |
| POND 1 | 100Y00 1H | 130.90 | 129.58 | 0.0010 | 11.52 | 1.20 7.67 | 19303 | 1.3333 | 0.4327 | 0.6335 | 1.3238 |
| POND 1 | 100Y00 2H | 130.90 | 129.72 | 0.0010 | 9.55 | 1.63 6.75 | 20242 | 1.8941 | 0.9082 | 0.8332 | 1.8797 |
| POND 1 | 100Y00 4H | 130.90 | 129.86 | 0.0010 | 5.72 | 2.14 4.42 | 21245 | 3.2358 | 2.1080 | 2.0337 | 3.2190 |
| POND 1 | 100Y00 8H | 130.90 | 129.89 | -0.0010 | 5.92 | 2.23 5.13 | 21414 | 5.0409 | 5.5090 | 3.9992 | 5.0409 |

| 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] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| POND 1 | 100Y024H | 130.90 | 129.63 | 0.0010 | 1.87 | 1.34 1.67 | 19617 | 12.6835 | 6.8687 | 11.9941 | 12.6230 |
| POND 1 | 100Y072H | 130.90 | 129.55 | 0.0010 | 1.23 | 1.10 1.19 | 19076 | 60.1228 | 8.1650 | 59.9062 | 60.1062 |

Node Stage w/Warning Stage: POND 1 [Scenario1]



| Drop Structure Link: Pond 1 Outfall | | Upstream Pipe | | Downstream Pipe | |
|---|---|---|---|---|---|
| Scenario: | Scenario1 | Invert: | 126.50 ft | Invert: | 124.00 ft |
| From Node: | POND 1 | Manning's N: | 0.0130 | Manning's N: | 0.0130 |
| To Node: | POST | Geometry: | Circular | Geometry: | Circular |
| Link Count: | 1 | Max Depth: | 1.50 ft | Max Depth: | 1.50 ft |
| Flow Direction: | Both | Bottom Clip | | | |
| Solution: | Combine | Default: | 0.00 ft | Default: | 0.00 ft |
| Increments: | 0 | Op Table: | | Op Table: | |
| Pipe Count: | 1 | Ref Node: | | Ref Node: | |
| Damping: | 0.0000 ft | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Length: | 40.00 ft | Top Clip | | | |
| FHWA Code: | 1 | Default: | 0.00 ft | Default: | 0.00 ft |
| Entr Loss Coef: | 0.50 | Op Table: | | Op Table: | |
| Exit Loss Coef: | 1.00 | Ref Node: | | Ref Node: | |
| Bend Loss Coef: | 0.00 | Manning's N: | 0.0000 | Manning's N: | 0.0000 |
| Bend Location: | 0.00 dec | | | | |
| Energy Switch: | Energy | | | | |

Pipe Comment:

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 1 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | Top Clip | |
| Weir Type: | Sharp Crested Vertical | Default: | 0.00 ft |
| Geometry Type: | Rectangular | Op Table: | |
| Invert: | 129.00 ft | Ref Node: | |
| Control Elevation: | 129.00 ft | Discharge Coefficients | |
| Max Depth: | 999.00 ft | Weir Default: | 3.200 |
| Max Width: | 0.83 ft | Weir Table: | |
| Fillet: | 0.00 ft | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment: Weir slot- set to 10"

| Weir Component | | Bottom Clip | |
|---|---|---|---|
| Weir: | 2 | Default: | 0.00 ft |
| Weir Count: | 1 | Op Table: | |
| Weir Flow Direction: | Both | Ref Node: | |
| Damping: | 0.0000 ft | Top Clip | |
| Weir Type: | Sharp Crested Vertical | Default: | 0.00 ft |
| Geometry Type: | Circular | Op Table: | |
| Invert: | 127.80 ft | Ref Node: | |
| Control Elevation: | 127.80 ft | Discharge Coefficients | |
| Max Depth: | 0.06 ft | Weir Default: | 3.200 |
| | | Weir Table: | |
| | | Orifice Default: | 0.600 |
| | | Orifice Table: | |

Weir Comment: 3/4" diameter orifice slot set at the SHWL of 127.8.

| Weir Component | |
|---|---|
| Weir: | 3 |
| Weir Count: | 1 |
| Weir Flow Direction: | Both |
| Damping: | 0.0000 ft |
| Weir Type: | Horizontal |
| Geometry Type: | Rectangular |
| Invert: | 130.00 ft |
| Control Elevation: | 130.00 ft |
| Max Depth: | 2.00 ft |
| Max Width: | 3.00 ft |
| Fillet: | 0.00 ft |

| Bottom Clip | |
|---|---|
| Default: | 0.00 ft |
| Op Table: | |
| Ref Node: | |

| Top Clip | |
|---|---|
| Default: | 0.00 ft |
| Op Table: | |
| Ref Node: | |

| Discharge Coefficients | |
|---|---|
| Weir Default: | 3.200 |
| Weir Table: | |
| Orifice Default: | 0.600 |
| Orifice Table: | |

Weir Comment: Type C inlet grate top at 130.0; top of pond is 130.9

Drop Structure Comment:

Link Min/Max Conditions [Scenario1]

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pond 1 Outfall - Pipe | 002Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 002Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 2 | 002Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 002Y002H | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 002Y002H | 0.07 | 0.00 | 0.00 | 0.97 | 0.97 | 0.97 |
| Pond 1 Outfall - Weir: 2 | 002Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 002Y004H | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pond 1 Outfall - Weir: 1 | 002Y004H | 0.28 | 0.00 | 0.00 | 1.52 | 1.52 | 1.52 |
| Pond 1 Outfall - Weir: 2 | 002Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 002Y008H | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 002Y008H | 0.34 | 0.00 | 0.00 | 1.61 | 1.61 | 1.61 |
| Pond 1 Outfall - Weir: 2 | 002Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 002Y024H | 0.38 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 002Y024H | 0.36 | 0.00 | 0.00 | 1.64 | 1.64 | 1.64 |
| Pond 1 Outfall - Weir: 2 | 002Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 002Y072H | 0.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 002Y072H | 0.42 | 0.00 | 0.00 | 1.73 | 1.73 | 1.73 |
| Pond 1 Outfall - Weir: 2 | 002Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 002Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y001H | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y001H | 0.13 | 0.00 | 0.00 | 1.16 | 1.16 | 1.16 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pond 1 Outfall - Weir: 2 | 005Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 005Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y002H | 0.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y002H | 0.42 | 0.00 | 0.00 | 1.73 | 1.73 | 1.73 |
| Pond 1 Outfall - Weir: 2 | 005Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 005Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y004H | 0.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y004H | 0.70 | 0.00 | 0.00 | 2.05 | 2.05 | 2.05 |
| Pond 1 Outfall - Weir: 2 | 005Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 005Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y008H | 0.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y008H | 0.75 | 0.00 | 0.00 | 2.10 | 2.10 | 2.10 |
| Pond 1 Outfall - Weir: 2 | 005Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 005Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y024H | 0.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y024H | 0.57 | 0.00 | 0.00 | 1.92 | 1.92 | 1.92 |
| Pond 1 Outfall - Weir: 2 | 005Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pond 1 Outfall - Weir: 3 | 005Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 005Y072H | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 005Y072H | 0.58 | 0.00 | 0.00 | 1.93 | 1.93 | 1.93 |
| Pond 1 Outfall - Weir: 2 | 005Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 005Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 010Y001H | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y001H | 0.29 | 0.00 | 0.00 | 1.53 | 1.53 | 1.53 |
| Pond 1 Outfall - Weir: 2 | 010Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 010Y002H | 0.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y002H | 0.64 | 0.00 | 0.00 | 1.99 | 1.99 | 1.99 |
| Pond 1 Outfall - Weir: 2 | 010Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 010Y004H | 1.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y004H | 1.02 | 0.00 | 0.00 | 2.33 | 2.33 | 2.33 |
| Pond 1 Outfall - Weir: 2 | 010Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

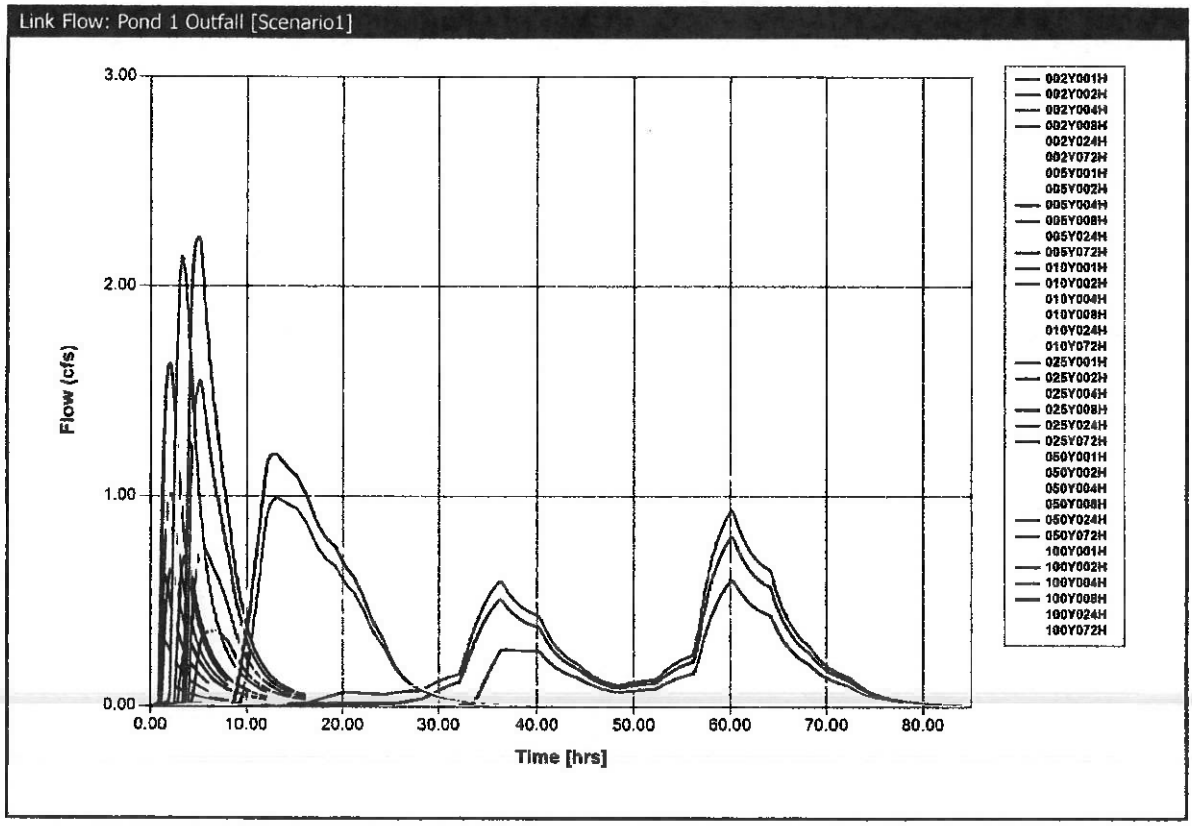
| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Pond 1 Outfall - Pipe | 010Y008H | 1.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y008H | 1.12 | 0.00 | 0.00 | 2.40 | 2.40 | 2.40 |
| Pond 1 Outfall - Weir: 2 | 010Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 010Y024H | 0.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y024H | 0.76 | 0.00 | 0.00 | 2.11 | 2.11 | 2.11 |
| Pond 1 Outfall - Weir: 2 | 010Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 010Y072H | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 010Y072H | 0.67 | 0.00 | 0.00 | 2.02 | 2.02 | 2.02 |
| Pond 1 Outfall - Weir: 2 | 010Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 010Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y001H | 0.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 025Y001H | 0.60 | 0.00 | 0.00 | 1.95 | 1.95 | 1.95 |
| Pond 1 Outfall - Weir: 2 | 025Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 025Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y002H | 1.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 | 025Y002H | 0.99 | 0.00 | 0.00 | 2.31 | 2.31 | 2.31 |

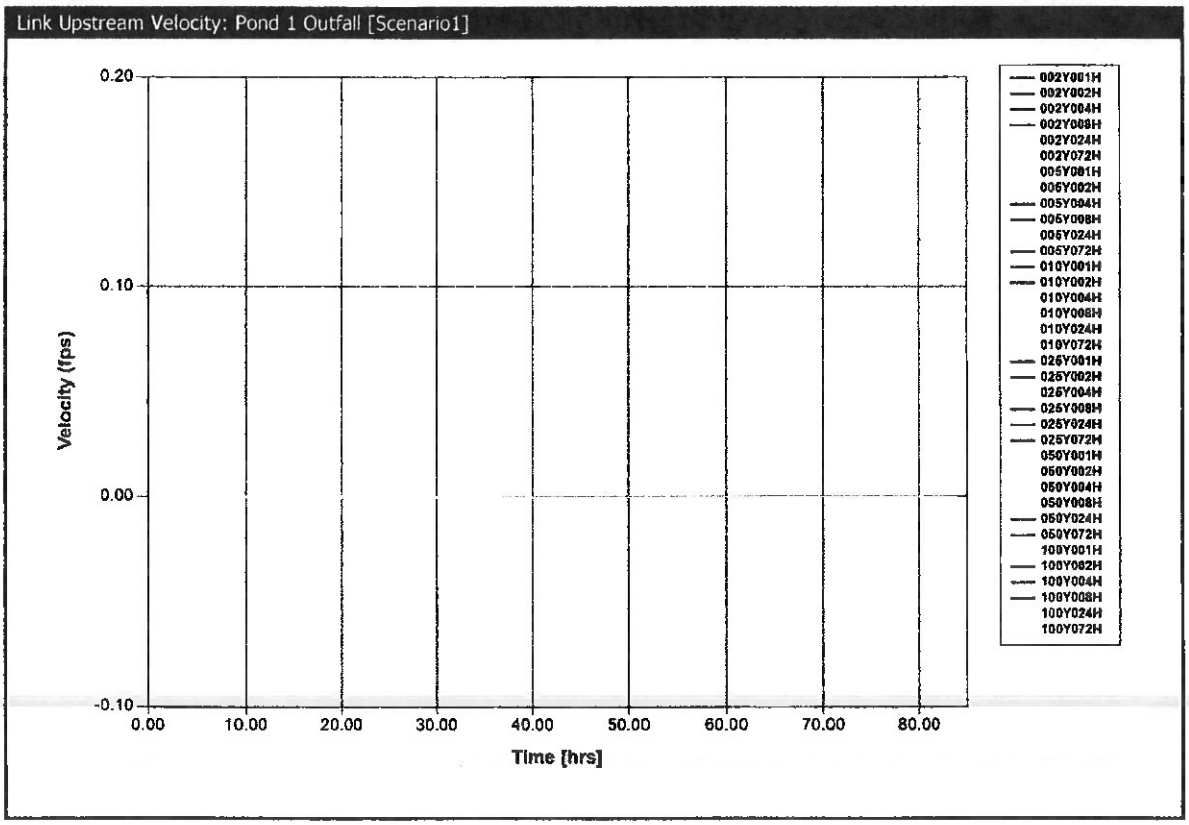
| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Outfall - Weir: 1 | | | | | | | |
| Pond 1 Outfall - Weir: 2 | 025Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 025Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y004H | 1.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 025Y004H | 1.42 | 0.00 | 0.00 | 2.60 | 2.60 | 2.60 |
| Pond 1 Outfall - Weir: 2 | 025Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 025Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y008H | 1.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 025Y008H | 1.53 | 0.00 | 0.00 | 2.66 | 2.66 | 2.66 |
| Pond 1 Outfall - Weir: 2 | 025Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 025Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y024H | 0.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 025Y024H | 0.97 | 0.00 | 0.00 | 2.29 | 2.29 | 2.29 |
| Pond 1 Outfall - Weir: 2 | 025Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 025Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 025Y072H | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 025Y072H | 0.79 | 0.00 | 0.00 | 2.14 | 2.14 | 2.14 |
| Pond 1 | 025Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Outfall - Weir: 2 | | | | | | | |
| Pond 1 Outfall - Weir: 3 | 025Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 050Y001H | 0.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y001H | 0.88 | 0.00 | 0.00 | 2.22 | 2.22 | 2.22 |
| Pond 1 Outfall - Weir: 2 | 050Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 050Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 050Y002H | 1.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y002H | 1.30 | 0.00 | 0.00 | 2.52 | 2.52 | 2.52 |
| Pond 1 Outfall - Weir: 2 | 050Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 050Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 050Y004H | 1.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y004H | 1.77 | 0.00 | 0.00 | 2.79 | 2.79 | 2.79 |
| Pond 1 Outfall - Weir: 2 | 050Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 050Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 050Y008H | 1.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y008H | 1.89 | 0.00 | 0.00 | 2.86 | 2.86 | 2.86 |
| Pond 1 Outfall - Weir: 2 | 050Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 | 050Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Outfall - Weir: 3 | | | | | | | |
| Pond 1 Outfall - Pipe | 050Y024H | 1.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y024H | 1.18 | 0.00 | 0.00 | 2.44 | 2.44 | 2.44 |
| Pond 1 Outfall - Weir: 2 | 050Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 050Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 050Y072H | 0.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 050Y072H | 0.91 | 0.00 | 0.00 | 2.24 | 2.24 | 2.24 |
| Pond 1 Outfall - Weir: 2 | 050Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 050Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 100Y001H | 1.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 100Y001H | 1.18 | 0.00 | 0.00 | 2.44 | 2.44 | 2.44 |
| Pond 1 Outfall - Weir: 2 | 100Y001H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y001H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 100Y002H | 1.63 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 100Y002H | 1.61 | 0.00 | 0.00 | 2.71 | 2.71 | 2.71 |
| Pond 1 Outfall - Weir: 2 | 100Y002H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y002H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 | 100Y004H | 2.14 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 |

| Link Name | Sim Name | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Max Avg Velocity [fps] |
|---|---|---|---|---|---|---|---|
| Outfall - Pipe | | | | | | | |
| Pond 1 Outfall - Weir: 1 | 100Y004H | 2.12 | 0.00 | 0.00 | 2.97 | 2.97 | 2.97 |
| Pond 1 Outfall - Weir: 2 | 100Y004H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y004H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 100Y008H | 2.23 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 100Y008H | 2.21 | 0.00 | 0.00 | 3.01 | 3.01 | 3.01 |
| Pond 1 Outfall - Weir: 2 | 100Y008H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y008H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 100Y024H | 1.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 100Y024H | 1.32 | 0.00 | 0.00 | 2.53 | 2.53 | 2.53 |
| Pond 1 Outfall - Weir: 2 | 100Y024H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y024H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Pipe | 100Y072H | 1.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 1 | 100Y072H | 1.08 | 0.00 | 0.00 | 2.37 | 2.37 | 2.37 |
| Pond 1 Outfall - Weir: 2 | 100Y072H | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pond 1 Outfall - Weir: 3 | 100Y072H | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |


Link Flow: Pond 1 Outfall [Scenario1]
Flow (cfs)
3.00
2.00
1.00
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Time [hrs]
002Y001H
002Y002H
002Y004H
002Y008H
002Y024H
002Y072H
005Y001H
005Y002H
005Y004H
005Y008H
005Y024H
005Y072H
010Y001H
010Y002H
010Y004H
010Y008H
010Y024H
010Y072H
025Y001H
025Y002H
025Y004H
025Y008H
025Y024H
025Y072H
050Y001H
050Y002H
050Y004H
050Y008H
050Y024H
050Y072H
100Y001H
100Y002H
100Y004H
100Y008H
100Y024H
100Y072H


Link Upstream Velocity: Pond 1 Outfall [Scenario1]
0.20
0.10
0.00
-0.10
Velocity (fps)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Time [hrs]
002Y001H
002Y002H
002Y004H
002Y008H
002Y024H
002Y072H
005Y001H
005Y002H
005Y004H
005Y008H
005Y024H
005Y072H
010Y001H
010Y002H
010Y004H
010Y008H
010Y024H
010Y072H
025Y001H
025Y002H
025Y004H
025Y008H
025Y024H
025Y072H
050Y001H
050Y002H
050Y004H
050Y008H
050Y024H
050Y072H
100Y001H
100Y002H
100Y004H
100Y008H
100Y024H
100Y072H

*PERMIT NO. 13706.003*

# Lucerne Loop Road
# Intersection Improvements

# Southwest Florida Water Management District

2379 Broad Street • Brooksville, Florida 34609-6899 • 1-800-423-1476 (Florida Only) or (904) 796-7211 • SUNCOM 628-4150 • T.D.D. Number Only (Florida Only): 1-800-231-6103

7601 Highway 301 North
Tampa, Florida 33637-6759
1-800-836-0797 or (813) 985-7481
SUNCOM 578-2070

170 Century Boulevard
Bartow, Florida 33830-7700
1-800-492-7862 or (941) 534-1448
SUNCOM 572-6200

115 Corporation Way
Venice, Florida 34292-3524
1-800-320-3503 or (941) 483-5970
SUNCOM 549-5970

2303 Highway 44 West
Inverness, Florida 34453-3809
(904) 637-1360

An Equal Opportunity Employer


November 22, 1995


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**Roy G. Harrell, Jr.**
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Land O' Lakes
**Virginia S. Roo**
Tampa

**Peter G. Hubbell**
Executive Director
**Mark D. Farrell**
Assistant Executive Director
**Edward B. Helvenston**
General Counsel


William Gerber, Vice President
Acceptance Insurance Company, Inc.
One Central Park Plaza
222 S. 15th Street, Suite 600 North
Omaha, NE 68102

John H. May, President
May Enterprises, Inc.
560 East Lake Elbert Drive
Winter Haven, FL 33881

Ken Frink, P.E.
City of Winter Haven
P.O. Box 2277
Winter Haven, FL 33883

James R. Wilt, Jr., P.E.
Florida Department of Transportation (District One)
P.O. Box 1249
Bartow, FL 33830

Subject: **Notice of Final Agency Action for Approval**

| | |
|---|---|
| Permit No: | 4013706.00 |
| Project Name: | Improvements to SR 544 and Lucerne Loop Road |
| County: | Polk |
| Sec/Twp/Rge: | 2,11/28S/26E |

Gentlemen:

This letter constitutes notice of Final Agency Action for **approval** of the permit application referenced above. Approval is contingent upon no objection to the permit being received by the District within the time frames described below.

The following statements describe procedures established by Florida law, should you or any other person disagree with the District's decision regarding this permit. State law and District rules provide that any person who is substantially affected by this decision for approval may petition for an administrative hearing in accordance with Section 120.57, Florida Statutes (F.S.), and Part V of Chapter 40D-1, Florida Administrative Code.

A request for hearing must be filed with (received by) the Agency Clerk of the District within 14 days after the date of receipt of this notice.

Failure to file a request for hearing within the 14 day period constitutes a waiver of the right such person has to request a hearing under Section 120.57, F.S. When the actual date of receipt of this notice cannot be determined, receipt is deemed to be the fifth day after the date on which this letter is postmarked.

The enclosed approved construction plans are part of the permit, and construction must be in accordance with these plans.


*Excellence Through Quality Service*


FILE OF RECORD
PERMIT NO. _____

0063

If you have any questions concerning the permit, please contact Jan R. Burke, P.E., at the Bartow Service Office.

Sincerely,

Robert M. Viertel

Robert M. Viertel, P.G., Director
Bartow Regulation Department

RMV:JRB:kmh
Enc. 4: Approved Permit w/Conditions
Construction Plans
Statement of Completion
Notice of Authorization

cc: File of Record, 4013706.00
Douglas M. Darden, P.E., Envisors, Inc.
M. Kehoe

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MANAGEMENT AND STORAGE OF SURFACE WATER
GENERAL CONSTRUCTION
PERMIT NO. 4013706.00

**EXPIRATION DATE:** November 22, 1998

PERMIT ISSUE DATE: November 22, 1995

This permit, issued under the provisions of Chapter 373, Florida Statutes and Florida Administrative Code Rule 40D-40 authorizes the Permittee to perform the work outlined herein and shown by the application, approved drawing(s), plans, and other documents, attached hereto and kept on file at the Southwest Florida Water Management District (District).

PROJECT NAME: Improvements to SR 544 and Lucerne Loop Road

GRANTED TO:

**Acceptance Insurance Company, Inc.**
One Central Park Plaza
222 S. 15th Street, Suite 600 North
Omaha, NE 68102

John H. May, President
May Enterprises, Inc.
560 East Lake Elbert Drive
Winter Haven, FL 33881

Ken Frink, P.E.
City of Winter Haven
Post Office Box 2277
Winter Haven, FL 33883

James R. Wilt, Jr., P.E.
Florida Department of Transportation (District One)
Post Office Box 1249
Bartow, FL 33830

ABSTRACT: This permit authorization is for the construction of a new surface water management system serving a 16.89-acre roadway project as named above and as shown on the approved construction drawings. The construction activities include grading, paving, retention swales and a wet detention pond (Pond No. 540) associated with the improvements to SR 544 and Lucerne Loop Road. The post-development peak discharge rate for a 25-year, 24-hour rainfall event will not exceed the pre-development conditions. Water quality treatment will be provided by three on-line retention swales (510, 520, and 530) through natural infiltration and a wet detention pond system (540).

The project area includes 0.88 acre of forested, waters of the state wetlands, and 0.10 acre of non-forested, isolated wetlands. No wetland impacts are proposed.

OP. & MAINT. ENTITY: City of Winter Haven

PROPERTY LOCATION: Polk County

FILE OF RECORD
PERMIT NO. [redacted]
0006

Permit No. 4013706.00
Project Name: Improvements to SR 544 and Lucerne Loop Road
Page 2

SEC/TWP/RGE: 2,11/28S/26E

TOTAL ACRES OWNED: N/A

PROJECT SIZE: 16.89 Acres

LAND USE: Road Project

DATE APPLICATION FILED: September 26, 1995

AMENDED DATE: N/A

I. Water Quantity/Quality

| POND # | AREA ACRES @ T.O.B. | TREATMENT TYPE |
|---|---|---|
| 510 | 0.08 | Retention |
| 520 | 0.10 | Retention |
| 530 | 0.35 | Retention |
| 540 | 0.79 | Wet Detention |
| TOTAL | 1.32 | |

II. 100-Year Floodplain

| Encroachment (ac-ft): | Compensation (ac-ft): |
|---|---|
| 0.22 | 0.35 |

III. Environmental Considerations

Wetland Information:

| WETLAND # | TOTAL AC. | PRESERVED AC. | TEMPORARILY DISTURBED AC. | PERMANENTLY DESTROYED AC. |
|---|---|---|---|---|
| South of SR 544 | 0.10 | 0.10 | 0.00 | 0.00 |
| North of SR 544 | 0.78 | 0.78 | 0.00 | 0.00 |
| South of SR 544 | 0.06 | 0.06 | 0.00 | 0.00 |
| TOTAL | 0.94 | 0.94 | 0.00 | 0.00 |

0007

Compensation Information:

Comments: No wetland impacts associated with this project.

Conservation easement required: YES ( ) NO (X)

SPECIFIC CONDITIONS

1. If the ownership of the project area covered by the subject permit is divided, with someone other than the Permittee becoming the owner of part of the project area, this permit shall terminate, pursuant to Rule 40D-1.6105, F.A.C. In such situations, each land owner shall obtain a permit (which may be a modification of this permit) for the land owned by that person. This condition shall not apply to the division and sale of lots or units in residential subdivisions or condominiums.

2. The discharges from this system shall meet state water quality standards as set forth in Chapter 62-302 and Rule 62-4.242, F.A.C., for class waters equivalent to the receiving waters.

3. Unless specified otherwise herein, two copies of all information and reports required by this permit shall be submitted to:

   Permit Data Section - Records & Data Department
   Southwest Florida Water Management District
   2379 Broad Street
   Brooksville, Florida 34609-6899

   The permit number, title of report or information and event (for recurring report or information submittal) shall be identified on all information and reports submitted.

4. All construction is prohibited within the permitted project area until the Permittee acquires legal ownership or legal control of the project area as delineated in the permitted construction drawings.

5. The Permittee shall retain the design engineer, or other professional engineer registered in Florida, to conduct on-site observations of construction and assist with the as-built certification requirements of this project. The Permittee shall inform the District in writing of the name, address and phone number of the professional engineer so employed. This information shall be submitted prior to construction.

6. The following boundaries, as shown on the approved construction drawings, shall be clearly delineated on the site prior to initial clearing or grading activities:

   (X) wetland preservation;

   The delineation shall endure throughout the construction period and be readily discernible to construction and District personnel.

7. If limestone bedrock is encountered during construction of the surface water management system, the District must be notified and construction in the affected area shall cease.

8. Within 30 days after completion of construction of the permitted activity, the Permittee shall submit to the Bartow Service Office a written statement of completion and certification by a registered professional engineer or other appropriate individual as authorized by law, utilizing the required Statement of Completion and Request for Transfer to Operation Entity form identified in Chapter 40D-1, F.A.C., and signed, dated, and sealed as-built drawings. The as-built drawings shall identify any deviations from the approved construction drawings.

9. Wetland buffers shall remain in an undisturbed condition except for **approved drainage facility construction/maintenance.**

10. The removal of littoral shelf vegetation (including cattails) from wet detention ponds is prohibited unless otherwise approved by the District. Removal includes dredging, the application of herbicide, cutting, and the introduction of grass carp. Any questions regarding authorized activities within the wet detention ponds shall be addressed to the District's Surface Water Regulation Manager, Bartow Service Office.

11. Wetland boundaries shown on the approved construction drawings shall be binding upon the Permittee and the District.

12. For dry bottom retention systems, the retention area(s) shall become dry within 72 hours after a rainfall event. If a retention area is regularly wet, this situation shall be deemed to be a violation of this permit.

13. The Permittee shall notify the District of any sinkhole development in the surface water management system within 48 hours of discovery and must submit a detailed sinkhole evaluation and repair plan for approval by the District within 30 days of discovery.

14. For the area(s) shown on the construction drawings as proposed construction, a permit modification shall be obtained for any construction in this/these area(s). As a requirement of the permit modification for this/these area(s), the Permittee shall submit a Statement of Completion and As-Built drawings.

15. The operation and maintenance entity shall submit inspection reports in the form required by the District, in accordance with the following schedule.

    ( ) For systems utilizing effluent filtration or exfiltration, the inspections shall be performed 18 months after operation is authorized and every 18 months thereafter.

    (X) For systems utilizing retention or wet detention, the inspections shall be performed two (2) years after operation is authorized and every two (2) years thereafter.

0003

( ) For systems utilizing effluent filtration or exfiltration and retention or wet detention, the inspections shall be performed 18 months after operation is authorized and every 18 months thereafter.

16. The District reserves the right, upon prior notice to the Permittee, to conduct on-site research to assess the pollutant removal efficiency of the surface water management system. The Permittee may be required to cooperate in this regard by allowing on-site access by District representatives, by allowing the installation and operation of testing and monitoring equipment, and by allowing other assistance measures as needed on site.

17. Refer to LIMITING CONDITION No. 4 herein.

**LIMITING AND STANDARD CONDITIONS**

1. The limiting and standard conditions attached hereto as Exhibit "A" are hereby incorporated into this permit by reference and the Permittee shall comply with them.

Robert M. Vierstra 11/22/95
Authorized Signature

0010

**EXHIBIT "A"**

**LIMITING CONDITIONS:**

1. The Permittee shall perform the construction authorized in a manner so as to minimize any adverse impact of the system on fish, wildlife, natural environmental values, and water quality. The Permittee shall institute necessary measures during the construction period, including full compaction of any fill material placed around newly installed structures, to reduce erosion, turbidity, nutrient loading and sedimentation in the receiving waters.

2. Water quality data for the water discharged from the Permittee's property or into the surface waters of the state shall be submitted to the District as required. Parameters to be monitored may include those listed in Chapter 17-3. Analyses shall be performed according to procedures outlined in the current edition of Standard Methods for the Examination of Water and Wastewater by American Public Health Association of Methods for Chemical analyses of Water and Wastes by the U.S. Environmental Protection Agency. If water quality data are required, the Permittee shall provide data as required on volumes of water discharged, including total volume discharged during the days of sampling and total monthly discharges from the property or into surface waters of the state.

3. The Permittee shall comply with all applicable local subdivision regulations and other local requirements. In addition the Permittee shall obtain all necessary Federal, State, local and special district authorizations prior to the start of any construction or alteration of works authorized by this permit.

4. The operation phase of this permit shall not become effective until the owner or his authorized agent certifies that all facilities have been constructed in accordance with the design permitted by the District. Within 30 days after completion of construction of the surface water management system, the Permittee shall submit the certification and notify the District that the facilities are complete. Upon completion of the surface water management system, the Permittee shall request transfer of the permit to the responsible entity approved by the District. The District may inspect the system and require remedial measures as a condition of transfer of the permit.

5. All roads shall be set at or above elevations required by the applicable local governmental flood criteria.

6. All building floors shall be set at or above elevations acceptable to the applicable local government.

7. Off-site discharges during construction and development shall be made only through the facilities authorized by this permit. Water discharged from the project shall be through structures having a mechanism suitable for regulating upstream stages. Stages may be subject to operating schedules satisfactory to the District.

8. No construction authorized herein shall commence until a responsible entity acceptable to the District has been established and has agreed to operate and maintain the system. The entity must be provided with sufficient ownership so that it has control over all water management facilities authorized herein. Upon receipt of written evidence of the satisfaction of this condition, the District will issue an authorization to commence construction.

9. The permit does not convey to the Permittee any property right nor any rights or privileges other than those specified in the permit and Chapter 40D-4.

10. The Permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance or use of any facility authorized by the permit.

11. This permit is issued based on the Permittee's submitted information which reasonably demonstrates that adverse off-site water resource related impacts will not be caused by the completed permit activity. It is also the responsibility of the Permittee to insure that adverse off-site water resource related impacts do not occur during construction.

12. Prior to dewatering, plans shall be submitted to the District for approval. Information shall include as a minimum; pump sizes, locations and hours of operation for each pump. If off-site discharge is proposed, or off-site adverse impacts are evident, an individual water use permit may be required. The Permittee is cautioned that several months may be required for consideration of the water use permit application. Temporary dewatering during construction, i.e., well pointing, ditching, etc. that will not affect adjacent wetlands or off-site lands is exempt from this requirement.

**STANDARD CONDITIONS**

13. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the District.

14. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

15. The Permittee shall at all times properly operate and maintain the systems of treatment and control (and related appurtenances) that are installed or used by the Permittee to achieve compliance with conditions of this permit, as required by District rules.

16. The Permittee, by accepting this permit, specifically agrees to allow authorized District personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted; for the purposes of inspection and testing to determine compliance with this permit and District regulations, such as:

    a. Having access to and copying any records that must be kept under the conditions of the permit;
    b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit;
    c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or District rules; and
    d. Gathering of data and information.

    Reasonable time may depend on the nature of the concern being investigated.

17. The Permittee shall notify the District within 30 days of the sale or transfer of ownership of land on which a surface water management system will be or is located, and request transfer of the permit to the new owner. A surface water management permit to construct or alter a system can be transferred if the new owner agrees to the transfer and the permit has not expired. The District can transfer the operation phase permit provided the project has been properly completed, the new owner meets the rule requirements for operation and maintenance entities and the land use remains the same. This permit is transferable only upon District approval in accordance with Rule 40D-4.351, F.A.C., as applicable. The Permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the District.

18. When requested by the District, the Permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the Permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the District, such facts or information shall be submitted or corrected promptly.

19. Drawings, plans, calculations, specifications or other information submitted by the Permittee, not attached hereto, but retained on file at the District office, are made a part of this permit.

20. The discharges from this system shall meet state water quality standards as set forth in Chapter 62-302 and Rule 62-4.242 for class waters equivalent to the receiving waters.

21. Any water discharged from the site during construction of the project shall meet State water quality standards at the property boundary or point of discharge to wetlands or State waters. If the discharge does not meet these standards, the discharge will be immediately stopped and the District shall be notified of corrective action taken to correct the violation. Turbidity shall not exceed 29 N.T.U. above background level. Turbidity shall be monitored at least daily during discharge, or more often as determined by the project engineer if needed, to ensure compliance.

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22. The Permittee and construction representatives shall assure that erosion and sediment control measures as necessary and as required by Rule 40D-4.091, F.A.C., shall be effectively implemented continuously from beginning of project construction until completion to prevent erosion and transport and discharge of sediment to wetlands or any property other than the project area. Project detention/retention ponds and discharge control structures which are to be constructed as part of the project shall be initially built and maintained continuously during project construction to avoid adverse impact to receiving waters or off site.

23. Except as authorized by this Permit, any further land development, wetlands disturbance or other construction within the total land area of this site will require additional permitting in accordance with Chapters 40D-4, 40D-40 and 40D-45, F.A.C.

24. Construction of the discharge control and water quality treatment facilities which are part of the permitted surface water management system shall be completed and operational prior to beneficial occupancy and use of the project development being served.

25. Any existing wells in the path of construction shall be properly plugged and abandoned by a licensed water well contractor in accordance with Chapter 40D-3, F.A.C.

26. All retention/detention pond side slopes, except over filter media, shall be sodded, and staked as necessary, to prevent erosion. Filter media surfaces shall also be stabilized to prevent erosion, but in a manner that does not restrict infiltration.

27. By issuance of this permit the District, its employees and representatives assume no responsibility and/or liability in regard to either the design, construction or performance of the permitted facilities.

28. Any system alteration, including for augmentation into or withdrawal of water from the permitted system, other than as specifically authorized by this permit will require additional District permitting consideration. The water level of retention and detention ponds shall not be augmented by pumping or diversion of water into the ponds to artificially control their level above the design normal or beginning storage level. Wells and diversion facilities for such augmentation may require water use permitting according to Chapter 40D-2, F.A.C.

29. The excavation of retention/detention ponds is limited to the permitted design elevation(s).

0014

0013

MSW PERMIT ROUTING SLI
SWFWMD BARTOW PERMITTING DEPARTMENT

| MSW PERMIT NO.: | DEFAULT DATE: | INTENDED ISSUE DATE (21 days from complete date) |
|---|---|---|
| 40/3706.00 | Nov 25 | Nov. 28 |

RUSH OR MISC INFO: IMPROVEMENTS TO SR 544 & LUCERNE LOOP ROAD.

| ROUGH DRAFT | INITIALS | DATE SIGNED | FINAL REVIEW | INITIALS | DATE SIGNED |
|---|---|---|---|---|---|
| REVIEW ES opt | MJK | 11-17-95 | REVIEW ES | MJK | 11-21-95 |
| REVIEW PE | | 11/17/95 | REVIEW PE | | 11/21/95 |
| ES SUPERVISOR | | 11/17/95 | ES SUPERVISOR | | 11/21/95 |
| SW SUPERVISOR | | 11/20/95 | SW SUPERVISOR | | 11/21/95 |
| PERMIT COORD | | | | | |
| | | | DEPT DIRECTOR | | |

(✓) APPROVAL ( ) DENIAL (KEEP DISK _____ MOS.)

( ) Noticed General: Contractor's Condition ( ) Yes ( ) No

(✓) General

( ) Mining

( ) Individual/Conceptual ( ) Individual/Construction

Proposed Board Date _____ Last Date Possible _____

( ) Letter Mods: MSW NO. _____ EXP DATE: _____

( ) Permit Mods: MSW NO. _____ EXP DATE: _____

GEN & IND MODS (.01, .02, etc.): Fill in SPEC COND #1 on Project Data Sheet.

I Water Quantity/Quality: ( ) No ponds, see engineer's comments below.

III Env. Considerations: ( ) There are no wetlands within the project area.

Wetlands: ( ) ES Compliance Copy (Worksheets, permit, etc.)

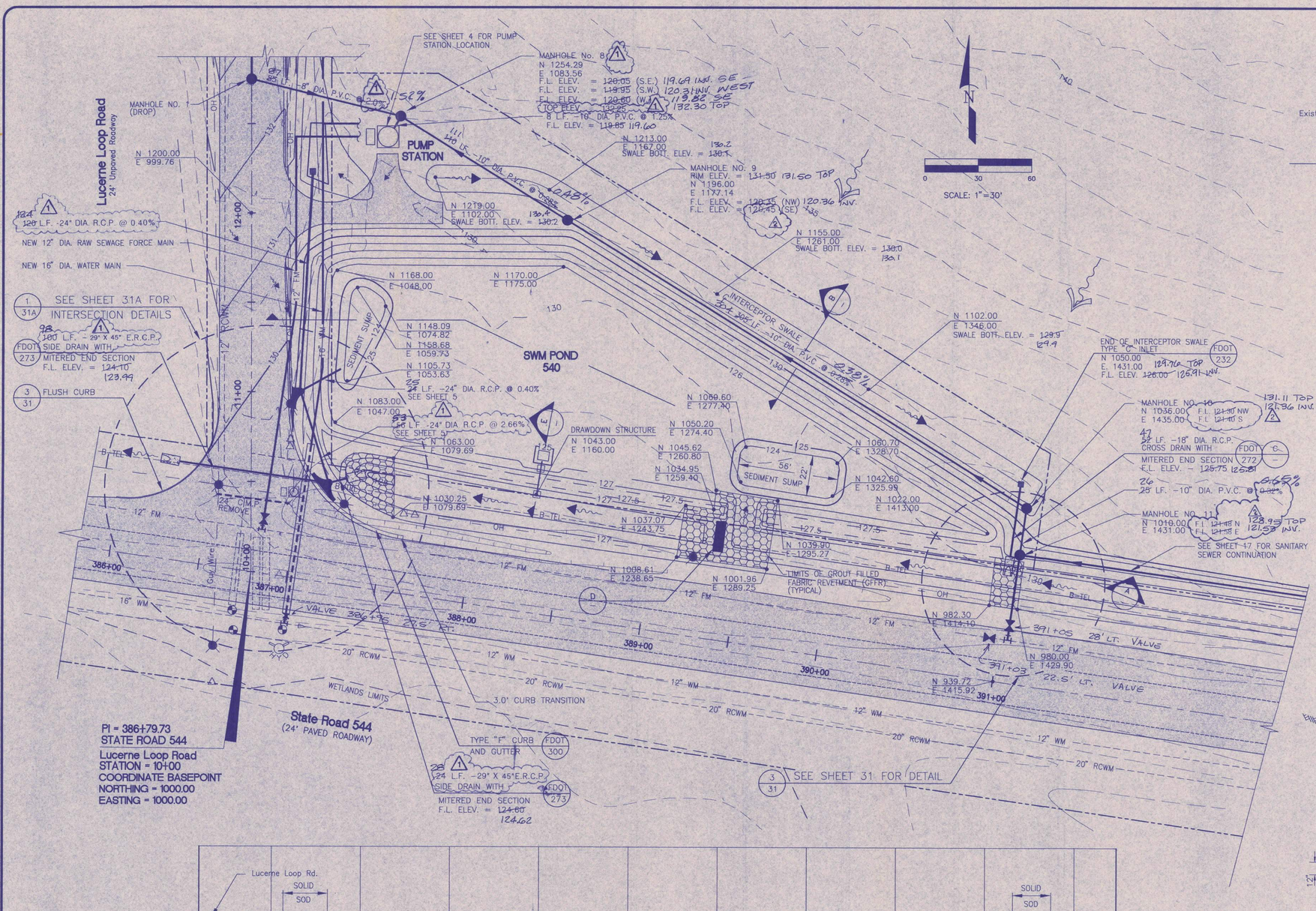
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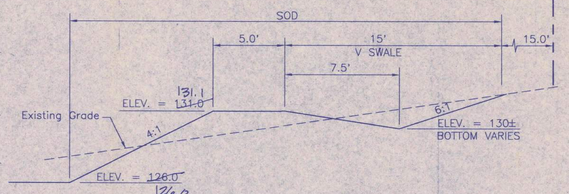
REVIEWER, have you purged your work file for File of Record? ( ) NO (✓) YES

Typist Initials and Date: KH 11/21/95

BPD/cal(06/93)MSWROUTE.FRM

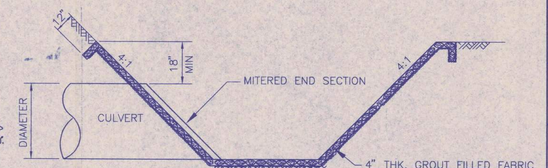
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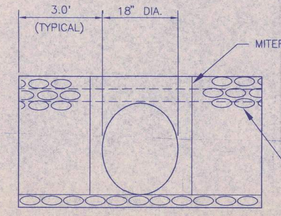


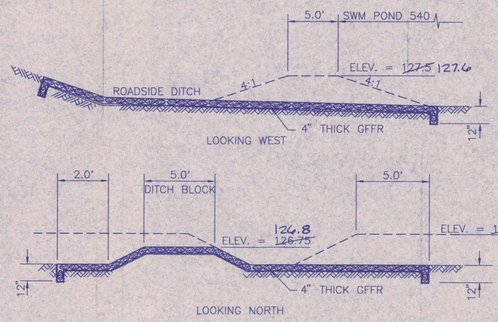

10" DIA. SANITARY SEWER

SECTION (B) NTS

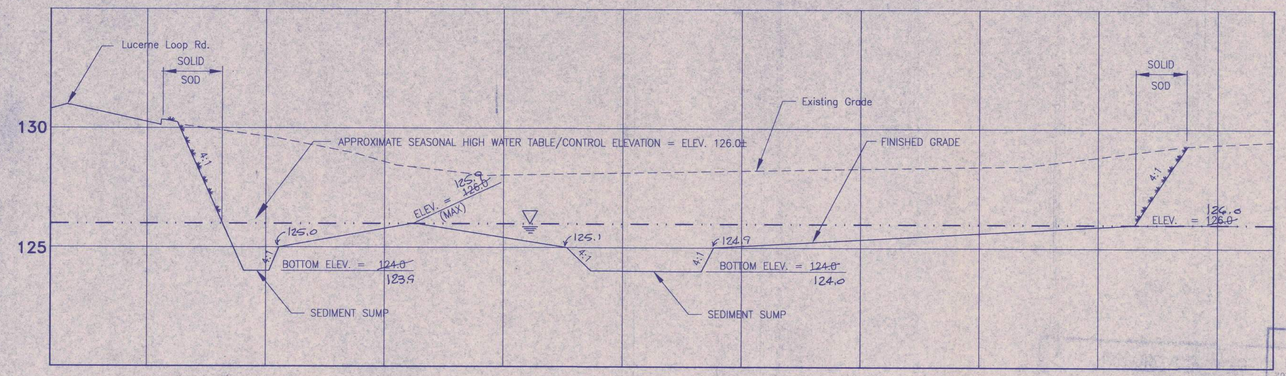



## CULVERT OUTLET EROSION PROTECTION STRUCTURE (C) NTS

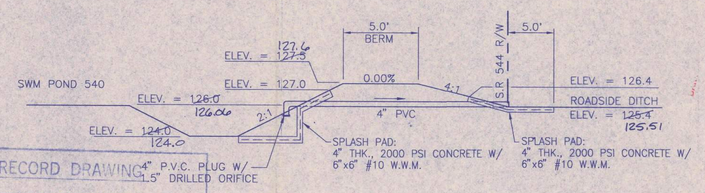



## DITCH BLOCK TREATMENT/DIVERTER STRUCTURE DETAIL (D) NTS




## SECTION (A)

NOTE: SEE LUCERNE LOOP ROAD PROFILE STA. 10+00 TO 12+00 FOR ADDITIONAL CROSS-SECTION INFORMATION




## SECTION AT DRAWDOWN STRUCTURE (E) NTS

RECORD DRAWING
NOTE: The information presented hereon is based upon drawings, specifications, addenda, shop drawings, modifications, etc. supplied by the contractor during the construction period to reflect the as-built parameters of the improvements as constructed.
The Engineer, Envisors, Inc., is not responsible for the accuracy or validity of the Record Drawing information depicted hereon.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
OCT 29 1996
RECEIVED
BARTOW, FLORIDA

THIS DOES NOT CONTAIN EXEMPT INFO

☑ INSPECTION CONDUCTED BY DISTRICT
☐ INSPECTION NOT CONDUCTED BY DISTRICT
RIGHT RESERVED FOR FUTURE INSPECTION

1ST ADDENDUM TO RE-BID

FILE OF RECORD PERMIT NO. 40137706.000

7089POND/10-26-95

| NO. | REVISION DESCRIPTION | BY | CHK | DATE |
|---|---|---|---|---|
| 1 | REVISE PER FDEP COMMENTS | JLF | RWM | 12-14-95 |
| 2 | CHANGED DROP M.H. #8 TO STD. M.H. | FRB | DCL | 11-15-95 |
| 3 | CHANGED E.R.C.P. UNDER LLR TO 29" X 45" | FRB | DCL | 11-14-95 |

DESIGNED RWM/DCL
DRAWN JLF/ZPO
CHECKED RWM
APPROVED DMD
JOB NO. 70895041
DATE NOV. 1995

ENVISORS, Inc
ENGINEERING & SURVEYING
WINTER HAVEN, FLA. (813) 324-1112

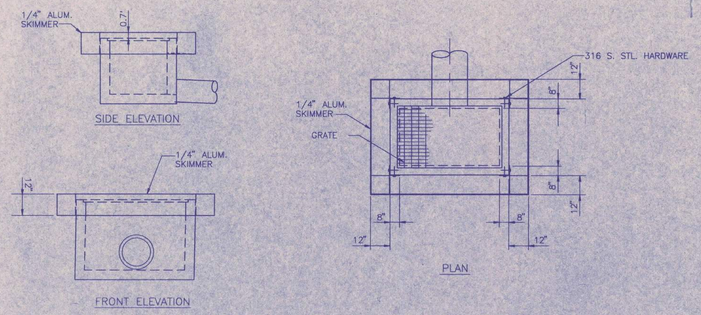
CITY OF WINTER HAVEN
ROAD, WATER, SEWER, AND DRAINAGE IMPROVEMENTS – LUCERNE PARK AREA

STORMWATER RETENTION POND 540

FLORIDA P.E. NO. 44692 DATE 10/21/96

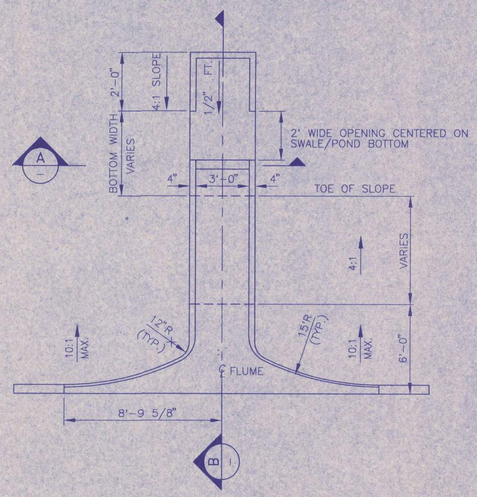
©COPYRIGHT 1995 ENVISORS, INC.

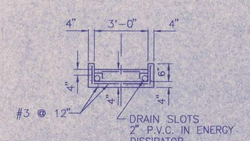
SHEET NO. 13 OF 37 SHEETS



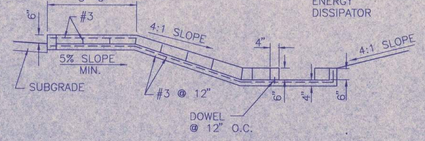

## MODIFICATION TO TYPE 'C' INLET

N.T.S. (1/5) (1/6)



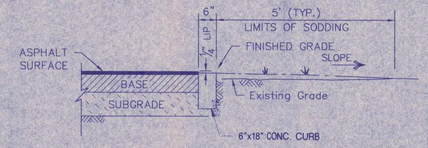

SECTION (A/—)




SECTION (B/—)

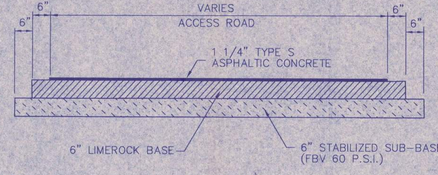
## CONCRETE SPILLWAY

N.T.S. (2/5) (2/6)




## FLUSH CURB

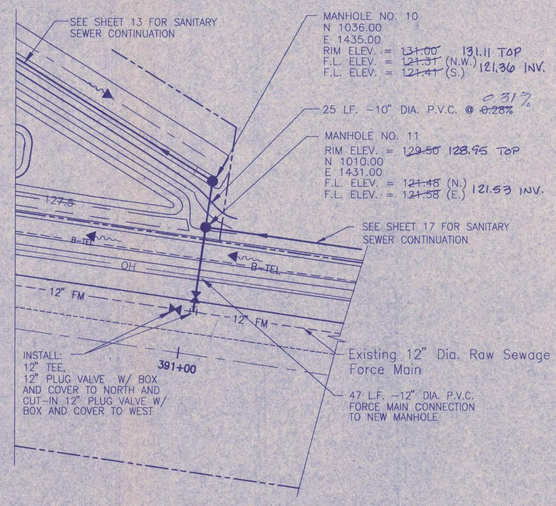
N.T.S. (3/5) (3/6)




SECTION

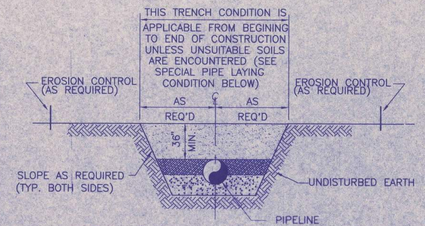
## TYPICAL ACCESS ROAD CONSTRUCTION

N.T.S. (4/5) (4/6)



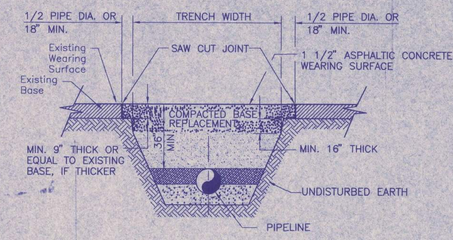

## CONNECTION DETAIL

1"=40' (3/13) (3/17)

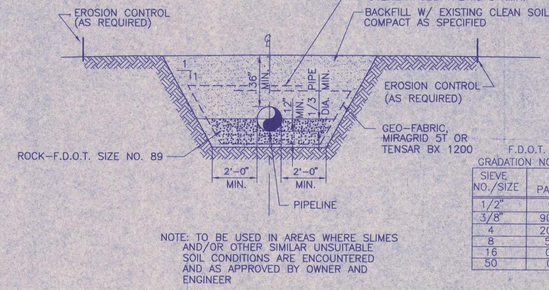



TYPE 4 TRENCH
PIPE BEDDED IN SAND, GRAVEL, OR CRUSHED STONE TO DEPTH OF 1/8 PIPE DIAMETER, 4" MINIMUM. BACKFILL COMPACTED TO TOP OF PIPE: APPROX. 90% STANDARD PROCTOR, AASHTO T-99. (TYPICAL)

## TYPICAL PIPE LAYING CONDITION




## OPEN CUT ASPHALT ROADWAY




F.D.O.T. GRADATION NO. 89

| SIEVE NO./SIZE | % PASSING |
|---|---|
| 1/2" | 100 |
| 3/8" | 90-100 |
| 4 | 20-55 |
| 8 | 5-30 |
| 16 | 0-10 |
| 50 | 0-5 |

NOTE: TO BE USED IN AREAS WHERE SLIMES AND/OR OTHER SIMILAR UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED AND AS APPROVED BY OWNER AND ENGINEER

## SPECIAL PIPE LAYING CONDITION

## TYPICAL TRENCH DETAILS

N.T.S. (5/31A)

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
OCT 29 1996
RECEIVED
BARTOW, FLORIDA

RECORD DRAWING

NOTE: The information presented hereon is based upon drawings, specifications, addenda, shop drawings, modifications, and similar data by the contractor during the construction process to reflect the in-situ parameters of the improvements as constructed.

The Engineer, Envisors, Inc., is not responsible for the accuracy or validity of the Record Drawing information depicted hereon.

© COPYRIGHT 1995 ENVISORS, INC.

| NO. | REVISION DESCRIPTION | BY | CHK | DATE |
|---|---|---|---|---|
| | 70895ET 10-26-95 | | | |

DESIGNED DCL
DRAWN ZPD
CHECKED DCL
APPROVED DMD
JOB NO. 70895041
DATE NOV. 1995

ENVISORS, Inc
ENGINEERING AND SURVEYING
WINTER HAVEN, FLA.
(813) 324-1112

CITY OF WINTER HAVEN
ROAD, WATER, SEWER, AND DRAINAGE IMPROVEMENTS - LUCERNE PARK AREA

STRUCTURES AND DETAILS

FLORIDA P.E. NO. 24945 DATE 10/29/96

SHEET NO. 31

OF 37 SHEETS

SWFWMD ENGINEERING WORKSHEET



PERMIT NO. _____.___

PERMIT NAME ROAD IMPROVEMENTS FOR SR 544 & LLR

| | | | | | | | | | TOTALS | |
|---|---|---|---|---|---|---|---|---|---|---|
| BASIN NO. - POND NO. | | | O OR C | 540 | O | TOTAL | O | | 1 | 1 |
| POND DATA | POND BOTTOM ELEVATION | | | 125.0 | | | | | | |
| | SEASONAL HIGH WATER ELEVATION | | | 126.0 | | | | | | |
| | CONTROL DEVICE ELEVATION | | | 126.0 | | | | | | |
| | DESIGN LOW WATER ELEVATION | | | 126.55 | | | | | | |
| | WEIR INVERT ELEVATION | | | 126.75 | | | | | | |
| | DESIGN HIGH WATER ELEVATION | | | 127.50 | | | | | | |
| | TOP OF BANK ELEVATION | | | 127.50 | | | | | | |
| | AREA AT TOP OF BANK (AC) | | | 0.785 | | | | | 0.785 | 2 |
| | VOLUME AT DHW (AC-FT) | | | 1.103 | | | | | | |
| | VOLUME AT TOB (AC-FT) | | | 1.103 | | | | | | |
| QUANTITY | 25YR/24HR DISCHARGE RATES | WEIR WIDTH (FT) | | 10 | | | | | | |
| | | PRE-DEVELOPED (CFS) | | 33.6 → | | 75.8 | | | | |
| | | POST-DEVELOPED (CFS) | | TOTAL → | | 56.2 | | | | |
| | 100YR/24HR RETENTION VOLUMES | PROVIDED (AC-FT) | | NA | | | | | | |
| | | REQUIRED (AC-FT) | | NA | | | | | | |
| QUALITY | TREATMENT AREA (AC) | | OFW? Y OR N | 5.194 | N | | | | | |
| | TREATMENT VOL. REQUIRED (AC-FT) | | | 0.433 | | | | | | |
| | TREATMENT VOL. PROVIDED (AC-FT) | | | 0.533 | | | | | | |
| | METHOD OF TREATMENT | | | WET DET | | | | | | 3 |
| | CONTROL DEVICE TYPE | | | ORIFICE | | | | | | |
| | CONTROL DEVICE DIMENSIONS | | | 1.5" ϕ | | | | | | |
| | RECOVERY TIME (HRS) | | | 217 ± | | | | | | |
| 100 YEAR FLOODPLAIN | ENCROACHMENT (AC-FT) | | | | | 0.219 | | | 0.219 | 4 |
| | COMPENSATION (AC-FT) | | | | | 0.352 | | | 0.352 | 5 |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
SEP 26 1995
RECEIVED
BARTOW, FLORIDA

Comments: PRE-VS-POST DEV. ATTENUATION PROVIDED BY UPGRADIENT WAL*MART FOOD DISTRIBUTION CENTER. SWFWMD MSSW PERMIT # 407322.01

Evaluator: _____

Supervisor: _____

0107

Rev. 8/9/91

## STORMWATER TREATMENT PONDS DATA AND DESIGN
(Continued)

**POND 530** (ONLINE DRY RETENTION)

CONTRIBUTING BASIN 53

| | | | |
|---|---|---|---|
| TOP EL. = | 144.0 | TOP AREA = | 0.352 AC. |
| BOTTOM EL. = | 142.0 | BOTTOM AREA = | 0.066 AC |

REQUIRED 1/2" TREATMENT VOLUME = 0.103 AC-FT
* AND 0.085 AC-FT (FROM PONDS 510 AND 520) = 0.188 AC-FT

VOLUME PROVIDED = 0.138 AT EL. 143.0'

* VOLUME DEFICIT = 0.050 AC-FT - REQUIRES DOUBLE THIS VOLUME IN DOWN STREAM WET-DETENTION POND 540 OR 0.100 AC-FT

**POND 540** (OFFLINE WET DETENTION)

CONTRIBUTING BASIN 54 A, 54 B, 54 C, 54 D, IMPERVIOUS SURFACE FROM 544 A AND 544 B, AND 0.100 AC-FT DEFICIT FROM ONLINE DRY RETENTION AREAS)

| | | | |
|---|---|---|---|
| TOP EL. = | 127.50 | TOP AREA = | 0.785 AC. |
| CONTROL EL. = | 126.0 | AREA AT CONTROL EL. = | 0.685 AC. |

REQUIRED 1" TREATMENT VOLUME = 0.025 + 0.110 + 0.036 + 0.135 + 0.077 + 0.050 + 0.100 = 0.533 AC-FT

VOLUME PROVIDED = 0.533 AT EL. 126.75'

SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
SEP 26 1995
RECEIVED
BARTOW, FLORIDA
0 0123

# *PERMIT NO. 43208.000*

## Tucker Paving

MATCHLINE-A

20' TYPE F LANDSCAPE BUFFER

OPEN SPACE

POLE BARN
7,200 S.F.

SEMI MANEUVERING AREA

RETENTION POND

COMMERCIAL BUILDING
9,000 S.F.

OFFICE BUILDING
19,984 S.F.

FUTURE DRIVE

78 LF ~ 3' VALLEY GUTTER

EXISTING WELL TO REMAIN

W.P.P.

15' TYPE D LANDSCAPE BUFFER

NEW R.O.W.

EX. R.O.W.

18' R.O.W. DEDICATION

S.M.H.

T.L.

SEE FDOT PLANS FOR OFFSITE IMPROVEMENTS

LUCERNE PARK ROAD / S.R. 544

0 15 30 60

SCALE: 1"=30'

## Site Legend

| | |
|---|---|
| TYP | TYPICAL |
| R | RADIUS |
| | PAINTED TRAFFIC ARROW |
| | HANDICAP PARKING |
| | NEW CURB |
| | PROPERTY LINE |
| | CENTER LINE |
| | RIGHT-OF-WAY |
| | FLOOD LINE |
| | EX. EDGE OF PAVEMENT |
| | NEW PAVEMENT MILLINGS |
| | EX. CONCRETE PAVEMENT |
| | NEW HEAVY DUTY PAVEMENT |
| | NEW LIGHT DUTY PAVEMENT |

## Site Plan Keyed Notes

| ITEM | DESCRIPTION |
|---|---|
| 1 | ADA ACCESSIBLE ZONE. SLOPES NOT TO EXCEED 2.0% ALL IN DIRECTIONS. |
| 2 | 4-INCH THICK CONCRETE SIDEWALK WITH JOINT 5' O.C. AND EXPANSION JOINT 50' O.C. SEE DETAIL SHEET. |
| 3 | LANDSCAPE BUFFER. SEE LANDSCAPE PLAN. |
| 4 | PROPOSED STORM SEWER STRUCTURE. SEE DRAINAGE PLAN. |
| 5 | INSTALL 1/2" PREFORMED EXPANSION JOINT WHEN ABUTTING CONCRETE. |
| 6 | ADA PAVEMENT MARKINGS PER DETAIL SHEET. |
| 7 | 6-INCH CONCRETE CURB. SEE DETAIL SHEET. |
| 8 | FIRE HYDRANT ASSEMBLY. |
| 9 | LIGHT DUTY ASPHALT. SEE DETAIL SHEET. |
| 10 | HEAVY DUTY ASPHALT. SEE DETAIL SHEET. |
| 11 | 6" THICK, 4,000 PSI CONCRETE PAD. SEE DETAIL SHEET. |
| 12 | ADA HANDICAP SIGNS. SEE DETAIL SHEET. |
| 13 | 4-INCH WHITE THERMOPLASTIC STRIP OR WHITE DIRECTIONAL ARROW. |
| 14 | LANDSCAPE AREA. SEE LANDSCAPE PLANS. |
| 15 | 6' HIGH CHAIN LINK FENCE |
| 16 | MONUMENT SIGN, DESIGN BY OTHERS. |
| 17 | RV DUMP STATION. SEE DETAIL SHEET. |
| 18 | 60" WIDE PEDESTRIAN GATE |
| 19 | BIKE RACK. SEE DETAIL SHEET. |
| 20 | 3' VALLEY GUTTER PER FDOT INDEX #300. |
| 21 | 6' CURB MOUNTED SIDEWALK. SEE DETAIL SHEET. |
| 22 | 6' WIDE PEDESTRIAN CROSSWALK PER FDOT INDEX #17346 |
| 23 | 24" WHITE STOP BAR WITH R1-1 STOP SIGN. |
| 24 | TYPE-F CURB AND GUTTER PER FDOT INDEX #300 |
| 25 | 6-INCH YELLOW STRIPE |
| 26 | 6-INCH WHITE STRIPE |
| 27 | 12-INCH YELLOW, 10' O.C. |
| 28 | ENCLOSED DUMPSTER WITH RECYCLE BIN. SEE DETAIL SHEET. |
| 29 | 6' ADA RAMP WITH DETECTABLE WARNING STRIP. 1:12 MAX SLOPE. |
| 30 | PAVEMENT MILLINGS. SEE DETAIL SHEET. |
| 31 | 6' HIGH CHAIN LINK FENCE |
| 32 | 16' SWING GATE |

## Site General Notes

1. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB. BUILDING DIMENSIONS ARE TO FACE OF BUILDING.
2. EXISTING IMPROVEMENTS SHOWN ARE TAKEN FROM BOUNDARY & TOPOGRAPHIC SURVEY PREPARED BY CYPRESS LAND SURVEYS, DATED 7/20/17.
3. BUILDING AND SIDEWALK DIMENSIONS ARE TO OUTSIDE EDGE OF WALL.
4. ALL TIES TO THE PROPERTY LINE ARE BASED ON THE BOUNDARY & TOPOGRAPHIC SURVEY.
5. ALL CURB RADIUS ARE 3' UNLESS OTHERWISE NOTED.
6. WATER SUPPLY SHALL BE AVAILABLE PRIOR TO CONSTRUCTION.
7. COMBUSTIBLE MATERIALS CAN NOT BE STORED ONSITE UNTIL FIREWATER IS INSTALLED

REVISIONS

| NO. | DATE | APPR. |
|---|---|---|
| | | |

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 71915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FILD DATE:

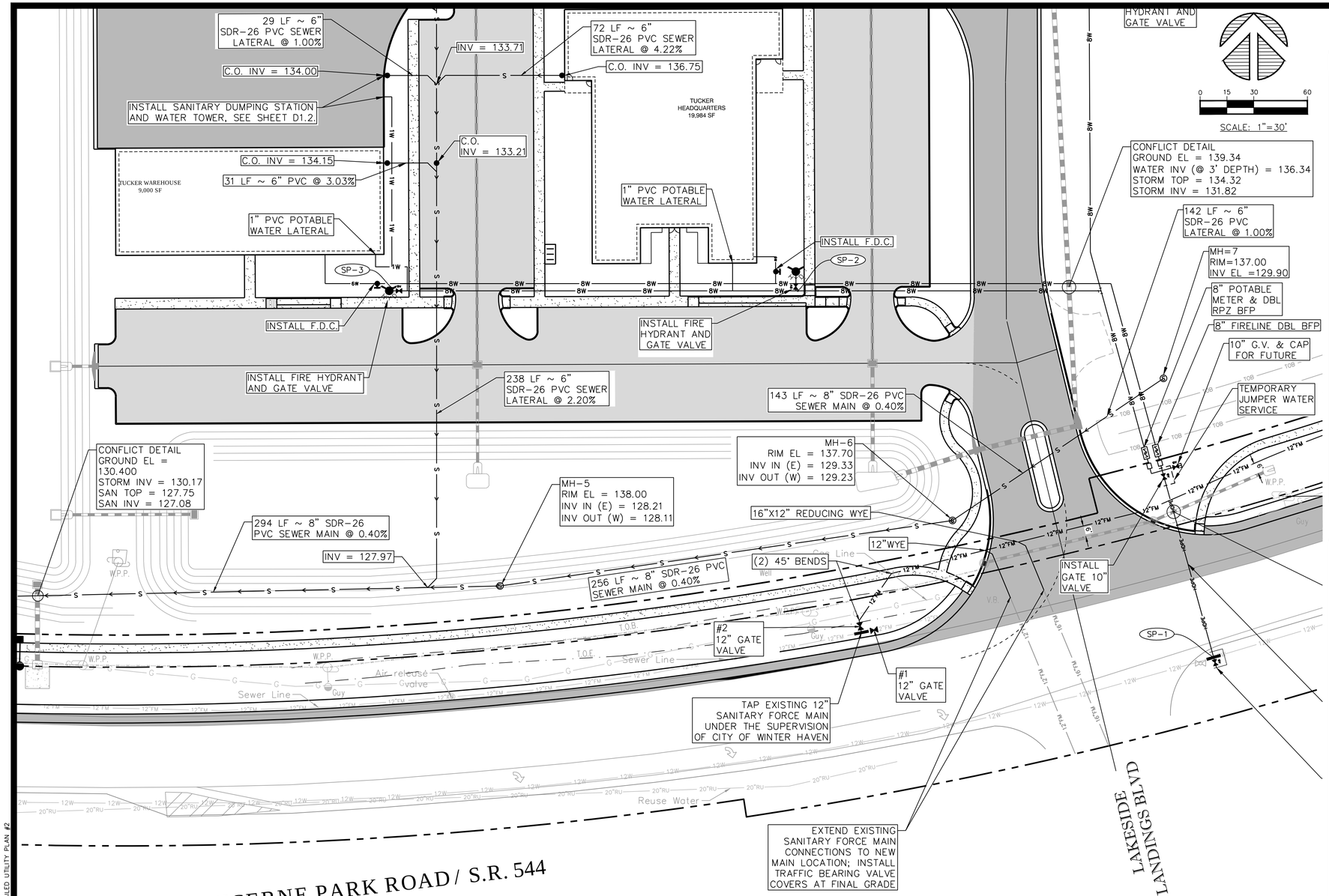
CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DETAILED SITE PLAN #1

TUCKER PAVING OFFICE
LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

| PROJECT No. | SHEET # |
|---|---|
| -000- | C2.1 |
| PLOT DATE | |
| Nov 08, 2017-14:24 | |

Dwg: N:\Tucker\2-Sitebo Site\Acad & Graphics_Engineering\Site Landscape.dwg, Layout: C2.1 DETAILED SITE PLAN #1




## Water General Notes

1. WATER AND SEWER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A LATERAL SEPARATION OF AT LEAST 6 FEET, OR IN CASE OF CROSSING A VERTICAL DISTANCE NOT LESS THAN 12" SHALL BE MAINTAINED. IF THESE CONDITIONS ARE NOT MET, THE WATER MAIN SHALL BE DUCTILE IRON FOR A DISTANCE OF 20' SPACED EQUALLY OVER THE INTERFERENCE.
2. WATER MAINS ARE TO BE DISINFECTED PER POLK COUNTY HEALTH DEPARTMENT STANDARDS AND AWWA C651-92. 3. WATER MAINS ARE TO BE PRESSURE TESTED PER THE STANDARDS OF THE UTILITY SUPPLYING SERVICE AND AWWA MANUAL M23.
3. ALL LINES TO HAVE #14 GAUGE, COPPER, BLUE COATED UF SOLID TRACER WIRE TAPED TO THE PIPE, STUB-UPS PER CITY'S DIRECTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN AND FOLLOW THE REGULATIONS OF THE UTILITY SUPPLYING SERVICE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING COPIES OF ALL PERMITS ISSUED FOR THE WATER DISTRIBUTION SYSTEM AND CONFORMING TO ALL CONDITIONS OF ISSUANCE.
6. ALL TAPS AND THEIR COORDINATION OF INSTALLATION ARE THE RESPONSIBILITY OF THE CONTRACTOR. WET TAP SHALL BE PERFORMED UNDER CITY SUPERVISION. CONTRACTOR TO COORDINATE WITH CITY'S INSPECTOR.
7. ALL WATER MAIN PIPING TO BE AWWA C-900 DR-18 DYED BLUE.
8. CONTRACTOR TO SUPPLY COMPLETE "AS-BUILT" DRAWINGS. ALL INSTALLATIONS ARE TO BE DIMENSIONED FROM PERMANENT ABOVE GROUND FACILITIES (I.E., MANHOLES, FIRE HYDRANTS, ETC.). ITEMS SUCH AS SERVICE VALVES, ETC. ALSO SHALL BE LOCATED.
9. ALL GATE VALVES TO BE ANSI/AWWA C-509 W/O RING STEM SEAL.
10. BUTTERFLY VALVES ARE NOT ALLOWED.
11. ALL JOINTS SHALL BE RESTRAINED USING MEGA-LUG RESTRAINTS.
12. ALL UTILITIES INSTALLATION SHALL BE TO CITY OF WINTER HAVEN SPECIFICATIONS.

## Sewer General Notes

1. ALL SANITARY SEWER GRAVITY PIPING AND LATERALS TO BE PVC SDR 26, DYED GREEN.
2. WATER AND SEWER LINES SHALL NOT BE PLACED IN THE SAME TRENCH AND SHALL REQUIRE A LATERAL SEPARATION OF AT LEAST 6 FEET, OR IN CASE OF CROSSING, A VERTICAL DISTANCE NOT LESS THAN 12" SHALL BE MAINTAINED. IF THESE CONDITIONS ARE NOT MET, THE WATER MAIN SHALL BE DUCTILE IRON FOR A DISTANCE OF 20' SPACED EQUALLY OVER THE INTERFERENCE.
3. ALL GRAVITY SEWER LINES SHALL BE TESTED BY "LAMPING" THE MANHOLES AND A CAMERA SHALL BE PASSED THROUGH ALL LINES FOR THE PURPOSE OF MAKING A VIDEO TAPE OF THE INTERNAL SYSTEM. REFERENCE SECTION 5.9 OF THE CITY OF WINTER HAVEN SPECIFICATIONS – WASTEWATER COLLECTION AND TRANSMISSION SYSTEM DESIGN AND CONSTRUCTION.
4. ALL FORCE MAINS TO BE TESTED PER THE PROCEDURE OF THE UTILITY PROVIDING SERVICE.
5. CONTRACTOR TO SUPPLY COMPLETE "AS-BUILT" DRAWINGS. ALL INSTALLATIONS ARE TO BE DIMENSIONED FROM PERMANENT ABOVE GROUND FACILITIES (I.E., MANHOLES, FIRE HYDRANTS, ETC.). ITEMS SUCH AS SERVICE VALVES, ETC., SHALL BE LOCATED.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING COPIES OF ALL PERMITS ISSUED FOR THE SANITARY SEWER SYSTEM AND CONFORM TO ALL CONDITIONS OF ISSUANCE.
7. ALL UTILITIES INSTALLATION SHALL BE TO CITY OF WINTER HAVEN SPECIFICATIONS.
8. THE ONSITE SANITARY SEWER SYSTEM (MANIFOLD AND SERVICE LATERALS) WILL BE PRIVATELY OWNED AND MAINTAINED.
9. ALL FORCE MAIN MATERIAL SHALL BE C-900 DR-25.

## Utility Backfill Notes

ALL UNDERGROUND UTILITIES MUST BE BACKFILLED IN 10 INCH LIFTS WITH THE TRENCH SPOIL, UNLESS THE SPOILS DO NOT MEET AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D698)., IN WHICH CASE A SUITABLE STRUCTURAL FILL MUST BE IMPORTED AND THE UNSUITABLE SPOILS DISPOSED OFF SITE.

## Existing Utility Locations

EXISTING UTILITY LOCATIONS SHOWN SUCH AS GAS, WATER, CABLE, ETC. ARE BASED ON BEST AVAILABLE INFORMATION AS PROVIDED BY THE UTILITY COMPANY. THESE UTILITIES ARE NOT SURVEYED LOCATIONS AND NEED TO BE FIELD VERIFIED BY THE SITE CONTRACTOR PRIOR TO CONSTRUCTION. UPON ACTUAL FIELD LOCATION, THE CONTRACTOR SHOULD NOTIFY THE ENGINEER OF RECORD OF ANY DESCEPENCIES THAT CONFLICT WITH THE PROPOSED DESIGN.
WATER MAIN ELEVATION IS ASSUMED TO HAVE 3' COVER.
GAS MAIN ELEVATION IS ASSUMED TO HAVE 4' COVER.

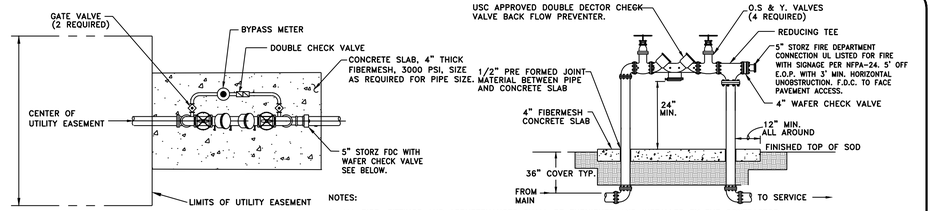
## Utility Legend

| | |
|---|---|
| Ⓢ | SANITARY MANHOLE |
| ● | CLEAN OUT |
| —S— | 8" PVC SAN. SEWER MAIN |
| —12"FM— | 12" PVC FORCE MAIN |
| —20"RU— | 20" PVC REUSE WATER |
| E— | CAP |
| ⋈ | GATE VALVE |
| BO⊗ | BLOW OFF |
| ⊗ | FIRE HYDRANT ASS'Y |
| —1W— | 1" PVC WATER MAIN |
| —2W— | 2" PVC WATER MAIN |
| —6W— | 6" PVC WATER MAIN |
| —8W— | 8" PVC WATER MAIN |
| —10WM— | 10" PVC WATER MAIN |
| SP-1 | SAMPLE POINT LOCATION |
| | STORM PIPE |
| | STORM INLET |

## Force Main Tie-in

1. INSTALL VALVES #1 AND #4.
2. TAP 12" FORCE MAIN NEAR VALVE #1 AND #4.
3. INSTALL VALVES #2 AND #3 AND CLOSE VALVES.
4. INSTALL 12" FORCE MAIN BETWEEN VALVES #2 AND #3.
5. TEST NEW 12" FORCE MAIN AND CLEAR FOR PUBLIC USE.
6. OPEN VALVES #2 AND #3.
7. CLOSE VALVES #1 AND #4. REMOVE AND CAP EXISTING 12" FORCE MAIN BETWEEN VALVE #1 AND #4.

## Backflow Preventor and F.D.C. Details




NOTES:
1. ALL PIPE, FITTINGS AND APPURTENANCES SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
2. ALL ABOVE GROUND PIPE SHALL BE FLANGE DUCTILE IRON.
3. APPROVED DEVICES: HERSEY DDC11, FEBCO 806 DDC, WATTS 709, OAE.
4. PROVIDE PIPE SUPPORT STANDS AS REQUIRED.
5. BY-PASS DOUBLE CHECK MUST BE THE SAME TYPE AS THE MAIN DOUBLE CHECK.
6. A 3' CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE F.D.C.

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

IMPORTANT:

ALL SERVICE LATERALS, VALVES, FIRE HYDRANTS, FITTINGS, INLETS, ETC... SHOWN HEREON ARE GRAPHICAL SYMBOLS ONLY AND NOT TO SCALE. REFER TO DETAIL SHEETS FOR EXACT LOCATION, SIZE AND OTHER SPECIFICS.

| NO. | DATE | APPR. | REVISIONS |
|---|---|---|---|
| | | | |

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 71915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

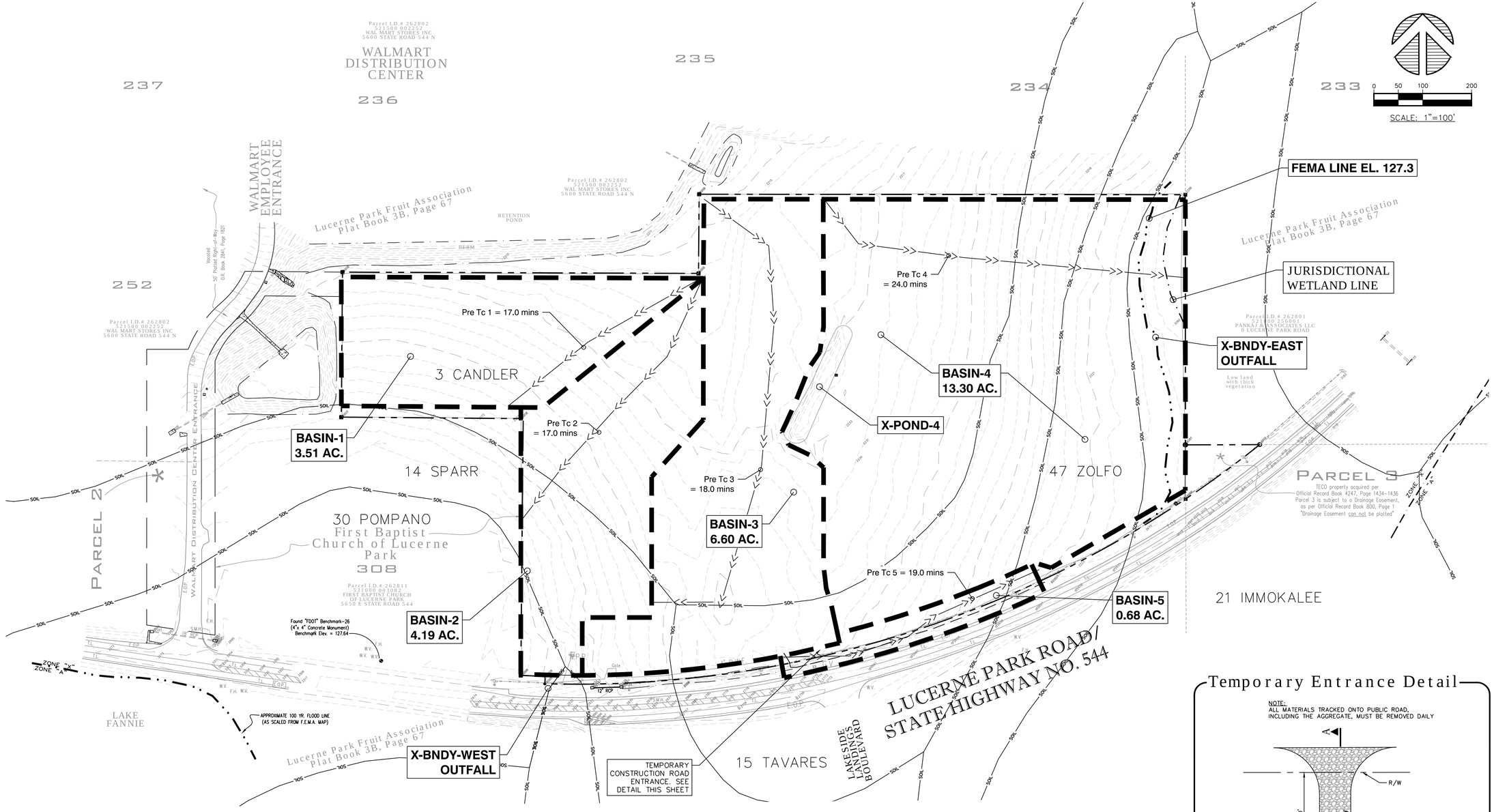
CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DETAILED UTILITY PLAN #2

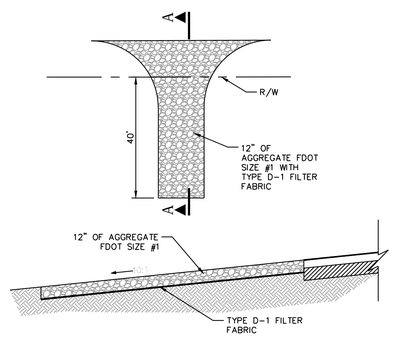
**TUCKER PAVING OFFICE**
LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

| PROJECT No. | SHEET # |
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| -000- | C3.2 |
| PLOT DATE | |
| Nov 08, 2017-14:27 | |

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## Temporary Entrance Detail




SECTION A-A

## General Notes

1. EXISTING IMPROVEMENTS SHOWN ARE TAKEN FROM BOUNDARY & TOPOGRAPHIC SURVEY PREPARED BY CYPRESS LAND SURVEYS, DATED 07/20/17.

2. SOILS INFORMATION OBTAINED FROM SCS SOIL SURVEY OF POLK COUNTY FLORIDA AND ARE MAPPED WITH THE FOLLOWING CHARACTERISTICS:
   - #3 – CANDLER – SOIL GROUP "A"
   - #14 – SPARR – SOIL GROUP "C"
   - #15 – TAVARES – SOIL GROUP "A"
   - #21 – IMMOKALEE – SOIL GROUP "B/D"
   - #30 – POMPANO – SOIL GROUP "B/D"
   - #31 – ADAMSVILLE – SOIL GROUP "C"
   - #47 – ZOLFO – SOIL GROUP "C"

Know what's below. Call before you dig.

**IMPORTANT:**

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| NO. | DATE | APPR. | REVISIONS |
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DAVID C. CARTER, P.E. NO. 31915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

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137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

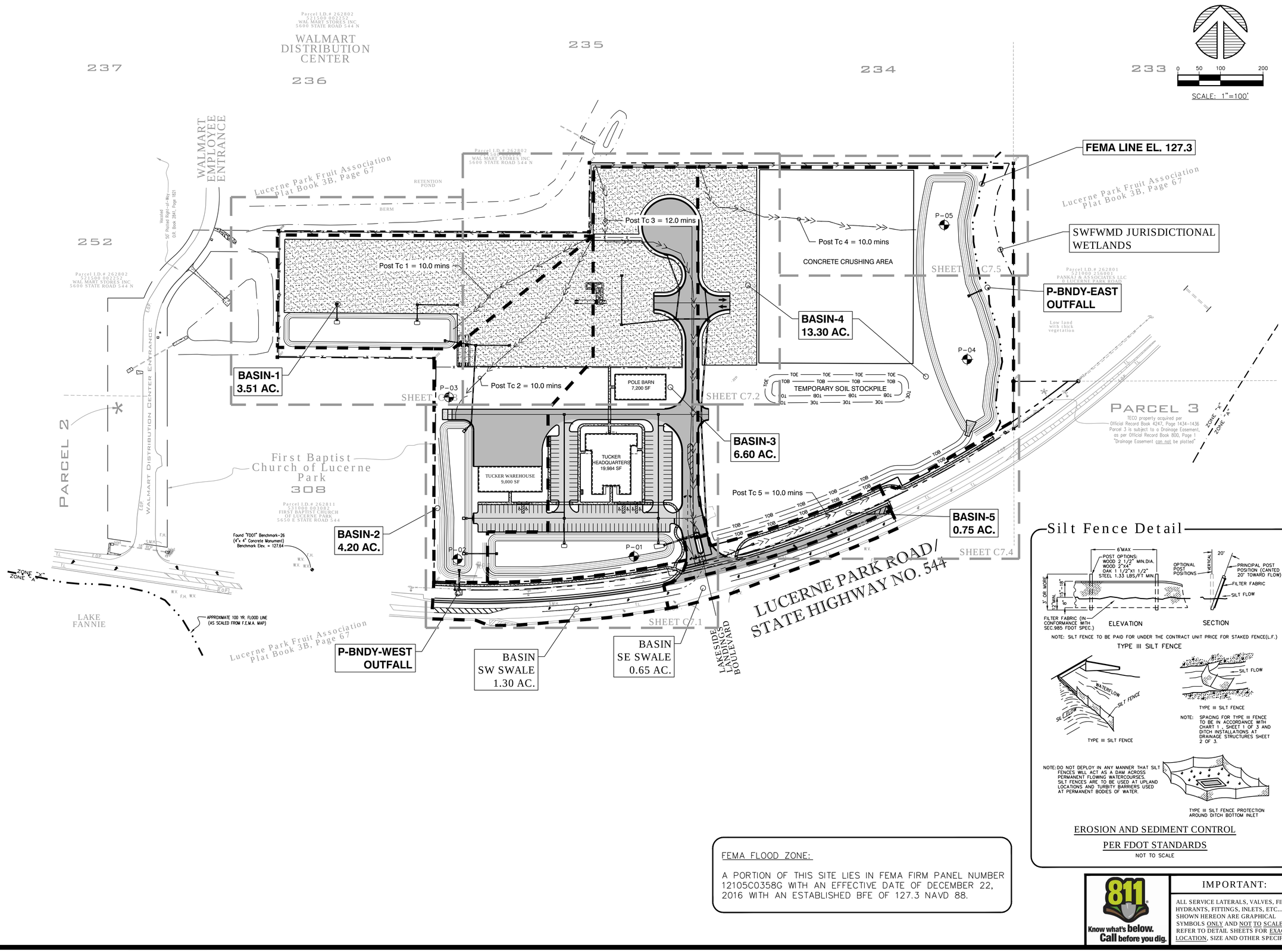
PRE-DEVELOPMENT DRAINAGE

# TUCKER PAVING OFFICE

LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

| PROJECT No. | SHEET # |
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| PLOT DATE | |
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## Silt Fence Detail




NOTE: SILT FENCE TO BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR STAKED FENCE(L.F.)

TYPE III SILT FENCE




TYPE III SILT FENCE

TYPE III SILT FENCE

NOTE: SPACING FOR TYPE III FENCE TO BE IN ACCORDANCE WITH CHART 1, SHEET 1 OF 3 AND DITCH INSTALLATIONS AT DRAINAGE STRUCTURES SHEET 2 OF 3.

NOTE: DO NOT DEPLOY IN ANY MANNER THAT SILT FENCES WILL ACT AS A DAM ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE USED AT UPLAND LOCATIONS AND TURBITY BARRIERS USED AT PERMANENT BODIES OF WATER.



TYPE III SILT FENCE PROTECTION AROUND DITCH BOTTOM INLET

EROSION AND SEDIMENT CONTROL

PER FDOT STANDARDS

NOT TO SCALE

FEMA FLOOD ZONE:

A PORTION OF THIS SITE LIES IN FEMA FIRM PANEL NUMBER 12105C0358G WITH AN EFFECTIVE DATE OF DECEMBER 22, 2016 WITH AN ESTABLISHED BFE OF 127.3 NAVD 88.

Know what's below. Call before you dig.

IMPORTANT:

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(863) 294-6965 * E-mail: dave@carter-eng.com

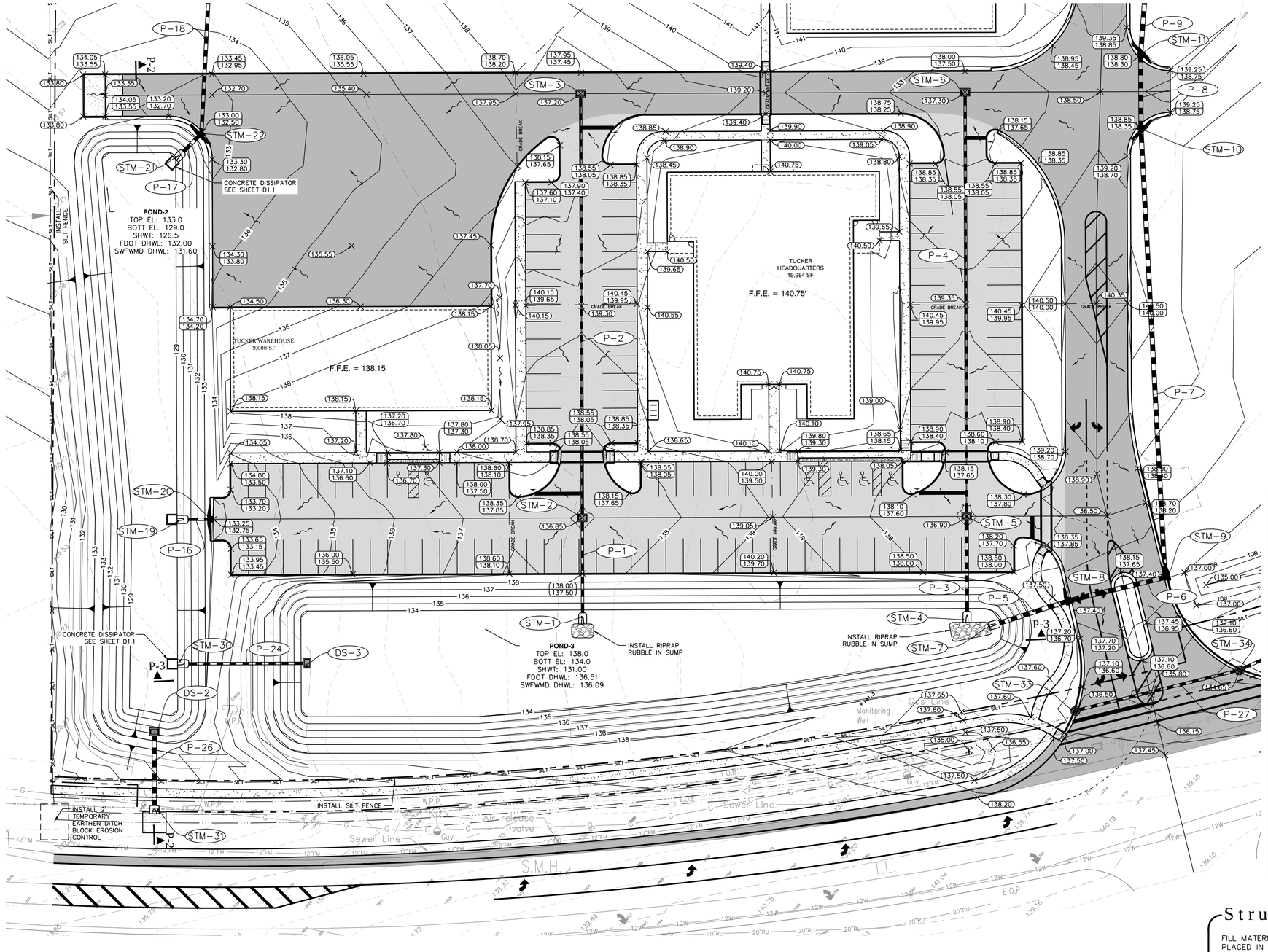
DRAINAGE PLAN

# TUCKER PAVING OFFICE

LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

| PROJECT No. | SHEET # |
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| PLOT DATE | |
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Dwg: N:\Tucker\2-Sitetbs Site\Acad & Graphics_Engineering\Base Plan.dwg, Layout: C5.0 DRAINAGE PLAN




0 15 30 60

SCALE: 1"=30'

## Drainage Legend

| | |
|---|---|
| EL | ELEVATION |
| TYP | TYPICAL |
| CO | CLEANOUT |
| IE | INVERT ELEVATION |
| 49.58 | EXISTING ELEVATION |
| | PROPOSED PAVEMENT ELEVATION |
| | GRATE INLET |
| FFE | FINISH FLOOR ELEVATION |
| RCP | REINFORCED CONCRETE PIPE |
| S-7 | STORM SEWER STRUCTURE NUMBER |
| GRADE BREAK | GRADE BREAK |
| MEG | MATCH EXISTING GRADE |
| DS | BUILDING DOWN SPOUT |
| | 12" OR GREATER STORMWATER PIPE |
| | LESS THAN 12" STORMWATER PIPE |
| | SURFACE STORMWATER FLOW |
| | DIRECTION OF PIPE FLOW |

## Paving & Grading Notes

1. ALL STORM PIPE SHALL BE REINFORCED CONCRETE PIPE (RCP) UNLESS OTHERWISE NOTED.
2. PROPERTY OWNER IS RESPONSIBLE FOR MAINTANANCE OF ALL ON-SITE STORMWATER MANAGEMENT SYSTEMS.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD 48 HOURS PRIOR TO COVERING STORMWATER PIPING FOR INSPECTION.
4. SEE PRE-DEVELOPMENT DRAINAGE PLAN, SHEET C6.0 FOR EROSION AND SILTATION CONTROL ALONG WITH GENERAL NOTES.
5. SEE SITE PLAN, SHEET C4.0 FOR SITE DATA.
6. SEE BOUNDARY & TOPOGRAPHIC SURVEY FOR TEMPORARY BENCH MARK (TBM) LOCATIONS.
7. THE CONTRACTOR SHALL MEET ALL REQUIREMENTS FOR LOCAL MUNICIPALITY AND THE FLORIDA DEPARTMENT OF TRANSPORTATION WITH REGARD TO IMPROVEMENTS WITHIN THEIR RESPECTIVE RIGHTS-OF-WAY.
8. ALL DISTURBED AREAS WITHIN RIGHTS-OF-WAY TO BE RETURNED TO MATCH EXISTING CONDITION UNLESS OTHERWISE INDICATED ON ROADWAY PLANS.
9. ALL CLEANOUT TOP ELEVATION SHALL MATCH FINISH GRADE ELEVATIONS.
10. CONTRACTOR SHALL INSTALL EROSION CONTROL SILT FENCE AROUND THE PERIMETER OF THE SITE AND MUST MAINTAIN THE SILT FENCE IN GOOD REPAIR UNTIL ALL CONSTRUCTION IS COMPLETE AND THE AREA IS STABILIZED, SEE PRE-DEVELOPMENT AND DEMOLITION PLANS.
11. THE CONTRACTOR SHALL CONTACT THE ENGINEER PRIOR TO ANY CONSTRUCTION IF ANY PROBLEMS OR DISCREPANCIES EXIST.

## Structural Fill Note

FILL MATERIAL SHALL BE PER GEOTECHNICAL REPORT. FILL SHOULD BE PLACED IN LIFTS NOT TO EXCEED ONE FOOT THICK. THE FILL MATERIAL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT OF ITS MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D 1557). CONFINED AREAS, SUCH AS UTILITY TRENCHES, SHOULD BE COMPACTED WITH MANUALLY OPERATED VIBRATORY COMPACTION EQUIPMENT.

SHEET 7.1 STRUCTURE TABLE

| STR NAME | TYPE | RIM | DOWNSTREAM PIPE: PIPE NAME | LENGTH (ft) | SIZE (in) | MATERIAL | UPPER INV (el) | LOWER INV (el) | SLOPE (%) |
|---|---|---|---|---|---|---|---|---|---|
| DS-2 | MODIFIED TYPE "H" INLET FDOT INDEX 232 | 132.50 | P-26 | 45 | 19x30 | EL. RCP | 130.35 | 130.15 | 0.44% |
| DS-3 | MODIFIED TYPE "C" INLET FDOT INDEX 232 | 136.86 | P-24 | 75 | 24 | ADS | 129.75 | 129.00 | 1.00% |
| STM-1 | M.E.S PER FDOT INDEX #272 | 131.42 | --- | --- | --- | CONC | --- | 131.42 | --- |
| STM-2 | TYPE "J" INLET FDOT INDEX 234 | 136.86 | P-1 | 61 | 18 | ADS | 132.61 | 132.00 | 1.00% |
| STM-3 | TYPE "J" INLET FDOT INDEX 234 | 137.20 | P-2 | 244 | 18 | RCP | 133.83 | 132.61 | 0.50% |
| STM-4 | M.E.S PER FDOT INDEX #272 | 131.00 | --- | --- | --- | CONC | --- | 131.00 | --- |
| STM-5 | TYPE "J" INLET FDOT INDEX 234 | 136.90 | P-3 | 61 | 24 | ADS | 131.46 | 131.00 | 0.75% |
| STM-6 | TYPE "J" INLET FDOT INDEX 234 | 137.30 | P-4 | 244 | 18 | RCP | 133.79 | 131.96 | 0.75% |
| STM-7 | M.E.S PER FDOT INDEX #272 | 131.00 | --- | --- | --- | CONC | --- | 131.00 | --- |
| STM-8 | TYPE "5" INLET FDOT INDEX 211 | 137.40 | P-5 | 49 | 18 | ADS | 131.20 | 131.00 | 0.40% |

SHEET 7.1 STRUCTURE TABLE

| STR NAME | TYPE | RIM | DOWNSTREAM PIPE: PIPE NAME | LENGTH (ft) | SIZE (in) | MATERIAL | UPPER INV (el) | LOWER INV (el) | SLOPE (%) |
|---|---|---|---|---|---|---|---|---|---|
| STM-9 | TYPE "5" INLET FDOT INDEX 211 | 137.40 | P-6 | 56 | 30 | RCP | 131.42 | 131.20 | 0.40% |
| STM-10 | TYPE "6" INLET FDOT INDEX 211 | 138.35 | P-7 | 258 | 30 | ADS | 132.45 | 131.42 | 0.40% |
| STM-11 | TYPE "6" INLET FDOT INDEX 211 | 138.30 | P-8 | 43 | 30 | RCP | 132.62 | 132.45 | 0.40% |
| STM-12 | TYPE "6" INLET FDOT INDEX 211 | 138.80 | P-9 | 203 | 30 | ADS | 133.44 | 132.62 | 0.40% |
| STM-19 | M.E.S PER FDOT INDEX #272 | 129.00 | --- | --- | --- | CONC | --- | 129.00 | --- |
| STM-20 | TYPE "6" INLET FDOT INDEX 211 | 132.75 | P-16 | 21 | 18 | ADS | 129.16 | 129.00 | 0.75% |
| STM-21 | M.E.S PER FDOT INDEX #272 | 129.00 | --- | --- | --- | CONC | --- | 129.00 | --- |
| STM-22 | TYPE "6" INLET FDOT INDEX 211 | 132.50 | P-17 | 21 | 24 | ADS | 129.26 | 129.00 | 1.25% |
| STM-23 | TYPE "J" INLET FDOT INDEX 234 | 136.75 | P-18 | 183 | 24 | RCP | 131.09 | 129.26 | 1.00% |
| STM-31 | M.E.S PER FDOT INDEX #273 | 130.15 | --- | --- | --- | CONC | --- | 130.15 | --- |

Know what's below. Call before you dig.

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| NO. | DATE | APPR. | REVISIONS |
|---|---|---|---|

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DAVID C. CARTER, P.E. NO. 31915

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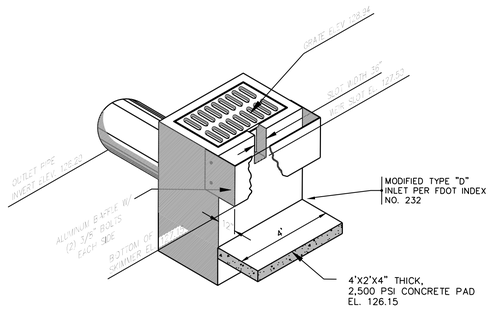
DETAILED DRAINAGE PLAN #1

# TUCKER PAVING OFFICE

LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

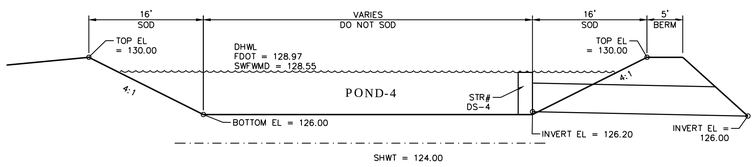
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PLOT DATE Nov 08, 2017-14:29
SHEET # C5.1

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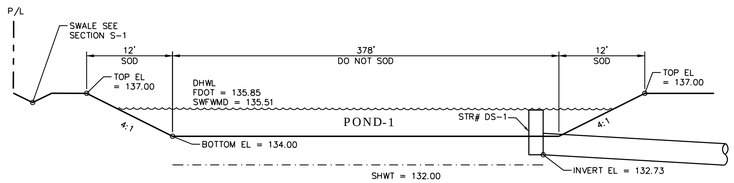



POND-4 OUTFALL DETAIL
STRUCTURE #DS-4

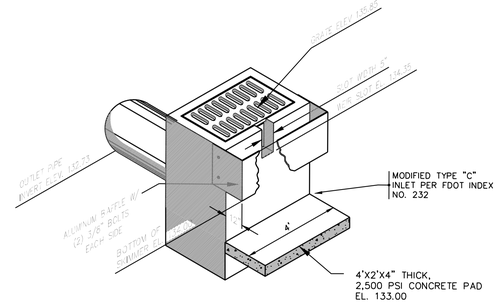
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Section P-4

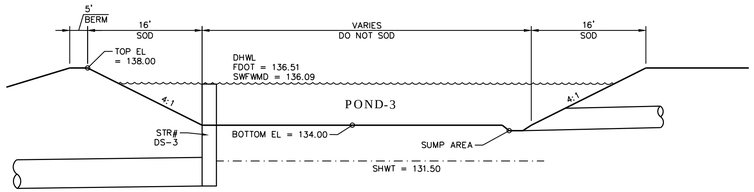



Section P-1

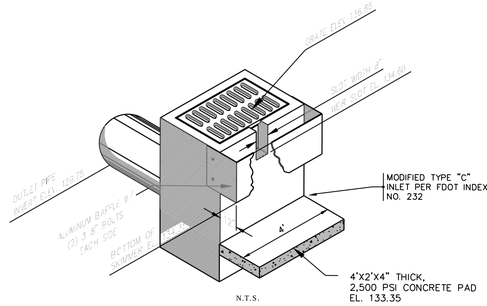



POND-1 OUTFALL DETAIL
STRUCTURE #DS-1

N.T.S.

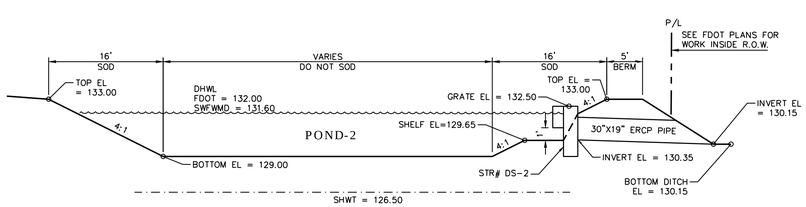



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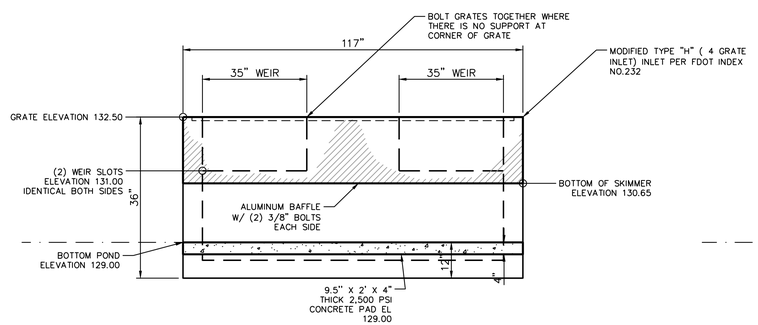



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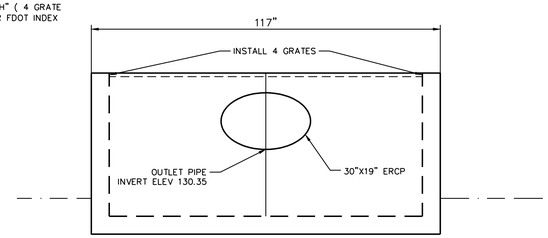
POND-3 OUTFALL DETAIL
STRUCTURE #DS-3




Section P-2




FRONT VIEW




REAR VIEW

POND-2 OUTFALL DETAIL
STRUCTURE #DS-2

N.T.S.

| NO. | DATE | APPR. | REVISIONS |
|---|---|---|---|
| | | | |

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DAVID C. CARTER, P.E. NO. 37915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FELD DATE:

CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DRAINAGE DETAILS

TUCKER PAVING OFFICE
~~(CHERRY PARK ROAD)~~ (SR. 544)
WINTER HAVEN, FLORIDA

PROJECT No. -000-
PLOT DATE Nov 08, 2017-14:31
SHEET # D2.1

Dwg: N:\Tucker\2-Siteplan Site\Mead & Graphics\Engineering\Cover Notes Details.dwg, Layout: D2.1 DRAINAGE DETAILS

# 4. Water Quality & Stage Storage

## *WATER QUALITY VOLUME CALCULATION:*

Project: **Tucker Office** Basin: **P-BASIN-1**

Pond: **P-POND-1**

*WATER QUALITY CALCULATION:* Date: **10/12/2017**

Required Treatment: 0.50 INCH

Treatment Area (Ac.) : 3.51 AC

Req'd Treatment Vol : 0.146 AF or 6,371 CF

*POND STAGE / AREA:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| | | | | 0 | |
| Pond Top El. | 137.00 | 0.73 | 31,816 | | 79,132 |
| | | | | 29,963 | |
| | 136.00 | 0.65 | 28,148 | | 49,168 |
| | | | | 26,344 | |
| | 135.00 | 0.56 | 24,580 | | 22,825 |
| | | | | 22,825 | |
| Pond Bottom Elev.: | 134.00 | 0.48 | 21,113 | | 0 |

*DETERMINE WEIR CREST ELEV:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| Weir Crest Elevation (WCE): | 134.40 | 0.517 | 22,500 | 8,721 | 8,721 |

Provided Volume beneath weir: = **0.200** Ac.ft. Or **8,721** $ft^3$

Req'd Treatment Volume: = **0.146** Ac.ft. Or Is > **6,371** $ft^3$

*EQUIVALENT POND DIMENSIONS:*

(P) effective perimeter = 792 feet

(h) Treatment depth = 0.40 feet

(V) Treatment volume: = 6,371 $ft^3$

Calculated Length = **351** ft

Calculated Width = **45** ft

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## *WATER QUALITY VOLUME CALCULATION:*

Project: **Tucker Office** Basin: **P-BASIN-2**

Pond: **P-POND-2**

*WATER QUALITY CALCULATION:* Date: **10/12/2017**

Required Treatment: 0.50 INCH

Treatment Area (Ac.) : 4.20 AC

Req'd Treatment Vol : 0.175 AF or 7,623 CF

*POND STAGE / AREA:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| | | | | 0 | |
| Pond Top El. | 133.00 | 0.51 | 22,367 | | 64,552 |
| | | | | 20,752 | |
| | 132.00 | 0.44 | 19,177 | | 43,800 |
| | | | | 17,609 | |
| | 131.00 | 0.37 | 16,087 | | 26,191 |
| | | | | 14,567 | |
| | 130.00 | 0.30 | 13,098 | | 11,624 |
| | | | | 11,624 | |
| Pond Bottom Elev.: | 129.00 | 0.23 | 10,210 | | 0 |

*DETERMINE WEIR CREST ELEV:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| Weir Crest Elevation (WCE): | 131.00 | 0.369 | 16,087 | 0 | 26,191 |

* Elevated weir used in order to outfall to FDOT ditch

Provided Volume beneath weir: = **0.601** Ac.ft. Or **26,191** $ft^3$

Req'd Treatment Volume: = **0.175** Ac.ft. Or Is > **7,623** $ft^3$

*EQUIVALENT POND DIMENSIONS:*

(P) effective perimeter = 724 feet

(h) Treatment depth = 2.00 feet

(V) Treatment volume: = 7,623 $ft^3$

Calculated Length = **351** ft

Calculated Width = **11** ft

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## *WATER QUALITY VOLUME CALCULATION:*

Project: **Tucker Office** Basin: **P-BASIN-3**

Pond: **P-POND-3**

*WATER QUALITY CALCULATION:* Date: **10/12/2017**

Required Treatment: 0.50 INCH

Treatment Area (Ac.) : 6.60 AC

Req'd Treatment Vol : 0.28 AF or 11,979 CF

*POND STAGE / AREA:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| | | | | 0 | |
| Pond Top El. | 138.00 | 0.80 | 34,665 | | 108,261 |
| | | | | 32,707 | |
| | 137.00 | 0.71 | 30,788 | | 75,553 |
| | | | | 28,879 | |
| | 136.00 | 0.62 | 27,012 | | 46,674 |
| | | | | 25,151 | |
| | 135.00 | 0.54 | 23,335 | | 21,523 |
| | | | | 21,523 | |
| Pond Bottom Elev.: | 134.00 | 0.45 | 19,760 | | 0 |

*DETERMINE WEIR CREST ELEV:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| Weir Crest Elevation (WCE): | 134.60 | 0.503 | 21,905 | 12,494 | 12,494 |

Provided Volume beneath weir: = **0.287** Ac.ft. Or **12,494** $ft^3$

Is >

Req'd Treatment Volume: = **0.275** Ac.ft. Or **11,979** $ft^3$

*EQUIVALENT POND DIMENSIONS:*

(P) effective perimeter = 881 feet

(h) Treatment depth = 0.60 feet

(V) Treatment volume: = 11,979 $ft^3$

Calculated Length = **389** ft

Calculated Width = **51** ft

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## *WATER QUALITY VOLUME CALCULATION:*

Project: **Tucker Office** Basin: **P-BASIN-4**

Pond: **P-POND-4**

*WATER QUALITY CALCULATION:* Date: **10/12/2017**

Required Treatment: 0.50 INCH

Treatment Area (Ac.) : 13.30 AC

Req'd Treatment Vol : 0.554 AF or 24,140 CF

*POND STAGE / AREA:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| | | | | 0 | |
| Pond Top El. | 130.00 | 1.69 | 73,560 | | 247,929 |
| | | | | 70,567 | |
| | 129.00 | 1.55 | 67,616 | | 177,362 |
| | | | | 64,736 | |
| | 128.00 | 1.42 | 61,898 | | 112,626 |
| | | | | 59,079 | |
| | 127.00 | 1.29 | 56,304 | | 53,547 |
| | | | | 53,547 | |
| Pond Bottom Elev.: | 126.00 | 1.17 | 50,837 | | 0 |

*DETERMINE WEIR CREST ELEV:*

| | Stage: (El) | Area: (Ac.) | Area: (sf) | Vol: (cf) | Cumul Vol: (cf) |
|---|---|---|---|---|---|
| Weir Crest Elevation (WCE): | 127.50 | 1.357 | 59,101 | 28,848 | 82,396 |

*100 year flood used for weir crest

Provided Volume beneath weir: = **1.892** Ac.ft. Or **82,396** $ft^3$

Req'd Treatment Volume: = **0.554** Ac.ft. Or Is > **24,140** $ft^3$

*EQUIVALENT POND DIMENSIONS:*

(P) effective perimeter = 1365 feet

(h) Treatment depth = 1.50 feet

(V) Treatment volume: = 24,140 $ft^3$

Calculated Length = **658** ft

Calculated Width = **24** ft

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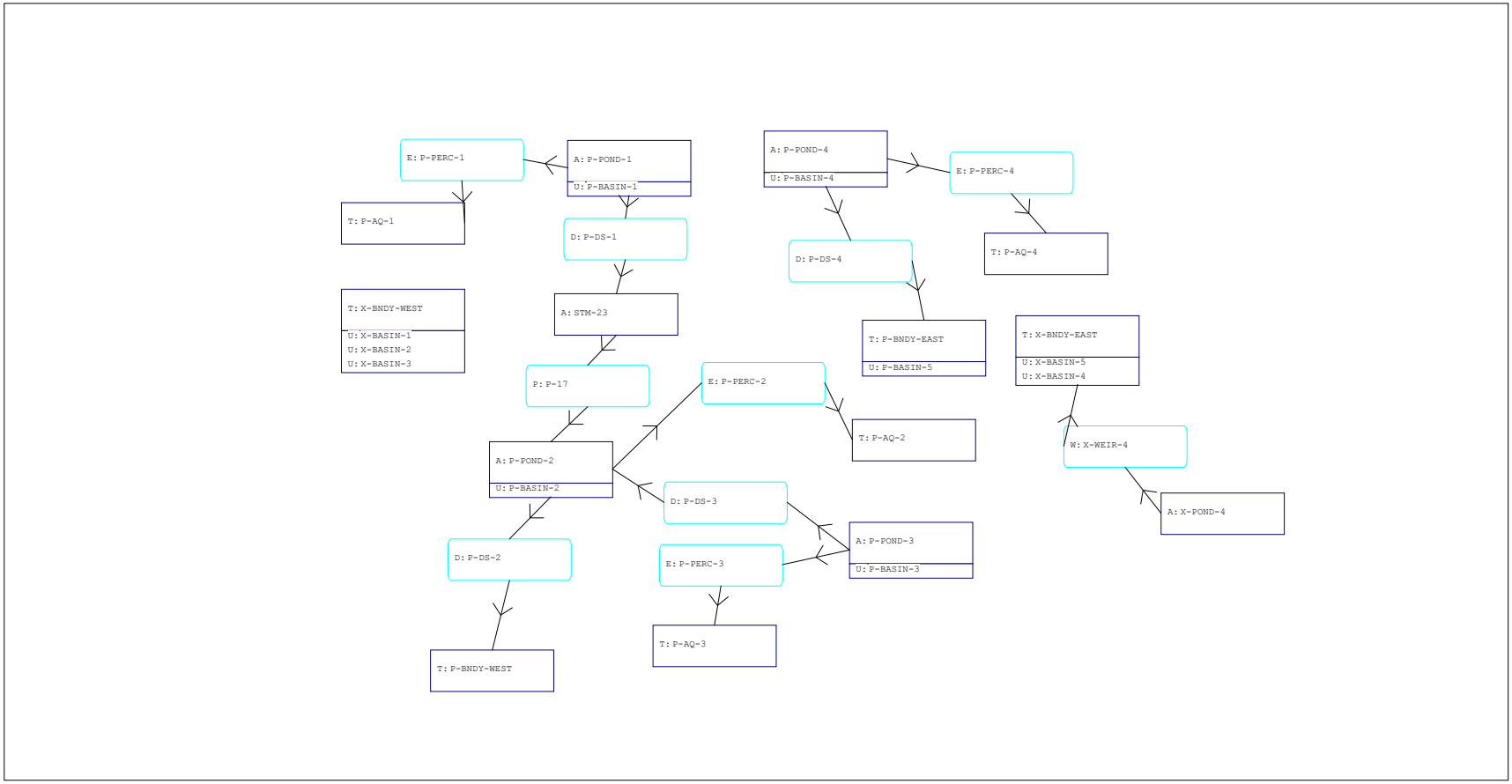
# 5. Water Quantity ICPR Model

Tucker Office

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-AQ-1 | BASE | 002Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.38 | 6.692 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 002Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.47 | 5.244 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 002Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.61 | 4.097 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 002Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 3.25 | 3.913 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 002Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.43 | 0.772 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 002Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 12.00 | 0.369 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.36 | 6.883 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.38 | 5.779 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.34 | 4.325 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 3.10 | 3.335 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 8.47 | 0.921 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 005Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 12.00 | 0.533 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.34 | 6.991 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.32 | 5.788 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.22 | 4.290 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.42 | 2.891 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 7.62 | 0.770 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 010Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 12.00 | 0.644 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.32 | 7.123 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.33 | 5.903 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.14 | 4.398 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.71 | 2.927 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 6.50 | 0.938 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 025Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 11.50 | 0.816 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.32 | 7.114 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.30 | 6.159 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.12 | 4.357 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.14 | 4.144 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.83 | 1.109 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 050Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 10.75 | 0.962 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.29 | 8.027 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.28 | 6.224 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.05 | 4.428 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.11 | 3.703 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.28 | 1.221 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 100Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 10.15 | 1.123 | 0.00 | 0.000 |
| P-AQ-1 | BASE | 25Y 24H SWFWMD | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.88 | 0.838 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.34 | 3.365 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y002H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 0.34 | 2.927 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 1.18 | 2.122 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 3.09 | 1.791 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 8.78 | 0.566 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 002Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 8.88 | 0.293 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.31 | 3.547 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y002H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 0.30 | 2.996 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 1.10 | 2.094 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 2.58 | 1.819 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 7.22 | 0.706 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 005Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 12.35 | 0.406 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.30 | 3.523 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y002H | 0.00 | 100.000 | 0.000 | -0.0492 | 0 | 0.27 | 3.101 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 1.03 | 2.102 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 2.42 | 1.822 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 6.43 | 0.890 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 010Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 8.87 | 0.479 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.29 | 3.656 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y002H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.25 | 3.240 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 0.88 | 2.206 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 2.17 | 1.856 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 5.58 | 0.768 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 025Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 8.87 | 0.599 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 050Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.27 | 3.591 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 050Y002H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.22 | 3.249 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-AQ-2 | BASE | 050Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 0.80 | 2.313 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 050Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 2.03 | 1.852 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 050Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 5.02 | 0.864 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 050Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 9.87 | 0.796 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y001H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.27 | 3.528 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y002H | 0.00 | 100.000 | 0.000 | -0.0394 | 0 | 0.22 | 3.308 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y004H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 0.75 | 2.379 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y008H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 1.93 | 1.874 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y024H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 4.45 | 0.932 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 100Y072H | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 9.40 | 0.924 | 0.00 | 0.000 |
| P-AQ-2 | BASE | 25Y 24H SWFWMD | 0.00 | 100.000 | 0.000 | -0.0500 | 0 | 12.39 | 0.961 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.35 | 6.584 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.37 | 5.644 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.22 | 4.133 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 3.09 | 3.508 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.00 | 1.201 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 002Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.03 | 0.584 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.34 | 6.549 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.31 | 5.766 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.12 | 4.125 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.58 | 3.568 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 8.05 | 1.322 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 005Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.03 | 0.809 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.32 | 6.698 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.30 | 5.875 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.05 | 4.114 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.42 | 3.574 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 7.40 | 1.097 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 010Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.03 | 0.956 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.31 | 6.680 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.27 | 6.081 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.92 | 4.282 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.18 | 3.634 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 6.15 | 1.490 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 025Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 11.10 | 1.490 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.30 | 6.868 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.25 | 6.351 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.83 | 4.490 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.02 | 3.652 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.53 | 1.587 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 050Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 10.43 | 1.476 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.29 | 7.046 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.23 | 6.398 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.78 | 4.588 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.88 | 3.730 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.00 | 1.490 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 100Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.03 | 1.644 | 0.00 | 0.000 |
| P-AQ-3 | BASE | 25Y 24H SWFWMD | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.47 | 1.155 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.34 | 17.200 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.35 | 14.549 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.23 | 10.643 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.90 | 6.103 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 7.53 | 1.803 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 002Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 8.87 | 1.389 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.33 | 16.943 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.30 | 15.015 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.12 | 10.657 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.55 | 7.790 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 6.55 | 2.205 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 005Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 11.53 | 1.933 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 010Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.31 | 17.366 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 010Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.29 | 15.285 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 010Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 1.07 | 10.609 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-AQ-4 | BASE | 010Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.40 | 8.715 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 010Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.87 | 2.616 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 010Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 10.77 | 2.286 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.29 | 17.352 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.26 | 15.846 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.95 | 10.854 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.25 | 9.400 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 5.10 | 2.656 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 025Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.92 | 2.856 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.29 | 17.821 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.23 | 16.612 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.83 | 11.451 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.10 | 9.412 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 4.50 | 2.918 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 050Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.42 | 3.366 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y001H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.27 | 18.591 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y002H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.22 | 16.826 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y004H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 0.78 | 11.763 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y008H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 2.08 | 9.396 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y024H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 4.02 | 3.416 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 100Y072H | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 9.00 | 3.930 | 0.00 | 0.000 |
| P-AQ-4 | BASE | 25Y 24H SWFWMD | 0.00 | 100.000 | 0.000 | 0.0000 | 0 | 7.97 | 1.798 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.62 | 1.446 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.83 | 1.092 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.00 | 0.617 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 7.13 | 1.233 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 21.05 | 1.152 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 002Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 64.02 | 1.285 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.63 | 1.740 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.09 | 1.478 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.56 | 3.601 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 5.21 | 4.561 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 19.02 | 2.213 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 005Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.07 | 3.552 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.63 | 1.917 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.04 | 3.728 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.36 | 5.936 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 5.12 | 7.276 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 16.03 | 3.411 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 010Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.05 | 4.413 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.14 | 3.960 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.91 | 6.679 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.19 | 9.659 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 5.08 | 9.942 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 15.06 | 5.400 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 025Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.03 | 5.757 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.12 | 6.578 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.80 | 9.494 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.13 | 12.544 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 5.03 | 13.107 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 13.09 | 7.338 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 050Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.02 | 6.959 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.09 | 9.225 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.72 | 11.276 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.11 | 14.537 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 5.01 | 13.725 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.46 | 9.438 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 100Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.02 | 8.222 | 0.00 | 0.000 |
| P-BNDY-EAST | BASE | 25Y 24H SWFWMD | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.63 | 10.013 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 002Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 0.00 | 0.000 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 002Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 0.00 | 0.000 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 002Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 0.00 | 0.000 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 002Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 8.14 | 0.766 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-BNDY-WEST | BASE | 002Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 21.40 | 0.725 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 002Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 64.10 | 1.009 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 0.00 | 0.000 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 4.00 | 0.174 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 4.09 | 2.093 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 5.76 | 3.073 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 19.06 | 1.672 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 005Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 60.10 | 2.524 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 0.00 | 0.000 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 2.34 | 2.003 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 3.67 | 3.801 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 5.25 | 4.950 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 16.08 | 2.589 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 010Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 60.10 | 3.255 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 1.96 | 1.289 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 2.10 | 4.368 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 3.44 | 6.448 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 5.17 | 7.063 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 15.15 | 4.150 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 025Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 60.10 | 4.433 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 1.37 | 3.020 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 2.03 | 6.405 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 3.29 | 8.787 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 5.12 | 9.691 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 15.09 | 5.540 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 050Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 60.10 | 5.503 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y001H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 1.27 | 4.814 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y002H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 1.97 | 7.755 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y004H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 3.25 | 10.420 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y008H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 5.12 | 10.210 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y024H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 13.19 | 7.114 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 100Y072H | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 60.10 | 6.703 | 0.00 | 0.000 |
| P-BNDY-WEST | BASE | 25Y 24H SWFWMD | 0.00 | 130.150 | 131.000 | 0.0000 | 0 | 13.09 | 6.216 | 0.00 | 0.000 |
| P-POND-1 | BASE | 002Y001H | 1.23 | 134.556 | 136.000 | 0.0028 | 22847 | 0.62 | 13.140 | 0.38 | 6.692 |
| P-POND-1 | BASE | 002Y002H | 2.13 | 134.619 | 136.000 | 0.0026 | 23068 | 0.83 | 9.652 | 0.47 | 5.244 |
| P-POND-1 | BASE | 002Y004H | 3.67 | 134.788 | 136.000 | 0.0027 | 23654 | 2.00 | 5.304 | 1.61 | 4.097 |
| P-POND-1 | BASE | 002Y008H | 6.16 | 134.802 | 136.000 | 0.0032 | 23704 | 4.00 | 5.184 | 3.25 | 3.913 |
| P-POND-1 | BASE | 002Y024H | 19.37 | 134.713 | 136.000 | 0.0030 | 23393 | 12.00 | 1.359 | 9.43 | 0.772 |
| P-POND-1 | BASE | 002Y072H | 64.05 | 134.739 | 136.000 | 0.0017 | 23486 | 59.92 | 0.795 | 64.02 | 0.423 |
| P-POND-1 | BASE | 005Y001H | 1.21 | 134.782 | 136.000 | 0.0029 | 23633 | 0.62 | 16.095 | 0.36 | 6.883 |
| P-POND-1 | BASE | 005Y002H | 2.10 | 134.900 | 136.000 | 0.0028 | 24043 | 0.83 | 12.353 | 0.38 | 5.779 |
| P-POND-1 | BASE | 005Y004H | 3.60 | 135.066 | 136.000 | 0.0032 | 24651 | 2.00 | 6.679 | 1.34 | 4.325 |
| P-POND-1 | BASE | 005Y008H | 5.30 | 135.133 | 136.000 | 0.0032 | 24917 | 4.00 | 6.830 | 3.10 | 3.335 |
| P-POND-1 | BASE | 005Y024H | 19.11 | 134.866 | 136.000 | 0.0031 | 23928 | 11.99 | 1.696 | 8.47 | 0.921 |
| P-POND-1 | BASE | 005Y072H | 60.33 | 134.935 | 136.000 | 0.0021 | 24166 | 59.92 | 1.121 | 60.22 | 0.722 |
| P-POND-1 | BASE | 010Y001H | 1.20 | 134.913 | 136.000 | 0.0029 | 24089 | 0.63 | 17.892 | 0.34 | 6.991 |
| P-POND-1 | BASE | 010Y002H | 2.07 | 135.086 | 136.000 | 0.0029 | 24730 | 0.83 | 14.309 | 0.32 | 5.788 |
| P-POND-1 | BASE | 010Y004H | 3.54 | 135.234 | 136.000 | 0.0031 | 25312 | 2.00 | 7.578 | 1.22 | 4.290 |
| P-POND-1 | BASE | 010Y008H | 5.24 | 135.330 | 136.000 | 0.0032 | 25687 | 4.00 | 7.882 | 2.42 | 2.891 |
| P-POND-1 | BASE | 010Y024H | 16.23 | 135.007 | 136.000 | 0.0031 | 24420 | 12.00 | 2.039 | 16.10 | 0.912 |
| P-POND-1 | BASE | 010Y072H | 60.30 | 135.036 | 136.000 | 0.0024 | 24535 | 59.92 | 1.334 | 60.20 | 0.893 |
| P-POND-1 | BASE | 025Y001H | 1.19 | 135.124 | 136.000 | 0.0030 | 24879 | 0.63 | 20.904 | 0.32 | 7.123 |
| P-POND-1 | BASE | 025Y002H | 2.03 | 135.298 | 136.000 | 0.0030 | 25561 | 0.83 | 16.681 | 0.33 | 5.903 |
| P-POND-1 | BASE | 025Y004H | 3.43 | 135.490 | 136.000 | 0.0033 | 26314 | 2.00 | 9.028 | 1.14 | 4.398 |
| P-POND-1 | BASE | 025Y008H | 5.20 | 135.543 | 136.000 | 0.0033 | 26521 | 4.00 | 9.086 | 2.71 | 2.927 |
| P-POND-1 | BASE | 025Y024H | 16.03 | 135.227 | 136.000 | 0.0030 | 25285 | 12.00 | 2.598 | 15.21 | 1.319 |
| P-POND-1 | BASE | 025Y072H | 60.25 | 135.188 | 136.000 | 0.0030 | 25132 | 59.91 | 1.678 | 60.18 | 1.170 |
| P-POND-1 | BASE | 050Y001H | 1.18 | 135.287 | 136.000 | 0.0031 | 25520 | 0.62 | 23.333 | 0.32 | 7.114 |
| P-POND-1 | BASE | 050Y002H | 1.99 | 135.500 | 136.000 | 0.0030 | 26355 | 0.83 | 19.056 | 0.30 | 6.159 |
| P-POND-1 | BASE | 050Y004H | 3.35 | 135.703 | 136.000 | 0.0032 | 27149 | 2.00 | 10.303 | 1.12 | 4.357 |
| P-POND-1 | BASE | 050Y008H | 5.16 | 135.794 | 136.000 | 0.0033 | 27507 | 4.00 | 10.592 | 2.14 | 4.144 |
| P-POND-1 | BASE | 050Y024H | 15.22 | 135.406 | 136.000 | 0.0032 | 25987 | 12.00 | 3.100 | 15.12 | 1.684 |
| P-POND-1 | BASE | 050Y072H | 60.23 | 135.313 | 136.000 | 0.0034 | 25621 | 59.92 | 1.984 | 60.17 | 1.417 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-POND-1 | BASE | 100Y001H | 1.17 | 135.446 | 136.000 | 0.0031 | 26143 | 0.62 | 25.770 | 0.29 | 8.027 |
| P-POND-1 | BASE | 100Y002H | 1.96 | 135.631 | 136.000 | 0.0031 | 26867 | 0.83 | 20.646 | 0.28 | 6.224 |
| P-POND-1 | BASE | 100Y004H | 3.32 | 135.850 | 136.000 | 0.0033 | 27725 | 2.00 | 11.214 | 1.05 | 4.428 |
| P-POND-1 | BASE | 100Y008H | 5.15 | 135.843 | 136.000 | 0.0033 | 27697 | 4.00 | 10.894 | 2.11 | 3.703 |
| P-POND-1 | BASE | 100Y024H | 15.14 | 135.589 | 136.000 | 0.0031 | 26703 | 12.00 | 3.662 | 15.07 | 2.085 |
| P-POND-1 | BASE | 100Y072H | 60.22 | 135.443 | 136.000 | 0.0034 | 26128 | 59.92 | 2.323 | 60.17 | 1.693 |
| P-POND-1 | BASE | 25Y 24H SWFWMD | 12.86 | 135.508 | 136.000 | 0.0033 | 26387 | 12.00 | 15.054 | 12.66 | 2.246 |
| P-POND-2 | BASE | 002Y001H | 1.22 | 130.004 | 132.000 | 0.0050 | 13175 | 0.62 | 9.713 | 0.34 | 3.365 |
| P-POND-2 | BASE | 002Y002H | 2.70 | 130.109 | 132.000 | 0.0050 | 13500 | 0.83 | 7.039 | 0.34 | 2.927 |
| P-POND-2 | BASE | 002Y004H | 6.94 | 130.751 | 132.000 | 0.0048 | 15456 | 2.00 | 3.811 | 1.18 | 2.122 |
| P-POND-2 | BASE | 002Y008H | 8.14 | 131.119 | 132.000 | 0.0040 | 16601 | 4.00 | 3.953 | 3.09 | 1.791 |
| P-POND-2 | BASE | 002Y024H | 21.40 | 131.115 | 132.000 | 0.0039 | 16582 | 19.00 | 1.272 | 21.28 | 1.008 |
| P-POND-2 | BASE | 002Y072H | 64.10 | 131.143 | 132.000 | 0.0050 | 16671 | 60.00 | 1.531 | 64.08 | 1.235 |
| P-POND-2 | BASE | 005Y001H | 2.00 | 130.454 | 132.000 | 0.0050 | 14566 | 0.62 | 11.852 | 0.31 | 3.547 |
| P-POND-2 | BASE | 005Y002H | 4.00 | 131.044 | 132.000 | 0.0050 | 16367 | 0.83 | 9.055 | 0.30 | 2.996 |
| P-POND-2 | BASE | 005Y004H | 4.09 | 131.233 | 132.000 | 0.0049 | 16968 | 3.00 | 5.533 | 4.06 | 2.711 |
| P-POND-2 | BASE | 005Y008H | 5.79 | 131.305 | 132.000 | 0.0042 | 17195 | 4.00 | 6.540 | 5.59 | 3.665 |
| P-POND-2 | BASE | 005Y024H | 19.06 | 131.200 | 132.000 | 0.0050 | 16857 | 16.00 | 2.070 | 19.02 | 1.945 |
| P-POND-2 | BASE | 005Y072H | 60.10 | 131.263 | 132.000 | 0.0050 | 17055 | 60.00 | 2.798 | 60.10 | 2.712 |
| P-POND-2 | BASE | 010Y001H | 2.00 | 130.782 | 132.000 | 0.0050 | 15578 | 0.63 | 13.274 | 0.30 | 3.523 |
| P-POND-2 | BASE | 010Y002H | 2.34 | 131.226 | 132.000 | 0.0050 | 16949 | 0.83 | 10.831 | 0.27 | 3.101 |
| P-POND-2 | BASE | 010Y004H | 3.67 | 131.371 | 132.000 | 0.0049 | 17400 | 3.00 | 7.060 | 3.63 | 4.521 |
| P-POND-2 | BASE | 010Y008H | 5.27 | 131.477 | 132.000 | 0.0050 | 17729 | 4.00 | 8.507 | 5.21 | 5.634 |
| P-POND-2 | BASE | 010Y024H | 16.08 | 131.268 | 132.000 | 0.0050 | 17074 | 15.00 | 3.038 | 16.03 | 2.919 |
| P-POND-2 | BASE | 010Y072H | 60.10 | 131.321 | 132.000 | 0.0040 | 17238 | 60.00 | 3.541 | 60.10 | 3.419 |
| P-POND-2 | BASE | 025Y001H | 1.96 | 131.168 | 132.000 | 0.0050 | 16769 | 0.67 | 16.082 | 0.29 | 3.656 |
| P-POND-2 | BASE | 025Y002H | 2.10 | 131.423 | 132.000 | 0.0050 | 17563 | 0.83 | 13.246 | 2.06 | 5.262 |
| P-POND-2 | BASE | 025Y004H | 3.45 | 131.616 | 132.000 | 0.0049 | 18051 | 3.00 | 9.670 | 3.37 | 7.257 |
| P-POND-2 | BASE | 025Y008H | 5.17 | 131.675 | 132.000 | 0.0050 | 18231 | 4.00 | 10.952 | 5.14 | 7.770 |
| P-POND-2 | BASE | 025Y024H | 15.15 | 131.403 | 132.000 | 0.0050 | 17498 | 15.00 | 4.576 | 15.11 | 4.488 |
| P-POND-2 | BASE | 025Y072H | 60.10 | 131.429 | 132.000 | 0.0050 | 17476 | 60.00 | 4.772 | 60.10 | 4.602 |
| P-POND-2 | BASE | 050Y001H | 1.37 | 131.301 | 132.000 | 0.0050 | 17189 | 0.67 | 18.536 | 1.26 | 4.515 |
| P-POND-2 | BASE | 050Y002H | 2.03 | 131.612 | 132.000 | 0.0050 | 18039 | 0.83 | 15.931 | 1.94 | 7.365 |
| P-POND-2 | BASE | 050Y004H | 3.29 | 131.839 | 132.000 | 0.0050 | 18732 | 2.58 | 12.084 | 3.24 | 9.674 |
| P-POND-2 | BASE | 050Y008H | 5.14 | 131.927 | 132.000 | 0.0050 | 19003 | 4.00 | 14.211 | 5.12 | 10.425 |
| P-POND-2 | BASE | 050Y024H | 15.09 | 131.531 | 132.000 | 0.0050 | 17791 | 12.00 | 6.068 | 15.09 | 5.867 |
| P-POND-2 | BASE | 050Y072H | 60.10 | 131.528 | 132.000 | 0.0050 | 17780 | 60.00 | 5.885 | 60.10 | 5.680 |
| P-POND-2 | BASE | 100Y001H | 1.27 | 131.464 | 132.000 | 0.0050 | 17695 | 0.67 | 21.130 | 1.18 | 6.523 |
| P-POND-2 | BASE | 100Y002H | 1.97 | 131.741 | 132.000 | 0.0050 | 18434 | 0.83 | 17.829 | 1.90 | 8.764 |
| P-POND-2 | BASE | 100Y004H | 3.25 | 132.001 | 132.000 | 0.0050 | 19228 | 2.56 | 13.866 | 3.22 | 11.345 |
| P-POND-2 | BASE | 100Y008H | 5.13 | 131.980 | 132.000 | 0.0050 | 19163 | 4.00 | 14.882 | 5.11 | 10.950 |
| P-POND-2 | BASE | 100Y024H | 13.21 | 131.680 | 132.000 | 0.0050 | 18246 | 12.00 | 7.992 | 13.14 | 7.514 |
| P-POND-2 | BASE | 100Y072H | 60.10 | 131.640 | 132.000 | 0.0050 | 18123 | 60.00 | 7.129 | 60.10 | 6.887 |
| P-POND-2 | BASE | 25Y 24H SWFWMD | 13.09 | 131.595 | 132.000 | 0.0049 | 17985 | 12.08 | 14.255 | 13.01 | 6.927 |
| P-POND-3 | BASE | 002Y001H | 1.07 | 134.956 | 137.000 | 0.0047 | 23350 | 0.62 | 18.254 | 0.35 | 6.584 |
| P-POND-3 | BASE | 002Y002H | 2.09 | 134.946 | 137.000 | 0.0048 | 23311 | 0.83 | 13.479 | 0.37 | 5.644 |
| P-POND-3 | BASE | 002Y004H | 3.61 | 135.148 | 137.000 | 0.0047 | 24036 | 2.00 | 7.496 | 1.22 | 4.133 |
| P-POND-3 | BASE | 002Y008H | 5.38 | 135.147 | 137.000 | 0.0043 | 24036 | 4.00 | 7.366 | 3.09 | 3.508 |
| P-POND-3 | BASE | 002Y024H | 19.20 | 134.984 | 137.000 | 0.0042 | 23459 | 12.00 | 1.920 | 9.00 | 1.201 |
| P-POND-3 | BASE | 002Y072H | 60.41 | 135.027 | 137.000 | 0.0026 | 23616 | 60.00 | 1.207 | 60.26 | 0.783 |
| P-POND-3 | BASE | 005Y001H | 1.08 | 135.225 | 137.000 | 0.0046 | 24308 | 0.63 | 22.044 | 0.34 | 6.549 |
| P-POND-3 | BASE | 005Y002H | 2.02 | 135.299 | 137.000 | 0.0048 | 24564 | 0.83 | 16.992 | 0.31 | 5.766 |
| P-POND-3 | BASE | 005Y004H | 3.44 | 135.501 | 137.000 | 0.0049 | 25267 | 2.00 | 9.308 | 1.12 | 4.125 |
| P-POND-3 | BASE | 005Y008H | 5.21 | 135.566 | 137.000 | 0.0044 | 25496 | 4.00 | 9.962 | 2.58 | 3.568 |
| P-POND-3 | BASE | 005Y024H | 16.22 | 135.150 | 137.000 | 0.0042 | 24046 | 11.99 | 2.450 | 8.05 | 1.322 |
| P-POND-3 | BASE | 005Y072H | 60.20 | 135.280 | 137.000 | 0.0030 | 24499 | 60.00 | 1.778 | 60.17 | 1.388 |
| P-POND-3 | BASE | 010Y001H | 1.09 | 135.385 | 137.000 | 0.0045 | 24864 | 0.63 | 24.413 | 0.32 | 6.698 |
| P-POND-3 | BASE | 010Y002H | 1.94 | 135.535 | 137.000 | 0.0047 | 25386 | 0.83 | 19.695 | 1.18 | 5.949 |
| P-POND-3 | BASE | 010Y004H | 3.35 | 135.717 | 137.000 | 0.0048 | 26022 | 2.08 | 10.612 | 1.05 | 4.114 |
| P-POND-3 | BASE | 010Y008H | 5.16 | 135.811 | 137.000 | 0.0043 | 26350 | 4.00 | 11.691 | 5.11 | 3.605 |
| P-POND-3 | BASE | 010Y024H | 16.03 | 135.320 | 137.000 | 0.0042 | 24638 | 12.00 | 3.009 | 15.25 | 1.633 |
| P-POND-3 | BASE | 010Y072H | 60.18 | 135.403 | 137.000 | 0.0035 | 24928 | 60.00 | 2.164 | 60.15 | 1.738 |
| P-POND-3 | BASE | 025Y001H | 1.17 | 135.652 | 137.000 | 0.0045 | 25795 | 0.67 | 28.555 | 0.98 | 7.558 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-POND-3 | BASE | 025Y002H | 1.87 | 135.807 | 137.000 | -0.0050 | 26334 | 0.83 | 23.087 | 1.14 | 6.806 |
| P-POND-3 | BASE | 025Y004H | 3.27 | 136.047 | 137.000 | -0.0049 | 27192 | 2.08 | 12.815 | 3.18 | 4.750 |
| P-POND-3 | BASE | 025Y008H | 5.13 | 136.076 | 137.000 | 0.0044 | 27304 | 4.00 | 13.719 | 5.08 | 4.628 |
| P-POND-3 | BASE | 025Y024H | 15.15 | 135.567 | 137.000 | 0.0042 | 25499 | 12.00 | 3.952 | 15.10 | 2.370 |
| P-POND-3 | BASE | 025Y072H | 60.16 | 135.590 | 137.000 | 0.0043 | 25577 | 60.00 | 2.799 | 60.13 | 2.319 |
| P-POND-3 | BASE | 050Y001H | 1.16 | 135.866 | 137.000 | 0.0045 | 26541 | 0.67 | 32.009 | 0.99 | 8.401 |
| P-POND-3 | BASE | 050Y002H | 1.80 | 136.069 | 137.000 | -0.0050 | 27280 | 0.83 | 26.608 | 1.11 | 7.680 |
| P-POND-3 | BASE | 050Y004H | 3.23 | 136.321 | 137.000 | -0.0050 | 28267 | 2.08 | 14.815 | 3.17 | 5.922 |
| P-POND-3 | BASE | 050Y008H | 5.09 | 136.387 | 137.000 | 0.0043 | 28524 | 4.00 | 16.316 | 5.01 | 5.954 |
| P-POND-3 | BASE | 050Y024H | 15.07 | 135.760 | 137.000 | 0.0044 | 26173 | 12.00 | 4.825 | 13.21 | 3.079 |
| P-POND-3 | BASE | 050Y072H | 60.15 | 135.745 | 137.000 | 0.0050 | 26120 | 59.98 | 3.373 | 60.13 | 2.848 |
| P-POND-3 | BASE | 100Y001H | 1.16 | 136.076 | 137.000 | -0.0049 | 27305 | 0.67 | 35.540 | 1.00 | 9.290 |
| P-POND-3 | BASE | 100Y002H | 1.76 | 136.240 | 137.000 | -0.0050 | 27949 | 0.83 | 29.009 | 1.08 | 8.264 |
| P-POND-3 | BASE | 100Y004H | 3.22 | 136.510 | 137.000 | -0.0050 | 29006 | 2.08 | 16.275 | 3.15 | 6.782 |
| P-POND-3 | BASE | 100Y008H | 5.09 | 136.447 | 137.000 | -0.0043 | 28760 | 4.00 | 16.844 | 4.69 | 6.234 |
| P-POND-3 | BASE | 100Y024H | 13.19 | 135.986 | 137.000 | 0.0042 | 26959 | 12.00 | 5.826 | 13.11 | 3.926 |
| P-POND-3 | BASE | 100Y072H | 60.14 | 135.908 | 137.000 | 0.0049 | 26687 | 59.99 | 4.014 | 60.12 | 3.442 |
| P-POND-3 | BASE 25Y 24H SWFWMD | | 12.76 | 136.092 | 137.000 | 0.0044 | 27368 | 12.08 | 21.204 | 12.66 | 4.839 |
| P-POND-4 | BASE | 002Y001H | 1.32 | 127.155 | 129.000 | 0.0050 | 57068 | 0.62 | 48.316 | 0.34 | 17.200 |
| P-POND-4 | BASE | 002Y002H | 2.29 | 127.316 | 129.000 | 0.0050 | 57982 | 0.83 | 35.332 | 0.35 | 14.549 |
| P-POND-4 | BASE | 002Y004H | 4.10 | 127.635 | 129.000 | 0.0050 | 59788 | 2.00 | 19.342 | 1.23 | 10.643 |
| P-POND-4 | BASE | 002Y008H | 7.22 | 127.746 | 129.000 | 0.0050 | 60416 | 4.00 | 18.944 | 2.90 | 6.103 |
| P-POND-4 | BASE | 002Y024H | 21.10 | 127.736 | 129.000 | 0.0048 | 60361 | 12.00 | 4.963 | 7.53 | 1.803 |
| P-POND-4 | BASE | 002Y072H | 64.08 | 127.754 | 129.000 | 0.0028 | 60464 | 59.92 | 2.932 | 64.07 | 1.484 |
| P-POND-4 | BASE | 005Y001H | 1.34 | 127.515 | 129.000 | 0.0050 | 59108 | 0.62 | 59.069 | 0.33 | 16.943 |
| P-POND-4 | BASE | 005Y002H | 2.17 | 127.770 | 129.000 | 0.0050 | 60554 | 0.83 | 45.180 | 0.30 | 15.015 |
| P-POND-4 | BASE | 005Y004H | 3.61 | 128.004 | 129.000 | 0.0050 | 61879 | 2.00 | 24.374 | 1.12 | 10.657 |
| P-POND-4 | BASE | 005Y008H | 5.27 | 128.092 | 129.000 | 0.0050 | 62379 | 4.00 | 25.054 | 2.55 | 7.790 |
| P-POND-4 | BASE | 005Y024H | 19.07 | 127.867 | 129.000 | 0.0049 | 61100 | 11.99 | 6.211 | 19.04 | 2.500 |
| P-POND-4 | BASE | 005Y072H | 60.10 | 128.004 | 129.000 | 0.0027 | 61875 | 59.92 | 4.159 | 60.10 | 3.680 |
| P-POND-4 | BASE | 010Y001H | 1.29 | 127.713 | 129.000 | 0.0050 | 60231 | 0.63 | 65.633 | 0.31 | 17.366 |
| P-POND-4 | BASE | 010Y002H | 2.09 | 128.015 | 129.000 | 0.0050 | 61939 | 0.83 | 52.351 | 0.29 | 15.285 |
| P-POND-4 | BASE | 010Y004H | 3.43 | 128.207 | 129.000 | 0.0050 | 63030 | 2.00 | 27.681 | 1.07 | 10.609 |
| P-POND-4 | BASE | 010Y008H | 5.16 | 128.313 | 129.000 | 0.0050 | 63628 | 4.00 | 28.984 | 2.40 | 8.715 |
| P-POND-4 | BASE | 010Y024H | 16.08 | 127.990 | 129.000 | 0.0050 | 61801 | 12.00 | 7.489 | 16.03 | 3.737 |
| P-POND-4 | BASE | 010Y072H | 60.10 | 128.082 | 129.000 | 0.0031 | 62320 | 59.92 | 4.966 | 60.08 | 4.497 |
| P-POND-4 | BASE | 025Y001H | 1.22 | 128.012 | 129.000 | 0.0050 | 61920 | 0.63 | 76.676 | 0.29 | 17.352 |
| P-POND-4 | BASE | 025Y002H | 1.97 | 128.266 | 129.000 | 0.0050 | 63362 | 0.83 | 61.090 | 0.26 | 15.846 |
| P-POND-4 | BASE | 025Y004H | 3.25 | 128.519 | 129.000 | 0.0050 | 64793 | 2.00 | 33.039 | 0.95 | 10.854 |
| P-POND-4 | BASE | 025Y008H | 5.12 | 128.550 | 129.000 | 0.0050 | 64970 | 4.00 | 33.500 | 5.09 | 10.581 |
| P-POND-4 | BASE | 025Y024H | 15.10 | 128.167 | 129.000 | 0.0050 | 62804 | 12.00 | 9.583 | 15.06 | 5.670 |
| P-POND-4 | BASE | 025Y072H | 60.08 | 128.195 | 129.000 | 0.0038 | 62960 | 59.91 | 6.271 | 60.06 | 5.782 |
| P-POND-4 | BASE | 050Y001H | 1.18 | 128.234 | 129.000 | 0.0050 | 63180 | 0.62 | 85.615 | 0.29 | 17.821 |
| P-POND-4 | BASE | 050Y002H | 1.87 | 128.506 | 129.000 | 0.0050 | 64723 | 0.83 | 69.880 | 0.23 | 16.612 |
| P-POND-4 | BASE | 050Y004H | 3.21 | 128.785 | 129.000 | 0.0050 | 66299 | 2.00 | 37.777 | 3.17 | 13.351 |
| P-POND-4 | BASE | 050Y008H | 5.07 | 128.846 | 129.000 | 0.0050 | 66644 | 4.00 | 39.169 | 5.04 | 13.685 |
| P-POND-4 | BASE | 050Y024H | 13.14 | 128.321 | 129.000 | 0.0050 | 63671 | 12.00 | 11.474 | 13.11 | 7.647 |
| P-POND-4 | BASE | 050Y072H | 60.07 | 128.289 | 129.000 | 0.0043 | 63492 | 59.92 | 7.434 | 60.07 | 6.930 |
| P-POND-4 | BASE | 100Y001H | 1.16 | 128.448 | 129.000 | 0.0050 | 64394 | 0.62 | 94.607 | 0.27 | 18.591 |
| P-POND-4 | BASE | 100Y002H | 1.82 | 128.670 | 129.000 | 0.0050 | 65648 | 0.83 | 75.785 | 0.22 | 16.826 |
| P-POND-4 | BASE | 100Y004H | 3.19 | 128.970 | 129.000 | 0.0050 | 67351 | 2.00 | 41.174 | 3.15 | 15.305 |
| P-POND-4 | BASE | 100Y008H | 5.07 | 128.904 | 129.000 | 0.0050 | 66977 | 4.00 | 40.307 | 5.03 | 14.290 |
| P-POND-4 | BASE | 100Y024H | 12.56 | 128.506 | 129.000 | 0.0050 | 64720 | 12.00 | 13.599 | 12.41 | 9.728 |
| P-POND-4 | BASE | 100Y072H | 60.07 | 128.391 | 129.000 | 0.0045 | 64068 | 59.92 | 8.723 | 60.07 | 8.133 |
| P-POND-4 | BASE 25Y 24H SWFWMD | | 12.71 | 128.545 | 129.000 | 0.0050 | 64943 | 12.00 | 55.351 | 12.65 | 10.759 |
| STM-23 | BASE | 002Y001H | 1.28 | 131.240 | 0.000 | -131.0900 | 216 | 1.23 | 0.125 | 1.25 | 0.124 |
| STM-23 | BASE | 002Y002H | 2.17 | 131.277 | 0.000 | -131.0900 | 226 | 2.13 | 0.187 | 2.15 | 0.186 |
| STM-23 | BASE | 002Y004H | 3.69 | 131.365 | 0.000 | -131.0900 | 248 | 3.67 | 0.386 | 3.68 | 0.386 |
| STM-23 | BASE | 002Y008H | 6.21 | 131.372 | 0.000 | -131.0900 | 249 | 6.16 | 0.405 | 6.10 | 0.405 |
| STM-23 | BASE | 002Y024H | 19.30 | 131.327 | 0.000 | -131.0900 | 239 | 19.37 | 0.291 | 19.30 | 0.291 |
| STM-23 | BASE | 002Y072H | 64.07 | 131.341 | 0.000 | -131.0900 | 242 | 64.05 | 0.324 | 64.07 | 0.324 |
| STM-23 | BASE | 005Y001H | 1.24 | 131.362 | 0.000 | -131.0900 | 247 | 1.21 | 0.378 | 1.24 | 0.378 |
| STM-23 | BASE | 005Y002H | 2.11 | 131.419 | 0.000 | -131.0900 | 258 | 2.10 | 0.543 | 2.11 | 0.543 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STM-23 | BASE | 005Y004H | 3.62 | 131.496 | 0.000 | -131.0900 | 270 | 3.60 | 0.807 | 3.60 | 0.807 |
| STM-23 | BASE | 005Y008H | 5.32 | 131.526 | 0.000 | -131.0900 | 274 | 5.30 | 0.925 | 5.29 | 0.924 |
| STM-23 | BASE | 005Y024H | 19.16 | 131.403 | 0.000 | -131.0900 | 255 | 19.11 | 0.495 | 19.06 | 0.495 |
| STM-23 | BASE | 005Y072H | 60.37 | 131.436 | 0.000 | -131.0900 | 261 | 60.33 | 0.596 | 60.32 | 0.596 |
| STM-23 | BASE | 010Y001H | 1.23 | 131.425 | 0.000 | -131.0900 | 259 | 1.20 | 0.563 | 1.21 | 0.562 |
| STM-23 | BASE | 010Y002H | 2.08 | 131.505 | 0.000 | -131.0900 | 271 | 2.07 | 0.842 | 2.08 | 0.842 |
| STM-23 | BASE | 010Y004H | 3.58 | 131.570 | 0.000 | -131.0900 | 280 | 3.54 | 1.108 | 3.52 | 1.108 |
| STM-23 | BASE | 010Y008H | 5.24 | 131.611 | 0.000 | -131.0900 | 285 | 5.24 | 1.293 | 5.24 | 1.293 |
| STM-23 | BASE | 010Y024H | 16.25 | 131.469 | 0.000 | -131.0900 | 266 | 16.23 | 0.709 | 16.23 | 0.710 |
| STM-23 | BASE | 010Y072H | 60.33 | 131.482 | 0.000 | -131.0900 | 268 | 60.30 | 0.758 | 60.25 | 0.758 |
| STM-23 | BASE | 025Y001H | 1.33 | 131.522 | 0.000 | -131.0900 | 241 | 1.19 | 0.908 | 1.19 | 0.907 |
| STM-23 | BASE | 025Y002H | 2.04 | 131.597 | 0.000 | -131.0900 | 283 | 2.03 | 1.230 | 2.03 | 1.230 |
| STM-23 | BASE | 025Y004H | 3.45 | 131.714 | 0.000 | -131.0900 | 257 | 3.43 | 1.623 | 3.46 | 1.622 |
| STM-23 | BASE | 025Y008H | 5.18 | 131.760 | 0.000 | -131.0900 | 260 | 5.20 | 1.737 | 5.23 | 1.739 |
| STM-23 | BASE | 025Y024H | 16.03 | 131.567 | 0.000 | -131.0900 | 280 | 16.03 | 1.096 | 16.03 | 1.096 |
| STM-23 | BASE | 025Y072H | 60.15 | 131.554 | 0.000 | -131.0900 | 245 | 60.25 | 1.023 | 60.26 | 1.025 |
| STM-23 | BASE | 050Y001H | 1.20 | 131.593 | 0.000 | -131.0900 | 283 | 1.18 | 1.210 | 1.19 | 1.209 |
| STM-23 | BASE | 050Y002H | 2.03 | 131.713 | 0.000 | -131.0900 | 257 | 1.99 | 1.645 | 2.03 | 1.644 |
| STM-23 | BASE | 050Y004H | 3.31 | 131.903 | 0.000 | -131.0900 | 266 | 3.35 | 2.098 | 3.39 | 2.101 |
| STM-23 | BASE | 050Y008H | 5.12 | 131.986 | 0.000 | -131.0900 | 268 | 5.16 | 2.314 | 5.24 | 2.315 |
| STM-23 | BASE | 050Y024H | 15.12 | 131.650 | 0.000 | -131.0900 | 253 | 15.22 | 1.448 | 15.24 | 1.449 |
| STM-23 | BASE | 050Y072H | 60.13 | 131.631 | 0.000 | -131.0900 | 251 | 60.23 | 1.260 | 60.25 | 1.263 |
| STM-23 | BASE | 100Y001H | 1.19 | 131.660 | 0.000 | -131.0900 | 290 | 1.17 | 1.530 | 1.18 | 1.530 |
| STM-23 | BASE | 100Y002H | 1.97 | 131.820 | 0.000 | -131.0900 | 263 | 1.96 | 1.933 | 1.98 | 1.933 |
| STM-23 | BASE | 100Y004H | 3.26 | 132.055 | 0.000 | -131.0900 | 268 | 3.32 | 2.449 | 3.34 | 2.453 |
| STM-23 | BASE | 100Y008H | 5.13 | 132.036 | 0.000 | -131.0900 | 268 | 5.15 | 2.432 | 5.06 | 2.474 |
| STM-23 | BASE | 100Y024H | 15.07 | 131.768 | 0.000 | -131.0900 | 260 | 15.14 | 1.839 | 15.16 | 1.840 |
| STM-23 | BASE | 100Y072H | 60.12 | 131.722 | 0.000 | -131.0900 | 258 | 60.22 | 1.523 | 60.24 | 1.526 |
| STM-23 | BASE | 25Y 24H SWFWMD | 13.06 | 131.703 | 0.000 | -131.0900 | 257 | 12.86 | 1.663 | 12.90 | 1.658 |
| X-BNDY-EAST | BASE | 002Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.96 | 3.215 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 002Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.50 | 2.346 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 002Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.08 | 3.889 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 002Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.17 | 3.621 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 002Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 15.08 | 1.174 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 002Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.00 | 1.484 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.92 | 6.257 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.17 | 5.090 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 3.00 | 6.535 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.17 | 7.481 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.10 | 1.882 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 005Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.00 | 2.700 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.92 | 8.421 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.13 | 7.660 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.67 | 8.486 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.17 | 10.300 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.08 | 2.897 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 010Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.00 | 3.545 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.92 | 12.486 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.08 | 11.247 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.67 | 12.181 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.08 | 13.831 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.09 | 4.729 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 025Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.00 | 4.952 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.88 | 16.189 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.08 | 15.309 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.67 | 15.656 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.08 | 18.599 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.08 | 6.507 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 050Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 60.00 | 6.225 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 100Y001H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 0.88 | 20.182 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 100Y002H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 1.04 | 18.225 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 100Y004H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 2.67 | 18.244 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 100Y008H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 4.08 | 19.589 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X-BNDY-EAST | BASE | 100Y024H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.08 | 8.606 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 100Y072H | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 59.99 | 7.648 | 0.00 | 0.000 |
| X-BNDY-EAST | BASE | 25Y 24H SWFWMD | 0.00 | 127.500 | 127.600 | 0.0000 | 0 | 12.17 | 17.708 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.88 | 1.990 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y002H | 4.00 | 130.263 | 131.100 | 0.0005 | 0 | 1.54 | 1.413 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y004H | 8.01 | 130.377 | 131.100 | 0.0005 | 0 | 3.08 | 2.726 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y008H | 16.01 | 130.604 | 131.100 | 0.0005 | 0 | 4.08 | 2.341 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y024H | 30.00 | 131.000 | 131.100 | 0.0005 | 0 | 15.08 | 0.853 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 002Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 60.00 | 1.190 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.88 | 4.418 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y002H | 4.00 | 130.263 | 131.100 | 0.0005 | 0 | 1.13 | 3.402 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y004H | 7.99 | 130.377 | 131.100 | 0.0005 | 0 | 3.00 | 5.019 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y008H | 16.01 | 130.604 | 131.100 | 0.0005 | 0 | 4.08 | 5.748 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y024H | 30.01 | 131.000 | 131.100 | 0.0005 | 0 | 15.08 | 1.456 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 005Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 60.00 | 2.330 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.87 | 6.261 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y002H | 4.00 | 130.263 | 131.100 | 0.0005 | 0 | 1.08 | 5.511 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y004H | 8.00 | 130.377 | 131.100 | 0.0005 | 0 | 3.00 | 6.721 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y008H | 15.99 | 130.603 | 131.100 | 0.0005 | 0 | 4.08 | 8.369 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y024H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 12.08 | 2.183 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 010Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 60.00 | 3.143 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.83 | 9.898 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y002H | 4.00 | 130.263 | 131.100 | 0.0004 | 0 | 1.04 | 8.600 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y004H | 8.00 | 130.377 | 131.100 | 0.0005 | 0 | 2.59 | 9.872 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y008H | 15.99 | 130.603 | 131.100 | 0.0005 | 0 | 4.08 | 11.681 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y024H | 30.01 | 131.000 | 131.100 | 0.0005 | 0 | 12.08 | 3.855 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 025Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 60.00 | 4.522 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.83 | 13.295 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y002H | 3.99 | 130.263 | 131.100 | 0.0004 | 0 | 1.00 | 12.261 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y004H | 8.00 | 130.377 | 131.100 | 0.0005 | 0 | 2.58 | 13.126 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y008H | 16.00 | 130.603 | 131.100 | 0.0005 | 0 | 4.08 | 16.201 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y024H | 30.01 | 131.000 | 131.100 | 0.0005 | 0 | 12.08 | 5.520 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 050Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 59.98 | 5.788 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y001H | 2.00 | 130.207 | 131.100 | 0.0004 | 0 | 0.83 | 17.022 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y002H | 4.00 | 130.263 | 131.100 | 0.0004 | 0 | 1.00 | 14.997 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y004H | 8.00 | 130.377 | 131.100 | 0.0005 | 0 | 2.58 | 15.588 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y008H | 16.00 | 130.603 | 131.100 | 0.0005 | 0 | 4.08 | 17.144 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y024H | 30.01 | 131.000 | 131.100 | 0.0005 | 0 | 12.08 | 7.517 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 100Y072H | 30.02 | 131.000 | 131.100 | 0.0005 | 0 | 59.99 | 7.217 | 0.00 | 0.000 |
| X-BNDY-WEST | BASE | 25Y 24H SWFWMD | 30.00 | 131.000 | 131.100 | 0.0005 | 0 | 12.17 | 14.993 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 002Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 005Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 010Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 025Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 025Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 025Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 025Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 025Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X-POND-4 | BASE | 025Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 050Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y001H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y002H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y004H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y008H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y024H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 100Y072H | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |
| X-POND-4 | BASE | 25Y 24H SWFWMD | 0.00 | 142.500 | 145.000 | 0.0000 | 1045 | 0.00 | 0.000 | 0.00 | 0.000 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| P-17 | BASE | 002Y001H | 1.25 | 0.124 | 0.001 | 1.28 | 131.240 | 0.80 | 129.804 |
| P-DS-1 | BASE | 002Y001H | 1.23 | 0.125 | 0.001 | 1.23 | 134.556 | 1.28 | 131.240 |
| P-DS-2 | BASE | 002Y001H | 0.00 | 0.000 | 0.000 | 1.22 | 130.004 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y001H | 1.07 | 0.453 | -0.005 | 1.07 | 134.956 | 1.22 | 130.004 |
| P-DS-4 | BASE | 002Y001H | 0.00 | 0.000 | 0.000 | 1.32 | 127.155 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y001H | 0.38 | 6.692 | -3.571 | 1.23 | 134.556 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y001H | 0.34 | 3.365 | -0.841 | 1.22 | 130.004 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y001H | 0.35 | 6.584 | -2.084 | 1.07 | 134.956 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y001H | 0.34 | 17.200 | -10.385 | 1.32 | 127.155 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 002Y002H | 2.15 | 0.186 | 0.002 | 2.17 | 131.277 | 1.18 | 129.775 |
| P-DS-1 | BASE | 002Y002H | 2.13 | 0.187 | 0.001 | 2.13 | 134.619 | 2.17 | 131.277 |
| P-DS-2 | BASE | 002Y002H | 0.00 | 0.000 | 0.000 | 2.70 | 130.109 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y002H | 2.09 | 0.434 | -0.004 | 2.09 | 134.946 | 2.70 | 130.109 |
| P-DS-4 | BASE | 002Y002H | 0.00 | 0.000 | 0.000 | 2.29 | 127.316 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y002H | 0.47 | 5.244 | -3.375 | 2.13 | 134.619 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y002H | 0.34 | 2.927 | -0.854 | 2.70 | 130.109 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y002H | 0.37 | 5.644 | -2.063 | 2.09 | 134.946 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y002H | 0.35 | 14.549 | -8.392 | 2.29 | 127.316 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 002Y004H | 3.68 | 0.386 | 0.002 | 3.69 | 131.365 | 2.41 | 129.701 |
| P-DS-1 | BASE | 002Y004H | 3.67 | 0.386 | -0.002 | 3.67 | 134.788 | 3.69 | 131.365 |
| P-DS-2 | BASE | 002Y004H | 0.00 | 0.000 | 0.000 | 6.94 | 130.751 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y004H | 3.61 | 0.864 | -0.006 | 3.61 | 135.148 | 6.94 | 130.751 |
| P-DS-4 | BASE | 002Y004H | 4.10 | 0.475 | 0.006 | 4.10 | 127.635 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y004H | 1.61 | 4.097 | -3.101 | 3.67 | 134.788 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y004H | 1.18 | 2.122 | -0.639 | 6.94 | 130.751 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y004H | 1.22 | 4.133 | -1.994 | 3.61 | 135.148 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y004H | 1.23 | 10.643 | -4.474 | 4.10 | 127.635 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 002Y008H | 6.10 | 0.405 | 0.002 | 6.21 | 131.372 | 11.57 | 131.029 |
| P-DS-1 | BASE | 002Y008H | 6.16 | 0.405 | 0.002 | 6.16 | 134.802 | 6.21 | 131.372 |
| P-DS-2 | BASE | 002Y008H | 8.14 | 0.766 | 0.017 | 8.14 | 131.119 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y008H | 5.38 | 0.864 | 0.004 | 5.38 | 135.147 | 8.14 | 131.119 |
| P-DS-4 | BASE | 002Y008H | 7.22 | 1.165 | -0.008 | 7.22 | 127.746 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y008H | 3.25 | 3.913 | -3.236 | 6.16 | 134.802 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y008H | 3.09 | 1.791 | -1.199 | 8.14 | 131.119 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y008H | 3.09 | 3.508 | -1.166 | 5.38 | 135.147 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y008H | 2.90 | 6.103 | -3.823 | 7.22 | 127.746 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 002Y024H | 19.30 | 0.291 | 0.002 | 19.30 | 131.327 | 24.97 | 131.058 |
| P-DS-1 | BASE | 002Y024H | 19.37 | 0.291 | 0.001 | 19.37 | 134.713 | 19.30 | 131.327 |
| P-DS-2 | BASE | 002Y024H | 21.40 | 0.725 | 0.014 | 21.40 | 131.115 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y024H | 19.20 | 0.507 | 0.003 | 19.20 | 134.984 | 21.40 | 131.115 |
| P-DS-4 | BASE | 002Y024H | 21.10 | 1.097 | 0.006 | 21.10 | 127.736 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y024H | 9.43 | 0.772 | 0.017 | 19.37 | 134.713 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y024H | 8.78 | 0.566 | 0.408 | 21.40 | 131.115 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y024H | 9.00 | 1.201 | 0.504 | 19.20 | 134.984 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y024H | 7.53 | 1.803 | -0.286 | 21.10 | 127.736 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 002Y072H | 64.07 | 0.324 | 0.002 | 64.07 | 131.341 | 68.55 | 131.082 |
| P-DS-1 | BASE | 002Y072H | 64.05 | 0.324 | 0.001 | 64.05 | 134.739 | 64.07 | 131.341 |
| P-DS-2 | BASE | 002Y072H | 64.10 | 1.009 | 0.018 | 64.10 | 131.143 | 0.00 | 130.150 |
| P-DS-3 | BASE | 002Y072H | 60.41 | 0.595 | 0.003 | 60.41 | 135.027 | 64.10 | 131.143 |
| P-DS-4 | BASE | 002Y072H | 64.08 | 1.226 | 0.009 | 64.08 | 127.754 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 002Y072H | 12.00 | 0.369 | 0.043 | 64.05 | 134.739 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 002Y072H | 8.88 | 0.293 | -0.093 | 64.10 | 131.143 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 002Y072H | 9.03 | 0.584 | 0.087 | 60.41 | 135.027 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 002Y072H | 8.87 | 1.389 | 0.197 | 64.08 | 127.754 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 002Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y001H | 1.24 | 0.378 | 0.002 | 1.24 | 131.362 | 0.69 | 129.807 |
| P-DS-1 | BASE | 005Y001H | 1.21 | 0.378 | 0.002 | 1.21 | 134.782 | 1.24 | 131.362 |
| P-DS-2 | BASE | 005Y001H | 0.00 | 0.000 | 0.000 | 2.00 | 130.454 | 0.00 | 130.150 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| P-DS-3 | BASE | 005Y001H | 1.08 | 1.055 | -0.008 | 1.08 | 135.225 | 2.00 | 130.454 |
| P-DS-4 | BASE | 005Y001H | 1.34 | 0.017 | 0.001 | 1.34 | 127.515 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y001H | 0.36 | 6.883 | -3.436 | 1.21 | 134.782 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y001H | 0.31 | 3.547 | -1.712 | 2.00 | 130.454 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y001H | 0.34 | 6.549 | -2.100 | 1.08 | 135.225 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y001H | 0.33 | 16.943 | -11.030 | 1.34 | 127.515 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y002H | 2.11 | 0.543 | -0.003 | 2.11 | 131.419 | 0.93 | 129.841 |
| P-DS-1 | BASE | 005Y002H | 2.10 | 0.543 | -0.002 | 2.10 | 134.900 | 2.11 | 131.419 |
| P-DS-2 | BASE | 005Y002H | 4.00 | 0.174 | 0.005 | 4.00 | 131.044 | 0.00 | 130.150 |
| P-DS-3 | BASE | 005Y002H | 2.02 | 1.247 | -0.008 | 2.02 | 135.299 | 4.00 | 131.044 |
| P-DS-4 | BASE | 005Y002H | 2.17 | 1.343 | 0.010 | 2.17 | 127.770 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y002H | 0.38 | 5.779 | -3.527 | 2.10 | 134.900 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y002H | 0.30 | 2.996 | -0.837 | 4.00 | 131.044 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y002H | 0.31 | 5.766 | -1.940 | 2.02 | 135.299 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y002H | 0.30 | 15.015 | -11.902 | 2.17 | 127.770 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y004H | 3.60 | 0.807 | -0.004 | 3.62 | 131.496 | 2.13 | 129.732 |
| P-DS-1 | BASE | 005Y004H | 3.60 | 0.807 | -0.004 | 3.60 | 135.066 | 3.62 | 131.496 |
| P-DS-2 | BASE | 005Y004H | 4.09 | 2.093 | 0.028 | 4.09 | 131.233 | 0.00 | 130.150 |
| P-DS-3 | BASE | 005Y004H | 3.44 | 1.824 | -0.012 | 3.44 | 135.501 | 4.09 | 131.233 |
| P-DS-4 | BASE | 005Y004H | 3.61 | 3.407 | -0.027 | 3.61 | 128.004 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y004H | 1.34 | 4.325 | -2.566 | 3.60 | 135.066 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y004H | 1.10 | 2.094 | -0.469 | 4.09 | 131.233 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y004H | 1.12 | 4.125 | -2.011 | 3.44 | 135.501 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y004H | 1.12 | 10.657 | -4.501 | 3.61 | 128.004 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y008H | 5.29 | 0.924 | 0.027 | 5.32 | 131.526 | 4.89 | 131.106 |
| P-DS-1 | BASE | 005Y008H | 5.30 | 0.925 | 0.003 | 5.30 | 135.133 | 5.32 | 131.526 |
| P-DS-2 | BASE | 005Y008H | 5.76 | 3.073 | 0.034 | 5.79 | 131.305 | 0.00 | 130.150 |
| P-DS-3 | BASE | 005Y008H | 5.21 | 2.027 | 0.008 | 5.21 | 135.566 | 5.79 | 131.305 |
| P-DS-4 | BASE | 005Y008H | 5.27 | 4.332 | -0.020 | 5.27 | 128.092 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y008H | 3.10 | 3.335 | -2.541 | 5.30 | 135.133 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y008H | 2.58 | 1.819 | -0.711 | 5.79 | 131.305 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y008H | 2.58 | 3.568 | -1.967 | 5.21 | 135.566 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y008H | 2.55 | 7.790 | -5.204 | 5.27 | 128.092 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y024H | 19.06 | 0.495 | 0.002 | 19.16 | 131.403 | 27.09 | 131.047 |
| P-DS-1 | BASE | 005Y024H | 19.11 | 0.495 | 0.002 | 19.11 | 134.866 | 19.16 | 131.403 |
| P-DS-2 | BASE | 005Y024H | 19.06 | 1.672 | 0.024 | 19.06 | 131.200 | 0.00 | 130.150 |
| P-DS-3 | BASE | 005Y024H | 16.22 | 0.871 | 0.005 | 16.22 | 135.150 | 19.06 | 131.200 |
| P-DS-4 | BASE | 005Y024H | 19.07 | 2.118 | 0.012 | 19.07 | 127.867 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y024H | 8.47 | 0.921 | -0.151 | 19.11 | 134.866 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y024H | 7.22 | 0.706 | 0.243 | 19.06 | 131.200 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y024H | 8.05 | 1.322 | 0.378 | 16.22 | 135.150 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y024H | 6.55 | 2.205 | -2.045 | 19.07 | 127.867 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 005Y072H | 60.32 | 0.596 | 0.003 | 60.37 | 131.436 | 58.62 | 131.225 |
| P-DS-1 | BASE | 005Y072H | 60.33 | 0.596 | 0.002 | 60.33 | 134.935 | 60.37 | 131.436 |
| P-DS-2 | BASE | 005Y072H | 60.10 | 2.524 | 0.030 | 60.10 | 131.263 | 0.00 | 130.150 |
| P-DS-3 | BASE | 005Y072H | 60.20 | 1.197 | 0.005 | 60.20 | 135.280 | 60.10 | 131.263 |
| P-DS-4 | BASE | 005Y072H | 60.10 | 3.400 | 0.019 | 60.10 | 128.004 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 005Y072H | 12.00 | 0.533 | 0.300 | 60.33 | 134.935 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 005Y072H | 12.35 | 0.406 | -0.147 | 60.10 | 131.263 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 005Y072H | 9.03 | 0.809 | -0.455 | 60.20 | 135.280 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 005Y072H | 11.53 | 1.933 | -0.415 | 60.10 | 128.004 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 005Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y001H | 1.21 | 0.562 | 0.003 | 1.23 | 131.425 | 0.66 | 129.807 |
| P-DS-1 | BASE | 010Y001H | 1.20 | 0.563 | 0.002 | 1.20 | 134.913 | 1.23 | 131.425 |
| P-DS-2 | BASE | 010Y001H | 0.00 | 0.000 | 0.000 | 2.00 | 130.782 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y001H | 1.09 | 1.484 | -0.008 | 1.09 | 135.385 | 2.00 | 130.782 |
| P-DS-4 | BASE | 010Y001H | 1.29 | 0.941 | 0.013 | 1.29 | 127.713 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y001H | 0.34 | 6.991 | -3.841 | 1.20 | 134.913 | 0.00 | 100.000 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| P-PERC-2 | BASE | 010Y001H | 0.30 | 3.523 | -0.615 | 2.00 | 130.782 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y001H | 0.32 | 6.698 | -3.718 | 1.09 | 135.385 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y001H | 0.31 | 17.366 | -11.358 | 1.29 | 127.713 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y002H | 2.08 | 0.842 | 0.029 | 2.08 | 131.505 | 1.87 | 131.102 |
| P-DS-1 | BASE | 010Y002H | 2.07 | 0.842 | -0.003 | 2.07 | 135.086 | 2.08 | 131.505 |
| P-DS-2 | BASE | 010Y002H | 2.34 | 2.003 | 0.030 | 2.34 | 131.226 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y002H | 1.94 | 1.928 | -0.009 | 1.94 | 135.535 | 2.34 | 131.226 |
| P-DS-4 | BASE | 010Y002H | 2.09 | 3.515 | -0.021 | 2.09 | 128.015 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y002H | 0.32 | 5.788 | -3.622 | 2.07 | 135.086 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 010Y002H | 0.27 | 3.101 | -2.477 | 2.34 | 131.226 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y002H | 0.30 | 5.875 | -1.866 | 1.94 | 135.535 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y002H | 0.29 | 15.285 | -10.238 | 2.09 | 128.015 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y004H | 3.52 | 1.108 | 0.022 | 3.58 | 131.570 | 3.04 | 131.153 |
| P-DS-1 | BASE | 010Y004H | 3.54 | 1.108 | -0.004 | 3.54 | 135.234 | 3.58 | 131.570 |
| P-DS-2 | BASE | 010Y004H | 3.67 | 3.801 | 0.035 | 3.67 | 131.371 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y004H | 3.35 | 2.519 | -0.013 | 3.35 | 135.717 | 3.67 | 131.371 |
| P-DS-4 | BASE | 010Y004H | 3.43 | 5.641 | -0.036 | 3.43 | 128.207 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y004H | 1.22 | 4.290 | -2.672 | 3.54 | 135.234 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 010Y004H | 1.03 | 2.102 | -0.630 | 3.67 | 131.371 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y004H | 1.05 | 4.114 | -1.664 | 3.35 | 135.717 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y004H | 1.07 | 10.609 | -9.030 | 3.43 | 128.207 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y008H | 5.24 | 1.293 | 0.024 | 5.24 | 131.611 | 4.46 | 131.166 |
| P-DS-1 | BASE | 010Y008H | 5.24 | 1.293 | -0.004 | 5.24 | 135.330 | 5.24 | 131.611 |
| P-DS-2 | BASE | 010Y008H | 5.25 | 4.950 | 0.040 | 5.27 | 131.477 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y008H | 5.16 | 2.844 | -0.010 | 5.16 | 135.811 | 5.27 | 131.477 |
| P-DS-4 | BASE | 010Y008H | 5.16 | 6.935 | -0.032 | 5.16 | 128.313 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y008H | 2.42 | 2.891 | -2.289 | 5.24 | 135.330 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 010Y008H | 2.42 | 1.822 | -0.849 | 5.27 | 131.477 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y008H | 2.42 | 3.574 | -1.927 | 5.16 | 135.811 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y008H | 2.40 | 8.715 | -7.192 | 5.16 | 128.313 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y024H | 16.23 | 0.710 | 0.003 | 16.25 | 131.469 | 28.42 | 131.045 |
| P-DS-1 | BASE | 010Y024H | 16.23 | 0.709 | 0.003 | 16.23 | 135.007 | 16.25 | 131.469 |
| P-DS-2 | BASE | 010Y024H | 16.08 | 2.589 | 0.029 | 16.08 | 131.268 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y024H | 16.03 | 1.303 | 0.006 | 16.03 | 135.320 | 16.08 | 131.268 |
| P-DS-4 | BASE | 010Y024H | 16.08 | 3.268 | 0.013 | 16.08 | 127.990 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y024H | 7.62 | 0.770 | 0.021 | 16.23 | 135.007 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 010Y024H | 6.43 | 0.890 | -0.342 | 16.08 | 131.268 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y024H | 7.40 | 1.097 | 0.197 | 16.03 | 135.320 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y024H | 5.87 | 2.616 | -2.371 | 16.08 | 127.990 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 010Y072H | 60.25 | 0.758 | 0.003 | 60.33 | 131.482 | 58.48 | 131.271 |
| P-DS-1 | BASE | 010Y072H | 60.30 | 0.758 | 0.003 | 60.30 | 135.036 | 60.33 | 131.482 |
| P-DS-2 | BASE | 010Y072H | 60.10 | 3.255 | 0.022 | 60.10 | 131.321 | 0.00 | 130.150 |
| P-DS-3 | BASE | 010Y072H | 60.18 | 1.536 | 0.007 | 60.18 | 135.403 | 60.10 | 131.321 |
| P-DS-4 | BASE | 010Y072H | 60.10 | 4.220 | 0.023 | 60.10 | 128.082 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 010Y072H | 12.00 | 0.644 | 0.227 | 60.30 | 135.036 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 010Y072H | 8.87 | 0.479 | -0.433 | 60.10 | 131.321 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 010Y072H | 9.03 | 0.956 | -0.080 | 60.18 | 135.403 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 010Y072H | 10.77 | 2.286 | -0.768 | 60.10 | 128.082 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 010Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y001H | 1.19 | 0.907 | -0.025 | 1.33 | 131.522 | 1.40 | 131.120 |
| P-DS-1 | BASE | 025Y001H | 1.19 | 0.908 | 0.003 | 1.19 | 135.124 | 1.33 | 131.522 |
| P-DS-2 | BASE | 025Y001H | 1.96 | 1.289 | 0.021 | 1.96 | 131.168 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y001H | 1.17 | 2.302 | -0.009 | 1.17 | 135.652 | 1.96 | 131.168 |
| P-DS-4 | BASE | 025Y001H | 1.22 | 3.481 | 0.022 | 1.22 | 128.012 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y001H | 0.32 | 7.123 | -3.984 | 1.19 | 135.124 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y001H | 0.29 | 3.656 | -0.731 | 1.96 | 131.168 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y001H | 0.31 | 6.680 | -2.088 | 1.17 | 135.652 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y001H | 0.29 | 17.352 | -7.512 | 1.22 | 128.012 | 0.00 | 100.000 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| X-WEIR-4 | BASE | 025Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y002H | 2.03 | 1.230 | 0.026 | 2.04 | 131.597 | 1.46 | 131.171 |
| P-DS-1 | BASE | 025Y002H | 2.03 | 1.230 | -0.005 | 2.03 | 135.298 | 2.04 | 131.597 |
| P-DS-2 | BASE | 025Y002H | 2.10 | 4.368 | 0.037 | 2.10 | 131.423 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y002H | 1.87 | 2.828 | -0.017 | 1.87 | 135.807 | 2.10 | 131.423 |
| P-DS-4 | BASE | 025Y002H | 1.97 | 6.349 | -0.049 | 1.97 | 128.266 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y002H | 0.33 | 5.903 | -2.648 | 2.03 | 135.298 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y002H | 0.25 | 3.240 | -0.452 | 2.10 | 131.423 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y002H | 0.27 | 6.081 | -3.407 | 1.87 | 135.807 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y002H | 0.26 | 15.846 | -10.538 | 1.97 | 128.266 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 025Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y004H | 3.46 | 1.622 | 0.031 | 3.45 | 131.714 | 3.45 | 131.616 |
| P-DS-1 | BASE | 025Y004H | 3.43 | 1.623 | -0.005 | 3.43 | 135.490 | 3.45 | 131.714 |
| P-DS-2 | BASE | 025Y004H | 3.44 | 6.448 | 0.040 | 3.45 | 131.616 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y004H | 3.27 | 3.714 | -0.018 | 3.27 | 136.047 | 3.45 | 131.616 |
| P-DS-4 | BASE | 025Y004H | 3.25 | 9.166 | -0.059 | 3.25 | 128.519 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y004H | 1.14 | 4.398 | -3.161 | 3.43 | 135.490 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y004H | 0.88 | 2.206 | -1.340 | 3.45 | 131.616 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y004H | 0.92 | 4.282 | -2.030 | 3.27 | 136.047 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y004H | 0.95 | 10.854 | -8.319 | 3.25 | 128.519 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 025Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y008H | 5.23 | 1.739 | 0.036 | 5.18 | 131.760 | 5.17 | 131.675 |
| P-DS-1 | BASE | 025Y008H | 5.20 | 1.737 | -0.005 | 5.20 | 135.543 | 5.18 | 131.760 |
| P-DS-2 | BASE | 025Y008H | 5.17 | 7.063 | 0.040 | 5.17 | 131.675 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y008H | 5.13 | 3.825 | -0.015 | 5.13 | 136.076 | 5.17 | 131.675 |
| P-DS-4 | BASE | 025Y008H | 5.12 | 9.488 | -0.042 | 5.12 | 128.550 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y008H | 2.71 | 2.927 | -2.153 | 5.20 | 135.543 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y008H | 2.17 | 1.856 | -0.876 | 5.17 | 131.675 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y008H | 2.18 | 3.634 | -1.935 | 5.13 | 136.076 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y008H | 2.25 | 9.400 | -6.104 | 5.12 | 128.550 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 025Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y024H | 16.03 | 1.096 | 0.003 | 16.03 | 131.567 | 29.91 | 131.042 |
| P-DS-1 | BASE | 025Y024H | 16.03 | 1.096 | 0.003 | 16.03 | 135.227 | 16.03 | 131.567 |
| P-DS-2 | BASE | 025Y024H | 15.15 | 4.150 | 0.035 | 15.15 | 131.403 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y024H | 15.15 | 2.029 | 0.006 | 15.15 | 135.567 | 15.15 | 131.403 |
| P-DS-4 | BASE | 025Y024H | 15.10 | 5.174 | 0.020 | 15.10 | 128.167 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y024H | 6.50 | 0.938 | -0.169 | 16.03 | 135.227 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y024H | 5.58 | 0.768 | 0.421 | 15.15 | 131.403 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y024H | 6.15 | 1.490 | 0.116 | 15.15 | 135.567 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y024H | 5.10 | 2.656 | -1.137 | 15.10 | 128.167 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 025Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 025Y072H | 60.26 | 1.025 | 0.004 | 60.15 | 131.554 | 60.10 | 131.429 |
| P-DS-1 | BASE | 025Y072H | 60.25 | 1.023 | 0.004 | 60.25 | 135.188 | 60.15 | 131.554 |
| P-DS-2 | BASE | 025Y072H | 60.10 | 4.433 | 0.031 | 60.10 | 131.429 | 0.00 | 130.150 |
| P-DS-3 | BASE | 025Y072H | 60.16 | 2.100 | 0.010 | 60.16 | 135.590 | 60.10 | 131.429 |
| P-DS-4 | BASE | 025Y072H | 60.08 | 5.496 | 0.032 | 60.08 | 128.195 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 025Y072H | 11.50 | 0.816 | -0.363 | 60.25 | 135.188 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 025Y072H | 8.87 | 0.599 | -0.263 | 60.10 | 131.429 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 025Y072H | 11.10 | 1.490 | 0.295 | 60.16 | 135.590 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 025Y072H | 9.92 | 2.856 | -0.692 | 60.08 | 128.195 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 025Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y001H | 1.19 | 1.209 | 0.031 | 1.20 | 131.593 | 1.07 | 131.204 |
| P-DS-1 | BASE | 050Y001H | 1.18 | 1.210 | -0.004 | 1.18 | 135.287 | 1.20 | 131.593 |
| P-DS-2 | BASE | 050Y001H | 1.37 | 3.020 | 0.033 | 1.37 | 131.301 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y001H | 1.16 | 3.040 | -0.015 | 1.16 | 135.866 | 1.37 | 131.301 |
| P-DS-4 | BASE | 050Y001H | 1.18 | 5.959 | -0.034 | 1.18 | 128.234 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y001H | 0.32 | 7.114 | -3.674 | 1.18 | 135.287 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y001H | 0.27 | 3.591 | -0.630 | 1.37 | 131.301 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y001H | 0.30 | 6.868 | -3.266 | 1.16 | 135.866 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y001H | 0.29 | 17.821 | -12.223 | 1.18 | 128.234 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y002H | 2.03 | 1.644 | 0.036 | 2.03 | 131.713 | 2.03 | 131.612 |
| P-DS-1 | BASE | 050Y002H | 1.99 | 1.645 | -0.005 | 1.99 | 135.500 | 2.03 | 131.713 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| P-DS-2 | BASE | 050Y002H | 2.03 | 6.405 | 0.042 | 2.03 | 131.612 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y002H | 1.80 | 3.800 | -0.019 | 1.80 | 136.069 | 2.03 | 131.612 |
| P-DS-4 | BASE | 050Y002H | 1.87 | 9.037 | -0.058 | 1.87 | 128.506 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y002H | 0.30 | 6.159 | -3.803 | 1.99 | 135.500 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y002H | 0.22 | 3.249 | -0.531 | 2.03 | 131.612 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y002H | 0.25 | 6.351 | -2.078 | 1.80 | 136.069 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y002H | 0.23 | 16.612 | -5.432 | 1.87 | 128.506 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y004H | 3.39 | 2.101 | 0.035 | 3.31 | 131.903 | 3.29 | 131.839 |
| P-DS-1 | BASE | 050Y004H | 3.35 | 2.098 | -0.006 | 3.35 | 135.703 | 3.31 | 131.903 |
| P-DS-2 | BASE | 050Y004H | 3.29 | 8.787 | 0.056 | 3.29 | 131.839 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y004H | 3.23 | 4.818 | -0.019 | 3.23 | 136.321 | 3.29 | 131.839 |
| P-DS-4 | BASE | 050Y004H | 3.21 | 11.893 | -0.051 | 3.21 | 128.785 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y004H | 1.12 | 4.357 | -1.973 | 3.35 | 135.703 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y004H | 0.80 | 2.313 | -1.975 | 3.29 | 131.839 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y004H | 0.83 | 4.490 | -2.038 | 3.23 | 136.321 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y004H | 0.83 | 11.451 | -5.487 | 3.21 | 128.785 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y008H | 5.24 | 2.315 | 0.040 | 5.12 | 131.986 | 5.14 | 131.927 |
| P-DS-1 | BASE | 050Y008H | 5.16 | 2.314 | -0.005 | 5.16 | 135.794 | 5.12 | 131.986 |
| P-DS-2 | BASE | 050Y008H | 5.12 | 9.691 | 0.055 | 5.14 | 131.927 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y008H | 5.09 | 5.096 | -0.014 | 5.09 | 136.387 | 5.14 | 131.927 |
| P-DS-4 | BASE | 050Y008H | 5.07 | 12.521 | 0.039 | 5.07 | 128.846 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y008H | 2.14 | 4.144 | -1.745 | 5.16 | 135.794 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y008H | 2.03 | 1.852 | -0.850 | 5.14 | 131.927 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y008H | 2.02 | 3.652 | -1.943 | 5.09 | 136.387 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y008H | 2.10 | 9.412 | -7.861 | 5.07 | 128.846 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y024H | 15.24 | 1.449 | 0.005 | 15.12 | 131.650 | 15.09 | 131.531 |
| P-DS-1 | BASE | 050Y024H | 15.22 | 1.448 | 0.004 | 15.22 | 135.406 | 15.12 | 131.650 |
| P-DS-2 | BASE | 050Y024H | 15.09 | 5.540 | 0.043 | 15.09 | 131.531 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y024H | 15.07 | 2.667 | 0.009 | 15.07 | 135.760 | 15.09 | 131.531 |
| P-DS-4 | BASE | 050Y024H | 13.14 | 7.031 | 0.030 | 13.14 | 128.321 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y024H | 5.83 | 1.109 | -1.004 | 15.22 | 135.406 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y024H | 5.02 | 0.864 | 0.818 | 15.09 | 131.531 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y024H | 5.53 | 1.587 | -0.096 | 15.07 | 135.760 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y024H | 4.50 | 2.918 | -1.399 | 13.14 | 128.321 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 050Y072H | 60.25 | 1.263 | 0.005 | 60.13 | 131.631 | 60.10 | 131.528 |
| P-DS-1 | BASE | 050Y072H | 60.23 | 1.260 | 0.005 | 60.23 | 135.313 | 60.13 | 131.631 |
| P-DS-2 | BASE | 050Y072H | 60.10 | 5.503 | 0.040 | 60.10 | 131.528 | 0.00 | 130.150 |
| P-DS-3 | BASE | 050Y072H | 60.15 | 2.615 | 0.011 | 60.15 | 135.745 | 60.10 | 131.528 |
| P-DS-4 | BASE | 050Y072H | 60.07 | 6.634 | 0.038 | 60.07 | 128.289 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 050Y072H | 10.75 | 0.962 | -0.103 | 60.23 | 135.313 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 050Y072H | 9.87 | 0.796 | 0.409 | 60.10 | 131.528 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 050Y072H | 10.43 | 1.476 | 1.323 | 60.15 | 135.745 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 050Y072H | 9.42 | 3.366 | -1.847 | 60.07 | 128.289 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 050Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y001H | 1.18 | 1.530 | 0.038 | 1.19 | 131.660 | 0.92 | 131.221 |
| P-DS-1 | BASE | 100Y001H | 1.17 | 1.530 | -0.005 | 1.17 | 135.446 | 1.19 | 131.660 |
| P-DS-2 | BASE | 100Y001H | 1.27 | 4.814 | 0.039 | 1.27 | 131.464 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y001H | 1.16 | 3.826 | -0.018 | 1.16 | 136.076 | 1.27 | 131.464 |
| P-DS-4 | BASE | 100Y001H | 1.16 | 8.433 | -0.051 | 1.16 | 128.448 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 100Y001H | 0.29 | 8.027 | -4.182 | 1.17 | 135.446 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y001H | 0.27 | 3.528 | -0.640 | 1.27 | 131.464 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y001H | 0.29 | 7.046 | -4.959 | 1.16 | 136.076 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y001H | 0.27 | 18.591 | -12.556 | 1.16 | 128.448 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y001H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y002H | 1.98 | 1.933 | 0.040 | 1.97 | 131.820 | 1.97 | 131.741 |
| P-DS-1 | BASE | 100Y002H | 1.96 | 1.933 | -0.006 | 1.96 | 135.631 | 1.97 | 131.820 |
| P-DS-2 | BASE | 100Y002H | 1.97 | 7.755 | 0.038 | 1.97 | 131.741 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y002H | 1.76 | 4.481 | -0.020 | 1.76 | 136.240 | 1.97 | 131.741 |
| P-DS-4 | BASE | 100Y002H | 1.82 | 10.722 | -0.051 | 1.82 | 128.670 | 0.00 | 127.500 |

| Name | Group | Simulation | Max Time Flow hrs | Max Flow cfs | Max Delta Q cfs | Max Time US Stage hrs | Max US Stage ft | Max Time DS Stage hrs | Max DS Stage ft |
|---|---|---|---|---|---|---|---|---|---|
| P-PERC-1 | BASE | 100Y002H | 0.28 | 6.224 | -2.751 | 1.96 | 135.631 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y002H | 0.22 | 3.308 | -0.750 | 1.97 | 131.741 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y002H | 0.23 | 6.398 | -2.068 | 1.76 | 136.240 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y002H | 0.22 | 16.826 | -6.438 | 1.82 | 128.670 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y002H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y004H | 3.34 | 2.453 | 0.037 | 3.26 | 132.055 | 3.25 | 132.001 |
| P-DS-1 | BASE | 100Y004H | 3.32 | 2.449 | -0.006 | 3.32 | 135.850 | 3.26 | 132.055 |
| P-DS-2 | BASE | 100Y004H | 3.25 | 10.420 | 0.050 | 3.25 | 132.001 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y004H | 3.22 | 5.630 | -0.021 | 3.22 | 136.510 | 3.25 | 132.001 |
| P-DS-4 | BASE | 100Y004H | 3.19 | 13.776 | -0.051 | 3.19 | 128.970 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 100Y004H | 1.05 | 4.428 | -2.729 | 3.32 | 135.850 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y004H | 0.75 | 2.379 | -1.795 | 3.25 | 132.001 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y004H | 0.78 | 4.588 | -2.045 | 3.22 | 136.510 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y004H | 0.78 | 11.763 | -8.451 | 3.19 | 128.970 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y004H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y008H | 5.06 | 2.474 | 0.043 | 5.13 | 132.036 | 5.13 | 131.980 |
| P-DS-1 | BASE | 100Y008H | 5.15 | 2.432 | 0.006 | 5.15 | 135.843 | 5.13 | 132.036 |
| P-DS-2 | BASE | 100Y008H | 5.12 | 10.210 | 0.057 | 5.13 | 131.980 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y008H | 5.09 | 5.355 | -0.018 | 5.09 | 136.447 | 5.13 | 131.980 |
| P-DS-4 | BASE | 100Y008H | 5.07 | 13.111 | -0.048 | 5.07 | 128.904 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 100Y008H | 2.11 | 3.703 | -2.869 | 5.15 | 135.843 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y008H | 1.93 | 1.874 | -0.849 | 5.13 | 131.980 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y008H | 1.88 | 3.730 | -3.439 | 5.09 | 136.447 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y008H | 2.08 | 9.396 | -4.675 | 5.07 | 128.904 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y008H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y024H | 15.16 | 1.840 | 0.005 | 15.07 | 131.768 | 13.21 | 131.680 |
| P-DS-1 | BASE | 100Y024H | 15.14 | 1.839 | 0.005 | 15.14 | 135.589 | 15.07 | 131.768 |
| P-DS-2 | BASE | 100Y024H | 13.19 | 7.114 | 0.041 | 13.21 | 131.680 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y024H | 13.19 | 3.481 | 0.010 | 13.19 | 135.986 | 13.21 | 131.680 |
| P-DS-4 | BASE | 100Y024H | 12.56 | 9.032 | 0.035 | 12.56 | 128.506 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 100Y024H | 5.28 | 1.221 | -0.230 | 15.14 | 135.589 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y024H | 4.45 | 0.932 | 0.215 | 13.21 | 131.680 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y024H | 5.00 | 1.490 | 0.057 | 13.19 | 135.986 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y024H | 4.02 | 3.416 | -1.896 | 12.56 | 128.506 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y024H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE | 100Y072H | 60.24 | 1.526 | 0.005 | 60.12 | 131.722 | 60.10 | 131.640 |
| P-DS-1 | BASE | 100Y072H | 60.22 | 1.523 | 0.005 | 60.22 | 135.443 | 60.12 | 131.722 |
| P-DS-2 | BASE | 100Y072H | 60.10 | 6.703 | 0.048 | 60.10 | 131.640 | 0.00 | 130.150 |
| P-DS-3 | BASE | 100Y072H | 60.14 | 3.192 | 0.012 | 60.14 | 135.908 | 60.10 | 131.640 |
| P-DS-4 | BASE | 100Y072H | 60.07 | 7.826 | 0.040 | 60.07 | 128.391 | 0.00 | 127.500 |
| P-PERC-1 | BASE | 100Y072H | 10.15 | 1.123 | -0.505 | 60.22 | 135.443 | 0.00 | 100.000 |
| P-PERC-2 | BASE | 100Y072H | 9.40 | 0.924 | 0.870 | 60.10 | 131.640 | 0.00 | 100.000 |
| P-PERC-3 | BASE | 100Y072H | 9.03 | 1.644 | -0.597 | 60.14 | 135.908 | 0.00 | 100.000 |
| P-PERC-4 | BASE | 100Y072H | 9.00 | 3.930 | -1.654 | 60.07 | 128.391 | 0.00 | 100.000 |
| X-WEIR-4 | BASE | 100Y072H | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |
| P-17 | BASE 25Y 24H SWFWMD | | 12.90 | 1.658 | 0.048 | 13.06 | 131.703 | 13.09 | 131.595 |
| P-DS-1 | BASE 25Y 24H SWFWMD | | 12.86 | 1.663 | 0.004 | 12.86 | 135.508 | 13.06 | 131.703 |
| P-DS-2 | BASE 25Y 24H SWFWMD | | 13.09 | 6.216 | 0.042 | 13.09 | 131.595 | 0.00 | 130.150 |
| P-DS-3 | BASE 25Y 24H SWFWMD | | 12.76 | 3.888 | -0.012 | 12.76 | 136.092 | 13.09 | 131.595 |
| P-DS-4 | BASE 25Y 24H SWFWMD | | 12.71 | 9.440 | 0.037 | 12.71 | 128.545 | 0.00 | 127.500 |
| P-PERC-1 | BASE 25Y 24H SWFWMD | | 9.88 | 0.838 | -0.391 | 12.86 | 135.508 | 0.00 | 100.000 |
| P-PERC-2 | BASE 25Y 24H SWFWMD | | 12.39 | 0.961 | 0.369 | 13.09 | 131.595 | 0.00 | 100.000 |
| P-PERC-3 | BASE 25Y 24H SWFWMD | | 9.47 | 1.155 | 0.631 | 12.76 | 136.092 | 0.00 | 100.000 |
| P-PERC-4 | BASE 25Y 24H SWFWMD | | 7.97 | 1.798 | -0.280 | 12.71 | 128.545 | 0.00 | 100.000 |
| X-WEIR-4 | BASE 25Y 24H SWFWMD | | 0.00 | 0.000 | 0.000 | 0.00 | 142.500 | 0.00 | 127.500 |

```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: P-BASIN-1               Node: P-POND-1              Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
             Area(ac): 3.510                 Time Shift(hrs): 0.00
         Curve Number: 78.70             Max Allowable Q(cfs): 999999.000
              DCIA(%): 77.40



--------------------------------------------------------------------------------------------------
         Name: P-BASIN-2               Node: P-POND-2              Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
             Area(ac): 4.200                 Time Shift(hrs): 0.00
         Curve Number: 51.80             Max Allowable Q(cfs): 999999.000
              DCIA(%): 52.90



--------------------------------------------------------------------------------------------------
         Name: P-BASIN-3               Node: P-POND-3              Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 12.00
             Area(ac): 6.600                 Time Shift(hrs): 0.00
         Curve Number: 50.50             Max Allowable Q(cfs): 999999.000
              DCIA(%): 67.20

*need to adjust cn and tc

--------------------------------------------------------------------------------------------------
         Name: P-BASIN-4               Node: P-POND-4              Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
             Area(ac): 13.300                Time Shift(hrs): 0.00
         Curve Number: 70.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 79.30



--------------------------------------------------------------------------------------------------
         Name: P-BASIN-5               Node: P-BNDY-EAST           Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                  Peaking Factor: 256.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
             Area(ac): 0.750                 Time Shift(hrs): 0.00
         Curve Number: 44.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 49.20



--------------------------------------------------------------------------------------------------
         Name: X-BASIN-1               Node: X-BNDY-WEST           Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 17.00
             Area(ac): 3.510                 Time Shift(hrs): 0.00
         Curve Number: 49.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00



--------------------------------------------------------------------------------------------------
         Name: X-BASIN-2               Node: X-BNDY-WEST           Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 17.00
             Area(ac): 4.200                 Time Shift(hrs): 0.00
```

Curve Number: 61.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

---

Name: X-BASIN-3 Node: X-BNDY-WEST Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256 Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 18.00
Area(ac): 6.600 Time Shift(hrs): 0.00
Curve Number: 51.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

---

Name: X-BASIN-4 Node: X-BNDY-EAST Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 24.00
Area(ac): 13.300 Time Shift(hrs): 0.00
Curve Number: 59.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

---

Name: X-BASIN-5 Node: X-BNDY-EAST Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256 Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 19.00
Area(ac): 0.750 Time Shift(hrs): 0.00
Curve Number: 53.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ==========
==========

Name: P-AQ-1 Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 0.000
Type: Time/Stage

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 100.000 |
| 30.00 | 100.000 |

---

Name: P-AQ-2 Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 0.000
Type: Time/Stage

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 100.000 |
| 30.00 | 10.000 |

---

Name: P-AQ-3 Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 0.000
Type: Time/Stage

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 100.000 |
| 30.00 | 100.000 |

---

Name: P-AQ-4 Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 0.000
Type: Time/Stage

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 100.000 |
| 30.00 | 100.000 |

---

Name: P-BNDY-EAST Base Flow(cfs): 0.000 Init Stage(ft): 127.500
Group: BASE Warn Stage(ft): 127.600
Type: Time/Stage

* 127.5 IS LATEST 100 YEAR FLOOD PER COUNTY STUDY

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 127.500 |
| 30.00 | 127.500 |

---

Name: P-BNDY-WEST Base Flow(cfs): 0.000 Init Stage(ft): 130.150
Group: BASE Warn Stage(ft): 131.000
Type: Time/Stage

**Ditch bottom used for initial stage
***Weir crest used for warning

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 130.150 |
| 30.00 | 130.150 |

---

Name: P-POND-1 Base Flow(cfs): 0.000 Init Stage(ft): 134.000
Group: BASE Warn Stage(ft): 136.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|
| 134.000 | 0.4800 |
| 135.000 | 0.5600 |
| 136.000 | 0.6500 |
| 137.000 | 0.7300 |

---

Name: P-POND-2 Base Flow(cfs): 0.000 Init Stage(ft): 129.000
Group: BASE Warn Stage(ft): 132.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|
| 129.000 | 0.2300 |
| 130.000 | 0.3000 |
| 131.000 | 0.3700 |
| 132.000 | 0.4400 |
| 133.000 | 0.5100 |

---

Name: P-POND-3 Base Flow(cfs): 0.000 Init Stage(ft): 134.000
Group: BASE Warn Stage(ft): 137.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|
| 134.000 | 0.4500 |
| 135.000 | 0.5400 |
| 136.000 | 0.6200 |
| 137.000 | 0.7100 |
| 138.000 | 0.8000 |

---

Name: P-POND-4 Base Flow(cfs): 0.000 Init Stage(ft): 126.000
Group: BASE Warn Stage(ft): 129.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|
| 126.000 | 1.1700 |
| 127.000 | 1.2900 |
| 128.000 | 1.4200 |
| 129.000 | 1.5500 |
| 130.000 | 1.6900 |

---

Name: STM-23 Base Flow(cfs): 0.000 Init Stage(ft): 0.000
Group: BASE Warn Stage(ft): 0.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|

---

Name: X-BNDY-EAST Base Flow(cfs): 0.000 Init Stage(ft): 127.500
Group: BASE Warn Stage(ft): 127.600
Type: Time/Stage

* 127.5 IS LATEST 100 YEAR FLOOD PER COUNTY STUDY

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 127.500 |
| 30.00 | 127.500 |

---

Name: X-BNDY-WEST Base Flow(cfs): 0.000 Init Stage(ft): 130.150
Group: BASE Warn Stage(ft): 131.100
Type: Time/Stage

**Ditch bottom used for initial stage
***Weir crest used for warning

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 130.150 |
| 30.00 | 131.000 |

---

Name: X-POND-4 Base Flow(cfs): 0.000 Init Stage(ft): 142.500
Group: BASE Warn Stage(ft): 145.000
Type: Stage/Area

| Stage(ft) | Area(ac) |
|---|---|
| 142.500 | 0.0240 |
| 143.000 | 0.0630 |
| 144.000 | 0.1730 |
| 145.000 | 0.3700 |

## Pipes

Name: P-17 From Node: STM-23 Length(ft): 204.00
Group: BASE To Node: P-POND-2 Count: 1
Friction Equation: Automatic

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| Geometry: | Circular | Circular | Solution Algorithm: | Most Restrictive |
| Span(in): | 24.00 | 24.00 | Flow: | Both |
| Rise(in): | 24.00 | 24.00 | Entrance Loss Coef: | 0.50 |
| Invert(ft): | 131.090 | 129.000 | Exit Loss Coef: | 0.00 |
| Manning's N: | 0.013000 | 0.013000 | Bend Loss Coef: | 0.00 |
| Top Clip(in): | 0.000 | 0.000 | Outlet Ctrl Spec: | Use dc or tw |
| Bot Clip(in): | 0.000 | 0.000 | Inlet Ctrl Spec: | Use dc |
| | | | Stabilizer Option: | None |

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

## Drop Structures

Name: P-DS-1 From Node: P-POND-1 Length(ft): 73.00
Group: BASE To Node: STM-23 Count: 1

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| Geometry: | Circular | Circular | Friction Equation: | Automatic |
| Span(in): | 18.00 | 18.00 | Solution Algorithm: | Most Restrictive |
| Rise(in): | 18.00 | 18.00 | Flow: | Both |
| Invert(ft): | 132.730 | 132.000 | Entrance Loss Coef: | 0.500 |
| Manning's N: | 0.013000 | 0.013000 | Exit Loss Coef: | 0.000 |
| Top Clip(in): | 0.000 | 0.000 | Outlet Ctrl Spec: | Use dc or tw |
| Bot Clip(in): | 0.000 | 0.000 | Inlet Ctrl Spec: | Use dc |
| | | | Solution Incs: | 10 |

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 1 for Drop Structure P-DS-1 ***

TABLE

| | | | |
|---|---|---|---|
| Count: | 1 | Bottom Clip(in): | 0.000 |
| Type: | Vertical: Mavis | Top Clip(in): | 0.000 |
| Flow: | Both | Weir Disc Coef: | 3.200 |
| Geometry: | Rectangular | Orifice Disc Coef: | 0.600 |
| Span(in): | 5.00 | Invert(ft): | 134.350 |
| Rise(in): | 9999.00 | Control Elev(ft): | 134.350 |

---

| | | | | | |
|---|---|---|---|---|---|
| Name: | P-DS-2 | From Node: | P-POND-2 | Length(ft): | 45.00 |
| Group: | BASE | To Node: | P-BNDY-WEST | Count: | 1 |

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| Geometry: | Horz Ellipse | Horz Ellipse | Friction Equation: | Automatic |
| Span(in): | 30.00 | 30.00 | Solution Algorithm: | Most Restrictive |
| Rise(in): | 19.00 | 19.00 | Flow: | Both |
| Invert(ft): | 130.350 | 130.150 | Entrance Loss Coef: | 0.000 |
| Manning's N: | 0.013000 | 0.013000 | Exit Loss Coef: | 0.500 |
| Top Clip(in): | 0.000 | 0.000 | Outlet Ctrl Spec: | Use dc or tw |
| Bot Clip(in): | 0.000 | 0.000 | Inlet Ctrl Spec: | Use dc |
| | | | Solution Incs: | 10 |

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

*** Weir 1 of 1 for Drop Structure P-DS-2 ***

TABLE

| | | | |
|---|---|---|---|
| Count: | 2 | Bottom Clip(in): | 0.000 |
| Type: | Vertical: Mavis | Top Clip(in): | 0.000 |
| Flow: | Both | Weir Disc Coef: | 3.200 |
| Geometry: | Rectangular | Orifice Disc Coef: | 0.600 |
| Span(in): | 35.00 | Invert(ft): | 131.000 |
| Rise(in): | 9999.00 | Control Elev(ft): | 131.000 |

---

| | | | | | |
|---|---|---|---|---|---|
| Name: | P-DS-3 | From Node: | P-POND-3 | Length(ft): | 75.00 |
| Group: | BASE | To Node: | P-POND-2 | Count: | 1 |

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| Geometry: | Circular | Circular | Friction Equation: | Automatic |
| Span(in): | 24.00 | 24.00 | Solution Algorithm: | Most Restrictive |
| Rise(in): | 24.00 | 24.00 | Flow: | Both |
| Invert(ft): | 129.750 | 129.000 | Entrance Loss Coef: | 0.000 |
| Manning's N: | 0.013000 | 0.013000 | Exit Loss Coef: | 0.500 |
| Top Clip(in): | 0.000 | 0.000 | Outlet Ctrl Spec: | Use dc or tw |
| Bot Clip(in): | 0.000 | 0.000 | Inlet Ctrl Spec: | Use dc |
| | | | Solution Incs: | 10 |

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 1 for Drop Structure P-DS-3 ***

TABLE

| | | | |
|---|---|---|---|
| Count: | 1 | Bottom Clip(in): | 0.000 |
| Type: | Vertical: Mavis | Top Clip(in): | 0.000 |
| Flow: | Both | Weir Disc Coef: | 3.200 |
| Geometry: | Rectangular | Orifice Disc Coef: | 0.600 |
| Span(in): | 8.00 | Invert(ft): | 134.600 |
| Rise(in): | 999.00 | Control Elev(ft): | 134.600 |

---

| | | | | | |
|---|---|---|---|---|---|
| Name: | P-DS-4 | From Node: | P-POND-4 | Length(ft): | 33.00 |
| Group: | BASE | To Node: | P-BNDY-EAST | Count: | 1 |

| | UPSTREAM | DOWNSTREAM | | |
|---|---|---|---|---|
| Geometry: | Circular | Circular | Friction Equation: | Automatic |
| Span(in): | 24.00 | 24.00 | Solution Algorithm: | Most Restrictive |
| | | | Flow: | Both |

```
     Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.000
   Invert(ft): 126.200        126.000                      Exit Loss Coef: 0.500
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 1 for Drop Structure P-DS-4 ***
                                                                                TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 36.00                       Invert(ft): 127.500
              Rise(in): 9999.00                Control Elev(ft): 127.500


================================================================================================
==== Weirs =====================================================================================
================================================================================================

         Name: X-WEIR-4            From Node: X-POND-4
        Group: BASE                  To Node: X-BNDY-EAST
         Flow: Both                    Count: 1
         Type: Vertical: Mavis      Geometry: Rectangular

                  Span(in): 3300.00
                  Rise(in): 9999.00
                Invert(ft): 144.750
       Control Elevation(ft): 144.750
                                        TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



================================================================================================
==== Percolation Links =========================================================================
================================================================================================

         Name: P-PERC-1            From Node: P-POND-1                Flow: Both
        Group: BASE                  To Node: P-AQ-1                Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 129.500                      Perimeter 1(ft): 929.000
        Water Table Elev(ft): 132.000                      Perimeter 2(ft): 1244.000
  Ann Recharge Rate(in/year): 0.000                        Perimeter 3(ft): 2710.000
  Horiz Conductivity(ft/day): 20.000                   Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                   Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                       Num Cells 1 to 2: 10
           Suction Head(in): 4.170                        Num Cells 2 to 3: 45
        Layer Thickness(ft): 2.000




------------------------------------------------------------------------------------------------
         Name: P-PERC-2            From Node: P-POND-2                Flow: Both
        Group: BASE                  To Node: P-AQ-2                Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 124.000                      Perimeter 1(ft): 810.000
        Water Table Elev(ft): 126.500                      Perimeter 2(ft): 934.000
  Ann Recharge Rate(in/year): 0.000                        Perimeter 3(ft): 1054.000
  Horiz Conductivity(ft/day): 20.000                   Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                   Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                       Num Cells 1 to 2: 10
           Suction Head(in): 4.170                        Num Cells 2 to 3: 45
        Layer Thickness(ft): 2.500




------------------------------------------------------------------------------------------------
         Name: P-PERC-3            From Node: P-POND-3                Flow: Both
        Group: BASE                  To Node: P-AQ-3                Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
```

```
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 128.500                      Perimeter 1(ft): 982.000
        Water Table Elev(ft): 131.000                      Perimeter 2(ft): 1075.000
  Ann Recharge Rate(in/year): 0.000                        Perimeter 3(ft): 1091.000
  Horiz Conductivity(ft/day): 20.000                   Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                   Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                       Num Cells 1 to 2: 10
           Suction Head(in): 4.170                        Num Cells 2 to 3: 45
         Layer Thickness(ft): 3.000



-------------------------------------------------------------------------------------------------
         Name: P-PERC-4            From Node: P-POND-4                Flow: Both
        Group: BASE                  To Node: P-AQ-4                Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 120.000                      Perimeter 1(ft): 1377.000
        Water Table Elev(ft): 124.000                      Perimeter 2(ft): 1691.000
  Ann Recharge Rate(in/year): 0.000                        Perimeter 3(ft): 3688.000
  Horiz Conductivity(ft/day): 20.000                   Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                   Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                       Num Cells 1 to 2: 10
           Suction Head(in): 4.170                        Num Cells 2 to 3: 45
         Layer Thickness(ft): 2.000



=================================================================================
==== Hydrology Simulations ======================================================
=================================================================================

         Name: 002Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 2.50

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

-------------------------------------------------------------------------------------------------
         Name: 002Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 2.80

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

-------------------------------------------------------------------------------------------------
         Name: 002Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 3.33

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

-------------------------------------------------------------------------------------------------
         Name: 002Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 3.80

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

-------------------------------------------------------------------------------------------------
         Name: 002Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y024H.R32
```

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: FDOT-24
Rainfall Amount(in): 4.21

| Time(hrs) | Print Inc(min) |
|---|---|
| 25.000 | 5.00 |

---

Name: 002Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y072H.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: FDOT-72
Rainfall Amount(in): 4.75

| Time(hrs) | Print Inc(min) |
|---|---|
| 73.000 | 5.00 |

---

Name: 005Y001H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y001H.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: FDOT-1
Rainfall Amount(in): 3.00

| Time(hrs) | Print Inc(min) |
|---|---|
| 2.000 | 2.50 |

---

Name: 005Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y002H.R32

Override Defaults: Yes
Storm Duration(hrs): 2.00
Rainfall File: FDOT-2
Rainfall Amount(in): 3.50

| Time(hrs) | Print Inc(min) |
|---|---|
| 3.000 | 2.50 |

---

Name: 005Y004H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y004H.R32

Override Defaults: Yes
Storm Duration(hrs): 4.00
Rainfall File: FDOT-4
Rainfall Amount(in): 4.10

| Time(hrs) | Print Inc(min) |
|---|---|
| 5.000 | 5.00 |

---

Name: 005Y008H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y008H.R32

Override Defaults: Yes
Storm Duration(hrs): 8.00
Rainfall File: FDOT-8
Rainfall Amount(in): 4.90

| Time(hrs) | Print Inc(min) |
|---|---|
| 9.000 | 5.00 |

---

Name: 005Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y024H.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: FDOT-24
Rainfall Amount(in): 5.16

| Time(hrs) | Print Inc(min) |
|---|---|
| 25.000 | 5.00 |

---

Name: 005Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y072H.R32

```
      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 6.58

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

-------------------------------------------------------------------------------------------------------
         Name: 010Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 3.30

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

-------------------------------------------------------------------------------------------------------
         Name: 010Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 4.00

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

-------------------------------------------------------------------------------------------------------
         Name: 010Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

-------------------------------------------------------------------------------------------------------
         Name: 010Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 5.60

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

-------------------------------------------------------------------------------------------------------
         Name: 010Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 6.12

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

-------------------------------------------------------------------------------------------------------
         Name: 010Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 7.78

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

-------------------------------------------------------------------------------------------------------
         Name: 025Y001H
```

```
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 3.80

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

-------------------------------------------------------------------------------------------------
         Name: 025Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

-------------------------------------------------------------------------------------------------
         Name: 025Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 5.40

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

-------------------------------------------------------------------------------------------------
         Name: 025Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 6.40

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

-------------------------------------------------------------------------------------------------
         Name: 025Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 7.68

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

-------------------------------------------------------------------------------------------------
         Name: 025Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 9.72

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

-------------------------------------------------------------------------------------------------
         Name: 050Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 4.20

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

-------------------------------------------------------------------------------------------------
```

Name: 050Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y002H.R32

Override Defaults: Yes
Storm Duration(hrs): 2.00
Rainfall File: FDOT-2
Rainfall Amount(in): 5.20

| Time(hrs) | Print Inc(min) |
|---|---|
| 3.000 | 2.50 |

---

Name: 050Y004H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y004H.R32

Override Defaults: Yes
Storm Duration(hrs): 4.00
Rainfall File: FDOT-4
Rainfall Amount(in): 6.10

| Time(hrs) | Print Inc(min) |
|---|---|
| 5.000 | 5.00 |

---

Name: 050Y008H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y008H.R32

Override Defaults: Yes
Storm Duration(hrs): 8.00
Rainfall File: FDOT-8
Rainfall Amount(in): 7.40

| Time(hrs) | Print Inc(min) |
|---|---|
| 9.000 | 5.00 |

---

Name: 050Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y024H.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: FDOT-24
Rainfall Amount(in): 9.08

| Time(hrs) | Print Inc(min) |
|---|---|
| 25.000 | 5.00 |

---

Name: 050Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y072H.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: FDOT-72
Rainfall Amount(in): 11.45

| Time(hrs) | Print Inc(min) |
|---|---|
| 73.000 | 5.00 |

---

Name: 100Y001H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y001H.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: FDOT-1
Rainfall Amount(in): 4.60

| Time(hrs) | Print Inc(min) |
|---|---|
| 2.000 | 2.50 |

---

Name: 100Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y002H.R32

Override Defaults: Yes
Storm Duration(hrs): 2.00
Rainfall File: FDOT-2
Rainfall Amount(in): 5.60

| Time(hrs) | Print Inc(min) |
|---|---|
| 3.000 | 2.50 |

---

```
--------------------------------------------------------------------------------------------------------
         Name: 100Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 6.60

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

--------------------------------------------------------------------------------------------------------
         Name: 100Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 7.60

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

--------------------------------------------------------------------------------------------------------
         Name: 100Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 10.65

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

--------------------------------------------------------------------------------------------------------
         Name: 100Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 13.37

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

--------------------------------------------------------------------------------------------------------
         Name: 25Y 24H SWFWMD
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\25Y 24H SWFWMD.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.00

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

============================================================================================
==== Routing Simulations ===================================================================
============================================================================================

         Name: 002Y001H            Hydrology Sim: 002Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y001H.I32

       Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                   End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

Name: 002Y002H Hydrology Sim: 002Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y002H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 4.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 002Y004H Hydrology Sim: 002Y004H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y004H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 8.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 002Y008H Hydrology Sim: 002Y008H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y008H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 16.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 002Y024H Hydrology Sim: 002Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y024H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|

| | |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 002Y072H Hydrology Sim: 002Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y072H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 78.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y001H Hydrology Sim: 005Y001H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y001H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 2.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y002H Hydrology Sim: 005Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y002H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 4.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y004H Hydrology Sim: 005Y004H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y004H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 8.00

Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y008H Hydrology Sim: 005Y008H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y008H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 16.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y024H Hydrology Sim: 005Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y024H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 36.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 005Y072H Hydrology Sim: 005Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y072H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 84.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 010Y001H Hydrology Sim: 010Y001H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y001H.I32

```
      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 010Y002H            Hydrology Sim: 010Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 010Y004H            Hydrology Sim: 010Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 010Y008H            Hydrology Sim: 010Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

Name: 010Y024H Hydrology Sim: 010Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y024H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 36.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 010Y072H Hydrology Sim: 010Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y072H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 84.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y001H Hydrology Sim: 025Y001H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y001H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 2.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y002H Hydrology Sim: 025Y002H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y002H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 4.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|

| | |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y004H Hydrology Sim: 025Y004H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y004H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 8.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y008H Hydrology Sim: 025Y008H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y008H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 16.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y024H Hydrology Sim: 025Y024H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y024H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 36.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 025Y072H Hydrology Sim: 025Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y072H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 84.00

```
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

------------------------------------------------------------------------------------------------
         Name: 050Y001H            Hydrology Sim: 050Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

------------------------------------------------------------------------------------------------
         Name: 050Y002H            Hydrology Sim: 050Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

------------------------------------------------------------------------------------------------
         Name: 050Y004H            Hydrology Sim: 050Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

------------------------------------------------------------------------------------------------
         Name: 050Y008H            Hydrology Sim: 050Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y008H.I32
```

```
      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 050Y024H            Hydrology Sim: 050Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 050Y072H            Hydrology Sim: 050Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y072H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 84.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 100Y001H            Hydrology Sim: 100Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

```
         Name: 100Y002H            Hydrology Sim: 100Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

```
         Name: 100Y004H            Hydrology Sim: 100Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

```
         Name: 100Y008H            Hydrology Sim: 100Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

---

```
         Name: 100Y024H            Hydrology Sim: 100Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
```

| | |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 100Y072H Hydrology Sim: 100Y072H
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y072H.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 84.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

---

Name: 25Y 24H SWFWMD Hydrology Sim: 25Y 24H SWFWMD
Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\25Y 24H SWFWMD.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 36.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

| Time(hrs) | Print Inc(min) |
|---|---|
| 999.000 | 15.000 |

| Group | Run |
|---|---|
| BASE | Yes |

# 6. FDOT Pre-Post Flow Match Calculations

TUCKER OFFICE
PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION
BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

**X-BASIN-1**

| | | |
|---|---|---|
| Basin c: | 0.25 | |
| Basin Area: | 3.51 | acres |
| S (Avg Slope): | 2.30% | percent |
| Time of Conc. | 16.8 | mins |

| | Area | c | Weighted "c" |
|---|---|---|---|
| Impervious | 0 | 0.95 | 0.00 |
| Lawns | 3.51 | 0.25 | 0.88 |
| | 3.51 | | 0.25 |

| Frequency | | Xt | c* | i | A | Q |
|---|---|---|---|---|---|---|
| 2 | Year | 1 | 0.25 | 6.10 | 3.51 | 5.35 |
| 5 | Year | 1 | 0.25 | 7.00 | 3.51 | 6.14 |
| 10 | Year | 1 | 0.25 | 7.50 | 3.51 | 6.58 |
| 25 | Year | 1.1 | 0.28 | 8.40 | 3.51 | 8.11 |
| 50 | Year | 1.2 | 0.30 | 9.00 | 3.51 | 9.48 |
| 100 | Year | 1.25 | 0.31 | 10.00 | 3.51 | 10.97 |

*Pervious areas adjusted by Design storm Frequency Factor Xt

---

**X-BASIN-2**

| | | |
|---|---|---|
| Basin c: | 0.25 | |
| Basin Area: | 4.20 | acres |
| S (Avg Slope): | 2.60% | percent |
| Time of Conc. | 16.8 | mins |

| | Area | c | Weighted "c" |
|---|---|---|---|
| Impervious | 0 | 0.95 | 0.00 |
| Lawns | 4.2 | 0.25 | 1.05 |
| | 4.20 | | 0.25 |

| Frequency | | Xt | c* | i | A | Q |
|---|---|---|---|---|---|---|
| 2 | Year | 1 | 0.25 | 6.10 | 4.20 | 6.41 |
| 5 | Year | 1 | 0.25 | 7.00 | 4.20 | 7.35 |
| 10 | Year | 1 | 0.25 | 7.50 | 4.20 | 7.88 |
| 25 | Year | 1.1 | 0.28 | 8.40 | 4.20 | 9.70 |
| 50 | Year | 1.2 | 0.30 | 9.00 | 4.20 | 11.34 |
| 100 | Year | 1.25 | 0.31 | 10.00 | 4.20 | 13.13 |

*Pervious areas adjusted by Design storm Frequency Factor Xt

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**X-BASIN-3**

| | | |
|---|---|---|
| Basin c: | 0.20 | |
| Basin Area: | 6.86 | acres |
| S (Avg Slope): | 1.35% | percent |
| Time of Conc. | 17.8 | mins |

| | Area | c | Weighted "c" |
|---|---|---|---|
| Impervious | 0 | 0.95 | 0.00 |
| Lawns | 6.86 | 0.2 | 1.37 |
| | 6.86 | | 0.20 |

| Frequency | | Xt | c* | i | A | Q |
|---|---|---|---|---|---|---|
| 2 | Year | 1 | 0.20 | 6.10 | 6.86 | 8.37 |
| 5 | Year | 1 | 0.20 | 7.00 | 6.86 | 9.60 |
| 10 | Year | 1 | 0.20 | 7.50 | 6.86 | 10.29 |
| 25 | Year | 1.1 | 0.28 | 8.40 | 6.86 | 15.85 |
| 50 | Year | 1.2 | 0.30 | 9.00 | 6.86 | 18.52 |
| 100 | Year | 1.25 | 0.31 | 10.00 | 6.86 | 21.44 |

*Pervious areas adjusted by Design storm Frequency Factor Xt

TUCKER OFFICE
PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION
BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

**X-BASIN 1, 2 & 3 - PEAK Q COMPARISON:**

| Frequency | | Pre Q | Critical Duration ICPR Post Q | Pre > Post? |
|---|---|---|---|---|
| 2 | Year | 20.13 | 1.01 | Yes |
| 5 | Year | 23.10 | 3.07 | Yes |
| 10 | Year | 24.75 | 4.95 | Yes |
| 25 | Year | 33.66 | 7.06 | Yes |
| 50 | Year | 39.34 | 9.69 | Yes |
| 100 | Year | 45.53 | 10.42 | Yes |

TUCKER OFFICE

PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION

BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

**X-BASIN-4**

| | | |
|---|---|---|
| Basin c: | 0.25 | |
| Basin Area: | 12.56 | acres |
| S (Avg Slope): | 2.70% | percent |
| Time of Conc. | 24 | mins |

| | Area | c | Weighted "c" |
|---|---|---|---|
| Impervious | 0 | 0.95 | 0.00 |
| Lawns | 12.561 | 0.25 | 3.14 |
| | 12.56 | | 0.25 |

| Frequency | | Xt | c* | i | A | Q |
|---|---|---|---|---|---|---|
| 2 | Year | 1 | 0.25 | 6.10 | 12.56 | 19.16 |
| 5 | Year | 1 | 0.25 | 7.00 | 12.56 | 21.98 |
| 10 | Year | 1 | 0.25 | 7.50 | 12.56 | 23.55 |
| 25 | Year | 1.1 | 0.28 | 8.40 | 12.56 | 29.02 |
| 50 | Year | 1.2 | 0.30 | 9.00 | 12.56 | 33.91 |
| 100 | Year | 1.25 | 0.31 | 10.00 | 12.56 | 39.25 |

*Pervious areas adjusted by Design storm Frequency Factor Xt

**X-BASIN-5**

| | | |
|---|---|---|
| Basin c: | 0.31 | |
| Basin Area: | 0.75 | acres |
| S (Avg Slope): | 2.10% | percent |
| Time of Conc. | 18.5 | mins |

| | Area | c | Weighted "c" |
|---|---|---|---|
| Impervious | 0.066 | 0.95 | 0.06 |
| Lawns | 0.687 | 0.25 | 0.17 |
| | 0.75 | | 0.31 |

| Frequency | | Xt | c* | i | A | Q |
|---|---|---|---|---|---|---|
| 2 | Year | 1 | 0.31 | 6.10 | 0.75 | 1.43 |
| 5 | Year | 1 | 0.31 | 7.00 | 0.75 | 1.64 |
| 10 | Year | 1 | 0.31 | 7.50 | 0.75 | 1.76 |
| 25 | Year | 1.1 | 0.28 | 8.40 | 0.75 | 1.74 |
| 50 | Year | 1.2 | 0.30 | 9.00 | 0.75 | 2.03 |
| 100 | Year | 1.25 | 0.31 | 10.00 | 0.75 | 2.35 |

*Pervious areas adjusted by Design storm Frequency Factor Xt

**X-BASIN 4 & 5 - PEAK Q COMPARISON:**

| Frequency | | Pre Q | Critical Duration ICPR Post Q | Pre > Post? |
|---|---|---|---|---|
| 2 | Year | 20.59 | 1.45 | Yes |
| 5 | Year | 23.62 | 4.56 | Yes |
| 10 | Year | 25.31 | 7.28 | Yes |
| 25 | Year | 30.76 | 9.94 | Yes |
| 50 | Year | 35.95 | 13.11 | Yes |
| 100 | Year | 41.61 | 14.54 | Yes |

**FDOT Design High Water Level Summary**

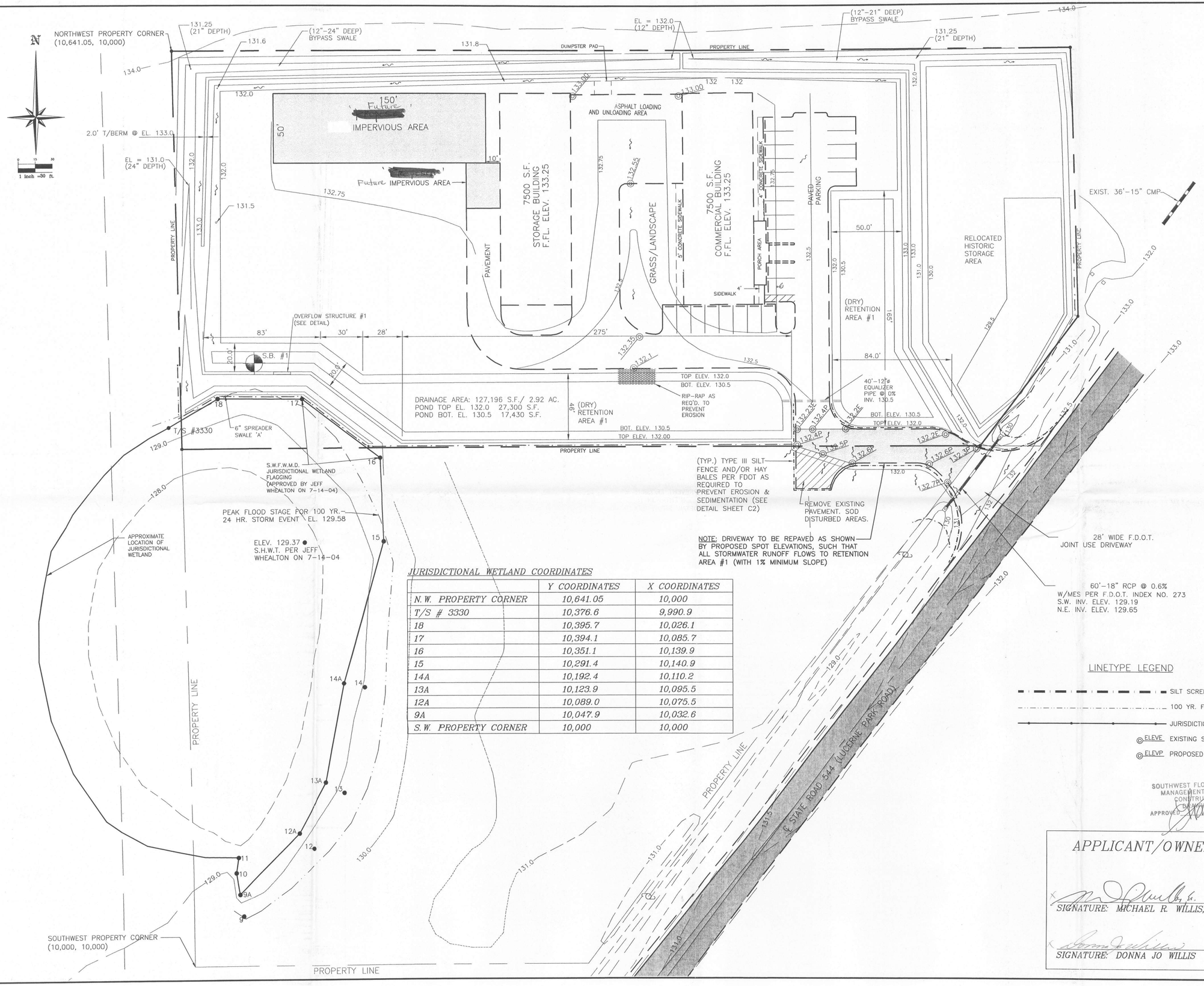
| Pond | Top | Critical Duration DHWL | Freeboard |
|---|---|---|---|
| 1 | 137.00 | 135.85 | 1.15 |
| 2 | 133.00 | 132.00 | 1.00 |
| 3 | 138.00 | 136.51 | 1.49 |
| 4 | 130.00 | 128.97 | 1.03 |

| **SWFWMD Pre/Post Match Calculations** | | | |
|---|---|---|---|
| ICPR Node Name | SWFWMD STORMS | | |
| | Pre Q | Post Q | Post < Pre? |
| BNDY-EAST | 17.71 | 10.01 | Yes |
| BNDY-WEST | 14.99 | 6.22 | Yes |

| **SWFWMD Design High Water Level Summary** | | | |
|---|---|---|---|
| Pond | Top | Critical Duration DHWL | Freeboard |
| 1 | 137.00 | 135.51 | 1.49 |
| 2 | 133.00 | 131.60 | 1.41 |
| 3 | 138.00 | 136.09 | 1.91 |
| 4 | 130.00 | 128.55 | 1.46 |

*PERMIT NO. 27164.001*

**Lucerne Professional**




*JURISDICTIONAL WETLAND COORDINATES*

| | *Y COORDINATES* | *X COORDINATES* |
|---|---|---|
| *N.W. PROPERTY CORNER* | *10,641.05* | *10,000* |
| *T/S # 3330* | *10,376.6* | *9,990.9* |
| *18* | *10,395.7* | *10,026.1* |
| *17* | *10,394.1* | *10,085.7* |
| *16* | *10,351.1* | *10,139.9* |
| *15* | *10,291.4* | *10,140.9* |
| *14A* | *10,192.4* | *10,110.2* |
| *13A* | *10,123.9* | *10,095.5* |
| *12A* | *10,089.0* | *10,075.5* |
| *9A* | *10,047.9* | *10,032.6* |
| *S.W. PROPERTY CORNER* | *10,000* | *10,000* |

LINETYPE LEGEND

- SILT SCREEN AND HAY BALES
- 100 YR. FLOOD LINE (ELEV. 129.58)
- JURISDICTIONAL WETLAND LINE
- ELEVE EXISTING SPOT ELEVATION
- ELEVP PROPOSED SPOT ELEVATION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED
File of Record
Permit No. 44027104.000

*APPLICANT/OWNER SIGNATURE*

*SIGNATURE: MICHAEL R. WILLIS, SR.* — *DATE* 5-21-07

*SIGNATURE: DONNA JO WILLIS* — *DATE* 5-21-07

DESIGNED BY: MSL
APPROVED BY: DRN

REVISIONS


*DAVID NORRIS ENGINEERING*
*CERTIFICATE OF AUTHORIZATION NUMBER: 8283*
*COMMERCIAL PLANS • INSPECTIONS • PERMITTING*
*SPECIALIZE IN UNIQUE DESIGN*
*1102 COLEMAN ROAD 33880*
*WINTER HAVEN, FLORIDA*
*OFFICE: (863)299-1048 FAX: (863)291-4305*
*PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET*


JOB NO. 07-05

*LUCERNE PROFESSIONAL LEASING LLC*
*SITE/CONSTRUCTION MGMT. PLAN*

SHEET C1 OF 2

Southwest Florida Water Management District
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LUCERNE Park LEASING
PONDS 1A & 1B - DRAINAGE Calculations
3-21-07

## Water Quantity

### Rate

Ponds 1A and 1B are designed to attenuate the stormwater runoff from their combined contributing areas so that the post-development peak discharge rate will not exceed the pre-development peak discharge rate for the 25-year, 24-hour storm event.

| | | |
|---|---|---|
| Basin 1 Pre-development Peak Discharge Rate | = | 6.22 cfs |
| Basin 1A & 1B Post-development Peak Discharge Rate | = | 5.30 cfs |

[redacted]

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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Southwest Florida Water
Management District

MAR 2 2 2007

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RRD-Bartow

DAVID R. NORRIS
LICENSE
No. 32186
STATE OF
FLORIDA
REGISTERED ENGINEER

3-21-07

# STAGE - STORAGE CALCULATION

PROJECT NAME: Lucerne Park Leasing
POND ID: Pond 1A

**INPUT PARAMETERS**

| | | | | | |
|---|---|---|---|---|---|
| BOT. ELEV. | = | **130.50** | ft. | | |
| TOP ELEV. | = | **132.00** | ft. | | |
| TOP AREA | = | **8150** | sqft. | = | **0.19** ac. |
| BOT. AREA | = | **6130** | sqft. | = | **0.14** ac. |
| DEPTH INC. | = | **0.1** | ft. | | |

| ELEVATION (ft.) | STAGE (ft.) | AREA (sqft.) | AREA (ac.) | VOLUME (cuft.) | VOLUME (ac-ft.) |
|---|---|---|---|---|---|
| 130.50 | 0.00 | 6130 | 0.14 | 0 | 0.00 |
| 130.60 | 0.10 | 6265 | 0.14 | 620 | 0.01 |
| 130.70 | 0.20 | 6399 | 0.15 | 1253 | 0.03 |
| 130.80 | 0.30 | 6534 | 0.15 | 1900 | 0.04 |
| 130.90 | 0.40 | 6669 | 0.15 | 2560 | 0.06 |
| 131.00 | 0.50 | 6803 | 0.16 | 3233 | 0.07 |
| 131.10 | 0.60 | 6938 | 0.16 | 3920 | 0.09 |
| 131.20 | 0.70 | 7073 | 0.16 | 4621 | 0.11 |
| 131.30 | 0.80 | 7207 | 0.17 | 5335 | 0.12 |
| 131.40 | 0.90 | 7342 | 0.17 | 6062 | 0.14 |
| 131.50 | 1.00 | 7477 | 0.17 | 6803 | 0.16 |
| 131.60 | 1.10 | 7611 | 0.17 | 7558 | 0.17 |
| 131.70 | 1.20 | 7746 | 0.18 | 8326 | 0.19 |
| 131.80 | 1.30 | 7881 | 0.18 | 9107 | 0.21 |
| 131.90 | 1.40 | 8015 | 0.18 | 9902 | 0.23 |
| 132.00 | 1.50 | 8150 | 0.19 | 10710 | 0.25 |

4402/184.001

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# STAGE - STORAGE CALCULATION

PROJECT NAME: Lucerne Park Leasing
POND ID: Pond 1B

**INPUT PARAMETERS**

| | | | | | |
|---|---|---|---|---|---|
| BOT. ELEV. | = | 130.50 | ft. | | |
| TOP ELEV. | = | 132.00 | ft. | | |
| TOP AREA | = | 19150 | sqft. | = | 0.44 ac. |
| BOT. AREA | = | 11300 | sqft. | = | 0.26 ac. |
| DEPTH INC. | = | 0.1 | ft. | | |

| ELEVATION (ft) | DEPTH (ft) | AREA (sqft) | AREA (ac) | VOLUME (cu ft) | VOLUME (ac-ft) |
|---|---|---|---|---|---|
| 130.50 | 0.00 | 11300 | 0.26 | 0 | 0.00 |
| 130.60 | 0.10 | 11823 | 0.27 | 1156 | 0.03 |
| 130.70 | 0.20 | 12347 | 0.28 | 2365 | 0.05 |
| 130.80 | 0.30 | 12870 | 0.30 | 3626 | 0.08 |
| 130.90 | 0.40 | 13393 | 0.31 | 4939 | 0.11 |
| 131.00 | 0.50 | 13917 | 0.32 | 6304 | 0.14 |
| 131.10 | 0.60 | 14440 | 0.33 | 7722 | 0.18 |
| 131.20 | 0.70 | 14963 | 0.34 | 9192 | 0.21 |
| 131.30 | 0.80 | 15487 | 0.36 | 10715 | 0.25 |
| 131.40 | 0.90 | 16010 | 0.37 | 12290 | 0.28 |
| 131.50 | 1.00 | 16533 | 0.38 | 13917 | 0.32 |
| 131.60 | 1.10 | 17057 | 0.39 | 15596 | 0.36 |
| 131.70 | 1.20 | 17580 | 0.40 | 17328 | 0.40 |
| 131.80 | 1.30 | 18103 | 0.42 | 19112 | 0.44 |
| 131.90 | 1.40 | 18627 | 0.43 | 20949 | 0.48 |
| 132.00 | 1.50 | 19150 | 0.44 | 22838 | 0.52 |

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## Runoff curve number (CN)

| | | | | |
|---|---|---|---|---|
| | | | JOB # | |
| Project : | Luceme Park Leasing - Basin 1 | By : | BH | 8/4/04 |
| Location : | Polk County, FL | Checked : | BH | 8/4/04 |

Check One : ☑ Present ☐ Developed

**Runoff curve number**

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN Figure 2-2 | CN Figure 2-3 | CN Figure 2-4 | Area ☑ acres ☐ sq. mi. ☐ % | Product of CN x Area |
|---|---|---|---|---|---|---|
| Immokalee (B/D) | Poor condition (grass cover < 75%) | 89 | | | 1.61 | 143 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | **Totals** | | | | 1.61 | 143 |

CN (weighted) = total product / total area **Use CN** **89**

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## Runoff curve number (CN)

| | | | JOB # | |
|---|---|---|---|---|
| **Project :** | Luceme Park Leasing - Pond 1A | **By :** | BH | 8/4/04 |
| **Location :** | Polk County, FL | **Checked :** | BH | 8/4/04 |

**Check One :** ☐ Present ☑ Developed

**Runoff curve number**

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN Figure 2-2 | CN Figure 2-3 | CN Figure 2-4 | Area ☑ acres ☐ sq. mi. ☐ % | Product of CN x Area |
|---|---|---|---|---|---|---|
| N.A. | Impervious Areas | 98 | | | 0.27 | 26 |
| N.A. | Retention Pond | 100 | | | 0.19 | 19 |
| Immokalee (B/D) | Good condition (grass cover is more than 75%) | 80 | | | 0.27 | 22 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | **Totals** | | | 0.73 | 67 |

CN (weighted) = total product / total area **Use CN** **92**

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# Runoff curve number (CN)

| | | | JOB # | |
|---|---|---|---|---|
| **Project :** | Luceme Park Leasing - Pond 1B | **By :** | BH | 8/4/04 |
| **Location :** | Polk County, FL | **Checked :** | BH | 8/4/04 |

**Check One :** ☐ Present ☑ Developed

## Runoff curve number

| Soil name and hydrologic group (appendix A) | Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN Figure 2-2 | CN Figure 2-3 | CN Figure 2-4 | Area ☑ acres ☐ sq. mi. ☐ % | Product of CN x Area |
|---|---|---|---|---|---|---|
| N.A. | Impervious Areas | 98 | | | 0.96 | 94 |
| N.A. | Retention Pond | 100 | | | 0.44 | 44 |
| Immokalee (B/D) | Good condition (grass cover is more than 75%) | 80 | | | 0.79 | 63 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | **Totals** | | | 2.19 | 201 |

CN (weighted) = total product / total area **Use CN** **92**

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# WATER QUANTITY

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Basin Summary.

---

| | |
|---|---|
| Basin Name: | Pond1a |
| Group Name: | BASE |
| Simulation: | POST25 |
| Node Name: | Pond1a |
| Basin Type: | SCS Unit Hydrograph |
| Unit Hydrograph: | UH256 |
| Peaking Fator: | 256.0 |
| Spec Time Inc (min): | 1.33 |
| Comp Time Inc (min): | 1.33 |
| Rainfall File: | Flmod |
| Rainfall Amount (in): | 7.000 |
| Storm Duration (hrs): | 24.00 |
| Status: | Onsite |
| Time of Conc (min): | 10.00 |
| Time Shift (hrs): | 0.00 |
| Area (ac): | 0.730 |
| Vol of Unit Hyd (in): | 1.000 |
| Curve Number: | 92.000 |
| DCIA (%): | 0.000 |
| Time Max (hrs): | 12.04 |
| Flow Max (cfs): | 2.928 |
| Runoff Volume (in): | 6.053 |
| Runoff Volume (ft3): | 16039.142 |

---

| | |
|---|---|
| Basin Name: | Pond1b |
| Group Name: | BASE |
| Simulation: | POST25 |
| Node Name: | Pond1b |
| Basin Type: | SCS Unit Hydrograph |
| Unit Hydrograph: | UH256 |
| Peaking Fator: | 256.0 |
| Spec Time Inc (min): | 1.33 |
| Comp Time Inc (min): | 1.33 |
| Rainfall File: | Flmod |
| Rainfall Amount (in): | 7.000 |
| Storm Duration (hrs): | 24.00 |
| Status: | Onsite |
| Time of Conc (min): | 10.00 |
| Time Shift (hrs): | 0.00 |
| Area (ac): | 2.190 |
| Vol of Unit Hyd (in): | 1.000 |
| Curve Number: | 92.000 |
| DCIA (%): | 0.000 |
| Time Max (hrs): | 12.04 |
| Flow Max (cfs): | 8.783 |
| Runoff Volume (in): | 6.053 |
| Runoff Volume (ft3): | 48117.425 |

---

[redacted]

Node Name: [redacted]
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: UH256
Spec Time Inc (min): 1.33
[redacted]
Rainfall File: Flmod
[redacted] Amount (in): 7.000
[redacted] Duration (hrs): [redacted]
Status: Onsite

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Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 2.290
Vol of Unit Hyd (in): 1.000
Curve Number: 96.000
DCIA (%): 0.000

Time Max (hrs): 12.04
Flow Max (cfs): 9.507
Runoff Volume (in): 6.521
Runoff Volume (ft3): 54211.072

---

Basin Name: Pre1
Group Name: BASE
Simulation: POST25
Node Name: Pre1
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: UH256
Peaking Fator: 256.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Flmod
Rainfall Amount (in): 7.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 1.610
Vol of Unit Hyd (in): 1.000
Curve Number: 89.000
DCIA (%): 0.000

Time Max (hrs): 12.04
Flow Max (cfs): 6.221
Runoff Volume (in): 5.706
Runoff Volume (ft3): 33348.409

Q (PRE)

---

Basin Name: Pre2
Group Name: BASE
Simulation: POST25
Node Name: Pre2
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: UH256
Peaking Fator: 256.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Flmod
Rainfall Amount (in): 7.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 1.600
Vol of Unit Hyd (in): 1.000
Curve Number: 89.000
DCIA (%): 0.000

Time Max (hrs): 12.04
Flow Max (cfs): 6.183
Runoff Volume (in): 5.706
Runoff Volume (ft3): 33141.277

Q (PRE)

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==== Basins ====

Name: Pond1a
Group: BASE
Node: Pond1a
Type: SCS Unit Hydrograph
Status: Onsite

Unit Hydrograph: UH256
Rainfall File: Flmod
Rainfall Amount(in): 7.000
Area(ac): 0.730
Curve Number: 92.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 24.00
Time of Conc(min): 10.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

Post Development Hydrograph For Pond 1a

---

Name: Pond1b
Group: BASE
Node: Pond1b
Type: SCS Unit Hydrograph
Status: Onsite

Unit Hydrograph: UH256
Rainfall File: Flmod
Rainfall Amount(in): 7.000
Area(ac): 2.190
Curve Number: 92.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 24.00
Time of Conc(min): 10.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

Post Development Hydrograph For Pond 1b

---

Name: Pond2
Group: BASE
Node: Pond2
Type: SCS Unit Hydrograph
Status: Onsite

Unit Hydrograph: UH256
Rainfall File: Flmod
Rainfall Amount(in): 7.000
Area(ac): 2.290
Curve Number: 96.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 24.00
Time of Conc(min): 10.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

Post Development Hydrograph For Pond 2

---

Name: Pre1
Group: BASE
Node: Pre1
Type: SCS Unit Hydrograph
Status: Onsite

Unit Hydrograph: UH256
Rainfall File: Flmod
Rainfall Amount(in): 7.000
Area(ac): 1.610
Curve Number: 89.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 24.00
Time of Conc(min): 10.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

PRE DEV. HYDROGRAPH FOR BASIN 1

---

Name: Pre2
Group: BASE
Node: Pre2
Type: SCS Unit Hydrograph
Status: Onsite

Unit Hydrograph: UH256
Rainfall File: Flmod
Rainfall Amount(in): 7.000
Area(ac): 1.600
Curve Number: 89.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 24.00
Time of Conc(min): 10.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

Pre Development Hydrograph For Basin 2

---

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==== Nodes ==========

Name: BNDRY  Base Flow(cfs): 0.000  Init Stage(ft): 129.370
Group: BASE  Warn Stage(ft): 130.000
Type: Time/Stage

DUMMY BOUNDARY NODE (Receiving Wetland)

| Time(hrs) | Stage(ft) |
|---|---|
| 0.00 | 129.370 |
| 24.00 | 129.370 |

---

Name: Pond1a  Base Flow(cfs): 0.000  Init Stage(ft): 130.520
Group: BASE  Warn Stage(ft): 132.000
Type: Stage/Area

POND 1a

| Stage(ft) | Area(ac) |
|---|---|
| 130.500 | 0.1400 |
| 132.000 | 0.1900 |

---

Name: Pond1b  Base Flow(cfs): 0.000  Init Stage(ft): 130.520
Group: BASE  Warn Stage(ft): 132.000
Type: Stage/Area

POND 1b

| Stage(ft) | Area(ac) |
|---|---|
| 130.500 | 0.2600 |
| 132.000 | 0.4400 |

---

Name: Pond2  Base Flow(cfs): 0.000  Init Stage(ft): 129.400
Group: BASE  Warn Stage(ft): 130.000
Type: Stage/Area

POND 2

| Stage(ft) | Area(ac) |
|---|---|
| 129.400 | 0.3400 |
| 130.000 | 0.5200 |

==== Cross Sections ==========

==== Operating Tables ==========

==== Pipes ==========

Name: Pipe1a-1b  From Node: pond1a  Length(ft): 40.00
Group: BASE  To Node: pond1b  Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.25

| | UPSTREAM | DOWNSTREAM |
|---|---|---|
| Geometry: | Circular | Circular |
| Span(in): | 12.00 | 12.00 |

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| | | | |
|---|---|---|---|
| Rise(in): | 12.00 | 12.00 | Exit Loss Coef: 0.25 |
| Invert(ft): | 130.500 | 130.500 | Bend Loss Coef: 0.00 |
| Manning's N: | 0.012000 | 0.012000 | Outlet Ctrl Spec: Use dc or tw |
| Top Clip(in): | 0.000 | 0.000 | Inlet Ctrl Spec: Use dn |
| Bot Clip(in): | 0.000 | 0.000 | Stabilizer Option: None |

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Equalizer Pipe Between Pond 1a and Pond 1b

## Channels

## Drop Strcutures

## Weirs

[redacted]

Span(in): 1.00
Rise(in): 1.00
Invert(ft): 129.400
Control Elevation(ft): 129.400
TABLE
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Discharge Coef: [redacted]00
Orifice Discharge Coef: 0.650

ORIFICE DISCHARGE FROM POND 8

---

Name: Weir1b
Group: BASE
Flow: Both
Type: Vertical: Mavis
From Node: pond1b
To Node: bndry
Count: 1
Geometry: Rectangular

24" wide weir

Span(in): 24.00
Rise(in): 999.00
Invert(ft): 130.800
Control Elevation(ft): 130.800
TABLE
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Discharge Coef: 3.200
Orifice Discharge Coef: 0.600

OUTFALL STRUCTURE FROM POND 1B

---

[redacted]

Name: [redacted]
Group: BASE
Flow: Both
Type: Vertical: Mavis
From Node: pond8
To Node: bndry
Count: 1
Geometry: Rectangular

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#2

54" wide LOFIK

[redacted]
Rise(in): 000.00
Invert Elev(ft): 129.900
Control Elevation(ft): 129.900
TABLE
Bottom Clip(in): 0.000
[redacted]
Orifice Discharge Coef: 0.600
[redacted] FROM POND 2

## Bridges

## Breaches

## Rating Curves

## Hydrology Simulations

Name: POST25
Filename: C:\Program Files\Icpr3\Jobs\Lucern Leasing\POST25.R32

Override Defaults: No

| Time(hrs) | Print Inc(min) |
|---|---|
| 24.000 | 15.00 |

## Routing Simulations

Name: POST25 Hydrology Sim: POST25
Filename: C:\Program Files\Icpr3\Jobs\Lucern Leasing\POST25.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.01000
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 120.00
Min Calc Time(sec): 1.0000 Max Calc Time(sec): 30.0000
Boundary Stages: Boundary Flows:

Simulation for 25-year, 24-hour rainfall event

| Time(hrs) | Print Inc(min) |
|---|---|
| 24.000 | 60.000 |

| Group | Run |
|---|---|
| BASE | Yes |

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Node Max.

| Name | Group | Simulation | Max Time Stage hrs | Max Stage ft | Warning Stage ft | Max Delta Stage ft | Max Surf Area ft2 | Max Time Inflow hrs | Max Inflow cfs | Max Time Outflow hrs | Max Outflow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BNDRY | BASE | POST25 | 0.00 | 129.370 | 130.000 | 0.0000 | 0 | 12.38 | 11.260 | 0.00 | 0.000 |
| Pond1a | BASE | POST25 | 12.56 | 131.755 | 132.000 | 0.0100 | 7922 | 12.00 | 2.843 | 13.03 | 1.351 |
| Pond1b | BASE | POST25 | 12.47 | 131.682 | 132.000 | 0.0098 | 17503 | 12.00 | 8.746 | 12.47 | 5.298 |

131.755 < 132.

O.K.

5.298 < 6.22

O.K.




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## Water Quality Treatment Volume

Basins 1A & 1B

Water Quality treatment will be provided in Ponds 1A & B for the stormwater runoff from Basins 1A & 1B through dry retention. The required treatment volume is determined by calculating the volume resulting from 1/2-inch of runoff over the combined 2.92-acre contributing area as follows:

Required Treatment Volume = 0.50 inch * 1 ft./12 inches * 2.92 ac. = 0.12 ac-ft.

From the attached stage-storage calculations for Ponds 1A & 1B it can be seen that sufficient volume is available below the overflow elevation.

~~Basins 2~~

~~Water Quality treatment will be provided in Pond 2 through wet detention of the stormwater runoff from Basin 2. The required treatment volume is determined by calculating the volume resulting from 1 inch of runoff over the 2.29-acre contributing area as follows:~~

~~Required Treatment Volume = 1 inch * 1 ft./12 inches * 2.29 acres = 0.19 ac-ft.~~

~~From the attached stage-storage calculations for the proposed Pond 2 it can be seen that sufficient storage volume is available below the overflow elevation.~~

~~Recovery~~

1.0 ϕ

~~Pond 2 will have a 1.25" bleed down orifice. From the attached ICPR Draw Down Report it can be seen that no more than 1/2 of the detention volume will be discharged within 60 hours:~~

~~1/2 of the Detention Volume = 0.095ac-ft.~~

~~Volume Released in 60 Hrs. = 0.080 ac-ft.~~

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## SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

**PROJECT NAME : Lucerne Leasing - Pond 1a & 1b**
**MANUAL RUNOFF DATA USED**
**UNSATURATED ANALYSIS EXCLUDED**

| | |
|---|---|
| Pond Bottom Area | 17,430.00 ft² |
| Pond Volume between Bottom & DHWL | 5,526.00 ft³ |
| Pond Length to Width Ratio (L/W) | 15.00 |
| Elevation of Effective Aquifer Base | 123.00 ft |
| Elevation of Seasonal High Groundwater Table | 129.37 ft |
| Elevation of Starting Water Level | 130.50 ft |
| Elevation of Pond Bottom | 130.50 ft |
| Design High Water Level Elevation | 130.80 ft |
| Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis | 0.10 |
| Unsaturated Vertical Hydraulic Conductivity | 12.00 ft/d |
| Factor of Safety | 1.00 |
| Saturated Horizontal Hydraulic Conductivity | 18.00 ft/d |
| Avg. Effective Storage Coefficient of Soil for Saturated Analysis | 0.10 |
| Avg. Effective Storage Coefficient of Pond/Exfiltration Trench | 1.00 |

**Hydraulic Control Features:**

| | Top | Bottom | Left | Right |
|---|---|---|---|---|
| **Groundwater Control Features - Y/N** | N | N | N | N |
| Distance to Edge of Pond | 0.00 | 0.00 | 0.00 | 0.00 |
| Elevation of Water Level | 0.00 | 0.00 | 0.00 | 0.00 |
| **Impervious Barrier - Y/N** | N | N | N | N |
| Elevation of Barrier Bottom | 0.00 | 0.00 | 0.00 | 0.00 |

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## TIME - RUNOFF INPUT DATA

**PROJECT NAME: LUCERNE LEASING - POND 1A & 1B**

| STRESS PERIOD NUMBER | INCREMENT OF TIME (hrs) | VOLUME OF RUNOFF ($ft^3$) |
|---|---|---|
| Unsat | 0.00 | 0.00 |
| 1 | 0.01 | 5,299.00 |
| 2 | 11.99 | 0.00 |
| 3 | 12.00 | 0.00 |
| 4 | 12.00 | 0.00 |
| 5 | 12.00 | 0.00 |
| 6 | 12.00 | 0.00 |
| 7 | 12.00 | 0.00 |

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Analysis Date: 8/7/04

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## SUMMARY OF RESULTS

**PROJECT NAME : Lucerne Leasing - Pond 1a & 1b**

| CUMULATIVE TIME (hrs) | WATER ELEVATION (feet) | INSTANTANEOUS INFILTRATION RATE (cfs) | AVERAGE INFILTRATION RATE (cfs) | CUMULATIVE OVERFLOW ($ft^3$) |
|---|---|---|---|---|
| 00.00 - 0.00 | 129.370 | 0.000 * | | |
| | | | 0.00000 | |
| 0.00 | 129.370 | 0.35414 | | |
| | | | 0.35391 | |
| 0.01 | 130.787 | 0.35368 | | 0.00 |
| | | | 0.07709 | |
| 12.00 | 130.606 | 0.05643 | | 0.00 |
| | | | 0.03574 | |
| 24.00 | 130.523 | 0.03031 | | 0.00 |
| | | | 0.02487 | |
| 28.63 | 130.500 | 0.02228 | | 0.00 |
| | | | 0.01969 | |
| 48.00 | 130.418 | 0.01801 | | 0.00 |
| | | | 0.01632 | |
| 60.00 | 130.380 | 0.01531 | | 0.00 |
| | | | 0.01429 | |
| 72.00 | 130.346 | | | 0.00 |
| | | | | |
| | | | | |
| | | | | |
| | < 130.5 | O.K. | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Maximum Water Elevation: 130.787 feet @ 0.01 hours
* Time increment when there is no runoff
Maximum Infiltration Rate: 1.660 ft/day

Recovery @ 28.630 hours
< 130 * O.K.

Analysis Date: 8/7/04

8-7-04

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*PERMIT NO. 7611.000*

# PDQ Car Wash and Ice Cream Stand

Scale: 1" = 20'

N

E.O.P. — 10' — 20' — 15' — 21' — E.O.P.

6" CONC. W/WIRE MESH — EL. 148.65 — EL. 148.75 — INLET #4 GRATE EL. 148.15 — EL. 148.77 — EL. 147.30 — FL. EL. 145.64

SECTION F-F
DRIVEWAY DETAIL
N.T.S.

E.O.P. — 10' — 27' — E.O.P.

6" CONC. W/WIRE MESH — EL. 152.60 — EL. 152.51 — EL. 152.10

SECTION G-G
DRIVEWAY DETAIL
N.T.S.

E.O.P. — 38' — E.O.P.

EL. 155.10 — EL. 155.12

SECTION H-H
TYPICAL
DRIVEWAY DETAIL
N.T.S.

** BOTH SEWER LINE AND F.M. SHALL HAVE A MIN. 3' COVER **

PROPERTY LINE (SEE DETAIL BELOW FOR JACK AND BORE DETAIL (DOWNTHRUST))

160 — 155 — 150 — 145

LIFT STATION RIM EL. 153.00 — TRACER WIRE — EXISTING GRADE — MH #1 RIM 158.50 ~~160.36~~

4" PVC FORCE MAIN — INV. EL. 149.00(S) — BOTT. EL. 145.00(S)

380 LF - 8" PVC @ ~~1.32%~~ 344 1.27%

INV. EL. ~~154.00(N)~~ 153.38

0 — 1 — 2 — 3 — 4 — 5

SEWER PROFILE

E.O.P. — 28' — 10' — 18' — E.O.P.

6" CONC. W/WIRE MESH — EL. 153.58 — EL. 154.08 — EL. 153.58

SECTION I-I
DRIVEWAY DETAIL
N.T.S.

TO RIDGE TECHNICAL SCHOOL

TO RIDGE TECHNICAL SCHOOL

STATE ROAD 544

16"X12" REDUCER

16" PVC PIPE (EXISTING)

12" EASEMENT

FH ASSEMBLY EXISTING

PROPOSED WATER METER DOMESTIC USE

2" GATE VALVE W/ BACK FLOW PREVENTER (SEE NOTE)

SELF-SERVE VACUUM AREA

VACUUM PARKING — VACUUM PARKING

CAR PORT AREA(20'x20')

VACUUM AREA

12" VALVE (EXISTING)

12" PVC PIPE (EXISTING)

RETENTION POND 100
POND TOP EL. 148.65
POND BOTT. EL. 144.00

SHEET 133.0 &

PROPOSED 2" PVC WATER SERVICE

4" WELL (CAR WASH & IRRIGATION)

CAR WASH
FF. EL. 155.50

GPAC-50 OIL SEPARATOR REUSE SYSTEM

4' SIDEWALK — 4' SIDEWALK

3/4" LS. Wash Down

SEE NOTE

5' SIDEWALK

OIL CHANGE

CO — CO

SAND SEPARATOR

4" PRIVATE SEWER SERVICE

DUMPSTER PAD
(SEE DETAIL E-1337-7)

TANK

(1)GTE BT 2-WAY GTS W/3 SUBDUCTS & 1 FOC-8, LS 26-19 * SEE NOTE

PROPOSED 3" FM

FLOW METER

JACK & BORE 76 LF 12" STEEL CASING W/ CASING SPACERS BY RACI (OR EQUAL) W/I CASING (STEEL CASING INV. EL. 141.00) (SEE S.R. 544 SECTION & DETAIL BELOW)

4" X 3" REDUCER

LIFT STATION RIM EL. ~~153.00~~ 152.95
INV. EL. 149.00(S)
BOT. EL. 145.00

344 ~~380~~ LF-8" PVC @ ~~1.32%~~ 1.27%

RETENTION POND 200
POND TOP EL. 153.00
POND BOTT. EL. 150.00
P - 151.5

1" GATE VALVE W/ BACK FLOW PREVENTER (SEE NOTE)
PROPOSED WATER METER

PROPOSED 1" PVC WATER SERVICE

H/C

MINI WAREHOUSE

NOT CONSTRUCTED — 4" PRIVATE SEWER SERVICE — MH #1 RIM EL. ~~158.50~~ 160.36 — INV. EL. ~~154.00~~(N) 153.38

11 SPACES @ 10' = 110'

FIELD COPY
Permit No. 461761.000

⚠ DISABLED PARKING SIGNAGE

SIGNAGE. EACH PARKING SPACE WHICH IS RESTRICTED FOR THE USE OF PHYSICALLY DISABLED PERSONS SHALL BE IDENTIFIED, POSTED AND MAINTAINED WITH A PERMANENT SIGN MEETING THE FOLLOWING CRITERIA.

A. SHALL BEAR THE INTERNATIONAL SYMBOL OF ACCESSIBILITY, BEING A WHITE REFLECTORIZED SYMBOL WITH A BLUE REFLECTORIZED BACKGROUND, AS REFERENCED IN AMERICAN NATIONAL STANDARDS SPECIFICATIONS ANSI, A117.1-1980.
B. SHALL BEAR THE CATPION "PARKING DISABLED PERMIT ONLY" BEING A BLACK OPAQUE LEGEND ON A WHITE REFLECTORIZED BACKGROUND.
C. SHALL BEAR THE MONETARY FINE FOR PARKING VIOLATIONS.
D. ALL LETTERING SHALL BE AT LEAST ONE (1) INCH HIGH.
E. SIGN SHALL HAVE A MINIMUM WIDTH OF TWELVE (12) INCHES.
F. SIGN SHALL HAVE A MINIMUM HIEGHT OF EIGHTEEN (18) INCHES, NOT INCLUDING THAT PORTION DISPLAYING FINE AMOUNT.

NOTE: "AS-BUILTS" ARE BASED ON SURVEY BY CYPRESS LAND SURVEY INC. THE SIGN AND SEALED COPIES ARE AVAILABLE IN THE FILES.

⚠ NOTE: GTE LINE LOCATIONS ARE APPROXIMATE. BE AWARE OF FIBER-OPTIC CABLE.

NOTE: BACKFLOW PREVENTORS WILL BE U.S.C. APPROVED R.P.Z. BACK FLOW PREVENTORS.

NOTE: LIFT STATION WILL BE OPERATED AND MAINTAINED AS A PRIVATE STATION.

NOTE: ALL ELEVATIONS ARE AFTER SODDING.

NOTE: OWNER IS RESPONSIBLE TO MAINTAIN S.W.M. SYSTEM UNCHANGED.

⚠ NOTE: THE 3" F.M. CONNECT WILL BE A WET TAP CONNECT, WHICH MUST BE SCHEDULED AND COORDINATED BY THE CITY OF WINTER HAVEN UTILITIES MANAGER.

⚠ NOTE: VERTICAL SEPARATION BETWEEN THE 3" FORCE MAIN AND THE 12" WATER MAIN WILL BE A MINIMUM OF 18".

⚠ NOTE: A TRACER WIRE WILL BE PLACED FOR THE 3" FORCE MAIN, PER CITY REQUIREMENTS.

AS-BUILT C.M.R. 5-14-99

R/W — E.O.P. — 90' R/W — E.O.P. — R/W — EL. 149.00 — S.R. 544 — 22' — 46' — 22' — EL. 147.00 — EL. 146.50 — EL. 146.30 — 8' — 6' — 8' — 76' — 8' — 6' — 8'

EXISTING 12" PVC W.M.

DTE (3' MIN)

INV. EL. 141.00

CONNECT PROPOSED 4" FM TO EXISTING 10" PVC FORCE MAIN *SEE NOTE

EXISTING 10" PVC FORCE MAIN

PROPOSED 3" FM INV. EL. 141.00

JACK & BORE 4" X 3" REDUCER 76 LF 12" STEEL CASING

JACK & BORE DETAIL
N.T.S.

R/W — E.O.P. — ℄ — E.O.P. — R/W — 90' R/W — 22' — 46' — 22' — 14' — 76'

4" X 3" REDUCER

ISOLATION VALVE

CONNECT PROPOSED 3" FM TO EXISTING 10" PVC FORCE MAIN

EXISTING 10" PVC FORCE MAIN

PROPOSED 3" FM INV. EL. 141.00

JACK & BORE 76 LF 12" STEEL CASING (SEE DETAIL)

STATE ROAD 544

*NOTE: THERE MUST BE A MINIMUM OF 18" BETWEEN JACK & BORE AND GTE LINES AND WATER MAIN.

⚠ *NOTE: ALL DISTURBED R\W AREAS MUST BE SODDED.

SEWER QUANTITIES

| | |
|---|---|
| 8" PVC | 380 LF |
| 3" FM | 165 LF |
| 4" SEWER SERVICE | 81 LF |
| MANHOLE | 1 EA. |
| LIFT STATION | 1 EA. |

WATER QUANTITIES

| | |
|---|---|
| 2" WATER SEVICE | 148 L.F. |
| 2" GATE VALVE | 1 EA. |
| 2" BACKFLOW PREVENTER | 1 EA. |
| 1" WATER SEVICE | 1 EA. |
| 1" GATE VALVE | 1 EA. |
| 1" BACKFLOW PREVENTER | 1 EA. |

48 HOURS BEFORE YOU DIG CALL SUNSHINE 1-800-432-4770 IT'S THE LAW IN FLORIDA

☐ INSPECTION CONDUCTED BY DISTRICT
☐ INSPECTION NOT CONDUCTED BY DISTRICT
RIGHT RESERVED FOR FUTURE INSPECTION

⚠ ROADWAY QUANTITIES

| | CAR WASH | WAREHOUSE |
|---|---|---|
| 1" ASPHALT | 35% ~~3,416~~ 3,535 S.Y. | 678 S.Y. |
| 6" LIMEROCK BASE | ~~3,693~~ S.Y. | 706 S.Y. |
| 8" STAB. SUB-BASE | 3,847 S.Y. | 734 S.Y. |
| 6" CONC. | 90 S.Y. | 30 S.Y. |

| DATE | REV. | DESCRIPTION | INIT |
|---|---|---|---|
| 11-16-98 | 9 | REVISED PER CITY COMMENTS | LL |
| 9-9-98 | 8 | REVISED PER FDOT COMMENTS | LL |
| 6-11-98 | 7 | REVISED DRIVEWAY AREA | JMB |
| 6-5-98 | 6 | REVISED PER DOT COMMENTS | LL |
| 6-2-98 | 5 | REVISED PER DOT COMMENTS | LL |
| 5-5-98 | 4 | REVISED PER CITY COMMENTS | SA |
| 5-5-98 | 3 | REVISED PER CITY COMMENTS | LL |
| 4-27-98 | 2 | REVISED PER DOT COMMENTS | JB |
| 4-14-98 | 1 | REVISED PER CITY COMMENTS | SA |

REVISIONS

ENGINEERS of CENTRAL FLORIDA
(941) 422-5517
FAX (941) 422-7299

SCALE: 1"=20' | APPROVED BY: | DRAWN BY: JMB | DATE: APR '98 | JOB NO.: E-1337

P.D.Q. CAR WASH

SITE, WATER, AND SEWER PLAN | SHEET NO.: E-1337-2

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received JUN 18 1999 RRR-BARTOW

Imaged As Is

File of Record Permit No. 461761.000

## SITE INFORMATION

WMD PERMIT NO. 46017611.002 PERMIT ISSUE DATE: DEC. 14 2011

NOTE: SITE WAS DESIGNED AND CONSTRUCTED IN 1998 AS A CAR WASH PARCEL (1.78 ACRES) WITH TWO BUILDINGS, PARKING AND STORM WATER SYSTEM. WMD PERMIT 4617611.000. CAR WASH BUILDING WAS CONSTRUCTED AT THAT TIME. PARCEL WAS DIVIDED SINCE THEN & THE CARWASH MAINTAINED POND 100. THIS AS-BUILT CONSTRUCTION & STORM RETENTION POND IS PART OF NORTH SUBJECT PARCEL. THIS AS-BUILT IS FOR MODIFICATION OF THE NORTHWEST CORNER ON 0.20 ACRES.

PARCEL NO. 27-28-06-000000-032070
WATER USAGE = 200 GPD
CONSTRUCTED USE = CAR WASH W/ ICE CREAM SHOP
CURRENT ZONING = COMMERCIAL/INDUSTRIAL
AS-BUILT BLDG. F.F. ELEV. = 152.60
FUTURE LAND USE = AGRICULTURAL/RESIDENTIAL - RURAL

### PARKING

PARKING FINAL

1 SPACE PER 300 S.F.
BUILDING IS 483 S.F.
NO SEATS IN ICE CREAM SHOP
(2) PICNIC TABLES

PARKING PROVIDED

(5) 10' REG. SPACES NORTH END
(2) HANDICAP CURRENTLY
(WITHIN ~70 FEET TO PROPOSED ICE CREAM SHOP)

### POND DATA

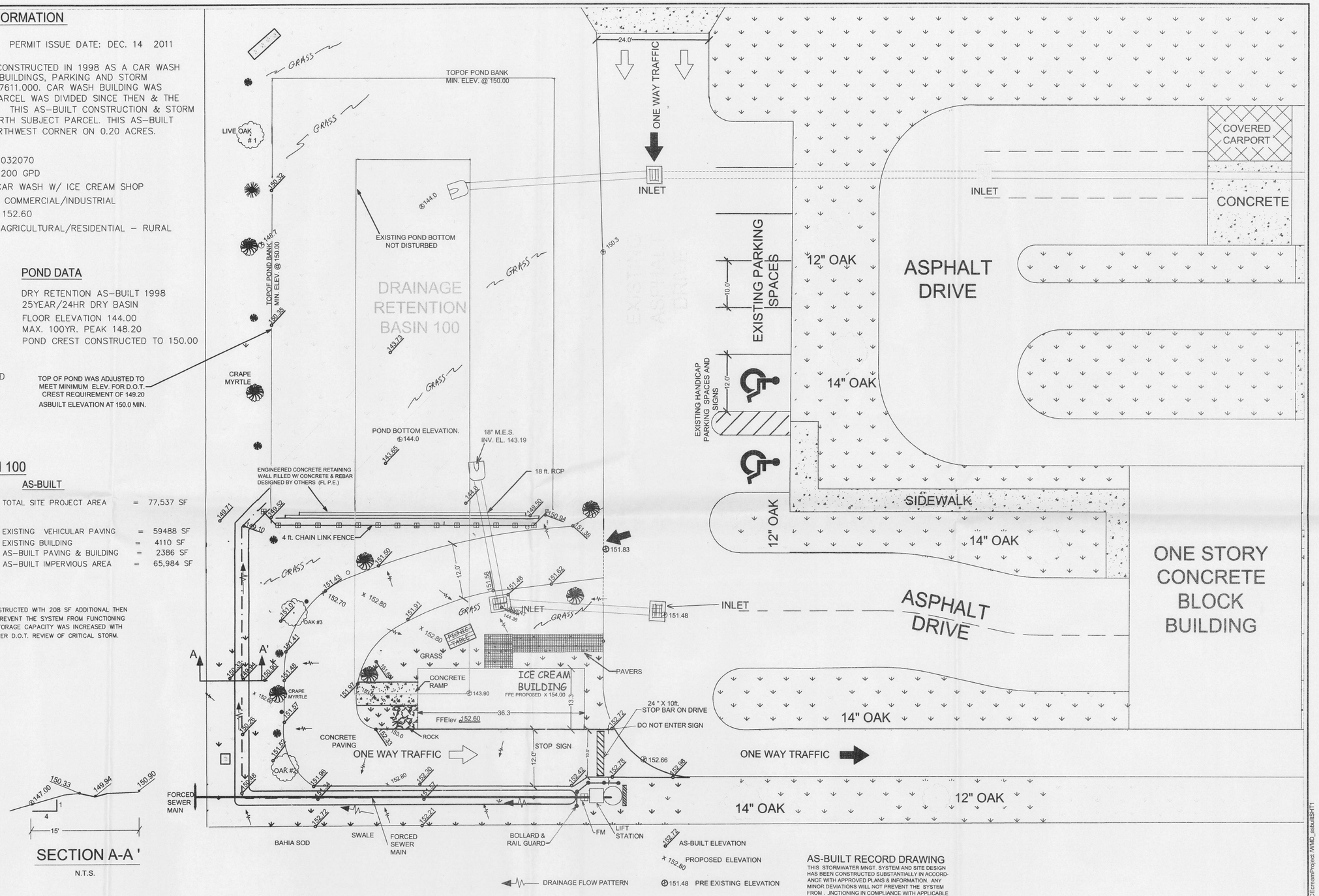
DRY RETENTION AS-BUILT 1998
25YEAR/24HR DRY BASIN
FLOOR ELEVATION 144.00
MAX. 100YR. PEAK 148.20
POND CREST CONSTRUCTED TO 150.00

TOP OF POND WAS ADJUSTED TO MEET MINIMUM ELEV. FOR D.O.T. CREST REQUIREMENT OF 149.20
ASBUILT ELEVATION AT 150.0 MIN.

## DRAINAGE AREA BASIN 100

| EXISTING DESIGN/CONDITIONS | | AS-BUILT | |
|---|---|---|---|
| TOTAL SITE PROJECT AREA | = 77,537 SF | TOTAL SITE PROJECT AREA | = 77,537 SF |
| OPEN SPACE AND RETENTION PONDs | = 11,761 SF | EXISTING VEHICULAR PAVING | = 59488 SF |
| EXISTING PAVING & BUILDING | = 63598 SF | EXISTING BUILDING | = 4110 SF |
| EXISTING IMPERVIOUS AREA | = 63,598 SF | AS-BUILT PAVING & BUILDING | = 2386 SF |
| PROPOSED PAVING & BUILDING | = 2,178 SF | AS-BUILT IMPERVIOUS AREA | = 65,984 SF |
| PROPOSED TOTAL IMPERVIOUS AREA | = 65,776 SF | | |

NOTE:
AS-BUILT DRIVEWAY AND BUILDING CONSTRUCTED WITH 208 SF ADDITIONAL THEN PLANNED. MINOR INCREASE WILL NOT PREVENT THE SYSTEM FROM FUNCTIONING AS DESIGNED AND PROPOSED. POND STORAGE CAPACITY WAS INCREASED WITH A FINAL TOP OF BANK @ 150.00min.- PER D.O.T. REVIEW OF CRITICAL STORM.







SECTION A-A '
N.T.S.

N

SCALE, FEET 0 5 10

AS-BUILT ELEVATION
PROPOSED ELEVATION
DRAINAGE FLOW PATTERN
PRE EXISTING ELEVATION

### AS-BUILT RECORD DRAWING

THIS STORMWATER MNGT. SYSTEM AND SITE DESIGN HAS BEEN CONSTRUCTED SUBSTANTIALLY IN ACCORDANCE WITH APPROVED PLANS & INFORMATION. ANY MINOR DEVIATIONS WILL NOT PREVENT THE SYSTEM FROM . JNCTIONING IN COMPLIANCE WITH APPLICABLE REGULATIONS. SUBSTANTIAL DEVIATIONS ARE NOTED.


GENERAL ENVIRONMENTAL ENGINEERING, INC.
205 WEST PALMETTO ST.
LAKELAND, FL 33815


# WASH ME CAR WASH
# ICE CREAM STAND ADDITION

## SITE AS-BUILT RECORD PLAN INFORMATION/ DATA

Dean Myers, P.E. 47666
7-5-2013
DATE

DEAN HOWARD MYERS LICENSE No. 47666 STATE OF FLORIDA PROFESSIONAL ENGINEER

DRAWN: DH M
APPROVED: DM
DATE: 6/12/ 2013
SCALE: 1" = 10'

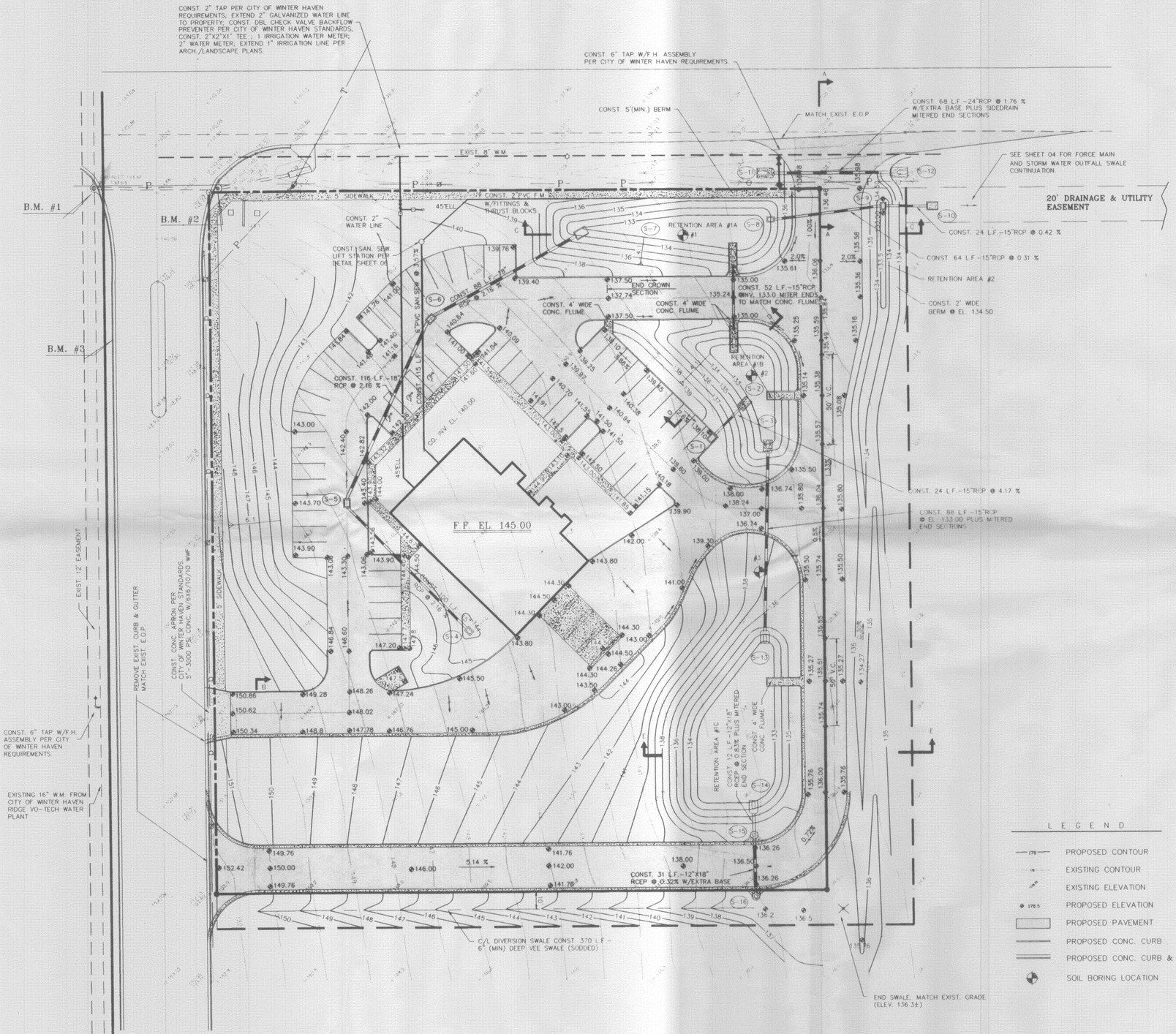
SHEET 1

Southwest Florida Water Management District
JUL 10 2013
Received
BARTOW RSB

\CEcreamProject \WMD_asbuiltSHT1

*PERMIT NO. 9344.000*

# First National Bank




L E G E N D

- PROPOSED CONTOUR
- EXISTING CONTOUR
- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED PAVEMENT
- PROPOSED CONC. CURB
- PROPOSED CONC. CURB & GUTTER
- SOIL BORING LOCATION

GENERAL NOTES

1. All materials and workmanship shall conform to the Florida Department of Transportation specifications (latest edition) and City of Winter Haven regulations.
2. Locations, elevations, and dimensions of existing utilities, structures, and other features are shown according to the best information available at the time of preparation of these plans. The Contractor shall verify the locations, elevations, and dimensions of all existing utilities, structures, and other features affecting this work prior to construction.
3. The Contractor shall use extreme caution in areas of buried utilities and shall provide at least 48 hours notice to the utility companies prior to construction to obtain field locations of existing underground utilities. The Contractor shall protect and maintain operation of existing utility services during construction.
4. The Contractor shall check plans for conflicts and discrepancies prior to construction. The Contractor shall notify the engineer of any conflicts before performing any work in the affected area.
5. The Engineer (CHASTAIN-SKILLMAN, INC.) shall be notified as to where existing utility services interfere with the proposed construction.
6. The Contractor is responsible for repairing any damage to existing facilities, above or below ground, that may occur as a result of the work performed by the Contractor.
7. All underground utilities must be in place and tested or inspected prior to base and surface construction.
8. It is the Contractor's responsibility to become familiar with the permit and inspection requirements specified by the various governmental agencies and the engineer. The Contractor shall obtain all necessary permits prior to construction, and schedule inspections according to agency instructions. All work performed shall comply with the regulations and ordinances of the various governmental agencies having jurisdiction over the work.
9. The Contractor shall submit shop drawings on all pre-cast and manufactured items to the engineer for approval. Failure to obtain approval before installation may result in removal and replacement at Contractor's expense.
10. At least three (3) working days prior to construction, the Contractor shall notify the engineer and appropriate agencies and supply them with the Contractor's name, starting date, projected construction schedule, all required shop drawings, and other information as required. Any work performed prior to proper notifications may be subject to removal and replacement at the Contractor's expense.
11. All disturbed areas not included in the landscape plans shall be either sodded or seeded and mulched depending on the type of grass cover prior to construction. Minimum sodding requirements include a 10' perimeter strip around all structures, the retention area sideslopes and berms (do not sod pond bottom); the southern diversion swale; and a 2' strip along all paved areas. Contractor shall coordinate work with the landscape personnel.
12. Coordinate work within the rights-of-way with the City of Winter Haven, FDOT, and School Board of Polk County construction and maintenance authorities.
13. The site shall be initially graded such that no off-site area will be adversely affected by the storm water runoff. Runoff to the adjacent rights-of-way shall be minimized. The existing drainage facilities within the right-of-way shall be protected at all times by the use of staked hay bales, temporary grading, revegetation, etc. Any disturbed area within the right-of-way shall be sodded. All areas shall be protected from erosion caused by stormwater runoff by vegetation, staked hay bales, temporary grading, etc.
14. Parking lot striping shall consist of white paint in accordance with the appropriate City of Winter Haven and FDOT specification.
15. Upon completion of construction activities, the retention area and stormwater piping systems shall be cleaned of all silts, debris, limerock, etc. The retention area shall be backfilled with clean coarse sand to the appropriate design elevations as required.
16. Safety
    - A. During construction and/or maintenance of this project, all safety regulations are to be enforced. The contractor or his representative shall be responsible for the control and safety of the traveling public and the safety of his personnel.
    - B. Labor safety regulations shall conform to the provisions set forth by OSHA in the Federal Registry of the Department of Transportation.
    - C. All trench excavation that exceeds an average depth of five (5) feet MUST conform to the requirements stated in the new "Trench Safety Act" incorporated into OSHA standards (Chapter 90-96, CS/SB 2626). The new law requires the Contractor to recognize the OSHA excavation safety standards, agree to abide by them, and identify the cost to comply.
    - D. The minimum standards as set forth in the current edition of the State of Florida Roadway and Traffic Design Standards shall be followed in the design application, installation, maintenance, and removal of all traffic control devices, warning devices, and barriers necessary to protect the public and workmen from hazards within the project.
    - E. All traffic control markings and devices shall conform to the provision set forth in the "Manual on Uniform Traffic Control Devices" prepared by the U.S. Department of Transportation, Federal Highway Administration.

STORMWATER MANAGEMENT SYSTEM OPERATING AND MAINTENANCE PROCEDURES

The stormwater facility must be maintained properly if it is to perform the service for which it was designed. This is intended to be a guide to the proper ways to maintain this facility. This is only a guide and should be modified as field conditions require.

1. Monthly, visually inspect inlet openings to insure that no clogging has occurred.
2. Once every three months, visually inspect all pipes for obstructions or a build-up of excessive sediments. If excessive sedimentation has occurred, have all lines properly flushed.
3. Weekly during summer months and bi-weekly during the remainder of the year, mow any grass within the collection areas and around the retention area. Grass clipping shall be collected and removed from the site for proper disposal.

STORM SEWER STRUCTURES TABULATION

S-1
Const. Type "F" DBI
T.G. Elev 139.05
Inv Elev 134.00

S-2
Const. 15" RCP U-Type Endwall with Baffles
Inv Elev 133.00

S-3
Const. 15" RCP U-Type Endwall
Inv El. 133.00

S-4
Const. Type "C" DBI
T.G. Elev 143.80
Inv Elev 139.56

S-5
Const. Type "F" DBI
T.G. Elev 143.10
Inv Elev 137.40

S-6
Const. Type "F" DBI
T.G. Elev 140.40
Inv Elev 134.90

S-7
Const. 18" RCP U-Type Endwall with Baffles
Inv Elev 133.00

S-8
Const. Control Structure
Type "C" DBI with Grease Baffle
T.G. Elev. 135.00
2' wide Slot W. Side
Slot Elev 133.85
Inv Elev 130.50

S-9
Const. Control Structure
Type "C" DBI with Grease Baffle
T.G. Elev 134.40
2' wide Slot S. Side
Slot Elev 134.10
Inv Elev 130.30

S-10
Const. 15" RCP U-Type Endwall with Baffles
Inv Elev 130.20

S-11
Const. 24" RCP Sidedrain
Mitered End Section
Inv Elev 133.00

S-12
Const. 24" RCP Sidedrain
Mitered End Section
Inv Elev 133.00

S-13
Const. 15" RCP U-Type Endwall
Inv. El. 133.00

S-14
Const. 12"x18" RCP "U" Type Endwall W/ Baffles
Inv El. 133.00

S-15
Const. P-4 Curb Inlet
E.O.P. El. 136.26
Inv El. 133.10

S-16
Const. P-4 Curb Inlet
E.O.P. El. 136.26
Inv El. 133.20

ON SITE BENCH MARKS:

B.M. #1 - Top of inlet near the Northwest corner of property, West side of Public Road Way. Elev = 143.61

B.M. #2 - Top of inlet near the Northwest corner of property, East side of Public Road Way. Elev = 142.45

B.M. #3 - Top of P.K. Nail located 83.00 feet South of the Northwest corner of property on top of curb west side of Public Road Way. Elev = 147.39

FILE OF RECORD
P. I.T NO.
SEP 03 1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED RSC

489344 01

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
AUG 21 1991
WINTER HAVEN, FLORIDA

| REVISION | DATE | | |
|---|---|---|---|
| 1 | 08/06/91 | REVISIONS PER OWNER & AGENCIES | |

CHECKED

engineers-surveyors-planners
chastain skillman incorporated
lakeland sebring

SCALE 1" = 30' | DATE

| | |
|---|---|
| ENGINEER | CBS |
| SURVEYOR | |
| DRAWN BY | BM/LKW |
| CHECKED | |
| APPROVED | |

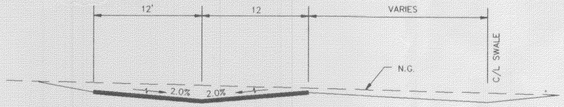
FIRST NATIONAL BANK OF POLK COUNTY

GRADING, DRAINAGE, AND UTILITIES PLAN

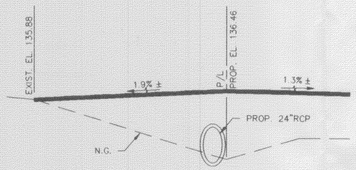
DATE 08/07/91 | DRWG. NO. DCL 4655.01-03 | REV. NO.

4

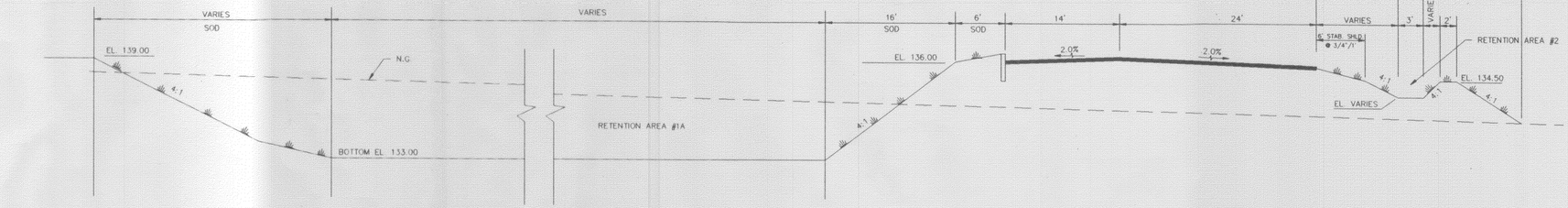
489344 01



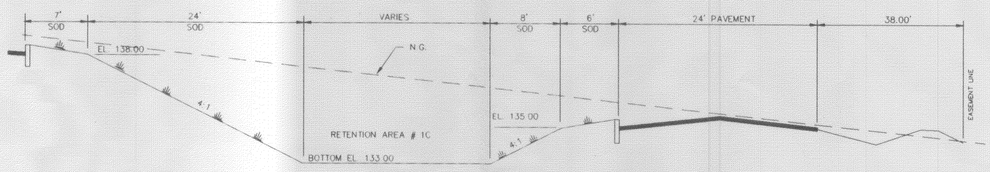

SECTION B-B
N.T.S.

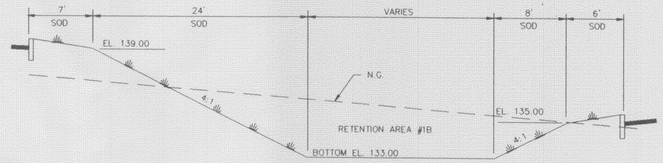



SECTION A-A
N.T.S.




SECTION C-C
N.T.S.



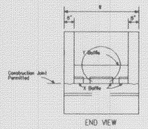

SECTION D-D
N.T.S.

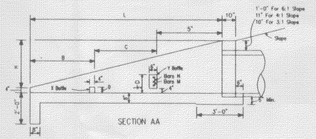
Reinforcing Bars @ 6" Centers Both Ways Except Middle Bars Shown @ 7" Centers. All Bars With XO Standard Hooks Contact Approx. 45° Or Embedded In Accordance With The Slab Reinforcement Detail Shown Under Optional Contraction Joints, Sheet No. 3 or 3. Except Bars Around Manhole Opening Shall Be Hooked

| Bar Size | Top Clearance |
|---|---|
| No. 4 | 3'-0" & 4' |
| No. 5 | 3' |
| No. 6 | 3' |

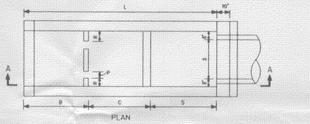
DIMENSIONS AND QUANTITIES FOR BAFFLES

| Pipe Size D | # Baffle Holes | # Baffle Height | # Baffle Length | # Baffle Hook Stud Dia. "A" | # Baffle Hook Stud Dia. "B" | Concrete Class II Cu. Yds. | Hook Stud Lbs. |
|---|---|---|---|---|---|---|---|
| 18" | 2 | 2' | 2' | 5/8-11 | 1/2-13 | 0.10 | 1 |
| 24" | 2 | 2' | 2' | 5/8-11 | 1/2-13 | | 1 |
| 30" | 2 | 2' | 2' | 5/8-11 | 1/2-13 | | 1 |
| 36" | 2 | 2' | 2' | 5/8-11 | 1/2-13 | | 1 |

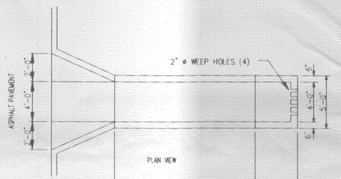



SECTION AA

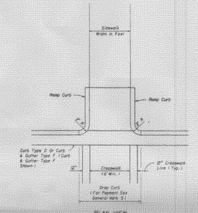


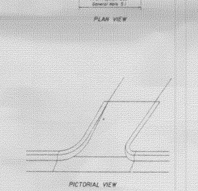

PLAN

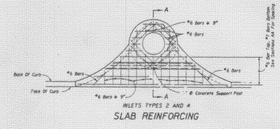


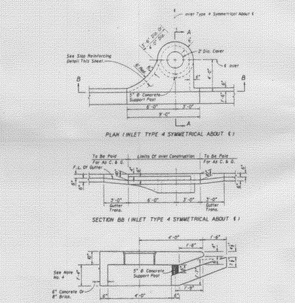

FLARED CONC. FLUME
N.T.S

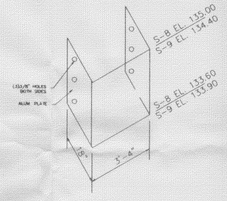
SECTION E-E
N.T.S.



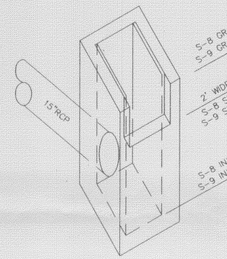



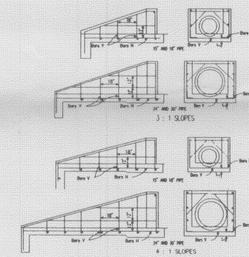



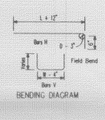




GREASE BAFFLE
N.T.S.




TYPE "C" D.B.I. CONTROL STRUCTURE
SEE D.O.T. INDEX 232
N.T.S.




DIMENSION DETAILS

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL

| Rate of Slope | Pipe Size D | Pipe Size Area Sq. Ft. | L | H | W | Baffle Locations (When Required) S | B | T | Concrete Class II Cu. Yd. | Reinf. Steel Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 : 1 | 15" | 1.23 | 5'-3" | 1'-9" | 3'-7" | 1'-9" | 1'-9" | 1'-9" | 1.19 | 51 |
| | 18" | 1.77 | 6'-0" | 2'-0" | 3'-10" | 2'-0" | 2'-0" | 2'-0" | 1.42 | 56 |
| | 24" | 3.14 | 7'-6" | 2'-6" | 4'-4" | 2'-6" | 2'-6" | 2'-6" | 1.94 | 77 |
| | 30" | 4.91 | 9'-0" | 3'-0" | 4'-10" | 3'-0" | 3'-0" | 3'-0" | 2.54 | 99 |
| 4 : 1 | 15" | 1.23 | 7'-4" | 1'-10" | 3'-7" | 2'-6" | 2'-6" | 2'-6" | 1.54 | 64 |
| | 18" | 1.77 | 8'-4" | 2'-1" | 3'-10" | 2'-10" | 2'-10" | 2'-10" | 1.84 | 71 |
| | 24" | 3.14 | 10'-4" | 2'-7" | 4'-4" | 3'-6" | 3'-6" | 3'-6" | 2.53 | 92 |
| | 30" | 4.91 | 12'-4" | 3'-1" | 4'-10" | 4'-2" | 4'-2" | 4'-2" | 3.34 | 124 |
| 6 : 1 | 15" | 1.23 | 11'-6" | 1'-11" | 3'-7" | 3'-10" | 3'-10" | 3'-10" | 2.19 | 89 |
| | 18" | 1.77 | 12'-6" | 2'-2" | 3'-10" | 4'-6" | 4'-6" | 4'-6" | 2.62 | 103 |
| | 24" | 3.14 | 15'-0" | 2'-7" | 4'-4" | 5'-4" | 5'-4" | 5'-4" | 3.58 | 143 |
| | 30" | 4.91 | 19'-0" | 3'-7" | 4'-10" | 6'-4" | 6'-4" | 6'-4" | 4.81 | 180 |

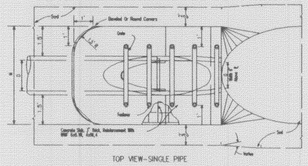
U-TYPE CONCRETE ENDWALLS
SEE D.O.T. INDEX 261

DIMENSIONS & QUANTITIES

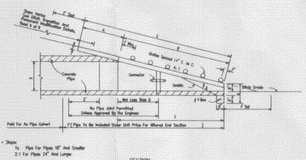
| D | X | A | B | C | L | F | G | W Single Pipe | W Double Pipe | W Triple Pipe | W Quad Pipe | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15" | 7'-0" | 2'-7" | 6'-09" | 6'-36" | 6'-03" | 8" | 1'-22" | 6.83 | 7.41 | 8.78 | 10.37 | 1.18 |
| 18" | 7'-0" | 3'-06" | 5'-11" | 6'-48" | 5'-03" | 9" | 1'-41" | 6.92 | 8.09 | 10.06 | 12.04 | 1.21 |
| 24" | 7'-6" | 3'-6" | 7'-03" | 7'-36" | 6'-03" | 1'-0" | 2'-0" | 8.08 | 9.49 | 11.35 | 13.48 | 1.21 |
| 30" | 8'-0" | 3'-9" | 7'-9" | 8'-0" | 7'-06" | 1'-3" | 2'-3" | 9.08 | 10.76 | 12.80 | 15.07 | 1.21 |
| 36" | 8'-6" | 4'-0" | 8'-3" | 8'-6" | 8'-0" | 1'-6" | 2'-6" | 10.08 | 12.03 | 14.25 | 16.67 | 1.21 |
| 42" | 9'-0" | 4'-3" | 8'-9" | 9'-0" | 8'-6" | 1'-9" | 2'-9" | 11.08 | 13.30 | 15.70 | 18.26 | 1.21 |
| 48" | 9'-6" | 4'-6" | 9'-6" | 9'-6" | 9'-0" | 2'-0" | 3'-0" | 12.08 | 14.57 | 17.15 | 19.86 | 1.21 |
| 54" | 10'-0" | 4'-9" | 10'-0" | 10'-0" | 9'-6" | 2'-3" | 3'-3" | 13.08 | 15.84 | 18.60 | 21.45 | 1.21 |
| 60" | 10'-6" | 5'-0" | 10'-6" | 10'-6" | 10'-0" | 2'-6" | 3'-6" | 14.08 | 17.11 | 20.05 | 23.05 | 1.21 |

| D | CRATE SIZES Standard Weight Pipe | Extra Strong Pipe | 3" CONC. SLAB (CY) Single Pipe | Double Pipe | Triple Pipe | Quad Pipe | SOODING (SQ. YDS.) Single Pipe | Double Pipe | Triple Pipe | Quad Pipe |
|---|---|---|---|---|---|---|---|---|---|---|
| 15" | | | 0.40 | 0.51 | 0.90 | 1.30 | 8 | 11 | 12 | 14 |
| 18" | | | 0.47 | 0.63 | 0.91 | 1.16 | 10 | 11 | 13 | 15 |
| 24" | | | 0.66 | 0.99 | 1.31 | 1.90 | 11 | 13 | 15 | 18 |
| 30" | 5" | 3" | 0.76 | 1.12 | 1.63 | 2.20 | 11 | 15 | 18 | 21 |
| 36" | 5" | 3" | 1.00 | 1.40 | 1.90 | 2.60 | 13 | 16 | 20 | 24 |
| 42" | 5" | 3" | 1.09 | 1.70 | 2.40 | 3.10 | 14 | 18 | 22 | 27 |
| 48" | 5 1/2" | 3 1/2" | 1.43 | 2.15 | 3.00 | 4.00 | 16 | 19 | 27 | 32 |
| 54" | 6" | 4" | 1.70 | 2.55 | 3.70 | 4.80 | 18 | 24 | 30 | 36 |
| 60" | 6" | 4" | 1.59 | 3.02 | 4.44 | 5.86 | 19 | 25 | 31 | 36 |

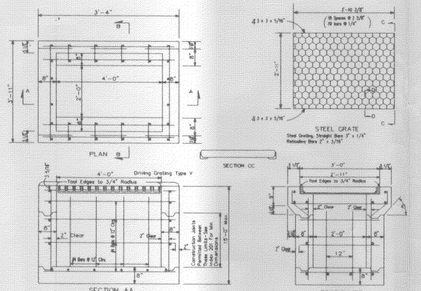
Δ5:4:2"
○10:40"
○90:10" Dimensions permitted to allow use of 12' standard pipe lengths.
Δ ⊕ Concrete shall be designed to form bridge across crown of pipe. See section below.




TOP VIEW-SINGLE PIPE



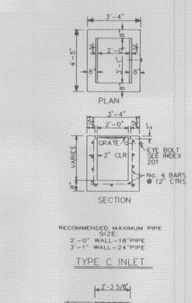

SIDE DRAIN MITERED END SECTION
ROUND CONCRETE PIPE
SEE D.O.T. INDEX 273



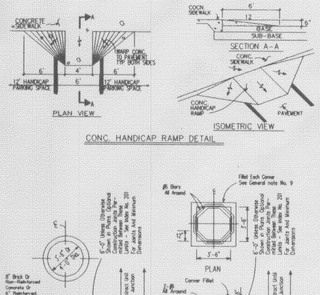


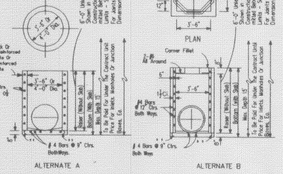


D.O.T. TYPE "F" D.B.I.
SEE D.O.T INDEX 233

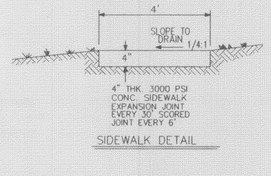



D.B.I. TYPE "C"
SEE D.O.T. INDEX 232
N.T.S.

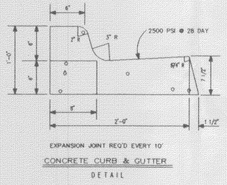


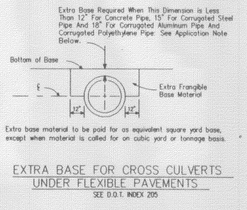

D.O.T. STRUCTURE TYPE "P" BOTTOM
FOR INLETS, mANHOLES AND JUNCTION BOXES
SEE D.O.T. INDEX 200



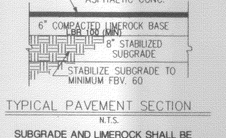

SIDEWALK DETAIL




CONCRETE CURB & GUTTER
DETAIL

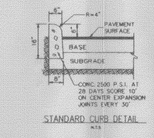



EXTRA BASE FOR CROSS CULVERTS
UNDER FLEXIBLE PAVEMENTS
SEE D.O.T. INDEX 205




TYPICAL PAVEMENT SECTION
N.T.S.

SUBGRADE AND LIMEROCK SHALL BE COMPACTED TO 98% OF MODIFIED PROCTOR




STANDARD CURB DETAIL
N.T.S.

SOIL BORING INFORMATION
DATE OF BORINGS: June 10, 1991

| BORING NUMBER | PERC TEST RESULTS | TYPES OF SUBSOIL TO 6 FEET | CURRENT WATER TABLE ELEVATION |
|---|---|---|---|
| 1 | 0.20 min/inch | 0" – 10" Brown top soil<br>10" – 40" Tan semi-fine sand<br>40" – 72" Tan fades to very light tan/white semi-fine sand | None to 6 feet |
| 2 | 0.30 min/inch | 0" – 9" Brown top soil<br>9" – 32" Tan semi-fine sand<br>32" – 72" Tan fades to very light tan/white semi-fine sand | None to 6 feet |
| 3 | 0.35 min/inch | 0" – 9" Dark tan top soil<br>9" – 18" Light tan semi-fine sand<br>18" – 72" Tan fades to very light tan/white semi-fine sand | None to 6 feet |

BORINGS PERFORMED BY: Karr's Percolation Service
77 Lake Pointe Drive
Mulberry, Florida 33860
Telephone: (813) 647-1770

FILE OF RECORD
PERMIT NO. _____
SEP 03 1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS
APPROVED RSC 7/3/91

489344 01 K

STORM SEWERS PIPING STANDARDS AND SPECIFICATIONS
REINFORCED CONCRETE PIPING MATERIALS

A. Round Concrete Pipe: Shall conform to requirements of ASTM C76-70 (Class III) except as modified in SSFR & BC, Section 941-1.3.
B. Elliptical Concrete Pipe: Shall conform to requirements of ASTM C-507 except as modified in SSFR & BC Section 941.1.3. Standard elliptical pipe shall meet the requirements of Table I for Class HE-III and special elliptical pipe shall meet the requirements of Table I for Class HE-V.
C. Gaskets: Rubber gaskets shall be used for round pipe and shall meet the requirements of ASTM C-443 or 5.9 ASTM C-361 with the additional requirement that it shall be of sufficient volume to fill the pipe/pipe joint space in which it is used. Elliptical pipe shall use gaskets in accordance with SSFR & BC Section 942.2.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
AUG 21 1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
AUG 29 1991
PROCESSED
BY
Brooksville Tampa Bartow Lakeland Sebring

| REVISION | DATE | CHECKED |
|---|---|---|
| | | |

engineers-surveyors-architects
chastain skillman incorporated
lakeland sebring

| | | |
|---|---|---|
| SCALE | N.T.S. | DATE |
| ENGINEER | C.B.S. | |
| SURVEYOR | | |
| DRAWN BY | L.K.W. | |
| CHECKED | | |
| APPROVED | | |

FIRST NATIONAL BANK OF POLK COUNTY

GRADING & DRAINAGE DETAILS

DATE 489344 01 K | DRWG. DCL 4655.01-05 | REV. NO.

489344.01

# FIRST NATIONAL BANK OF POLK COUNTY -- STATE ROAD 544 SITE
# STORMWATER INFORMATION AND CALCULATIONS

CSI Project Number 4655.01
August 15, 1991

SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
AUG 21 1991
RECEIVED
BARTOW, FLORIDA

Southwest Florida Water Management District
RECEIVED
AUG 23 1991
PROCESSING & RECORDS
Brooksville, Florida

engineers • scientists • surveyors
chastain skillman
incorporated

8/22/91

FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

GENERAL INFORMATION

The following storm water information and calculations pertain to the proposed construction of a new bank facility located on State Road 544 east of Winter Haven, Polk County. These calculations are based upon retaining and filtering the first 1/2" of runoff from the new development.

SOILS INFORMATION

The SCS Soil Survey of Polk County identifies the soils in the area of the proposed project as "Candler Sand" which is classified as a hydrologic group "A" soil with a SHW level at greater than 6.0 feet below existing grade. This SCS information also indicates a perc rate of 6 to 20 iph.

Soil borings performed in the vicinity of the retention areas indicate no groundwater to a depth of 72" (borings dated 6/10/91). The proposed retention areas will be constructed at an average depth of 3.0 feet. Therefore, the existing groundwater levels of the area should not be adversely affected. These soils tests also indicated an average perc rate of over 200 iph. The design of the storm water system is based upon a rate of 18 iph which is less than 10% of the measured value and which falls within the range determined by the SCS.

Southwest Florida Water Management District
RECEIVED
AUG 23 1991
BARTOW, FLORIDA
Brooksville, Florida

489344.01

FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

| | | BASIN #1 | BASIN #2 |
|---|---|---|---|
| DRAINAGE AREA -- | OPEN SPACE | 1.31 ac | 0.08 ac |
| | IMPERVIOUS AREA | 1.55 ac | 0.13 ac |
| | RETENTION AREA | 0.26 ac | 0.05 ac |
| | TOTAL AREA | 3.12 ac | 0.26 ac |

| RETENTION AREA DATA | POND #1A | POND #1B | POND #1C | |
|---|---|---|---|---|
| BOTTOM ELEV | 133.0 | 133.0 | 133.0 | 133.5 |
| BOTTOM AREA | 1,370 sq.ft. | 845 sq.ft. | 3,400 sq.ft. | 165 sq.ft. |
| T/B ELEV | 135.0 | 135.0 | 135.0 | 134.5 |
| T/B AREA | 3,480 sq.ft. | 2,300 sq.ft. | 5,700 sq.ft. | 2,400 sq.ft. |
| AVG SIDESLOPES | 4:1 | 4:1 | 4:1 | 4:1 |
| REQUIRED STORAGE | | 5,663 cu.ft. | | 472 cu.ft. |
| DISCHARGE ELEV. | | 133.85 | | 134.10 |
| STORAGE PROVIDED | | 5,756 cu.ft. | | 512 cu.ft. |

**********

DISCHARGE STRUCTURE INFORMATION

FROM: RETENTION AREA #1B
TO: RETENTION AREA #1A
52 LF - 15" RCP
HW INV EL 133.00
TW INV EL 133.00

FROM: RETENTION AREA #1C
TO: RETENTION AREA #1B
88 LF - 15" RCP
HW INV EL 133.00
TW INV EL 133.00

FROM: RETENTION AREA #1A
TO: OUTFALL SWALE
TYPE "C" DBI W/ GREASE BAFFLE
T.G. ELEV 135.00
2' WIDE SLOT W. SIDE
SLOT ELEV 133.85
88 LF - 15" RCP
HW INV EL 130.50
TW INV EL 130.20

FROM: RETENTION AREA #2
TO: OUTFALL SWALE
TYPE "C" DBI W/ GREASE BAFFLE
T.G. ELEV 134.40
2' WIDE SLOT S. SIDE
SLOT ELEV 134.10
24 LF - 15" RCP
HW INV EL 130.30
TW INV EL 130.20

Southwest Florida Water Management District
RECEIVED
AUG 23 1991
PROCESSING & RECORDS
Brooksville, Florida
SOUTHWEST FLORIDA WATER

AUG 21 1991
RECEIVED
BARTOW, FLORIDA

FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

RETENTION AREA #1A -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 1370.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 3480.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 102.51 FT
LENGTH = 13.36 FT

| ELEV | STAGE (ft) | WIDTH (ft) | LENGTH (ft) | AREA (sq.ft) | INC. VOL (cu.ft) | VOLUME (cu.ft) | VOLUME (ac-ft) | PERC RATE (cfs) |
|---|---|---|---|---|---|---|---|---|
| 133.00 | 0.00 | 102.51 | 13.36 | 1370 | 0 | 0 | 0.000 | 0.57 |
| 133.25 | 0.25 | 104.51 | 15.36 | 1606 | 372 | 372 | 0.009 | 0.67 |
| 133.50 | 0.50 | 106.51 | 17.36 | 1850 | 432 | 804 | 0.018 | 0.77 |
| 133.75 | 0.75 | 108.51 | 19.36 | 2101 | 494 | 1298 | 0.030 | 0.88 |
| 134.00 | 1.00 | 110.51 | 21.36 | 2361 | 558 | 1856 | 0.043 | 0.98 |
| 134.25 | 1.25 | 112.51 | 23.36 | 2629 | 624 | 2479 | 0.057 | 1.10 |
| 134.50 | 1.50 | 114.51 | 25.36 | 2905 | 692 | 3171 | 0.073 | 1.21 |
| 134.75 | 1.75 | 116.51 | 27.36 | 3188 | 762 | 3932 | 0.090 | 1.33 |
| 135.00 | 2.00 | 118.51 | 29.36 | 3480 | 834 | 4766 | 0.109 | 1.45 |

RETENTION AREA #1B -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 845.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 2300.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 61.11 FT
LENGTH = 13.83 FT

| ELEV | STAGE (ft) | WIDTH (ft) | LENGTH (ft) | AREA (sq.ft) | INC. VOL (cu.ft) | VOLUME (cu.ft) | VOLUME (ac-ft) | PERC RATE (cfs) |
|---|---|---|---|---|---|---|---|---|
| 133.00 | 0.00 | 61.11 | 13.83 | 845 | 0 | 0 | 0.000 | 0.35 |
| 133.25 | 0.25 | 63.11 | 15.83 | 999 | 230 | 230 | 0.005 | 0.42 |
| 133.50 | 0.50 | 65.11 | 17.83 | 1161 | 270 | 500 | 0.011 | 0.48 |
| 133.75 | 0.75 | 67.11 | 19.83 | 1331 | 311 | 812 | 0.019 | 0.55 |
| 134.00 | 1.00 | 69.11 | 21.83 | 1508 | 355 | 1167 | 0.027 | 0.63 |
| 134.25 | 1.25 | 71.11 | 23.83 | 1694 | 400 | 1567 | 0.036 | 0.71 |
| 134.50 | 1.50 | 73.11 | 25.83 | 1888 | 448 | 2015 | 0.046 | 0.79 |
| 134.75 | 1.75 | 75.11 | 27.83 | 2090 | 497 | 2512 | 0.058 | 0.87 |
| 135.00 | 2.00 | 77.11 | 29.83 | 2300 | 549 | 3061 | 0.070 | 0.96 |

RETENTION AREA #1C -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 3400.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 5700.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
DEPTH INCR. = 0.25 FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 89.95 FT
LENGTH = 37.80 FT

| ELEV | STAGE (ft) | WIDTH (ft) | LENGTH (ft) | AREA (sq.ft) | INC. VOL (cu.ft) | VOLUME (cu.ft) | VOLUME (ac-ft) | PERC RATE (cfs) |
|---|---|---|---|---|---|---|---|---|
| 133.00 | 0.00 | 89.95 | 37.80 | 3400 | 0 | 0 | 0.000 | 1.42 |
| 133.25 | 0.25 | 91.95 | 39.80 | 3659 | 882 | 882 | 0.020 | 1.52 |
| 133.50 | 0.50 | 93.95 | 41.80 | 3927 | 948 | 1831 | 0.042 | 1.64 |
| 133.75 | 0.75 | 95.95 | 43.80 | 4203 | 1016 | 2847 | 0.065 | 1.75 |
| 134.00 | 1.00 | 97.95 | 45.80 | 4486 | 1086 | 3933 | 0.090 | 1.87 |
| 134.25 | 1.25 | 99.95 | 47.80 | 4778 | 1158 | 5091 | 0.117 | 1.99 |
| 134.50 | 1.50 | 101.95 | 49.80 | 5077 | 1232 | 6323 | 0.145 | 2.12 |
| 134.75 | 1.75 | 103.95 | 51.80 | 5385 | 1308 | 7630 | 0.175 | 2.24 |
| 135.00 | 2.00 | 105.95 | 53.80 | 5700 | 1386 | 9016 | 0.207 | 2.38 |

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FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

RETENTION AREA #1 (COMPOSITE) -- STAGE/STORAGE RELATIONSHIP

| ELEV | STAGE (ft) | #1A VOL (cu.ft) | #1B VOL (cu.ft) | #1C VOL (cu.ft) | VOLUME (cu.ft) | VOLUME (ac-ft) | PERC RATE (cfs) |
|---|---|---|---|---|---|---|---|
| 133.00 | 0.00 | 0 | 0 | 0 | 0 | 0.000 | 2.34 |
| 133.25 | 0.25 | 372 | 230 | 882 | 1485 | 0.034 | 2.61 |
| 133.50 | 0.50 | 804 | 500 | 1831 | 3135 | 0.072 | 2.89 |
| 133.75 | 0.75 | 1298 | 812 | 2547 | 4957 | 0.114 | 3.18 |
| 134.00 | 1.00 | 1856 | 1167 | 3933 | 6955 | 0.160 | 3.48 |
| 134.25 | 1.25 | 2479 | 1567 | 5091 | 9137 | 0.210 | 3.79 |
| 134.50 | 1.50 | 3171 | 2015 | 6323 | 11509 | 0.264 | 4.11 |
| 134.75 | 1.75 | 3932 | 2512 | 7630 | 14075 | 0.323 | 4.44 |
| 135.00 | 2.00 | 4766 | 3061 | 9016 | 16843 | 0.387 | 4.78 |

RETENTION AREA #1 (COMPOSITE) -- DRAWDOWN ANALYSIS

INPUT PARAMETERS

INITIAL VOLUME = 5955.00 CU.FT.
NWL SURFACE AREA = 0.00 SQ.FT.
PERC RATE = 18.00 IN/HR
TIME INCR. = 0.10 HR
STAGE-STORAGE
Ks = 7496
b = 1.168

| TIME (HR) | STORED VOLUME (CU.FT.) | SURFACE AREA (SQ.FT.) | PERC AREA (SQ.FT.) | PERC VOLUME (CU.FT.) |
|---|---|---|---|---|
| 0.00 | 5955.00 | 7252.05 | 7252.05 | 1087.81 |
| 0.10 | 4867.19 | 7044.77 | 7044.77 | 1056.72 |
| 0.20 | 3810.48 | 6801.19 | 6801.19 | 1020.18 |
| 0.30 | 2790.30 | 6503.24 | 6503.24 | 975.49 |
| 0.40 | 1814.81 | 6113.25 | 6113.25 | 916.99 |
| 0.50 | 897.82 | 5525.01 | 5525.01 | 828.75 |
| 0.60 | 69.07 | 3821.19 | 3821.19 | 69.07 |
| 0.70 | 0.00 | 0.00 | 0.00 | 0.00 |

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STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

RETENTION AREA #2 -- STAGE/STORAGE RELATIONSHIP

INPUT PARAMETERS: BOTTOM AREA = 165.00 SQ.FT.
BOTTOM ELEV = 133.50 FT
TOP AREA = 2400.00 SQ.FT.
TOP ELEV = 134.50 FT
SIDESLOPES = 4.00 FT/FT.
PERC RATE = 18.00 IPH
RECTANGULAR POND: WIDTH = 270.77 FT
LENGTH = 0.61 FT

| ELEV | STAGE (ft) | WIDTH (ft) | LENGTH (ft) | AREA (sq.ft) | INC. VOL (cu.ft) | VOLUME (cu.ft) | VOLUME (ac-ft) | PERC RATE (cfs) |
|---|---|---|---|---|---|---|---|---|
| 133.50 | 0.00 | 270.77 | 0.61 | 165 | 0 | 0 | 0.000 | 0.07 |
| 133.75 | 0.25 | 272.77 | 2.61 | 712 | 110 | 110 | 0.003 | 0.30 |
| 134.00 | 0.50 | 274.77 | 4.61 | 1267 | 247 | 357 | 0.008 | 0.53 |
| 134.25 | 0.75 | 276.77 | 6.61 | 1829 | 387 | 744 | 0.017 | 0.76 |
| 134.50 | 1.00 | 278.77 | 8.61 | 2400 | 529 | 1273 | 0.029 | 1.00 |

RETENTION AREA #2 -- DRAWDOWN ANALYSIS

INPUT PARAMETERS
INITIAL VOLUME = 512.00 CU.FT.
NWL SURFACE AREA = 0.00 SQ.FT.
PERC RATE = 18.00 IN/HR
TIME INCR. = 0.10 HR
STAGE-STORAGE
Ks = 1273
b = 1.766

| TIME (HR) | STORED VOLUME (CU.FT.) | SURFACE AREA (SQ.FT.) | PERC AREA (SQ.FT.) | PERC VOLUME (CU.FT.) |
|---|---|---|---|---|
| 0.00 | 512.00 | 857.54 | 857.54 | 128.63 |
| 0.10 | 383.37 | 756.40 | 756.40 | 113.46 |
| 0.20 | 269.91 | 649.61 | 649.61 | 97.44 |
| 0.30 | 172.47 | 534.91 | 534.91 | 80.24 |
| 0.40 | 92.23 | 407.73 | 407.73 | 61.16 |
| 0.50 | 31.07 | 254.34 | 254.34 | 31.07 |
| 0.60 | 0.00 | 0.00 | 0.00 | 0.00 |

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
AUG 21 1991
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BARTOW, FLORIDA

***PERMIT NO. 10159.000***

# Century Commercial Parking
# (FDOT Pond Relocation)

*Project Description*

This project, entitled Century Commercial Vehicle Parking, consists of the construction of short and long term commercial vehicle parking areas on 13.29 acres. The site is located south of Lucerne Park Road, west of U.S. highway 27, in Section 6, Township 28 S., Range 27 E, Winter Haven, Florida. Access for the project will be through the Bretton Manor Avenue and through and existing local private roadway adjacent to CenterState Bank.

This project will modify 3 other prior ERP permit authorizations.

44010159.001. Entitled SR 544 & US Hwy 27 Site Grading, this project authorized a 24.00 mass grading plan on the property where this new project is located. The activities authorized under that permit, among other things, filled and removed an historic wetland and floodplain near the northern boundary of the project area. Much of the earthwork and grading for this project were completed, but not all.

48009344.001. Entitled First National Bank of Polk County, this authorized the construction of a bank with associated improvements and stormwater management system. This bank project had 4 designated retention ponds. One of them, Retention Area #2, appears to have been impacted and rendered ineffective by the construction of the driveway to the new RaceTrac store to the east. This RaceTrac driveway appears to have filled Retention Area #2. It is unclear if any design modifications or compensation was provided in the RaceTrac permit for this. Nevertheless, our project proposes to accept our new pond the runoff originally intended to be treated in the Bank pond.

43010159.004. Entitled SR 544 at US 27 was issued to FDOT for the construction of a surface water management system to serve improvements to the adjacent SR 544. Our project intends to relocate this FDOT Pond to a new location just to the south of its current location in order to accommodate our proposed development. It is clear from the narrative in the prior permit as well as the language in the FDOT Pond Easement that this pond was always intended to be relocated at a future date to accommodate future development on the Adams property. The newly proposed FDOT Pond is slightly larger than the existing FDOT Pond and much of the contributing drainage basin has been reduced and re-routed to our other proposed onsite pond. Please refer to the drainage calculations included with this report which show a reduction in the DHWL for the FDOT Pond for the 100 yr, 24 hr rainfall event. A copy of the recorded FDOT Drainage Easement is included in the Appendix of this report. This easement will be modified to reflect the revised location and recorded.

*Onsite Soil Conditions*

The soils located within the project area, as mapped by the NRCS, consist predominantly of Candler & Tavares Fine Sands (#3 & #15, hydrologic soil group "A") as well as Smyrna Myakka Fine Sand (#17, HSG "B/D"). In addition, the map shows a portion of the Race Trac and FDOT Dry stormwater ponds located in Basinger Mucky Fine Sands (#36, hydrologic soil group "D"). This existing depression, and other areas of the site, have been filled as authorized under SWFWMD ERP #44010159.001. Please refer to the soils map included with this report, though the usefulness of this historic mapping is limited given the level of onsite earthwork that has taken place.

***Design SHWT***. In order to estimate a seasonal high water table for design purposes, a combination of factors were observed and applied.

1. Permitted SHWT's for existing adjacent retention ponds. The permitted SHWT for the existing FDOT is 129.30' (NGVD 29). This pond has been personally observed by the Engineer of Record for years and has never been observed holding any water for an extended period of time. The bottom is constantly dry enough to mow or drive a vehicle through and it is evident that it functions as designed. The permitted SHWT for the RaceTrac retention pond immediately to the east of the FDOT Pond and on the same parcel is 126.50' (NGVD 29). Similar to the FDOT Pond to the west, the Racetrac Pond is perpetually dry and appears to be functioning as designed.

2. Onsite soil boring in the location of the proposed pond. A single soil boring was performed and witnessed by the Engineer of Record in the location of the proposed pond. This boring was performed to a depth of 10'. No confining layer was encountered. Seasonal high water table indicators were observed at a depth of 8' below the surface. Groundwater was encountered at a depth of 9' below the surface. A SHWT at a depth of 8' at the location of the boring converts to and elevation of 128.00' (NGVD 29), which is consistent and reasonable when compared to the design SHWT elevations of the existing retention ponds. A depiction of the onsite soil boring profile is provided with this report.

*Water Quality Treatment*

One dry retention pond (Pond 100) is proposed to treat the stormwater runoff from the new development. The existing FDOT pond was permitted to provide no water quality treatment (only storage) and, accordingly, water quality treatment is not addressed in the relocated FDOT either.

Pond 100 Treatment Volume

Treatment Volume Required = 0.73 ac. ft.
Treatment Volume Provided = 9.70 ac. ft.

*Water Quantity Storage*

Rate

The project lies within a closed drainage basin. The relocated FDOT pond and Pond 100 have been designed to retain the entire stormwater runoff volume generated from the 100-year, 24-hour storm event with no discharge. The design of the relocated FDOT mirrors the permitted design. Previously permitted contributing areas and basin characteristics were utilized in the drainage calculations for the new FDOT Pond design. Only slight modifications to the reach(s) immediately upstream of the permitted pond, the pond geometric and storage characteristics, and the onsite contributing basing size, were modified to reflect the FDOT Pond's new location. An emergency overflow structure for Pond 100 has been placed in the northeast corner of the pond.

| | |
|---|---|
| Pond 100 DHWL Elevation: | 134.44 ft. |
| Pond 100 Top of Bank Elevation: | 135.00 ft. |
| | |
| FDOT Pond Permitted DHWL Elevation: | 134.22 ft. |
| FDOT Pond Proposed DHWL Elevation: | 133.60 ft. |

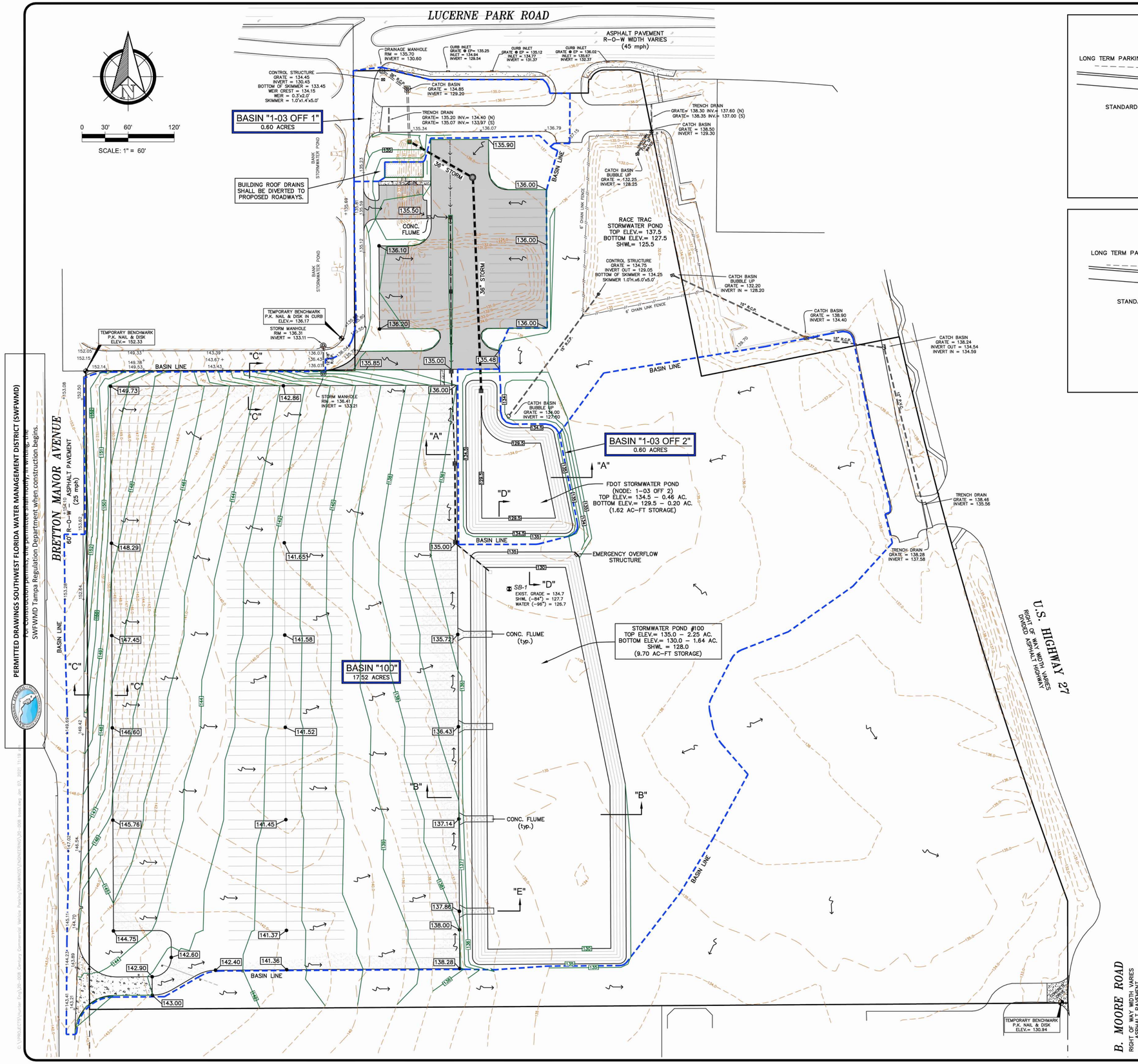
# STAGE - STORAGE CALCULATION

PROJECT NAME: Century Commercial Vehicle Parking
POND ID: FDOTPond

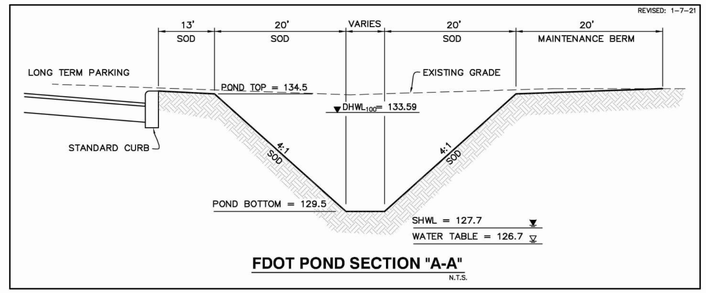
**INPUT PARAMETERS**

| | | | | | |
|---|---|---|---|---|---|
| BOTTOM ELEV. | = | **129.50** | ft. | | |
| TOP ELEV. | = | **134.50** | ft. | | |
| TOP AREA | = | **19930** | sqft. | **=** | **0.458** ac. |
| BOTTOM AREA | = | **8809** | sqft. | **=** | **0.202** ac. |
| DEPTH INC. | = | **1** | ft. | | |

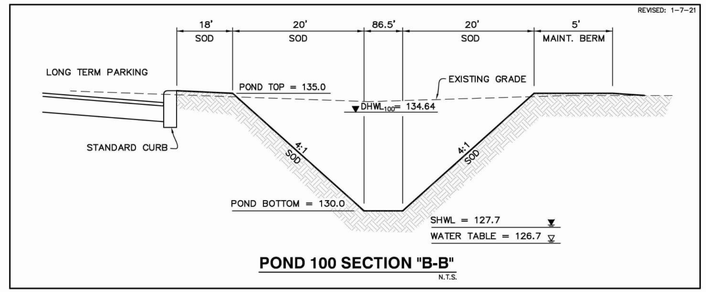
| ELEVATION (ft.) | STAGE (ft.) | AREA (sqft.) | AREA (ac.) | VOLUME (cuft.) | VOLUME (ac-ft.) |
|---|---|---|---|---|---|
| 129.50 | 0.00 | 8809 | 0.20 | 0 | 0.000 |
| 130.50 | 1.00 | 10783 | 0.25 | 9796 | 0.225 |
| 131.50 | 2.00 | 12893 | 0.30 | 21634 | 0.497 |
| 132.50 | 3.00 | 15136 | 0.35 | 35649 | 0.818 |
| 133.50 | 4.00 | 17482 | 0.40 | 51958 | 1.193 |
| 134.50 | 5.00 | 19930 | 0.46 | 70664 | 1.622 |



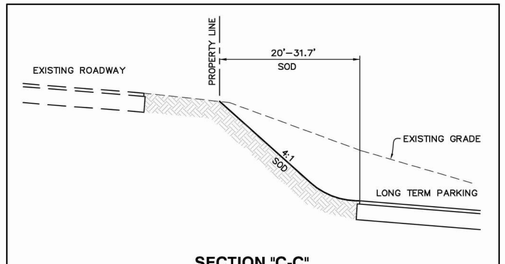

PERMITTED DRAWINGS SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD)
For Construction Permits, the permittee shall notify in writing, the
SWFWMD Tampa Regulation Department when construction begins.



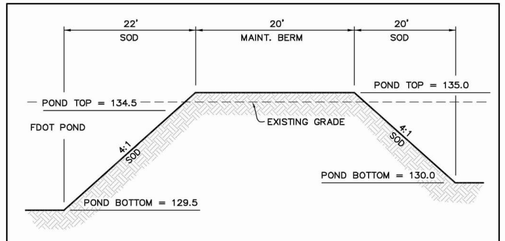

**FDOT POND SECTION "A-A"**
N.T.S.




**POND 100 SECTION "B-B"**
N.T.S.




**SECTION "C-C"**
N.T.S.




**POND SECTION "D-D"**
N.T.S.

## LEGEND

- PROPOSED BUILDING
- PROPOSED PAVEMENT SURFACE
- PROPOSED CONCRETE SURFACE
- PROPOSED LONG TERM PARKING
- BASIN LIMITS
- EXISTING STORM PIPE
- PROPOSED STORM PIPE
- 138.33 PROPOSED GRADE
- x 135.85 EXISTING GRADE
- 132 PROPOSED CONTOUR
- 135 EXISTING CONTOUR
- FLOW DIRECTION
- BENCHMARK
- SB-1 SOIL BORING

MASTER DRAINAGE & GRADING PLAN


HUNTER ENGINEERING
4900 Dundee Road
Winter Haven, FL 33884
Telephone: 863-676-7770
Facsimile: 863-965-0181
C.A. #8394


Prepared For
CBRV-27GL, LLC
500 South Florida Avenue, Suite 700 Lakeland, Florida 33801

Construction Plans
For
Century Commercial Vehicle Parking
Winter Haven, Florida

Date: November 13, 2020

Project No.: 20-008

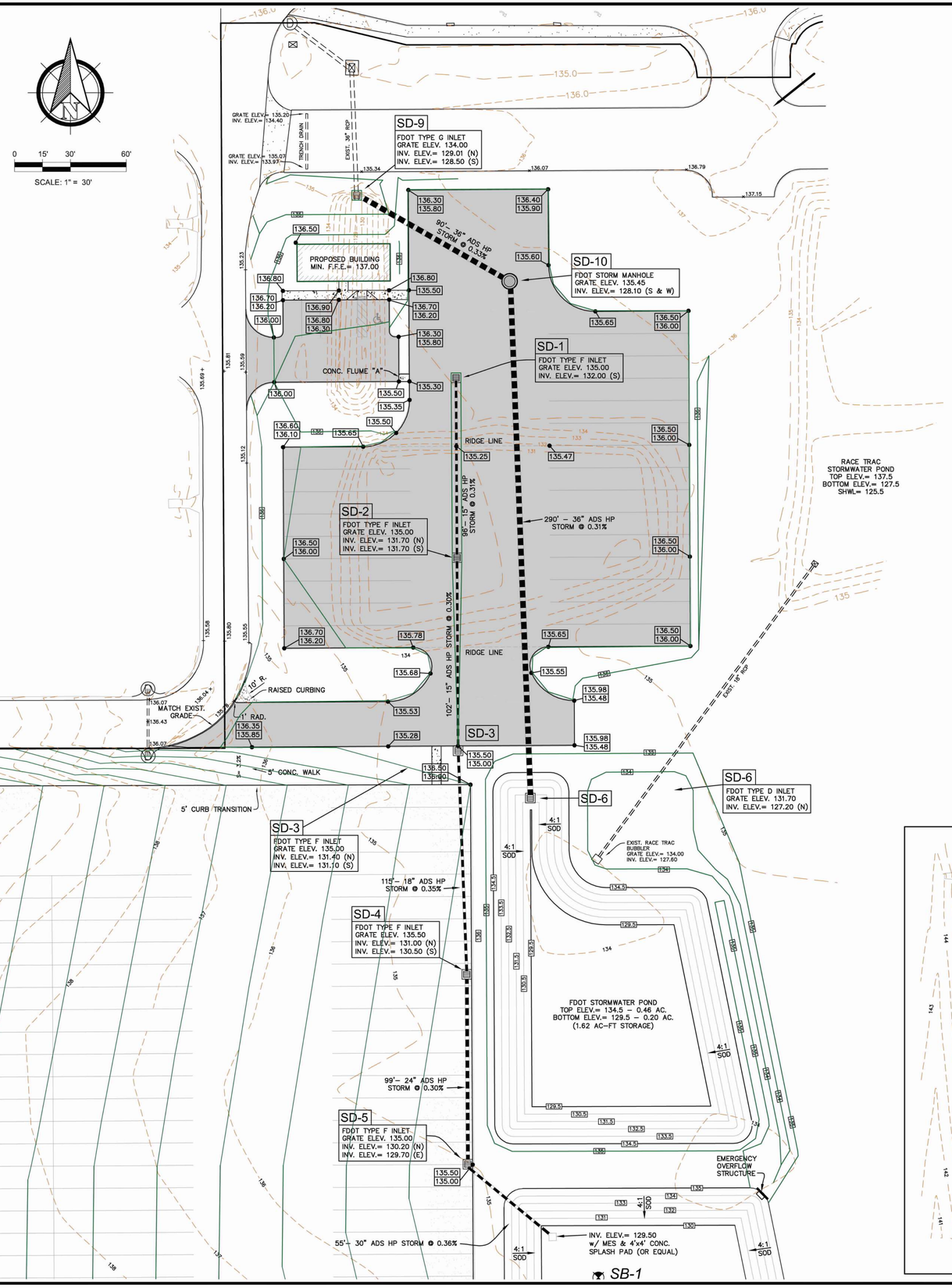
Not Valid Without Engineer's Seal
BRYAN A. HUNTER LICENSE No. 53168 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Bryan A. Hunter using a digital signature on the date indicated. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Bryan A. Hunter, P.E. Reg. No. 53168 C.A. #8394 — Date

C104


A:\CBRV-27GL\Hunter Eng\20-008 Century Commercial Vehicle Parking\DRAWINGS\NONPERMIT\20-008 base.dwg Jan 07, 2021 11:19




## DRAINAGE NOTES

1. ALL STORMWATER RUNOFF FROM THIS SITE SHALL BE VISUALLY MONITORED DURING CONSTRUCTION BY THE CONTRACTOR TO ASSURE WATER QUALITY AND QUANTITY ARE GENERALLY MAINTAINED TO THE PRE-DEVELOPMENT LEVELS. THE FOLLOWING SHALL BE USED TO ACCOMPLISH MITIGATION OF ADVERSE QUANTITY AND QUALITY IMPACTS TO OFF-SITE PROPERTIES DURING CONSTRUCTION:
   A. DRAINAGE SWALES AND RETENTION SHOULD BE ROUGH CONSTRUCTED FIRST TO AVOID ANY INCREASE IN RUNOFF DUE TO THE CONSTRUCTION.
   B. TEMPORARY EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED TO PROTECT EXISTING DRAINAGE SYSTEMS AND WATER QUALITY DURING CONSTRUCTION.
   C. WHERE WORK IS PERFORMED IN A WATER COURSE OR WATER BODY, SILK CURTAINS AND SILT SCREENS SHALL BE USED TO CONTROL SILTATION AND TURBIDITY.
   D. DISTURBED AREAS AS A MINIMUM REQUIREMENT SHALL BE SEEDED AND MULCHED.
   E. IF SPECIAL CONDITIONS EXIST REQUIRING UNANTICIPATED MEASURES TO CONTROL STORMWATER RUNOFF, THESE MEASURES SHALL BE IMPLEMENTED AS SOON AS POSSIBLE.
2. PIPE LENGTHS ARE APPROXIMATE AND MAY REQUIRE MINOR ADJUSTMENTS IN THE FIELD.
3. THE CONTRACTOR IS TO VERIFY LOCATIONS AND ELEVATIONS OF ALL OUTFALLS BEFORE CONSTRUCTION, AND IF FOUND TO BE INADEQUATE, SHALL NOTIFY THE ENGINEER.
4. THE CONTRACTOR SHALL CONSTRUCT ALL DRAINAGE STRUCTURES IN ACCORDANCE WITH F.D.O.T. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN.
5. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III WITH RUBBER GASKET JOINTS.
6. OPERATION AND MAINTENANCE INSTRUCTIONS:
   A. THE STORMWATER MANAGEMENT SYSTEM SHALL BE PERIODICALLY INSPECTED DURING STORMS TO DETERMINE THAT IT IS OPERATING PROPERLY.
   B. CUTTING/MOWING BELOW NORMAL WATER LEVELS AND WITHIN THE LITTORAL ZONES (WET PONDS) SHALL BE PROHIBITED. CHEMICALS OR GRASS CARP IN THE LITTORAL ZONES SHALL NOT BE USED.
   C. THE DETENTION AREA SHALL BE PERIODICALLY CLEANED OF DEBRIS OR SILTATION AS NECESSARY. ORIFICES/WEIRS SHALL BE CLEARED OF DEBRIS TO PREVENT CLOGGING.
   D. SWALES AND DITCHES SHALL BE CLEANED AS REQUIRED TO MAINTAIN FLOWS AND RESODDED WHEN NECESSARY.

## CONSTRUCTION NOTES:

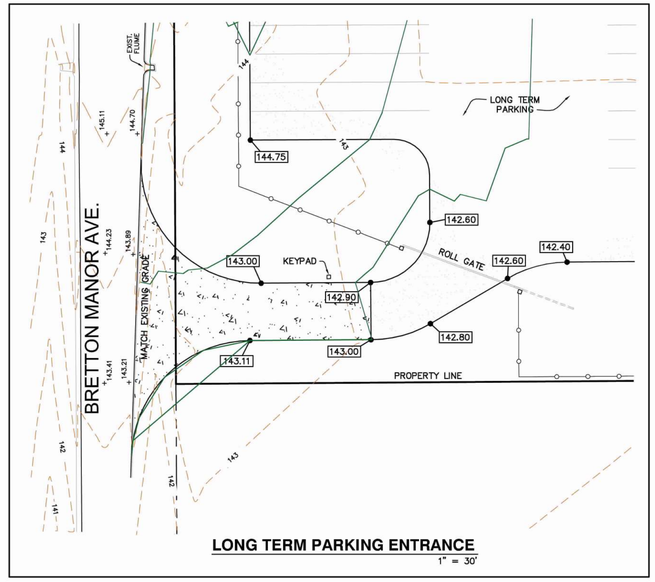
1. ANY UNSUITABLE MATERIALS SUCH AS MUCK, PEAT AND/OR PLASTIC CLAYS FOUND DURING CONSTRUCTION SHALL BE REMOVED FROM ROADBED AREAS. THE AREA SHOULD THEN BE BACKFILLED WITH SUITABLE MATERIAL AND THE SUBGRADE STABILIZED TO A MINIMUM DEPTH OF 10 INCHES (BELOW THE BASE COURSE) HAVING A MINIMUM 75-psi FLORIDA BEARING VALUE. SUITABLE MATERIALS FOR BACKFILL FOR STABILIZATION, IF NEEDED, INCLUDE HIGH-BEARING SOLID, SAND CLAY, GROUND LIME ROCK, OR ANY OTHER SUITABLE MATERIAL. MATERIAL TO BE CITY APPROVED.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF WINTER HAVEN LAND DEVELOPMENT CODE, LATEST REVISION.
3. RECORD/"AS-BUILT" DATA SHALL BE PROVIDED BY THE CONTRACTOR, SO THAT RECORD "AS-BUILT" DRAWINGS CAN BE PREPARED FOR SUBMITTAL TO VARIOUS PERMITTING AGENCIES. DRAWINGS SHALL BE IN STATE PLANE, PDF AND ACAD FORMAT.

## FILL PLACEMENT

ALL FILL PLACED FOR SITE BERMING SHALL BE FREE OF ORGANICS, NON-PLASTIC GRANULAR SOIL (CLEAN SANDS). FILL SHALL BE PLACED IN MAX. OF 12" LIFTS AND COMPACTED TO A MINIMUM 95% per ASTM SPEC D-1557. TO OBTAIN BERM STABILITY, CLAY CORES MAY BE REQUIRED.

## LEGEND

- PROPOSED BUILDING
- PROPOSED PAVEMENT SURFACE
- PROPOSED CONCRETE SURFACE
- PROPOSED LONG TERM PARKING
- EXISTING STORM PIPE
- PROPOSED STORM PIPE
- 138.33 PROPOSED GRADE
- x 135.85 EXISTING GRADE
- 132 PROPOSED CONTOUR
- 135 EXISTING CONTOUR
- FLOW DIRECTION




**LONG TERM PARKING ENTRANCE**
1" = 30'

0 15' 30' 60'
SCALE: 1" = 30'

PERMITTED DRAWINGS SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD)
For Construction permits, the permittee shall notify, in writing, the SWFWMD Tampa Regulation Department when construction begins.

F:\URREF\ENV\Winter Fo\20-008 Century Commercial Vehicle Parking\DRAWINGS\ENGINEERING\20-008 base.dwg, Nov 24, 2020 3:45:


HUNTER ENGINEERING
4900 Dundee Road
Winter Haven, FL 33884
Telephone: 863-676-7770
Facsimile: 863-965-0181
C.A. #8394


DETAILED GRADING PLAN

Prepared For
CBRV-27GL, LLC
500 South Florida Avenue, Suite 700 Lakeland, Florida 33801

Construction Plans
For
Century Commercial Vehicle Parking
Winter Haven, Florida

Date: November 13, 2020

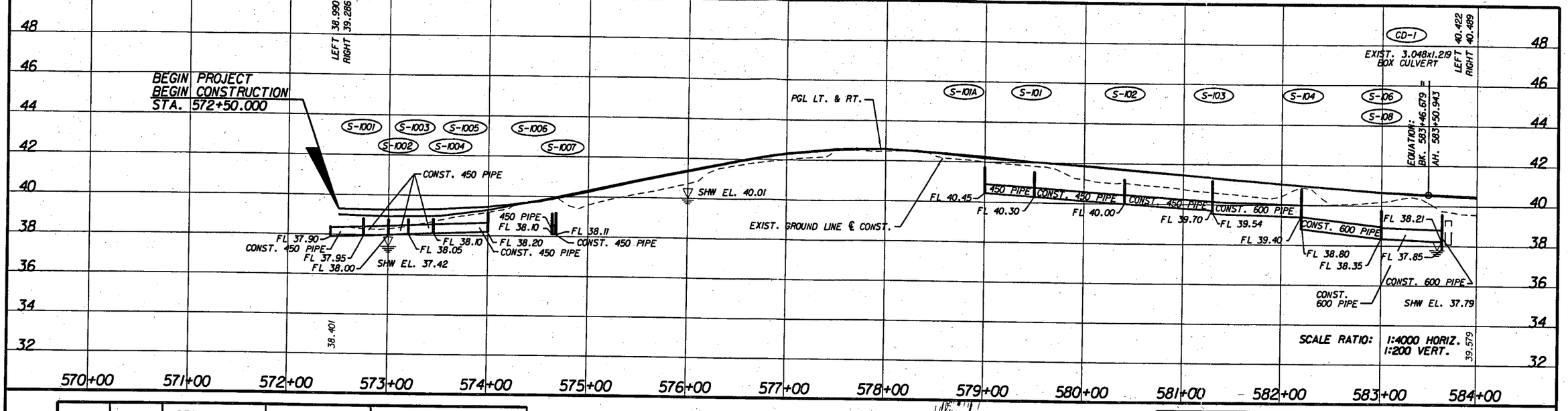
Project No.: 20-008

Not Valid Without Engineer's Seal
BRYAN A. HUNTER LICENSE No. 53168 STATE OF FLORIDA PROFESSIONAL ENGINEER
This item has been digitally signed and sealed by Bryan A. Hunter using a digital signature on the date indicated. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.
Bryan A. Hunter, P.E. Reg. No. 53168 C.A. #8394 Date

C105

# *PERMIT NO. 23431.000*

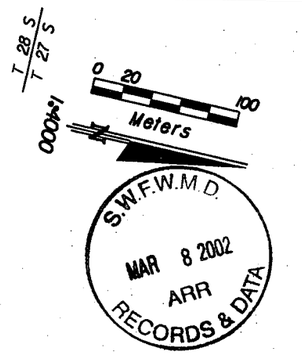
# US 27

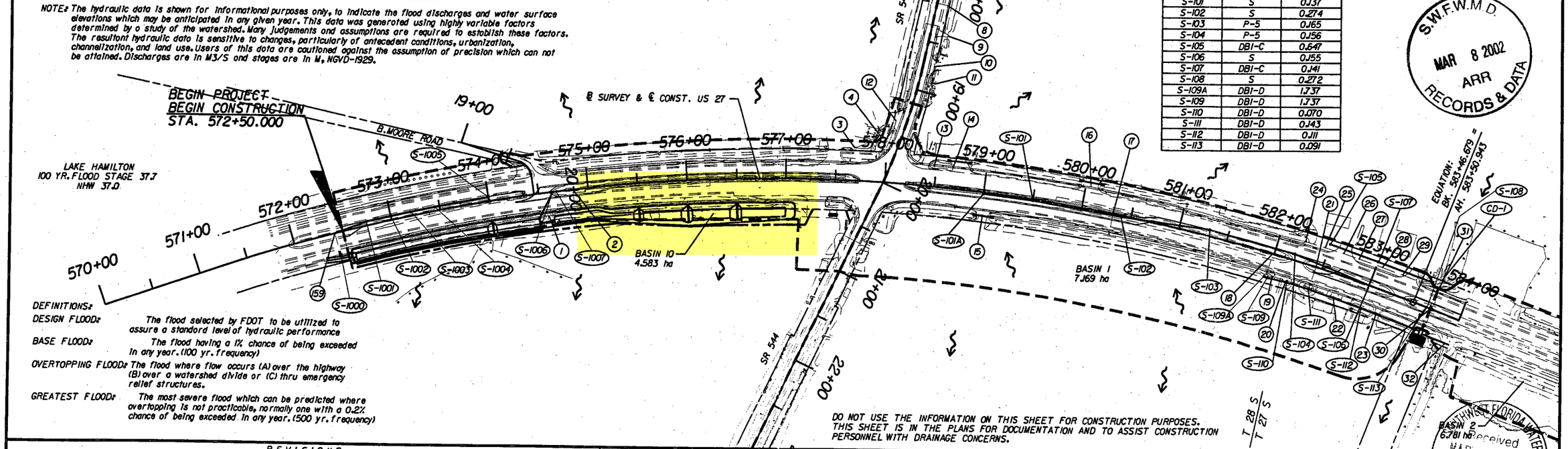



| STRUCTURE NO. | STATION | DESIGN FLOOD | | BASE FLOOD | | GREATEST FLOOD | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2% PROB. | 50 YR FREQ. | 1% PROB. | 100 YR FREQ. | | | | |
| | | DISCHARGE | STAGE | DISCHARGE | STAGE | DISCHARGE | STAGE | PROB. % | FREQ. YR. |
| CD-1 | 583+69.652 | 1.407 | 38.76 | 1.614 | 38.80 | 2.218 | 38.95 | 0.2 | 500 |
| CD-2 | 599+02.158 | 1.829 | 37.99 | 2.100 | 38.04 | 2.400 | 38.18 | 0.2 | 500 |
| CD-3 | 603+44.571 | 0.170 | 37.99 | 0.200 | 38.04 | 0.700 | 38.18 | 0.2 | 500 |
| CD-4 | 615+37.759 | 0.975 | 38.59 | 1.124 | 38.61 | 1.531 | 38.67 | 0.2 | 500 |
| CD-5 | 622+92.049 | 0.901 | 38.38 | 1.030 | 38.45 | 1.407 | 38.63 | 0.2 | 500 |

NOTE: The hydraulic data is shown for informational purposes only, to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgements and assumptions are required to establish these factors. The resultant hydraulic data is sensitive to changes, particularly of antecedent conditions, urbanization, channelization, and land use. Users of this data are cautioned against the assumption of precision which can not be attained. Discharges are in M3/S and stages are in M, NGVD-1929.

| STRUCTURE NO. | STRUCTURE TYPE | AREA (HA) |
|---|---|---|
| S-1001 | B | 0.071 |
| S-1002 | B | 0.043 |
| S-1003 | B | 0.043 |
| S-1004 | B | 0.095 |
| S-1005 | B | 0.096 |
| S-1006 | DBI-C | 0.317 |
| S-1007 | DBI-C | 0.317 |
| S-101A | S | 0.184 |
| S-101 | S | 0.137 |
| S-102 | S | 0.274 |
| S-103 | P-5 | 0.165 |
| S-104 | P-5 | 0.156 |
| S-105 | DBI-C | 0.647 |
| S-106 | S | 0.155 |
| S-107 | DBI-C | 0.141 |
| S-108 | S | 0.272 |
| S-109A | DBI-D | 1.737 |
| S-109 | DBI-D | 1.737 |
| S-110 | DBI-D | 0.070 |
| S-111 | DBI-D | 0.143 |
| S-112 | DBI-D | 0.111 |
| S-113 | DBI-D | 0.091 |




DEFINITIONS:

DESIGN FLOOD: The flood selected by FDOT to be utilized to assure a standard level of hydraulic performance

BASE FLOOD: The flood having a 1% chance of being exceeded in any year. (100 yr. frequency)

OVERTOPPING FLOOD: The flood where flow occurs (A) over the highway (B) over a watershed divide or (C) thru emergency relief structures.

GREATEST FLOOD: The most severe flood which can be predicted where overtopping is not practicable, normally one with a 0.2% chance of being exceeded in any year. (500 yr. frequency)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 2002
RAD-BARTOW

REVISIONS

| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

RS&H
Reynolds, Smith and Hills, Inc.
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Henri V. Belrose, P.E. No.: 56761
Architectural: Engineering, Planning and Environmental Services

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

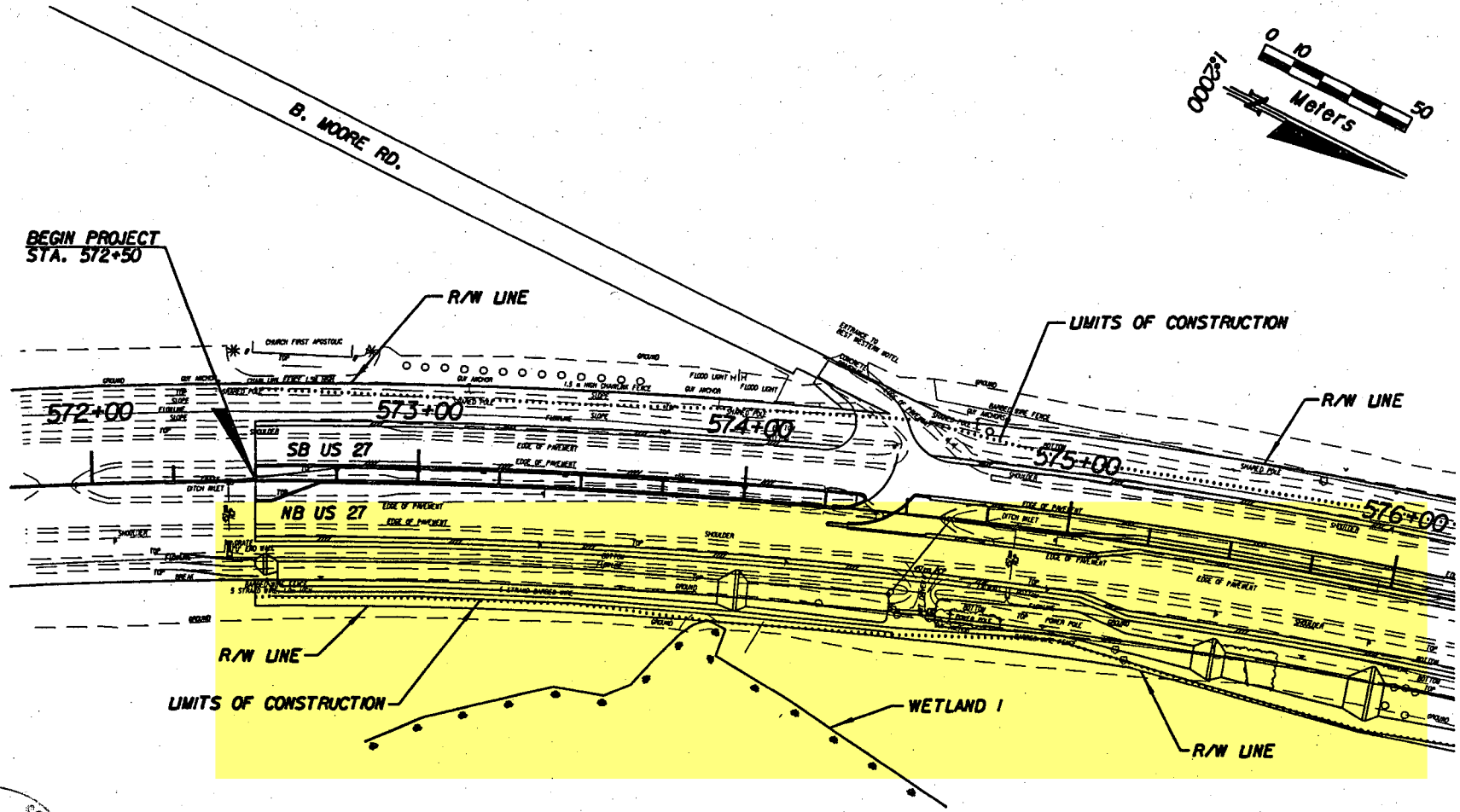
| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| S.R. 25 | POLK | 197679-1-52-01 |

DRAINAGE MAP (1)

SHEET NO.

Thu Feb 21 10:15:35 2002

x:\04-9440.000\J \RDWY\drmprd01.dgn




43023431.000

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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MAR 6 2002
BROOKSVILLE

**LEGEND**

..... UMITS OF CONSTRUCTION

SWFWMD APPROVED WETLAND JURISDICTIONAL LINE

Original Poor Quality

| | | |
|---|---|---|
| PROJECT DESCRIPTION | FLORIDA DEPARTMENT OF TRANSPORTATION | STATE PROJECT NO. 16180-3538 |
| SR 25 (US 27) | | FINANCIAL PROJECT ID: 197679-1-52-01 |
| TWP: 28 SOUTH RNG: 27 EAST | NAME: | POLK COUNTY / SHEET 2 OF 17 |
| SEC: 6 | SIGNATURE / CERTIFICATE NO. / DATE: | DATE: |

Fri Dec 14 15:11:24 2001
x:\04-9440.000\TYDOW\wetr01.dgn

Linear Pond from Station 577+14 to Station 572+50
Basin 10 – Pond 10

The linear pond, located on the east side of US 27, flows south from Station 577+14 (south of SR 544) to the beginning of the project at Station 572+50. It was designed with a constant bottom width to treat and attenuate the runoff contributing from the roadway from the crown of SR 544 to the beginning of the project. The linear pond is divided in six sections. At the end of each section a ditch block with an orifice was designed to attenuate the water. The orifices will assure that the volume is recovered at each pond section.

The last section of the linear pond, from Station 574+00 to Station 572+50, is the only section designed to treat the required 1 inch over the total basin runoff since treatment in the other sections of the pond would result in comingling. The orifice of this section was sized to meet SWFWMD bleeddown criteria for a wet detention system.

The SWHT elevation at Station 573+00 was provided by the FDOT Geotechnical Engineer. The SHWT depth at this station varies from 0.46 meters (1.5 feet) to 0.76 meters (2.5 feet) below existing ground elevation. It was assumed that the SHWT at each cross section is the average of these two elevations (0.61 meters or 2 feet below existing ground elevation).

See Post-Development Analysis for Pond 10 for supporting documentation.



RS&H
Reynolds, Smith & Hills, Inc.

| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

| | |
|---|---|
| DRAINAGE AREA (ac): | 1.193 |
| BASIN NAME/NO.: | 577+00 |

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.741 | 72.618 |
| | | | | |
| Pasture-Good | A | 39 | 0.226 | 8.814 |
| Pasture-Poor | A | 68 | 0.226 | 15.368 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 96.80 |
| Total Area = | 1.193 |
| Composite CN Value = | 81.14 |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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Resource Flow

RS&H
Reynolds, Smith & Hills, Inc.

| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

| | |
|---|---|
| DRAINAGE AREA (ac): | 0.427 |
| BASIN NAME/NO.: | 576+50 |

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.247 | 24.206 |
| | | | | |
| Pasture-Good | A | 39 | 0.090 | 3.51 |
| Pasture-Poor | A | 68 | 0.090 | 6.12 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 33.84 |
| Total Area = | 0.427 |
| **Composite CN Value =** | **79.24** |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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RS&H
Reynolds, Smith & Hills, Inc.

| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

| | |
|---|---|
| DRAINAGE AREA (ac): | 0.427 |
| BASIN NAME/NO.: | 576+00 |

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.247 | 24.206 |
| | | | | |
| Pasture-Good | A | 39 | 0.090 | 3.51 |
| Pasture-Poor | A | 68 | 0.090 | 6.12 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 33.84 |
| Total Area = | 0.427 |
| **Composite CN Value =** | **79.24** |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 6 2002
REGULATION

RS&H
Reynolds, Smith & Hills, Inc.

| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 8/22/00 |
| | | Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 0.581

**BASIN NAME/NO.:** 575+50

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.314 | 30.772 |
| | | | | |
| Pasture-Good | A | 39 | 0.134 | 5.2065 |
| Pasture-Poor | A | 68 | 0.134 | 9.078 |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 45.06 |
| Total Area = | 0.581 |
| **Composite CN Value =** | **77.55** |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 6 2002
REGULATION

RS&H
Reynolds, Smith & Hills, Inc.

| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 8/22/00 |
| | | Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 1.972
**BASIN NAME/NO.:** 574+50

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 1.295 | 126.91 |
| | | | | |
| Pasture-Good | B/D | 86 | 0.339 | 29.111 |
| Pasture-Poor | B/D | 74 | 0.339 | 25.049 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 181.07 |
| Total Area = | 1.972 |
| Composite CN Value = | 91.82 |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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RS&H
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| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 8/22/00 |
| | | Revised: | 5/23/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 1.305
**BASIN NAME/NO.:** 574+00

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.677 | 66.346 |
| | | | | |
| Pasture-Good | B/D | 86 | 0.314 | 27.004 |
| Pasture-Poor | B/D | 74 | 0.314 | 23.236 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 116.59 |
| Total Area = | 1.305 |
| **Composite CN Value =** | **89.34** |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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MAR 6 2002
BROOKSVILLE

RS&H
Reynolds, Smith & Hills, Inc.

| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | SWFWMD Water Quality Treatment Calculations | Date: | 8/4/00 |
| | | Revised: | 1/23/02 |

## Pond 10 Water Quality Treatment Calculations

Treatment Section at Pond: From STA. 577+00 to STA. 572+50, RT

This ditch will be treating the total area for the right side of the mainline. All ditches have 4:1 front slopes and 2:1 back slopes.

| POST-DEVELOPMENT CONDITIONS | Area, acre |
|---|---|
| Impervious area: | 3.723 |
| Pervious area: | 2.609 |
| Total Basin Area = | 6.332 |

Location and length of treatment facility:

From STA. 574+50.000 To STA. 572+50.000 RT

| | |
|---|---|
| Length at ditch top: | 656 ft |
| Length at ditch bottom: | 632 ft |
| Length at orifice elevation: | 642 ft |

**Step #1: TREATMENT VOLUME REQUIRED FOR THE TOTAL BASIN AREA**
**Treatment volume = 1" of runoff over the total basin area**

Treatment Volume = 1 inch of runoff over the total basin area
= 0.53 ac-ft

**Step #2: CALCULATE WEIR ELEVATION FOR TREATMENT**

Control elevation is based on the average depth of SHWL from existing ground according to geotech information at Sta. 573+00, RT. The average SWHL depth is 0.61 meters (2.00 feet).

| | |
|---|---|
| Avg. Existing Ground Elevation = | 124.49 ft |
| Avg. SHWL = | 122.48 ft |
| Ditch Bottom Elevation = | 123.50 ft |
| Top of Ditch block = | 125.48 ft |
| Control Elevation FOR POSITIVE OUTFALL= | 124.31 ft |
| Weir Elevation = Treatment Elevation = | 125.38 ft |
| Avg. width @ ditch bottom = | 25.00 ft |
| Avg. width @ control elevation = | 29.87 ft |
| Avg. width @ top of bank = | 36.88 ft |

Area @ Bottom Elev.= Length * Avg. Width
= 0.363 ac

Area @ Control Elev.= Length * Avg. Width
= 0.440 ac

Area @ Top of ditch = Length * Avg. Width
= 0.556 ac

| Elevation m | Elevation ft | | Area acres | Volume acre-ft |
|---|---|---|---|---|
| 37.89 | 124.31 | Control Elev. | 0.44 | 0.00 |
| 38.22 | 125.38 | Treat. Elev. | 0.55 | 0.53 |
| 38.25 | 125.48 | Top of ditch | 0.56 | 0.58 |

**Note: Pond 10 is a linear pond that will treat and attenuate roadway runoff from Sta. 577+00 to Sta. 572+50. Treatment will be provided on the last section of the linear pond between Sta. 574+00 to Sta. 572+50**

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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BROOKSVILLE

# US 27
## Stormwater Summary Table of Peak Conditions - Linear Pond 10

| Discharge Comparison - ENGLISH | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Storm Event | | | Proposed Conditions | | | Historical Conditions | | | Historical vs. Proposed | |
| | | | Stage Pond 10 | Outflow 57400 | Total Outflow | Run-off Basin 10A | Run-off Basin 10B | Total Runoff | Diff. Runoff | % Diff. Runoff |
| | | | | | | Q = ciA | | Q | Q | Q |
| Frequency (Years) | Duration (Hours) | Rainfall (Inches) | (ft) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) |
| 100 | 240 | 18.000 | 125.46 | 3.64 | 3.64 | 22.83 | 25.62 | 48.45 | 44.81 | 92.49% |
| 100 | 168 | 16.632 | 125.45 | 2.88 | 2.88 | 22.83 | 25.62 | 48.45 | 45.57 | 94.06% |
| 100 | 72 | 13.824 | 125.46 | 3.93 | 3.93 | 22.83 | 25.62 | 48.45 | 44.52 | 91.89% |
| 100 | 24 | 10.800 | 125.48 | 5.39 | 5.39 | 22.83 | 25.62 | 48.45 | 43.06 | 88.88% |
| 100 | 8 | 8.400 | 125.59 | 14.01 | 14.01 | 22.83 | 25.62 | 48.45 | 34.44 | 71.08% |
| 100 | 4 | 7.100 | 125.56 | 12.08 | 12.08 | 22.83 | 25.62 | 48.45 | 36.37 | 75.07% |
| 100 | 2 | 5.920 | 125.64 | 18.95 | 18.95 | 22.83 | 25.62 | 48.45 | 29.50 | 60.89% |
| 100 | 1 | 4.807 | 125.66 | 21.33 | 21.33 | 22.83 | 25.62 | 48.45 | 27.12 | 55.97% |
| 50 | 240 | 15.840 | 125.45 | 3.19 | 3.19 | 20.01 | 22.46 | 42.47 | 39.28 | 92.49% |
| 50 | 168 | 14.616 | 125.44 | 2.51 | 2.51 | 20.01 | 22.46 | 42.47 | 39.96 | 94.09% |
| 50 | 72 | 12.096 | 125.45 | 3.02 | 3.02 | 20.01 | 22.46 | 42.47 | 39.45 | 92.89% |
| 50 | 24 | 9.480 | 125.46 | 3.75 | 3.75 | 20.01 | 22.46 | 42.47 | 38.72 | 91.17% |
| 50 | 8 | 7.360 | 125.55 | 10.93 | 10.93 | 20.01 | 22.46 | 42.47 | 31.54 | 74.26% |
| 50 | 4 | 6.224 | 125.61 | 16.54 | 16.54 | 20.01 | 22.46 | 42.47 | 25.93 | 61.06% |
| 50 | 2 | 5.190 | 125.60 | 15.62 | 15.62 | 20.01 | 22.46 | 42.47 | 26.85 | 63.22% |
| 50 | 1 | 4.214 | 125.62 | 17.41 | 17.41 | 20.01 | 22.46 | 42.47 | 25.06 | 59.01% |
| 25 | 240 | 13.920 | 125.44 | 2.79 | 2.79 | 17.54 | 19.69 | 37.23 | 34.44 | 92.51% |
| 25 | 168 | 12.768 | 125.43 | 1.99 | 1.99 | 17.54 | 19.69 | 37.23 | 35.24 | 94.65% |
| 25 | 72 | 10.584 | 125.44 | 2.31 | 2.31 | 17.54 | 19.69 | 37.23 | 34.92 | 93.80% |
| 25 | 24 | 8.304 | 125.45 | 3.21 | 3.21 | 17.54 | 19.69 | 37.23 | 34.02 | 91.38% |
| 25 | 8 | 6.456 | 125.53 | 9.36 | 9.36 | 17.54 | 19.69 | 37.23 | 27.87 | 74.86% |
| 25 | 4 | 5.456 | 125.52 | 8.55 | 8.55 | 17.54 | 19.69 | 37.23 | 28.68 | 77.03% |
| 25 | 2 | 4.550 | 125.57 | 12.54 | 12.54 | 17.54 | 19.69 | 37.23 | 24.69 | 66.32% |
| 25 | 1 | 3.694 | 125.59 | 13.93 | 13.93 | 17.54 | 19.69 | 37.23 | 23.30 | 62.58% |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 6 2002

# US 27
## Stormwater Summary Table of Peak Conditions - Linear Pond 10

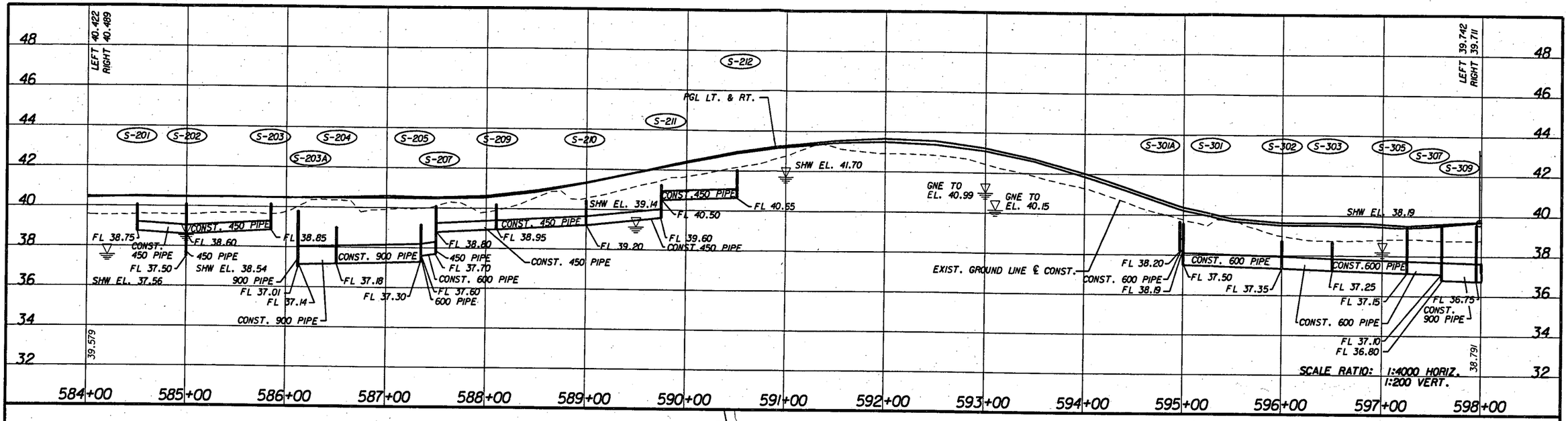
| Discharge Comparison - ENGLISH | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Storm Event | | | Proposed Conditions | | | Historical Conditions | | | Historical vs. Proposed | |
| | | | Stage Pond 10 | Outflow 57400 | Total Outflow | Run-off Basin 10A | Run-off Basin 10B | Total Runoff | Diff. Runoff | % Diff. Runoff |
| | | | | | | Q = ciA | | Q | Q | Q |
| Frequency (Years) | Duration (Hours) | Rainfall (Inches) | (ft) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) |
| 10 | 240 | 11.520 | 125.43 | 2.12 | 2.12 | 14.74 | 16.54 | 31.28 | 29.16 | 93.22% |
| 10 | 168 | 10.752 | 125.42 | 1.54 | 1.54 | 14.74 | 16.54 | 31.28 | 29.74 | 95.08% |
| 10 | 72 | 8.928 | 125.43 | 1.95 | 1.95 | 14.74 | 16.54 | 31.28 | 29.33 | 93.77% |
| 10 | 24 | 6.984 | 125.44 | 2.62 | 2.62 | 14.74 | 16.54 | 31.28 | 28.66 | 91.62% |
| 10 | 8 | 5.424 | 125.51 | 7.59 | 7.59 | 14.74 | 16.54 | 31.28 | 23.69 | 75.74% |
| 10 | 4 | 4.584 | 125.50 | 6.73 | 6.73 | 14.74 | 16.54 | 31.28 | 24.55 | 78.48% |
| 10 | 2 | 3.822 | 125.53 | 8.90 | 8.90 | 14.74 | 16.54 | 31.28 | 22.38 | 71.55% |
| 10 | 1 | 3.104 | 125.54 | 9.89 | 9.89 | 14.74 | 16.54 | 31.28 | 21.39 | 68.38% |
| 5 | 240 | 10.080 | 125.43 | 1.65 | 1.65 | 12.92 | 14.50 | 27.42 | 25.77 | 93.98% |
| 5 | 168 | 9.408 | 125.42 | 1.35 | 1.35 | 12.92 | 14.50 | 27.42 | 26.07 | 95.08% |
| 5 | 72 | 7.848 | 125.43 | 1.71 | 1.71 | 12.92 | 14.50 | 27.42 | 25.71 | 93.76% |
| 5 | 24 | 6.120 | 125.44 | 2.21 | 2.21 | 12.92 | 14.50 | 27.42 | 25.21 | 91.94% |
| 5 | 8 | 4.752 | 125.49 | 6.46 | 6.46 | 12.92 | 14.50 | 27.42 | 20.96 | 76.44% |
| 5 | 4 | 4.020 | 125.48 | 5.61 | 5.61 | 12.92 | 14.50 | 27.42 | 21.81 | 79.54% |
| 5 | 2 | 3.350 | 125.50 | 6.63 | 6.63 | 12.92 | 14.50 | 27.42 | 20.79 | 75.82% |
| 5 | 1 | 2.721 | 125.50 | 7.14 | 7.14 | 12.92 | 14.50 | 27.42 | 20.28 | 73.96% |
| 2 | 240 | 8.640 | 125.42 | 1.42 | 1.42 | 10.86 | 12.18 | 23.04 | 21.62 | 93.84% |
| 2 | 168 | 7.896 | 125.41 | 1.14 | 1.14 | 10.86 | 12.18 | 23.04 | 21.90 | 95.05% |
| 2 | 72 | 6.552 | 125.42 | 1.41 | 1.41 | 10.86 | 12.18 | 23.04 | 21.63 | 93.88% |
| 2 | 24 | 5.136 | 125.43 | 1.75 | 1.75 | 10.86 | 12.18 | 23.04 | 21.29 | 92.40% |
| 2 | 8 | 3.992 | 125.48 | 5.17 | 5.17 | 10.86 | 12.18 | 23.04 | 17.87 | 77.56% |
| 2 | 4 | 3.376 | 125.47 | 4.45 | 4.45 | 10.86 | 12.18 | 23.04 | 18.59 | 80.69% |
| 2 | 2 | 2.816 | 125.43 | 3.95 | 3.95 | 10.86 | 12.18 | 23.04 | 19.09 | 82.86% |
| 2 | 1 | 2.286 | 125.46 | 3.54 | 3.54 | 10.86 | 12.18 | 23.04 | 19.50 | 84.64% |

SOUTHWEST FLORIDA WATER

# US 27
## Stormwater Summary Table of Peak Conditions - Linear Pond 10

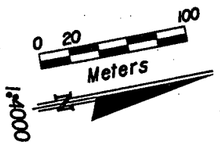
| Discharge Comparison - ENGLISH | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Storm Event | | | Proposed Conditions | | | Historical Conditions | | | Historical vs. Proposed | |
| | | | Stage Pond 10 | Outflow 57400 | Total Outflow | Run-off Basin 10A | Run-off Basin 10B | Total Runoff | Diff. Runoff | % Diff. Runoff |
| | | | | | | Q = ciA | | Q | Q | Q |
| Frequency (Years) | Duration (Hours) | Rainfall (Inches) | (ft) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) |
| 25 | 24 | FLMOD | 125.59 | 13.87 | 13.87 | 9.86 | 15.45 | 25.31 | 11.44 | 45.20% |

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 6 2002
REG. BARTOW

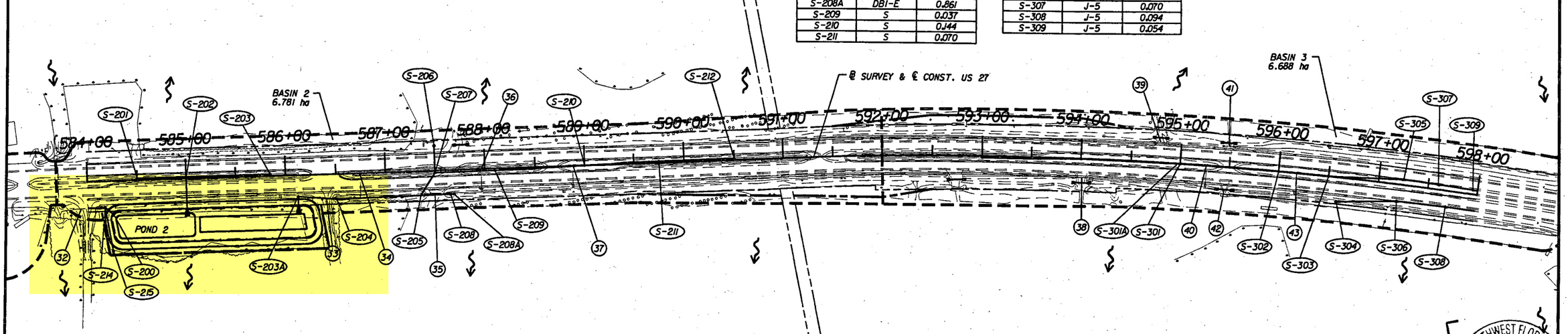



| STRUCTURE NO. | STRUCTURE TYPE | AREA (HA) |
|---|---|---|
| S-201 | S | 0.047 |
| S-202 | S | 0.080 |
| S-203 | S | 0.028 |
| S-203A | MH | 0 |
| S-204 | DBI-C | 0.220 |
| S-205 | DBI-C | 0.074 |
| S-206 | DBI-E | 0.905 |
| S-207 | S | 0.135 |
| S-208 | DBI-E | 0.861 |
| S-208A | DBI-E | 0.861 |
| S-209 | S | 0.037 |
| S-210 | S | 0.144 |
| S-211 | S | 0.070 |

| STRUCTURE NO. | STRUCTURE TYPE | AREA (HA) |
|---|---|---|
| S-212 | S | 0.211 |
| S-301A | S | 0.238 |
| S-301B | S | 0.284 |
| S-301 | S | 0.238 |
| S-302 | S | 0.238 |
| S-303 | S | 0.208 |
| S-304 | DBI-D | 1.185 |
| S-305 | P-6 | 0.151 |
| S-306 | J-6 | 0.172 |
| S-307 | J-5 | 0.070 |
| S-308 | J-5 | 0.094 |
| S-309 | J-5 | 0.054 |




SECTION 31
SECTION 30




SOUTHWEST FLORIDA WATER
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DISTRICT

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

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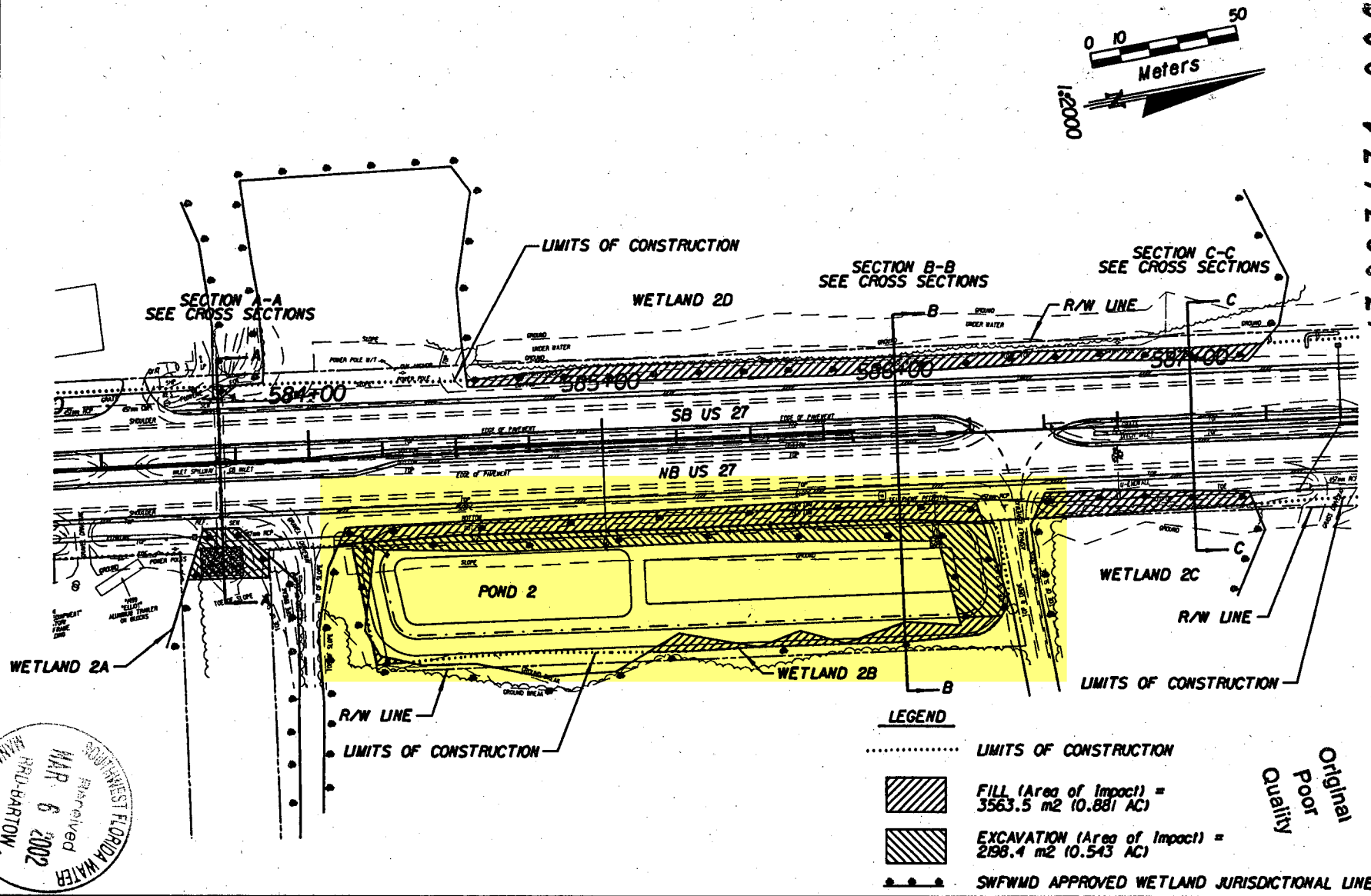
RS&H
Reynolds, Smith and Hills, Inc.
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Henri V. Belrose, P.E. No.: 56761
Architectural, Engineering, Planning and Environmental Services

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| S.R. 25 | POLK | 197679-1-52-01 |

# DRAINAGE MAP (2)

SHEET NO.




4302343 1.000

Original Poor Quality

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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| | | |
|---|---|---|
| PROJECT DESCRIPTION | FLORIDA DEPARTMENT OF TRANSPORTATION | STATE PROJECT NO. 16180-3538 |
| SR 25 (US 27) | NAME: | FINANCIAL PROJECT ID: 197679-1-52-01 |
| TWP: 27 SOUTH RNG: 27 EAST | SIGNATURE | POLK COUNTY / SHEET 3 OF 17 |
| SEC: 31 | CERTIFICATE NO. DATE: | DATE: |

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## 7.1 POND DESIGN ANALYSIS SUMMARY

This project is divided into 10 drainage basins, for a total of five (5) detention ponds and one (1) swale systems.

Basin 1

Basin 1 begins at the intersection of SR 544 and US 27, at Station 578+00, and ends at Station 583+70. A rural typical section is proposed for this portion of the roadway. The drainage system consists of conveyance ditches and a stormsewer system placed on either side of US 27 and the median. These systems carry the runoff toward cross drain CD-1. Pond 2 accommodates the treatment and attenuation of the stormwater runoff from Basin 1 through compensating treatment and attenuation in Basin 2.

Basin 2

Basin 2 begins at Station 583+70, and ends at Station 592+00. A rural typical section is proposed for this portion of the roadway. The drainage system consists of conveyance ditches and a stormsewer system placed on either side of US 27 and the median. These systems carry the runoff toward the pond, which is sized for both water quality and quantity. This pond discharges into the lateral ditch or adjacent wetland located at Station 583+70.

Pond 2

Pond 2 accommodates the treatment and attenuation of the stormwater runoff from Basin 1 through compensating treatment and attenuation in Basin 2. With the construction of this pond site, no pond will be necessary within Basin 1.

The maximum discharge in the pond at the 25-year, 24-hour event is 10.84 cfs at elev. 126.64 ft. The maximum discharge in the pond at the 100-year, 8-hour event is 16.34 cfs at elev. 127.07 ft.

43023431.000

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**US 27 (SR 25) WIDENING**
**FROM SR 544 TO BLUE HERON BAY BOULEVARD**
Polk County, Florida

---

# POST-DEVELOPMENT

CN CALCULATIONS AND TREATMENT CALCULATIONS
POND 2 AND CD-1

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| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 8/22/00 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 1.64

**BASIN NAME/NO.:** WETLAND

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 1.060 | 103.88 |
| | | | | |
| Houtoon | B/D | 74 | 0.578 | 42.772 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 146.65 |
| Total Area = | 1.638 |
| **Composite CN Value =** | **89.53** |

**NOTE: This is the total area sheet flowing into wetland**

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| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 8/22/00 |
| | | Revised: | 11/10/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 1.95
**BASIN NAME/NO.:** 1

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.346 | 33.902 |
| | | | | |
| Tavares | A | 39 | 1.441 | 56.202 |
| | | | | |
| Houtoon | B/D | 74 | 0.160 | 11.849 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 101.95 |
| Total Area = | 1.947 |
| **Composite CN Value =** | **52.36** |

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| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 11/10/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 3.31
**BASIN NAME/NO.:** 1A

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 2.338 | 229.081 |
| | | | | |
| Tavares | A | 39 | 0.878 | 34.259 |
| | | | | |
| Houtoon | B/D | 74 | 0.098 | 7.223 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 270.56 |
| Total Area = | 3.31 |
| **Composite CN Value =** | **81.65** |

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| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 11/16/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 9.61

**BASIN NAME/NO.:** 1B

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 1.890 | 185.251 |
| | | | | |
| Tavares | A | 39 | 6.947 | 270.951 |
| | | | | |
| Houtoon | B/D | 74 | 0.772 | 57.124 |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 513.33 |
| Total Area = | 9.610 |
| **Composite CN Value =** | **53.42** |

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|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 5/30/01 |
| Revised: | 5/24/01 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 0.38
**BASIN NAME/NO.:** S-202

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.146 | 14.287322 |
| | | | | |
| Houtoon | B/D | 74 | 0.237 | 17.553984 |
| | | | | |
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|---|---|
| $Sum_{Area*CN}$ = | 31.84 |
| Total Area = | 0.38 |
| Composite CN Value = | 83.14 |

**NOTE: This is the total area from the median ditch going into Pond 2 from Sta. 584+50 to 586+15. (See stormtab tabulations)**

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| | | | |
|---|---|---|---|
| Project Name: | US 27 | Prepared by: | SL |
| Project Number: | 104-9440.000 | Checked by: | MDF |
| Task Description: | Post-Development CN Calculations | Date: | 1/17/02 |
| | | Revised: | 11/16/01 |

## SCS RUNOFF CURVE NUMBER

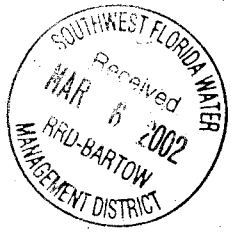
## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 8.69
**BASIN NAME/NO.:** S-203A

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 4.102 | 401.98228 |
| | | | | |
| Houtoon | B/D | 74 | 4.591 | 339.74273 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 741.73 |
| Total Area = | 8.693 |
| **Composite CN Value =** | **85.32** |

**NOTE: This is the total area from the ditches going into Pond 2 from Sta. 592+00 to Sta. 586+50 (see stormtab tabulations)**



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| | |
|---|---|
| Project Name: | US 27 |
| Project Number: | 104-9440.000 |
| Task Description: | Post-Development CN Calculations |

| | |
|---|---|
| Prepared by: | SL |
| Checked by: | MDF |
| Date: | 8/22/00 |
| Revised: | 12/18/00 |

## SCS RUNOFF CURVE NUMBER

## POST-DEVELOPMENT

**DRAINAGE AREA (ac):** 3.18
**BASIN NAME/NO.:** BASIN2

| Land Use Type | Hydrologic Soil Group | SCS Curve Number Value | Area Covered by CN Value | AREA*CN |
|---|---|---|---|---|
| | | | | |
| Impervious | N/A | 98 | 0.979 | 95.942 |
| | | | | |
| Houtoon | B/D | 74 | 0.680 | 50.32 |
| | | | | |
| Pond 2 | N/A | 100 | 1.52 | 152 |
| | | | | |
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| | |
|---|---|
| $Sum_{Area*CN}$ = | 298.26 |
| Total Area = | 3.179 |
| **Composite CN Value =** | **93.82** |

**NOTE: This is the total area sheet flowing into Pond 2 (including the pond 6m berm and Pond Area at SHWL) from Sta. 584+00 to Sta. 586+50.**

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| | | | |
|---|---|---|---|
| **Project Name:** | US 27 | **Prepared by:** | SL |
| **Project Number:** | 104-9440.000 | **Checked by:** | MDF |
| **Task Description:** | Stage-Storage Treatment | **Date:** | 8/23/00 |
| | | **Revised:** | 1/18/02 |

## Basin 2 - Pond 2

| **POST-DEVELOPMENT CONDITIONS** | **Area, ac** | **Area, ha** |
|---|---|---|
| Impervious area: | 5.23 | 2.115 |
| Pond 2 Wet area: | 1.52 | 0.616 |
| Pervious area: | 5.51 | 2.229 |
| Access Road area to be treated in pond 2: | 0.71 | 0.287 |
| **Total Basin Area =** | **12.97** | **5.248** |

**Step #1: CALCULATE TREATMENT VOLUME TO BE PROVIDED**

**Treatment Volume based on the first one inch of runoff from the total basin area**

Treatment Volume = Total basin Area $_{(ac)}$ * 1 in * (1 ft / 12 in )

= **1.08** ac-ft

**Step #2: CALCULATE STAGE VS. STORAGE RELATIONSHIP**

**Calculate area at control and top of bank elevation**

| | | |
|---|---|---|
| **SHWL = Control Elevation =** | 124.54 ft | 37.959 m |
| **Inside top of bank elevation =** | 125.49 ft | 38.250 m |
| **Outside top of bank elevation =** | 127.95 ft | 39.000 m |
| **Area @ control elevation =** | 1.52 ac | 0.616 ha |
| **Area @ inside top of bank =** | 1.65 ac | 0.669 ha |
| **Area @ outside top of bank =** | 2.36 ac | 0.956 ha |

**Step #3: CALCULATE WEIR ELEVATION**

| Elevation m | Elevation ft | | Area acres | Volume acre-ft |
|---|---|---|---|---|
| 37.96 | 124.54 | Control Elev. | 1.52 | 0.00 |
| 38.17 | 125.24 | Treatment Elev. | 1.62 | 1.10 |
| 38.25 | 125.49 | Inside TOB | 1.65 | 1.52 |

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# *PERMIT NO. 33368.000*

## US 27

# US 27 (SR 25) Widening

From CR 546 to SR 544
Polk County, Florida

AEP: 104-3472-025
FPID: 411039-1-52-01

# DRAINAGE DOCUMENTATION
# SWFWMD
# PERMIT SUBMITTAL

Prepared for:

**FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT ONE AND SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT**

Prepared by:
**REYNOLDS, SMITH AND HILLS, INC.**
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607
(813) 289-5550

**AUGUST 2007**

Southwest Florida Water Management District
SEP 11 2007
JASON W. DUNN
PE
LICENSE
NO. 39
STATE OF FLORIDA
PROFESSIONAL ENGINEER
BRS Barlow
430333680 000

# EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District One proposes to widen US 27 (SR 25) in Polk County, from north of CR 546 (Kokomo Road) to South of SR 544 (MP 11.354 to MP 12.926). This project is approximately 1.57 miles in length and includes widening the existing four-lane, rural, divided roadway to a six-lane, rural, divided roadway. The project is identified as Financial Project Number 411039-1-52-01.

The project is located in Sections 5, 6, 7 and 8 of Township 27 South, and Range 27 East. The regulatory water management district is the Southwest Florida Water Management District (SWFWMD). This project lies within the Lake Hamilton Watershed that includes Little Lake Hamilton, Middle Lake Hamilton and Lake Hamilton.

This project is divided into two major basins and five sub-basins. The existing flow path of roadway runoff collects in roadside ditches and is conveyed from east to west by means of existing cross drains. These cross drains send water toward Lake Hamilton and Middle Lake Hamilton located on the west side of the project corridor. This project is located within an open basin—the positive outfall being Lake Hamilton. The proposed condition flow paths mimic the existing and include a collection system designed to capture the runoff from selected sub basins for treatment in proposed storm water management facilities.

This project was designed to meet current FDOT and SWFWMD standards for water quantity and water quality. The method of treatment for this project is wet detention. This design proposes the treatment volume equivalent to 1-inch of runoff from the roadway widening as well as the directly connected impervious areas, where hydraulically possible. The combined storm water management facilities will treat 0.85 acre-feet of roadway runoff.

The roadway widening will have impacts to the 100-year floodplain. The floodplain for this area encompasses the total project limits; therefore, one floodplain site is used to provide compensation. Two and a half (2.50) acre-ft of floodplain compensation is required and is provided.

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STATE OF FLORIDA
ENGINEER
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## LIST OF FIGURES

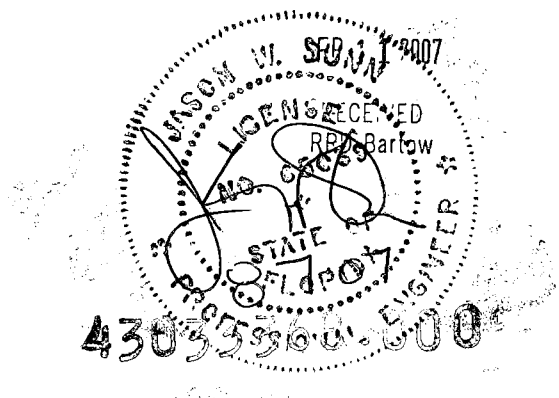
**FIGURE** **PAGE**


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| APPENDIX B | Basin 2 Calculations |
| APPENDIX C | ASAD |
| APPENDIX D | Ditch Design |
| APPENDIX E | Side Drain Calculations |
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| APPENDIX G | Floodplain Encroachments |
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| APPENDIX I | Optional Culvert Analysis |
| APPENDIX J | Correspondence |


Southwest Florida Water Management District



# 1.0 PROJECT DESCRIPTION

## 1.1. Purpose

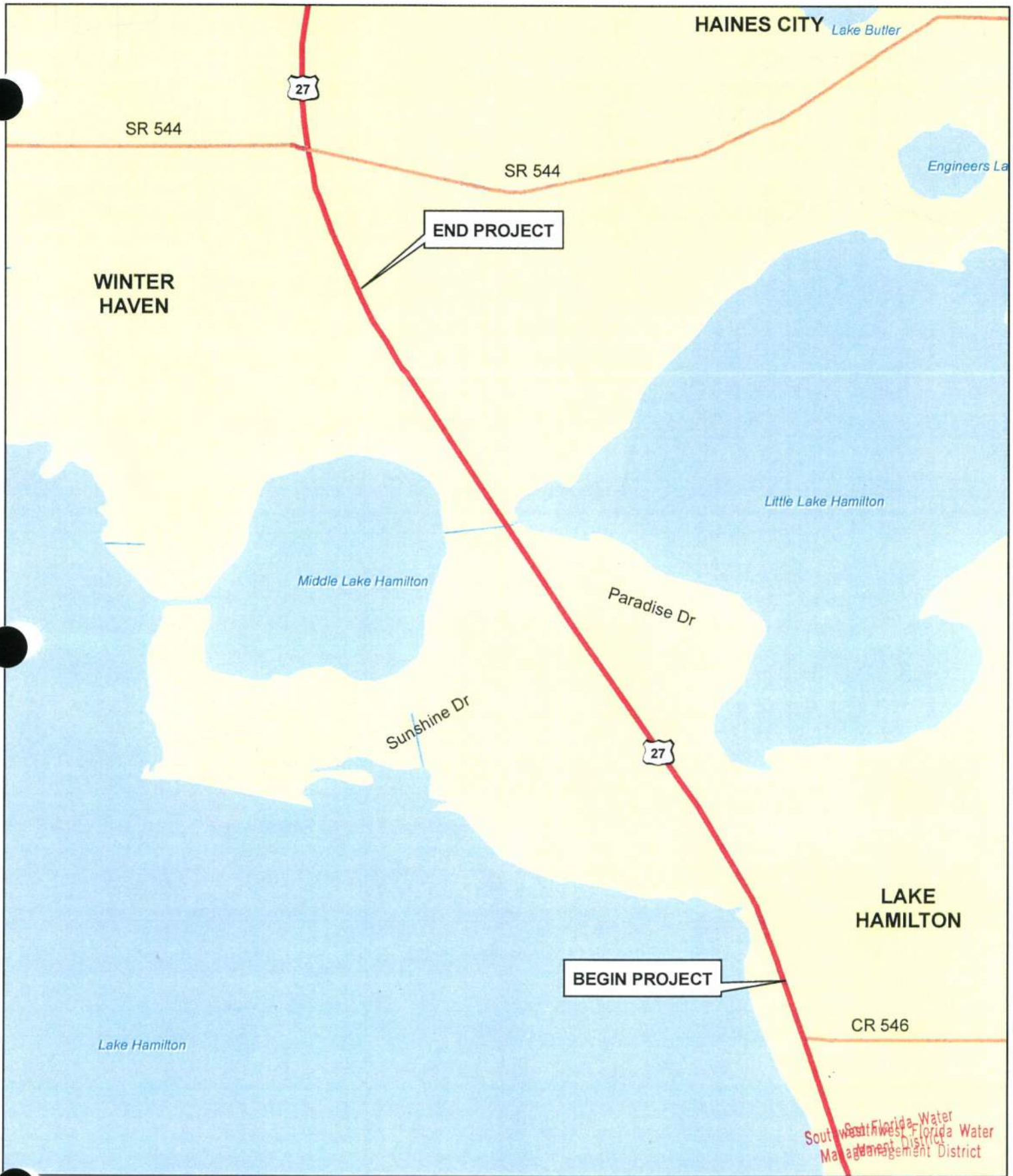
As part of the US 27 (SR 25) Widening Project this report will serve as the drainage documentation that details the proposed drainage design. The purpose of this report is to define the drainage improvements that will be made to accommodate the proposed roadway widening. This report will include existing and proposed drainage conditions, stormwater management facilities models, and floodplain encroachments and compensation.

## 1.2. Project Description and Location

The Florida Department of Transportation (FDOT) District One proposes to widen US 27 (SR 25) in Polk County, from north of CR 546 (Kokomo Road) to South of SR 544 (MP 11.354 to MP 12.926). This project is approximately 1.57 miles and includes of widening the existing four-lane divided roadway to a six-lane rural divided roadway. The project is identified as Financial Project Number 411039-1-52-01.

The project is located in Sections 5, 6, 7, 8 of Township 27 South, and Range 27 East. See the Location Map in Figure 1. The regulatory water management district is the Southwest Florida Water Management District (SWFWMD). This project lies within the Lake Hamilton Watershed that includes Little Lake Hamilton, Middle Lake Hamilton and Lake Hamilton. This watershed is part of the much larger Peace Creek Canal watershed, including the easternmost headwaters of the Peace River.

**Figure 1** shows the project location.




US 27 from north of CR 546 to south of SR 544
Financial Project ID No. 411039-1
Polk County, FL

N
NTS



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PROJECT LOCATION MAP
Figure 1

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## 1.3. Existing Typical Section

The existing typical section is a rural 4-lane divided highway. Within the 200-foot right of way, there are four 12-foot lanes, two 4-foot shoulders, a 40-foot median and approximately 52 feet of border width on both sides. The existing corridor consists of several businesses and commercial properties, along with residential neighborhoods, a campground and a church. The existing typical section includes approximately 12.4 acres of impervious area and 22.3 acres of pervious area.

## 1.4. Proposed Typical Section

The proposed typical section is a rural 6-lane divided highway. This widening project includes the construction of one additional 12' lane in each direction that will be built on the outside lanes. Within the 200-foot of right of way, there will be six 12-foot lanes, two 8-foot shoulders (4 ft. paved, 4 ft. grassed), a 40-foot median and approximately 36 feet of border width on both sides. The proposed corridor will have similar land use as the existing condition, but some of areas are being developed. The proposed typical section contains approximately 12.4 acres of impervious area and 22.3 acres of pervious area. **Figure 2** shows the proposed typical section for the project.

Southwest Florida Water
Management District

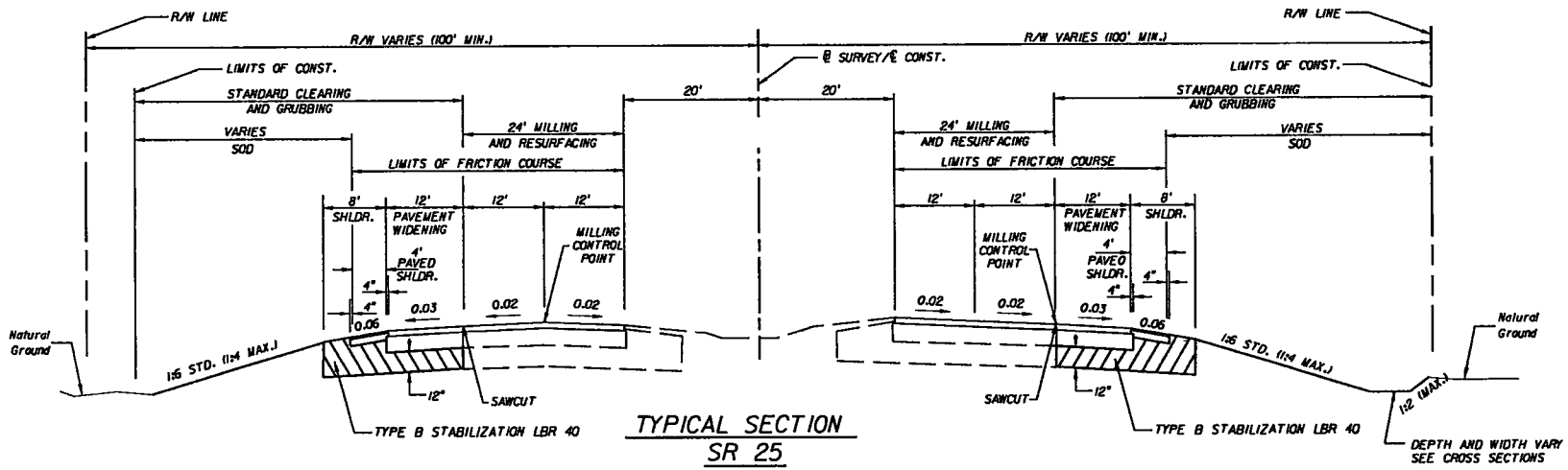
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4

430368-010 FIGURE 2




## TYPICAL SECTION SR 25

STA. 1803+80.00 TO STA. 1875+17.55 BK.
STA. 1874+32.22 AH. TO STA. 1878+27.71

**MAINLINE, CROSSOVERS, TURNLANES, AND INTERSECTIONS**
**MILLING & RESURFACING**

MILL EXISTING ASPHALT PAVEMENT 2 1/4" AVG. DEPTH
TYPE SP STRUCTURAL COURSE (TRAFFIC D) (PG 76-22)
(1 1/2"), AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

**WIDENING**

OPTIONAL BASE GROUP 09 WITH TYPE SP
STRUCTURAL COURSE (TRAFFIC D) (PG 76-22) (3")
AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

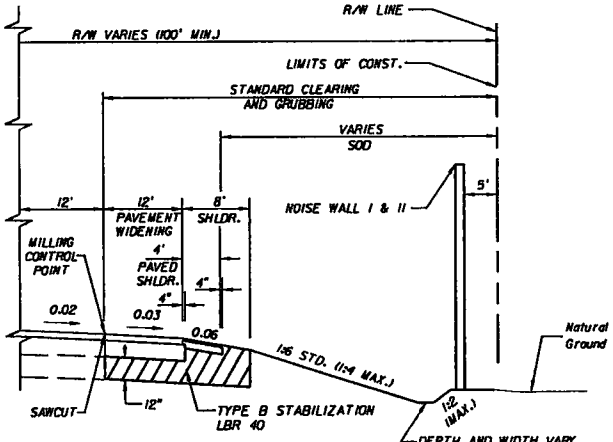
**SHOULDER PAVEMENT**

OPTIONAL BASE GROUP 1 WITH TYPE SP
STRUCTURAL COURSE (TRAFFIC D) (PG 76-22) (2")
AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

**TRAFFIC DATA**

CURRENT YEAR ESTIMATE = 2006 AADT = 32800
OPENING YEAR ESTIMATE = 2012 AADT = 37000
DESIGN YEAR ESTIMATE = 2032 AADT = 51000
K = 8.3% D = 51.2% T = 20.0% (24 HOUR)
DESIGN HOUR T = 10.0%
DESIGN SPEED = 60 MPH
POSTED SPEED = 60 MPH

NTS




## NOISEWALL DETAIL

NOISE WALL I - HEIGHT = 15'
STA. 1829+60 TO STA. 1838+80
NOISE WALL II - HEIGHT = 11'
STA. 1842+00 TO STA. 1851+20

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| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

ENGINEER OF RECORD:
MARK L. PERONTO
P.E. LICENSE NUMBER 54845
FLORIDA DEPARTMENT OF TRANSPORTATION
801 N. BROADWAY AVENUE
BARTOW, FL 33830-3809

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| 25 | POLK | 411039-1-52-01 |

**TYPICAL SECTION**

SHEET NO. 8

4/24/2007 8:23:33 AM X:\FP\411039\201\roadway\typsr60.dgn

## 2.0 DRAINAGE BASINS

The drainage basins were defined using SWFWMD aerials, USGS Quad maps, and the topographic survey. A field review was also conducted to verify these divides and to better understand existing drainage patterns.

The project that encompasses 1.57 miles of rural divided highway can be divided into two major basins and five sub-basins: Basin 1 (A, B) and Basin 2 (A, B, C). The main flow path of roadway runoff collects in roadside ditches and is conveyed from east to west by means of existing cross drains. These cross drains send water toward Lake Hamilton and Middle Lake Hamilton located on the west side of the project corridor. It is these cross drains that separate the two main basins into their prospective sub-basins. This project can be defined as an open basin—the positive outfall being Lake Hamilton. Lake Hamilton is part of the Lakes Region Lakes Management District (LRLMD) and discharges to the south through a control structure; and ultimately into the Peace Creek Drainage Canal.

Basin Limits are shown in the attached Quad Map in **Figure 3**.

### 2.1. Basin 1

Basin 1 extends from the beginning of the project, Sta. 1796+13.5 north to Paradise Drive, Sta. 1841+40. The cross drain, (2) 48-inch pipes, is located at station 1809+10 and separates Basin 1 into Sub-Basin 1A and Sub-Basin 1B.

*Sub-Basin 1A*

Sub-Basin 1A is defined from Sta. 1800+22 to 1809+10. A portion of the project limits (Sta. 1796+13.5 to Sta. 1800+22) is included in a separate project FPID 197707-1-32-01 and will not be part of this drainage design. Sub-basin 1A conveys roadway runoff into roadside ditches north towards the existing cross drain at 1809+10. The existing double 48-inch cross drain sends this runoff west to Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 1B.

Southwest Florida Water
Management District

*Sub-Basin 1B*

Sub-Basin 1B is defined from Sta. 1809+10 to 1841+40. A small portion of this basin (Sta.

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1815+10 to Sta. 1809+10) will convey water south to the existing cross drain and will not be routed to the pond. The majority of this basin (Sta. 1841+40 to 1815+00) will convey all runoff to the stormwater management facility (Pond 1) by means of roadside ditches, side drains, and a collection system comprised of ditch bottom inlets. Pond 1 will discharge to the Flood Plain Compensation Site which is hydraulically connected to Lake Hamilton.

## 2.2. Basin 2

Basin 2 extends from Paradise Drive, Sta. 1841+40 north to the end of the project, Sta. 1878+27.71. There are two cross drains in Basin 2: a 10-foot by 12-foot concrete box culvert at Sta. 1854+35, and a double 10-foot by 12-foot bridge culvert at Sta. 1867+00. These cross drains separate Basin 2 into Sub-Basin 2A, Sub-Basin 2B and Sub-Basin 2C.

*Sub-Basin 2A*

Sub-Basin 1A is defined from Sta. 1841+40 to Sta. 1854+35. Sub-basin 2A conveys roadway runoff into roadside ditches north towards the existing cross drain at 1854+35. The existing 10-foot by 12-foot concrete box culvert sends runoff west to Middle Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 2B.

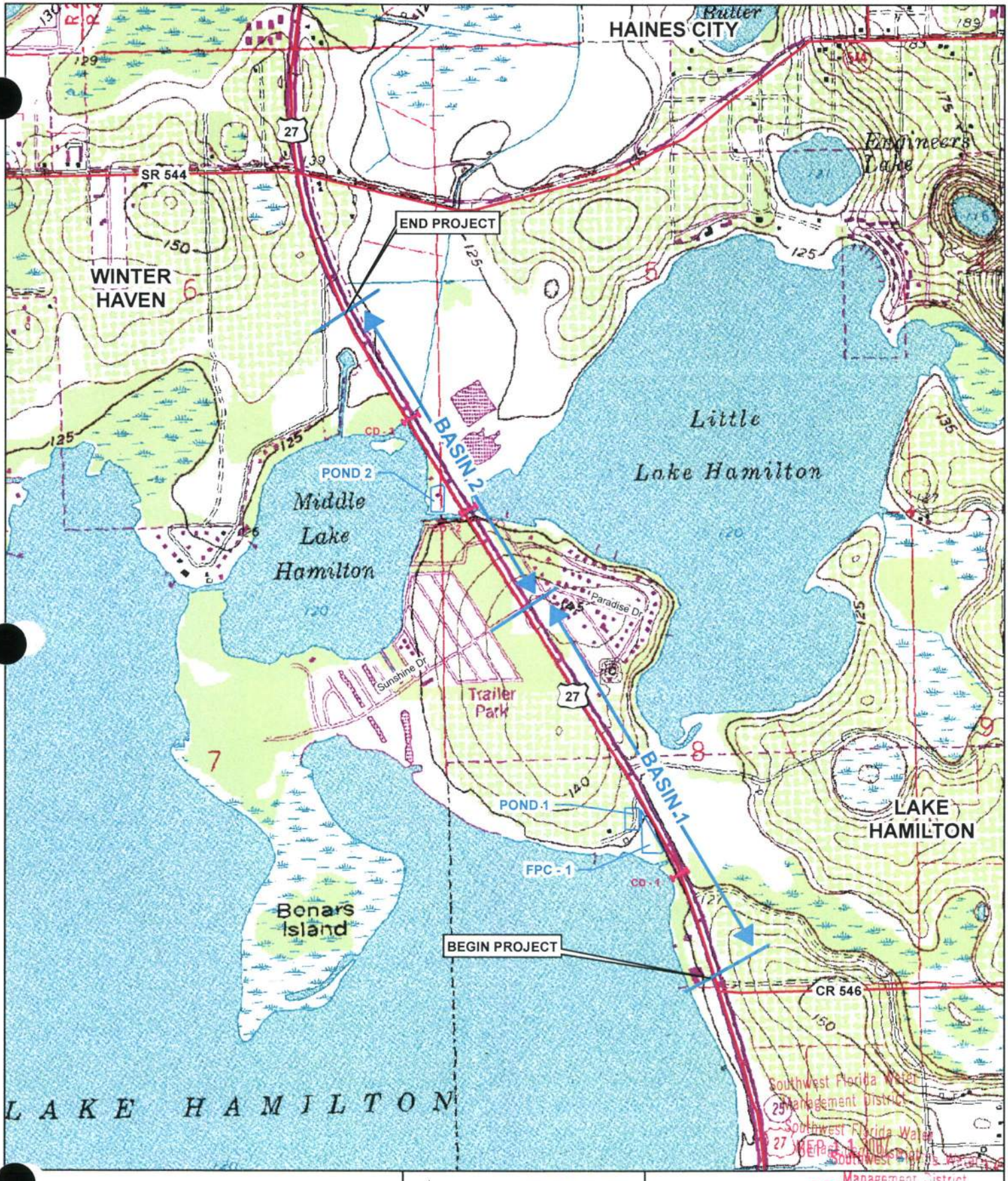
*Sub-Basin 2B*

Sub-Basin 2B is defined from Sta. 1854+35to 1867+00. The entire basin will convey all runoff to the stormwater management facility (Pond 2) by means of roadside ditches, side drains, and a collection system comprised of ditch bottom inlets. Pond 2 will discharge to Middle Lake Hamilton.

*Sub-Basin 2C*

Sub-Basin 2C is defined from Sta. 1867+00 to Sta. 1878+27.71. Sub-basin 2C conveys roadway runoff into roadside ditches south towards the existing cross drain at 1867+00. The existing (2) 10-foot by 12-foot concrete box culvert sends runoff west to Middle Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 2B.

Sub Basins are defined in attached Drainage Maps, **Figure 4.**




US 27 from north of CR 546 to south of SR 544
Financial Project ID No. 411039-1
Polk County, FL

NTS

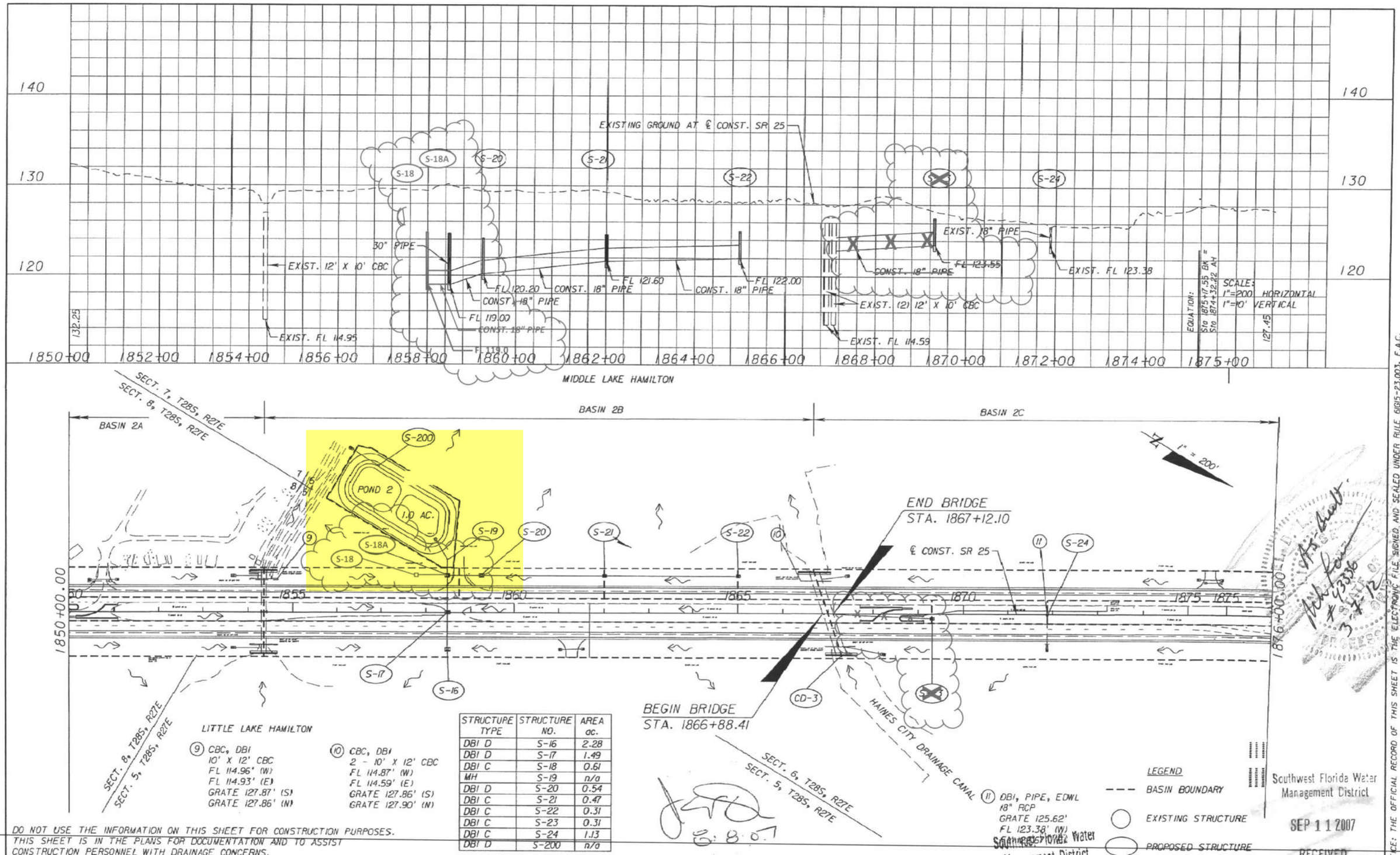
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USGS QUADRANGLE MAP
Figure 3

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43033368.000




LITTLE LAKE HAMILTON

(9) CBC, DBI
10' X 12' CBC
FL 114.96' (W)
FL 114.93' (E)
GRATE 127.87' (S)
GRATE 127.86' (N)

(10) CBC, DBI
2 - 10' X 12' CBC
FL 114.87' (W)
FL 114.59' (E)
GRATE 127.86' (S)
GRATE 127.90' (N)

(11) DBI, PIPE, EDWL
18" RCP
GRATE 125.62'
FL 123.38' (W)

| STRUCTURE TYPE | STRUCTURE NO. | AREA ac. |
|---|---|---|
| DBI D | S-16 | 2.28 |
| DBI D | S-17 | 1.49 |
| DBI C | S-18 | 0.61 |
| MH | S-19 | n/a |
| DBI D | S-20 | 0.54 |
| DBI C | S-21 | 0.47 |
| DBI C | S-22 | 0.31 |
| DBI C | S-23 | 0.31 |
| DBI C | S-24 | 1.13 |
| DBI D | S-200 | n/a |

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

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RS+H
Reynolds, Smith and Hills, Inc.
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Jason W. Dunn, P.E. No.: 65039
Architectural, Engineering, Planning and Environmental Services


STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| 25 | POLK | 411039-1-52-01 |

# DRAINAGE MAP

SHEET NO. 5

# *APPENDIX G*

**Cultural Resources Desktop Analysis**

# CULTURAL RESOURCE ASSESSMENT SURVEY
# PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

# STATE ROAD (SR) 544 (LUCERNE PARK ROAD)
# FROM MARTIN LUTHER KING BOULEVARD TO SR 17
# POLK COUNTY, FLORIDA

**Financial Project ID No.: 440273-1-22-01**
**Federal Aid Project Number: D119-048-B**
**ETDM No. 5873**

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

July 2023

# CULTURAL RESOURCE ASSESSMENT SURVEY
# PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

# STATE ROAD (SR) 544 (LUCERNE PARK ROAD)
# FROM MARTIN LUTHER KING BOULEVARD TO SR 17
# POLK COUNTY, FLORIDA

**Financial Project ID No.: 440273-1-22-01**
**Federal Aid Project Number: D119-048-B**
**ETDM No. 5873**

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

Prepared for:

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

By:

Archaeological Consultants, Inc.
8110 Blaikie Court, Suite A
Sarasota, Florida 34240

Marion Almy - Project Manager
Lee Hutchinson - Project Archaeologist
Justin Winkler and Crystal Wright - Archaeologist
Kimberly M. Irby – Project Architectural Historian
Savannah Y. Finch – Architectural Historian

July 2023

# EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One, is proposing roadway improvements to State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles. The purpose of this project is to address roadway capacity deficiency along SR 544 (Lucerne Park Road) to accommodate future travel demand as a result of projected population and employment growth in the area. Other goals of the project include enhancing mobility options and multi-modal access as well as supporting local economic development initiatives. The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/Floodplain Compensation (FPC) sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional right-of-way (ROW) will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

The purpose of this Cultural Resource Assessment Survey (CRAS) was to locate and identify any cultural resources within the project Area of Potential Effects (APE) and to assess their significance in terms of eligibility for listing in the National Register of Historic Places (NRHP). As defined in 36 CFR Part § 800.16(d), the APE is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The archaeological APE was defined as the footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200-feet (ft) of the existing ROW were surveyed. In addition, the historical APE included resources within 100-ft of the proposed pond sites. The archaeological and historical/architectural field surveys were conducted between March and June 2023.

All work was conducted to comply with Section 106 of the *National Historic Preservation Act* of 1966 (Public Law 89-655, as amended), as implemented by 36 CFR 800 (*Protection of Historic Properties*, effective August 2004), as well as Chapters 267 and 373, *Florida Statutes* (FS), Chapter 1A-46, *Florida Administrative Code* (FAC). All work was carried out in conformity with the standards outlined in Part 2, Chapter 8 ("Archaeological and Historical Resources") of the FDOT's *Project Development and Environment (PD&E) Manual* (FDOT 2020), and the standards and guidelines contained in the *Cultural Resource Management Standards and Operational Manual*: *Module 3* (Florida Division of Historical Resources [FDHR] 2003). The Principal Investigators meet the *Secretary of the Interior's Professional Qualification Standards* (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

Research methods included a review of the ETDM Report No. 5873, Florida Master Site File (FMSF) database, and the NRHP. In September 2019, ACI prepared a Research Methodology Report for District One to review (ACI 2019). The report provided details on the APE, project Methodology, and potential for cultural resources in the project area.

Archaeological background research indicated that three archaeological sites have been recorded within the APE and four within one-half mile. Sites within the APE include 8PO04797 (Homer's Grove Site), a single artifact site (today referred to as an archaeological occurrence [AO]), 8PO05426 (Whittaker Site) a low-density Pre-Contact artifact scatter, and 8PO05407 (Lake Tracey Canal), a historic earthwork dating to the American Boom Times (1921-1929). Sites within one-half

mile include 8PO04798 (Hochberg Hammock) a single artifact site, 8PO07085 (Chris' Last Site) a lithic scatter, 8PO08107 (Bellaviva C Site) a lithic scatter, and 8PO06533 (Lake Rochelle Site). The two single artifact sites have not been evaluated by the State Historic Preservation Officer (SHPO), but the five other archaeological sites were determined ineligible for listing in the NRHP by the SHPO. Based on a review of the relevant site information for environmentally similar areas within Polk County and the surrounding region, the archeological APE was considered to have variable archaeological potential. As a result of the survey, including the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor, no Pre-Contact period or historic archaeological sites were discovered and no evidence of 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site) were found within the APE. The Lake Tracey Canal (8PO05407) is within the APE, but no testing was deemed necessary given that it is a canal. However, one AO was found; it is not considered a site and is not NRHP eligible.

Historical/architectural background research, including a review of the FMSF database and NRHP, indicated that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, and 8PO08606) were previously recorded within the APE. These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, six buildings (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and the bridge (8PO08606) were determined ineligible for listing in the NRHP by the SHPO. One building (8PO03077) has not been evaluated and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within Pond 5. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO. A review of relevant historic United States Geological Survey (USGS) quadrangle maps, historic aerial photographs, and the Polk County Property Appraiser's data revealed the potential for 99 new historic resources 46 years of age or older (constructed in 1977 or earlier) within the APE (Faux 2023).

Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE. This includes 100 newly identified historic resources (8PO09983, 8PO09999 – 8PO10095, 8PO10132, 8PO10133), seven (7) extant previously recorded historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606), and an unrecorded segment of the Peace Creek Drainage Canal (8PO05391). These 108 historic resources include: 98 buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10094, 8PO10095, 8PO10132, 8PO10133) constructed between ca. 1895 and 1977, three building complex resource groups (8PO10056, 8PO10070, 8PO10093), one historic district (8PO09983), and one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087). Of the seven (7) extant previously recorded historic resources located within the APE, two (8PO03077 and 8PO03079) were updated and re-evaluated and five (8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606) were not updated because they were previously evaluated by the SHPO as ineligible for listing in the NRHP and no changes were observed during the field survey. Of these, 104 historic resources are within the mainline corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no

longer extant. A new FMSF form was prepared for the 100 newly identified resources, and an updated FMSF form was prepared for the two previously recorded buildings and the unrecorded canal segment.

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133), five appear eligible (8PO03077, 8PO03079, 8PO10093, 8PO10094, and 8PO10095), and the newly identified historic district (8PO09983) has insufficient information to make a determination. The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133) constructed between circa (ca.) 1895 and 1977, two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.

In addition, the Florence Citrus Growers Association Historic District (8PO09983) was newly identified during the survey. The proposed historic district within the APE spans approximately 200 ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. This portion of the proposed district is comprised of 29 contributing resources (8PO09999 through 8PO10027) that were constructed between circa (ca.) 1918 – 1974. Six non-contributing resources, as contained within the APE, are located within the historic district, and were not recorded as they are considered non-historic (constructed after 1977). It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. None of the contributing resources appear individually eligible for listing in the NRHP. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. As such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

A total of five historic resources within the APE appear eligible for listing in the NRHP. Of these, two buildings (8PO03077 and 8PO03079) were previously recorded but 8PO03077 has not been evaluated by the SHPO and 8PO03079 was found to have insufficient information. The Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095) were newly identified. The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In

addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

Given the results of archaeological background research and field survey, including the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor, no Pre-Contact period or historic archaeological sites were discovered and no evidence of 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site) were found within the APE. However, one AO was found; it is not considered a site and not considered NRHP eligible. As such, no prehistoric or historic archaeological sites that are listed, eligible for listing, or that appear potentially eligible for listing in the NRHP were located within the APE. However, of the 108 extant historic resources identified within the APE, five historic resources (8PO03077, 8PO03079, 8PO10093, 8PO10094, 8PO10095) appear eligible for listing in the NRHP and one resource, the Florence Citrus Growers Association Historic District (8PO09983), has insufficient information for evaluating the NRHP eligibility.

The proposed work being conducted within the APE includes ROW acquisition for the road widening and construction of a sidewalk, as well as the installation of traffic separators. In addition, to these improvements, work within the proposed district includes one pond site (Pond 1A) along 1st Street N between Avenue U NW and Avenue V NW. The proposed new ROW will be approximately 20-ft from the two residential buildings (8PO03077 and 8PO03079) and approximately 140-ft from the school (8PO10093). These resources are located between Myrtle Avenue and S 10th Street where the road widening will occur to the south of SR 544. Of the five potentially eligible resources, the Craftsman style building located at 128 Scenic Highway (8PO03079) is on the south side of SR 544 and the remaining properties are on the north side. Furthermore, ROW acquisition within the district will impact two contributing resources (8PO10001 and 8PO10003); however, both of these resources appear individually ineligible for listing in the NRHP. Based on these results, further coordination may be required.

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# 1.0 INTRODUCTION

The Florida Department of Transportation (FDOT), District One, is proposing capacity and multi-modal improvements to State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles (**Figures 1.1 – 1.5**). The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/Floodplain Compensation (FPC) sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional right-of-way (ROW) will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

## 1.1 Project Description

The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system; however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing ROW along SR 544 (Lucerne Park Road) ranges from 50-feet (ft) to 85-ft from Martin Luther King Boulevard to Avenue Y, 90-ft to 170-ft from Avenue Y to US 27, and 60-ft to 140-ft from US 27 to SR 17.

In addition to widening from two to four lanes, the proposed improvements include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional ROW may be required depending on the proposed improvements and specific ROW requirements will be determined during this Project Development and Environment (PD&E) Study.




**Figure 1.1.** Location of the SR 544 project, Polk County, Florida.




**Figure 1.2.** Location of the SR 544 project, Polk County, Florida.




**Figure 1.3.** Location of the SR 544 project, Polk County, Florida.

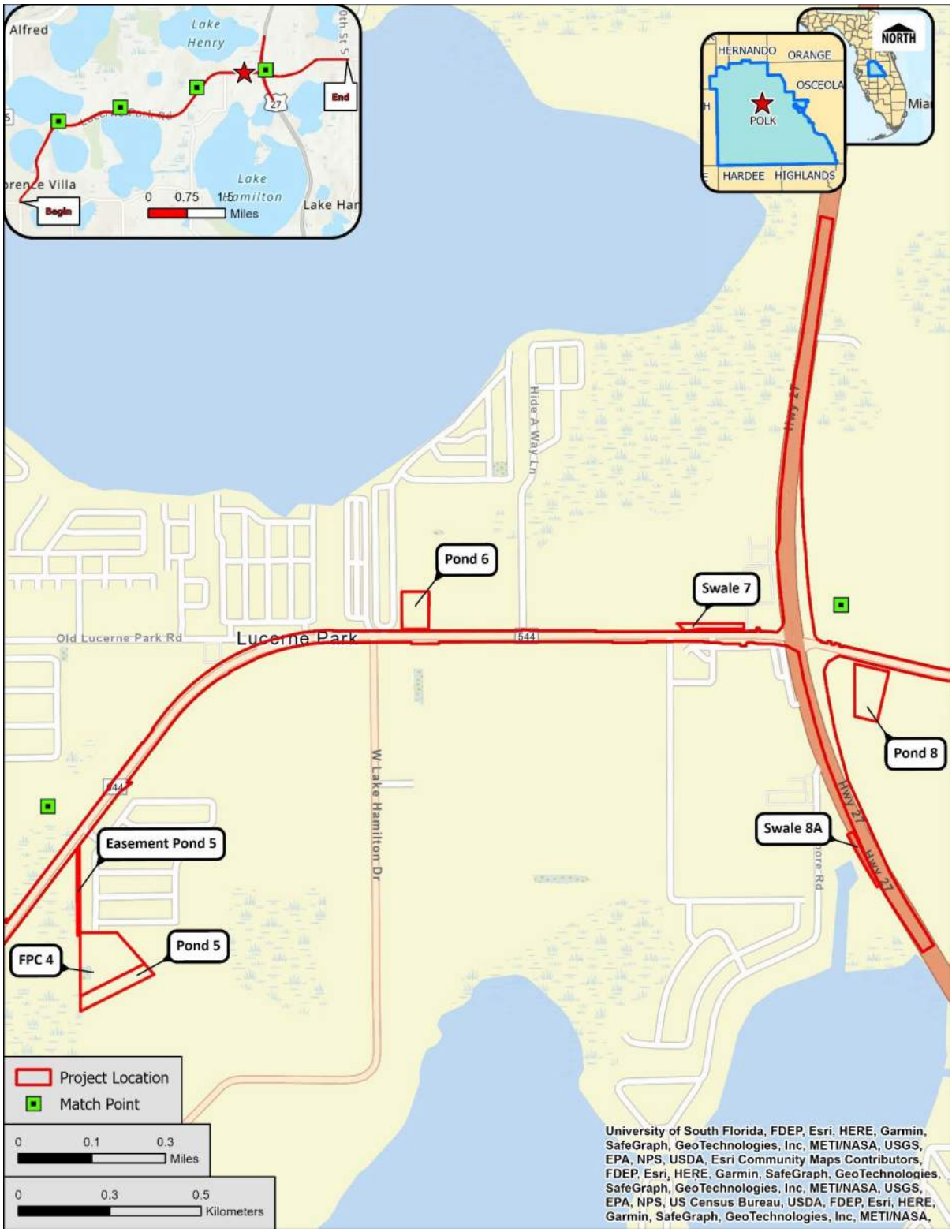



**Figure 1.4.** Location of the SR 544 project, Polk County, Florida.




**Figure 1.5.** Location of the SR 544 project, Polk County, Florida.

## 1.6 Report Purpose

The purpose of this Cultural Resource Assessment Survey (CRAS) was to locate and identify any cultural resources within the Area of Potential Effects (APE), and to assess their significance in terms of eligibility for listing in the National Register of Historic Places (NRHP). This CRAS was initiated to comply with Section 106 of the National Historic Preservation Act of 1966, as amended by Public Law 89-665; the Archaeological and Historic Preservation Act, as amended by Public Law 93-291; Executive Order 11593; and Chapter 267, Florida Statutes (FS). All work was carried out in conformity with Part 2, Chapter 8 ("Archaeological and Historical Resources") of the FDOT's Project Development and Environment (PD&E) Manual (FDOT 2020), and the Florida Division of Historical Resources' (FDHR) standards contained in the Cultural Resource Management Standards and Operational Manual (FDHR 2003), as well as with the provisions contained in the Chapter 1A-46, Florida Administrative Code (FAC). Principal Investigators meet the Secretary of the Interior's Professional Qualification Standards (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

## 1.7 Area of Potential Effects (APE)

As defined in 36 CFR Part § 800.16(d), the APE is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The archaeological APE was defined as the footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200-ft of the existing ROW were surveyed. In addition, the historical APE included resources within 100-ft of the proposed ponds. The archaeological and historical/architectural field surveys were conducted between March and June 2023.

# 2.0 ENVIRONMENTAL SETTING

Environmental factors such as geology, topography, relative elevation, soils, vegetation, and water resources are important in determining where prehistoric and historic period archaeological sites are likely to be located. These variables influenced what types of resources were available for utilization in a given area. This, in turn, affected decisions regarding settlement location and land-use patterns. Because of the influence of the local environmental factors upon the aboriginal inhabitants, a discussion of the effective environment is included.

## 2.1 Project Location and Physical Setting

The APE is located in Sections 32-33, Township 27 South, Range 27 East; Sections 1-3, 9-12, and 16-17, Township 28 South, Range 26 East; and Sections 4-6, Township 28 South, Range 27 East (United States Geological Survey [USGS] Winter Haven 1959, 2021 and Dundee 1953, 2021) (**Figures 2.1-2.5**). The SR 544 APE extends approximately from Martin Luther King Boulevard to SR 17, with. Proceeding northeast from the beginning of the project, the SR 544 ROW expansion is surrounded by urban residential blocks until reaching Avenue Y. From here, the ROW transitions to semi-urban subdivisions and mobile home parks flanked by Lakes Connie, Smart, and Rochelle. The project corridor eventually curves east approaching Lake Fannie to the south and large industrial distribution centers to the north. As the corridor approaches US 27, the environment gradually becomes urbanized with long established residential and retail developments. Further east of US 27, the project ROW converts back to rural residential neighborhoods mixed with relict citrus groves until terminating at SR 17. The environment of the preferred ponds APE varied between improved and woodland pastures, vacant residential lots, relict citrus groves, and wetlands, with easements around the pastures and residential lots.

The SR 544 project occupies disturbed lands throughout its APE. Specific examples include existing sidewalks underpinned by storm sewer lines followed by assorted buried utilities such as cable, electric, fiber-optic, gas, water, and sewer lines. Additional disturbances include concrete culverts, deep swales, new high voltage transmission line construction, and residential/commercial development. In the proposed pond APE, disturbances in the area consists of urban land development, including fixed and temporary residential buildings, infrastructure improvements, and partial land clearing efforts that affect each retention pond location. Photos of the environment and related disturbances within the SR 544 corridor and proposed pond locations are included in **Appendix A**.

## 2.2 Physiography and Geology

The project area is contained within the Polk Uplands, Winter Haven Ridge, and Lake Wales Ridge physiographic zones (White 1970). The project area contains clayey sand underlain by reworked Cypresshead sediments, Pliocene Cypresshead formation, and Plio-Pleistocene sediments (Scott 2001; Scott et al. 2001). The APE is on an elevation range of 125- to 215-ft above mean sea level (amsl) with an approximate acreage of 152 acres for the corridor and pond sites.




**Figure 2.1.** Environmental setting of the SR 544 project.




**Figure 2.2.** Environmental setting of the SR 544 project.




**Figure 2.3.** Environmental setting of the SR 544 project.




**Figure 2.4.** Environmental setting of the SR 544 project.

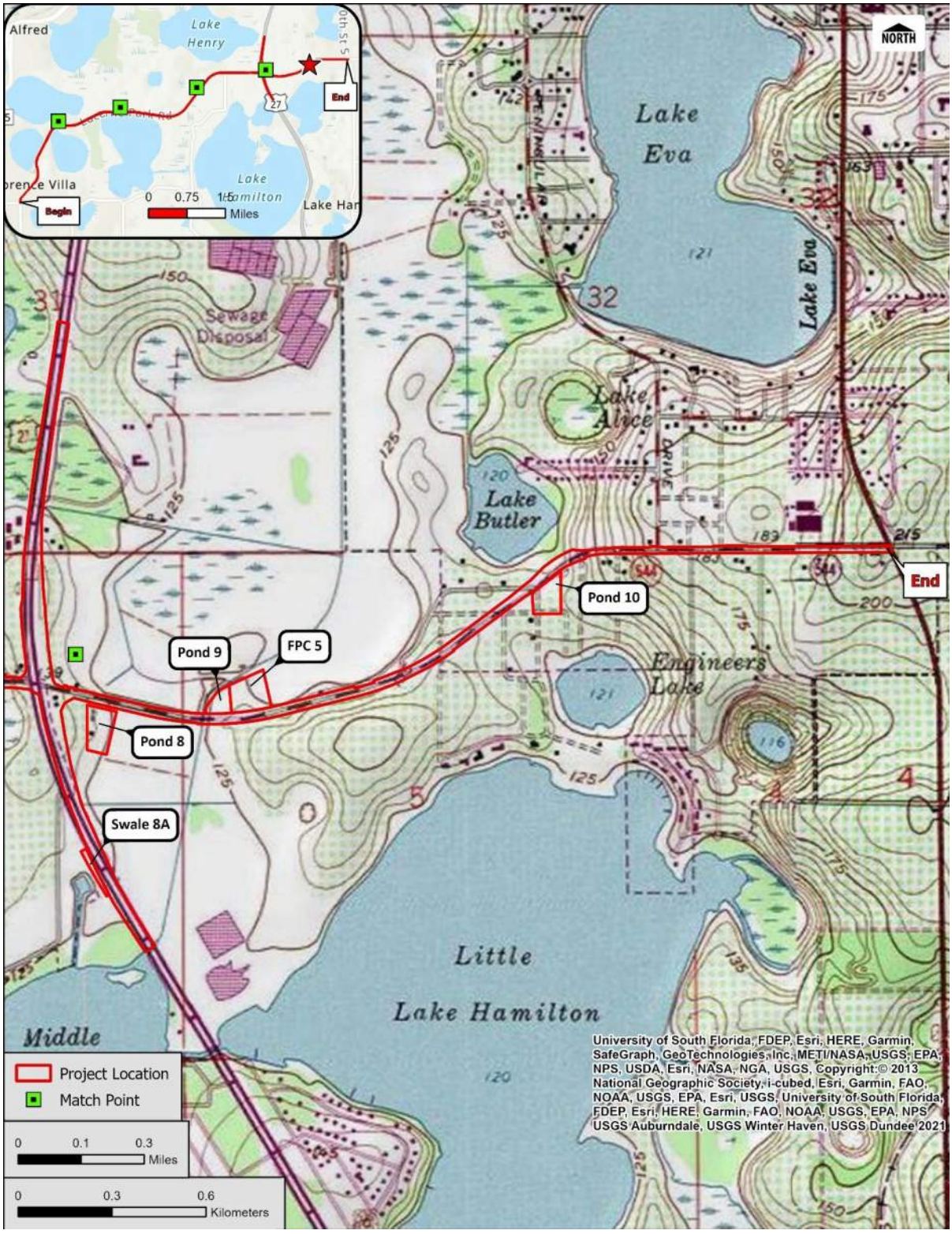



**Figure 2.5.** Environmental setting of the SR 544 project.

## 2.3 Soils and Vegetation

Vegetation within the APE is comprised of forests of longleaf pine and xerophytic oaks, with pine flatwood. According to the U.S. Department of Agriculture (USDA), the APE is specifically within three soil associations. The Candler-Tavares-Apopka soil association is characterized by nearly level to moderately sloping, excessively drained, moderately well-drained, and well-drained sandy soils on uplands (USDA 1990). Some are underlain by loamy or clayey material. The natural vegetation consists of turkey oak, longleaf pine, slash pine, and live oak. The APE also contains soils from the Pomona-Myakka-Smyrna soil association, which is characterized by nearly level, poorly drained, sandy soils on flatwoods interspersed with wet depressions, swamps, and poorly defined drainageways. Some are underlain by loamy material. The natural vegetation consists of South Florida slash pine, longleaf pine, saw palmetto, water oak, running oak, gallberry, wax myrtle, ground blueberry, pineland threeawn, and scattered fetterbush lyonia. In depressional areas, the dominant vegetation comprises of bay, cypress, maple and gum trees with a ground cover of fern, sawgrass, greenbrier, lilies, reeds, and other aquatic plants. The Samsula-Hontoon soil association is characterized by nearly level, very poorly drained organic soils, some of which are underlain by sand, in swamps, marshes, and drainageways. The natural vegetation consists of bay, cypress, maple, gum, and pine trees with a ground cover of sawgrass, greenbrier, fern lilies, reeds, and ither aquatic plants. Soil types, and their characteristics, specific to the project APE, are listed in **Table 2.1** and shown on **Figures 2.6-2.10** are the drainage characteristics of the soils (USDA 1990).

**Table 2.1.** Soil types within the project area.

| Name | Drainage | Location |
|---|---|---|
| Adamsville-Urban land complex | Somewhat poor | Urban land |
| Adamsville fs, 0-2% | Somewhat poor | On low ridges on flatwoods and low areas on uplands |
| Arents-Urban land complex, 0-5% | Somewhat poor | Urban land |
| Basinger mucky fs, frequently ponded, 0-1% | Very poor | Wet depressions on flatwoods |
| Candler-Urban, 0-5% | Excessive | Urban land |
| Candler sand. 0-5% | Excessive | Uplands and knolls on flatwoods |
| Felda fs | Poor | Sloughs or low hammocks on flatwoods |
| Hontoon muck, frequently ponded, 0-1% | Very poor | Swamps and marshes |
| Immokalee sand | Poor | On broad areas of flatwoods |
| Kaliga muck, frequently ponded, 0-1% | Very poor | Marshes and swamps |
| Lochloosa fs | Somewhat poor | Lower positions on uplands and on low ridges on flatwoods |
| Millhopper fs, 0-5% | Moderately well | Upland ridges and on knolls in flatwoods |
| Ona-Ona, wet, fs, 0-2% | Poor | On broad areas of the flatwoods |
| Placid and Myakka fs, depressional | Very poor | Flatwoods |
| Pomona fs | Poor | Broad areas on flatwoods |
| Pompano fs | Poor | On broad, low flatwoods |
| Samsula muck, frequently ponded, 0-1% | Very poor | Swamps and marshes |
| Smyrna and Myakka fs | Poor | On broad areas of flatwoods |
| Sparr sand, 0-5% | Somewhat poor | Seasonally wet uplands and knolls |
| Tavares fs | Moderately well | Uplands and knolls on flatwoods |
| Tavares-Urban | Moderately well | Urban land |
| Wauchula fs | Poor | Low broad areas on flatwoods |
| Zolfo fs | Somewhat poor | Low broad ridges and on knolls on flatwoods |

The soils support different vegetative regimes, which in turn provide habitats for the local animal population, and thus provide essential food resources. These soils have variable suitability for openland, woodland, and wetland habitats. The habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox. Felda, Lochloosa, Millhopper, Myakka, Ona, Smyrna, Sparr, and Tavares soils are rated as fair for openland wildlife habitat. Woodland wildlife habitat includes areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include turkey, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer. Adamsville, Millhopper, Ona, Smyrna, Sparr, and Tavares soils are rated fair while Lochloosa fine sands are rated good for the woodland habitat. The habitat for wetland wildlife includes areas of open, marshy, or swampy, shallow water areas. Wildlife in these areas include ducks, egrets, herons, alligators, and otters. The depressional and muck soils are well suited for wetland habitat; the Felda, Ona, and Smyrna sands are rated fair for this habitat type (Ford et al. 1990).

## 2.4 Paleoenvironmental Considerations

The early environment of the region was different from that seen today. Sea levels were lower, the climate was arid, and fresh water was scarce. An understanding of human ecology during the earliest periods of human occupation in Florida cannot be based on observations of the modern environment because of changes in water availability, botanical communities, and faunal resources. Aboriginal inhabitants would have developed cultural adaptations in response to the environmental changes taking place, which were then reflected in settlement patterns, site types, artifact forms, and subsistence economies.

Due to the arid conditions between 16,500 and 12,500 years ago, the perched water aquifer and potable water supplies were absent. Palynological studies conducted in Florida and Georgia suggest that between 13,000 and 5000 years ago, this area was covered with an upland vegetation community of scrub oak and prairie (Watts 1969, 1971, 1975). However, the environment was not static. Evidence recovered from the inundated Page-Ladson Site in north Florida has clearly demonstrated that there were two periods of low water tables and dry climatic conditions and two episodes of elevated water tables and wet conditions (Dunbar 2006). The rise of sea level reduced xeric habitats over the next several millennia.

By 5000 years ago, a climatic event marking a brief return to Pleistocene climatic conditions induced a change toward more open vegetation. Southern pine forests replaced the oak savannahs. Extensive marshes and swamps developed along the coasts and subtropical hardwood forests became established along the southern tip of Florida (Delcourt and Delcourt 1981). Northern Florida saw an increase in oak species, grasses, and sedges (Carbone 1983). At Lake Annie, in south central Florida, pollen cores were dominated by wax myrtle and pine. The assemblage suggests that by this time, a forest dominated by longleaf pine along with cypress swamps and bayheads existed in the area (Watts 1971, 1975). About 5000 years ago, surface water was plentiful in karst terrains and the level of the Floridan aquifer rose to 5 ft above present levels. With the establishment of warmer winters and cooler summers than in the preceding early Holocene, the fire-adapted pine communities prevailed. These depend on the high summer precipitation caused by the thunderstorms and the accompanying lightning strikes to spark the fires (Watts et al. 1996; Watts and Hansen 1994). The increased precipitation also resulted in the formation of the large swamp systems such as the Okefenokee and Everglades (Gleason and Stone 1994). After this time, modern floral, climatic, and environmental conditions began to be established.




**Figure 2.6.** Soil types within the SR 544 project.




**Figure 2.7.** Soil types within the SR 544 project.

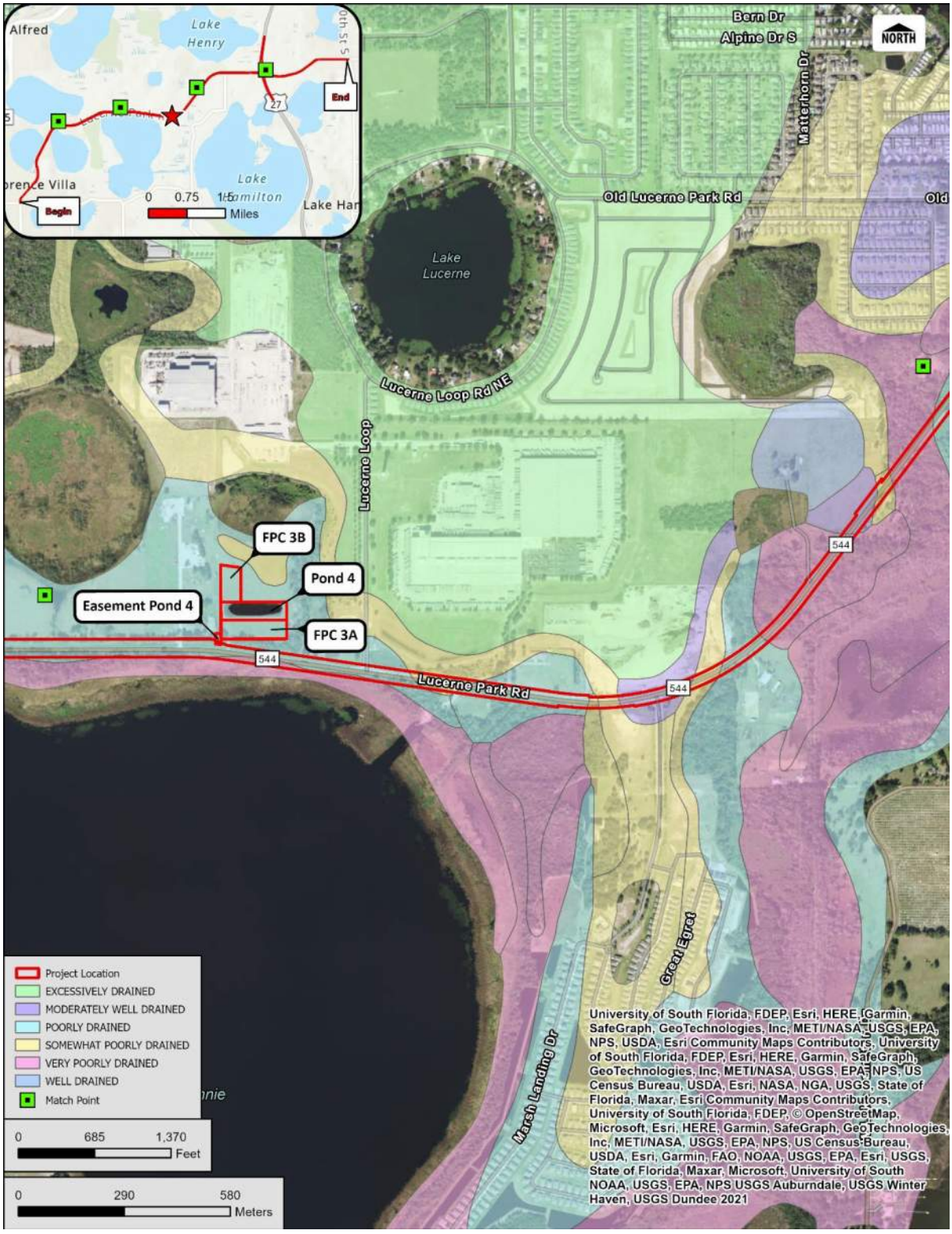



**Figure 2.8.** Soil types within the SR 544 project.

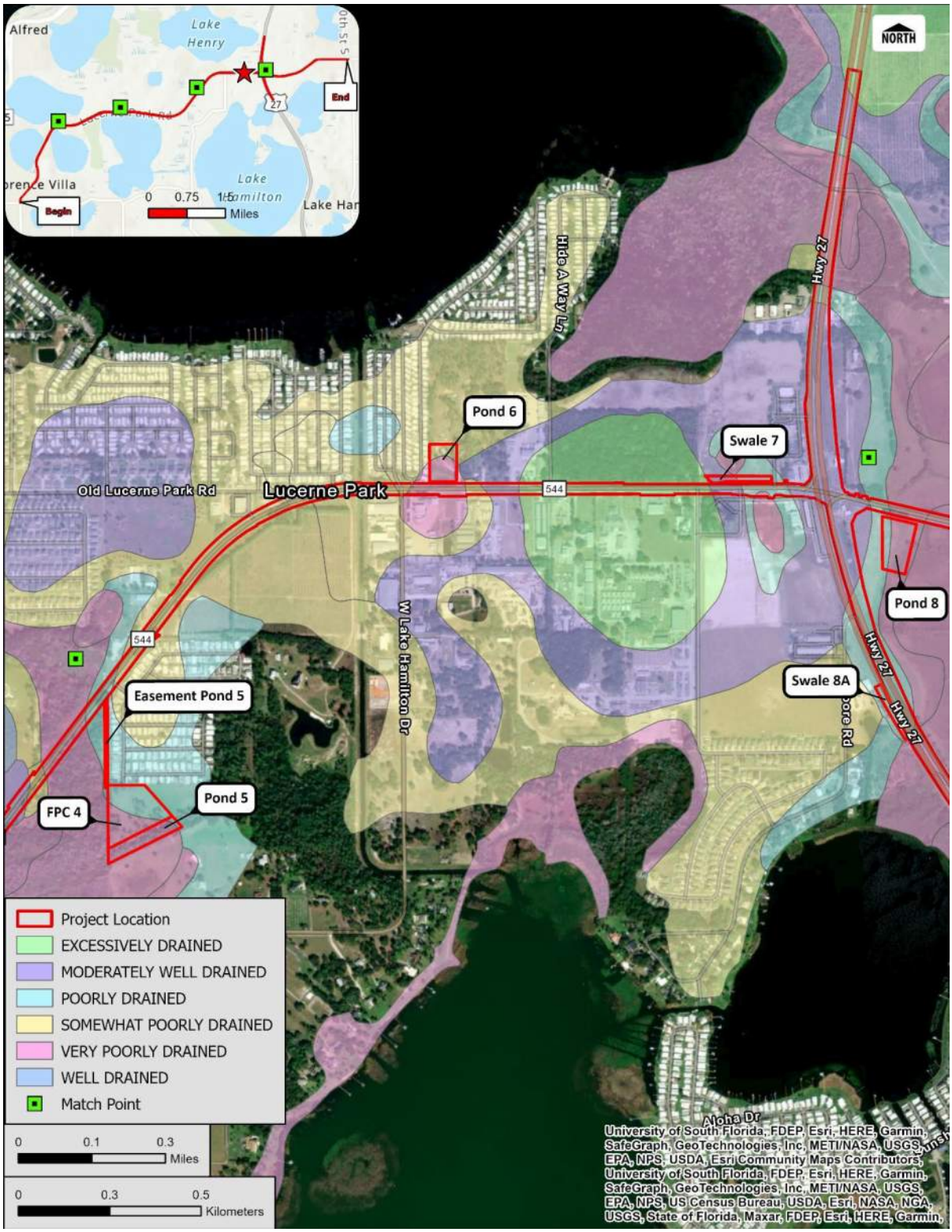



**Figure 2.9.** Soil types within the SR 544 project.

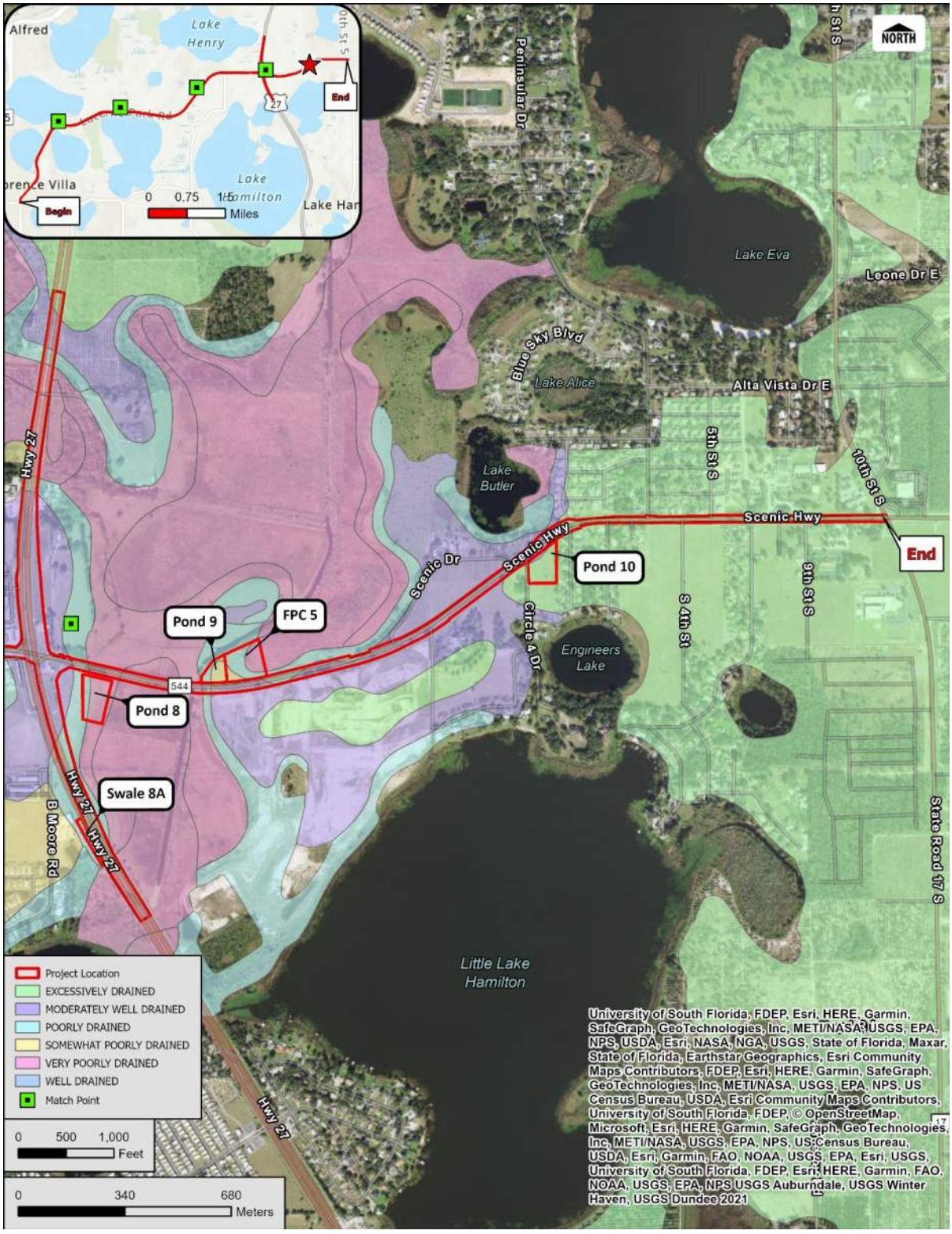



**Figure 2.10.** Soil types within the SR 544 project.

# 3.0 CULTURAL CHRONOLOGY

A discussion of the regional prehistory is included in cultural resource assessment reports to provide a framework within which the local archaeological record can be examined. Archaeological sites are not individual entities, but rather are part of once dynamic cultural systems. As a result, individual sites cannot be adequately examined, interpreted, or evaluated without reference to other sites and resources in the general area.

Archaeologists summarize the culture history of an area (i.e., an archaeological region) by outlining the sequence of archaeological cultures through time. These are defined largely in geographical terms but also reflect shared environmental and cultural factors. The project APE is located within the in Florida's East and Central region (Milanich and Fairbanks This region extends from the northern portions of Indian River, Osceola, and Polk counties up to Nassau County, and includes eastern portions of Marion and Sumter counties (**Figure 3.1**). Within this zone the Paleoindian, Archaic, Woodland and Mississippian stages have been defined based on unique sets of material culture traits such as stone tools and ceramics as well as subsistence, settlement, and burial patterns. These broad temporal units are further subdivided into culture phases or periods.

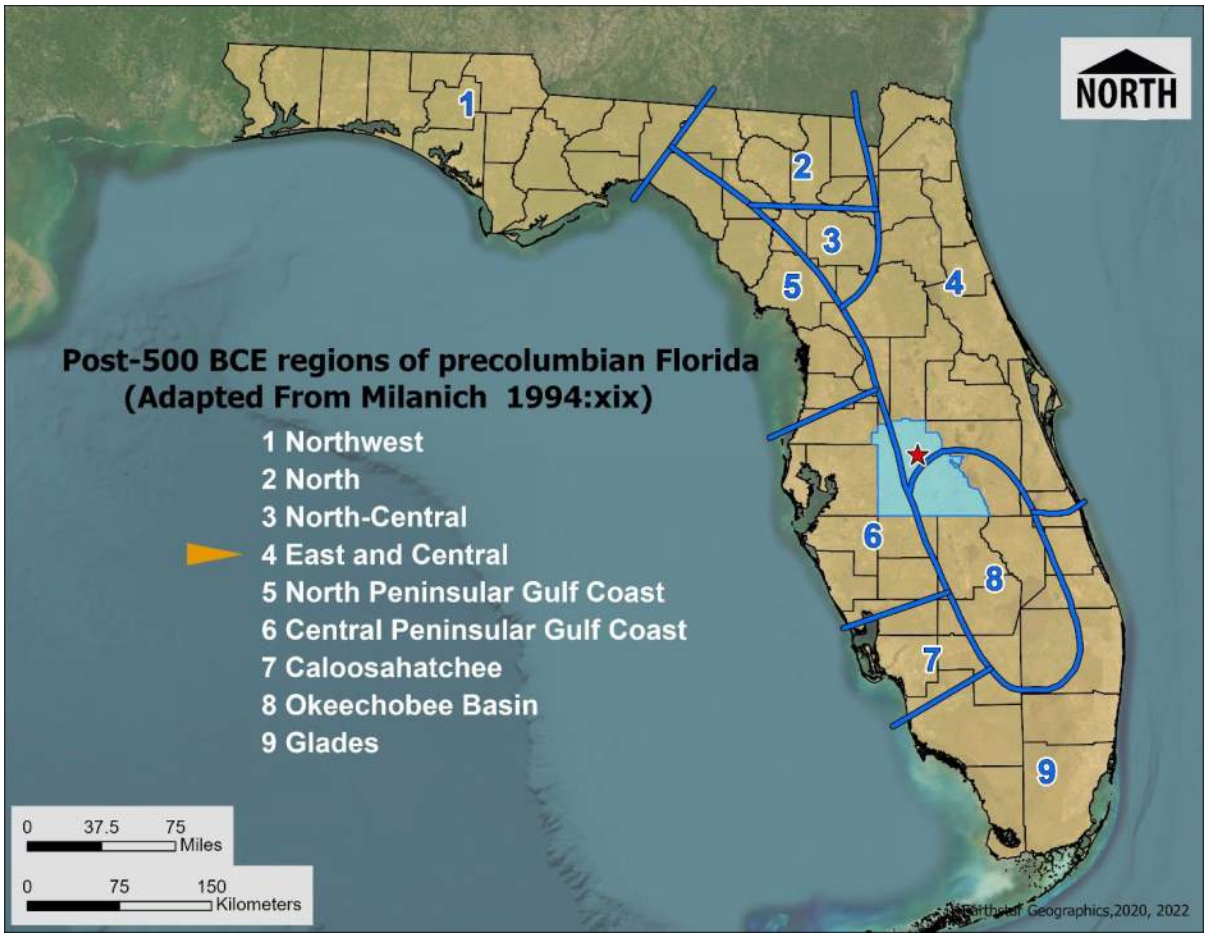



**Figure 3.1.** Florida Archaeological Regions.

The local history of the region is divided into four broad periods based initially upon the major governmental powers. The first period, Colonialism, occurred during the exploration and control of Florida by the Spanish and British from around 1513 until 1821. At that time, Florida became a territory

of the U.S. and 21 years later became a State (Territorial and Statehood, 1842-1860). The Civil War and Aftermath (1861-1899) period deals with the Civil War, the period of Reconstruction following the war, and the late 1800s, when the transportation systems were dramatically increased and development throughout the state expanded. The Twentieth Century includes subperiods defined by important historic events such as the World Wars, the Boom of the 1920s, and the Depression. Each of these periods evidenced differential development and utilization of the region, thus affecting the historic site distribution.

The following culture history provides a general overview for this project area, certain sections may be expanded based on research questions and findings related to this project.

**Table 3.1.** Cultural chronology and traits.

| Cultural Period Time Frame | Cultural Traits |
|---|---|
| Paleo-Indian 11,000-8,000 B.C.E. | Migratory hunters and gatherers; Clovis, Suwannee and Simpson projectile points; unifacial scrapers. |
| Early Archaic 8000-6000 B.C.E. | Hunters and gatherers; less nomadic; increased utilization of coastal resources; Greenbriar, Bolen, Arredondo, Hamilton and Kirk Serrated points; increase in population size and density. |
| Mount Taylor 6000-2000 B.C.E. | First occupation of the St. Johns River valley; evidenced by large freshwater shell middens; burials in wet environment cemeteries and middens; increased sedentism; shellfish is an increasingly important part of the diet; more evidence for coastal occupation; stemmed, broad bladed projectile points, Newnan points most common; steatite; fired clay objects. |
| Orange 2000-500 B.C.E. | Appearance of ceramics; Orange series is fiber tempered and molded; plain ceramics early on, incising during later periods; increase occupation of the coastal lagoons; cultigens may be utilized; toward end of period increased use of sand as a tempering agent and an apparent increase in population size, socio-political complexity, and territorial range. |
| St. Johns I 500 B.C.E.-100 C.E. | Plain and incised varieties of St. Johns ceramics; ceramics coiled, not molded; some pottery has fiber and quartz sand tempering; first use of burial mounds. |
| St. Johns Ia 100-500 C.E. | Village pottery was primarily plain; larger burial mounds, some containing log tombs; trade evidenced by exotic materials within the burial mounds; Dunns Creek Red ceramics are common. |
| St. Johns Ib 500-750 C.E. | Village pottery is plain; increased influence of Weeden Island populations; central pit burials within the mounds; some pottery caches in mounds |
| St. Johns IIa 750-1050 C.E. | St. Johns check stamped ceramics appear; increased use of burial mounds; mound burial seems to be saved for higher status individuals; pottery caches found in mounds; increase in size and number of villages; increase in the variety of burial patterns. |
| St. Johns IIb 1050-1513 C.E. | Evidence of Mississippian influence seen; continued use of plain and check stamped ceramics; platform mound make their appearance at some of the ceremonial complexes. |
| St. Johns IIc 1513-1565 C.E. | European artifacts occasionally found in the burial mounds and middens; Timucuan speaking groups; disease beginning to decimate the aboriginal populations. |

## 3.1 Paleo-Indian

The Paleo-Indian stage is the earliest cultural manifestation in Florida, dating from roughly 11,000 to 8000 B.C.E. (Before Common Era) (Austin 2001; Milanich 1994). Archaeological evidence for Paleo-Indians consists primarily of scattered finds of diagnostic lanceolate-shaped projectile points.

Clovis points characterize the Clovis horizon (c. 11,000-10,000 B.C.E.), Suwannee and Simpson points are the diagnostic forms for the Suwannee horizon (10,000-9,000 B.C.E.), and the Dalton horizon (9000-8000 B.C.E.), which is poorly understood in the state, is identified by the presence of Dalton points. During this late Paleo-Indian period, the large lanceolate-shaped Suwannee and Simpson points may have been replaced by the smaller Tallahassee, Santa Fe, and Beaver Lake types (Milanich 1994:53). However, more often than not, these latter point types are most often recovered from Late Archaic or Early Woodland period components as opposed to Paleo-Indian ones (Austin 2001; Farr 2006).

The majority of Paleo-Indian sites are associated with the rivers in the north-central portion of Florida (Dunbar and Waller 1983). At that time, the climate was cooler and drier. Vegetation was typified by xerophytic species with scrub oak, pine, open grassy prairies, and savannas being the most common (Milanich 1994:40). Sea levels were as much as 115 ft below present levels and the coastal regions extended miles beyond present-day shorelines (Milliman and Emery 1968). Miller (1998) suggests that around 10,000 years ago, along the Atlantic coast, the shoreline may have been 62 mi to the east and sea level roughly 269 ft below present levels. It is probable that many of the sites dating from this time period have been inundated (Clausen et al. 1979; Dunbar 1997; Ruppé 1980; Scholl et al. 1969).

Some of the information about the Paleo-Indian period is derived from underwater excavations at two inland spring sites in Sarasota County: Little Salt and Warm Mineral Springs (Clausen et al. 1979). Traditionally, this time was characterized by small nomadic bands of hunters and gatherers. Daniel (1985) has proposed a model of early hunter-gatherer settlement that suggests that some Paleo-Indian groups may have practiced a more sedentary lifestyle than previously believed. Since the climate was cooler and much drier, it is likely that these nomadic bands traveled between permanent and semi-permanent sources of water, exploiting seasonally available resources. This has been referred to as the Oasis hypothesis (Dunbar 1991). These watering holes would have attracted the animals upon which the Native Americans hunted, thus providing food and drink. In addition to being tied to the water resources, most Paleo-Indian sites are also located proximate to sources of good quality lithic raw materials (Daniel 1985; Daniel and Wisenbaker 1987; Dunbar 1991; Goodyear et al. 1983). Given these parameters, Miller (1998:54-57) suggests a higher probability for Paleo-Indian occurrence around or near Salt Springs, Silver Glen Springs, and Fern Hammock Springs. In addition to these specific locales, he considers the Crescent Ridge, located between the St. Johns River and Crescent Lake, and areas of surficial exposure of Hawthorn and Avon Park Formations to have higher probabilities for Paleo-Indian occupations.

Excavations at the Harney Flats Site in Hillsborough County (8HI00507) has provided a rich body of data concerning Paleo-Indian lifeways (Daniel and Wisenbaker 1987). It has been suggested that Paleo-Indian settlement may "not have been related as much to seasonal changes as generally postulated for the succeeding Archaic period," but instead movement was perhaps related to the scheduling of "tool-kit replacement, social needs, and the availability of water," among other factors (Daniel and Wisenbaker 1987:175). The excavations at the Colorado Site in Hernando County revealed a Paleo-Indian lithic workshop and encampment where the manufacture of blanks appears to have been a major site function (Horvath et al. 1998). The numerous expedient flake tools and the relative lack of formal tool forms may suggest that this site dates from the later Paleo-Indian period when foraging adaptations characterized by high residential mobility and expedient technologies became more prominent (Anderson 1996; Cable 1996).

Evidence for Paleo-Indian occupation within the East and Central region is limited. This area is, however, outside of the Suwannee/Simpson macroband area postulated by Anderson (1996:38). A few of the sites recorded had possible Paleo-Indian artifacts including unifaces and patinated materials

(Johnson 1998). The Nalcrest Site located on Lake Weohyakapka in southeastern Polk County has yielded a distinctive microlithic tool assemblage that may be datable to the Late Paleo-Indian and/or succeeding Early Archaic time (Bullen and Beilman 1973). However, more recent research suggests the microlithic technology is associated with Middle to Late Archaic period components (ACI/Janus 2001; Thomas and Campbell 1991).

## 3.2 Archaic

The beginning of the Archaic is denoted by interrelated environmental and cultural changes. The environmental changes associated with the end of the Pleistocene necessitated modification of the extant prehistoric settlement patterns and subsistence strategies. Whereas the Paleo-Indians depended more heavily upon the Pleistocene megafauna and the relatively limited number of freshwater sources, Archaic populations hunted smaller game and learned to effectively exploit their changing environment. The gradual environmental changes led in part to the extinction of the Pleistocene fauna as well as resulted in the change in composition and distribution of various vegetative communities (Miller 1998). The adaptive changes of the Indigenous populations resulted in an increase in the number and types of archeological sites, such as marine and freshwater shell middens. The effects of the changing environment can also be seen in the variation in site locations. Although Early Archaic materials are often found in association with Paleo-Indian deposits, especially around water sources, other Early Archaic sites are located in areas devoid of Paleo-Indian components.

Early Archaic sites are recognized by the presence of Greenbriar and Bolen points as well as Kirk, Hardee Beveled, Hamilton, Arredondo, Sumter, and Thonotosassa varieties (Bullen 1975). Milanich (1994:64) notes that there are no well-documented Early Archaic coastal or riverine shell midden sites. This may be due to sea level rise as opposed to avoidance of these areas. Discoveries at Little Salt Spring in Sarasota County (Clausen et al. 1979) and the Windover Site (Doran 2002) in Brevard County indicate that bone and wood tools, as well as fabric and cordage, were an important part of the material culture. The archaeological record suggests a pattern of exploiting both coastal and interior resources. Most Early Archaic sites are small, seasonal campsites. This type of site may suggest that small bands moved seasonally in search of food. The Early Archaic tool assemblages are more diverse than the preceding Paleo-Indian tool kits and include specialized stone tools for performing a variety of tasks (Milanich and Fairbanks 1980).

During the Middle Archaic, wetter conditions prevailed, sea levels began to rise, and pine forests and swamps began to emerge (Watts et al. 1996). The climate was changed to one of more pronounced seasonality with warmer summers and colder winters. Although by 4000 B.C.E. the climate became essentially the same as that of today (Watts et al. 1996:29). Settlement became focused within coastal and riverine locales (Milanich 1994:64). The Mount Taylor period has been identified for the time between roughly 5000-2000 B.C.E. (Milanich 1994). Subsistence was based on hunting, fishing, shellfish collecting, and plant gathering. Sites are generally located along the Atlantic coast or along the upper reaches of the St. Johns River and the Ocklawaha and Wekiva Rivers (Ste. Claire 1990; Weisman 1993; Wheeler et al. 2000).

About 4000 B.C.E., present-day vegetation patterns became established; hammocks of broad-leafed mesic trees, pine forests on uplands, and bayhead and cypress swamps became significant plant communities (Watts 1971). The archaeobotanical research at the Groves' Orange Midden (4260-2130 B.C. [Common Era]) and the Lake Monroe Outlet Midden (4040-3090 B.C.E.) confirms an environment similar to that which is present today (ACI/Janus 2001; Newsom 1994; Purdy 1994). Most of the botanical remains were from wetland species, including trees and shrubs common along the lake margin, river swamp, and backwaters. Upland species were also utilized. It is believed that populations

combined hunting and gathering into a productive subsistence strategy, and as a result, occupation became more sedentary and village life began (Milanich and Fairbanks 1980:147-152). Middens of mystery snail, apple snail, and mussel provide evidence of occupation and resource exploitation along the rivers of east and central Florida (Cumbaa 1976; Ellis et al. 1994; Fryman et al. 1978). The Lake Monroe Outlet Midden is somewhat anomalous in that the mystery snail was not a major portion of the subsistence economy, rather apple snail and mussel were much more important (ACI/Janus 2001).

According to Milanich and Fairbanks (1980:151), one of the most interesting aspects of the Mount Taylor culture is evidence for mass burial interments in specially prepared areas within shell middens. Such burials were found at Tick Island along the St. Johns River (Aten 1999; Bullen 1962; Jahn and Bullen 1978). Milanich (1994:81) suggests that Early and Middle Archaic peoples used aquatic environments for burial. The Early Archaic Windover Site, located near Titusville, contained primary and flexed burials within a peat pond. These were held in place with wooden stakes and the interments included grave goods such as textiles and worked bone, shell, and wood (Adovasio et al. 2002; Andrews et al. 2002; Dickel 2002; Doran 2002; Penders 2002). Underwater interments have also been recovered from the Middle Archaic Bay West Site near Naples, Republic Groves Site in Hardee County, and Nona's Site in southeast Sarasota County (Beriault et al. 1981; Luer 2002; Wharton et al. 1981). Each site, like Windover, had an adjacent land component evidenced by a midden. The Gauthier Cemetery, dating from the Middle to Late Archaic, was situated on a palm island within a slough between a pond and Lake Poinsett, and contained primary and flexed burials (Carr and Jones 1981). The burial mound at Tomoka (8VO00051) is one of the earliest in Florida (Piatek 1994). Russo (1996:284) suggests though that the Archaic burials mounds of Florida (Tomoka and Horr's Island) were not the precursors to the extensive burial mound use seen in the more recent past, rather, they were short-lived, dead-end traditions.

The Middle to Late Archaic/Mount Taylor sites recorded throughout the state include large base camps, smaller special-use campsites, quarries, and burial areas and, within East Florida, extensive shell middens. The large, stemmed projectile points, especially the Newnan type, are diagnostic of Middle and Late preceramic Archaic period sites. Other common point types include Hillsborough, Levy, Putnam, Alachua, and Marion (Bullen 1975). In addition, silicified coral was more prevalent as a lithic tool raw material (Milanich 1994) and thermal alteration of the stone became more common (Ste. Claire 1987). Interior sites include the smaller lithic scatter campsites that were most likely used for hunting or served as special use extractive sites for such activities as gathering nuts or other botanical materials (Ste. Claire 1989, 1990). Evidence for canoes from this time period is well documented, and in fact, many of the canoes recovered from Florida waters have dated to the Archaic (Newsom and Purdy 1990; Purdy 1988; Wheeler et al. 2003). The earliest canoe comes from DeLeon Springs and is roughly 6000 years old (Newsom and Purdy 1990).

By about 2000 B.C.E., the firing of clay pottery made its appearance in Florida. The first ceramic types had fibers (Spanish moss or palmetto) as the tempering agents within the clay. These wares are referred to as the Orange series. The Orange period was divided into subperiods based on a variety of ceramic attributes (Bullen 1955b, 1972; Milanich 1994). However, recent research has called the entire Orange chronology into question (Sassaman 2003) and all the various Orange ceramic types occur within the time span of roughly 3600-4100 years ago. In addition, research by Cordell (2004) has documented the presence of sponge spicules in the Orange ceramic paste (the diagnostic trait of St. Johns wares) which suggest that the St. Johns ceramic tradition extends back to the beginning of the ceramic technology in the region (Sassaman 2003:11).

Milanich (1994) and Miller (1998) indicate that there is little difference between Middle/Late Archaic and Orange populations except that there are more Orange Period sites and the density of sites is higher. Orange settlements were primarily located near wetland locales. The abundance of resources

located in and near the wetlands permitted larger settlements. This change in settlement patterns may be related to environmental changes resulting from the establishment of current sea levels. By the end of the Middle Archaic, the climate closely resembles that of today's vegetation changed from those species that preferred moist conditions to pines and mixed forests (Watts and Hansen 1988). Sea levels rose, inundating sites located along the coastal and riverine shorelines (McGee and Wheeler 1994; Ruppé 1988). The adaptation to this environment allowed for a wider variety of resources to be exploited and greater variability in settlement patterns. Shellfish, fish, and other food sources were now available from coastal and freshwater wetlands resulting in an increase in population size. Other evidence suggests that at least some of the sites were being occupied on a year-round basis (Russo 1992; Russo et al. 1993; Russo et al. 1992). Russo and Ste. Claire (1992) suggest that the occupations in these two major environmental locales were, in fact, separate cultural entities, not one group migrating back and forth. Although there is a similarity in ceramic types, settlement and subsistence patterns are quite different between the two (Russo 1988).

Bridging the close of the Archaic stage and the beginning of the Formative is the Florida Transitional period, circa 1200 to 500 B.C.E., as defined by Bullen (1959). Milanich (1994), Miller (1991), Russo et al. (1993), Shannon (1986), and others suggest that assemblages from this "period" cannot be discerned with any accuracy from the preceding or following periods. In general, this time was characterized by increased regionalism, population growth, and socio-cultural complexity (Bullen 1959, 1970). Exploitation of shellfish, fish and wild plants, as well as a reliance on hunting, was continued (Bullen 1959, 1970; Bullen et al. 1978), and Indigenous groups may have engaged in limited horticulture (Milanich and Fairbanks 1980). Russo (1992:114) however, notes that there is no known evidence in this area for horticulture during this time. The Florida Transitional period is identified by the presence of St. Johns Incised ceramics (Bullen 1955b, 1972; Milanich 1994; Miller 1998). Bullen hypothesized that during the Florida Transitional period, the diffusion of culture traits, resulting from the movements of small groups of people, led to the spread of several ceramic and tool traditions (Bullen 1959). "The major changes in post-Transitional cultures cannot be attributed to environmental changes but rather appear to be the result of social, political, religious, and technological innovations introduced from elsewhere in the eastern United States" (Miller 1998:76).

In the East and Central region, fiber-tempered pottery was slowly replaced by temperless wares (St. Johns series) and by sand-tempered ceramics. Among the sites in the region dating from this time are Bluffton in Volusia County (Bullen 1955b; Wheeler and Newman 1997), the Lake Jennie Jewel and Zellwood (Bullen et al. 1974) sites in Orange County, and the Zabski Site (Atkins and MacMahan 1967; Bullen 1972) on Merritt Island in Brevard County. Dickinson and Wayne (1996) report a Transitional period component at the Sligh Site (8SE01332) based upon the recovery of Orange Simple Stamped and St. Johns Incised and Punctated sherds.

## 3.3 Formative/Acculturative

The period from about 500 B.C.E. until 750 C.E. in the East and Central Lake region is referred to as St. Johns I, which has been divided into three temporal sub-periods: St. Johns I (500 B.C.E.-100 C.E.), St. Johns Ia (100-500 C.E.), and St. Johns Ib (500-750 C.E.) based primarily on characteristic ceramic types (Milanich 1994:247).

There are regional variants of this basic cultural tradition: the St. Marys to the north and the Indian River to the south. The St. Marys Region is located at the mouth of the St. Johns and extends northward into Georgia (see Ashley and Rolland 2002; Russo 1992). Sites in this area contain a mixture of Georgia ceramics as well as St. Johns ceramics. At the southern end of the East and Central Region

is the Indian River Region which was first defined by Rouse (1951). There is a much higher prevalence of sand-tempered wares in this region.

Settlement patterns during this time were virtually the same as seen for the earlier Mount Taylor and Orange periods, i.e., along the coastal estuaries and larger rivers. The faunal analysis conducted at the Twin Mounds Site (8OR00459) along the Wekiva River suggests that there was a slight decrease in the dependence on freshwater shellfish during the St. Johns periods as opposed to the preceding Orange period (Weisman 1993). Based on that analysis, there was an increase in the use of reptilian resources. There was also a tremendous increase in the number of archaeological sites during this time. An apparent trend from St. Johns I through Ib times was a population shift into the northern part of the St. Johns River valley, possibly due to the need for more arable land (Milanich and Fairbanks 1980:158).

Village wares were almost all St. Johns Plain throughout this period. St. Johns Incised is associated with the early St. Johns I period. Deptford and Swift Creek pottery or copies are occasionally present in St. Johns I and Ia subperiods. St. Johns Cordmarked ceramics are associated with the St. Johns Ia period while Dunns Creek Red is associated with the St. Johns Ia and Ib periods.

Evidence of the continuous use of burial mounds begins at this time. Many of the burials were found in large central pits, probably the result of secondary interments. Some changes in the burial practices include the possible use of log tombs during the St. Johns Ia period as well as inclusion of Hopewellian-Yent complex exotic trade items (Milanich 1994:261). Much of the information on St. Johns I period burial practices have been obtained from the Ross Hammock Site in Volusia County (Bullen et al. 1967). This site complex consists of two large burial mounds and an extensive village midden located on the west shore of Mosquito Lagoon. A large, polished stone celt was recovered from Mound 1, and this artifact type was reportedly common in Weeden Island burial mounds on the Florida Gulf Coast (Bullen et al. 1967:16).

Year-round occupation of the coast and along the rivers occurred with special use-activity sites located in other locales and short-term campsites on the coast as well. Excavations at the Sligh Site (8SE01332) and the Lake Jessup South Site (8SE00580), located on the south shore of Lake Jessup, suggest that these sites served as villages or long-term encampments (Dickinson and Wayne 1996; Wayne and Dickinson 1993). There was a wide variety of tools and an abundance of ceramics suggesting a relatively sedentary group. Hunting, food preparation, and tool making were common site activities. The site pattern "consists of small, probably individual household midden deposits with structural evidence limited to arcs of shallow post holes, often shell-filled, and firepits" (Dickinson and Wayne 1996:108). The Hontoon Island Site (8VO00202) located within the St. Johns River southwest of Lake Beresford, has provided a wealth of data due to the preservation of many classes of artifacts within the inundated midden deposits. Evidence of an extensive wood-working tradition is noted by the numerous carved items recovered from the river around the site as well as the debitage remaining from the carving activities (Bullen 1955a; Purdy 1987). The analysis of the faunal and botanical remains suggested that the site was occupied on a year-round basis and that most of the resources were collected within 5-10 km (3-6 miles) of the site (Newsom 1987; Wing and McKean 1987).

The St. Johns II period has also been sub-divided into three sub-periods: St. Johns IIa (750-1050 C.E.), St. Johns IIb (1050-1513 C.E.), and St. Johns IIc (1513-1565 C.E.). The St. Johns IIa-c periods are marked by the presence of St. Johns Check Stamped pottery. "St. Johns II carries on the tradition and is marked only by the introduction of check-stamped pottery" (Goggin 1952:70). Occupation of riverine and coastal shell middens continued, although Miller (1998:80) notes that there is a relative increase in the number of non-riverine and non-coastal sites, perhaps as the result of

locating sites in more agriculturally suited locales. Such sites are quite numerous, suggesting the possibility of an increase in population.

Milanich and Fairbanks (1980) suggest that hunting and gathering remained important but the dependence upon cultivated crops such as maize, squash, and gourds increased. The use of gourds as domesticates is still being studied as there is no evidence for cultivation even though gourds and squashes have been around for thousands of years prior to this period (Newsom et al. 1993). Sigler-Eisenberg and her colleagues (1985), however, suggest that in the upper St. Johns basin, the practice of horticulture was not adopted. Russo (1984) and Sigler-Eisenberg (1984a) further indicate that the wetland ecology and subsistence strategies were different. At the Gauthier Site, fish and aquatic turtles were the primary subsistence items, with relatively little reliance upon terrestrial game or freshwater shellfish (Sigler-Eisenberg 1984b). Seasonal utilization of the various coastal resources continued. The species exploited were dependent upon micro-environmental factors such as salinity and hardness of the lagoon bottom. The faunal remains recovered from the Castle Windy Site were indicative of a winter occupation (Bullen and Sleight 1959). However, other St. Johns II sites such as Palmer and Fletcher were occupied during the fall (Miller 1980).

There was an increase in the number and size of villages during the St. Johns IIa period suggesting population expansion. A ranked society evolved as evidenced by the differential burial customs. No longer were all people interred in burial mounds. Deagan (1978:109) notes that around 1000 C.E. a population shift from the more southern and southwestern areas into the northern areas is evidenced by changes in relative frequencies of burial mounds in the areas over time. The Thursby Mound on the St. Johns River in Volusia County as well as two smaller habitation sites on the south shore of Lake Mizell in Orange County (Swindell et al. 1977:14), among others, date to this period. Excavations at the Burns, Ormond Beach, and Fuller Mounds A and D revealed a new burial pattern in that the burials were placed on their backs with their heads or feet pointing toward the center of the mound (Jennings et al. 1957; Willey 1954).

The St. Johns IIb period is characterized by the adoption of some Mississippian traits into the ceremonial system as well as the presence of St. Johns Simple Stamped ceramics. The Mississippian lifestyle, however, never became dominant, possibly because the soils were not suitable for full agricultural pursuits. A more complex socio-political organization is suggested by the presence of platform mounds at the ceremonial centers. These include the Shields Mound, Mount Royal, and the Thursby Mound, all of which were excavated by C. B. Moore (Moore 1894a, 1894b). Copper beads and ornaments as well as greenstone celts have been recovered from several sites and suggest contact with cultures to the north and northwest of Florida.

The St. Johns IIc period is marked by the introduction of European artifacts in some of the mounds. The historic aboriginal occupants of the region were the Timucua, Mayaca, and possibly the Ais. The Timucuans shared a common language but cannot be considered as a specific cultural group because the range of the Timucuan speakers "... was crosscut by dialect, techno-environmental, ceremonial, political and geographical differences" (Deagan 1978:89). The project area lies within the territory of the Jororo, who were south of Mayaca and west of the Ais, in Orange, Polk, and Highlands Counties (Milanich 1995). Although these Native Americans apparently continued the St. Johns tradition, they did not share the same Timucuan language as many of the other St. Johns historic counterparts (Milanich 1995). Excavations at Hontoon Island suggest that these people pursued a hunting-gathering-fishing economy without any major agricultural pursuits (Newsom 1987). Missionization of the Jororo began in the late seventeenth century (Hann 2003).

The arrival of the Europeans in the 1500s began a period of extensive social and cultural upheaval. Many of the traditional ways of life were destroyed or abandoned. Warfare and European

diseases brought an end to the Indigenous inhabitants and their cultures. Missionization of the Jororo and Myaca began in the late 1600s, and in 1728 Joseph de Bullones wrote to the king that the Jororo were "gone" (Hann 2003:132). Evidence of European contact with the central Florida natives is seen at the Phillip Mound, west of Saint Cloud, and in the Goodnow Mound, near Sebring (Milanich 1995). Due to the attempts of the Spanish military and missionaries to alter the traditional lifeways, by the end of the seventeenth century these aboriginal populations were virtually extinct. Raids in the early eighteenth century by Indigenous groups allied with the English drove many of the Mayaca and Timucuans to seek refuge near St. Augustine where most perished in warfare or because of epidemics (Hann 1993:133; Milanich 1995). By the first half of the eighteenth century, the native populations had all but vanished (Neill 1968), and groups of Creek natives, who came to be known as Seminoles, moved into Florida. Archaeologically, Seminole sites are poorly understood. A number of Seminole period sites are recorded within Polk County, but none of them have received sufficient archaeological investigations (Carr and Steele 1993).

## 3.4 Colonialism

The cultural traditions of the native Floridians ended with the European expeditions to the New World. The initial events, authorized by the Spanish Crown in the 1500s, ushered in devastating European contact. After Ponce de Leon's landing in northeast Florida and circumnavigation of the peninsula in 1513, official Spanish explorations were confined to the west coast of Florida until 1565. Florida's east coast, lacking deep water harbors like Tampa Bay and Charlotte Harbor, was left to a few shipwrecked sailors from treasure ships which, by 1551, sailed through the Straits of Florida on their way to Spain.

Between 1513 and 1558, Spain launched several expeditions of exploration and ultimately failed colonization of *La Florida*. Archaeological evidence of contact can be found in the form of European trade goods such as glass beads, bells, and trinkets recovered from village sites.

Prior to the settlement of St. Augustine in 1565, European contact with the Indigenous peoples was sporadic and brief; however, the repercussions were devastating. The southeastern Native American population of 1500 has been estimated to be between 1.5 to 2 million (Dobyns 1983). Following exposure to Old World diseases such as bubonic plague, dysentery, influenza, and smallpox, epidemics to which they had no immunity, the Native American population of the New World was reduced by as much as 90% (Ramenofsky 1987). The social consequences of such a swift and merciless depopulation were staggering. Within 87 years of Ponce de Leon's landing, the Mississippian cultures of the Southeast had collapsed (Smith 1987).

In northern Florida, much of the surviving Native American population was converted by Jesuit and Franciscan missions (cf., McEwan 1993). However similar efforts in peninsular Florida met with mixed success because the remaining peninsular populations were intractable (Hann 1991, 2003). The Philip Mound Site in eastern Polk County has produced evidence of a Spanish mission to the Jororo of the region. A 1693 priest's account describes the Jororo, "On the whole [they] do not work at plantings. They are able to sustain themselves solely with the abundance of fish they catch and some wild fruits" (Fray Juan de Carmenatri 1693 in Hann 1991:111).

During the two centuries following the settlement of St. Augustine, the Spanish widened their Florida holdings to include the settlement at Pensacola and a garrison at Saint Marks. With the English to the north, the French to the west, and surviving portions of the Muskogean Creek, Yamassee, and Oconee moving into interior Florida, the Spanish colony of *La Florida* was extremely fragile. The Treaty of Paris (1763) reallocated the English, French, and Spanish holdings in the New World. As a

result, Florida was ceded to the English. The ensuing decades witnessed the American Revolution during which English loyalists immigrated to Florida. Following the Revolution, the Treaty of Paris (1783) returned Florida to Spain; however, Spanish influence was nominal during this second period of ownership. For the next 36 years, Spain, from the vantage of Florida, watched with growing concern as the infant American Nation to the north gained momentum. When the United States acquired the Louisiana Purchase from France in 1803, Spain was hemmed in by the aggressive young nation. When Andrew Jackson conducted cross border raids into Florida under the pretext of suppressing Native American hostilities, he set in motion the chain of events that culminated in the cession of Spanish Florida to the United States in exchange for lands west of the Sabine River, which separates Louisiana and Texas.

During the political machinations between 1763 and 1819, Native Americans continued to move into the uncharted lands of Florida. These migrating groups became known to English speakers as Seminioles or Seminoles. This term is thought to be either a corruption of the Creek *ishti semoli* (wild men) or the Spanish c*imarron* (wild or unruly). Their presence curtailed settlement of the region and hostilities increased. The conflict between the Americans and the Seminoles over Florida came to a head in 1818 and was subsequently known as the First Seminole War.

## 3.5 Territorial and Statehood

As a result of the First Seminole War and the Adams-Onis Treaty of 1819, Florida became a United States territory in 1821. Andrew Jackson, named provisional governor, divided the territory into St. Johns and Escambia Counties. At that time, St. Johns County encompassed all of Florida lying east of the Suwannee River, and Escambia County included the land lying to the west. Settlement was slow and scattered during the early years. In the first territorial census in 1825, some 317 persons reportedly lived in South Florida; by 1830 that number had risen to 517 (Tebeau 1980:134).

Although the First Seminole War was fought in north Florida, the Treaty of Moultrie Creek in 1823, at the end of the war, was to affect the settlement of south Florida. In exchange for occupancy of an approximately four-million-acre reservation south of Ocala and north of Charlotte Harbor, the Seminoles relinquished their claim to the remainder of the peninsula (Covington 1958; Mahon 1985). The treaty satisfied neither the Native Americans nor the settlers. The inadequacy of the reservation, the desperate situation of the Seminoles, and the mounting demand of the whites for their removal, spawned the Indian Removal Act of 1830, and soon produced another conflict. By 1835, the Second Seminole War was underway.

During the Second Seminole War, Fort Gardiner, lying within present-day Polk County, was established at the headwaters of the Kissimmee. Military and civilian suppliers passed through the region traveling to reach Seminole villages and an increasing number of military fortifications. A major military strategy during the war was developed to ensure that the Seminoles would remain on the lands south of Ocala. General Zachary Taylor established a line of posts or forts across the state from Fort Brooke, on the west, to around New Smyrna on the east coast. The line of forts included Fort Fraser in Polk County. The Second Seminole War lasted until 1842, when the federal government decided to end the conflict by withdrawing troops from Florida. Some of the battle-weary Seminoles were persuaded to emigrate west where the federal government had set aside land for a reservation. However, those who wished to remain were allowed to do so but were pushed further south into the Everglades and Big Cypress Swamp. This area became the last stronghold for the Seminoles (Tebeau 1980).

Encouraged by the passage of the Armed Occupation Act in 1842, designed to promote settlement and to protect the Florida frontier, families moved south through the state. The Act made

available 200,000 acres outside the already developed regions south of Gainesville to the Peace River, barring coastal lands and those within a two-mile radius of a fort. The Armed Occupation Act stipulated that any family or single man over 18, able to bear arms, could earn title to 160 acres by erecting a habitable dwelling, cultivating at least five acres of land, and living on it for five years (Covington 1961a:48). During the nine-month period the law was in effect, 1184 permits were issued totaling some 189,440 acres (Covington 1961a:48).

In 1845, the State of Florida was admitted to the Union with Tallahassee selected as the state capital. During the same year, Hillsborough County, which was established in 1834, was enlarged to include parts of Mosquito County, including the area that later became Polk County. Federal surveys were initiated by the U.S. Government in the 1840s, following the Second Seminole War and the Armed Occupation Act. **Table 3.2** notes the surveyors and their observations of the environment in the vicinity of the CR 557 project. The federal surveyors Plats (State of Florida 1848, 1849, 1850, 1853) did not show any trails, homesteads or other historic features (**Figures 3.2, 3.3, 3.4**).

**Table 3.2.** Federal surveys and notes.

| *Township/Range/Section* | *Exterior or Subdivision/Year* | *Surveyor* | *Volume and Page* | *Notes* |
|---|---|---|---|---|
| 27/27/32-33 | Exterior/1843<br>Subdivision/1848 | H. Washington<br>F.R. Loring | 74:573-575<br>92:83-85 | Exterior: Bay and swamp with open pine woods, water oak, and live oak; ponds and hilly 3rd rate pine land, poor 3rd rate pine, grassy ponds, bay swamps, open pine woods, and gum; open deep grassy pond, hilly, and pine land |
| 28/26/1-3, 9-12, 16-17 | Exterior/1850<br>Subdivision/1850 | J. Westcott | 132:35<br>144: 577, 584, 588-590 | Exterior: Pine on the margins of swamp<br>Interior: Swamp, lake, 1st, 2nd, and 3rd rate pine |
| 28/27/4-6 | Exterior/1843 & 1850<br>Subdivision/1853 | H. Washington | 74:573-575<br>92:83-85 | Exterior (north line): Bay and swamp with open pine woods, water oak, and live oak; ponds and hilly 3rd rate Pine land; poor 3rd rate pine; grassy ponds, bay swamps, and gum; open deep grassy pond, hilly, and Pine land |
| | | J. Westcott | 132:35 | Exterior (west line): Pine on the margin of swamp |
| | | H.H. Floyd | 127:68-70 | Interior: 3rd rate high and rolling pine, marsh, and swamp, and lake |

By 1851, there were not more than a dozen Anglo-American families, along with a garrison of soldiers and a hundred or so Indians, in what was to become Polk County. The earliest settlements were established along the Peace River, west of the project area. Pioneer homesteaders included the Blounts, Raulersons, and Summerlins, most of who were from northeast Florida. Many of the families tended to concentrate around the communities of Medulla, Bartow, Socrum, and Fort Meade.

Military trails crisscrossed present-day Polk County. As more homesteaders settled further south on the peninsula, difficulties with the Seminoles increased, eventually resulting in the Third Seminole War (1855-1858) (McNeely 1961:7). For example, in 1849 an “Indian Scare” began with

several attacks, one occurring near a trading post at Payne's Creek. There, white settlers employed at the post, were attacked by a few young Seminoles. Two settlers were killed, and others escaped to alert surrounding settlements (Frisbie 1976:16). The possibility of repeat events such as this made military installations necessary (Covington 1961b).

Fortifications built after this incident included Fort Chokonikla, erected in 1849 on the west bank of the Peace River, near present-day Bowling Green (Miller and Schene 1978). Fort Hartsuff and Fort Green were established in the surrounding area in the 1850s after the withdrawal of federal troops from Ft. Chokonikla in the spring of 1850 (Miller and Schene 1978). Fort Gibson, established c. 1850, was erected as a civilian fort to provide protection against Indian attacks because no military forts were located in the near vicinity. In addition, Fort Hartsuff was established in 1851 in the area that later became Wauchula. It served as a haven for settlers and proved to be the center from which the town of English (now Wauchula) developed. Fort Hartsuff was occupied on two separate occasions: 1851 and again in 1856 during the Third Seminole War. Fort Green, a non-military fortified homestead, was built between 1854 and 1856 (Plowden 1929).

In December 1855, the Third Seminole War, or Billy Bowlegs War, began as a result of pressure placed on the Seminoles remaining in Florida to emigrate west (Covington 1982). The war began in present-day Collier County when Seminole Chief Holatter-Micco, or Billy Bowlegs, and 30 warriors attacked an army camp killing four soldiers and wounding four others. The attack was in retaliation for damage done by several artillerymen to property belonging to Billy Bowlegs. This hostile action renewed state and federal interest in the final removal of the Seminoles from Florida (Tebeau 1966).

Polk County was witness to some hostile action during the Third Seminole War. The Battle of Peace River occurred in the summer of 1856, as a result of a Seminole war party attack on the Tillis family home near Fort Meade (Matthews 1983:232). Reinforcements were sent from Fort Fraser to Fort Meade and a bloody battle ensued with the settlers withdrawing to a position south of Fort Meade. Captain William B. Hooker, commander of militia forces in the area, arrived and searched for the Seminole group up and down the banks of the Peace River with no success. The battle was over. It was not until two years later in February of 1858, that the final Seminole War ended when Chief Billy Bowlegs, along with 165 Seminoles, accepted monetary persuasion to migrate west. On May 8, 1858, the Third Seminole War was declared officially over (Brown 1991:112-115; Covington 1982:78-80).

Following the Third Seminole War, the area that currently comprises Polk County experienced its first land boom. More soldiers settled in the area and civilians finally felt the land was sufficiently safe to inhabit. Several settlements sprang up and others grew. Communities developed during the Mid-Nineteenth Century as families settled near forts for protection. By 1860, the total population of Hillsborough County, which included present-day Polk County, was 2,979. Nineteen percent of the total population was slaves, with only 120 slave owners in the entire county. One year later, Readding Blount, James Hamilton, George Hamilton, Francis A. Hendry, Louis Lanier, John C. Oats, Henry Seward, and Frederick Varn owned 55 percent of the slaves in Polk County. The slaves located in Fort Fraser and Fort Blount held a value of $81,450, almost as much as cattle in the same year (Brown 1991:137-138).

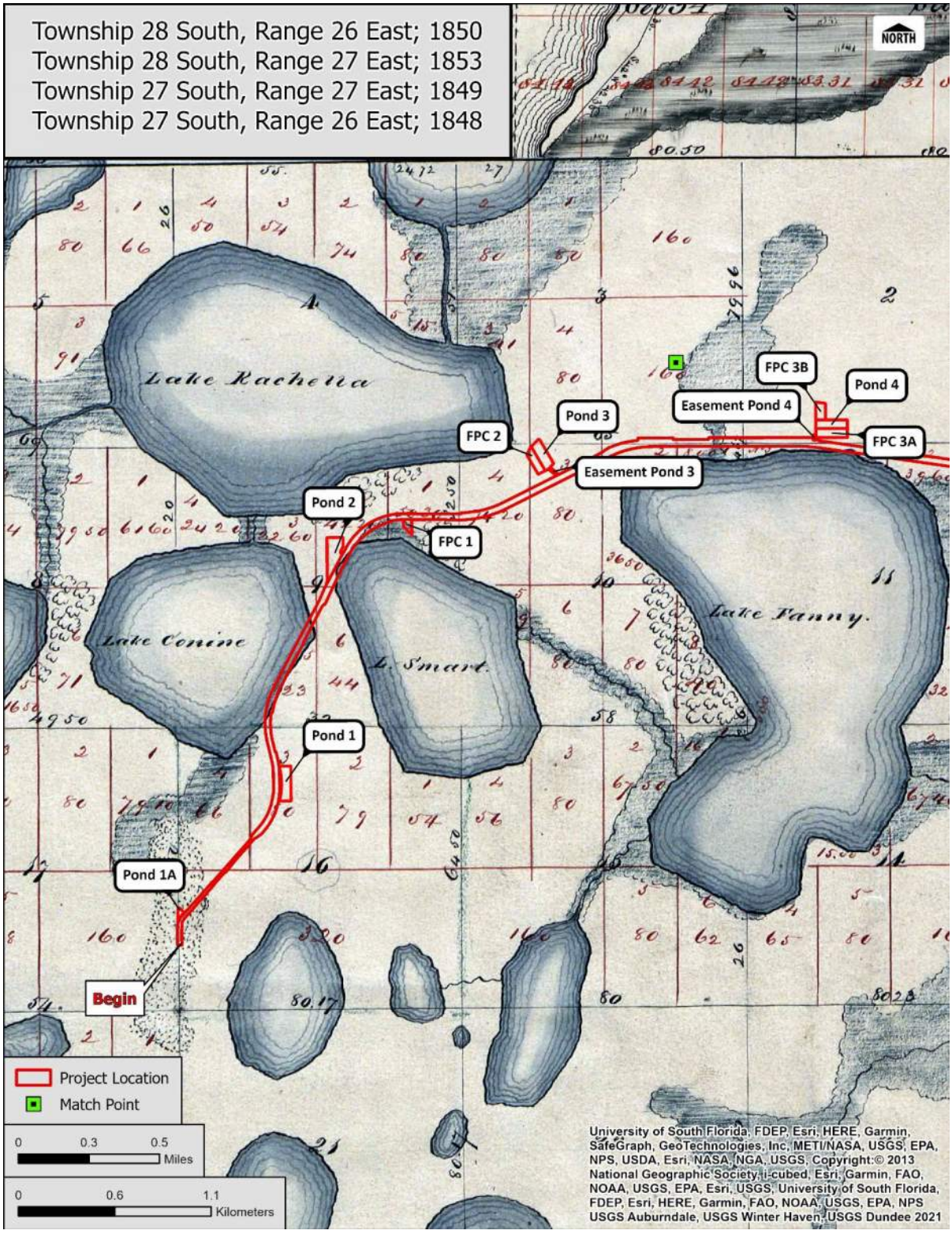



**Figure 3.2.** Historic plat of the SR 544 project.

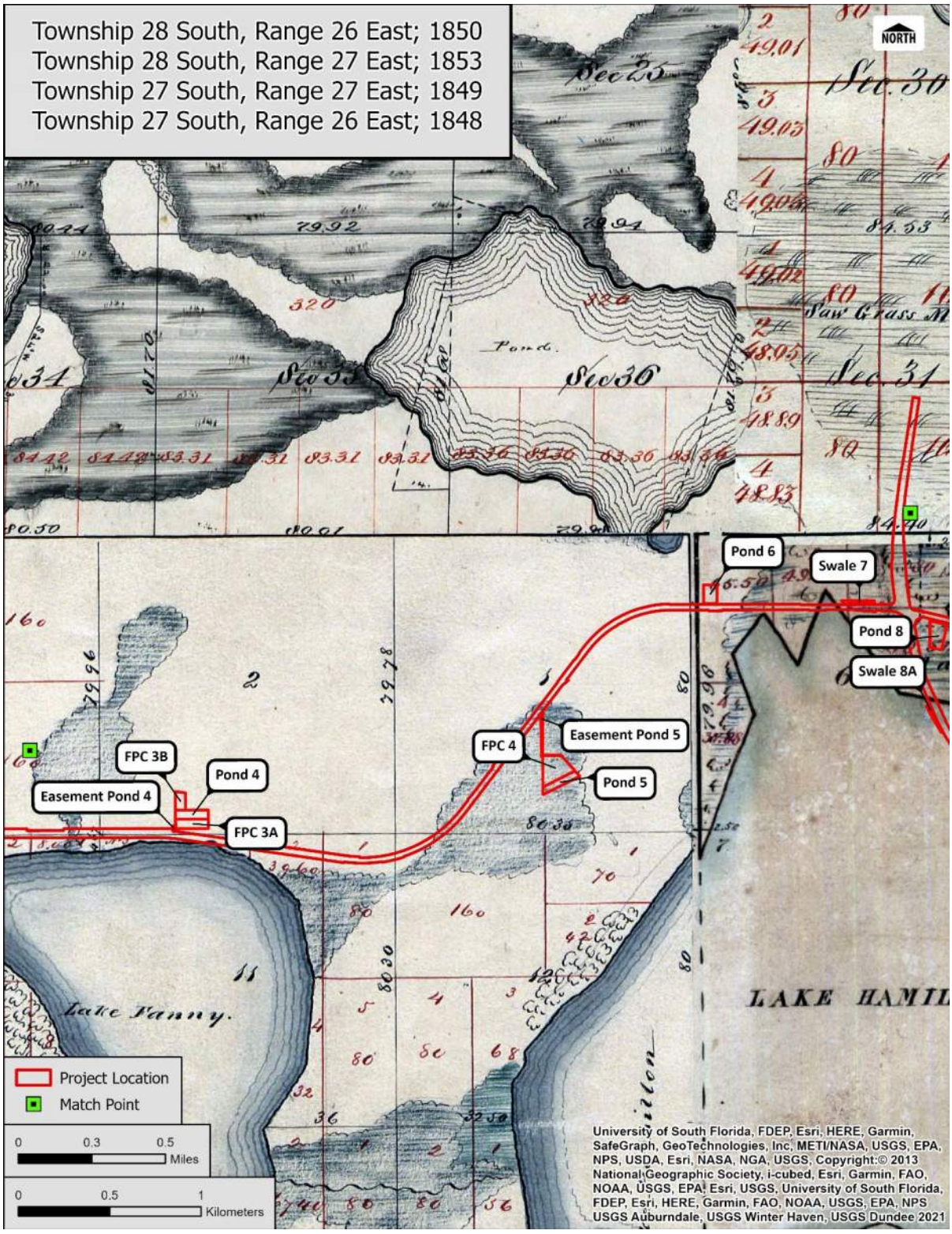



**Figure 3.3.** Historic plat of the SR 544 project.

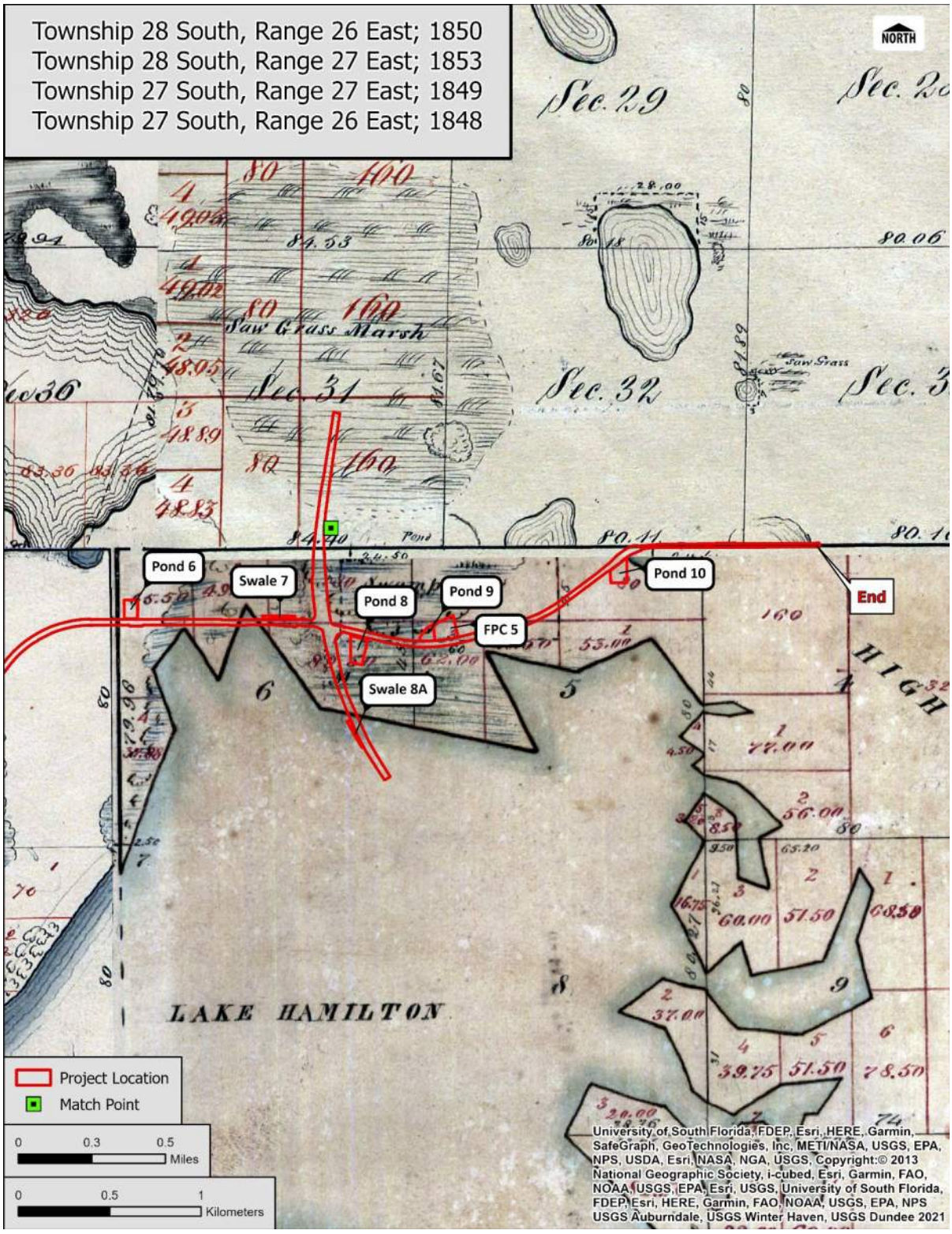



**Figure 3.4.** Historic plat of the SR 544 project.

## 3.6 Civil War and Aftermath

On February 8, 1861, the state legislature created Polk County out of portions of Hillsborough and Brevard Counties and named it in honor of President James K. Polk (Frisbie 1976:32). That same year, Florida followed South Carolina's lead and seceded from the Union as a prelude to the American Civil War. Although homesteaders and settlers clustered around the drainage and supply systems of Peas Creek (Peace River), occupation was still scattered and isolated throughout the years of the War Between the States (Davis 1856). Many male residents abandoned their farms and settlements to join the Union Army at one of the coastal areas retained by the United States government or joined the Confederate Cow Cavalry. The Confederate Cow Cavalry provided one of the major contributions to the Confederate war effort by supplying and protecting the transportation of beef to the government (Akerman 1976:93-95). There was little military activity in Polk County during the ensuing four years of the Civil War.

Immediately following the war, the South underwent a period of "Reconstruction" to prepare the Confederate States for readmission to the Union. The program was administered by the U.S. Congress, and on July 25, 1868, Florida officially returned to the Union (Tebeau 1980:251). During the early post-war years, the highly publicized 1862 Homestead Act, passed by the U.S. Congress as wartime legislation, enticed more settlers into Florida to establish farms and rescue the rebel state. Civilian activity slowly resumed a normal pace after recovery from wartime depressions. Subsistence agriculture, citrus, and cattle remained the primary economic sources in Polk County. The county seat was established in 1867 on land at Fort Blount given by Jacob Summerlin. The settlement was named Bartow, for Gen. Francis S. Bartow of Georgia, a wartime casualty (Frisbie 1976:32). Travel between Tampa, Fort Meade, and Bartow, a 48-mile trip requiring twelve hours, was completed weekly by stagecoach (Pizzo 1968:77). During the early 1870s, there were less than 150 people residing within an area of 50 square miles surrounding the county seat of Bartow (Frisbie 1976:32). The unstable economy following the war hampered any noticeable development in central and south Florida until the 1880s, when railroads extended tracks through the area (Historic Property Associates [HPA] 1992).

During the Reconstruction period following the Civil War, Florida's financial crisis, born of pre-Civil War railroad bonded indebtedness, led Governor Bloxham to search for a buyer for an immense amount of state lands. Bloxham's task was to raise adequate capital in one sale to free from litigation the remainder of state lands for desperately needed revenue. In 1881, Hamilton Disston, a Philadelphia investor and friend of Governor Bloxham, purchased four million acres from the State of Florida, in order to clear the state's debt. This transaction, known as the Disston Purchase, enabled the distribution of large land subsidies to railroad companies, allowing them to begin extensive construction programs for new lines throughout the state (Harner 1973; Tebeau 1980). Disston's land holding company was the Florida Land and Improvement Company. He and his associates also formed the Atlantic and Gulf Coast Canal and Okeechobee Land Company on July 20, 1881 (Davis 1939:205). This company was established as part of the drainage contract established with the State. This contract provided Disston and his associates one-half of the acreage that they could drain, reclaim, and make fit for cultivation.

Coupled with Disston's project and the arrival of the railroads in the 1880s, economic development and progress began to increase (Frisbie 1976). In addition to the introduction of the railroad in the 1880s, natural resources were discovered, fostering growth in the area. Established communities in Polk County, such as Bartow and Fort Meade, witnessed a population growth as new settlers came in search of cheap land on which to establish homesteads. Other communities such as Avon Park and Kissimmee were established at this time primarily due to investors who purchased large tracts of land from Disston. Settlers in the area first planted tomatoes and grapes but by the turn of the

century, the majority of the area was involved in the citrus industry. Settlements continued to extend further south, increasing the population and number of citrus groves in South Florida.

Studies were conducted by the U.S. Army Corps of Engineers in 1881 to determine the feasibility of opening a navigable waterway from the St. Johns River to Charlotte Harbor. During these studies, valuable pebble rock phosphate deposits were discovered along the Peace River. Subsequent massive land acquisitions began and continued for decades. Mining towns, refineries, and shipping facilities were soon to change the face of the lands in which deposits were found (Blakey 1974; Brown 1991; Driver 1992; Historic Tampa/Hillsborough County Preservation Board [HT/HCPB] 1980).

Polk County began witnessing major growth following the discovery of phosphate and the construction of the railroad throughout the county. In 1883, Henry Plant's South Florida Railway entered Polk County and passed through what would become Winter Haven, extending from Tampa northeast to Kissimmee where it linked up with the Sanford Line. Winter Haven was platted by Bartow realtors J.O. Blount and W.T. Whitledge the same year (Johnston 1997). The town plan of Winter Haven was comprised of a grid system of blocks and tiers that was divided into commercial, residential, and farmland with a centrally located park surrounding the railroad tracks. The settlement, originally called Harris Corner after F.A.K. Harris, the operator and builder of the first building in the downtown area, was later named Winter Haven to convey its future potential as a winter resort for northerners (City of Winter Haven 2018; Johnston 1997). An early subdivision – the East College Addition, located to the east of downtown – was platted by Earnest Johnson in 1888 (Johnston 1998). Other settlers who bought land in the APE, between 1881 and 1891, are shown on **Table 3.3.**

In late 1889, the DeSoto Phosphate Mining Company erected a phosphate processing plant on the bank of the Peace River (Brown 1991:314). From its beginnings at Zolfo and Arcadia, the phosphate craze spread through the Peace River Valley. The Pharr Phosphate Company and the Florida Phosphate Company established mines near Bartow in 1890. However, the pebble phosphate boom was short lived. A drop in prices, decreased demand, increasing production costs, the effects of the great Panic of 1893, and competition from hard rock and land pebble mine, ultimately combined to close the production of pebble phosphate (Brown 1991:316). Nonetheless, land mining for phosphate continued, and in 1919 there were 17 phosphate companies in Polk County (United States Environmental Protection Agency [USEPA] 1978). By 1938, extensive consolidation of the various phosphate companies across the state resulted in a total of three hardrock phosphate companies and six land pebble phosphate companies (Blakey 1974:159).

By 1895, only a decade after incorporation, the population of nearby Lakeland had nearly doubled to 1,000. Much of this was because Lakeland had become an important rail yard and shipping site in Polk County; by 1893, there were 20 daily train arrivals and departures at the local station. Essential to the economic success of Lakeland, the railroad facilitated the shipment of citrus, strawberries and phosphate, three of the county's key industries, to markets worldwide (Hetherington 1928:10; McNeely 1961:5, 10-11). This placed the town among the top 15 cities in Florida at the time. Although the national financial Panic of 1893, and the Great Freeze of 1894-95, devastated capital investment and much of the Florida citrus industry, including that in Polk County, groves were replanted and prospered again within the next decade (Hetherington 1928).

**Table 3.3.** Tract Book Records.

| **Township 27 South, Range 27 East** | | | | |
|---|---|---|---|---|
| *Section* | *¼ Section* | *Deed Entry* | *Year* | *Volume and Page* |
| 32 | SE | A.W. Barro (NE ¼); William T. Whittedge (NW ¼); S. J. Drawdy (S ½) | 1884; 1885; 1884 | 23:297 |
| 33 | SW | Hubbard & McDuff (N ½); S. J. Drawdy (S ½) | 1884 | |
| **Township 28 South, Range 26 East** | | | | |
| *Section* | *¼ Section* | *Deed Entry* | *Year* | *Volume and Page* |
| 1 | NW & SW | Florida Land Navigation Company (W ½); Florida Southern Rail Company (E ½) | 1883; 1887 | 22: 285 |
| 2 | SW | Florida Land Navigation Company (E ½); The Plant Investment Company (W ½) | 1883; 1884 | |
| 3 | SE | Ashley D. Hurt; Florida Southern Rail Company (E ½) | 1883; 1887 | |
| 9 | NE & S ½ | Brantley A. Weathers (NE ¼); James A. Harris (S ½) | 1882 | 22:286 |
| 10 | N ½ | Arredondo Claim; E.S. Daws Giod, and Thomsen A. Norris | 1881 | |
| 11 | N ½ | Melliva (?) J. Reynolds; Florida Southern Rail Company | 1883;1887 | |
| 12 | NW | The Plant Investment Company | 1883 | 22:287 |
| 16 | W ½ | Duncan M. Neal and Archibald Gray Trustees for NM McKinnon | 1881 | |
| 17 | SE | Sillah B. Sawyer (NE ½); Florida Land Management Company (W ½); David W. Gwynn (SE ¼) | 1884; 1888; 1891 | 22:288 |
| **Township 28 South, Range 27 East** | | | | |
| *Section* | *¼ Section* | *Deed Entry* | *Year* | *Volume and Page* |
| 4 | NW | Edwyn Landys Daives, George Augustus Thomson, and Anthony Norris (Trustees of the Florida Land and Colonization Company) | 1883 | 24:1 |
| 5 | N ½ | Florida Land and Improvement Company | 1883 | |
| 6 | N ½ | Charles D. Owens; The Plant Investment Company | 1883;1884 | 24:2 |

## 3.7 Twentieth Century

In 1900, the main industries remained phosphate mining, citrus, and strawberry farming (Hetherington 1928). Between 1900 and the 1920s, Winter Haven experienced renewed residential, commercial, and industrial development with the population increasing from 429 in 1900 to 1,436 in 1910 (Johnston 1998). The Florida Citrus Exchange was established by Frederick W. Inman – the founder of the nearby settlement and future neighborhood of Winter Haven, Florence Villa – in 1909 with a Polk County sub-exchange headquartered in Bartow. The town of Winter Haven was incorporated in 1911 and by 1919 Downtown Winter Haven had been filled with commercial buildings along the centrally located park (City of Winter Haven 2018; Johnston 1997). Several other packinghouses and a juice plant were constructed by 1916, primarily located along the railroad tracks, northwest of downtown. By the late 1910s, the naval stores industry, which produced turpentine,

lumber, and rosin, joined the citrus and phosphate industries as a prime economic resource in Polk County. New roads were constructed in the 1910s, allowing greater mobility bringing in newcomers to larger cities like Lakeland (McNeely 1961). In addition to the road systems, the Peace Creek Drainage District was established in 1915 which involved the draining approximately 48,000 acres within the area, constructing canals between the regions lakes, and equalizing the level of the lakes (Johnston 1998). This large-scale project made it possible to travel throughout the county lake by lake via recreational boats. New land for development was provided through the platting of new subdivisions or redividing existing areas within the original town plan from the early Twentieth Century onward into the Florida land boom. One of the first residential subdivisions platted during this time was the Winter Haven Heights neighborhood established by Walter W. Taylor – a New York City developer – in 1907 (Johnston and Shiver 2000). The neighborhood is located two blocks to the east of the original Winter Haven town plan's original eastern boundary.

The Florida land boom of the 1920s saw widespread development of towns and highways. Hundreds of citrus growers promoted crops and land simultaneously. Around this time, many roads were constructed throughout the county, connecting various communities. Polk County boasted 326 miles of "velvet asphalt" highways "winding through 50,000 acres of orange groves" and "hundreds of lakes" (Barber 1975:324-325). This period of prosperity was witness to a revival of the phosphate mining business and to new towns like Polk City. Over thirty-one subdivisions were platted in Winter Haven between 1920 and 1928 (Johnston 1997). During the 1920s, several subdivisions were platted along 1st Street in the vicinity of lake Silver, including Silver Shores, Silvercrest Addition, and Lake Silver Terrace (Tampa Tribune 1925a, 1925b; Orlando Sentinel 1937). As a result, infrastructure and other necessities to serve the new residents of the city were required. In 1926, a charter was adopted to establish the Winter Haven Hospital in a small, wood frame duplex located on Avenue C Northeast (Tampa Times 1926; Johnston 1967). By 1928, the hospital had outgrown the original location and was relocated to the former Groveland Hotel on Seventh Street Southwest where it remained until 1938 (Johnston 1967). In May 1938, the first iteration of the Winter Haven Hospital located at 200 Avenue F Northeast was opened (Tampa Tribune 1938). The 27-bed, one-story, tile-and-steel building was constructed for $75,000 on land donated by the Frierson-Nichols post of the American Legion (Tampa Tribune 1938). Since its construction, the c. 1938 facility has received several additions, including a large-scale, eight-story Swann Building addition in c. 1967 and a 100-bed, three-story addition opened in c. 1972 (Johnston 1967; Tampa Tribune 1972). The most recent additions to the hospital were constructed from the c. 1990s and 2018 (Google Earth 2023).

The Great Depression began early in Florida with the collapse of the real estate market in 1927. The following decade saw the closing of mines, mills, and citrus packing plants, and widespread unemployment (Burr 1974:156). Exacerbating the economic downturn was the compulsory cattle dipping law that forced cattle owners to dip their stock every two weeks for two years. This law was enforced in an effort to eradicate cattle fever tick, the arthropod vector organism responsible for transmission of tick fever. This disease, which although debilitating to the nation's southern stock, was fatal to northern herds (Black 1998). Although the program was subsidized by the state, until the correct arsenical, DDT, and/or Toxaphene "dip recipe" was discovered, numerous cattle were lost to overdosing, at the expense of the private ranchers (Black 1998). In addition, where cattle were scattered over vast distances, bi-monthly dipping required constant hours in the saddle for the roundups (Akerman 1976). Despite the short-term economic burden placed on ranchers, many see the cattle dipping program as the birth of the cattle industry in Florida (Carlton 1997). Prior to this, herds were allowed to roam freely. The legislation made ranchers accountable for their herds, a responsibility, which, practically translated, resulted in fenced ranches and branded cattle (Carlton 1997).

By the mid-1930s, federal programs implemented by the Roosevelt administration began employing large numbers of construction workers helping to revive the economy. These projects

included federal building of parks, bridges, and public buildings. In addition to projects such as these, the Work Program Administration (WPA) occasionally assisted local entrepreneurs. One such local businessperson was Dick Pope who developed the swampland on the north bank of Lake Eloise into Cypress Gardens, located in Winter Haven. On January 2, 1936, Cypress Gardens opened to the public and became Florida's first theme park show-placing thousands of types of flowers from countries around the world (Brown 2001:312). Eventually the park expanded to include rides and water-skiing shows.

In addition to Pope, Winter Haven became associated with Floridian entrepreneur, George W. Jenkins. Publix Super Markets Inc. got its start in 1930, when Jenkins, who had recently quit his job as a manager for the Piggly Wiggly store in Winter Haven, rented the empty building next door, and opened his own grocery store. While it was a typical grocery store for the time period, "Jenkins emphasized pleasing the customer and providing a clean, well-stocked store" (Hinder 2001). Despite the Great Depression, his store and concept proved successful, and by 1935, Jenkins had opened a second store across town (Hinder 2001; Watters 1980a). In 1940, Jenkins opened his "dream store" at the edge of downtown Winter Haven. This $25,000 Streamline Moderne style structure incorporated "the best from the new phenomenon of supermarketing, avoided that about it which appalled him [Jenkins], held onto good things he had found in old-fashioned stores, and applied what he had learned from 10 years in his own two conventional, small markets" (Watters 1980a). The store included the latest equipment and technology, such as air conditioning, fluorescent lighting, open dairy cases (built to Jenkins' specifications) frozen food cases, and electric-eye doors; it was the first time many of these features had been used in a supermarket (Watters 1980a; Hinder 2001).

Following the Depression, World War II (WWII) and federal efforts to package and transport food resulted in innovative changes. Rapid expansion occurred in the citrus canning field (HT/HCPB 1980:13). In addition, federal road building and airfield construction for the wartime defense effort brought unparalleled numbers of residents into Florida and the project area during the postwar years. Phosphate operations continued. The 1940s saw an industry-wide rebound as wartime and post-wartime demands for modern agricultural production created economic market incentives worldwide. Conglomerate corporations entered the market as technology evolved and small-scale operations began to disappear (HT/HCPB 1980:17-18). Post-WWII growth led to the destruction of several older residential and commercial areas and the construction of new subdivisions and businesses along major transportation routes to accommodate the returning veterans and retirees (Johnston 1998). Citrus remained a significant industry and source of jobs in Winter Haven following the war with the Florence Citrus Growers Association constructing a frozen concentrate facility in 1949 (Johnston 1998). During the following decade, the 1956 Highway Act funded a plan for 41,500 miles of interstate highway nationwide. Interstate 4 (I-4) was part of that plan and was constructed during the late 1950s and early 1960s. Today, I-4 is the major automobile transportation link between Tampa and Orlando through Polk County. In addition, the original route between the vicinity of Lake Smart and Lake Henry – now Old Lucerne Park Road – was widened by the State Road Department in ca. 1964 and was maintained although it would soon be bypassed by the newly constructed section of SR 544 to the south (Tampa Tribune 1963). Construction on the improved SR 544 segment was well underway by January 1965 (Johnston 1965). The ca. 1965 portion of SR 544 within the APE begins at Old Lucerne Park Road (north of Lake Smart) and runs eastward along the northern shore of Lake Fannie, merging with Old Lucerne Park Road just west of Lake Hamilton Canal. This new segment was constructed to decrease the number of turns and sharp curves on the road and also create a wider route, improving safety and the overall driving experience.

In addition to agricultural success, Winter Haven's local company – Publix – continued to flourish within the state and overall southeastern United States. Between 1963 and 1979, Publix continued to expand throughout Florida. During this time, 119 new Publix stores opened throughout

the state, as did 69 additional shopping centers (Watters 1980b). During the 1980s, Publix continued to expand and introduce new services. By the end of the decade, there were 367 stores throughout Florida. In 1991, Publix opened its first out-of-state market in Savannah, Georgia, and subsequently established an Atlanta division. By 2014, Publix had expanded into South Carolina, Tennessee, and North Carolina (Publix 2014).

Economically, the county continues to rely on the industries that have historically supported it, such as phosphate mining, agriculture, and tourism (Polk County Board of County Commissioners 2011). In addition, trade, transportation, and utilities made up over 20% of all the industries in Polk County in 2021, followed by professional and business services (EDR 2023). The population of Polk County has steadily increased at a rate of approximately 20% each decade since 1980 – the 1980 population of roughly 320,000 had increased to roughly 720,000 by 2020 (EDR 2023).

### 3.7.1 Florence Villa

In 1884, the community of Florence Villa was settled, as well as Winter Haven approximately 1.5 miles to the south. The community of Florence Villa, originally called Wahneta, was settled by Frederick W. Inman and his wife Florence Jewett Inman, for whom it was named, in 1904. Inman experimented with the agricultural potential of the area, including a citrus grove on 100 acres of his large property. Inman and his wife constructed a large residence on Spring Lake which they eventually developed into the Florence Villa Hotel, welcoming guests such as Henry B. Plant (Johnston 1997). The community of Florence Villa, which thrived in its early years due to the citrus and hospitality businesses of the Inmans, was incorporated in 1917 and in 1923 merged with the city of Winter Haven (Gernert Jr. 2014).

Frederick Inman became a pioneer of the citrus industry, which was prominent in the economy of the Winter Haven area. Inman was a leader in the establishment of the Florida Citrus Exchange in 1909, serving on the statewide organizational committee and as the Florida Citrus Exchange's first president. During the same year, Inman also established the Florence Citrus Growers Association which was located at 303 Avenue T NW. The original wood frame packing house was supplemented by a large masonry building – one of the largest buildings constructed in Winter Haven during the Great Depression. The facility was expanded in 1949 and 1953 by the addition of a concentrate factory and a cold storage facility, respectively. The overall facility, which included a frozen orange juice plant, fresh fruit packing house, warehouse, and icehouse, was sold to General Foods-Birdseye Corporation in 1959 (Johnston 1997). Multiple small areas of development were located around the Florence Citrus Growers Association packing house, including directly east of the property, south, southeast, and to the northeast in 1941; however, the area was largely filled in with development to the east between 1952 and 1971 (USDA 1941, 1952; FDOT 1971).

Florence Inman's sister, Mary B. Jewett, purchased and subdivided land bounded by Avenue T to the north, Avenue O to the south, and 1st Street and 8th Street to the east and west during the late 1800s. This area was intended as an African American community, including the Lake Maude Cemetery (Kelly 2005). By the mid-twentieth century, however, the whole community of Florence Villa was a segregated Black neighborhood of the Winter Haven area (Vickers 2010). An area of Florence Villa, referred to as "Boggy Bottom," is located along Avenue Y NE and bordered by Lake Conine (Maxwell 1987). Pughsville, located south of Winter Haven, was also a segregated Black neighborhood of the city (Cribb 1961). Unlike Florence Villa, Pughsville began as a Black community that was established following the emancipation of slaves in 1865 (Ferguson 2017). The Pughsville community included a school, grocery stores, restaurants, and social halls from the early twentieth century until the 1960s; however, the community no longer exists due to new development (Ferguson

2017). An annual May Day Festival is hosted by the nonprofit Historic Pughsville Association to celebrate the heritage of Pughsville and a historical marker commemorating the historic Pughsville community is located on Avenue O SE immediately east of US 17.

## 3.8 Project Specifics

Although the central portion of Winter Haven was well-established with residential and commercial development by the early 1940s, a review of historic aerial photographs reveals that the majority of the area with the SR 544 corridor was rural with undeveloped wetland and citrus groves (USDA 1941a-d) (**Figures 3.5 – 3.9**). Development within the corridor at this time was limited to the Florence Villa community in the southwest portion of the APE and minimal residential development at the eastern end of the APE. The Lucerne Park Branch of the Atlantic Coast Line (ACL) Railroad loosely followed what is now SR 544. In the eastern portion of the APE, US 27 appears to have been under construction; however, construction had not progressed significantly between ca. 1941 and 1952 (USDA 1941d and 1952c). By ca. 1952, residential development in Florence Villa and the eastern terminus of the APE had expanded but the area remained dominated by agricultural land and the adjacent lakes (USDA 1952 a-d). The original route between the vicinity of Lake Smart and Lake Henry – now called Old Lucerne Park Road – was located to the north of the APE and was bypassed the current section of SR 544 to the south which was under construction by 1965 (Tampa Tribune 1963; Johnston 1965). The ca. 1965 portion of SR 544 within the APE begins at Old Lucerne Park Road (north of Lake Smart) and runs eastward along the northern shore of Lake Fannie, merging with Old Lucerne Park Road just west of Lake Hamilton Canal. By ca. 1968, development within the corridor had expanded again, including additional residential and commercial buildings, mobile home parks, the Alta Vista Elementary School, and the construction of the Willow Brook Golf Course (USDA 1968a). In addition, the Lake Hamilton Canal was constructed by this time and US 27 was complete (USDA 1968b) (**Figures 3.5 – 3.9**). Development along the corridor remained steady over the next few decades with additional mobile home parks being constructed by the 1980s, multi-family residential developments from the 1980s into the 1990s, and industrial development within the central portion of the APE by the late 1990s (FDOT 1980a, 1980b; Google Earth 2023). Since the early 2000s, changes within the APE have been limited to the occasional demolition and construction of residential and commercial buildings along the corridor and newly constructed subdivisions (Google Earth 2023).

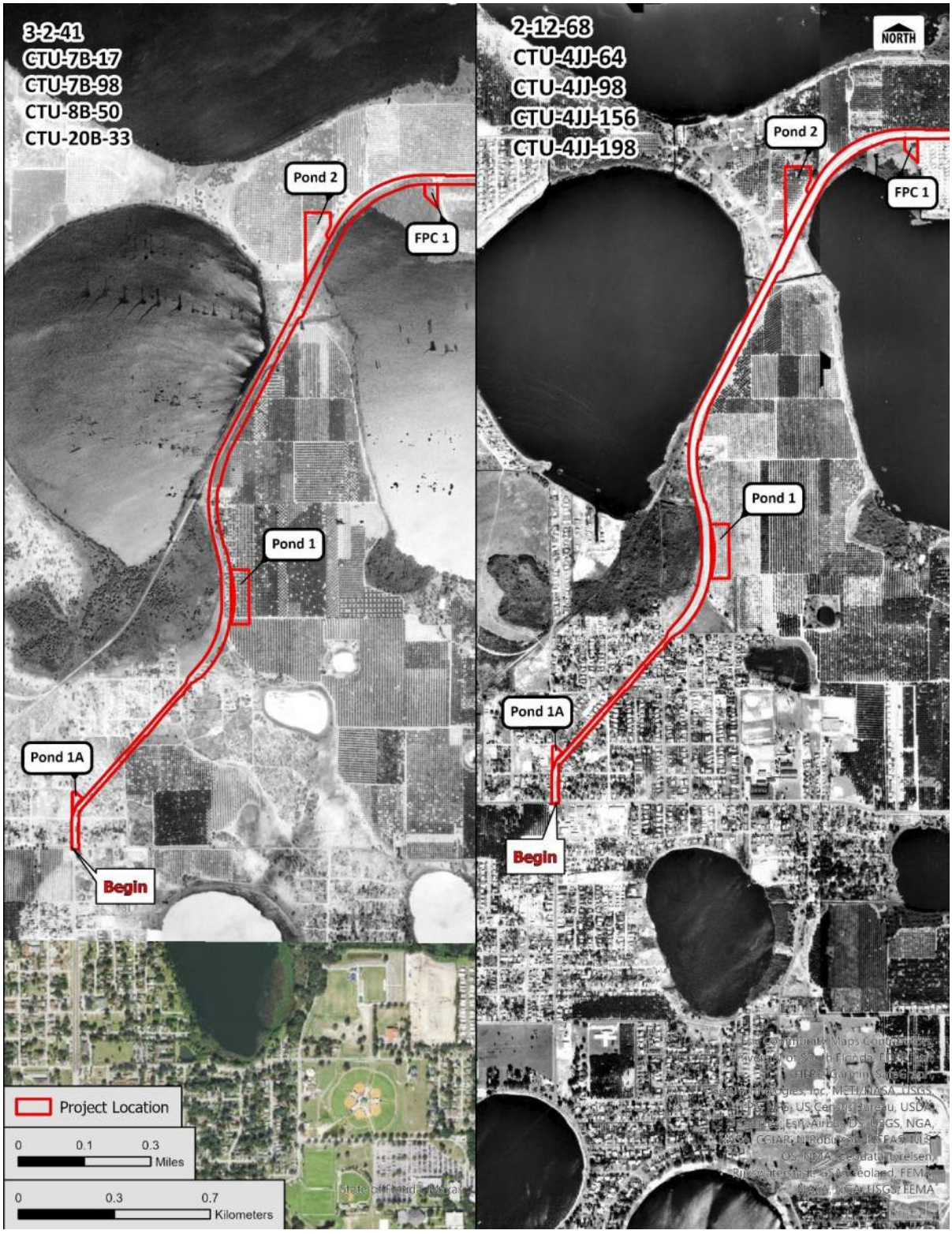



**Figure 3.5.** 1941 and 1968 aerial photographs of the SR 544 project.

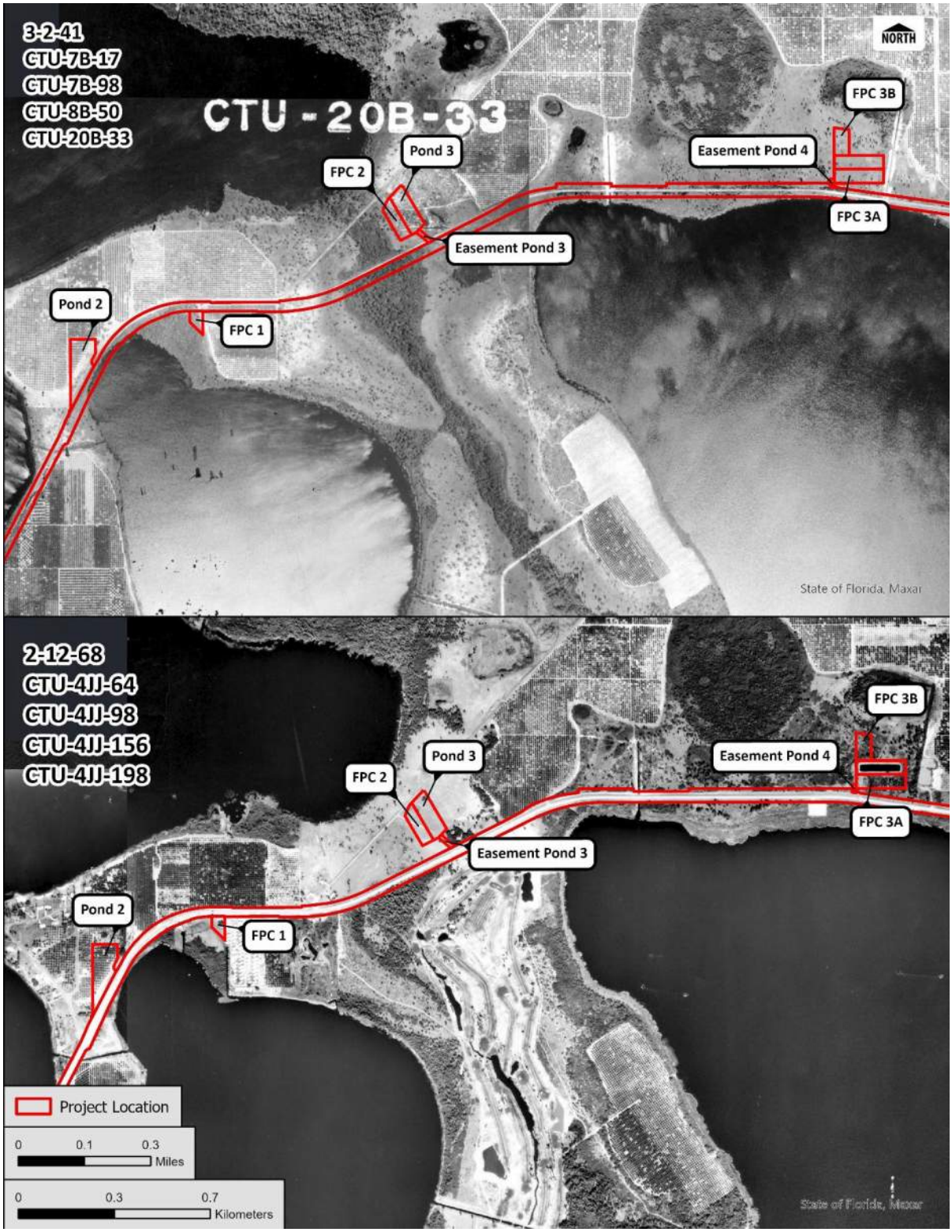



**Figure 3.6.** 1941 and 1968 aerial photographs of the SR 544 project.

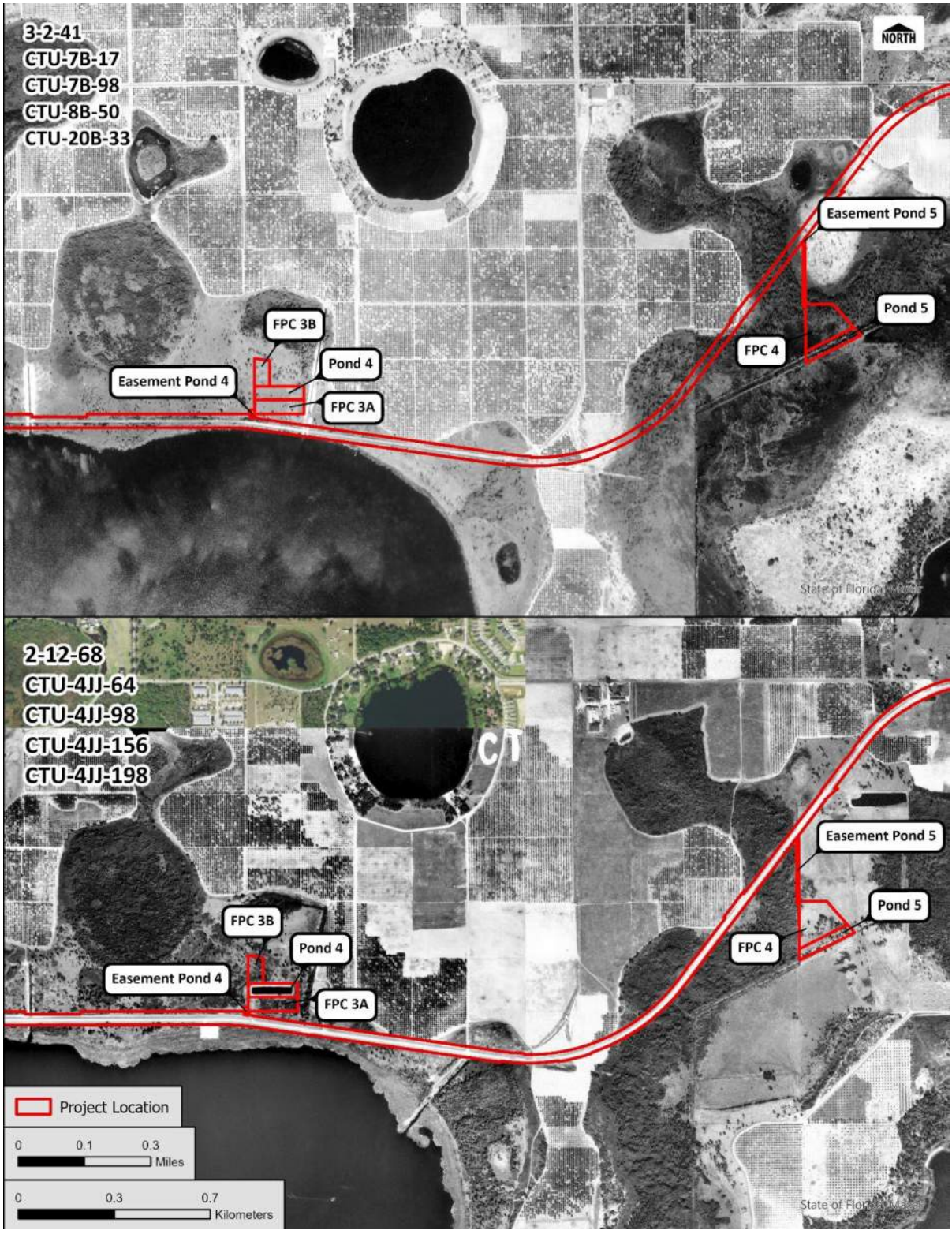



**Figure 3.7.** 1941 and 1968 aerial photographs of the SR 544 project.

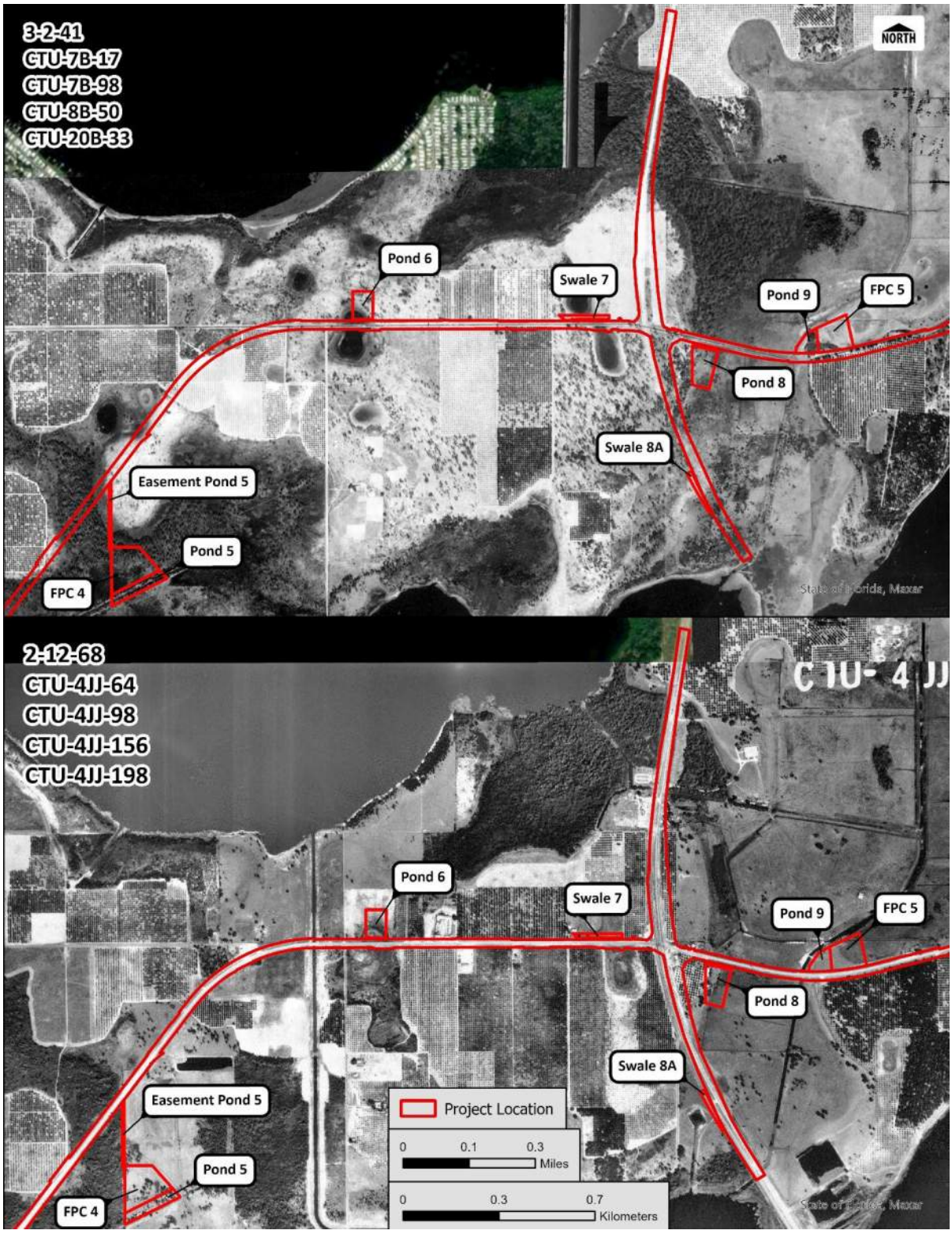



**Figure 3.8.** 1941 and 1968 aerial photographs of the SR 544 project.

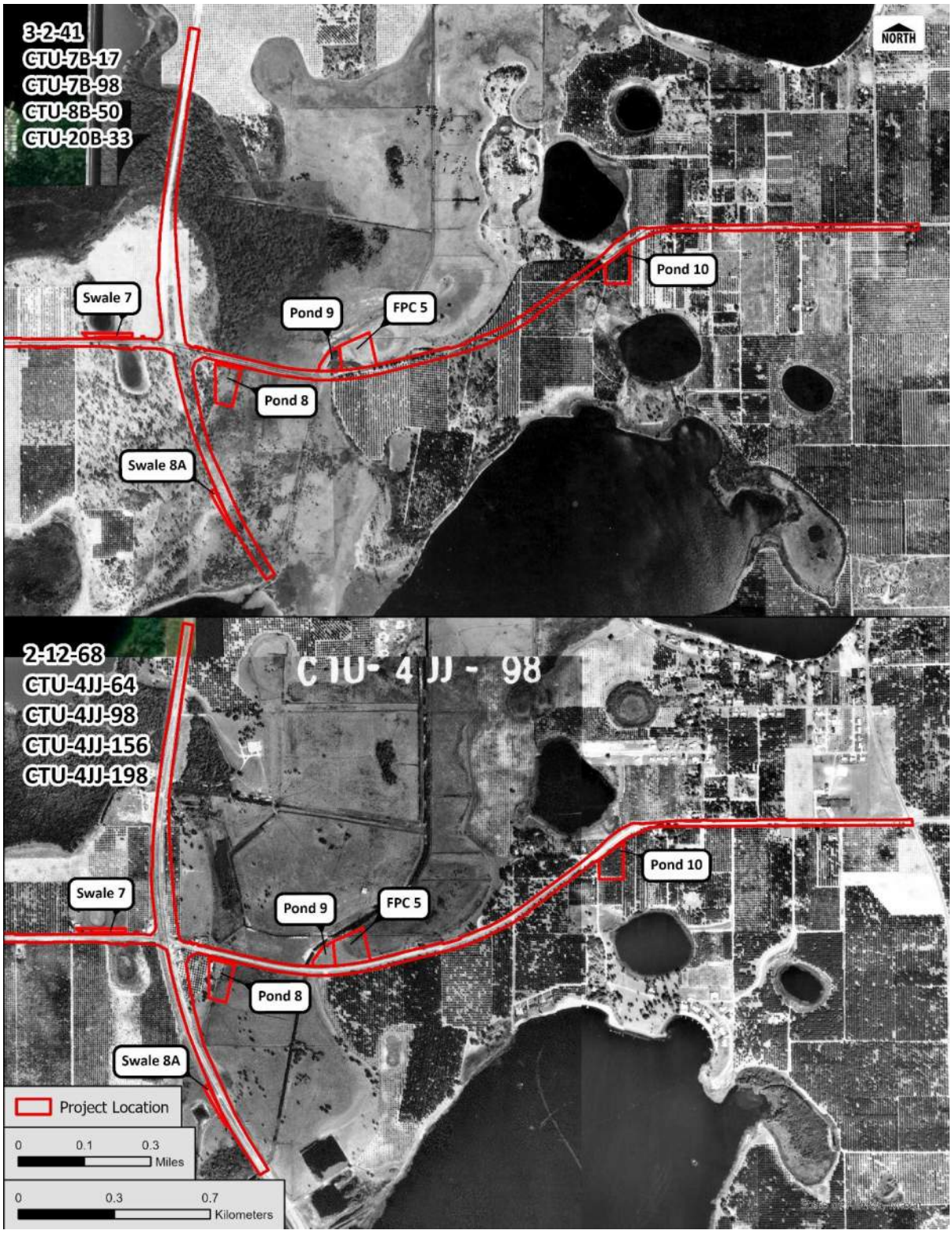



**Figure 3.9.** 1941 and 1968 aerial photographs of the SR 544 project.

# 4.0 RESEARCH CONSIDERATIONS AND METHODOLOGY

## 4.1 Background Research and Literature Review

A review of archaeological and historical literature, records and other documents and data pertaining to the project area was conducted. The focus of this research was to ascertain the types of cultural resources known in the project area and vicinity, their temporal/cultural affiliations, site location information, and other relevant data. This included Efficient Transportation Decision Making (ETDM) report No. 5873, Research Methodology Report (ACI 2019), a review of sites listed in the NRHP, the Florida Master Site File (FMSF), cultural resource survey reports, published books and articles, unpublished manuscripts, and maps. The FMSF information in this report was obtained December 2022 and updated in May 2023, which is the most recent edition. However, according to FMSF staff, input may be a month or more behind receipt of reports and site files. An informal discussion was conducted with a current rancher to obtain information about the past activities on the property.

### 4.1.1 Archaeological Considerations

Archaeological background research, including a review of the FMSF and the NRHP, indicated that three archaeological sites have been recorded within the APE and four within one-half mile. Sites within the APE include 8PO04797 (Homer's Grove Site), a single artifact site (today referred to as an archaeological occurrence [AO]) (FMSF), 8PO05426 (Whittaker Site) a low-density Pre-Contact artifact scatter, and 8PO05407 (Lake Tracey Canal), a historic earthwork dating to the American Boom Times (1921-1929). The Lake Tracey Canal, 8PO05407 was recorded during a survey of US 27 (Janus Research 1997) and updated during private surveys (Carty 2007; Alleman et al. 2021). The Whittaker Site, 8PO05426, was also recorded during a US 27 survey (Janus Research 1997b). Sites within one-half mile include 8PO04798 (Hochberg Hammock) a single artifact site (FMSF); 8PO07085 (Chris' Last Site) (Dickinson et al. 2007); 8PO08107 (Bellaviva C Site) (ACI 2017); and 8PO06533 (Lake Rochelle Site) (Whitaker 2002); the latter three are lithic scatters. The two single artifact sites have not been evaluated by the State Historic Preservation Officer (SHPO), but the five other archaeological sites were determined ineligible for listing in the NRHP by the SHPO (**Table 4.1; Figures 4.1-4.5**). Other surveys conducted in the vicinity of the APE did not yield cultural resources in close proximity of the APE and are listed, along with previously mentioned surveys, in **Table 4.2**.

**Table 4.1.** Previously recorded archaeological sites located within one half mile of the APE.

| FMSF No. | Site Name | Site Type | Culture | SHPO Evaluation |
|---|---|---|---|---|
| 8PO04797 | Homer's Grove | Single artifact/isolated find | Pre-Contact | Not evaluated |
| 8PO04798 | Hochberg Hammock | Single artifact/isolated find | Pre-Contact | Not evaluated |
| 8PO05407 | Lake Tracey Canal | Historic earthworks | 20th Century American, 1900 – present; Boom Times, 1921-1929 | Ineligible |
| 8PO05426 | Whittaker | Artifact scatter | Pre-Contact | Ineligible |
| 8PO06533 | Lake Rochelle | Lithic scatter | Pre-Contact | Ineligible |
| 8PO07085 | Chris' Last | Lithic scatter | Archaic (BCE 8500-1000 | Ineligible |
| 8PO08107 | Bellaviva C | Lithic scatter | Middle-Late Archaic | Ineligible |

**Table 4.2.** Previous surveys conducted within one half mile of the APE.

| Survey No. | Title | Reference |
|---|---|---|
| 2976 | Historic Properties Survey of Haines City, Florida | HPA 1991 |
| 5247 | Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 544 to CR 547 and from CR 547 to SR 400 I-4 in Polk County, Florida | Janus Research 1997b |
| 5259 | Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 60 to SR 540 and from SR 540 to SR 544 in Polk County, Florida | Janus Research 1997a |
| 5801 | Cultural Resource Assessment Survey SR 544 at Lake Henry/Hamilton Canal | Fillman-Richards and Richards 1998 |
| 6211 | CRAS. Technical Memorandum, US 27, Pond Siting from SR 544 to Blue Heron Bay Blvd, Polk County, Florida | ACI 2000 |
| 8161 | Archaeological Resource Survey: Proposed Cell Tower #015720, Lucerne Park, Polk County, Florida | Carlson 2001 |
| 8216 | Cultural Resource Assessment Survey of the Winter Haven Tract, Lakes at Lucerne Park Polk County, Florida | Whitaker 2002 |
| 11964 | An Archaeological and Historical Survey of the Willowbrook Project Area in Polk County, Florida | Driscoll 2005 |
| 12176 | Cultural Resource Assessment, Technical Memorandum US 27 from North of CR 546 to South of SR 544 in Polk County, Florida | ACI 2006 |
| 14725 | Cultural Resource Survey and Assessment, Winter Haven Industrial Site, Polk County, Florida | Dickinson et al. 2007 |
| 17674 | Section 106 Assessment (FCC Form 620) of the Diamon Mini Storage Telecommunications Tower Site (Tech Tower Properties), Polk County, Florida | FACI 2007 |
| 23682 | A Cultural Resource Assessment Survey of the Proposed Cellular Communications Collocation Project, A2B0160B Caribbean Distillers, Polk County, Florida | Mikell 2016 |
| 24999 | Cultural Resource Assessment Survey of the Bellaviva Property, Polk County, Florida | ACI 2017 |
| 27607 | Cultural Resources Assessment Survey, SR 549 (First Street) from Central Avenue to Avenue O, Polk County, Florida; FPID: 440349-1-52-01 | ACI 2021 |
| 27714 | Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida | Alleman et al. 2021 |

As archaeologists have long realized, aboriginal populations did not select their habitation sites and special activity areas in a random fashion. Rather, many environmental factors had a direct influence upon site location selection. In addition to freshwater availability, relative elevation, and better-drained soils, proximity to food and other resources including stone and clay were important site selection criteria. Based on environmental setting of the APE, there was a variable probability (despite the development in the area) for archaeological sites due to the presence of several lakes situated along the corridor and the presence of excessively draining soil within the APE. In addition, the ETDM report gave the project a minimal to moderate potential for finding historic and archaeological sites (FDOT 2019).




**Figure 4.1.** Previously recorded resources in close proximity to the SR 544 project.




**Figure 4.2.** Previously recorded resources in close proximity to the SR 544 project.

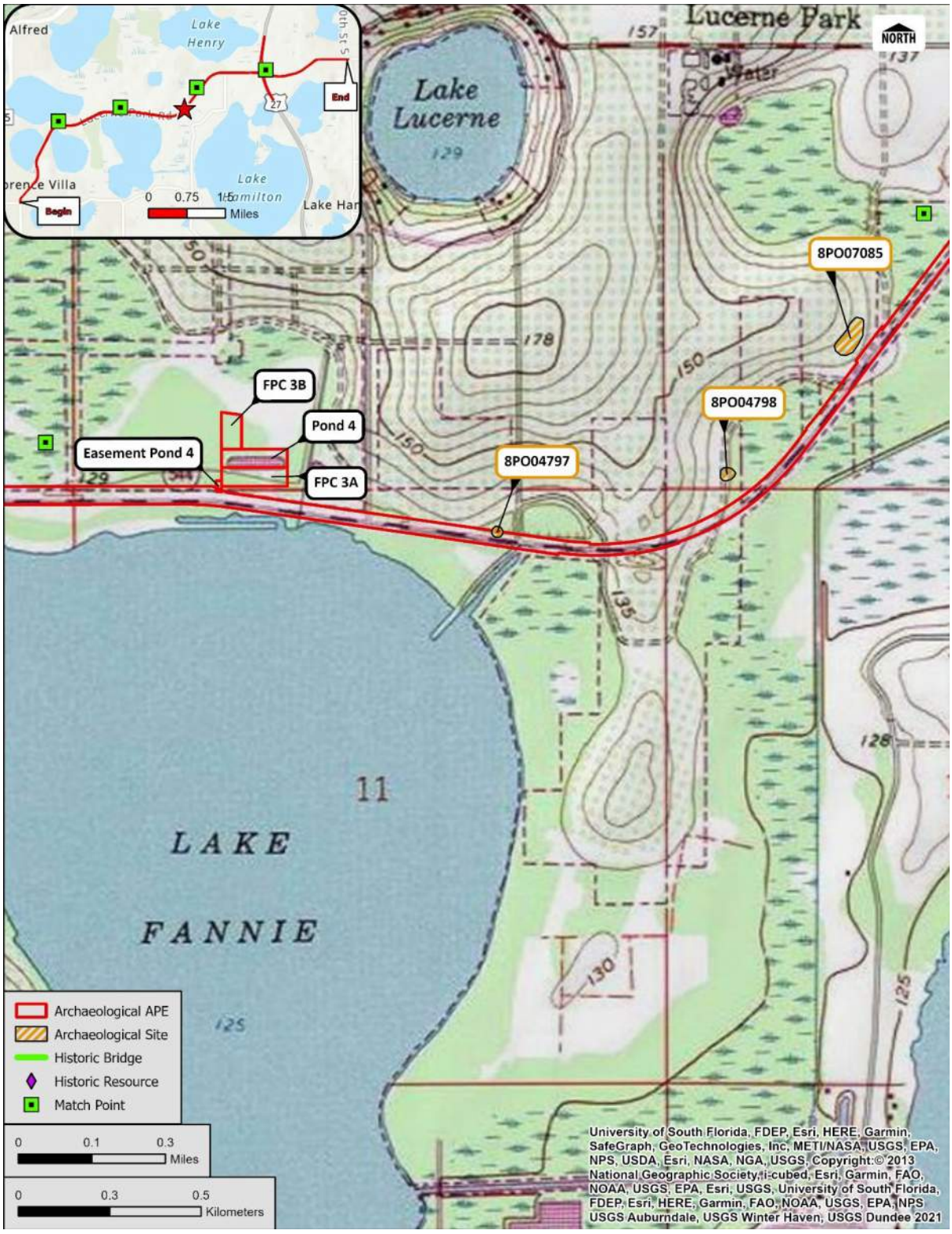



**Figure 4.3.** Previously recorded resources in close proximity to the SR 544 project.

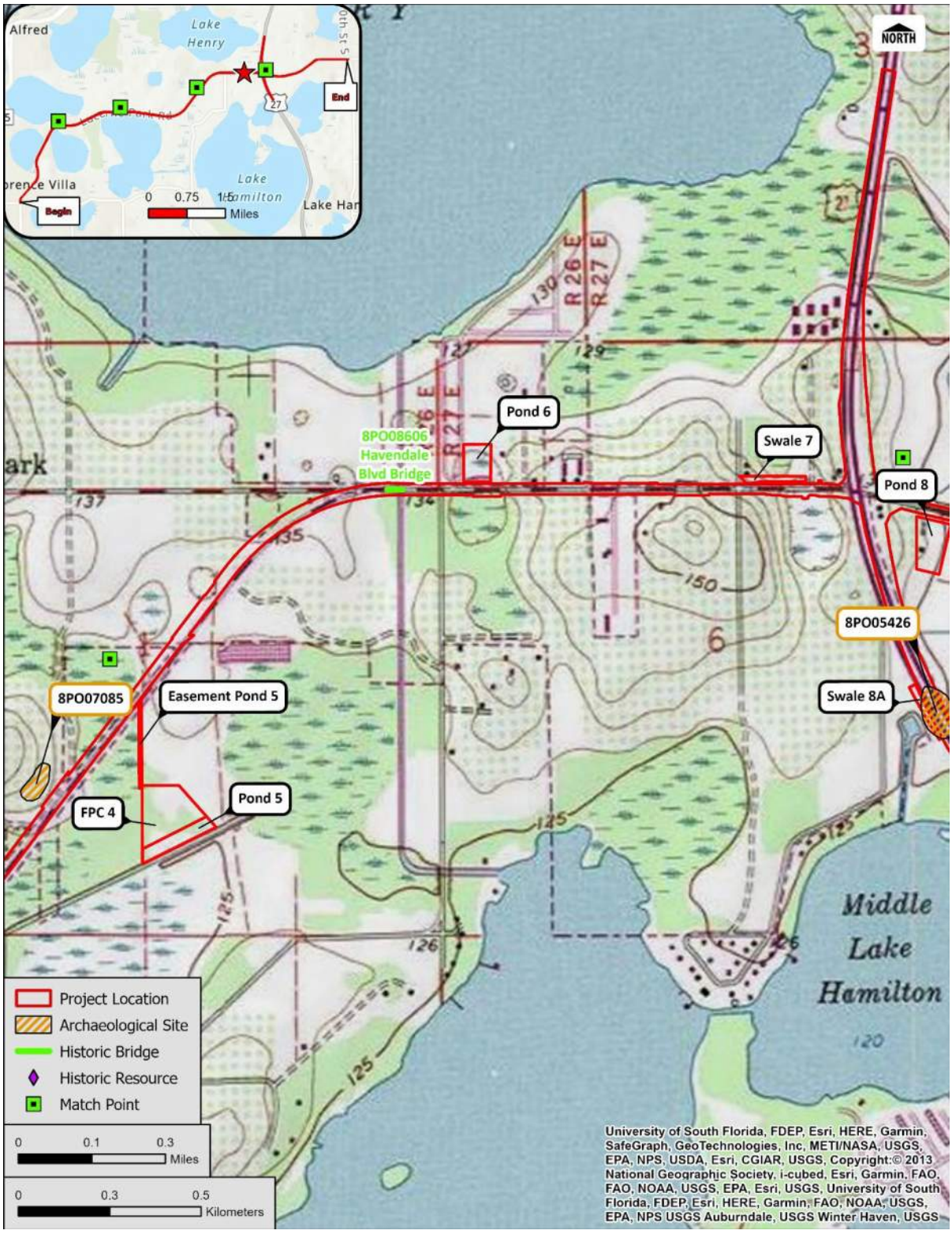



**Figure 4.4.** Previously recorded resources in close proximity to the SR 544 project.




**Figure 4.5.** Previously recorded resources in close proximity to the SR 544 project.

### 4.1.2 Historical Considerations

Historical/architectural background research, including a review of the FMSF database and the NRHP, that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, 8PO08606) were previously recorded within the APE (**Figures 4.1 – 4.5; Table 4.3**). These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, seven resources were updated (8PO03079, 8PO03084, 8PO03085) or newly identified (8PO08599, 8PO08600, 8PO08601, 8PO08606) during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* conducted in 2021 (Alleman et al. 2021; Survey No. 27714). As a result of the survey, six resources (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) were determined ineligible for listing in the NRHP and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility.

A ca. 1915 Georgian Revival style building located at 2208 Peninsular Drive (8PO03077) was previously recorded during the *Historic Properties Survey of Haines City* in 1991 (Historic Property Associates (HPA); Survey No. 2976). The resource has not been evaluated by the SHPO. Furthermore, a ca. 1925 Frame Vernacular style building (8PO05399) was previously recorded within the APE during the *Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 544 to CR 547 and from CR 547 to SR 400 I-4 in Polk County, Florida* conducted by Janus Research in 1997 (Survey No. 05247). The resource was determined ineligible for listing in the NRHP by the SHPO in 1998. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within the APE. The canal was constructed in order to drain land around the lakes in the Winter Haven area to support citrus and other agricultural productions. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO.

**Table 4.3.** Previously recorded historic resources within the SR 544 APE.

| FMSF No. | Address/Site Name | Build Date | Style/Type | SHPO Evaluation |
|---|---|---|---|---|
| **Structures** | | | | |
| 8PO03077 | 2208 Peninsular Drive | ca. 1915 | Colonial Revival | Not Evaluated |
| 8PO03079 | 128 Scenic Highway | ca. 1925 | Frame Vernacular | Insufficient Information |
| 8PO03084 | 509 Scenic Highway | ca. 1925 | Frame Vernacular | Ineligible |
| 8PO03085 | 501 Scenic Highway | ca. 1926 | Frame Vernacular | Ineligible |
| 8PO05399 | 1501 US 27 | ca. 1925 | Frame Vernacular | Ineligible |
| 8PO08599 | 124 Scenic Highway | ca. 1953 | No Style | Ineligible |
| 8PO08600 | 908 Scenic Highway | ca. 1950 | No Style | Ineligible |
| 8PO08601 | 1203 Scenic Highway | ca. 1925 | Frame Vernacular | Ineligible |
| **Bridges** | | | | |
| 8PO08606 | Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021) | ca. 1964 | Bridge | Ineligible |

Two previously recorded historic resources are located adjacent to, but outside of, the APE (8PO05737 and 8PO08069). The ca. 1930 Todhunter International (8PO05737) building, also known as the Florence Citrus Growers Association Packing House, is a Masonry Vernacular style packing house that was first recorded during the *Historic Properties Survey of Winter Haven, Florida* conducted by Historic Property Associates, Inc. in 1997 (Survey No. 04998). The resource has not been evaluated

by the SHPO. In addition, the ca. 1955 Florence Citrus Growers Association Water Tower (8PO08069) was recorded during *A Cultural Resource Assessment Survey of the Proposed Cellular Communications Collocation Project, A2B0160B Caribbean Distillers, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2016 (Mikell 2016; Survey No. 23682).

In 1991, Historic Property Associates (HPA), Inc. conducted the *Historic Properties Survey of Haines City* which documented resources constructed in or prior to 1941 throughout Haines City, satisfying the fifty-year criteria used by the NRHP (Survey No. 02976). As a result of the *Survey of Haines City*, the *Historic and Architectural Resources of Haines City MPL [Multiple Property Listing]* was prepared by HPA and in 1993 the FDHR converted the form into a manuscript (Shiver 1993; Survey No. 06287). The MPL was officially listed in the NRHP in 1994. The survey summarizes the historic resources constructed within the city limits of Haines City, including three contexts: I. Founding and Early Development of Haines City: 1883 – 1909; II. Progressive Era Development: 1910 – 1920; III. Florida Land Boom and Depression: 1921 – 1941. The survey identified 354 buildings and one structure within these limits. There are three property types that contribute to the multiple property nomination, including, F.1 – Commercial Buildings; F.2 – Religious and Public Buildings; F.3 – Residential Buildings.

In 1997, Historic Property Associates, Inc. conducted the *Historic Properties Survey of Winter Haven, FL* which documented historic resources constructed in or prior to 1950 throughout the urban core of Winter Haven (Johnston 1997). Following the 1997 survey, the *Historic Architectural Resources of Winter Haven Multiple Property Listing (MPL)* was submitted in 1998 (Johnston 1998). The MPL was added to the NRHP in 2000 and "fulfills Criteria A, B, and C for listing in the NRHP" with resources significant for their "association with events and persons locally significant in the areas of architecture, agriculture, exploration/settlement, community planning and development, engineering, ethnic heritage: Black, entertainment/recreation, commerce, industry, politics/government, religion, military, social history, transportation, and education" (Johnston 1998). The *Historic Architectural Resources of Winter Haven MPL* covers the development of Winter Haven from its founding in 1883 to 1949, including four contexts: I. Disston Era and Founding of Winter Haven, 1883 – 1895; II. Progressive Era, 1896 – 1919; III. Florida Land Boom, 1920 – 1928; IV. Great Depression to Post-World War II, 1929 – 1949. The listing includes the following property types: F.1 – Residential Buildings, F.2 – Commercial Buildings, F.3 – Public Buildings, and F.4 – Agriculture-related Buildings.

A review of relevant historic USGS quadrangle maps, historic aerial photographs, and the Polk County Property Appraiser's data revealed the potential for 100 new historic resources 46 years of age or older (constructed in 1977 or earlier) within the APE (Faux 2023). The APE traverses through the Winter Haven community of Florence Villa. Although Florence Villa is currently a predominantly Black community within Winter Haven, the area was established as a resort and citrus center by Frederick W. Inman in 1884, and gradually developed into the community it is today. Multiple subdivisions located within the community of Florence Villa are located within the APE, including the Florence Citrus Growers Association subdivision (1920), Booker Subdivision (1925), Unit 3 of the Eula Vista subdivision (1957), and the Lincoln subdivision (1925) (Polk County 1920, 1925a, 1925b, 1957). Limited area of the Booker, Lincoln, and Eula Vista subdivisions are located within the APE and as such, few potential resources associated with each subdivision are located within the APE; as such, it is beyond the scope of work to establish if the subdivisions would be considered a historic district. However, the Florence Citrus Growers Association subdivision accounts for approximately 29 of the potential 100 new historic resources within the APE. As such, the Florence Citrus Growers Association subdivision will be recorded as a proposed historic district.

## 4.2 Field Methodology

The FDHR's Module Three, *Guidelines for Use by Historic Professionals*, indicates that the first stage of archaeological field survey is a reconnaissance of the project area to "ground truth," or ascertain the validity of the predictive model (FDHR 2003). During this part of the survey, the researcher assesses whether the initial predictive model needs adjustment based on disturbance or conditions such as constructed features (i.e., parking lots, buildings, etc.), underground utilities, landscape alterations (i.e., ditches and swales, mined land, dredged and filled land, agricultural fields), or other constraints that may affect the archaeological potential. Additionally, these Guidelines indicate that non-systematic "judgmental" testing may be appropriate in urbanized environments where pavement, utilities, and constructed features make systematic testing unfeasible; in geographically restricted areas such as proposed pond sites; or within project areas that have limited high and moderate probability zones, but where a larger subsurface testing sample may be desired. While predictive models are useful in determining preliminary testing strategies in a broad context, it is understood that testing intervals may be altered due to conditions encountered by the field crew at the time of survey.

Archaeological field survey methods consisted of surface reconnaissance combined with systematic shovel tests placed at 25-meter (m) in high probability zones, 50-m in moderate probability zones, and 100-m intervals in low probability zones in addition to judgmental testing. High interval testing occurred on sandy upland slopes adjacent to previously recorded sites and freshwater sources. Moderate testing focused on upland plateaus overlooking water features, and low to judgmental testing focused on remaining lowlands and urban areas. Shovel tests were circular and measured approximately 50 centimeters (cm) in diameter by at least 100 cm in depth unless precluded by road fill, presence of utilities, water at shallow depths, and impenetrable clay. All soil removed from the shovel tests was screened through a 0.64 cm mesh hardware cloth to maximize the recovery of artifacts. The locations of all shovel tests were recorded using a Juno 5d Series/Terrasync mobile mapping application and following the recording of relevant data such as stratigraphic profile and artifact finds, all test pits were refilled.

Historic/architectural field methodology consisted of a field survey of the APE to determine and verify the location of all buildings and other historic resources (i.e., bridges, roads, cemeteries) that are 46 years of age or older (constructed in or prior to 1977), and to establish if any such resources could be determined eligible for listing in the NRHP. The field survey focused on the assessment of existing conditions for all previously recorded historic resources located within the project APE, and the presence of unrecorded historic resources within the project area. For each property, photographs were taken, and information needed for the completion of FMSF forms was gathered. In addition to architectural descriptions, each historic resource was reviewed to assess style, historic context, condition, and potential NRHP eligibility. Also, informant interviews would have been conducted, if possible, with knowledgeable persons to obtain site-specific building construction dates and/or possible associations with individuals or events significant to local or regional history.

## 4.3 Inadvertent/Unexpected Discovery of Cultural Materials

Occasionally, archaeological deposits, subsurface features or ancestral remains are encountered during development, even though the project area may have previously received a thorough and professionally adequate cultural resources assessment. Such events are rare, but they do occur. In the event pre-contact or historic period artifacts, such as pottery or ceramics, projectile points, shell or bone tools, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered or observed during development activities at any time within the project site, the permitted project shall

cease all activities involving subsurface disturbance in the immediate vicinity of the discovery and a professional archaeologist will be contacted to evaluate the importance of the discovery. The area will be examined by the archaeologist, who, in consultation with the staff of the Florida SHPO, will determine if the discovery is significant or potentially significant.

In the event the discovery is found to be not significant, the work may immediately resume. If, on the other hand, the discovery is found to be significant or potentially significant, then development activities in the immediate vicinity of the discovery will continue to be suspended until a mitigation plan, acceptable to the SHPO, is developed and implemented. Development activities may then resume within the discovery area, but only when conducted in accordance with the guidelines and conditions of the approved mitigation plan. If ancestral remains are encountered during development, the procedures outlined in Chapter 872.05 FS must be followed, all activities in the vicinity of the discovery must cease and the local Medical Examiner and State Archaeologist should be notified.

## 4.4 Laboratory Methods and Curation

All recovered cultural materials were initially cleaned and sorted by artifact class. Only two small lithic flakes were found. The flakes (i.e., lithic debitage) were subjected to a limited technological analysis focused on ascertaining the stages of stone tool production. Flakes were classified into four types (primary decortication, secondary decortication, non-decortication, and shatter) based on the amount of cortex on the dorsal surface and the shape (White 1963). No ceramics or other artifact types were found.

The project related documents (field notes, maps, photos, etc.) will be maintained at Archaeological Consultants, Inc. in Sarasota (Project File No. P19097), unless the client requests otherwise.

# 5.0 SURVEY RESULTS AND RECOMMENDATIONS

## 5.1 Archaeological Results

Archaeological field survey included surface reconnaissance, systematic and judgmental subsurface testing. Systematic testing was conducted at 25-m in high probability zones, 50-m in moderate probability zones, and 100-m intervals in low probability zones in addition to judgmental testing. High interval testing occurred on sandy upland slopes adjacent to previously recorded sites and freshwater sources. Moderate testing focused on upland plateaus overlooking water features, and low to judgmental testing focused on remaining lowlands and urban areas. This resulted in the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor (**Figures 5.1-5.10**). As a result, no archaeological sites were identified and no evidence of two of the sites located within the APE were found: 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site). The Lake Tracey Canal (8PO05407) is within a portion of the APE, but no testing was deemed necessary given that it is a canal. Although there were negative results for the two Pre-Contact period archaeological sites, the FMSF forms were still updated. The Lake Tracey Canal MSF form was not updated due to it having recently been updated in 2021 (Alleman et al. 2021), the fact that nothing has changed about the canal, and the SHPO determined it not eligible for listing in the NRHP.

However, one Archaeological Occurrence (AO) was found; it is not considered a site and not considered NRHP eligible. An AO is defined by the FMSF as "the presence of one or two nondiagnostic artifacts, not known to be distant from their original context which fit within a hypothetical cylinder of 30 meters diameter regardless of depth below surface." Thus, occurrences are not recorded as a site, but the presence of the artifact indicated Pre-Contact period activity in the area. A reasonable and good faith effort was made per the regulations laid out in 36 CFR § 800.4(b)(1) (Advisory Council on Historic Preservation n.d.) to test all areas of the APE.

Stratigraphy in the corridor APE differed between the upland and the lowland environments. The stratigraphy in the upland environments consisted of 0-20 centimeters below surface (cmbs) of gray gravelly sand and 20-100 cmbs of yellowish-brown gravelly sand. The stratigraphy in the lowland environments consisted of 0-20 cmbs of gray gravelly sand and 20-100 cmbs of light gray gravelly sand. Pond stratigraphy is noted in **Table 5.1**. Sample stratigraphy of the corridor and ponds sites are shown in **Appendix B**.

**Table 5.1.** Summary of archaeological survey results.

| Pond # | No. of STs | Stratigraphy |
|---|---|---|
| Pond 1A (0.37 acres) | 3 | 0-100 cmbs grayish-brown gravelly sand |
| Pond 1 (2.83 acres) | 9 | 0-20 cmbs gray sand; 20-100 cmbs yellowish-brown sand |
| Pond 2 (3.83 acres) | 13 | 0-20 cmbs gray sand; 20-100 cmbs yellowish-brown sand |
| FPC 1 (0.74 acres) | 4 | 0-100 grayish-brown gravelly sand |
| FPC 2 (1.62 acres) | 3 | 0-20 cmbs dark gray sand; 20-100 cmbs gray sand |
| Pond 3 (2.50 acres) + easement | 4 | 0-100 cmbs gray sand |
| Pond 4 (2.21 acres) + easement | 1 | Existing pond; test pit was placed in the easement: 0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 light brown sand |
| FPC 3A (2.29 acres) | 3 | 0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 cmbs light brown sand |

| Pond # | No. of STs | Stratigraphy |
|---|---|---|
| FPC 3B (1.33 acres) | 2 | 0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 light brown sand |
| FPC 4 (4.84 acres) | 4 | 0-20 cmbs dark gray sand; 20-100 gray sand |
| Pond 5 (1.95 acres) + easement | 5 | 0-100 cmbs dark gray clay |
| Pond 6 (1.96 acres) | 4 | 0-100 cmbs grayish-brown gravelly sand |
| Swale 7 (0.62 acres) | 3 | 0-30 cmbs gray sand; 30-100 cmbs light brown sand |
| Pond 8 (0.68 acres) | 7 | 0-20 cmbs gray sand; 20-100 cmbs pale brown sand |
| Swale 8 (0.50 acres) | 3 | 0-100 cm with mottled grey, brown, and orange soil with fill, utilities, and asphalt. |
| Pond 9 (1.25 acres) | 3 | 0-30 cmbs gray sand; 30-100 yellowish brown sand |
| FPC 5 (1.56 ac) | 2 | 0-100 cmbs gray sand; wetland in eastern part of FPC |
| Pond 10 (2.34 acres – Dry) | 11 | 0-20 cmbs gray sand; 20-100 cmbs yellowish brown sand |

* Zone of Archaeological Potential

**8PO04797:** Homer's Grove is in the northeast quarter of Section 11 in Township 28 South, Range 26 East located within the northern ROW of SR 544, 365-m east of SR 544 (USGS Winter Haven; Dundee) (**Figure 5.6; Photo 5.1**). 8PO04797 was previously recorded in 1995 by Janus Research and was described as a land site that recovered a single whole prehistoric lithic flake. The site has not been evaluated by the SHPO for NRHP eligibility. Homer's Grove occurs on Sparr sand with 0-5% slopes, a somewhat poorly drained soil on seasonally wet uplands and knolls (USDA 1990). The stratigraphy in this area was 0-20 cmbs of gray gravelly sand and 20-100 cmbs of yellowish-brown gravelly sand. The elevation is approximately 130 ft amsl. The current investigations within the SR 544 corridor APE consisted of five shovel tests placed at 25-m intervals and judgmentally adjacent to the site. No positive shovel tests were encountered during the present survey and no evidence of the Homer's Grove Site was recovered. In addition, site 8PO04797 appears potentially destroyed by disturbance from the distribution center and driveway development. Therefore, 8PO04797 is considered ineligible for listing in the NRHP given the lack of recovered evidence of the site.



**Photo 5.1.** View of 8PO04797 (Homer's Grove) adjacent to north side of SR 544, facing north. Note disturbance from distribution center facility and driveway.

**8PO05407:** The Lake Tracey Canal Site runs from Lake Tracy to the north in the southwest quarter of Section 20 in Township 27 South Range 27 East and terminates at the northeastern edge of Middle Lake Hamilton in the southeastern corner of Section 6 in Township 28 South Range 27 East (USGS Winter Haven; Dundee). The canal also runs through Sections 19 and 30-31 in Township 27 South Range 27 East and through Section 5 in Township 28 South, Range 26 East (**Figures 5.8, 5.9; Photos 5.2-5.4**). The elevation is approximately 125-ft amsl. The Lake Tracey Canal was previously recorded during a survey of US 27 in 1997 by Janus Research. They described the site as a land-based earthwork from the American Twentieth Century used to drain wetlands for development. The canal is not navigable and does not exhibit any significant engineering features nor does it hold significant historical associations. During this survey, no cultural material was recovered from the canal and in 1998, the SHPO determined the canal to be ineligible for NRHP listing (FMSF). The Lake Tracey Canal was reviewed in a literature search by Carty in 2007 for a separate survey of the Crossings Project Area and a recent survey for the Osprey-Haines City Transmission Line (Alleman et al. 2021), but its eligibility status did not change since it was previously determined that the canal was ineligible for NRHP listing (FMSF). In the present survey, no additional information was obtained about the Lake Tracey Canal, which continues to lack engineering features and significant historical associations, therefore continuing to be ineligible for listing in the NRHP.



**Photo 5.2.** View of 8PO05407 (Lake Tracy Canal) facing south.



**Photo 5.3.** View of 8PO05407 (Lake Tracy Canal) facing west.



**Photo 5.4.** View of 8PO05047 (Lake Tracy Canal) facing northwest.

**8PO05426:** The Whittaker Site is in the southeast quarter of Section 6 in Township 28 South, Range 27 East located south of SR 544 along both sides of US 27 as well as in Swale 8A (USGS Winter Haven; Dundee) (**Figures 5.8, 5.9; Photos 5.5, 5.6**). This site was previously recorded in 1997 during a survey of US 27 (Janus Research 1997b) and was described as an artifact scatter that contained sand tempered plain and St. Johns pottery sherds as well as 15 lithic flakes found in 14 shovel tests. The site occurs on Tavares fine sand with 0-5% slopes, a well-drained soil. The elevation is approximately 120-130-ft amsl. The current investigations within the SR 544 corridor APE consisted of eight shovel tests placed within and adjacent to the site at 25-5-m intervals. No positive shovel tests were encountered during the present survey and no evidence of the site was recovered. The stratigraphy was disturbed from 0-100 cm with mottled grey, brown, and orange soil with fill, utilities, and asphalt. In addition, site 8PO05426 appears to have been destroyed by the construction of US 27. The site was determined not eligible for listing in the NRHP by the SHPO in 1998 and ACI concurs with this evaluation..



**Photo 5.5.** Looking south at the west portion site 8PO05426.



**Photo 5.6.** Looking north at east portion of site 8PO05426.

**AO #1** is located in the extreme northeast corner of Pond 2 in the southeast quarter of Section 9 in Township 28 South, Range 26 East (USGS Winter Haven; Dundee). The pond occurs on both somewhat poorly drained Adamsville fine sand with 0-2% slopes and excessively drained Candler-Urban Land complex with 0-5% slopes at an elevation of approximately 135-140-ft amsl (USDA 1990) (**Figures 5.2, 5.3**). One positive shovel test produced two very small chert non-decortication flakes between 30-50 cmbs. The general stratigraphy of the single positive test consists of 0-20 cmbs gray sand and 20-100 cmbs yellowish-brown sand. The area is forested with live oak and has been disturbed by residential lots, although they are abandoned (**Photo 5.7**). The AO was found during 25-m interval testing. Two small, non-decortication waste flakes (non-thermally altered) were recovered from 30-50 cmbs below surface. No artifacts were found in the additional four tests at 10-m intervals west and south around the positive test; no shovel tests were able to be placed north or east due to the limits of the pond boundaries. Due to its low research potential, it is not considered eligible for listing in the NRHP.



**Photo 5.7.** View of AO #1 and surrounding environmental conditions at the extreme northeast corner of proposed Pond 2.




**Figure 5.1.** Approximate location of the shovel tests within the APE.




**Figure 5.2.** Approximate location of the shovel tests within the APE and the AO.




**Figure 5.3.** Approximate location of the shovel tests within the APE and the AO.




**Figure 5.4.** Approximate location of the shovel tests within the APE.




**Figure 5.5.** Approximate location of the shovel tests within the APE and previously recorded site.




**Figure 5.6.** Approximate location of the shovel tests within the APE and previously recorded site.




**Figure 5.7.** Approximate location of the shovel tests within the APE.




**Figure 5.8.** Approximate location of the shovel tests within the APE and previously recorded sites.




**Figure 5.9.** Approximate location of the shovel tests within the APE and previously recorded sites.




**Figure 5.10.** Approximate location of the shovel tests within the APE.

## 5.2 Historical/Architectural Results

Historical/architectural background research indicated that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, and 8PO08606) were previously recorded within the APE. These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, six buildings (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and the bridge (FDOT No. 160021/8PO08606) were determined ineligible for listing in the NRHP by the SHPO. One building (8PO03077) has not been evaluated and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within Pond 5. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO.

The Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE (**Tables 5.2 – 5.4; Appendix C**). Of these, 100 were newly identified, recorded, and evaluated (8PO09983, 8PO09999 – 8PO10095, 8PO10132, 8PO10133), two previously recorded historic resources (8PO03077 and 8PO03079) were identified and re-evaluated, and an unrecorded segment of linear resource, the Peace Creek Drainage Canal (8PO05391), was identified, recorded, and evaluated (8PO05391) within the APE. In addition, five (5) previously recorded historic resources (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO08606) were identified but have not been significantly altered since determined ineligible for listing in the NRHP by the SHPO and as such, were not updated during this survey. Of these, 104 historic resources are within the mainline SR 544 corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no longer extant.

**Table 5.2.** Summary of Previously Recorded Historic Resources within the APE.

| Resource Type | Number of Resources Identified | Number of Resources with Updated FMSF Forms | Number of Resources Determined National Register Eligible* |
|---|---|---|---|
| Structures | 6 | 2 | 2 |
| Resource Groups/ Linear Resources | 1 | 1 | 0 |
| Cemeteries | 0 | 0 | 0 |
| Bridges | 1 | 0 | 0 |
| Total Number of Resources | 8 | 3 | 2 |

*The determination of eligibility is based on the current FMSF data. These evaluations may change.

**Table 5.3.** Previously Recorded Historic Resources within the APE.

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| **Structures** | | | | |
| 8PO03077 | 2208 Peninsular Drive | ca. 1915 | Colonial Revival | Eligible |
| 8PO03079 | 128 Scenic Highway | ca. 1925 | Craftsman | Eligible |
| *8PO03084 | 509 Scenic Highway | ca. 1925 | Frame Vernacular | Ineligible (SHPO 8/27/2021) |
| *8PO03085 | 501 Scenic Highway | ca. 1926 | Frame Vernacular | Ineligible (SHPO 8/27/2021) |
| 8PO05399 | 1501 US 27 | ca. 1925 | Frame Vernacular | Ineligible (SHPO 6/11/1998) |
| *8PO08599 | 124 Scenic Highway | ca. 1953 | No Style | Ineligible (SHPO 8/27/2021) |
| 8PO08600 | 908 Scenic Highway | ca. 1950 | No Style | Ineligible (SHPO 8/27/2021) |
| *8PO08601 | 1203 Scenic Highway | ca. 1925 | Frame Vernacular | Ineligible (SHPO 8/27/2021) |
| **Linear Resources** | | | | |
| 8PO05391 | Peace Creek Drainage Canal | ca. 1915 | Linear Resource | Ineligible |
| **Bridges** | | | | |
| *8PO08606 | Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021) | ca. 1964 | Bridge (Slab) | Ineligible (SHPO 8/27/2021) |

*Indicates previously recorded resources that have not been updated; red text indicates resources that identified as demolished during the field survey.

**Table 5.4.** Summary of Newly Identified Historic Resources within the APE.

| Resource Type | Number of Resources Identified | Number of Resources with FMSF Forms | Number of Resources Recommended National Register Eligible |
|---|---|---|---|
| Structures | 92 | 92 | 2 |
| Resource Groups/ Linear Resources | 7 | 7 | 1 |
| Cemeteries | 0 | 0 | 0 |
| Bridges | 1 | 1 | 0 |
| Total Number of Resources | 100 | 100 | 3 |

**Table 5.5.** Newly Identified Historic Resources within the APE.

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| **Structures** | | | | |
| 8PO09999 | 130 Avenue U NE | ca. 1918 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10000 | 131 Martin Luther King Blvd NE | ca. 1920 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10001 | 105 Martin Luther King Blvd NW | ca. 1960 | Commercial | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10002 | 125 Martin Luther King Blvd NW | ca. 1930 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| 8PO10003 | 2106 NE 1st Street | ca. 1935 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10004 | 2114 Lucerne Park Road | ca. 1935 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10005 | 2101 1st Street N | ca. 1958 | Industrial Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10006 | 2130 Lucerne Park Road | ca. 1963 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10007 | 2206 Lucerne Park Road (Building 1) | ca. 1952 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10008 | 2206 Lucerne Park Road (Building 2) | ca. 1952 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10009 | 2208 Lucerne Park Road | ca. 1947 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10010 | 2220 Lucerne Park Road | ca. 1952 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10011 | 2222 Lucerne Park Road | ca. 1952 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10012 | 2244 Lucerne Park Road | ca. 1952 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10013 | 2250 Lucerne Park Road/Pentecostal Church of God | ca. 1968 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10014 | 2137 Lucerne Park Road | ca. 1925 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10015 | 0 Lucerne Park Road | ca. 1953 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10016 | 101 Avenue V NW | ca. 1930 | Frame Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10017 | 2255 1st Street N | ca. 1969 | Ranch | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10018 | 2207 Lucerne Park Road | ca. 1965 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10019 | 2219 Lucerne Park Road | ca. 1935 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10020 | 2221 Lucerne Park Road (Building 1) | ca. 1974 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10021 | 2221 Lucerne Park Road (Building 2) | ca. 1974 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10022 | 2245 Lucerne Park Road | ca. 1964 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10023 | 2247 Lucerne Park Road | ca. 1963 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10024 | 2209 Lucerne Park Road | ca. 1965 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10025 | 2211 Lucerne Park Road | ca. 1965 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10026 | 2213 Lucerne Park Road | ca. 1965 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10027 | 244 Ware Avenue NE | ca. 1965 | Masonry Vernacular | Individually Ineligible; Contributing to 8PO09983 |
| 8PO10028 | 2202 2nd Street NE | ca. 1963 | Masonry Vernacular | Ineligible |

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| 8PO10029 | 2204 2nd Street NE | ca. 1963 | Masonry Vernacular | Ineligible |
| 8PO10030 | 2206 2nd Street NE | ca. 1964 | Masonry Vernacular | Ineligible |
| 8PO10031 | 2208 2nd Street NE | ca. 1963 | Masonry Vernacular | Ineligible |
| 8PO10132 | 2310 Lucerne Park Road/ St. James Free Will Baptist Church | ca. 1968 | Masonry Vernacular | Ineligible |
| 8PO10032 | 2285 3rd Street NE | ca. 1959 | Masonry Vernacular | Ineligible |
| 8PO10033 | 2400 Lucerne Park Road | ca. 1956 | Masonry Vernacular | Ineligible |
| 8PO10034 | 2402 Lucerne Park Road | ca. 1969 | Masonry Vernacular | Ineligible |
| 8PO10035 | 2410 Lucerne Park Road | ca. 1934 | Masonry Vernacular | Ineligible |
| 8PO10036 | 2413 Cedie Street NE | ca. 1953 | Masonry Vernacular | Ineligible |
| 8PO10037 | 2415 Cedie Street NE | ca. 1963 | Masonry Vernacular | Ineligible |
| 8PO10038 | 317-319 Avenue X NE | ca. 1958 | Masonry Vernacular | Ineligible |
| 8PO10039 | 313 Avenue X NE | ca. 1950 | Masonry Vernacular | Ineligible |
| 8PO10133 | 307 Avenue X NE | ca. 1950 | Frame Vernacular | Ineligible |
| 8PO10040 | 309 Avenue X NE | ca. 1950 | Masonry Vernacular | Ineligible |
| 8PO10041 | 2416 Lucerne Park Road | ca. 1946 | Frame Vernacular | Ineligible |
| 8PO10042 | 2426 Lucerne Park Road | ca. 1968 | Masonry Vernacular | Ineligible |
| 8PO10043 | 2456 Lucerne Park Road | ca. 1968 | Frame Vernacular | Ineligible |
| 8PO10044 | 408 Avenue Y NE | ca. 1977 | Masonry Vernacular | Ineligible |
| 8PO10045 | 402 Avenue Y NE (Building 1) | ca. 1942 | Frame Vernacular | Ineligible |
| 8PO10046 | 402 Avenue Y NE (Building 2) | ca. 1952 | Masonry Vernacular | Ineligible |
| 8PO10047 | 406 Avenue Y NE | ca. 1968 | Frame Vernacular | Ineligible |
| 8PO10048 | 2443 5th Street NE | ca. 1932 | Masonry Vernacular | Ineligible |
| 8PO10049 | 369 Avenue Y NE | ca. 1961 | Masonry Vernacular | Ineligible |
| 8PO10050 | 2507 Bishop James Cochran Way | ca. 1970 | No Style | Ineligible |
| 8PO10051 | 2513 Bishop James Cochran Way | ca. 1970 | No Style | Ineligible |
| 8PO10052 | 2515 Bishop James Cochran Way | ca. 1970 | Frame Vernacular | Ineligible |
| 8PO10053 | 96 Hilltop Drive | ca. 1972 | Ranch | Ineligible |
| 8PO10054 | 100 Hilltop Drive | ca. 1966 | Frame Vernacular | Ineligible |
| 8PO10055 | 2950 Lucerne Park Road | ca. 1959 | Masonry Vernacular | Ineligible |

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| 8PO10057 | 39 Azalea Drive/Lucerne Lakeside MHP (Clubhouse) | ca. 1964 | Masonry Vernacular | Ineligible |
| 8PO10058 | 74 Hibiscus Drive/Lucerne Lakeside MHP (Mobile Home 1) | ca. 1968 | No Style | Ineligible |
| 8PO10059 | Ixora Drive/Lucerne Lakeside MHP (Mobile Home 2) | ca. 1971 | No Style | Ineligible |
| 8PO10060 | 119 Ixora Drive/Lucerne Lakeside MHP (Mobile Home 3) | ca. 1971 | No Style | Ineligible |
| 8PO10062 | 3001 Old Lucerne Park Road | ca. 1954 | Masonry Vernacular | Ineligible |
| 8PO10063 | 3005 Old Lucerne Park Road | ca. 1972 | Masonry Vernacular | Ineligible |
| 8PO10064 | 3010 Lucerne Park Road | ca. 1954 | Masonry Vernacular | Ineligible |
| 8PO10066 | 3200 Old Lucerne Park Road | ca. 1895 | Frame Vernacular | Ineligible |
| 8PO10067 | 5825 Old Lucerne Park Road | ca. 1953 | Masonry Vernacular | Ineligible |
| 8PO10068 | 5900 Lucerne Park Road | ca. 1965 | Masonry Vernacular | Ineligible |
| 8PO10071 | 885 Lakeside Ranch Court/Lakeside Ranch (Mobile Home 1) | ca. 1972 | No Style | Ineligible |
| 8PO10072 | 109 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 2) | ca. 1971 | No Style | Ineligible |
| 8PO10073 | 100 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 3) | ca. 1972 | No Style | Ineligible |
| 8PO10074 | 104 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 4) | ca. 1976 | No Style | Ineligible |
| 8PO10075 | 7423 Lucerne Park Road | ca. 1974 | Masonry Vernacular | Ineligible |
| 8PO10076 | 33230 US 27 | ca. 1969 | Masonry Vernacular | Ineligible |
| 8PO10077 | 33224 US 27/Stay Plus Inn (Office) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10078 | 33224 US 27/Stay Plus Inn (Pool House) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10079 | 33224 US 27/Stay Plus Inn (Building 1) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10080 | 33224 US 27/Stay Plus Inn (Building 2) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10081 | 33224 US 27/Stay Plus Inn (Building 3) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10082 | 33224 US 27/Stay Plus Inn (Building 4) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10083 | 33224 US 27/Stay Plus Inn (Building 5) | ca. 1973 | Masonry Vernacular | Ineligible |
| 8PO10084 | 1499 US 27 N | ca. 1970 | No Style | Ineligible |
| 8PO10085 | 33231 US 27 (Warehouse) | ca. 1946 | Masonry Vernacular | Ineligible |

| FMSF No. | Address/Site Name | Build Date | Style/Type | NRHP Eligibility Recommendation |
|---|---|---|---|---|
| 8PO10086 | 33231 US 27 (Residence) | ca. 1952 | Frame Vernacular | Ineligible |
| 8PO10088 | 80 Circle Four Drive | ca. 1948 | Frame Vernacular | Ineligible |
| 8PO10089 | 120 Scenic Drive | ca. 1970 | Masonry Vernacular | Ineligible |
| 8PO10090 | 100 Scenic Highway | ca. 1930 | Frame Vernacular | Ineligible |
| 8PO10091 | 2305 Myrtle Street | ca. 1936 | Frame Vernacular | Ineligible |
| 8PO10092 | 2310 S 9th Street | ca. 1952 | Frame Vernacular | Ineligible |
| 8PO10094 | 801 Scenic Highway S/Alta Vista Elementary School (Building 1) | ca. 1962 | International | Individually Ineligible; Contributing to 8PO10093 |
| 8PO10095 | 801 Scenic Highway S/Alta Vista Elementary School (Building 2) | ca. 1962 | International | Individually Ineligible; Contributing to 8PO10093 |
| **Resource Groups / Linear Resources** | | | | |
| 8PO09983 | Florence Citrus Growers Association Historic District | n/a | Historic District | Insufficient Information |
| 8PO10056 | 1 Gardenia Drive NE/Lucerne Lakeside MHP | ca. 1964 | Resource Group (Building Complex) | Ineligible |
| 8PO10061 | Lucerne Park Road/SR 544 | ca. 1917 | Linear Resource | Ineligible |
| 8PO10065 | 4200 Lucerne Park Road/Willow Brook Golf Course | ca. 1967 | Designed Historic Landscape | Ineligible |
| 8PO10069 | Lake Hamilton Canal | ca. 1964 | Linear Resource | Ineligible |
| 8PO10070 | 271 Lakeside Ranch Circle/Lakeside Ranch MHP | ca. 1970 | Resource Group (Building Complex) | Ineligible |
| 8PO10093 | 801 Scenic Highway S/Alta Vista Elementary School | ca. 1962 | Resource Group (Building Complex) | Eligible |
| **Bridges** | | | | |
| 8PO10087 | SR 544 over Lake Hamilton Creek (FDOT No. 160147) | ca. 1965 | Box Culvert | Ineligible |

The 108 extant historic resources include: 98 buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10094, 8PO10095, 8PO10132, 8PO10133) constructed between ca. 1895 and 1977, three building complex resource groups (8PO10056, 8PO10070, 8PO10093), one historic district (8PO09983), and one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087).

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133), five appear eligible (8PO03077, 8PO03079, 8PO10093, 8PO10094, and 8PO10095), and the newly identified historic district (8PO09983) has insufficient information to make a determination. The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133) constructed between circa (ca.) 1895 and 1977, two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources

(8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). A total of five historic resources within the APE appear eligible for listing in the NRHP. Of these, two buildings (8PO03077 and 8PO03079) were previously recorded but 8PO03077 has not been evaluated by the SHPO and 8PO03079 was found to have insufficient information. The Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095) were newly identified. Furthermore, the Florence Citrus Growers Association Historic District (8PO09983) has insufficient information for evaluating the NRHP eligibility of the historic district.

Below are descriptions and photographs of the five NRHP eligible resources, the historic district, as well as general descriptions and selected examples of the architectural styles and resource types represented within the APE. A new FMSF form was prepared for the 100 newly identified resources and an updated FMSF form was prepared for the three previously recorded resources (**Appendix D**). A letter was prepared to notify the FMSF of the two demolished buildings and is contained in **Appendix E**.

## NRHP-Listed, Eligible, or Potentially Eligible Historic Resources

Within the APE, five historic resources appear eligible for listing in the NRHP. These include one Colonial Revival style building (8PO03077), one Craftsman style building (8PO03079), and the newly identified Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095). The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.



**Photo 5.8.** 2208 Peninsular Drive (8PO03077), looking west.

**8PO03077:** The Colonial Revival style building at 2208 Peninsular Drive was constructed in ca. 1915 (**Photo 5.8**). The 2.5-story, irregular plan building rests on a rusticated concrete pier foundation and has a wood frame structural system clad in weatherboard. The complex roof line comprised of a primary hip roof with hip dormers, hip extensions, and half-hip porches is covered with composition shingles. A brick chimney is located within the slope of the primary hip roof on the west elevation. The main entryway is on the east elevation through a single door with an inset rectangular light and screen door within a wrap-around open porch beneath a half hip roof with squared column supports and balustrade. The segment of the porch that extends to the south elevation has been enclosed. Visible windows include a mixture of individual and paired, one-over-one wood double-hung sash units, and an individual wood picture window comprised of a central fixed pane flanked with one-over-one single-hung-sash units. Distinguishing architectural features include wide, overhanging eaves with boxed rafter tails, corner pilasters, wooden trim around the windows and doors, and wooden foundation lattice. Alterations include replacement roofing and the segment of enclosed porch on the south elevation. A non-historic detached garage is located to the northwest of the building. Overall, the building has minimal material alterations, and the enclosed segment of the wrap-around porch does not significantly detract from the overall design and massing of the residence. As such, 8PO03077 appears individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of a Colonial Revival style residence in Haines City. In addition, the resource appears to be a contributing resource to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings (Shiver 1993; Survey No. 06287).



**Photo 5.9.** 128 Scenic Highway (8PO03079), looking south.

**8PO03079:** The Craftsman style building at 128 Scenic Highway was constructed in ca. 1925 (**Photo 5.9**). The two-story, irregular plan building rests on a continuous brick foundation and has a wood frame structural system clad in novelty siding. The clipped gable roofs are covered with composition shingles, as well as the gable roof porte-cochere. A brick chimney is located on the eave end of the west elevation. The main entryway is on the north elevation through a single wooden door with nine inset lights and a screen door within a partial width open porch beneath a clipped gable roof. The porch is supported by squared wooden porch supports on brick piers and lined with brick half walls. Visible windows include a mixture of individual, paired, and grouped (3), one-over-one, three-over-one, six-over-one, and eight-over-one wood double-hung sash units. Distinguishing architectural features include overhanging eaves with exposed rafter tails, wooden brackets, wood trim around the windows and doors, rectangular gable vents, and wood porch supports on brick piers. A gable roof porte-cochere is located on the east elevation of the building with a second story room located above the driveway. Alterations include replacement roofing. A historic detached garage is located to the south of the building but is not visible from the public right-of-way. Overall, the resource has not been significantly altered and appears to retain most of the original materials and character defining features. As such, 8PO03079 appears individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of a Craftsman style residence in Haines City. In addition, the resource appears to be a contributing resource to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings (Shiver 1993; Survey No. 06287).



**Photo 5.10.** 801 Scenic Highway S/Alta Vista Elementary School (8PO10093; 8PO10094 and 8PO10095), looking northeast.

**8PO10093:** Alta Vista Elementary School is a building complex resource group located at 801 Scenic Highway S (**Photo 5.10**). Alta Vista Elementary School was one of three air-conditioned elementary schools opened in Polk County in 1962 (Tampa Tribune 1962). Within the boundaries of the resource group, as contained within the APE, there are two contributing resources. These include two International style buildings (8PO10094 & 8PO10095), constructed in ca. 1962. It was beyond the scope of work for this CRAS to identify all resources within the entire resource group, and only permanent structures within the APE visible from the right-of-way were evaluated.

In 1961, the Polk County School Board introduced plans for the county's first climate-controlled school in Mulberry (Dobert 1961). The proposition led to significant controversy amongst the public as it was feared the costs would be high, therefore increasing taxes, and at the time there was little evidence that climate-controlled environments were more conducive to learning. Many believed the school board should wait for more detailed information from "an experimental air-conditioned school" located in Pinellas County (Dobert 1961). Those in favor argued that the costs would not be significant and that criminals are provided air-conditioned jail cells – the children should be afforded the same amenities. The issue of climate-controlled schools was a topic of debate in several surrounding counties in 1961, including Hillsborough County, Sarasota County, and Pinellas County (Tampa Tribune 1961a). A major opponent of the Polk County efforts – the Polk County Property Owners League – referred to the efforts to construct climate-controlled schools as an "unsubstantiated expenditure of our school funds for an experiment which no one has proven will aid our children's education" (Tampa Tribune 1961b). Plans were not limited to one school, however, as a total of three were planned for opening in time for the 1962-1963 school year – Kingsford Elementary in Mulberry, Lake Elbert Elementary in Winter Haven, and Alta Vista Elementary in Haines City (Tampa Tribune 1961b). The approval of these schools set the precedent for future school construction in Polk County, ending the nearly yearlong controversy, with two additional "compact, full air-conditioned" elementary schools approved and planned for construction in 1962 (Orlando Sentinel 1961).

Alta Vista Elementary was the first set to be completed in February 1962 at an approximate cost of $255,000 (Orlando Sentinel 1961). The original design was equipped to handle 360 elementary students with a total of 12 classrooms, office space, and a cafetorium (a combined cafeteria and auditorium space) and could be expanded with an additional 12 classrooms in future without destroying the original design (Orlando Sentinel 1961). To decrease construction costs and improve the efficiency of the air-conditioning, a compact version of the "finger-type" school design was utilized at Alta Vista, as well as Lake Elbert and Kingsford (Tampa Tribune 1961c). This school design was prominent throughout the United States following World War II. In order to accommodate the post-WWII "baby boom" and building boom, school design became more lightweight in construction compared to previous multi-story, grand brick buildings. Similar to the Ranch style houses popular at the time, schools became more spread out in plan with flat roofs, decreased ornamentation, and often used brick or concrete with glass or metal window wall systems often in the International style (ICON Architecture, Inc. 2003; Baker 2012). The popular "finger plan" often had an E-shaped footprint with rows of classrooms (the "fingers") along covered, open air corridors separated by grassy courts (Icon Architecture, Inc. 2003). With this design, classrooms were provided direct access to the school grounds with entrances along covered walkways, as well as maximum circulation of fresh air and natural light (Baker 2012). In addition, the segmented design allowed for the schools to be expanded as needed without significantly altering the design of the campus – an important feature during a time of increasing population growth.

Overall, the Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

## Ineligible Historic Resources

Of the 108 historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133). The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133), two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087). The architectural styles represented are Masonry Vernacular (56), Frame Vernacular (23), No Style (11), Ranch (2), Commercial (1), and Industrial Vernacular (1). In general, the historic resources are associated with the residential development of the unincorporated areas of Winter Haven and Haines City in Polk County between 1895 – 1977. The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during

the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.



**Photo 5.11.** Masonry Vernacular style building (8PO10024) located at 2209 Lucerne Park Road, looking northwest.




**Photo 5.12.** Masonry Vernacular style building (8PO10068) located at 5900 Lucerne Park Road, looking west.

**Masonry Vernacular:** A total of 56 historic resources (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10040, 8PO10042, 8PO10044, 8PO10046, 8PO10048, 8PO10049, 8PO10055, 8PO10057, 8PO10062 – 8PO10064, 8PO10067, 8PO10068, 8PO10075 – 8PO10083, 8PO10085, 8PO10089) within the APE are of the Masonry Vernacular style (**Photos 5.11 and 5.12; Appendix C**). The majority of these resources are single or multi-family residences; however, commercial properties and churches are also present. These resources have construction dates that range from ca. 1932 to ca.

1977. Masonry Vernacular style buildings reflect the local customs, environment, and building materials, and do not rely on academic architectural vocabulary for their design and ornament. Within the APE, the resources generally have a concrete slab or continuous concrete block foundations and concrete block walls, and the windows are typically a mixture of single-hung sash, awning, picture, or fixed. Roof types commonly consist of gable or hip, most of which are clad with composition shingles. The exterior cladding often consists of painted concrete block, stucco, and artificial masonry or brick veneer. Most display replacement windows and roofs, fenestration changes, and additions. Of these, 19 Masonry Vernacular style buildings (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10027), are contributing resources to the Florence Citrus Growers Association Historic District (8PO09983).



**Photo 5.13.** Frame Vernacular style building (8PO10016) located at 101 Avenue V NW, looking north.



**Photo 5.14.** Frame Vernacular style building (8PO10066) located at 3200 Old Lucerne Park Road, looking southeast.

**Frame Vernacular**: A total of 23 historic resources (8PO03084, 8PO03085, 8PO08601, 8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016, 8PO10041, 8PO10043, 8PO10045, 8PO10047, 8PO10052, 8PO10054, 8PO10066, 8PO10086, 8PO10088, 8PO10090 – 8PO10092, 8PO10133) within the APE are of the Frame Vernacular style (**Photos 5.13 and 5.14;**

**Appendix C**) and have construction dates that range from ca. 1895 to 1970. Of these, three (8PO03084, 8PO03085, 8PO08601) were previously recorded during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resources have not been significantly altered since this determination and as such, were not updated during this survey. The majority of the resources represented in this style are single-family residences. Frame Vernacular style buildings are simple structures built with available local materials and boasting little ornamentation (McAlester 2013). They are often built by developers, contractors, master carpenters, or the building's occupants. These buildings are decidedly practical structures. Within the APE, this building type has pier, continuous, or slab foundations. Gable roofs are most common, and the majority of the roofs are clad with composition shingles or sheet metal. The majority of these buildings are clad in wood siding, vinyl, or stucco. Fenestration typically includes single-hung sash windows, but awning and fixed windows are also present. Exterior ornamentation is minimal, and typically consists of wood window and door surrounds, corner boards, gable vents, and overhanging eaves with boxed rafter tails. The majority display alterations or additions, such as replacement siding and windows and living-space additions. Of these, seven Frame Vernacular style buildings (8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016), are contributing resources to the Florence Citrus Growers Association Historic District (8PO09983).



**Photo 5.15.** Mobile home with no style (8PO10060) located at 119 Ixora Drive, looking northeast.



**Photo 5.16.** Mobile home with no style (8PO10084) located at 1499 US 27 N, looking northeast.

**No Style**: Eleven (11) historic resources within the APE are buildings with no style (8PO08599, 8PO10050, 8PO10051, 8PO10058, 8PO10059, 8PO10060, 8PO10071 – 8PO10074, 8PO10084) and have construction dates that range from ca. 1968 to ca. 1976 (**Photos 5.15 and 5.16; Appendix C**). Of these, one (8PO08599) was previously recorded during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resource has not been significantly altered since this determination and as such, was not updated during this survey. The newly identified historic resources with no style are mobile homes of the single-wide and double-wide variety, and all display alterations or additions. This building type usually rests on a pier foundation that is covered by metal skirt panels. Metal awning or single-hung sash windows with clamshell hurricane awnings are most common, and exterior ornamentation is minimal. These manufactured buildings have no style and are simply built in a factory with a steel chassis to allow for the ability to be moved.



**Photo 5.17.** Ranch style building (8PO10017) located at 2255 1st Street N, looking east.



**Photo 5.18.** Ranch style building (8PO10053) located at 96 Hilltop Drive, looking east.

**Ranch:** Two historic resources (8PO10017 and 8PO10053) within the APE are of the Ranch style (**Photos 5.17 and 5.18; Appendix C**). These are residential buildings that were constructed in ca. 1969 and ca. 1972, respectively. The style, which gained popularity after World War II, features low-slung buildings and a low-pitched roof with large windows (McAlester 2013). Within the APE, this building type has continuous concrete block foundations. The gable roofs are clad with composition shingles, while the buildings are clad in a mixture of painted concrete block, stucco, brick veneer, and

wood siding. Fenestrations include metal awning and single-hung sash windows. Exterior ornamentation is minimal, and consists of wide roof overhangs, shutters, and concrete windowsills. The resources display alterations or additions, such as replacement roofing, siding, and windows, as well as living space additions and enclosed carports. One Ranch style building (8PO10017) is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).



**Photo 5.19.** Industrial Vernacular style building (8PO10005) located at 2101 1st Street N, looking west.

**Industrial Vernacular**: One Industrial Vernacular style building (8PO10005) is located within the APE (**Photo 5.19; Appendix C**). The building was constructed in ca. 1958 and has a continuous concrete block foundation with a steel skeleton structural system and a gable roof with two shed roof segments. The building exterior, as well as the roof, are clad with metal; however, some patches of vinyl and plywood siding are present. Similar to Masonry Vernacular and Frame Vernacular style buildings, Industrial Vernacular style structures are simply built with available local materials and display little ornamentation. The building is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).



**Photo 5.20.** Commercial style building (8PO10001) located at 105 Martin Luther King Blvd NW, looking north.

**Commercial**: One Commercial style building (8PO10001) is located within the APE (**Photo 5.20; Appendix C**). The building was constructed in ca. 1960 and consists of a single retail unit beneath a flat roof and crenelated parapet. The entrance is through double metal frame doors with full-view glass panels. The building exterior is clad with stucco scored with a grid pattern and circles. Full-length, fixed pane windows with metal frames line the south elevation, and exterior ornamentation is minimal. The Commercial style building within the APE display's fenestration alterations, as well as new roofing and siding, and the removal of a covered walkway. The building is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).



**Photo 5.21.** SR 544 over Lake Hamilton Creek (FDOT 160147) (8PO10087), looking northwest.

**Bridges & Culverts:** One bridge (8PO08606) and one culvert (8PO10087) are located within the APE. These include the ca. 1964 Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021/8PO08608) bridge and the ca. 1965 SR 544 over Lake Hamilton Creek (FDOT No. 160147/8PO10087) culvert. The Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021/8PO08608) is a concrete slab bridge that was updated during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resource has not been significantly altered since this determination and as such, was not updated during this survey.

The SR 544 over Lake Hamilton Creek (FDOT No. 160147/8PO10087) is a concrete box culvert constructed in ca. 1965 in order to carry SR 544 over Lake Hamilton Creek, also known as the Lake Tracey Canal (**Photo 5.21**). The overall dimension of the culvert measures approximately 10-ft long and 62-ft wide with a roadway width of approximately 32-ft. The structure consists of two squared concrete barrels with straight concrete wing walls. Metal guardrails are located along the north and south edge of the roadway. The culvert is a typical example of a common Post-1945 concrete culvert found throughout Florida. This type of culvert was constructed as part of the massive expansion of the State's road system in the decades following the end of World War II (Parsons Brinckerhoff 2005). The culvert within the APE does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. Furthermore, the culvert falls under the ordnance with the Advisory Council on Historic Preservation (ACHP) Program Comment for Streamlining Section 106 Review for Actions Affecting Post-1945 Concrete and Steel Bridges/culverts issued in November 2012, and is excluded from individual Section 106 consideration by the Program Comment for Common Post-1945 Concrete and Steel Bridges (Federal Register 2012:68793). Background research did not reveal any historic associations with significant persons and/or events. Thus, due to the commonality of design and lack of significant attributes or association, 8PO10087 does not appear eligible for listing in the NRHP, either individually or as part of a historic district.

**Resource Groups:** There are three (3) resource groups within the APE (8PO10056, 8PO10065, 8PO10070) (**Table 5.6; Appendix C**). These include two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065). Only the portions of the resource groups that are located within the APE were recorded, as a survey of the entire resource groups is beyond the scope of work for this project. No contributing resources for the Willow Brook Golf Course (8PO10065) are located within the APE. The historic buildings that contribute to the mobile home parks are mostly mobile homes or associated facilities such as offices or community centers. All contributing buildings listed below are typical examples of their respective styles and construction.

**Table 5.6.** Historic Resource Groups within APE.

| FMSF No. | Address/ Name | No. Contrib. Buildings | Build Dates | Style(s) |
|---|---|---|---|---|
| 8PO10056 | 1 Gardenia Drive NE/Lucerne Lakeside MHP | 4 (8PO10057, 8PO10058, 8PO10059, 8PO10060) | ca. 1964 to ca. 1971 | Masonry Vernacular (8PO10057); Mobile Home/No Style (8PO10058, 8PO10059, 8PO10060) |
| 8PO10065 | 4200 Lucerne Park Road/Willow Brook Golf Course | None within the APE | ca. 1967 | N/A |
| 8PO10070 | 271 Lakeside Ranch Circle/Lakeside Ranch MHP | 4 (8PO10071 – 8PO10074) | ca. 1971 to ca. 1976 | Mobile Home/No Style (8PO10071 – 8PO10074) |

**Linear Resources:** There are three (3) linear resources within the APE (8PO05391, 8PO10061, 8PO10069) (**Table 5.7; Appendix C**). The Peace Creek Drainage Canal (8PO05391) and Lake Hamilton Canal (8PO10069) are common examples of canals found throughout Polk County and the State of Florida, lack unique design and/or engineering features, and background research did not reveal any historic associations with significant persons and/or events. Similarly, the surveyed segment of Lucerne Park Road/SR 544 (8PO10061) is a common two-lane roadway found throughout Polk County, without historic paving or markers. It lacks specific design features or characteristics that would differentiate it from other similar roads and was realigned during the 1960s. Its setting within the APE has been greatly altered with the construction of residential subdivisions and the introduction of modern traffic signage along the road. As a result, the linear resources (8PO05391, 8PO10061, 8PO10069) within the APE do not appear eligible for listing in the NRHP, individually or as part of a district.

**Table 5.7.** Linear Resources within the APE.

| FMSF No. | Name / Address | Build Date | Type |
|---|---|---|---|
| 8PO05391 | Peace Creek Drainage Canal | ca. 1915 | Canal |
| 8PO10061 | Lucerne Park Road/SR 544 | ca. 1917 | Road |
| 8PO10069 | Lake Hamilton Canal | ca. 1964 | Canal |

## Insufficient Information

**8PO09983:** The Florence Citrus Growers Association Historic District is located in Sections 16 and 17 of Township 28 South, Range 26 East in the Florence Villa community of Winter Haven, Florida (USGS 1959). The proposed boundary for the Florence Citrus Growers Association Historic District was loosely set in order to determine where the project improvements entered and left the historic district within the project APE. The proposed boundary for the district is bounded by Martin Luther King Boulevard to the south, Ware Avenue NE to the north, 2nd Street NE to the east, and the former Atlantic Coast Line (ACL) Railroad to the west (**Figure 5.11**). Within the APE, the historic district spans approximately 200 ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. Within the proposed boundaries, as contained within the APE for the corridor and ponds, there are 29 contributing resources (8PO09999 through 8PO10027). These include 19 Masonry Vernacular style buildings (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10027), seven Frame Vernacular style buildings (8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016), one Commercial style building (8PO10001), one Industrial Vernacular style building (8PO10005), and one Ranch style building (8PO10017), constructed between circa (ca.) 1918 – 1974. Six non-contributing resources are located within the historic district, as contained within the APE, and were not recorded as they are considered non-historic (constructed after 1977) for the purposes of this Cultural Resource Assessment Survey (CRAS).

The community of Florence Villa, originally called "Wahneta," was settled in 1884. The community was settled by Frederick W. Inman and his wife, Florence Jewett Inman, and was renamed in honor of Mrs. Inman in 1904 (Johnston 1997). Inman experimented with the agricultural potential of the area, including a citrus grove on 100 acres of his large property. Inman and his wife constructed a large residence on Spring Lake which they eventually developed into the Florence Villa Hotel, welcoming guests such as Henry B. Plant (Johnston 1997). The community of Florence Villa, which thrived in its early years due to the citrus and hospitality businesses of the Inmans, was incorporated in 1917 and in 1923 merged with the city of Winter Haven (Gernert Jr. 2014).

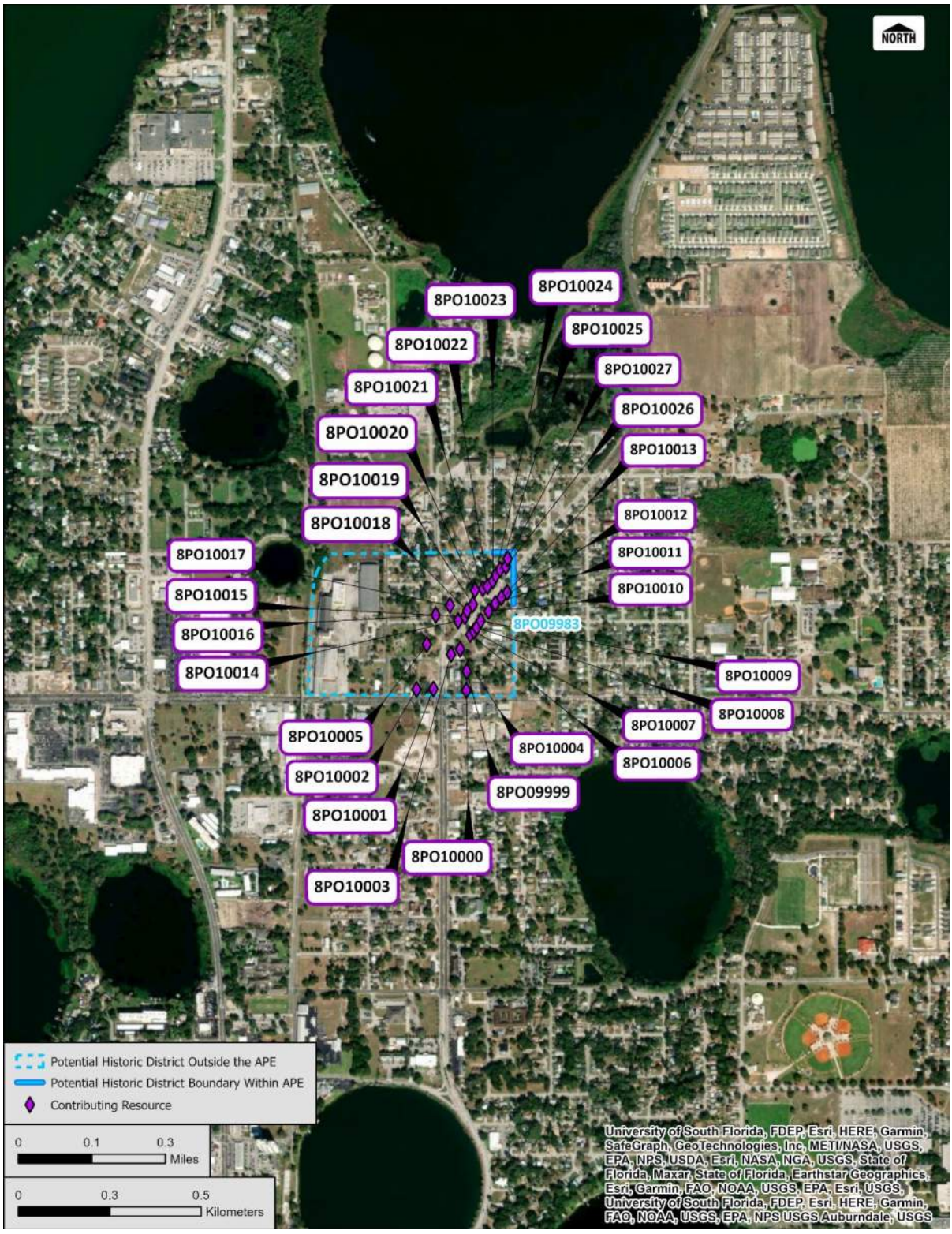



**Figure 5.11.** Approximate location of the shovel tests within the APE.

Frederick Inman became a pioneer of the citrus industry, which was prominent in the economy of the Winter Haven area. Inman was a leader in the establishment of the Florida Citrus Exchange in 1909, serving on the statewide organizational committee and as the Florida Citrus Exchange's first

president. During the same year, Inman also established the Florence Citrus Growers Association, which was located at 303 Avenue T NW, adjacent to the ACL Railroad. The original wood frame packing house was replaced by a large masonry building – one of the largest buildings constructed in Winter Haven during the Great Depression – which remains extant (8PO05737). The facility was expanded in 1949 and 1953 by the addition of a concentrate factory and a cold storage facility, respectively. The overall facility, which included a frozen orange juice plant, fresh fruit packing house, warehouse, and icehouse, was sold to General Foods-Birdseye Corporation in 1959 (Johnston 1997). In 1920, the Florence Citrus Growers Association was platted to the north and east of the packinghouse (Polk County 1920). The subdivision is believed to have been platted as a neighborhood for packing house workers; however, this could not be confirmed (Burr 1974).

It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. Limited information regarding the Florence Citrus Growers Association subdivision was found during historic background research, as such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

## 5.3 Conclusions

The FDOT, District One, is proposing roadway improvements to SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles. The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/FPC sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional ROW will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

The results of background research and archaeological field survey, including a visual reconnaissance and excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor. As a result, no archaeological sites were identified and no evidence of the two previously identified sites located within the APE was found: 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site). Homer's Grove Site (8PO04797) appears potentially destroyed by disturbance from the distribution center and driveway development; therefore, is considered ineligible for listing in the NRHP given the lack of recovered evidence of the site. The Whittaker Site (8PO05426) was determined not eligible for listing in the NRHP by the SHPO in 1998 and ACI concurs with this evaluation. In addition, the Lake Tracey Canal (8PO05407) is within a portion of the APE, but no testing was deemed necessary given that it is a canal and the SHPO determined it not eligible for listing in the NRHP. One AO was found; AO's are not sites and are not considered eligible for listing in the NRHP. As such, no archaeological sites that are listed, determined eligible for listing, or that appear potentially eligible for listing in the NRHP were located within the archaeological APE.

Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE. This includes 100 newly identified historic resources (8PO09983, 8PO09999 –

8PO10095, 8PO10132, 8PO10133), seven (7) extant previously recorded historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606), and an unrecorded segment of the Peace Creek Drainage Canal (8PO05391). Of the seven (7) extant previously recorded historic resources located within the APE, two (8PO03077 and 8PO03079) were updated and re-evaluated and five (8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606) were not updated because they were previously evaluated by the SHPO as ineligible for listing in the NRHP and no changes were observed during the field survey. Of these, 104 historic resources are within the mainline corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no longer extant.

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for individual listing in the NRHP. This total includes 94 buildings constructed between circa (ca.) 1895 and 1977 (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133), two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.

Five historic resources within the APE appear eligible for listing in the NRHP. These include one Colonial Revival style building (8PO03077), one Craftsman style building (8PO03079), and the newly identified Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095). The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

In addition, the Florence Citrus Growers Association Historic District (8PO09983) is located within the APE. The historic district spans approximately 200-ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. This portion of the historic district is comprised of 29 contributing resources (8PO09999 through 8PO10027) that were constructed between ca. 1918 – 1974. Six non-contributing resources, as contained within the APE, are located within the historic district, and were not recorded as they are considered non-historic (constructed after 1977) for the purposes of this CRAS. It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. Limited information regarding the Florence Citrus Growers Association subdivision was found during historic background research, as such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

The proposed work being conducted within the APE includes ROW acquisition for the road widening and construction of a sidewalk, as well as the installation of traffic separators. The proposed new ROW will be approximately 20-ft from the two residential buildings (8PO03077 and 8PO03079) and approximately 140-ft from the school (8PO10093). These resources are located between Myrtle Avenue and S 10th Street where the road widening will occur to the south of SR 544. Of the five potentially eligible resources, the Craftsman style building located at 128 Scenic Highway (8PO03079) is on the south side of SR 544 and the remaining properties are on the north side. In addition, to these improvements, work within the proposed district includes one pond site (Pond 1A) along 1st Street N between Avenue U NW and Avenue V NW. Furthermore, ROW widening will impact two contributing resources (8PO10001 and 8PO10003); however, both of these resources appear individually ineligible for listing in the NRHP. Based on these results, further coordination may be required.

# *APPENDIX H*

**Natural Resources Evaluation Report**

# NATURAL RESOURCES EVALUATION

Florida Department of Transportation

District One

State Road 544 (Lucerne Park Road) Project Development and Environment Study

From Martin Luther King Boulevard to State Road 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

ETDM Number: 5873

Date: July 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

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# EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District one, is conducting a Project Development and Environment (PD&E) Study to evaluate the proposed widening of State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard (Avenue T) to SR 17 in Polk County, a length of approximately 7.96 miles. This project involves the widening of SR 544 from two lanes to four lanes to meet future travel demands, improving safety and providing for bicycle and pedestrian features, such as a shared use path.

This Natural Resources Evaluation (NRE) has been prepared as part of the PD&E Study to assess the widening alternatives and identify potential impacts to natural resources throughout the SR 544 corridor. The purpose of this NRE is to document protected species and habitat and identify the location of wetlands and surface waters within the project corridor in order to determine potential impacts to these resources, provide rationale to support species effect determinations, identify avoidance and minimization measures, and quantify mitigation necessary for the recommended preferred alternative. This NRE has been prepared in accordance with the *Wetlands and Other Surface Waters* and *Protected Species and Habitat* chapters of the FDOT's *PD&E Manual* (FDOT 2020) and the current Natural Resources Evaluation Outline and Guidance (FDOT 2022).

The Preferred Alternative is located within the US Fish and Wildlife Service (USFWS) Consultation Area (CA) of the Audubon's crested caracara (*Polyborus plancus audubonii*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida bonneted bat (*Eumops floridanus*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), sand skink (*Neoseps reynoldsi)* and blue-tailed mole skink (*Eumeces egregious lividus*), and Lake Wales Ridge plants. The Preferred Alternative falls within the Core Foraging Area (CFA) for five wood stork (*Mycertia americana*) colonies. The existing habitats in the study area may also support other federally protected species, as well as many state protected species. Effect determinations were based on the results of general wildlife and species-specific surveys, data collection, and USFWS' effect determination keys. **Table ES-1** identifies protected species evaluated in this document, their regulatory status, and the effect determination under the Preferred Alternative.

## Table ES-1: Effect Determinations for Protected Species

| Scientific Name | Common Name | Status | Effect Determination |
|---|---|---|---|
| **Birds** | | | |
| *Ammodramus savannarum floridanus* | Florida Grasshopper Sparrow | FE | NO EFFECT |
| *Aphelocoma coerulescens* | Florida Scrub-jay | FT | NO EFFECT |
| *Athene cunicularia floridana* | Burrowing Owl | ST | NAEA |
| *Egretta caerulea* | Little Blue Heron | ST | NAEA |
| *Egretta tricolor* | Tricolored Heron | ST | NAEA |
| *Falco sparverius paulus* | Southeastern American Kestrel | ST | NAEA |
| *Grus canadensis pratensis* | Florida Sandhill Crane | ST | NAEA |
| *Haliaeetus leucocephalus* | Bald Eagle | BGEPA/MGTA | -- |
| *Laterallus jamaicensis jamaicensis* | Eastern Black Rail | FT | MANLAA |
| *Mycteria americana* | Wood Stork | FT | MANLAA |
| *Platalea ajaja* | Roseate Spoonbill | ST | NAEA |
| *Polyborus plancus audubonii* | Audubon's Crested Caracara | FT | MANLAA |
| *Rostrhamus sociabilis plumbeus* | Everglade Snail Kite | FE | MANLAA |
| **Mammals** | | | |
| *Eumops floridanus* | Florida Bonneted Bat | FE | NO EFFECT |
| *Perimyotis subflavus* | Tricolored Bat | C | -- |
| *Sciurus niger niger* | Southern Fox Squirrel | M | -- |
| *Ursus americanus floridanus* | Florida Black Bear | M | -- |
| **Reptiles** | | | |
| *Drymarchon corais couperi* | Eastern Indigo Snake | FT | MANLAA |
| *Eumeces egregious lividus* | Blue-tailed Mole Skink | FT | MANLAA |
| *Gopherus polyphemus* | Gopher Tortoise | ST | NAEA |
| *Pituophis melanoleucus mugitis* | Florida Pine Snake | ST | NAEA |
| *Neoseps reynoldsi* | Sand Skink | FT | MALAA |
| **Plants** | | | |
| *Bonamia grandiflora* | Florida Bonamia | FT/SE | MANLAA |
| *Calamintha ashei* | Ashe's Savory | ST | NAEA |
| *Calopogon mutliflorus* | Many-flowered Grass-pink | ST | NAEA |
| *Carex chapmanni* | Chapman's sedge | ST | NAEA |
| *Centosema Arenicola* | Sand Butterfly Pea | SE | NAEA |
| *Chionanthus pygmaeus* | Pygmy Fringe-tree | FE | MANLAA |
| *Clitoria fragrans* | Pigeon Wings | FT/SE | MANLAA |
| *Coelorachis tuberculosa* | Piedmont Jointgrass | ST | NAEA |
| *Coleataenia abscissa* | Cutthroatgrass | SE | NAEA |
| *Conradia brevifolia* | Short-leaved Rosemary | FE | MANLAA |
| *Crotalaria avonensis* | Avon Park Harebells | FE | MANLAA |
| *Dicerandra frutescens* | Scrub Mint | FE | MANLAA |
| *Eriogonum longifolium* | Scrub Buckwheat | FT/SE | MANLAA |

| Scientific Name | Common Name | Status | Effect Determination |
|---|---|---|---|
| **Plants** (continued) | | | |
| *Hartwrightia floridana* | Hartwrightia | ST | NAEA |
| *Hypericum cumulicola* | Highlands Scrub Hypericum | FE | MANLAA |
| *Illicium parviflorum* | Star Anise | SE | NAEA |
| *Lechea cernua* | Nodding Pinweed | ST | NAEA |
| *Liatris ohlingerae* | Florida Blazing Star | FE | MANLAA |
| *Lupinus aridorum* | Scrub Lupine | FE | MANLAA |
| *Matelea floridana* | Florida Spiny-pod | SE | NAEA |
| *Nemasylis floridana* | Celestial Lily | SE | NAEA |
| *Nolina atopocarpa* | Florida Beargrass | ST | NAEA |
| *Nolina brittoniana* | Britton's Beargrass | FE | MANLAA |
| *Paronychia chartacea* | Papery Witlow-wort | FT/SE | MANLAA |
| *Polygala lewtonii* | Lewton's Polygala | FE | MANLAA |
| *Polygonella basiramia* | Wireweed (Florida Jointweed) | FE | MANLAA |
| *Polygonella myriophylla* | Sandlace (Small's Jointweed) | FE | MANLAA |
| *Prunus geniculate* | Scrub Plum | FE | MANLAA |
| *Pteroglossaspis ecristata* | Giant Orchid | ST | NAEA |
| *Salix floridana* | Florida Willow | SE | NAEA |
| *Warea amplexifolia* | Clasping Warea | FE | MANLAA |
| *Warea carteri* | Carter's Mustard (Cater's Warea) | FE | MANLAA |
| *Ziziphus celata* | Florida Ziziphus | FE | MANLAA |

**MANLAA** = May Affect, Not Likely to Adversely Affect **MALAA** = May Affect, Likely to Adversely Affect
**NAEA** = No Adverse Effect Anticipated **NEA** = No Effect Anticipated
**FE** = Federally Endangered **FT** = Federally Threatened **SE** = State Endangered **ST** = State Threatened
**M** = Managed **C** = Candidate
**BGEPA** = Bald and Golden Eagle Protection Act **MGTA** = Migratory Bird Treaty Act

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area. A wetland assessment was performed for wetlands and other surface waters in accordance with the Uniform Mitigation Assessment Method (UMAM), pursuant to Chapter 62-345, Florida Administrative Code (F.A.C.), to determine the functional value provided by the wetlands and other surface waters and determine the amount of mitigation required to offset adverse impacts. Other surface waters classified as upland cut ditches and permitted reservoirs were not included in the assessment as mitigation will not be required for impacts to these surface waters. Direct impacts to jurisdictional wetlands associated with the Preferred Alternative and preferred pond/floodplain compensation sites are approximately 12.52 acres. Secondary impacts to adjacent wetlands are approximately 10.62 acres. The total project impacts result in a functional loss of 9.726 units for state and federal jurisdictional wetlands. Mitigation for unavoidable wetland impacts will be provided to satisfy all mitigation requirements of Part IV, Chapter 373 Florida Statutes (F.S.), and United States Code (U.S.C.) 1344.

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Section 7 of the Endangered Species Act (ESA), and the FDOT's PD&E Manual, the proposed project was evaluated for potential Essential Fish Habitat (EFH). No EFH is located within or adjacent to the project area. Therefore, an EFH Assessment is not required.

The proposed project was evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual. No Critical Habitat occurs within the project corridor; therefore, no impacts to Critical Habitat are anticipated as a result of the proposed project.

## 1.5 Proposed Drainage

The stormwater runoff from the project limits will be collected and conveyed via curb and gutter to the proposed offsite detention ponds. The ponds will discharge at or near the same cross drains that carry the roadway runoff in the existing condition, or directly into canals or wetlands where appropriate. Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data calculations, reasonable engineering judgment, and assumptions. Pond sizes and configurations may change during final design as more detailed information on Seasonal High-Water Table (SHWT), wetland normal pool elevation, final roadway profile design, etc. become available.

There are currently twelve (12) proposed drainage basins within the project limits. One (1) pond site alternative has been identified and analyzed for each basin.

The onsite roadway basin areas draining to the ponds were determined to be the areas within the proposed right-of-way limits. The limits of the proposed basins begin and end at the same locations as the existing condition, except for Basin 1 which was split into two smaller basins, Basin 1A and Basin 1. Additionally, another basin (Basin 8A) was added to provide a pond alternative for the quadrant roadway intersection concept that is under consideration at US 27. Attenuation in the proposed ponds is provided in all basins.

Six (6) Floodplain Impact Areas (FIAs) have been identified within the project limits. Each FIA consists of a floodplain or multiple floodplain areas that are hydraulically connected. One (1) Floodplain Compensation Site (FPC) has been identified for each FIA, except for the FIA located just west of the US 27 intersection. All the proposed FPCs are offsite scraped down areas adjacent to or hydraulically connected to the 100-year floodplain. Compensation is provided between the SHWT of the pond and the lowest of either the pond top of bank or the 100-year floodplain elevation. Most of the floodplains within the project limits are Zone AE floodplains with Base Flood Elevations (BFEs) ranging from 124.20 FT to 131.10 FT NAVD across the project limits and are associated with various lakes. A few areas of Zone A floodplains are present, mainly associated with roadside ditches or existing detention ponds. Elevations for these floodplain areas have been estimated from LIDAR data or adjacent Zone AE BFEs.

Detailed information about the proposed drainage is provided in the Pond Siting Report.

The preferred pond alternatives are shown on **Table 1-1**.

**Table 1-1: Preferred Pond Alternatives**

| Pond Site | Pond Size (ac) |
|---|---|
| Pond 1A | 0.12 |
| Pond 1 | 2.83 |
| Pond 2 | 3.83 |
| Pond 3 | 2.73 |
| Pond 4 | 2.32 |
| Pond 5 | 2.22 |
| Pond 6 | 1.69 |
| Swale 7 | 0.70 |
| Pond 8 | 2.75 |
| Swale 8A | 0.57 |
| Pond 9 | 1.25 |
| Pond 10 | 1.32 |

## 1.6 Existing Conditions

Prior to field surveys, staff ecologists reviewed the most currently available information to determine location and extent of habitats and land uses within the vicinity of the project area and whether protected species occur or have the potential to occur in these habitats and land uses. This information included land use maps provided by the Southwest Florida Water Management District (SWFWMD). The land use descriptions were based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999). Other information included but was not limited to:

- U.S. Geographic Survey (USGS) Topographic Maps (https://viewer.nationalmap.gov/launch/)
- Natural Resources Conservation Service (NRCS) Soil Maps (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
- Florida Natural Areas Inventory (FNAI) Cooperative Land Cover Maps
- (http://www.fnai.org/landcover.cfm)
- FNAI Biodiversity Matrix Map Server (https://www.fnai.org/biodiversity-matrix-intro)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps (https://www.fws.gov/wetlands/data/mapper.html)
- USFWS CA and Critical Habitats Maps (https://crithab.fws.gov/)
- USFWS Wood Stork Nesting Colonies and CFA Maps
- National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) Maps

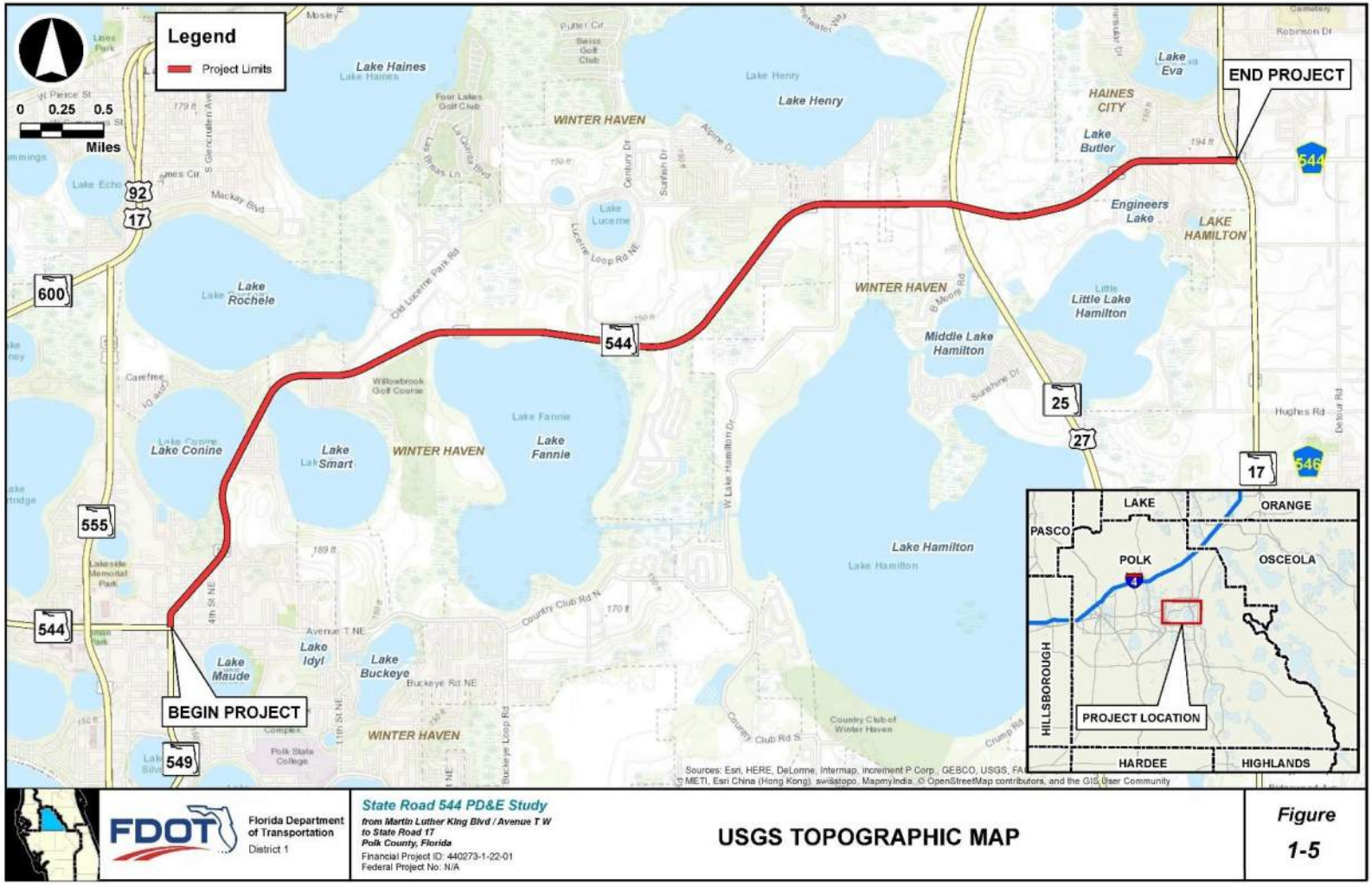
(https://www.habitat.noaa.gov/protection/efh/habitatmapper.html)

- Florida Fish and Wildlife Conservation Commission (FWC) Scrub-Jay Observation Maps (http://myfwc.com/research/gis/)
- FWC Bald Eagle Nesting Territory Maps (https://publictemp.myfwc.com/FWRI/EagleNests/nestlocator.aspx)
- Audubon Florida EagleWatch Nest Website (https://cbop.audubon.org/conservation/about-eaglewatch-program)
- FWC Red-Cockaded Woodpecker Observation Maps (http://geodata.myfwc.com/datasets/red-cockaded-woodpecker-observation-locations)
- FWC Wildlife Occurrence Maps (http://geodata.myfwc.com/datasets)
- FWC Species Action Plans (http://myfwc.com/wildlifehabitats/imperiled/species-action-plans/)
- FDOT Efficient Transportation Decision Making (ETDM) Summary Report #5873 (https://etdmpub.fla-etat.org/est/#)
- University of Florida GeoPlan Center Highest Priority eBird Data in Florida (eBird)

### 1.6.1 Topography

The SR 544 study area lies within the Northern Lake Wales Ridge region of Florida (Griffith et al. 1997). According to the USGS, elevations within the SR 544 Study Area vary from approximately 125 feet above sea level to approximately 175 feet above sea level (**Figure 1-5**). These elevations fluctuate throughout the corridor.

## Figure 1-5: USGS TOPOGRAPHIC MAP



### 1.6.2 Vegetative Communities and Land Use

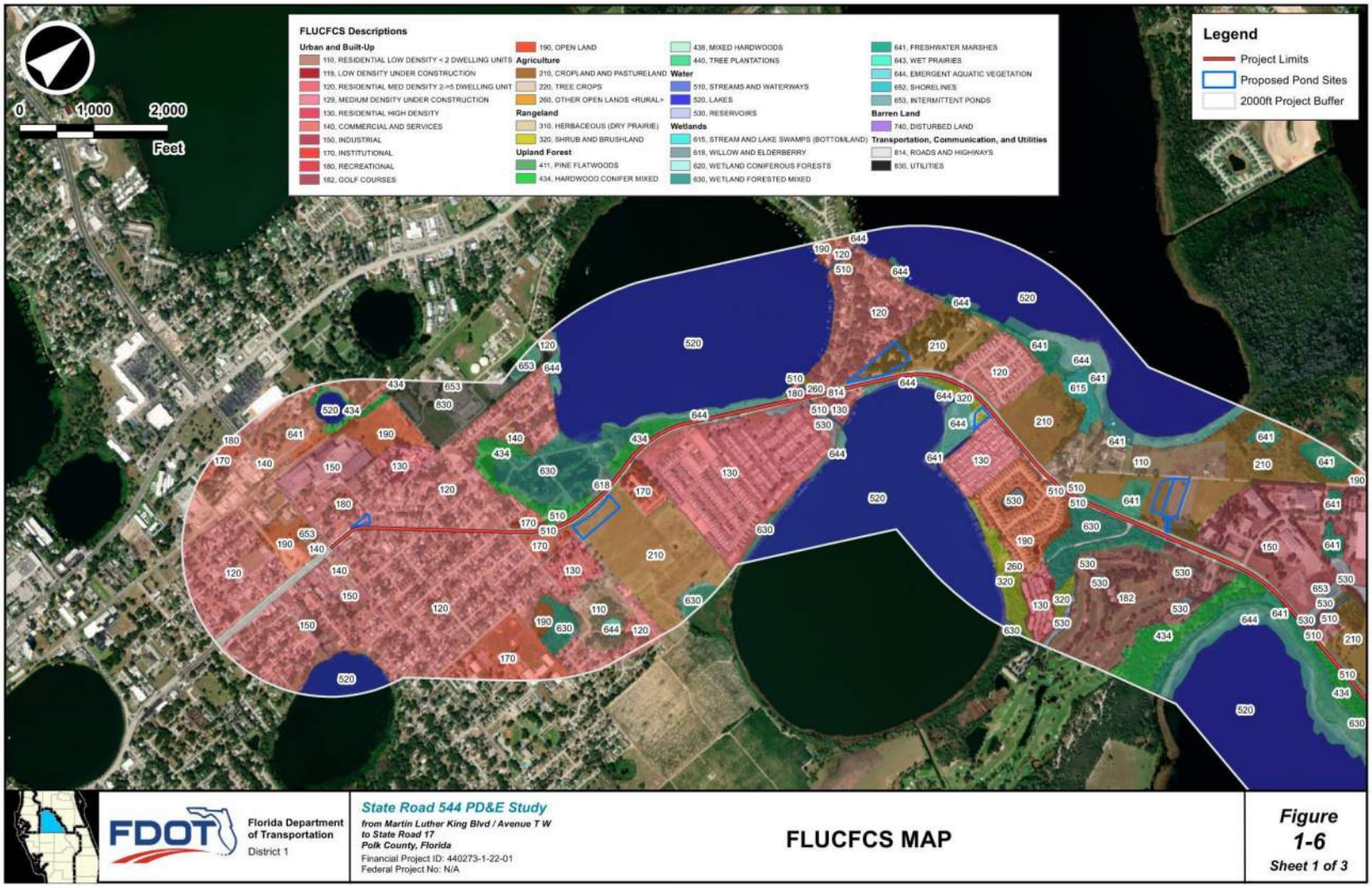
The land uses within the SR 544 Study Area were first characterized by SWFWMD online resources and later modified or delineated by ecologists to reflect field observations made at the time of the study. The SR 544 Study Area contains a mixture of several FLUCFCS types including urban and built-up, agriculture, rangeland, upland forests, water, wetland, barren land, and transportation or other linear utilities (**Figure 1-6**). A detailed list of the land uses within the study area is provided in **Table 1-2** along with additional descriptions of the land uses in **Appendix A**. Photographs of representative habitats in the study area are provided in **Appendix B**.

**Table 1-2: FLUCFCS within the SR 544 Study Area**

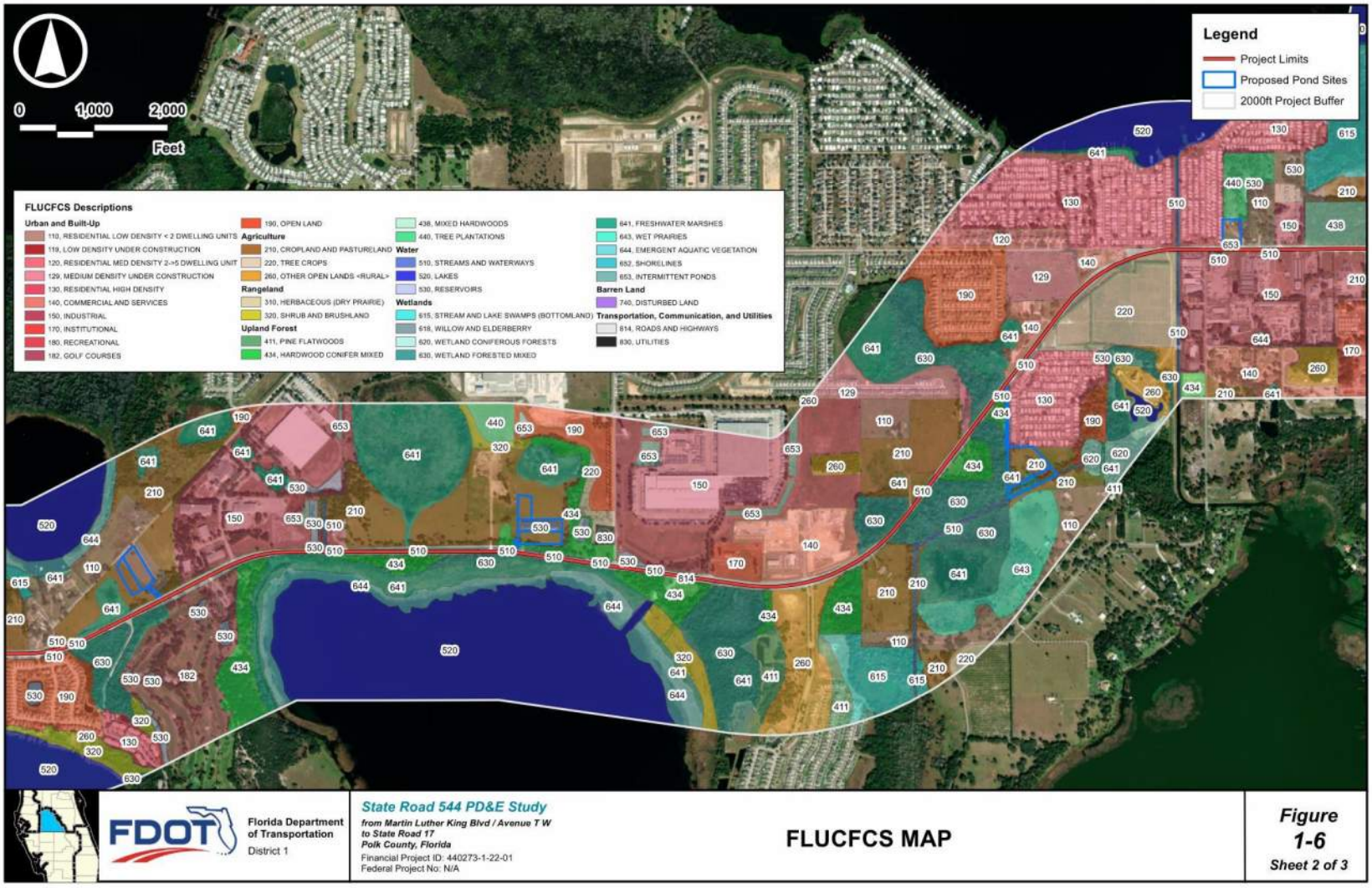
| FLUCFCS Code | FLUCFCS Description | Area (ac.) |
|---|---|---|
| 110 | Residential Low Density | 150 |
| 119 | Low Density Under Construction | 78 |
| 120 | Residential Medium Density | 447 |
| 130 | Residential High Density | 255 |
| 140 | Commercial and Services | 109 |
| 150 | Industrial | 289 |
| 170 | Institutional | 126 |
| 180 | Recreational | 3 |
| 182 | Golf Courses | 53 |
| 190 | Open Land | 169 |
| 210 | Cropland and Pastureland | 511 |
| 220 | Tree Crops | 149 |
| 260 | Other Open Lands (Rural) | 95 |
| 320 | Shrub and Brushland | 32 |
| 411 | Pine Flatwoods | 15 |
| 434 | Hardwood Conifer Mixed | 96 |
| 438 | Mixed Hardwoods | 18 |
| 440 | Tree Plantations | 84 |
| 510 | Streams and Waterways | 8 |
| 520 | Lakes | 645 |
| 530 | Reservoirs | 12 |
| 615 | Streams and Lake Swamps (Bottomland) | 77 |
| 618 | Willow and Elderberry | 2 |
| 620 | Wetland Coniferous Forests | 10 |
| 630 | Wetland Forested Mixed | 180 |
| 641 | Freshwater Marshes | 168 |

| FLUCFCS Code | FLUCFCS Description | Area (ac.) |
|---|---|---|
| 643 | Wet Prairies | 110 |
| 644 | Emergent Aquatic Vegetation | 84 |
| 653 | Intermittent Ponds | 14 |
| 740 | Disturbed Land | 26 |
| 810 | Transportation | 103 |
| 814 | Roads and Highways | 14 |
| 830 | Utilities | 23 |

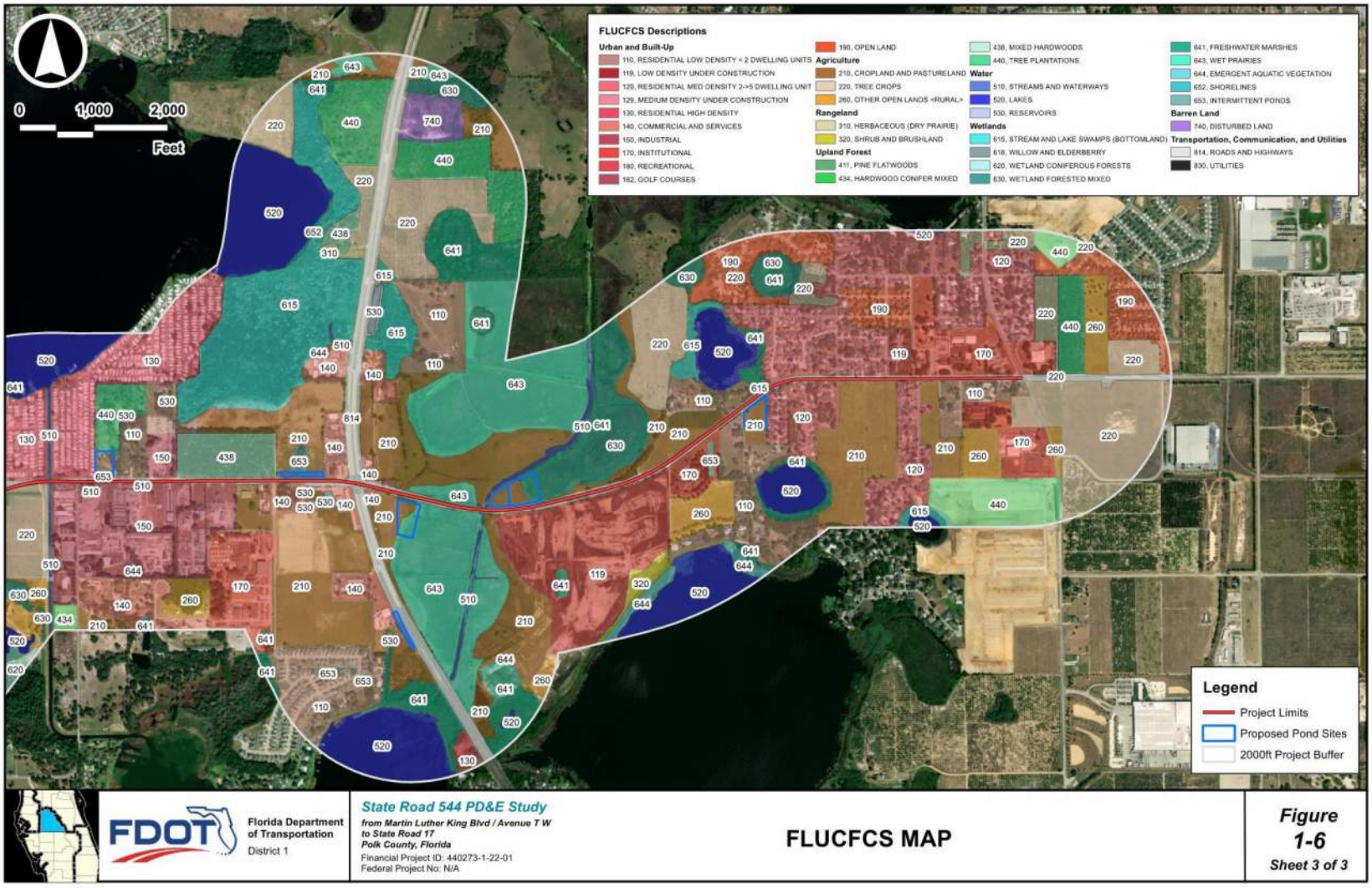
## Figure 1-6: FLUCFCS Map



## Figure 1-6: FLUCFCS Map



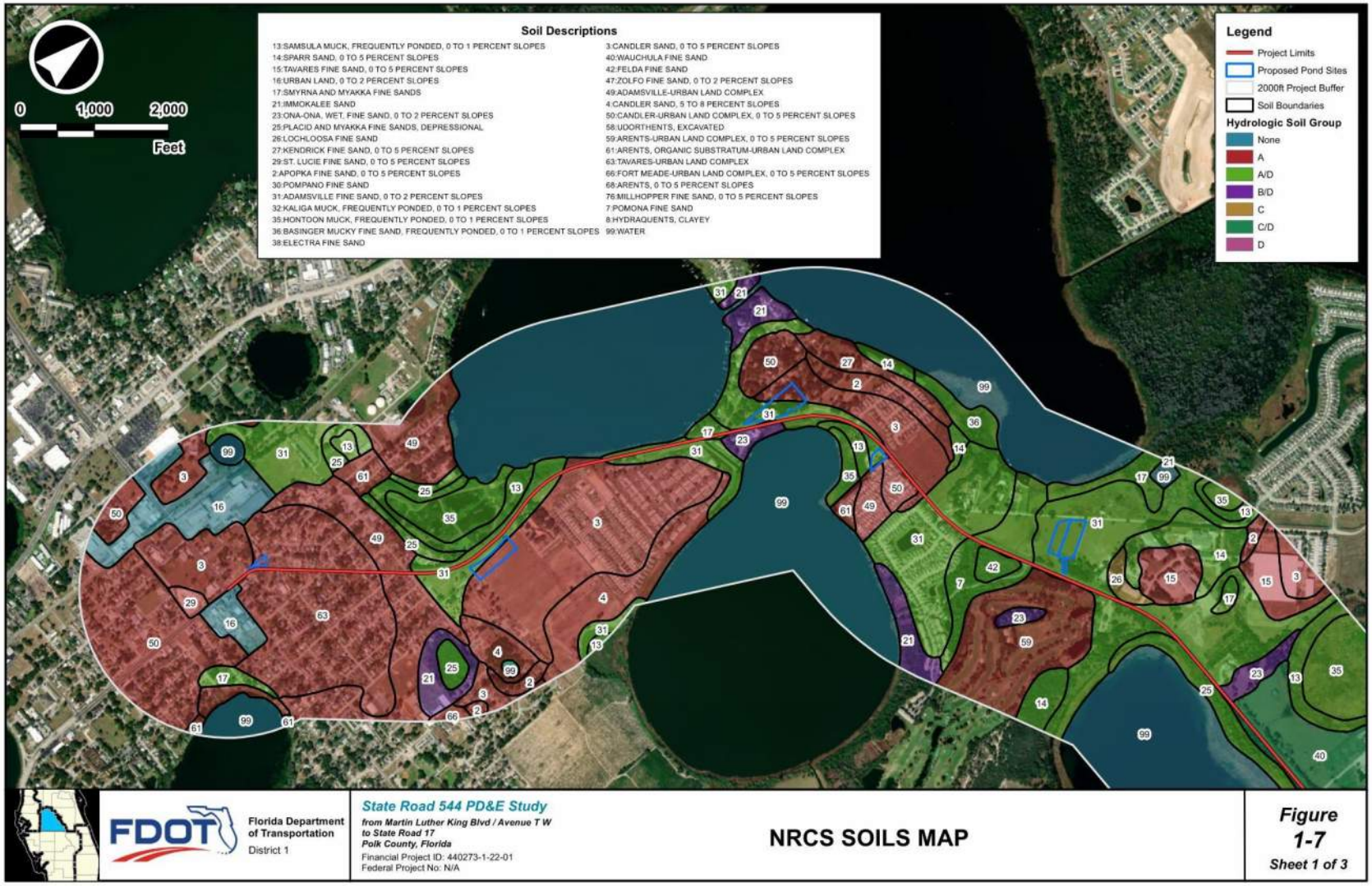
## Figure 1-6: FLUCFCS Map



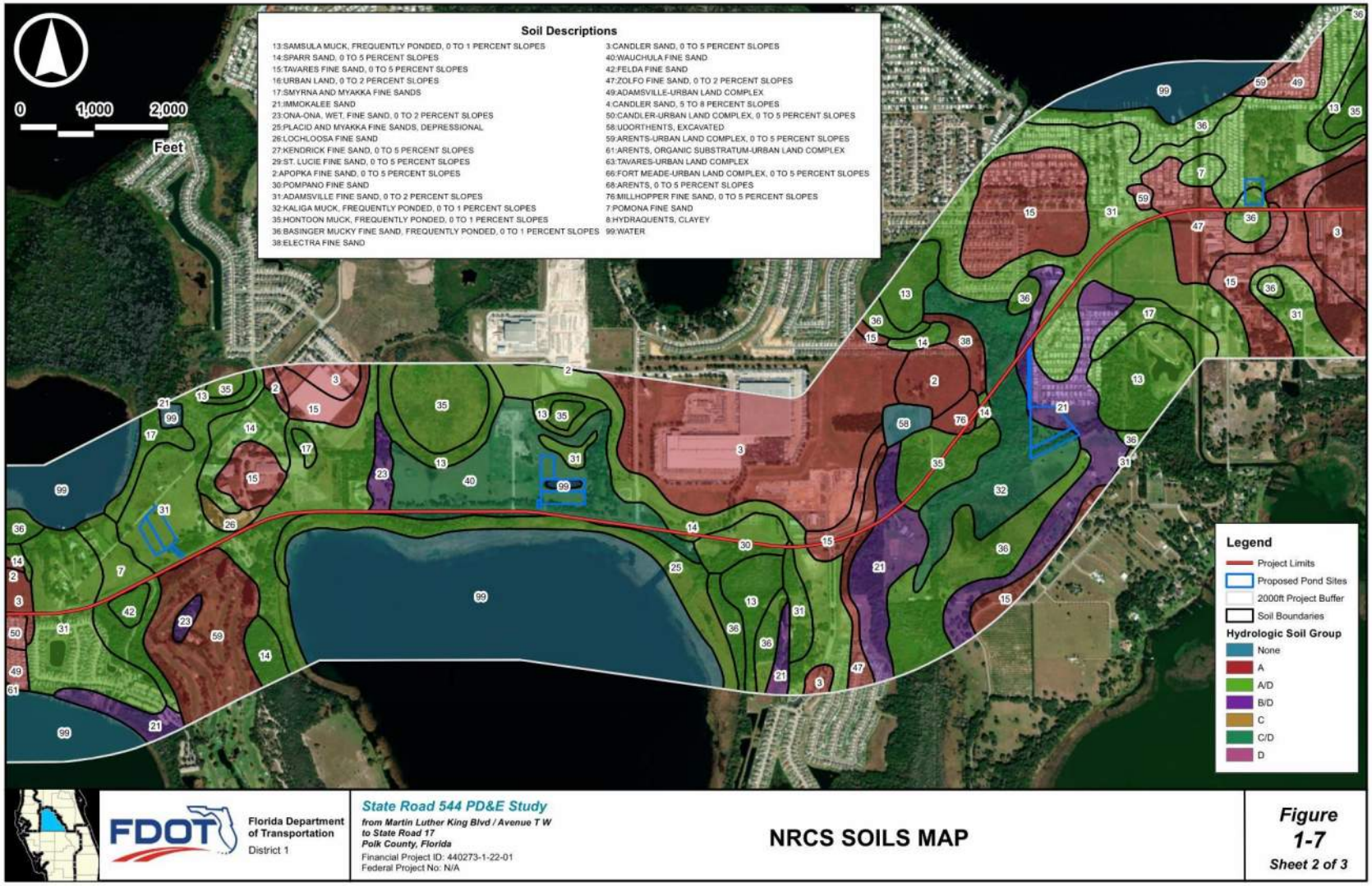
### 1.6.3 Soils

The soil survey of Polk County, Florida (NRCS 1985) and GIS data provided by NRCS were reviewed to determine the soil types and characteristics within the SR 544 Study Area (**Appendix C**). The soils encountered along the project limits include Hydrologic Soil Group (HSG) A, A/D, B/D, C/D and D. HSG A consists of deep, well to excessively well-drained sand or gravel soils. HSG C consists of moderately fine to fine-textured soil that restricts percolation of water. HSG D consists of soils with permanently high-water tables and often indicative of wetlands or depressions. According to the soil surveys, there are 32 different soil types within the SR 544 Study Area. The soil types are depicted in **Figure 1-7.**

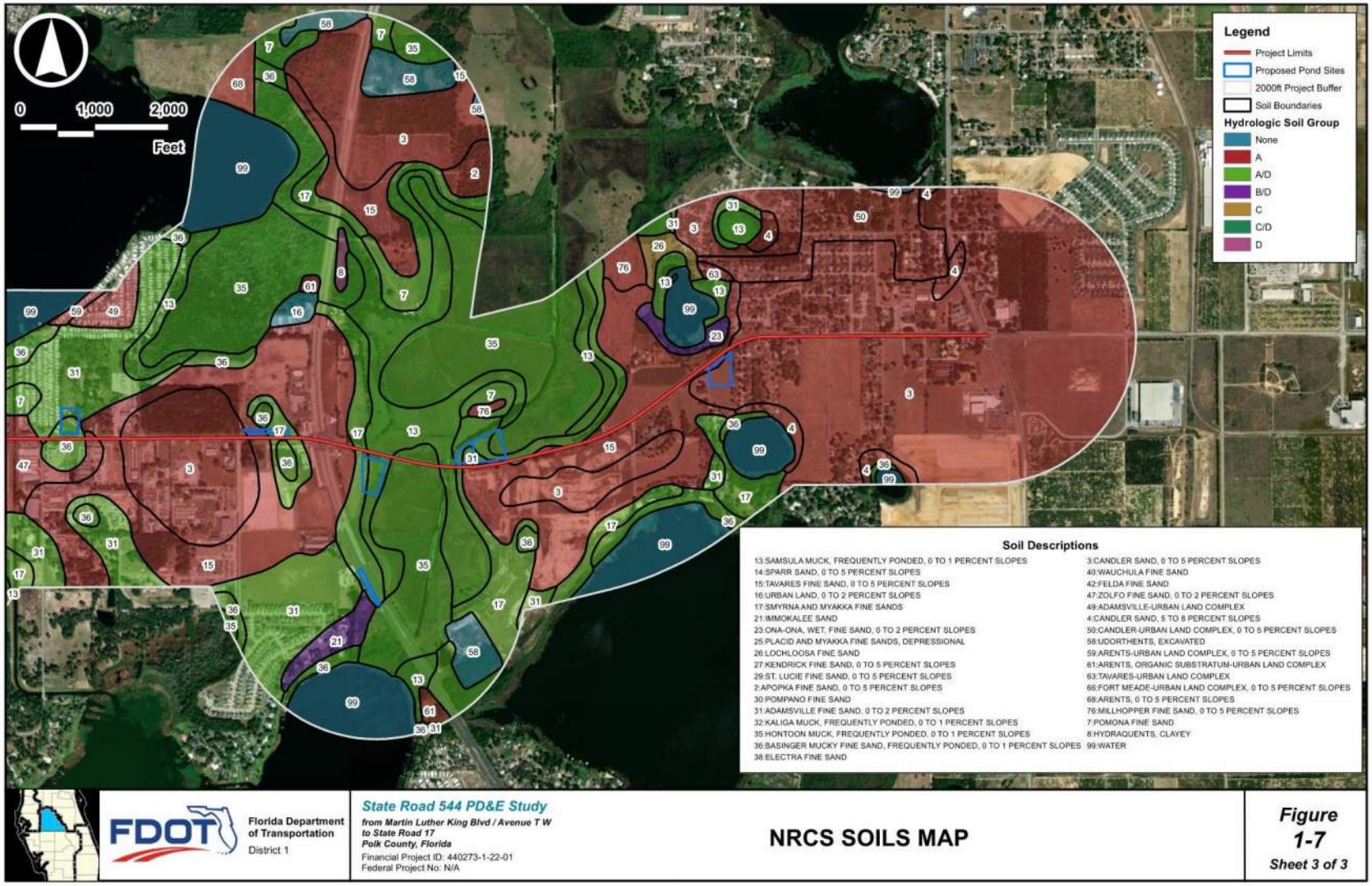
## Figure 1-7: NRCS Soils Map



## Figure 1-7: NRCS Soils Map



## Figure 1-7: NRCS Soils Map



### 1.6.4 Natural Features

No other significant natural features were identified within the limits of the SR 544 Study Area including special aquatic sites, sanctuaries, and refuges, Wild and Scenic Rivers, Aquatic Preserves, and Outstanding Florida Waters; nor does the project provide designated Critical Habitat or Essential Fish Habitat to federally protected or managed species.

# SECTION 2 PROTECTED SPECIES AND HABITAT

Ecologists used online resources and multiple field surveys to determine whether protected species occur or have the potential to occur in the SR 544 Study Area. The term protected species refers to those species that are protected by law, regulation, or rule. Specifically, the term protected species refers to those species listed under the Endangered Species Act (ESA) of 1973, as amended; those species listed under Florida's Endangered and Threatened Species List, Chapter 68A-27, F.A.C.; or those species listed under the Preservation of Native Flora of Florida, Chapter 5B-40, F.A.C. Florida also affords protection to federally-listed species, thus all federally-listed species are also state listed, pursuant to Chapter 68A-27.003(1)(b). The study area was also evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual.

## 2.1 Efficient Transportation Decision Making

According to the ETDM Summary Report No. 5873, dated May 22, 2020, the FWC, SWFWMD, and USFWS indicated the project alternatives may create a "Minimal" to "Moderate" Degree of Effect (DOE) on wildlife and habitat resources. The primary issues were the direct loss of wetland habitats, potential adverse effects to a moderate number of state and federal listed species, potential increase in wildlife roadkill, and potential water quality degradation from the additional stormwater runoff from the expanded roadway surface draining into adjacent lakes and wetlands. Avoidance and minimization measures will be implemented for the noted species to the greatest extent practicable. In order to minimize the effect of the proposed project on protected species, FDOT will provide commitments that will be tracked through the design process. FDOT will coordinate with the USFWS and FWC to obtain concurrence with the effect determinations listed below and address potential impacts to each species.

## 2.2 Data Collection and Methodology

The study methodology included GIS analysis, ETAT comments review, agency coordination, agency database searches, general wildlife surveys, and species-specific surveys. The Existing Conditions Section, Section 1.3 lists the data sources utilized for review.

Ecologists familiar with Florida's protected species and natural habitats conducted general field surveys and species-specific surveys from October 2019 through December 2022 as part of the Study. The field surveys were performed utilizing pedestrian surveys conducted during daylight hours over multiple seasons to document the presence or evidence of protected species utilizing the study area. Species-specific surveys included the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and sand skink and blue-tailed mole skink. The species-specific surveys were conducted in accordance with the survey protocols outlined by the USFWS. Species-specific survey methodologies were submitted to USFWS for approval before the surveys were conducted.

Agency coordination is included in **Appendix D**. The ecologists also documented habitat types and predominant plant species, including general wetland limits, during the field reviews. Listed species occurrences and habitat within the SR 544 Study Area are shown on **Figure 2-1**.

A total of 55 protected species have the potential to occur in the SR 544 Study Area, according to the information obtained during the preliminary data collection. These include the 13 avian, four (4) mammal, five (5) reptile, and 33 plant species shown on **Table 2-1**. Ecologists determined a species' potential occurrence in the study area based on its habitat preferences and distributions, existing site conditions, historical data, and field survey results. The likelihood of occurrence was rated as no, low, moderate, high, or observed. Definitions for the likelihood of occurrence are provided below:

- No – Species with a no likelihood of occurrence are those species that are known to occur in Polk County but have specialized habitat requirements that do not occur in the project area.
- Low – Species with a low likelihood of occurrence are those species that are known to occur in Polk County, limited habitat occurs within the project site, but there are no known adjacent populations, limited dispersal abilities, and the species has not been observed or documented within the site.
- Moderate – Species with a moderate likelihood of occurrence are those species that are known to occur in Polk County, for which suitable habitat occurs within the project site, but there are no positive indications to verify presence, and the species has not been observed in or documented within the site.
- High – Species with a high likelihood of occurrence are those species that are known to occur in Polk County, are suspected in the project area based on the existence of suitable habitat within the project site, are known to occur adjacent to the site, or have been previously documented in the project vicinity.
- Observed – the species has been observed during this evaluation.

## Table 2-1: Protected Species with Potential to Occur in the SR 544 Study Area

| Scientific Name | Common Name | Status | Potential Occurence |
|---|---|---|---|
| **Birds** | | | |
| *Ammodramus savannarum floridanus* | Florida Grasshopper Sparrow | FE | No |
| *Aphelocoma coerulescens* | Florida Scrub-jay | FT | No |
| *Athene cunicularia floridana* | Florida Burrowing Owl | ST | Moderate |
| *Egretta caerulea* | Little Blue Heron | ST | Observed |
| *Egretta tricolor* | Tricolored Heron | ST | Observed |
| *Falco sparverius paulus* | Southeastern American Kestrel | ST | Observed |
| *Grus canadensis pratensis* | Florida Sandhill Crane | ST | Observed |
| *Haliaeetus leucocephalus* | Bald Eagle | BGEMA/MGTA | Observed |
| *Laterallus jamaicensis jamaicensis* | Eastern Black Rail | FT | Low |
| *Mycteria americana* | Wood Stork | FT | Observed |
| *Platalea ajaja* | Roseate Spoonbill | ST | Observed |
| *Polyborus plancus audubonii* | Audubon's Crested Caracara | FT | Moderate |
| *Rostrhamus sociabilis plumbeus* | Everglade Snail Kite | FE | High |
| **Mammals** | | | |
| *Eumops floridanus* | Florida Bonneted Bat | FE | Moderate |
| *Perimyotis subflavus* | Tricolored Bat | C | Observed |
| *Sciurus niger niger* | Southern Fox Squirrel | M | High |
| *Ursus americanus floridanus* | Florida Black Bear | M | Moderate |
| **Reptiles** | | | |
| *Drymarchon corais couperi* | Eastern Indigo Snake | FT | High |
| *Eumeces egregious lividus* | Blue-tailed Mole Skink | FT | Moderate |
| *Gopherus polyphemus* | Gopher Tortoise | ST | Observed |
| *Pituophis melanoleucus mugitis* | Florida Pine Snake | ST | Moderate |
| *Neoseps reynoldsi* | Sand Skink | FT | Moderate |
| **Plants** | | | |
| *Bonamia grandiflora** | Florida Bonamia | FT/SE | Low |
| *Calamintha ashei* | Ashe's Savory | ST | Low |
| *Calopogon mutliflorus* | Many-flowered Grass-pink | ST | Low |
| *Carex chapmanni* | Chapman's sedge | ST | Low |
| *Centosema Arenicola* | Sand Butterfly Pea | SE | Low |
| *Chionanthus pygmaeus** | Pygmy Fringe-tree | FE | Low |
| *Clitoria fragrans** | Pigeon Wings | FT/SE | Low |
| *Coelorachis tuberculosa* | Piedmont Jointgrass | ST | Low |
| *Coleataenia abscissa* | Cutthroatgrass | SE | Low |
| *Conradia brevifolia** | Short-leaved Rosemary | FE | Low |
| *Crotalaria avonensis** | Avon Park Harebells | FE | Low |
| *Dicerandra frutescens** | Scrub Mint | FE | Low |
| *Eriogonum longifolium** | Scrub Buckwheat | FT/SE | Low |
| *Hartwrightia floridana* | Hartwrightia | ST | Low |

| Scientific Name | Common Name | Status | Potential Occurence |
|---|---|---|---|
| *Hypericum cumulicola** | Highlands Scrub Hypericum | FE | Low |
| *Illicium parviflorum* | Star Anise | SE | Low |
| *Lechea cernua* | Nodding Pinweed | ST | Low |
| *Liatris ohlingerae** | Florida Blazing Star | FE | Low |
| *Lupinus aridorum** | Scrub Lupine | FE | Low |
| *Matelea floridana* | Florida Spiny-pod | SE | Low |
| *Nemasylis floridana* | Celestial Lily | SE | Low |
| *Nolina atopocarpa* | Florida Beargrass | ST | Low |
| *Nolina brittoniana** | Britton's Beargrass | FE | Low |
| *Paronychia chartacea** | Papery Whitlow-wort | FT/SE | Low |
| *Polygala lewtonii** | Lewton's Polygala | FE | Low |
| *Polygonella basiramia** | Wireweed (Florida Jointweed) | FE | Low |
| *Polygonella myriophylla** | Sandlace (Small's Jointweed) | FE | Low |
| *Prunus geniculate** | Scrub Plum | FE | Low |
| *Pteroglossaspis ecristata* | Giant Orchid | ST | Low |
| *Salix floridana* | Florida Willow | SE | Low |
| *Warea amplexifolia** | Clasping Warea | FE | Low |
| *Warea carteri** | Carter's Mustard (Cater's Warea) | FE | Low |
| *Ziziphus celata* | Florida Ziziphus | FE | Low |

**FE** = Federally Endangered **FT** = Federally Threatened
**SE** = State Endangered **ST** = State Threatened
**M** = Managed **C** = Candidate

***** Indicates Lake Wales Ridge plants

## Figure 2-1: Protected Species and Habitat



## 2.3 Federally Listed Species and Designated Critical Habitat

The study area is located within or partially within the USFWS CA of the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, Florida grasshopper sparrow, Florida scrub-jay, sand skink and blue- tailed mole skink, and Lake Wales Ridge Plants. A consultation area is intended to identify the geographical landscape where each federally listed species is most likely to occur. Portions of the study area also fall within five wood stork CFAs, which include suitable foraging areas important to the reproductive success of known wood stork nesting colonies. The existing habitats in the study area may also support other federally protected and ESA candidate species including the eastern black rail, eastern indigo snake, and tricolored bat (a candidate species). No Critical Habitat designated for listed species occurs within the SR 544 study area.

### 2.3.1 Audubon's Crested Caracara

The entire study area occurs within the USFWS Audubon's crested caracara CA. It is a resident, non-migratory species in Florida that prefers grasslands and pastures in the south-central region of the state, particularly in Glades, Desoto, Highlands, Okeechobee, and Osceola Counties (USFWS 1999). Historically, caracara have inhabited dry or wet prairies with scattered cabbage palms (*Sabal palmetto*) and occasionally used lightly wooded areas next to those prairies. Many of those areas were converted and frequently replaced by pastures with non-native sod-forming grasses that still support caracaras. The caracara is classified as threatened due to habitat loss and population decline (Layne 1996). No Critical Habitat has been designated for the Audubon's crested caracara.

Species-specific caracara surveys were conducted in accordance with the caracara survey methodology developed by Morrison (2001), supplemental information established by the USFWS (2004a), and additional survey guidance prepared by the USFWS (2015, 2016). A survey was conducted January through March 2020, but was halted due to the Covid-19 pandemic. The survey was repeated January through April 2021. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe caracara activity along the corridor and up to 1,500 meters from the project boundary. Based on the preliminary field analysis, an *Audubon's Crested Caracara Survey Methodology* memorandum for the SR 544 PD&E Study was submitted to and approved by the USFWS on October 9, 2019 (**Appendix D**). Surveys were conducted by qualified ecologists at least 15 minutes prior to sunrise for at least three hours per survey block. Ecologists spent the entire three-hour survey session in the bed of a pick-up truck observing and recording caracara activity with the assistance of binoculars and a Nikon PROSTAFF 5 scope with 16-48 power. A total of five survey sessions were conducted for each survey block. No caracara were observed during the 2020 survey.

The subsequent caracara survey conducted January through April 2021 consisted of nine survey sessions conducted in accordance with the approved methodology obtained October 9, 2019. The

2021 caracara survey was conducted utilizing the same protocol as the 2020 survey detailed above. No caracara were observed during the 2021 caracara survey. Survey maps depicting the overall project area, survey blocks, and 1,500-meter buffer; data sheets; caracara activity maps; and photographs are included in **Appendix E**.

No Audubon's crested caracara were observed during the 2020 and 2021 caracara surveys. According to FNAI's Biodiversity Matrix Query Report (FNAI) and eBird, no individuals have been documented within the study area. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Audubon's crested caracara.

### 2.3.2 Eastern Black Rail

The eastern black rail is listed by the USFWS as threatened due to habitat loss, destruction, and modification; sea level rise and tidal flooding, and incompatible land management. They are wetland-dependent birds and are primarily associated with herbaceous, persistent emergent plant cover (USFWS 2019). They require dense overhead perennial herbaceous cover with underlying moist to saturated soils with or adjacent to very shallow water (Flores and Eddelman 1995; Legare and Eddleman 2001; Haverland 2019). No Critical Habitat has been designated.

Suitable habitat for the eastern black rail was observed within the study area. No eastern black rails were observed during the field reviews. Based on the best available information, there is no evidence that the eastern black rail occurs within the project area. According FNAI and eBird, no individuals have been documented in the project area. As part of this project, wetland impacts will be mitigated to prevent loss of wetland functions and values. Based on the lack of occurrence data in the project's vicinity and mitigation of wetland impacts will be provided by FDOT, the proposed project "**may affect, but is not likely to adversely affect**" the eastern black rail.

### 2.3.3 Eastern Indigo Snake

The eastern indigo snake is a large, stout-bodied, shiny black snake with a red throat and chin. The eastern indigo snake is listed by the USFWS as threatened due to over-collecting for the pet trade as well as habitat loss and fragmentation (USFWS 1999) and is widely distributed throughout central and south Florida. They occur in a broad range of habitats, from scrub and sandhill to wet prairies and mangrove swamps. Indigo snakes are most closely associated with habitats occupied by gopher tortoises whose burrows provide refugia from cold or desiccating conditions (USFWS 1999). No Critical Habitat has been designated for the eastern indigo snake.

Suitable habitat for the indigo snake was observed within the study area. No indigo snakes were observed during the field reviews. Suitable habitat for the gopher tortoise was also observed within the study area with one direct observation of a gopher tortoise burrow. A 100% gopher tortoise survey was not conducted during this PD&E Study but will be required before

construction activities commence. To address any potential effects to the eastern indigo snake, all potentially occupied gopher tortoise burrows within the limits of construction will be excavated and the *Standard Protection Measures for the Indigo Snake* (USFWS 2013; **Appendix F**) will be implemented during construction activities. According to the *Eastern Indigo Snake Effect Determination Key* (**Appendix G**), the proposed project will result in the following sequential determination: A>B>C>D>E = "**may affect, but is not likely to adversely affect**" the eastern indigo snake.

### 2.3.4 Everglade Snail Kite

The entire study area occurs within the USFWS Everglade snail kite CA. The Everglade snail kite is a medium-sized hawk, with a slender and very hooked beak. The Everglade snail kite is classified as endangered due to a "very small population and increasingly limited amount of fresh marsh with sufficient water to ensure an adequate supply of snails" (Bureau of Sport Fisheries and Wildlife 1973, p. 120). It is a non-migratory subspecies only found in Florida, particularly near large watersheds (e.g., Everglades, Lake Okeechobee) and the shallow vegetated edges of lakes that support apple snails, the primary component of the snail kite's diet. Suitable habitat includes habitats for both foraging and nesting. Foraging habitat can be described as being relatively shallow vegetated wetland systems, often in either expansive marsh systems or within the littoral zones of lakes. Ideal vegetation within these areas includes bulrushes, spike rushes, and maidencane as these create ideal habitat for the apple snail. Suitable nesting habitat for the snail kite almost always occurs over open water (0.2-1.3 meters deep) and greater than 150 meters from uplands. Vegetation in nesting habitat can include native and exotic species of both trees and shrubs, including but not limited to willow (*Salix spp.*), cypress (*Taxodium spp.*), melaleuca (*Melaleuca quinquenervia),* sweetbay (*Magnolia virginiana*), Brazilian pepper (*Schinus terebinthifolia*), button bush (*Cephalanthus occidentalis*), and elderberry (*Sambucus nigra*). Nesting can also occur in herbaceous vegetation consisting of bulrush (*Scirpus spp.*) and cattail (*Typha spp.*). The USFWS has designated Critical Habitat for snail kites, which consists mostly in marshes in south Florida. No Critical Habitat occurs within the project corridor.

Suitable foraging and nesting habitat for the snail kite was observed within the project corridor. Ecologists conducted species-specific surveys for the presence of snail kites in these habitats during the 2020 and 2021 survey season.

Everglade snail kite surveys were conducted in accordance with the USFWS Snail Kite Survey Guidelines. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe snail activity along the corridor. Based on the preliminary field analysis, an *Everglade Snail Kite Survey Methodology for the SR 544 PD&E Study* memorandum was developed and submitted to the USFWS on January 8, 2020, and subsequently approved on January 14, 2020 (**Appendix D**). Due to the linear nature of the project and suitable snail kite

habitat occurring within the lake shorelines near the adjacent SR 544 right-of-way, observation stations were established along the roadway corridor and proposed pond sites. A buffer of 300-meters was utilized in order to accommodate both the roadway and potential pond site locations. A total of three survey events were conducted at each observation location. The visual surveys were conducted in January 2020, February 2020, and April 2021. No Everglade snail kites were observed during the surveys. Survey maps, data sheets, and photographs are included in **Appendix H**.

According to eBird, five sightings have been documented within the study area between 2015 through 2022. The most recent eBird sighting occurred in January 2022, but no data, including photographs or field notes, were provided. No Everglade snail kites were observed during the 2020 or 2021 species-specific surveys. No evidence of snail kite nesting within the project area was observed. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Everglade snail kite.

### 2.3.5 Florida Bonneted Bat

The entire study area is within USFWS Florida bonneted bat CA. The Florida bonneted bat is classified as endangered due habitat loss, degradation, and modification, as well as other manmade and natural factors including a small population size with few colonies, restricted range, slow reproductivity, and low fecundity (USFWS 2013). It has short glossy fur consisting of bicolored hairs and large broad ears that project over the eyes and are joined at the midline of the head. This identifying characteristic, along with its larger size distinguishes it from the Brazilian free-tailed bat (*Tadarida brasiliensis*). The Florida bonneted bat is a subtropical species that does not hibernate and is active year-round. Habitat consists of foraging areas and roosting sites, including artificial structures. Foraging habitat consists of relatively open areas that provide sources of prey and drinking water, including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. In urban areas, suitable foraging can be found at golf courses, parking lots, and parks. Potential roosting habitats include forests or other areas with tall or mature trees or other areas with potential roost structures, including utility poles and artificial roosts. This includes habitat in which suitable structural features for breeding and sheltering are present. Roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. The project corridor is located between residential development as well as open fields, upland and wetland habitats, and open water associated with the Winter Haven Chain of Lakes. There is proposed Critical Habitat for this species; however, the proposed project is not within the Critical Habitat.

Inwood conducted two full acoustic and roost surveys in 2020/2021 and 2022 to determine Florida bonneted bat activity within the study corridor. The survey methodologies were submitted and

approved by the USFWS prior to the commencement of the surveys (**Appendix D**). The acoustic and roost surveys were conducted by qualified ecologists with the required acoustic survey course training and experience. The 2020/2021 acoustic survey was conducted from November 16, 2020, through January 3, 2021. The 100% roost survey was conducted in December 2020. Due to the addition of a quadrant roadway alternative and updated pond site locations, a supplemental acoustic and roost survey was conducted in October 2022. The results of the surveys showed no Florida bonneted bat activity within the study area. *The Florida Bonneted Bat Survey Report* and *Supplemental Florida Bonneted Bat Survey Report* can be found in **Appendix I**.

Based on the results of the acoustic and roost surveys, no evidence of roosting or foraging by the Florida bonneted bat within the project corridor was detected. Due to the absence of FBB activity, this project is anticipated to have "**no effect**" on the Florida bonneted bat. This effect determination was by using the following sequence from the Florida Bonneted Bat Consultation Key (**Appendix J**): 1a>2a>3b>6b = "**no effect**".

### 2.3.6 Florida Grasshopper Sparrow

The entire study area occurs within the USFWS Florida grasshopper sparrow CA. The Florida grasshopper sparrow was listed as endangered because of habitat loss and degradation resulting from conversion of native vegetation to improved pasture and agriculture (51 FR 27492). It is a subspecies of grasshopper sparrow that is endemic to the dry prairie region of central and south Florida. This subspecies is extremely habitat specific and relies on fire every two or three years to maintain its habitat (USFWS 1999). The primary habitat consists of large (>50 hectares), treeless (less than one tree per acre), and relatively poorly drained prairies dominated by saw palmetto and dwarf oaks (Delany et al. 1985). It is known to occur only in Highlands, Okeechobee, Osceola, and Polk counties (Robertson & Woolfenden 1992; Delany, 1996). No Critical Habitat has been designated for the Florida grasshopper sparrow.

The project corridor does not contain large, treeless prairie habitats required by the grasshopper sparrow. No suitable habitat and no individuals were observed during the field reviews. Due to the lack of suitable habitat, the proposed project will have "**no effect**" on the Florida grasshopper sparrow.

### 2.3.7 Florida Scrub-Jay

The entire study area occurs within the USFWS Florida scrub-jay CA. The scrub-jay is classified as threatened due to habitat loss, degradation, and fragmentation (USFWS 1987). They are restricted to xeric scrub habitats with optimal habitat consisting of fire-dominated, low-growing oak scrub found on well-drained sandy soils with patches of bare sandy soil. No Critical Habitat has been designated for the Florida scrub-jay.

The study area includes a mix of residential, commercial, and agricultural lands that do not contain the xeric scrub habitats required by the Florida scrub-jay. According to FNAI, eBird, and FWC's statewide occurrence data, there are no documented occurrences within the study area. No individuals or suitable scrub-jay habitat was observed within the project area. Due to the lack of suitable habitat, the proposed project will have "**no effect**" for the Florida scrub-jay.

### 2.3.8 Sand Skink and Blue-tailed Mole Skink

The entire study area occurs within the USFWS sand skink and blue-tailed mole skink (skinks) CAs. These species are highly adapted to life in sand, spending most of their time "swimming" though loose sand in search of food, shelter, and mates. They are rarely seen above ground. Their motion leaves sinusoidal ("S"-shaped) tracks in the soil surface that can be identified through visual pedestrian surveys. Both the sand skink and the blue-tailed mole skink are classified as threatened due to habitat loss, degradation, and fragmentation.

The geographic range of these skinks is limited to sandy ridges and ancient dunes of the Central Highlands, particularly the Lakes Wales Ridge, the Winter Haven Ridge, and the Mount Dora Ridge. These areas contain excessively drained, well-drained, and moderately well-drained sandy soils that usually support scrub habitats like sand pine scrub, xeric oak scrub, rosemary scrub, and scrubby flatwoods; high pine habitats like sandhills, longleaf pine-turkey oak, turkey oak barrens, and xeric hammock; and managed lands, such as citrus groves, pine plantations and pastures Skinks prefer habitats with open canopies, scattered shrubby vegetation, and patches of bare sand (Christman 1992). According to criteria defined by the USFWS, suitable habitat is considered to be "skink soils" located within the CA at elevations at or above 82 feet above sea level. No Critical Habitat has been designated for the skinks.

Portions of the study area contain suitable skink habitat based on the location, soil types, and elevation criteria in the *Peninsular Florida Species Conservation Guidelines for Sand and Blue-tailed Mole Skink* (**Appendix K**). Atkins North America, Inc. (Atkins) conducted a soils investigation in order to identify areas within the project that are suitable for skinks. A Skink Soils Investigation Report was developed by Atkins and included in **Appendix L**. As a result of this investigation, four areas of potential suitable soils were identified and a skink coverboard survey was performed within these areas in March through April 2021. Survey blocks were established using the maximum typical section widths for both north and south alignments. UWSFWS coordination regarding the sank skink survey is included in **Appendix D**. Coverboards were installed within each block at a minimum of 40 coverboards per acre. Prior to being placed, the vegetation and roots were removed so the coverboard would sit flush with the soil surface. Once installed, the coverboards were located via GPS and monitored weekly for four consecutive weeks. Each monitoring event consisted of lifting the coverboard, inspecting for tracks and skink activity, leveling the soil underneath the board, and placing the board flush against the soil surface. Areas

of exposed soil were visually inspected via pedestrian transects for evidence of skink activity. Survey maps, data sheets, and photographs are included in **Appendix M**. No skink tracks or evidence of skink activity was observed during the coverboard and pedestrian surveys.

The proposed pond and FPC sites were not surveyed during the March 2021 coverboard surveys. These areas contain suitable habitat for skinks based on location, soil types, and elevation criteria. A coverboard survey will be required for these areas to determine a presumed absence conclusion. The USFWS maintains presumptive criteria for skinks; meaning, the project "**may affect and is likely to adversely affect**" sand and blue-tailed mole skinks until a species-specific survey has been completed. FDOT commits to conduct a skink coverboard survey in suitable habitats during the design phase of the project. FDOT will consult with the USFWS once the survey is completed, and the results are known.

### 2.3.9 Tricolored Bat

The tricolored bat is a candidate species for federal listing. It is Florida's smallest bat and distinguished by its unique tricolored fur and pink forearms that contrast their black wings. This wide-ranging species is found throughout the central and eastern United States, and portions of Canada, Mexico, and Central America. Typically hibernating in caves and mines during the winter, tricolored bats in the southern U.S. have an increased utilization of culverts as hibernacula, with shorter hibernation durations and increased winter activity. The tricolored bat is mostly associated with forested habitats and requires habitat suitable for roosting, foraging, and commuting between winter and summer habitats. Roosting singly or in small groups, the tricolored bat prefers to roost in caves, tree foliage, tree cavities, Spanish moss, and man-made structures such as buildings and culverts. They form summer colonies in forested habitats, utilizing cavities, bark, and foliage. The maternity season in Florida is May - June. They forage most commonly over water courses and along forest edges.

Suitable roosting and foraging habitat was observed throughout the study corridor. Acoustic and roost surveys were conducted in 2020/2021 and 2022 in accordance with the Florida bonneted bat survey guidelines. While the data analysis and manual vetting focused on low frequency calls and the Florida bonneted bat, the results of the acoustic survey identified the presence of tricolored bats in the study area. Tricolored bats were recorded at 13 of the 16 survey stations; however, activity appears low throughout the corridor with the majority of the stations only recording one call per night, but not each night of the survey. The roost survey focused on cavities and roosts preferred by the Florida bonneted bat; however, no evidence of bat roosting was observed within the study area during the roost survey or general wildlife surveys. Impacts to forested habitats within the project area are minimal, leaving the larger forested communities intact. FDOT will continue consultation with the USFWS regarding the tricolored bat listing status and potential impacts to this species during the design and permitting phase as needed.

### 2.3.10 Wood Stork

The wood stork is listed by the USFWS as threatened due to the reduction in food base attributed to the loss of suitable foraging habitat (SFH). Wood storks are associated with freshwater and estuarine wetlands that are used for nesting, roosting, and foraging. Nesting typically occurs in medium to tall trees that occur in stands located in swamps or islands surrounded by open water (Odgen 1991; Rodgers et al. 1996). Because of their specialized feeding behavior, they forage most effectively in shallow water with highly concentrated prey. The USFWS defines suitable foraging habitat as shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between two to fifteen inches. SFH includes freshwater marshes, swamps, lagoons, tidal creeks and pools, ponds, ditches, and flooded pastures. No Critical Habitat has been designated for the wood stork.

According to the USFWS South Florida Ecological Service Office, the habitats within 18.6 miles of a wood stork breeding colony are considered to be wood stork CFAs. The proposed project site is within the CFA of five wood stork colonies: Lake Rosalie, Lake Russell, Lake Somerset, Lone Palm, and Mulberry Northeast. Wood storks were observed flying and foraging within the project area and adjacent habitats during the field reviews. SFH is located throughout the project corridor. The proposed project will impact approximately 2.66 acres of SFH. This acreage was calculated based on direct impacts to surface waters which provide SFH for wood storks. According to the *South Florida Programmatic Concurrence Key for the Wood Stork* (USFWS 2010) (**Appendix N**), the proposed project will result in the following sequential determination: A>B>C>E= "**may affect, but is not likely to adversely affect**" the wood stork. Based on the current design, the project will impact over 5 acres of wetlands, and therefore, a foraging prey base analysis is required. The final impacts will be calculated during the design phase and any mitigation will adhere to the requirements of the USACE and USFWS Effect Determination Key.

### 2.3.11 Federally Listed Plants

The Lake Wales Ridge is the remnant of an ancient dune system that runs north and south through Florida's peninsula. The entire study area occurs within the USFWS Lake Wales Ridge Plants CA. According to the Florida Natural Areas Inventory (FNAI) and USFWS, 19 federally listed plants have the potential to occur within the study area (**Table 2-1**). These include the endangered Avon Park harebells, Britton's beargrass, Carter's mustard, clasping warea, Florida ziziphus, Highlands scrub hypericum, Lewton's polygala, pygmy fringe tree, sandlace, scrub blazingstar, scrub lupine, scrub mint, scrub plum, short-leaved rosemary, and wireweed; and the threatened Florida bonamia, scrub pigeon wings, scrub buckwheat, and papery Whitlow-wort. These species are restricted to sandy habitats with specific fire regime requirements. This suite of species share a narrow geographic range on the paleo-dunes of Central Florida, where they occur in xeric scrub an sandhill vegetation and face the same general threats. These species were listed due to habitat

destruction, modification, and curtailment of habitat range, primarily as result of development and lack of prescribed fire (USFWS 2019).

The Lake Wales Ridge Plants are restricted to sandy habitats maintained by periodic fire, such as scrub, high pine, turkey oak barrens, and sandhill. These habitats do not occur within the project area impacted by the Preferred Alternative, including pond sites. The right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. The proposed pond sites do not contain the scrub habitats to support these species. According to FNAI, none of these species have been documented within the project area. No federally listed plants were observed during the field surveys, however FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Based on the lack of habitat and documented occurrences, and the commitment to complete a plant survey during the design phase, the proposed project "**may affect, but it not likely to adversely affect"** federally listed plants.

## 2.5 State Listed Species

The FWC maintains the list of animals designated as federally endangered, federally threatened, state threatened, or species of special concern. While the USFWS has primary responsibility for federally endangered or threatened species in Florida, the FWC works as a cooperating agency to help conserve these species and other imperiled species found in the state. Some listed and non-listed species are considered 'managed species' because of the well-developed programs that address their species' conservation, management, or recovery. The FWC has developed a comprehensive management plan and species action plans for the state's 57 state-listed species (FWC 2016).

### 2.5.1 Florida Burrowing Owl

The FWC listed the Florida burrowing owl as threatened due to loss of native habitat, dependence on altered habitat, and lack of regulatory protections (FWC 2013a). The burrowing owl is a non-migratory resident of Florida and maintains home ranges and territories while nesting. Burrowing owls inhabit upland areas that are sparsely vegetated. Natural habitats include dry prairie and sandhill, but they will make use of ruderal areas such as pastures, airports, parks, and road rights-of-way because much of their native habitat has been altered or converted to other uses.

Suitable habitat was observed throughout the study area. No burrowing owls were observed during the general wildlife surveys or species-specific surveys. Burrowing owls usually dig their own burrows but are known to utilize gopher tortoise burrows and armadillo burrows as well. Gopher tortoise and mammal burrows were observed within the study area. Pre-construction surveys will be conducted to adhere to the components of the Imperiled Species Management Plan (ISMP) and permitting guidelines and the necessary FWC coordination and permitting will be

required if burrows are found prior to construction; therefore, "**no adverse effect is anticipated**" for the burrowing owl resulting from the proposed project.

### 2.5.2 Florida Pine Snake

The Florida pine snake is listed by the FWC as threatened due to habitat loss, fragmentation, and degradation to upland habitats from development and fire suppression (FWC 2013b). They inhabit areas that feature well-drained sandy soils with a moderate to open canopy (Franz 1992, Ernst and Ernst 2003). Preferred habitats include sandhill and former sandhill, including old fields and pastures, sand pine scrub, and scrubby flatwoods. The pine snake often coexists with gopher tortoise and pocket gophers, spending the majority of its time underground.

No pine snakes were observed during the field surveys. Suitable habitat was observed within the site. Gopher tortoise, mammal burrows and pocket gopher mounds were observed. All gopher tortoise burrows within the construction limits will be excavated. Current FWC guidelines for the relocation of the Florida pine snake state that any incidentally captured pine snake should be released on-site or allowed to escape unharmed if habitat will remain post-development. Based on existing conservation measures, "**no adverse effect is anticipated**" for the Florida pine snake resulting from the proposed project.

### 2.5.3 Florida Sandhill Crane

The FWC listed the Florida sandhill crane as threatened due to the loss and degradation to nesting and foraging habitat from development and hydrologic alteration to their potential nesting habitat (FWC 2013c). The Florida sandhill crane is a heavy-bodied gray bird, with a long neck and long legs. It is widely distributed throughout most of peninsular Florida. Sandhill cranes rely on shallow marshes for roosting and nesting and open upland and wetland habitats for foraging (Wood and Nesbitt 2001).

Florida sandhill cranes were observed foraging or flying on multiple occasions throughout the study area. The marshes and wet prairies within the study area provide potential nesting habitat for the sandhill crane. While the mainline of the roadway has minimal nesting habitat, some of the proposed pond site locations are within or adjacent to suitable nesting habitat. The pastures and other open uplands, including the roadway right-of-way, provide foraging habitat. Ecologists observed sandhill cranes, including juveniles, foraging in these areas and roadside ditches during numerous field surveys. Pre-construction surveys will be conducted to adhere to the components of the ISMP; therefore, "**no adverse effect is anticipated**" for the Florida sandhill crane resulting from the proposed project.

### 2.5.4 Gopher Tortoise

The gopher tortoise is listed at threatened by the FWC. They occur in the southeastern Coastal Plain from Louisiana to South Carolina; the largest portion of the population is located in Florida (FWC 2012). Gopher tortoises require well-drained, sandy soils for burrowing and nest construction, with a generally open canopy and an abundance of herbaceous groundcover, particularly broadleaf grasses, wiregrass (*Aristida stricta*), legumes and fruits for foraging. Gopher tortoises can be found in most types of upland communities including disturbed areas and pastures.

Suitable gopher tortoise habitat was observed throughout the study corridor, including proposed pond sites. Gopher tortoises and gopher tortoise burrows were observed during the field reviews; however, a 100% gopher tortoise survey was not conducted. A relocation permit from FWC will be required if tortoises are present within any permanent or temporary construction area. FDOT will conduct a 100% pre-construction survey for the gopher tortoise in accordance with 68A-27.003 and the current FWC Gopher Tortoise Permitting Guidelines and coordinate with FWC to receive necessary permit authorizations prior to construction. Based on the information provided above, "**no adverse effect is anticipated**" for the gopher tortoise.

### 2.5.5 Short-Tailed Snake

The FWC listed the short-tailed snake as threatened because it is a Florida endemic with a restricted geographic range, 57% of its potential habitat is privately owned, it inhabits xeric upland habitats that are in great demand for development. The short-tailed snake is endemic to Florida and is only found from the Suwannee River south to Highlands County (FNAI 2001). Short-tailed snakes are rarely seen above ground as they spend most of the time burrowed in sandy soils. They primarily inhabit areas with well drained sandy soils, particularly longleaf pine and xeric oak habitats, but may also be found in scrub and xeric hammock habitats (Van Duyn 1939; Carr 1940; Campbell and Moler 1992; Enge 1997).

Limited habitat for the short-tailed snake occurs within the study area. No individuals were observed during the field surveys. The project will have minimal impacts to xeric habitats where this cryptic species is found; therefore, "**no adverse effect is anticipated**" for the short-tailed snake.

### 2.5.6 Southeastern American Kestrel

The southeastern American kestrel is listed by the FWC as threatened due to habitat loss, degradation and fragmentation, as well as lack of regulatory protection (FWC 2013d). The southeastern American kestrel is the only non-migratory, permanent resident kestrel in Florida. However, the seasonal occurrence of a migratory subspecies of the northern American kestrel (*Falco sparverius sparverius*) occurs from September through March in Florida. Confident

identification of southeastern American kestrels can only be made during the portion of the breeding season when migratory species are not present (FWC 2013d). Preferred habitat consists of fire-maintained sandhill and open pine savannah. They utilize open pine habitats, woodland edges, prairies, pastures, and other agricultural lands. The southeastern American kestrel is a secondary cavity nester, typically nesting in tall trees or utility poles.

Suitable nesting and foraging habitat for kestrels were observed throughout the study area, including proposed pond site locations. Individuals were observed on multiple occasions during field surveys. Activities within the 492 feet (150 meter) buffer of an active nest are considered to cause take. Pre-construction surveys will be conducted to adhere to the components of the ISMP; therefore, "**no adverse effect is anticipated**" for the southeastern American kestrel resulting from the proposed project.

### 2.5.7 Imperiled Wading Birds

Three wading birds have the potential to occur in the study area. These species are the little blue heron, roseate spoonbill, and tricolored heron. All three are listed by the FWC as threatened due to habitat loss and degradation, particularly from hydrologic alterations to their essential foraging areas (FWC 2013e). These species are widely distributed throughout peninsular Florida. Wading birds depend on healthy wetlands and vegetated areas suitable for resting and breeding which are near foraging areas (FWC 2013e). They forage in freshwater, brackish, and saltwater habitats. They tend to nest in multi-species colonies of a variety of woody vegetation types including cypress, willow, maple, black mangrove, and cabbage palm (FNAI 2001).

Ecologists observed suitable foraging and minimal nesting habitat for wading birds throughout the study area, including proposed pond sites. All three species were observed throughout the study area. These observations include flyovers and foraging in roadside ditches. No nesting activity was observed during the field reviews. According to FNAI and the FWC Wading Bird Rookery Database, no active wading bird rookeries are located within the project area. Impacts to wetlands will be mitigated. Based on the information provided, "**no adverse effect is anticipated**" for wading birds resulting from the proposed project.

### 2.5.8 State Listed Plants

Through regulation by the FDACS Division of Plant Industry, Florida protects plant species native to the state that are endangered, threatened, or commercially exploited. The Florida Regulated Plant Index includes all plants listed as endangered, threatened, or commercially exploited as defined in Chapter 5B-40.0055, F.A.C. According to the FNAI, and FDACS 14 state protected plant species have the potential to occur in the project area (**Table 2-1**). However, FNAI listed no occurrences of protected plants within the study area. Many of these plant species are endemic to the Lake Wales Ridge or otherwise occur in open sandy habitats maintained by periodic fire,

such as sandhill, oak scrub, and scrubby flatwoods and include Ashe's savory, Florida beargrass, Florida spiny-pod, giant orchid, nodding pinweed, and sand butterfly pea. These species are listed due to habitat destruction and modification, primarily as a result of development and fire suppression. The remaining listed plant species include celestial lily, Chapman's sedge, cutthroatgrass, Florida willow, hartwrightia, many-flowered grass-pink, Piedmont jointgrass, and star anise, and require mesic or wetland habitats. These species are listed due to habitat destruction and modification as a result of water quality degradation, hydrologic disturbances, and lack of fire.

The scrub habitats required to support many of these species do not occur within the project area impacted by the Preferred Alternative, including pond sites. Mesic and wetland habitats were observed throughout the corridor. The majority of the areas within or immediately adjacent to the project footprint have been disturbed or developed and the right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. No listed plant species were observed during the field surveys. FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Based on the information provided, "**no adverse effect is anticipated**" for state listed plant species resulting from the proposed project.

## 2.6 Other Protected Species or Habitats

### 2.6.1 Bald Eagle

The bald eagle was removed from the ESA in 2007 and Florida's Endangered and Threatened Species list in 2008; however, it remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles tend to nest in the tops of very tall trees that provide unobstructed lines of sight to nearby habitats, particularly lakes and other open waters. Because eagles are piscivorous (fish-eating) raptors, nearly all eagles' nests occur within 1.8 miles of water (Wood et at. 1989). No Critical Habitat has been designated for the bald eagle.

Suitable habitat for the bald eagle was observed throughout the study area. Several bald eagles were observed during the field reviews. According to the FWC's Eagle Nest locator and the Audubon Florida EagleWatch Nest website (EagleWatch), there are seven (7) nests located within one mile of the study area. All the documented nests are located outside the 660-foot eagle nest protection zone except Nest PO149. The location of Nest PO149 was documented by Inwood staff via submeter GPS and found to be approximately 550 feet northwest of the FWC/EagleWatch location. Ecologists surveyed the area to identify the correct location of Nest PO149 and ensure there were no other nests in the area. Nest PO149 was located approximately 95 feet from the existing roadway and was observed during multiple field visits (**Figure 2-1**). Ecologists documented the status of the nest tree during the course of the study. In 2019, the tree was observed to be dying and had dropped most of its limbs, with the nest at the top of the tree with little structural support. The nest was still observed to be active. Similar conditions were observed

and documented in 2020 and 2021 with increasing evidence of decay. EagleWatch documented the status of Nest PO149 as active and successful for the 2022 nesting season. Hurricane Ian struck Florida on September 28, 2022. Ecologists conducted a field review on October 10, 2022, and observed the nest had been destroyed. Only a snag remained of the tree and the nest had fallen to the ground. FDOT will conduct an eagle nest survey during design and permitting. Based on the current nest status, it is anticipated that the proposed project will have no impact on the bald eagle since the proposed activities are outside the 660-ft eagle nest protection buffer.

### 2.6.2 Florida Black Bear

The Florida black bear was removed from Florida's Endangered and Threatened Species list in 2012; however, it remains protected under Chapter 68A-4.009 F.A.C., the Florida Black Bear Conservation Plan. The study area is located in the occasional range of the South Central Bear Management Unit (BMU).

The black bear requires large amounts of space for its home range and a variety of forested habitats, including flatwoods, swamps, scrub oak ridges, bayheads, and hammocks. Self-sustaining populations of bears are generally found on large tracks of contiguous forests with understories of berry producing shrubs or trees. The corridor primarily consists of residential and agricultural land uses with a number of lakes throughout the corridor. Additionally, the project corridor continues to be developed and site clearing and construction was observed during the field reviews. The mobility of bears throughout the study area is limited by the surrounding development and lakes as evidenced by the FWC data. The most current FWC data for the Florida black bear was reviewed and documents only four (4) historical occurrences within a one-mile buffer of the SR 544 roadway (**Figure 2-1**). No recent bear activity has been recorded in the corridor. No impacts to the Florida black bear are anticipated as a result of this project based on the lack of suitable habitat, including connectivity to suitable habitat, and bear utilization within the project area.

### 2.6.3 Southern Fox Squirrel

The southern fox squirrel was removed from Florida's Endangered and Threatened Species list in 2018; however, it remains protected under Chapter 68A-4.001, 68A-1.004. and 68A-29.002(1)c F.A.C. The southern fox squirrel can be found throughout the Florida peninsula and up to central Georgia. They inhabit open, fire-maintained longleaf pine, turkey oak, sandhills, and flatwoods (FNAI 2001). They will also utilize mixed hardwood – conifer forest, open areas with pines and oaks, cypress swamps, pastures, and other agricultural lands including the ecotones between these habitats.

Ecologists observed suitable habitat for the southern fox squirrel which primarily occurs within the proposed pond sites and adjacent pastures containing pines and oaks. No individuals or nests

were observed during the field survey. Pre-construction surveys will be conducted to adhere to the components of the ISMP and permitting guidelines; therefore, the project will have no impact on the southern fox squirrel.

### 2.6.4 Strategic Habitat Conservation Areas

Strategic Habitat Conservation Areas (SHCA) are lands in need of protection to maintain natural communities and viable populations of many species that are indicators of the state's biological diversity. In 1994, FWC completed a project entitled *Closing the Gaps in Florida's Wildlife Habitat Conservation System* (Cox et al. 1994), which assessed the security of rare and imperiled species on existing conservation lands in Florida. This research identified important habitat areas in Florida with no conservation protection. These SHCA serve as a foundation for conservation planning for species protection through habitat conservation.

FWC designated SHCA occur throughout the study area for the sand skink, snail kite, and Cooper's hawk (**Figure 2-1**). No regulatory action is required for impacts to SHCA.

## 2.7 Conceptual Mitigation for Protected Species

The proposed ponds, and FPC sites contain suitable habitat for skinks and were not surveyed during the March 2021 coverboard surveys. Species-specific surveys for sand skinks will be conducted in suitable habitat during the design and permitting phases to determine presence or absence of skinks, and whether and to what extent mitigation may be required. If skinks are determined to be present and mitigation is required, mitigation for unavoidable impacts to occupied skink habitat will be provided through the purchase of credits from an USFWS-approved conservation bank.

The project is within the CFA of five wood stork colonies. Mitigation will be required for impacts to SFH. Any unavoidable impacts to SFH may be compensated in accordance with the South Florida Programmatic Concurrence Key for the Wood Stork (USFWS 2010). Mitigation for impacts to wood stork SFH will be provided within the Service area of an USFWS-approved wetland mitigation bank or wood stork conservation bank.

Multiple gopher tortoise burrows were observed within the project area. Mitigation contributions for the gopher tortoise will be calculated and provided to FWC during the gopher tortoise relocation permitting process.

# SECTION 3 WETLAND EVALUATION

Ecologists performed a wetland evaluation of the study area. The wetland evaluation relied on literature reviews and field surveys to identify the location, extent, and functional value of wetlands in the study area; the potential direct, indirect, or cumulative effects of the project's actions to those wetlands; and available mitigation options to satisfy permit requirements from regulatory agencies. This wetland evaluation was performed in accordance with the Presidential Executive Order (EO) 11990 ("Protection of Wetlands"); U.S. Department of Transportation Order 5660.1A ("Preservation of the Nation's Wetlands"); Federal Highway Administration Technical Advisory T6640.8A regarding the preparation of environmental documents; the *Wetlands and Other Surface Waters* chapter of the FDOT's PD&E Manual.

## 3.1 Efficient Transportation Decision Making

According to their ETDM Summary Report No. 5873, dated May 22, 2020, the U.S. Environmental Protection Agency (EPA), SWFWMD, and USACE indicated the project alternatives may create a "moderate" DOE to wetlands and surface waters; while the Florida Department of Environmental Protection (FDEP) indicated a DOE of "minimal." The primary issues were the potential loss of wetland functions; loss of wildlife habitat; degradation of water quality in wetlands and surface waters; and reduction in flood storage and capacity. In order to provide reasonable assurances that direct, indirect, or cumulative impacts from construction, alteration and intended or reasonably expected uses of the proposed alternatives will not contribute to violations of water quality standards or adverse impacts to the functions of wetlands or other surface waters, the FDOT will calculate the appropriate mitigation during the design and permitting phase to satisfy the requirements of 33 United States Code (U.S.C.) § 1344 and Part IV of Chapter 373, Florida Statutes (F.S.)

## 3.2 Data Collection and Methodology

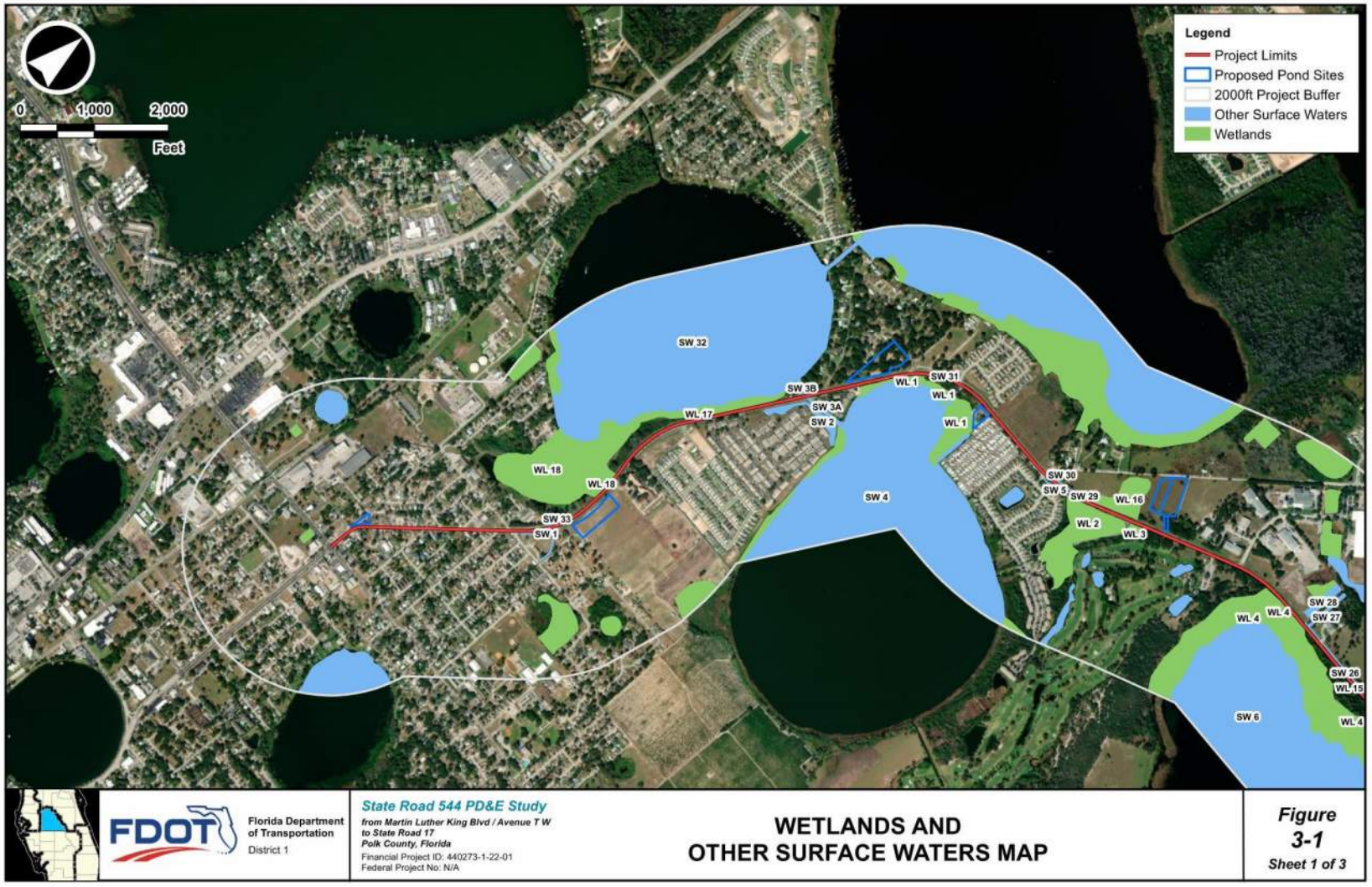
The wetland evaluation included GIS analysis, agency database search, and field reviews. Existing Conditions Section lists the data sources utilized for review. Ecologists familiar with Florida's natural plant communities performed an assessment of the study area to identify wetland vegetation, wetland hydrology, and hydrologic indicators to determine the presence of wetlands and other surface waters within the study area. Field reviews were conducted from October 2019 through December 2022. A formal wetland delineation to determine jurisdictional boundaries was not performed; however, the general limits of wetlands and other surface waters were identified in the field using the criteria established in Rule 62-340, F.A.C. The wetland limits have not been reviewed by the agencies. Wetlands and surface waters were classified per the FLUCFCS (FDOT 1999), and the Classification of Wetlands and Deepwater Habitats of the US (NWI) (Cowardin et al. 1979). The Uniform Mitigation Assessment Method (UMAM) was utilized, per Chapter 62-345, F.A.C., for the functional assessment of wetlands within the SR 544 Study Area. Additionally, a

Sovereign Submerged Lands (SSL) determination was obtained from the FDEP (**Appendix D**) regarding Lake Conine, Lake Smart, Lake Fannie, the canal between Lake Conine and Lake Smart, the canal between Lake Henry and Lake Hamilton, and the unnamed canal in S5, 28S, 27E.

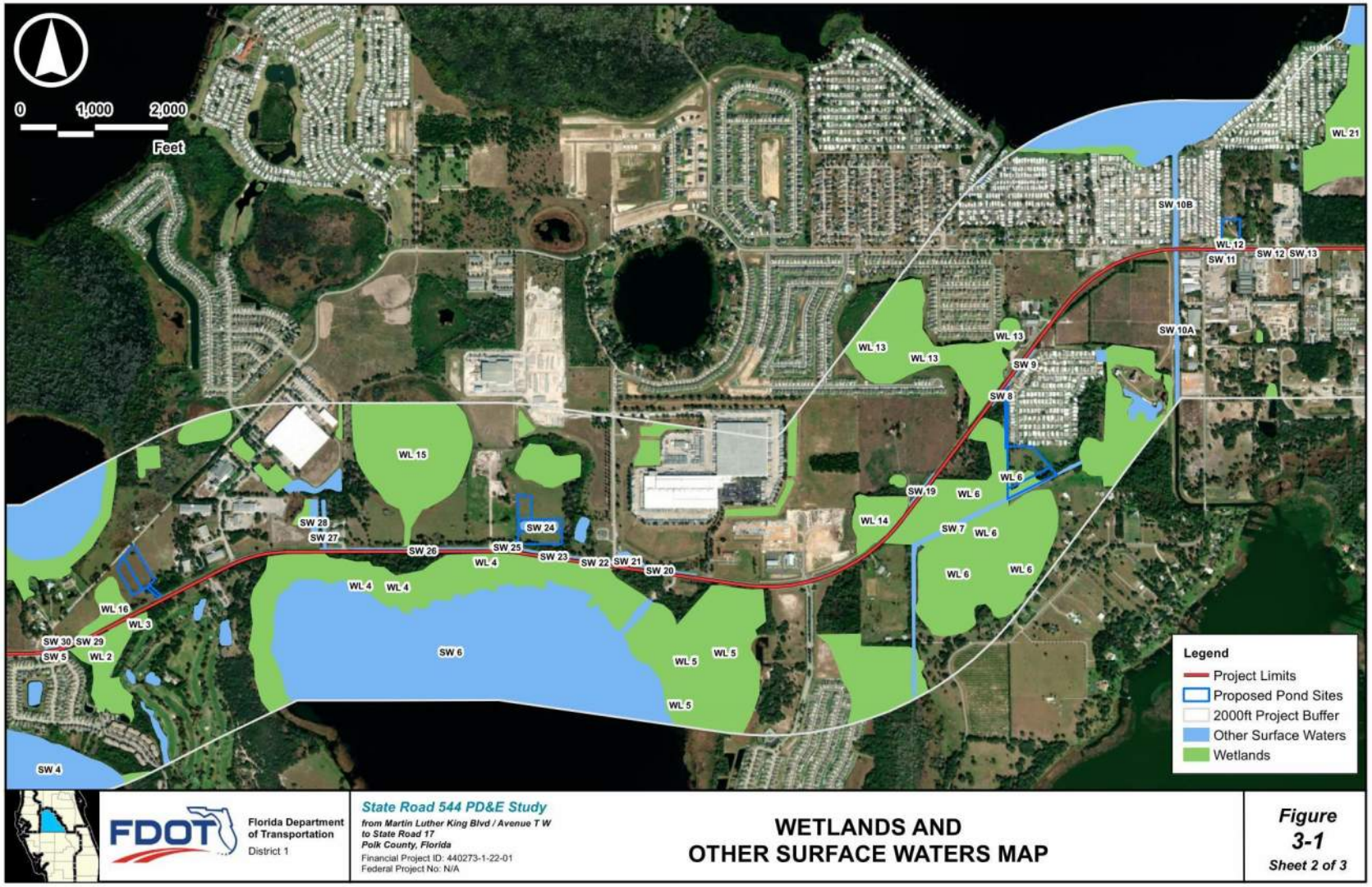
## 3.3 Wetlands and Surface Waters

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area (**Figure 3-1**). The following section includes a brief description of each wetland type and other surface water within the study area. **Table 3-1** provides details identifying each wetland including the wetland number, NWI and FLUCFCS classification, and a brief description.

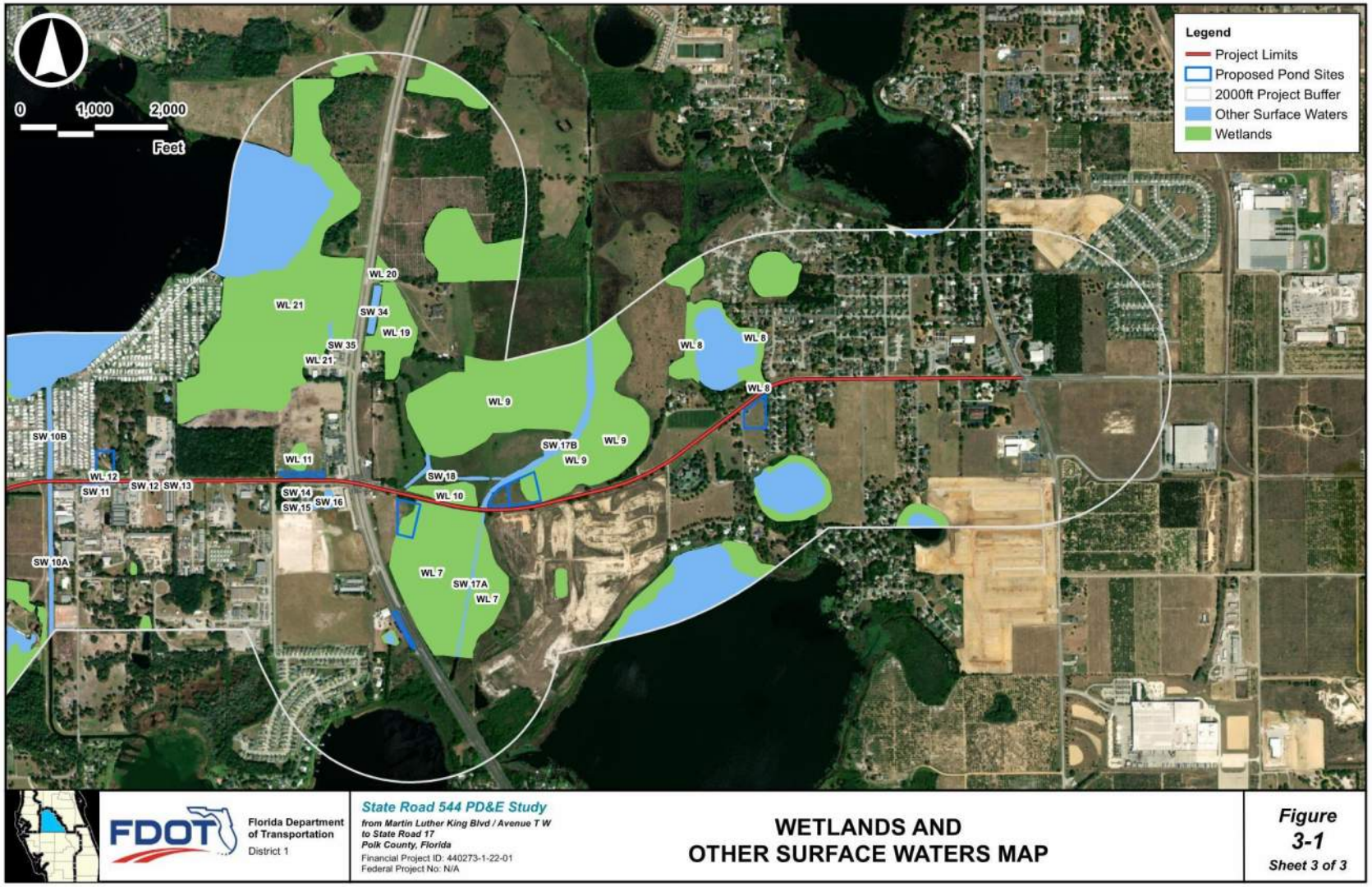
## Figure 3-1: Wetlands and Other Surface Waters



## Figure 3-1: Wetlands and Other Surface Waters



## Figure 3-1: Wetlands and Other Surface Waters



## Table 3-1: Wetlands and Other Surface Waters in the SR 544 Study Area

| WETLAND ID | FLUCFCS | NWI | DESCRIPTION |
|---|---|---|---|
| WL 1 | 644 | PEM1C | Emergent Aquatic Vegetation |
| WL 2 | 630 | PFO7C/ PSS3B | Wetland Forested Mixed |
| WL 3 | 630 | PFO7C/ PSS3B | Wetland Forested Mixed |
| WL 4 | 630/641/ 644 | PEM1F/PEM1G | Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation |
| WL 5 | 630/641/ 644 | PFO6F/PFO7F/PEM1F | Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation |
| WL 6 | 630/640/ 643 | PFO7B/PFO1C/PAB4Hx/PSS1F | Wetland Forested Mixed/Freshwater Marshes/Wet Prairies |
| WL 7 | 643 | PEM1Cd | Wet Prairies |
| WL 8 | 615/641 | PEM1F | Stream and Lake Swamps/Freshwater Marshes |
| WL 9 | 630/641/ 643 | PEM1Cd/PFO2F | Wetland Forested Mixes/Freshwater Marshes/Wet Prairies |
| WL 10 | 643 | PEM1Cd | Wet Prairies |
| WL11 | 653 | PEM1F | Intermittent Ponds |
| WL 12 | 653 | PUBHx | Intermittent Ponds |
| WL 13 | 630/641 | PFO7B/PEM1F | Wetland Forested Mixed/Freshwater Marshes |
| WL 14 | 630 | PFO7C/PFO6F | Wetland Forested Mixed |
| WL 15 | 641 | PFO6F/PSSF | Freshwater Marshes |
| WL 16 | 615/641 | PEM1C | Freshwater Marshes |
| WL 17 | 644 | L1UBH | Emergent Aquatic Vegetation |
| WL 18 | 618/630 | PFO3A | Willow and Elderberry/Wetland Forested Mixed |
| WL 19 | 615 | PFO1/3C | Stream and Lake Swamps |
| WL 20 | 615 | PFO1/3C | Stream and Lake Swamps |
| WL 21 | 615/644 | PFO1/3C/PEM1F/PFO6F/PFO7C | Stream and Lake Swamps/Emergent Aquatic Vegetation |
| SW 1 | 510 | R5UBFx | Streams and Waterways |
| SW 2 | 530 | N/A | Reservoirs |
| SW 3A | 510 | L1UBHx | Streams and Waterways |
| SW 3B | 510 | L1UBHx | Streams and Waterways |
| SW 4 | 520 | L1UBH | Lakes |
| SW 5 | 510 | PUBCx | Streams and Waterways |
| SW 6 | 520 | L1UBH | Lakes |
| SW 7 | 510 | R5UBFx | Streams and Waterways |
| SW 8 | 510 | PUBCx | Streams and Waterways |

| WETLAND ID | FLUCFCS | NWI | DESCRIPTION |
|---|---|---|---|
| SW 9 | 510 | PUBCx | Streams and Waterways |
| SW 10A | 510 | R2UBHx | Streams and Waterways |
| SW 10B | 510 | R2UBHx | Streams and Waterways |
| SW 11 | 510 | PUBCx | Streams and Waterways |
| SW 12 | 510 | PUBCx | Streams and Waterways |
| SW 13 | 510 | PUBCx | Streams and Waterways |
| SW 14 | 530 | PUBCx | Reservoirs |
| SW 15 | 530 | PUBCx | Reservoirs |
| SW 16 | 530 | PEM1F | Reservoirs |
| SW 17A | 510 | R2UBHx | Streams and Waterways |
| SW 17B | 510 | R2UBHx | Streams and Waterways |
| SW 18 | 510 | R5UBFx | Streams and Waterways |
| SW 19 | 510 | PUBCx | Streams and Waterways |
| SW 20 | 510 | PUBCx | Streams and Waterways |
| SW 21 | 530 | PUBCx | Reservoirs |
| SW 22 | 510 | R5UBFx | Streams and Waterways |
| SW 23 | 510 | R5UBFx | Streams and Waterways |
| SW 24 | 530 | PUBHx | Reservoirs |
| SW 25 | 510 | R5UBFx | Streams and Waterways |
| SW 26 | 510 | R5UBFx | Streams and Waterways |
| SW 27 | 510 | R5UBFx | Streams and Waterways |
| SW 28 | 530 | PUBHx | Reservoirs |
| SW 29 | 510 | PUBCx | Streams and Waterways |
| SW 30 | 510 | PUBCx | Streams and Waterways |
| SW 31 | 510 | PUBCx | Streams and Waterways |
| SW 32 | 520 | L1UBH | Lakes |
| SW 33 | 510 | R5UBH | Streams and Waterways |
| SW 34 | 530 | PEM1Cx | Reservoirs |
| SW 35 | 510 | R5UBFx | Streams and Waterways |

### 3.3.1 Stream and Lake Swamps (Bottomland)

FLUCFCS: 615

USFWS: PFO7C, PPFO1/3C, PEM1F

Wetlands: WL 8, WL 19, WL 20, WL 21

Streams and Lake Swamps (Bottomland) usually occur in floodplain or overflow areas. This wetland type occurs within the project area along northern and eastern project termini. Observed canopy species include red maple (*Acer rubrum*). Shrub species observed include immature canopy

species, Carolina willow (*Salix caroliniana*), elderberry (*Sambucus nigra*), and Peruvian primrose willow (*Ludwigia peruviana*). Groundcover includes pickerelweed (*Pontederia cordata*).

### 3.3.2 Willow and Elderberry

FLUCFCS: 618
USFWS: PFO3A
Wetlands: WL 18

The willow and elderberry classification consists of a vegetative community that is dominated by Carolina willow. The portion of WL 18 that abuts SR 544 is classified as Willow and Elderberry. Vegetative species within this portion of WL 18 include red maple, Carolina willow, elderberry, Brazilian pepper (*Schinus terebinthifolia*), and lantana.

### 3.3.3 Wetland Forested Mixed

FLUCFCS: 630
USFWS: PFO7C, PSS3B
Wetlands: WL 2, WL 3, WL 4, WL 5, WL 6, W L9, WL 13, WL 14, WL 18

Wetland Forested Mixed wetlands contain communities in which neither hardwoods nor conifers achieve 66 percent canopy composition. This type of forested wetland occurs throughout the project area. Vegetative species observed in these communities include a canopy of red maple, sweet bay (*Magnolia virginiana*), black gum (*Nyssa sylvatica),* bald cypress (*Taxodium distichum*), slash pine (*Pinus Elliotti*), and laurel oak (*Quercus laurifolia*). Understory species observed include Brazilian pepper, Peruvian primrose willow, immature canopy species, Carolina willow, elderberry, salt bush *(Baccharis halimifolia*), and wax myrtle (*Myrica cerifera*). Groundcover species observed include various rush *(Juncus* spp.), torpedograss (*Panicum repens*), cinnamon fern (*Osmunda cinnamomea*), beggar ticks (*Bidens alba*), and swamp fern *(Blechnum serrulatum*).

### 3.3.4 Freshwater Marshes

FLUCFCS: 641
USFWS: PEM1G, PEM1CD, PEM1F,
Wetlands: WL 4, WL 5, WL 13, WL 15, WL 16

Freshwater Marshes are non-forested wetlands that are usually confined to relatively low-lying areas. This type of non-forested wetland occurs multiple times throughout the project area. Vegetative species observed in these communities are comprised of Peruvian primrose willow, saltbush, Carolina willow, and red maple saplings, cinnamon fern, torpedograss, soft rush, various sedges (*Adropogon* spp.), arrowhead (*Sagitaria latifolia*), lizards' tail (*Saururus cernuus*), and cattails (*Typha* spp.)

### 3.3.5 Wet Prairies

FLUCFCS: 643
USFWS: PEM1CD
Wetlands: WL 6, WL 7, WL 9, WL 10

Wet Prairies are non-forested wetlands composed predominantly of grassy vegetation and usually distinguished from marshes by having less water and shorter herbage. Wet prairies occur throughout the study area. Vegetative species observed within these communities include St. Johns wort (*Hypericum* spp.), Peruvian primrose willow, cordgrass (*Spartina bakeri*), yellow-eyed grass (*Xyris* spp.), maidencane *(Panicum hemitomon*), smartweed (*Polygonum hydropiperoides*), dollarweed *(Hydrocotyle* spp.), and torpedograss.

### 3.3.6 Emergent Aquatic Vegetation

FLUCFCS: 644
USFWS: PEM1C, L2AB3H
Wetlands: WL 1, WL 4, WL 5, WL 17, WL 21

Emergent Aquatic Vegetation wetlands are non-forested wetlands comprised of both floating vegetation and vegetation which is found either partially or completely above the surface of water. These wetland communities are associated with the lakes within the project corridor. Vegetative species observed within these communities include spatterdock (*Nuphar* spp.), smartweed (*Persicari hydropiperoides*), duck weed (*Lemna* spp.), pickerel week, Peruvian primrose willow, and cattails.

### 3.3.7 Intermittent Ponds

FLUCFCS: 652
USFWS: PEM1F, PUBHx
Wetlands: WL 11, WL 12

Intermittent Ponds is a category of wetland defined as a waterbody which exists for only a portion of the year. These land use types occur in WL 11 and WL 12. Water levels were observed to fluctuate throughout the year, with WL 11 almost completely drying up. Observed vegetation within WL 12 includes soft rush, Peruvian primrose willow, torpedo grass, and maidencane.

### 3.3.8 Streams and Waterways

FLUCFCS: 510
USFWS: R2UBSx, R5UBFx, L1UBHx
Surface Water: SW 1, SW 3A, SW 3B, SW 5, SW 7, SW 8, SW 9, SW 10A, SW 10B, SW 11, SW 12, SW 13, SW 17A, SW 17B, SW 18, SW 19, SW 20, SW 22, SW 23, SW 25, SW 26, SW 27, SW 29, SW 30, SW 31, SW 33, SW 35

Streams and Waterways include rivers, creeks, canals, and other linear bodies of water. The surface waters within the study area consists of canals, agricultural ditches, and roadside ditches. These ditches generally contain standing water during the rainy season and are shallow or dry during the dry season. Many of these systems support hydrophytic vegetation. Typical vegetation observed in these surface waters include red maple, water oak (*Quercus nigra*), duck potato (*sagitaria lancifolia*), pickerel weed, smart weed, Carolina willow, and Peruvian primrose willow.

### 3.3.9 Lakes

FLUCFCS: 520
USFWS: L1UBH
Surface Water: SW 4, SW 6, SW 32

Lakes include extensive inland water bodies, excluding man-made reservoirs. Three lakes occur immediately adjacent to the SR 544 roadway. These lakes include Lake Conine, Lake Smart, and Lake Fannie.

### 3.3.10 Reservoirs

FLUCFCS: 530
USFWS: PUBHX, PEM1F
Surface Water: SW 2, SW 14, SW 15, SW 16, SW 21, SW 24, SW 28, SW 34

Reservoirs are artificial impoundments of water used for irrigation, flood control, and municipal and rural water supplies. Reservoirs occur throughout the study area. Many of the reservoirs are permitted stormwater ponds.

## 3.4 Wetland and Surface Water Impacts

Data collected during the literature review, previous permit history, and field survey were used to evaluate the potential adverse direct and secondary impacts of the project to wetlands and the potential cumulative impacts to those wetlands and surface waters in the project limits. Practicable measures to avoid or minimize impacts to wetlands and surface waters were considered during the SR 544 Study. The unavoidable adverse impacts will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. **Table 3-2** details the proposed wetland and surface water impacts.

### 3.4.1 Direct Impacts

The Preferred Alternative will result in 12.52 acres of direct impacts to wetlands and 2.66 acres of direct impacts to other surface waters. Final direct impacts will be determined during design and permitting and will be assessed accordingly.

### 3.4.2 Secondary Impacts

Secondary impacts were assessed at a distance of 25 feet beyond any direct wetland impacts. The proposed project will result in approximately 8.45 acres of secondary impacts to wetlands. Final secondary impacts will be determined during design and permitting and will be assessed accordingly.

**Table 3-2: Potential Wetland and Other Surface Water Impacts from the Preferred Alternative and Pond Site Alternatives**

| Wetland ID | FLUCFCS | Description | Impact Type | Impact Area (ac.) |
|---|---|---|---|---|
| WL 1 | 644 | Emergent Aquatic Vegetation | Right-of-Way | 0.32 |
| | | | FPC 1 | 0.09 |
| WL 2 | 630 | Wetland Forested Mixed | Right-of-Way | 0.53 |
| WL 3 | 630 | Wetland Forested Mixed | Right-of-Way | 0.17 |
| WL 4 | 630 | Wetland Forested Mixed | Right-of-Way | 0.89 |
| | 641 | Freshwater Marshes | Right-of-Way | 1.19 |
| WL 5 | 630 | Wetland Forested Mixed | Right-of-Way | 0.08 |
| WL 6 | 630 | Wetland Forested Mixed | Right-of-Way | 0.47 |
| | | | Pond 5 | 1.05 |
| | | | FPC 4 | 0.45 |
| | 641 | Freshwater Marshes | FPC 4 | 0.28 |
| WL 7 | 643 | Wet Prairies | Right-of-Way | 0.75 |
| WL 8 | 615 | Stream and Lake Swamps (Bottomland) | Right-of-Way | 0.16 |
| WL 9 | 641 | Freshwater Marshes | Right-of-Way | 0.04 |
| | | | FPC 5 | 1.66 |
| WL 10 | 643 | Wet Prairies | Right-of-Way | 0.18 |
| WL 12 | 653 | Intermittent Ponds | Right-of-Way | 0.10 |
| | | | Pond 6 | 0.33 |
| WL 13 | 630 | Wetland Forested Mixed | Right-of-Way | 0.24 |
| WL 14 | 630 | Wetland Forested Mixed | Right-of-Way | 0.41 |
| WL 16 | 641 | Freshwater Marshes | Right-of-Way | 1.16 |
| WL 17 | 644 | Emergent Aquatic Vegetation | Right-of-Way | 0.48 |
| WL 18 | 618 | Willow and Elderberry | Right-of-Way | 0.14 |
| WL 21 | 615 | Stream and Lake Swamps (Bottomland) | Right-of-Way | 1.35 |
| SW 1 | 510 | Streams and Waterways | Right-of-Way | 0.18 |
| SW 3A | 510 | Streams and Waterways | Right-of-Way | 0.02 |
| SW 3B | 510 | Streams and Waterways | Right-of-Way | 0.02 |
| SW 5 | 510 | Streams and Waterways | Right-of-Way | 0.07 |
| SW 8 | 510 | Streams and Waterways | Right-of-Way | 0.09 |
| SW 9 | 510 | Streams and Waterways | Right-of-Way | 0.08 |

| Wetland ID | FLUCFCS | Description | Impact Type | Impact Area (ac.) |
|---|---|---|---|---|
| SW 10A | 510 | Streams and Waterways | Right-of-Way | 0.03 |
| SW 10B | 510 | Streams and Waterways | Right-of-Way | 0.04 |
| SW 11 | 510 | Streams and Waterways | Right-of-Way | 0.08 |
| SW 12 | 510 | Streams and Waterways | Right-of-Way | 0.09 |
| SW 13 | 510 | Streams and Waterways | Right-of-Way | 0.01 |
| SW 17A | 510 | Streams and Waterways | Right-of-Way | 0.02 |
| SW 17B | 510 | Streams and Waterways | Right-of-Way | 0.04 |
| SW 19 | 510 | Streams and Waterways | Right-of-Way | 0.14 |
| SW 20 | 510 | Streams and Waterways | Right-of-Way | 0.21 |
| SW 21 | 530 | Reservoirs | Right-of-Way | 0.20 |
| SW 22 | 510 | Streams and Waterways | Right-of-Way | 0.13 |
| SW 23 | 510 | Streams and Waterways | Right-of-Way | 0.33 |
| SW 25 | 510 | Streams and Waterways | Right-of-Way | 0.06 |
| SW 26 | 510 | Streams and Waterways | Right-of-Way | 0.48 |
| SW 27 | 510 | Streams and Waterways | Right-of-Way | 0.06 |
| SW 29 | 510 | Streams and Waterways | Right-of-Way | 0.02 |
| SW 30 | 510 | Streams and Waterways | Right-of-Way | 0.05 |
| SW 31 | 510 | Streams and Waterways | Right-of-Way | 0.05 |
| SW 33 | 510 | Streams and Waterways | Right-of-Way | 0.04 |
| SW 35 | 510 | Streams and Waterways | Right-of-Way | 0.12 |
| **Total Impacts** | | | | |
| **Total Right-of-Way Wetland Impacts (ac.)** | | **Total Pond and FPC Wetland Impacts (ac.)** | **Secondary Wetland Impacts (ac.)** | |
| **8.66** | | **3.86** | **8.45** | |
| | | | **Total Direct Wetland Impacts** | **12.52** |
| | | | **Total Other Surface Water Impacts** | **2.66** |
| | | | **Total Proposed Impacts** | **15.18** |

### 3.4.3 Cumulative Impacts

Cumulative impacts can result from incremental but collectively significant impacts within the basin over time. In order to provide reasonable assurances that the project will not cause unacceptable cumulative impacts, mitigation will be provided from within the same drainage basin as the anticipated impacts or the project will utilize a regional mitigation plan pursuant to Section 373.4137, F.S.

## 3.5 Avoidance and Minimization

The No-Build Alternative, in which no roadway improvements would occur aside from routine maintenance, will not result in direct or indirect impacts to wetlands or other surface waters in the project area; however, this alternative is not consistent with existing long-range transportation plans and does not meet the stated purpose and need for the SR 544 Study. Several alternatives

described above were considered to reduce overall impacts to wetlands to the greatest extent practicable. Within Segment 1 (Martin Luther King Boulevard to North of Avenue Y), four alternative typical sections were considered including two-lane urban typical, a three-lane urban typical, a four-lane undivided rural typical, and a five-lane urban typical. Within Segments 2-7 (North of Avenue Y to La Vista Drive) a four-lane divided typical section with north and south widenings was considered. Segment 8 (LaVista Drive to SR 17) considered a four-lane divided typical section with north, south, and center widenings. Complete avoidance of impacts was not feasible due to the nature of the roadway widening project and the occurrence of wetland habitats immediately adjacent to the proposed project. Avoidance and minimization measures utilized by the proposed project include pond siting to minimize or completely avoid impacts to wetlands and protected species occurring within the project area. The Alternatives Analysis can be found in Section 5 of the Preliminary Engineering Report (PER).

## 3.6 Wetland Assessment

A wetland assessment was performed for wetlands and other surface waters in the SR 544 Study Area. The wetland assessment was conducted in accordance with UMAM, as described in Chapter 62-345, F.A.C. The UMAM is the state-wide methodology for determining the functional value provided by wetlands and other surface waters and the amount of mitigation required to offset adverse impacts to those areas for regulatory permits. The results of the UMAM assessment are provided in **Table 3-3**. UMAM summary sheets can be found in **Appendix O**. These values may be refined during the design and permitting phases of the project.

## Table 3-3: Proposed Wetland Functional Loss Due to Impacts from the Preferred Alternative

| Wetland ID | Wetland Type | Impact Type | UMAM Delta | Impact Area (ac.) | Functional Loss |
|---|---|---|---|---|---|
| WL 1 | Herbaceous | Direct | 0.43 | 0.41 | 0.178 |
| | | Secondary | 0.07 | 0.57 | 0.038 |
| WL 2 | Forested | Direct | 0.40 | 0.53 | 0.212 |
| | | Secondary | 0.07 | 0.59 | 0.039 |
| WL 3 | Forested | Direct | 0.40 | 0.17 | 0.068 |
| | | Secondary | 0.07 | 0.14 | 0.009 |
| WL 4 | Forested and Herbaceous | Direct | 0.40 | 2.08 | 0.832 |
| | | Secondary | 0.07 | 1.77 | 0.118 |
| WL 5 | Forested | Direct | 0.57 | 0.08 | 0.045 |
| | | Secondary | 0.07 | 0.31 | 0.021 |
| WL 6 | Forested and Herbaceous | Direct | 0.57 | 2.25 | 1.275 |
| | | Secondary | 0.07 | 1.39 | 0.093 |
| WL 7 | Herbaceous | Direct | 0.40 | 0.75 | 0.30 |
| | | Secondary | 0.07 | 0.88 | 0.059 |
| WL 8 | Forested | Direct | 0.40 | 0.16 | 0.064 |
| | | Secondary | 0.07 | 0.11 | 0.007 |
| WL 9 | Herbaceous | Direct | 0.40 | 1.70 | 0.680 |
| | | Secondary | 0.07 | 0.47 | 0.031 |
| WL 10 | Herbaceous | Direct | 0.40 | 0.18 | 0.072 |
| | | Secondary | 0.07 | 0.36 | 0.024 |
| WL 12 | Herbaceous | Direct | 0.40 | 0.43 | 0.143 |
| | | Secondary | 0.00 | 0.00 | 0.00 |
| WL 13 | Forested | Direct | 0.40 | 0.24 | 0.136 |
| | | Secondary | 0.07 | 0.44 | 0.029 |
| WL 14 | Forested | Direct | 0.40 | 0.41 | 0.232 |
| | | Secondary | 0.07 | 0.59 | 0.039 |
| WL 16 | Herbaceous | Direct | 0.40 | 1.16 | 0.464 |
| | | Secondary | 0.07 | 0.89 | 0.059 |
| WL 17 | Herbaceous | Direct | 0.40 | 0.48 | 0.208 |
| | | Secondary | 0.07 | 0.71 | 0.047 |
| WL 18 | Herbaceous | Direct | 0.40 | 0.14 | 0.061 |
| | | Secondary | 0.07 | 0.24 | 0.016 |
| WL 21 | Forested | Direct | 0.40 | 1.35 | 0.765 |
| | | Secondary | 0.07 | 0.57 | 0.323 |
| | | | | **Total Direct Functional Loss** | **5.735** |
| | | | | **Total Secondary Functional Loss** | **0.991** |
| | | | | **Total Functional Loss** | **6.726** |

### 3.7 Wetlands Finding

The Preferred Alternative was evaluated for impacts to wetlands in accordance with EO 11990 and USDOT Order 5560.1A. The Preferred Alternative will be constructed almost entirely within the existing right-of-way to avoid impacts to wetlands. Unavoidable impacts to wetlands and surface waters outside of the existing right-of-way include impacts to unnamed systems immediately abutting the existing right-of-way that, due to the horizontal geometry of the preferred roadway build alternative or the establishment of FPC sites, cannot be avoided. In order to minimize impacts to wetlands, the roadway preferred build alternative is located within the existing right-of-way as much as is practicable and proposed stormwater ponds are located in upland areas wherever practicable.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

## 3.8 – Conceptual Mitigation

Wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. Compensatory mitigation for this project will be completed through the use of mitigation banks and any other mitigation options that satisfy state and federal requirements.

The study area is located within the Peace River Regulatory Basin. Currently, this basin has two mitigation banks (Peace River Mitigation Bank and Horse Creek Mitigation Bank) with forested and herbaceous credits available for both state and federal mitigation. Boran Ranch Mitigation Bank, which is also within the same basin, currently has herbaceous credits for both state and federal mitigation, and forested credits for state mitigation.

# SECTION 4 ESSENTIAL FISH HABITAT

The National Marine Fisheries Service (NMFS) is the regulatory agency responsible for the nation's living marine resources and their habitats, including essential fish habitat (EFH). This authority is designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended. The MSFCMA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)].

In accordance with the MSFCMA, Section 7 of the ESA, and Part 2, Chapter 17, Essential Fish Habitat, of the FDOT's PD&E Manual, the Malabar Road Study Area was evaluated for potential EFH. According to their ETDM Summary Report No. 5873, dated May 28, 2020, NMFS staff concluded that the project will not impact EFH; therefore, an EFH assessment is not required.

# SECTION 5 ANTICIPATED PERMITS

FDOT construction and maintenance activities are regulated by numerous environmental laws and regulations administered by state and federal agencies. These agencies have established environmental programs to conserve, protect, manage, and control the air, land, water and natural resources of the state or U.S. The following is a list of anticipated permits needed from the state and federal agencies for the proposed project.

## 5.1 State 404 Permit

Section 404 of the CWA established a program to regulate the discharge of dredge or fill material into the waters of the United States, including wetlands. Responsibility for Section 404 was previously administered by the USACE. However, the State of Florida requested and was granted authority on December 22, 2020 (85 FR 83553), to operate the Section 404 Program for work in most non-tidal waters in the state. The State 404 Program is administered by the FDEP. All waters of the United States with potential to be impacted by the proposed project are not retained by the USACE and are therefore assumed by FDEP. Based on the amount of wetland and surface water impacts, a State 404 Individual Permit is anticipated.

## 5.2 Biological Opinion/Incidental Take Permit

The ESA of 1973, as amended, requires all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the ESA. Section 7(a)(2) of the ESA is the mechanism by which Federal agencies ensure the action they take, including those they fund or authorize (i.e., Federal permit), do not jeopardize the existence of any listed species. When a federal action "may affect and is likely to adversely affect" a listed endangered or threatened species, the lead Federal agency submits a request to the USFWS for formal consultation. Then the USFWS prepares a Biological Opinion (BO) on whether the proposed activity will jeopardize the continued existence of a listed species. This process would occur during Clean Water Act § 404 Dredge and Fill permitting if jurisdictional wetlands to waters of the U.S. would be impacted by the proposed project. Otherwise, an incidental take permit (ITP) would be necessary under Section 10(a)(1)(B) of the ESA for impacts to federally listed species without nexus to a federal action. A Habitat Conservation Plan is required as part of an ITP from the USFWS. As the project does include federal funds, the Federal action used to initiate ESA Section 7 consultation will be Clean Water Act § 404 Dredge and Fill permitting review by the FDEP with the FWC being responsible for the federal wildlife review, following the assumption of a portion of the CEA 404 program from the USACE in December 2020.

Due to the presence of suitable sand skink habitat, the project "**may affect**" the sand skink and blue-tailed mole skink. A BO would be required if survey results found them to be present within the project area.

## 5.3 NPDES Permit

As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The Environmental Protection Agency (EPA) delegated its authority to implement the NPDES program to the FDEP. This permit is required because the proposed project will disturb more than one acre of land, and the stormwater runoff will discharge to waters of the state. A Stormwater Pollution Prevention Plan (SWPPP) is required to be developed as part of the NPDES and implemented during construction. The objectives of the SWPPP are to prevent erosion where construction activities occur, prevent pollutants from mixing with stormwater, and prevent pollutants from being discharged by trapping them on-site, before they can affect the receiving waters. The applicant must submit a Notice of Intent with the FDEP at least two days prior to the commencement of construction.

## 5.4 Environmental Resource Permit

FDEP and Florida's five Water Management Districts implemented Chapter 62-330, F.A.C, Environmental Resource Permitting (ERP) to govern certain regulated activities, such as works in waters of the state, including wetlands, and construction of stormwater management systems. The proposed project is located within the jurisdiction of the SWFWMD. The proposed project is expected to require an ERP for a stormwater management plan and impacts to wetlands and other surface waters. Additionally, according to the SSL determination, title to the submerged lands below the ordinary high water line of Lake Conine, Lake Smart, and Lake Fannie is held by the Board of Trustees. Any work performed below the ordinary high water line in these areas may require an SSL easement. In the event additional SSL easements are needed, this will be addressed during the permitting phase.

## 5.5 Gopher Tortoise Relocation Permit

Gopher tortoises and their burrows are protected by Chapter 68A-27.003, F.A.C. A gopher tortoise relocation permit must be obtained from the FWC before disturbing burrows or if construction activities occur within 25 feet of a gopher tortoise burrow. The number of gopher tortoise burrows located within 25 feet of the project footprint will determine the type of gopher tortoise relocation permit that is needed. A 100% gopher tortoise survey should be completed during the design of the project to finalize potential permit needs. Surveys, permitting, excavation, and relocation must be performed by an FWC Authorized Gopher Tortoise Agent.

# SECTION 6 CONCLUSIONS

The Preferred Alternative will provide additional capacity on SR 544, consistent with existing long-range transportation plans for the roadway and region and the stated purpose and need for this PD&E Study. The Preferred Alternative will avoid and minimize impacts to wetlands, protected species, and their habitats to the greatest extent practicable. Additional coordination with the appropriate agencies during the design and permitting phase and additional surveys may be required prior to or during construction.

The Preferred Alternative will result in unavoidable wetland and other surface water impacts. During the design phase, the final impacts will be determined, and the appropriate mitigation will be calculated to satisfy the requirements of 33 U.S.C. § 1344 and Part IV of Chapter 373, F.S.

## 6.1 Implementation Measures/Design Considerations

To ensure the project will not adversely affect protected species or contribute to water quality degradation, the following measures will be implemented:

- Surveys for gopher tortoise burrows, as well as commensal species, will be conducted during the design phase in accordance with 68A-27.003 and the current FWC *Gopher Tortoise Permitting Guidelines*. Permits to relocate tortoises and commensals as appropriate will be obtained from the FWC.
- Surveys for the Florida burrowing owl will be conducted in accordance with 68A-27.003(a), 68A-27.001(4), F.A.C. and the current FWC *Florida Burrowing Owl Species Conservation and Permitting Guidelines* during the design phase. Coordination with FWC will take place as necessary to determine appropriate avoidance and minimization measures to apply during construction.
- Surveys for Florida sandhill crane nest sites will be conducted during the design phase in accordance with 68A-27.003 F.A.C and the Florida Sandhill Crane Conservation Measures and Permitting Guidelines. FDOT will coordinate with FWC to receive the necessary authorizations and implement the appropriate conservation measures as needed prior to construction.
- Surveys for the Southeastern American kestrel will be conducted during the nesting season (May through August) in the design phase in accordance with 68A-27.003(2)(a), 68A-27.001(4), F.A.C. and the current FWC *Southeastern American Kestrel Species Conservation Measures and Permitting Guidelines*. FDOT will coordinate with FWC to receive the necessary authorizations and implement appropriate conservation measures as needed prior to construction.
- Surveys for the Southern fox squirrel will be conducted during the design phase and in accordance with the current FWC *Southern Fox Squirrel Species Conservation Measures and Permitting Guidelines*. FDOT will coordinate with FWC to receive the necessary authorizations and implement appropriate conservation measures as needed prior to construction.

- FDOT will provide mitigation for wetland impacts resulting from project design and construction per 373.4137, F.S. and 33 U.S.C. § 1344.
- Apply erosion and sediment controls and other best management practices prior to and throughout construction to prevent adverse impacts to wetland and aquatic resources adjacent to the project area.
- A survey to update the location of bald eagle nest sites will be conducted during the design phase, and permits will be acquired if there will be unavoidable impacts during construction. Coordination with USFWS will take place as necessary.

## 6.2 Commitments

To ensure the project will not adversely affect protected species and their habitats, the following commitments will be implemented:

- A survey will be conducted for sand skinks in suitable sand skink habitat per USFWS protocol during the design phase. Consultation with USFWS will be reinitiated at this time.
- The most recent version of the USFWS *Standard Protection Measures for the Eastern Indigo Snake* will be utilized during project construction.
- The FDOT will provide mitigation for impacts to suitable wood stork SFH within the Service Area of the USFWS-approved wetland mitigation bank or wood stork conservation bank.
- A survey for listed plants will be performed during the design phase and coordination prior to construction with the appropriate agency will occur as needed if listed plants are observed within the project area.

## 6.3 Agency Coordination

### 6.3.1 Prior Coordination

Comments from the ETAT were provided in the ETDM Summary Report No. 5873, dated May 22, 2020. ETAT members submitted comments related to protected species and their habitats, noting the need for protected species surveys and coordination during the PD&E Study, and implementation of protection measures during construction. ETAT members also commented on potential impacts to wetlands and surface waters, noting the need to avoid and/or minimize impacts to wetlands, document cumulative impact criteria, meet water quality and quantity requirements, and implement proper best management practices during construction. Through the PD&E process, the FDOT has continued to meet with and address the concerns from the commenting agencies as documented in this report.

Species-specific surveys were conducted for the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and skinks. Coordination with the USFWS was conducted for survey requirements and methodology approval. Agency coordination documentation is included in **Appendix D**.

### 6.3.2 Continuing Coordination

The final NRE report will be provided to the relevant resource agencies for review and concurrence with the proposed effect determinations for listed species and potential impacts to wetland resources. Agency coordination will continue during and throughout the design phase of the project when environmental permitting typically occurs. Environmental permits will be required from the FDEP and SWFWMD for the proposed project. Permit applications will be reviewed by the regulatory agencies for potential impacts to environmental resources. During the permitting process, the regulatory agencies will likely request input from the commenting agencies to ensure consistency with regulatory criteria under their purview. Consultation with, or technical assistance by the USFWS shall be required for potential impacts to federally protected species, particularly skinks and wood stork.

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# *APPENDIX I*

## Contamination Screening Evaluation Report

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## Contamination Screening Evaluation Report

Florida Department of Transportation
District One

# SR 544 (Lucerne Park Road)
# Project Development and Environment Study
**from Martin Luther King Blvd to SR 17**
**Polk County, Florida**

Financial Management Number: 440273-1-22-01
ETDM No.: 5873

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

**September 2023**

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# *EXECUTIVE SUMMARY*

The Florida Department of Transportation (FDOT), District One is conducting a Project Development and Environment (PD&E) study for State Road (SR) 544 (Lucerne Park Road) in Polk County to determine alternative roadway improvements along the corridor. The study limits are from Martin Luther King Blvd. to SR 17, a distance of approximately 8 miles. The purpose of the PD&E Study is to document the need for additional capacity within the study corridor and to evaluate the costs and impacts associated with providing this additional capacity.

The purpose of this Contamination Screening Evaluation Report (CSER) is to present findings of a contamination screening evaluation for SR 544 (Lucerne Park Road) within the study limits. This report identifies and evaluates known or potential contamination problems, presents testing or remedial recommendations concerning these problems, and discusses possible project impacts or impacts to the proposed project including the associated floodplain compensation and stormwater management sites.

This report has been prepared using the FDOT PD&E Manual, Part 2, Chapter 20 (July 1, 2023) reporting format and standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, literature review and when necessary, personal interviews of individuals and business owners within the limits of the project.

Thirty-nine (39) sites were investigated for facilities or operations that may present the potential for finding petroleum contamination or hazardous materials, and therefore may impact the proposed improvements for this project. Specific details for each site are outlined in **Section 7.0** and their locations are presented in **Appendix A**.

For the purpose of this report, the project study area includes the limits of the project with associated Floodplain Compensation and Stormwater Management sites and the following buffer distances as recommended on FDOT projects extending beyond those boundaries: 500 feet from the right-of-way line for petroleum, drycleaners, and non-petroleum sites; 1,000 feet from the right-of-way line for non-landfill solid waste sites; and ½ mile from the right-of-way line for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known also as Superfund, National Priority List (NPL), or landfill sites. This report evaluated the alternative roadway improvements. Of the 39 sites investigated, the following risk ratings have been applied: **3 “High” rating sites, 6 “Medium” rating sites and 30 “Low/No” rating sites for potential contamination concerns.**

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**Table i: Sites Recommended for Additional Evaluation**

| Site | Facility Name | Risk Rating |
|---|---|---|
| 2 | Big M Mart | High |
| 6 | CastelGas LLC/ Pronto Station LLC (Winter Haven Chevron) | Medium |
| 7 | Washington Garage | Medium |
| 8 | BP #610 Twin Brothers Food Mart | Medium |
| 20 | Giant Oil #121 | High |
| 28 | RaceTrac #2343/ Star Enterprise/ Texaco #242031370 | Medium |
| 29 | Marathon-Lucern #136 | High |
| 38 A-B | Bridges | Medium |
| 39 A-K | Adjacent Agricultural Lands | Medium |

For the sites rated “No” for potential contamination, no further action is planned. These sites/facilities have been evaluated and determined not to have any potential environmental risk to the study area at this time.

For sites rated “Low” for potential contamination, no further action is required at this time. These sites/facilities have potential to impact the study area but based on select variables have been determined to have low risk to the corridor at this time. Variables that may change the risk rating include a facility’s non-compliance with environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change an additional assessment of the facilities would be conducted.

For those sites with a risk rating of “Medium” or “High”, the Project Manager (PM) and the District Contamination Impact Coordinator (DCIC) will coordinate on further actions that must be taken to best address the contamination issue. This may include determining if the Florida Department of Environmental Protection (FDEP)/FDOT Memorandum of Understanding (MOU) applies to any sites, conducting Level II activities or recommending Level III or remedial activities, notes on the plans, design modifications and/or special provisions prior to or during construction.

Additional information may become available or site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring right-of-way and/or proceeding with roadway construction.

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# *DEFINITIONS*

**Contamination** – The presence of any contaminant in surface water, groundwater, soil, sediment, or upon the land, in concentrations that exceed the applicable Cleanup Target Levels (CTLs) specified in **Chapter 62-777, F.A.C.**, or water quality standards in **Chapter 62-302 or 62-520, F.A.C.**, or in concentrations that may result in contaminated sediment.

**Contaminant** – Any physical, chemical, biological, or radiological substance present in any medium which may result in adverse effects to human health or the environment or which creates an adverse nuisance, organoleptic, or aesthetic condition in groundwater.

**Contaminated Site** – Any site with hazardous substances, pollutants, or contaminants that are harmful or likely to be harmful to human health or the environment.

**Hazardous Material** – A general term that includes all materials and substances which are now designated or defined as hazardous by federal or state law or by the rules or regulations of the state or any federal agency: **40 CFR § 261.30, 40 CFR § 261.4**, **40 CFR §§ 261.21-261.24**, **Section 376.301, F.S.**, and **Section 403.74, F.S.**

**Hazardous Waste Site** – Site at which wastes as defined in **Rule Chapter 62-730, F.A.C., and 40 CFR §§ 260-272**, have been disposed, treated, or stored.

**Level of Investigation** – To standardize contamination evaluations on transportation projects, FDOT broadly uses the following levels of contamination investigation:

> **Level I** – A contamination screening evaluation consisting of a desktop review of current and historical records and site reconnaissance to identify past and present activities that have the potential to impact areas in, or immediately adjacent to, project construction. It is used to determine the need and scope of further assessments. Level I evaluation is completed as early as feasible in the project process, typically during the PD&E phase or during preparation of Phase I (30%) design plans for projects which do not have a PD&E Study.
>
> **Level II** – Level II assessment [also known as Impact to Construction Assessment (ICA)] consists of a detailed evaluation of potential contaminated sites based on the findings of Level I evaluation. When applicable, a Level II assessment includes soil sampling, laboratory testing and/or installation of groundwater monitoring wells for sites with known or potentially contaminated materials. This is done to assess the type and extent of contamination in potentially contaminated sites, identify impacts to construction and associated costs for remediation, and to develop recommendations for Level III activities or avoidance measures as warranted. Level II assessment is typically performed during the Design phase and prior to right-of-way acquisition and Construction. However, it may be performed during the PD&E phase for projects with advanced design activities or when it is required to substantiate the impact of potentially contaminated sites on the Preferred Alternative.

**Level III** – Level III refers to additional evaluation of contamination identified or suspected based on the Level II assessment and any requisite remediation or abatement of contamination or hazardous materials. It includes a detailed plan for the removal and disposal of contaminated media, storage tanks, and/or other hazardous materials that may directly impact construction activities or right-of-way acquisition and clearance. Level III activities can occur during design and right-of-way acquisition, or during or prior to construction to avoid impacts to construction and project delays.

**National Pollutant Discharge Elimination System (NPDES)** – The NPDES Stormwater Program is a comprehensive two-phased national program (established by the **Clean Water Act**) for addressing the non-agricultural sources of stormwater discharges which adversely affect the quality of our nation's waters. The program uses the NPDES permitting mechanism to require the implementation of controls designed to prevent harmful pollutants from being discharged by stormwater runoff into local water bodies.

**Potentially Contaminated Site** – A site, within or adjacent to the project limits, suspected to have existing contamination based on past or current activities on or near the site as evidenced by records review, historical land use evaluation, or field reconnaissance.

**Remediation** – Those activities necessary to remove, treat, or otherwise reduce contamination to a level acceptable to the regulatory agency having jurisdiction in accordance with **Chapter 62- 780, F.A.C**., or applicable federal programs e.g., **Resource Conservation and Recovery Act (RCRA**).

**Solid Waste** – **RCRA** defines a solid waste as: “any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial or mining and agricultural operations, and from community activities . . . [excluding] . . . solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under **Section 402 of the Federal Water Pollution Control Act**.”

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# *SECTION 1.0 INTRODUCTION*

The Florida Department of Transportation (FDOT), District One is conducting a Project Development and Environment (PD&E) study for State Road (SR) 544 in Polk County to determine alternative roadway improvements along the corridor. The study limits are from Martin Luther King Boulevard to SR 17, a distance of approximately 8 miles and is illustrated in **Figure 1-1**. The purpose of the PD&E study is to document the need for additional capacity within the study corridor and to evaluate the costs and impacts associated with providing this additional capacity. The purpose of this Contamination Screening Evaluation Report (CSER) is to present findings of a contamination screening evaluation for SR 544. The study area for this project includes the mainline corridor and associated floodplain compensation and stormwater management sites, as identified in **Appendix A**. This report identifies and evaluates known or potential contamination problems, presents testing or remedial recommendations concerning these problems, and discusses possible project impacts or impacts to the proposed project.

This report has been prepared using the FDOT PD&E Manual, Part 2, Chapter 20 (July 1, 2023) reporting format and standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, literature review and when necessary, personal interviews of individuals and business owners within the limits of the project.

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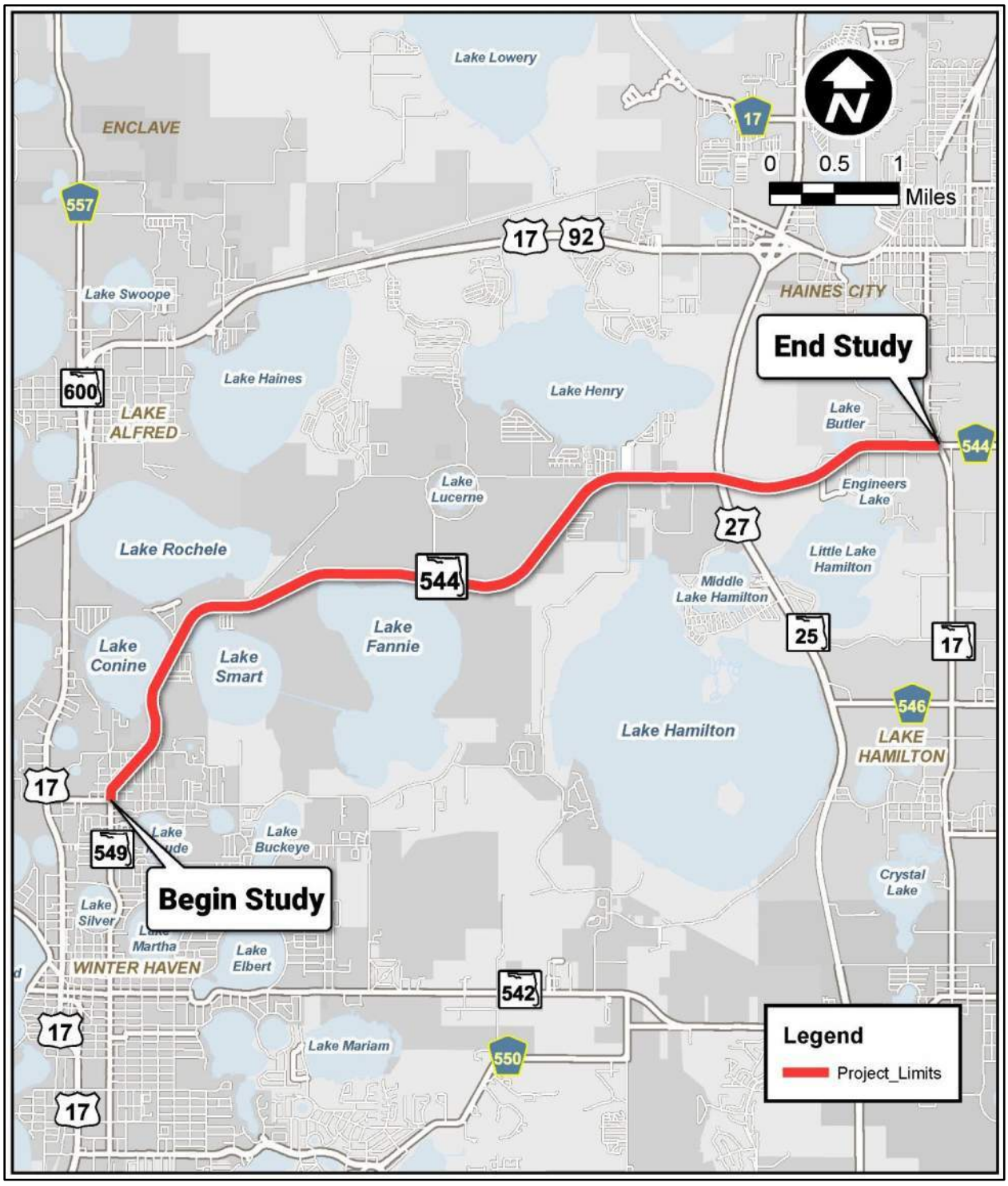



**Figure 1-1 Project Location Map**

# *SECTION 4.0 METHODOLOGY*

A preliminary evaluation of SR 544 (Lucerne Park Road) was conducted to determine potential contamination issues within the proposed project limits from properties or operations located within the vicinity of the project. The evaluation consisted of the following tasks:

- Document review using Polk County Property Appraiser's website,
- A regulatory review of governmental databases for permits and or violations associated with environmental issues,
- Obtaining and evaluating historical aerial photographs, topographic maps, and soil surveys in an effort to determine potential contamination problem areas,
- Conducting site visits to verify information provided and to identify other potential concerns within the vicinity of the project, and
- Determining the contamination potential and assigning a risk rating for each potential contamination site within the proposed project limits.

## 4.1 Regulatory Review

An environmental database search using Environmental Data Management, Inc. (EDM) was conducted on April 13, 2020, and updated on March 10, 2022, to identify sites within one-half mile of the project corridor containing documented or suspected petroleum contamination or other hazardous materials. The regulatory review of federal and state environmental records utilizes an integrated geographic information system database. The search was conducted as a preliminary screening tool to identify facilities that are registered with various county, state, and federal agencies.

The following buffer distances are recommended on FDOT projects:

1. 500 feet from the right-of-way line for petroleum, drycleaners, and non-petroleum sites.
2. 1,000 feet from the right-of-way line for non-landfill solid waste sites.
3. One-half mile from the right-of-way line for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known also as Superfund, National Priority List (NPL), or landfill sites.

All database listings were reviewed for potential impacts to the corridor. Many of the sites/facilities are listed in more than one database. The listings were located and identified within the study area and discussed further in **Section 7.0**.

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The reviewed records include information compiled by the Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP) and other various reporting programs. The following list is a typical summary of searchable databases. A complete list of all environmental record databases searched is included in the database search report.

**Federal Databases:**

- National Priorities List (NPL)
- Comprehensive Env Response, Compensation & Liability Information System List (CERCLIS)
- Archived CERCLIS Sites (NFRAP)
- Emergency Response Notification System List (ERNS)
- Resource Conservation and Recovery Information System (RCRIS) Handlers with Corrective Action (CORRACTS)
- Resource Conservation and Recovery Act (RCRA)-Treatment, Storage and/or Disposal Sites (TSD)
- RCRA-Large Quantity Generator (LQG), Small Quantity Generator (SQG), (Conditionally-Exempt Small Quantity Generator (CESQG) and Transporters (NONTSD)
- Tribal Tanks List (TRIBLTANKS)
- Tribal Lust List (TRIBLLUST)
- Brownfields Management System (USBRWNFLDS)
- Institutional and/or Engineering Controls (USINSTENG)

**State Databases:**

- State NPL Equivalent (STNPL)
- State CERCLIS Equivalent (STCERC)
- Solid Waste Facilities List (SLDWST)
- Leaking Underground Storage Tanks List (LUST)
- Underground/Aboveground Storage Tanks (TANKS)
- State Designated Brownfields (BRWNFLDS)
- Voluntary Cleanup List (VOLCLNUP)
- Institutional and/or Engineering Controls (INSTENG)
- Dry Cleaners List (DRY)

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**Other Ascertainable Records, including but not limited to:**

| | |
|---|---|
| • DOT OPS | Incident and Accident Data |
| • DOD | Department of Defense Sites |
| • FUDS | Formerly Used Defense Sites |
| • CONSENT | Superfund (CERCLA) Consent Decrees |
| • ROD | Records of Decision |
| • US MINES | Mines Master Index File |
| • TRIS | Toxic Chemical Release Inventory System |
| • TSCA | Toxic Substances Control Act |
| • ICIS | Integrated Compliance Information System |
| • PADS | PCB Activity Database System |
| • FINDS | Facility Index System/Facility Registry System |
| • UIC | Underground Injection Wells Database Listing |
| • DEDB | Ethylene Dibromide Database Results |
| • NPDES | National Pollution Discharge Elimination System, the Wastewater Facility Regulation Database |
| • FL Cattle Dip Vats | Cattle Dipping Vats |
| • TIER 2 | Tier 2 Facility Listing |
| • INDIAN RESERV | Indian Reservations |
| • PRP | Potentially Responsible Parties |
| • 2020 COR ACTION | 2020 Corrective Action Program List |
| • EPA WATCH LIST | EPA WATCH LIST |
| • PCB TRANSFORMER | PCB Transformer Registration Database |
| • COAL ASH DOE | Steam-Electric Plant Operation Data |
| • COAL ASH EPA | Coal Combustion Residues Surface Impoundments |
| • Financial Assurance | Financial Assurance Information Listing |

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## 4.2 Supplemental Regulatory Information

In addition to the EDM database search report, additional regulatory records review was based on readily available information from various online sources, including those listed below, which were reviewed in June 2023. Other information that may be provided by the client is also reviewed, verified, and utilized if applicable. Copies of applicable documentation are included, as necessary, in **Appendix C**.

- FDEP Map Direct GIS Application
- FDEP's Document Management System (OCULUS) Electronic Document Management System
- FDEP's Nexus Information Portal
- EPA EnviroMapper for Envirofacts Multi-system Search

Interviews with present and past owners, operators, and/or occupants of the properties with contamination concerns, and local government officials, may be used to verify or supplement the results of desktop and field reviews. Efforts to conduct interviews with agency or local officials were directed to various online resources including OCULUS, Map Direct, and the County's Property Appraiser websites for the latest updated information. Property owners, occupants or managers were not available for interview.

## 4.3 Site Reconnaissance

Site visits were conducted in March 2022 to evaluate each property along the project corridor for potential contamination. The reconnaissance included a systematic inspection of each parcel adjoining the project corridor looking for signs of potential contamination. This was achieved by first driving the main roadway several times in both directions to get generalized information on the study area, then walking specific parcels of interest fronting the right-of-way to gain specific information regarding the usage and condition of the parcel. Photographs of parcels were obtained during the site inspection and select images are included in **Appendix D**.

Some of the typical physical indicators for contamination include: underground and/or aboveground storage tank (UST/AST) fill ports and vent pipes; oil/petroleum staining; drums; chemical containers; refuse; illicit dumping; solid waste; stressed vegetation; dry cleaning facilities; materials handling from adjacent businesses; petroleum dispensers; excavated areas; agricultural use areas; chemical mix/load areas; storm water outfall areas; surface water indicators; and other property uses that may present environmental concerns.

The site reconnaissance in conjunction with the review of historical aerial photography, soil maps and topographic maps, allows the site to be rated as to the degree of environmental concerns as discussed in **Section 7.0**.

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# *SECTION 5.0 LAND USES*

## 5.1 Project Limits

The study limits are SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County, a distance of approximately 8 miles. For purposes of this report, the project study area includes the limits of the mainline project, stormwater management facilities, floodplain compensation sites, and the search buffer distances outlined in the PD&E Manual and listed in **Section 4**.

## 5.2 Existing Land Uses

Land use is an important factor when evaluating historical and current environmental conditions. Evaluating the past use of properties can assist in determining possible chemical constituents that may have been used or associated with a particular parcel. Current land use records, typically supplied by the local county or municipality, also provide environmental professionals additional information for identification of target areas for potential contaminants.

The existing land use and land cover data from Southwest Florida Water Management District (SWFWMD) was reviewed for this project. The majority of current land uses along the SR 544 (Lucerne Park Road) corridor includes 100: Urban & Built-up – 640 acres, 200: Agriculture – 244 acres and 600: Wetlands – 298 acres. Minor land uses along the project corridor consist of 400: Upland Forest – 4 acres, 500: Water – 56 acres, 700: Barren – 19 acres and 800: Transportation & Utilities – 7 acres. Typically, land uses that include utilities, industrial and some commercial purposes are considered to be of potential environmental concern. The general land uses along the project corridor are illustrated in **Figure 5-1**.

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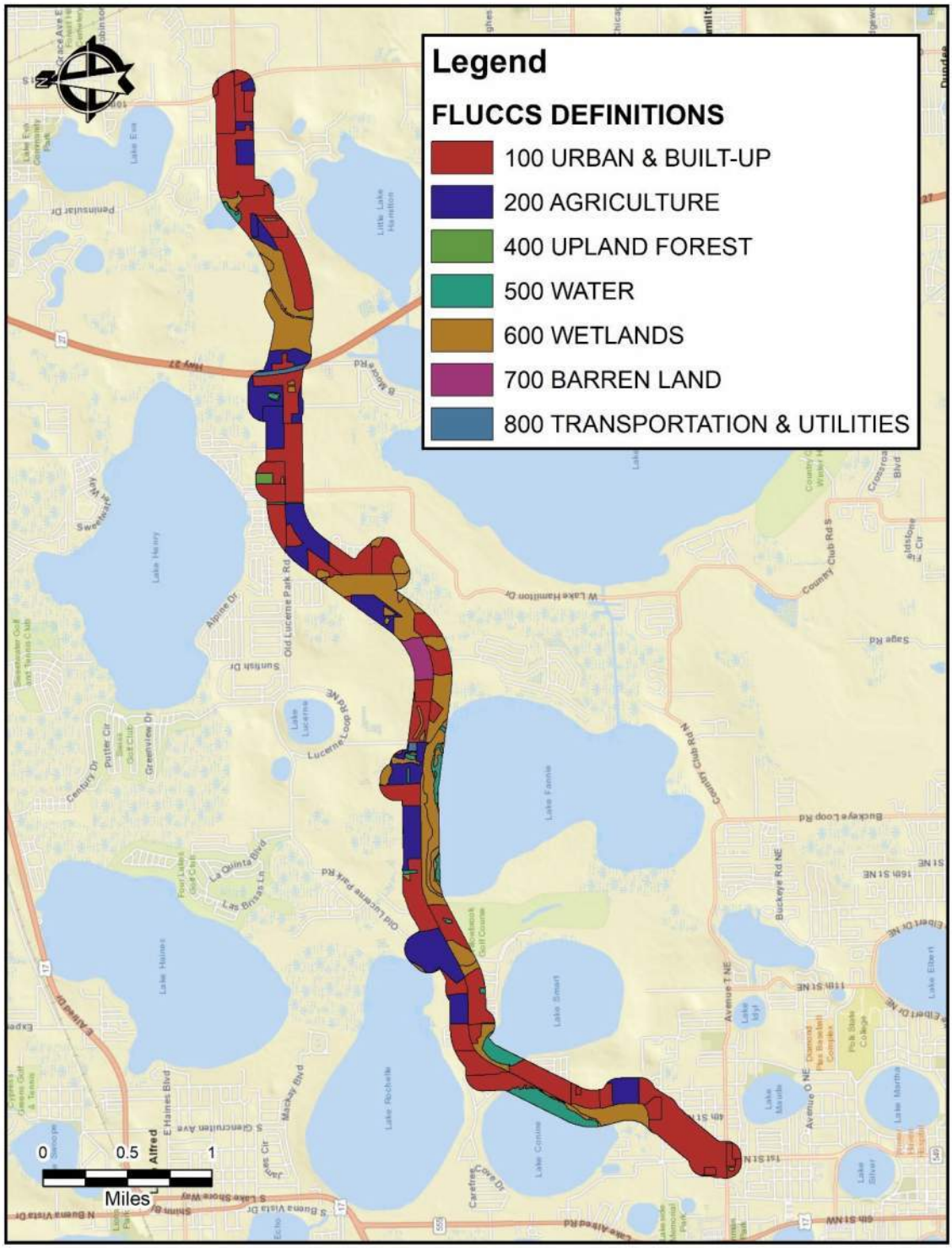



**Figure 5-1 Existing Land Use Map**

## 5.3 Historical Land Uses

City Directories can be useful tools for identifying gas stations prior to registration. A review of the R. L. Polk City Directories for the SR 544 PD&E Study was unavailable at the time of this report.

Historical aerial photographs were reviewed as part of the Level I CSER to develop a history of the previous land uses along the project corridor and to identify any areas which pose potential environmental concerns. The review of historical aerial photographs suggests that areas of potential environmental concern may exist within the project corridor. The types of agricultural, commercial, and industrial site development identified in the review are a concern due to the potential association with petroleum storage tanks, commercial operations, and agricultural processes. They typically store and use petroleum products, chemical fluids, solvents, and pesticides, and produce hazardous wastes as part of their daily business operations. Due to the rural and agricultural nature of the project area, each historical aerial was reviewed for any pesticide mix/load areas or indications of irrigation pump sheds that may contain diesel pumps and fuel ASTs.

Historical aerial photographs were obtained from the FDOT Aerial Photograph Look Up System (APLUS), the Publication of Archival Library & Museum Materials (PALMM) from the University of Florida, FDEP's Land Boundary Information System (LABINS), and Historical Aerial Photograph Report provided by EDM for the years 1941, 1952, 1957/58, 1968, 1971, 1980, 1993, 2005, and 2017; which are provided in **Appendix E**. Historical areas were divided into four "areas". Area 1 starts at Martin Luther King Boulevard., the western end of the project limits, to Connie Canal between Lake Connie and Lake Smart, Area 2 covers from Conine Canal to Lucerne Loop Road., north of Lake Fannie, Area 3 covers Lucerne Loop Road. to US 27, and Area 4 covers from US 27 to SR 17, the eastern end of the project.

**1941 Aerial Photographs**

AREA 1: The 1941 aerial shows a mix of urban (commercial and residential) development with agricultural (pasture and citrus groves) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1941 aerial shows this portion of the project area is predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1941 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is not fully constructed in the 1941 aerial.

AREA 4: The 1941 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is not fully constructed in the 1941 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences. SR 17 is constructed.

**1952 Aerial Photographs**

AREA 1: The 1952 aerial shows an increase in urban (commercial and residential) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1952 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1952 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is not fully constructed in the 1952 aerial.

AREA 4: The 1952 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is not fully constructed in the 1952 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences. SR 17 is visible on the 1952 aerial.

**1957/58 Aerial Photographs**

AREA 1: The 1958 aerial shows an increase in urban (commercial and residential) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1958 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1958 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is visible on the 1958 aerial.

AREA 4: The 1957 aerial show the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is visible in the 1957 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences.

**1968 Aerial Photograph**

AREA 1: The 1968 aerial, between Avenue T and Avenue Y, is predominantly urban (commercial and residential) development. The retail fuel stations at the intersection of Martin Luther King Boulevard and SR 544 are visible. North of Avenue Y is predominantly Lake Conine west of SR

544 and citrus groves east of SR 544. SR 544 appears to have widened and taken over the railroad grade for the Atlantic Coast Line where the two merge between Lake Conine and Lake Smart.

AREA 2: The 1968 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures, but with an increase in residential developments including mobile home park and golf courses. SR 544 occupies the former Atlantic Coast Line.

AREA 3: The 1968 aerial shows the project area remains largely agricultural, predominantly citrus groves and pasture. SR 544 follows its current path in the 1968 aerial. The Lake Hamilton Canal is visible.

AREA 4: The 1968 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. SR 544 follows its current path in the 1968 aerial. The eastern end of the SR 544 project is a mix of residential developments and remaining citrus groves. The Alta Vista School is visible at eastern end.

**1971 Aerial Photograph**

AREA 1: The 1971 aerial shows little significant change from the 1968 aerial in this area.

AREA 2: The 1971 aerial shows little significant change from the 1968 aerial in this area. The retail fuel station is visible at the intersection of SR 544 and Old Lucerne Park Road.

AREA 3: The 1971 aerial shows little significant change from the 1968 aerial in this area. The retail fuel stations are visible at the intersection of SR 544 and US 27.

AREA 4: The 1971 aerial shows little significant change from the 1968 aerial in this area.

**1980 Aerial Photograph**

AREA 1: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Washington Garage facility and its junk vehicles are visible.

AREA 2: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Willowbrook Golf Course is visible.

AREA 3: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Lake n Golf Estates, Fairview and Hidden Cove mobile home park developments are visible between SR 544 and Lake Henry.

AREA 4: The 1980 aerial shows little significant change from the 1971 aerial in this area.

**1993 Aerial Photograph**

AREA 1: The 1993 aerial shows little significant change from the 1980 aerial in this area. The retail fuel facility south of Avenue Y is visible. The Winter Ridge residential development is visible between Lake Conine and Lake Smart.

AREA 2: The 1993 aerial shows little significant change from the 1980 aerial in this area. The Sherwin Williams Distribution Center is visible.

AREA 3: The 1993 aerial shows an increase in residential and commercial development at the eastern end of this area closer to US 27. Three retail fueling stations are visible at the intersection of US 27.

AREA 4: The 1993 aerial shows an increase in residential and commercial development at the eastern end of this area closer to SR 17.

**2005 Aerial Photograph**

AREA 1: The 2005 aerial shows an increase in residential and commercial development.

AREA 2: The 2005 aerial shows an increase in residential and commercial development. The Walmart Distribution Center is visible.

AREA 3: The 2005 aerial shows little significant change from the 1993 aerial in this area.

AREA 4: The 2005 aerial shows an increase in residential development.

**2017 Aerial Photographs**

AREA 1: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 2: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 3: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 4: The 2017 aerial shows an increase in residential development.

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# SECTION 6.0 HYDROLOGIC FEATURES

Hydrologic features can be indicators of possible environmental concerns; therefore, they are reviewed as part of the CSER process. The hydrologic features such as rivers, artesian wells, creeks, sinks, mines, well fields, etc. provided on governmental maps and identified in regional soils and geology literature are reviewed for the noted items which fall within the project limits. The features are evaluated to determine if there are any known areas, or other regional environmental concerns that may contribute to environmental influences within the project limits.

## 6.1 Regional Physiography

Polk County is in the Southern Florida Flatwoods and South Central Florida Ridge Major Land Resource Areas (MLRA's). The Southern Florida Flatwoods MLRA consists mainly of nearly level, poorly drained soils. These soils are used generally as pasture, rangeland, or woodland. The South Central Florida Ridge MLRA consists of nearly level to moderately sloping, sandy soils that range from excessively drained to very poorly drained. These soils are used mainly as pasture, rangeland, cropland, or woodland. Most of the citrus in the county grows on these soils. Polk County is in the Central Highlands physiographic province, mainly on the Polk and Lake Uplands The eastern part of the county is part of the Osceola Plain, and a small area in the northwestern corner is in the Western Valley. The elevation ranges from 50 to 305 feet above National Geodetic Vertical Datum (NGVD). The lowest elevation is in the Kissimmee River Valley, and the highest elevation is along the crest of the Lake Wales Ridge near Lake Wales and Babson Park.

The SR 544 (Lucerne Park Road) project area is located across portions of the Winter Haven Ridge to the west, the Lake Wales Ridge to the east and the Polk Upland in the middle.

Most of Polk County is in the Polk and Lake Upland areas. Several ridges rise above the Polk Upland surface. The most prominent is the Lake Wales Ridge. Others include the Lakeland, Winter Haven, and Lake Henry Ridges, which appear to be remnants of a previous widespread upland. The elevation of the Polk Upland generally ranges between 100 to 130 feet above NGVD. It is higher on the ridges. In the northern part of the county, the Polk Upland merges with the Lake Upland. The two uplands do not have a distinct topographic distinction; therefore, the boundary is drawn arbitrarily. The Lake Wales Ridge is the most prominent topographic feature in peninsular Florida. It is the distal remnant of a much longer ridge that at one time may have included the Trail Ridge in northeastern Florida. The elevation is from 150 to 305 feet above NGVD and is highest at Lake Wales and Babson Park. The ridge is made up mainly of coarse elastic material that has been dissected by streams and karst activity. It has been straightened on its flanks by coastal erosion to produce its present western bounding scarp and a probable buried former eastern bounding scarp.

The preservation of the Lake Wales Ridge as a present day highland is thought to be the result of the clayey, gravelly, coarse quartz sand having limited but not completely prevented dissolution of the underlying limestone.

## 6.2 Regional Hydrogeology

In Polk County, water is used for municipal, industrial, and agricultural purposes. In most of the county, the water supply is adequate for domestic use, irrigation of crops, and the watering of livestock late in spring, in summer, and early in autumn. Low rainfall, however, causes a shortage of water in most winters.

The development of land for agriculture and mining has decreased the supply of water from surface and ground water storage. Agriculture consumptive use of water has placed a higher demand on water for irrigation. High value crops are now routinely irrigated. Mining companies also use a great deal of water in processing minerals extracted from the earth. In Polk County, water resources are managed by the Southwest Florida, South Florida, and St. Johns River Water Management Districts.

The water in Polk County comes mainly from the Floridan Aquifer, which is an artesian aquifer throughout much of the county. The Surficial Aquifer and Intermediate Aquifer System are also in the county. The Surficial Aquifer consists primarily of quartz sand and includes surficial sand and clay. The top of the Surficial Aquifer is ground water that is virtually unconfined. The Intermediate Aquifer System is in the western part of the county south of Polk City. It is a confined aquifer made up of limestone and clayey sediments. The base of the Intermediate Aquifer System is in direct contact with the Floridan Aquifer. The major permanent streams and surface drainage systems are the Withlacoochee River, North Prong Alafia River, and the Peace River. The Withlacoochee River drains the northern part of the county, the North Prong Alafia River drains the western part, and the Peace River drains the central part to the Highlands County line. The Kissimmee River drains a large area in the southeastern part of the county. The many branches and creeks are interconnected to complete the drainage of the county. Groundwater flow direction can vary significantly depending on localized subsurface conditions.

According to United States Geological Survey (USGS) maps, SWFWMD drainage basin data and aerial topographic maps, the project lies within four drainage basins, (from west to east), LAKE FANNIE OUTLET 03100101-01107000, LAKE HAMILTON OUTLET 03100101-01109900, CHANNELIZED STREAM 03100101-01108099, and LAKE EVA OUTLET 03100101-01108040. A series of mad-made channels connecting the region's lakes, drainage ditches and drainage ponds influence the depth of the seasonal highwater table and specific direction of surficial flows. Fluctuations in the groundwater level will occur with the variations in rainfall, evaporation, surface water run-off, and man-made features.

## 6.3 USGS Quadrangle Map

Topographic maps are reviewed to develop an understanding of previous land uses in the project corridor and to identify any areas that may show historical, natural, and manmade features, which aid in determining potential environmental concerns.

The USGS 7.5-Minute Winter Haven and Dundee Quadrangle topographic maps, dated 1953, 1959, 1970, 1980, 1983, 1987 and 2015 Copies of the topographic maps are provided in **Appendix F**.

## 6.4 USDA Soil Survey

Soil surveys provide indications of what a soil may be useful for and can provide clues as to possible uses and potential environmental issues. Additionally, maps of the soil units provided in the surveys often show historical land features such as mines, borrow pits, railroads, etc. These can also be indications of areas of concern. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) “Soil Survey of Polk County, Florida” issued in 1990 was reviewed for near surface soil information.

According to the Soil Survey, the mean annual rainfall for the county is approximately 54 inches with 70 percent falling April through September. In winter the average temperature is 62 degrees F, and the average minimum temperature is 50 degrees. In summer the average temperature is 82 degrees, and the average daily maximum temperature is 92 degrees.

The NRCS Soil Survey indicates that there are 31 soil-mapping units within the project area. Their general engineering properties are summarized in **Table 6-1** and their locations are indicated on the soil map for the project area, shown in **Figure 6-1**.

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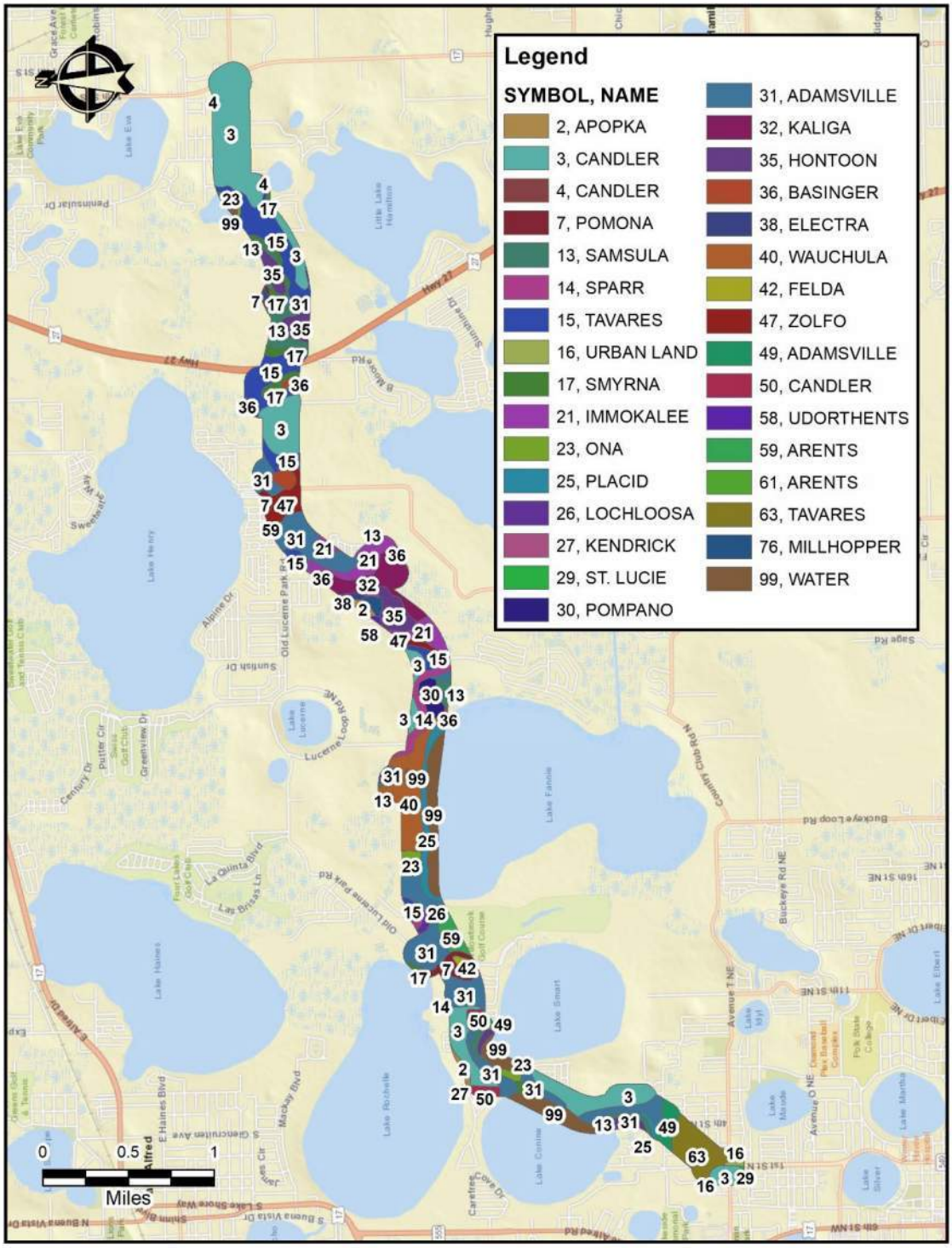



**Figure 6-1 NRSC Soil Survey Map**

## Table 6-1 Summary of NRCS Soil Survey of Polk County

| MUSYM | MUNAME | ACRES | TEXTURE | HYDRIC RATING | DRAINAGE CLASS | HYDRO GROUP | CORROSION | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | CONCRETE | STEEL |
| 2 | APOPKA FINE SAND, 0 TO 5 PERCENT SLOPES | 8.68 | FS | NO | WELL DRAINED | A | MODERATE | LOW |
| 3 | CANDLER SAND, 0 TO 5 PERCENT SLOPES | 274.40 | S | NO | EXCESSIVELY DRAINED | A | HIGH | LOW |
| 7 | POMONA FINE SAND | 22.24 | FS | NO | POORLY DRAINED | A/D | HIGH | HIGH |
| 13 | SAMSULA MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES | 46.80 | MUCK | YES | VERY POORLY DRAINED | A/D | HIGH | HIGH |
| 14 | SPARR SAND, 0 TO 5 PERCENT SLOPES | 26.75 | S | NO | SOMEWHAT POORLY DRAINED | A/D | HIGH | HIGH |
| 15 | TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES | 124.91 | FS | NO | MODERATELY WELL DRAINED | A | HIGH | LOW |
| 16 | URBAN LAND, 0 TO 2 PERCENT SLOPES | 5.23 | CEM-MAT | UNRANKED | | | | |
| 17 | SMYRNA AND MYAKKA FINE SANDS | 34.88 | FS | NO | POORLY DRAINED | A/D | HIGH | HIGH |
| 21 | IMMOKALEE SAND | 51.27 | S | NO | POORLY DRAINED | B/D | HIGH | HIGH |
| 23 | ONA-ONA, WET, FINE SAND, 0 TO 2 PERCENT SLOPES | 12.85 | FS | NO | POORLY DRAINED | B/D | HIGH | MODERATE |
| 25 | PLACID AND MYAKKA FINE SANDS, DEPRESSIONAL | 31.08 | FS | YES | VERY POORLY DRAINED | A/D | HIGH | HIGH |
| 26 | LOCHLOOSA FINE SAND | 4.22 | FS | NO | SOMEWHAT POORLY DRAINED | C | HIGH | MODERATE |
| 27 | KENDRICK FINE SAND, 0 TO 5 PERCENT SLOPES | 0.03 | FS | NO | WELL DRAINED | A | HIGH | LOW |
| 29 | ST. LUCIE FINE SAND, 0 TO 5 PERCENT SLOPES | 0.86 | FS | NO | EXCESSIVELY DRAINED | A | HIGH | LOW |
| 30 | POMPANO FINE SAND | 14.36 | FS | YES | POORLY DRAINED | A/D | MODERATE | HIGH |
| 31 | ADAMSVILLE FINE SAND, 0 TO 2 PERCENT SLOPES | 198.94 | FS | NO | SOMEWHAT POORLY DRAINED | A/D | MODERATE | HIGH |
| 32 | KALIGA MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES | 44.63 | MUCK | YES | VERY POORLY DRAINED | C/D | HIGH | HIGH |
| 35 | HONTOON MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES | 61.48 | MUCK | YES | VERY POORLY DRAINED | A/D | HIGH | HIGH |

| MUSYM | MUNAME | ACRES | TEXTURE | HYDRIC RATING | DRAINAGE CLASS | HYDRO GROUP | CORROSION | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | CONCRETE | STEEL |
| 36 | BASINGER MUCKY FINE SAND, DEPRESSIONAL | 19.41 | MK-FS | YES | VERY POORLY DRAINED | A/D | HIGH | HIGH |
| 38 | ELECTRA FINE SAND | 3.28 | FS | NO | SOMEWHAT POORLY DRAINED | A | HIGH | MODERATE |
| 40 | WAUCHULA FINE SAND | 63.99 | FS | NO | POORLY DRAINED | C/D | HIGH | HIGH |
| 42 | FELDA FINE SAND | 4.47 | FS | YES | POORLY DRAINED | A/D | MODERATE | HIGH |
| 47 | ZOLFO FINE SAND, 0 TO 2 PERCENT SLOPES | 29.20 | FS | NO | SOMEWHAT POORLY DRAINED | A | HIGH | HIGH |
| 49 | ADAMSVILLE-URBAN LAND COMPLEX | 19.35 | FS | NO | SOMEWHAT POORLY DRAINED | A | MODERATE | LOW |
| 50 | CANDLER-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES | 12.09 | S | NO | EXCESSIVELY DRAINED | A | HIGH | LOW |
| 58 | UDORTHENTS, EXCAVATED | 1.25 | | NO | | | | |
| 59 | ARENTS-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES | 15.69 | S | NO | SOMEWHAT POORLY DRAINED | A | LOW | HIGH |
| 61 | ARENTS, ORGANIC SUBSTRATUM-URBAN LAND COMPLEX | 0.82 | S | NO | SOMEWHAT POORLY DRAINED | A | MODERATE | HIGH |
| 63 | TAVARES-URBAN LAND COMPLEX | 45.12 | FS | NO | MODERATELY WELL DRAINED | A | HIGH | LOW |
| 76 | MILLHOPPER FINE SAND, 0 TO 5 PERCENT SLOPES | 6.76 | FS | NO | MODERATELY WELL DRAINED | A | HIGH | MODERATE |
| 99 | WATER | 81.87 | | UNRANKED | | | | |

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# *SECTION 7.0 PROJECT IMPACTS*

## 7.1 Potential Contamination Sites

After gathering and reviewing all readily available public information and conducting site reconnaissance, contamination risk ratings were assigned to sites of potential concern. The rating system is divided into four categories of risk as defined by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023). These four degrees of risk are “No”, “Low”, “Medium” and “High”. This system expresses the degree of concern for potential contamination problems. Known problems may not necessarily present a high cause for concern if the regulatory agencies are aware of the situation and actions, where necessary, are either complete or are underway, and these actions will not have an adverse impact on the proposed project.

Each property is evaluated for potential contamination-related impacts to the project and assigned a contamination rating. These ratings are as follows:

1. No – A review of available information on the property and a review of the conceptual or design plans indicates there is no potential contamination impact to the project. It is possible that contaminants have been handled on the property. However, findings from the contamination screening evaluation or sampling and testing results indicate that contamination impacts are not expected.

2. Low – A review of available information indicates that past or current activities on the property have an ongoing contamination issue; the site has a hazardous waste generator identification (ID) number, or the site stores, handles, or manufactures hazardous materials. However, based on the review of conceptual or design plans and/or findings from the Level I evaluation, it is not likely that there would be any contamination impacts to the project.

3. Medium – After a review of conceptual or design plans and findings from a Level I evaluation, a potential contamination impact to the project has been identified. If there is insufficient information (such as regulatory records or site historical documents) to make a determination as to the potential for contamination impact, and there is reasonable suspicion that contamination may exist, the property should be rated at least as a “Medium”. Properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive this rating.

4. High – After a review of all available information and conceptual or design plans, there is appropriate analytical data that shows contamination will substantially impact construction activities, have implications to right-of-way acquisition or have other potential transfer of contamination related liability to the FDOT.

The rating can change based on changes in design, construction activities, construction methods, right-of-way needs or other factors when the project progresses from design to construction. Where anticipated involvement with right-of-way acquisition exists, the District Contamination

Impact Coordinator (DCIC) will inform and coordinate further related activities with the Project Manager (PM), the assigned right-of-way agent and/or the Office of General Counsel as appropriate. If construction involvement is anticipated, further delineation during final design, remediation, or a Modified Special Provision (MSP) may be needed.

Additionally, The District One Environmental Management Office requests that any site within 500 feet of the project limits that has an “open” discharge or “active” documented contamination be assigned a risk rating of “Medium” (at least) because the presence of documented contamination is anticipated to affect the permitting process for National Pollutant Discharge Elimination System (NPDES) dewatering. The FDEP may also require effluent treatment and monitoring for NPDES discharges within 500 feet of these sites. The latest information on the “open” or “active” sites of concern can be found on the FDEP’s Contamination Locator Map (CLM).

The regulatory database search report, provided by EDM, identified 66 mapped facilities, located within the buffer distance (one-half mile) of the study area requested for the report. Out of the 66 mapped facilities, 36 were within or appeared to be within the appropriate search buffer distances as recommended by FDOT in the PD&E Manual. An additional three (3) facilities were included in the analysis which were identified during site reviews. Historical research, review of environmental record databases, site reconnaissance, and detailed file reviews were performed for a total of 39 sites located within the study area. These sites may present the potential for finding petroleum contamination or hazardous materials and therefore may impact the proposed improvements for this project. Specific details for each site are outlined in **Table 7-1**, and their locations are presented on **Figure 7-1** and aerial photographs located in **Appendix A**. The regulatory database search report provided by EDM is presented in **Appendix B**. Supplemental regulatory data is provided in **Appendix C**.

Of the 39 sites investigated, the following risk ratings have been applied: **3 “High” rating sites, 6 “Medium” rating sites and 30 “Low/No” rating sites for potential contamination concerns.** The following paragraphs provide details of each MEDIUM/HIGH site, as well as the factors in determining their assigned rating.

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## Table 7-1 Potential Contamination Sites

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 8628299 | GROWERS SERVICE CO INC | 1950 1ST ST N WINTER HAVEN, FL 33881 | 278 S | Petroleum | TANKS | NO | FUEL USER/NON-RETAIL<br>FAC STATUS: Closed<br><br>This facility previously consisted of four USTs containing leaded and unleaded gasoline. The USTs were removed from the facility on December 31, 1989. There were no evidence of contaminated soils or groundwater at the time of removal. Four ASTs were closed in place on December 06, 2012. The FDEP performed a closure inspection of the facility's tanks on December 20, 2012, where no violations were found. No currently regulated tanks exist on site. Due to the facility status and lack of contamination history, no contamination impacts are anticipated. |
| 2 | 8840952 | BIG M MART | 128 AVE "T" NE WINTER HAVEN, FL 33881 | 120 SE | Petroleum | LUST/TANKS | HIGH | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This is an active gasoline retail station with one 10,000-gallon UST holding unleaded gasoline, one 12,000-gallon holding unleaded gasoline, and one 12,000-gallon UST holding diesel. Discharges have been reported at this facility; therefore, the potential for contaminants is high. Full site discussion is located after Table 7-1. |
| 3 (2) | 8840952 | CITGO-NORTHEAST (FORMER) [see #2 BIG M MART] | 1916 1ST ST N WINTER HAVEN, FL 33881 | 423 S | Petroleum | LUST | NO | Mapped location is an error. See facility detail in #2 BIG M MART. |
| 4 | 9100384 | IVAHS TIRE STORE | 101 AVENUE T NE WINTER HAVEN, FL 33881 | 80 E | Petroleum | TANKS | LOW | GASOLINE RETAIL STATION<br>FAC STATUS: Closed<br><br>Four USTs containing unleaded gasoline were removed from the facility on August 31, 1990. At the time of removal, no evidence of contaminated soils or groundwater were observed. There is no contamination history at the facility. Due to the facility status, contamination impacts from this facility are low. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 5 | 8630555 | SOLO FUEL & FOOD #4 | 205 AVENUE T NW WINTER HAVEN, FL 33881 | 492 W | Petroleum | TANKS | NO | GASOLINE RETAIL STATION<br>FAC STATUS: Closed<br><br>Five USTs containing leaded and unleaded gasoline were removed from the facility on July 1, 1992. At the time of removal, no evidence of contaminated soils or groundwater were observed. There is no contamination history at the facility. Due to the facility status and distance from the project, no contamination impacts are anticipated. |
| 6 | 9807255 | CASTELGAS LLC/ PRONTO STATION LLC (Winter Haven Chevron) | 2100 1ST ST N WINTER HAVEN, FL 33881 | 20 E | Petroleum | TANKS | MEDIUM | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This facility is an open gasoline retail station with one compartmentalized 24,000-gallon UST holding unleaded gasoline. There is no contamination history at the facility; however, due to the facility's status as an open gasoline station, the site is rated medium. Full site discussion is located after Table 7-1. |
| 7 | ERIC_13415/ FLR000098426 | WASHINGTON GARAGE | 2101 1ST ST N WINTER HAVEN, FL 33881 | 135 W | Petroleum | VOLCLNUP/ NONTSD | MEDIUM | AUTOMOTIVE TRANSMISSION REPAIR SHOP<br>GENERAL AUTOMOTIVE REPAIR STATUS: Closed<br><br>This facility is a former automotive repair site used for towing and vehicle storage. In addition to cars and trucks, other wastes included used batteries, tires, and contaminated gasoline. Visible contaminants such as areas of oil-stained soil were present during an FDEP inspection in 2003, and were oberserved through soil samples taken in 2006. Currently, the facility is an undeveloped lot. Full site discussion is located after Table 7-1. |
| 8 | 8945035 | BP #610 TWIN BROTHERS FOOD MART | 2433 LUCERNE PARK RD WINTER HAVEN, FL 33881 | 35 NW | Petroleum | LUST/TANKS | MEDIUM | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This facility is an open gasoline retail station with one compartmentalized 20,000-gallon UST holding unleaded gasoline and diesel. There are discharges reported at the facility; however, there are no open or active cleanup efforts on-going. Due to the facility's status as an open gasoline station, the site is rated medium. Full site discussion is located after Table 7-1. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 9 | 1007211 | ROADWAY | LUCERNE PARK RD @ 4TH ST NE WINTER HAVEN, FL | 0 | Hazardous Waste | ERNS | NO | INCIDENTAL SPILL<br>FAC STATUS: Closed<br><br>On March 29, 2012, ten gallons of ethylene glycol spilled into the roadway as a result of a motor vehicle collision. An environmental contractor was dispatched to the site for cleanup activities, which occurred the same day. The material was removed from the roadway and an impacted catch basin adjacent to the incident location. Based on the limited impact and lapsed time of incident, no contamination impacts are anticipated. |
| 10 | 110032782031 | ST PAUL'S HOLINESS CHURCH OF WINTER HAVEN | 2520 4th St NE WINTER HAVEN, FL 33881 | 151 W | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general stormwater permit May 6, 2007. No contamination impacts are anticipated. |
| 11 | 110015729489 | SR 544 | SR 544 WINTER HAVEN, FL 33881 | 0 | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general stormwater permit August 9, 2008. No contamination impacts are anticipated. |
| 12 | 110032797098 | LAKE SMART ESTATES | IXORA DR WINTER HAVEN, FL 33881 | 257 S | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit March 10, 2007. No contamination impacts are anticipated. |
| 13 | 110024817279/ 110054138401 | LAKE SMART ESTATES | S OF LUCERNE PARK RD WINTER HAVEN, FL 33881 | 267 S | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit July 29, 2012. No contamination impacts are anticipated. |
| 14 | 110025343732/ 110028299188 | LAKES AT LUCERNE PARK PHASES 1 & 2 | OLD LUCERNE PARK RD & LUCERNE PARK RD WINTER HAVEN, FL 33881 | 10 S | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit August 16, 2006. No contamination impacts are anticipated. |
| 15 | 9601302 | DANIEL PROPERTY | 3009 OLD LUCERNE PARK RD WINTER HAVEN, FL 33881 | 180 N | Petroleum | LUST/TANKS | LOW | FUEL USER/NON-RETAIL (Residential)<br>FAC STATUS: Closed<br><br>This closed facility previously consisted of one UST holding leaded gasoline. A Discharge Report Form (DRF) was filed on June 28, 1996, after discovery of contamination during closure activities. The extent of contamination did not extend into the project limits. Subsequently, the tank was removed on July 1, 1996. Cleanup activities were completed on August 15, 2003, when an NFA Proposal was submitted to the FDEP. A Site Rehabilitation Order (SRCO) was issued on October 1, 2003. Due to the facility status, contamination impacts from this facility are low. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 16 | 110024821077 | DRY STORAGE OF WINTER HAVEN | SR 544 LUCERNE PARK RD WINTER HAVEN, FL 33881 | 153 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit April 1, 2011. No contamination impacts are anticipated. |
| 17 | 8624474 | RUBUSH GROVE SERVICE | 5520 LUCERNE PARK RD WINTER HAVEN, FL 33881 | 2,700 NW | Petroleum | TANKS | NO | FUEL USER/NON-RETAIL (Agricultural)<br>FAC STATUS: Closed<br><br>The mapped location for this facility is an error. The actual location of this facility is located on Old Lucerne Park Road, approximately 2,700 feet northwest of the project limits. Currently, there are no regulated tanks at the facility. Due to the distance from the project, no contamination impacts are anticipated. The database location for this facility is shown on the aerials in Appendix A, however; the actual location of the facility is north of the project outside of the project limits and not shown. |
| 18 | 110021033344 | LUCERNE PROFESSIONAL LEASING | W SIDE LUCERNE PARK RD WINTER HAVEN, FL 33880 | 155 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit February 11, 2005. No contamination impacts are anticipated. |
| 19 | 110064750498 | FAMILY DOLLAR STORE | 5880 LUCERNE PARK RD WINTER HAVEN, FL 33881 | 115 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit May 15, 2015. No contamination impacts are anticipated. |
| 20 | 8624284 | GIANT OIL #121 | 5900 LUCERNE PARK RD WINTER HAVEN, FL 33881 | 0 N | Petroleum | LUST/TANKS | HIGH | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This facility is an open gasoline retail station consisting of two 15,000-gallon USTs holding unleaded gasoline and diesel. Discharges have been reported on site; however, there are no active or open cleanup efforts on-going. Due to the anticipated full take of the property and removal of an entire UST system, the facility is rated high. Full site discussion is located after Table 7-1. |
| 21 | 8736730 | K J TRANSPORTATION INC (Truck Maintenance Inc)/ LITTLE GIANT PUMP COMPANY | 6200 HWY 544 N (LUCERNE PARK ROAD) WINTER HAVEN, FL 33881 | 150 S | Petroleum | LUST/TANKS | LOW | FUEL USER/NON-RETAIL<br>FAC STATUS: Closed<br><br>This closed facility previously consisted of one 20,000-gallon UST, which was removed on June 30, 1991. A discharge occurred on August 15, 1991; however, the extent of contamination did not reach the project limits. The facility was granted a No Cleanup Required status on August 23, 2009. Due to the facility staus, contamination impacts from this facility are low. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 22 | 8736037/ 8732697 | KATROS GROVES/ KEEN FRUIT | LAKE HOWARD TERR CONDOS WINTER HAVEN, FL 33881 | 330 N | Petroleum | TANKS | LOW | FUEL USER/NON-RETAIL (Agricultural)<br>FAC STATUS: Open<br><br>This facility consists of one 200-gallon AST, which is in service as of March 2022. Previously, the facility also contained three 1,000 gallon USTs which were removed in June 1986 and October 1991. Both removals resulted in a "clean closure". There is no contamination history at the facility. Due to the facility status and lack of contamination history, the contamination impacts from this facility are low. |
| 23 | 8736867 | MOORE FRUIT CO | 6600 LUCERNE PARK AVE DR WINTER HAVEN, FL 33881 | 123 S | Petroleum | LUST/TANKS | LOW | FUEL USER/NON-RETAIL (Agricultural)<br>FAC STATUS: Closed<br><br>This facility previously consisted of one 1,000-gallon UST and one 2,000-gallon UST, both of which were removed on July 31, 1990. Two DRFs are on record at this facility, one from the time of removal and the second from January 9, 1991. Site assessments were performed in August/September of 2000, and September 2001, where no contaminants above clean up target levels (CTLs) were identified. The FDEP granted an SRCO for both discharges on March 7, 2002. Due to facility status, contamination impacts from this facility are low. |
| 24 | 8628253 | GUARANTEED TRANSPORT SERVICE | 7400 STATE ROAD 544 WINTER HAVEN, FL 33881 | 306 S | Petroleum | TANKS | LOW | FUEL USER/NON-RETAIL<br>FAC STATUS: Closed<br><br>This facility consists of one 20,000-gallon AST and one 5,000-gallon AST, both of which were closed in place on November 26, 2018. Previously, the facility consisted of two USTs, both of which were removed from the facility in June 1989 and resulted in a "clean closure". There is no contamination history at the facility. Due to facility status, contamination impacts from this facility are low. |
| 25 | 110063610141 | DOLLAR GENERAL - LUCERNE PARK ROAD | WINTER HAVEN, FL 33881 | 142 S | Hazardous Waste | FRS NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit February 8, 2015. No contamination impacts are anticipated. |
| 26 | 9103318 | LAKE SMART GROVES | HWY 544 W OF HWY 27 WINTER HAVEN, FL | 500 N | Petroleum | TANKS | LOW | FUEL USER/NON-RETAIL (Agricultural)<br>FAC STATUS: Deleted<br><br>According to the FDEP's Nexus Information Portal, historical registration records for the facility indicate one AST was present at the facility in September 1989. There are no documents available to identify its current status or condition. Due to the distance from the project, contamination impacts from this facility are low. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 27 | 110032803063 | SR 544 & US HWY 27 SITE/ JOHN P ADAMS PROPERTIES INC | SWC OF SR 544 & US HWY 27 WINTER HAVEN, FL 33880 | 283 S | Hazardous Waste | FRS NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit September 20, 2007. No contamination impacts are anticipated. |
| 28 | 8735196 | RACETRAC #2343/ STAR ENTERPRISE/ TEXACO #242031370 | 32886 HWY 27 (1602 US HWY 27 S) HAINES CITY, FL 33844 | 0 S | Petroleum | LUST/TANKS | MEDIUM | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This facility is an open gasoline retail station consisting of three 20,000-gallon USTs holding unleaded gasoline, non-ethanol gasoline, and diesel. Discharges have been reported on site; however, there are no active or open cleanup efforts on-going. Due to the facility's status as an open gasoline station, the facility is rated as medium. Full site discussion is located after Table 7-1. |
| 29 | 8628429 | MARATHON-LUCERN #136 | 32940 US HWY 27 HAINES CITY, FL 33844 | 0 N | Petroleum | LUST/TANKS | HIGH | GASOLINE RETAIL STATION<br>FAC STATUS: Open<br><br>This facility is an open gasoline retail station consisting of two 10,000-gallon USTs holding unleaded gasoline and diesel. Discharges have been reported on site where active contamination cleanup is on-going. Therefore, the facility is rated as high. Full site discussion is located after Table 7-1. |
| 30 | FLD984201111/ FLTMP9002502/ 106965 | JARRETT FORD HAINES CITY/ HAINES CITY FORD/ BARGAIN CARTS | 33026 US HWY 27 S (1550 US HIGHWAY 27 S) HAINES CITY, FL 33844 | 411 N | Hazardous Waste | RCRA/ NONTSD/ SLDWST | LOW | MOTOR VEHICLE DEALER/GENERAL AUTOMOTIVE REPAIR<br>FAC STATUS: Non-generator/transporter<br><br>This facility was formerly registered as a small quantity generator (less than 1,000 kilograms per month) of hazardous waste. The facility was verified as not a generator or transporter on November 7, 2000. One violation was recorded in June 3, 1996. The facility returned to compliance and violation completed on June 24, 1996. There is no other contamination history at the facility. The facility is currently registered as a Waste Tire Collector. Contamination impacts from this facility are low. |
| 31 | 110040330353 | FDOT T1334 US 27 | 32876 HWY 27 HAINES CITY, FL 33844 | 196 S | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit November 20, 2009. No contamination impacts are anticipated. |

| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 32 | 8628415 | SAMS CORNER | 1601 US HWY 27 S HAINES CITY, FL 33844 | 20 S | Petroleum | LUST/TANKS | LOW | GASOLINE RETAIL STATION<br>FAC STATUS: Closed<br><br>This closed facility previously consisted of five USTs holding unleaded gasoline and vehicular diesel. A discharge of generic gasoline occurred on March 21, 1991. The cleanup work status for the discharge was completed when a No Further Action (NFA) request was approved on November 6, 1997. The five USTs were removed from the site on April 1, 2000; however, a second discharge was recorded on December 6, 2005. The Polk County Health Department Petroleum Cleanup Program reviewed the Source Removal (SR) Report dated April 1, 2006, and Addendum dated July 13, 2006, and confirmed contaminated soils were successfully removed. Polk County concurred with the NFA Proposal and prepared an SRCO. Due to the current facility status, contamination impacts from this facility are low. |
| 33 | 110015730271 | SR 544 // 1972242 | EAST OF US 27 TO SR 17 DUNDEE, FL 33838 | 0 | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit August 9, 2008. No contamination impacts are anticipated. |
| 34 | N/A | ABOVEGROUND STORAGE TANK #1 | SCENIC DR, HAINES CITY, FL 33844 | 435 N | Petroleum | None | LOW | A large AST was identified during the field review and site insections. The tank appears to be in good condition and no evidence of contamination was identified. Contamination impacts from this site are low. |
| 35 | 110015618401 | ESTATES AT LAKE BUTLER | N.W QUADRANT PENINSULAR DR. & SR 544 HAINES CITY, FL 33845 | 487 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit May 7, 2003. No contamination impacts are anticipated. |
| 36 | 110032756854 | PENINSULAR RIDGE | NE CORNER 5TH ST & SR-544 HAINES CITY, FL 33844 | 120 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit August 24, 2006. No contamination impacts are anticipated. |
| 37 | 110058924552 | ALTA VISTA ELEMENTARY SCHOOL | 801 SCENIC HIGHWAY HAINES CITY, FL 33844 | 297 N | Hazardous Waste | FRS/ NPDES | NO | NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit March 29, 2014. No contamination impacts are anticipated. |

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| Site | Facility ID | Facility Name | Address or Location | Distance (ft) | Type of Concern(s) | Regulatory Database | Risk Rating | Site History, Regulatory Status and Comments |
|---|---|---|---|---|---|---|---|---|
| 38 A & B | N/A | BRIDGE NO. 160021 AND<br>BRIDGE NO. 106147 | BRIDGE NO. 160021: BETWEEN BRENTWOOD DR AND W LAKE HAMILTON DR<br><br>BRIDGE NO. 106147: EAST OF US HWY 27 | 0 | Asbestos/Lead | None | MEDIUM | These bridges present the risk of contamination involvement through the potential presence of asbestos containing materials (ACM) and/or RCRA-regulated metals in the paints or metals-based coatings (MBCs). Therefore, these bridges and/or bridge culverts present a medium risk for contamination impacts and will require additional testing. Full site discussion is located after Table 7-1. |
| 39 A-K | N/A | ADJACENT AGRICULTURAL LANDS | NUMEROUS LOCATIONS | 0 | Agricultural Chemicals | None | MEDIUM | The agricultural lands immediately adjacent to the project present the risk of contamination involvement through the potential presence of residual contaminants including herbicides, pesticides, and insecticides. Full site discussion is located after Table 7-1. |

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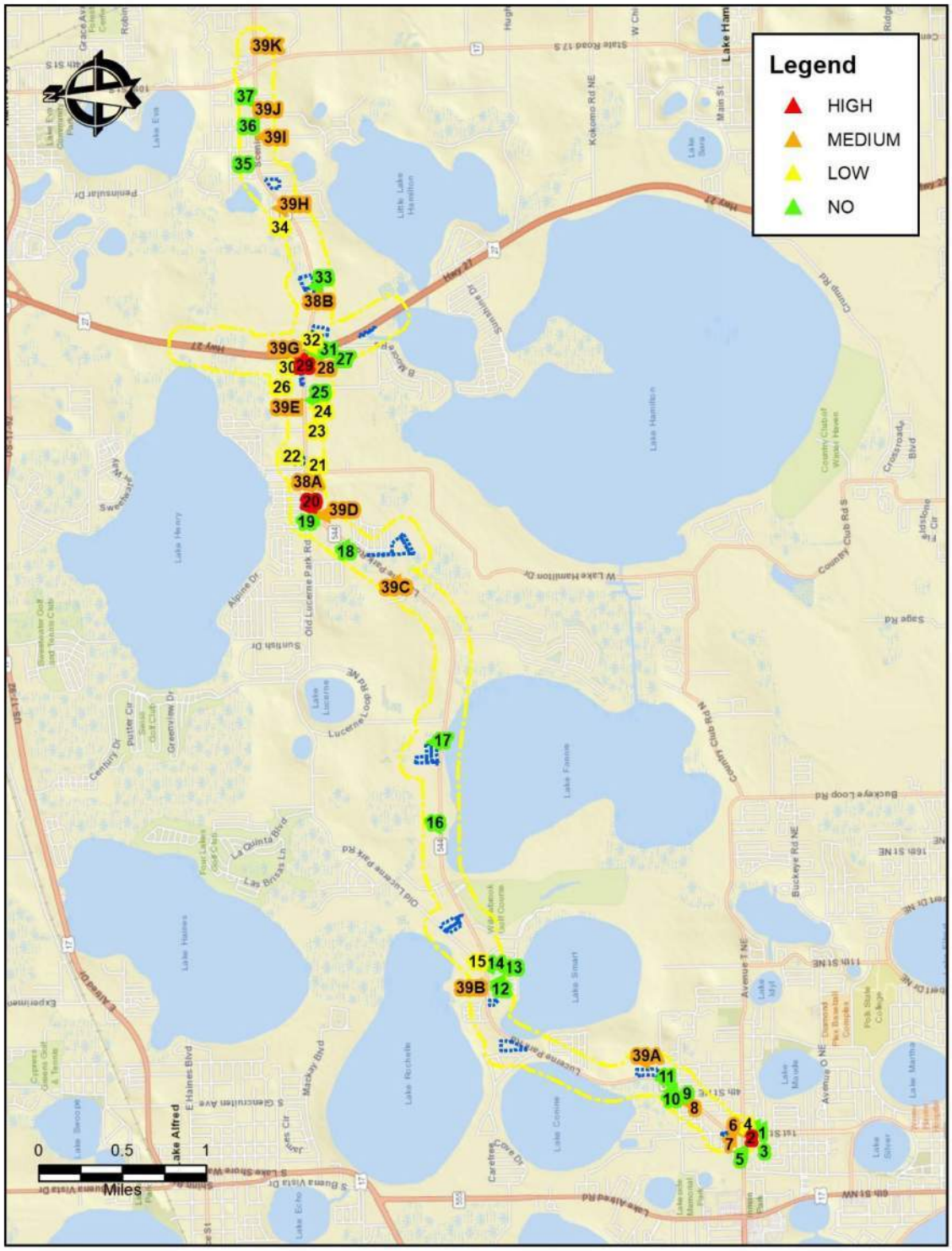



**Figure 7-1 Potential Contamination Sites**

**SITE 2: BIG M MART (CITGO)**

**LOCATION: 128 AVENUE "T" NE, WINTER HAVEN, FLORIDA 33881**

**FAC ID: 8840952 LUST**

**Risk Rating: HIGH**

The subject site is a retail gasoline station located at 128 Avenue T Northeast on the southeast corner of the intersection of Avenue T Northeast and 1st Street North in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the east side of the property, which operates as a convenience store. A canopy exists west of the facility building and covers three, typical, dispenser islands. The current tank field is located south of the canopy and consists of one 10,000-gallon and one 12,000-gallon unleaded gasoline and diesel USTs.

The former petroleum storage systems consisted of two 3,000-gallon unleaded gasoline USTs, which were installed in July and December 1978 and were removed from the site in October 1995 and three 6,000-gallon unleaded gasoline USTs, which were installed in April 1988 and were removed from the site in October 1995. The current tank field is located south of the canopy and consists of one 10,000-gallon and one 12,000-gallon unleaded gasoline fiberglass clad steel USTs installed in October 1995. Access to the property is via the main entrances on the north side of the site from Avenue T Northeast and on the west side of the site from First Street North.

According to the FDEP, Data Management System (OCULUS), only one of the discharges filed for the site was eligible for state-funded cleanup. An application was filed on December 28, 1988, in response to an unleaded gasoline leak from a loose connection on a pipe fitting. The number of gallons discharged is listed as unknown. The incident was approved for participation in Florida's Early Detection Incentive (EDI) Program for the discharge. No previous assessment or remediation has been completed for this discharge. After this incident, the site had one other DRF filed October 18, 2010. This DRF was submitted in response to a spill bucket closure assessment. Soil sampling was conducted which documented adsorbed-phase hydrocarbon concentrations above standards in the eastern spill bucket. An unknown number of gallons of gasoline was discharged due to an overfill of the spill bucket. No other DRFs have been filed for this site.

As documented in the March 2018 Templated Site Assessment Report (TSAR), EnviroTrac was onsite on October 4 and 5, 2017, to investigate any potential existing soil impacts. Sixteen soil borings (SB-1 through SB-16) were attempted to be advanced onsite, approximately around the tank farm and dispenser area. Three soil samples were recovered for laboratory analysis. From December 4 through 6, 2017, EnviroTrac personnel oversaw the installation of seven groundwater monitoring wells (MW-1 through MW-7). Further soil assessment was conducted July 30-31, 2018; soil borings SB-17 thru SB-21 and SB-26 thru SB-29 were advanced and screened for vapor analysis. Thirteen soil samples (SB-17@8' thru SB-29@8') were collected at eight feet bls in the vadose zone for laboratory analysis. Three shallow monitoring wells (MW-8 thru MW-10) were installed on July 31,2018. Further dissolved phase delineation was completed with wells MW-11 thru MW-16, DMW-1 and DMW-2 and MW-17 on June 17-19, 2019, and September 3, 2019. Recently completed assessment at the site indicates petroleum compounds remain in the groundwater at this facility.

Laboratory analyses of the groundwater samples indicated contaminants of concern (COC) exceeded both Natural Attenuation Default Concentration (NADCs) and groundwater cleanup target levels (GCTLs). No separate phase petroleum (free product) has been documented at the monitoring wells. Select soil samples were collected for laboratory analysis and indicate soil tested below CTLs as defined by Residential Direct Exposure and Leachability Based on Groundwater Criteria. Analytical results reported petroleum compounds exceeded CTLs at MW-1, MW-7, MW-8, MW-9, MW-10, and MW-18.

EnviroTrac completed an air sparge/soil vapor extraction (AS/SVE) pilot test in August 2020. Due to the success of the AS/SVE pilot test described in the October 2020 Pilot Test Report submitted by EnviroTrac, AS/SVE technology was recommended to remediate this site.

FDEP Petroleum Restoration Program selected EnviroTrac to perform the Remedial Action Plan (RAP) at the Big M Mart. FDEP received the latest groundwater sampling results in March 2023. Based on these results, it does not appear the existing plume of contaminants has extended beyond the limits of FDOT right-of-way and monitoring wells are limited to the subject property, as well as the northeast and southwest corners of the intersection at Martin Luther King Boulevard (outside of FDOT right-of-way).

Groundwater impacts are documented in the western portion and northwest corner of the property. Contaminant(s) of Concern: Groundwater: Semi-volatiles, TRPH, volatile organics target compound list. Assessment data did not reveal soil or groundwater contamination within the FDOT right-of-way. Based on the results of the most recent site assessments and ongoing remedial actions, the impacted groundwater is located within 120 feet southeast of the proposed SR 544 project. Contact with contaminated groundwater during construction is not anticipated. However, this site may affect any NPDES dewatering efforts within 500 feet. Treatment or monitoring will depend on the contamination levels and sampling data at the time of construction. Based on the current regulatory status, this facility is given a risk rating of HIGH for potential contamination to impact the project corridor.

**Site 6: CASTELGAS LLC/ PRONTO STATION LLC (Winter Haven Chevron)**

**Location: 2100 1ST STREET N, WINTER HAVEN, FLORIDA 33881**

**Fac ID: 9807255 TANKS**

**Risk Rating: MEDIUM**

The subject site is a retail gasoline station located at 2100 1st Street North, on the northeast corner of the intersection of Avenue T Northeast and 1st Street North in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the east side of the property, which operates as a convenience store. A canopy exists west of the facility building and covers four typical dispenser islands. The current tank field is located south of the building and consists of one 24,000-gallon unleaded gasoline in service since April 2005.

No discharges have been reported. No contamination has been documented. However, based on the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

**SITE 7: WASHINGTON GARAGE**

**LOCATION: 2101 1ST STREET N, WINTER HAVEN, FLORIDA 33881**

**FAC ID: ERIC_13415/ FLR000098426**

**Risk Rating: MEDIUM**

The property was a former auto repair site located at 2101 1st Street N. The site covers multiple parcels located west of SR 544 (Lucerne Park Road) and 1st Street N north of Avenue U NW and south of Avenue V NW in Winter Haven, Polk County, Florida.

FDEP inspected the Washington Garage site on April 16, 2003. The site inspection was conducted following a request by the City of Winter Haven's Office of Code Enforcement. Mr. Lonnie Washington operated a towing and vehicle repair business from his property. The majority of the site was used for storage of inoperable and damaged cars and trucks. In addition to the cars and trucks on the property, other waste included used batteries, construction and demolition (C&D) debris, tires, car and truck parts (engines, transmissions, and fuel tanks) and contaminated gasoline. Throughout the property were numerous areas of oil-stained soil.

Mr. Washington made no efforts to address the violations that existed on the property; the FDEP filed a suit against Mr. Washington to compel him to cleanup his property. A Summary Judgment ordered to remove the hazardous waste from the site and to do a Site Assessment on April 29, 2005. Mr. Washington passed away on January 6, 2006.

On September 12, 2006, during an inspection of the subject property, the FDEP conducted a very limited soil assessment which indicated that total recoverable petroleum hydrocarbons (TRPH) and lead concentrations exceeded the residential soil cleanup target level (RSCTL) established in Chapter 62-777, F.A.C. FDEP issued a letter on January 28, 2008, requesting that a Site Assessment be initiated within 60 days of contamination discovery, based on the laboratory analysis of soil samples taken by FDEP on September 12, 2006. On March 25, 2013, the FDEP referred the site to Office of General Counsel (OGC). Staff from the FDEP visited the site on July 1, 2013, and found a vacant, undeveloped lot. Upon further consideration related to the limited nature of the preliminary shallow soil assessment and because the property is currently a vacant, undeveloped lot, FDEP determined that no further assessment will be required under Chapter 62-780, F.A.C., at this time. Therefore, the FDEP closed the files on this case on September 10, 2013. However, it is noted in the letter that if the property changes ownership, due diligence may require Mrs. Washington to notify the new owner of the property's history of potential environmental issues. The FDEP may then be presented with sufficient facts to consider the property owner at that time to be a Person Responsible for Site Rehabilitation, as defined in Rule 62-780.200(32), F.A.C., and require achievement of a Risk Management Option under Rule 62-

780.680, F.A.C., to address the existing contamination left in place on the subject property. Sell or other dispossession of the property does not release you from future potential financial liability for contamination that may exist at the property.

There are previously documented petroleum and hazardous waste related impacts to this site's soil. No further site assessments have been conducted and no additional information is available. Based on the results of the 2006 site assessment, contact with contaminated soils and groundwater during construction is anticipated. This facility is given a risk rating of MEDIUM for potential contamination to impact the project corridor.

**Site 8: BP #610 TWIN BROTHERS FOOD MART**

**Location: 2433 LUCERNE PARK ROAD, WINTER HAVEN, FLORIDA 33881**

**Fac ID: 8945035 LUST**

**Risk Rating: MEDIUM**

The subject site is a retail gasoline station located at 2433 Lucerne Park Road, northwest of SR 544 (Lucerne Park Road) and east of Cedie Street NE in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the north end of the property, which operates as a convenience store. A canopy exists south of the facility building and covers two, typical, dispenser islands. The current tank field is located south of the canopy and consists of one compartmentalized 20,000-gallon UST holding unleaded gasoline and diesel installed and in service since December 2007.

A discharge was reported in May 2006. The source of the discharge was reported to be related to the former USTs. The Closure Assessment Report indicated that laboratory analysis conducted on soil and groundwater samples collected at the site verified the presence of petroleum constituents in the groundwater samples. The concentrations exceeded cleanup target levels. The volume of petroleum product discharged was unknown.

A Limited Site Assessment Report (LSAR) was submitted in October 2008. The LSAR indicated that laboratory analysis of the soil and groundwater samples were below selected CTLs. An LSAR Addendum (LSARA) was submitted February 2009. The LSARA indicated that groundwater samples collected were not impacted. Based on the laboratory analysis, none of the analities were present in detectable concentrations for any of the monitoring wells sampled. Analytical results indicated all four groundwater samples were consistent with the previous sampling event and are below the selected GCTL. The discharge and contaminants did not extend into the project limits.

The Polk County Health Department Petroleum Cleanup Program reviewed the LSAR and LSARA and issued an SRCO on April 16, 2009.

Based on the LSAR, LSARA and the SRCO; the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. However, based on by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

**Site 20: GIANT OIL #121**

**Location: 5900 LUCERNE PARK ROAD, WINTER HAVEN, FLORIDA 33881**

**Fac ID: 8624284 LUST**

**Risk Rating: HIGH**

The subject site is a retail gasoline station located at 2433 Lucerne Park Road, west of SR 544 (Lucerne Park Road) and Old Lucerne Park Road in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the west end of the property, which operates as a convenience store. A canopy exists east of the facility building and covers three typical dispenser islands. The current tank field is located east of the canopy, situated in the same area as the former tank field, and consists of two 15,000-gallon USTs holding unleaded gasoline and diesel installed and in service since July 2009.

FDEP records show that a discharge was reported in October 1993. The discharge was eligible for the FDEP Petroleum Liability Insurance and Restoration Program (PLIRP). Site assessment activities were conducted in 1996 and 1997. In 1998, a RAP was submitted and approved. Operation and Maintenance activities were conducted in 1998 and monitoring activities conducted from 1998 to 2002. An SRCO was issued on December 11, 2002. The site historically had five USTs installed in 1984, consisting of four unleaded gasoline and one diesel. The USTs were removed in June of 2009. Two current USTs exist at the facility, a compartmented tank contains diesel and premium unleaded gasoline and the other contains regular unleaded gasoline. During the June 2009 tank closure assessment, soil and groundwater samples were collected for laboratory analysis. Based on the analysis, groundwater concentrations exceeded the GCTL. A DRF was filed.

The 2002 SRCO was rescinded in 2010 and the site was returned to the State Cleanup Program. In 2010, Site Assessment Report (SAR) activities were conducted. The extent of contamination and monitoring well network did not extend into the project limits. Based on the laboratory analysis of the soil and groundwater samples collected, NFA was recommended. The Polk County Health Department approved the SAR but requested additional soil assessment. Supplemental SAR (SSAR) activities were conducted in January 2011. Based on the soil and groundwater data obtained in the SAR and the SSAR, impacted soil was not encountered and groundwater impacts were not present. NFA was recommended.

The Polk County Health Department Petroleum Cleanup Program reviewed the SAR and NFAP dated January 21, 2011 and issued a SRCO on April 1, 2011.

Based on the SAR, SSAR and the SRCO; the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. Based on by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating. However, due to the anticipated alternative alignment and full take of the property with documented historical contamination presence, as well as removal of an entire UST system, the facility is given a risk rating of HIGH.

**Site 28: RACETRAC #2343/ STAR ENTERPRISE/ TEXACO #242031370**

**Location: 32886 US 27 (1602 US 27 S) HAINES CITY, FLORIDA 33844**

**Fac ID: 8735196 LUST**

**Risk Rating: MEDIUM**

The former Sunshine Food Mart No. 199 was a retail gas station and convenience store. The original set of USTs was installed in 1987 and removed in 2004. A new set of USTs was installed in 2004 in the same location as the original set of USTs. The USTs installed in 2004 consisted of one, 16,000-gallon double wall regular unleaded gasoline UST and one, 16,000-gallon double wall compartmented UST containing diesel fuel and premium unleaded gasoline. The 16,000-gallon USTs were removed on December 8, 2015.

There were two prior reported petroleum discharges at this site; one on December 30, 1988 and one on January 6, 2004. An SRCO was issued by the FDEP on April 18, 2000 for the 1988 discharge and an SRCO was issued by the FDEP on April 19, 2006 for the 2004 discharge. For these two discharges, the extent of contamination did not extend into the limits of the project.

In 2014, site demolition activities and storage tank system removal were conducted including removal of the site building, canopy, canopy footers, concrete pump islands, asphalt paving, and the concrete overlying the USTs. Demolition activities were completed by November 21, 2014. Storage tank system removal activities were conducted in December 2014. Site redevelopment for the new RaceTrac gas station and convenience store began in June 2016 with the facility opening in November 2016. Three 20,000-gallon USTs were installed in July 2016.

A petroleum discharge was discovered during tank closure activities on December 8, 2014. The discharge occurred as a result of petroleum product that leaked from damaged product lines during site demolition activities in November 2014 and tank closure activities on December 8, 2014. The estimated volume of petroleum product in the product lines was 80 gallons. Of the 80 gallons, approximately 42 gallons were discharged to the subsurface and approximately 38 gallons were recovered and properly disposed.

Source removal of vadose zone hydrocarbon-impacted soil was conducted in January 2015 with approximately 429 tons of hydrocarbon-impacted soil removed from the site and properly disposed. The vadose zone was estimated from land surface to 12 feet below ground surface (BGS). Laboratory analyses of confirmation sidewall and bottom soil samples collected from the excavations indicated no Chapter 62-777, F.A.C., Table II, Soil Cleanup Target Level exceedances for benzene, toluene, ethylbenzene, total xylenes (BTEX), methyl tert-butyl ether (MTBE), polycyclic aromatic hydrocarbons (PAHs), and TRPH.

Prior groundwater sampling of former temporary wells in 2015 indicated a dissolved hydrocarbon plume located between the former tank pit and former dispenser. Prior to tank installation activities in July 2016, groundwater sampling was conducted on March 28, 2016, which indicated dissolved hydrocarbons exceeding GCTLs only at the former dispenser area. The extent of the contaminants did not extend into the limits of the project; however, two monitoring wells appear to be located within FDOT right-of-way on the southwest corner of the intersection at US Hwy 27 and SR 544.

In July 2016, RaceTrac installed a new set of USTs with the north side of the new tank pit encompassing the area around the former tank pit and former dispenser. For installation of the new USTs, short term dewatering of the new tank pit was conducted with approximately 192,000 gallons of groundwater pumped from the tank pit, treated, and discharged to a drainage ditch on the FDOT west right-of-way of US 27. Soil sampling was conducted during the tank pit excavation with minimal organic vapor readings and no petroleum odors observed with the exception of two locations at the 15 to 16 foot depth at the north side of the tank pit near the former dispenser location. Based on this data, 78.75 tons (approximately 56 cubic yards) of hydrocarbon-impacted soil was excavated and properly disposed. During the tank installation activities, four monitoring wells were installed at the north side of the tank pit.

Based on the SSAR, dated December 14, 2018, groundwater sampling at the former tank pit and former dispenser areas (prior dissolved hydrocarbon impacted areas) indicated no GCTL exceedances. The SSAR recommended additional sampling. If the next sampling event has no GCTL exceedances, a NFA Request will be submitted.

A Confirmatory Sampling Report and NFA Proposal, dated March 3, 2021, indicated groundwater samples were collected and analyzed by EPA Method 8260B for BTEXMTBE, EPA Method 8270D for PAHs and the FL-PRO Method for TRPHs. All tested compounds were found at concentrations below the GCTLs. The Florida Department of Health in Polk County (FDOH-Polk) Petroleum Cleanup Program, on behalf of the FDEP, reviewed the NFA Proposal dated March 3, 2021 – FDOH-Polk approved an SRCO on April 2, 2021.

Based on the SSAR and the SRCO, the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. However, based on Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

**SITE 29: MARATHON-LUCERN #136**

**LOCATION: 32940 US 27, HAINES CITY, FLORIDA 33844**

**FAC ID: 8628429 LUST**

**Risk Rating: HIGH**

The subject site is a retail gasoline station and convenience store located at 32940 US 27 on the northwest corner of SR 544 (Lucerne Park Road) and US 27 in Haines City, Polk County, Florida. The fuel dispensers are located east of the building and the UST area is located east of the two southern most dispensers. The site is paved with asphalt and concrete, and the dispensers are covered by a canopy.

The site formally had six USTs. One 10,000-gallon, two 3,000-gallon, and two 4,000-gallon unleaded gasoline tanks; and one 10,000-gallon vehicular diesel tank. Tanks were installed in 1979 and 1988. The USTs were removed in 1995. The FDEP databased reports that the site has

two 10,000-gallon USTs which store unleaded gasoline, but it is known that diesel fuel is dispensed at the site. The current USTs were installed in 1995.

A DRF was filed for the site on July 19, 1995, when petroleum impacts were discovered during the UST closure assessment activities. Site assessment activities were performed in 2002 and 2003 and a RAP and RAP Addendum was developed in 2004. The RAP AS/SVE was implemented in January 2006 and the system operated until April 2008. Post active remediation monitoring (PARM) was conducted in August 2008.

A DRF was filed in September 2008, after response to discovery of free product in monitoring well and a failed product line test. Petroleum-stained soil was observed, organic vapor analyzer/flame ionization detectors (OVA/FID) measurements indicated significant petroleum impacts. Free product was removed and site assessment activities were conducted in late 2008. A RAP was prepared and was approved on May 25, 2011. The remediation system was installed in June 2013 and started in August 2013. The system was modified in August 2016 and is currently in operation. Based on current monitoring of the system conducted in August 2021, analytical data indicated monitoring well 14 remains the most impacted and lies within the right-of-way of US 27.

Groundwater impacts are documented in the southeastern portion of the property. Assessment data did reveal groundwater contamination within the FDOT right-of-way. Based on the results of the most recent site assessments and ongoing remedial actions, contact with contaminated groundwater during construction is anticipated. This site may affect any NPDES dewatering efforts within 500 feet. Treatment and/or monitoring will depend on the contamination levels and sampling data at the time of construction. Based on the current regulatory status, this facility is given a risk rating of HIGH for potential contamination to impact the project corridor.

**SITE 38 A & B: BRIDGE NO. 160021 AND BRIDGE NO. 106147**

**LOCATION: 3 INDIVIDUAL LOCATIONS**

**FAC ID: N/A**

**Risk Rating: MEDIUM**

There are two numbered bridges along the project corridor: Bridge No. 160021 (Lake Henry/Hamilton Canal) located between Brentwood Drive and W Lake Hamilton Drive (28.080799, -81.662323); and Bridge No. 106147 (SR 544 Over Lake Hamilton) east of US Hwy 27 (28.079705, -81.644214). These bridges present the risk of contamination involvement through the potential presence of ACMs and/or RCRA-regulated metals in the paints or MBCs. Therefore, these bridges and/or bridge culverts present a medium risk for contamination impacts and will require additional testing. One bridge culvert is located over the Conine-Smart Canal; however, is not recommended for testing.

**SITE 39 A-K: ADJACENT AGRICULTURAL LANDS**

**LOCATION: SEVERAL LOCATIONS**

**FAC ID: N/A**

**Risk Rating: MEDIUM**

The agricultural lands immediately adjacent to the project present the risk of contamination involvement through the potential presence of residual contaminants including herbicides, pesticides, and insecticides. Agricultural lands adjacent to DOT projects have been known to pose a challenge during construction phase due to unidentified residual contaminants during the planning and development phase. Therefore, the agricultural lands located adjacent to the project pose a medium risk for contamination impacts.

These lands were identified by reviewing the historic aerials to determine which currently undeveloped/open parcels may have had a history of agricultural use. Several tracts of land were identified throughout the project which all have a similar apparent historical use as citrus groves and/or row crops. The numbering for these lands is under Site 39 for their similarity and separated alphabetically for individual parcels or groups of parcels depending on their relatively close geographic location or adjoining boundaries. The individual or grouped parcels as identified in **Table 7-2** below are mapped on the aerials provided in **Appendix A**. The sites are listed below:

**Table 7-2 Adjacent Agricultural Lands**

| Site | Approximate Location | Parcel Number(s) |
|---|---|---|
| 39 A | East of SR 544, to the north of Ave Y NE | 26-28-16-000000-032040 |
| | | 26-28-16-000000-013020 |
| | | 26-28-16-000000-031060 |
| | | 26-28-16-000000-031050 |
| 39 B | North of SR 544, to the west of Old Lucerne Park Road | 26-28-09-530000-000011 |
| 39 C | North/west of SR 544, to the south of Jacaranda Ave | 26-28-01-521000-332001 |
| | | 26-28-01-521000-331002 |
| 39 D | North and south of SR 544, at Old Lucerne Park Road | 26-28-01-521000-203002 |
| | | 26-28-01-521000-203003 |
| | | 26-28-01-521000-182003 |
| | | 26-28-01-521000-181001 |
| | | 26-28-01-521000-180001 |
| | | 26-28-01-521000-203001 |
| | | 26-28-01-521000-182001 |
| 39 E | North of SR 544, west of Brenton Manor Ave | 27-28-06-821500-000010 |
| | | 27-28-06-821500-000040 |
| | | 27-28-06-821000-005010 |
| | | 27-28-06-821500-000050 |
| | | 27-28-06-821000-006010 |
| 39 F | West of US Hwy 27, to the north of SR 544 | 27-27-31-000000-042020 |
| 39 G | East of US Hwy 27, to the north of SR 544 | 27-28-06-000000-013070 |
| 39 H | North and south of SR 544, between Scenic Drive and La Vista Drive | 27-28-05-000000-031030 |
| | | 27-28-05-000000-013070 |
| | | 27-28-05-817000-002010 |

| | | |
|---|---|---|
| | | 27-28-05-000000-013010 |
| | | 27-28-05-820517-000010 |
| 39 I | South of SR 544, at 4th Street | 27-28-05-819000-000010 |
| | | 27-28-04-814000-000010 |
| 39 J | South of SR 544, between Crest Drive and 8th Street S | 27-28-04-815000-000070 |
| | | 27-28-04-812500-000010 |
| 39 K | Adjacent to SR 544 at SR 17 | 27-28-04-815032-000011 |
| | | 27-28-04-815032-000012 |
| | | 27-27-32-800000-000051 |
| | | 27-27-32-800000-000041 |
| | | 27-27-32-800000-000061 |

## 7.2 Involvement with Floodplain Compensation and Stormwater Management Sites

The preferred floodplain compensation and stormwater management sites have been screened for potential contamination involvement. This section provides a risk rating determination for the potential contamination involvement in each site based on the proposed improvements. The potential risk for each pond site was determined by several factors including the proximity to potential contamination sites, the risk rating for each contamination site, and field review observations. A summary of each pond site is provided in **Table 7-3**.

There are four floodplain compensation and/or stormwater management sites with a “Medium” rating based on their proximity to identified potential contamination sites.

Pond 1A is 0.37 acres and approximately 135 feet from potential contamination Site 7, a property with documented contamination history on site. Although the FDEP recommended NFA for the facility, the subject property poses a risk to Pond 1A due to the relatively close proximity; therefore, a Medium risk rating was assigned.

Pond 1 is 2.83 acres and located on potential contamination Site 39A (adjacent agricultural lands). The presence of residual contaminants from the property’s history of agricultural use poses a risk of contamination involvement with Pond 1; therefore, a Medium risk rating was assigned.

Pond 7 (swale) is 0.70 acres and approximately 245 feet from potential contamination Site 29, a property with active groundwater contamination monitoring efforts. The plume and monitoring well network have not extended into the limits of Pond 7; however, there are four other identified potential contamination sites within 500 feet, two of which are rated medium. Therefore, Pond 7 is assigned a risk rating of Medium.

Pond 10 (dry) is 2.28 acres and is located on potential contamination Site 39H (adjacent agricultural lands). The presence of residual contaminants from the property’s history of agricultural use poses a risk of contamination involvement with Pond 10; therefore, a Medium risk rating was assigned.

## Table 7-3 Pond Site Risk Ratings

| Preferred FPC or SMF | Risk Rating | Adjacent Potential Contamination Sites | Approximate Distance to Pond Location (in feet) |
|---|---|---|---|
| Pond 1A | MEDIUM | Site 4 – Low risk<br>Site 6 – Medium risk<br>Site 7 – Medium risk | 330<br>250<br>135 |
| Pond 1 | MEDIUM | Site 11 – No risk<br>Site 39A – Medium risk | 150<br>0 |
| Pond 2 | NO | -- | -- |
| FPC 1 | NO | -- | -- |
| FPC 2 | NO | -- | -- |
| Pond 3 | NO | -- | -- |
| Pond 4 | NO | -- | -- |
| FPC 3A | NO | -- | -- |
| FPC 3B | NO | -- | -- |
| Pond 5 | NO | -- | -- |
| FPC 4 | NO | -- | -- |
| Pond 6 | LOW | Site 21 – Low risk<br>Site 22 – Low risk | 250<br>0 |
| Pond 7 (swale) | MEDIUM | Site 27 – No risk<br>Site 28 – Medium risk<br>Site 29 – High risk<br>Site 30 – Low risk<br>Site 39E – Medium risk | 425<br>375<br>245<br>365<br>50 |
| Pond 8 | LOW | Site 32 – Low risk | 350 |
| Pond 8A (swale) | NO | -- | -- |
| Pond 9 | NO | Site 33 – No risk<br>Site 38B – Medium risk* | 70<br>70 |
| FPC 5 | NO | Site 33 – No risk<br>Site 38B – Medium risk* | 50<br>350 |
| Pond 10 (dry) | MEDIUM | Site 39H – Medium risk | 0 |

*Site 38B is Bridge No. 106147 (SR 544 Over Lake Hamilton), which does not present an impact risk to the soils at the pond locations.

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# SECTION 8.0 CONCLUSIONS AND RECOMMENDATIONS

Of the 39 sites investigated, the following risk ratings have been applied: **3 "High" rating sites, 6 "Medium" rating sites and 30 "Low/No" rating sites for potential contamination concerns.** The sites rated as "High" and "Medium" are listed below in **Table 8-1**.

**Table 8-1: Sites Recommended for Additional Evaluation**

| Site | Facility Name | Risk Rating |
|---|---|---|
| 2 | Big M Mart | High |
| 6 | CastelGas LLC/ Pronto Station LLC (Winter Haven Chevron) | Medium |
| 7 | Washington Garage | Medium |
| 8 | BP #610 Twin Brothers Food Mart | Medium |
| 20 | Giant Oil #121 | High |
| 28 | RaceTrac #2343/ Star Enterprise/ Texaco #242031370 | Medium |
| 29 | Marathon-Lucern #136 | High |
| 38 A-B | Bridges | Medium |
| 39 A-K | Adjacent Agricultural Lands | Medium |

Based on the findings of the study and the risk ratings noted above, the following conclusions are being made:

For the sites rated "No" for potential contamination, no further action is planned. These sites/facilities have been evaluated and determined not to have any potential environmental risk to the study area at this time.

For sites rated "Low" for potential contamination, no further action is required at this time. These sites/facilities have the potential to impact the study area but based on select variables have been determined to have low risk to the corridor at this time. Variables that may change the risk rating include a facility's non-compliance with environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change additional assessment of the facilities would be conducted.

For those locations with a risk rating of "Medium" or "High", the PM and the DCIC will coordinate on further actions that must be taken to best address the contamination issue. This may include determining if the FDEP/FDOT Memorandum of Understanding (MOU) applies to any sites, conducting Level II activities or recommending Level III or remedial activities, notes on the plans, design modifications and/or special provisions prior to or during construction. A rough cost estimate for additional testing was calculated using an average cost of $7,500 for petroleum sites and agricultural lands and $12,500 for the bridges – amounting to a total of $160,000.

After a review of all available information, indications are found that identify known soil and groundwater contamination. Construction activities may require dewatering. Dewatering operations must obtain an NPDES Generic Permit for Discharge of Groundwater. Dewatering operations seeking coverage under the NPDES Generic Permit for Stormwater Discharges from Large and Small Construction Activities under subsection 62-621.300(4), F.A.C, are not required to obtain separate coverage under subsection 62-621.300(2), F.A.C.

Contamination issues must be screened within 500 feet of the dewatering area before applying for a permit application. Any pollutants of concern (i.e., contamination) present in groundwater at the dewatering site at concentrations equal to or exceeding the surface water criteria under subsection 62-302.530 F.A.C must be remediated; otherwise, the dewatering operation will not qualify for a permit under subsection 62-621.300(2), F.A.C. Therefore, dewatering operations in areas identified with contamination issues require treatment of effluent to limits and requirements specified in the NPDES Generic Permit.

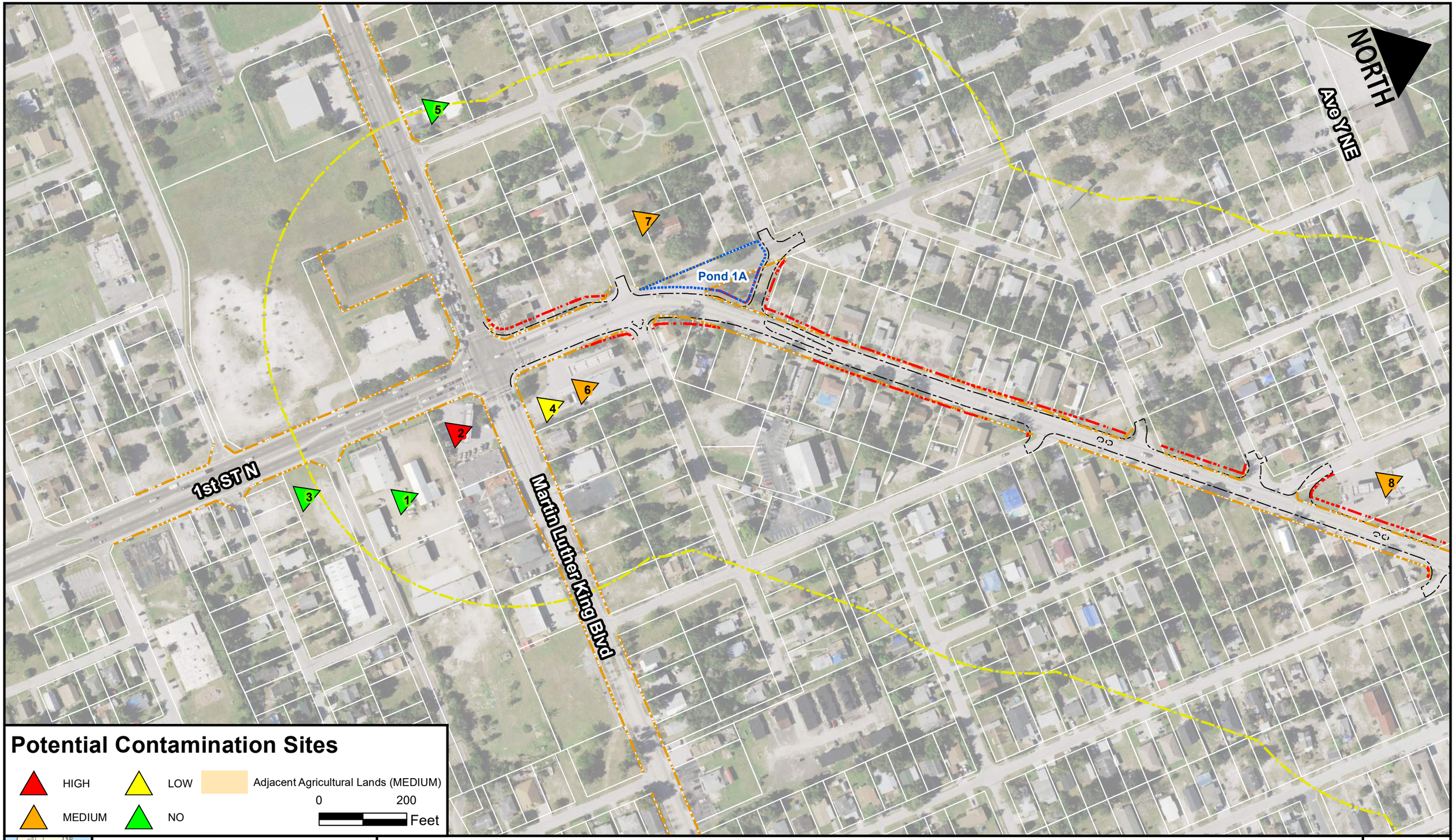
Additional information may become available and site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring right-of-way and/or proceeding with roadway construction.

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# APPENDIX A

## Project Aerial Maps

DRAFT




Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

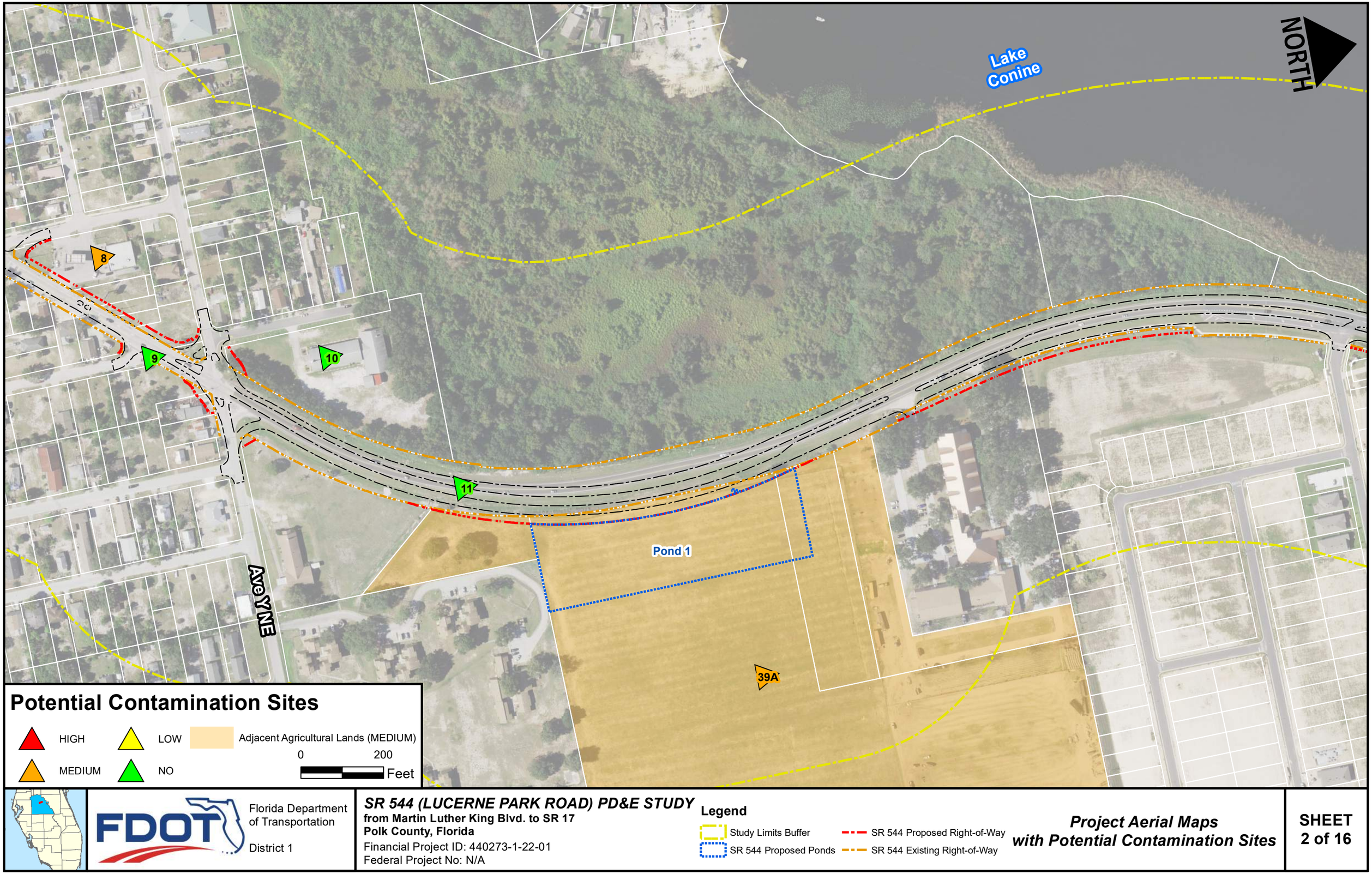
Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 1 of 16**




Florida Department of Transportation

District 1

# *SR 544 (LUCERNE PARK ROAD) PD&E STUDY*

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

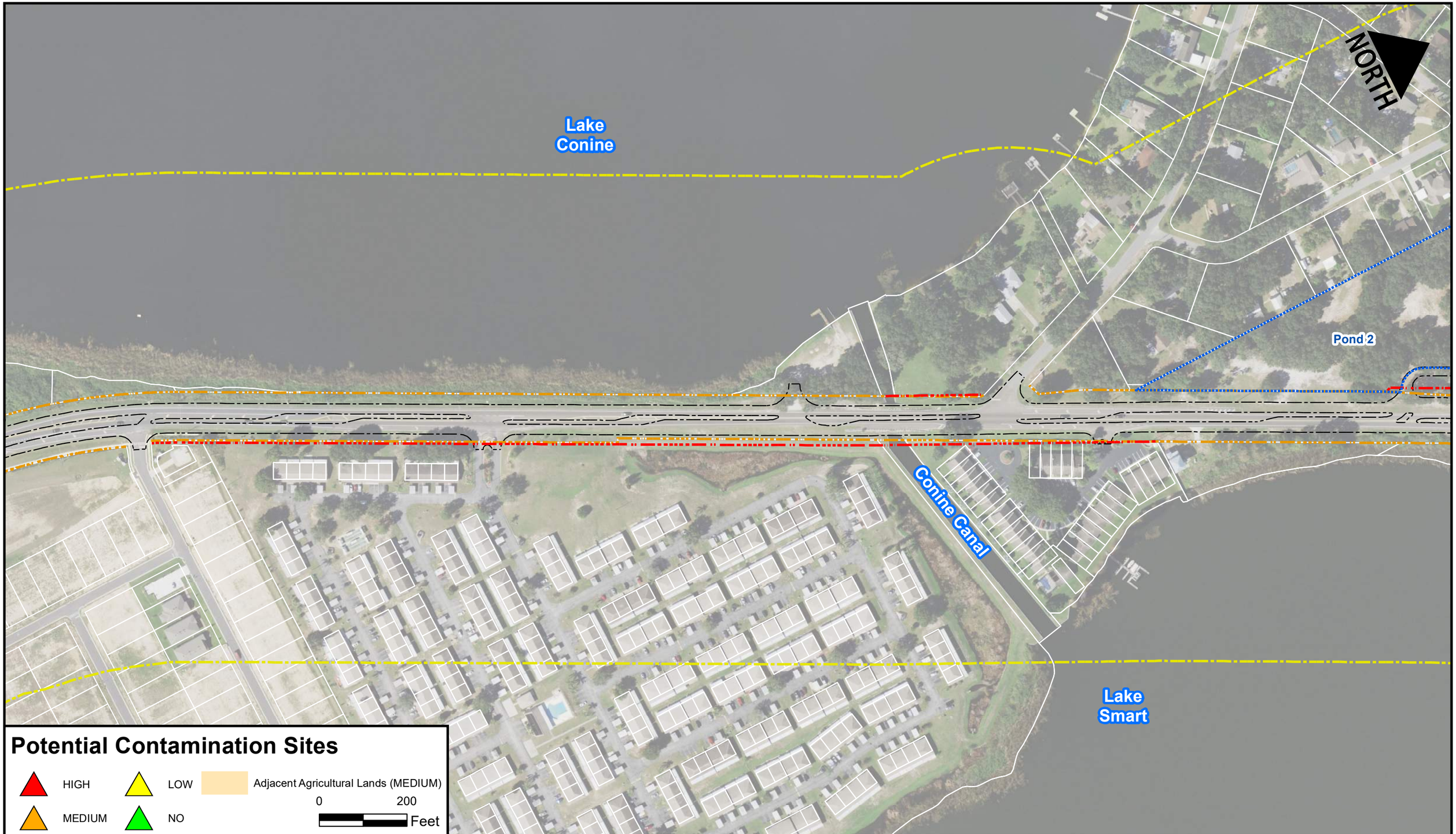
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Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet



Florida Department of Transportation

District 1

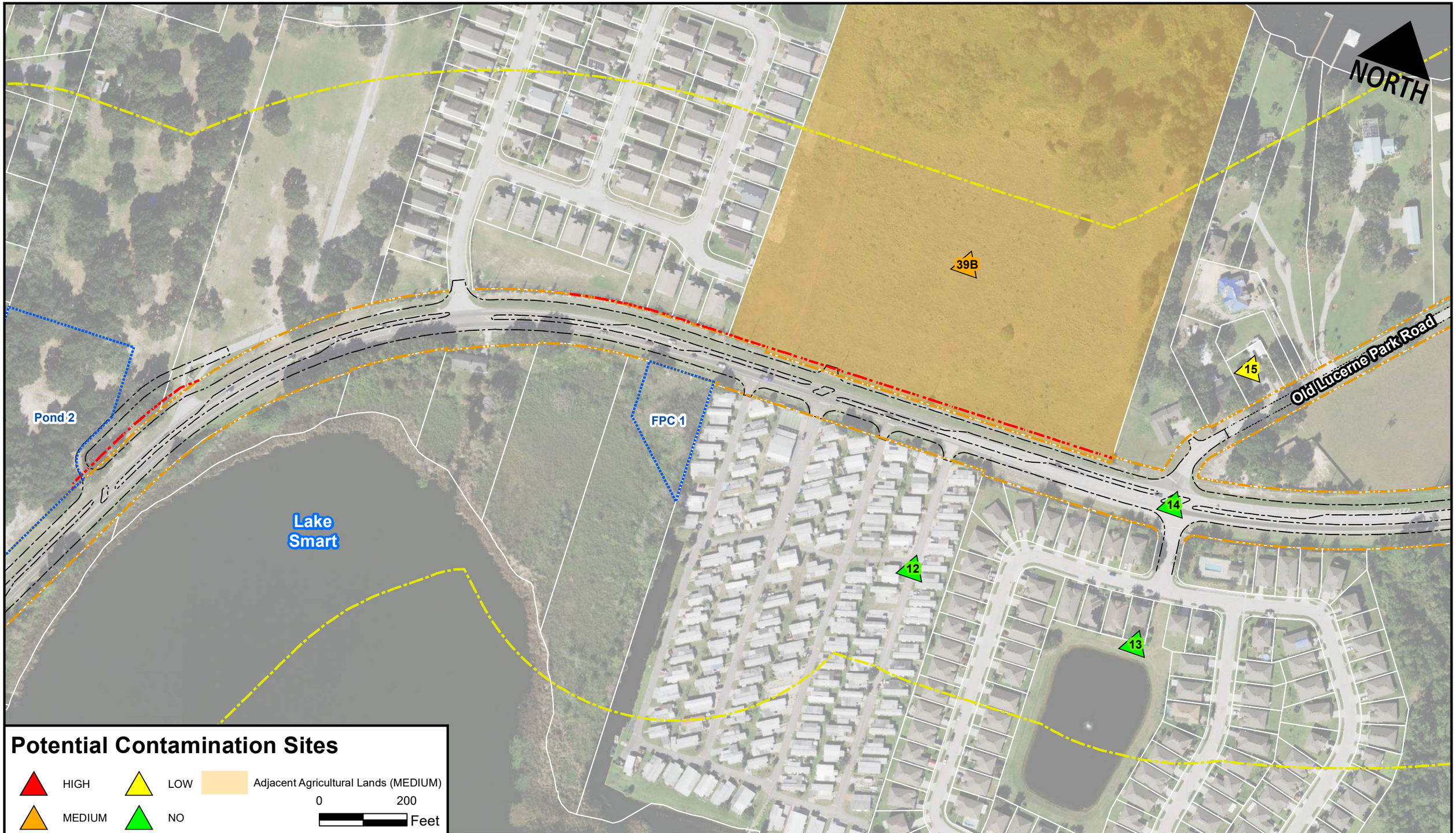
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**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 3 of 16**




Florida Department of Transportation

District 1

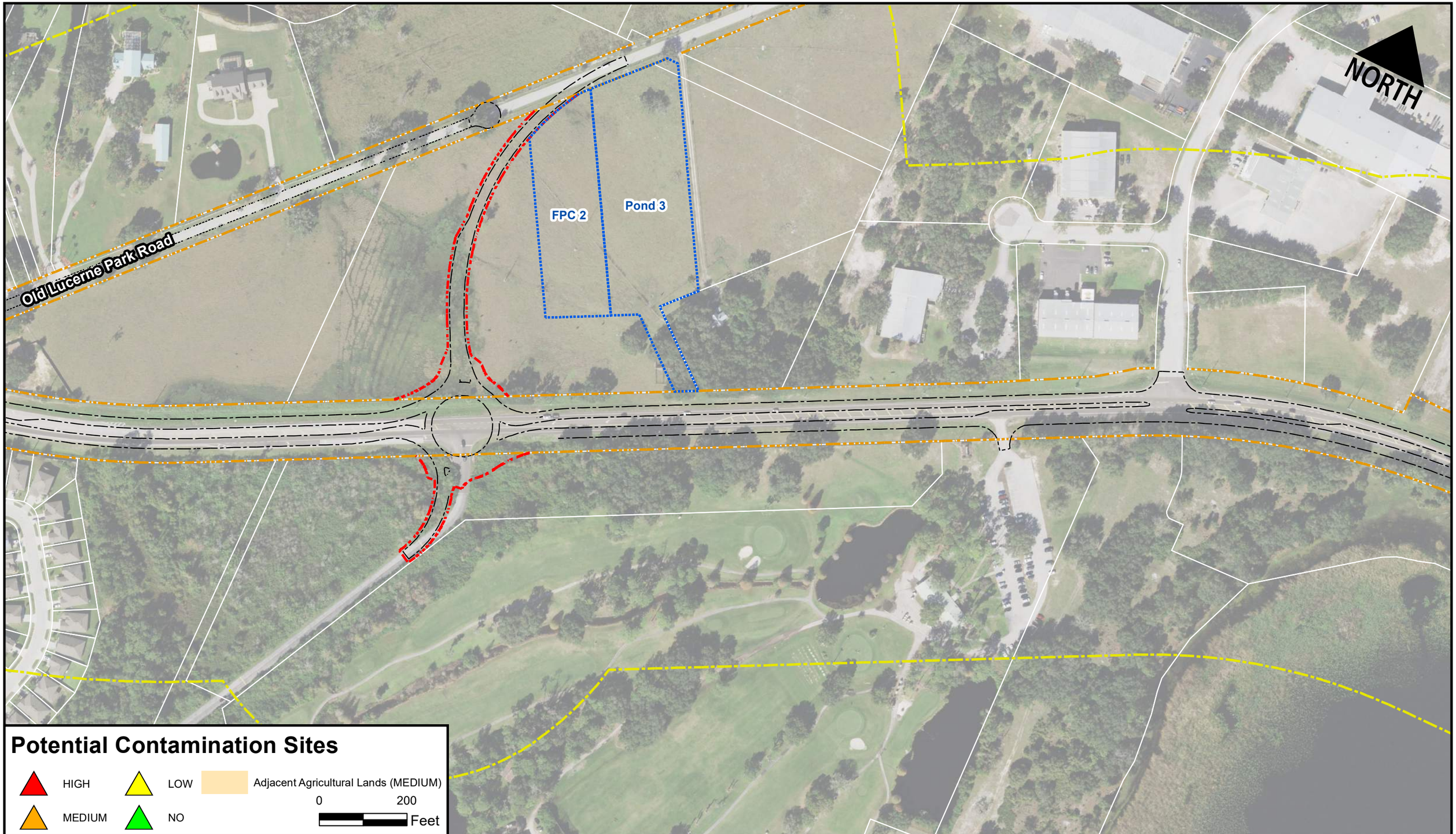
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**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 4 of 16**




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO
0 200 Feet

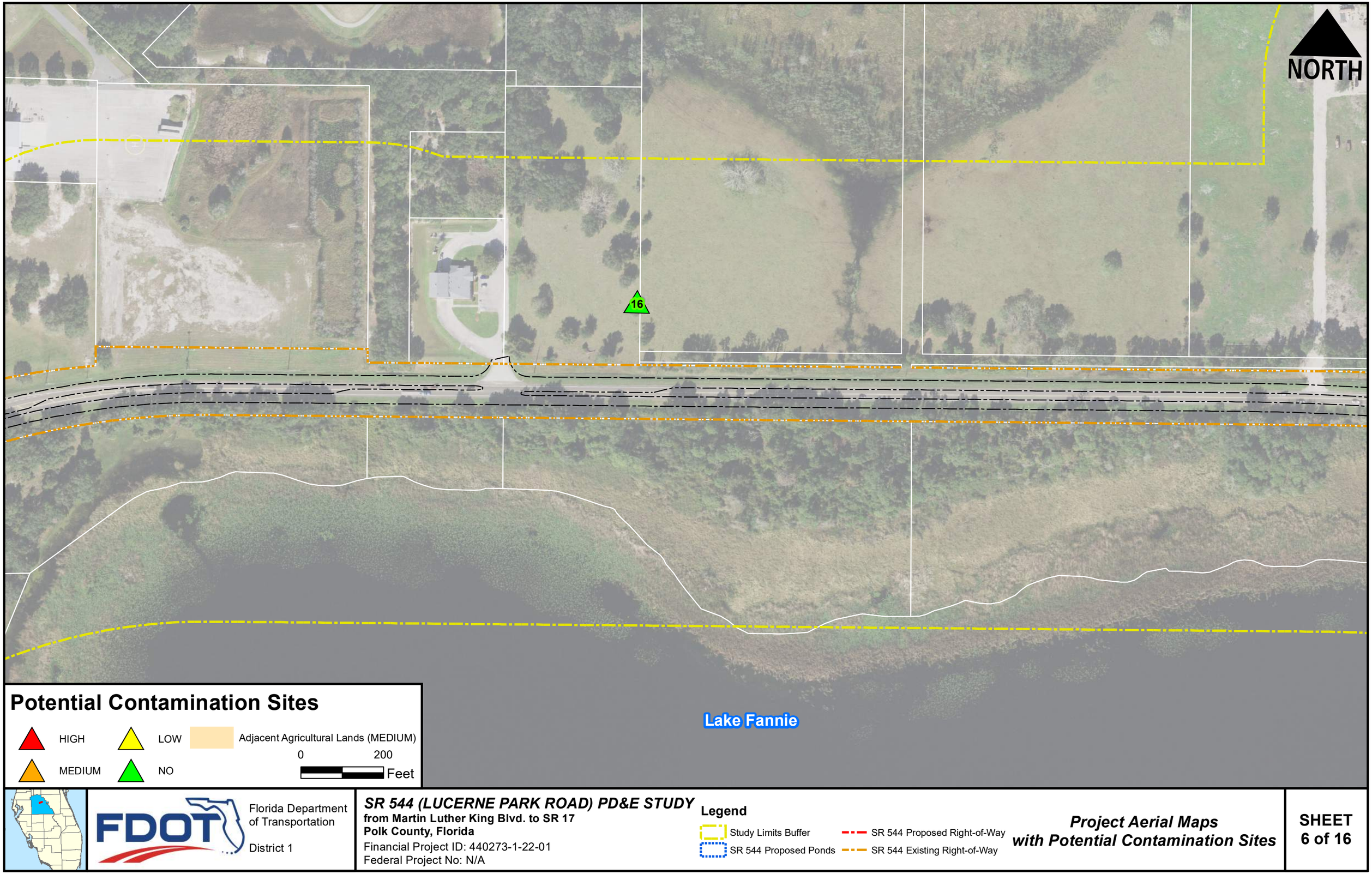
Florida Department of Transportation
District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***
**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**
Study Limits Buffer
SR 544 Proposed Ponds
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 5 of 16**




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet

Florida Department of Transportation

District 1

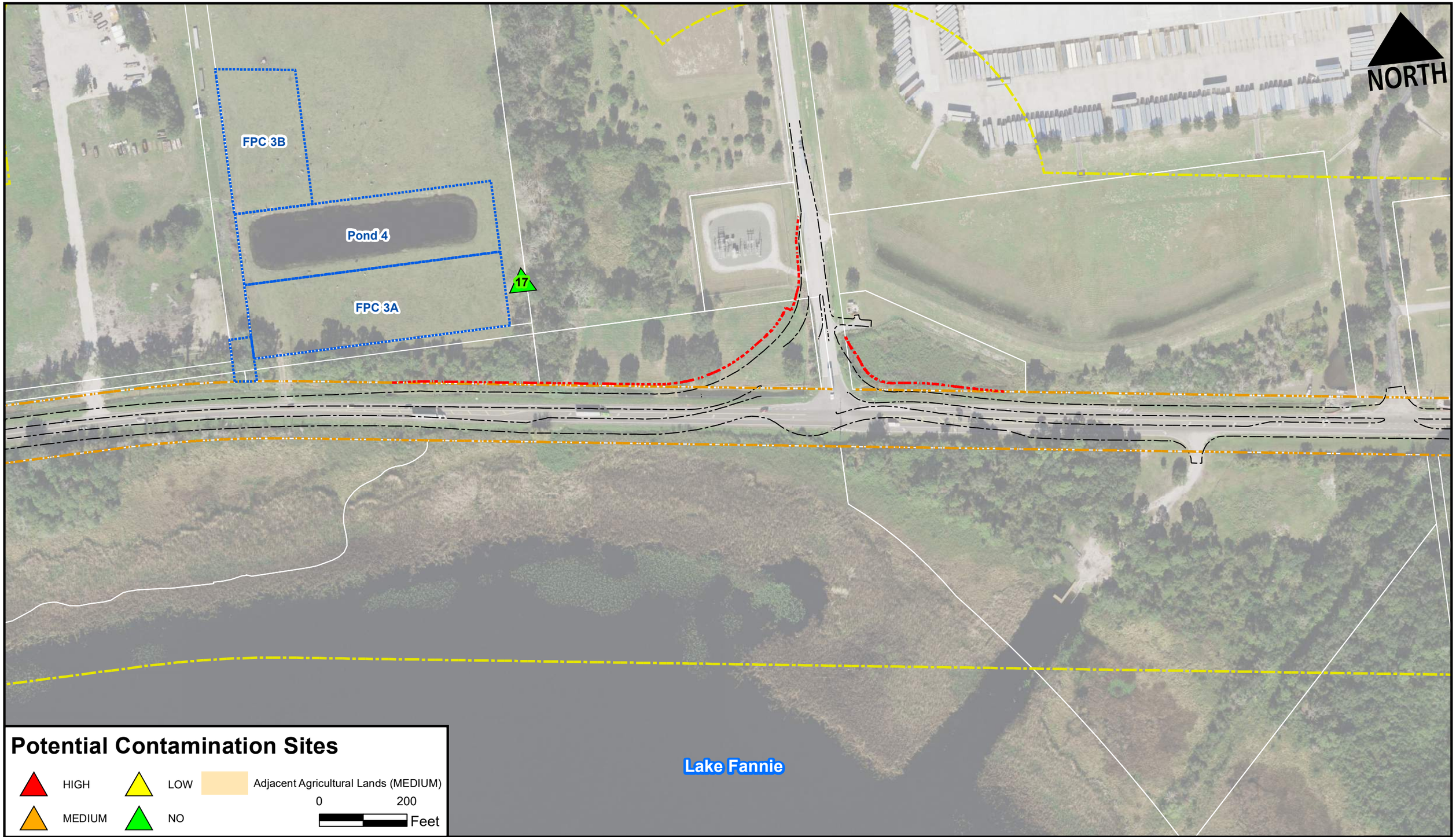
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**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**

Study Limits Buffer
SR 544 Proposed Ponds
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 6 of 16**




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet



Florida Department of Transportation

District 1

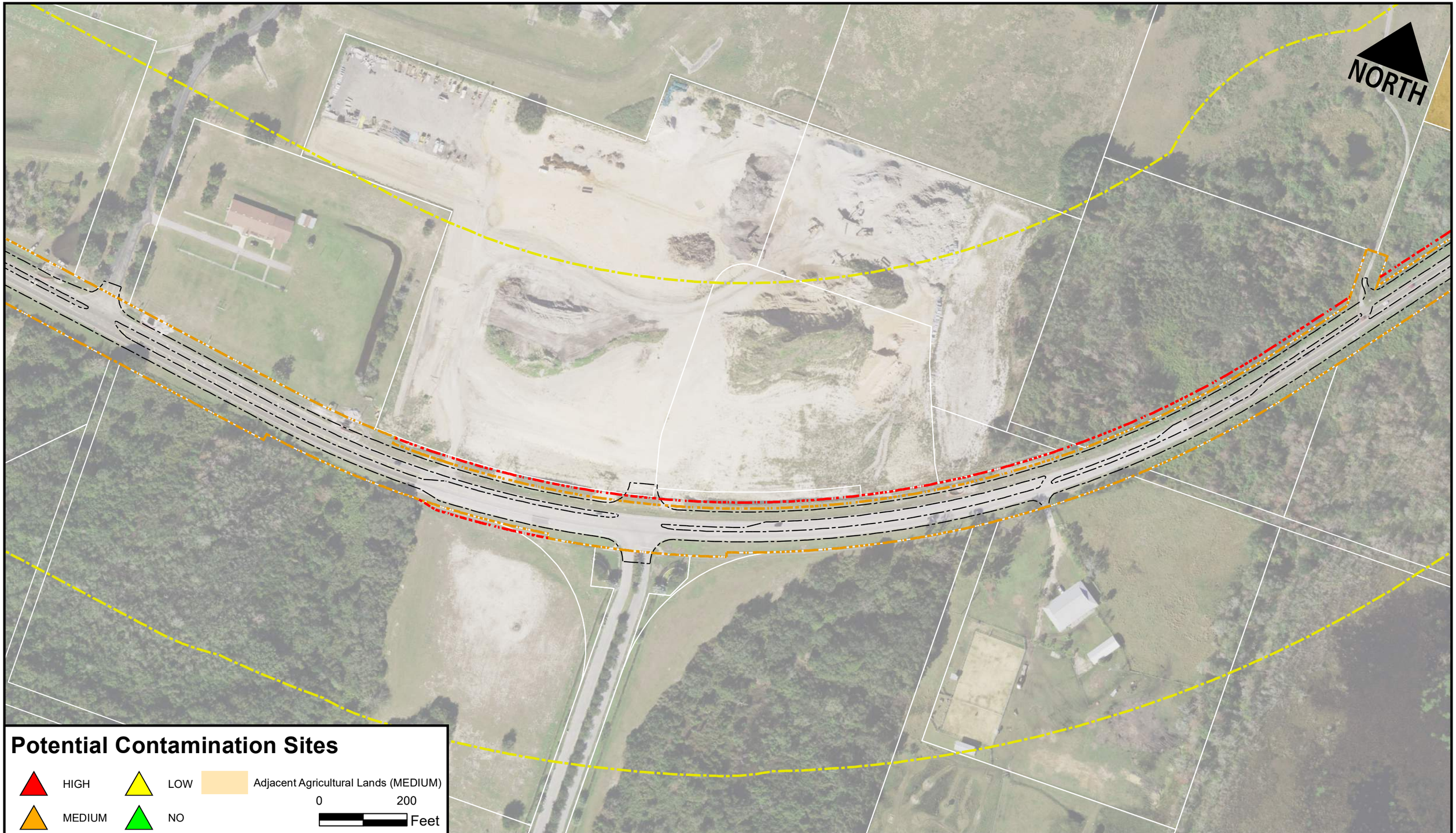
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**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 7 of 16**




Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***
**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 8 of 16**

NORTH

39C

18

FPC 4

Pond 5

## Potential Contamination Sites

HIGH

LOW

Adjacent Agricultural Lands (MEDIUM)

MEDIUM

NO

0 200 Feet

Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

Study Limits Buffer

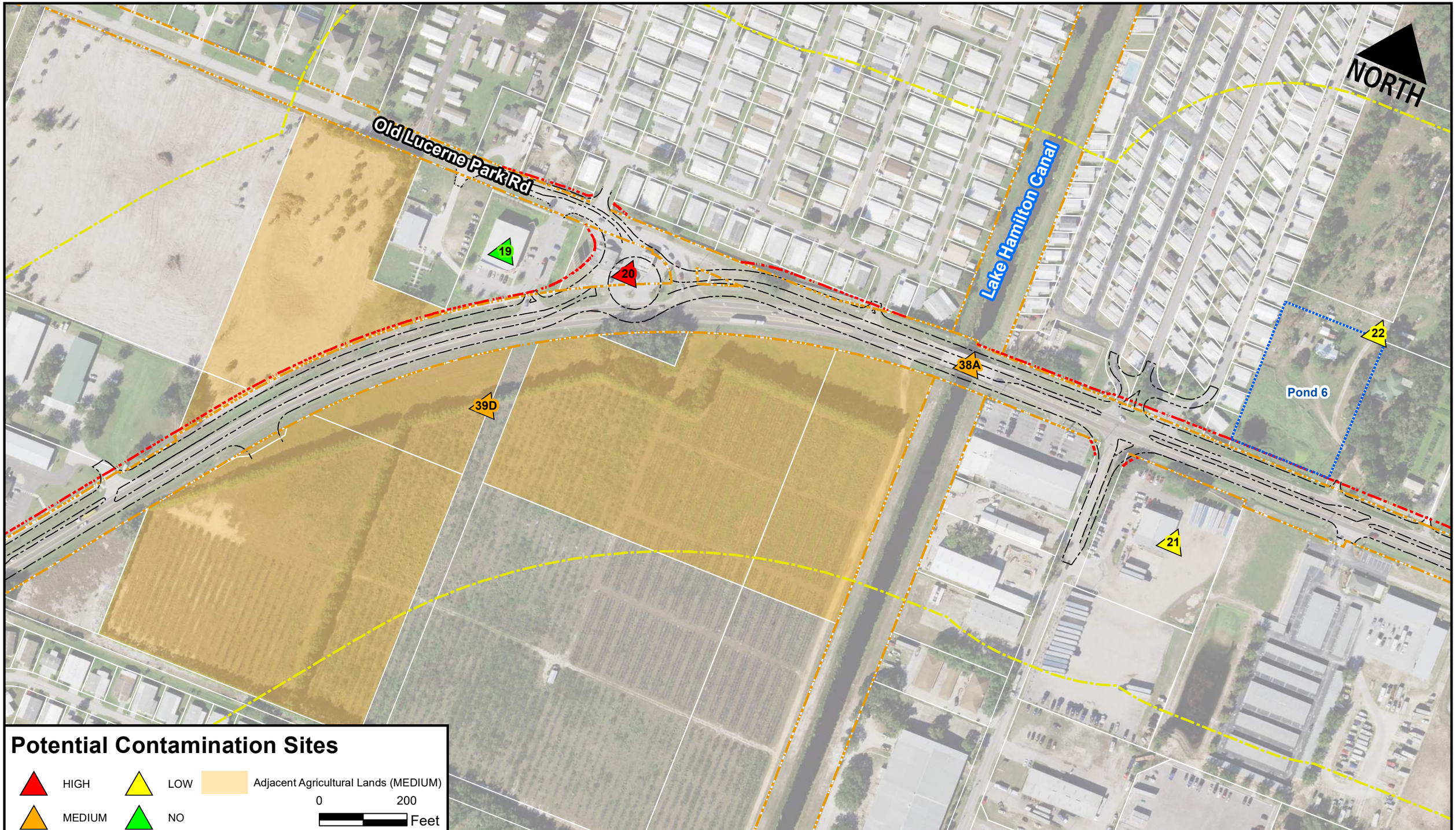
SR 544 Proposed Right-of-Way

SR 544 Proposed Ponds

SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 9 of 16**




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet

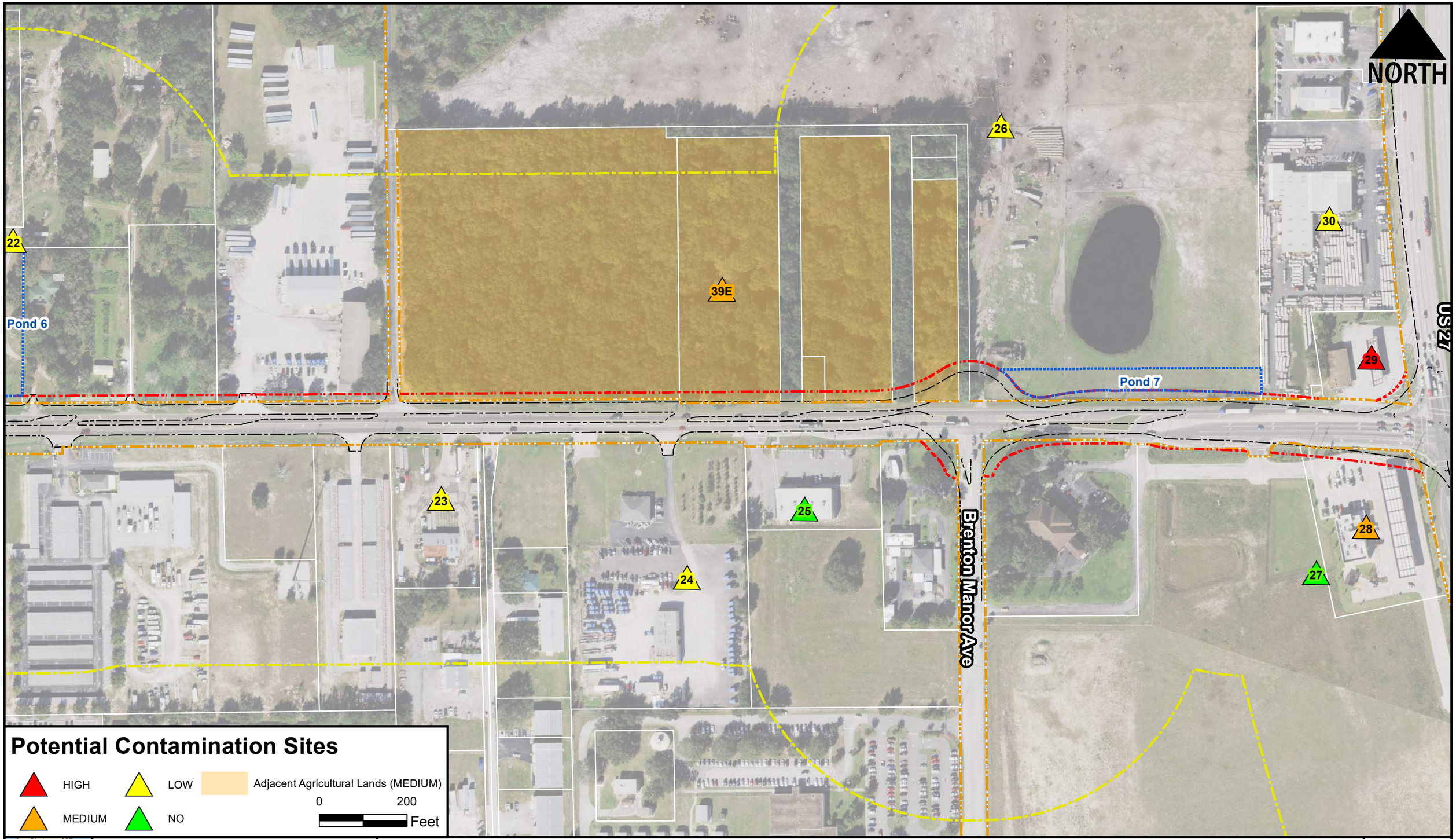
Florida Department of Transportation
District 1

**SR 544 (LUCERNE PARK ROAD) PD&E STUDY**
**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**
Study Limits Buffer
SR 544 Proposed Ponds
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 10 of 16**




## Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet

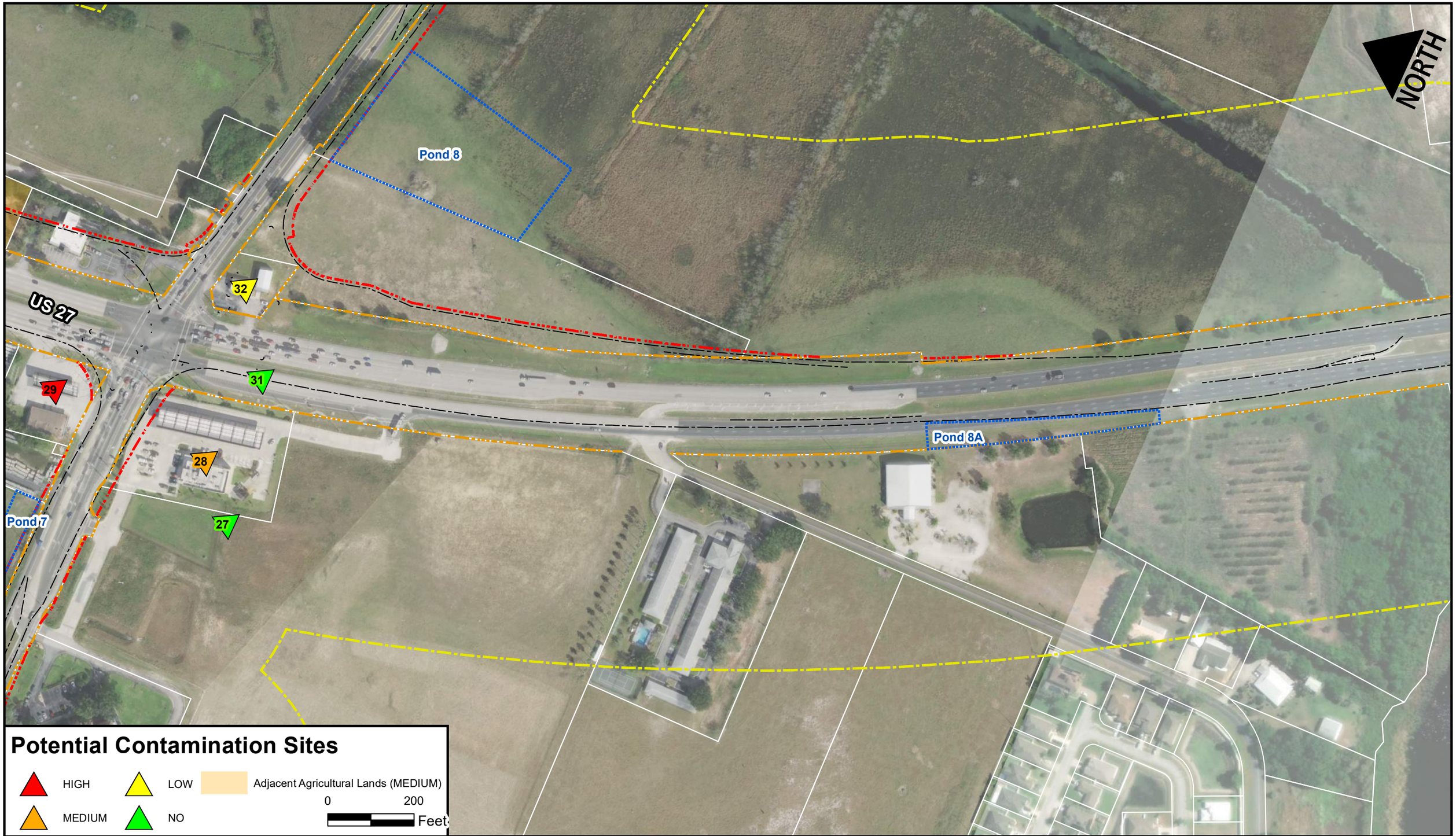
Florida Department of Transportation
District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***
**from Martin Luther King Blvd. to SR 17**
**Polk County, Florida**
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

**Legend**
Study Limits Buffer
SR 544 Proposed Ponds
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 11 of 16**




Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 12 of 16**

NORTH

US27

39G

30

29

28

31

27

32

38B

33

Pond 9

FPC 5

Pond 8

## Potential Contamination Sites

HIGH

LOW

Adjacent Agricultural Lands (MEDIUM)

MEDIUM

NO

0 200 Feet

Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

Study Limits Buffer

SR 544 Proposed Ponds

SR 544 Proposed Right-of-Way

SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 13 of 16**

NORTH

FPC 5

34

39H

Pond 10

## Potential Contamination Sites

HIGH

LOW

Adjacent Agricultural Lands (MEDIUM)

MEDIUM

NO

0 200 Feet

Florida Department of Transportation

District 1

# *SR 544 (LUCERNE PARK ROAD) PD&E STUDY*

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

Study Limits Buffer

SR 544 Proposed Ponds

SR 544 Proposed Right-of-Way

SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 14 of 16**

NORTH

35

36

37

39I

39J

LaVista Dr

Pond 10

## Potential Contamination Sites

HIGH

LOW

Adjacent Agricultural Lands (MEDIUM)

MEDIUM

NO

0 200 Feet

Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

Study Limits Buffer

SR 544 Proposed Ponds

SR 544 Proposed Right-of-Way

SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 15 of 16**

NORTH

SR 17 (S 10th St)

Lake Marion Rd

39K

## Potential Contamination Sites

HIGH

LOW

Adjacent Agricultural Lands (MEDIUM)

MEDIUM

NO

0 200

Feet

Florida Department of Transportation

District 1

***SR 544 (LUCERNE PARK ROAD) PD&E STUDY***

**from Martin Luther King Blvd. to SR 17**

**Polk County, Florida**

Financial Project ID: 440273-1-22-01

Federal Project No: N/A

**Legend**

Study Limits Buffer

SR 544 Proposed Ponds

SR 544 Proposed Right-of-Way

SR 544 Existing Right-of-Way

***Project Aerial Maps with Potential Contamination Sites***

**SHEET 16 of 16**

# *APPENDIX J*

**Geotechnical Report**

# Geotechnical Technical Memorandum

## SR 544 (Lucerne Park Rd) from Ave T NW to SR 17

**Polk County, Florida**

**Financial Project ID: 440273-1-22-01**
**FAP NO: D119 048 B**

# Project Development and Environment Study

**Florida Department of Transportation**
**District 1**




**April 2022**

**TIERRA, Inc.**
**7351 Temple Terrace Highway ● Tampa, Florida 33637**
**Phone (813) 989-1354 ● Fax (813) 989-1355**

April 13, 2022

Inwood Consulting Engineers
3000 Dovera Drive, Suite 200
Oviedo, FL 32765

Attn: Mr. David S. Dangel, P.E.

**RE: Geotechnical Technical Memorandum**
**Project Development and Environment (PD&E) Soil Survey Study**
**SR 544 (Lucerne Park Rd) from Ave T NW to SR 17**
**Polk County, Florida**
**FPID: 440273-1-22-01**
**Tierra Project No. 6511-19-056**

Mr. Dangel:

Tierra, Inc. (Tierra) has completed Geotechnical Engineering Services for the referenced project. The results of the study are enclosed herein.

Tierra appreciates the opportunity to provide our services to Inwood Consulting Engineers (Inwood) and the Florida Department of Transportation (FDOT) on this project. If you have any questions regarding this report, please contact us at (813) 989-1354.

Respectfully Submitted,

**TIERRA, INC.**

Susan E. Fries, P.E.
Geotechnical Engineer
Florida License No. 93751

Lawrence P. Moore, P.E.
Principal Geotechnical Engineer
Florida License No. 47673

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Figure 1-1: Project Location Map


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5-1 & 5-2 Polk County USDA NRCS Soil Survey Information


**Appendix A**


USGS Quadrangle Map (1 Sheet)
USDA Soil Survey (2 Sheets)

# 1.0 PROJECT SUMMARY

## 1.1 Project Description

This project involves the potential widening of SR 544 (Lucerne Park Road) from two to four lanes from Martin Luther King Boulevard (Avenue T) to SR 17 in Polk County, a length of 7.96 miles. The project location map is provided as **Figure 1-1**. The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system, however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing right-of-way along SR 544 (Lucerne Park Road) ranges from 50 feet to 85 feet from Martin Luther King Boulevard to Avenue Y, 90 feet to 170 feet from Avenue Y to US 27, and 60 feet to 140 feet from US 27 to SR 17.

The proposed improvements may include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional right-of-way may be required depending on the proposed improvements and specific right-of-way requirements will be determined during this Project Development and Environment (PD&E) Study.

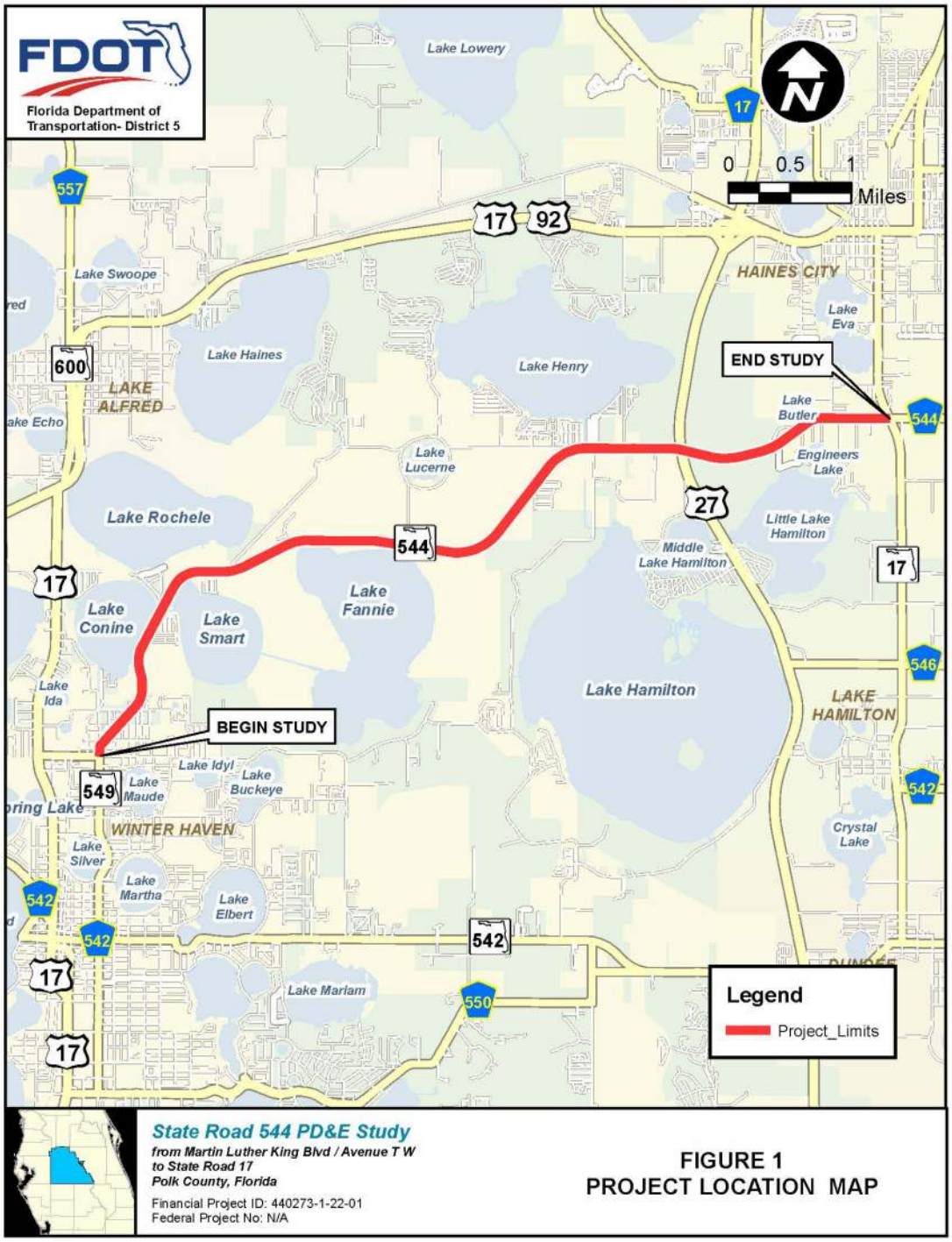



**Figure 1-1: Project Location Map**

# 2.0 SCOPE OF SERVICES

The purpose of the geotechnical portion of the PD&E study is to review published information regarding the existing subsurface conditions along the project alignment and within the limits of the pond alternative sites to assist in the preparation of the PD&E Report for the project. The following services were provided to achieve the preceding objective:

1. Reviewed published topographic information. This published information was obtained from the "Winter Haven, Florida" Quadrangle Map published by the USGS.

2. Reviewed published regional geological information. This published information was obtained from the Florida Geological Survey for Polk County.

3. Reviewed published soils information. This published information was obtained from the Web Soil Survey of Polk County, Florida published by the USDA – NRCS.

4. Prepared this Geotechnical Technical Memorandum for the project.

# 3.0 REVIEW OF USGS QUADRANGLE MAPS

Based on a review of "Winter Haven, Florida" Quadrangle Map, it appears that the project site elevations are on the order of approximately +120 to +215 feet, National Geodetic Vertical Datum of 1929 (NGVD 29). The **USGS Quadrangle Map** of the project area is illustrated in **Appendix A**.

# 4.0 REVIEW OF REGIONAL GEOLOGY OF POLK COUNY

Polk County Geology was paraphrased from the Florida Geological Survey, Open-File Report 80, 2001 and other geologic references.

The near surface geologic deposits and formations from youngest to oldest in Polk County include: Holocene Sediment (Qh), Undifferentiated sediments (Qu), reworked Cypresshead (TQuc), dunes (TQd), Cypresshead Formation (Tc), the Hawthorn Group Peace River Formation Bone Valley Member (Thpb), the Hawthorn Group Arcadia Formation Tampa Member (That), the Suwannee Limestone (Ts), and Ocala Limestone (To).

The Holocene sediments generally occur within lakes and river flood plains and includes quartz sands, carbonate sand and muds with organics. The Undifferentiated sediments are siliciclastics that are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. The dune sediments are at elevations greater than 100 feet and are fine to medium quartz sand with varying amounts of organic matter.

The undifferentiated reworked Cypresshead Formation is generally fine to coarse quartz sands with scattered quartz gravel and varying amounts of clay matrix. The Cypresshead Formation occurs above 100 feet msl and consists of reddish brown to reddish orange, unconsolidated to poorly consolidated, fine to very coarse grained, clean to clayey sands.

The Peace River Formation Bone Valley Member occurs in southwest Polk County and is a clastic unit consisting of sand-sized and larger phosphate grains in a matrix of quartz sand, silt and clay. The lithology is highly variable ranging from sandy, silty, phosphatic clays and relatively pure clays to clayey, phosphatic sand to sandy, clayey phosphorites. The Arcadia Formation Tampa member is only found in western Polk County from elevations of 50 to -50 mean sea level (msl) and consist of a white to yellowish gray, fossiliferous and variably sandy and clayey mudstones, wackestone and packstone with minor to no phosphate grains.

The Suwannee Limestone only occurs near the surface in the northwest corner of Polk County and consists of a white to cream, poorly to well indurated, fossiliferous, vuggy to moldic limestone (grainstone and packstone). The dolomitized parts are gray, tan, light brown to moderate brown, moderately to well indurated, finely to coarsely crystalline, dolostone with limited occurrences of fossiliferous beds of mollusks, foraminifers, corals and echinoids.

The Ocala Limestone occurs near the surface in the northwest corner of Polk County and underlies the entire County. The Ocala Limestone is generally a white to poorly to well indurated, poorly sorted, very fossiliferous limestone (grainstone, packstone and wackestone). Chert is common in the upper facies. The permeable and highly transmissive carbonates of the Ocala Limestone form the upper part of the Floridan Aquifer System.

# 5.0 REVIEW OF USDA-NRCS SOIL SURVEY

## 5.1 Polk County Soil Survey

Based on a review of the Polk County Soil Survey published by the USDA-NRCS, it appears that there are twenty-four (24) soil-mapping units noted within the project limits. A detailed soil survey map is shown on the **USDA Soil Survey** sheets in **Appendix A**. The general soil descriptions are presented in the sub-sections below, as described in the Web Soil Survey.

### 5.1.1 Candler Sand (Unit 3)

The Candler component makes up 90 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains, knolls on marine terraces on coastal plains. The parent material consists of eolian deposits and/or sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

### 5.1.2 Pomona Fine Sand (Unit 7)

The Pomona, non-hydric component makes up 70 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water

movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

The Pomona, hydric component makes up 20 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

### 5.1.3 Samsula Muck (Unit 13)

The Samsula component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of herbaceous organic material over sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

### 5.1.4 Sparr Sand (Unit 14)

The Sparr component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on rises on marine terraces on coastal plains. The parent material consists of sandy marine deposits and/or loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 23 inches during July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

### 5.1.5 Tavares Fine Sand (Unit 15)

The Winder component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the

most restrictive layer is moderately low. Available water to a depth of 60 inches (or restrictive depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

### 5.1.6 Urban Land (Unit 16)

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

### 5.1.7 Smyrna and Myakka Fine Sands (Unit 17)

The Smyrna, non-hydric component makes up 41 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

The Myakka component makes up 39 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 4 percent.

The Smyrna, hydric component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

### 5.1.8 Immokalee Sand (Unit 21)

The Immokalee, non-hydric component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

The Immokalee, hydric component makes up 10 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

### 5.1.9 Ona-Ona, wet, Fine Sand (Unit 23)

The Ona component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 3 percent.

The Ona, wet component makes up 12 percent of the map unit. Slopes are 0 to 2 percent. This component is on sloughs on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 8 inches during July, August, and September. Organic matter content in the surface horizon is about 3 percent.

### 5.1.10 Placid and Myakka Fine Sands (Unit 25)

The Placid, depressional component makes up 60 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, February, March, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 6 percent.

The Myakka, depressional component makes up 30 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, February, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 5 percent.

### 5.1.11 Lochloosa Fine Sand (Unit 26)

The Lochloosa component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains, rises on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

### 5.1.12 Pompano Fine Sand (Unit 30)

The Pompano component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on drainageways on marine terraces on coastal plains, flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 3 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 3 percent.

### 5.1.13 Adamsville Fine Sand (Unit 31)

The Adamsville component makes up 95 percent of the map unit. Slopes are 0 to 2 percent. This component is on rises, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 20 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 1 percent.

### 5.1.14 Kaliga Muck (Unit 32)

The Kaliga component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions, marine terraces on coastal plains. The parent material consists of herbaceous organic material over loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

### 5.1.15 Hontoon Muck (Unit 35)

The Hontoon component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of herbaceous organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

### 5.1.16 Basinger mucky Fine Sand (Unit 36)

The Basinger component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground

surface during July, August, September, and October. Organic matter content in the surface horizon is about 12 percent.

### 5.1.17 Wauchula Fine Sand (Unit 40)

The Wauchula, non-hydric component makes up 65 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

The Wauchula, hydric component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

### 5.1.18 Felda Fine Sand (Unit 42)

The Felda component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on drainageways on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 3 percent.

### 5.1.19 Zolfo Fine Sand (Unit 47)

The Zolfo component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during June, July, August,

September, October, and November. Organic matter content in the surface horizon is about 1 percent.

### 5.1.20 Adamsville-Urban Land Complex (Unit 49)

The Adamsville component makes up 60 percent of the map unit. Slopes are 0 to 2 percent. This component is on rises on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 33 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

### 5.1.21 Candler-Urban Land Complex (Unit 50)

The Candler component makes up 55 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian deposits and/or sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

### 5.1.22 Arents-Urban Land Complex (Unit 59)

The Arents component makes up 55 percent of the map unit. Slopes are 0 to 5 percent. This component is on fills, rises on marine terraces on coastal plains. The parent material consists of altered marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during June, July, August, September, October, and November.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

### 5.1.23 Tavares-Urban Land Complex (Unit 63)

The Tavares component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 57 inches during June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

### 5.1.24 Millhopper Fine Sand (Unit 76)

The Millhopper component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 51 inches during January, February, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 1 percent.

## 5.2 General Soil Properties Presented in USDA Soil Survey

Additional information regarding the soils and groundwater conditions for the above soil mapping units was obtained from the Polk County Soil Surveys published by USDA-NRCS and the Web Soil Survey and is presented in **Tables 5-1** and **5-2** as follows:

## Table 5-1
## Polk County USDA NRCS Soil Survey Information

| Map No. | Soil Name | Hydrologic Soil Group | Depth to High Water Table (ft)* | Typical Soil Types (Profile from Ground Surface to depth of approximately 80 inches) |
|---|---|---|---|---|
| 3 | Candler Sand | A | > 6.0 | Sand |
| 7 | Pomona Fine Sand | A/D | 0.5-1.5, 0.0-1.0 | Fine Sand to Sand to Fine Sand to Fine Sandy Loam to Loamy Sand |
| 13 | Samsula Muck | A/D | +2.0-0.0 | Muck to Sand |
| 14 | Sparr Sand | A/D | 1.5-3.5 | Sand to Sandy Clay Loam |
| 15 | Tavares Fine Sand | A | 3.5-6.0 | Fine Sand |
| 16 | Urban Land | Data not provided for Urban Land | | |
| 17 | Smyrna and Myakka Fine Sands | A/D | 0.5-1.5, 0.0-1.0 | Fine Sand |
| 21 | Immokalee Sand | B/D | 0.5-1.5, 0.0-1.0 | Sand |
| 23 | Ona-Ona, wet, Fine Sand | B/D | 0.5-1.5,0.0-1.5 | Fine Sand |
| 25 | Placid and Myakka Fine Sands | A/D | +2.0-0.0 | Fine Sand |
| 26 | Lochloosa Fine Sand | C | 2.5-5.0 | Fine Sand to Sandy Clay Loam |
| 30 | Pompano Fine Sand | A/D | 0.0-0.5 | Fine sand |
| 31 | Adamsville Fine Sand | A/D | 1.5-3.5 | Fine Sand |
| 32 | Kaliga Muck | C/D | +2.0-0.0 | Muck to Fine Sandy Loam to Sandy Clay Loam |
| 35 | Hontoon Muck | A/D | +2.0-0.0 | Muck to Sandy Loam |
| 36 | Basinger mucky Fine Sand | A/D | +2.0-0.0 | Mucky Fine Sand to Fine Sand |
| 40 | Wauchula Fine Sand | C/D | 0.5-1.5, 0.0-1.0 | Fine Sand to Sandy Clay Loam to Fine Sandy Loam |
| 42 | Felda Fine Sand | A/D | 0.0-1.0 | Fine Sand to Sandy Clay Loam to Sandy Loam |
| 47 | Zolfo Fine Sand | A | 1.5-3.5 | Fine Sand |
| 49 | Adamsville-Urban Land Complex | A | 2.0-3.5 | Fine Sand |

*Depth to High Water Table is also commonly known as the depth to the Seasonal High Groundwater Table.

**Table 5-1 (Cont.)**
**Polk County USDA NRCS Soil Survey Information**

| Map No. | Soil Name | Hydrologic Soil Group | Depth to High Water Table (ft)* | Typical Soil Types (Profile from Ground Surface to depth of approximately 80 inches) |
|---|---|---|---|---|
| 50 | Candler-Urban Land Complex | A | >6.0 | Sand |
| 59 | Arents-Urban Land Complex | A | 1.5-3.0 | Sand |
| 63 | Tavares-Urban Land Complex | A | 3.5-6.0 | Fine Sand |
| 76 | Millhopper Fine Sand | A | 3.5-6.5 | Fine Sand to Sandy Clay Loam |

*Depth to High Water Table is also commonly known as the depth to the Seasonal High Groundwater Table.

**Table 5-2**
**Polk County USDA NRCS Soil Survey Information**

| USDA Map Symbol and Soil Name | Soil Classification | | | |
|---|---|---|---|---|
| | Depth (in) | USCS | AASHTO | Permeability (in/hr) |
| (3) Candler | 0-6 | SP-SM, SP | A-3 | 6.0-50.0 |
| | 6-63 | SP-SM, SP | A-2-4, A-3 | 6.0-50.0 |
| | 63-80 | SP-SM | A-2-4, A-3 | 6.0-20.0 |
| (7) Pomona, non-hydric - Pomona, hydric | 0-6 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 6-21 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 21-26 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 26-48 | SP-SM, SP | A-2-4, A-3 | 2.0-20.0 |
| | 48-73 | SC-SM, SC, SM | A-2, A-4, A-6 | 0.2-2.0 |
| | 73-80 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 0-6 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 6-21 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 21-26 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 26-48 | SP-SM, SP | A-2-4, A-3 | 2.0-20.0 |
| | 48-73 | SC-SM, SC, SM | A-2, A-4, A-6 | 0.2-2.0 |
| | 73-80 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |

## Table 5-2 (Cont.)
## Polk County USDA NRCS Soil Survey Information

| USDA Map Symbol and Soil Name | Soil Classification | | | |
|---|---|---|---|---|
| | Depth (in) | USCS | AASHTO | Permeability (in/hr) |
| (13) Samsula | 0-24 | PT | A-8 | 6.0-20.0 |
| | 24-32 | PT | A-8 | 6.0-20.0 |
| | 32-35 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 35-44 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 44-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| (14) Sparr | 0-8 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 8-57 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 57-80 | SC-SM, SC | A-2-4, A-2-6, A-7-6 | 0.6-2.0 |
| (15) Tavares | 0-5 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 5-80 | SP-SM, SP, SM | A-2-4, A-3 | 6.0-20.0 |
| (16) Urban Land | Data not provided for Urban Land | | | |
| (17) Myakka – Smyrna, non-hydric – Smyrna, hydric | 0-7 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 7-25 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 25-36 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 36-80 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 0-4 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 4-12 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 12-25 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 25-42 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 42-48 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 48-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 0-4 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 4-12 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 12-25 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 25-42 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 42-48 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 48-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |

## Table 5-2 (Cont.)
## Polk County USDA NRCS Soil Survey Information

| USDA Map Symbol and Soil Name | Soil Classification | | | |
|---|---|---|---|---|
| | Depth (in) | USCS | AASHTO | Permeability (in/hr) |
| (21) Immokalee, non-hydric - Immokalee, hydric | 0-7 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 7-39 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 39-58 | SP-SM, SM | A-2-4, A-3 | 0.6-2.0 |
| | 58-66 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 66-80 | SP-SM, SM | A-2-4, A-3 | 0.6-2.0 |
| | 0-7 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 7-39 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 39-58 | SP-SM, SM | A-2-4, A-3 | 0.6-2.0 |
| | 58-66 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 66-80 | SP-SM, SM | A-2-4, A-3 | 0.6-2.0 |
| (23) Ona, - Ona, wet | 0-9 | SP-SM, SM | A-2-4 | 6.0-20.0 |
| | 9-16 | SP-SM, SM | A-2-4 | 0.6-2.0 |
| | 16-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 0-9 | SP-SM, SM | A-2-4 | 6.0-20.0 |
| | 9-16 | SP-SM, SM | A-2-4 | 0.6-2.0 |
| | 16-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| (25) Placid, depressional - Myakka, depressional | 0-18 | SP-SM, SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 18-80 | SP-SM, SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 0-3 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 3-25 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 25-35 | SP-SM, SM | A-2-4, A-3 | 0.6-6.0 |
| | 35-80 | SP-SM, SP | A-3 | 6.0-20.0 |
| (26) Lochloosa | 0-6 | SP-SM, SM | A-2-4, A-3 | 2.0-20.0 |
| | 6-36 | SP-SM, SM | A-2-4, A-3 | 2.0-20.0 |
| | 36-65 | SC-SM, SC | A-2-6, A-4, A-6 | 0.1-0.2 |
| | 65-80 | SC-SM, SC | A-2-6, A-4, A-6 | 0.1-0.2 |
| (30) Pompano | 0-15 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 15-80 | SP-SM, SP | A-3 | 6.0-20.0 |
| (31) Adamsville | 0-7 | SP-SM, SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 7-20 | SP-SM, SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | 20-80 | SP-SM, SM, SP | A-2-4, A-3 | 6.0-20.0 |
| (32) Kaliga | 0-25 | PT | A-8 | 6.0-20.0 |
| | 25-35 | SC, SM | A-2-4, A-4, A-7-6 | 0.6-6.0 |
| | 35-60 | CL, SC-SM | A-4, A-6 | 0.1-0.2 |
| | 60-80 | CL, SC, SM | A-4, A-6 | 2.0-20.0 |

## Table 5-2 (Cont.)
## Polk County USDA NRCS Soil Survey Information

| USDA Map Symbol and Soil Name | Soil Classification | | | |
|---|---|---|---|---|
| | Depth (in) | USCS | AASHTO | Permeability (in/hr) |
| (35) Hontoon | 0-75 | PT | A-8 | 6.0-20.0 |
| | 75-80 | SC-SM, SC, SM | A-2-4, A-6 | 6.0-20.0 |
| (36) Basinger | 0-7 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 7-19 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 19-39 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 39-80 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| (40) Wauchula, non-hydric - Wauchula, hydric | 0-7 | SP-SM | A-2-4, A-3 | 6.0-20.0 |
| | 7-18 | SP-SM | A-3, A-2-4 | 6.0-20.0 |
| | 18-26 | SP-SM, SM | A-2-4, A-3 | 0.2-6.0 |
| | 26-33 | SP-SM, SM | A-2-4, A-3 | 2.0-6.0 |
| | 33-70 | SC-SM, SC, SM | A-2-4, A-2-6, A-4, A-6 | 0.1-0.2 |
| | 70-80 | SC-SM, SC | A-2-4, A-2-6 | 0.6-6.0 |
| | 0-7 | SP-SM | A-2-4, A-3 | 6.0-20.0 |
| | 7-18 | SP-SM | A-3, A-2-4 | 6.0-20.0 |
| | 18-26 | SP-SM, SM | A-2-4, A-3 | 0.2-6.0 |
| | 26-33 | SP-SM, SM | A-2-4, A-3 | 2.0-6.0 |
| | 33-70 | SC-SM, SC, SM | A-2-4, A-2-6, A-4, A-6 | 0.1-0.2 |
| | 70-80 | SC-SM, SC | A-2-4, A-2-6 | 0.6-6.0 |
| (42) Felda | 0-5 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 5-22 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 22-50 | SC-SM, SC, SM | A-2-4, A-2-6 | 0.6-6.0 |
| | 50-80 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| (47) Zolfo | 0-5 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 5-59 | SP-SM, SM | A-2-4, A-3 | 6.0-20.0 |
| | 59-80 | SP-SM, SM | A-2-4, A-3 | 0.6-2.0 |
| (49) Adamsville – Urban Land | 0-6 | SP-SM | A-2-4, A-3 | 6.0-20.0 |
| | 6-80 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | Data not provided for Urban Land | | | |
| (50) Candler - Urban Land | 0-6 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 6-63 | SP-SM, SP | A-3 | 6.0-20.0 |
| | 63-80 | SP-SM | A-2-4, A-3 | 6.0-20.0 |
| | Data not provided for Urban Land | | | |
| (59) Arents - Urban Land | 0-80 | SP-SM, SP | A-2-4, A-3 | 6.0-20.0 |
| | Data not provided for Urban Land | | | |

**Table 5-2 (Cont.)**
**Polk County USDA NRCS Soil Survey Information**

| USDA Map Symbol and Soil Name | Soil Classification | | | |
|---|---|---|---|---|
| | Depth (in) | USCS | AASHTO | Permeability (in/hr) |
| (63) Tavares - Urban land | 0-8 | SP-SM, SP | A-3 | 6.0-50.0 |
| | 8-80 | SP-SM, SP | A-3 | 6.0-50.0 |
| | Data not provided for Urban Land | | | |
| (76) Millhopper | 0-7 | SP-SM, SM | A-2-4 | 6.0-20.0 |
| | 7-59 | SC-SM, SP-SM, SM | A-2-4 | 6.0-20.0 |
| | 59-64 | CL, SC | A-2-4, A-6 | 2.0-6.0 |
| | 64-80 | CL, SC | A-7-6, A-6 | 0.6-2.0 |

# 6.0 PRELIMINARY ENGINEERING EVALUATIONS

## 6.1 General Based on USDA Soil Survey

Based upon the USDA-NRCS Soil Surveys for Polk County, sandy soils occasionally underlain by silty to clayey (loam) soils are reported along the majority of the project corridor to depths of 80 inches below the natural ground surface. Some areas along the project corridor are expected to contain organic material/muck.

In general, the sandy soils are suitable for supporting proposed roadway embankments after proper subgrade preparation including removal and replacement of unsuitable materials. Areas along the project corridor where shallow groundwater conditions, clay soils, and muck may impact the project are detailed below.

### 6.1.1 Shallow Groundwater

The Seasonal High Groundwater Table (SHGWT) for the soil units presented above is reported to range from at or above the predevelopment natural grade to a depth of 6 feet or greater below the predevelopment natural grade within the project limits. According to the USDA-NRSC Soil Survey, the project corridor includes both excessively drained soils with a deep water table to very poorly drained soils with shallow water table levels. One of the **USDA Soil Survey** maps provided with this report is shaded blue for the soil types reported with a Seasonal High Groundwater Table within 1.5 feet of natural grades.

Roadway base to groundwater clearance will need to be evaluated to ensure minimum separation between the base and the SHGWT is maintained or to determine if additional measures are required (ie, blackbase, underdrains, etc.). In areas where the existing SHGWT is above grade, the SHWGT will need to be established by the project biologist utilizing biological indicators. Additionally, drainage design will need to consider the impact of shallow groundwater levels on stormwater management facilities.

### 6.1.2 Near Surface Clayey Soils

Shallow plastic soils are reported at an isolated area along the project alignment near Vista Del Lago Drive. The following soil mapping unit noted plastic/clayey soils (A-2-4, A-2-6) at depths within 24 inches of natural grades:

- Felda Fine Sand (Unit 42)

Plastic soils have limitations related to base clearance and are also poorly drained. Separation between plastic clayey soils and the roadway pavement sections should be in accordance with FDOT Standard Plans, Indices 120-001 and 120-002.

One of the **USDA Soil Survey** maps provided with this report is shaded orange for the soil type reported with plastic/clayey soils (A-2-4, A-2-6) at depths within 24 inches of natural grades.

### 6.1.3 Organic Soils

According to the USDA, organic soil mapping units are reported along the proposed roadway alignment and within select pond alternatives. The following soil mapping units noted organic/muck (A-8) soils from the predevelopment natural ground surface to up to 75 inches below the ground surface within the project limits:

- Samsula Muck (Unit 13)
- Kaliga Muck (Unit 32)
- Hontoon Muck (Unit 35)

Organic/muck (A-8) soil should be removed in accordance with FDOT Standard Plans, Index 120-002 and replaced with backfill in accordance with Index 120-001.

One of the **USDA Soil Survey** maps provided with this report is shaded red for the soil types reported to contain organic/muck soils.

## 6.2 Roadway Construction

Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Subgrade preparation should include the removal of plastic soils, top-soils, organic soils, and unsuitable materials in accordance with FDOT Standard Plans, Index 120-002. Backfill embankment materials should consist of materials conforming to the FDOT Standard Plans, Index 120-001. Clearing and grubbing and compaction should be accomplished in accordance with the FDOT Standard Specifications.

The overall site preparation and mechanical densification work for the construction of the proposed roadway improvements should be in accordance with FDOT Standard Specifications and Standard Plans Index requirements. In general, the existing subsurface soils appear

capable of supporting the construction of the proposed roadway improvements subject to the above geotechnical considerations and after proper subgrade preparation.

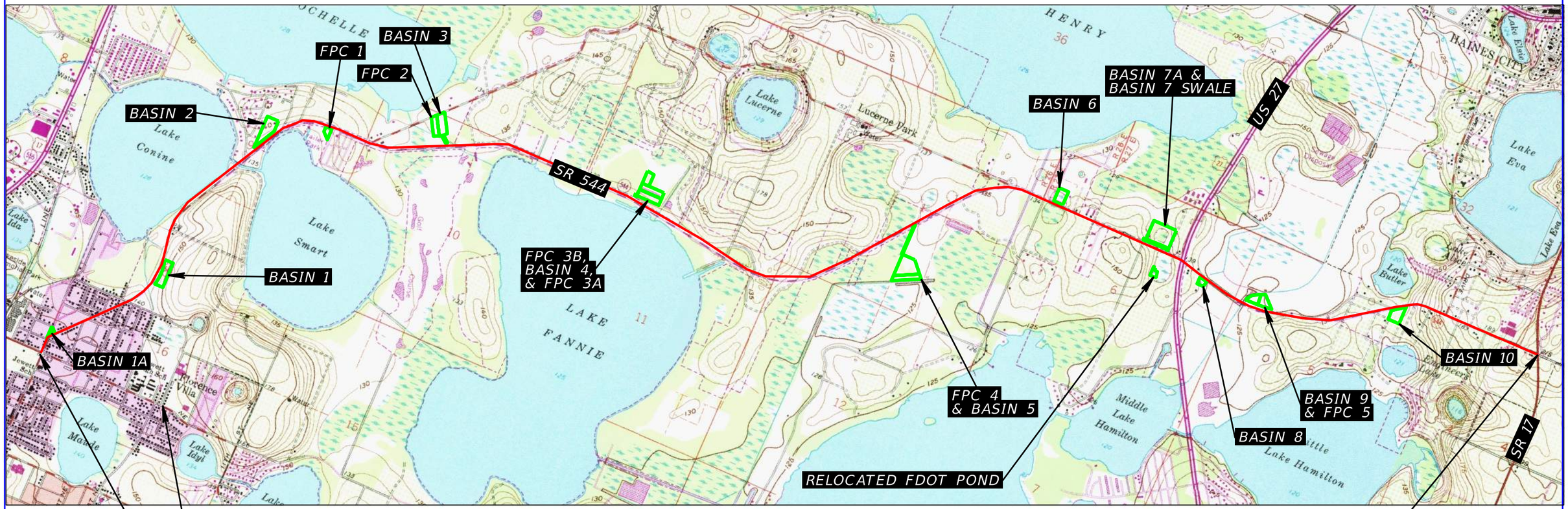
# 7.0 LIMITATIONS

Our services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

The scope of the geotechnical portion of the PD&E study is to provide preliminary information on the existing subsurface conditions along the project alignment based on a review of the Polk County Soil Survey published by the USDA-NRCS to assist in the preparation of the PD&E Report for the project. The preliminary evaluations submitted in this report are based upon the data obtained from the published information. Should subsoil variations become evident during the course of this project, a re-evaluation will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway construction and stormwater management areas.

Our services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

# Appendix A




REFERENCE: USGS QUADRANGLE MAP OF "WINTER HAVEN, FLORIDA"

| | | |
|---|---|---|
| TOWNSHIP: | 28S | 28S |
| RANGE: | 26E | 27E |
| SECTION: | 1, 2, 3, 9, 10, 11, 16, 17 | 5, 6 |

| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

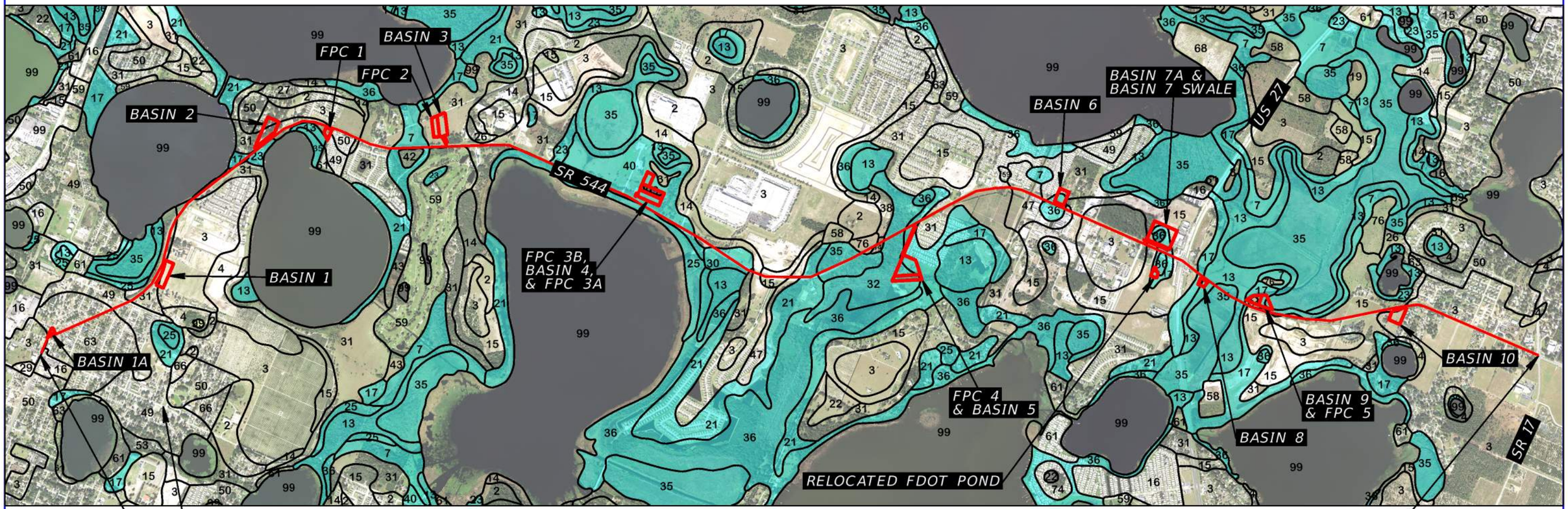
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

USGS QUADRANGLE MAP

SHEET NO.




REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

SEASONAL HIGH GROUNDWATER ABOVE NATURAL GRADES TO WITHIN 1.5 FEET OF NATURAL GRADES

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | |
| | | | | | |

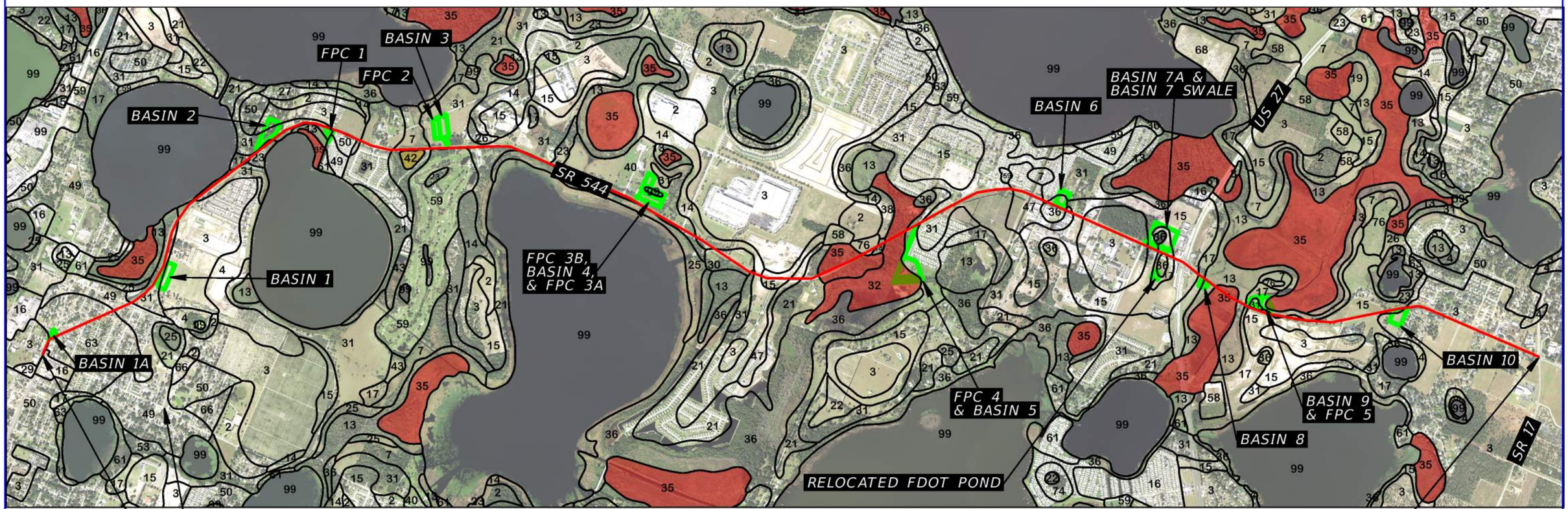
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

USDA SOIL SURVEY

SHEET NO.




REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

ORGANIC SOILS (A-8) AT THE NATURAL GROUND SURFACE TO GREATER THAN 6 FEET BELOW NATURAL GRADES

CLAYEY SOILS WITHIN 2 FEET OF NATURAL GRADES

| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| SR 544 | POLK | 440273-1-22-01 |

# USDA SOIL SURVEY

SHEET NO.

# *APPENDIX K*

**Correspondence**

# State Road 544
# Project Development and Environment Study
# From MLK Jr. Boulevard to SR 17
# Polk County, Florida
# Financial Project ID: 440273-1-22-01

## FDOT Pond Site Coordination Meeting Summary – November 2, 2020, 3:00 pm

**1. Attendees**

FDOT: Richard Oujevolk, David Turley, Brent Setchell, Sergio Figueroa
Inwood: David Dangel, Jason Houck, Renato Chuw, Dayna Duffy

**2. Discussion Items**

a. The purpose of this meeting was to provide an overview of the preliminary pond locations for the SR 544 PD&E Study to the Department and receive feedback, in preparation to have the pond sites ready for Inwood's ecologists to conduct site specific species survey

b. An aerial display of the project along with the pond site locations was shared to all attendees and each basin description discussed with the preliminary pond site. Attached to these meeting minutes is a PDF of this display

c. It was discussed in the meeting that the scope for this study was to evaluate one pond site per basin so that the study can be environmentally cleared and demonstrated that it can be feasible. Evaluation of multiple pond sites per basin will be done during the design phase (when funded). Brent asked if site specific survey was necessary at this stage of the PD&E if only one pond site per basin was evaluated. Jason indicated that per new directives from EMO, it is required to get a Biological Opinion (BO).

d. The following items were discussed regarding each specific basin and pond site

   i. Basin 1 – two possible pond sites were explored to discuss with the Department. Pond 1A is a pond site adjacent to SR 544 and located within a parcel owned by the adjacent church. The pond site is in an old agricultural crop area but does not impact the church facility. The consensus was that it is acceptable to locate a pond site in this parcel. FDOT suggested to reshape this pond so that an access opening could be provided to the back end of the parcel. An alternative pond (1B) was also investigated and located adjacent to Lake Smart. This site is about 2000 feet away from SR 544 and not within a church property. However, the pipe easement from SR 544 would have to cross a high ridge line, making the inflow pipe at this location very deep. FDOT indicated that because of this, this pond site should not be evaluated. The direction was to proceed in evaluating Pond 1A.

   ii. Basin 2 – during the discussions, Inwood indicated that Basin 2 could be left untreated and compensating treatment provided in the pond site for Basin 1 (since they shared the same outfall). However, Brent suggested that because these lakes are impaired for nutrients, it is preferrable to have a dedicated pond site for Basin 2. Another option was to utilize the proposed floodplain compensation site to capture pollutants and provide some benefit to nutrient removal prior to discharging to the lake. Another potential pond location is on another church-owned parcel across from Lake Smart. This site will also be identified for the purpose of conducting the species survey.

iii. Basin 3 – the treatment and floodplain compensation sites are proposed to abut each other and located on a private parcel. FDOT agreed with the pond site location.

iv. Basin 4 – the treatment and floodplain compensation sites are proposed to abut each other and located on a private parcel. FDOT agreed with the pond site location.

v. Basin 5 and 6 – FDOT agreed with the proposed floodplain compensation site. For the treatment pond option, this was another basin that compensating treatment could be proposed (enlarging Pond 5 and not having a pond for Basin 6). However, due to the nutrient impairments of the lakes and to provide as much benefit to the environment, a dedicated pond site will be sited in Basin 6. FDOT mentioned that a floodplain complaint was logged for the adjacent mobile homes where the preliminary Pond 6 site is shown. The conclusion was that FDOT was not the cause of the flooding. There is an existing pond on this site that overtops the berm. One suggestion from David Turley was to evaluate if the pond can be located on the adjacent parcel to the north of the Pond 6 to avoid impacting the house within the property, or if the pond could utilize the existing pond in front of the house and be equalized with a second, new pond on the adjacent parcel. Inwood will investigate these options. FDOT agreed with the pond site for Basin 5.

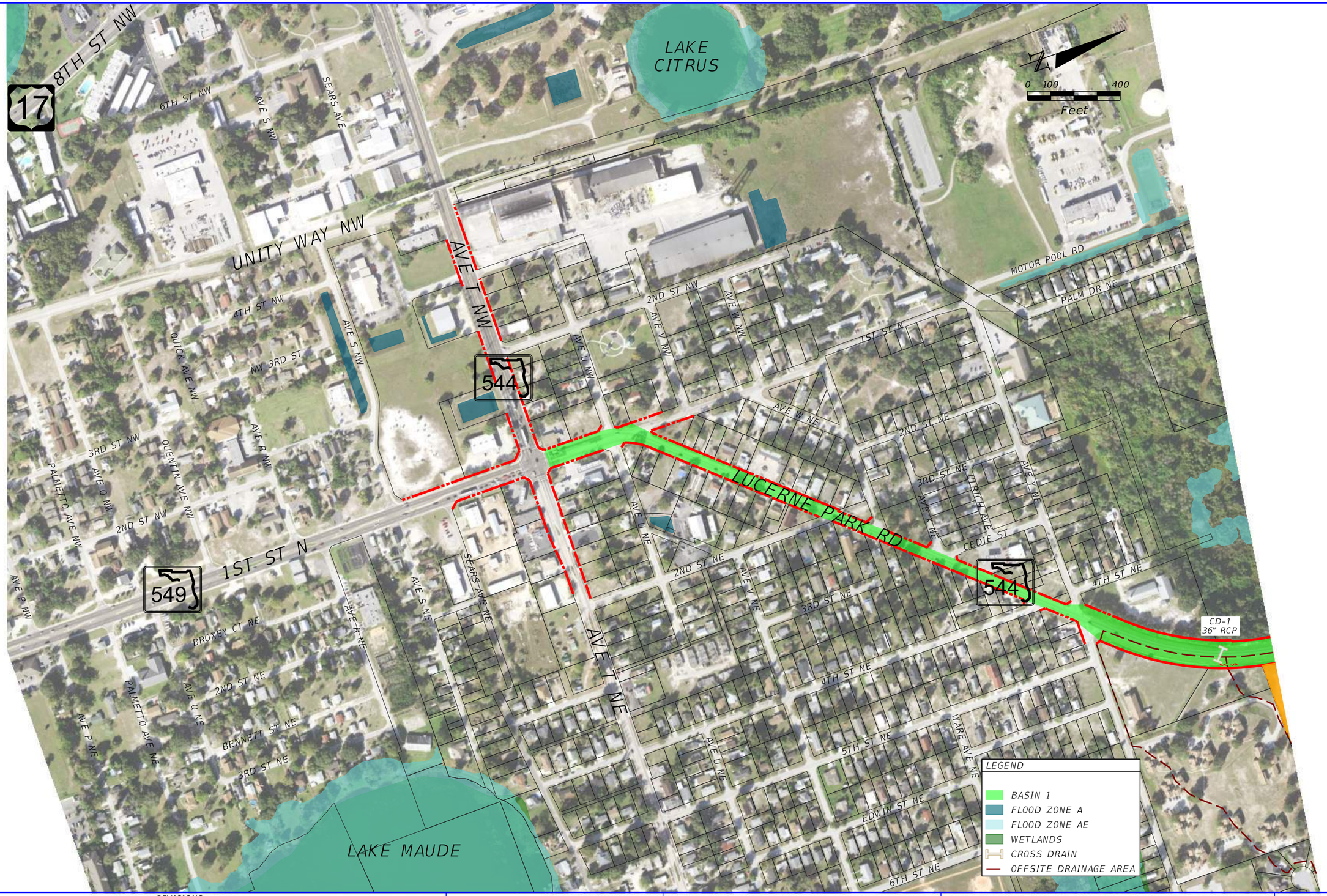
vi. Basin 7 – an existing FDOT pond was constructed that already treats portions of SR 544 and the turn lanes built under the existing development at the corner of SR 544 and US 27. FDOT agreed that this pond would be good to evaluate for this basin. Some expansion of the pond may be necessary to accommodate the proposed improvements of SR 544 for the study.

vii. Basin 8 and 9 – a single pond site is proposed adjacent to Lake Hamilton Creek with a compensating treatment approach. The site is outside of the floodplains with a direct outfall to the creek. A floodplain compensation site is proposed to abut the treatment site. Inwood mentioned that the compensating treatment approach made more sense in this area due the bridge culvert crossing and the large floodplain coverage within Basin 8. FDOT agreed with this pond site.

viii. Basin 10 – the pond site is on a private parcel, across from Lake Butler. There is an existing closed drainage system along SR 544 that drains to Lake Butler. The existing cross drain (CD-17, 15” pipe) collects and directs mostly the roadside runoff to the lake. This pond will be a dry retention pond but will also have an emergency outfall structure to discharge to Lake Butler. FDOT agreed with this pond site.

e. Sergio asked if we were scoped to evaluate Environmental Look Arounds/regional stormwater opportunities. Inwood mentioned that we will conduct meetings with the stakeholders including the Lakes Region Lake Water Management District (LRLWMD) to discuss any opportunities and document in the Pond Siting Report. Brent also suggested to contact the City of Winter Haven and ask about their stormwater master plan and see if there were any opportunities for their canal systems to provide a regional stormwater approach.

The meeting concluded at 4:00 pm




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| | | | | | | | | | |

LAKE ROCHELLE

OLD LUCERNE PARK RD

LUCERNE PARK RD

ROCHELLE DR

SHUMARD ST

ROCHELLE DR

TREMA AVE

FPCA 1
0.74 AC

POND 3
1.9 AC

FPCA 2
1.7 AC

CD-7
DBL. 30" RCP

CD-8
36" RCP

544

VALENTIA BLVD

0 100 400
Feet

GARDENIA DR

AZALEA DR

HIBISCUS DR

LAKE SMART DR

JULIUS ESTATE BLVD

ELOISE ESTATE CT

JULIUS ESTATE BLVD

VISTA DEL LAGO DR

LAKE SMART

LAKE FANNIE

LEGEND
- BASIN 2
- BASIN 3
- FLOOD ZONE A
- FLOOD ZONE AE
- WETLANDS
- CROSS DRAIN
- OFFSITE DRAINAGE AREA

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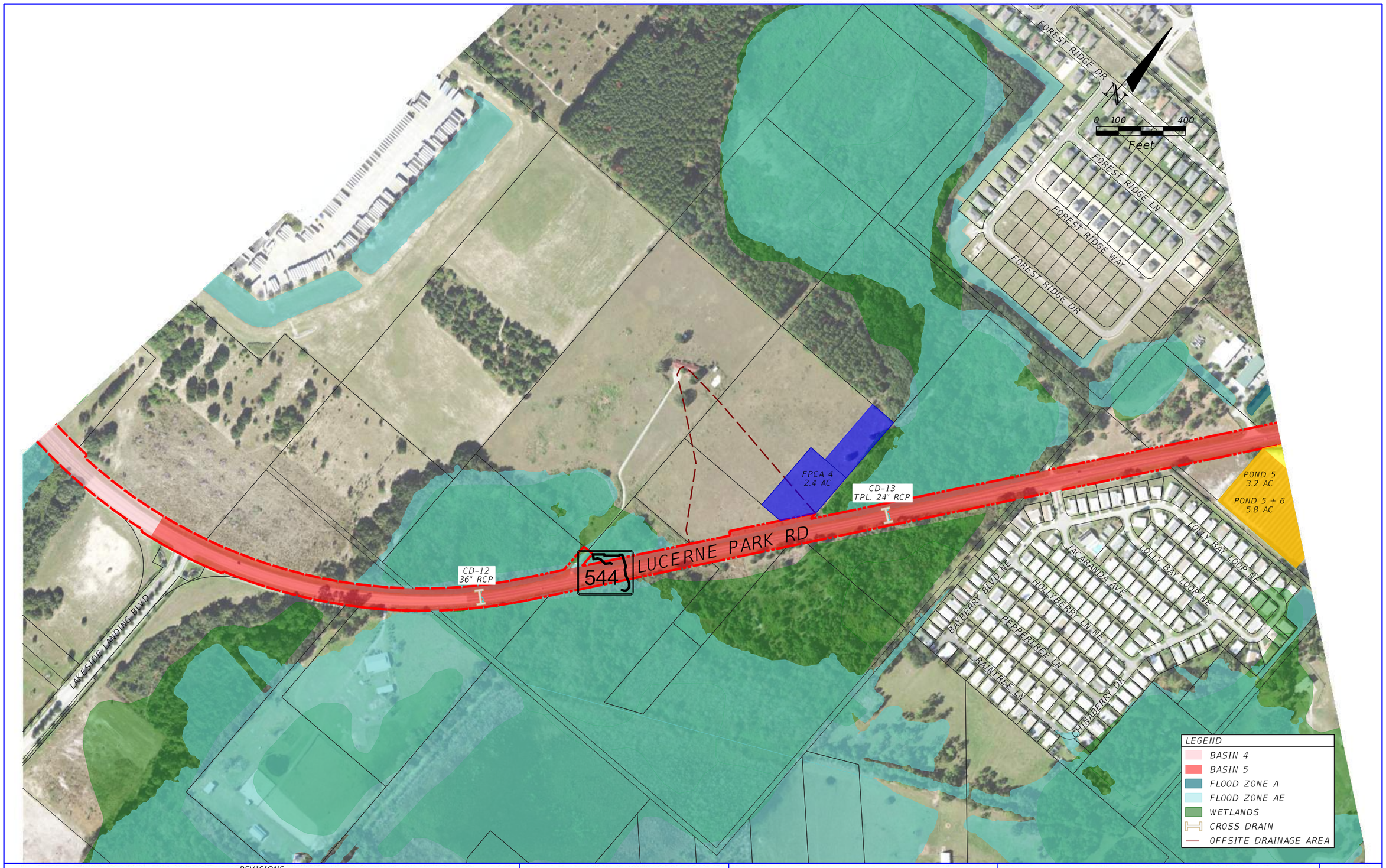



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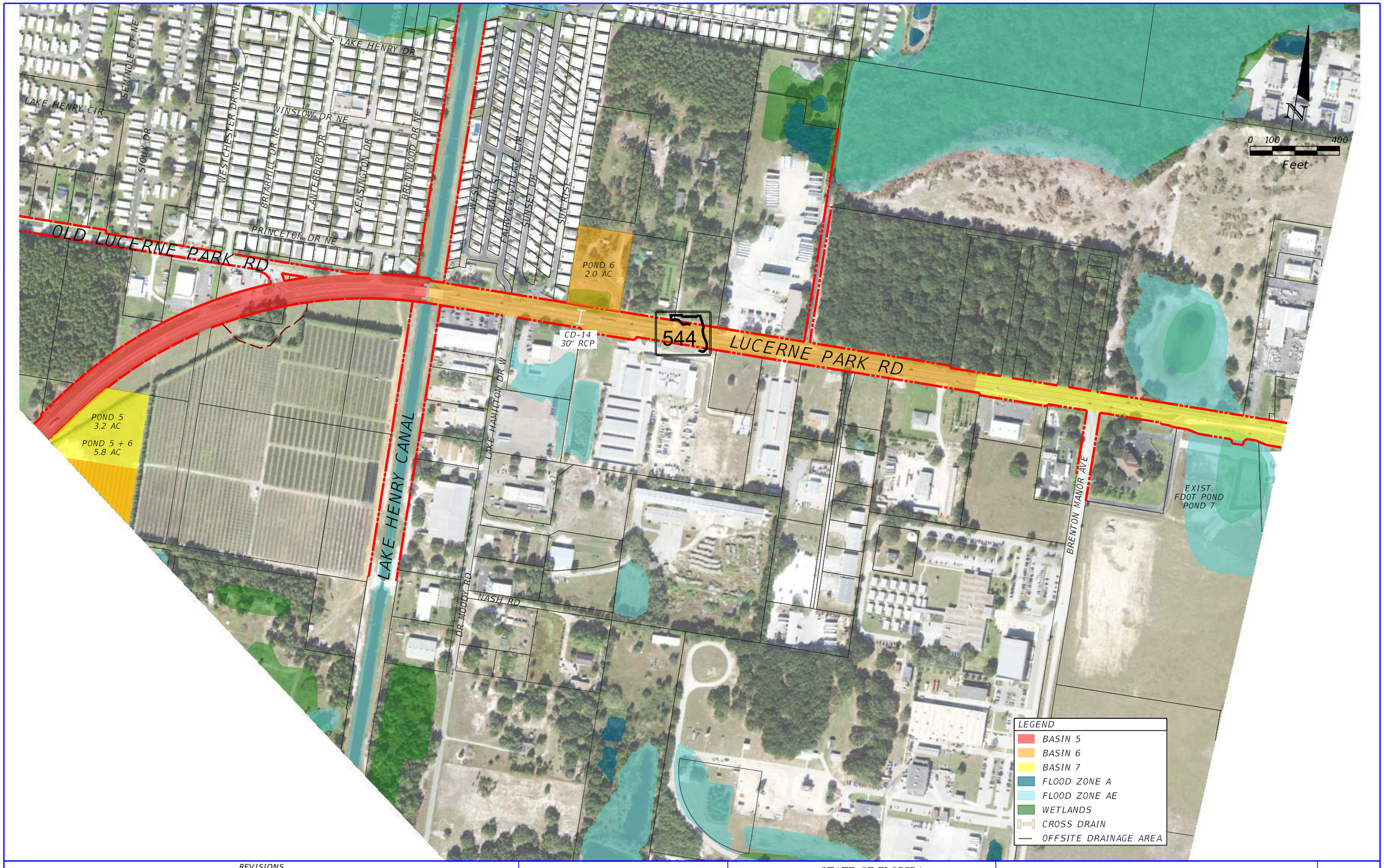



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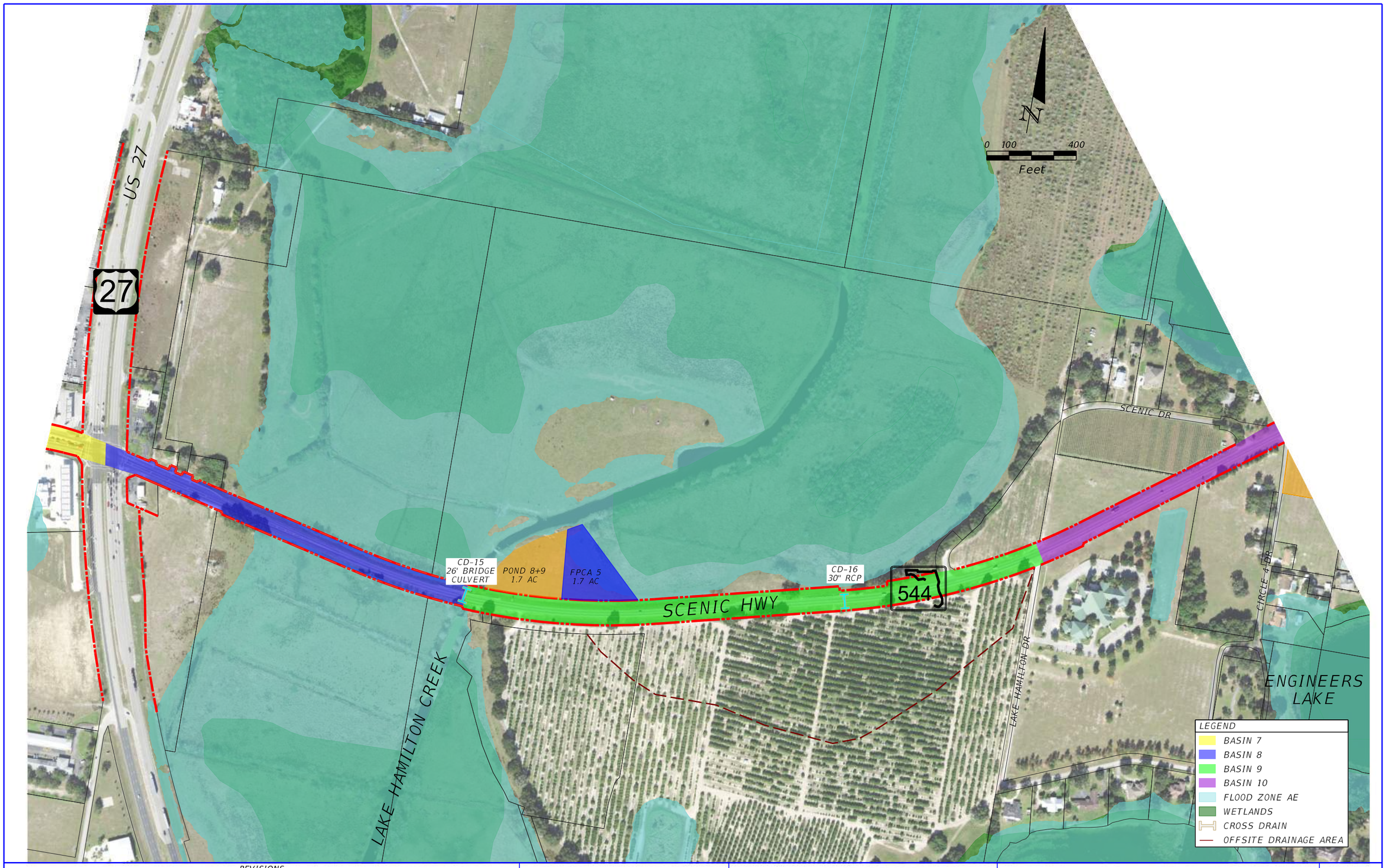



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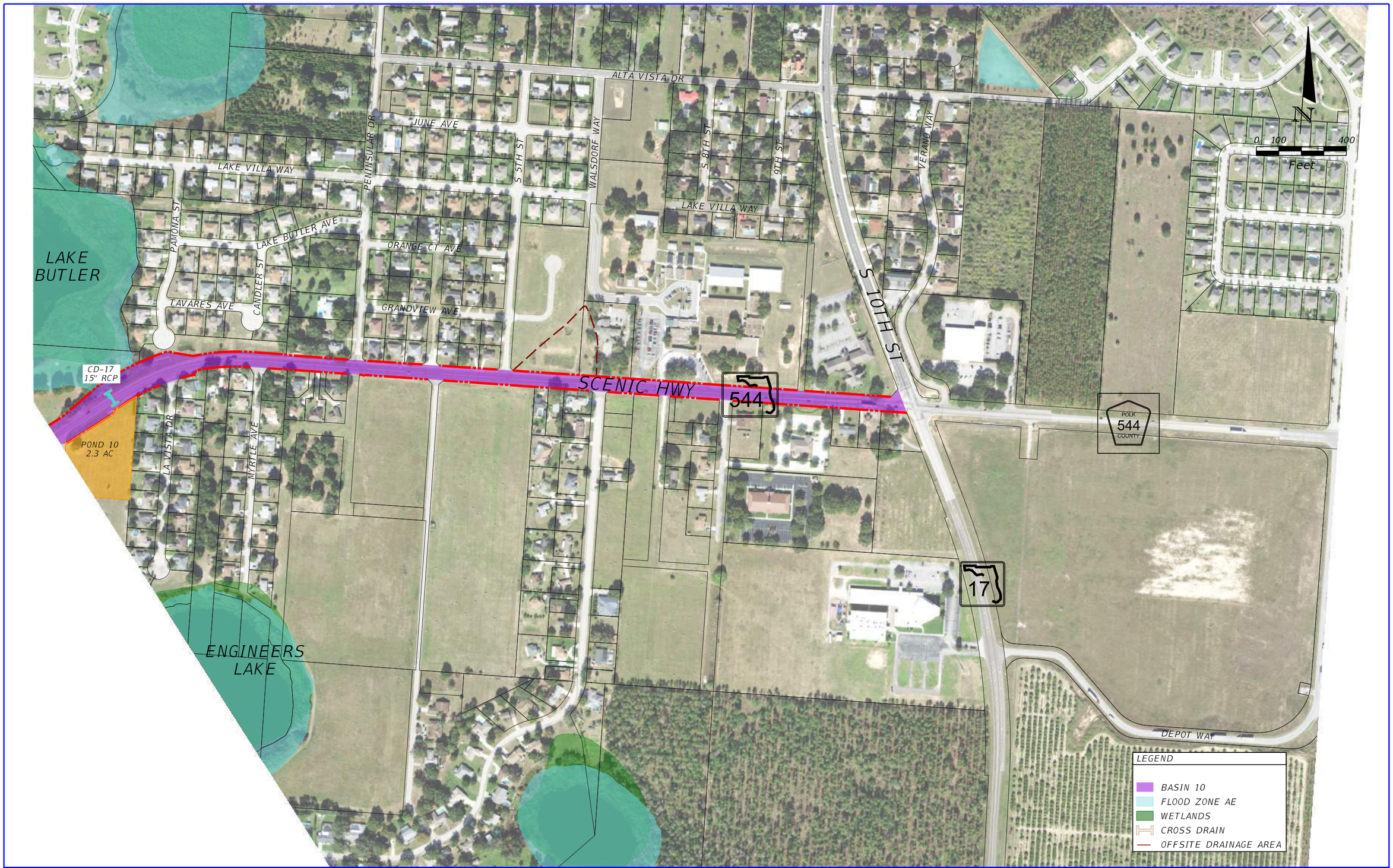



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# State Road 544
# Project Development and Environment Study
# From MLK Jr. Boulevard to SR 17
# Polk County, Florida
# Financial Project ID: 440273-1-22-01

## FDOT Pond Site Coordination Meeting Summary – August 12, 2021 at 10 a.m.

**1. Attendees**

FDOT: Richard Oujevolk, David Turley, Brent Setchell, Sergio Figueroa
Inwood: David Dangel, Jason Houck, Jada Barhorst, Renato Chuw, Dayna Duffy

**2. Discussion Items**

- The purpose of the meeting was to provide FDOT with updated pond sites from the original sites shown back in November 2020. Since then, new developments and permit applications have been submitted that required some of the pond sites to be reshaped or relocated to different parcels.

- A separate basin (Basin 1A) was created with a dry pond (Pond 1A) north of the beginning of the project in the Florence Villa historic district. The dry pond will be located in a remnant area within FDOT R/W. This remnant area will be created by the realignment of the intersection of 1st St. N and SR 544. Brent concurred with the site.

- This new Basin and Pond 1A allowed for the previous Pond 1 to be smaller due to the reduced volume requirements. The existing ground rises rapidly east of Pond 1. Brent indicated that the site appears to have been an agricultural land and if so, there will be a benefit in accepting the offsite water into the pond due to the reduction in nutrient loadings.

    - David indicated that there are plans for a future road just south of the church and to discuss reshaping the pond to allow room for the future road. David will coordinate with drainage for the preliminary location of the road. The pond could be shortened on the north end and expanded to the east to make up the volume needed.

    - Pond 1 also has the option to provide compensating treatment for Basin 2, since these two basins share the same outfall to the lakes. David mentioned that the project is intended to be full reconstruction of the road. Brent stated that we will need to verify with SWFWMD regarding compensating treatment as they have applied it on hardship situations. Inwood will request for this project to be added in the agenda for the Sept. 1st monthly meeting with SWFWMD for the pre application meeting and will discuss the compensating treatment applicability.

    - Brent mentioned that if we can show a net benefit to the environment, SWFWMD may be more lenient on allowing compensating treatment.

- Pond 2 was shown as a standalone pond in Basin 2 in case the compensating treatment approach would not be applicable. Brent concurred with the site

- FPCA 1, FPCA 2 and Pond 3 did not change shape or locations from the November 2020 meeting. No comments from FDOT on these sites

- FPCA 3 and Pond 4 changed from the original locations due to recent development and permit on the parcel. The new Pond 4 occupies an existing borrow pit on the adjacent parcel to the east. FPCA 3 was divided into two separate sites (FPCA 3A and 3B), each abutting the north and south side of Pond 4. Brent asked if FPCA

3B (north side) could be reshaped to allow a better remnant to the parcel. However, after explaining that an access gap was provided on the east side of the parcel, Brent concurred with the site and shapes shown in the meeting.

- FPCA 4 and Pond 5 changed from the original locations due to a future residential development on the parcel for Pond 5 and a commercial development on the parcel for FPCA 4. The new locations are located on a privately owned parcel south of the project with an existing easement from SR 544. The new Pond 5 location encroaches into the floodplains and Brent suggested another option would be to place the pond on the adjacent parcel to the east. However, Brent indicated that his preference is to impact just one parcel. Inwood stated that as the roadway concept is refined more, a more accurate floodplain impact volume will be estimated and then it will be determined if the new Pond 5 location would be acceptable. The outfall for the new pond would be either to the existing ditch that runs along the south side of the parcel or to the adjacent wetlands.

- The previous Pond 5 location had the option for an expanded shape to provide compensating treatment, however, it was agreed to provide a dedicated pond for Basin 6. This site was previously shown in the November 2020 meeting. There is also a flooding complaint on the adjacent mobile home park. This would be another reason to site a pond for Basin 6 to see if it could provide relief for the existing flooding. Brent mentioned that FDOT has documentation regarding this flooding. Inwood mentioned that they will check back through their files for the documentation or request it from FDOT if needed.

- Inwood explained that the existing FDOT pond on the south side of SR 544 for Basin 7 is proposed to be relocated further south due to the new truck parking development on the parcel. Brent was aware of this project as FDOT had been coordinating with the property owner. Inwood stated that the existing permit and calculations were checked for the FDOT pond and that enough capacity is provided for the minor improvements to SR 544 in the basin. Most of the road has already been improved to four lanes at the intersection with US 27. Brent stated that he was hesitant on relying solely on the existing FDOT pond since the basin is a closed basin and FDOT had discussed with the property owner that the existing FDOT pond would be collecting the turn lanes on SR 544. Even if there was capacity for the rest of SR 544 improvements, Brent was concerned on adding more water to the pond and overloading it, giving reasons to the property owner for future issues.

    - David indicated that two concepts are currently being evaluated for the intersection at US 27, one of which is a quadrant roadway. Additional R/W for the roadway is anticipated along the north side of SR 544. Brent suggested that another option would be get more roadway right of way and provide linear swale treatment for Basin 7. Inwood will investigate the swale capacity required and add this to their concept.

    - For the quadrant roadway option, a separate pond was shown. The pond occupies the southern portion of the quadrant roadway and the size was based on accommodating the offsite runoff being as it is in a closed basin. An outfall will be provided to the NW to the existing wetlands and the size of the pond also accommodates the attenuation in the existing condition to the wetlands. Brent suggested to eliminate the access gap along the east side of the pond. Inwood will revise the shape accordingly.

    - Brent indicated that the existing cross drain in Basin 7 acts as a relief from the floodplains to the south with a bubble up structure.

- The pond in Basin 9 remained the same as the original location presented in November 2020. However, the pond also provides compensating treatment for Basin 8. Inwood mentioned that a pond site in Basin 8 was previously shown but taken out in favor of the compensating treatment approach. As mentioned before, FDOT had concerns regarding the compensating treatment applicability with SWFWMD, so it was agreed to provide a pond in Basin 8 for conservative measures. The compensating treatment would be acceptable if a

net improvement to the watershed can be demonstrated and will be verified with SWFWMD at the pre app meeting.

    - David mentioned that a Duke easement is proposed along the north side of SR 544 through this basin and that Inwood is currently coordinating with the utility agency and will need to verify that the pond shape will not conflict with the easement

- For Basin 10, Inwood explained that there is a permit exemption request from the property owner to have the ability to either develop houses or sell the property in the future. However, no development concept plans are available or prepared. Another site alternative was shown in the meeting west of this pond site and north of SR 544. Inwood asked if the Department had a preference on which site to move forward with. Brent indicated that because this is a PD&E study, it was OK to leave the original site for consideration. Furthermore, the outfall for the site is an existing cross drain in front of the pond site which made this site preferable. The pond location will also allow for the inflow pipe to discharge to the pond without having to cross the existing cross drain.

Action Items

1. Inwood to coordinate with Nicole Monies to include this project in the agenda for the pre app meeting with SWFWMD on Sept. 1st
2. Inwood to adjust Pond 1 shape to allow for the future access road south of the church
3. Investigate if Pond 1 can accept offsite runoff to the east to assist in the nutrient loading reductions
4. Investigate if Pond 5 can remain within the floodplain encroachments
5. Inwood to investigate if more roadway R/W can be acquired for a linear swale for assisted treatment in Basin 7
6. Inwood to revise shape of Pond 7 for the quadrant option to eliminate access gap on the east side
7. Inwood to locate pond in Basin 8 in case compensating treatment is not possible
8. Inwood to investigate Duke easement and potential impacts to Pond 9

The meeting concluded at 11:00 am

# Meeting Minutes

3000 Dovera Drive, Suite 200, Oviedo, FL 32765 I P: 407-971-8850 I F: 407-971-8955 I www.inwoodinc.com

DATE: September 1, 2021

TO: **All Attendees / Project File**

FROM: Renato Chuw, PE

RE: SR 544 PD&E Study FPID 440273-1; SWFWMD Pre Application Meeting

CC: David Turley, Richard Oujevolk, Jonathon Bennett

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A Pre-Application meeting was held for the SR 544 PD&E Study with Southwest Florida Water Management District (SWFWMD) on September 1st, 2021, at 2:00 PM. The meeting was held via a Teams meeting. In attendance were:

Dave Kramer (SWFWMD)
Al Gagne (SWFWMD)
Brent Setchell (FDOT)
Sergio Figueroa (FDOT)
Nicole Monies (FDOT)
Ben Shepherd (FDOT GEC)
David Dangel (Inwood)
Renato Chuw (Inwood)
Dayna Duffy (Inwood)
Jada Barhorst (Inwood)

The following is a summary of the items discussed in this meeting:

Project overview and description

- Renato shared his screen with Google Earth along with a KMZ of the project limits, drainage basins and preliminary pond site locations. An overview of the project was provided. The project begins at MLK Jr. Blvd/Avenue T in Winter Haven and extends to SR 17 in Haines City. The scope of the project is to evaluate widening SR 544 from two to four lanes. There are a total of 17 cross drains within the project, including 3 major (bridge culvert or bridge) crossings. These are located at the canal between Lake Conine and Lake Smart, at Lake Henry Canal, and at Lake Hamilton Creek.
- The project is within the Peace River Basin and has been divided into 10 drainage basins based on existing outfall locations and drainage patterns.
- Basin 7, located west of US 27, is a closed basin. Within this basin, there is an existing FDOT pond that will soon be relocated as part of a new development. Renato also pointed out that there is a potential quadrant roadway concept at this intersection and a separate pond site was located for this alternative.
- Renato mentioned that Inwood met with SWFWMD two years ago for a pre-application meeting while pursuing this project. At that time, SWFWMD stated that it would be acceptable to provide treatment only for net-new impervious if it could be physically separated from the existing runoff. However, at the time it was expected that the original lanes would remain throughout most of the project and two new lanes would be constructed. It is now anticipated that full reconstruction will be necessary due to right-of-way constraints.
    - Dave Kramer stated that while net new impervious is the minimum acceptable treatment, it would be preferable to SWFWMD to see treatment provided for all contributing DCIA in each basin.
    - Brent Setchell added that since right-of-way acquisition is needed anyway, FDOT would also prefer the most conservative approach of treating the total area of the reconstructed pavement.

- In Basins 1 and 2, one idea presented was to provide a larger pond in Basin 1 that would overtreat that basin and provide compensation for Basin 2 since at the time, it was thought that these two basins discharge to a common location (Lake Conine and Lake Smart which are connected by a canal crossing SR 544). Basin 2 would then discharge untreated.
    - FDOT had previously concurred with this idea and pointed out that the pond site for Basin 1 has a large offsite area of pasture that could be treated in the pond to balance the additional treatment for Basin 2 and show net benefit (nutrient reduction) to the basin.
    - SWFWMD indicated that although Basins 1 and 2 discharge to different lakes that are connected by a free-flowing canal, they are separate WBIDs and would recommend keeping them as separate basins and have one pond in each basin. Inwood had previously sited an alternative pond for Basin 2 so this will now be shown as the pond site for Basin 2.
- In Basins 8 and 9, a similar plan to use compensating treatment was proposed by Inwood. Both basins drain to Lake Hamilton Creek. Inwood mentioned that based on previous discussion with FDOT, they planned to show separate ponds for both basins moving forward.
    - SWFWMD mentioned that since these basins do drain to the same WBID, compensation might be more acceptable here.
    - Inwood will still locate a separate Basin 8 pond at the request of FDOT.
- Renato mentioned that the Lake Region Lakes Management District (LRLMD) is also a stakeholder on the project and will be contacted soon. Inwood met with them previously and obtained some information about local stormwater projects.
    - The Lake Conine Stormwater Park is located adjacent to the project but cannot be used for treatment of the roadway improvement since it was a cooperative project between LRLMD and SWFWMD with grant funding dedicated only for the scope of that project.
    - Inwood and SWFWMD are also aware of another LRLMD project, believed to be located near Lake Eloise. SWFWMD believed this project was too far from the SR 544 project to provide any potential credits.
- Renato mentioned that the first half of this project (from Avenue T until the Walmart Distribution Center) is funded for design in 2025 with the remainder of the project is unfunded. However, it is expected to be added to the 5-year work program soon.
- Renato also briefly discussed the floodplains on the project. There are multiple encroachments associated with various lakes and canals in the area. The floodplains are well defined and have established Zone AE 100-year elevations.
    - Inwood utilized a standard cup for cup compensation approach when sizing and siting the floodplain compensation sites.
    - Inwood is also aware of the Peace Creek Watershed study and will verify that the floodplains are consistent with those shown in FEMA maps.
- Jada provided an overview of the ecological and environmental permitting concerns on the project. Inwood's ecology team has completed several species surveys along the corridor. They are also investigating credits available in wetland mitigation banks to offset potential wetland impacts.
    - Albert Gagne mentioned that there could be Sovereign Submerged Lands (SSL) along the corridor and that this should be investigated if purchasing right-of-way adjacent to lakes.
    - Nicole Monies mentioned that she is aware the Peace River mitigation bank will not have forested credits available for several years.

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**Action Items**

- Inwood to revise all ponds to include treatment for all lanes of the corridor.
- Inwood to show separate ponds for each basin including Basins 2 and 8 which previously used a compensating approach.
- Inwood to arrange a meeting with LRLMD to discuss ELA opportunities.

*These are the author's understanding of the discussions and decisions reached at this meeting. If there are comments or questions, please contact Renato Chuw at rchuw@inwoodinc.com or 407-971-8850.*

# Meeting Minutes

3000 Dovera Drive, Suite 200, Oviedo, FL 32765 I P: 407-971-8850 I F: 407-971-8955 I www.inwoodinc.com

DATE: November 30, 2021

TO: **All Attendees / Project File**

FROM: Renato Chuw, PE

RE: SR 544 PD&E Study FPID 440273-1; Lake Region Lakes Management District (LRLMD) Environmental Look Arounds (ELA) Meeting

CC: Sergio Figueroa, Richard Oujevolk, Jonathon Bennett

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An Environmental Look Arounds (ELA) meeting was held for the SR 544 PD&E Study with the Lake Region Lakes Management District (LRLMD) on November 30th, 2021, at 2:00 PM. The meeting was held via a Teams meeting. In attendance were:

| | |
|---|---|
| Roger Griffiths (LRLMD) | David Dangel (Inwood) |
| Brent Setchell (FDOT) | Renato Chuw (Inwood) |
| David Turley (FDOT) | Dayna Duffy (Inwood) |
| | Jada Barhorst (Inwood) |

The purpose of this meeting was to discuss potential regional stormwater opportunities ("Environmental Look Arounds-ELA") with the Lake Region Lakes Management District (LRLMD). The following is a summary of the items discussed in this meeting:

- Renato shared his screen with Google Earth along with a KMZ of the project limits, drainage basins and preliminary pond site locations. Proposed stormwater treatment ponds and floodplain compensation ponds for each basin were shown. An overview of the project was provided. The project begins at MLK Jr. Blvd/Avenue T in Winter Haven and extends to SR 17 in Haines City. The scope of the project is to evaluate widening SR 544 from two to four lanes.

- Inwood had previously met with the LRLMD two years ago while pursuing this project and the objective of today's meeting was to revisit any potential opportunities for regional stormwater / ELA.

- It was confirmed in the meeting that using credits in the Lake Conine Wetland restoration project is not available for the purpose of the road improvement because of the funding mechanism specifically for the wetland restoration project. This was also stated by SWFWMD in the pre-application meeting held in September 2021.

- Previous discussion with LRLMD indicated the willingness to place pond sites on their parcels if they could include aesthetics and park-like features, specifically, the boat ramp parcel to Lake Fannie. However, the decision was to avoid placing pond sites in these Section 4(f) resources.

- LRLMD mentioned a new house built along Lake Smart, just north of the Winter Ridge Condos. Access to the house was discussed. Inwood indicated that this will be evaluated as the proposed roadway concepts are refined with the widening options.

- LRLMD expressed concern about access into and out of the boat ramp entrance to Lake Conine (west of SR 544) with acceleration and deceleration lanes on SR 544, which in the existing condition, is not provided. Inwood indicated that the four-lane improvement of SR 544 will accommodate this.

- LRLMD expressed their desire to realign the existing box culvert connecting Lake Conine and Lake Smart if improvements are proposed to this culvert resulting from the four-lane widening. Realigning the culvert will provide for better visibility to boaters. In addition, providing more vertical clearance inside the culvert would be desirable. LRLMD indicated that they are willing to realign portions of the canal as needed to accommodate the improvements.

- The segment of SR 544 from MLK Boulevard to the Walmart Distribution Center is funded for design in 2025. The segment from the Walmart Distribution Center to SR 17 is currently not funded but FDOT anticipates that it will be included in their 5-year work program.

- Inwood inquire if the LRLMD was aware of any potential regional stormwater opportunities in the area. LRLMD indicated that there is a property next to the Lake Fannie boat ramp that is vacant that may be suitable for a pond site. However, after looking at maps, this area appears to contain wetlands and is within the existing floodplain associated with Lake Fannie and more likely will present challenges to show avoidance and minimization of wetland impacts.

- A previous item discussed in 2019 was regarding the Lake Eloise treatment project. LRLMD indicated that this project would not work for any credits apply toward the SR 544 project.

- Nutrient loading analysis for the project will be evaluated as part of the SR 544 study with the proposed stormwater ponds. An option was discussed regarding possible conversion of some of the existing communities that are on septic to sewer, but this would involve cooperative efforts with the City.

- Inwood mentioned that a public meeting will be held in February 2022 to present initial roadway and typical section concepts. LRLMD expressed their desired to stay involved and informed on the study progression.

*These are the author's understanding of the discussions and decisions reached at this meeting. If there are comments or questions, please contact Renato Chuw at rchuw@inwoodinc.com or 407-971-8850.*

# DRAINAGE COMPLAINT STUDY

# SR 544 – POLK COUNTY

## LAKESIDE RANCH ESTATES
## SR 544 IN WINTER HAVEN

Prepared for:

FLORIDA DEPARTMENT OF TRANSPORTATION
District One
Bartow, FL

Prepared By:

Leanna O'Regan
FDOT District One
801 Broadway Ave
Bartow, FL 33830

# 1. INTRODUCTION

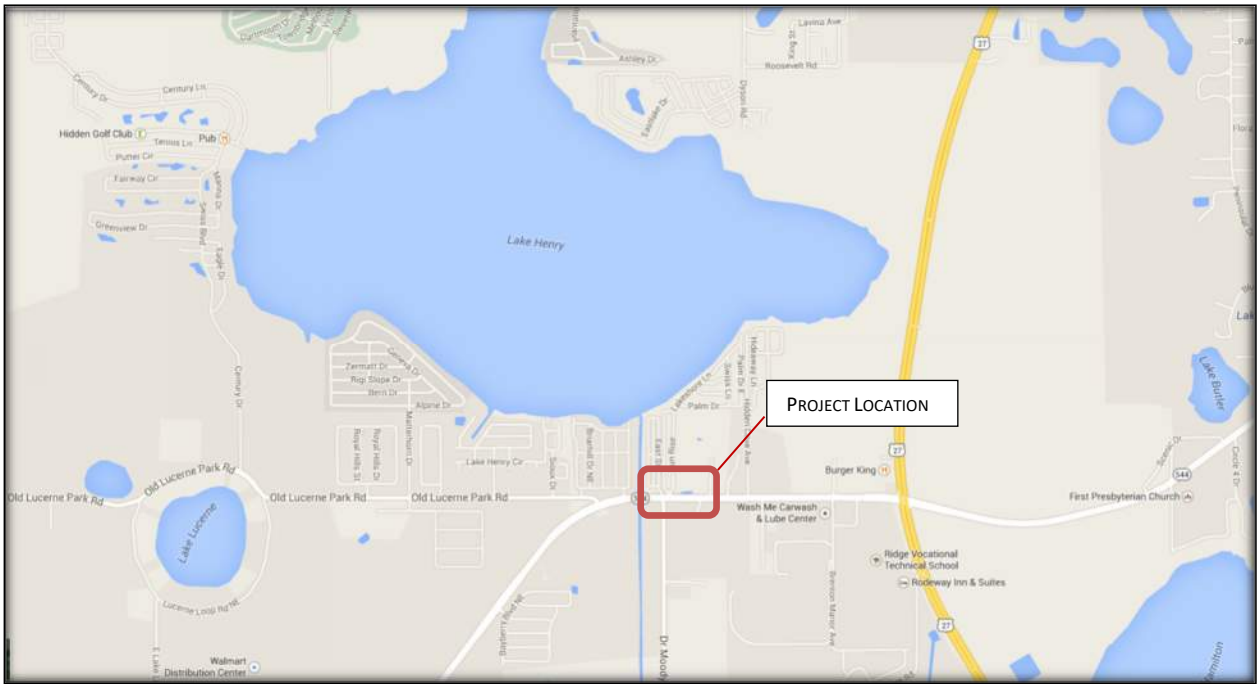



**Figure 1: Project Location Map**

# 2. DATA COLLECTION

Following is a list of data sources utilized in this investigation:

- On-site meeting with Residents March 24th, 2015
- Cook Surveying and Mapping, Inc. Survey (provided by residents)
- Polk County Property Appraiser
- Southwest Florida Water Management District permitting
- USGS
- FDOT straight line diagrams
- FDOT historical drainage maps (Section 16140-3501)
- FDOT construction plans for SR 544, 197429-1-52-01
- FDOT construction plans for SR 544, 197697-1-52-01

- FDOT Permits 2011-H-190-0179, C1605292, 2013-D-190-0003
- Field review April 27th, 2015

## 3. EXISTING CONDITIONS

SR 544 is an east west 2-lane urban facility with 12-foot travel lane and 5-foot paved shoulders. The road is in a normal crown section in this location. There is an existing 30-inch cross drain on SR 544, east of the Lakeside Estate entrance, which historically conveyed runoff from the south side of the roadway to an existing offsite pond located on the north side of SR 544. This runoff was then conveyed northward to Lake Henry via a system of drainage ditches and swales.

The majority of the runoff on the north side of the roadway from 1800-feet east of the cross drain, is conveyed westward to the historic 30-inch outfall via ditches and swales and through several driveway culverts. On the west side of the outfall, the runoff is collected from the Lake Hamilton Bridge and roadway areas and conveyed via ditch/swale through two existing driveway culverts and to the existing outfall.

The runoff on the south side of the roadway is conveyed via ditch/swale system from 1800-feet east of the outfall, through several driveway culverts to the historical 30-inch outfall. The runoff from the west side of the roadway and bridge section is also collected via ditch/swale and is directed to the outfall.

The flooding in this area appears to have be caused by a lack of maintenance of the existing outfall system on the north side of the roadway. The pond has become overgrown in recent years which has significantly reduced the capacity, whilst the existing outfall to Lake Henry has also become overgrown and can no longer convey runoff to the Lake. The conveyance ditches and swales previously used for conveyance have also been blocked by the addition of a private roadway/driveway entrance on private property which has been documented during FDOT staff site visits.

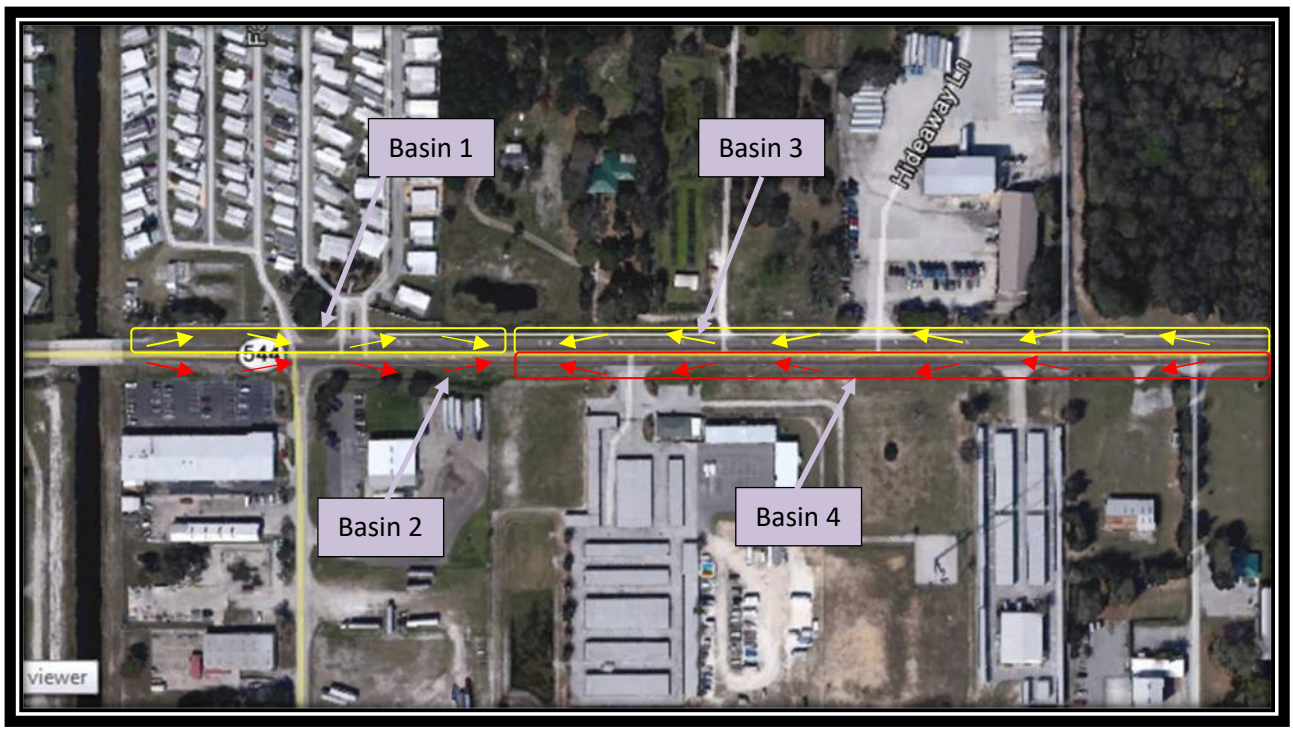



**Figure 2: Project Existing Drainage Basin Map**

BASIN 1:

The area included in the Basin 1 drainage boundary extends from the center of SR 544 roadway northward to the FDOT right of way line on the north side of the roadway. The area includes runoff from the bottom of the existing bridge to the location of the 30-inch cross-drain which discharges into the FDOT ditch from under SR 544.

Area & CN:

| | | | | | |
|---|---|---|---|---|---|
| Basin Area | 0.72 acres | | | | |
| Impervious area: | | | | | |
| Roadway (CN 98) | 0.39 acres | X | 98 | = | 38.22 |
| Pervious area: | | | | | |
| Ditches (CN 39) | 0.33 acres | X | 39 | = | 12.87 |
| | 0.72 acres | | | | 51.09 |
| Weighted CN Calculation: | (0.39) X (98) | = | 38.22 | | |
| | (0.33) X (39) | = | 12.87 | | |
| | 0.72 acres | | 51.09 | | **Weighted CN = 71.0** |

BASIN 2:

The area included in the Basin 2 drainage boundary extends from the center of the roadway southward to the FDOT right of way line on the south side of the roadway. The area extends along the length of the SR 544 roadway from the existing bridge to the location of 30-inch cross-drain which conveys runoff from the southside of the road to the north. Basin 2 also includes additional offsite runoff from Lake Hamilton Dr. W., (south of SR 544), which drains from the south northward discharging into the SR 544 ditch. The runoff within this basin area then collectively drains eastwards towards the existing 30-inch cross drain under SR 544. Basin 4 also includes runoff from the offsite StoreRite development on the south side of the roadway. The permitted runoff from this site is documented in FDOT Drainage Application 2013-D-190-0003 and is included in the model using the maximum discharge rate during the peak storm event of 1.0-cfs.

Area & CN:

Basin Area 1.53 acres

Impervious area:

| | | | | | | |
|---|---|---|---|---|---|---|
| Roadway | (CN 98) | 0.70 acres | X | 98 | = | 68.60 |
| Offsite parking | (CN 98) | 0.15 acres | X | 98 | = | 14.70 |
| Total Impervious | | 0.85 ac | | | | 83.3 |

Pervious area:

| | | | | | | |
|---|---|---|---|---|---|---|
| Grassed area | (CN 39) | 0.68 acres | X | 39 | = | 26.52 |

| | | | | |
|---|---|---|---|---|
| Weighted CN Calculation: | (0.85) X (98) | = | 83.3 | |
| | (0.68) X (39) | = | 26.52 | |
| | 1.53 ac | | 109.82 | **Weighted CN = 71.8** |

StoreRite

Offsite Drainage = 1.0 cfs

BASIN 3:

The area included in the Basin 3 drainage boundary extends from the center of the roadway northward to the right of way property line. The area extends from the center of the roadway at the location of the 30-inch crossdrain to for approximately 1400-feet eastward along SR 544 to the beginning of the roadway taper. The drainage basin is bordered by the right of way line on the northern side of the roadway.

Area & CN:

Basin Area 1.43 acres

Impervious area:

| | | | | | | |
|---|---|---|---|---|---|---|
| Roadway | (CN 98) | 0.90 acres | X | 98 | = | 88.20 |

Pervious area:

| | | | | | | |
|---|---|---|---|---|---|---|
| Grassed area | (CN 39) | 0.53 acres | X | 39 | = | 20.98 |

| | | | | |
|---|---|---|---|---|
| Weighted CN Calculation: | (0.90) X (98) | = | 88.20 | |
| | (0.53) X (39) | = | 20.98 | |
| | 1.43 acres | | 109.18 | **Weighted CN = 76.1** |

BASIN 4:

The area included in the Basin 4 boundary extends from the centerline of SR 544 southward to the right of way line on the southside of the roadway. This area includes the runoff from the east side of the existing driveway for the Dollar General Store westward to the existing 30-inch crossdrain under SR 544.

Area & CN:

Basin Area 2.23 acres

Impervious area:

| | | | | | |
|---|---|---|---|---|---|
| Roadway | (CN 98) 1.14 acres | X | 98 | = | 111.72 |

Pervious area:

| | | | | | |
|---|---|---|---|---|---|
| Grassed area | (CN 39) 1.09 acres | X | 39 | = | 42.51 |

| | | | | |
|---|---|---|---|---|
| Weighted CN Calculation: | (1.14) X (98) | = | 111.72 | |
| | (1.09) X (39) | = | 42.51 | |
| | 2.23 acres | | 154.23 | **Weighted CN = 69.2** |

The tailwater conditions utilized for the existing and proposed condition designs will be as described in the drainage manual Chapter Three for ponds and open ditches.

## 4. CONCEPTUAL DESIGN