Drainage Design Documentation

SR 60 Grade Separation over CSX Railroad

FPID Number 436559-1-52-01

Polk County

Prepared For:

Florida Department of Transportation

District One

September 2016

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APPENDICES

1 INTRODUCTION

The project, SR 60, is being undertaken by the Florida Department of Transportation (FDOT) District 1, which has contracted with Faller, Davis, & Associates, Inc. (FDA) to perform engineering services.

The purpose of this report is to document the design decisions and calculations that are the basis of project stormwater and drainage conveyance design. Other related reports prepared for this project include the Alternative Pond Siting Memorandum.

2 PROJECT DESCRIPTION

The project is located in Polk County within the jurisdiction of the Southwest Florida Water Management District (SWFWMD). It is located within the Upper Peace Creek Watershed and will discharge to the Peace Creek Drainage Canal (PCDC) via two different outfalls. It is located in Section 6, Township 30 S Range 27 E. See Figure 1 for a location map.

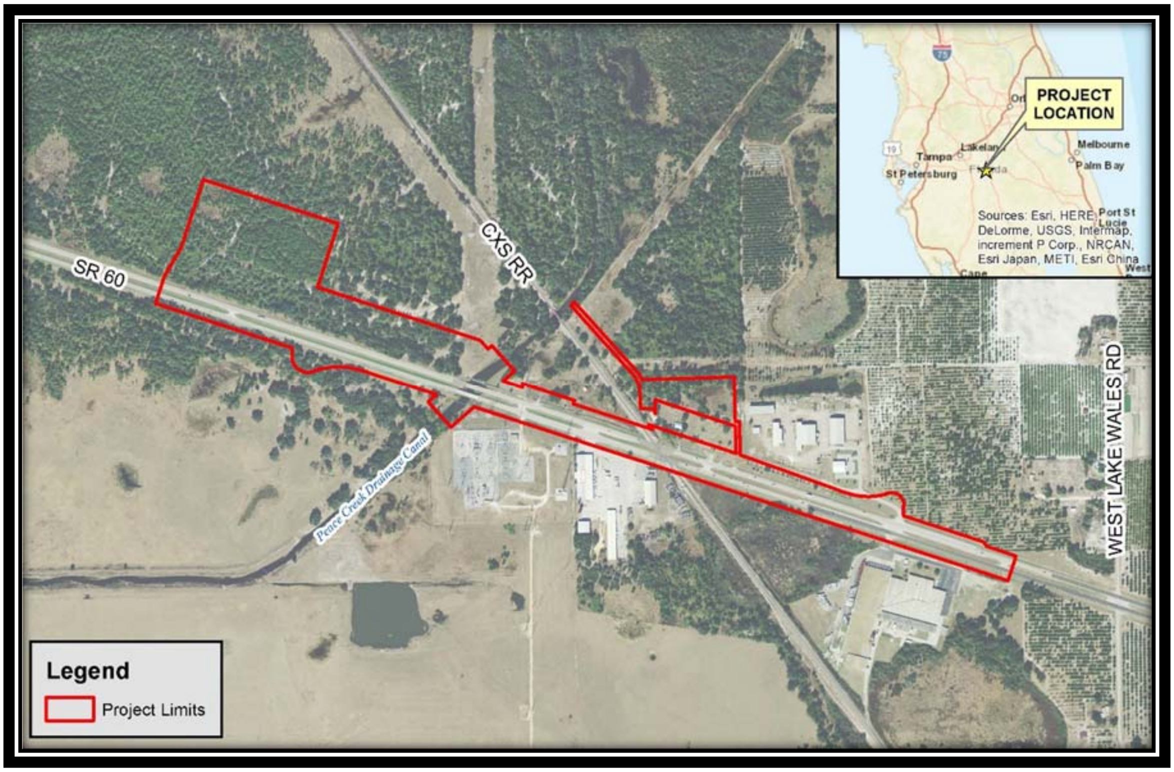

Figure 1 – Location Map

The proposed project converts the at-grade railroad crossing to a grade separated crossing. S.R. 60 will be shifted to the north and connects to the existing alignment using normal crowned reverse curves. Two parallel multi-span bridges will carry east and westbound S.R. 60 over the PCDC. Two additional parallel, single span bridges will cross the area over the large existing petroleum pipeline and a proposed access road connecting the Northwest and Southwest Frontage Roads. Two proposed parallel single span bridges will carry the east and westbound S.R. 60 traffic over the CSX railroad. The approaches to the bridges will be fill sections with MSE retaining walls on both the north and south sides and at the abutments. To minimize future construction costs, impacts to the CSX railroad, and disruptions to surrounding homes and businesses, the S.R. 60 mainline will be constructed to a six-lane configuration and will be striped for four mainline travel lanes. The mainline will have a design speed of 70 mph. The existing S.R. 60 eastbound bridge over the PCDC will be widened and used for the Southwest Frontage Road. The Southwest Frontage Road will have two 12-foot lanes with two-way traffic and paved shoulders. The Northwest Frontage Road will have two 10-foot lanes with curb and gutter and two-way traffic. The Northeast Frontage Road will have two 10-foot lanes with curb and gutter and two-way traffic. The drainage systems for the project will include ditches and storm sewer for conveyance of the project runoff to Stormwater Management Facilities (SMFs) for treatment and attenuation.

The existing land use within the project limits ranges from industrial to pastures.

3 COORDINATION

The following is a summary of the coordination that has occurred during the preparation of this report. Specific information is provided in Appendix 1.

- February 26, 2016 FDOT District 1 Drainage and Environmental Permits Kickoff Meeting: Design criteria and potential design concepts were coordinated with Carl Spirio and Brent Setchell.
- May 6, 2016 FDOT District 1 Pond Update: Geotechnical investigation results and the revised location for SMF 1 were coordinated with the Project Manager, Permits, Survey and Right of Way departments.
- June 1, 2016 SWFWMD Pre-Application Meeting: Design criterial and design concepts were coordinated with SWFWMD.
- June 30, 2016 USACE Pre-Application Meeting: Environmental concerns and approach were coordinated with USACE.

4 REFERENCES/RESOURCES

The following is a listing of references and resources utilized during the preparation of this report:

- Existing Studies/Plans/Reports
- Drainage Design Concept Report for the PD&E study
- Technical Reference and Regulation Material
- FDOT Drainage Manual
- FDOT Drainage Handbooks
- ERP Applicant’s Handbook I
- SWFWMD ERP Applicant’s Handbook II
- Soil Survey for Polk County, by NRCS
- Flood Insurance Study and Flood Insurance Rate Panels, by Federal Emergency Management Agency (FEMA)
- Aerial Photography and Survey
- Aerial photograph Maps by I.F. Rooks & Associates, Inc.
- Electronic topographic files from CivilSurv, Inc.
- Field reviews conducted by FDA staff on February 9, 2016
- All references/resources, as well as the project design, utilize the NAVD 1988 datum.

5 SOILS INFORMATION

Soils information was obtained from the Soil Conservation Service (NRCS) Soil Survey of Polk County, Florida.
Project Basins: Generally, the soils are A/D consisting of a combination of fine sand and muck.
SMF Locations: Generally, the soils are A/D consisting of a combination of fine sand and muck.
See Appendix 3 for specific soils information.

6 RAINFALL DATA

Rainfall data was obtained from several sources. The 24-hour rainfall depths were obtained from the SWFMWD ERP Information Manual Part D Design Aids. These rainfall depths are used for the SWFWMD water quantity modeling of the SMFs and for the modeling of the cross drain.

The Rainfall Intensity-Duration-Frequency Curve for Zone 6 from the FDOT Drainage Manual is used for modeling the 2 and 5 -year storm events in the SMFs for interpolating to obtain the 3-year storm event to use as the tailwater in the conveyance systems. Copies of the above items are provided in Appendix 2.

7 FEMA FLOODPLAINS

Floodplain information was obtained from the FEMA Flood Insurance Rate Map (FIRM) panel 12105C0545G dated November 2003. The PCDC is classified as a FEMA floodway and a no-rise determination will be performed as a part of the Bridge Hydraulics Analysis. An update to the FIRM maps is in progress and the revised FIRM maps will be available in September 2016.

The SWFWMD has an approved ICPR watershed model for the PCDC. This model is the basis of the upcoming FIRM map update.

The floodplain impacts related to this project are minimal and not expected to result in an increase in the 100-year flood stages. An update to the PCDC ICPR model will be performed to ensure that there is no rise due to the impacts. A FEMA Floodplain Map can be found in Appendix 2.

8 DESIGN TAILWATER ELEVATIONS

The following is a summary of the sources of design tailwater elevations.

- Seasonal high water (SHW) elevations in wetlands were obtained from FDA environmental scientist – Nicole Cribbs.
- Seasonal high water table (SHWT) elevations were obtained from Tierra geotechnical engineer – Kevin Lo.
- Cross drain stain lines were observed during a field review by Tammy Kreisle (FDA) and Nicole Cribbs on February 9, 2016.

9 DRAINAGE DESIGN CRITERIA

- Normal Water Level (NWL) Establishment – The control elevation for the SMF sites is generally the SHGWT elevation minus six inches.

- Water Quality Treatment – Water quality criteria for the project is as specified in Part IV of the SWFWMD ERP Applicant's Handbook II.
- Attenuation – Water Quantity criteria for the project is as specified in Part III of the SWFWMD ERP Applicant's Handbook II.
- SMF Design – SMF berms will have a 15-foot width at a 1:15 slope. Side slopes will be 1:3 to the bottom of the SMFs. Back slopes and tie-down slopes will be 1:4. Desirable inside berm radius will be 50 feet (35 feet minimum). SMFs will be fenced due to cattle access concerns and dumping of trash. Skimmer devices will be used on all SMF control structures from 6 inches below the control elevation to at or above the 100-year SMF peak stage. Turn-down bleeder devices will be used to discharge the water quality treatment volume. The back of berm elevation will be set to provide one foot of freeboard over the 100-year peak stage (Appendix 10).
- Tailwater and Outfall Conditions – Tailwater conditions for the SMFs utilize the SHW elevations in the PCDC. Tailwater for the cross drain is 107.43.
- Floodplain Encroachment Volume – Floodplain encroachment criteria for the project is as specified in the SWFWMD ERP Applicant's Handbook II.

10 BASIN DESCRIPTIONS

10.1 Basin 1

Basin 1 encompasses the area from the beginning of the project limits to the east end of the PCDC bridges. The first inlets will be placed at the western end of the PCDC bridges and are anticipated to collect the runoff from the entire bridge length. The bridge outside shoulders are 10 feet wide and spread is not expected to exceed the shoulder width. The runoff will be conveyed within a closed storm drain system to the SMF site east of the PCDC on the north side of SR 60. This location is adjacent to the roadway and located within proposed right of way. The outfall will be placed within the existing right of way between the SMF site and the PCDC. The SMF site area is 2.8 acres in size. The existing impervious area in Basin 1 is 3.61 Ac. The proposed impervious area for the future six-lane roadway with frontage roads is 8.09 Ac. Therefore, the added impervious area for Basin 1 totals 4.48 Ac. The SHGW elevation at the pond site is 110.5 and the wetland SHW elevations are approximately 111.94.

10.1 Basin 2

Basin 2 is located between the PCDC and the CSX railroad. It was determined that compensatory treatment and over-attenuation will be utilized to treat for the added impervious area within this basin. This eliminates the need to purchase additional right of way and avoids placing pipes under the CSX railroad as well as hanging them on the bridge over the PCDC. Runoff in this basin will be collected via a combination of inlets, pipes and ditches and conveyed directly to the PCDC. The existing impervious area in Basin 2 is 2.43 Ac. The proposed impervious area including frontage roads is 4.40 Ac. Basin 2 has an additional 1.97 Ac. of impervious area that will be treated compensatorily by collecting runoff from additional existing pavement in an amount equal to or greater than the Basin 1 added impervious area (4.48 Ac.) plus the Basin 2 added impervious area (1.97 Ac.). Runoff will be over-attenuated in SMF 1 to compensate for the added direct runoff from Basin 2 into the PCDC (Appendix 8).

10.2 Basin 3

Basin 3 encompasses the area from the CSX railroad to the east end of the project limits. The first inlets will be placed at the eastern end of the bridges over the railroad and are anticipated to collect the runoff from the crown of the bridge and the approach slab. The outside bridge shoulders are 10 feet wide and spread is not expected to exceed the shoulder width (Appendix 11). The runoff will be conveyed within a closed storm drain system to a FDOT-owned parcel (273006000000032010), purchased in the 1990s, that is located north of SR 60 and just east of the CSX railroad. A 30-foot-wide by 280-foot-long ingress/egress easement is required for access and inflow pipe placement and is proposed to occur on the southeast corner. The outfall will be placed within the existing easement between the northwest corner of the FDOT site and the PCDC. This outfall contains a drainage ditch that is thought to have historically extended to the PCDC, however it currently dead-ends approximately 350 feet to the east of the canal and will need to be re-established as a part of this project. The FDOT site area is 3.8 acres in size. The existing impervious area in Basin 3 is 7.55 Ac. The proposed impervious area including frontage roads is 12.62 Ac. The added impervious area for Basin 3 totals 5.07 Ac. The SHGW elevation at the pond site is 115.2 and the wetland SHW elevations are approximately 113.9.

11 CROSS DRAIN AND BRIDGES

The FDOT Allowable High Water (AHW) criteria requires cross drain 50-year headwater be no higher than the low edge of travel lane and the 100-year headwater to leave one lane dry.

There are no new cross drains proposed by this project. The existing 30-inch cross drain just east of the CSX railroad is being replaced with a Class IV pipe as it will have more than 35 feet of fill over it. The cross drain length will also be more than twice the existing length. The AHW's will be no higher than they are in the existing condition. Cross drain calculations are included in Appendix 11.

There are two existing bridges over the PCDC. The westbound bridge will be removed. The eastbound bridge will be repurposed for the southwest frontage road and will provide access to the properties on the south side of the project west of the PCDC. New mainline bridges will be constructed to carry SR 60 traffic over the PCDC. Refer to the Bridge Hydraulics Report under separate cover for additional information.

12 FLOODPLAIN ENCROACHMENT/COMPENSATION

FEMA Zone A 100-year floodplains will be impacted by roadway embankment in Basins 1 and 2 where the roadway alignment traverses the floodplain. The floodplain volume filled between the SHW elevation and the 100-year flood elevation total 3.49 Ac-ft and requires modeling to demonstrate that there is no rise to the 100-year flood elevation in the PCDC. This modeling has been accomplished by modifying the Peace Creek Watershed Model that has been approved by the SWFWMD governing board to remove storage that is equivalent to the impacts that this project is having to the floodplain. The 100-year, 1-day and the 100-year, 5-day design storms were modeled and the results show no increase in the flood stages.

See Appendix 9 for floodplain encroachment and modeling results.

13 STORMWATER QUALITY/QUANTITY

Stormwater quality treatment and quantity attenuation is required for the project in accordance with the SWFWMD ERP Applicant's Handbook II, Part III and IV and the FDOT Drainage Manual Chapter 5. Calculations can be found in Appendix 8.

13.1 Stormwater Quality

Due to the shallow depths to the SHWTs, the SMFs will use the wet detention method of treatment. Therefore, the required water quality volume is one inch of runoff from the contributing area for all basins. Compensatory treatment will be utilized to treat the added impervious area in Basin 2 that will not be conveyed to a SMF site. The project is located within impaired WBIDs 1539 and 1626 and require net improvement calculations to be performed (Appendix 11). The overall discharge from the three basins meets the net improvement requirement. Offsite runoff will be conveyed to the outfalls and not through the SMFs.

13.2 Stormwater Quantity

The stormwater quantity design complies with the applicable SWFWMD criteria. All basins are considered "open." The post-development peak discharge is no greater than pre-development peak discharge for the 25-year, 24-hour storm event. The SCS Curve Number Method is utilized with the SCS Type II Florida Modified rainfall distribution.

The FDOT Critical Duration (Rule 14-86) Analysis is not required for this project as it does not outfall to offsite areas subject to reported historical flooding.

For the pre-development analyses, a peak rate factor of 256 is used. A peak rate factor of 256 is used in the post-development analyses for the entire project (Appendix 10). For all analyses, the initial stage in the SMF is equal to the weir elevation.

The design tailwater for the routings is set as the SHW elevation in the PCDC.

13.3 Stormwater Management Facility Descriptions

SMF 1 is located adjacent to the roadway and will require a turnout and access easement to be obtained. The inflow to the SMF is via a storm drain system and the outflow is via a pipe system flowing east to the PCDC. The control elevation (110) is six inches below the SHWT elevation at the SMF site.

SMF 3 is located on an existing borrow pit owned by FDOT. An ingress/egress/drainage easement will be obtained from the Northeast Frontage Road to the east side of the SMF 3 parcel. The inflow to the SMF is via a storm drain system and the outflow is via a lateral ditch flowing northwest to the PCDC. The control elevation (114.7) is six inches below the SHWT elevation at the SMF site.

A 15-foot wide maintenance berm with a 1:15 side slope is provided around both SMFs. Side slopes down into the SMF are 1:3 to the bottom of the SMFs.

The treatment volume bleeder will discharge no more than one-half of the treatment volume in the first 60 hours and discharge the entire treatment volume in no less than 120 hours. DIP turn-down devices will be used for the bleeder and skimmers will be used on the control structures for the overflow. These calculations can be found in Appendix 10.

14 DITCHES

Side ditches and median ditches are utilized for collection and conveyance where possible. The ditches are designed to the keep the HGL elevation below the shoulder hinge for the 10-year storm frequency. Where necessary, a berm at the top of the back slope of the side ditches will provide a minimum of 0.5 foot of freeboard. The depth of ditches will vary based on special ditch profiles.

Collection / conveyance calculations are included in Appendix 7.

15 STORM DRAINS

Storm drain systems are used to convey the runoff from the inlets, side ditches and median ditches to the SMFs. The storm drains are sized for the three-year storm frequency. The storm drain systems will be long systems conveying the runoff from the inlets and ditches to the SMFs.

Collection / conveyance calculations are included in Appendix 4.

16 GUTTER SPREAD

Gutter spread has been evaluated for barrier walls and curb and gutter along the mainline and frontage roads. For the barrier wall sections, the spread resulting from a four-inch per hour intensity does not exceed the shoulder width. Spread adjacent to the curb and gutter on the Frontage Roads has been limited to half of a lane.

Gutter spread calculations are included in Appendix 11.

17 OPTIONAL CULVERT MATERIALS

Selection of optional culvert materials follows Chapter 6 of the FDOT Drainage Manual, the FDOT Optional Pipe Materials Handbook, and the FDOT Plans Preparation Manual. The roadway will be considered “Major” for the purpose of selecting the Design Service Life (DSL). Therefore, the DSL for storm drains and cross drains will be 100 years and the DSL for side drains will be 25 years. The output from the Culvert Service Life Estimator can be found in Appendix 12.

18 EROSION AND SEDIMENT CONTROL

Permanent erosion control:

- Side ditches and median ditches: 10-year velocities are anticipated to be low enough to use sod.
- Storm drain outfalls to SMFs: 10-year velocities are anticipated to be low and pipes will be submerged, no special measures required.
- SMF outfalls: 25-year outlet velocities are low; outlets are submerged under peak flow conditions, no special measures required.
- Cross drains: 100-year velocities are low, no special measures required.

Permanent sediment control:

- The stormwater management facilities will provide sediment sumps and/or permanent pools to allow for sediment fall-out.

Temporary erosion and sediment control:

- Appropriate measures will be provided in the plans per the FDOT Erosion and Sediment Control Handbook.

19 TEMPORARY DRAINAGE

Construction of the drainage system should generally be from downstream to upstream, prior to or concurrent with, any construction that will alter drainage patterns.

- Construct in the following order:

1. SMF outfalls
2. SMFs
3. Ditches, side drains, and storm drains from downstream to upstream

Appendix 1.0

PROJECT CORRESPONDANCE AND DOCUMENTATION

1.1 Drainage and Permits Kickoff Meeting

Drainage and Permitting Kickoff Meeting Minutes
SR 60 Grade Separation over CSX Railroad
FPID 436559-1-52-01

February 26, 2016
10:00 AM

The meeting began with an overview of the project which is to grade separate SR 60 over the CSX railroad. Three frontage roads will be provided in the northwest, southwest, and northeast quadrants. Two new frontage road terminals will be provided at each end of the grade separation. Three new bridge pairs on SR 60 are proposed over the Peace Creek Drainage Canal (PCDC), fuel line and frontage road access, and the CSX railroad. The existing eastbound SR 60 bridge over the PCDC will be re-used for the southwest frontage road. Sidewalks in both directions are provided.

The alignment is shifted to the north to allow re-use of the existing eastbound PCDC bridge for the southwest frontage road and to allow traffic control phasing to keep four lanes open on SR 60 during construction and is consistent with the PD&E alignment. Right of way will be acquired on the north side except for the west frontage road terminal, which is on the south side.

I. Design Criteria

For quantity/quality calculations the 25-year 24-hour storm will be used for the pond design. Carl mentioned that lately the water management district has been asking for additional storms be modeled when demonstrating no adverse impact for 100-year floodplain impacts. This will be confirmed at the pre-application meeting. The standard pond freeboard is one foot. Carl confirmed that this is acceptable but if there is any hardship, a reduction could be considered (no less than 0.5’ of freeboard) since this is not an area with a history of flooding. Brent pointed out that the net improvement calculations will need to address the change in DCIA since a closed storm sewer will be utilized for the entire project. Brent mentioned that there may be two watershed floodplain model versions available and that we should confirm that we have the latest model.

II. Ponds

The existing borrow pit in Basin 1 was originally proposed to be used as both a pond site and for borrow. Subsequently, discussions were initiated by the property owner and a new pond site has been added directly south of the current borrow pit location, adjacent to the right of way. The plan is to excavate the borrow pit and return it to the property owner and use the new pond for a permanent storm water facility. Brent asked FDA to review the proposed pond location since it would require significant piping back to the outfall. A discussion took place regarding the fencing at the Basin 1 pond. It was decided that the pond fence will not be included in the construction plans but the adjacent property owner would be compensated to install a fence around the back side of the pond as part of the cost to cure.

Photographs were presented that show the dumping that has occurred in the Basin 3 pond site.

The dumping is significant and since this pond site will continue to be isolated from view, it is preferable to include fencing in the proposed design. After reviewing the photographs of the site Carl and Brent both agreed that a variation for pond fencing is needed. Amy will provide an example of a previously used variation.

The pond siting report addendum will include calculations and data regarding the relocated pond site in Basin 1.

III. Regional Idea

For the environmental look around (ELA), the entire region will be considered. With the borrow pit and drainage easement being returned to the adjacent property owner, syphoning the Peace Creek Drainage Canal may no longer be a viable option. The new pond site should be reviewed for opportunities related to this idea. Brent asked FDA to include calculations that show the benefit of nitrogen and phosphorus removal.

IV. Pipes

A roll plot with the conceptual storm sewer layout was provided. The location of the trunkline was discussed. The concept showed the trunkline located in the median within the limits of the MSE wall. It was mentioned that dropping vertically from the inlets and using a thrust block at the bend would result in less pipe. If a vertical drop is utilized it would be preferable to pass the pipe beneath the MSE wall leveling pad inside a steel casing prior to it connecting to the trunkline under the Frontage Road.

Temporary drainage was discussed and with dropping the pipe vertically it would be much simpler. After discussions with temporary retaining wall manufacturer’s, it was confirmed that the median trunkline option would also be constructible.

The outfall from Pond 3 to the PCDC will need to be re-established. The type of connection was discussed. It was decided that an open ditch would be preferable due to maintenance but the final decision should be coordinated with utilities so access to their facilities can be accommodated. A water crossing using gravel or culvert should be considered.

The cross drain will be replaced with a class IV pipe due to the depth of fill being added over the pipe. Calculations will be performed to evaluate whether a size increase is needed due to the extra length.

A few side drain pipes need replacement in the ditch that will remain, primarily on the south side of SR 60. It was decided that all side drain pipes will be replaced as the cost is incidental to the project.

V. Environmental

The current status of the environmental reviews for pond siting, JD limits, permitting and mitigation requirements was provided.

No further environmental review is required for the relocated Basin 1 pond; the area was reviewed during previous phases of the pond siting.

Wetland and surface water limits for the mainline, existing pond sites, and the proposed new location were established in the field and were surveyed. These are shown on the Phase I submittal plans.

Permits applications will be prepared and submitted with the Phase II revised plans. An Individual permit from SWFWMD and USACE is expected. Brent noted the USACE SAJ-92 permit may apply. Niki will confirm the project was reviewed in EDTM with the DEMO staff as part of the requirements to applying for this permit. Follow up: Vivienne Cross confirmed this project was not screened through ETDM "since it started out on a fast track." So the USACE SAJ-92 permit is not applicable. Since the PD&E will be producing a state document, FWS will not consult on the project until USACE provides the federal nexus. We have been able to get technical guidance from them so we do not expect any surprises once they are fully involved during permitting.

A pre-application meeting will be scheduled at one of the regularly scheduled SWFWMD monthly meetings (1st Wednesday of the month).

Mitigation requirements for wetlands will be determined during the permit application preparation. Brent has about 9-10 credits of both herbaceous and forested credits from Boran Ranch Mitigation Bank and the Peace River Mitigation Bank.

Wildlife involvement includes mitigating for wood stork suitable foraging habitat. FDA will use the process detailed by Brent for determining the wood stork mitigation. The wetland credits will cover the required wood stork credits.

Other wildlife species with involvement with the project include:

- Gopher tortoises located within the Basin 3 pond site and outfall. These will be permitted for relocation closer to the construction date.

- Surveys for the crested caracara are underway. No caracara have been observed during the survey. The ESBA will be updated after the survey. The survey will be complete at the end of April 2016.

- A survey for Southeastern American kestrels was conducted in the summer of 2015. One nest pole was identified off-site. The nest pole was cut down and replaced with a metal pole by Duke Energy. Kestrels continue to forage in the project area, mainly around Peace Creek Drainage Canal. No new nest locations are known.

- A pair of fox squirrels were observed within the project limits on the southwest quadrant of Peace Creek Drainage Canal. They were in pine trees and foraging on pine cones.

- The dry shelves under the new bridges at the Peace Creek Drainage Canal were discussed. The existing SR 60 eastbound bridge will remain in place for the frontage road. Brent noted that a project in Collier County added a 2-foot-wide dry pathway for wildlife as a retrofit to an existing bridge. FDA will review the potential for a similar retrofit for the SR 60 eastbound bridge so that a complete wildlife pathway is provided.

FWC has issued a concurrence letter. USFWS has indicated they will not consult on the project until the USACE provides the federal nexus during permitting. Niki will forward Brent any available concurrence letters along with the USFWS correspondence.

Drainage and Permitting Kickoff Meeting Agenda
SR 60 Grade Separation over CSX Railroad
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February 26, 2016
10:00 AM

Engineering:

- Criteria
    a. Base clearance / variation
    b. Critical Duration
    c. Freeboard
    d. Impaired Water Bodies

- Ponds
    a. Basin 1 - Change in plan due to property owner request (PSR Addendum)
    b. ELA
    c. Fencing
    d. Re-establish outfall in Basin 3
        i. Pipe vs. ditch
        ii. Update ICPR model
- Regional Idea
- Pipes
    a. Trunkline location
    b. Outfall locations / types
    c. MOT drainage
    d. Cross Drain
    e. Side Drains
        i. Mostly CMP
        ii. All but two are in good condition

Environmental:

- Pond Siting
    a. Evaluate revised Basin 1 pond area
    b. Limited JD staking expected
- Wetland and Surface Water Limits
    a. Mainline and original Basin 1 & 3 SMFs areas have been staked, surveyed
    b. Limits are shown on plans
- Permitting – after Phase II revised
    a. SWFWMD – Individual
    b. USACE – Individual
    c. Pre-application meetings
        i. PD&E held 10/1/14
        ii. Design phase pre-app to be scheduled
- Mitigation Requirements
    a. Wetland impacts
        i. Credits at Peace River MB for forested; Boran Ranch MB for herbaceous
        ii. Total impacts & credit requirements TBD
    b. Wood stork SFH—with wetland mitigation

    c. Gopher tortoise recipient site (down the road)
- No SSL, easements, other special designations
- Wildlife Surveys
    a. SE American kestrel survey completed
    b. Caracara survey underway now—no sightings so far
    c. Gopher tortoises
        i. Present on Basin 3 parcel and outfall
        ii. Resurvey/permitting/relocation necessary ~ six months prior to construction
- Other Wildlife Issues
    a. Fox squirrels and SE American kestrels are within project limits
    b. These are state-listed species; FWC this week issued concurrence letter for ESBA and no mitigation is required for these species
    c. New PCDC bridges have wildlife shelves (see BDR)

Schedule

- BDR and BHR in review
- Phase II Plans – Fall 2016

Action Items

1.2 District 1 Pond Update

Pond Update Meeting Minutes
SR 60 Grade Separation over CSX Railroad
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May 6, 2016, 9:00 AM

The meeting began with a brief overview of the project which is to grade separate SR 60 over the CSX railroad. Three frontage roads will be provided in the northwest, southwest, and northeast quadrants. Two new frontage road terminals will be provided at each end of the grade separation. Three new bridge pairs on SR 60 are proposed over the Peace Creek Drainage Canal (PCDC), fuel line and frontage road access, and the CSX railroad. The existing eastbound SR 60 bridge over the PCDC will be re-used for the southwest frontage road. Sidewalks in both directions are provided.

The alignment is shifted to the north to allow re-use of the existing eastbound PCDC bridge for the southwest frontage road and to allow traffic control phasing to keep four lanes open on SR 60 during construction and is consistent with the PD&E alignment. Right of way will be acquired on the north side except for the west frontage road terminal, which is on the south side.

I. West Pond Site

This was a new pond site located west of the CSX RR, north of SR 60, and immediately south of the borrow pit site. This new pond site was created during discussions with the property owner to consider their request to recover ownership of the borrow pit site. The plan prior to this meeting was to excavate the borrow pit site and revert it back to the property owner afterwards and create a new pond site for stormwater only that would be permanent. The new pond site location was previously surveyed, environmentally cleared, and needed further geotechnical investigation. Subsequent geotechnical investigation yielded seasonal high waters that were too high to suit the design based on the available pond site area.

A secondary three-acre site was chosen to the east, abutting the Peace Creek Drainage Canal. A preliminary geotechnical investigation yielded seasonal high water levels that are conducive to the design. Survey data covers this area, however a full geotechnical investigation and environmental clearances are needed. Exhibits were provided showing the earlier and latest locations of the west pond site.

II. Borrow Pit Site

The existing 12 acre borrow pit site is located west of the CSX RR and north of SR 60 on FDOT owned property. It was intended for a dual purpose as a stormwater pond and a borrow source. The approach prior to this meeting was to excavate the borrow pit site and revert it back to the property owner afterwards. A full geotechnical investigation was conducted on the site and unfortunately resulted in unusable soil types. Most of the embankment needed for this project needs to be A-3 select soils due to the significant use of MSE walls which limits the variability in soil properties that are acceptable. Non-select soils can be used in the embankment outside the MSE walls, however this is expected to be a relatively small quantity and would not be practical to use the borrow pit site only for that purpose. The borrow pit site will be left unused if the non-select earthwork volumes are available in the east pond site.

III. East Pond Site

The east pond site is located east of the CSX RR and north of SR 60 on FDOT owner property. It was intended for a dual purpose as a stormwater pond and a borrow source. The suitability of this site for stormwater was previously confirmed. The borrow source approach prior to this meeting was to excavate the east pond site to the maximum extent practical. A full geotechnical investigation was conducted on the site and unfortunately resulted in more than 50% of the soil being non-select. Most of the embankment needed for this project needs to be A-3 select soils due to the significant use of MSE walls which limits the variability in soil properties that are acceptable. Non-select soils can be used in the embankment outside the MSE walls, and this site will be used to maximize the soil available based on earthwork calculations.

IV. BDR/BHR Update

We discussed the status of the BDR and BHR. All comment responses from the draft reports were submitted to the ERC. There were several rejected comment responses that were re-responded to and all are complete and accepted. No significant changes to the recommendations occurred and the final report preparation is underway.

We discussed the wildlife shelves under the new Peace Creek Drainage Canal bridge and the existing EB SR 60 bridge that is being reused for the SW frontage road along with several exhibits. The wildlife shelf under the new Peace Creek Drainage Canal bridge is 10’ wide and the wildlife shelf under the existing EB SR 60 bridge is two feet, consistent with previous discussions. The Peace Creek Drainage Canal is a floodway and is restricted to “no rise” to the upstream design water surface elevations. The BDR analysis will be updated to use a 1:2 front slope between the wildlife shelf and the canal for both the new and reused bridges. If this results in a rise in the water surface elevation, a 1:1.5 front slope will be used for the reused bridge only.

We discussed the connection of the wildlife crossing to the south. On the west side of the Peace Creek Drainage Canal the roadside ditch is relatively flat and traversable. On the east side of the Peace Creek Drainage Canal the roadside ditch is deep and eroding and not traversable. We agreed to enclose this ditch and pipe the drainage.

V. Action Items

1. FDA will update the PSR to reflect the new location of the west pond site and the change in use of the borrow pit site. The design will continue to progress and the PSR will be submitted after the additional data is available (expected late summer 2016).
2. FDA will prepare the scope and fee estimate for the environmental clearances and geotechnical investigation of the new location of the west pond site and submit it to Amy the week of May 16, 2016.
3. This project will be added to the June 1st agenda for a SWFWMD pre-application meeting (complete).

1.3 SWFWMD Pre-Application Meeting

FALLER, DAVIS & ASSOCIATES, Inc.
HIGHWAY ENGINEERING SPECIALISTS
DESIGN | ENVIRONMENTAL | OPERATIONS

MEETING MINUTES

PROJECT: SR 60 Grade Separation over CSX Railroad
FPID 436559-1-52-01

DATE: June 1, 2016 at 2:00 pm

SUBJECT: SWFWMD Pre-Application Meeting

ATTENDEES: Dave Kramer, PE, Al Gagne (SWFWMD)
Brent Setchell, PE, Nicole Monies (FDOT),
Ken Muzyk, PE, Tammy Kreisle, PE, Niki Cribbs (FDA)
Brett French, PE (KCA)

TOPICS OF DISCUSSION:

The meeting began with an overview of the project which is to grade separate SR 60 over the CSX railroad. Three frontage roads will be provided in the northwest, southwest, and northeast quadrants. Two new frontage road terminals will be provided at each end of the grade separation. Three new bridge pairs on SR 60 are proposed over the Peace Creek Drainage Canal (PCDC), fuel line and frontage road access, and the CSX railroad. The existing eastbound SR 60 bridge over the PCDC will be re-used for the southwest frontage road. It is proposed that the westbound bridge be removed and the eastbound bridge be rehabilitated/widened for use as a frontage road bridge. Sidewalks in both directions are provided.

The alignment is shifted to the north to allow re-use of the existing eastbound PCDC bridge for the southwest frontage road and to allow traffic control phasing to keep four lanes open on SR 60 during construction and is consistent with the PD&E alignment. Right of way will be acquired on the north side except for the west frontage road terminal, which is on the south side.

I. Design

For the water quantity calculations, the 25-year 24-hour storm will be used for the pond design. At the time of the meeting, there was no known credible historical evidence of past flooding, or information provided that the physical capacity of the downstream conveyance or receiving waters indicates that the conditions for issuance will not be met without consideration of storm events of different frequency or duration. Therefore, there is not a known reason to require additional analyses using storm events of different duration or frequency other than the 25-year 24-hour storm event, or to adjust the volume, rate or timing of discharges. [Section 3.0 Applicant's Handbook Volume II]. The floodplain analysis may need to consider lesser storm events including the mean annual, 10-Yr, 25-Yr, and 50-Yr in addition to the 100-Yr storm. These storms only need to be considered if not providing cup for cup compensation or if isolated wetlands were used for treatment. A control elevation set 0.5' below the SHGW elevation is acceptable to SWFWMD for this project since there appears to be a positive outfall without any tailwater concerns. Potential wetland dewatering will need to be considered and addressed in the permit application if the control elevation of the pond(s) is set lower than the normal pool or SHW elevation of adjacent wetlands or surface waters. The Peace Creek watershed model that has been obtained was approved by the governing board on March 29, 2013. FDA is to confirm that there have been no updates to the model by contacting Scott Letasi in the Brooksville office. The 100-year elevation from the latest model should be used for floodplain analysis. Continued coordination with the county should occur to discuss flooding, floodplain mapping and elevations. Any out of bank storage or historic basin storage that is displaced with the proposed bridges will need to be addressed. It was suggested that Randy Smith in the SWIMM section be contacted regarding any opportunities for regional improvements within the contributing basin.

We also discussed the need for net improvement since the receiving system has a nutrient related impairment and that compensatory treatment of currently untreated portions of the existing roadway could be used to offset new lanes/pavement that could not physically be treated.

II. Environmental

Information was received from SWFWMD in February 2015 indicating Peace Creek Drainage Canal is not sovereign. There are no other special designations (i.e. Aquatic Preserve, Outstanding Florida Water, etc.) No conservation easements are known to occur within or adjacent to the project limits.

The preliminary estimate indicates about 0.5 acres of permanent wetland impacts and 2.0 acres of impacts (temporary and permanent) in surface waters. Boran Ranch MB and Peace River MB are available for wetland credits. Wetlands are shrubby and herbaceous; the surface waters consist of Peace Creek Drainage Canal and roadside ditches along SR 60. SWFWMD stated that the isolated wetlands less than 0.5 acres in size, not connected to ditches, and not providing habitat for listed species will not require mitigation. Three wetland areas on the project fall within this category. No mitigation will be required for impacts to the upland-cut ditches. It is likely that no mitigation will be required for impacts to wetland-cut ditches on this project in anticipation of a de minimus impact. Ten-foot-wide wildlife shelves will be constructed under the two new bridges, and a two-foot-wide shelf will be retrofitted underneath both sides of the one remaining bridge by re-working the riprap. Impacts to Peace Creek Drainage Canal resulting from the wildlife shelves will be included in the ERP permit.

III. Bridge Hydraulics

The existing westbound bridge has 9 bents that are in the channel and consist of square concrete piles with an effective width of 18" due to concrete pile jackets. The frontage road bridge will be widened to the south with the widened portion of the bridge being supported by 18" square concrete piles. Two new parallel bridge structures will be built north of the frontage road bridge which will accommodate the SR 60 eastbound and westbound lanes. The proposed bridge structures are two spans with one intermediate bent that consists of 24" square concrete piles. The abutments and wildlife shelves of the proposed SR 60 bridges and the frontage road bridge will be protected with the standard amount rubble riprap. A smooth surface for the wildlife shelves will be created by placing sand cement riprap and a layer of soil on top of the riprap. The Peace Creek Watershed ICPR model was used to update the FEMA FIRM maps that are within the project area. These updated FEMA maps will be effective in September. We were directed by Randall Vogel, the floodplain manager of Polk County and Pradeep Chettri, the lead MT-2 reviewer for FEMA Region IV, to use this ICPR model for the hydrology and tailwater information for the bridge hydraulic analysis. This hydraulic analysis was performed in HEC-RAS. This hydraulic analysis shows that there will be no-rise in upstream water surface elevations as a result of the proposed project.

Action List:

1. FDA is to confirm that there have been no updates to the model by contacting Scott Letasi in the Brooksville office.

2. FDA to follow up with Randy Smith in the SWIMM section regarding any opportunities for regional improvements within the contributing basin.

1.4 USACE Pre-Application Meeting

FALLER, DAVIS & ASSOCIATES, Inc.
HIGHWAY ENGINEERING SPECIALISTS
DESIGN | ENVIRONMENTAL | OPERATIONS

MEETING MINUTES

PROJECT: SR 60 Grade Separation over CSX Railroad
FPID 436559-1-52-01

DATE: June 30, 2016 at 9:30 am

SUBJECT: USACE Pre-Application Meeting

ATTENDEES: Tarrie Ostrofsky (USACE)
Amy Setchell, PE, Brent Setchell, PE, Nicole Monies, Vivianne Cross (FDOT),
Ken Muzyk, PE, Niki Cribbs, Shannon Ladd (FDA)

TOPICS OF DISCUSSION:

The meeting began with an overview of the project which is to grade separate SR 60 over the CSX railroad. The purpose and need for the project is to elevate the traffic over the railroad. School buses as well as many types of trucks are required to come to a full stop at the railroad tracks which can stop the flow of traffic. In addition, the tracks serve as many as 14 trains per day through this location.

Three new bridge pairs on SR 60 are proposed over the Peace Creek Drainage Canal (PCDC), fuel line and frontage road access, and the CSX railroad. The existing eastbound SR 60 bridge over the PCDC will be re-used for the southwest frontage road. It is proposed that the westbound bridge be removed and the eastbound bridge be rehabilitated/widened for use as a frontage road bridge. Three frontage roads will be provided in the northwest, southwest, and northeast quadrants. Two new frontage road terminals will be provided at each end of the grade separation. Sidewalks in both directions will be provided.

The existing westbound bridge has 9 bents that are in the channel and consist of square concrete piles with an effective width of 18” due to concrete pile jackets. The frontage road bridge will be widened to the south with the widened portion of the bridge being supported by 18” square concrete piles. Two new parallel bridge structures will be built north of the frontage road bridge which will accommodate the SR 60 eastbound and westbound lanes. The proposed bridge structures are two spans with one intermediate bent that consists of 24” square concrete piles.

The alignment is shifted to the north to allow re-use of the existing eastbound PCDC bridge for the southwest frontage road and to allow traffic control phasing to keep four lanes open on SR 60 during construction and is consistent with the PD&E alignment. Right of way will be acquired on the north side and for the west frontage road terminal, which is on the south side.

Environmental Discussion

There are no special designations (i.e. Aquatic Preserve, Outstanding Florida Water, etc.) No conservation easements are known to occur within or adjacent to the project limits.

USACE-jurisdictional areas include small isolated and non-isolated wetlands, Peace Creek Drainage Canal, and some wet ditches with suitable foraging habitat (SFH). Three small wetlands were determined to be isolated by SWFWMD, however, an USACE-approved jurisdictional review to determine isolation *will not* be obtained for this project. The project impacts are anticipated to be over 0.5 acres. This project was not reviewed in ETDM which eliminates the use of an RGP SAJ-92 permit; and therefore, an individual USACE permit is expected.

The project is within the service areas for both Boran Ranch Mitigation Bank and Peace River Mitigation Bank. FDOT currently has federal credits in-hand from Peace River Mitigation Bank and it is anticipated that these credits will be used for the project impacts.

The PD&E study for the project is being conducted concurrently with the design as a State-Wide Acceleration and Transformation (SWAT) project. The environmental report will be a State Environmental Impact Report (SEIR).

Wildlife involvement with the project includes both federal and state species. There is no critical habitat. Federal species involvement includes Wood Stork SFH and Indigo snake habitat. Surveys for Audubon’s Crested Caracara were conducted in the spring of 2016 with negative results. There are no suitable skink soils in the project limits. Because the project is state-funded, the federal nexus will occur when the USACE permit application is submitted. John Wrublik (US Fish and Wildlife Service/USFWS) was contacted for technical guidance for the Caracara survey, but no formal or informal consultation has occurred, and USFWS has not reviewed the Endangered Species Biological Assessment (ESBA) for the project.

State species involvement includes active gopher tortoise burrows, the fox squirrel habitat on the southwest side of Peace Creek Drainage Canal, and Southeastern

American Kestrels in the project vicinity. Coordination with Florida Fish and Wildlife Conservation Commission (FWC) has occurred and no comments were received.

Ten-foot-wide wildlife shelves will be constructed under the two new bridges, and a two-foot-wide shelf will be retrofitted underneath both sides of the one remaining bridge by re-working the riprap. The abutments and wildlife shelves of the proposed SR 60 bridges and the frontage road bridge will be protected with the standard amount of rubble riprap. A smooth surface for the wildlife shelves will be created by placing sand cement riprap and a layer of soil on top of the riprap. Impacts to Peace Creek Drainage Canal resulting from the new bridges and wildlife shelves will be included in the ERP permit.

The permit application is anticipated to be submitted to the agencies in November 2016. A note will be included with the application to USACE about submitting the ESBA to USFWS before the Caracara survey expires.

Appendix 2.0

MISCELLANEOUS MAPS

2.1 Drainage Map

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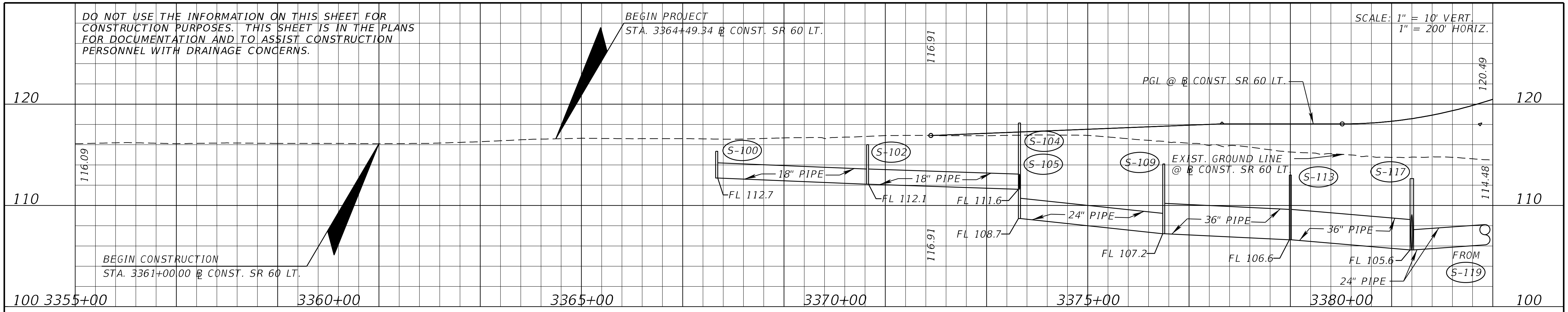

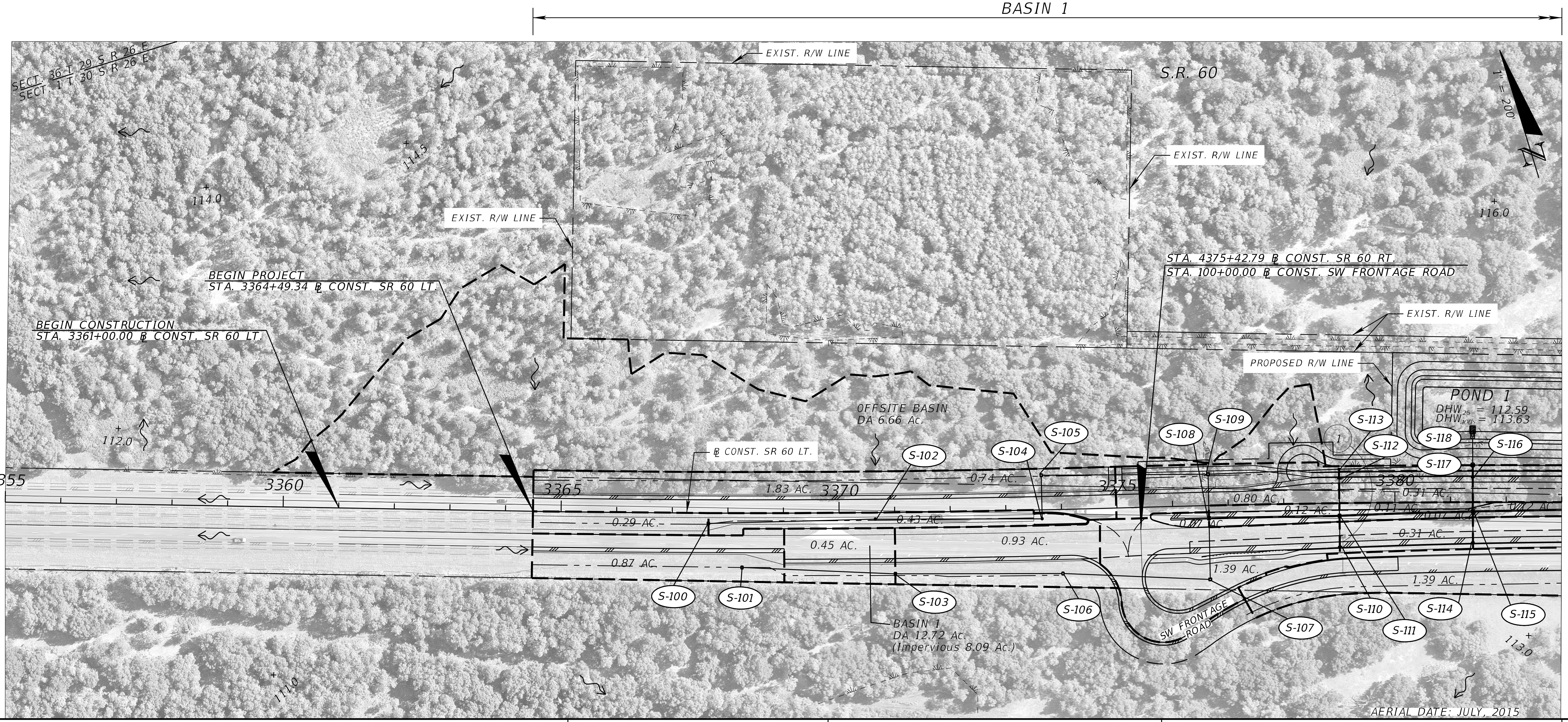

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TAMMY M. KREISLE, P.E. NO.: 61731

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

DRAINAGE MAP (1)

SHEET NO.
11

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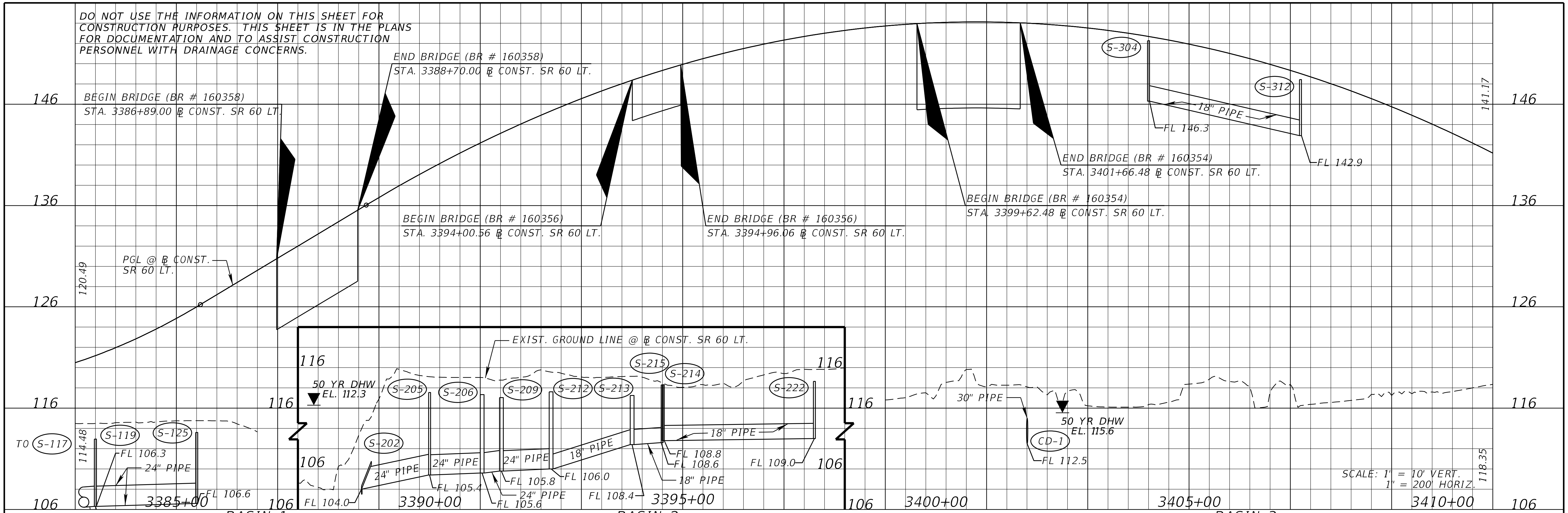

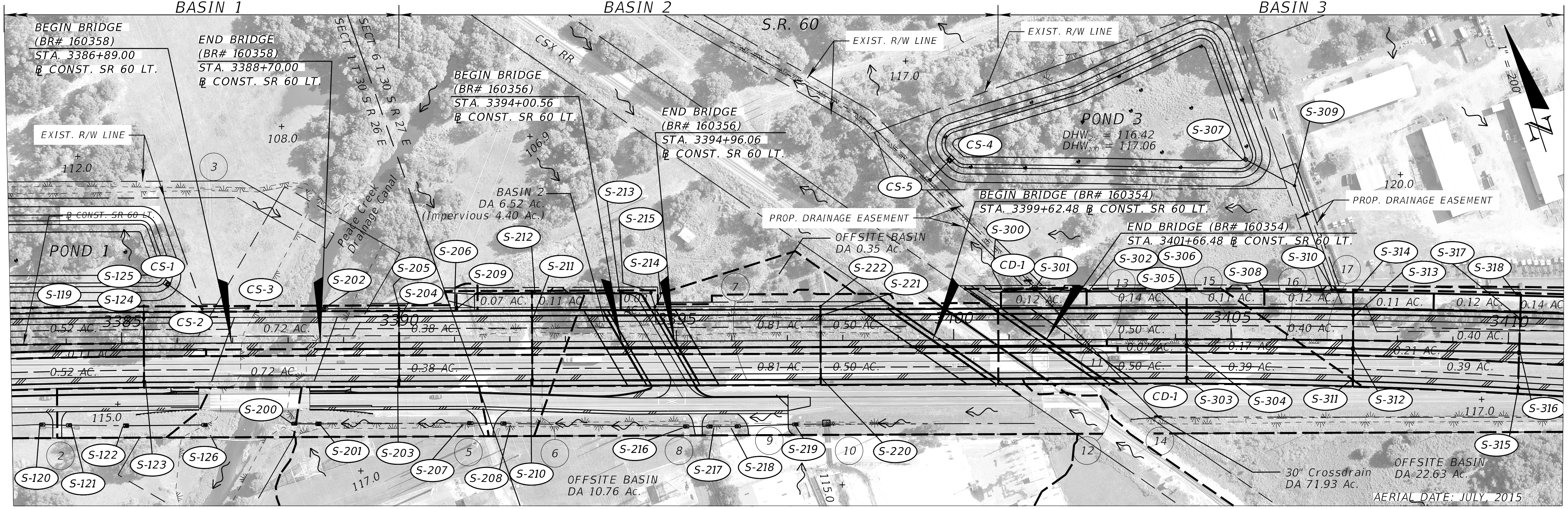

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

DRAINAGE MAP (2)

SHEET NO.
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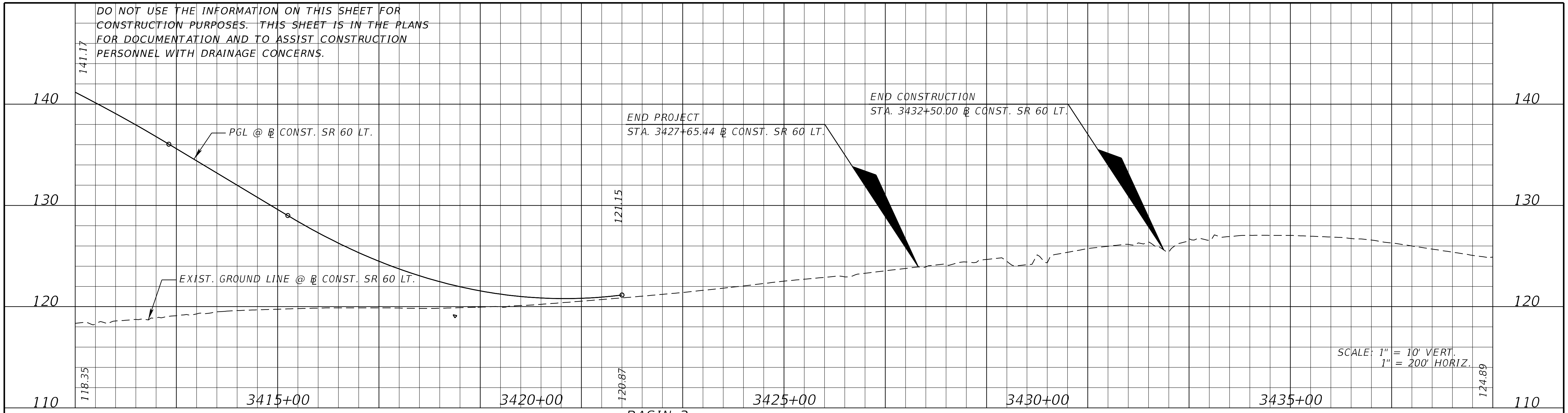

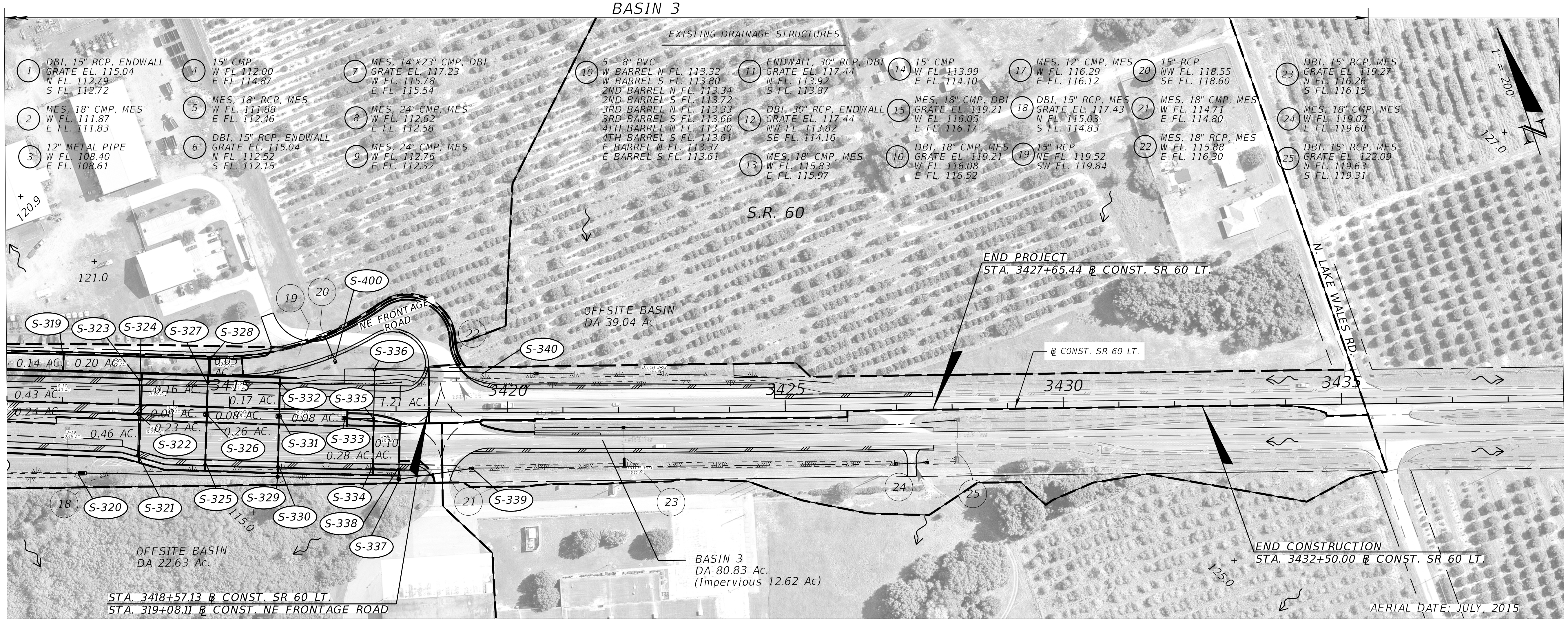

EXISTING DRAINAGE STRUCTURES

1	DBI, 15" RCP, ENDWALL GRATE EL. 115.04 N FL. 112.79 S FL. 112.72
2	MES, 18" CMP, MES W FL. 111.87 E FL. 111.83
3	12" METAL PIPE W FL. 108.40 E FL. 108.61
4	15" CMP W FL 112.00 E FL 114.87
5	MES, 18" RCP, MES W FL. 111.88 E FL. 112.46
6	DBI, 15" RCP, ENDWALL GRATE EL. 115.04 N FL. 112.52 S FL. 112.15
7	MES, 14"X23" CMP, DBI GRATE EL. 117.23 W FL. 115.78 E FL. 115.54
8	MES, 24" CMP, MES W FL. 112.62 E FL. 112.58
9	MES, 24" CMP, MES W FL. 112.76 E FL. 112.32
10	5 - 8" PVC W BARREL N FL. 113.32 W BARREL S FL. 113.80 2ND BARREL N FL. 113.34 2ND BARREL S FL. 113.72 3RD BARREL N FL. 113.33 3RD BARREL S FL. 113.66 4TH BARREL N FL. 113.30 4TH BARREL S FL. 113.61 E BARREL N FL. 113.37 E BARREL S FL. 113.61
11	ENDWALL, 30" RCP, DBI GRATE EL. 117.44 N FL. 113.92 S FL. 113.87
12	DBI, 30" RCP, ENDWALL GRATE EL. 117.44 NW FL. 113.82 SE FL. 114.16
13	MES, 18" CMP, MES W FL. 115.83 E FL. 115.97
14	15" CMP W FL. 113.99 E FL. 114.10
15	MES, 18" CMP, DBI GRATE EL. 119.21 W FL. 116.05 E FL. 116.17
16	DBI, 18" CMP, MES GRATE EL. 119.21 W FL. 116.08 E FL. 116.52
17	MES, 12" CMP, MES W FL. 116.29 E FL. 116.12
18	DBI, 15" RCP, MES GRATE EL. 117.43 N FL. 115.03 S FL. 114.83
19	15" RCP NE FL. 119.52 SW FL. 119.84
20	15" RCP NW FL. 118.55 SE FL. 118.60
21	MES, 18" CMP, MES W FL. 114.71 E FL. 114.80
22	MES, 18" RCP, MES W FL. 115.88 E FL. 116.30
23	DBI, 15" RCP, MES GRATE EL. 119.27 N FL. 116.26 S FL. 116.15
24	MES, 18" CMP, MES W FL. 119.02 E FL. 119.60
25	DBI, 15" RCP, MES GRATE EL. 122.09 N FL. 119.63 S FL. 119.31

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

DRAINAGE MAP (3)

SHEET NO.
13

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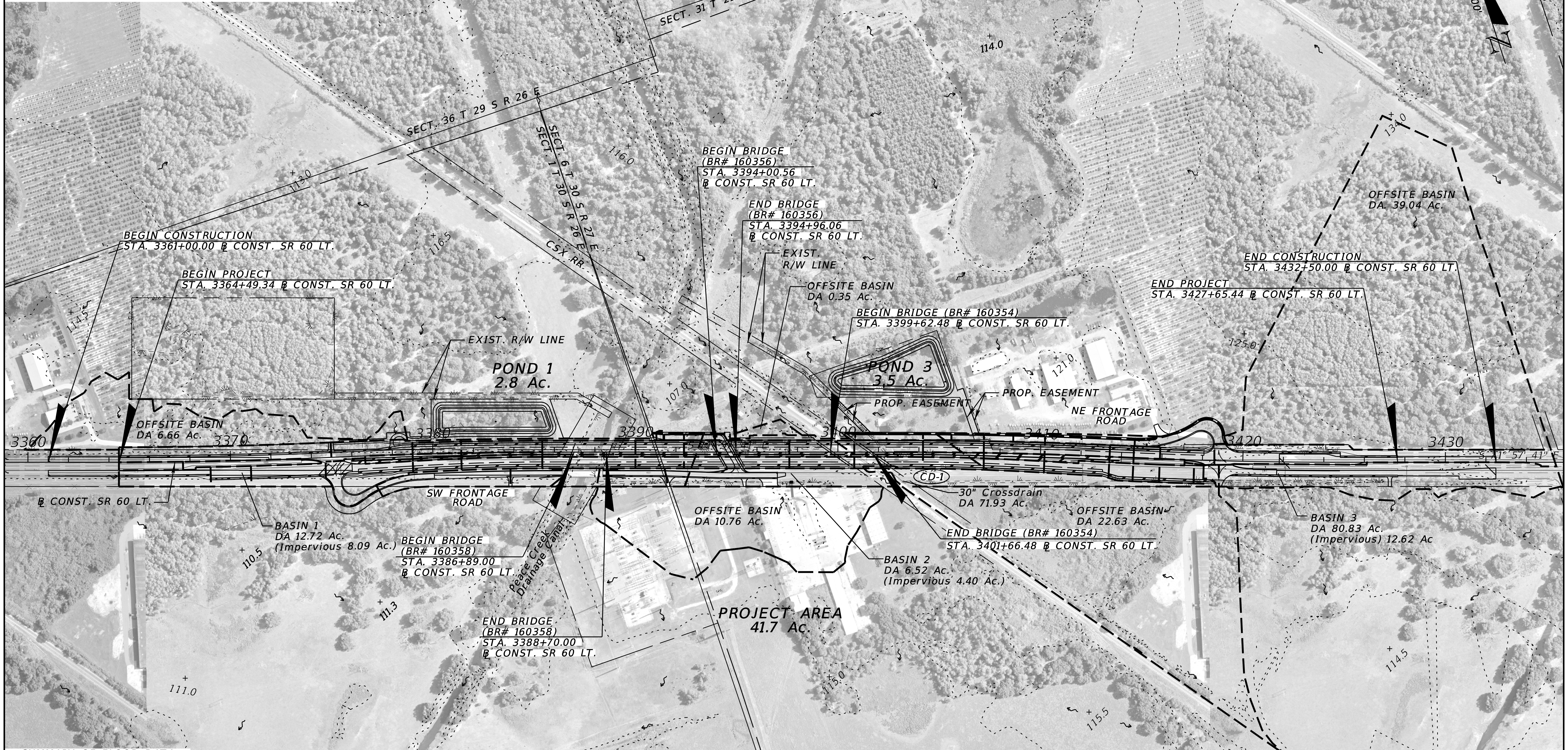

SUMMARY OF FLOOD DATA

STRUCTURE NO.	STATION	DESIGN FLOOD		BASE FLOOD		OVERTOPPING FLOOD				GREATEST FLOOD			
		2% PROB	50 YR FREQ	1% PROB	100 YR FREQ								
		DISCHARGE	STAGE	DISCHARGE	STAGE	DISCHARGE	STAGE	PROB %	FREQ YR	DISCHARGE	STAGE	PROB %	FREQ YR
CD-01	2% PROB	9.79	115.55	9.82	115.56	N/A	N/A	NA	NA	16.69	116.9	0.20	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 CUBIC FEET PER SECOND (CFS) AND STAGES ARE IN FEET, NAVD 88.

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SR 60	POLK	436559-1-52-01

REGIONAL DRAINAGE MAP

SHEET NO.
14

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2.2 Impaired Waterbodies

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

2.3 FEMA Floodplain Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS report in conjunction with the data shown on this FIRM.

Elevation Reference Mark (ERM) elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at WWW.NGS.NOAA.GOV. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Corporate limits shown on this map are based on the best data available. The user should contact appropriate community officials to verify the corporate limit delineations shown on this map.

For community map revision history prior to countywide mapping, see section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

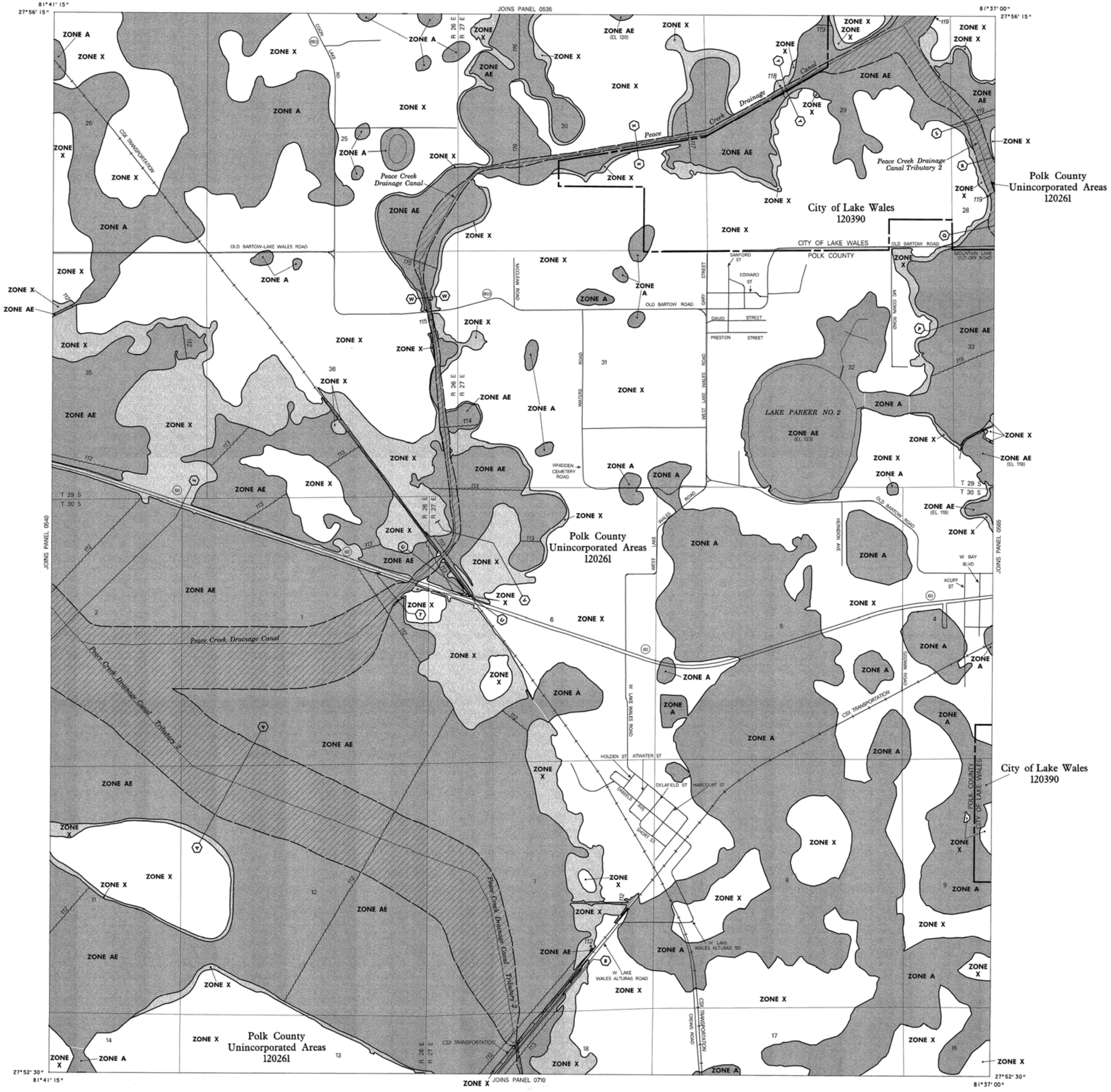
DIGITAL DATA AVAILABILITY: Digital files containing the thematic floodplain information shown on this map can be made available on CD-ROM by request. The files are currently archived in MicroStation design (DGN) file format referenced to the Universal Transverse Mercator (UTM) projection and the North American Datum of 1927 (NAD27). To obtain the digital files, send a written request to: Flood Insurance Information Specialist, 2977 Prosperity Avenue, Fairfax, Virginia 22031. Telephone (703) 876-0148, FAX (703) 876-0073.

NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1927 (NAD27), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator projection, NAD27. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

ATTENTION: Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

BASE MAP SOURCE: Planimetric base map information was derived from multiple sources. The Polk County Community Services Department provided planimetric data obtained from the Southwest Florida Water Management District that were digitized from 1:24,000 U.S. Geological Survey 7.5-Minute Series Topographic Maps. The Polk County Community Services Department also provided planimetric data derived from other published county map sources. Additional information in and around the floodplains was derived from aerial photographs dated 1993 - 1994. 1994 TIGER data published by the U.S. Census Bureau were used where no other source was available. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.



LEGEND

▒ SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

░ OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside 500-year floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

UNDEVELOPED COASTAL BARRIERS*

▧	▧	▧
Identified 1983	Identified 1990 or Later	Otherwise Protected Areas Identified 1991 or Later

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

———————	Floodplain Boundary
— — — —	Floodway Boundary
- —— —— -	Zone D Boundary
▬ ←	Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
~~513~~~~	Base Flood Elevation Line; Elevation in Feet**
(A)———(A)	Cross Section Line
(23)- - - - -(23)	Transect Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone**
RM7 ×	Elevation Reference Mark
● M1.5	River Mile

**Referenced to the National Geodetic Vertical Datum of 1929

MAP REPOSITORY

Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
DECEMBER 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
November 19, 2003 – to change Special Flood Hazard Areas, to reflect updated topographic information, and to incorporate previously issued Letters of Map Revision.

Please refer to the Listing of Communities table on the FIRM Index for NFIP Initial Identification and Post-FIRM dates for all jurisdictions shown on this map.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
POLK COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 545 OF 1025

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE WALES, CITY OF	120390	0545	G
POLK COUNTY	120261	0545	G

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
12105C0545G

MAP REVISED:
NOVEMBER 19, 2003

Federal Emergency Management Agency

2.4 SWFWMD Rainfall Map

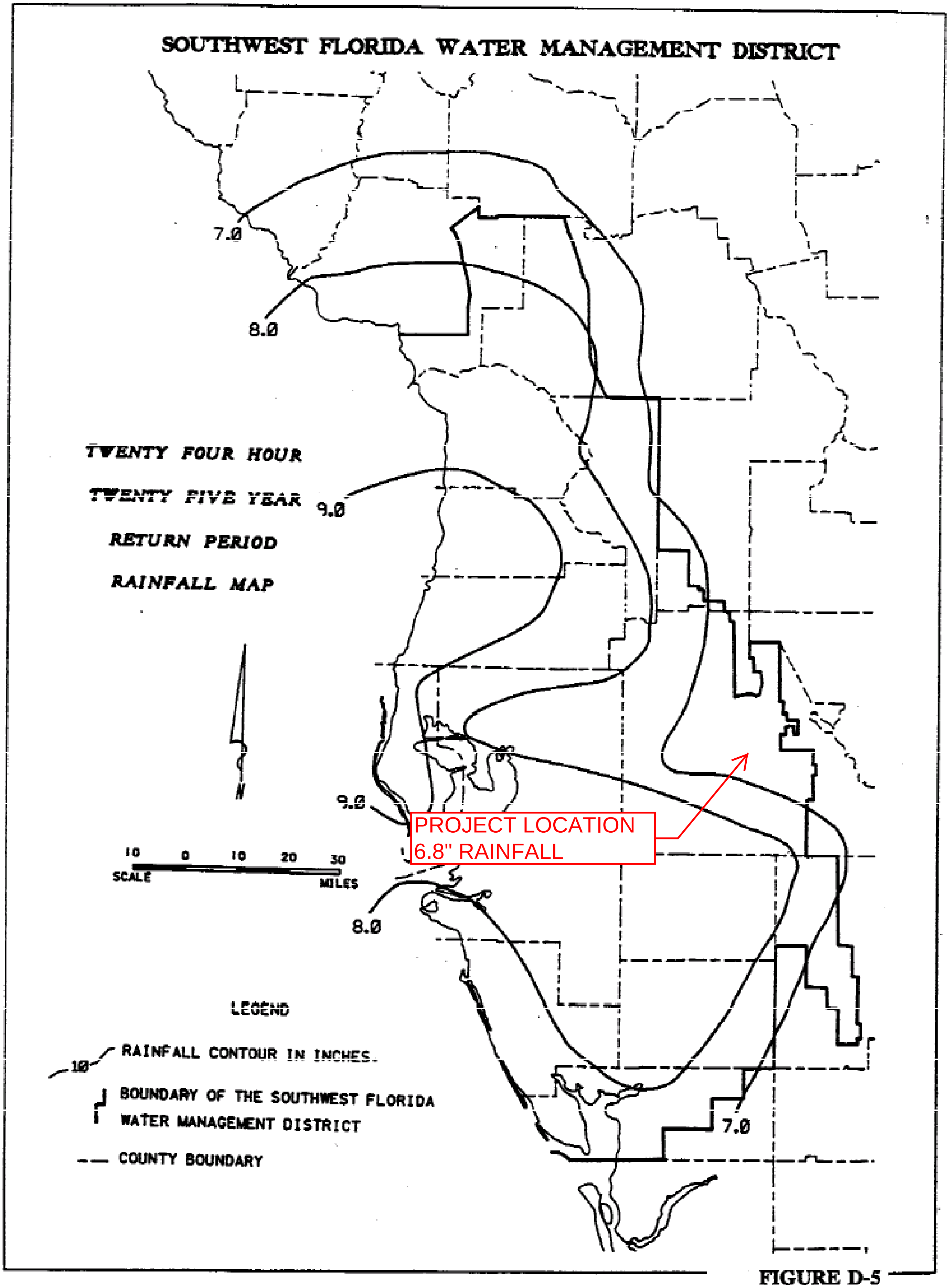

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
TWENTY FOUR HOUR
TWENTY FIVE YEAR
RETURN PERIOD
RAINFALL MAP
7.0
8.0
9.0
9.0
8.0
7.0
N
10 0 10 20 30
SCALE MILES
PROJECT LOCATION
6.8" RAINFALL
LEGEND
10 RAINFALL CONTOUR IN INCHES.
BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
COUNTY BOUNDARY

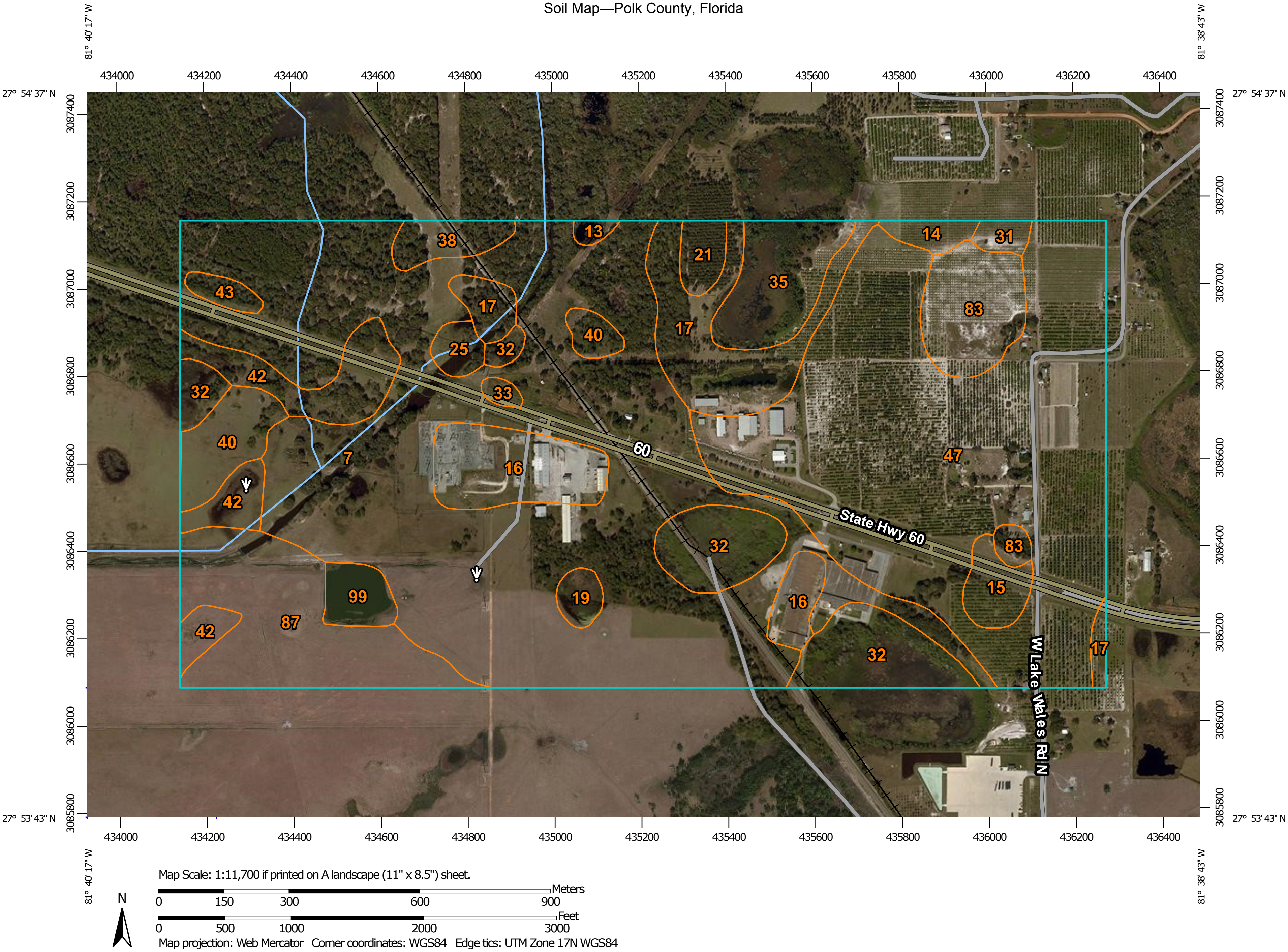
FIGURE D-5

Appendix 3.0

SOILS INFORMATION

3.1 NRCS Soils Information

Soil Map—Polk County, Florida



Map Scale: 1:11,700 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- ▭ Area of Interest (AOI)

Soils

- ▭ Soil Map Unit Polygons
- ~ Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features

- ◎ Blowout
- ⊠ Borrow Pit
- ✱ Clay Spot
- ◇ Closed Depression
- ✂ Gravel Pit
- ∴ Gravelly Spot
- ⊕ Landfill
- ʌ Lava Flow
- ⊥ Marsh or swamp
- ⚒ Mine or Quarry
- ◉ Miscellaneous Water
- ◎ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁙ Sandy Spot
- ⊖ Severely Eroded Spot
- ◇ Sinkhole
- ≫ Slide or Slip
- ∅ Sodic Spot
- ≡ Spoil Area
- ○ Stony Spot
- ∞ Very Stony Spot
- ψ Wet Spot
- △ Other
- ‐‐ Special Line Features

Water Features

- ~ Streams and Canals

Transportation

- ┼┼┼ Rails
- ~ Interstate Highways
- ~ US Routes
- ~ Major Roads
- ~ Local Roads

Background

- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 12, Nov 19, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

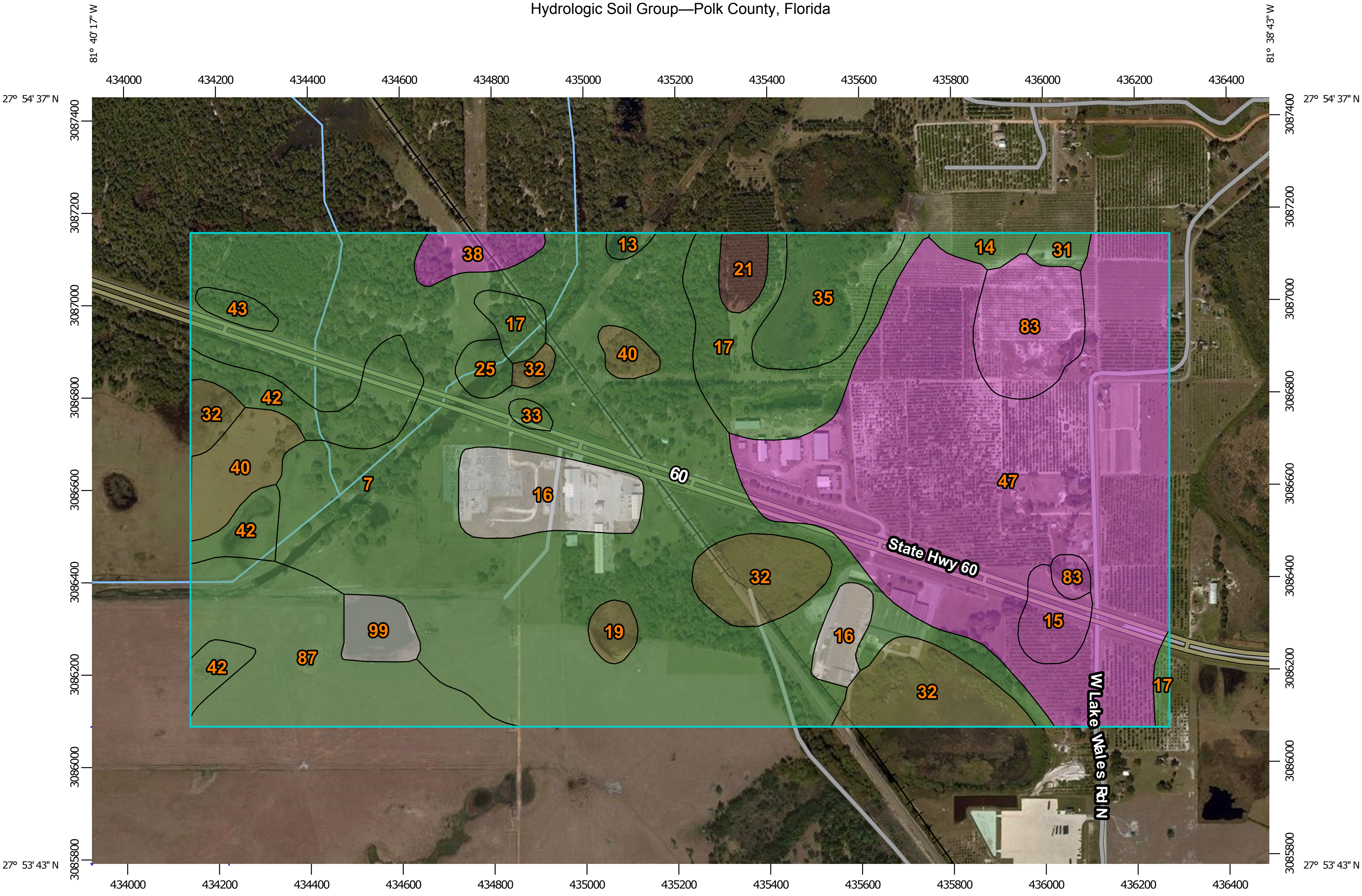
Date(s) aerial images were photographed: Dec 8, 2010—Feb 14, 2015

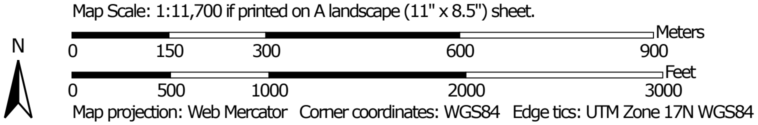
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Polk County, Florida (FL105)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
7	Pomona fine sand	211.3	37.4%
13	Samsula muck	1.1	0.2%
14	Sparr sand, 0 to 5 percent slopes	3.0	0.5%
15	Tavares fine sand, 0 to 5 percent slopes	5.8	1.0%
16	Urban land	21.1	3.7%
17	Smyrna and Myakka fine sands	27.8	4.9%
19	Floridana mucky fine sand, depressional	2.8	0.5%
21	Immokalee sand	4.0	0.7%
25	Placid and Myakka fine sands, depressional	3.0	0.5%
31	Adamsville fine sand, 0 to 2 percent slopes	2.2	0.4%
32	Kaliga muck	29.7	5.3%
33	Holopaw fine sand, depressional	1.2	0.2%
35	Hontoon muck	15.4	2.7%
38	Electra fine sand	5.6	1.0%
40	Wauchula fine sand	12.5	2.2%
42	Felda fine sand	20.1	3.6%
43	Oldsmar fine sand	2.5	0.4%
47	Zolfo fine sand, 0 to 2 percent slopes	139.7	24.7%
83	Archbold sand, 0 to 5 percent slopes	16.6	2.9%
87	Basinger fine sand	34.8	6.2%
99	Water	5.3	0.9%
Totals for Area of Interest		**565.4**	**100.0%**

Hydrologic Soil Group—Polk County, Florida





MAP LEGEND

Area of Interest (AOI)

- ▭ Area of Interest (AOI)

Soils

Soil Rating Polygons

- 🟪 A
- 🟩 A/D
- 🟦 B
- 🟫 B/D
- 🟦 C
- 🟨 C/D
- 🟥 D
- ⬜ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 12, Nov 19, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 8, 2010—Feb 14, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Polk County, Florida (FL105)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
7	Pomona fine sand	A/D	211.3	37.4%
13	Samsula muck	A/D	1.1	0.2%
14	Sparr sand, 0 to 5 percent slopes	A/D	3.0	0.5%
15	Tavares fine sand, 0 to 5 percent slopes	A	5.8	1.0%
16	Urban land		21.1	3.7%
17	Smyrna and Myakka fine sands	A/D	27.8	4.9%
19	Floridana mucky fine sand, depressional	C/D	2.8	0.5%
21	Immokalee sand	B/D	4.0	0.7%
25	Placid and Myakka fine sands, depressional	A/D	3.0	0.5%
31	Adamsville fine sand, 0 to 2 percent slopes	A/D	2.2	0.4%
32	Kaliga muck	C/D	29.7	5.3%
33	Holopaw fine sand, depressional	A/D	1.2	0.2%
35	Hontoon muck	A/D	15.4	2.7%
38	Electra fine sand	A	5.6	1.0%
40	Wauchula fine sand	C/D	12.5	2.2%
42	Felda fine sand	A/D	20.1	3.6%
43	Oldsmar fine sand	A/D	2.5	0.4%
47	Zolfo fine sand, 0 to 2 percent slopes	A	139.7	24.7%
83	Archbold sand, 0 to 5 percent slopes	A	16.6	2.9%
87	Basinger fine sand	A/D	34.8	6.2%
99	Water		5.3	0.9%
Totals for Area of Interest			**565.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

3.2 Geotechnical Investigation

August 22, 2016

Faller, Davis and Associates, Inc.
5525 W. Cypress Street, Suite 300
Tampa, Florida 33607

Attn: Mr. Kenneth Muzyk, P.E.

RE: Roadway Soil Survey Report
SR 60 Grade Separation over CSX Railroad
Polk County, Florida
FPN 436559-1-52-01
Tierra Project No.: 6511-15-022

Mr. Muzyk:

Tierra, Inc. (Tierra) has completed a Roadway Soil Survey Report for the above referenced project. This report is provided as part of documents needed for the Phase II Roadway Plans submittal. The results of our field exploration program, laboratory testing performed to date and our geotechnical recommendations are presented herein.

Tierra appreciates the opportunity to be of service to Faller, Davis & Associates, Inc. (FDA) on this project. If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely,

TIERRA, INC.

William Rovira

William P. Rovira IV, P.E.
Geotechnical Engineer
Florida License No. 74586

Marc E. Novak, Ph.D., P.E.
Senior Geotechnical Engineer
Florida License No. 67431

Tierra, Inc.
7351 Temple Terrace Highway • Tampa, Florida 33637
Phone (813) 989-1354 • Fax (813) 989-1355
Florida Certificate No. 6486

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Page 1 of 2

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APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed with this project was issued by FDA in accordance with the Subconsultant Agreement.

1.2 Project Description

The project consists of creating a grade separation between SR 60 from the existing CSX railroad crossing. The improvements include constructing six new bridges with retaining wall supported bridge approaches (for eastbound and westbound traffic) over Peace Creek, SW Frontage Road, and the CSX Railroad crossing. A total of three frontage roads are to be constructed adjacent to the proposed retaining walls and bridges.

The purpose of this study was to provide geotechnical (i.e. soils and groundwater) input to the design team to assist in the design of the proposed roadway and drainage improvements. This report concentrates on the roadway and drainage portion of the project and is to be included with the Phase II Plans submittal. Reports addressing the bridge and retaining wall structures and miscellaneous structures associated with the project will be submitted under separate report covers.

1.3 General Site Conditions

The proposed improvements to SR 60 are located in Polk County, Florida. The existing pavement section along SR 60 is typically supported on a low embankment utilized to separate the pavement section from historical groundwater conditions. Cross-drains and linear ditches/swales were noted along portions of the project alignment. A majority of the land surrounding the proposed project improvements consists of rural, agricultural and undeveloped land.

2.0 PURPOSE AND SCOPE OF SERVICES

The geotechnical study was performed to obtain information on the existing subsurface conditions along the limits of the proposed roadway and drainage improvements to assist in the design of construction plans for the project. The following services were provided:

1. Reviewed soil information from the “Soil Survey of Polk County, Florida” published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Reviewed topographic and potentiometric information obtained from the “Winter Haven, Florida” Quadrangle Map and the “Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida” maps published by the USGS.

2. Conducted a visual reconnaissance of the project site, located and coordinated utility clearance via Sunshine State One Call.

3. Performed a geotechnical field study for the proposed roadway improvements consisting of borings, subsurface sampling, and field testing.

4. Collected five (5) bulk samples along the roadway corridor and transported the samples to the FDOT State Materials Office (SMO) in Gainesville.

5. Identification of groundwater levels and estimation of the Seasonal High Groundwater Table (SHGWT) at select boring locations along the project alignment.

6. Coordinated with the project surveyor to provide survey data (location and elevation) for borings performed along the proposed roadway alignment.

7. Visually examined the recovered soil samples in the laboratory. Performed laboratory tests on selected representative samples to develop the soil legend for the project using the American Association of State Highway and Transportation Officials (AASHTO) soil classification system.

8. Prepared this Roadway Soil Survey Report for the project.

3.0 REVIEW OF PUBLISHED DATA

3.1 Regional Geology of Polk County

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.

3.2 USGS Quadrangle Maps

Based on a review of the “Winter Haven, Florida” USGS Quadrangle Maps, it appears that the natural ground surface elevations in the project vicinity are on the order of approximately +100 to +120 feet, National Geodetic Vertical Datum of 1929 (NGVD 29). This is reasonably consistent with survey information provided by the project surveyor for the borings performed along the alignment. A **USGS Vicinity Map** of the project area is illustrated in **Appendix A**.

3.3 USDA Soil Survey

The USDA Soil Survey along the project alignment was reviewed for information regarding near surface soil and groundwater information. A **USDA Vicinity Map** of the project area within Polk County is illustrated in **Appendix A**. The Polk County Soil Survey identifies eight (8) soil-mapping units along the project alignment. The general descriptions of the mapping units encountered are summarized in **Appendix B**.

3.4 Review of Potentiometric Surface Information

Based on a review of the “Potentiometric surface elevation of the upper Floridan Aquifer, West-Central Florida” maps published by the USGS, the potentiometric surface elevation of the upper Floridan Aquifer along the project alignment ranges from approximately +100 to +120 feet, NGVD 29. As indicated in **Section 3.2**, the ground elevations along the project alignment range from approximately +65 to +80 feet, NGVD 29. Artesian flow conditions were not encountered during the field exploration. However, the Contractor’s tools and construction methods should be prepared to handle a potentiometric surface condition of up to +80 feet, NGVD 29.

4.0 SUBSURFACE EXPLORATION

4.1 Boring Location Plan and Utility Clearance

Prior to commencing our subsurface explorations, a boring location plan for the proposed roadway and drainage improvements was developed based on project information provided by FDA, our engineering judgment, and guidelines provided in the "Soils and Foundations Handbook" published by the FDOT. Borings were located and staked in the field using hand-held Garmin Etrex® Global Positioning System (GPS) equipment with a reported accuracy of 10 feet. When not possible due to access or natural barriers, the boring locations were offset and the GPS coordinates of the relocated positions were recorded on the field boring logs.

The locations of the roadway and pond borings where the SHGWT depth was estimated for the project design were survey located by the project surveyor. The project surveyor provided State Plane coordinates and elevations. The State Plane coordinates were then converted by Tierra to station and offset using project Microstation design files provided by FDA. The remaining boring locations and elevations were determined using the project Microstation design files provided by FDA in conjunction with the GPS coordinates obtained by Tierra in the field. The **Boring Location Plan Sheets** depicting the locations of the borings performed to date is presented in **Appendix A**.

Utility clearances were coordinated by Tierra and updated as required prior to performing the soil borings in order to reduce the potential for damage to underground utilities during the boring process.

4.2 Roadway and Pond Borings

To evaluate the subsurface conditions and estimate the seasonal high groundwater table along the proposed roadway alignment and within pond sites, over 100 auger borings were performed to depths ranging from 3 feet to 10 feet below the existing ground surface. Auger borings performed to depths of less than five feet were terminated due to the cave-in of soils as a result of shallow groundwater intrusion. Additionally, over 60 Standard Penetration Test (SPT) borings were performed along the roadway alignment and within proposed pond sites. The SPT borings were performed to depths ranging from 10 to 85 feet below grade.

The hand auger borings were performed in general accordance with the procedures of ASTM D-1452 by manually twisting and advancing a bucket auger into the ground, typically in 6-inch increments. The SPT borings were performed in general accordance with ASTM D-1586. In some instances, the initial 4 feet of an SPT boring was manually augered to verify utility clearance. SPT resistance N-values were then recorded continuously to a depth of 10 feet and on intervals of 5 feet thereafter to the boring termination depth. As each soil type was revealed, representative samples were placed in air-tight containers and returned to our office for confirmation of the field classification by a geotechnical engineer. The station and offset along with the soil profile of each boring performed are shown on the **Roadway Soil Profiles** and **Pond Soil Survey** sheets in **Appendix A**. It should be noted that SPT borings drilled to depths greater than 20 feet along the roadway alignment were truncated to a depth of 20 feet for presentation in this roadway soil survey report. The full depth borings are provided in the wall geotechnical report prepared by others.

4.3 Bulk Sampling and Resilient Modulus Testing

Bulk samples of near-surface soils were obtained for Resilient Modulus Testing (M_R) at 5 locations along the proposed roadway improvements and transported to the FDOT State Materials Office in Gainesville, Florida. The sample locations were selected on alternating sides of the existing alignment in areas of the proposed roadway improvements. In general, these samples were collected at depths ranging from 1 to 2 feet below grade. The results of the M_R testing completed by the FDOT State Materials Office are provided in **Appendix B** of this report.

4.4 Muck Probes

Organic soils which are classified as muck (A-8) were encountered at various boring locations during our roadway soil survey along the project alignment. Muck probes using bucket augers and steel probes were then performed in the vicinity of these locations for further evaluation and to delineate the approximate horizontal and vertical limits of the organic soils initially encountered. The results of the delineation efforts are illustrated on the **Muck Delineation Plan Sheets** in **Appendix A**.

4.5 Plastic Soils Delineation

Plastic soils (Strata 3, 4 and 5; A-2-4/A-2-6/A-2-7/A-6/A-7-6) were encountered at various boring locations along the project alignment. Based on the review of the roadway cross-sections and the added borings provided by FDA, the Stratum 3, 4 and 5 plastic soils do not appear to encroach within 2 feet of the proposed pavement section along the project alignment. These plastic soils are within the base of the proposed MSE walls in some areas.

5.0 LABORATORY TESTING

5.1 General

Representative soil samples collected from the borings were classified and stratified in general accordance with the AASHTO soil classification system. Our classification was based on visual observations using the results from the laboratory testing as confirmation. These tests included fines content (percentage passing No. 200 mesh sieve), grain size analyses, Atterberg Limits, organic content testing, natural moisture content determination, and environmental corrosion tests.

5.2 Test Designation

The following list summarizes the laboratory tests performed and respective test methods.

- Fines Content Analyses - The fines content tests were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designation D-1140).

- Grain-Size Analyses - The grain-size analyses were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designation D-422).

- Atterberg Limits - The liquid limit and the plastic limit tests ("Atterberg Limits") were conducted in general accordance with the AASHTO test designations T-089 and T-090, respectively (ASTM test designation D-4318).

- Natural Moisture Content - The laboratory moisture content tests were conducted in general accordance with the AASHTO test designation T-265 (ASTM test designation D-2216).

- Organic Content - The organic content tests were conducted in general accordance with the AASHTO test designation T-267.

- Environmental Corrosion – Environmental corrosion tests were conducted in accordance with the FDOT test designations FM 5-550, FM 5-551, FM 5-552, and FM 5-553.

A summary of the laboratory test results for each soil stratum is presented on the **Roadway Soil Survey** sheet in **Appendix A**. This sheet includes ranges of laboratory test results for different stratum soil samples collected from borings included in this report. A detailed summary of the laboratory tests with the corresponding results is also presented in **Appendix D**.

6.0 RESULTS OF SUBSURFACE EXPLORATION

6.1 General Soil Condition

The soil types encountered during exploration have been assigned a stratum number. The stratum numbers and soil types associated with this project are listed in the following table.

Stratum Number	Typical Soil Description	AASHTO Classification
1	Pale Brown to Gray to Dark Brown SAND To SAND with Silt	A-3
2	Light Gray to Brown SAND with Silt to Silty SAND	A-2-4
3	Gray to Brown Silty-Clayey to Clayey SAND	A-2-4/A-2-6
4	Gray to Gray-Brown Clayey SAND to Sandy CLAY	A-6/A-7-6
5	Cemented SAND with Silty SAND	A-2-4
6	Dark Brown Organic to Highly Organic Silty SAND/MUCK	A-8
7	Limerock Base Material	--(1)
8	Dark Brown Silty SAND with Trace Organics	A-2-4
9	Debris (Sand Mixed with Asphalt, Wood, Organics and Plastic)	--(2)

(1) AASHTO does not have a classification for limerock base material.
(2) AASHTO does not have a classification for debris material.

A geotechnical engineer bases soil stratification on a visual review of the recovered samples, laboratory testing, and interpretation of the field boring logs. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles represent the conditions at the particular boring location and variations do occur among the borings.

The results of the borings performed for this project along with the boring locations are presented in **Appendix A**.

6.2 Organic Soils

As previously stated, organic to highly organic soils (Stratum 6, A-8) were encountered at some of the locations of our initial borings during our roadway soil survey along the project alignment.

The locations and approximate depth ranges of the A-8 soils initially encountered are summarized as follows:

Boring Name	Boring Location (B/L Const. SR 60 LT)		Approximate Depth of Muck (feet)	Delineation Notes and Evaluation
	Station (feet)	Offset (feet)		
Roadway Alignment – SR 60				
AB-103	3377+41	154 RT	0.0 – 1.0	– The results of additional auger borings indicate that muck encountered at this location is isolated and extends only 6 to 12 inches below grade in a small area. – Anticipated to be removed during the “Clearing and Grubbing” process as part of site preparation
AB-3378L	3378+04	15 LT	2.5 – 3.5	– Delineated (See *Muck Delineation Plan Sheets*) – Muck removal and replacement should be performed in accordance with the FDOT Design Standards.
RB-3391R	3390+93	127 RT	4.0 – 6.0	- Delineated; Results of additional borings in this area indicate that a majority of of the muck is located outside of the proposed 1V:2H Control Line per Index 500. - Muck may remain in place at this location (3390+93, 127 RT) considering 1) No additional widening is proposed at this location. 2) New roadway will be constructed at existing grades of embankment. 3) The organic content of 6%.
AB-2395L	3395+00	12 LT	0.5 – 3.5	– Delineated – Muck removal and replacement should be performed in accordance with the FDOT Design Standards. (See *Muck Delineation Plan Sheets*)
AB-2415R	3415+10	121 RT	1.0 – 2.5	– Delineated; Muck located outside 1V:2H Control Line per Index 500. – Muck may remain in place at this location.
WB-3415R	3415+15	118 RT	2.0 – 4.0	

A-8 soils were also found within boring WB-3396L (i.e. approximately 18.5 to 43.5 feet deep). This area is anticipated to be remediated as part of the construction of the MSE Walls. For more information concerning remediation and recommendations, refer to the wall geotechnical report prepared by others.

Delineation of the organic soils encountered has been performed, where appropriate, using bucket augers and steel probes. The results of the delineation are illustrated on the **Muck Delineation Plan Sheets** in **Appendix A**.

6.3 Plastic Soils

As previously stated, plastic soils (Stratum 3, A-2-4/A-2-6/A-2-7/A-6/A-7-6) were encountered at and within the leveling pad of the proposed MSE walls in some areas. During site preparation, plastic soils could prove difficult to compact due to their moisture sensitivity and the relatively shallow groundwater levels.

6.3 Groundwater

The groundwater table, when encountered, was measured at the boring locations during our field exploration. The depths to the encountered groundwater table were found to range from above the existing grade to 10 feet below existing grades within the borings performed along the roadway alignments and within the pond sites. In some of the borings performed, the groundwater table was not encountered prior to the boring termination depth. As a result, GNE (Groundwater Not Encountered) is shown adjacent to these soil profiles.

The measured groundwater table at each of the boring locations is presented on the **Roadway Soil Profiles** and the **Pond Soil Profiles** sheets in **Appendix A**.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing water management canals, swales, drainage ponds, underdrains and areas of covered soils, such as paved parking lots and sidewalks).

6.4 Seasonal High Groundwater Estimates

Seasonal high groundwater table levels were estimated at selected boring locations along the project and within the pond sites. The estimated seasonal high groundwater table (SHGWT) levels ranged from above the existing ground surface to about 6 feet below existing grades along the project alignment and within the pond sites. Estimated SHGWT levels along the project and within the pond sites are presented on the **Roadway Soil Profiles** and **Pond Soil Survey** sheets in **Appendix A** and summarized in the **Summary of Seasonal High Groundwater Table Estimates Tables** in **Appendix B**.

The SHGWT levels were estimated based on a review of the soil samples, measured groundwater levels in the borings, the Polk County, Florida USDA Soil Survey information, and the surrounding topography.

7.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

7.1 General

In general, the existing shallow subsurface soils encountered in the borings along the project alignment are suitable for supporting the proposed roadway improvements after proper subgrade preparation.

The removal and utilization of plastic soils, top-soils and other surficial organic soils should be accomplished in accordance with the current FDOT Design Standard Indices 500 and 505. Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Backfill should consist of materials conforming to FDOT Design Standard Index 505. Clearing and grubbing and compaction should be accomplished in accordance with Sections 110 and 120 of the FDOT Standard Specifications.

Cemented sand with silty sand (Stratum 5) was encountered in some borings performed along the project alignment. This material can be very dense and shall be treated as “rock”. Excavation into and through this material may be difficult and may require specialized equipment. Tierra has included a note on the **Roadway Soils Survey Sheet** presented in **Appendix A** warning the Contractor of the presence of the cemented sand materials.

Organic soils were encountered in some areas within the project limits and were categorized as “Stratum 6” A-8 material. This material shall be removed and utilized as “muck” in accordance with the FDOT Design Standards. The approximate limits of the proposed organic soils removal are identified on the **Muck Delineation Plan** sheets in **Appendix A** as well as the roadway cross-sections.

During the organic soil delineation program near Station 3396 LT, debris materials consisting of sand mixed with wood, organics, plastic and asphalt (Stratum 9) was encountered. This material was generally encountered at offset of 70LT to the right-of-way line. Based on the preliminary exploration program, these materials appear to be out of the 1V:2H control line of the roadway and outside of the leveling pad area. Further delineation of these materials is on-going and will be presented at the next submittal including if over-excavation is required. These materials (Stratum 9) should be considered deleterious/undocumented fill. Due to the inherent variability in the composition and thickness of these materials and their unknown origin, reuse for roadway embankment or general fill is not recommended.

7.2 Plastic Soils

Plastic (Strata 3, 4, & 5) soils were encountered in our borings. However, plastic soils were not encountered within 2 feet of the proposed roadway base along the project alignment. Plastic soils if encountered within the roadway and embankment section should be removed and placed in areas not affecting pavement performance. These soils shall be removed in accordance with FDOT Design Standard Index 500.

As previously stated, plastic soils (Stratum 3, A-2-4/A-2-6/A-2-7/A-6/A-7-6) were encountered within the leveling pad and base of the proposed MSE walls in some areas.

7.3 Roadway Embankment Settlement

Embankment fill soils should be placed and compacted in accordance with the FDOT Specifications and Design Standard Index requirements.

A majority of the roadway alignment will consist of MSE walls. The evaluations and recommendations of these MSE walls will be presented under a separate cover being prepared by the FDOT. The settlement of roadway frontage roads adjacent to the new MSE walls will be influenced by the settlement of these new MSE walls. The settlement of the frontage roads along these portions of the alignment will be presented at the next submittal incorporating the settlement estimates of the MSE walls once the wall geotechnical wall report has been finalized.

For the frontage roads and roadway along the remainder of the alignment (not adjacent to new MSE walls) based on the anticipated embankment heights and the performance of the existing roadway, we do not anticipate conditions that would pose major limitations to the construction of the proposed roadway embankments, after proper subgrade preparation including removal and replacement of the organic material as recommended in this report. For the anticipated new fill heights in these areas, the total and differential settlements is estimated to be one (1) inch or less and should occur predominately during construction.

7.4 Slope Stability

The evaluations and recommendations including the global stability of the MSE walls, which run along a majority of the alignment, will be presented under a separate cover being prepared by the FDOT.

Based on a review of the roadway cross-sections prepared by FDA, the proposed roadway embankments and cuts appear to have side slopes of 3 horizontal to 1 vertical (2H:1V) or flatter. Based on the results of the borings and assuming side slopes of 2H:1V, slope stability factors of safety will exceed 1.3 provided embankment construction is in accordance with the FDOT Specifications.

7.5 Cut and Fill Slopes

It is anticipated that fills will be required for the proposed roadway construction. Assuming proper subgrade preparation and adequate fill materials are utilized, it is recommended that all proposed side fill slopes be constructed on 2 horizontal to 1 vertical (2H:1V) or flatter and any cuts be constructed at 3H:1V or flatter.

7.6 Temporary Side Slopes

Temporary side slopes and excavations should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of

Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

7.7 Groundwater Control

Depending upon groundwater levels at the time of construction, some form of dewatering may be required to achieve the required compaction.

Due to groundwater levels during the wet season of the year, seepage may enter the bottom and sides of excavated areas. Such seepage will act to loosen soils and create difficult working conditions. Groundwater levels should be determined immediately prior to construction. Shallow groundwater should be kept below the lowest working area to facilitate proper material placement and compaction in accordance with FDOT Specifications.

7.8 Pavement Design Considerations

In accordance with FDOT guidelines, grades for this type of roadway should be ideally set to provide a minimum separation per FDOT, PPM between the bottom of the base and the estimated seasonal high groundwater levels. The choice of base material would depend upon the relationship of final roadway improvement grades and the bottom of the base to the estimated seasonal high groundwater table levels.

As previously mentioned, M_R testing was performed by the FDOT State Materials Office in Gainesville, Florida on soil samples obtained by Tierra along the alignment. The recommended design M_R values for the project is 7,100 psi as provided by the FDOT and is included in **Appendix B**. It should be noted that the design M_R value obtained from the soils tested may not be representative of borrow materials (fill) which may support some of the proposed roadway and in the MSE wall areas.

7.9 On-Site Soil Suitability

The general suitability of the soils encountered during our geotechnical exploration is presented on the **Roadway Soil Survey** sheet in **Appendix A**. FDOT Indices 500 and 505 should be consulted to determine the specific use/suitability of the soil types encountered during our geotechnical exploration performed to date.

7.10 General Roadway Construction

The overall site preparation and mechanical densification work for the construction of the proposed roadway should be in accordance with FDOT Specifications and Standard Index requirements.

8.0 FHWA REVIEW CHECKLIST

As referenced in the Structures Design Guidelines, conformance to the FHWA Report "Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications" prepared by the Geotechnical and Materials Branch, FHWA, Washington, D.C., dated October 1985, is required when preparing geotechnical reports. The FHWA checklist for this report is enclosed in **Appendix E** of this report.

9.0 REPORT LIMITATIONS

Our services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Our geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned roadway improvements, and our recommendations for site preparation and foundation construction are based upon the following: (1) site observations, (2) the field exploratory test data obtained during the geotechnical study, and (3) our understanding of the project information and anticipated grades as presented in this report. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The scope of the exploration was intended to evaluate soil conditions within the influence of the proposed roadway improvements. The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction and data obtained from the soil borings performed at the locations indicated and does not reflect any variations which may occur among these borings. If any variations become evident during the course of construction, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered.

The scope of services, included herein, did not include any environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater, air, on the site, below and around the site. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items and conditions are strictly for the information of FDA and the FDOT.

APPENDIX A

USDA Soil Survey Map (1 Sheet)

USGS Quadrangle Map (1 Sheet)

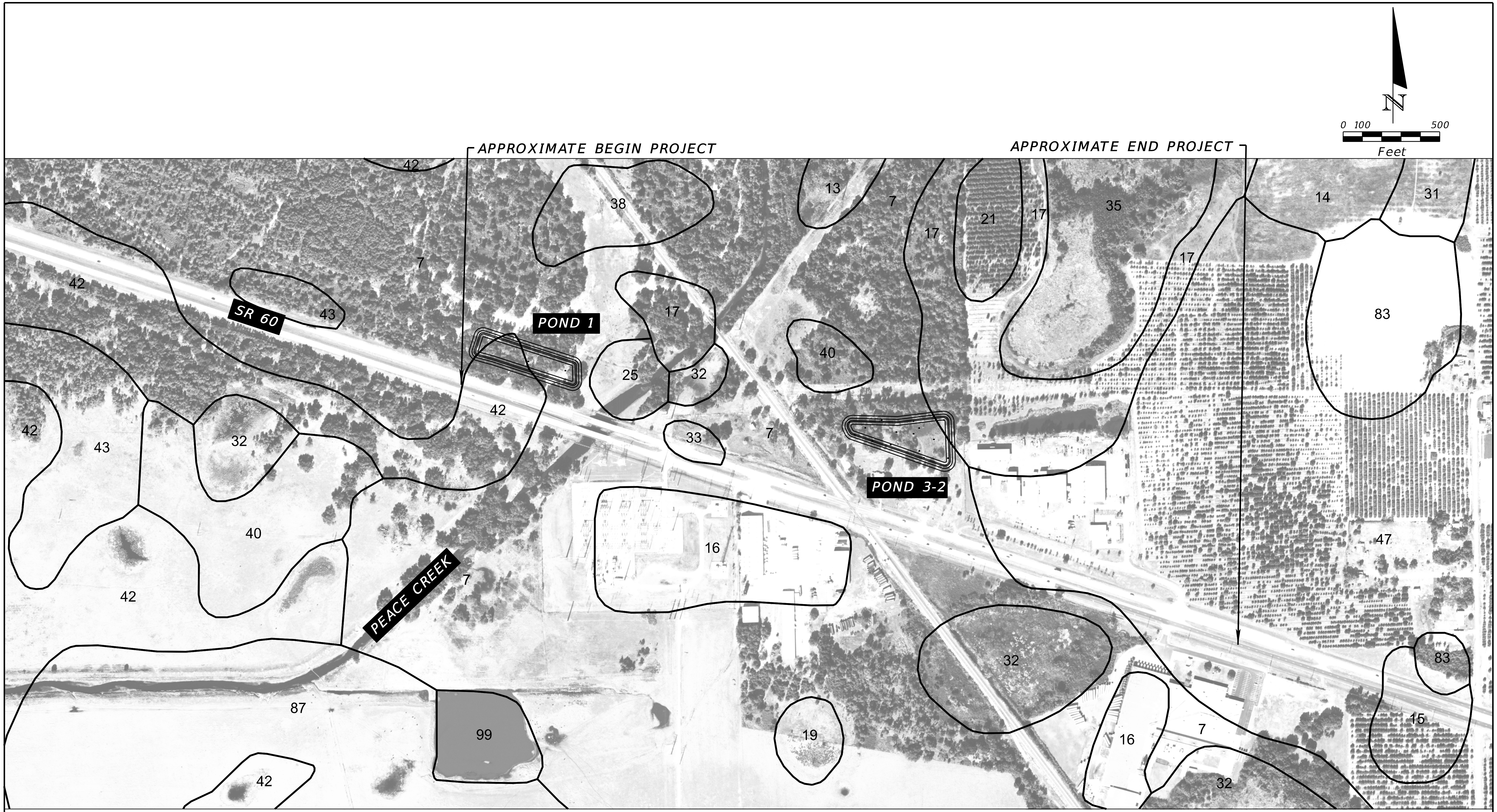
Roadway Soil Survey (1 Sheet)

Boring Location Plan Sheets (5 Sheets)

Roadway Soil Profiles (6 Sheets)

Pond Soil Profiles (5 Sheets)

Muck Delineation Plan (2 Sheets)



REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

USDA SOIL SURVEY MAP

SHEET NO.

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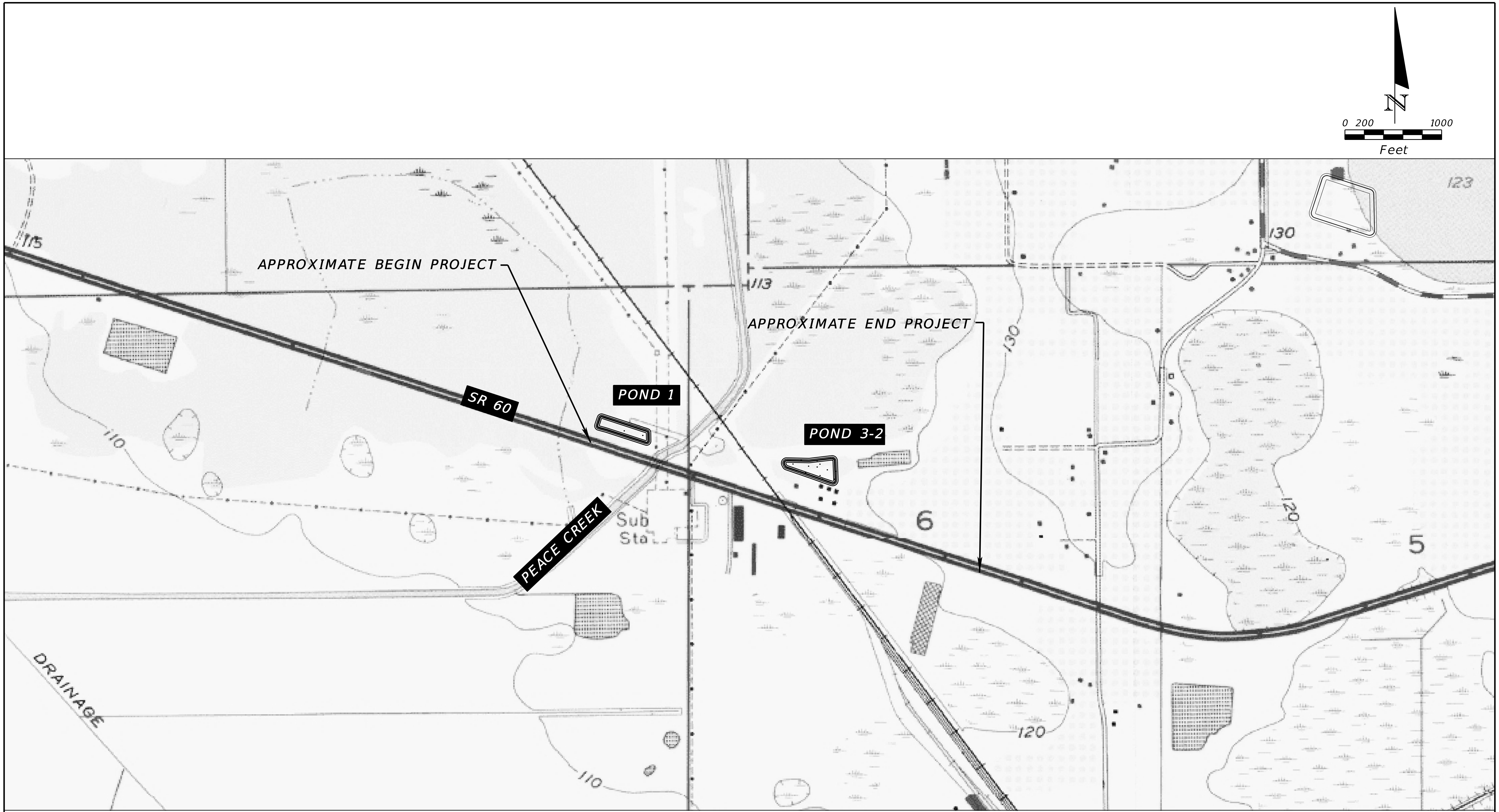

REFERENCE: USGS QUADRANGLE MAP OF "ELOISE, FLORIDA"

TOWNSHIP:	30S	30S
RANGE:	26E	27E
SECTION:	1	6

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

USGS QUADRANGLE MAP

SHEET NO.

DATE OF SURVEY: JULY 2015 TO AUGUST 2016
SURVEY MADE BY: TIERRA, INC.
SUBMITTED BY: WILLIAM P. ROVIRA IV, P.E.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

DISTRICT: 1
ROAD NO.: SR 60
COUNTY: POLK

FINANCIAL PROJECT ID : 436559-1-52-01
PROJECT NAME: SR 60 GRADE SEPARATION OVER CSX RAILROAD

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : 3364+49.34 SURVEY ENDS STA. : 3427+65.44

REFERENCE: BASELINE OF CONSTRUCTION SR 60 LT.

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS PERCENT PASS (%)						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC	NO. OF TESTS	MOISTURE CONTENT	NO. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohm-cm	CHLORIDE ppm	SULFATES ppm	pH
1	3	1-3	3	16-23	43	100	83-91	40-55	9-19	2-10	--	--	--	A-3	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT	19	8,600-88,000	5-45	<4.8-15.5	4.1-8.2
2	2	2-3	8	13-25	36	100	77-93	40-73	15-34	10-21	6	NP	NP	A-2-4	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND	6	13,000-44,000	15-30	<4.8	4.4-6.8
3	--	--	34	11-26	38	100	70-94	49-75	24-40	15-34	33	16-42	2-24	A-2-4/A-2-6/A-2-7	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND	7	3,500-22,000	15-90	<4.8-6.2	3.5-6.7
4	--	--	6	20-27	6	100	92-93	64-67	45-46	37-42	6	28-43	13-25	A-6/A-7-6	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY	--	--	--	--	--
5	--	--	--	--	1	--	--	--	--	20	--	--	--	A-2-4	CEMENTED SILTY SAND	--	--	--	--	--
6	9	6-25	9	29-106	9	--	--	--	--	12-35	1	35	5	A-8	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND/MUCK	1	15,000	15	<4.8	6.9
7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	LIMEROCK BASE MATERIAL	--	--	--	--	--
8	5	4	5	20-64	5	100	88	51	21	12-25	--	--	--	A-2-4	DARK BROWN SILTY SAND WITH TRACE ORGANICS	--	--	--	--	--
9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)	--	--	--	--	--

EMBANKMENT AND SUBGRADE MATERIAL

STRATA BOUNDARIES ARE APPROXIMATE. MAKE FINAL CHECK AFTER GRADING.

NOTES:

1. THE MATERIAL FROM STRATUM 1 (A-3) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505.
2. THE MATERIAL FROM STRATUM 2 (A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505. HOWEVER, THIS MATERIAL IS LIKELY TO RETAIN EXCESS MOISTURE AND MAY BE DIFFICULT TO DRY AND COMPACT. IT SHOULD BE USED IN THE EMBANKMENT ABOVE THE WATER LEVEL EXISTING AT THE TIME OF CONSTRUCTION.
3. THE MATERIAL FROM STRATA 3 AND 4 (A-2-4/A-2-6/A-2-7/A-6/A-7-6) IS PLASTIC MATERIAL AND SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500 AND UTILIZED IN ACCORDANCE WITH INDEX 505.
4. THE MATERIAL FROM STRATUM 5 (A-2-4) IS CEMENTED SAND. THIS MATERIAL CAN BE VERY DENSE/HARD AND SHALL BE CONSIDERED AS "ROCK". EXCAVATION INTO AND THROUGH THIS MATERIAL MAY BE DIFFICULT AND MAY REQUIRE SPECIALIZED EQUIPMENT. THE CONTRACTOR SHALL ANTICIPATE ENCOUNTERING THIS VERY DENSE MATERIAL DURING EXCAVATIONS. IF EXCAVATED, THIS MATERIAL SHALL BE EVALUATED AGAINST THE FDOT SPECIFICATIONS FOR EMBANKMENT UTILIZATION.
5. THE MATERIAL FROM STRATUM 6 (A-8) IS ORGANIC MATERIAL TO MUCK. THIS MATERIAL SHALL BE REMOVED IN ACCORDANCE WITH INDEX 500. THIS MATERIAL SHALL NOT BE USED WITHIN THE SUBGRADE OR EMBANKMENT PORTION OF THE ROADBED, WITH THE EXCEPTION OF THIS MATERIAL USED AS A SUPPLEMENT TO CONSTRUCT A FINISH SOIL LAYER AS DESCRIBED IN SECTION 162 OF THE FDOT SPECIFICATIONS. THE APPROXIMATE REMOVAL LIMITS OF THIS MATERIAL ARE DEPICTED ON THE MUCK DELINEATION PLAN SHEETS AND ROADWAY CROSS SECTIONS.

∇ - WATER TABLE ENCOUNTERED

▼ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼+ - ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ANTICIPATED TO BE ABOVE GRADE

GNE - GROUNDWATER NOT ENCOUNTERED

NP - NON-PLASTIC

6. THE MATERIAL FROM STRATUM 7 IS LIMEROCK ROADWAY BASE MATERIAL. IT MAY BE USED AS STABILIZED SUBGRADE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505. HOWEVER, THIS MATERIAL SHALL NOT BE USED AS BASE MATERIAL.
7. THE MATERIAL FROM STRATUM 8 (A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH INDEX 505. HOWEVER, THIS MATERIAL SHALL NOT BE USED IN THE SUBGRADE PORTION OF THE ROAD BED DUE TO ITS ORGANIC CONTENT. THIS MATERIAL IS LIKELY TO RETAIN EXCESS MOISTURE AND MAY BE DIFFICULT TO DRY AND COMPACT. IT SHOULD BE USED IN THE EMBANKMENT ABOVE THE WATER LEVEL EXISTING AT THE TIME OF CONSTRUCTION.
8. THE MATERIAL FROM STRATUM 9 IS DEBRIS MATERIAL CONSISTING OF SAND MIXED WITH ASPHALT, ORGANICS, WOOD AND PLASTIC. THIS MATERIAL SHALL BE CONSIDERED AS UNDOCUMENTED FILL. THIS MATERIAL WAS ENCOUNTERED NEAR STATION 3396+00 NEAR THE RIGHT OF WAY LINE. IF EXCAVATED, IT SHALL BE DISPOSED OF OFF-SITE AND NOT RE-USED WITHIN THE PROJECT LIMITS. REMOVAL LIMITS IF REQUIRED WILL BE PRESENTED AT THE NEXT SUBMITTAL.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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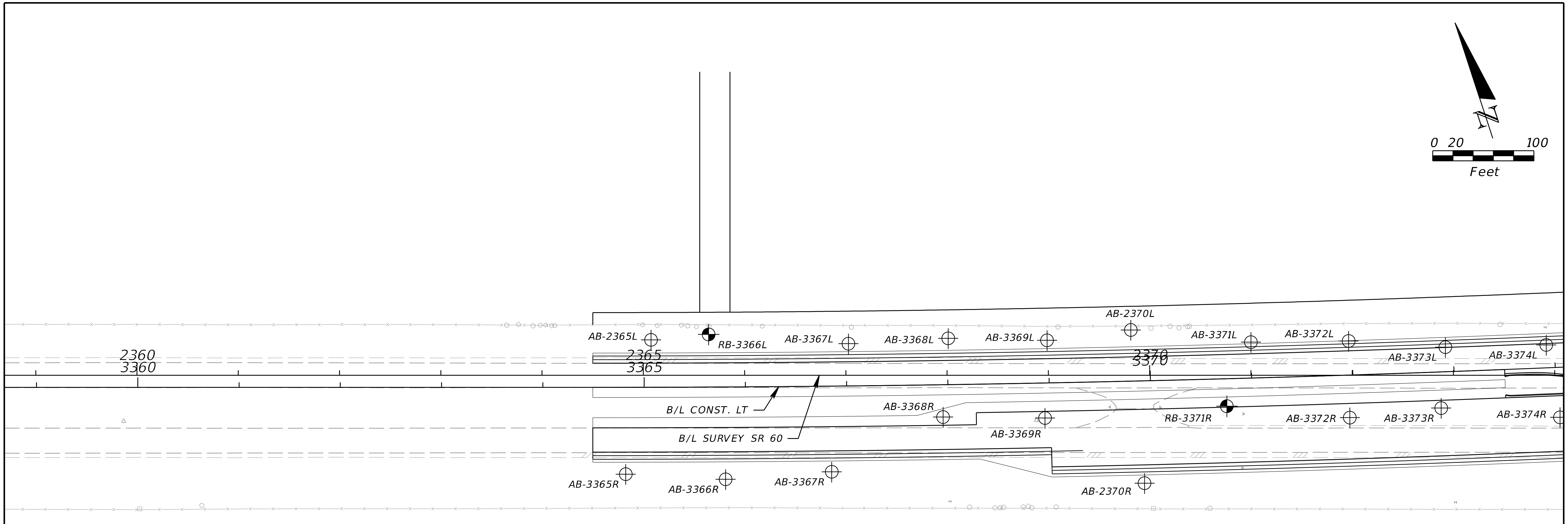
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
60	POLK	436559-1-52-01

ROADWAY SOIL SURVEY

SHEET NO.



LEGEND

- ◐ APPROXIMATE SPT BORING LOCATION
- ⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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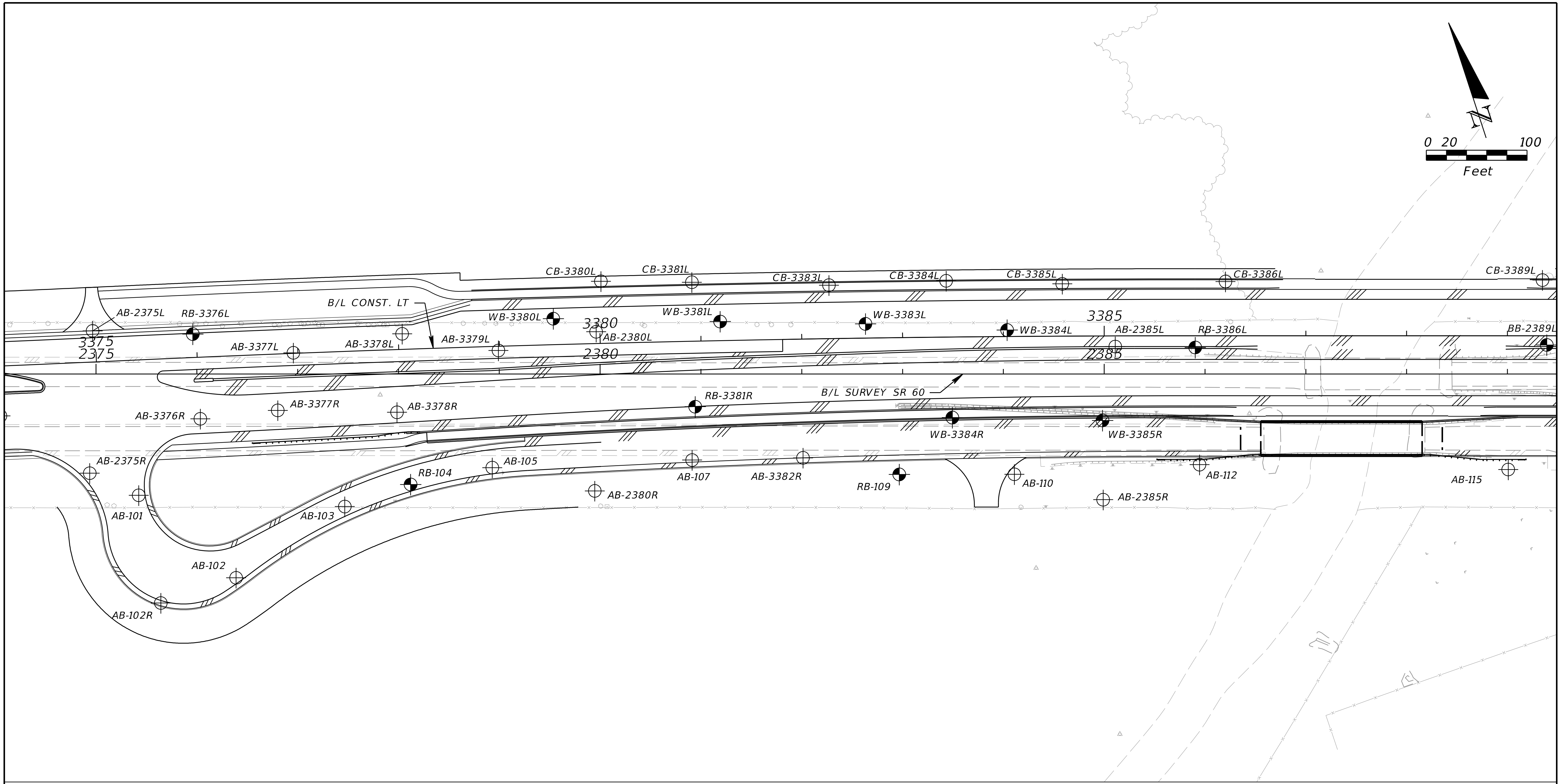
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

BORING LOCATION PLAN (1)

SHEET NO.



LEGEND

◐ APPROXIMATE SPT BORING LOCATION

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

BORING LOCATION PLAN (2)

SHEET
NO.

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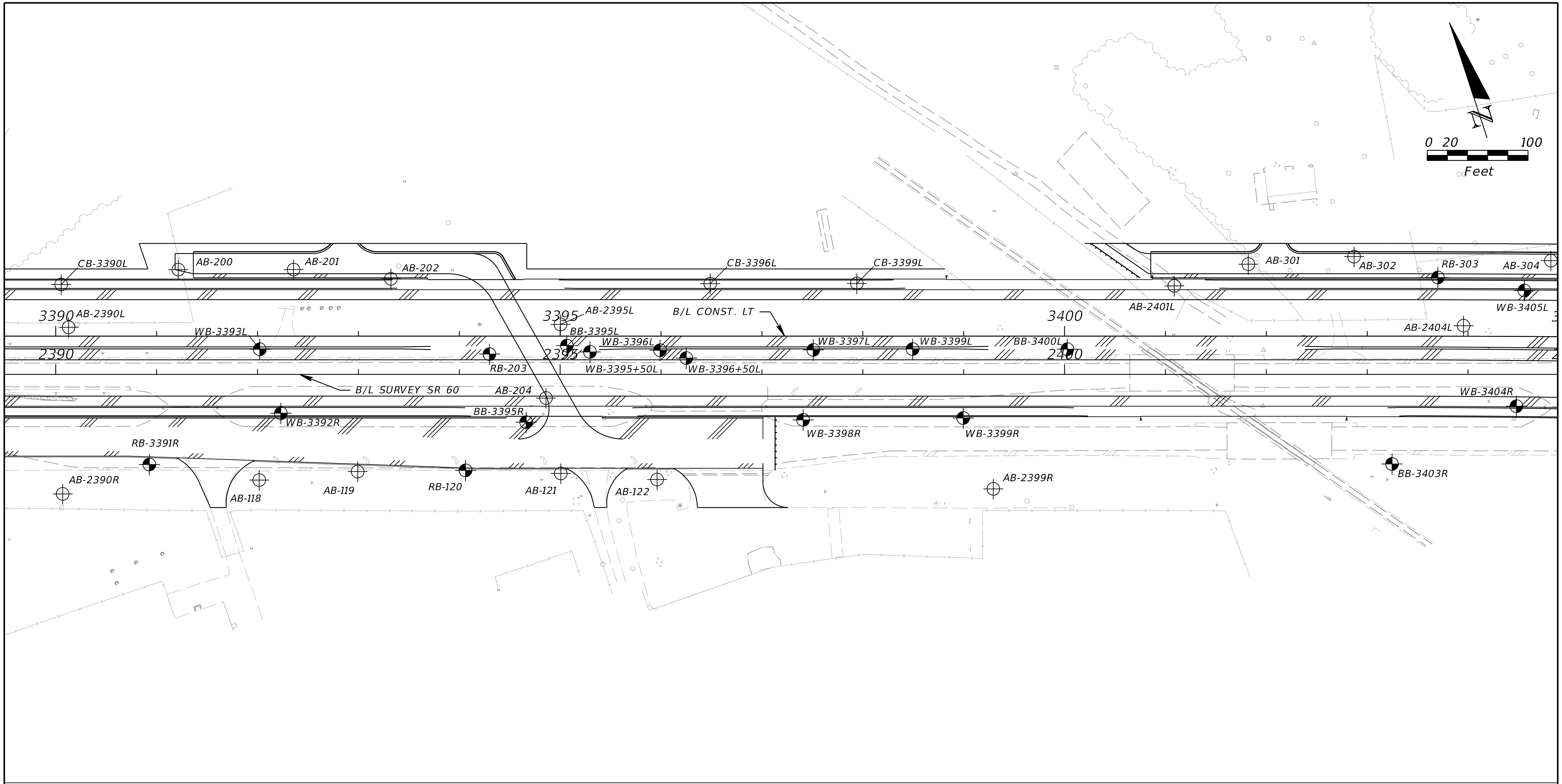

LEGEND

● APPROXIMATE SPT BORING LOCATION

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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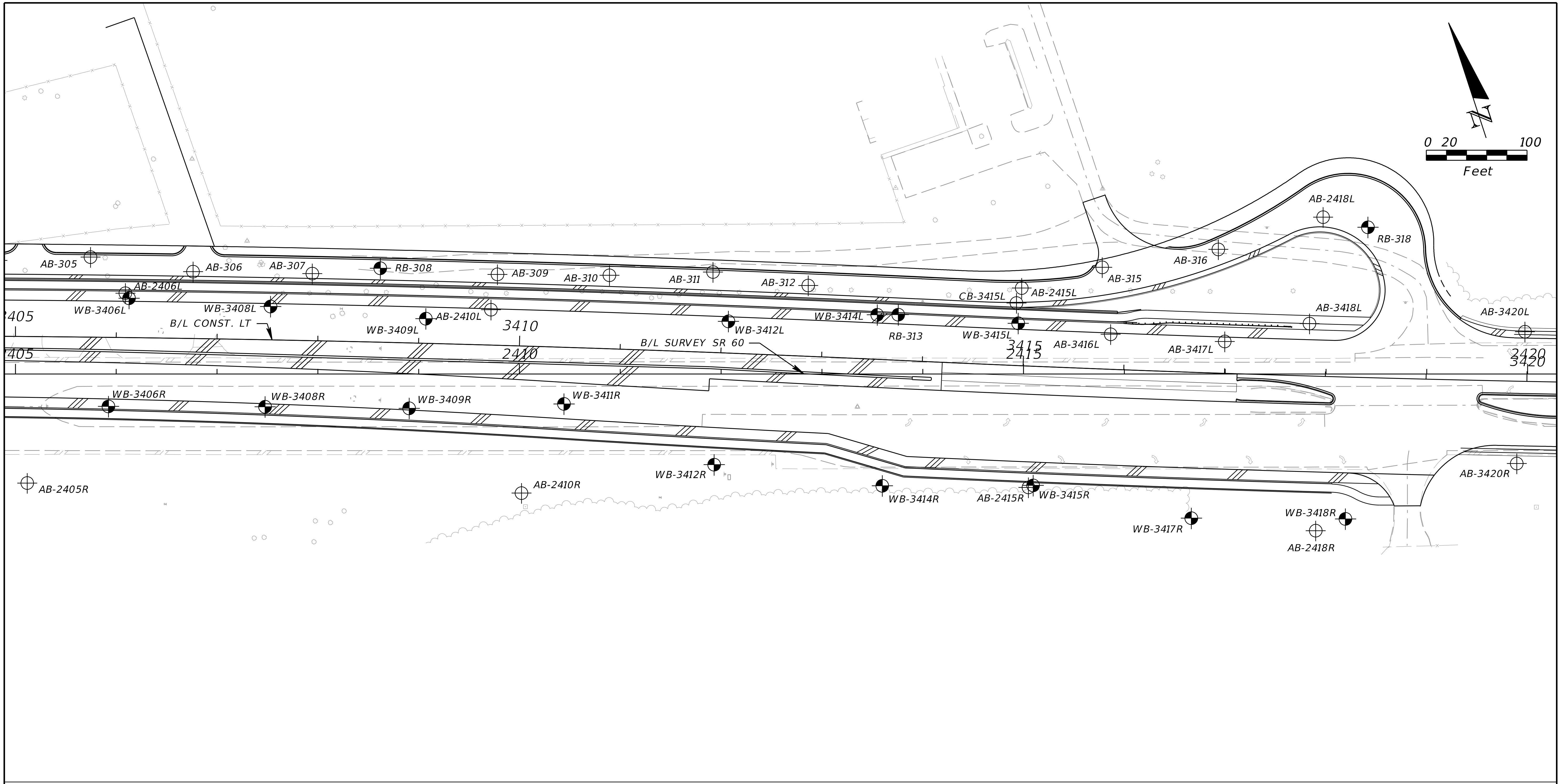
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

BORING LOCATION PLAN (3)

SHEET NO.



LEGEND

◐ APPROXIMATE SPT BORING LOCATION

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

BORING LOCATION PLAN (4)

SHEET
NO.

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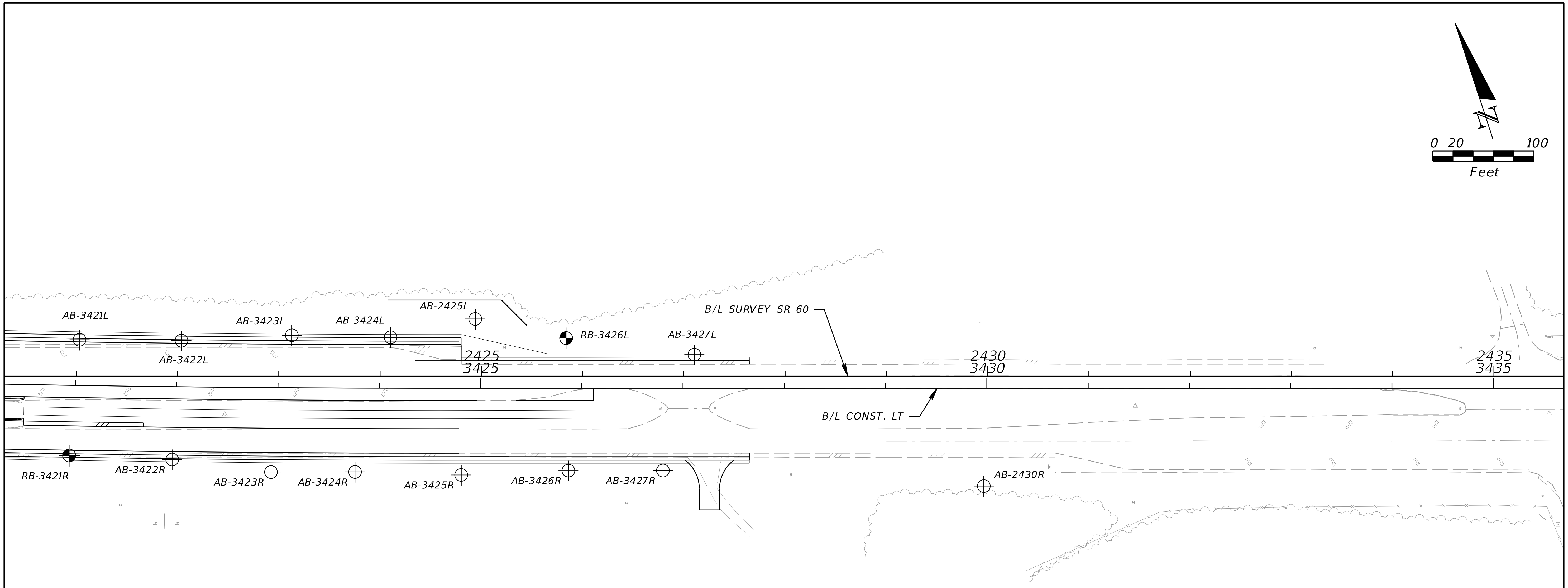

LEGEND

◐ APPROXIMATE SPT BORING LOCATION

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
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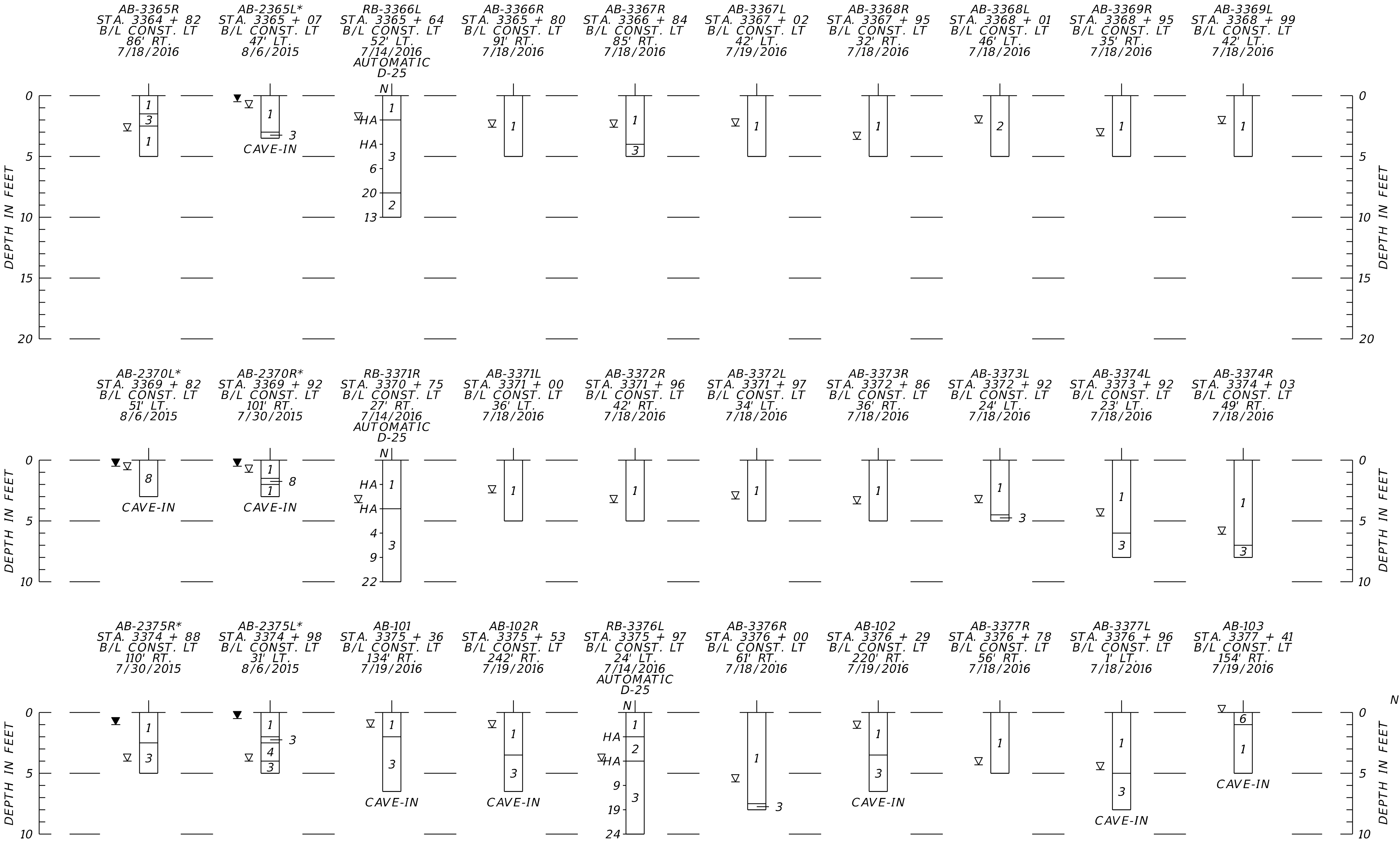
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

BORING LOCATION PLAN (5)

SHEET
NO.



LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
4.	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY (A-6/A-7-6)
5.	CEMENTED SILTY SAND (A-2-4)
6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND / MUCK (A-8)
7.	LIMEROCK BASE MATERIAL
8.	DARK BROWN SILTY SAND WITH TRACE ORGANICS (A-2-4)
9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ANTICIPATED TO BE ABOVE GRADE
GNE	GROUNDWATER NOT ENCOUNTERED
T	BORING TRUNCATED. FULL DEPTH BORING PRESENTED IN WALL GEOTECHNICAL REPORT.
B/L CONST. LT	BASELINE CONSTRUCTION OF SR 60 LEFT

NOTES: 1. THE STATION AND OFFSET OF THE BORINGS INDICATED WITH AN "*" WERE DETERMINED BY THE PROJECT LAND SURVEYOR. THE STATION AND OFFSET OF THE REMAINING BORINGS WERE ESTIMATED BASED ON THE GPS COORDINATES OBTAINED BY TIERRA IN CONJUNCTION WITH PROJECT DESIGN FILES PROVIDED BY FALLER, DAVIS & ASSOCIATES, INC. AND THEREFORE SHOULD BE CONSIDERED APPROXIMATE.

2. SPT BORINGS PERFORMED WITH AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

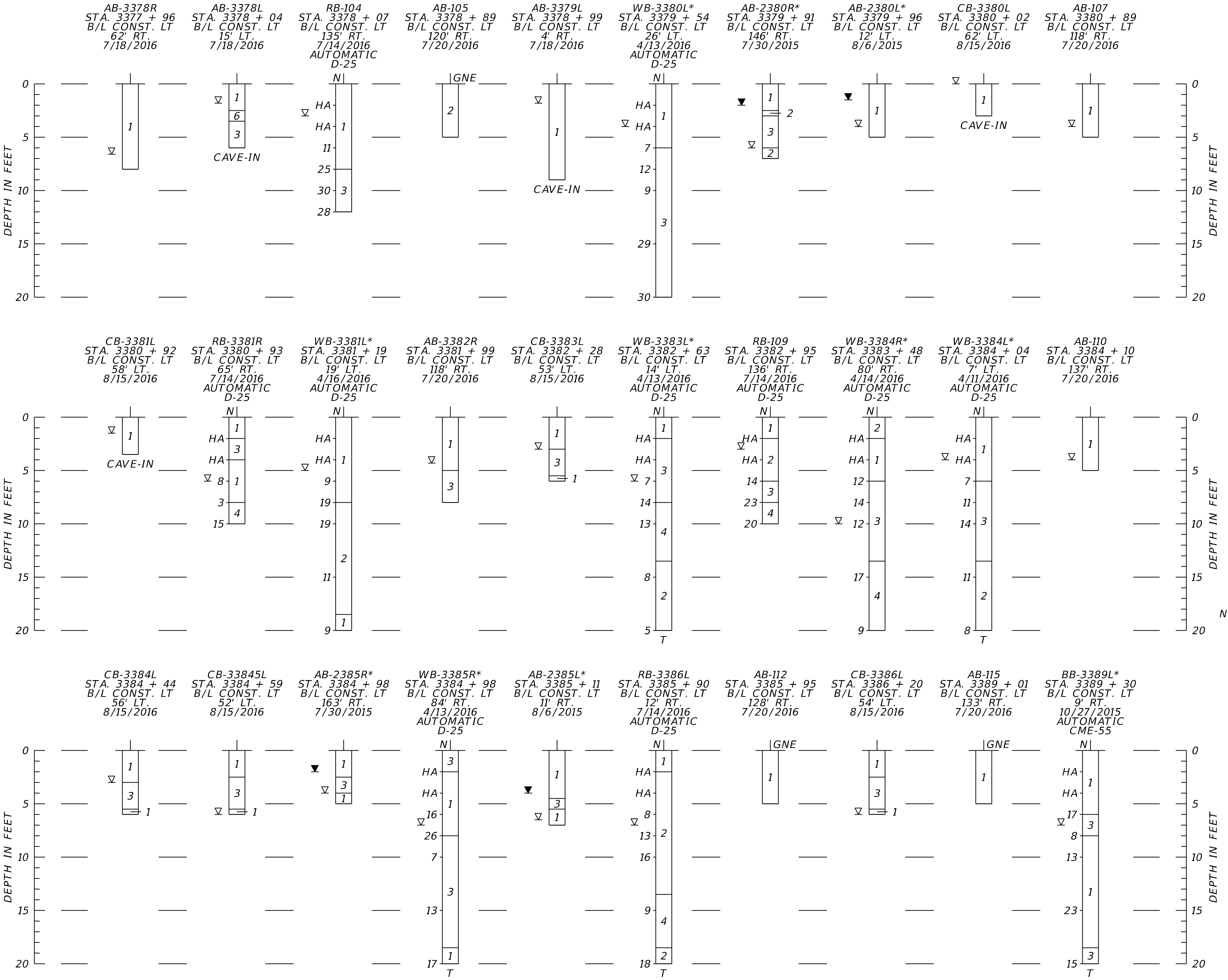
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (1)

SHEET NO.



LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
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WH	SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
∇	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ANTICIPATED TO BE ABOVE GRADE
GNE	GROUNDWATER NOT ENCOUNTERED
T	BORING TRUNCATED. FULL DEPTH BORING PRESENTED IN WALL GEOTECHNICAL REPORT.
B/L CONST. LT	BASELINE CONSTRUCTION OF SR 60 LEFT

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2. SPT BORINGS PERFORMED WITH AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

REVISIONS

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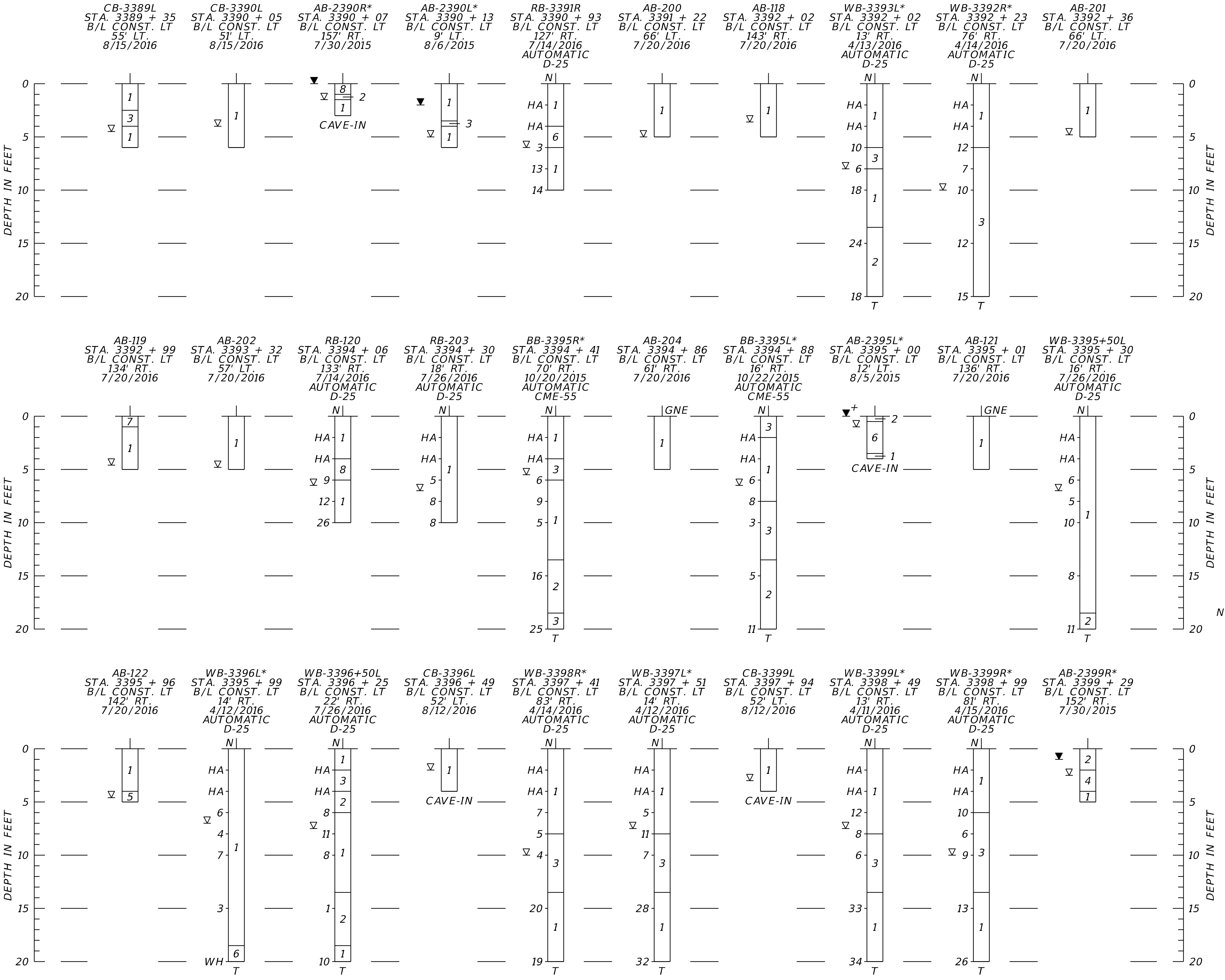
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (2)

SHEET NO.



LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
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6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND / MUCK (A-8)
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▼+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE ANTICIPATED TO BE ABOVE GRADE
GNE	GROUNDWATER NOT ENCOUNTERED
T	BORING TRUNCATED. FULL DEPTH BORING PRESENTED IN WALL GEOTECHNICAL REPORT.
B/L CONST. LT	BASELINE CONSTRUCTION OF SR 60 LEFT

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	SAFETY HAMMER	AUTOMATIC HAMMER
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VERY LOOSE	LESS THAN 4	LESS THAN 3
LOOSE	4 to 10	3 to 8
MEDIUM DENSE	10 to 30	8 to 24
DENSE	30 to 50	24 to 40
VERY DENSE	GREATER THAN 50	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2	LESS THAN 1
SOFT	2 to 4	1 to 3
FIRM	4 to 8	3 to 6
STIFF	8 to 15	6 to 12
VERY STIFF	15 to 30	12 to 24
HARD	GREATER THAN 30	GREATER THAN 24

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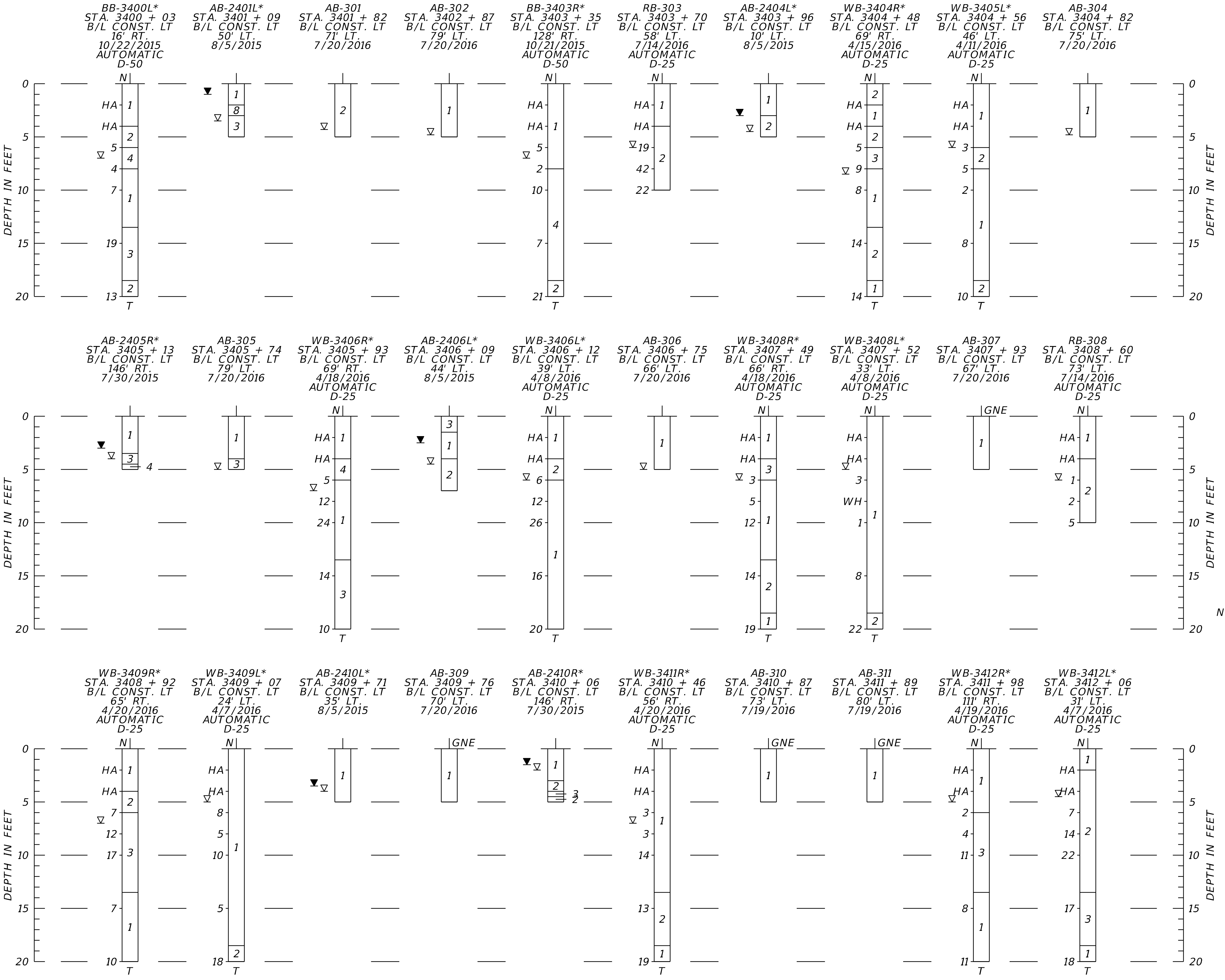
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (3)

SHEET NO.



LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
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	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
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REVISIONS

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STATE OF FLORIDA
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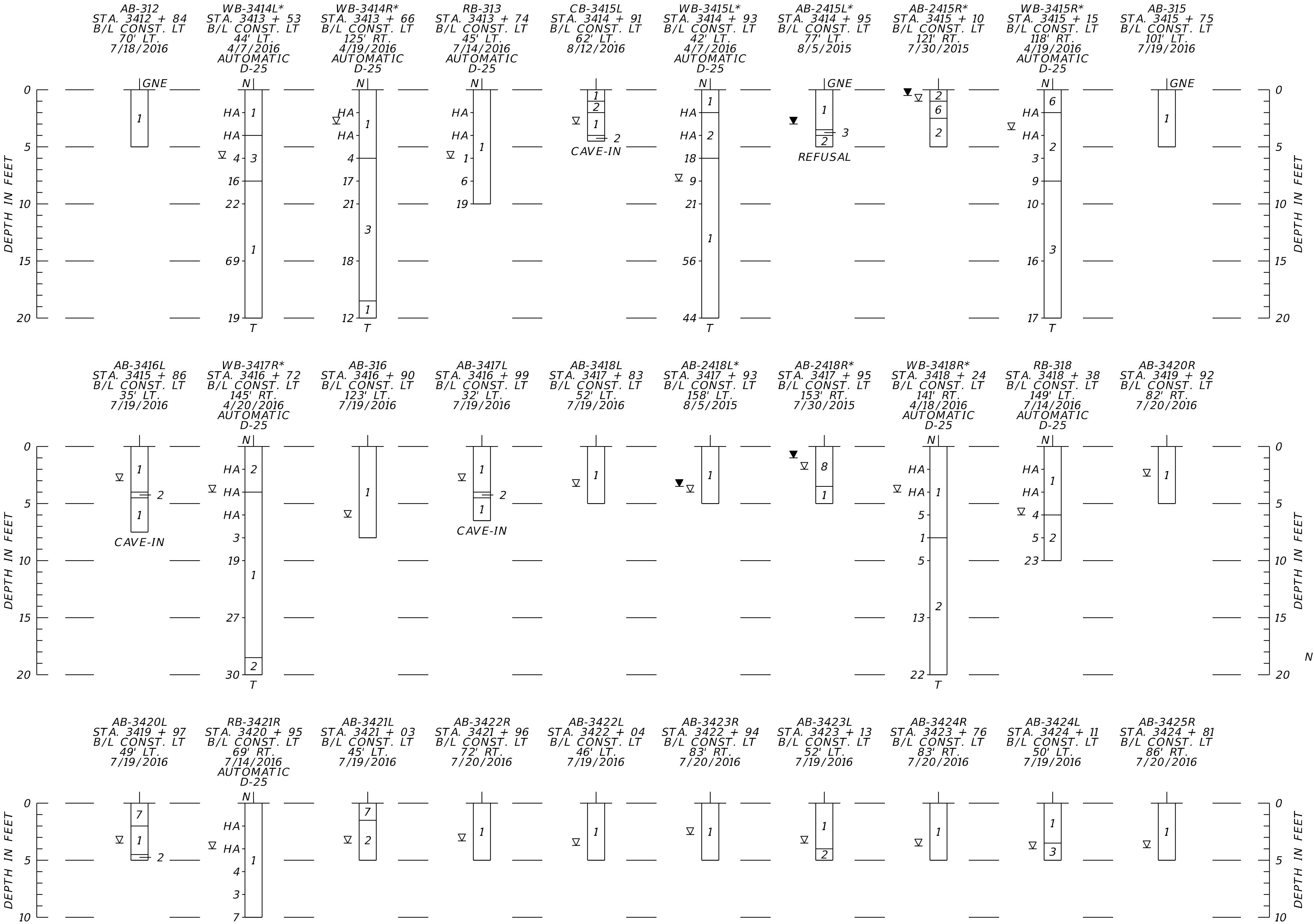
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (4)

SHEET NO.



LEGEND

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GNE	GROUNDWATER NOT ENCOUNTERED
T	BORING TRUNCATED. FULL DEPTH BORING PRESENTED IN WALL GEOTECHNICAL REPORT.

B/L CONST. LT   BASELINE CONSTRUCTION OF SR 60 LEFT

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REVIEWS

DATE	DESCRIPTION	DATE	DESCRIPTION

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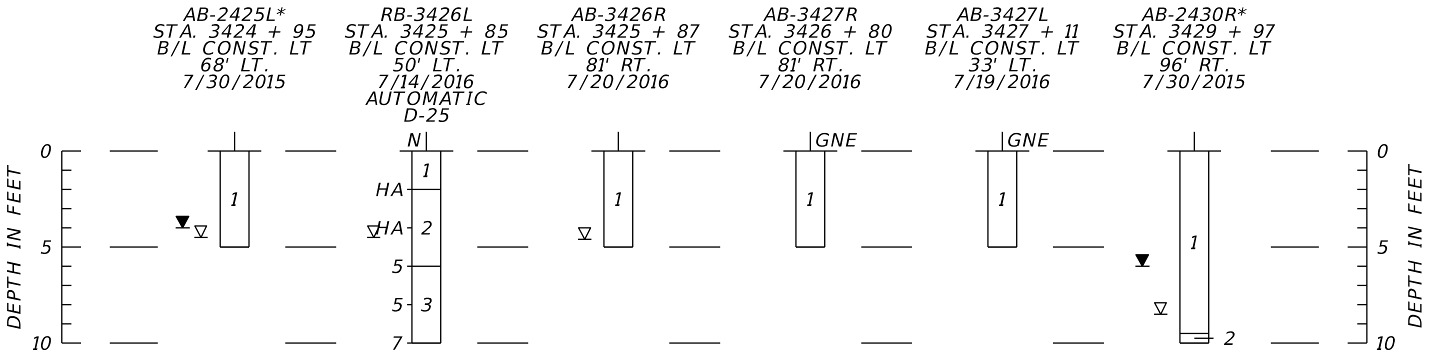
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (5)

SHEET NO.



LEGEND

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B/L CONST. LT	BASELINE CONSTRUCTION OF SR 60 LEFT

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2. SPT BORINGS PERFORMED WITH AN AUTOMATIC HAMMER

	SAFETY HAMMER	AUTOMATIC HAMMER
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REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

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STATE OF FLORIDA
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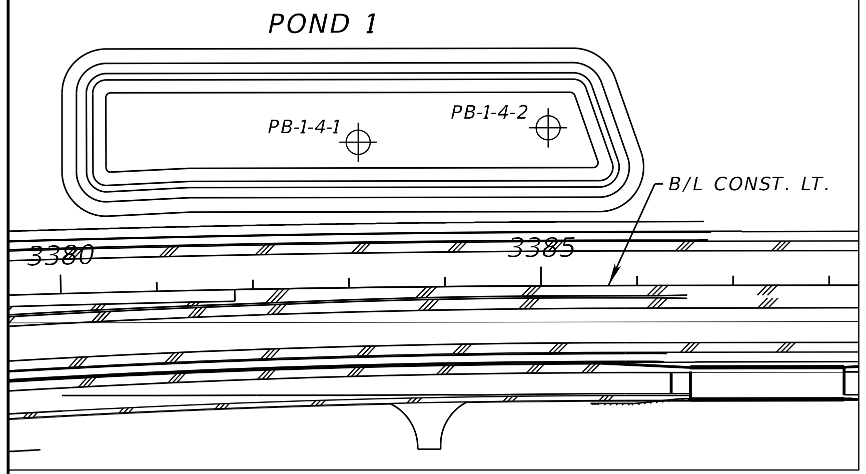
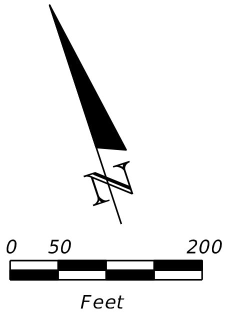
60	POLK	436559-1-52-01

ROADWAY SOIL PROFILES (6)

SHEET NO.



BORING LOCATION PLAN



NOTE:

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7.	LIMEROCK BASE MATERIAL
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9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
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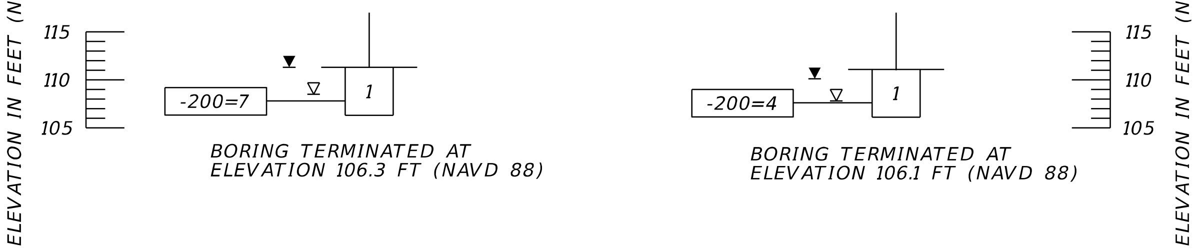
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
NAVD 88	NORTH AMERICAM VERTICAL DATUM OF 1988
⯐	APPROXIMATE SPT BORING LOCATION
⌖	APPROXIMATE AUGER BORING LOCATION
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
B/L CONST. LT.	BASELINE CONSTRUCTION OF SR 60 LEFT
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC

BOR # PB-1-4-1*
STA. 3383+12
REF. B/L CONST. LT.
OFF. 152 LT
ELEV. 111.3
DATE 4/18/2016

BOR # PB-1-4-2*
STA. 3385+08
REF. B/L CONST. LT.
OFF. 165 LT
ELEV. 111.1
DATE 4/18/2016



BORING TERMINATED AT
ELEVATION 106.3 FT (NAVD 88)

BORING TERMINATED AT
ELEVATION 106.1 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

POND 1

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

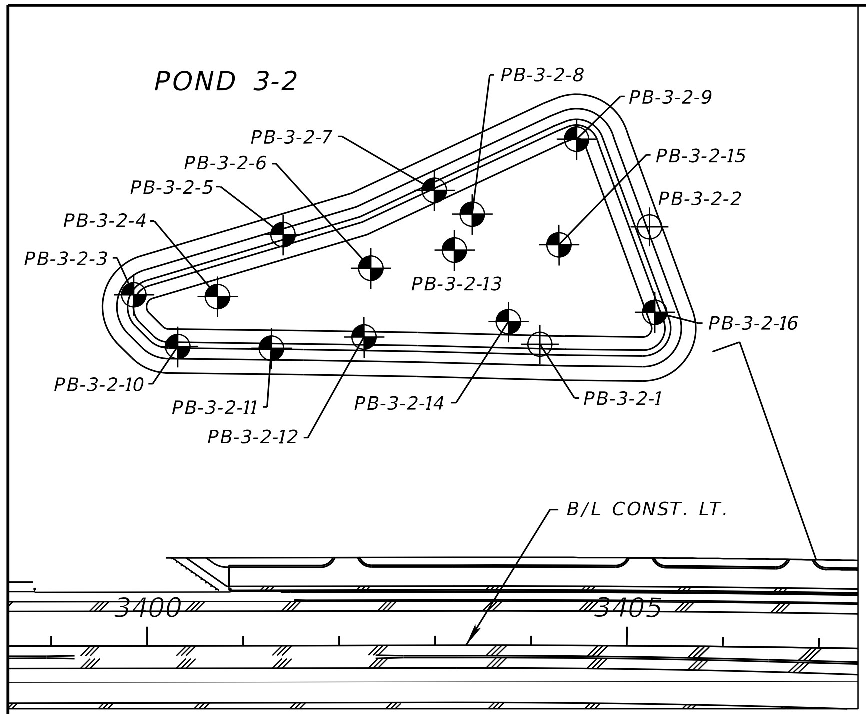
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

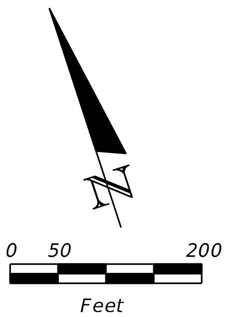
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

POND SOIL SURVEY (1)

SHEET NO.



BORING LOCATION PLAN



NOTE:

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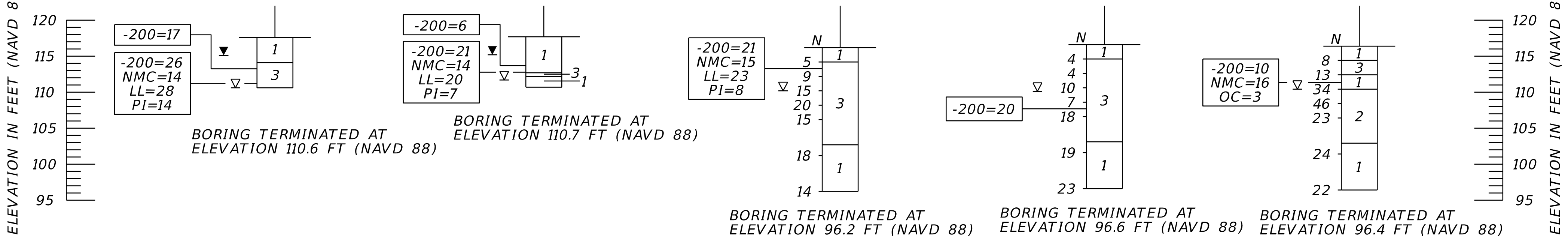
LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
4.	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY (A-6/A-7-6)
5.	CEMENTED SILTY SAND (A-2-4)
6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND/MUCK (A-8)
7.	LIMEROCK BASE MATERIAL
8.	DARK BROWN SILTY SAND WITH TRACE ORGANICS (A-2-4)
9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
NAVD 88	NORTH AMERICAM VERTICAL DATUM OF 1988
◉	APPROXIMATE SPT BORING LOCATION
⊕	APPROXIMATE AUGER BORING LOCATION
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
B/L CONST. LT.	BASELINE CONSTRUCTION OF SR 60 LEFT
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC

BOR #	PB-3-2-1*	PB-3-2-2*	PB-3-2-3	PB-3-2-4	PB-3-2-5
STA.	3404+09	3405+18	3399+87	3400+74	3401+42
REF.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.
OFF.	310' LT.	432' LT.	366' LT.	364' LT.	428' LT.
ELEV.	117.6	117.7	116.2	116.6	116.4
DATE	6/22/2015	6/22/2015	12/23/2015	12/23/2015	12/23/2015
DRILLER			J. SMITH	J. SMITH	J. SMITH
HAMMER			AUTOMATIC	AUTOMATIC	AUTOMATIC
RIG			D-50	D-50	D-50



BORING TERMINATED AT ELEVATION 110.6 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 110.7 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 96.2 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 96.6 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 96.4 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

POND 3-2

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

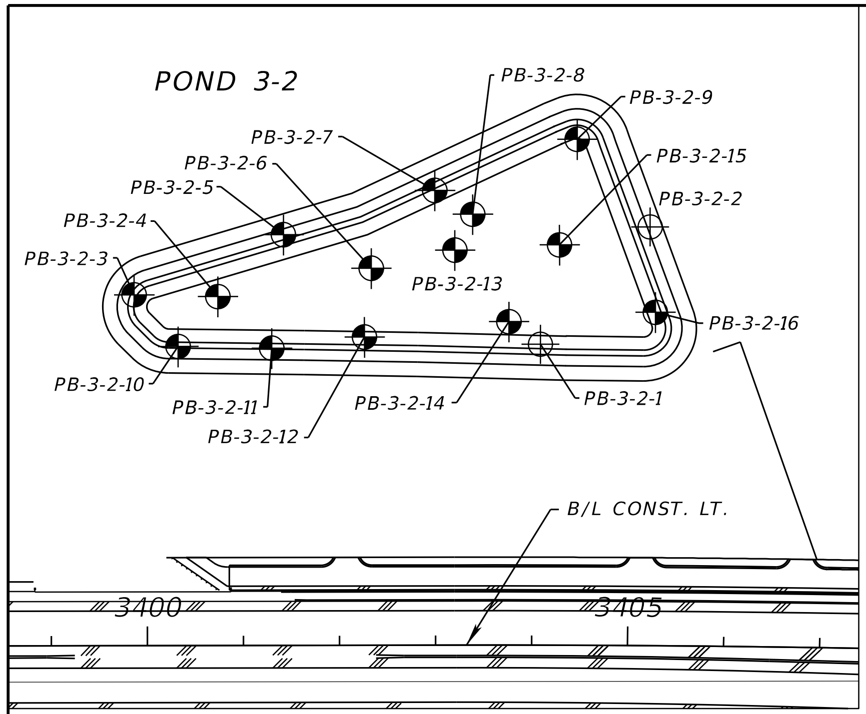
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

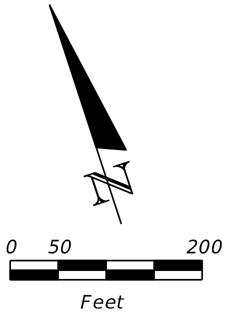
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

POND SOIL SURVEY (2)

SHEET NO.



BORING LOCATION PLAN



NOTE:

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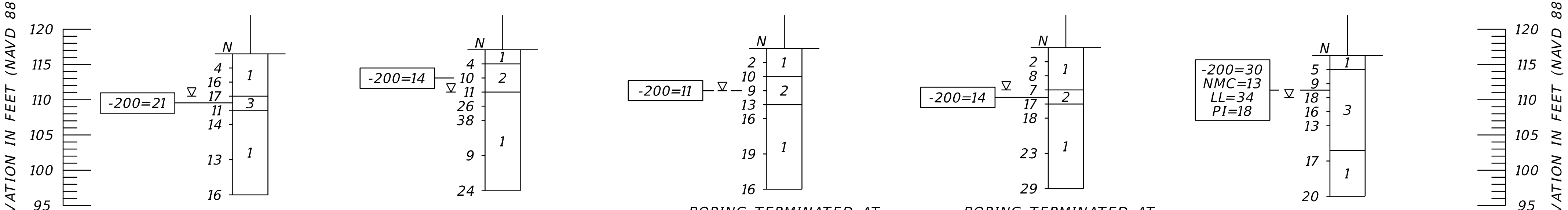
LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
4.	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY (A-6/A-7-6)
5.	CEMENTED SILTY SAND (A-2-4)
6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND/MUCK (A-8)
7.	LIMEROCK BASE MATERIAL
8.	DARK BROWN SILTY SAND WITH TRACE ORGANICS (A-2-4)
9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
NAVD 88	NORTH AMERICAM VERTICAL DATUM OF 1988
◐	APPROXIMATE SPT BORING LOCATION
⊕	APPROXIMATE AUGER BORING LOCATION
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
B/L CONST. LT.	BASELINE CONSTRUCTION OF SR 60 LEFT
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC

BOR #	PB-3-2-6	PB-3-2-7	PB-3-2-8	PB-3-2-9	PB-3-2-10
STA.	3402+34	3403+00	3403+39	3404+45	3400+32
REF.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.	B/L CONST. LT.
OFF.	393' LT.	474' LT.	449' LT.	528' LT.	312' LT.
ELEV.	116.5	117.1	117.3	117.4	116.3
DATE	12/22/2015	12/23/2015	12/22/2015	12/22/2015	12/23/2015
DRILLER	J. SMITH	J. SMITH	J. SMITH	J. SMITH	J. SMITH
HAMMER	AUTOMATIC	AUTOMATIC	AUTOMATIC	AUTOMATIC	AUTOMATIC
RIG	D-50	D-50	D-50	D-50	D-50



BORING TERMINATED AT ELEVATION 96.5 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 97.1 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 97.3 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 97.4 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 96.3 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

POND 3-2

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

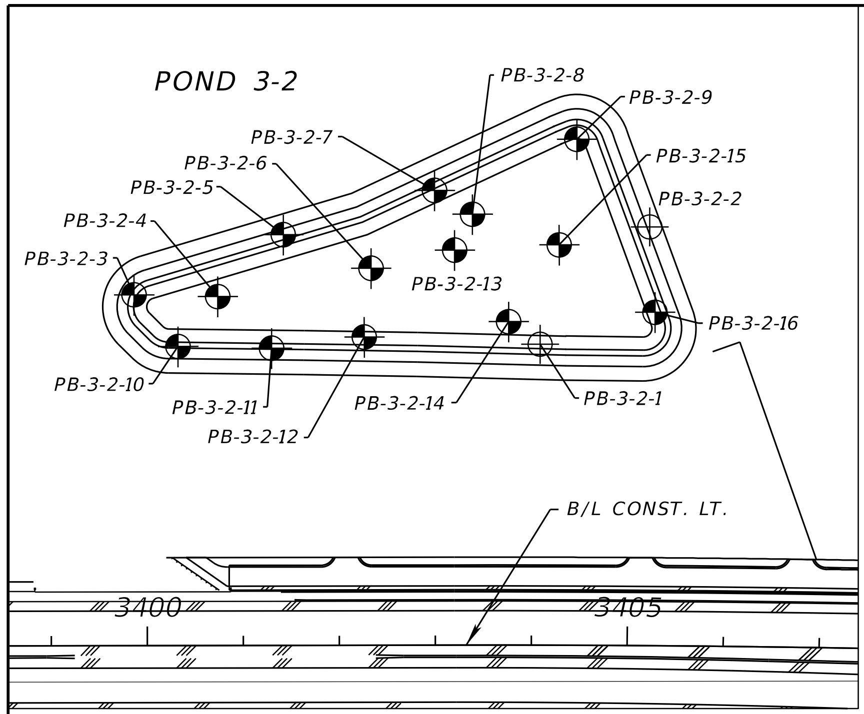
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

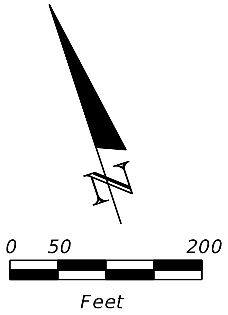
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

POND SOIL SURVEY (3)

SHEET NO.



BORING LOCATION PLAN



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LEGEND

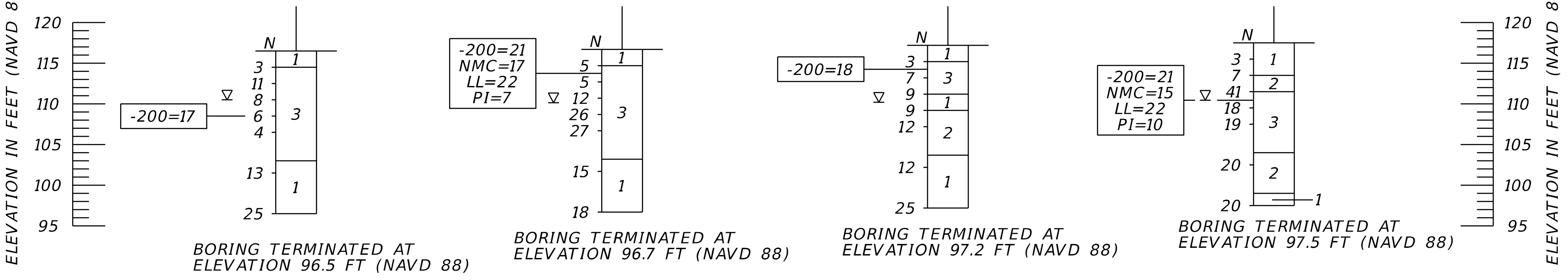
1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
4.	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY (A-6/A-7-6)
5.	CEMENTED SILTY SAND (A-2-4)
6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND/MUCK (A-8)
7.	LIMEROCK BASE MATERIAL
8.	DARK BROWN SILTY SAND WITH TRACE ORGANICS (A-2-4)
9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
NAVD 88	NORTH AMERICAM VERTICAL DATUM OF 1988
◒	APPROXIMATE SPT BORING LOCATION
⊕	APPROXIMATE AUGER BORING LOCATION
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
B/L CONST. LT.	BASELINE CONSTRUCTION OF SR 60 LEFT
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC

BOR # PB-3-2-11
STA. 3401+30
REF. B/L CONST. LT.
OFF. 310' LT.
ELEV. 116.5
DATE 12/22/2015
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-50

BOR # PB-3-2-12
STA. 3402+26
REF. B/L CONST. LT.
OFF. 321' LT.
ELEV. 116.7
DATE 12/23/2015
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-50

BOR # PB-3-2-13
STA. 3403+21
REF. B/L CONST. LT.
OFF. 412' LT.
ELEV. 117.2
DATE 12/23/2015
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-50

BOR # PB-3-2-14
STA. 3403+76
REF. B/L CONST. LT.
OFF. 337' LT.
ELEV. 117.5
DATE 12/22/2015
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-50



	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

POND 3-2

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

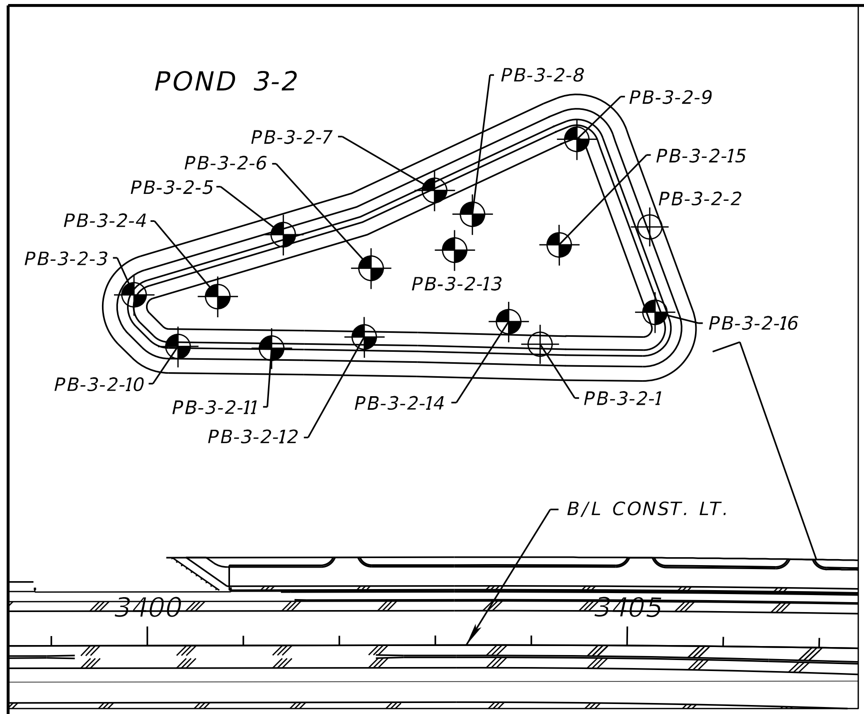
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

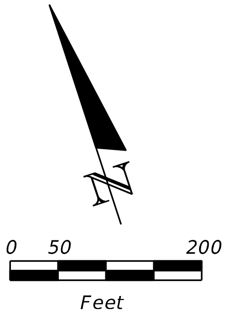
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

POND SOIL SURVEY (4)

SHEET NO.



BORING LOCATION PLAN



NOTE:

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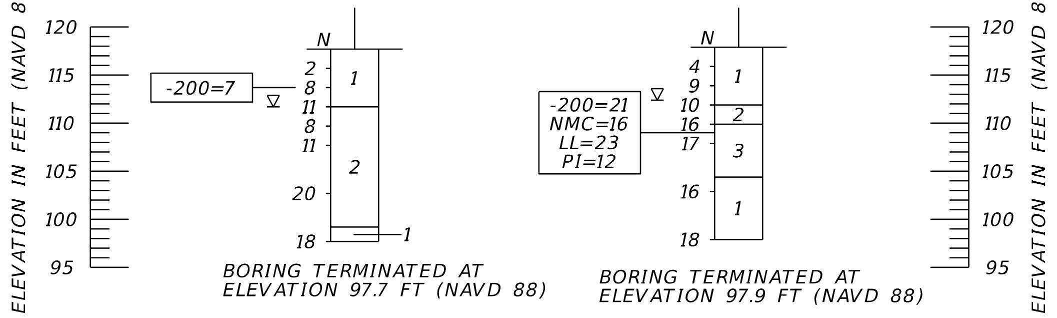
LEGEND

1.	PALE BROWN TO GRAY TO DARK BROWN SAND TO SAND WITH SILT (A-3)
2.	LIGHT GRAY TO BROWN SAND WITH SILT TO SILTY SAND (A-2-4)
3.	GRAY TO BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6)
4.	GRAY TO GRAY-BROWN CLAYEY SAND TO SANDY CLAY (A-6/A-7-6)
5.	CEMENTED SILTY SAND (A-2-4)
6.	DARK BROWN ORGANIC TO HIGHLY ORGANIC SILTY SAND/MUCK (A-8)
7.	LIMEROCK BASE MATERIAL
8.	DARK BROWN SILTY SAND WITH TRACE ORGANICS (A-2-4)
9.	DEBRIS (SAND, MIXED WITH ASPHALT, WOOD, ORGANICS AND PLASTIC)
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW
N	NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)
50/4	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
HA	HAND AUGERED TO VERIFY UTILITY CLEARANCE
NAVD 88	NORTH AMERICAM VERTICAL DATUM OF 1988
◕	APPROXIMATE SPT BORING LOCATION
⊕	APPROXIMATE AUGER BORING LOCATION
∇	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
B/L CONST. LT.	BASELINE CONSTRUCTION OF SR 60 LEFT
-200	PERCENT PASSING #200 SIEVE
NMC	NATURAL MOISTURE CONTENT (%)
LL	LIQUID LIMIT (%)
PI	PLASTICITY INDEX (%)
OC	ORGANIC CONTENT (%)
NP	NON-PLASTIC

BOR #	PB-3-2-15
STA.	3404+28
REF.	B/L CONST. LT.
OFF.	417' LT.
ELEV.	117.7
DATE	12/22/2015
DRILLER	J. SMITH
HAMMER	AUTOMATIC
RIG	D-50

BOR #	PB-3-2-16
STA.	3405+26
REF.	B/L CONST. LT.
OFF.	348' LT.
ELEV.	117.9
DATE	12/22/2015
DRILLER	J. SMITH
HAMMER	AUTOMATIC
RIG	D-50



BORING TERMINATED AT ELEVATION 97.7 FT (NAVD 88)

BORING TERMINATED AT ELEVATION 97.9 FT (NAVD 88)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

POND 3-2

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

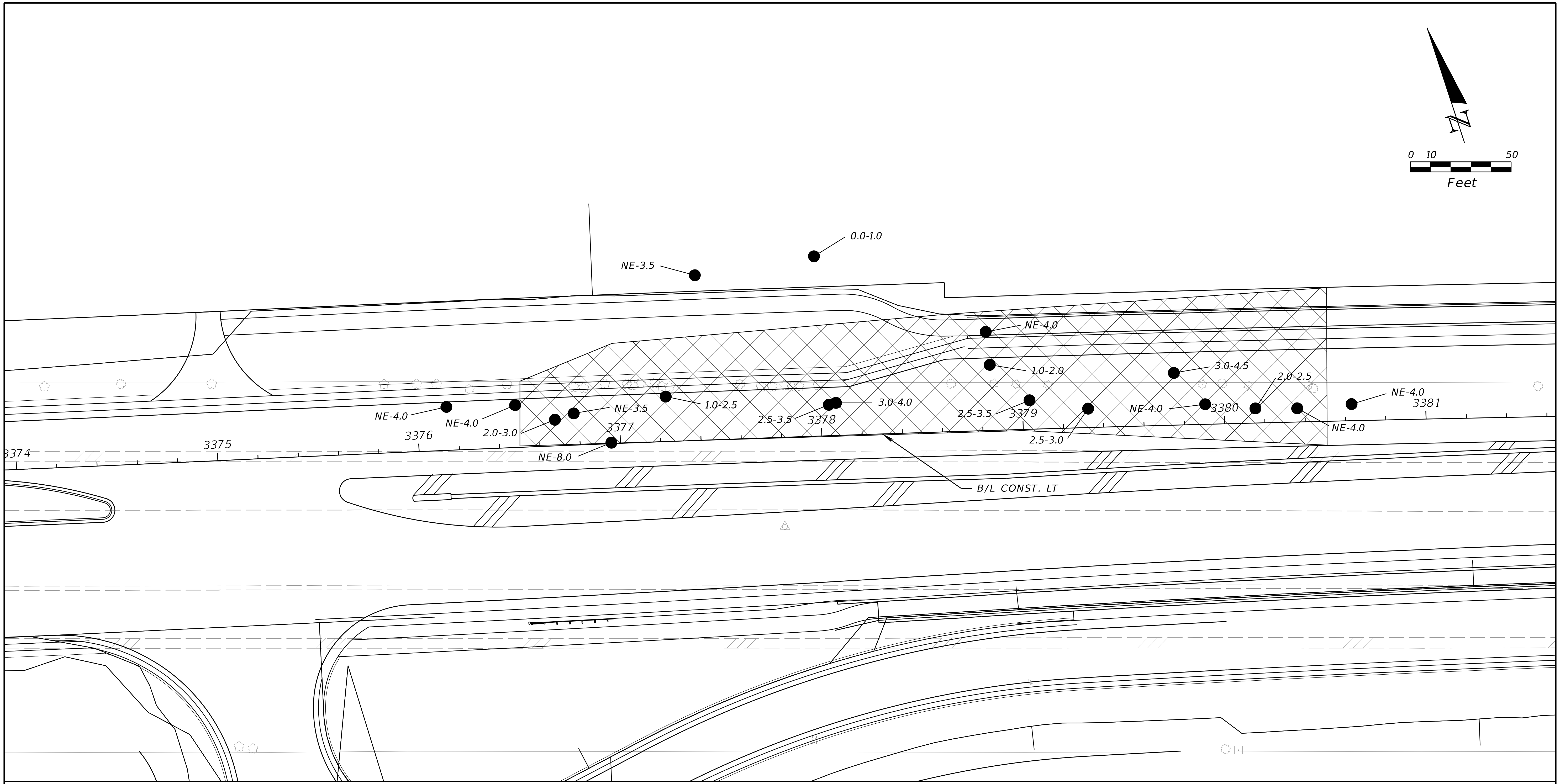
WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

POND SOIL SURVEY (5)

SHEET NO.



LEGEND

0-8.0 ●	APPROXIMATE DEPTH RANGE OF A-8 BELOW EXISTING GRADE (i.e. A-8 ENCOUNTERED FROM A DEPTH OF 0 TO 8 FEET BELOW GRADE)
NE-5.0 ●	ORGANIC MATERIAL NOT ENCOUNTERED TO A DEPTH OF FIVE FEET BELOW GRADE
▨	APPROXIMATE LIMITS OF ORGANIC SOIL REMOVAL

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

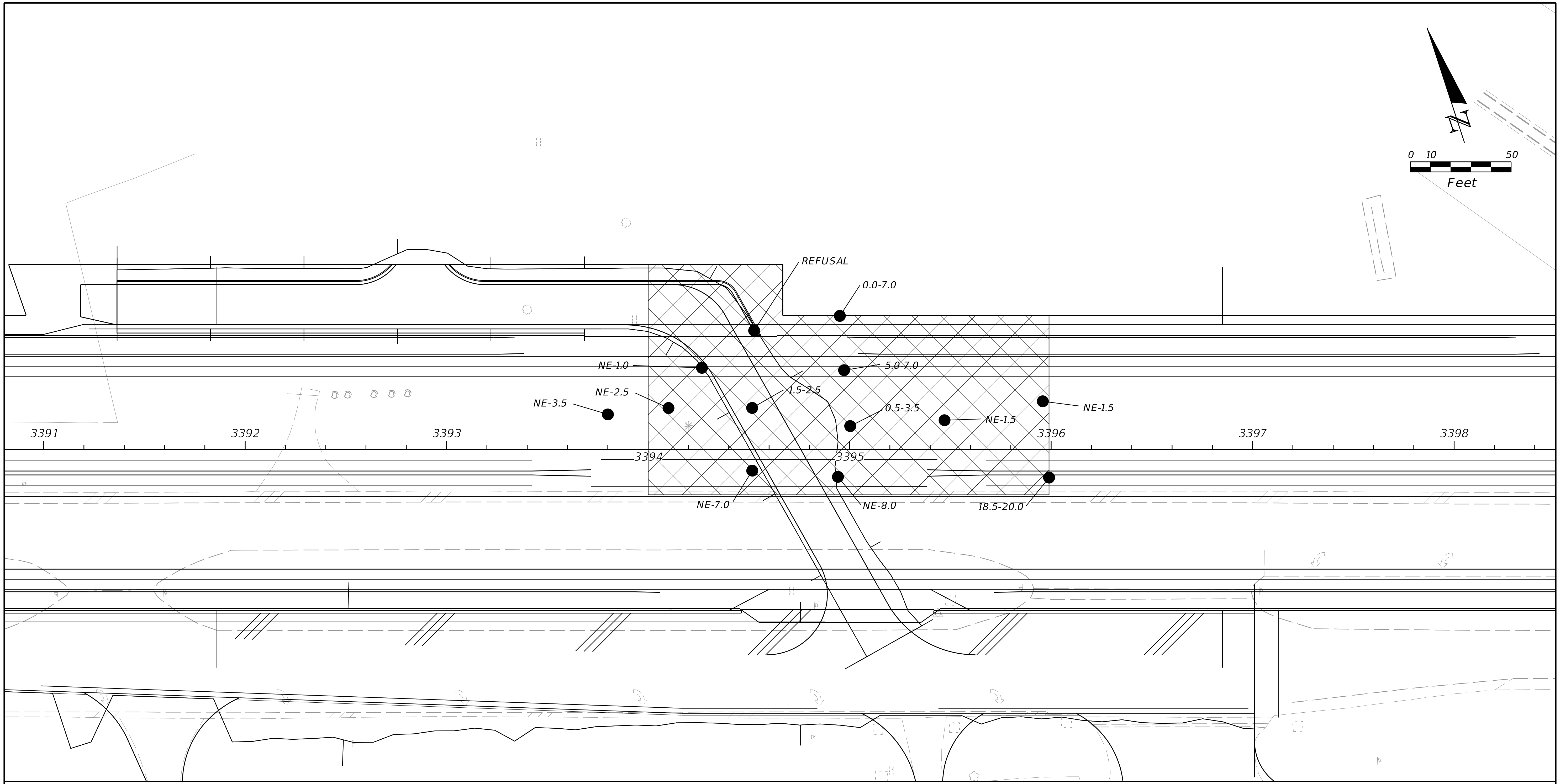
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

MUCK DELINEATION PLAN (1)

SHEET
NO.

wrovira 8/22/2016 6:29:57 PM J:\6511\2015 Files\6511-15-022 D1 SR 60 CSX\Microstation\mtgeo01.dgn



LEGEND

0-8.0 ●	APPROXIMATE DEPTH RANGE OF A-8 BELOW EXISTING GRADE (i.e. A-8 ENCOUNTERED FROM A DEPTH OF 0 TO 8 FEET BELOW GRADE)
NE-5.0 ●	ORGANIC MATERIAL NOT ENCOUNTERED TO A DEPTH OF FIVE FEET BELOW GRADE
▨	APPROXIMATE LIMITS OF ORGANIC SOIL REMOVAL

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM P. ROVIRA IV, P.E.
P.E. LICENSE NUMBER 74586
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

MUCK DELINEATION PLAN (2)

SHEET NO.

APPENDIX B

Table 1
Summary of USDA Soil Survey
Summary of Seasonal High Groundwater Table Estimates for Roadway
SR 60 Grade Separation over CSX Railroad
Polk County, Florida
FPN: 436559-1-52-01
Tierra Project No: 6511-15-022

USDA Map Symbol and Soil Name	Soil Classification				pH	Seasonal High Water Table	
	Depth (in)	USCS	AASHTO	Permeability (in/hr)		Depth (feet)	Months
(7) Pomona fine sand, non-hydric	0-6	SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5	0.5 - 1.5	June-Oct
	6-21	SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5		
	21-26	SM, SP-SM	A-2-4, A-3	0.6-6.0	3.5-5.5		
	26-48	SP, SP-SM	A-2-4, A-3	2.0-20.0	3.5-6.0		
	48-73	SC, SP-SM, SM	A-2, A-4, A-6	0.2-2.0	3.5-5.5		
	73-80	SM, SP-SM	A-2-4, A-3	0.6-6.0	3.5-5.5		
(7) Pomona fine sand, hydric	0-6	SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5	0.0 - 1.0	June-Oct
	6-21	SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5		
	21-26	SM, SP-SM	A-2-4, A-3	0.6-6.0	3.5-5.5		
	26-48	SP, SP-SM	A-2-4, A-3	2.0-20.0	3.5-6.0		
	48-73	SC, SC-SM, SM	A-2, A-4, A-6	0.2-2.0	3.5-5.5		
	73-80	SM, SP-SM	A-2-4, A-3	0.6-6.0	3.5-5.5		
(16) Urban Land	---	---	---	---	---	---	Jan-Dec
(25) Placid, depressional-Myakka, depressional	0-18	SM, SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5	+2.0 - 0.0	Jan-Dec
	18-80	SM, SP, SP-SM	A-2-4, A-3	6.0-20.0	3.5-5.5		
	0-3	SP, SP-SM	A-3	6.0-20.0	3.5-6.5	+2.0 - 0.0	Jan-Dec
	3-25	SP, SP-SM	A-3	6.0-20.0	3.5-6.5		
	25-35	SM, SP-SM	A-2-4, A-3	0.6-6.0	3.5-6.5		
	35-80	SP, SP-SM	A-3	6.0-20.0	3.5-6.5		
(32) Kaliga Muck	0-30	PT	A-8	6.0-20.0	3.1-4.4	+1.0 - 0.0	Jan-Dec
	30-75	SC, SC-SM, SM	A-2-4, A-2-6	0.06-0.2	4.5-8.4		
	75-80	SP, SP-SM	A-2-4, A-3	6.0-20.0	4.5-8.4		
(33) Holopaw, depressional	0-6	SP, SP-SM	A-3	6.0-20.0	5.1-7.3	+2.0 - 0.0	Jan-Feb, June-Dec
	6-41	SP, SP-SM	A-3	6.0-20.0	5.1-7.3		
	41-65	SC-SM, SM	A-2-4	0.2-2.0	5.1-8.4		
	65-80	SM, SP-SM	A-2-4	6.0-20.0	5.1-8.4		
(42) Felda sand	0-5	SP, SP-SM	A-3	6.0-20.0	5.1-7.8	0.0 - 1.0	Jan-Mar, July-Dec
	5-22	SP, SP-SM	A-3	6.0-20.0	5.1-7.8		
	22-50	SC, SC-SM, SM	A-2-4, A-2-6	0.6-6.0	6.1-8.4		
	50-80	SP, SP-SM	A-2-4, A-3	6.0-20.0	6.1-8.4		
(47) Zolfo fine sand	0-7	SP-SM	A-2-4, A-3	6.0-20.0	4.5-7.3	2.0 - 3.5	June-Nov
	7-71	SM, SP-SM	A-2-4, A-3	6.0-20.0	4.5-7.3		
	71-80	SM, SP-SM	A-2-4, A-3	0.2-6.0	3.5-6.5		

TABLE 2
Summary of Seasonal High Groundwater Table Estimates for Roadway
SR 60 Grade Separation over CSX Railroad
Polk County, Florida
FPN: 436559-1-52-01
Tierra Project No: 6511-15-022

Boring Number	Boring Location(1)		Boring Depth(2) (feet)	Ground Surface Elevation NAVD88(1) (feet)	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT(4)	
	Station (feet)	Offset (feet)			Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)		Soil Map Unit	SHGWT Depth(3) (feet)	Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)
AB - 2365L	3365+07	47 LT	3.5	114.1	1	113.1	8/6/2015	7	0.0 - 1.5	0.5	113.6
AB - 2370L	3369+82	51 LT	3.0	113.9	0.8	113.1	8/6/2015	7, 43	0.0 - 1.5	0.5	113.4
AB - 2370R	3369+92	101 RT	3.0	112.9	1.0	111.9	7/30/2015	7	0.0 - 1.5	0.5	112.4
AB - 2375R	3374+88	110 RT	5.0	114.1	4.0	110.1	7/30/2015	7	0.0 - 1.5	1.0	113.1
AB - 2375L	3374+98	31 LT	5.0	113.3	4.0	109.3	8/6/2015	7	0.0 - 1.5	0.5	112.8
AB - 2380R	3379+91	146 RT	7.0	112.1	6.0	106.1	7/30/2015	7	0.0 - 1.5	2.0	110.1
AB - 2380L	3379+96	12 LT	5.0	113.1	4.0	109.1	8/6/2015	7	0.0 - 1.5	1.5	111.6
AB - 2385R	3384+98	163 RT	5.0	113.1	4.0	109.1	7/30/2015	7	0.0 - 1.5	2.0	111.1
AB - 2385L	3385+11	11 RT	7.0	116.0	6.5	109.5	8/6/2015	7	0.0 - 1.5	4.0	112.0
AB - 2390R	3390+07	157 RT	3.0	112.6	1.5	111.1	7/30/2015	7	0.0 - 1.5	0.0	112.6
AB - 2390L	3390+13	9 LT	6.0	114.1	5.0	109.1	8/6/2015	7	0.0 - 1.5	2.0	112.1
AB - 2395L	3395+00	12 LT	4.0	112.0	1.0	111.0	8/5/2015	7	0.0 - 1.5	ABG(6)	> 112
AB - 2399R	3399+29	152 RT	5.0	114.1	2.5	111.6	7/30/2015	7, 16	0.0 - 1.5, ---	1.0	113.1
AB - 2401L	3401+09	50 LT	5.0	115.9	3.5	112.4	8/5/2015	7	0.0 - 1.5	1.0	114.9
AB - 2404L	3403+96	10 LT	5.0	117.2	4.5	112.7	8/5/2015	7	0.0 - 1.5	3.0	114.2
AB - 2405R	3405+13	146 RT	5.0	117.2	4.0	113.2	7/30/2015	7	0.0 - 1.5	3.0	114.2
AB - 2406L	3406+09	44 LT	7.0	118.8	4.5	114.3	8/5/2015	7,47	0.0 - 1.5, 2.0 - 3.5	2.5	116.3
AB - 2410L	3409+71	35 LT	5.0	118.4	4.0	114.4	8/5/2015	47	2.0 - 3.5	3.5	114.9
AB - 2410R	3410+06	146 RT	5.0	116.5	2.0	114.5	7/30/2015	7	0.0 - 1.5	1.5	115.0

(1) The boring locations and elevations were determined by the project land surveyor CivilSurv Design Group.

(2) Depth below existing grades at time of field services.

(3) Seasonal high groundwater table depth reported in the Soil Survey of Polk County, Florida published by the USDA/NRCS.

(4) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the USDA NRCS Soil Survey information, and surrounding topography.

(5) GNE: Groundwater not encountered within the depth of the soil boring.

(6) ABG: Above existing ground surface (SHGWT can be determined by the project biological indicators.)

TABLE 2
Summary of Seasonal High Groundwater Table Estimates for Roadway
SR 60 Grade Separation over CSX Railroad
Polk County, Florida
FPN: 436559-1-52-01
Tierra Project No: 6511-15-022

Boring Number	Boring Location(1)		Boring Depth(2) (feet)	Ground Surface Elevation NAVD88(1) (feet)	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT(4)	
	Station (feet)	Offset (feet)			Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)		Soil Map Unit	SHGWT Depth(3) (feet)	Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)
AB - 2415L	3414+95	77 LT	5.0	118.9	GNE(5)	< 113.9	8/5/2015	47	2.0 - 3.5	3.0	115.9
AB - 2415R	3415+10	121 RT	5.0	114.8	1.0	113.8	7/30/2015	7	0.0 - 1.5	0.5	114.3
AB - 2418L	3417+93	158 LT	5.0	121.4	4.0	117.4	8/5/2015	47	2.0 - 3.5	3.5	117.9
AB - 2418R	3417+95	153 RT	5.0	116.7	2.0	114.7	7/30/2015	7, 47	0.0 - 1.5, 2.0 - 3.5	1.0	115.7
AB - 2425L	3424+95	68 LT	5.0	122.5	4.5	118.0	7/30/2015	47	2.0 - 3.5	4.0	118.5
AB - 2430R	3429+97	96 RT	10.0	121.1	8.5	112.6	7/30/2015	47	2.0 - 3.5	6.0	115.1

(1) The boring locations and elevations were determined by the project land surveyor CivilSurv Design Group.

(2) Depth below existing grades at time of field services.

(3) Seasonal high groundwater table depth reported in the Soil Survey of Polk County, Florida published by the USDA/NRCS.

(4) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the USDA NRCS Soil Survey information, and surrounding topography.

(5) GNE: Groundwater not encountered within the depth of the soil boring.

(6) ABG: Above existing ground surface (SHGWT can be determined by the project biological indicators.)

TABLE 3

SUMMARY OF SEASONAL HIGH GROUNDWATER TABLE ESTIMATES FOR PONDS

SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Name	Boring Location(1)		Ground Elevation(1)	Boring Depth(2)	Date Recorded	Measured Groundwater Table		USDA Soil Survey		Estimated SHGWT(4)	
	Station	Offset	(ft, NAVD88)	(ft)		Depth(2) (ft)	Elevation (ft, NAVD88)	Map Symbol	Estimated SHGWT Depth(3) (ft)	Depth(2) (ft)	Elevation (ft, NAVD88)
POND 1 (B/L CONST. LT. SR 60)											
PB-1-4-1	3383+12	152 LT	111.3	5	4/18/2016	2.8	108.5	7, 42	0.0-1.5, 0.0-1.0	0.0	111.3
PB-1-4-2	3385+08	165 LT	111.1	5	4/18/2016	3.3	107.8	7	0.0-1.5	1.0	110.1
POND 3-2 (B/L CONST. LT. SR 60)											
PB-3-2-1	3404+09	310 LT	117.6	7	6/22/2015	7.0	110.6	7	0.0-1.5	2.5	115.1
PB-3-2-2	3405+18	432 LT	117.7	7	6/22/2015	6.0	111.7	7, 17	0.0-1.5, 0.0-1.5	2.5	115.2

(1) The boring locations and elevations were determined by the project land surveyor CivilSurv Design Group.

(2) Depth below existing grades at time of boring.

(3) Seasonal high groundwater table depth reported in the Polk County, Florida USDA Soil Survey information.

(4) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Polk County, Florida USDA Soil Survey information, surrounding topography, and ground elevations of adjacent wetlands.

APPENDIX C

Summary of Resilient Modulus Test Results (Provided by FDOT State Materials Office)

Florida Department of Transportation

RICK SCOTT
GOVERNOR

State Materials Office
5007 NE 39th Avenue, Gainesville, FL 32609
(352) 955-6600

JIM BOXOLD
SECRETARY

MEMORANDUM

DATE: September 8, 2015

TO: Teresa Puckett

FROM: David Horhota

SUBJECT: Embankment Resilient Modulus Pavement Design
District 1, Polk County
FPN 436559-1: SR-60 Grade Separation over CSX Railroad

Five (5), 2-bag samples were received by the State Materials Office (SMO) for determination of an embankment (roadbed) resilient modulus for pavement design. After visual observation of the five samples, it was determined that the material from each 2-bag sample looked visually similar and the material from each of the bags were combined to form one sample from each location. After combining materials from the bags, samples from each location were obtained for classification tests (Atterberg limits, particle size analysis, and organic content), Proctor density, and resilient modulus. The classification test results are reported in Tables 1 and 2. Information provided for this project by Tierra, Inc. indicated all samples were collected from between 1.0 and 2.0 feet in depth.

Table 1. Summary of Gradation Results

Sample ID	Passing 1/2" (%)	Passing 3/8” (%)	Passing No. 4 (%)	Passing No. 10 (%)	Passing No. 40 (%)	Passing No. 60 (%)	Passing No. 100 (%)	Passing No. 200 (%)
PB-1-1	100.0	100.0	100.0	100.0	88.3	55.3	22.1	12.3
AB-2380R	100.0	100.0	100.0	100.0	86.4	45.7	11.3	2.9
AB-2395L	100.0	99.7	99.5	99.3	85.6	46.5	17.9	10.1
PB-2-1	100.0	100.0	100.0	100.0	89.0	50.4	15.3	6.4
AB-2415L	100.0	100.0	100.0	100.0	88.2	47.4	14.9	6.7

Table 2. Summary of Classification Results

Sample ID	Easting	Northing	Soil Class.	Org. Content (%)	LL/PI
PB-1-1	763460	1298935	A-2-4	2.3	N.P.
AB-2380R	764173	1298224	A-3	0.2	N.P.
AB-2395L	765665	1297924	A-3	3.2	N.P.
PB-2-1	766623	1297914	A-3	0.5	N.P.
AB-2415L	767566	1297319	A-3	0.4	N.P.

In addition to the classification testing, the following test program was conducted:

(1) Standard Proctor, AASHTO T 99
(2) Resilient Modulus (M_R), AASHTO T 307.

A summary of laboratory test results is included in Table 3. The resilient modulus values listed in this table were obtained using the relationship developed from each individual test (resilient modulus versus bulk stress - with bulk stress, **Θ,** defined as $\mathbf{\Theta = \sigma_1 + \sigma_2 + \sigma_3}$), and using a bulk stress of 11 psi, which is the recommendation from Dr. Ping's research work in modeling the embankment in-situ stresses for Florida pavement conditions. Two results are listed for each location because two samples were prepared for each location and they represent the individual test result from each sample tested. The resilient modulus samples were compacted to within 1 pound per cubic foot (pcf) of the maximum density and 0.5 percent of the optimum moisture content as determined by AASHTO T99.

Table 3. Summary of T-99 and M_R Test Results

Sample ID	Passing No. 200 (%)	Standard Proctor Density (pcf)	Optimum Moisture Content (%)	Resilient Modulus @ Θ=11psi (psi)
PB-1-1	12	109.7	11.8	9,798
				10,154
AB-2380R	3	107.6	12.8	10,855
				11,425
AB-2395L	10	101.9	18.0	7,112
				7,107
PB-2-1	6	105.5	12.8	7,768
				7,877
AB-2415L	7	108.8	12.4	10,491
				10,040

To obtain a design embankment resilient modulus, a 90 percent method was used as outlined in both the Flexible Pavement Design Manual and Soils and Foundations Handbook. The resilient modulus values were ranked in ascending order and the percentage of values which were greater than or equal to the individual value were determined. The results of this analysis are recorded in Table 4 and the corresponding graph of these results is included as Figure 1. The numbers in parentheses (after the sample identification information) represent the test number (either 1 or 2) for the corresponding resilient modulus value due to the fact that two individual tests were performed on material from the same location (as shown in Table 3).

Table 4. Ranked M_R Test Results for 90 Percent Method

Rank	Sample ID	% ≥	M_R (psi)
1	AB-2395L (2)	100	7,107
2	AB-2395L (1)	90	7,112
3	PB-2-1 (1)	80	7,768
4	PB-2-1 (2)	70	7,877
5	PB-1-1 (1)	60	9,798
6	AB-2415L (2)	50	10,040
7	PB-1-1 (2)	40	10,154
8	AB-2415L (1)	30	10,491
9	AB-2380R (1)	20	10,855
10	AB-2380R (2)	10	11,425

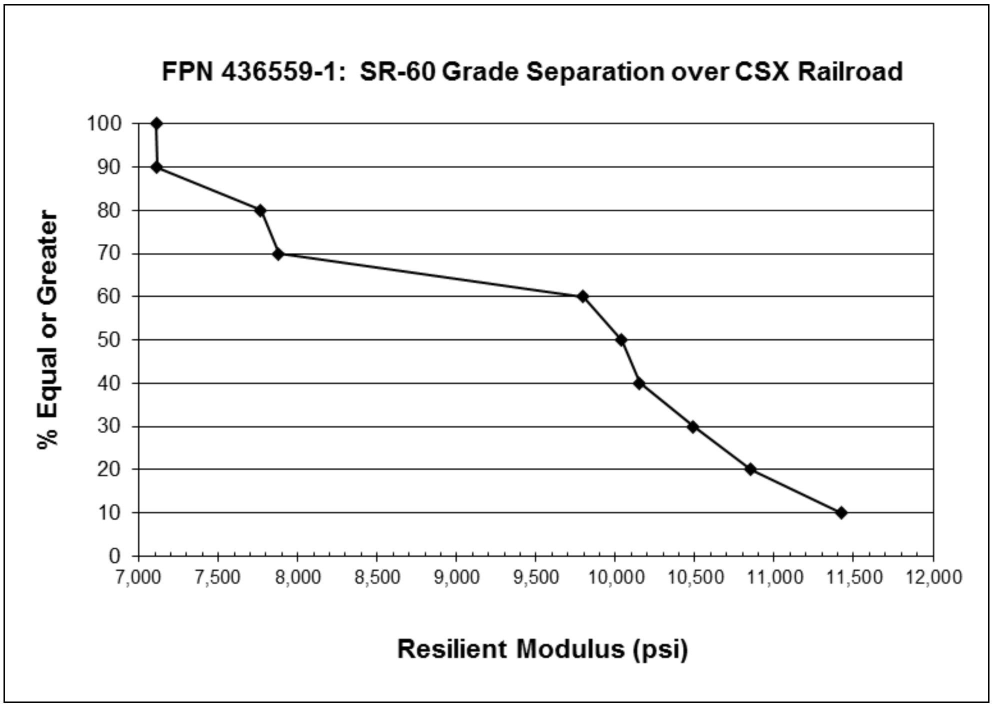


Figure 1. Ranked M_R Test Results for 90% Method

Based on the results shown in Table 4 and Figure 1, the resilient modulus corresponding to a 90th percentile is **7,100 psi**, which would represent the design embankment M_R value.

APPENDIX D

Summary of Laboratory Test Results (7 Sheets)

Summary of Corrosion Test Results (2 Sheets)

TABLE 4

SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
AB-3377R	4.0 - 5.0	1	A-3	100	88	45	9	2	---	---	---	---	---
PB-1-4-2	3.5 - 4.0	1	A-3	100	86	42	11	4	---	---	---	---	---
AB-3379L	0.0 - 9.0	1	A-3	---	---	---	---	4	---	---	---	---	---
AB-3423R	0.0 - 5.0	1	A-3	---	---	---	---	4	---	---	---	---	---
RB-3421R	6.0 - 8.0	1	A-3	---	---	---	---	4	---	---	---	---	---
AB-201	0.0 - 5.0	1	A-3	---	---	---	---	5	---	---	---	---	---
AB-204	0.5 - 5.0	1	A-3	---	---	---	---	5	---	---	---	---	---
AB-101	0.0 - 2.0	1	A-3	100	87	49	16	6	---	---	---	---	---
AB-2380R	1.5 - 2.5	1	A-3	---	---	---	---	6	---	---	---	---	---
BB-3389L	2.0 - 6.0	1	A-3	---	---	---	---	6	---	---	---	---	---
RB-104	4.0 - 6.0	1	A-3	100	88	49	16	6	---	---	---	---	---
PB-3-2-2	3.5 - 4.5	1	A-3	100	89	48	13	6	---	---	---	---	---
AB-2390L	2.5 - 3.5	1	A-3	---	---	---	---	6	---	---	---	---	---
WB-3397L	0.0 - 4.0	1	A-3	---	---	---	---	6	---	---	---	---	---
AB-110	0.5 - 5.0	1	A-3	100	87	48	15	6	---	---	---	---	---
AB-2365L	0.5 - 1.5	1	A-3					6	---	---	---	---	---
AB-118	2.0 - 5.0	1	A-3	---	---	---	---	6	---	---	---	---	---
WB-3409L	0.0 - 4.0	1	A-3	---	---	---	---	6	---	---	---	---	---
AB-2390L	5.5 - 6.0	1	A-3	100	84	40	10	7	---	---	---	---	---
RB-313	2.0 - 4.0	1	A-3	---	---	---	---	7	---	---	---	---	---
AB-2404L	1.0 - 2.0	1	A-3	---	---	---	---	7	---	---	---	---	---
PB-3-2-15	2.0 - 6.0	1	A-3	---	---	---	---	7	---	---	---	---	---

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
AB-2385R	4.5 - 5.0	1	A-3	100	83	40	11	7	---	---	---	---	---
AB-2410L	1.5 - 2.0	1	A-3	100	87	47	15	7	---	---	---	---	---
PB-1-4-1	3.0 - 4.0	1	A-3	100	89	51	15	7	---	---	---	---	---
AB-3373R	0.0 - 5.0	1	A-3	---	---	---	---	7	---	---	---	---	---
AB-2425L	1.5 - 2.5	1	A-3	---	---	---	---	7	---	---	---	---	---
AB-2418L	3.5 - 4.0	1	A-3	100	88	51	16	7	---	---	---	---	---
AB-2415L	2.5 - 3.0	1	A-3	100	88	47	16	7	---	---	---	---	---
WB-3418R	2.0 - 6.0	1	A-3	---	---	---	---	7	---	---	---	---	---
AB-3427L	0.0 - 5.0	1	A-3	100	89	50	15	7	---	---	---	---	---
AB-2380L	3.5 - 4.0	1	A-3	100	88	51	16	8	---	---	---	2	21
AB-2385L	0.5 - 1.0	1	A-3	100	85	44	15	8	---	---	---	---	---
WB-3384R	2.0 - 6.0	1	A-3	---	---	---	---	8	---	---	---	---	---
WB-3398R	2.0 - 6.0	1	A-3	---	---	---	---	8	---	---	---	---	---
AB-2395L	3.5 - 4.0	1	A-3	---	---	---	---	8	---	---	---	1	23
AB-2425L	0.5 - 1.0	1	A-3	100	91	55	17	8	---	---	---	---	---
AB-2430R	8.5 - 9.0	1	A-3	100	83	40	13	9	---	---	---	---	---
BB-3403R	2.0 - 8.0	1	A-3	---	---	---	---	9	---	---	---	---	---
WB-3384L	2.0 - 6.0	1	A-3	---	---	---	---	9	---	---	---	---	---
AB-2370R	2.0 - 2.5	1	A-3	100	88	50	19	10	---	---	---	---	---
AB-3426R	3.5 - 5.0	1	A-3	---	---	---	---	10	---	---	---	---	---
PB-3-2-5	4.0 - 6.0	1	A-3	---	---	---	---	10	---	---	---	3	16
RB-3376L	2.0 - 4.0	2	A-2-4	---	---	---	---	10	---	---	---	---	---

TABLE 4

SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
RB-3386L	2.0 - 4.0	2	A-2-4	100	86	50	19	11	---	---	---	---	---
AB-2370L	2.5 - 3.0	2	A-2-4	100	88	50	20	11	---	---	---	---	---
PB-3-2-8	4.0 - 8.0	2	A-2-4	---	---	---	---	11	---	---	---	---	---
WB-3415R	2.0 - 4.0	2	A-2-4	---	---	---	---	11	---	---	---	2	25
AB-105	0.0 - 5.0	2	A-2-4	---	---	---	---	11	---	---	---	---	---
AB-2415R	3.0 - 3.5	2	A-2-4	100	85	44	17	12	---	---	---	---	---
WB-3406L	4.0 - 6.0	2	A-2-4	---	---	---	---	13	NP	NP	NP	---	16
BB-3387R	6.0 - 10.0	2	A-2-4	---	---	---	---	14	---	---	---	---	---
RB-3426L	2.0 - 4.0	2	A-2-4	100	86	46	18	14	NP	NP	NP	---	13
WB-3405L	18.5 - 20.0	2	A-2-4	100	93	50	15	14	---	---	---	---	---
AB-3417L	4.0 - 4.5	2	A-2-4	---	---	---	---	14	NP	NP	NP	---	22
PB-3-2-7	2.0 - 6.0	2	A-2-4	---	---	---	---	14	---	---	---	---	---
PB-3-2-9	6.0 - 8.0	2	A-2-4	---	---	---	---	14	---	---	---	---	---
AB-3368L	0.0 - 5.0	2	A-2-4	100	87	50	23	15	---	---	---	---	---
BB-3400L	18.5 - 20.0	2	A-2-4	---	---	---	---	15	NP	NP	NP	---	20
RB-109	4.0 - 6.0	2	A-2-4	---	---	---	---	15	---	---	---	---	---
RB-318	6.0 - 8.0	2	A-2-4	---	---	---	---	15	---	---	---	---	---
AB-2370R	1.5 - 2.0	2	A-2-4	100	89	54	24	16	---	---	---	---	---
RB-303	6.0 - 8.0	2	A-2-4	---	---	---	---	17	---	---	---	---	---
WB-3412L	4.0 - 6.0	2	A-2-4	100	89	52	23	17	---	---	---	---	---
PB-3-2-1	4.0 - 4.5	2	A-2-4	---	---	---	---	17	---	---	---	---	---

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
PB-3-2-11	6.0 - 10.0	2	A-2-4	---	---	---	---	17	---	---	---	---	---
AB-301	0.0 - 5.0	2	A-2-4	100	87	49	22	17	---	---	---	---	---
AB-2406L	4.0 - 4.5	2	A-2-4	---	---	---	---	18	---	---	---	---	---
RB-308	4.0 - 6.0	2	A-2-4	---	---	---	---	18	NP	NP	NP	---	16
PB-3-2-13	2.0 - 4.0	2	A-2-4	---	---	---	---	18	---	---	---	---	---
AB-2430R	9.5 - 10.0	2	A-2-4	---	---	---	---	19	NP	NP	NP	---	19
AB-2399R	0.0 - 2.0	2	A-2-4	100	89	54	27	19	---	---	---	---	
WB-3396+50L	13.5 - 15.0	2	A-2-4	---	---	---	---	19	---	---	---	3	23
AB-3421L	3.0 - 4.5	2	A-2-4	100	77	40	25	19	---	---	---	---	---
PB-3-2-4	8.0 - 10.0	2	A-2-4	---	---	---	---	20	---	---	---	---	---
AB-2404L	4.0 - 4.5	2	A-2-4	100	89	54	27	20	---	---	---	---	---
AB-2410R	3.0 - 4.0	2	A-2-4	---	---	---	---	21	---	---	---	---	---
PB-3-2-6	6.0 - 8.0	2	A-2-4	---	---	---	---	21	---	---	---	---	---
WB-3384R	0.0 - 2.0	2	A-2-4	100	93	73	34	21	---	---	---	---	---
RB-3381R	2.0 - 4.0	3	A-2-4	---	---	---	---	16	16	14	2	---	14
RB-3376L	4.0 - 6.0	3	A-2-4	---	---	---	---	15	19	16	3	---	15
AB-2401L	4.5 - 5.0	3	A-2-4	100	86	49	24	19	18	14	4	---	21
WB-3408R	4.0 - 6.0	3	A-2-4	---	---	---	---	15	18	12	6	---	18
BB-3395R	4.0 - 6.0	3	A-2-4	---	---	---	---	26	18	12	6	---	13
AB-3424L	3.5 - 5.0	3	A-2-4	---	---	---	---	28	19	12	7	---	13
PB-3-2-2	5.0 - 5.5	3	A-2-4	---	---	---	---	21	20	13	7	---	14
PB-3-2-12	2.0 - 4.0	3	A-2-4	---	---	---	---	21	22	15	7	---	17

TABLE 4

SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
AB-2405R	3.5 - 4.0	3	A-2-4	100	91	63	40	34	22	14	8	---	25
AB-3382R	5.0 - 8.0	3	A-2-4	---	---	---	---	29	22	14	8	---	25
PB-3-2-3	2.0 - 4.0	3	A-2-4	---	---	---	---	21	23	15	8	---	15
AB-2365L	3.0 - 3.5	3	A-2-4	100	91	61	33	26	22	13	9	---	23
PB-3-2-14	6.0 - 8.0	3	A-2-4	---	---	---	---	21	22	12	10	---	15
WB-3380L	8.0 - 10.0	3	A-2-4	---	---	---	---	20	23	13	10	---	16
AB-2380R	4.5 - 5.0	3	A-2-4	---	---	---	---	19	30	20	10	---	15
AB-3373L	4.5 - 5.0	3	A-2-6	---	---	---	---	31	22	11	11	---	21
AB-3367R	4.0 - 5.0	3	A-2-6	---	---	---	---	32	23	12	11	---	21
RB-3366L	2.0 - 4.0	3	A-2-6	100	88	59	37	32	25	14	11	---	22
AB-2401L	3.5 - 4.0	3	A-2-6	100	91	58	36	30	27	16	11	---	21
PB-3-2-16	8.0 - 10.0	3	A-2-6	---	---	---	---	21	23	11	12	---	16
RB-3371R	4.0 - 6.0	3	A-2-6	---	---	---	---	34	28	16	12	---	22
AB-2410R	4.0 - 4.5	3	A-2-6	100	88	56	38	34	29	17	12	---	24
BB-3395L	8.0 - 10.0	3	A-2-6	---	---	---	---	30	29	16	13	---	21
PB-3-2-1	6.5 - 7.0	3	A-2-6	---	---	---	---	26	28	14	14	---	14
AB-2385L	4.5 - 5.0	3	A-2-6	---	---	---	---	30	27	12	15	---	11
AB-2375L	4.5 - 5.0	3	A-2-6	---	---	---	---	22	31	16	15	---	18
AB-2390L	3.5 - 4.0	3	A-2-6	---	---	---	---	27	29	13	16	---	15
WB-3412L	13.5 - 15.0	3	A-2-6	---	---	---	---	29	30	13	17	---	15
PB-3-2-10	4.0 - 6.0	3	A-2-6	---	---	---	---	30	34	16	18	---	13
AB-2380R	3.0 - 3.5	3	A-2-6	---	---	---	---	31	35	17	18	---	23

TABLE 4

SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION

SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
BB-3389L	18.5 - 20.0	3	A-2-6	---	---	---	---	31	34	15	19	---	18
AB-2385R	2.5 - 3.0	3	A-2-6	---	---	---	---	30	34	14	20	---	15
AB-2375R	2.5 - 3.0	3	A-2-7	---	---	---	---	34	42	18	24	---	26
AB-2406L	0.5 - 1.0	3	A-2-4	100	70	53	28	23	---	---	---	---	---
AB-3365R	1.5 - 2.5	3	A-2-4	100	94	75	36	27	---	---	---	---	---
AB-102R	3.0 - 6.0	3	A-2-4	---	---	---	---	26	---	---	---	---	18
AB-305	4.0 - 5.0	3	A-2-6	---	---	---	---	32	---	---	---	---	---
AB-3374R	7.0 - 8.0	3	A-2-6	---	---	---	---	34	---	---	---	---	---
AB-2405R	4.5 - 5.0	4	A-6	100	93	67	45	39	29	16	13	---	27
WB-3406R	4.0 - 6.0	4	A-6	---	---	---	---	41	28	14	14	---	21
BB-3400L	6.0 - 8.0	4	A-6	---	---	---	---	37	37	19	18	---	20
BB-3403R	13.5 - 15.0	4	A-6	---	---	---	---	39	36	17	19	---	22
AB-2375L	2.5 - 3.0	4	A-6	---	---	---	---	37	38	17	21	---	21
AB-2399R	2.5 - 3.0	4	A-7-6	100	92	64	46	42	43	18	25	---	22
AB-122	4.0 - 5.0	5	A-2-4	---	---	---	---	20	---	---	---	---	---
AB-3378L	2.5 - 3.5	6	A-8	---	---	---	---	12	---	---	---	7	45
WB-3415R	0.0 - 2.0	6	A-8	---	---	---	---	12	---	---	---	18	55
AB-2415R	1.5 - 2.0	6	A-8	---	---	---	---	13	---	---	---	16	51
RB-3391R	4.0 - 6.0	6	A-8	---	---	---	---	14	---	---	---	6	30
AB-2395L	1.0 - 1.5	6	A-8	---	---	---	---	15	---	---	---	6	34
AB-2390R	0.5 - 1.0	6	A-8	---	---	---	---	18	---	---	---	6	29
AB-103	0.0 - 1.0	6	A-8	---	---	---	---	22	---	---	---	12	53

TABLE 4

SUMMARY OF LABORATORY TEST RESULTS FOR SOIL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Sample Depth (ft)	Stratum Number	AASHTO Symbol	Sieve Analysis (% Passing)					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				No. 10	No. 40	No. 60	No. 100	No. 200	Liquid Limit	Plastic Limit	Plasticity Index		
WB-3396L	18.5 - 20.0	6	A-8	---	---	---	---	34	35	30	5	9	44
AB-2395L	2.5 - 3.0	6	A-8	---	---	---	---	35	---	---	---	25	106
AB-2370L	0.0 - 0.5	8	A-2-4	---	---	---	---	12	---	---	---	4	31
AB-2390R	1.0 - 1.5	8	A-2-4	---	---	---	---	13	---	---	---	4	24
AB-2401L	2.5 - 3.0	8	A-2-4	100	88	51	21	13	---	---	---	4	64
AB-2418R	2.0 - 2.5	8	A-2-4	---	---	---	---	15	---	---	---	4	24
RB-120	4.0 - 6.0	8	A-2-4	---	---	---	---	25	---	---	---	4	20

TABLE 5

SUMMARY OF LABORATORY TEST RESULTS FOR ENVIRONMENTAL CLASSIFICATION

SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Depth (ft)	Stratum	pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification(1) (Soil)	
							Steel	**Concrete**
PB-1-4-1	3.0 - 4.0	1	4.1	23,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
PB-3-2-15	2.0 - 6.0	1	4.6	34,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
PB-3-2-2	3.5 - 4.5	1	4.9	88,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
AB-2425L	1.5 - 2.5	1	6.0	28,000	15	< 4.8	Moderately Aggressive	Moderately Aggressive
WB-3384L	2.0 - 6.0	1	6.1	24,000	5	< 4.8	Moderately Aggressive	Slightly Aggressive
WB-3409L	0.0 - 4.0	1	6.1	45,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
AB-2404L	1.0 - 2.0	1	6.2	38,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
BB-3403R	2.0 - 8.0	1	6.5	19,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
WB-3398R	2.0 - 6.0	1	6.5	28,000	30	< 4.8	Moderately Aggressive	Slightly Aggressive
AB-2380R	1.5 - 2.5	1	6.6	46,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
WB-3384R	2.0 - 6.0	1	6.8	36,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
WB-3418R	2.0 - 6.0	1	7.3	33,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
AB-201	0.0 - 5.0	1	7.4	46,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
AB-3423R	0.0 - 5.0	1	7.5	25,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
AB-2365L	0.5 - 1.5	1	7.5	8,600	45	15.5	Slightly Aggressive	Slightly Aggressive
BB-3395L	4.0 - 8.0	1	7.6	12,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
WB-3397L	0.0 - 4.0	1	7.6	24,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
BB-3389L	2.0 - 6.0	1	7.8	37,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
AB-2390L	2.5 - 3.5	1	8.2	36,000	15	< 4.8	Slightly Aggressive	Slightly Aggressive
AB-2410R	3.0 - 4.0	2	4.4	18,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
BB-3387R	6.0 - 10.0	2	5.1	16,000	30	< 4.8	Extremely Aggressive	Moderately Aggressive
BB-3400L	2.0 - 6.0	2	6.7	19,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
AB-3417L	4.0 - 4.5	2	6.8	13,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
PB-3-2-7	2.0 - 6.0	2	4.5	25,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive

(1) As per FDOT Structures Design Guidelines.

TABLE 5

SUMMARY OF LABORATORY TEST RESULTS FOR ENVIRONMENTAL CLASSIFICATION
SR 60 GRADE SEPARATION OVER CSX RAILROAD
POLK COUNTY, FLORIDA
FINANCIAL PROJECT NO. 436559-1-52-01
TIERRA PROJECT NO: 6511-15-022

Boring Number	Depth (ft)	Stratum	pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification[1] (Soil)	
							Steel	Concrete
PB-3-2-8	4.0 - 8.0	2	4.9	44,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
AB-102R	3.0 - 6.0	3	3.5	3,500	15	< 4.8	Extremely Aggressive	Extremely Aggressive
AB-3365R	1.5 - 2.5	3	4.2	22,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
PB-3-2-11	6.0 - 10.0	3	4.7	13,000	30	6.2	Extremely Aggressive	Extremely Aggressive
AB-3382R	5.0 - 8.0	3	4.9	15,000	15	< 4.8	Extremely Aggressive	Extremely Aggressive
AB-305	4.0 - 5.0	3	5.2	5,500	90	< 4.8	Extremely Aggressive	Moderately Aggressive
AB-3373L	4.5 - 5.0	3	5.7	18,000	15	< 4.8	Extremely Aggressive	Moderately Aggressive
BB-3395L	0.0 - 4.0	3	6.7	17,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive
AB-3378L	2.5 - 3.5	6	6.9	15,000	15	< 4.8	Moderately Aggressive	Slightly Aggressive

(1) As per FDOT Structures Design Guidelines.

APPENDIX E

FHWA Review Checklist

GTR REVIEW CHECKLIST (SITE INVESTIGATION)

A. Site Investigation Information

Since the most important step in the geotechnical design process is the conduct of an adequate site investigation, presentation of the subsurface information in the geotechnical report and on the plans deserves careful attention.

Geotechnical Report Text (Introduction) (Pages 322-325)	YES	NO	UNKNOWN OR N/A
1. Is the general location of the investigation described and/or a vicinity map included?	☒	☐	☐
2. Is scope and purpose of the investigation summarized?	☒	☐	☐
3. Is concise description given of geologic setting and topography of area?	☒	☐	☐
4. Are the field explorations and laboratory tests on which the report is based listed?	☒	☐	☐
5. Is general description of subsurface soil, rock, and groundwater conditions given?	☒	☐	☐
*6. Is the following information included with the geotechnical report (typically included in report appendices):			
a. Test hole logs? (Pages 25-33) b. Field test data? c. Laboratory test data? (Pages 74 - 75) d. Photographs (if pertinent)?	☒	☐	☐
Plan and Subsurface Profile (Pages 24, 47-49, 335)			
*7. Is a plan and subsurface profile of the investigation site provided?	☒	☐	☐
8. Are the field explorations located on the plan view?	☒	☐	☐
*9. Does the conducted site investigation meet minimum criteria outlined in Table 2?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SITE INVESTIGATION)			
Plan and Subsurface Profile (Pages 24, 47-49, 335) Continued	YES	NO	UNKNOWN OR N/A
10. Are the explorations plotted and correctly numbered on the profile at their true elevation and location?	☒	☐	☐
11. Does the subsurface profile contain a word description and/or graphic depiction of soil and rock types?	☒	☐	☐
12. Are groundwater levels and date measured shown on the subsurface profile?	☒	☐	☐
Subsurface Profile or Field Boring Log (Pages 16-17, 25-29)			
13. Are sample types and depths noted?	☒	☐	☐
*14 Are SPT blow counts, percent core recovery, and RQD values shown?	☒	☐	☐
15. If cone penetration tests were made, are plots of cone resistance and friction ratio shown with depth?	☐	☐	☒
Laboratory Test Data (Pages 60, 74-75)			
*16 Were lab soil classification tests such as natural moisture content, gradation, Atterberg limits, performed on selected representative samples to verify field visual soil identifications?	☒	☐	☐
17. Are laboratory test results such as shear strength (Page 62), consolidation (Page 68), etc., included and/or summarized?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)			
B. Centerline Cuts and Embankments (Pages 6-9) In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?			
Are station to station descriptions included for:	YES	NO	UNKNOWN OR N/A
1. Existing surface and subsurface drainage?	☐	☐	☒
2. Evidence of springs and excessively wet areas?	☐	☐	☒
3. Slides, slumps, and faults noted along the alignment?	☐	☐	☒
Are station to station recommendations included for:			
General Soil Cut or Fill			
4. Specific surface/subsurface drainage recommendations?	☐	☐	☒
5. Excavation limits of unsuitable materials?	☒	☐	☐
*6. Erosion protection measures for backslopes, side slopes, and ditches, including riprap recommendations or special slope treatments?	☐	☐	☒
Soil Cuts (Pages 101-102)			
*7. Recommended cut slope design?	☒	☐	☐
8. Are clay cut slopes designed for minimum F.S. = 1.50?	☐	☐	☒
9. Special usage of excavated soils?	☒	☐	☐
10. Estimated shrink-swell factors for excavated materials?	☐	☐	☒
11. If answer to 3 is YES, are recommendations provided for design treatments?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (CENTERLINE CUTS & EMBANKMENTS)			
Fills (Pages 77-79)	YES	NO	UNKNOWN OR N/A
11. Recommended fill slope design?	☒	☐	☐
12. Will fill slope design provide minimum F.S. = 1.25?	☒	☐	☐
Rock Slopes			
*13 Are recommended slope designs and blasting specifications provided?	☐	☐	☒
*14 Is the need for special rock slope stabilization measures, e.g., rockfall catch ditch, wire mesh slope protection, shotcrete, rock bolts, addressed?	☐	☐	☒
15. Has the use of "template" designs been avoided (such as designing all rock slopes on 1/4 to 1 rather than designing based on orientation of major rock jointing)?	☐	☐	☒
*16 Have effects of blast induced vibrations on adjacent structures been evaluated?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)

C. Embankments over Soft Ground

Where embankments must be built over soft ground (such as soft clays, organic silts, or peat), stability and settlement of the fill should be carefully evaluated. In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?

Embankment Stability (Pages 77-79, 95-97)	YES	NO	UNKNOWN OR N/A
*1 Has the stability of the embankment been evaluated for minimum safety factors of 1.25 for side slope stability and 1.30 for end slope stability of bridge approach embankments?	☐	☐	☒
*2. Has the shear strength of the foundation soil been determined from lab testing and/or field vane shear or static cone penetrometer tests?	☐	☐	☒
*3. If the proposed embankment does not provide minimum factors of safety given above, are recommendations given for feasible treatment alternates which will increase factor of safety to minimum acceptable (such as change alignment, lower grade, use stabilizing counterberms, excavate and replace weak subsoil, fill stage construction, lightweight fill, geotextile fabric reinforcement, etc.)?	☐	☐	☒
*4. Are cost comparisons of treatment alternates given and a specific alternate recommended?	☐	☐	☒
Settlement of Subsoil (Pages 146-160)			
5. Have consolidation properties of fine grained soils been determined from laboratory consolidation tests?	☐	☐	☒
*6. Have settlement amount and settlement time been estimated?	☐	☐	☒
7. For bridge approach embankments, are recommendations made to get the settlement out before the bridge abutment is constructed (waiting period, surcharge, or wick drains)?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (EMBANKMENTS OVER SOFT GROUND)

Settlement of Subsoil (Pages 146-160)	YES	NO	UNKNOWN OR N/A
8. If geotechnical instrumentation is proposed to monitor fill stability and settlement, are detailed recommendations provided on the number, type, and specific locations of the proposed instruments?	☐	☐	☒
9. Construction Considerations (Pages 183, 331-334)			
a. If excavation and replacement of unsuitable shallow surface deposits (peat, muck, top soil) is recommended - are vertical and lateral limits of recommended excavation provided?	☒	☐	☐
b. Where a surcharge treatment is recommended, are plan and cross-section of surcharge treatment provided in geotechnical report for benefit of the roadway designer?	☐	☐	☒
c. Are instructions or specifications provided concerning instrumentation, fill placement rates and estimated delay times for the contractor?	☐	☐	☒
d. Are recommendations provided for disposal of surcharge material after the settlement period is complete?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)

D. Landslide Corrections (Pages 77-80, 103-105)

In addition to the basic information listed in Section A, is the following information provided in the landslide study geotechnical report? (Refer to Table 4 for guidance on the necessary technical support data for correction of slope instabilities.)

	YES	NO	UNKNOWN OR N/A
*1. Is a site plan and scaled cross-section provided showing ground surface conditions both before and after failure?	☐	☐	☒
*2. Is the past history of the slide area summarized - including movement history, summary of maintenance work and costs, and previous corrective measures taken (if any?)	☐	☐	☒
*3. Is a summary given of results of site investigation, field and lab testing, and stability analysis, including cause(s) of the slide?	☐	☐	☒
Plan			
4. Are detailed slide features - including location of ground surface cracks, head scarp, and toe bulge - shown on the site plan?	☐	☐	☒
Cross Section			
*5. Are the cross sections used for stability analysis included with the soil profile, water table, soil unit weights, soil shear strengths, and failure plane shown as it exists?	☐	☐	☒
*6. Is slide failure plane location determined from slope indicators?	☐	☐	☒
*7. For an active slide, was soil strength along the slide failure plane backfigured using a safety factor equal to 1.0 at the time of failure?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (LANDSLIDE CORRECTIONS)

Landslide Corrections (Continued)	YES	NO	UNKNOWN OR N/A
Text			
*8. Is the following information presented for each proposed correction alternate: (typical correction methods include buttress, shear key, rebuild slope, surface drainage, subsurface drainage-interceptor, drain trenches or horizontal drains and retaining structures)?	☐	☐	☒
a. Cross-section of proposed alternate? b. Estimated safety factor? c. Estimated cost? d. Advantages and disadvantages?			
9. Is a recommended correction alternate(s) given which provide a minimum F.S. = 1.25?	☐	☐	☒
10. If horizontal drains are proposed as part of slide correction, has subsurface investigation located definite water bearing strata that can be tapped with horizontal drains?	☐	☐	☒
11. If a toe counterberm is proposed to stabilize an active slide, has field investigation confirmed that the toe of the existing slide does <u>not</u> extend beyond the toe of the proposed counterberm?	☐	☐	☒
12. <u>Construction Considerations:</u>			
a. Where proposed correction will require excavation into the toe of an active slide (such as for buttress or shear key), has the "during construction backslope F.S." with open excavation been determined?	☐	☐	☒
b. If open excavation F.S. is near 1.0, has excavation stage construction been proposed?	☐	☐	☒
c. Has seasonal fluctuation of groundwater table been considered?	☐	☐	☒
d. Are special construction features, techniques and materials described and specified?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (RETAINING WALLS)

E. Retaining Walls (See Section 5 of "Geotechnical Engineering Notebook")

In addition to the basic information listed in Section A, is the following information provided in the project geotechnical report?

	YES	NO	UNKNOWN OR N/A
*1. Does the geotechnical report include recommended soil strength parameters and groundwater elevation for use in computing wall design lateral earth pressures and factor of safety for overturning, sliding, and external slope stability?	☐	☐	☒
2. Is it proposed to bid alternate wall designs?	☐	☐	☒
*3. Are acceptable reasons given for the choice and/or exclusion of certain wall types (gravity, reinforced soil, tieback, cantilever, etc.)?	☐	☐	☒
*4. Is an analysis of the wall stability included with minimum acceptable factors of safety against overturning (F.S. = 2.0), sliding (F.S. = 1.5), and external slope stability (F.S. = 1.5)?	☐	☐	☒
5. If wall will be placed on compressible foundation soils, is estimated total settlement, differential settlement, and time rate of settlement given?	☐	☐	☒
6. Will wall types selected for compressible foundation soils allow differential movement without distress?	☐	☐	☒
7. Are wall drainage details including materials and compaction provided?	☐	☐	☒
8. Construction Considerations			
a. Are excavation requirements covered - safe slopes for open excavations, need for sheeting or shoring?	☒	☐	☐
b. Fluctuation of groundwater table?	☒	☐	☐

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (SPREAD FOOTINGS)

F. Structure Foundations - Spread Footings
(Pages 191-205)

In addition to the basic information listed in Section A, is the following information provided in the project foundation report?

	YES	NO	UNKNOWN OR N/A
*1. Are spread footings recommended for foundation support? If not, are reasons for not using them discussed?	☐	☐	☒
If spread footing supports are recommended, are conclusions/recommendations given for the following:			
*2. Is recommended bottom of footing elevation and reason for recommendation (e.g., based on frost depth, estimated scour depth, or depth to competent bearing material) given?	☐	☐	☒
*3. Is recommended allowable soil or rock bearing pressure given?	☐	☐	☒
*4. Is estimated footing settlement and time given?	☐	☐	☒
5. Where spread footings are recommended to support abutments placed in the bridge end fills, are special gradation and compaction requirements provided for select end fill and backwall drainage material? (Pages 137-141)	☐	☐	☒
6. Construction Considerations:			
a. Have the materials been adequately described on which the footing is to be placed so the project inspector can verify that material is as expected?	☐	☐	☒
b. Have excavation requirements been included for safe slopes in open excavations, need for sheeting or shoring, etc?	☐	☐	☒
c. Has fluctuation of the groundwater table been addressed?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)

G. Structure Foundations - Piles
(Pages 224-311)

In addition to the basic information listed in Section A, if pile support is recommended or given as an alternate, conclusions/recommendations should be provided in the project geotechnical report for the following:

	YES	NO	UNKNOWN OR N/A
*1. Is the recommended pile type given (displacement, nondisplacement, pipe pile, concrete pile, H-pile, etc.) with valid reasons given for choice and/or exclusions? (Pages 224-226)	☐	☐	☒
2. Do you consider the recommended pile type(s) to be the most suitable and economical?	☐	☐	☒
*3. Are estimated pile lengths and estimated tip elevations given for the recommended allowable pile design loads?	☐	☐	☒
4. Do you consider the recommended design loads to be reasonable?	☐	☐	☒
5. Has pile group settlement been estimated (only of practical significance for friction pile groups ending in cohesive soil)? (Pages 245-247)	☐	☐	☒
6. If a specified or minimum pile tip elevation is recommended, is a clear reason given for the required tip elevation, such as underlying soft layers, scour, downdrag, piles uneconomically long, etc.?	☐	☐	☒
*7. Has design analysis (wave equation analysis) verified that the recommended pile section can be driven to the estimated or specified tip elevation without damage (especially applicable where dense gravel-cobble-boulder layers or other obstructions have to be penetrated?	☐	☐	☒
8. Where scour piles are required, have pile design and driving criteria been established based on mobilizing the full pile design capacity below the scour zone?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)

G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
9. Where lateral load capacity of large diameter piles is an important design consideration, are P-Y curves (load vs. deflection) or soil parameters given in the geotechnical report to allow the structural engineer to evaluate lateral load capacity of all piles?	☐	☐	☒
*10. For pile supported bridge abutments over soft ground:			
a. Has the abutment pile downdrag load been estimated and solutions such as bitumen coating considered in design? Not generally required if surcharging of the fill is being performed (Pages 248-251)	☐	☐	☒
b. Is bridge approach slab recommended to moderate differentials settlement between bridge ends and fill?	☐	☐	☒
c. If the majority of subsoil settlement will not be removed prior to abutment construction (by surcharging), has estimate been made of the amount of abutment rotation that can occur due to lateral squeeze of soft subsoil? (Pages 114-115)	☐	☐	☒
d. Does the geotechnical report specifically alert the structural designer to the estimated horizontal abutment movement?	☐	☐	☒
11. If bridge project is large, has pile load test program been recommended? (Pages 299-302)	☐	☐	☒
12. For a major structure in high seismic risk area, has assessment been made of liquefaction potential of foundation soil during design earthquake (note: only loose saturated sands and silts are "susceptible" to liquefaction)?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (PILE FOUNDATIONS)			
G. Structure Foundations - Piles (Pages 224-311) - Continued	YES	NO	UNKNOWN OR N/A
13. Construction Considerations: (Pages 279-311)			
Have the following important construction considerations been adequately addressed?	☐	☐	☒
a. Pile driving details such as: boulders or obstructions which may be encountered during driving - need for preaugering, jetting, spudding, need for pile tip reinforcement, driving shoes, etc.?	☐	☐	☒
b. Excavation requirements - safe slope for open excavations, need for sheeting or shoring? Fluctuation of groundwater table?	☐	☐	☒
c. Have effects of pile driving operation on adjacent structures been evaluated - such as protection against damage caused by footing excavations or pile driving vibrations?	☐	☐	☒
d. Is preconstruction condition survey to be made of adjacent structures to prevent unwarranted damage claims?	☐	☐	☒
e. On large pile driving projects, have other methods of pile driving control been considered such as dynamic testing or wave equation analysis?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (DRILLED SHAFTS)			
H. Structure Foundations - Drilled Shafts (Pages 252-260) In addition to the basic information listed in Section A, if drilled shaft support is recommended or given as an alternate, are conclusions/recommendations provided in the project foundation report for the following:			
	YES	NO	UNKNOWN OR N/A
*1. Are recommended shaft diameter(s) and length(s) for allowable design loads based on an analysis using soil parameters for side friction and end bearing?	☐	☐	☒
*2. Settlement estimated for recommended design load?	☐	☐	☒
*3. Where lateral load capacity of shaft is an important design consideration, are P-Y (load vs. deflection) curves or soils data provided in geotechnical report which will allow structural engineer to evaluate lateral load capacity of shaft?	☐	☐	☒
4. Is static load test (to plunging failure) recommended?	☐	☐	☒
5. Construction Considerations:			
a. Have construction methods been evaluated, (i.e., can less expensive dry method or slurry method be used or will casing be required)?	☐	☐	☒
b. If casing will be required, can casing be pulled as shaft is concreted (this can result in significant cost savings on very large diameter shafts)?	☐	☐	☒
c. If artesian water was encountered in explorations, have design provisions been included to handle it (such as by requiring casing and tremie seal)?	☐	☐	☒
d. Will boulders be encountered? (Note: If boulders will be encountered, then the use of shafts should be seriously questioned due to construction installation difficulties and resultant higher costs the boulders can cause.)	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)

I. Material Sites

In addition to the basic information listed in Section A, is the following information provided in the project Material Site Report?

	YES	NO	UNKNOWN OR N/A
1. Material site location, including description of existing or proposed access routes and bridge load limits (if any)?	☐	☐	☒
*2. Have soil samples representative of all materials encountered during the pit investigation been submitted and tested?	☐	☐	☒
*3. Are laboratory quality test results included in the report?	☐	☐	☒
4. For aggregate sources, do the laboratory quality test results (such as L.A. abrasion, sodium sulfate, degradation, absorption, reactive aggregate, etc.) indicate if specification materials can be obtained from the deposit using normal processing methods?	☐	☐	☒
5. If the lab quality test results indicate that specification material cannot be obtained from the pit materials as they exist naturally - has the source been rejected or are detailed recommendations provided for processing or controlling production so as to ensure a satisfactory product?	☐	☐	☒
*6. For soil borrow sources, have possible difficulties been noted - such as above optimum moisture content clay-silt soils, waste due to high PI, boulders, etc?	☐	☐	☒
*7. Where high moisture content clay-silt soils must be used, are recommendations provided on the need for aeration to allow the materials to dry out sufficiently to meet compaction requirements?	☐	☐	☒
8. Are estimated shrink-swell factors provided?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

GTR REVIEW CHECKLIST (MATERIAL SITES)

I. Material Site - Continued	YES	NO	UNKNOWN OR N/A
*9. Do the proven material site quantities satisfy the estimated project quantity needs?	☐	☐	☒
10. Where materials will be excavated from below the water table, has seasonal fluctuation of the water table been determined?	☐	☐	☒
11. Are special permits requirement covered?	☐	☐	☒
12. Have pit reclamation requirements been covered adequately?	☐	☐	☒
13. Has a material site sketch (plan and profile) been provided for inclusion in the plans, which contains:	☐	☐	☒
* Material site number?			
* North arrow and legal subdivision?	☐	☐	☒
* Test hole or test pit logs, locations, number and date?	☐	☐	☒
* Water table elevation and date?	☐	☐	☒
* Depth of unsuitable overburden which will have to be stripped?	☐	☐	☒
* Suggested overburden disposal area?	☐	☐	☒
* Proposed mining area and previously mined areas?	☐	☐	☒
* Existing stockpile locations?	☐	☐	☒
* Existing or suggested access roads?	☐	☐	☒
* Bridge load limits?	☐	☐	☒
* Reclamation details?	☐	☐	☒
14. Are recommended special provisions provided?	☐	☐	☒

* A response other than (Yes) or (N/A) for any of these checklist questions is cause to contact the appropriate geotechnical engineer for a clarification and/or to discuss the project.

Appendix 4.0

STORMTABS

4.1 Basin 1

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

PROJECT: SR 60 CSX
PROJECT NUMBER: 436559-1-32-01
SYSTEM: Basin 1-1
LOCATION: SMF 1
PREPARED BY: J. Hernandez
CHECKED BY: T.Kreisle
DATE: 29-Jul-16
DATE: 16-Aug-16

ZONE OR COUNTY: 8
FREQUENCY (YR) 3
FREQ. FACTOR: 1.00
TAILWATER EL (ft.) 112.41
MIN. HGL COVER = 0.00
MIN. PIPE COVER = 3.75

LOCATION OF UPPER END ALIGNMENT NAME STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	DRAINAGE AREA (Ac) c = 0.95 c = 0.50 c = 0.25 INCREMENTAL	SUBTOTAL	SUB-TOTAL (C*A)	INLET PIPE TIME OF CONCENTRATION (min.)	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./ hr.)	INCREMENTAL TOTAL INFLOW (CFS)	TOTAL (C*A)	TOTAL RUNOFF (cfs)	SLOT ELEV. (ft) (if Needed) THERO GUTTER OR GRATE ELEV. (ft)	HYDRAULIC GRADIENT CROWN FLOW LINE UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	TOTAL MINOR FRICT. HEAD LOSS (FT)	MINOR FRICT. LOSS COEFF.	NUMBER OF BARRELS	PIPE SIZE (in.) Ellip.? RISE SPAN (ROUND) OR (ROUND EQUIV.)	HYD. GRAD. PHYSICAL MIN. PHYS. SLOPE (%)	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	NOTES:
BL CONST. SR 60 LT.			S-100	DBI D			0.00	0.0	0.000								114.20	113.60	0.60	0.02			No	0.00	0.4		
3367+65.00	18.70	RT.					0.00	0.0	0.000	26.60	1.73	4.41	0.00	0.18	0.79	115.34	114.20	113.60		0.00	0.50	1	0	0.20	2.9	19.34	
			S-102		M	300	0.72	0.7	0.180	26.60			0.00				112.70	112.10	0.60	0.01	0.012		18	0.15	2.5		
BL CONST. SR 60 RT.			S-101	DBI D			0.50	0.5	0.475								113.76	113.67	0.09	0.09			No	0.03	1.3		BERM EL 114.3
4368+25.50	57.67	RT.					0.00	0.0	0.000	10.00	1.78	6.58	0.00	0.63	4.13	112.70	110.60	110.30		0.01	0.50	1	0	0.11	2.6	39.36	
			S-103		L	276	0.61	0.6	0.153	10.00			0.00				108.60	108.30	0.30	0.08	0.012		24	0.10	2.5		
BL CONST. SR 60 LT.			S-102	MH			0.00	0.0	0.000								113.60	113.29	0.31	0.02				0.00	0.4		
3370+65.00	11.70	RT.					0.00	0.0	0.000	10.00	1.90	4.28	0.00	0.18	0.77	116.00	113.60	113.10		0.00	0.50	1	0	0.17	2.6	18.48	
			S-104		M	300	0.00	0.7	0.180	28.33			0.00				112.10	111.60	0.50	0.01	0.012		18	0.15	2.5		
BL CONST. SR 60 RT.			S-103	DBI D			0.28	0.8	0.741								113.67	113.52	0.15	0.15			No	0.04	1.6		BERM EL 114.3
4371+00.54	70.57	RT.					0.00	0.0	0.000	10.00	2.04	5.44	0.00	0.94	5.10	112.70	110.30	110.00		0.02	0.50	1	0	0.10	2.5	38.48	
			S-106		L	302	0.17	0.8	0.195	16.58			0.00				108.30	108.00	0.30	0.13	0.012		24	0.10	2.5		
BL CONST. SR 60 LT.			S-104	MH			0.00	0.0	0.000								113.29	113.29	0.01	0.01				0.00	0.4		
3373+65.00	16.00	RT.					0.00	0.0	0.000	10.00	0.10	4.14	0.00	0.18	0.75	118.14	113.10	110.20		0.00	0.80	1	0	3.72	12.5	40.15	
			S-105		M	78	0.00	0.7	0.180	30.23			0.00				111.60	108.70	2.90	0.00	0.012		18	0.15	2.5		
BL CONST. SR 60 LT.			S-105	DBI D			0.81	0.8	0.770								113.29	113.13	0.15	0.15				0.04	1.6		TOB EL 113.86
3373+65.00	62.30	LT.					0.00	0.0	0.000	27.60	0.90	4.14	0.00	1.20	4.98	111.90	110.70	109.20		0.03	0.80	1	0	0.50	5.5	57.64	
			S-109		M	300	1.02	1.7	0.435	30.33			0.00				108.70	107.20	1.50	0.12	0.012		24	0.10	2.5		
BL CONST. SR 60 RT.			S-106	DBI D			0.54	1.3	1.254								113.52	113.43	0.09	0.09			No	0.03	1.5		BERM EL 114.3
4374+01.06	75.34	RT.					0.00	0.0	0.000	10.00	1.25	4.82	0.00	1.55	7.45	112.40	110.50	110.10		0.02	0.50	1	0	0.15	3.5	83.44	
			S-107		L	265	0.39	1.2	0.293	22.02			0.00				108.00	107.60	0.40	0.07	0.012		30	0.08	2.5		
BL CONST. SR 60 RT.			S-107	DBI D			1.12	2.4	2.318								113.43	113.26	0.17	0.17				0.08	2.6		J-BOTTOM 4'X4'
4376+64.83	94.70	RT.					0.00	0.0	0.000	10.00	0.47	4.70	0.00	2.71	12.74	113.60	110.10	109.90		0.08	0.80	1	0	0.18	3.9	87.42	
			S-108		L	110	0.40	1.6	0.393	23.28			0.00				107.60	107.40	0.20	0.09	0.012		30	0.08	2.5		
BL CONST. SR 60 LT.			S-108	MBWI			0.19	2.6	2.499								113.26	113.13	0.12	0.12				0.09	2.7		
3376+65.00	23.00	RT.					0.00	0.0	0.000	10.00	0.25	4.66	0.00	2.89	13.46	117.39	109.90	109.70		0.06	0.50	1	0	0.28	4.8	97.19	
			S-109		L	72	0.00	1.6	0.393	23.75			0.00				107.40	107.20	0.20	0.07	0.012		30	0.08	2.5		
BL CONST. SR 60 LT.			S-109	DBI D			0.47	3.9	3.715								113.13	112.90	0.24	0.24				0.07	2.7		J-BOTTOM 5'X4'
3376+65.00	56.30	LT.					0.00	0.0	0.000	10.00	0.76	4.07	0.00	4.62	18.84	114.10	110.20	109.60		0.08	0.70	1	0	0.25	5.2	164.26	SLOT EL 113.50
			S-113		M	236	0.33	3.6	0.910	31.24			0.00				107.20	106.60	0.60	0.16	0.012		36	0.06	2.5		
BL CONST. SR 60 RT.			S-110	BWI			0.31	0.3	0.295								114.30	114.10	0.20	0.03			No	0.03	1.1		
4378+99.35	45.42	RT.					0.00	0.0	0.000	10.00	0.24	6.58	0.00	0.29	1.94	117.46	114.30	114.10		0.01	0.50	1	0	0.36	3.9	22.35	
			S-111		L	56	0.00	0.0	0.000	10.00			0.00				112.80	112.60	0.20	0.02	0.012		18	0.15	2.5		
BL CONST. SR 60 RT.			S-111	MBWI			0.18	0.5	0.466								114.10	113.90	0.20	0.07				0.07	1.7		
3379+00.00	22.70	RT.					0.00	0.0	0.000	10.00	0.32	6.52	0.00	0.47	3.04	118.35	114.10	113.90		0.02	0.50	1	0	0.29	3.5	21.29	
			S-112		L	68	0.00	0.0	0.000	10.24			0.00				112.60	112.40	0.20	0.05	0.012		18	0.15	2.5		
BL CONST. SR 60 LT.			S-112	BWI			0.31	0.8	0.760								113.46	112.90	0.56	0.56				1.61	6.2		
3379+00.00	45.42	LT.					0.00	0.0	0.000	10.00	0.01	6.45	0.00	0.76	4.91	117.32	113.40	107.60		0.30	0.50	1	0	36.25	29.7	21.02	
			S-113		L	16	0.00	0.0	0.000	10.57			0.00				112.40	106.60	5.80	0.26	0.012		12	0.26	2.5		
BL CONST. SR 60 LT.			S-113	MH			0.00	4.7	4.475								112.90	112.58	0.32	0.32			No	0.09	3.1		J-BOTTOM 5' DIA
3379+00.00	61.00	LT.					0.00	0.0	0.000	10.00	0.96	4.02	0.00	5.38	21.67	112.96	109.60	109.20		0.10	0.70	1	0	0.17	4.2	147.65	
			S-117		M	241	0.00	3.6	0.910	32.00			0.00				106.60	106.20	0.40	0.22	0.012		36	0.06	2.5		
BL CONST. SR 60 RT.			S-114	BWI			0.52	0.5	0.494								115.10	114.90	0.20	0.07			No	0.08	1.8		
4381+39.54	45.42	RT.					0.00	0.0	0.000	10.00	0.24	6.58	0.00	0.49	3.25	118.24	115.10	114.90		0.03	0.50	1	0	0.36	3.9	22.35	
			S-115		L	56	0.00	0.0	0.000	10.00			0.00				113.60	113.40	0.20	0.05	0.012		18	0.15	2.5		
BL CONST. SR 60 LT.			S-115	MBWI			0.23	0.8	0.713								114.90	114.70	0.20	0.16			No	0.17	2.6		
3381+40.00	16.82	RT.					0.00	0.0	0.000	10.00	0.28	6.52	0.00	0.71	4.65	119.04	114.90	114.70		0.05	0.50	1	0	0.32	3.7	21.79	
			S-116		L	62	0.00	0.0	0.000	10.24			0.00				113.40	113.20	0.20	0.10	0.012		18	0.15	2.5		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STORM DRAIN TABULATION FORM

PROJECT: SR 60 CSX
PROJECT NUMBER: 436559-1-32-01
SYSTEM: Basin 1-1
LOCATION: SMF 1
PREPARED BY: J. Hernandez
CHECKED BY: T.Kreisle
DATE: 29-Jul-16
DATE: 16-Aug-16

LOCATION OF UPPER END ALIGNMENT NAME STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	DRAINAGE AREA (Ac) c = c = c = INCREMENTAL	 0.95 0.50 0.25 SUBTOTAL	SUB-TOTAL (C*A)	INLET PIPE TIME OF CONCENTRATION (min.)	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./ hr.)	INCREMENTAL TOTAL INFLOW (CFS)	TOTAL (C*A)	TOTAL RUNOFF (cfs)	SLOT ELEV. (ft) (if Needed) THERO GUTTER OR GRATE ELEV. (ft)	HYDRAULIC GRADIENT CROWN FLOW LINE UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	TOTAL MINOR FRICT. HEAD LOSS (FT)	MINOR FRICT. LOSS COEFF.	NUMBER OF BARRELS	PIPE SIZE (in.) Ellip.? RISE SPAN (ROUND) OR (ROUND EQUIV.)	HYD. GRAD. PHYSICAL MIN. PHYS. SLOPE (%)	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	**ZONE OR COUNTY:** 8 **FREQUENCY (YR)** 3 **FREQ. FACTOR:** 1.00 **TAILWATER EL (ft.)** 112.41 MIN. HGL COVER = 0.00 MIN. PIPE COVER = 3.75 **NOTES:**
BL CONST. SR 60 LT.			**S-116**	BWI			0.52	1.3	1.207								114.28	112.58	1.70	1.70			No	4.06	9.9		
3381+40.00	45.42	LT.					0.00	0.0	0.000	10.00	0.01	6.46	0.00	1.21	7.80	118.12	114.20	107.20		0.77	0.50	1	0	30.43	27.2	20.12	
			S-117		L	23	0.00	0.0	0.000	10.52			0.00				113.20	106.20	7.00	0.93	0.012		12	0.26	2.5		
BL CONST. SR 60 LT.			**S-117**	MH			0.00	7.4	7.049								112.58	112.41	0.17	0.17			No	0.08	3.3		J-BOTTOM 7' DIA
3381+40.00	66.60	LT.					0.00	0.0	0.000	10.00	0.03	3.96	0.00	7.96	31.54	114.80	109.10	106.50		0.13	0.80	1	0	6.05	27.9	576.04	
			S-118		M	43	0.00	3.6	0.910	32.96			0.00				105.60	103.00	2.60	0.04	0.012		42	0.05	2.5		
BL CONST. SR 60 LT.			**S-118**	MES													106.50	3.50	103.00	0.00			No				1:2
3381+40.00	120.65	LT.															106.50	3.50		0.00		1	0				
					M												103.00		103.00	0.00			42				
BL CONST. SR 60 RT.			**S-123**	BWI			0.72	0.7	0.684								121.60	121.30	0.30	0.23			No	0.16	2.5		
4385+39.96	45.42	RT.					0.00	0.0	0.000	10.00	0.57	6.58	0.00	0.68	4.50	124.74	121.60	121.30		0.05	0.50	1	0	0.26	3.3	20.71	
			S-124		L	114	0.00	0.0	0.000	10.00			0.00				120.10	119.80	0.30	0.18	0.012		18	0.15	2.5		
BL CONST. SR 60 LT.			**S-124**	BWI			0.72	1.4	1.368								120.80	113.23	7.57	2.65			No	5.20	11.2		
3385+40.00	45.42	LT.					0.00	0.0	0.000	10.00	0.02	6.45	0.00	1.37	8.83	124.72	120.80	107.60		0.98	0.50	1	0	41.25	31.6	21.71	
			S-125		L	32	0.00	0.0	0.000	10.57			0.00				119.80	106.60	13.20	1.66	0.012		12	0.26	2.5		
BL CONST. SR 60 LT.			**S-125**	MH			0.00	1.4	1.368								113.23	112.88	0.36	0.36			No	0.13	2.8		
3385+40.00	67.10	LT.					0.00	0.0	0.000	10.00	1.10	6.45	0.00	1.37	8.82	114.70	108.60	108.30		0.10	0.80	1	0	0.15	3.0	42.66	
			S-119		L	200	0.00	0.0	0.000	10.59			0.00				106.60	106.30	0.30	0.26	0.012		24	0.10	2.5		
BL CONST. SR 60 LT.			**S-119**	MH			0.00	1.4	1.368								112.88	112.58	0.30	0.30			No	0.12	2.7		
3383+40.00	65.99	LT.					0.00	0.0	0.000	10.00	0.72	6.23	0.00	1.37	8.52	114.75	108.30	107.60		0.06	0.50	1	0	0.35	4.6	52.72	
			S-117		L	200	0.00	0.0	0.000	11.69			0.00				106.30	105.60	0.70	0.24	0.012		24	0.10	2.5		

4.2 Basin 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STORM DRAIN TABULATION FORM

PROJECT: SR 60 over CSX

PROJECT NUMBER: 436559-1-32-01

SYSTEM: Basin 2

LOCATIO

PREPARED BY: K. Myers

CHECKED BY: T.Kreisle

DATE: 18-Aug-15

DATE: 18-Aug-15

ZONE OR COUNTY:	**FREQUENCY (YR)**
8	3
FREQ. FACTOR:	1.00
TAILWATER EL (ft.)	109.00

MIN. HGL COVER = 0.00

MIN. PIPE COVER = 3.00

LOCATION OF UPPER END ALIGNMENT NAME STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	DRAINAGE AREA (Ac) c = 0.95 c = 0.50 c = 0.25 INCREMENTAL	SUBTOTAL	SUB-TOTAL (C*A)	TIME OF CONCENTRATION (min.) INLET PIPE	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./hr.)	INFLOW (CFS) INCREMENTAL TOTAL	TOTAL (C*A)	TOTAL RUNOFF (cfs)	THERO GUTTER OR GRATE ELEV. (ft) SLOT ELEV. (if Needed) (ft)	HYDRAULIC GRADIENT CROWN FLOW LINE UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	HEAD LOSS (FT) TOTAL MINOR FRICT.	LOSS COEFF. MINOR FRICT.	NUMBER OF BARRELS	PIPE SIZE (in.) Ellip.? SPAN (ROUND) OR (ROUND EQUIV.) RISE	SLOPE (%) HYD. GRAD. PHYSICAL MIN. PHYS.	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	NOTES:
BL RT SURVEY S.R. 60			S-220	BWI			0.50	0.5	0.475								149.10	148.90	0.20	0.11			No	0.07	1.8		
4397+60.	45.42	RT					0.00	0.0	0.000	10.00	0.71	6.58	0.00	0.48	3.12	151.50	149.10	148.90		0.02	0.50	1	0	0.17	2.7	18.70	
			S-221		L	114	0.00	0.0	0.000	10.00			0.00				147.60	147.40	0.20	0.09	0.012		18	0.15	2.5		
BL LT SURVEY S.R. 60			S-221	BWI			0.50	1.0	0.950								148.40	111.39	37.01	0.87			No	2.49	7.8		
3397+60.	45.42	L					0.00	0.0	0.000	10.00	0.00	6.42	0.00	0.95	6.10	151.50	148.40	110.00		0.47	0.50	1	0	239.31	76.2	33.70	
			S-222		L	16	0.00	0.0	0.000	10.71			0.00				147.40	109.00	38.40	0.40	0.012		12	0.26	2.5		
BL LT SURVEY S.R. 60)			S-222	MH			0.00	1.0	0.950								111.39	110.39	1.00	1.00			No	0.29	3.5		
3397+60.	61.46	L					0.00	0.0	0.000	10.00	1.44	6.42	0.00	0.95	6.10	114.64	110.50	110.30		0.15	0.80	1	0	0.07	1.7	14.71	
			S-214		M	299	0.00	0.0	0.000	10.71			0.00				109.00	108.80	0.20	0.85	0.012		18	0.15	2.5		
BL LT SURVEY S.R. 60			S-214	MH			0.00	1.0	0.950								110.39	110.19	0.20	0.20				0.26	3.3		
3394+61.62	62.00	L					0.00	0.0	0.000	10.00	0.07	6.14	0.00	0.95	5.83	114.31	110.30	110.10		0.14	0.80	1	0	0.80	5.8	27.33	
			S-215		M	25	0.00	0.0	0.000	12.15			0.00				108.80	108.60	0.20	0.07	0.012		18	0.15	2.5		
BL LT SURVEY S.R. 60			S-215	MH			0.00	1.0	0.950								110.19	109.90	0.29	0.29				0.26	3.3		
3394+59.35	86.82	L					0.00	0.0	0.000	10.00	0.26	6.13	0.00	0.95	5.82	114.30	110.10	109.90		0.13	0.80	1	0	0.34	3.7	22.03	
			S-213		M	59	0.00	0.0	0.000	12.22			0.00				108.60	108.40	0.20	0.15	0.012		18	0.15	2.5		
BL RT SURVEY S.R. 60			S-210	BWI			0.81	0.8	0.770								141.59	141.30	0.29	0.29				0.20	2.9		
4392+40.	45.42	RT					0.00	0.0	0.000	10.00	0.67	6.58	0.00	0.77	5.06	143.99	141.50	141.30		0.06	0.50	1	0	0.17	2.7	18.70	
			S-211		L	114	0.00	0.0	0.000	10.00			0.00				140.00	139.80	0.20	0.23	0.012		18	0.15	2.5		
BL FR M SURVEY S.R. 60			S-213	P-5			0.03	1.0	0.979								109.90	109.15	0.75	0.52				0.27	3.4		
202+59.48	26.21	L					0.00	0.0	0.000	10.00	0.34	6.08	0.00	0.98	5.95	114.60	109.90	107.50		0.09	0.50	1	0	1.50	7.9	32.00	
			S-212		M	160	0.00	0.0	0.000	12.49			0.00				108.40	106.00	2.40	0.43	0.012		18	0.15	2.5		
BL LT SURVEY S.R. 60			S-211	BWI			0.81	1.6	1.539								140.80	109.15	31.65	3.95				6.54	12.6		
3392+40.	45.42	L					0.00	0.0	0.000	10.00	0.02	6.43	0.00	1.54	9.90	143.99	140.80	107.00		1.23	0.50	1	0	81.33	44.4	25.73	
			S-212		L	42	0.00	0.0	0.000	10.67			0.00				139.80	106.00	33.80	2.72	0.012		12	0.26	2.5		
BL FR M SURVEY S.R. 60			S-212	P-5			0.11	2.8	2.622								109.15	108.51	0.64	0.64				0.41	5.0		
201+03.59	25.25	L					0.00	0.0	0.000	10.00	0.33	6.02	0.00	2.62	15.78	113.61	108.00	107.80		0.24	0.60	1	0	0.20	3.5	46.05	
			S-209		M	98	0.00	0.0	0.000	12.82			0.00				106.00	105.80	0.20	0.40	0.012		24	0.10	2.5		
BL FR M SURVEY S.R. 60			S-209	P-5			0.07	2.8	2.689								108.51	108.08	0.43	0.43				0.43	5.1		
200+05.44	25.25	L					0.00	0.0	0.000	10.00	0.14	5.96	0.00	2.69	16.03	113.05	107.80	107.60		0.24	0.60	1	0	0.46	5.3	56.54	
			S-206		M	43	0.00	0.0	0.000	13.15			0.00				105.80	105.60	0.20	0.18	0.012		24	0.10	2.5		
BL RT SURVEY S.R. 60			S-203	BWI			0.38	0.4	0.361								135.80	135.60	0.20	0.06				0.04	1.3		
4390+00.	45.42	RT					0.00	0.0	0.000	10.00	0.68	6.58	0.00	0.36	2.37	138.26	135.80	135.60		0.01	0.50	1	0	0.18	2.7	18.80	
			S-204		L	112	0.00	0.0	0.000	10.00			0.00				134.30	134.10	0.20	0.05	0.012		18	0.15	2.5		
BL LT SURVEY S.R. 60			S-206	DBI			0.04	2.9	2.727								108.08	107.40	0.68	0.68			No	0.43	5.2		
3391+03.79	61.40	L					0.00	0.0	0.000	10.00	0.33	5.94	0.00	2.73	16.19	113.34	107.60	107.40		0.25	0.60	1	0	0.20	3.5	45.76	
			S-205		M	101	0.00	0.0	0.000	13.28			0.00				105.60	105.40	0.20	0.44	0.012		24	0.10	2.5		
BL LT SURVEY S.R. 60			S-204	BWI			0.38	0.8	0.722								135.10	107.40	27.70	0.46				1.44	5.9		
3390+00.	45.42	L					0.00	0.0	0.000	10.00	0.00	6.43	0.00	0.72	4.64	138.26	135.10	106.40		0.27	0.50	1	0	216.07	72.4	32.85	
			S-205		L	13	0.00	0.0	0.000	10.68			0.00				134.10	105.40	28.70	0.19	0.012		12	0.26	2.5		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STORM DRAIN TABULATION FORM

PROJECT: SR 60 over CSX
PROJECT NUMBER: 436559-1-32-01
SYSTEM: Basin 2
LOCATIO
PREPARED BY: K. Myers
CHECKED BY: T.Kreisle
DATE: 18-Aug-15
DATE: 18-Aug-15

ZONE OR COUNTY: 8
FREQUENCY (YR) 3
FREQ. FACTOR: 1.00
TAILWATER EL (ft.) 109.00
MIN. HGL COVER = 0.00
MIN. PIPE COVER = 3.00

LOCATION OF UPPER END							DRAINAGE AREA (Ac)			INLET			INCREMENTAL TOTAL			SLOT ELEV. (ft) (if Needed)	HYDRAULIC GRADIENT						PIPE SIZE (in.)				
							c =	0.95		PIPE							CROWN			TOTAL			Ellip.?	HYD. GRAD.			
							c =	0.50									FLOW LINE			MINOR	MINOR		RISE	PHYSICAL			
ALIGNMENT NAME							c =	0.25												FRICT.	FRICT.			MIN. PHYS.			
STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	INCREMENTAL	SUBTOTAL	SUB-TOTAL (C*A)	TIME OF CONCENTRATION (min.)	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./ hr.)	INFLOW (CFS)	TOTAL (C*A)	TOTAL RUNOFF (cfs)	THERO GUTTER OR GRATE ELEV. (ft)	UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	HEAD LOSS (FT)	LOSS COEFF.	NUMBER OF BARRELS	SPAN (ROUND) OR (ROUND EQUIV.)	SLOPE (%)	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	NOTES:
BL LT SURVEY S.R. 60			**S-205**	MH			0.00	3.6	3.449								107.40	106.00	1.40	1.27				0.68	6.5		
3390+00.	61.00	L					0.00	0.0	0.000	10.00	0.26	5.88	0.00	3.45	20.29	113.55	107.40	106.00		0.39	0.60	1	0	1.09	8.1	69.96	
			S-202		L	129	0.00	0.0	0.000	13.61			0.00				105.40	104.00	1.40	0.88	0.012		24	0.10	2.5		
BL LT SURVEY S.R. 60)			**S-202**	MES			0.00	3.6	3.449														No	-			
3388+65.47	61.13	L					0.00	0.0	0.000													1	0				
					M	0	0.00	0.0	0.000								104.00						24	-			

4.3 Basin 3

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STORM DRAIN TABULATION FORM

PROJECT: SR 60 CSX
PROJECT NUMBER: 436559-1-32-01
SYSTEM: Basin 3-1
LOCATION: SMF 3
PREPARED BY: S. Curran
CHECKED BY: T.Kreisle
DATE: 18-Jul-16
DATE: 1-Aug-16

LOCATION OF UPPER END							DRAINAGE AREA (Ac)			INLET			INCREMENTAL TOTAL			SLOT ELEV. (ft) (if Needed)	HYDRAULIC GRADIENT						PIPE SIZE (in.)				**ZONE OR COUNTY:** **FREQUENCY (YR)**
							c =	0.95		PIPE							CROWN			TOTAL			Ellip.?	HYD. GRAD.			8 3
							c =	0.50									FLOW LINE			MINOR	MINOR		RISE	PHYSICAL			**FREQ. FACTOR:** 1.00
ALIGNMENT NAME							c =	0.25												FRICT.	FRICT.			MIN. PHYS.			**TAILWATER EL (ft.)** 115.84
STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	INCREMENTAL	SUBTOTAL	SUB-TOTAL (C*A)	TIME OF CONCENTRATION (min.)	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./ hr.)	INFLOW (CFS)	TOTAL (C*A)	TOTAL RUNOFF (cfs)	THERO GUTTER OR GRATE ELEV. (ft)	UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	HEAD LOSS (FT)	LOSS COEFF.	NUMBER OF BARRELS	SPAN (ROUND) OR (ROUND EQUIV.)	SLOPE (%)	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	MIN. HGL COVER = 0.00 MIN. PIPE COVER = 3.75 **NOTES:**
BL CONST. SR 60 RT.			**S-303**	BWI			0.50	0.5	0.475								148.30	147.80	0.50	0.07			No	0.07	1.8		
4404+20.09	45.42	RT.					0.00	0.0	0.000	10.00	0.16	6.58	0.00	0.48	3.12	151.33	148.30	147.80		0.02	0.50	1	0	0.88	6.0	27.98	
			S-304		L	57	0.00	0.0	0.000	10.00			0.00				146.80	146.30	0.50	0.04	0.012		18	0.15	2.5		
BL CONST. SR 60 LT.			**S-304**	MBWI			0.07	1.1	1.017								147.80	144.98	2.82	1.16				0.34	3.7		
3404+20.00	11.95	RT.					0.00	0.0	0.000	10.00	0.73	6.50	0.00	1.02	6.61	152.26	147.80	144.40		0.15	0.70	1	0	1.13	6.9	29.84	
			S-312		M	299.8	0.00	0.0	0.000	10.35			0.00				146.30	142.90	3.40	1.00	0.012		18	0.29	3.5		
BL CONST. SR 60 LT.			**S-305**	BWI			0.50	0.5	0.475								147.90	147.80	0.10	0.07				0.07	1.8		
3404+20.00	45.42	LT.					0.00	0.0	0.000	10.00	0.35	6.58	0.00	0.48	3.12	151.33	147.90	147.80		0.02	0.50	1	0	0.17	2.7	18.68	
			S-304		L	57	0.00	0.0	0.000	10.00			0.00				146.40	146.30	0.10	0.04	0.012		18	0.49	4.5		
BL CONST. NE FRONTAGE ROAD			**S-308**	P5			0.11	0.1	0.105								118.58	118.58	0.00	0.00				0.00	0.2		
0304+75.19	29.25	LT.					0.00	0.0	0.000	10.00	0.25	6.58	0.00	0.11	0.70	118.58	116.20	114.90		0.00	0.50	1	0	1.07	8.1	69.67	
			S-310		L	121.8	0.01	0.0	0.003	10.00			0.00				114.20	112.90	1.30	0.00	0.012		24	0.49	5.5		
BL CONST. SR 60 RT.			**S-311**	BWI			0.39	0.4	0.371								145.02	144.98	0.04	0.04				0.05	1.4		
4407+20.38	45.42	RT.					0.00	0.0	0.000	10.00	0.25	6.58	0.00	0.37	2.44	147.66	144.60	144.40		0.01	0.50	1	0	0.35	3.8	22.22	
			S-312		L	57	0.00	0.0	0.000	10.00			0.00				143.10	142.90	0.20	0.03	0.012		18	1.01	6.5		
BL CONST. SR 60 LT.			**S-312**	MBWI			0.17	1.6	1.549								144.98	144.20	0.78	0.78				0.74	5.6		148.59 GRATE EL RT
3407+20.00	14.93	RT.					0.00	0.0	0.000	10.00	0.18	6.35	0.00	1.55	9.83	148.43	144.40	144.20		0.34	0.70	1	0	0.33	3.7	21.94	148.43 GRATE EL LT
			S-313		M	60	0.00	0.0	0.000	11.08			0.00				142.90	142.70	0.20	0.45	0.012		18	1.35	7.5		
BL CONST. SR 60 LT.			**S-313**	BWI			0.40	2.0	1.929								144.20	119.10	25.10	1.14				1.14	6.9		
3407+20.00	45.42	LT.					0.00	0.0	0.000	10.00	0.03	6.31	0.00	1.93	12.17	147.66	144.20	114.60		0.37	0.50	1	0	43.53	42.6	74.27	
			S-314		M	68	0.00	0.0	0.000	11.26			0.00				142.70	113.10	29.60	0.77	0.012		18	1.73	8.5		
BL CONST. NE FRONTAGE ROAD			**S-314**	P5			0.10	5.2	4.931								119.10	118.58	0.52	0.52			No	0.40	5.8		
0306+35.59	29.25	LT.					0.00	0.0	0.000	10.00	0.10	5.72	0.00	4.95	28.29	120.78	115.60	115.40		0.36	0.70	1	0	0.52	6.5	113.43	
			S-310		M	39	0.01	0.1	0.015	14.65			0.00				113.10	112.90	0.20	0.16	0.012		30	1.10	9.5		
BL CONST. SR 60 RT.			**S-315**	BWI			0.39	0.4	0.371								138.70	138.50	0.20	0.04				0.05	1.4		
4410+20.66	45.42	RT.					0.00	0.0	0.000	10.00	0.29	6.58	0.00	0.37	2.44	141.77	138.70	138.50		0.01	0.50	1	0	0.32	3.6	21.71	
			S-316		L	63	0.00	0.0	0.000	10.00			0.00				137.20	137.00	0.20	0.03	0.012		18	2.64	10.5		
BL CONST. SR 60 LT.			**S-316**	MBWI			0.21	0.6	0.570								138.50	138.30	0.20	0.10				0.11	2.1		142.47 LT
3410+20.00	16.24	RT.					0.00	0.0	0.000	10.00	0.28	6.51	0.00	0.57	3.71	142.39	138.50	138.30		0.03	0.50	1	0	0.32	3.7	21.79	142.39 RT
			S-317		L	62	0.00	0.0	0.000	10.29			0.00				137.00	136.80	0.20	0.07	0.012		18	3.17	11.5		
BL CONST. SR 60 LT.			**S-317**	BWI			0.40	1.0	0.950								137.80	119.69	18.11	2.03			No	2.51	7.8		
3410+20.00	45.42	LT.					0.00	0.0	0.000	10.00	0.03	6.45	0.00	0.95	6.13	141.77	137.80	114.40		0.47	0.50	1	0	37.74	30.3	21.24	
			S-318		L	62	0.00	0.0	0.000	10.57			0.00				136.80	113.40	23.40	1.56	0.012		12	6.44	12.5		
BL CONST. NE FRONTAGE ROAD			**S-318**	P5			0.11	3.1	2.907								119.69	119.10	0.59	0.59			No	0.15	3.5		
0309+36.35	29.25	LT.					0.00	0.0	0.000	10.00	1.42	5.95	0.00	2.92	17.37	121.69	115.90	115.60		0.14	0.70	1	0	0.10	2.9	75.21	
			S-314		M	301.1	0.01	0.1	0.013	13.23			0.00				113.40	113.10	0.30	0.46	0.012		30	2.21	13.5		
BL CONST. NE FRONTAGE ROAD			**S-319**	P5			0.13	2.0	1.853								119.85	119.69	0.16	0.16			No	0.07	2.3		
0311+16.80	29.25	LT.					0.00	0.0	0.000	10.00	0.99	6.12	0.00	1.86	11.40	121.07	116.10	115.90		0.04	0.50	1	0	0.11	3.0	77.29	
			S-318		M	180	0.01	0.0	0.010	12.24			0.00				113.60	113.40	0.20	0.12	0.012		30	2.55	14.5		
BL CONST. SR 60 RT.			**S-321**	BWI			0.46	0.5	0.437								129.90	129.70	0.20	0.07			No	0.06	1.6		
4413+36.92	52.42	RT.					0.00	0.0	0.000	10.00	0.38	6.58	0.00	0.44	2.87	132.93	129.90	129.70		0.02	0.50	1	0	0.27	3.3	20.75	
			S-322		L	75	0.00	0.0	0.000	10.00			0.00				128.40	128.20	0.20	0.05	0.012		18	5.76	15.5		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STORM DRAIN TABULATION FORM

PROJECT: SR 60 CSX
PROJECT NUMBER: 436559-1-32-01
SYSTEM: Basin 3-1
LOCATION: SMF 3
PREPARED BY: S. Curran
CHECKED BY: T.Kreisle
DATE: 18-Jul-16
DATE: 1-Aug-16

ZONE OR COUNTY: 8
FREQUENCY (YR) 3
FREQ. FACTOR: 1.00
TAILWATER EL (ft.) 115.84
MIN. HGL COVER = 0.00
MIN. PIPE COVER = 3.75

LOCATION OF UPPER END ALIGNMENT NAME STATION	DISTANCE (ft)	SIDE	STRUCTURE NO. UPPER LOWER	TYPE OF STRUCTURE	MAINLINE (M) OR LATERAL (L)	LENGTH (ft)	DRAINAGE AREA (Ac) c = 0.95 c = 0.50 c = 0.25 INCREMENTAL	SUBTOTAL	SUB-TOTAL (C*A)	INLET PIPE TIME OF CONCENTRATION (min.)	TIME OF FLOW IN SECTION (min.)	INTENSITY (in./ hr.)	INCREMENTAL TOTAL INFLOW (CFS)	TOTAL (C*A)	TOTAL RUNOFF (cfs)	SLOT ELEV. (ft) (if Needed) THERO GUTTER OR GRATE ELEV. (ft)	HYDRAULIC GRADIENT CROWN FLOW LINE UPPER END ELEVATION (ft.)	LOWER END ELEVATION (ft.)	FALL (ft)	TOTAL MINOR FRICT. HEAD LOSS (FT)	MINOR FRICT. LOSS COEFF.	NUMBER OF BARRELS	PIPE SIZE (in.) Ellip.? RISE SPAN (ROUND) OR (ROUND EQUIV.)	HYD. GRAD. PHYSICAL MIN. PHYS. SLOPE (%)	VELOCITY (FPS)	FULL FLOW CAPACITY (cfs)	NOTES:
BL CONST. SR 60 LT.			**S-322**	MBWI			0.24	0.7	0.665								129.70	129.50	0.20	0.14			No	0.14	2.4		134.06 RT
3413+37.85	16.88	RT.					0.00	0.0	0.000	10.00	0.29	6.50	0.00	0.67	4.32	133.77	129.70	129.50		0.05	0.50	1	0	0.31	3.6	21.66	133.77 LT
			S-323		L	64	0.00	0.0	0.000	10.38			0.00				128.20	128.00	0.20	0.09	0.012		18	6.53	16.5		
BL CONST. SR 60 LT.			**S-323**	BWI			0.43	1.1	1.074								129.00	120.25	8.75	2.32			No	3.18	8.8		
3413+37.85	45.42	LT.					0.00	0.0	0.000	10.00	0.04	6.43	0.00	1.07	6.91	133.03	129.00	114.80		0.60	0.50	1	0	26.30	25.3	19.40	
			S-324		L	54	0.00	0.0	0.000	10.67			0.00				128.00	113.80	14.20	1.72	0.012		12	12.61	17.5		
BL CONST. NE FRONTAGE ROAD			**S-324**	P6			0.18	1.8	1.729								120.25	119.85	0.40	0.40			No	0.19	3.5		
0312+55.00	29.25	LT.					0.00	0.0	0.000	10.00	0.67	6.25	0.00	1.74	10.85	120.59	115.80	115.60		0.13	0.70	1	0	0.14	3.0	42.26	
			S-319		M	138.4	0.02	0.0	0.008	11.57			0.00				113.80	113.60	0.20	0.27	0.012		24	5.59	18.5		
BL CONST. SR 60 RT.			**S-325**	BWI			0.23	0.2	0.219								125.90	125.70	0.20	0.02			No	0.02	0.8		
4414+58.85	64.42	RT.					0.00	0.0	0.000	10.00	0.50	6.58	0.00	0.22	1.44	128.91	125.90	125.70		0.01	0.50	1	0	0.22	3.0	19.83	
			S-326		L	90	0.00	0.0	0.000	10.00			0.00				124.40	124.20	0.20	0.01	0.012		18	9.12	19.5		
BL CONST. SR 60 LT.			**S-326**	DBI C			0.08	0.3	0.295								125.70	125.50	0.20	0.03			No	0.03	1.1		W/TRAV. SLOT
3414+60.00	14.00	LT.					0.00	0.0	0.000	10.00	0.27	6.47	0.00	0.29	1.91	129.97	125.70	125.50		0.01	0.50	1	0	0.33	3.7	21.92	
			S-327		L	61	0.00	0.0	0.000	10.50			0.00				124.20	124.00	0.20	0.02	0.012		18	10.08	20.5		
BL CONST. SR 60 LT.			**S-327**	BWI			0.16	0.5	0.447								125.00	120.38	4.62	0.37			No	0.55	3.6		
3414+60.00	45.42	LT.					0.00	0.0	0.000	10.00	0.04	6.41	0.00	0.45	2.86	129.45	125.00	115.00		0.10	0.50	1	0	20.41	22.3	18.21	
			S-328		L	49	0.00	0.0	0.000	10.77			0.00				124.00	114.00	10.00	0.27	0.012		12	19.04	21.5		
BL CONST. NE FRONTAGE ROAD			**S-328**	P5			0.04	0.5	0.485								120.38	120.25	0.13	0.13			No	0.07	1.8		
0313+77.11	29.25	LT.					0.00	0.0	0.000	10.00	0.77	6.40	0.00	0.49	3.12	120.96	115.50	115.30		0.04	0.80	1	0	0.17	2.6	18.44	
			S-324		M	121	0.01	0.0	0.003	10.81			0.00				114.00	113.80	0.20	0.09	0.012		18	12.14	22.5		
BL CONST. NE FRONTAGE ROAD			**S-310**	MH			0.00	5.3	5.035								118.58	117.14	1.44	1.44			No	0.42	5.9		J-BOTTOM 6' DIA.
0305+96.86	32.13	LT.					0.00	0.0	0.000	10.00	0.65	5.70	0.00	5.05	28.82	120.39	115.40	115.20		0.48	0.90	1	0	0.09	2.7	72.70	
			S-309		M	230	0.00	0.1	0.018	14.75			0.00				112.90	112.70	0.20	0.96	0.012		30	6.70	23.5		
BL CONST. POND			**S-309**	MH			0.00	5.3	5.035								117.14	115.84	1.30	1.30			No	0.40	5.8		
0012+57.59	14.49	RT.					0.00	0.0	0.000	10.00	0.10	5.61	0.00	5.05	28.33	118.20	115.20	108.30		0.78	1.50	1	0	5.35	21.0	203.59	
			S-307		M	129	0.00	0.1	0.018	15.40			0.00				112.70	105.80	6.90	0.52	0.012		30	7.29	24.5		

Appendix 5.0

TC CALCULATIONS

5.1 Existing

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** J. Hernandez **Date: 7/14/2016**
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 7/29/2016

Basin: 1

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	Asphalt	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	53	ft
4.	Rainfall Intensity, I	5.6	in/hr
5.	Average land slope, s	0.049	ft/ft

6. $$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$$ T1= **0.9** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1547	ft
9.	Watercourse slope, s	0.001	ft/ft
10.	Average velocity, V (Figure F-3)	0.56	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **45.7** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	539	ft
9.	Watercourse slope, s	0.004	ft/ft
10.	Average velocity, V (Figure F-3)	0.98	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **9.2** min

Channel Flow (T4)

	Segment ID	T4	
12.	Cross sectional flow area, a	16.0	ft2
13.	Wetted perimeter, Pw	20.2	ft
14.	Hydraulic radius, r = A / Pw	**0.79**	ft
15.	Channel slope, s	0.01140	ft/ft
16.	Manning's roughness coefficient, n	0.045	
17.	$V = \dfrac{1.49 * r^\wedge(2/3) * s^\wedge(1/2)}{n}$	**3.02**	ft/s
18.	Flow length, L	438	ft
19.	$T_3 = \dfrac{L}{60*V}$ T3=	**2.4**	min
20.	Watershed or subarea T_c or T_t	**58.2**	min

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01**
FDA No.: 47100

Designed By: J. Hernandez **Date:** **7/14/2016**
Checked By: T. Kreisle **Date:** 7/29/2016

Basin: 2

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		Pavement	
2.	Manning's roughness coefficient, n		0.012	
3.	Flow length, L (max. 100 ft)		60	ft
4.	Rainfall Intensity, I		8.8	in/hr
5.	Average land slope, s		0.023	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **1.0** min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		850	ft
9.	Watercourse slope, s		0.008705882	ft/ft
10.	Average velocity, V (Figure F-3)		1.50	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **9.4** min

Shallow Concentrated Flow (T3)

		Segment ID	T3	
12	Surface description (paved or unpaved)			
13	Flow length, L		Time to stage up in	ft
14	Watercourse slope, s		ditch storage area	ft/ft
15	Average velocity, V (Figure F-3)			ft/s

16 $T_2 = \frac{L}{60*V}$ T2= **35.0** min

Shallow Concentrated Flow (T4)

	Segment ID	T4	
17	Surface description (paved or unpaved)	Unpaved	
18	Flow length, L	298	ft
19	Watercourse slope, s	0.032885906	ft/ft
20	Average velocity, V (Figure F-3)	2.92	ft/s
21	$T_2 = \frac{L}{60*V}$ T2=	**1.7**	min
22	Watershed or subarea T_c or T_t	**47.1**	min

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-01

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	ASPHALT	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	44	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.071	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **2.2** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	187	ft
9.	Watercourse slope, s	0.002	ft/ft
10.	Average velocity, V (Figure F-3)	0.78	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **4.0** min

12. Watershed or subarea Tc or Tt **6.2** **USE 10.0**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-02

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	ASPHALT	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.012	ft/ft

6. $$T_1 = \frac{0.93\ L\text{^}0.6\ \ n\text{^}0.6}{I\text{^}0.4\ \ S\text{^}0.3}$$ T1= **6.3** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	163	ft
9.	Watercourse slope, s	0.006	ft/ft
10.	Average velocity, V (Figure F-3)	1.22	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **2.2** min

12. Watershed or subarea T_c or T_t **8.5** **USE 10.0**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-03

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		GRASS	
2.	Manning's roughness coefficient, n		0.410	
3.	Flow length, L (max. 100 ft)		28	ft
4.	Rainfall Intensity, I		0.3	in/hr
5.	Average land slope, s		0.086	ft/ft

6. $$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$$ T1= **13.4** min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		166	ft
9.	Watercourse slope, s		0.000	ft/ft
10.	Average velocity, V (Figure F-3)		0.25	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **11.0** min

12. Watershed or subarea T_c or T_t **24.4**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-04

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

Segment ID	T1	
1. Surface description	ASPHALT	
2. Manning's roughness coefficient, n	0.012	
3. Flow length, L (max. 100 ft)	51	ft
4. Rainfall Intensity, I	0.3	in/hr
5. Average land slope, s	0.006	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **5.2** min

7. Watershed or subarea T_c or T_t **5.2** **USE 10.0**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-05

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		ASPHALT	
2.	Manning's roughness coefficient, n		0.012	
3.	Flow length, L (max. 100 ft)		49	ft
4.	Rainfall Intensity, I		0.3	in/hr
5.	Average land slope, s		0.070	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **2.4** min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		163	ft
9.	Watercourse slope, s		0.001	ft/ft
10.	Average velocity, V (Figure F-3)		0.52	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **5.2** min

12. Watershed or subarea T_c or T_t **7.6** **USE 10.0**

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01**
FDA No.: 47100

Designed By: S. Curran
Checked By: T. Kreisle

Date: 8/4/2016
Date: 8/12/2016

Basin: 3-06

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	GRASS	
2.	Manning's roughness coefficient, n	0.410	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.058	ft/ft

6. $$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$$ T1= **32.3** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1147	ft
9.	Watercourse slope, s	0.000	ft/ft
10.	Average velocity, V (Figure F-3)	0.29	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **65.2** min

12. Watershed or subarea T_c or T_t **97.6**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-07

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	ASPHALT	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.001	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **12.8** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	632	ft
9.	Watercourse slope, s	0.003	ft/ft
10.	Average velocity, V (Figure F-3)	0.89	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **11.8** min

12. Watershed or subarea Tc or Tt **24.6**

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01**
FDA No.: **47100**

Designed By: S. Curran **Date:** 8/4/2016
Checked By: T. Kreisle **Date:** 8/12/2016

Basin: 3-08

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	ASPHALT	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.047	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **4.1** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1324	ft
9.	Watercourse slope, s	0.000	ft/ft
10.	Average velocity, V (Figure F-3)	0.22	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **99.7** min

12. Watershed or subarea T_c or T_t **103.9**

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-09

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	GRAVEL	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.003	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **9.5** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1083	ft
9.	Watercourse slope, s	0.003	ft/ft
10.	Average velocity, V (Figure F-3)	0.90	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **20.0** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	152	ft
9.	Watercourse slope, s	0.005	ft/ft
10.	Average velocity, V (Figure F-3)	1.12	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **2.3** min

12. Watershed or subarea T_c or T_t **31.7**

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-10

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		WOODS	
2.	Manning's roughness coefficient, n		0.450	
3.	Flow length, L (max. 100 ft)		100	ft
4.	Rainfall Intensity, I		0.3	in/hr
5.	Average land slope, s		0.002	ft/ft
6.	$T_1 = \frac{0.93\ L\text{^}0.6\ \ n\text{^}0.6}{I\text{^}0.4\ \ S\text{^}0.3}$	T1=	**102.6**	min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		1814	ft
9.	Watercourse slope, s		0.005	ft/ft
10.	Average velocity, V (Figure F-3)		1.12	ft/s
11.	$T_2 = \frac{L}{60*V}$	T2=	**27.1**	min

Channel Flow (T3)

		Segment ID	T3	
12.	Cross sectional flow area, A		24.0	ft2
13.	Wetted perimeter, Pw		22.4	ft
14.	Hydraulic radius, r = A / Pw		**1.07**	ft
15.	Channel slope, s		0.005	ft/ft
16.	Manning's roughness coefficient, n		0.410	
17.	$V = \frac{1.49 * r\text{^}(2/3) * s\text{^}(1/2)}{n}$		**0.27**	ft/s
18.	Flow length, L		1271	ft
19.	$T_3 = \frac{L}{60*V}$	T3=	**79.0**	min
20.	Watershed or subarea Tc or Tt		**208.7**	min

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/12/2016

Basin: 3-11

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	GRASS	
2.	Manning's roughness coefficient, n	0.410	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.011	ft/ft
6.	$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$	T1= **53.4**	min

Channel Flow (T2)

	Segment ID	T2	
7.	Cross sectional flow area, A	24.0	ft2
8.	Wetted perimeter, Pw	22.4	ft
9.	Hydraulic radius, r = A / Pw	**1.07**	ft
10.	Channel slope, s	0.006	ft/ft
11.	Manning's roughness coefficient, n	0.410	
12.	$V = \frac{1.49 * r^{(2/3)} * s^{(1/2)}}{n}$	**0.30**	ft/s
13.	Flow length, L	1481	ft
14.	$T_3 = \frac{L}{60*V}$	T3= **83.6**	min
15.	Watershed or subarea Tc or Tt	**136.9**	min

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/16/2016
FDA No.: **47100** **Checked By:** T. Kreisle **Date:** 8/25/2016

Basin: 1 Existing Pond Site

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		Grass	
2.	Manning's roughness coefficient, n		0.410	
3.	Flow length, L (max. 100 ft)		100	ft
4.	Rainfall Intensity, I		5.6	in/hr
5.	Average land slope, s		0.009	ft/ft

6. $$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$$ T1= **17.6** min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		580	ft
9.	Watercourse slope, s		0.005	ft/ft
10.	Average velocity, V (Figure F-3)		1.14	ft/s

11. $$T_2 = \frac{L}{60*V}$$ T2= **8.5** min

Channel Flow (T3)

		Segment ID	T3	
12.	Cross sectional flow area, a		44.0	ft2
13.	Wetted perimeter, Pw		34.2	ft
14.	Hydraulic radius, r = A / Pw		**1.29**	ft
15.	Channel slope, s		0.009	ft/ft
16.	Manning's roughness coefficient, n		0.045	
17.	$V = \frac{1.49 * r^{(2/3)} * s^{(1/2)}}{n}$		**3.67**	ft/s
18.	Flow length, L		312	ft
19.	$T_3 = \frac{L}{60*V}$	T3=	**1.4**	min
20.	Watershed or subarea T_c or T_t		**27.5**	min

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/16/2016
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 8/25/2016

Basin: 3 Existing Pond Site

Check one: ☒ Present ☐ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

		Segment ID	T1	
1.	Surface description		Grass	
2.	Manning's roughness coefficient, n		0.410	
3.	Flow length, L (max. 100 ft)		100	ft
4.	Rainfall Intensity, I		5.6	in/hr
5.	Average land slope, s		0.005	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **21.1** min

Shallow Concentrated Flow (T2)

		Segment ID	T2	
7.	Surface description (paved or unpaved)		Unpaved	
8.	Flow length, L		613	ft
9.	Watercourse slope, s		0.006	ft/ft
10.	Average velocity, V (Figure F-3)		1.28	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **8.0** min

12. Watershed or subarea T_c or T_t **29.1** min

5.2 Proposed

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date: 7/30/2016**
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 7/30/2016

Basin: OFFSITE 3-01

Check one: ☐ Present ☒ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	GRAVEL	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.003	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **9.5** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1083	ft
9.	Watercourse slope, s	0.003	ft/ft
10.	Average velocity, V (Figure F-3)	0.90	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **20.0** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
11.	Surface description (paved or unpaved)	Unpaved	
12.	Flow length, L	152	ft
13.	Watercourse slope, s	0.005	ft/ft
14.	Average velocity, V (Figure F-3)	1.12	ft/s

15. $T_2 = \frac{L}{60*V}$ T2= **2.3** min

16. Watershed or subarea Tc or Tt **31.7**

Time of Concentration (TC) Calculation

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01**
FDA No.: **47100**

Designed By: S. Curran **Date:** **7/30/2016**
Checked By: T. Kreisle **Date:** 7/30/2016

Basin: DITCH 3-01

Check one: ☐ Present ☒ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	ASPHALT	
2.	Manning's roughness coefficient, n	0.012	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.018	ft/ft

6. $T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$ T1= **5.6** min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	630	ft
9.	Watercourse slope, s	0.009	ft/ft
10.	Average velocity, V (Figure F-3)	1.51	ft/s

11. $T_2 = \frac{L}{60*V}$ T2= **7.0** min

Channel Flow (T3)

	Segment ID	T3	
12.	Cross sectional flow area, A	24.0	ft2
13.	Wetted perimeter, Pw	22.4	ft
14.	Hydraulic radius, r = A / Pw	**1.07**	ft
15.	Channel slope, s	0.001	ft/ft
16.	Manning's roughness coefficient, n	0.410	
17.	$V = \frac{1.49 * r^{(2/3)} * s^{(1/2)}}{n}$	**0.13**	ft/s
18.	Flow length, L	847	ft

19. $T_3 = \frac{L}{60*V}$ T3= **107.8** min

20. Watershed or subarea Tc or Tt **120.4** min

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date: 7/30/2016**
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 7/30/2016

Basin: DITCH 3-02

Check one: ☐ Present ☒ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	Woods light underbrush	
2.	Manning's roughness coefficient, n	0.400	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.002	ft/ft
6.	$T_1 = \frac{0.93\ L^{\wedge}0.6\ \ n^{\wedge}0.6}{I^{\wedge}0.4\ \ S^{\wedge}0.3}$	T1= **95.6**	min

Shallow Concentrated Flow (T2)

	Segment ID	T2	
7.	Surface description (paved or unpaved)	Unpaved	
8.	Flow length, L	1814	ft
9.	Watercourse slope, s	0.005	ft/ft
10.	Average velocity, V (Figure F-3)	1.12	ft/s
11.	$T_2 = \frac{L}{60*V}$	T2= **27.1**	min

Channel Flow (T3)

	Segment ID	T3	
12.	Cross sectional flow area, A	24.0	ft2
13.	Wetted perimeter, Pw	22.4	ft
14.	Hydraulic radius, r = A / Pw	**1.07**	ft
15.	Channel slope, s	0.005	ft/ft
16.	Manning's roughness coefficient, n	0.410	
17.	$V = \frac{1.49 * r^{\wedge}(2/3) * s^{\wedge}(1/2)}{n}$	**0.27**	ft/s
18.	Flow length, L	1271	ft
19.	$T_3 = \frac{L}{60*V}$	T3= **79.0**	min
20.	Watershed or subarea T_c or T_t	**201.7**	min

Time of Concentration (TC) Calculation

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01
FDA No.: 47100

Designed By: S. Curran **Date: 7/30/2016**
Checked By: T. Kreisle **Date:** 7/30/2016

Basin: DITCH 3-03

Check one: ☐ Present ☒ Developed

Check one: ☒ Tc ☐ Tt through subarea **10 year / 24 hour event**

Notes: Space for one segment per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Overland Flow (T1)

	Segment ID	T1	
1.	Surface description	GRASS	
2.	Manning's roughness coefficient, n	0.410	
3.	Flow length, L (max. 100 ft)	100	ft
4.	Rainfall Intensity, I	0.3	in/hr
5.	Average land slope, s	0.011	ft/ft
6.	$T_1 = \frac{0.93\ L^{0.6}\ n^{0.6}}{I^{0.4}\ S^{0.3}}$	T1= **53.4**	min

Channel Flow (T2)

	Segment ID	T2	
7.	Cross sectional flow area, A	24.0	ft2
8.	Wetted perimeter, Pw	22.4	ft
9.	Hydraulic radius, r = A / Pw	**1.07**	ft
10.	Channel slope, s	0.006	ft/ft
11.	Manning's roughness coefficient, n	0.410	
12.	$V = \frac{1.49 * r^{(2/3)} * s^{(1/2)}}{n}$	**0.30**	ft/s
13.	Flow length, L	1481	ft
14.	$T_3 = \frac{L}{60*V}$	T3= **83.6**	min
15.	Watershed or subarea Tc or Tt	**136.9**	min

Appendix 6.0

CN CALCULATIONS

6.1 Existing

CN CALCULATIONS

Project: SR 60 over CSX RR

FPID No.: 436559-1-52-01	**Designed By:**	S. Curran	**Date:**	08/03/16
FDA No.: 47100	**Checked By:**	T. Kreisle	**Date:**	08/12/16

EXISTING CONDITION - BASIN 1

Basin 1 Roadway Right of Way

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	3.61	353.78
Open Spaces (fair condition)	D	84	9.63	808.92
	Weighted CN:	88	13.24	

POND 1-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Open Spaces (fair condition)	D	84	3.01	252.84
	Weighted CN:	84	3.01	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/12/16

EXISTING CONDITION - BASIN 2

Basin 2 Roadway Right of Way

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	2.11	207.074
Open Spaces (fair condition)	D	84	4.37	367.08
	Weighted CN:	89	6.48	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/15/16

EXISTING CONDITION - BASIN 3

3-00

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.00	0
Open Spaces (fair condition)	D	84	1.36	114.24
	Weighted CN:	84	1.36	

3-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.09	8.82
Open Spaces (fair condition)	D	84	0.16	13.44
	Weighted CN:	89	0.25	

3-02

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.11	10.78
Open Spaces (fair condition)	D	84	0.26	21.84
	Weighted CN:	88	0.37	

3-03

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.21	20.58
Open Spaces (fair condition)	D	84	0.27	22.68
	Weighted CN:	90	0.48	

3-04

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.03	2.94
Open Spaces (fair condition)	D	84	0.04	3.36
	Weighted CN:	90	0.07	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/15/16

EXISTING CONDITION - BASIN 3

3-05

Land Use Description	**Hydrologic Soil Group**	**SCS Curve Number (CN)**	**Area (Ac.)**	**CN x Area**
Impervious (Pavement)	D	98	0.04	3.92
Open Spaces (fair condition)	D	84	0.10	8.4
	Weighted CN:	88	0.14	

3-06

Land Use Description	**Hydrologic Soil Group**	**SCS Curve Number (CN)**	**Area (Ac.)**	**CN x Area**
Impervious (Pavement)	D	98	0.56	54.88
Open Spaces (fair condition)	D	84	2.92	245.28
	Weighted CN:	86	3.48	

3-07

Land Use Description	**Hydrologic Soil Group**	**SCS Curve Number (CN)**	**Area (Ac.)**	**CN x Area**
Impervious (Pavement)	D	98	0.68	66.64
Open Spaces (fair condition)	D	84	0.98	82.32
	Weighted CN:	90	1.66	

3-08

Land Use Description	**Hydrologic Soil Group**	**SCS Curve Number (CN)**	**Area (Ac.)**	**CN x Area**
Impervious (Pavement)	D	98	1.11	108.78
Open Spaces (fair condition)	D	84	1.43	120.12
	Weighted CN:	90	2.54	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/15/16

EXISTING CONDITION - BASIN 3

3-09

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	1.55	151.9
Open Spaces (fair condition)	D	84	2.74	230.16
Woods/Forest (good cover)	D	77	14.07	1083.39
Impervious (Buildings)	D	98	3.24	317.52
Gravel	D	91	1.03	93.73
	Weighted CN:	83	22.63	

3-10

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.91	89.18
Open Spaces (fair condition)	A	49	37.42	1833.58
	Weighted CN:	50	38.33	

3-11

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	2.26	221.48
Open Spaces (fair condition)	A	49	3.73	182.77
	Weighted CN:	67	5.99	

OFFSITE POND 3

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Open Spaces (fair condition)	D	84	3.53	296.52
	Weighted CN:	84	3.53	

6.2 Proposed

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/12/16

PROPOSED CONDITION - BASIN 1

Basin 1 Roadway Right of Way StormTAB

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	7.40	725.2
Open Spaces (fair condition)	D	84	3.66	307.44
	Weighted CN:	93	11.06	

DITCH 1-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.48	47.04
Open Spaces (fair condition)	D	84	0.68	57.12
	Weighted CN:	90	1.16	

DITCH 1-02

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.21	20.58
Open Spaces (fair condition)	D	84	0.29	24.36
	Weighted CN:	90	0.50	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/03/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/12/16

PROPOSED CONDITION - BASIN 2

Basin 2 Roadway Right of Way

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	3.58	350.84
Open Spaces (fair condition)	D	84	0.00	0
	Weighted CN:	98	3.58	

DITCH 2-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.26	25.48
Open Spaces (fair condition)	D	84	0.43	36.12
	Weighted CN:	89	0.69	

DITCH 2-02

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.34	33.32
Open Spaces (fair condition)	D	84	0.43	36.12
	Weighted CN:	90	0.77	

DITCH 2-03

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.14	13.72
Open Spaces (fair condition)	D	84	0.12	10.08
	Weighted CN:	92	0.26	

DITCH 2-04

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.08	7.84
Open Spaces (fair condition)	D	84	1.14	95.76
	Weighted CN:	85	1.22	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/30/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/30/16

PROPOSED CONDITION - BASIN 3

Basin 3 Roadway Right of Way Stormtab

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	5.30	519.4
Open Spaces (fair condition)	D	84	0.07	5.88
Water	D	100	1.94	194
Open Spaces (good condition)	D	80	1.59	127.2
	Weighted CN:	95	8.90	

OFFSITE 3-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	1.54	150.92
Woods/Forest (good cover)	D	77	14.06	1082.62
Open Spaces (fair condition)	D	84	2.73	229.32
Gravel	D	91	1.06	96.46
Commercial/Business	D	95	3.24	307.8
	Weighted CN:	83	22.63	

DITCH 3-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.14	13.72
Open Spaces (fair condition)	D	84	2.19	183.96
	Weighted CN:	85	2.33	

DITCH 3-02

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	1.76	172.48
Open Spaces (fair condition)	A	49	37.28	1826.72
	Weighted CN:	51	39.04	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01 **Designed By:** S. Curran **Date:** 08/30/16
FDA No.: 47100 **Checked By:** T. Kreisle **Date:** 08/30/16

PROPOSED CONDITION - BASIN 3

DITCH 3-03

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	1.60	156.8
Open Spaces (fair condition)	A	49	3.70	181.3
	Weighted CN:	64	5.30	

SUBBASIN 3-01

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.11	10.78
Open Spaces (fair condition)	D	84	0.01	0.84
	Weighted CN:	97	0.12	

SUBBASIN 3-04

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.13	12.74
Open Spaces (fair condition)	D	84	0.01	0.84
	Weighted CN:	97	0.14	

SUBBASIN 3-06

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.10	9.8
Open Spaces (fair condition)	D	84	0.01	0.84
	Weighted CN:	97	0.11	

SUBBASIN 3-25

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.17	16.66
	Weighted CN:	98	0.17	

CN CALCULATIONS

Project: SR 60 over CSX RR
FPID No.: 436559-1-52-01
FDA No.: 47100

Designed By: S. Curran **Date:** 08/30/16
Checked By: T. Kreisle **Date:** 08/30/16

PROPOSED CONDITION - BASIN 3

SUBBASIN 3-26

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.08	7.84
	Weighted CN:	98	0.08	

SUBBASIN 3-26A

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.08	7.84
	Weighted CN:	98	0.08	

SUBBASIN 3-27

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.26	25.48
	Weighted CN:	98	0.26	

SUBBASIN 3-28

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.36	35.28
	Weighted CN:	98	0.36	

SUBBASIN 3-29

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.89	87.22
Open Spaces (fair condition)	D	84	0.32	26.88
	Weighted CN:	94	1.21	

SUBBASIN 3-30

Land Use Description	Hydrologic Soil Group	SCS Curve Number (CN)	Area (Ac.)	CN x Area
Impervious (Pavement)	D	98	0.10	9.8
	Weighted CN:	98	0.10	

Appendix 7.0

DITCH CALCULATIONS

7.1 Ditch Conveyance Calculations

Roadside Ditch Design Calculations

Project: SR 60 at CXS RR, FP ID 436559-1-52-01 Computed By TMK Date: 08/15/16

Frequency: 10 year Zone: 8 Basin 1 Left Ditch Checked By: SC Date: 08/25/16

Station		Side	Incr Area (ac)	Total Area (ac)	C	CA (ac)	Tc (min)	I (in/hr)	Q (cfs)	Ditch FL (ft)	Ditch Length (ft)	Ditch Slope (%)	Ditch Section			Mann-ing's n	Normal Depth (ft)	Velocity (fps)	Travel Time (min)	Ditch Lining	Remarks
From	To												BW (Ft)	FS (H:V)	BS (H:V)						
3364+50	3373+65	Lt.	0.73 0.92	0.73 0.92	0.95 0.25	0.92	27.0	5.10	4.71	112.8 111.9	915	-0.098%	5	6	3	0.06	0.91	0.56	27.0	none	
3373+65	3374+60	Lt.	0.08 0.10	0.08 0.10	0.95 0.25	0.10	10.0	7.45	0.75	111.9 112.5	95	0.632%	5	6	3	0.06	0.21	0.62	2.6	none	

Roadside Ditch Design Calculations

Project: SR 60 at CXS RR, FP ID 436559-1-52-01 | Computed By: TMK | Date: 08/15/16

Frequency: 10 year | Zone: 8 | Basin 1 Left Ditch | Checked By: SC | Date: 08/25/16

Station		Side	Incr Area (ac)	Total Area (ac)	C	CA (ac)	Tc (min)	I (in/hr)	Q (cfs)	Ditch FL (ft)	Ditch Length (ft)	Ditch Slope (%)	Ditch Section			Mann-ing's n	Normal Depth (ft)	Velocity (fps)	Travel Time (min)	Ditch Lining	Remarks
From	To												BW (Ft)	FS (H:V)	BS (H:V)						
3375+40	3376+65	Lt.	0.33	0.33	0.95	0.34	10.0	7.45	2.56	113.7	125	-0.160%	5	4	4	0.06	0.60	0.58	3.6	none	
			0.12	0.12	0.25																
										113.5											
3376+65	3378+20	Lt.	0.14	0.14	0.95	0.16	10.0	7.45	1.19	113.5	155	0.129%	5	4	4	0.06	0.42	0.43	6.1	none	
			0.11	0.11	0.25																
										113.7											

Roadside Ditch Design Calculations

Project: SR 60 at CXS RR, FP ID 436559-1-52-01 Computed By: TMK Date: 08/15/16

Frequency: 10 year Zone: 8 Basin 1 Med. Ditch Checked By: SC Date: 08/25/16

Station		Side	Incr Area (ac)	Total Area (ac)	C	CA (ac)	Tc (min)	I (in/hr)	Q (cfs)	Ditch FL (ft)	Ditch Length (ft)	Ditch Slope (%)	Ditch Section			Mann-ing's n	Normal Depth (ft)	Velocity (fps)	Travel Time (min)	Ditch Lining	Remarks
From	To												BW (Ft)	FS (H:V)	BS (H:V)						
3364+50	3367+65	Med.	0.00	0.00	0.95	0.07	21.2	5.67	0.41	115.6	315	-0.083%	5	6	6	0.06	0.25	0.25	21.2	none	
			0.29	0.29	0.25																
										115.3											
3367+65	3373+50	Med.	0.00	0.00	0.95	0.11	26.6	5.13	0.55	115.3	585	0.198%	5	6	6	0.06	0.23	0.37	26.6	none	
			0.43	0.43	0.25																
										116.5											

Roadside Ditch Design Calculations

Project: SR 60 at CXS RR, FP ID 436559-1-52-01 Computed By: TMK Date: 08/15/16

Frequency: 10 year Zone: 8 Basin 1 Right Checked By: __ SC Date: 08/25/16

Station		Side	Incr Area (ac)	Total Area (ac)	C	CA (ac)	Tc (min)	I (in/hr)	Q (cfs)	Ditch FL (ft)	Ditch Length (ft)	Ditch Slope (%)	Ditch Section			Mann-ing's n	Normal Depth (ft)	Velocity (fps)	Travel Time (min)	Ditch Lining	Remarks	
From	To												BW (Ft)	FS (H:V)	BS (H:V)							
4364+50	4368+25	Rt.	0.20 0.43	0.20 0.43	0.95 0.25	0.30	13.7	6.70	1.99	113.1 112.7	375	-0.107%	5	6	3	0.06	0.58	0.46	13.7	none		
4368+25	4369+75	Rt.	0.15 0.09	0.15 0.09	0.95 0.25	0.17	10.0	7.45	1.23	112.7 113.0	150	0.200%	5	6	3	0.06	0.37	0.49	5.1	none		#REF!
4369+75	4371+00	Rt.	0.28 0.17	0.28 0.17	0.95 0.25	0.31	10.0	7.45	2.30	113.0 112.7	125	-0.240%	5	4	3	0.06	0.51	0.66	3.2	none		#REF!
4371+00	4374+00	Rt.	0.54 0.39	0.54 0.39	0.95 0.25	0.61	10.0 .	7.45	4.55	112.7 112.4	300	-0.100%	5	4	3	0.06	0.93	0.59	8.5	none		#REF!
			1.32																			

7.2 Ditch Stage Area Calculations

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 1-01

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 1.80 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= 2.20 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
103+27	5.0			112.20	8.00
109+07	5.0	580.37	596.37	111.80	8.00

	Stage Elevation (in order)	Area (Ac)
	111.80	0.001
	112.60	0.112
	113.00	0.156
Low TOB	114.00	0.266
Low TOB	114.00	0.266

Stage Elevation	Volume (Ac-ft)
111.80	0.000
112.60	0.045
113.00	0.099
114.00	0.310
114.00	0.310

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 1-02

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 2.30 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= 3.00 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
110+07	5.0			111.70	8.00
111+04	5.0	96.58	117.78	111.00	8.00

	Stage Elevation (in order)	Area (Ac)
	111.60	0.001
	112.00	0.018
	113.00	0.039
Low TOB	114.00	0.061

Stage Elevation	Volume (Ac-ft)
111.60	0.000
112.00	0.004
113.00	0.032
114.00	0.083

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 2-01

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 1.90 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= 1.60 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
114+55	5.0			112.10	7.00
117+14	5.0	258.98	272.98	112.40	7.00

	Stage Elevation (in order)	Area (Ac)
	112.10	0.001
	112.50	0.040
	113.00	0.062
	113.50	0.084
Low TOB	114.00	0.106

Stage Elevation	Volume (Ac-ft)
112.10	0.000
112.50	0.008
113.00	0.034
113.50	0.070
114.00	0.118

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 2-02

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 4.40 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= 4.20 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
117+97	5.0			112.60	7.00
121+11	5.0	314.33	348.73	112.80	7.00

	Stage Elevation (in order)	Area (Ac)
	112.60	0.001
	113.00	0.051
	113.50	0.079
	114.00	0.107
	115.00	0.163
	116.00	0.219
Low TOB	117.00	0.275

Stage Elevation	Volume (Ac-ft)
112.60	0.000
113.00	0.010
113.50	0.043
114.00	0.090
115.00	0.225
116.00	0.416
117.00	0.664

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 2-03

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 3.10 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= 3.00 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
121+66	5.0			112.90	7.00
121+98	5.0	32.39	56.79	113.00	7.00

	Stage Elevation (in order)	Area (Ac)
	113.10	0.007
	113.50	0.010
	114.00	0.015
	114.50	0.019
	115.00	0.024
Low TOB	116.00	0.033

Stage Elevation	Volume (Ac-ft)
113.10	0.000
113.50	0.003
114.00	0.010
114.50	0.018
115.00	0.029
116.00	0.057

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 2-04

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 1.40 **Slope to Top (BK.)** 4.00 (h:v)
Depth of Ditch= -1.50 **Slope to Top (AH.)** 4.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
4397+31	5.0			113.10	7.00
4398+00	55.0	69	74.6	113.60	7.00
4399+00	59.0	100	100	114.24	7.00
4401+45	50.0	245	239	116.00	7.00

	Stage Elevation (in order)	Area (Ac)
	113.50	0.001
	114.00	0.050
Low TOB	114.50	0.191

Stage Elevation	Volume (Ac-ft)
113.50	0.000
114.00	0.013
114.50	0.073

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 3-02

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 4.09 **Slope to Top (BK.)** 6.00 (h:v)
Depth of Ditch= 1.69 **Slope to Top (AH.)** 6.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
3419+53	5.0			116.10	9.00
3424+01	5.0	448.19	482.87	118.50	9.00

	Stage Elevation (in order)	Area (Ac)
	116.10	0.001
	117.00	
	118.00	
	119.00	0.200
	120.00	0.300
Low TOB	120.19	0.319

Stage Elevation	Volume (Ac-ft)
116.10	0.000
117.00	0.000
118.00	0.000
119.00	0.100
120.00	0.350
120.19	0.409

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

DITCH STAGE/AREA CALCULATIONS

Project: **SR 60 over CSX RR**
FPID No.: **436559-1-52-01** **Designed By:** S. Curran **Date:** 8/4/2016
FDA No.: **47100** **Checked By:** **T.Kreisle** **Date:** 8/24/2016

DITCH 3-03

Enter Typical or Average Depth at the Begin and End Ditch Stations and Slope to Bottom:

Depth of Ditch= 3.50 **Slope to Top (BK.)** 6.00 (h:v)
Depth of Ditch= 0.50 **Slope to Top (AH.)** 6.00 (h:v)

Station	* Width (ft)	Length Difference (ft)	Length Difference (ft)	Lowest Elevation (ft)	Slope Sum (h:v) (ft/ft)
4419+22	5.0			116.00	10.00
4420+00	11.6	78.18	99.18	116.30	10.00
4421+00	14.4	100	100	116.70	10.00
4422+00	13.0	100	100	117.09	10.00
4423+00	10.2	100	100	117.48	10.00
4424+00	9.0	100	100	117.87	10.00
4425+00	8.6	100	100	118.26	10.00
4426+00	6.4	100	100	118.65	10.00
4426+95	5.0	95	98	119.00	10.00

	Stage Elevation (in order)	Area (Ac)
	116.00	0.001
	116.50	0.019
	117.00	0.064
	117.50	0.158
	118.00	0.232
	118.50	0.315
	119.00	0.420
Low TOB	119.50	0.511

Stage Elevation	Volume (Ac-ft)
116.00	0.000
116.50	0.005
117.00	0.026
117.50	0.081
118.00	0.179
118.50	0.316
119.00	0.499
119.50	0.732

* Enter "V" Bottom Width as "0.01"

** For Sag-profiles, add XS at corresponding elev. On opposite side of low point.

Appendix 8.0

TREATMENT VOLUME CALCULATIONS

BASIN 1 POND CALCULATIONS

Designed By:	**T.Kreisle**	**Date:**	**8/15/16**
Checked By:	**S. Curran**	**Date:**	**8/25/2016**

Required Treatment Volume (Ac- Ft.)

Contributing Area (Added Pavement) x 1" = 0.54

Added Pavement is for both Basin 1 and 2

Contr. Area = Proposed Pavement (12.49 Ac.) - Existing Pavement (6.04 Ac.)

Pond Data

Stage	Elevation (Ft.)	Area (Ac.)	Voume (Ac-Ft)
Berm (Back)	114.5	2.28	7.94
Berm (Front)	113.5	1.80	5.90
Design High Water	112.62	1.75	4.34
Weir	110.4	1.61	0.62
Control	110.0	1.48	0.00

DHW = FLMOD 25YR-24HR

Provided Treatment Volume (Ac.-Ft.)

Volume between Control and Weir = 0.62

BASIN 3 POND CALCULATIONS

Designed By: **T.Kreisle** **Date:** **8/15/16**
Checked By: **S. Curran** **Date:** **8/25/2016**

Required Treatment Volume (Ac.-Ft.)

Contributing Area (Added Pavement) x 1" = 0.42

Added Pavement = Basin 3 Added Pavement

Contr. Area = Proposed Pavement (12.62 Ac.) - Existing Pavement (7.55 Ac.)

Pond Data

Stage	Elevation (Ft.)	Area (Ac.)	Voume (Ac-Ft)
Berm (Back)	118.4	2.68	7.94
Berm (Front)	117.4	2.17	5.51
Design High Water	116.38	2.07	3.35
Weir	115.0	1.94	0.58
Control	114.7	1.92	0.00

DHW = FLMOD 25YR-24HR

Provided Treatment Volume (Ac. Ft.)

Volume between Control and Weir = 0.58

OVERALL PRE/POST DEVELOPMENT DISCHARGE COMPARISION (25-Year, 24-Hour)

Pre-Development Discharge = 45.66

Post Development Discharge = 25.84

Appendix 9.0

FLOODPLAIN

9.1 Encroachment

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 1 EB

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		110 to 111.92
4374+85		
	345	0.35
4378+30		
	Total (ac-ft)	0.350

SHW Elev. = 111.0

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 1 WB

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		111 to 111.92
3376+41		
	48	0.07
3376+89		
3377+29		
	289	0.12
3380+18		
3380+14		
	607	1.59
3386+21		
	Total (ac-ft)	1.780

SHW Elev. = 111.0

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 1 EB PCDC

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		107.4
		to
		111.92
4374+85		
	345	0.12
4378+30		
Total (ac-ft)		0.120

SHW Elev. = 107.4

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 1 WB PCDC

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		107.4
		to
		111.92
3386+90		
	53	0.19
3387+43		
	Total (ac-ft)	0.190

SHW Elev. = 107.4

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 2 EB PCDC

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		107.4 to 111.92
4387+94		
	51	0.13
4388+45		
	Total (ac-ft)	0.130

SHW Elev. = 107.4

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 2 WB PCDC

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		107.4 to 111.92
3388+30		
	118	0.36
3389+48		
	Total (ac-ft)	0.360

SHW Elev. = 107.4

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 2 WB

Station	Length (ft)	Volume of Encroachment (Ac.-ft)
		111.5 to 111.92
3391+62		
	38	0.002
3392+00		
3392+85		
	578	0.525
3398+63		
	Total (ac-ft)	0.527

SHW Elev. = 111.5

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 Over CSX Basin 2 Pond 3 Site

Station	Length (ft)	Volume of Encroachment (Ac.-ft) 111.00 to 111.92
018+46		
	55	0.03
019+01		
	Total (ac-ft)	0.034

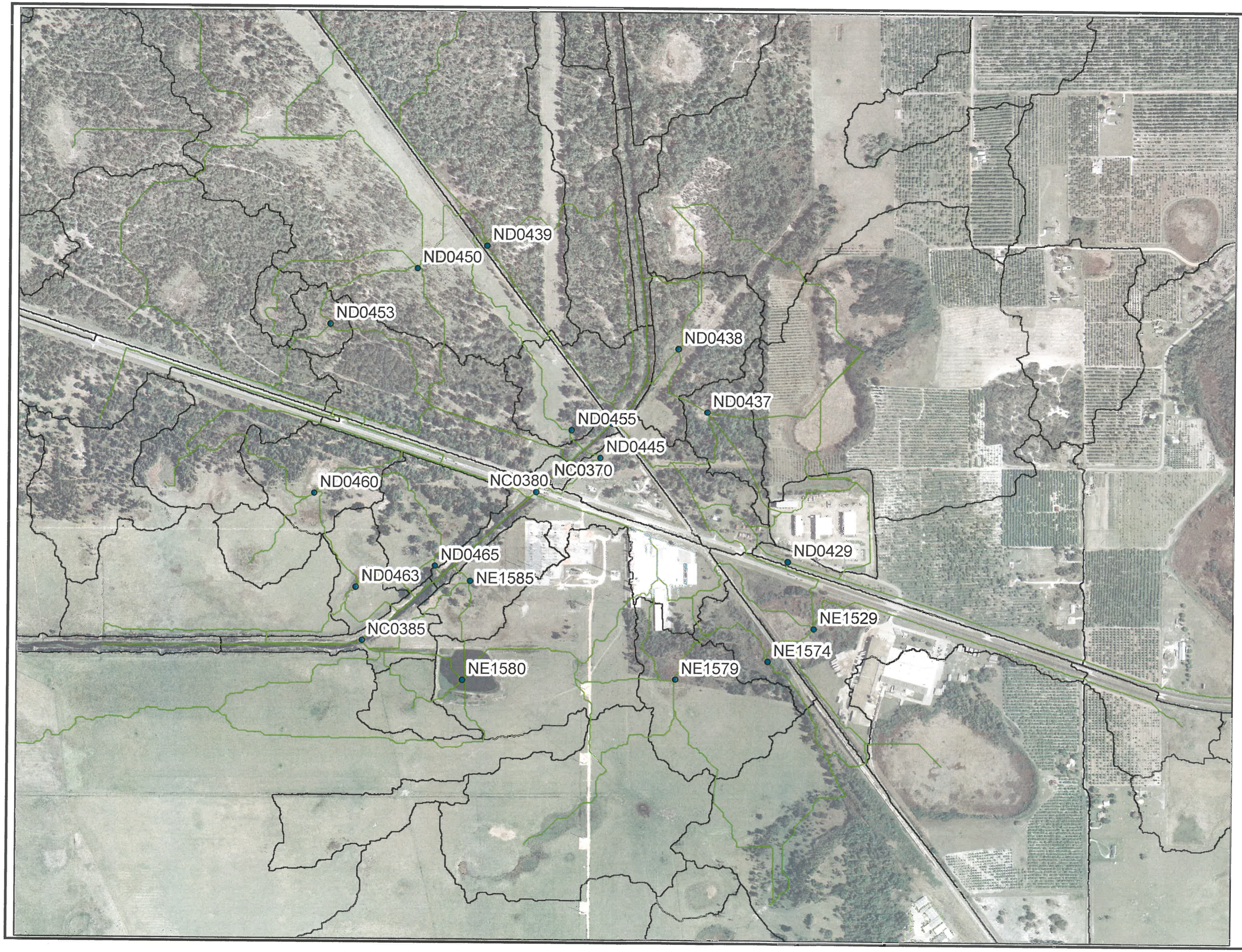
SHW Elev. = 111.0

100 Year Flood Elev. = 111.92

100-Year Floodplain Encroachment
SR 60 over CSX Totals

Location of Encroachment (see previous sheets)	Volume of Encroachment (ac-ft)
	107.4' to 111.92'
Basin 1 EB	0.350
Basin 1 WB	1.780
Basin 1 EB PCDC	0.120
Basin 1 WB PCDC	0.190
Basin 2 EB PCDC	0.130
Basin 2 WB PCDC	0.360
Basin 2 WB	0.527
Pond 3	0.034
Total (ac-ft)	**3.491**

9.2 Modeling



ATKINS

4030 West Boy Scout Boulevard, Suite 700
Tampa, FL, 33607

Notes:

This information is being developed in accordance with the Southwest Florida Water Management District's Watershed Management Program Guidelines and Specifications (G&S) and is provided for informational and review purposes. The G&S define the watershed parameters used to develop a computer model that simulates projected surface water levels. The model includes watershed and rainfall event simulation parameters such as a design rainfall event and associated antecedent moisture conditions. This information has not been finalized and may be revised following a public review and comment period. Revisions may result in changes to the projected surface water levels. This information should be used as a reference only and not as the definitive source to determine flood elevations at this time. The District does not guarantee the completeness of this information and it is being provided as preliminary. The District shall not be liable for any damages suffered as a result of using this information. If you have questions or comments on the information and the methods used, please contact the Southwest Florida Water Management District's Engineering Section at 352-796-7211 ext. 4232. Environmental Resource Permit (ERP) applicants are encouraged to schedule a pre-application meeting(s) with the District's Regulatory staff to discuss the use of any watershed study/model in a subsequent ERP application.

Link to the District's G&S:
http://www.swfwmd.state.fl.us/documents/plans/watershed_guidesspecs.pdf

0

0

1 inch equals 804 feet

MAP ATLAS

Project: N223

Polk County: Peace Creek Watershed

Filename:	Map Date:	Map Prepared By:
	February, 2013	ATKINS

Date of Photography:
2007 Aerial Photography

```
      Name: NC0370             Base Flow(cfs): 0.000          Init Stage(ft): 104.910
     Group: C                                                 Warn Stage(ft): 109.910
      Type: Stage/Area

PC <--->   Measured <--->.     Stage:   109.6   Time: 24

      Stage(ft)        Area(ac)
--------------- ---------------
        103.000          0.1000
        112.700          0.1310
        113.200          0.1600
        113.700          0.1880
        114.200          0.2230
        114.700          0.2660
        117.200          0.3200

□
      Name: NC0380             Base Flow(cfs): 0.000          Init Stage(ft): 104.890
     Group: C                                                 Warn Stage(ft): 109.890
      Type: Stage/Area

PC <--->   Measured <--->.     Stage:   109.6   Time: 24

      Stage(ft)        Area(ac)
--------------- ---------------
         98.000          0.1000
        111.100          0.2050
        111.600          0.2500
        112.100          0.2890
        112.600          0.3810
        113.100          0.7380
        113.600          1.1760
        114.100          1.5260
        114.600          2.1300
        115.100          3.4600
        116.600         13.8870
        117.100         15.6240
        118.100         20.4300
        118.600         20.6750
        120.600         21.2400

□
      Name: ND0445             Base Flow(cfs): 0.000          Init Stage(ft): 106.800
     Group: D                                                 Warn Stage(ft): 111.800
      Type: Stage/Area

Initial Stage from: BASEFLOW SIMULATION OUTPUT - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        106.600          0.1000
        107.100          0.3120
        107.600          0.4060
        108.100          0.5190
        110.100          1.1020
        110.600          1.2830
        112.100          1.9250
        112.600          2.1800
        113.100          2.4430
        113.600          2.8910
        114.100          3.7210
        114.600          4.8230
        115.100          6.2850
        115.600          6.8570
        116.600          7.3700
        117.100          7.6490
        117.600          7.9920
        118.100          8.4040
        118.600          8.7260
        119.100          9.2410
        120.600          9.9150

□
      Name: ND0465             Base Flow(cfs): 0.000          Init Stage(ft): 107.700
     Group: D                                                 Warn Stage(ft): 112.700
      Type: Stage/Area

Initial Stage from: BASEFLOW SIMULATION OUTPUT - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        107.400          0.1000
        110.000          0.5130
        110.500          2.9020
        111.000          6.4450
        112.000         13.0500
        112.500         15.3630
        113.000         16.7460
        113.500         17.6660
```

```
        114.000        17.9910
        114.500        18.0510
        115.000        18.0810
        115.500        18.1050
        119.000        18.1930

□
      Name: ND0470              Base Flow(cfs): 0.000          Init Stage(ft): 110.040
     Group: D                                                  Warn Stage(ft): 115.040
      Type: Stage/Area

Initial Stage from: PBSJ SURVEY CULVERT 2/16/2006 - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        106.600         0.1000
        111.000         0.1500
        112.000        13.8630
        112.500        19.2030
        113.000        26.0050
        113.500        34.3420
        114.000        43.6800
        114.500        50.5730
        115.000        55.2930
        115.500        59.0060
        116.000        62.9230
        118.000        68.0440
```

Unmodified Peace Creek Watershed Model

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
NC0370	C	PC100y1d	14.27	110.35	109.91	0.0018	74998	14.30	822.78	14.34	822.89
NC0370	C	PC100y5d	96.34	111.98	109.91	-0.0007	77889	62.22	1448.48	62.24	1448.42
NC0380	C	PC100y1d	14.27	110.31	109.89	0.0018	108353	14.32	845.67	14.39	845.95
NC0380	C	PC100y5d	96.41	111.94	109.89	0.0004	120215	62.05	1312.66	62.08	1311.77
ND0445	D	PC100y1d	14.28	110.60	111.80	0.0017	55879	12.08	46.09	12.02	23.43
ND0445	D	PC100y5d	96.21	112.14	111.80	0.0004	84781	60.00	21.73	61.08	8.60
ND0465	D	PC100y1d	14.27	110.31	112.70	0.0014	86970	12.08	85.24	12.10	80.37
ND0465	D	PC100y5d	96.57	111.84	112.70	0.0004	520612	60.00	40.01	59.36	25.05
ND0470	D	PC100y1d	13.84	113.20	115.04	0.0012	1278243	12.17	6.49	0.00	0.00
ND0470	D	PC100y5d	62.13	113.21	115.04	0.0003	1282780	6.00	4.11	0.00	0.00

```
      Name: NC0370              Base Flow(cfs): 0.000          Init Stage(ft): 104.910
     Group: C                                                  Warn Stage(ft): 109.910
      Type: Stage/Area

PC <--->   Measured <--->.     Stage:   109.6   Time: 24

      Stage(ft)        Area(ac)
--------------- ---------------
        103.000          0.0050
        112.700          0.0200
        113.200          0.1600
        113.700          0.1880
        114.200          0.2230
        114.700          0.2660
        117.200          0.3200
```

Decreased for floodplain impacts

```
☐
      Name: NC0380              Base Flow(cfs): 0.000          Init Stage(ft): 104.890
     Group: C                                                  Warn Stage(ft): 109.890
      Type: Stage/Area

PC <--->   Measured <--->.     Stage:   109.6   Time: 24

      Stage(ft)        Area(ac)
--------------- ---------------
         98.000          0.1000
        111.100          0.1950
        111.600          0.2400
        112.100          0.2790
        112.600          0.3810
        113.100          0.7380
        113.600          1.1760
        114.100          1.5260
        114.600          2.1300
        115.100          3.4600
        116.600         13.8870
        117.100         15.6240
        118.100         20.4300
        118.600         20.6750
        120.600         21.2400
```

Decreased for floodplain impacts

```
☐
      Name: ND0445              Base Flow(cfs): 0.000          Init Stage(ft): 106.800
     Group: D                                                  Warn Stage(ft): 111.800
      Type: Stage/Area

Initial Stage from: BASEFLOW SIMULATION OUTPUT - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        106.600          0.1000
        107.100          0.1500
        107.600          0.2000
        108.100          0.2500
        110.100          1.0250
        110.600          1.2830
        112.100          1.9250
        112.600          2.1800
        113.100          2.4430
        113.600          2.8910
        114.100          3.7210
        114.600          4.8230
        115.100          6.2850
        115.600          6.8570
        116.600          7.3700
        117.100          7.6490
        117.600          7.9920
        118.100          8.4040
        118.600          8.7260
        119.100          9.2410
        120.600          9.9150
```

Decreased for floodplain impacts

```
☐
      Name: ND0465              Base Flow(cfs): 0.000          Init Stage(ft): 107.700
     Group: D                                                  Warn Stage(ft): 112.700
      Type: Stage/Area

Initial Stage from: BASEFLOW SIMULATION OUTPUT - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        107.400          0.1000
        110.000          0.5130
        110.500          2.9020
        111.000          6.0950
        112.000         13.0500
        112.500         15.3630
        113.000         16.7460
        113.500         17.6660
```

Decreased for floodplain impacts

```
        114.000         17.9910
        114.500         18.0510
        115.000         18.0810
        115.500         18.1050
        119.000         18.1930

☐
      Name: ND0470              Base Flow(cfs): 0.000          Init Stage(ft): 110.040
     Group: D                                                  Warn Stage(ft): 115.040
      Type: Stage/Area

Initial Stage from: PBSJ SURVEY CULVERT 2/16/2006 - Stage Area from: PEACE CREEK DEM

      Stage(ft)        Area(ac)
--------------- ---------------
        106.600          0.1000
        111.000          0.1500
        112.000         11.8060
        112.500         19.2030
        113.000         26.0050
        113.500         34.3420
        114.000         43.6800
        114.500         50.5730
        115.000         55.2930
        115.500         59.0060
        116.000         62.9230
        118.000         68.0440
```

Decreased for floodplain impacts

```
Modified PC Watershed Model for Floodplain Impacts

                                               Max Time       Max   Warning Max Delta  Max Surf  Max Time       Max  Max Time       Max
           Name          Group     Simulation     Stage     Stage     Stage     Stage      Area    Inflow    Inflow   Outflow   Outflow
                                                    hrs        ft        ft        ft       ft2       hrs       cfs       hrs       cfs

         NC0370              C       PC100y1d     14.27    110.35    109.91    0.0018     74998     14.30    822.78     14.34    822.89
         NC0370              C       PC100y5d     96.34    111.98    109.91   -0.0007     77889     62.22   1448.48     62.24   1448.42

         NC0380              C       PC100y1d     14.27    110.31    109.89    0.0018    108353     14.32    845.67     14.39    845.95
         NC0380              C       PC100y5d     96.41    111.94    109.89    0.0004    120215     62.05   1312.66     62.08   1311.77

         ND0445              D       PC100y1d     14.28    110.60    111.80    0.0017     55879     12.08     46.09     12.02     23.43
         ND0445              D       PC100y5d     96.21    112.14    111.80    0.0004     84781     60.00     21.73     61.08      8.60

         ND0465              D       PC100y1d     14.27    110.31    112.70    0.0014     86970     12.08     85.24     12.10     80.37
         ND0465              D       PC100y5d     96.57    111.84    112.70    0.0004    520612     60.00     40.01     59.36     25.05

         ND0470              D       PC100y1d     13.84    113.20    115.04    0.0012   1278243     12.17      6.49      0.00      0.00
         ND0470              D       PC100y5d     62.13    113.21    115.04    0.0003   1282780      6.00      4.11      0.00      0.00
```

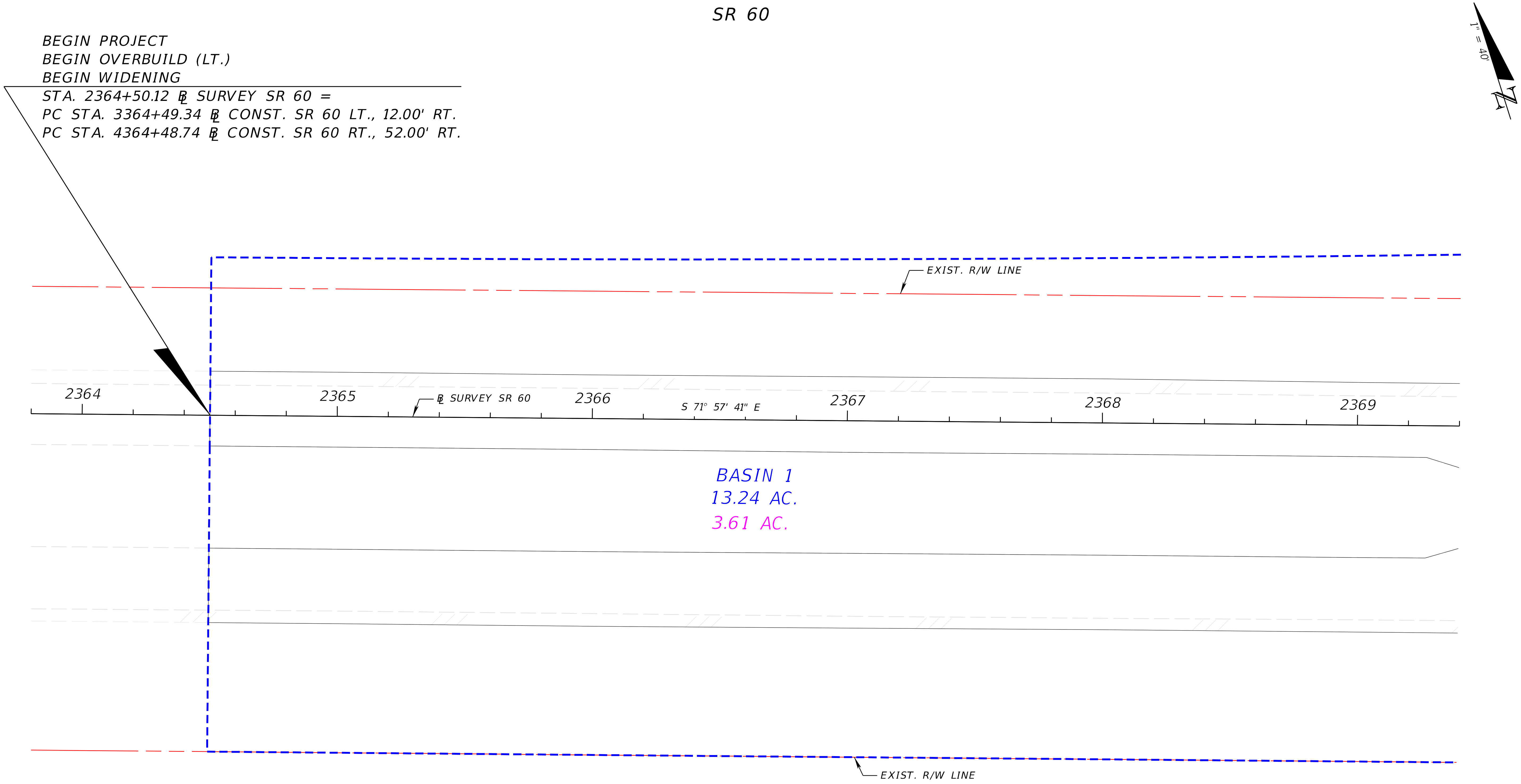
No change

Appendix 10.0

ICPR MODELING

10.1 Existing Node Map

SR 60



LEGEND	
13.24 AC.	TOTAL AREA
3.61 AC.	IMPERVIOUS AREA

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

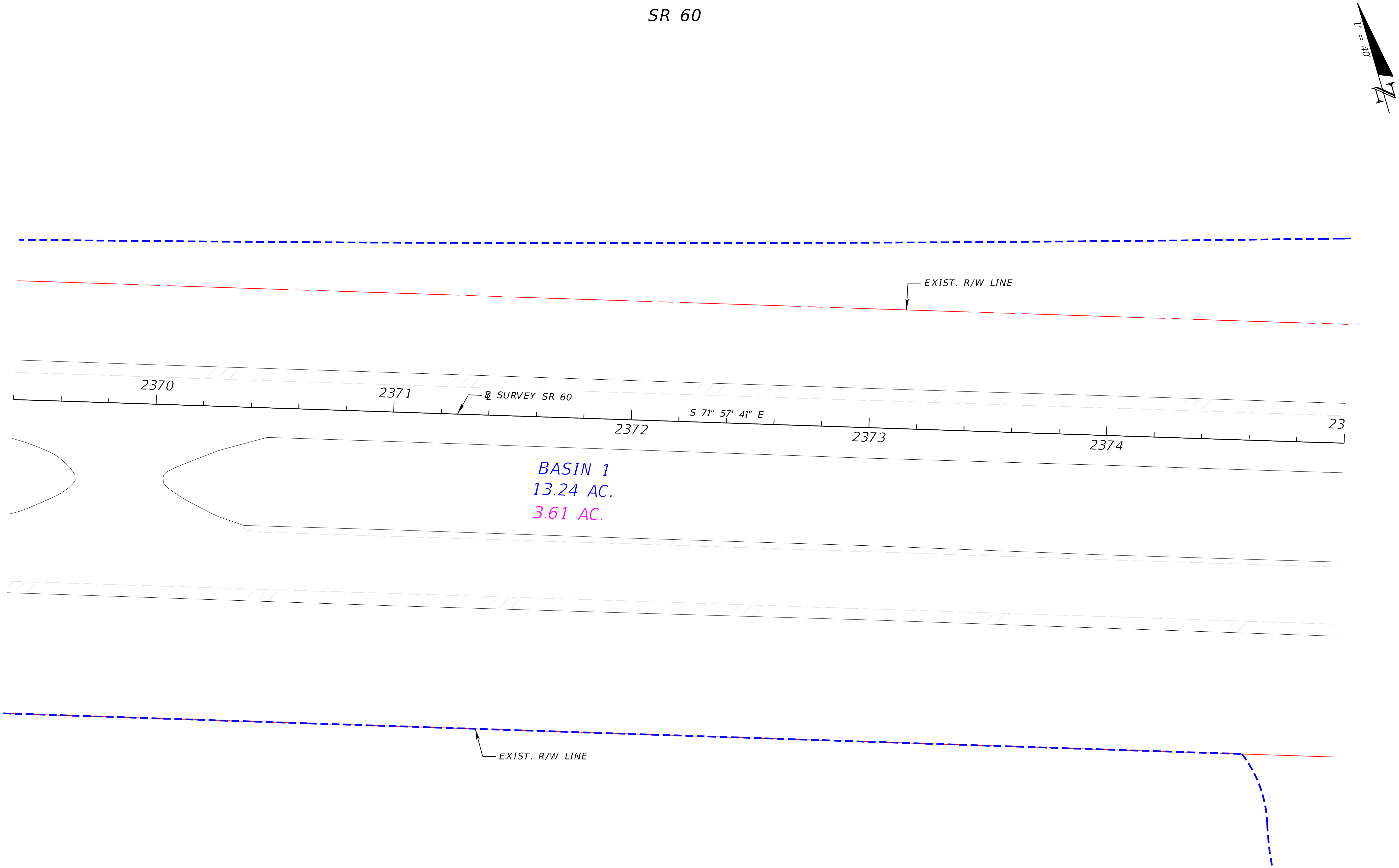
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (1)

SHEET
NO.

scurran 8/25/2016 5:34:24 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD01.dgn

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

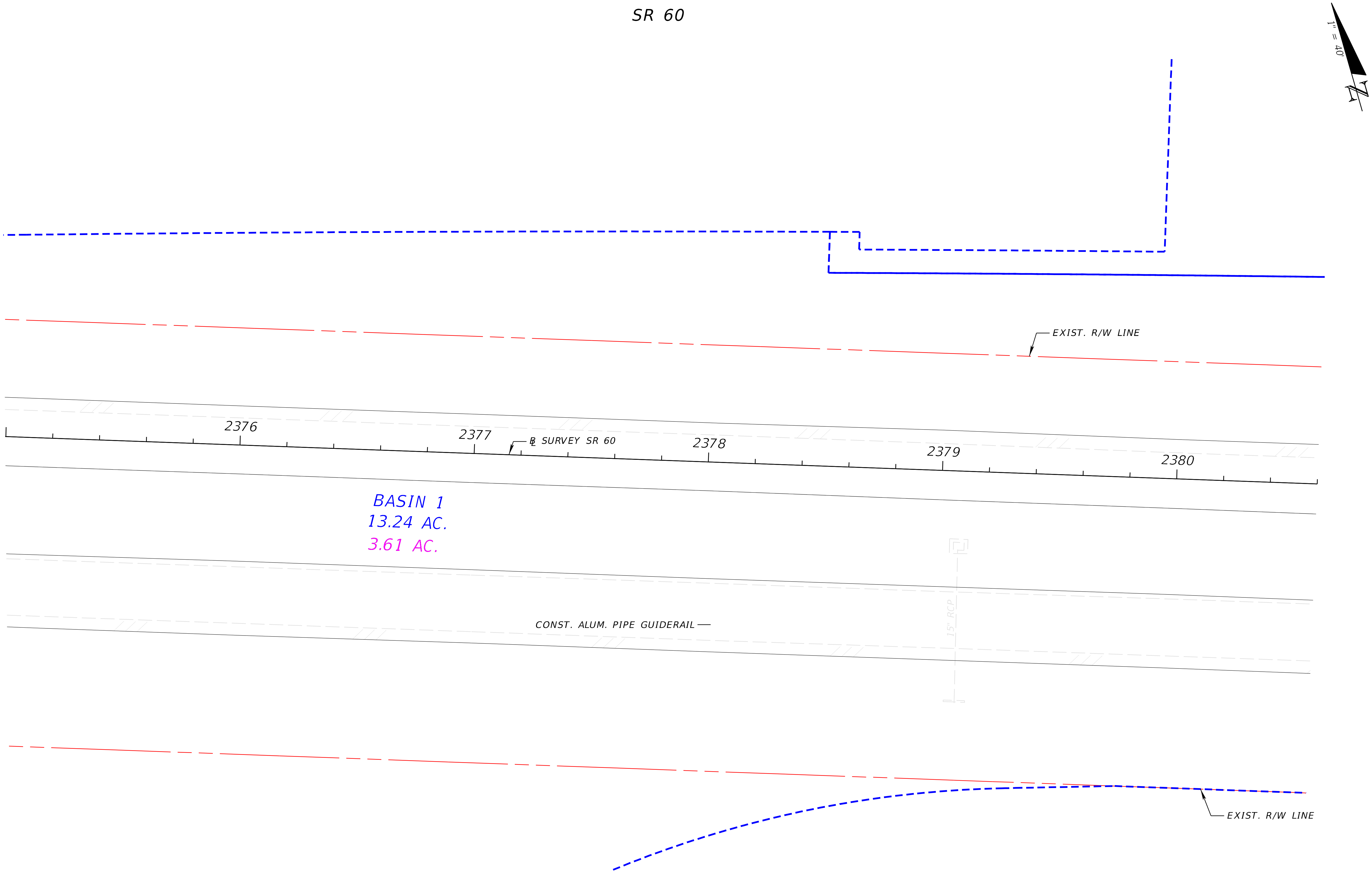
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (2)

SHEET NO.

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

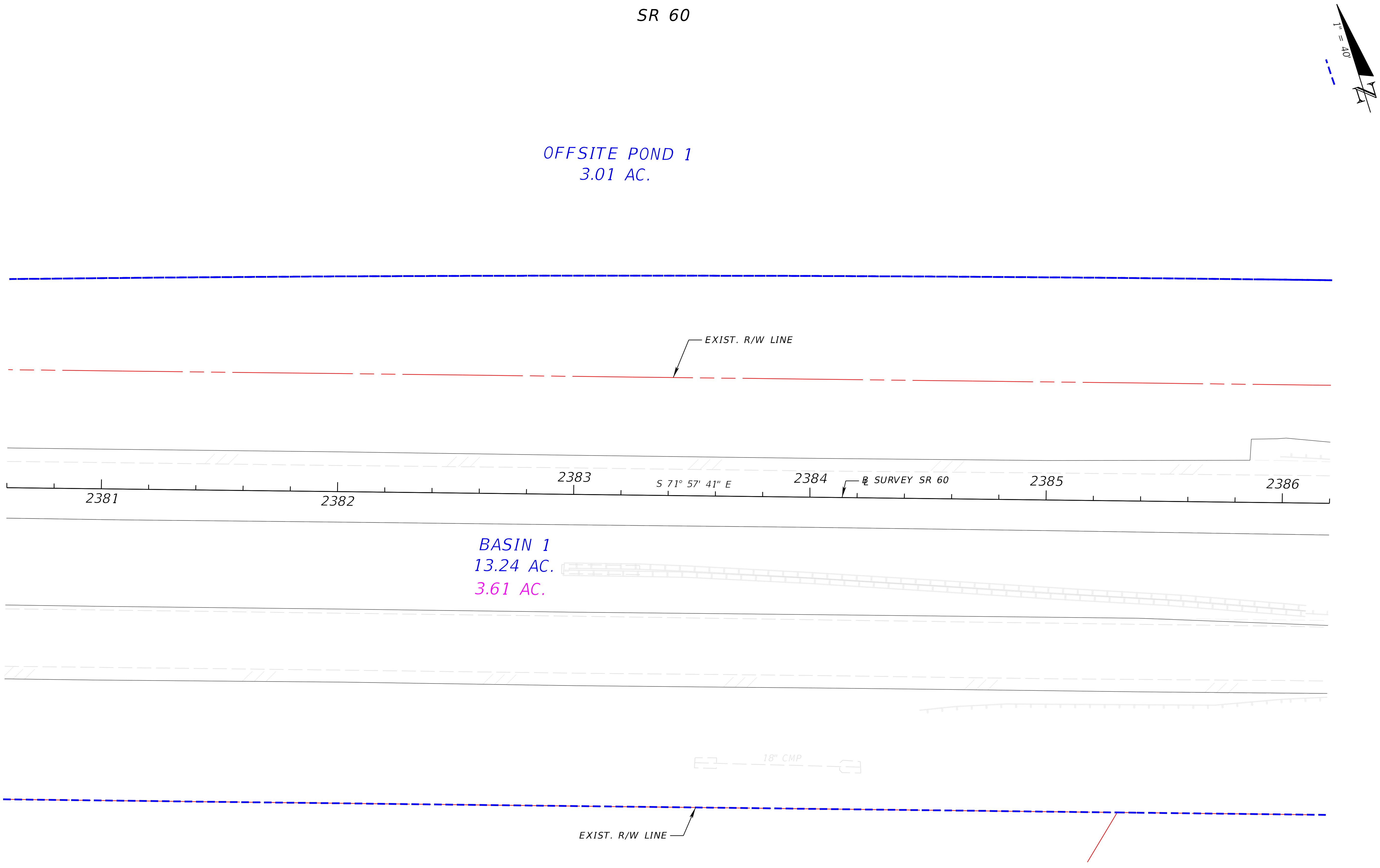
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (3)

SHEET
NO.

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

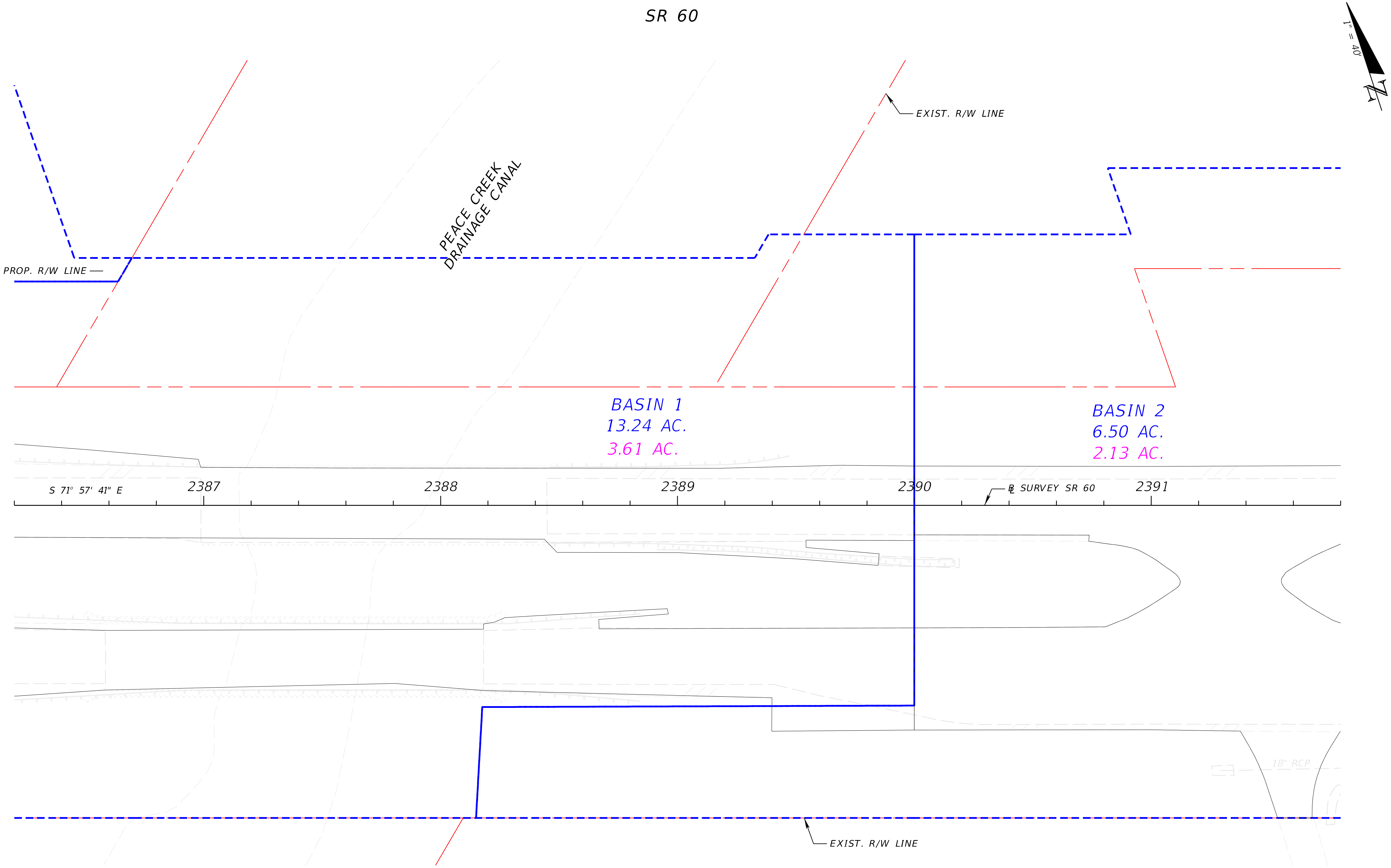
FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (4)

SHEET NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

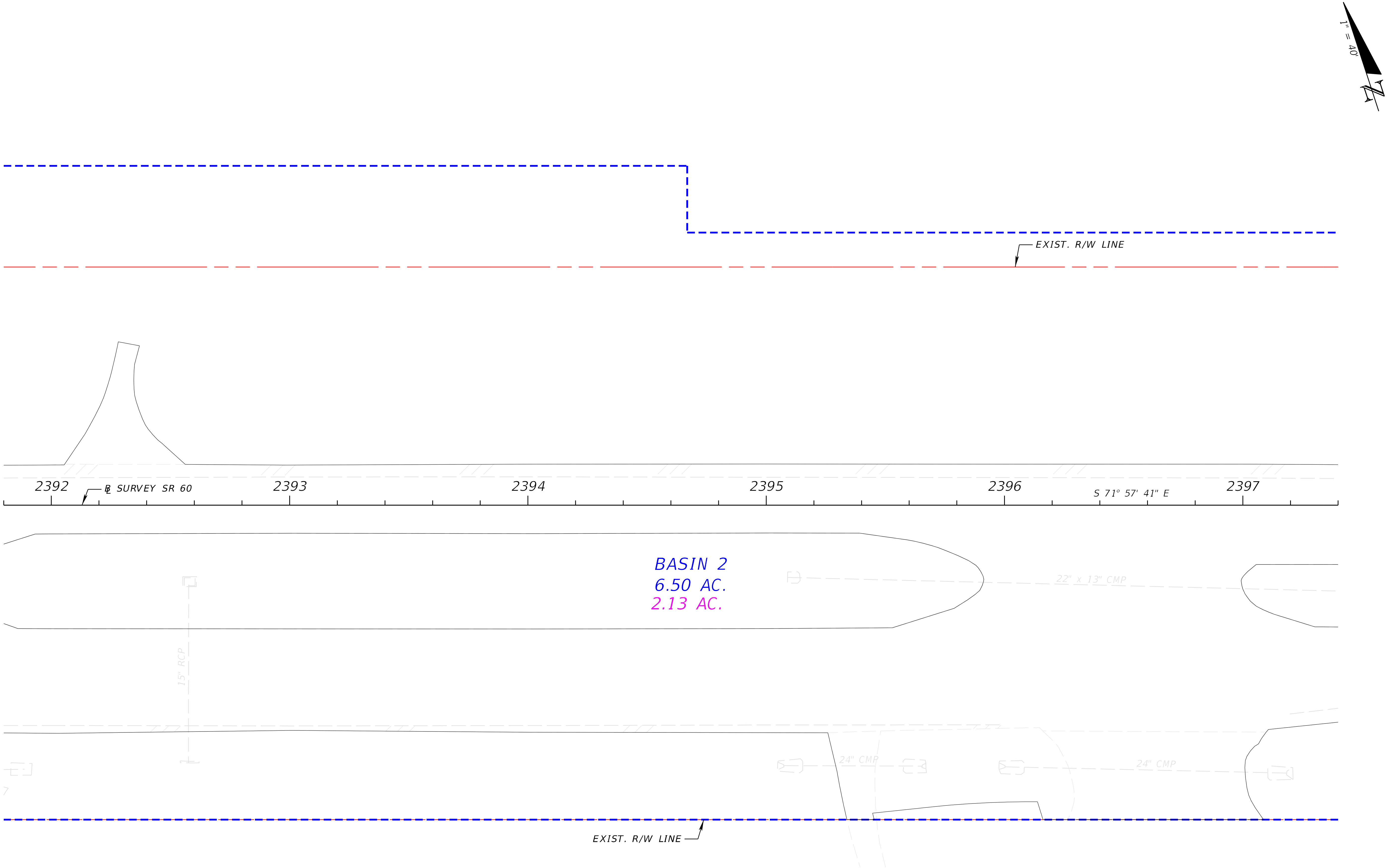
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (5)

SHEET NO.

scurran 8/25/2016 5:34:27 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD05.dgn



REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

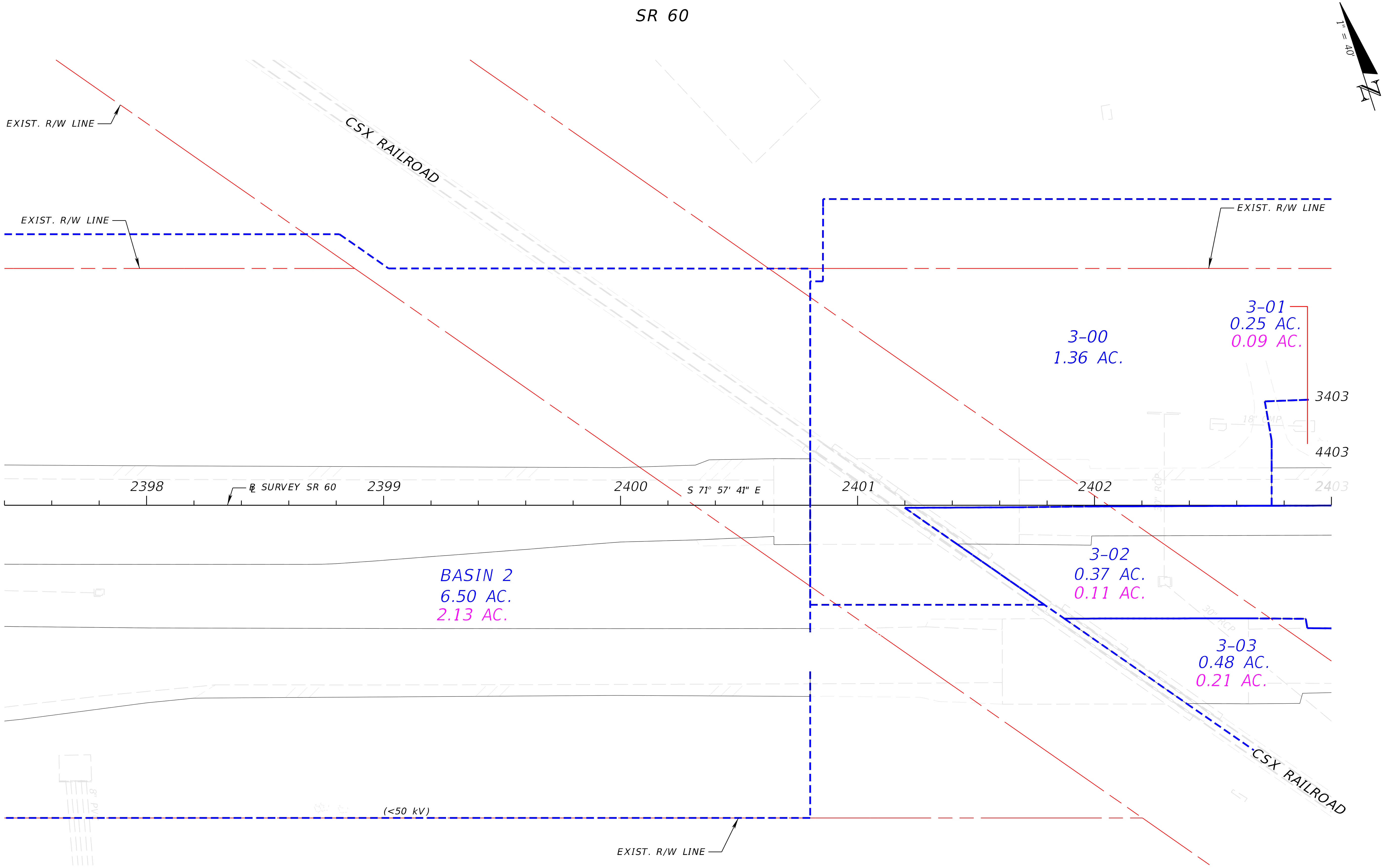
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (6)

SHEET NO.

SR 60



REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

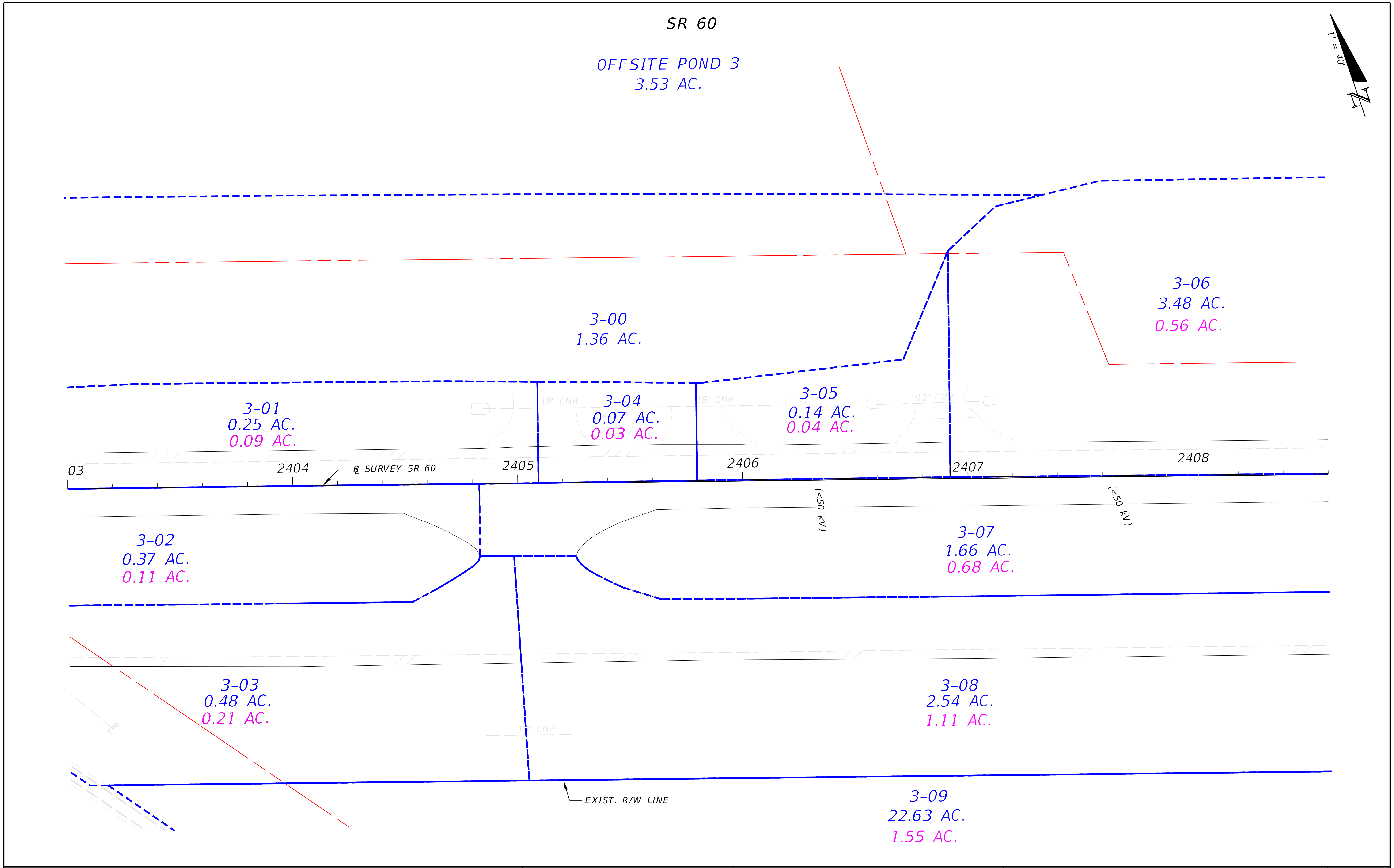
FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (7)

SHEET NO.



REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

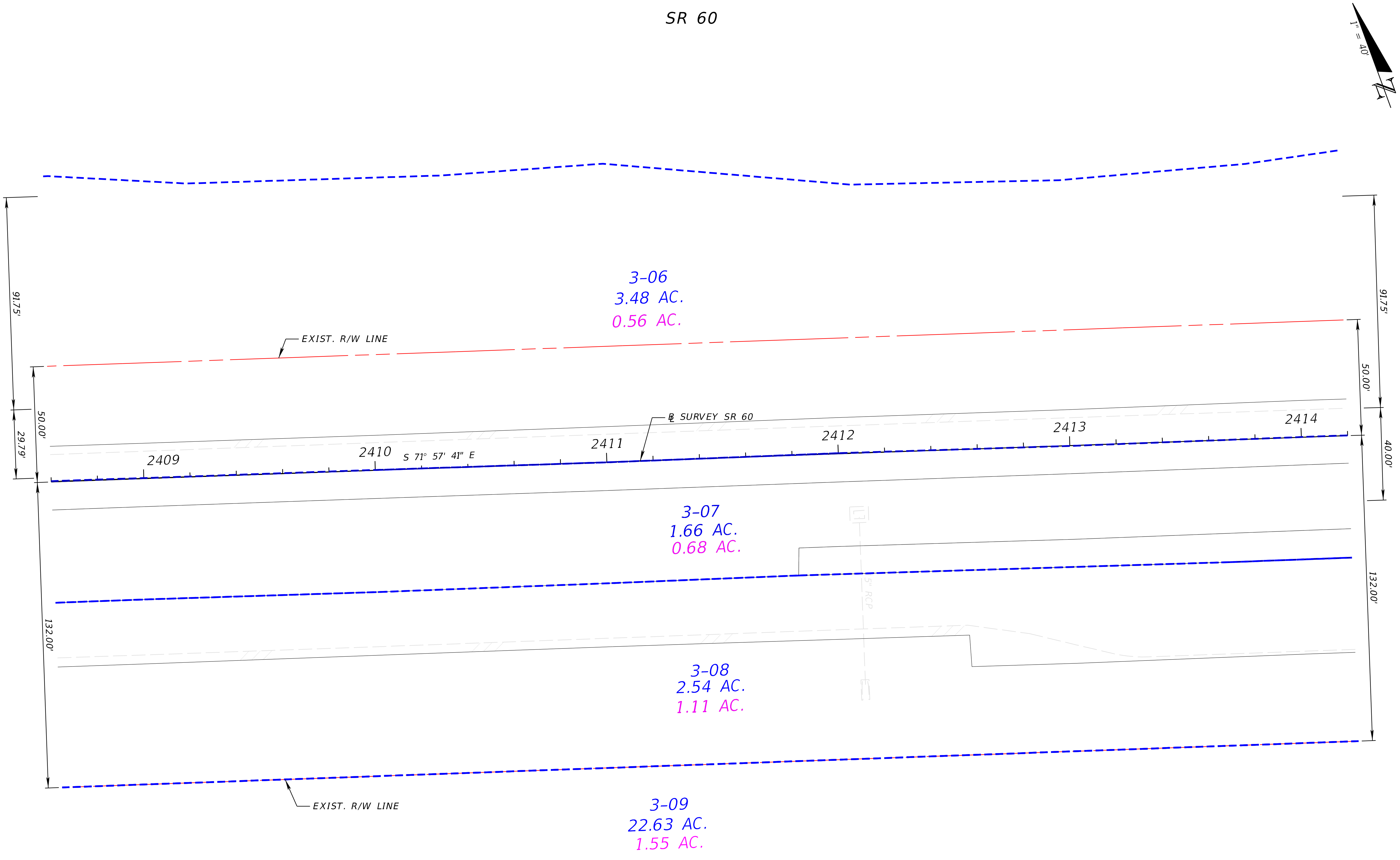
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (8)

SHEET
NO.

scurran 8/25/2016 5:34:28 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD08.dgn



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

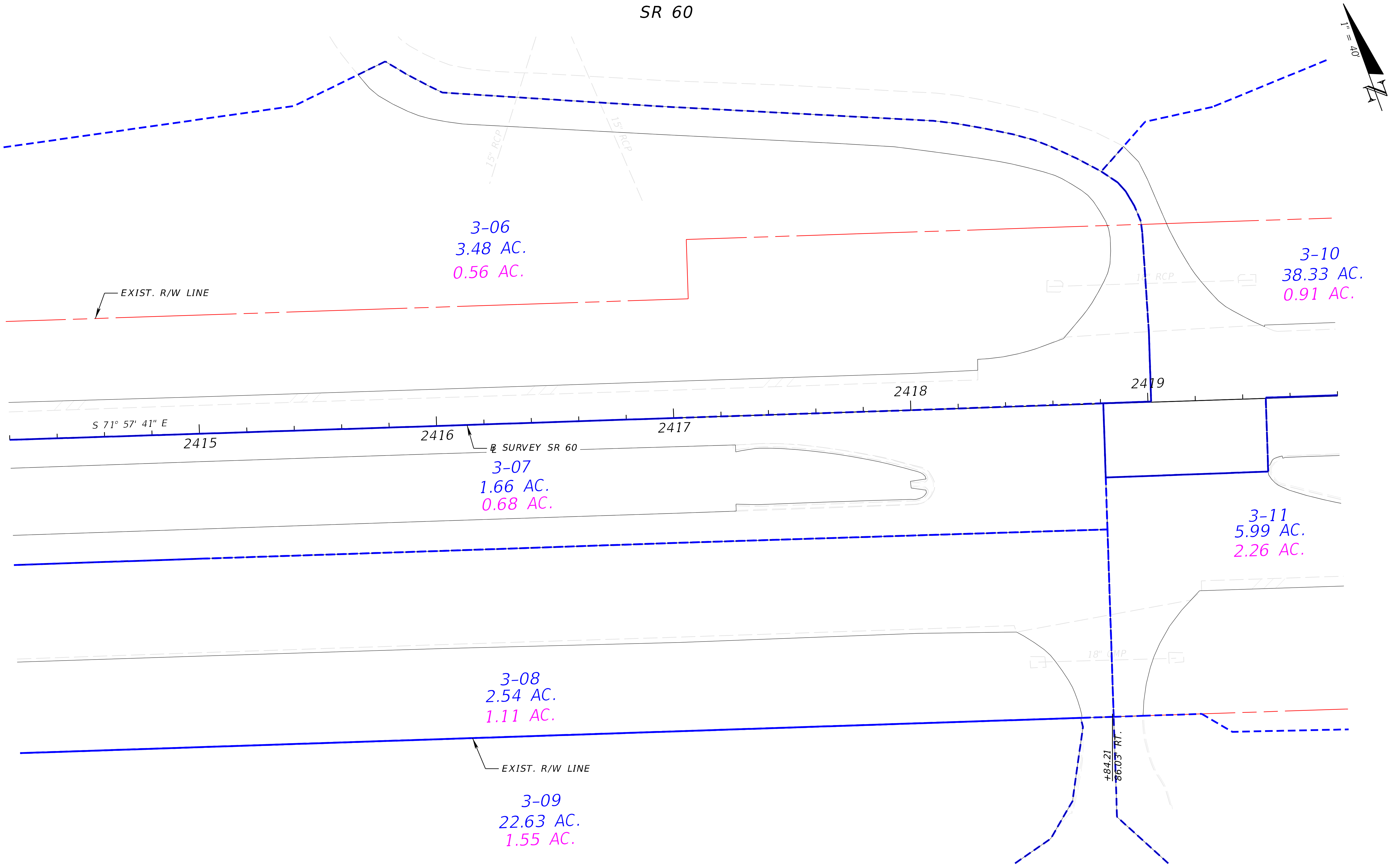
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (9)

SHEET NO.

scurran 8/25/2016 5:34:29 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD09.dgn

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

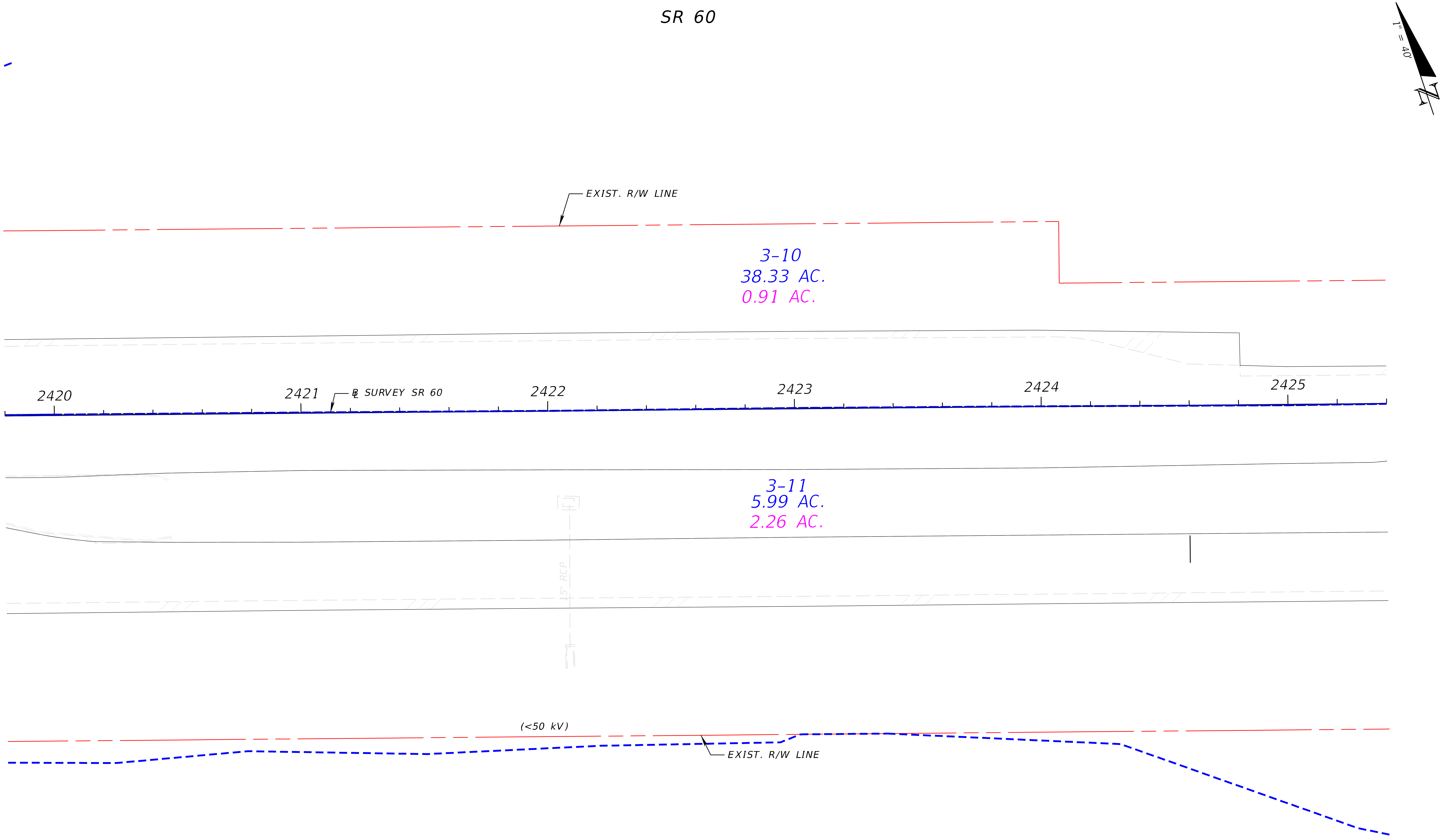
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (10)

SHEET NO.

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

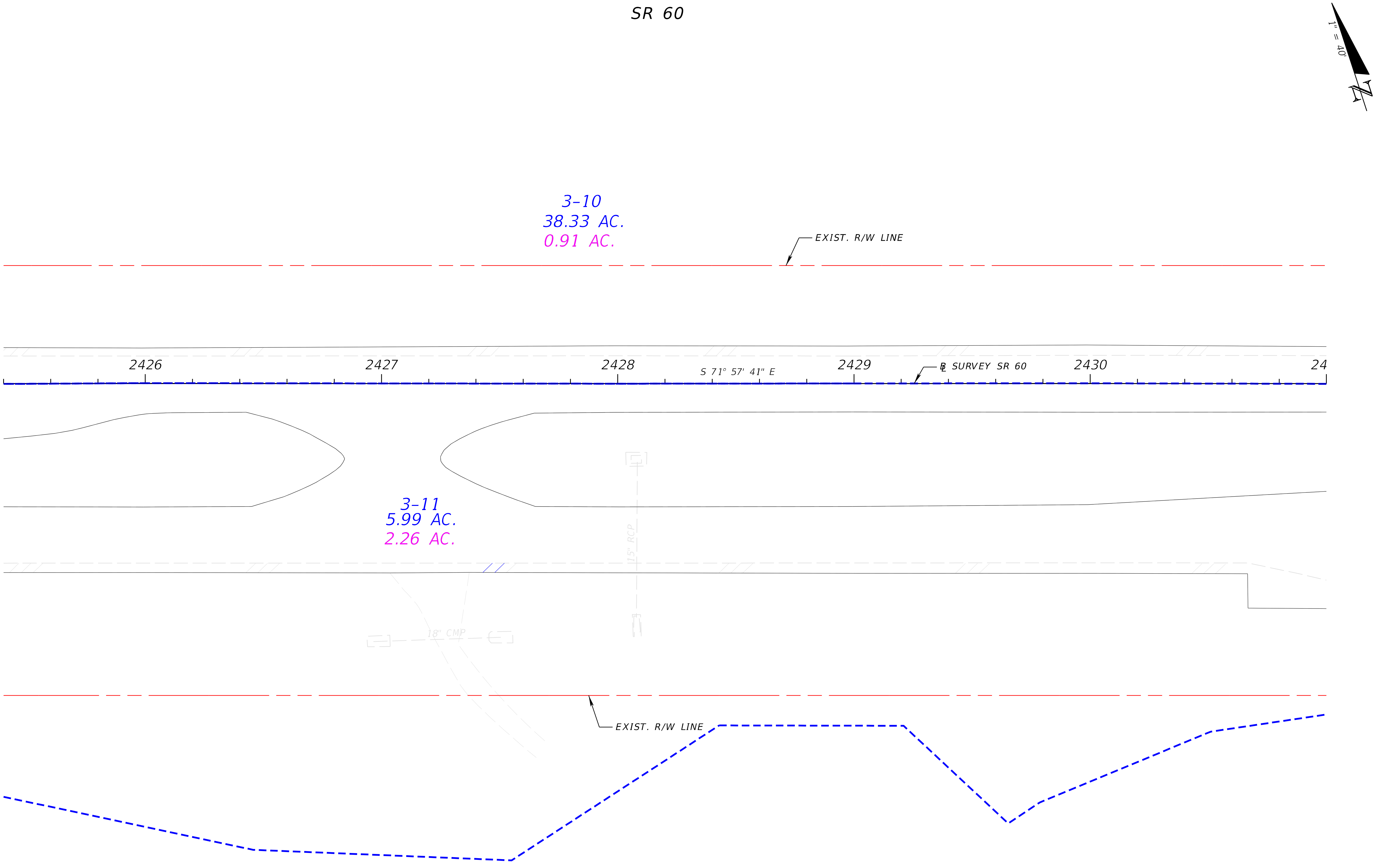
FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (11)

SHEET
NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

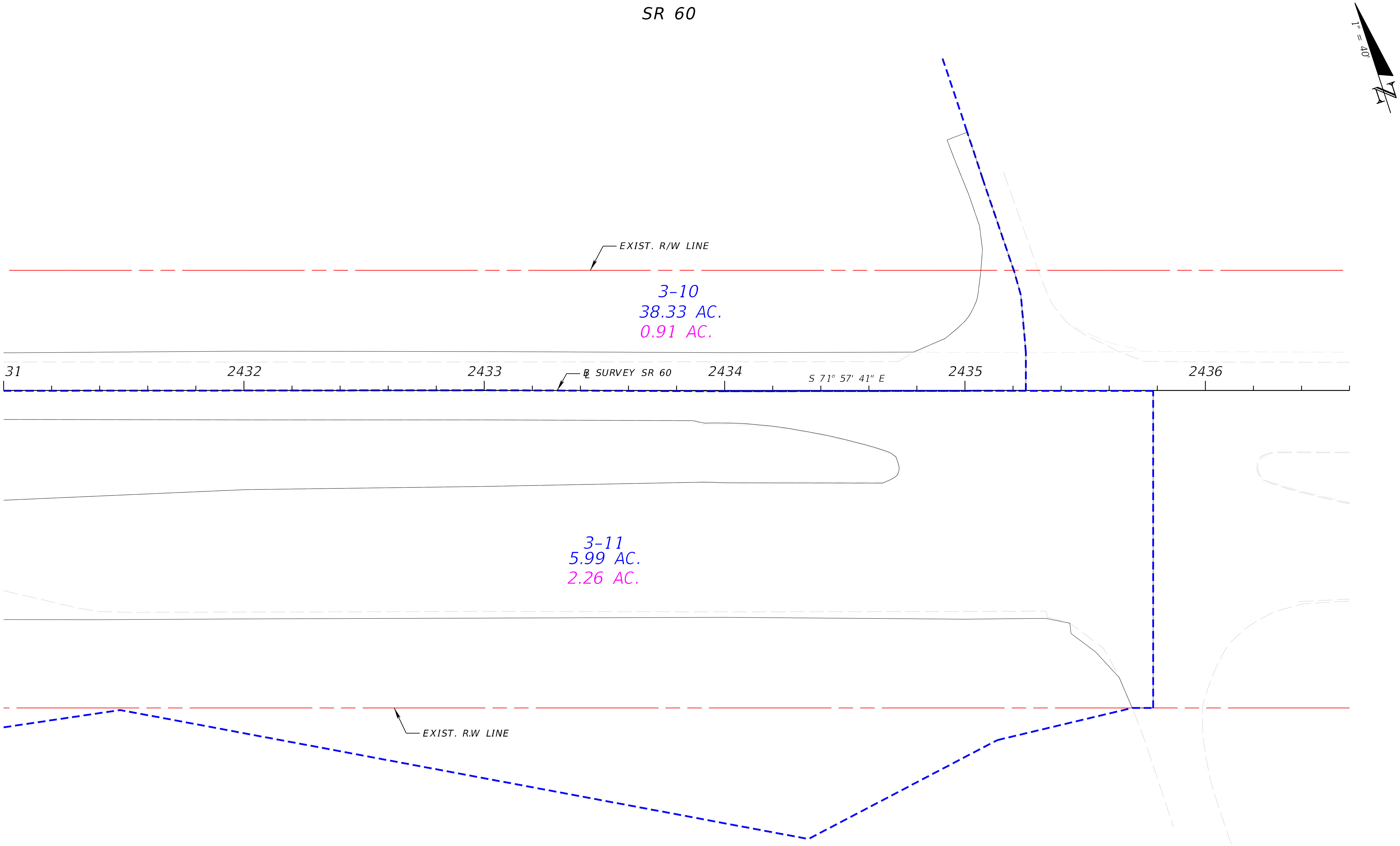
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (12)

SHEET NO.

scurran 8/25/2016 5:34:31 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD12.dgn

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
EXISTING NODE MAP (13)

SHEET
NO.

scurran 8/25/2016 5:34:31 PM H:\47100\43655913201\drainage\Node Maps\Existing\PLANRD13.dgn

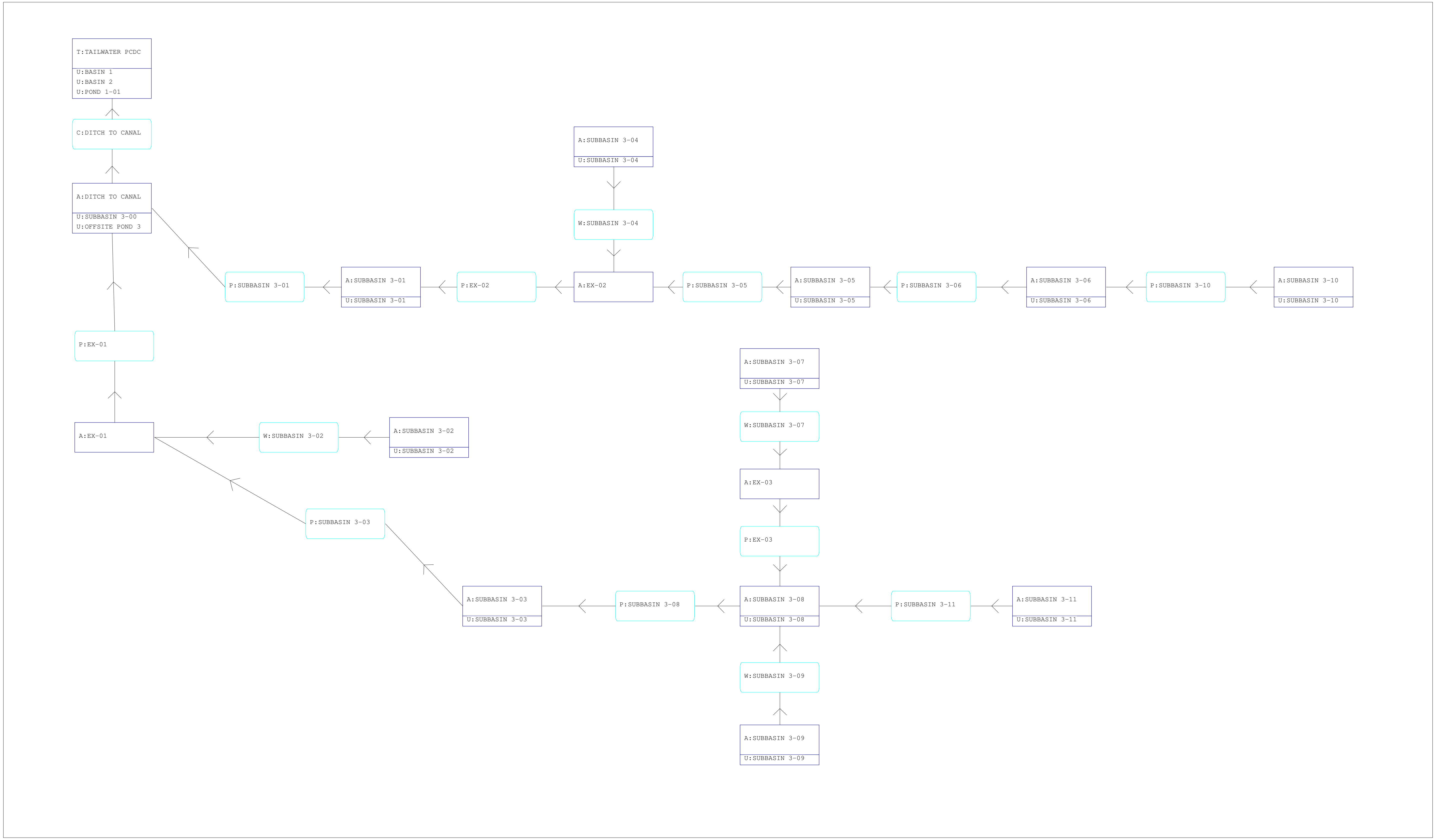
10.2 Existing Model

EXISTING SR 60

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



```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: BASIN 1                  Node: TAILWATER PCDC         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 58.20
               Area(ac): 13.240                  Time Shift(hrs): 0.00
           Curve Number: 88.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: BASIN 2                  Node: TAILWATER PCDC         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 47.10
               Area(ac): 6.490                   Time Shift(hrs): 0.00
           Curve Number: 89.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: OFFSITE POND 3           Node: DITCH TO CANAL         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 29.10
               Area(ac): 3.010                   Time Shift(hrs): 0.00
           Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

Existing Pond Site


----------------------------------------------------------------------------------------------------
         Name: POND 1-01                Node: TAILWATER PCDC         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 27.50
               Area(ac): 3.010                   Time Shift(hrs): 0.00
           Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

Existing Pond Site

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-00            Node: DITCH TO CANAL         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 1.360                   Time Shift(hrs): 0.00
           Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-01            Node: SUBBASIN 3-01          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.250                   Time Shift(hrs): 0.00
           Curve Number: 89.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-02            Node: SUBBASIN 3-02          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
```

```
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.370                   Time Shift(hrs): 0.00
           Curve Number: 88.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-03            Node: SUBBASIN 3-03          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 24.40
               Area(ac): 0.480                   Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-04            Node: SUBBASIN 3-04          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.070                   Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-05            Node: SUBBASIN 3-05          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.140                   Time Shift(hrs): 0.00
           Curve Number: 88.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-06            Node: SUBBASIN 3-06          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): 97.60
               Area(ac): 3.480                   Time Shift(hrs): 0.00
           Curve Number: 86.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-07            Node: SUBBASIN 3-07          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 24.60
               Area(ac): 1.660                   Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-08            Node: SUBBASIN 3-08          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 103.90
               Area(ac): 2.540                   Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-09            Node: SUBBASIN 3-09          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN
```

```
        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 31.70
               Area(ac): 22.630                  Time Shift(hrs): 0.00
           Curve Number: 83.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-10           Node: SUBBASIN 3-10          Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 208.70
               Area(ac): 38.330                  Time Shift(hrs): 0.00
           Curve Number: 50.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-11           Node: SUBBASIN 3-11          Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 136.90
               Area(ac): 5.990                   Time Shift(hrs): 0.00
           Curve Number: 67.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: DITCH TO CANAL      Base Flow(cfs): 0.000          Init Stage(ft): 113.920
     Group: BASE                                               Warn Stage(ft): 116.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        113.920          0.0010
        116.000          0.0020

------------------------------------------------------------------------------------------
      Name: EX-01               Base Flow(cfs): 0.000          Init Stage(ft): 113.820
     Group: BASE                                               Warn Stage(ft): 117.440
      Type: Stage/Area

EX-01
WARNING SET TO GRATE EL

      Stage(ft)        Area(ac)
--------------- ---------------
        113.820          0.0010
        117.440          0.0020

------------------------------------------------------------------------------------------
      Name: EX-02               Base Flow(cfs): 0.000          Init Stage(ft): 116.080
     Group: BASE                                               Warn Stage(ft): 119.210
      Type: Stage/Area

WARNING SET TO GRATE EL

      Stage(ft)        Area(ac)
--------------- ---------------
        116.080          0.0010
        119.210          0.0020

------------------------------------------------------------------------------------------
      Name: EX-03               Base Flow(cfs): 0.000          Init Stage(ft): 115.030
     Group: BASE                                               Warn Stage(ft): 117.430
      Type: Stage/Area

EX-03
WARNING SET TO GRATE EL

      Stage(ft)        Area(ac)
--------------- ---------------
        115.030          0.0010
        117.430          0.0020

------------------------------------------------------------------------------------------
```

```
      Name: SUBBASIN 3-01       Base Flow(cfs): 0.000          Init Stage(ft): 116.000
     Group: BASE                                               Warn Stage(ft): 117.000
      Type: Stage/Area

WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        116.000          0.0100
        116.500          0.0300
        117.000          0.0500

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-02       Base Flow(cfs): 0.000          Init Stage(ft): 117.440
     Group: BASE                                               Warn Stage(ft): 119.000
      Type: Stage/Area

WARNING SET TO LOW EOP

      Stage(ft)        Area(ac)
--------------- ---------------
        117.440          0.0001
        118.000          0.0100
        118.500          0.0600
        119.000          0.1100

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-03       Base Flow(cfs): 0.000          Init Stage(ft): 114.500
     Group: BASE                                               Warn Stage(ft): 116.000
      Type: Stage/Area

WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        114.500          0.0200
        115.000          0.0300
        116.000          0.0700

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-04       Base Flow(cfs): 0.000          Init Stage(ft): 119.210
     Group: BASE                                               Warn Stage(ft): 119.300
      Type: Stage/Area

WARNING SET TO LOW EOP


      Stage(ft)        Area(ac)
--------------- ---------------
        119.210          0.0010
        119.300          0.0020

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-05       Base Flow(cfs): 0.000          Init Stage(ft): 117.000
     Group: BASE                                               Warn Stage(ft): 118.000
      Type: Stage/Area

WARNING SET TO TOB


      Stage(ft)        Area(ac)
--------------- ---------------
        117.000          0.0100
        118.000          0.0200

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-06       Base Flow(cfs): 0.000          Init Stage(ft): 116.500
     Group: BASE                                               Warn Stage(ft): 118.000
      Type: Stage/Area

WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        116.500          0.0100
        117.000          0.0900
        117.500          0.2400
        118.000          0.4400

--------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-07       Base Flow(cfs): 0.000          Init Stage(ft): 117.500
     Group: BASE                                               Warn Stage(ft): 119.000
      Type: Stage/Area

WARNING SET TO LOW EOP

      Stage(ft)        Area(ac)
--------------- ---------------
        117.430          0.0001
```

```
        118.000          0.0400
        118.500          0.1600
        119.000          0.4200
        119.500          0.8800

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-08       Base Flow(cfs): 0.000          Init Stage(ft): 114.500
     Group: BASE                                               Warn Stage(ft): 115.000
      Type: Stage/Area

WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        114.500          0.0500
        115.000          0.1300

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-09       Base Flow(cfs): 0.000          Init Stage(ft): 112.200
     Group: BASE                                               Warn Stage(ft): 113.280
      Type: Stage/Area

Offsite area contributing to SUBBASIN 3-08

      Stage(ft)        Area(ac)
--------------- ---------------
        112.200          5.2000
        112.280          5.2600
        112.780          6.9100
        113.280          7.9400

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-10       Base Flow(cfs): 0.000          Init Stage(ft): 117.500
     Group: BASE                                               Warn Stage(ft): 119.000
      Type: Stage/Area

WARNING STAGE SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        117.500          0.0500
        118.000          0.1000
        119.000          0.2300

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-11       Base Flow(cfs): 0.000          Init Stage(ft): 116.000
     Group: BASE                                               Warn Stage(ft): 119.000
      Type: Stage/Area

WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        116.000          0.0300
        117.000          0.1300
        118.000          0.2700
        119.000          0.5000

------------------------------------------------------------------------------------------
      Name: TAILWATER PCDC      Base Flow(cfs): 0.000          Init Stage(ft): 107.430
     Group: BASE                                               Warn Stage(ft): 107.430
      Type: Time/Stage

TAILWATER SET TO SEASONAL HIGH WATER OF PEACE CREEK DRAINAGE CANAL


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         107.430
         240.00         107.430

==========================================================================================
==== Cross Sections ======================================================================
==========================================================================================

              Name: SUBBASIN 3-09                Group: BASE
      Encroachment: No




    Station(ft)   Elevation(ft)     Manning's N
--------------- --------------- ---------------
          0.000         116.500        0.450000
        101.200         116.000        0.450000
        163.200         115.500        0.450000
        198.700         115.500        0.450000
        236.200         115.500        0.450000
```

```
        271.600         119.280         0.450000

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

         Name: EX-01               From Node: EX-01              Length(ft): 71.00
        Group: BASE                  To Node: DITCH TO CANAL          Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 1.00
   Invert(ft): 113.870        113.920                        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 dc
 Bot Clip(in): 0.000          0.000                       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


----------------------------------------------------------------------------------------------------
         Name: EX-02               From Node: EX-02              Length(ft): 65.00
        Group: BASE                  To Node: SUBBASIN 3-01           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.50
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 116.170        116.050                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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


----------------------------------------------------------------------------------------------------
         Name: EX-03               From Node: EX-03              Length(ft): 73.00
        Group: BASE                  To Node: SUBBASIN 3-08           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 15.00          15.00                      Entrance Loss Coef: 0.50
     Rise(in): 15.00          15.00                          Exit Loss Coef: 1.00
   Invert(ft): 115.030        114.830                        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 dc
 Bot Clip(in): 0.000          0.000                       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


----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-01       From Node: SUBBASIN 3-01      Length(ft): 41.00
        Group: BASE                  To Node: DITCH TO CANAL          Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 115.970        115.830                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-03       From Node: SUBBASIN 3-03      Length(ft): 117.00
        Group: BASE                  To Node: EX-01                   Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 0.00
   Invert(ft): 114.160        113.820                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-05       From Node: SUBBASIN 3-05      Length(ft): 71.00
        Group: BASE                  To Node: EX-02                   Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.00
   Invert(ft): 116.520        116.080                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-06       From Node: SUBBASIN 3-06      Length(ft): 49.00
        Group: BASE                  To Node: SUBBASIN 3-05           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 12.00          12.00                      Entrance Loss Coef: 0.70
     Rise(in): 12.00          12.00                          Exit Loss Coef: 1.00
   Invert(ft): 116.120        116.290                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-08       From Node: SUBBASIN 3-08      Length(ft): 40.00
        Group: BASE                  To Node: SUBBASIN 3-03           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 15.00          15.00                      Entrance Loss Coef: 0.70
     Rise(in): 15.00          15.00                          Exit Loss Coef: 1.00
   Invert(ft): 114.100        113.990                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-10       From Node: SUBBASIN 3-10      Length(ft): 87.00
        Group: BASE                  To Node: SUBBASIN 3-06           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 116.300        115.880                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-11       From Node: SUBBASIN 3-11      Length(ft): 58.00
        Group: BASE                  To Node: SUBBASIN 3-08           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 114.800        114.710                        Bend Loss Coef: 0.00
  Manning's N: 0.024000       0.024000                     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                       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



==========================================================================================
==== Channels ============================================================================
==========================================================================================

          Name: DITCH TO CANAL      From Node: DITCH TO CANAL     Length(ft): 1250.00
         Group: BASE                  To Node: TAILWATER PCDC          Count: 1

                UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
      Geometry: Trapezoidal    Trapezoidal                Solution Algorithm: Automatic
    Invert(ft): 113.920        104.000                                  Flow: Both
 TClpInitZ(ft): 9999.000       9999.000                     Contraction Coef: 0.100
   Manning's N: 0.450000       0.450000                       Expansion Coef: 0.300
  Top Clip(ft): 0.000          0.000                      Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000          0.000                          Exit Loss Coef: 0.000
     Main XSec:                                             Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft):                                              Inlet Ctrl Spec: Use dc
     Aux XSec1:                                            Stabilizer Option: None
  AuxElev2(ft):
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft): 10.000         10.000
  LtSdSlp(h/v): 2.00           2.00
  RtSdSlp(h/v): 4.00           4.00


==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: SUBBASIN 3-02       From Node: SUBBASIN 3-02
```

```
        Group: BASE                  To Node: EX-01
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Rectangular

                    Span(in): 49.00
                    Rise(in): 37.00
                  Invert(ft): 117.440
       Control Elevation(ft): 117.440
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-04       From Node: SUBBASIN 3-04
        Group: BASE                  To Node: EX-02
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Rectangular

                    Span(in): 49.00
                    Rise(in): 37.00
                  Invert(ft): 119.210
       Control Elevation(ft): 119.210
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-07       From Node: SUBBASIN 3-07
        Group: BASE                  To Node: EX-03
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Rectangular

                    Span(in): 49.00
                    Rise(in): 37.00
                  Invert(ft): 117.430
       Control Elevation(ft): 117.300
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-09       From Node: SUBBASIN 3-09
        Group: BASE                  To Node: SUBBASIN 3-08
         Flow: Both                    Count: 1
         Type: Vertical: Mavis      Geometry: Irregular

                        XSec: SUBBASIN 3-09
                  Invert(ft): 115.000
       Control Elevation(ft): 115.000
      Struct Opening Dim(ft): 9999.00
                                              TABLE
             Bottom Clip(ft): 0.000
                Top Clip(ft): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: FDOT 100YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 100YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 10.08

Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 10YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 10YR-24HR.R32
```

```
      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 7.44

Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 50YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 50YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 9.84

Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.00

----------------------------------------------------------------------------------------------------
         Name: FLMOD 25YR-24H
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FLMOD 25YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 6.80

Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: FDOT 100YR-24HR     Hydrology Sim: FDOT 100YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 100YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: FDOT 10YR-24HR      Hydrology Sim: FDOT 10YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 10YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: FDOT 50YR-24HR      Hydrology Sim: FDOT 50YR-24HR
```

```
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FDOT 50YR-24HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: FLMOD 25YR-24H      Hydrology Sim: FLMOD 25YR-24H
     Filename: H:\47100\43655913201\drainage\ICPR\Existing Model\FLMOD 25YR-24HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes
```

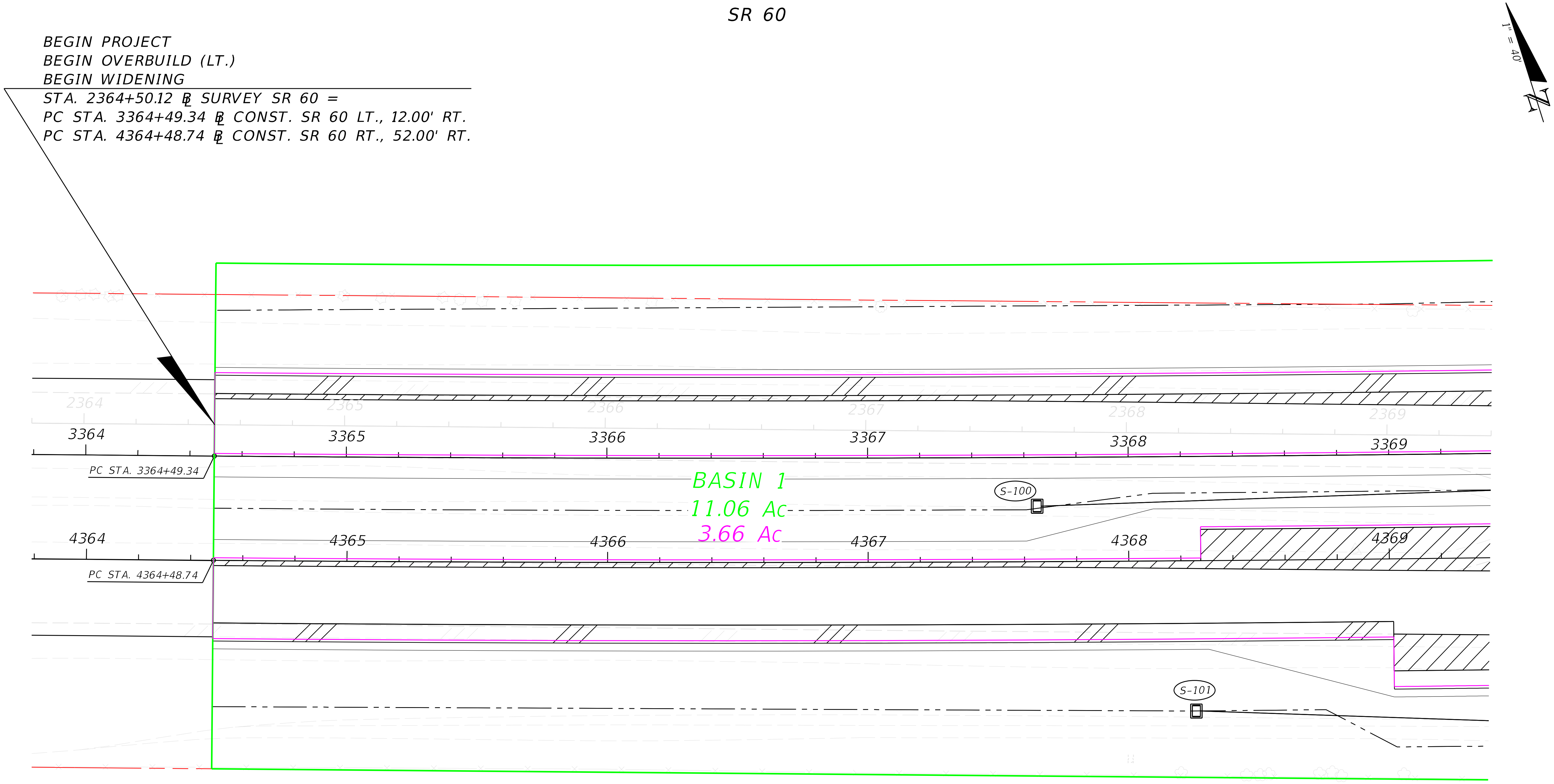
```
                                                  Max Time        Max    Warning Max Delta  Max Surf  Max Time       Max  Max Time        Max
          Name           Group      Simulation       Stage      Stage      Stage     Stage      Area    Inflow    Inflow   Outflow    Outflow
                                                       hrs         ft         ft        ft       ft2       hrs       cfs       hrs        cfs

 DITCH TO CANAL           BASEFDOT 100YR-24HR      12.17     115.14     116.00    0.0006     13133     12.00      6.43     12.17       5.82
          EX-01           BASEFDOT 100YR-24HR      12.18     115.14     117.44    0.0010       347      7.98      1.58      7.99       1.58
          EX-02           BASEFDOT 100YR-24HR      28.47     118.16     119.21   -0.0009       118     28.46      4.40     28.47       4.40
          EX-03           BASEFDOT 100YR-24HR      12.09     115.79     117.43    0.0006       158     12.08      1.55     12.09       1.55
  SUBBASIN 3-01           BASEFDOT 100YR-24HR      28.42     117.62     117.00    0.0004      3277     28.47      4.40     28.42       4.40
  SUBBASIN 3-02           BASEFDOT 100YR-24HR      12.00     117.48     119.00    0.0000       113     12.00      0.36     12.00       0.36
  SUBBASIN 3-03           BASEFDOT 100YR-24HR      12.19     115.14     116.00    0.0007      1709      7.94      1.49      7.98       1.46
  SUBBASIN 3-04           BASEFDOT 100YR-24HR      12.00     119.22     119.30    0.0000       113     12.00      0.07     12.00       0.07
  SUBBASIN 3-05           BASEFDOT 100YR-24HR      28.46     118.75     118.00    0.0004      1200     28.04      4.40     28.46       4.40
  SUBBASIN 3-06           BASEFDOT 100YR-24HR      28.21     122.12     118.00    0.0007     91043     19.33      8.96     28.04       4.40
  SUBBASIN 3-07           BASEFDOT 100YR-24HR      12.08     117.53     119.00   -0.0001       323     12.08      1.55     12.08       1.55
  SUBBASIN 3-08           BASEFDOT 100YR-24HR      13.11     115.09     115.00   -0.0009      6365      0.00      2.62      7.94       1.32
  SUBBASIN 3-09           BASEFDOT 100YR-24HR      30.42     114.73     113.28    0.0004    476053     12.08     19.13      0.00       0.00
  SUBBASIN 3-10           BASEFDOT 100YR-24HR      25.05     122.61     119.00   -0.0010     30448     19.58      9.48     21.20       7.54
  SUBBASIN 3-11           BASEFDOT 100YR-24HR      15.99     116.02     119.00   -0.0007      1444     15.92      2.70     15.99       2.70
 TAILWATER PCDC           BASEFDOT 100YR-24HR       0.00     107.43     107.43    0.0000     14413     12.25     24.45      0.00       0.00
 DITCH TO CANAL           BASE FDOT 10YR-24HR      12.20     115.05     116.00    0.0004     12866     11.97      5.19     12.20       5.01
          EX-01           BASE FDOT 10YR-24HR      12.20     115.05     117.44   -0.0010       346      9.60      1.60      9.61       1.59
          EX-02           BASE FDOT 10YR-24HR      26.39     117.69     119.21   -0.0004       128     26.29      3.56     26.30       3.56
          EX-03           BASE FDOT 10YR-24HR      12.09     115.65     117.43    0.0006       158     12.08      1.11     12.09       1.11
  SUBBASIN 3-01           BASE FDOT 10YR-24HR      26.50     117.33     117.00   -0.0004      2793     26.30      3.56     26.50       3.56
  SUBBASIN 3-02           BASE FDOT 10YR-24HR      12.00     117.47     119.00    0.0000       113     12.00      0.26     12.00       0.26
  SUBBASIN 3-03           BASE FDOT 10YR-24HR      12.22     115.05     116.00    0.0005      1559      9.57      1.50      9.60       1.46
  SUBBASIN 3-04           BASE FDOT 10YR-24HR      12.00     119.22     119.30    0.0000       113     12.00      0.05     12.00       0.05
  SUBBASIN 3-05           BASE FDOT 10YR-24HR      26.36     118.01     118.00   -0.0004       883     25.99      3.56     26.29       3.56
  SUBBASIN 3-06           BASE FDOT 10YR-24HR      26.16     120.22     118.00    0.0006     57833     19.73      5.50     25.99       3.56
  SUBBASIN 3-07           BASE FDOT 10YR-24HR      12.08     117.51     119.00   -0.0001       260     12.08      1.11     12.08       1.11
  SUBBASIN 3-08           BASE FDOT 10YR-24HR      15.13     115.06     115.00   -0.0009      6159      0.00      2.62      9.56       1.32
  SUBBASIN 3-09           BASE FDOT 10YR-24HR      27.17     113.96     113.28    0.0004    406830     12.08     13.24      0.00       0.00
  SUBBASIN 3-10           BASE FDOT 10YR-24HR      24.90     120.42     119.00   -0.0010     18060     20.42      5.26     21.40       4.53
  SUBBASIN 3-11           BASE FDOT 10YR-24HR       0.00     116.00     119.00   -0.0007      1344     16.08      1.70      0.00       2.62
 TAILWATER PCDC           BASE FDOT 10YR-24HR       0.00     107.43     107.43    0.0000     14413     12.25     18.21      0.00       0.00
 DITCH TO CANAL           BASE FDOT 50YR-24HR      12.19     115.13     116.00    0.0006     13103     12.03      6.26     12.19       5.73
          EX-01           BASE FDOT 50YR-24HR      12.18     115.13     117.44    0.0010       347      8.22      1.60      8.21       1.59
          EX-02           BASE FDOT 50YR-24HR      28.37     118.12     119.21    0.0009       118     28.15      4.33     28.17       4.33
          EX-03           BASE FDOT 50YR-24HR      12.09     115.77     117.43    0.0006       158     12.08      1.51     12.09       1.51
  SUBBASIN 3-01           BASE FDOT 50YR-24HR      28.50     117.60     117.00    0.0004      3238     28.17      4.33     28.50       4.33
  SUBBASIN 3-02           BASE FDOT 50YR-24HR      12.00     117.48     119.00    0.0000       113     12.00      0.35     12.00       0.35
  SUBBASIN 3-03           BASE FDOT 50YR-24HR      12.19     115.13     116.00    0.0007      1691      8.13      1.49      8.13       1.45
  SUBBASIN 3-04           BASE FDOT 50YR-24HR      12.00     119.22     119.30    0.0000       113     12.00      0.07     12.00       0.07
  SUBBASIN 3-05           BASE FDOT 50YR-24HR      28.30     118.69     118.00    0.0003      1175     27.93      4.33     28.15       4.33
  SUBBASIN 3-06           BASE FDOT 50YR-24HR      28.04     121.96     118.00    0.0006     88218     19.33      8.64     27.93       4.33
  SUBBASIN 3-07           BASE FDOT 50YR-24HR      12.08     117.53     119.00   -0.0001       318     12.08      1.51     12.08       1.51
  SUBBASIN 3-08           BASE FDOT 50YR-24HR      13.11     115.08     115.00   -0.0009      6349      0.00      2.62      8.11       1.32
  SUBBASIN 3-09           BASE FDOT 50YR-24HR      29.81     114.66     113.28    0.0004    470114     12.08     18.60      0.00       0.00
  SUBBASIN 3-10           BASE FDOT 50YR-24HR      25.06     122.41     119.00   -0.0010     29336     19.75      9.07     21.20       7.26
  SUBBASIN 3-11           BASE FDOT 50YR-24HR       0.00     116.00     119.00   -0.0007      1344     15.92      2.61      0.00       2.62
 TAILWATER PCDC           BASE FDOT 50YR-24HR       0.00     107.43     107.43    0.0000     14413     12.25     23.86      0.00       0.00
 DITCH TO CANAL           BASE FLMOD 25YR-24H      12.45     115.49     116.00    0.0007     14099     12.11     11.98     12.45       9.28
          EX-01           BASE FLMOD 25YR-24H      12.45     115.48     117.44   -0.0010       338     11.84      1.99     11.84       1.87
          EX-02           BASE FLMOD 25YR-24H      23.48     117.61     119.21   -0.0005       147     23.48      3.37     23.49       3.37
          EX-03           BASE FLMOD 25YR-24H      12.20     116.62     117.43   -0.0010       126     12.18      4.18     12.20       4.18
  SUBBASIN 3-01           BASE FLMOD 25YR-24H      22.68     117.28     117.00   -0.0005      2718     22.53      3.39     22.68       3.39
  SUBBASIN 3-02           BASE FLMOD 25YR-24H      12.00     117.53     119.00    0.0002       113     12.00      1.32     12.00       1.32
  SUBBASIN 3-03           BASE FLMOD 25YR-24H      12.45     115.48     116.00    0.0006      2290     11.81      1.60     11.81       1.15
  SUBBASIN 3-04           BASE FLMOD 25YR-24H      12.01     119.24     119.30    0.0001       113     12.00      0.26     12.01       0.26
  SUBBASIN 3-05           BASE FLMOD 25YR-24H      23.48     117.88     118.00   -0.0004       843     23.42      3.36     23.49       3.36
  SUBBASIN 3-06           BASE FLMOD 25YR-24H      23.45     119.84     118.00    0.0007     51146     14.77      6.24     24.47       3.35
  SUBBASIN 3-07           BASE FLMOD 25YR-24H      12.18     117.63     119.00    0.0002       622     12.17      4.18     12.18       4.18
  SUBBASIN 3-08           BASE FLMOD 25YR-24H      12.62     115.11     115.00   -0.0009      6512      0.00      2.62     11.80       1.04
  SUBBASIN 3-09           BASE FLMOD 25YR-24H      27.17     113.83     113.28    0.0006    395361     12.25     43.98      0.00       0.00
  SUBBASIN 3-10           BASE FLMOD 25YR-24H      22.35     119.98     119.00   -0.0010     15559     15.17      5.45      0.00       4.42
```

EXISTING SR 60

```
                                                    Max Time       Max   Warning Max Delta  Max Surf  Max Time       Max  Max Time       Max
          Name           Group      Simulation         Stage     Stage     Stage     Stage      Area    Inflow    Inflow   Outflow   Outflow
                                                         hrs        ft        ft        ft       ft2       hrs       cfs       hrs       cfs
------------------------------------------------------------------------------------------------------------------------------------------
  SUBBASIN 3-11           BASE FLMOD 25YR-24H          13.83    116.03    119.00   -0.0009      1473     13.67      2.74     13.83      2.73
 TAILWATER PCDC           BASE FLMOD 25YR-24H           0.00    107.43    107.43    0.0000     14413     12.50     45.66      0.00      0.00
```

10.3 Proposed Node Maps

SR 60



BEGIN PROJECT
BEGIN OVERBUILD (LT.)
BEGIN WIDENING
STA. 2364+50.12 ℄ SURVEY SR 60 =
PC STA. 3364+49.34 ℄ CONST. SR 60 LT., 12.00' RT.
PC STA. 4364+48.74 ℄ CONST. SR 60 RT., 52.00' RT.

LEGEND

XX.XX AC.	TOTAL AREA
X.XX AC.	IMPERVIOUS AREA

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FALLER, DAVIS & ASSOCIATES, INC.
5525 W. CYPRESS ST.
TAMPA, FLORIDA 33607-1707
CERTIFICATE OF AUTHORIZATION NO.: 5864
KENNETH R. MUZYK, JR., P.E. NO.: 44076

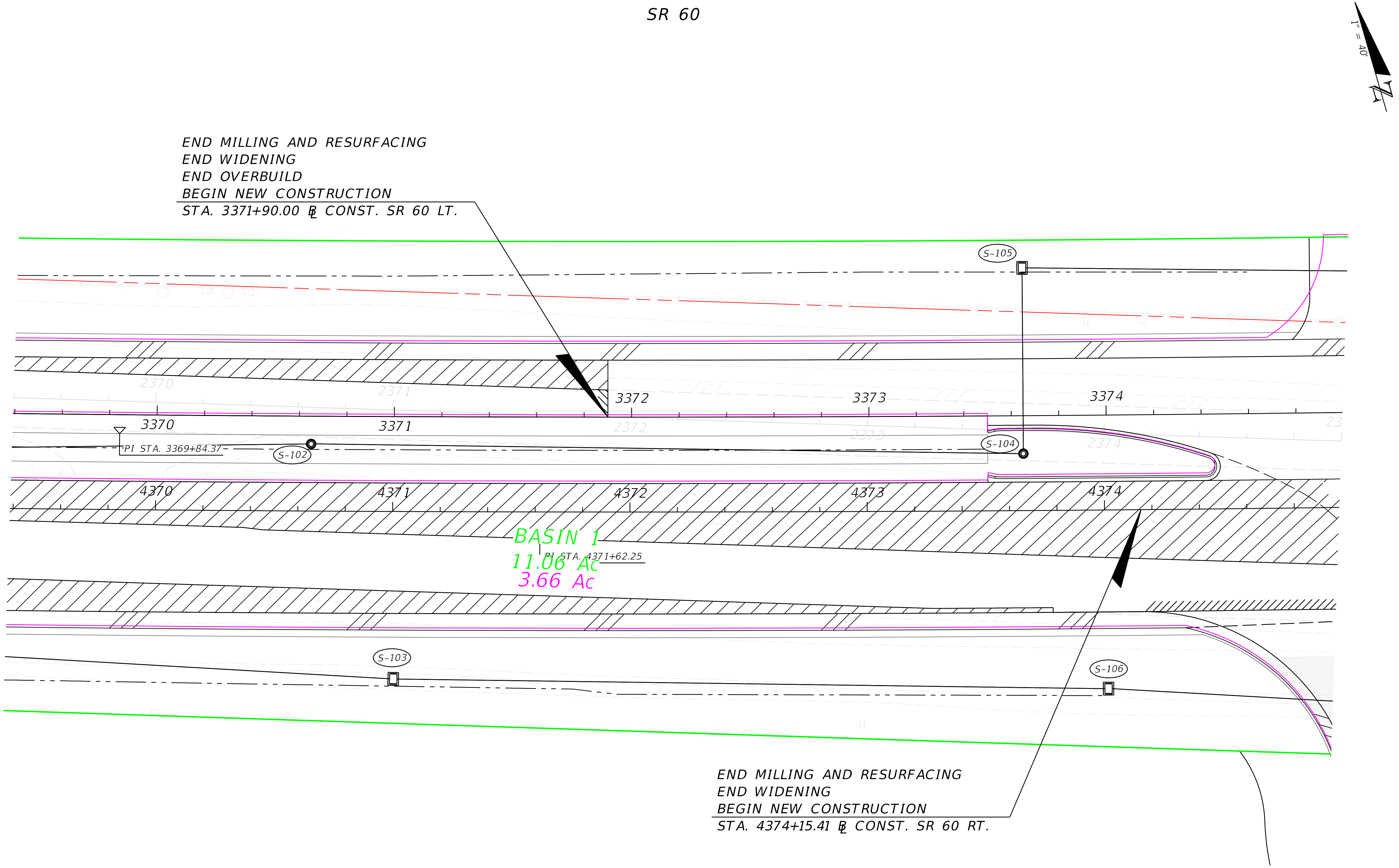
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (1)

SHEET NO.

SR 60



END MILLING AND RESURFACING
END WIDENING
END OVERBUILD
BEGIN NEW CONSTRUCTION
STA. 3371+90.00 ℄ CONST. SR 60 LT.

END MILLING AND RESURFACING
END WIDENING
BEGIN NEW CONSTRUCTION
STA. 4374+15.41 ℄ CONST. SR 60 RT.

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DATE	DESCRIPTION	DATE	DESCRIPTION

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KENNETH R. MUZYK, JR., P.E. NO.: 44076

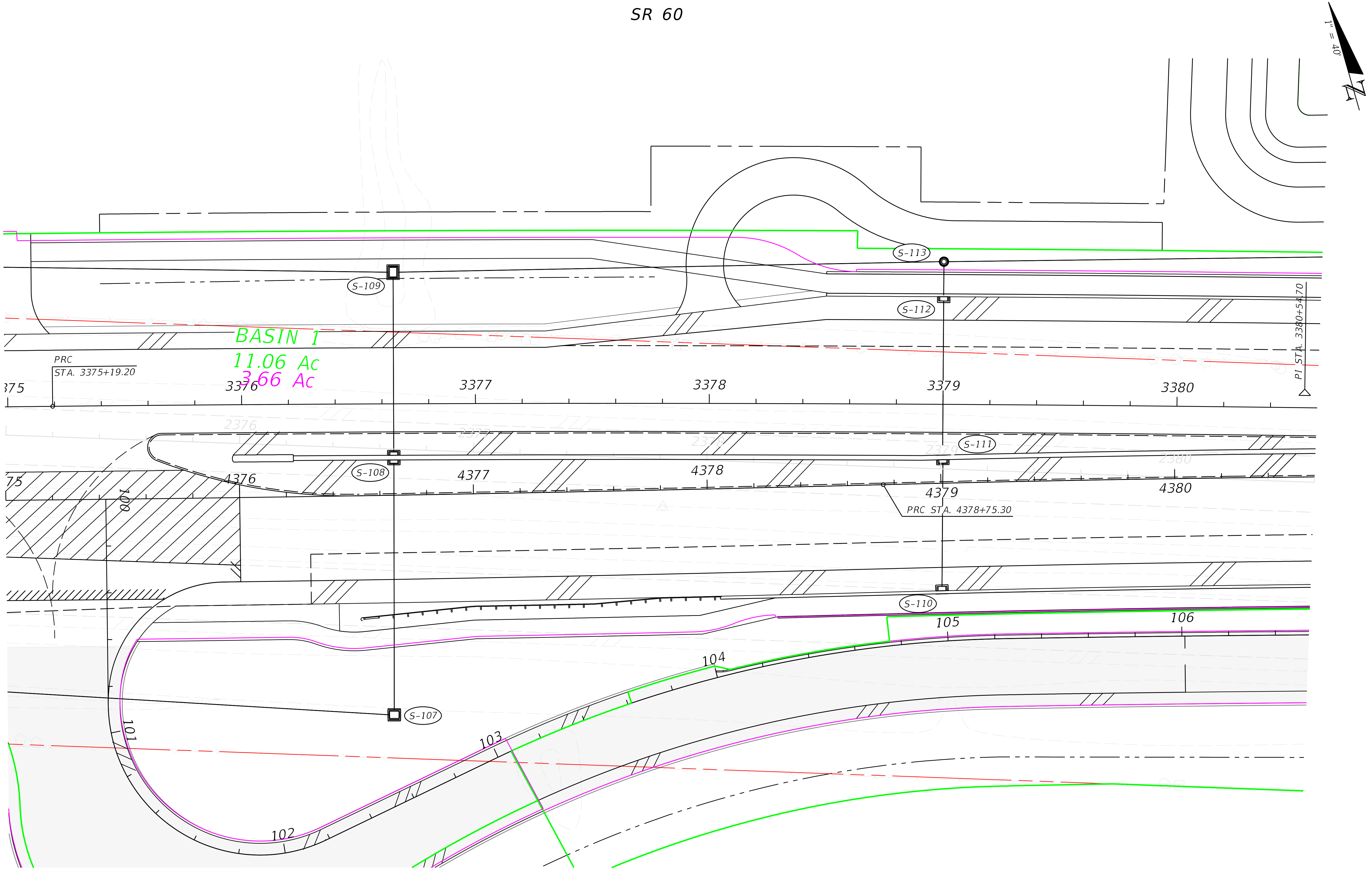
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (2)

SHEET NO.

SR 60



REVISIONS			
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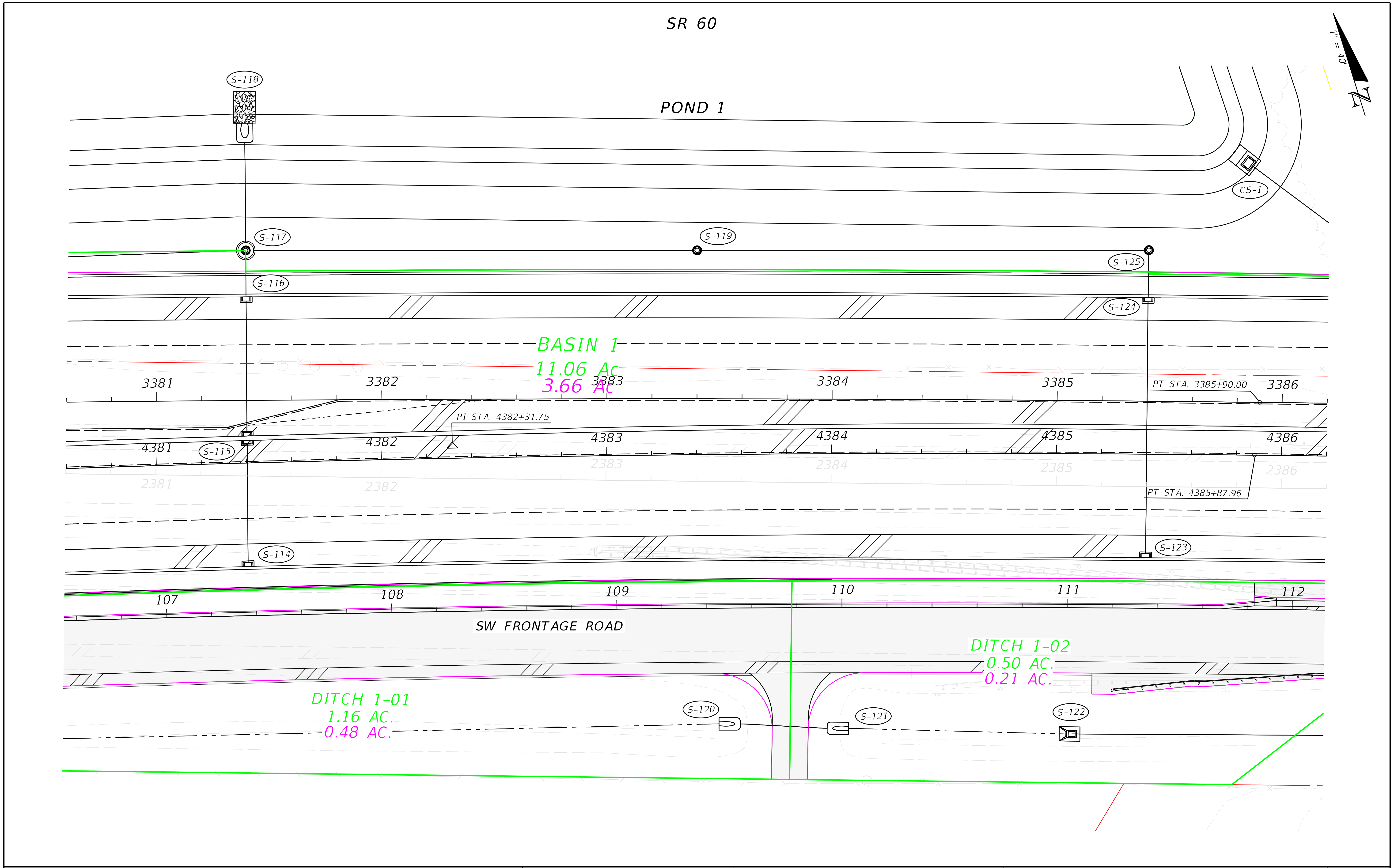
KENNETH R. MUZYK, JR., P.E. NO.: 44076

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (3)

SHEET NO.
36



REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

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CERTIFICATE OF AUTHORIZATION NO.: 5864
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (4)

SHEET NO.

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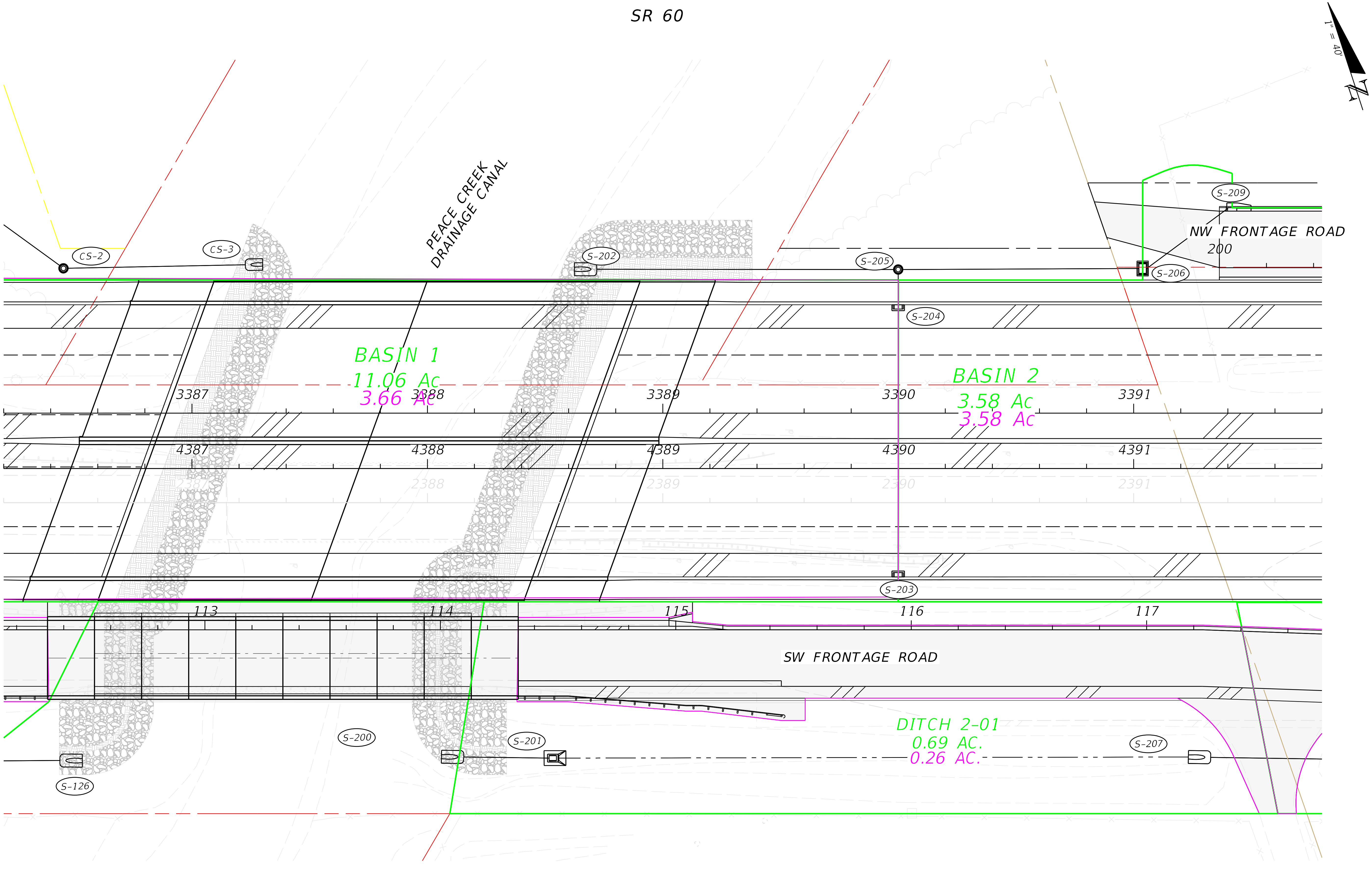

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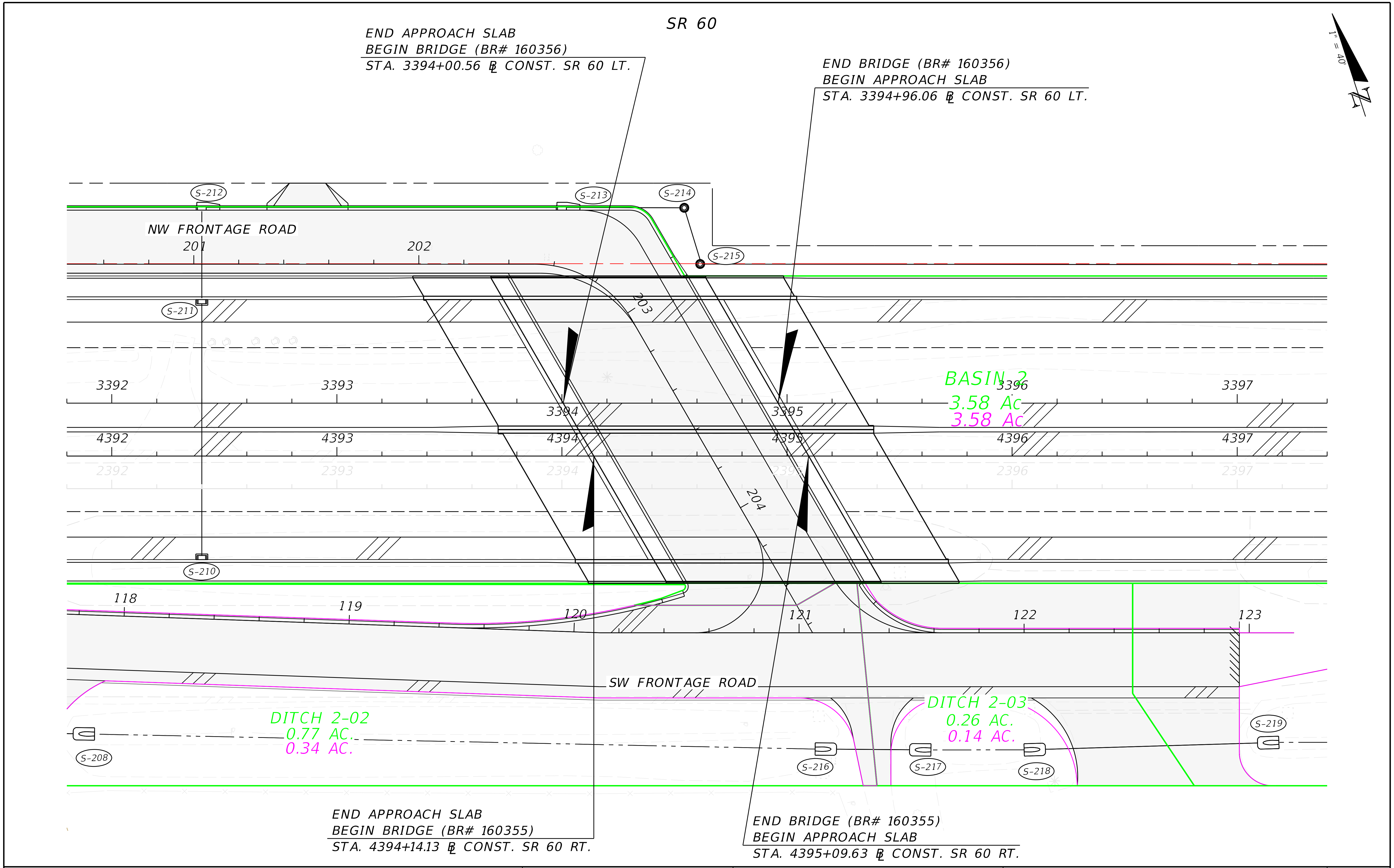
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (5)

SHEET NO.
38



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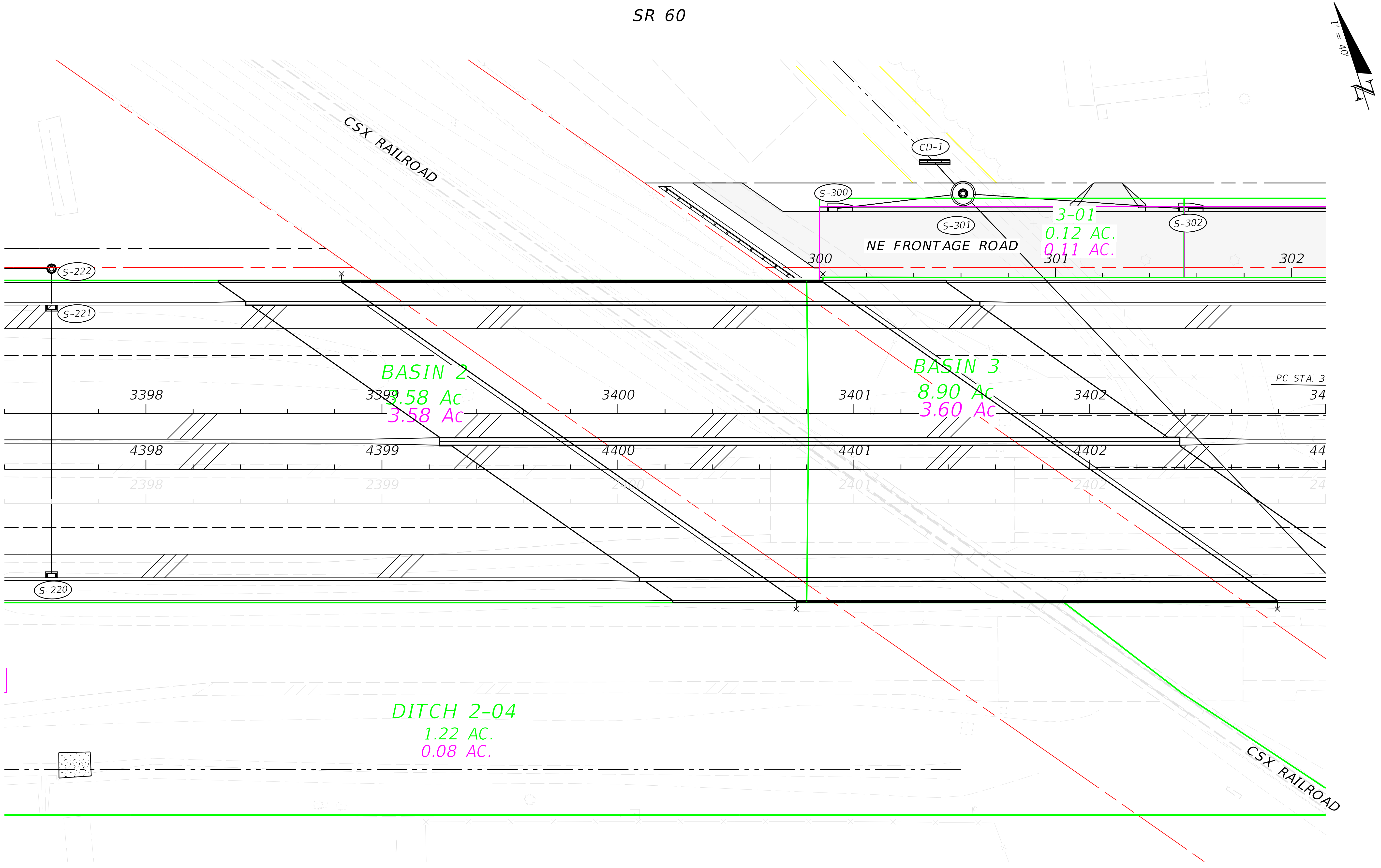
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (6)

SHEET NO.

jhernandez 9/12/2016 7:37:36 AM H:\47100\43655913201\drainage\Node Maps\Proposed\PLANRD06.dgn



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

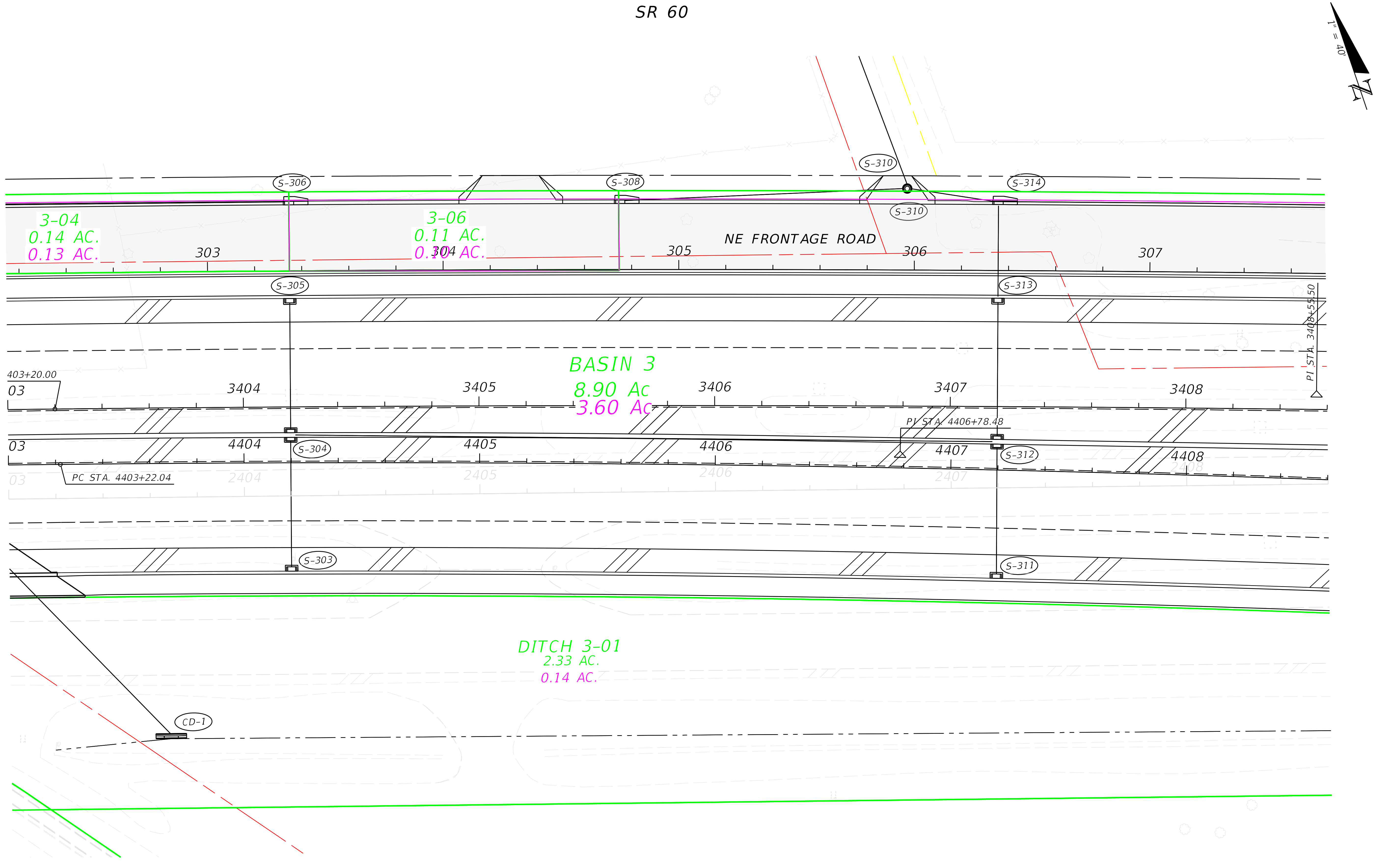
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (7)

SHEET NO.

jhernandez 9/12/2016 7:37:37 AM H:\47100\43655913201\drainage\Node Maps\Proposed\PLANRD07.dgn

SR 60



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (8)

SHEET
NO.

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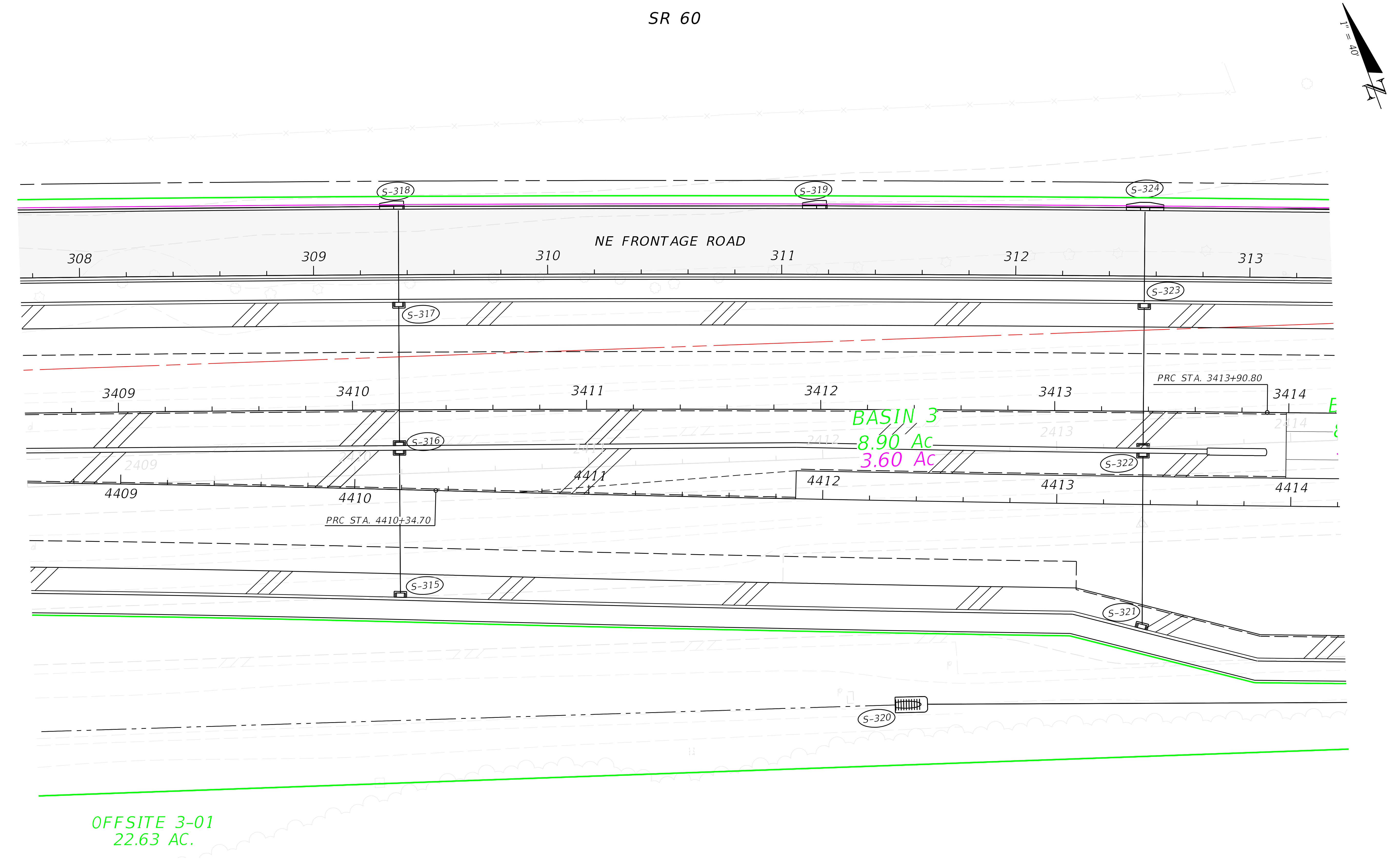

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

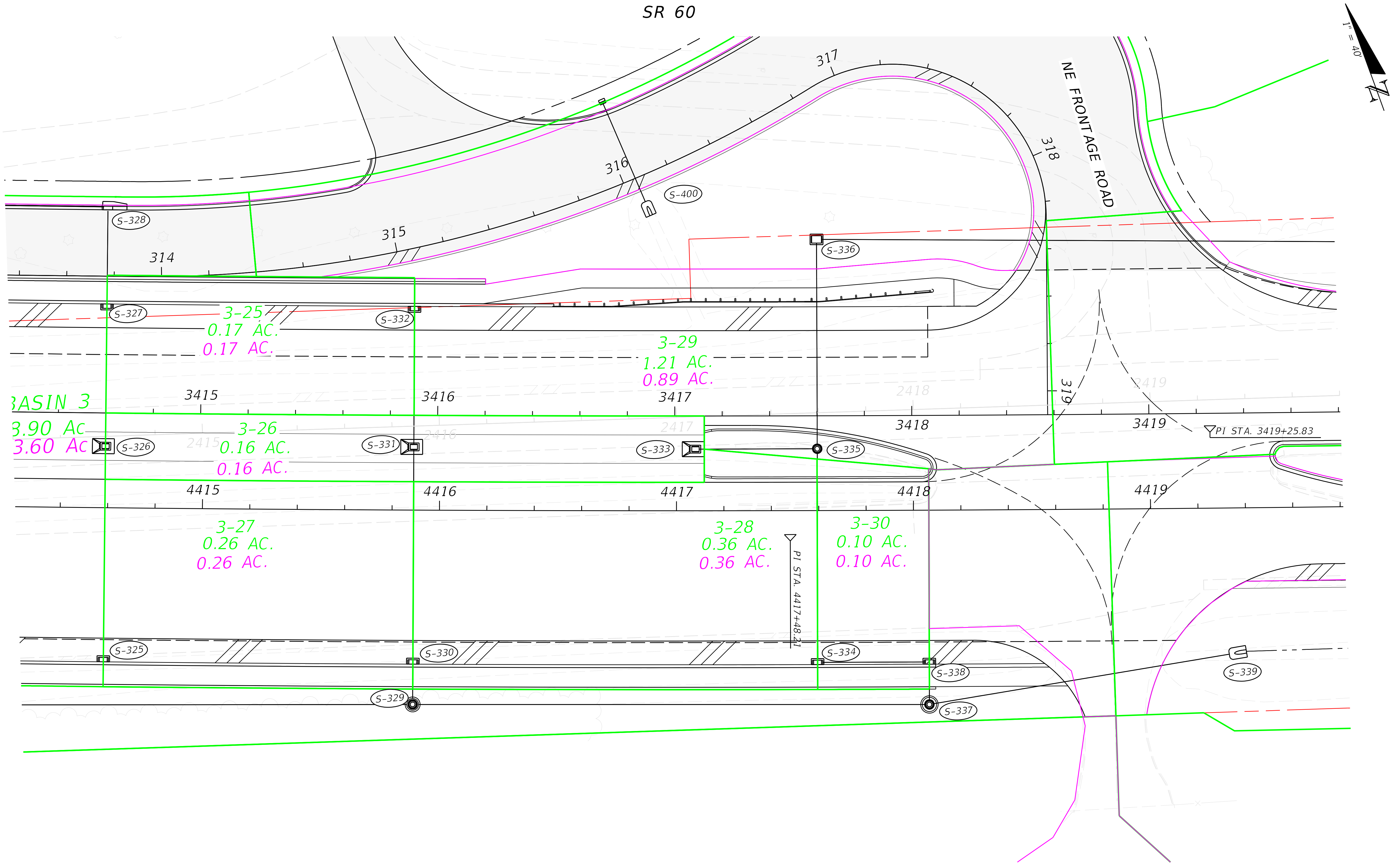
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (9)

SHEET NO.

jhernandez 9/12/2016 7:37:40 AM H:\47100\43655913201\drainage\Node Maps\Proposed\PLANRD09.dgn

SR 60



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (10)

SHEET NO.

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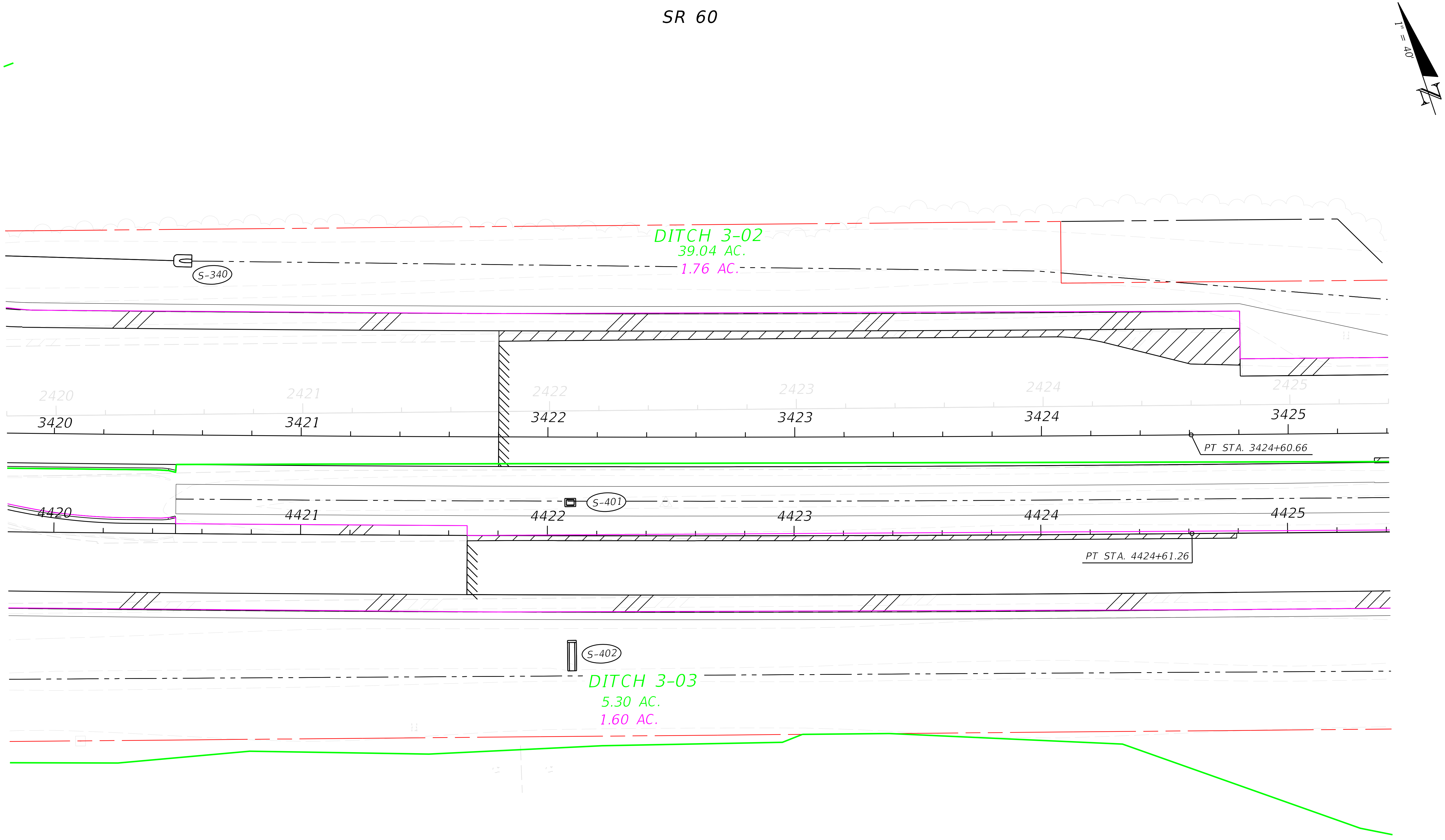

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DATE	DESCRIPTION	DATE	DESCRIPTION

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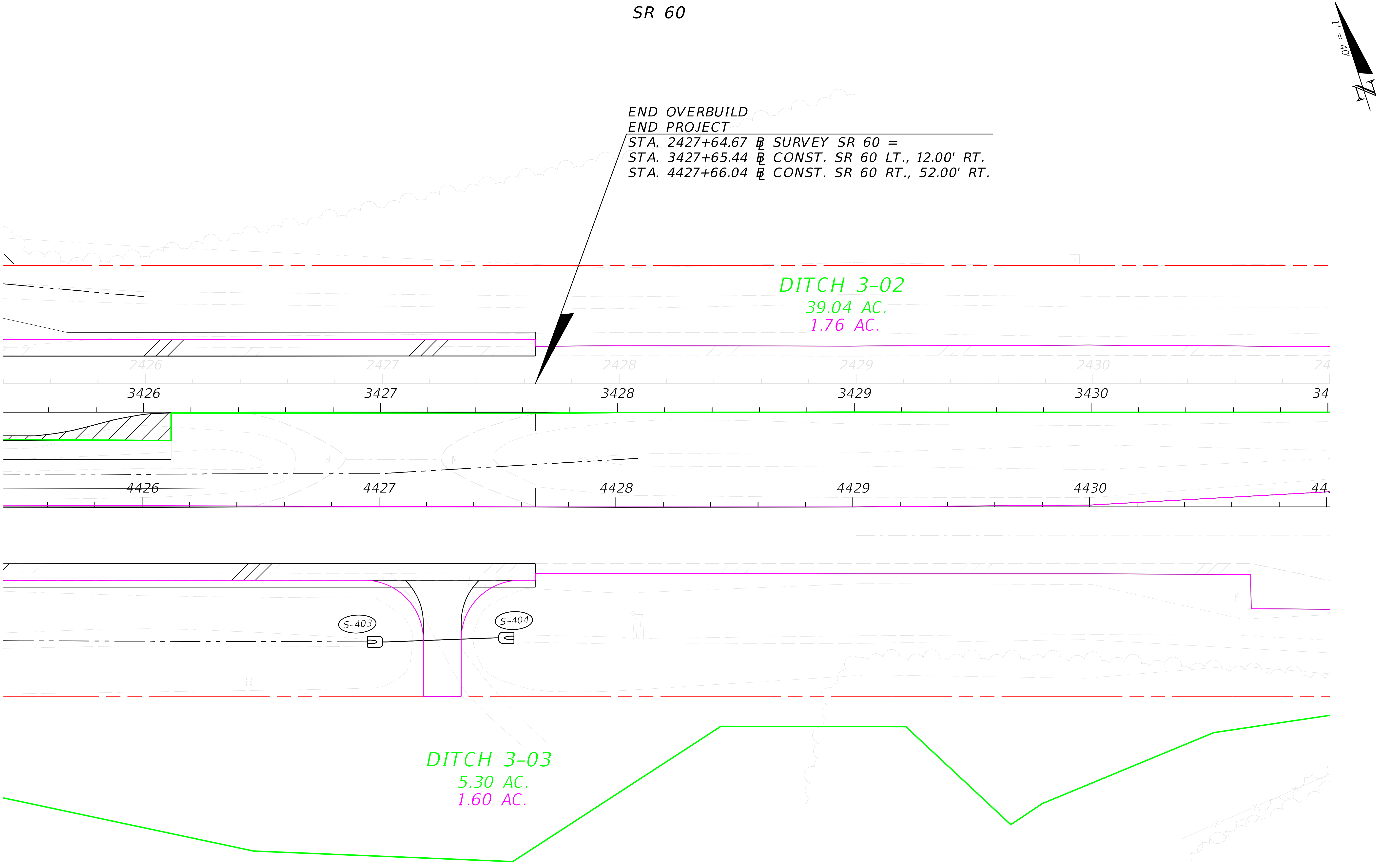
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (11)

SHEET NO.

SR 60



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

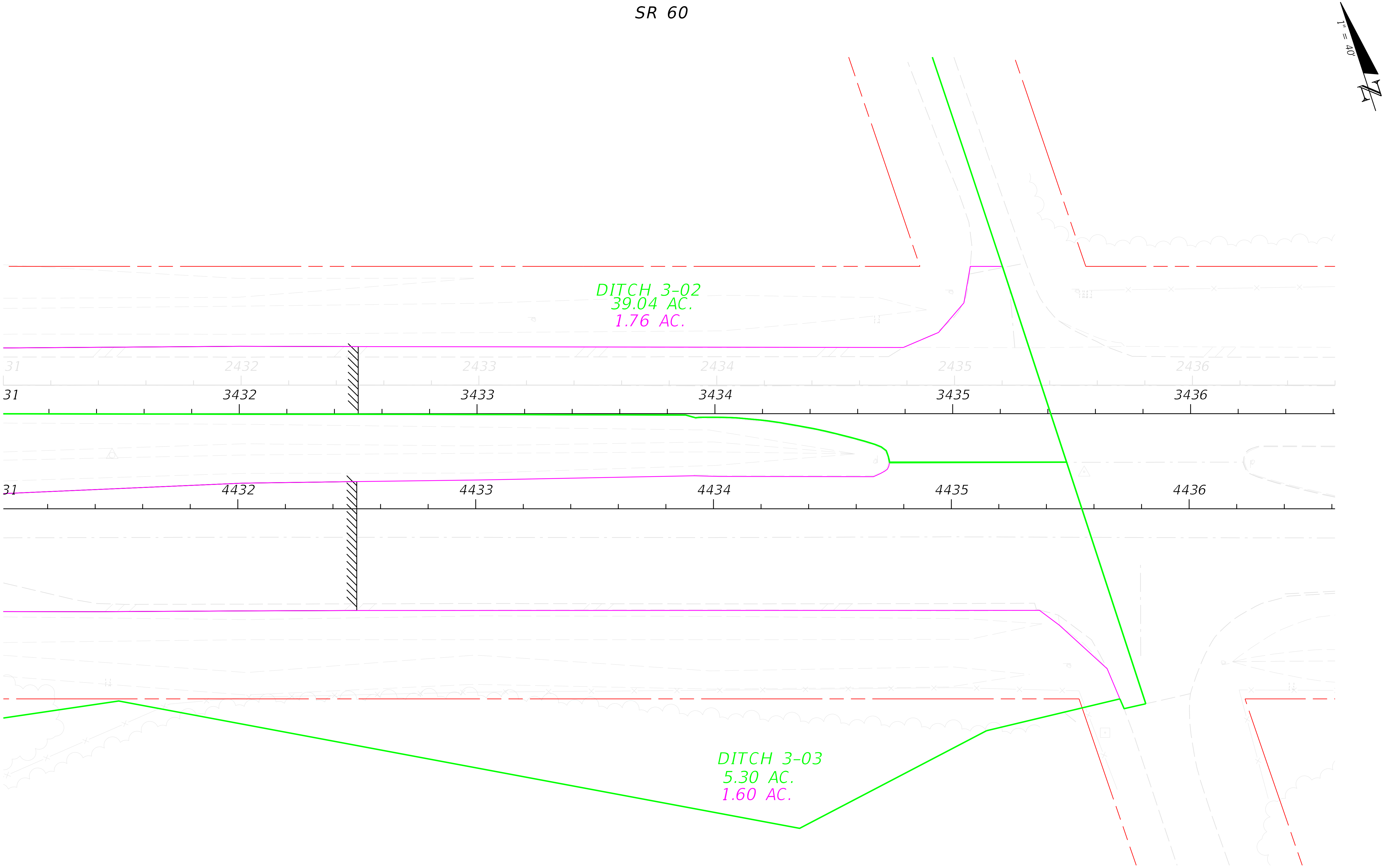
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (12)

SHEET
NO.

jhernandez 9/12/2016 7:37:43 AM H:\47100\43655913201\drainage\Node Maps\Proposed\PLANRD12.dgn

SR 60



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 60	POLK	436559-1-52-01

SR 60
PROPOSED NODE MAP (13)

SHEET
NO.

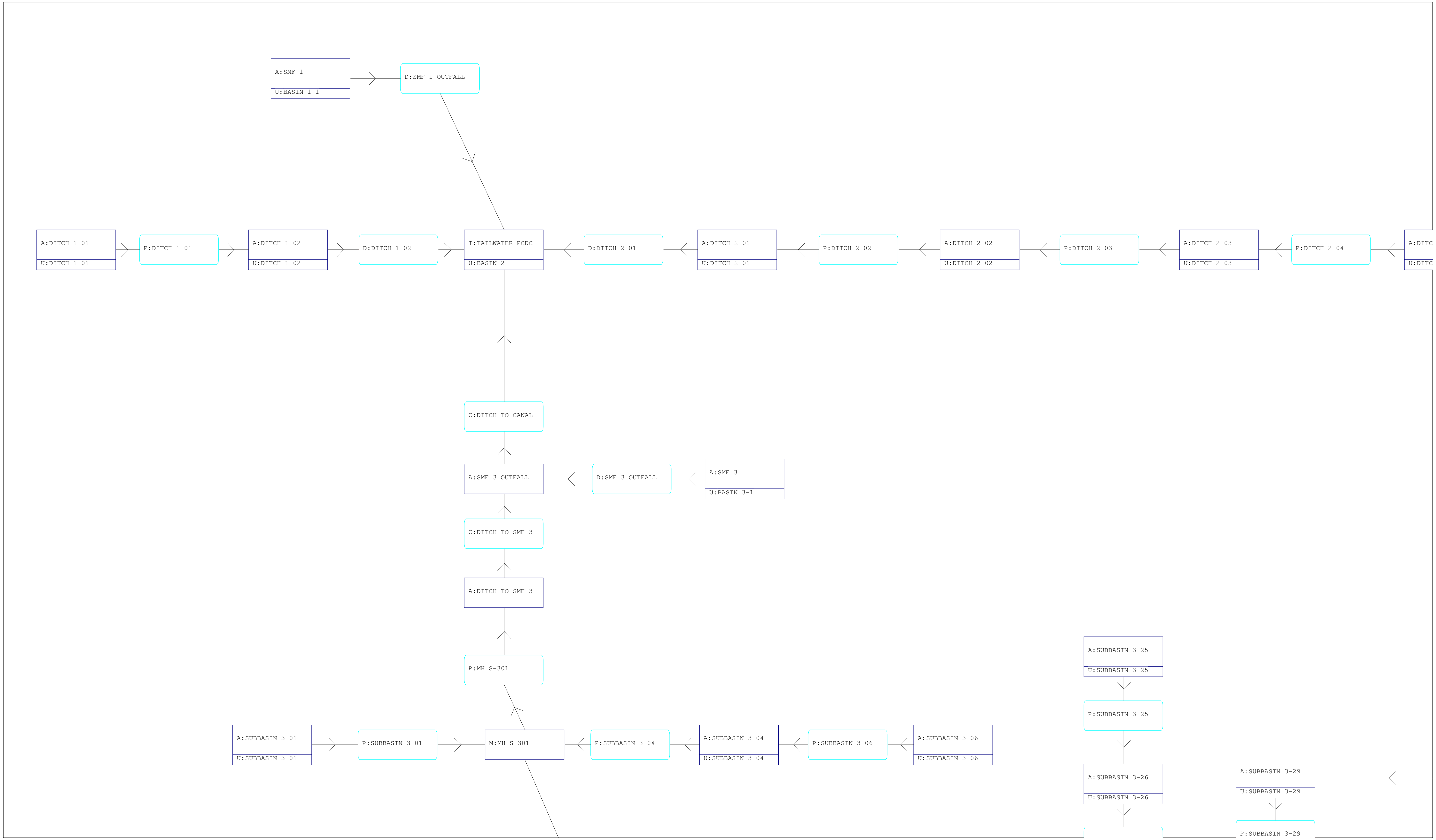
jhernandez 9/12/2016 7:37:44 AM H:\47100\43655913201\drainage\Node Maps\Proposed\PLANRD13.dgn

10.4 Proposed Model

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

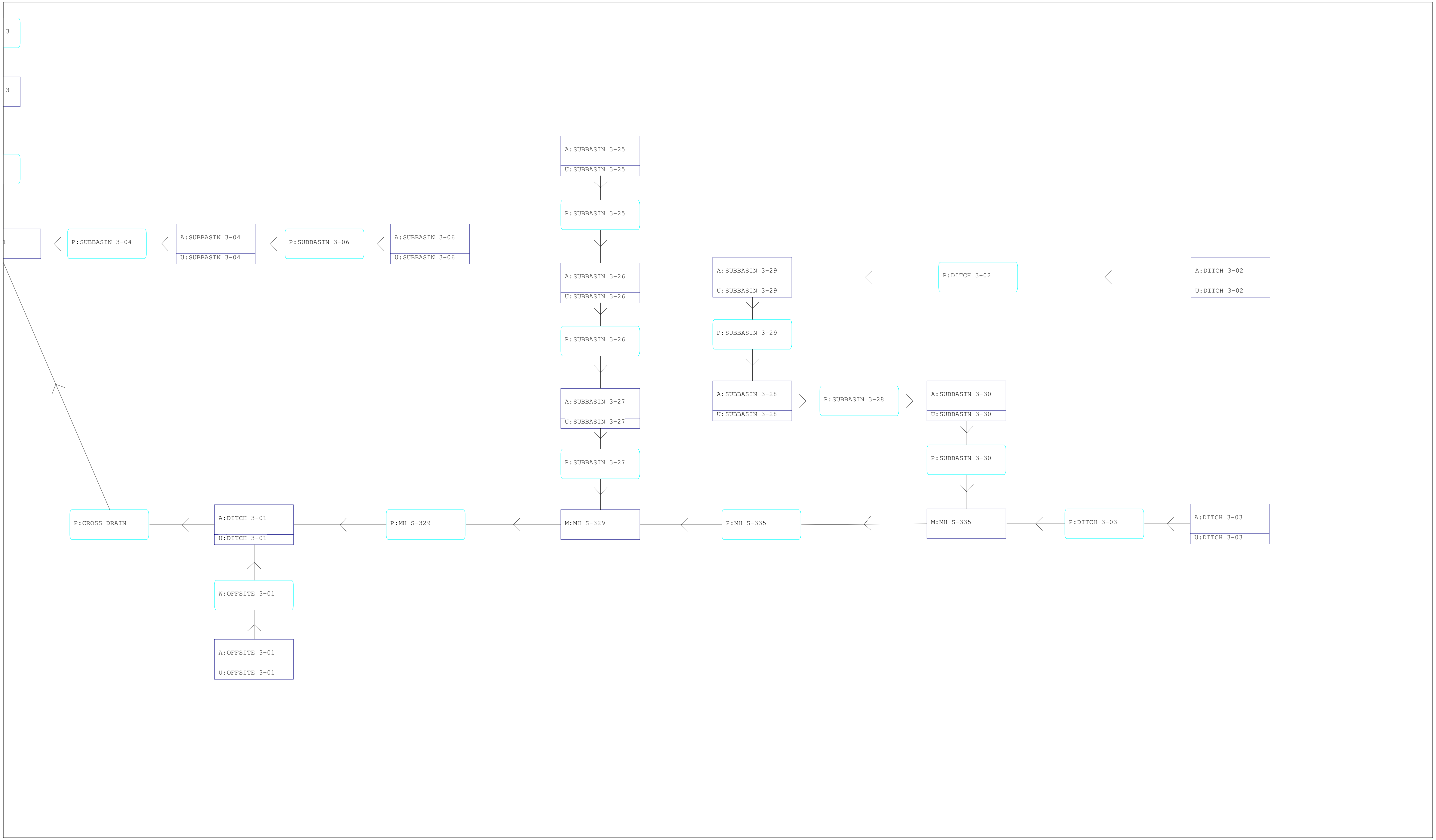
Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



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

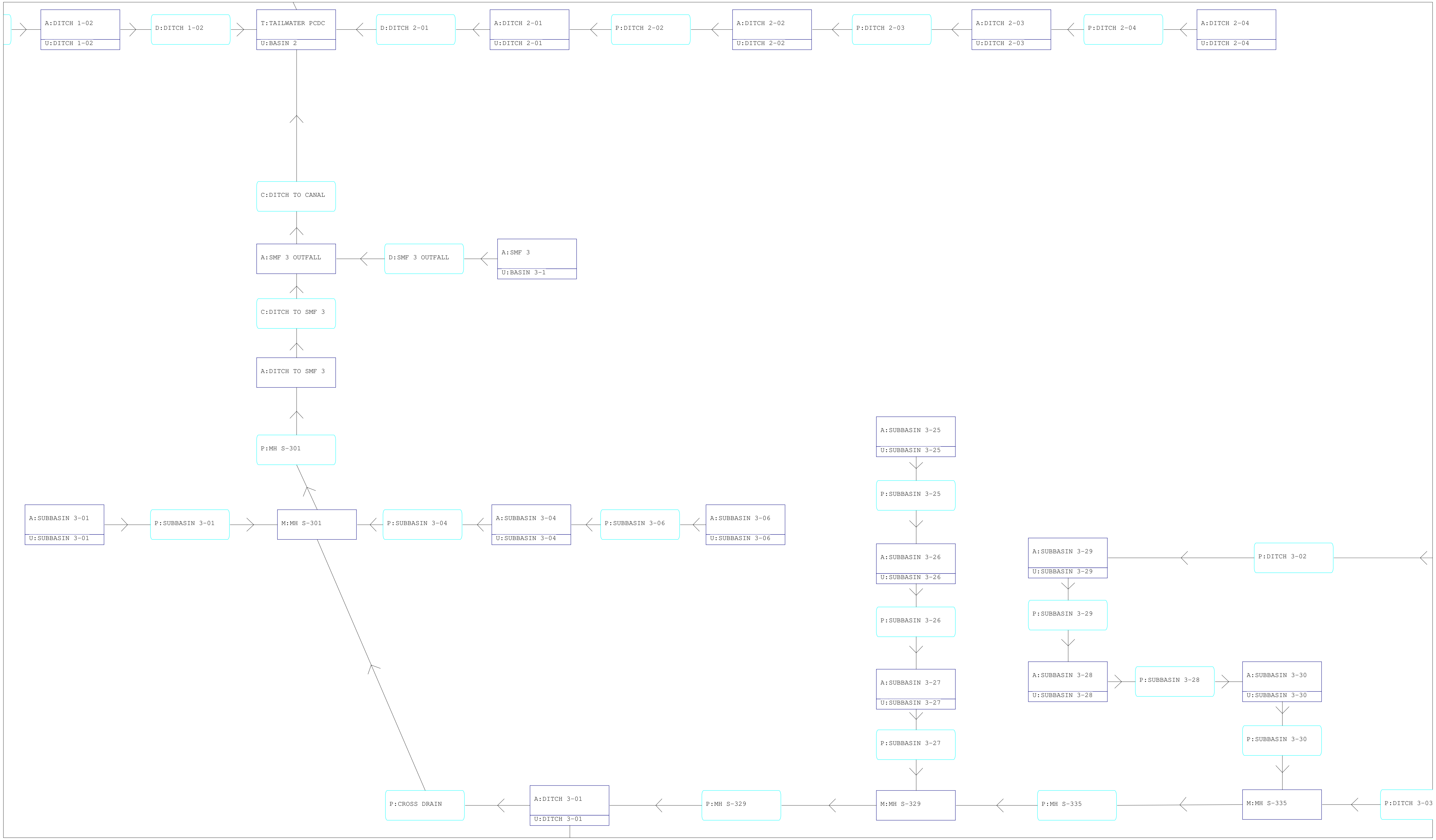


PROPOSED SR 60

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

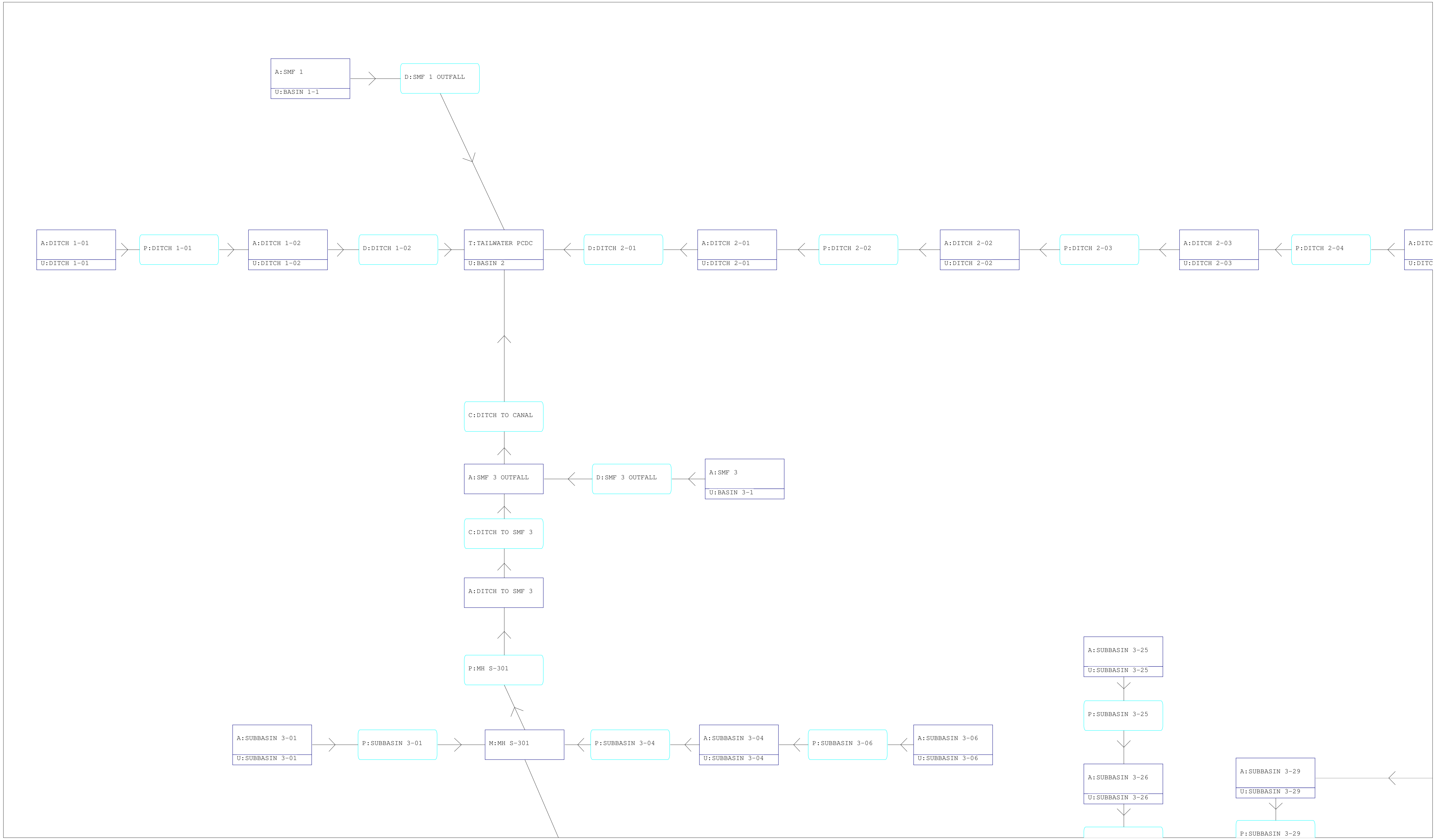


PROPOSED SR 60

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

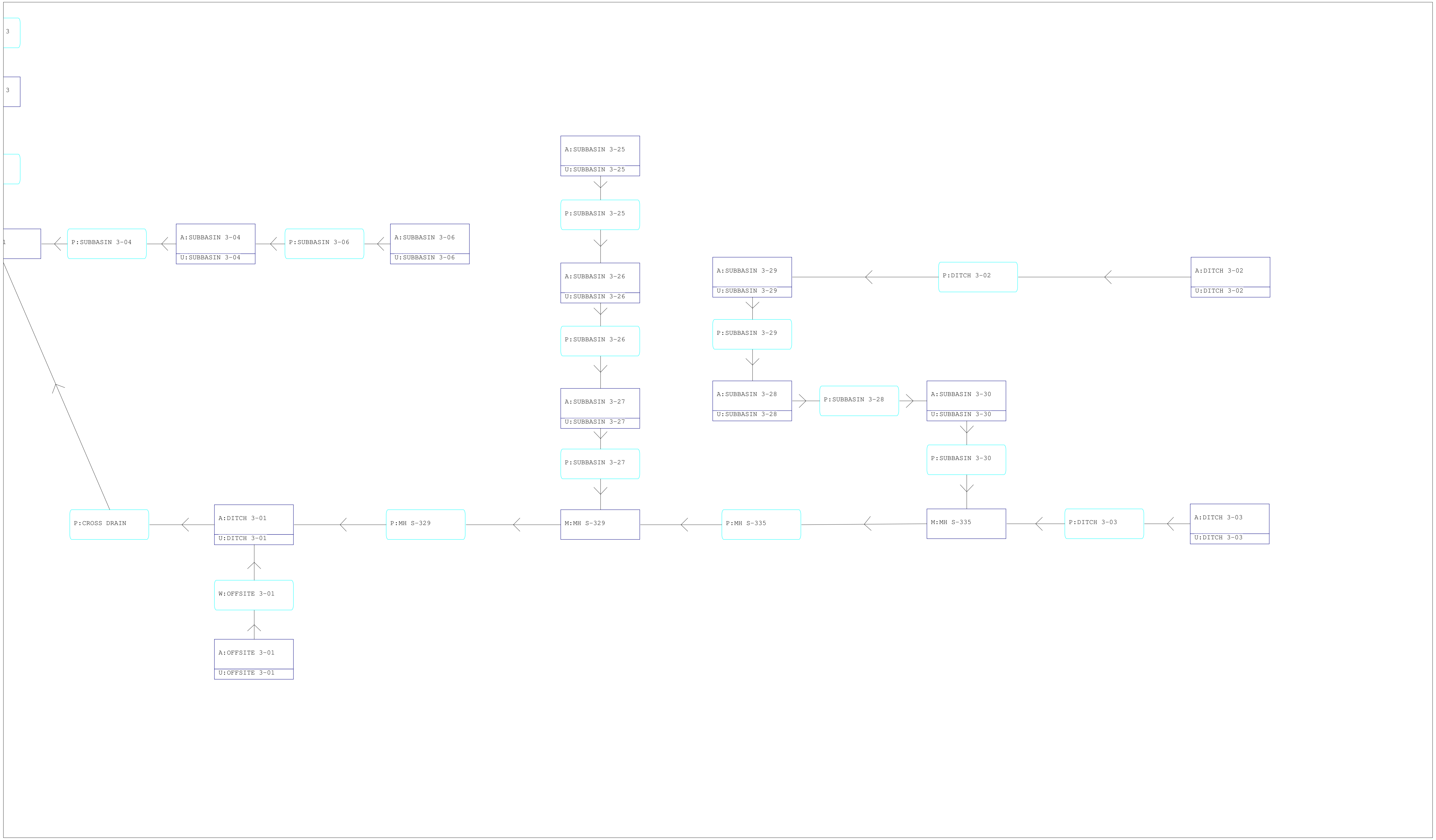


PROPOSED SR 60

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

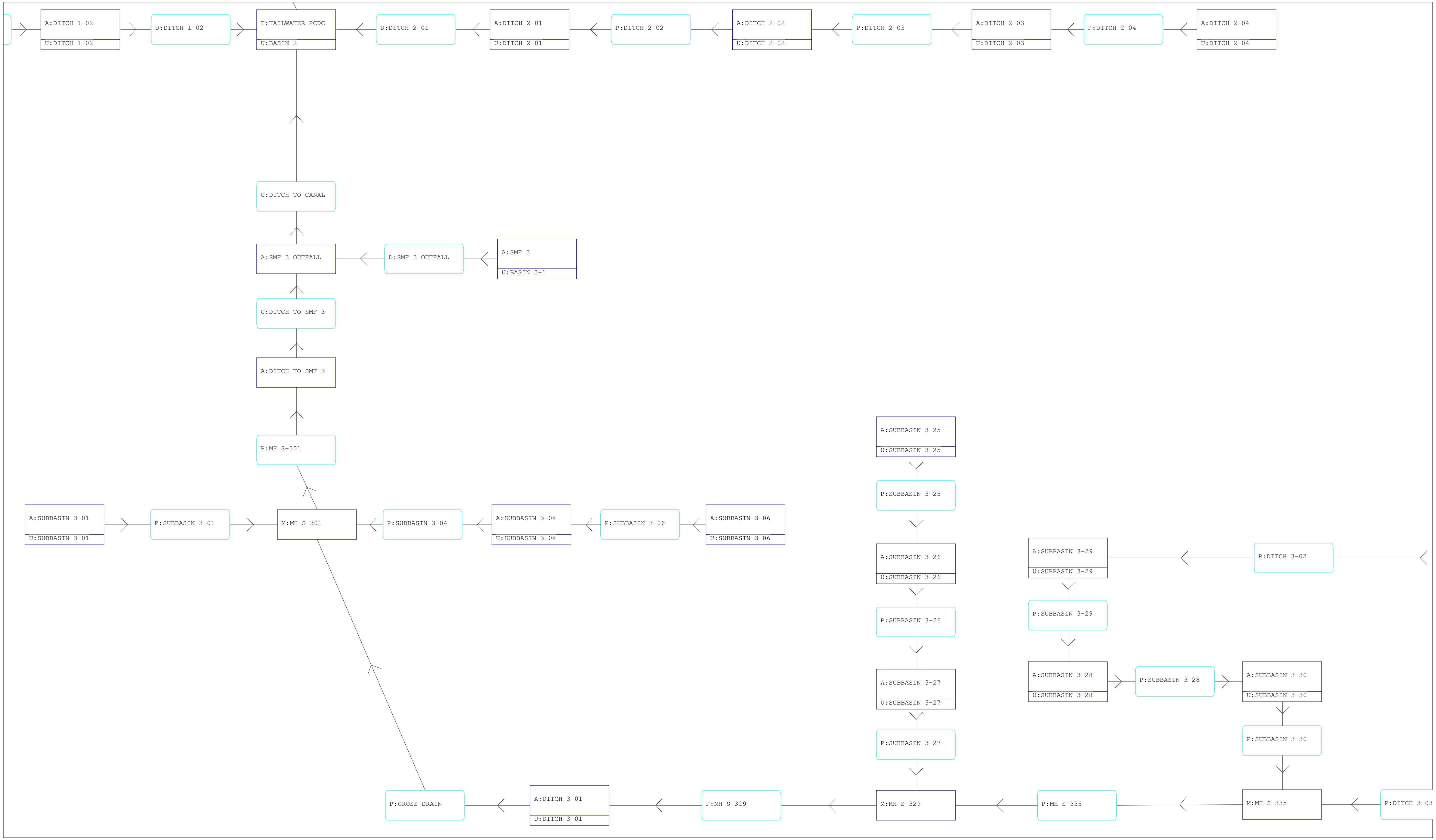


PROPOSED SR 60

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



```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: BASIN 1-1                Node: SMF 1                  Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 11.68
               Area(ac): 11.060                 Time Shift(hrs): 0.00
           Curve Number: 93.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

From Stormtab for Basin 1

----------------------------------------------------------------------------------------------------
         Name: BASIN 2                  Node: TAILWATER PCDC         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 13.77
               Area(ac): 3.580                  Time Shift(hrs): 0.00
           Curve Number: 98.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

From Stormtab for Basin 2

----------------------------------------------------------------------------------------------------
         Name: BASIN 3-1                Node: SMF 3                  Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 15.39
               Area(ac): 8.900                  Time Shift(hrs): 0.00
           Curve Number: 95.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

From Stormtab for Basin 3

----------------------------------------------------------------------------------------------------
         Name: DITCH 1-01               Node: DITCH 1-01             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 1.160                  Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 1-02               Node: DITCH 1-02             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.500                  Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-01               Node: DITCH 2-01             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.690                  Time Shift(hrs): 0.00
           Curve Number: 89.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-02               Node: DITCH 2-02             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
```

```
               Area(ac): 0.770                   Time Shift(hrs): 0.00
           Curve Number: 90.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-03               Node: DITCH 2-03             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.260                   Time Shift(hrs): 0.00
           Curve Number: 92.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-04               Node: DITCH 2-04             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 1.220                   Time Shift(hrs): 0.00
           Curve Number: 85.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 3-01               Node: DITCH 3-01             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 120.40
               Area(ac): 2.330                   Time Shift(hrs): 0.00
           Curve Number: 85.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 3-02               Node: DITCH 3-02             Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 201.70
               Area(ac): 39.040                  Time Shift(hrs): 0.00
           Curve Number: 51.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: DITCH 3-03               Node: DITCH 3-03             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): 136.90
               Area(ac): 5.300                   Time Shift(hrs): 0.00
           Curve Number: 64.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: OFFSITE 3-01             Node: OFFSITE 3-01           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 31.70
               Area(ac): 22.630                  Time Shift(hrs): 0.00
           Curve Number: 83.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-01            Node: SUBBASIN 3-01          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
```

```
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.120                   Time Shift(hrs): 0.00
           Curve Number: 97.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-04            Node: SUBBASIN 3-04          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.140                   Time Shift(hrs): 0.00
           Curve Number: 97.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-06            Node: SUBBASIN 3-06          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.110                   Time Shift(hrs): 0.00
           Curve Number: 97.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-25            Node: SUBBASIN 3-25          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.170                   Time Shift(hrs): 0.00
           Curve Number: 98.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-26            Node: SUBBASIN 3-26          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.080                   Time Shift(hrs): 0.00
           Curve Number: 98.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-26A           Node: SUBBASIN 3-26A         Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.080                   Time Shift(hrs): 0.00
           Curve Number: 98.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-27            Node: SUBBASIN 3-27          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File: Flmod               Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 10.00
               Area(ac): 0.260                   Time Shift(hrs): 0.00
           Curve Number: 98.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-28            Node: SUBBASIN 3-28          Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN
```

```
        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File: Flmod              Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 0.360                  Time Shift(hrs): 0.00
           Curve Number: 98.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

S-333

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-29           Node: SUBBASIN 3-29          Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File: Flmod              Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 1.210                  Time Shift(hrs): 0.00
           Curve Number: 94.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-30           Node: SUBBASIN 3-30          Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File: Flmod              Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 0.100                  Time Shift(hrs): 0.00
           Curve Number: 98.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: DITCH 1-01         Base Flow(cfs): 0.000          Init Stage(ft): 111.800
     Group: BASE                                              Warn Stage(ft): 114.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        111.800          0.0010
        112.600          0.1120
        113.000          0.1560
        114.000          0.2660

------------------------------------------------------------------------------------------
      Name: DITCH 1-02         Base Flow(cfs): 0.000          Init Stage(ft): 111.600
     Group: BASE                                              Warn Stage(ft): 114.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        111.600          0.0010
        112.000          0.0180
        113.000          0.0390
        114.000          0.0610

------------------------------------------------------------------------------------------
      Name: DITCH 2-01         Base Flow(cfs): 0.000          Init Stage(ft): 112.100
     Group: BASE                                              Warn Stage(ft): 113.700
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        112.100          0.0010
        112.500          0.0400
        113.000          0.0620
        113.500          0.0840
        114.000          0.1060

------------------------------------------------------------------------------------------
      Name: DITCH 2-02         Base Flow(cfs): 0.000          Init Stage(ft): 112.600
     Group: BASE                                              Warn Stage(ft): 116.800
      Type: Stage/Area
```

```
      Stage(ft)        Area(ac)
--------------- ---------------
        112.600          0.0010
        113.000          0.0510
        113.500          0.0790
        114.000          0.1070
        115.000          0.1630
        116.000          0.2190
        117.000          0.2750

------------------------------------------------------------------------------------------
      Name: DITCH 2-03          Base Flow(cfs): 0.000          Init Stage(ft): 112.900
     Group: BASE                                               Warn Stage(ft): 116.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        112.900          0.0070
        113.500          0.0100
        114.000          0.0150
        114.500          0.0190
        115.000          0.0240
        116.000          0.0330

------------------------------------------------------------------------------------------
      Name: DITCH 2-04          Base Flow(cfs): 0.000          Init Stage(ft): 113.100
     Group: BASE                                               Warn Stage(ft): 114.500
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        113.100          0.0010
        114.000          0.0500
        114.500          0.1910

------------------------------------------------------------------------------------------
      Name: DITCH 3-01          Base Flow(cfs): 0.000          Init Stage(ft): 113.800
     Group: BASE                                               Warn Stage(ft): 115.500
      Type: Stage/Area

DITCH TO CROSS DRAIN
WARNING STAGE SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        113.800          0.0100
        114.000          0.4000
        114.500          0.8700
        115.500          1.0600

------------------------------------------------------------------------------------------
      Name: DITCH 3-02          Base Flow(cfs): 0.000          Init Stage(ft): 116.700
     Group: BASE                                               Warn Stage(ft): 119.760
      Type: Stage/Area

S-340
WARNING STAGE SET TO LOW EOP

      Stage(ft)        Area(ac)
--------------- ---------------
        116.700          0.0010
        119.000          0.2000
        119.760          0.3190
        120.000          0.3500

------------------------------------------------------------------------------------------
      Name: DITCH 3-03          Base Flow(cfs): 0.000          Init Stage(ft): 116.000
     Group: BASE                                               Warn Stage(ft): 119.500
      Type: Stage/Area

S-339
WARNING SET TO TOB

      Stage(ft)        Area(ac)
--------------- ---------------
        116.000          0.0010
        116.500          0.0190
        117.000          0.0640
        117.500          0.1580
        118.000          0.2320
        118.500          0.3150
        119.000          0.4200
        119.500          0.5110

------------------------------------------------------------------------------------------
```

```
      Name: DITCH TO SMF 3      Base Flow(cfs): 0.000          Init Stage(ft): 111.700
     Group: BASE                                               Warn Stage(ft): 115.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        111.700          0.0010
        116.000          0.0020

------------------------------------------------------------------------------------------
      Name: MH S-301            Base Flow(cfs): 0.000          Init Stage(ft): 111.700
     Group: BASE                 Plunge Factor: 1.00           Warn Stage(ft): 116.600
      Type: Manhole, Flat Floor

S-301
CAST IN PLACE

      Stage(ft)        Area(ac)
--------------- ---------------
        111.700          0.0010
        116.600          0.0020

------------------------------------------------------------------------------------------
      Name: MH S-329            Base Flow(cfs): 0.000          Init Stage(ft): 114.500
     Group: BASE                 Plunge Factor: 1.00           Warn Stage(ft): 119.000
      Type: Manhole, Flat Floor

S-329

      Stage(ft)        Area(ac)
--------------- ---------------
        114.500          0.0010
        119.000          0.0020

------------------------------------------------------------------------------------------
      Name: MH S-335            Base Flow(cfs): 0.000          Init Stage(ft): 115.500
     Group: BASE                                               Warn Stage(ft): 124.200
      Type: Stage/Area

S-335

      Stage(ft)        Area(ac)
--------------- ---------------
        115.500          0.0010
        124.200          0.0020

------------------------------------------------------------------------------------------
      Name: MH S-337            Base Flow(cfs): 0.000          Init Stage(ft): 114.700
     Group: BASE                 Plunge Factor: 1.00           Warn Stage(ft): 119.600
      Type: Manhole, Flat Floor

S-337


      Stage(ft)        Area(ac)
--------------- ---------------
        114.700          0.0010
        119.600          0.0020

------------------------------------------------------------------------------------------
      Name: OFFSITE 3-01        Base Flow(cfs): 0.000          Init Stage(ft): 112.200
     Group: BASE                                               Warn Stage(ft): 113.280
      Type: Stage/Area

Offsite area contributing to ditch 3-01

      Stage(ft)        Area(ac)
--------------- ---------------
        112.200          5.2000
        112.280          5.2600
        112.780          6.9100
        113.280          7.9400

------------------------------------------------------------------------------------------
      Name: SMF 1               Base Flow(cfs): 0.000          Init Stage(ft): 110.400
     Group: BASE                                               Warn Stage(ft): 113.500
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        101.000          0.9100
        107.800          1.2800
        109.800          1.4600
        113.500          1.8000
        114.500          2.2800
```

```
------------------------------------------------------------------------------------------
      Name: SMF 3               Base Flow(cfs): 0.000          Init Stage(ft): 115.000
     Group: BASE                                               Warn Stage(ft): 118.400
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        105.800          1.3200
        112.700          1.7300
        118.400          2.2700
        119.400          2.7800

------------------------------------------------------------------------------------------
      Name: SMF 3 OUTFALL       Base Flow(cfs): 0.000          Init Stage(ft): 111.200
     Group: BASE                                               Warn Stage(ft): 116.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        111.200          0.0001
        116.000          0.0002

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-01       Base Flow(cfs): 0.000          Init Stage(ft): 111.900
     Group: BASE                                               Warn Stage(ft): 115.660
      Type: Stage/Area

S-300

      Stage(ft)        Area(ac)
--------------- ---------------
        111.900          0.0010
        115.660          0.0020

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-04       Base Flow(cfs): 0.000          Init Stage(ft): 112.700
     Group: BASE                                               Warn Stage(ft): 116.530
      Type: Stage/Area

S-302

      Stage(ft)        Area(ac)
--------------- ---------------
        112.700          0.0010
        116.530          0.0020

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-06       Base Flow(cfs): 0.000          Init Stage(ft): 113.800
     Group: BASE                                               Warn Stage(ft): 117.570
      Type: Stage/Area

S-306

      Stage(ft)        Area(ac)
--------------- ---------------
        113.800          0.0010
        117.570          0.0020

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-25       Base Flow(cfs): 0.000          Init Stage(ft): 121.700
     Group: BASE                                               Warn Stage(ft): 125.740
      Type: Stage/Area

S-332


      Stage(ft)        Area(ac)
--------------- ---------------
        121.700          0.0010
        125.740          0.0020

------------------------------------------------------------------------------------------
      Name: SUBBASIN 3-26       Base Flow(cfs): 0.000          Init Stage(ft): 121.500
     Group: BASE                                               Warn Stage(ft): 125.500
      Type: Stage/Area

S-331


      Stage(ft)        Area(ac)
--------------- ---------------
        121.500          0.0010
        125.500          0.0020
```

```
-----------------------------------------------------------------------------------------
      Name: SUBBASIN 3-26A      Base Flow(cfs): 0.000          Init Stage(ft): 115.600
     Group: BASE                                               Warn Stage(ft): 123.410
      Type: Stage/Area

S-333

      Stage(ft)        Area(ac)
--------------- ---------------
        115.600          0.0001
        123.410          0.0001

-----------------------------------------------------------------------------------------
      Name: SUBBASIN 3-27       Base Flow(cfs): 0.000          Init Stage(ft): 121.200
     Group: BASE                                               Warn Stage(ft): 125.100
      Type: Stage/Area

S-330

      Stage(ft)        Area(ac)
--------------- ---------------
        121.200          0.0010
        125.100          0.0020

-----------------------------------------------------------------------------------------
      Name: SUBBASIN 3-28       Base Flow(cfs): 0.000          Init Stage(ft): 115.400
     Group: BASE                                               Warn Stage(ft): 121.310
      Type: Stage/Area

S-334


      Stage(ft)        Area(ac)
--------------- ---------------
        115.400          0.0010
        121.310          0.0020

-----------------------------------------------------------------------------------------
      Name: SUBBASIN 3-29       Base Flow(cfs): 0.000          Init Stage(ft): 115.600
     Group: BASE                                               Warn Stage(ft): 120.300
      Type: Stage/Area

S-336
WARNING STAGE SET TO GRATE EL.


      Stage(ft)        Area(ac)
--------------- ---------------
        115.600          0.1300
        120.300          0.1900

-----------------------------------------------------------------------------------------
      Name: SUBBASIN 3-30       Base Flow(cfs): 0.000          Init Stage(ft): 115.300
     Group: BASE                                               Warn Stage(ft): 120.550
      Type: Stage/Area

S-338

      Stage(ft)        Area(ac)
--------------- ---------------
        115.300          0.0010
        120.550          0.0020

-----------------------------------------------------------------------------------------
      Name: TAILWATER PCDC      Base Flow(cfs): 0.000          Init Stage(ft): 107.430
     Group: BASE                                               Warn Stage(ft): 107.430
      Type: Time/Stage

TAILWATER SET TO SHW OF PEACE CREEK DRAINAGE CANAL

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         107.430
         240.00         107.430

=========================================================================================
==== Cross Sections =====================================================================
=========================================================================================

              Name: OFFSITE 3-01                 Group: BASE
      Encroachment: No




    Station(ft)   Elevation(ft)     Manning's N
--------------- --------------- ---------------
          0.000         116.500        0.450000
```

```
        101.200         116.000        0.450000
        163.200         115.500        0.450000
        198.700         115.500        0.450000
        236.200         115.500        0.450000
        271.600         119.280        0.450000

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

         Name: CROSS DRAIN         From Node: DITCH 3-01         Length(ft): 317.00
        Group: BASE                  To Node: MH S-301                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 0.00
   Invert(ft): 113.800        111.700                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: DITCH 1-01          From Node: DITCH 1-01         Length(ft): 36.00
        Group: BASE                  To Node: DITCH 1-02              Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 111.800        111.700                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-02          From Node: DITCH 2-02         Length(ft): 48.00
        Group: BASE                  To Node: DITCH 2-01              Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 112.600        112.400                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-03          From Node: DITCH 2-03         Length(ft): 30.00
        Group: BASE                  To Node: DITCH 2-02              Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 112.900        112.800                        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 dc
```

```
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: DITCH 2-04          From Node: DITCH 2-04         Length(ft): 92.00
        Group: BASE                  To Node: DITCH 2-03              Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 113.100        113.000                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: DITCH 3-02          From Node: DITCH 3-02         Length(ft): 284.00
        Group: BASE                  To Node: SUBBASIN 3-29           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.50
   Invert(ft): 116.700        115.600                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE BETWEEN S-340 AND S-336

----------------------------------------------------------------------------------------------------
         Name: DITCH 3-03          From Node: DITCH 3-03         Length(ft): 126.00
        Group: BASE                  To Node: MH S-337                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.70
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 116.100        114.700                        Bend Loss Coef: 0.15
  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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE BETWEEN S-339 AND S-337

----------------------------------------------------------------------------------------------------
         Name: MH S-301            From Node: MH S-301           Length(ft): 14.00
        Group: BASE                  To Node: DITCH TO SMF 3          Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 1.00
```

```
   Invert(ft): 111.700        111.700                        Bend Loss Coef: 0.70
  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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: MH S-329           From Node: MH S-329          Length(ft): 341.00
        Group: BASE                 To Node: DITCH 3-01             Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 1.00
   Invert(ft): 114.500        114.300                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE BETWEEN S-329 AND S-320

----------------------------------------------------------------------------------------------------
         Name: MH S-335           From Node: MH S-335          Length(ft): 88.00
        Group: BASE                 To Node: SUBBASIN 3-28          Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.50
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): 115.500        115.400                        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 dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: MH S-337           From Node: MH S-337          Length(ft): 215.00
        Group: BASE                 To Node: MH S-329               Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 30.00          30.00                      Entrance Loss Coef: 0.50
     Rise(in): 30.00          30.00                          Exit Loss Coef: 0.00
   Invert(ft): 114.700        114.500                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE BETWEEN S-337 TO S-329

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-01       From Node: SUBBASIN 3-01      Length(ft): 50.00
        Group: BASE                 To Node: MH S-301               Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
```

```
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.50
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.00
   Invert(ft): 111.900        111.700                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-300 TO S-301

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-04       From Node: SUBBASIN 3-04      Length(ft): 78.00
        Group: BASE                  To Node: MH S-301                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.50
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.00
   Invert(ft): 112.700        111.700                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-302 TO S-301

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-06       From Node: SUBBASIN 3-06      Length(ft): 177.00
        Group: BASE                  To Node: SUBBASIN 3-04           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.50
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.00
   Invert(ft): 113.800        112.700                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-306 TO S-302

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-25       From Node: SUBBASIN 3-25      Length(ft): 57.00
        Group: BASE                  To Node: SUBBASIN 3-26           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 121.700        121.500                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-332 TO S-331

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-26       From Node: SUBBASIN 3-26      Length(ft): 89.00
```

```
        Group: BASE                  To Node: SUBBASIN 3-27           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 121.500        121.200                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-331 TO S-330

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-26A      From Node: SUBBASIN 3-26A     Length(ft): 49.00
        Group: BASE                  To Node: MH S-335                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): 115.600        115.500                        Bend Loss Coef: 0.00
  Manning's N: 0.012000       0.012000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.012          0.012                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       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



----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-27       From Node: SUBBASIN 3-27      Length(ft): 15.00
        Group: BASE                  To Node: MH S-329                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 0.70
   Invert(ft): 114.600        114.500                        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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-330 TO S-329

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-28       From Node: SUBBASIN 3-28      Length(ft): 44.00
        Group: BASE                  To Node: SUBBASIN 3-30           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): 115.400        115.300                        Bend Loss Coef: 0.90
  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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-334 TO S-338
```

```
----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-29       From Node: SUBBASIN 3-29      Length(ft): 86.00
        Group: BASE                  To Node: MH S-335                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.50
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): 115.600        115.500                        Bend Loss Coef: 0.70
  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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-336 TO S-335

----------------------------------------------------------------------------------------------------
         Name: SUBBASIN 3-30       From Node: SUBBASIN 3-30      Length(ft): 15.00
        Group: BASE                  To Node: MH S-337                Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.50
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): 115.300        114.700                        Bend Loss Coef: 0.70
  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 dc
 Bot Clip(in): 0.000          0.000                       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

PIPE FROM S-338 TO S-337

==========================================================================================
==== Channels ============================================================================
==========================================================================================

          Name: DITCH TO CANAL      From Node: SMF 3 OUTFALL      Length(ft): 780.00
         Group: BASE                  To Node: TAILWATER PCDC          Count: 1

                UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
      Geometry: Trapezoidal    Trapezoidal               Solution Algorithm: Automatic
    Invert(ft): 111.200        110.400                                 Flow: Both
 TClpInitZ(ft): 9999.000       9999.000                    Contraction Coef: 0.100
   Manning's N: 0.450000       0.450000                      Expansion Coef: 0.300
  Top Clip(ft): 0.000          0.000                     Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000          0.000                         Exit Loss Coef: 0.000
     Main XSec:                                            Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft):                                             Inlet Ctrl Spec: Use dc
     Aux XSec1:                                           Stabilizer Option: None
  AuxElev2(ft):
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft): 5.000          5.000
  LtSdSlp(h/v): 3.00           3.00
  RtSdSlp(h/v): 3.00           3.00



----------------------------------------------------------------------------------------------------
          Name: DITCH TO SMF 3      From Node: DITCH TO SMF 3     Length(ft): 254.00
         Group: BASE                  To Node: SMF 3 OUTFALL           Count: 1

                UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
      Geometry: Trapezoidal    Trapezoidal               Solution Algorithm: Automatic
    Invert(ft): 111.700        111.200                                 Flow: Both
 TClpInitZ(ft): 9999.000       9999.000                    Contraction Coef: 0.100
   Manning's N: 0.450000       0.450000                      Expansion Coef: 0.300
  Top Clip(ft): 0.000          0.000                     Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000          0.000                         Exit Loss Coef: 0.000
     Main XSec:                                            Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft):                                             Inlet Ctrl Spec: Use dc
     Aux XSec1:                                           Stabilizer Option: None
  AuxElev2(ft):
```

```
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft): 5.000         5.000
  LtSdSlp(h/v): 2.00          2.00
  RtSdSlp(h/v): 2.00          2.00

PROPOSED DITCH TO CANAL

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name: DITCH 1-02          From Node: DITCH 1-02         Length(ft): 135.00
        Group: BASE                  To Node: TAILWATER PCDC          Count: 1

               UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
     Geometry: Circular       Circular                   Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                    Flow: Both
     Rise(in): 18.00          18.00                      Entrance Loss Coef: 0.500
   Invert(ft): 109.000        108.500                        Exit Loss Coef: 1.000
  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 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 2 for Drop Structure DITCH 1-02 ***
                                                                                  TABLE
                  Count: 1                       Bottom Clip(in): 0.000
                   Type: Horizontal                 Top Clip(in): 0.000
                   Flow: Both                     Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 49.00                        Invert(ft): 113.000
               Rise(in): 37.00                  Control Elev(ft): 113.000

*** Weir 2 of 2 for Drop Structure DITCH 1-02 ***
                                                                                  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): 6.00                         Invert(ft): 111.600
               Rise(in): 9999.00                Control Elev(ft): 111.600


----------------------------------------------------------------------------------------------------
         Name: DITCH 2-01          From Node: DITCH 2-01         Length(ft): 35.00
        Group: BASE                  To Node: TAILWATER PCDC          Count: 1

               UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
     Geometry: Circular       Circular                   Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                    Flow: Both
     Rise(in): 18.00          18.00                      Entrance Loss Coef: 0.500
   Invert(ft): 107.000        106.500                        Exit Loss Coef: 1.000
  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 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 2 for Drop Structure DITCH 2-01 ***
                                                                                  TABLE
                  Count: 1                       Bottom Clip(in): 0.000
                   Type: Horizontal                 Top Clip(in): 0.000
                   Flow: Both                     Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 49.00                        Invert(ft): 113.000
               Rise(in): 37.00                  Control Elev(ft): 113.000

*** Weir 2 of 2 for Drop Structure DITCH 2-01 ***
                                                                                  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): 6.00                         Invert(ft): 112.100
               Rise(in): 9999.00                Control Elev(ft): 112.100


----------------------------------------------------------------------------------------------------
         Name: SMF 1 OUTFALL       From Node: SMF 1              Length(ft): 147.00
        Group: BASE                  To Node: TAILWATER PCDC          Count: 1

               UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
     Geometry: Circular       Circular                   Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                    Flow: Both
     Rise(in): 18.00          18.00                      Entrance Loss Coef: 0.000
   Invert(ft): 108.500        108.000                        Exit Loss Coef: 1.000
  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 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 2 for Drop Structure SMF 1 OUTFALL ***
                                                                                  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): 3.00                         Invert(ft): 110.400
               Rise(in): 9999.00                Control Elev(ft): 110.400

*** Weir 2 of 2 for Drop Structure SMF 1 OUTFALL ***
                                                                                  TABLE
                  Count: 1                       Bottom Clip(in): 0.000
                   Type: Vertical: Mavis            Top Clip(in): 0.000
                   Flow: Both                     Weir Disc Coef: 3.200
               Geometry: Circular              Orifice Disc Coef: 0.600

               Span(in): 2.88                         Invert(ft): 110.000
               Rise(in): 2.88                   Control Elev(ft): 110.000


----------------------------------------------------------------------------------------------------
         Name: SMF 3 OUTFALL       From Node: SMF 3              Length(ft): 45.00
        Group: BASE                  To Node: SMF 3 OUTFALL           Count: 1

               UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
     Geometry: Circular       Circular                   Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                    Flow: Both
     Rise(in): 18.00          18.00                      Entrance Loss Coef: 0.500
   Invert(ft): 111.400        111.200                        Exit Loss Coef: 1.000
  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 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 2 for Drop Structure SMF 3 OUTFALL ***
                                                                                  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): 9.00                         Invert(ft): 115.000
               Rise(in): 9999.00                Control Elev(ft): 115.000

*** Weir 2 of 2 for Drop Structure SMF 3 OUTFALL ***
                                                                                  TABLE
                  Count: 1                       Bottom Clip(in): 0.000
                   Type: Vertical: Mavis            Top Clip(in): 0.000
                   Flow: Both                     Weir Disc Coef: 3.200
               Geometry: Circular              Orifice Disc Coef: 0.600

               Span(in): 2.13                         Invert(ft): 114.700
               Rise(in): 2.13                   Control Elev(ft): 114.700
```

```
==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: OFFSITE 3-01        From Node: OFFSITE 3-01
        Group: BASE                  To Node: DITCH 3-01
         Flow: Both                    Count: 1
         Type: Vertical: Mavis      Geometry: Irregular

                        XSec: OFFSITE 3-01
                 Invert(ft): 115.500
       Control Elevation(ft): 115.500
      Struct Opening Dim(ft): 9999.00
                                             TABLE
             Bottom Clip(ft): 0.000
                Top Clip(ft): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: FDOT 100YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 100YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 10.08

Time(hrs)       Print Inc(min)
--------------- ---------------
100.000         5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 10YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 10YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 7.44

Time(hrs)       Print Inc(min)
--------------- ---------------
100.000         5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 2YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 2YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 4.80

Time(hrs)       Print Inc(min)
--------------- ---------------
100.000         5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 50YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 50YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 9.84

Time(hrs)       Print Inc(min)
--------------- ---------------
100.000         5.00

----------------------------------------------------------------------------------------------------
         Name: FDOT 5YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 5YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 6.24

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
100.000         5.00

----------------------------------------------------------------------------------------------------
         Name: FLMOD 25YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FLMOD 25YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 6.80

Time(hrs)       Print Inc(min)
--------------- ---------------
100.000         5.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: FDOT 100YR-24HR     Hydrology Sim: FDOT 100YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 100YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: FDOT 10YR-24HR      Hydrology Sim: FDOT 10YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 10YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: FDOT 2YR-24HR       Hydrology Sim: FDOT 2YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 2YR-24HR.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes
```

```
----------------------------------------------------------------------------------------------------
         Name: FDOT 50YR-24HR      Hydrology Sim: FDOT 50YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 50YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: FDOT 5YR-24HR       Hydrology Sim: FDOT 5YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FDOT 5YR-24HR.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: FLMOD 25YR-24HR     Hydrology Sim: FLMOD 25YR-24HR
     Filename: H:\47100\43655913201\drainage\ICPR\Proposed Model\FLMOD 25YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                     Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 50.00
     Min Calc Time(sec): 0.0100               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
50.000          5.000

Group           Run
--------------- -----
BASE            Yes
```

```
                                             Max Time       Max    Warning Max Delta  Max Surf  Max Time       Max  Max Time       Max
         Name           Group     Simulation    Stage     Stage      Stage     Stage      Area    Inflow    Inflow   Outflow   Outflow
                                                  hrs        ft         ft        ft       ft2       hrs       cfs       hrs       cfs

     DITCH 1-01          BASEFDOT 100YR-24HR    12.13    112.59     114.00    0.0008      4823     12.00      1.14     12.20      1.04
     DITCH 1-02          BASEFDOT 100YR-24HR    12.12    112.55     114.00    0.0010      1316     12.00      1.50     12.12      1.49
     DITCH 2-01          BASEFDOT 100YR-24HR    12.03    113.09     113.70    0.0009      2906     12.00      2.79     12.03      2.78
     DITCH 2-02          BASEFDOT 100YR-24HR    12.07    113.36     116.80    0.0007      3167     12.00      2.15     12.06      2.12
     DITCH 2-03          BASEFDOT 100YR-24HR    12.02    113.55     116.00    0.0005       546     12.00      1.40     12.02      1.40
     DITCH 2-04          BASEFDOT 100YR-24HR    12.02    113.74     114.50    0.0010      1624     12.00      1.15     12.01      1.14
     DITCH 3-01          BASEFDOT 100YR-24HR    19.14    115.56     115.50    0.0002     47321     15.23     12.33     24.52     10.20
     DITCH 3-02          BASEFDOT 100YR-24HR    21.52    120.42     119.76   -0.0002     17625     17.92     10.08     21.89      9.69
     DITCH 3-03          BASEFDOT 100YR-24HR    19.29    117.06     119.50    0.0001      3318     16.00      2.24     15.32      2.21
 DITCH TO SMF 3          BASEFDOT 100YR-24HR    16.80    115.26     115.00    0.0007      2560     24.00     10.25     24.06     10.24
       MH S-301          BASEFDOT 100YR-24HR    17.54    115.36     116.60    0.0010       224     25.29     10.67     24.00     10.25
       MH S-329          BASEFDOT 100YR-24HR    19.20    116.64     119.00    0.0017       625      0.00     20.96     19.18     12.15
       MH S-335          BASEFDOT 100YR-24HR    21.03    117.37     124.20    0.0004       198     21.25      9.81     21.25     10.04
       MH S-337          BASEFDOT 100YR-24HR    20.79    116.98     119.60    0.0010       304     19.61     11.97     25.36     12.21
   OFFSITE 3-01          BASEFDOT 100YR-24HR    27.17    114.38     113.28    0.0001    444187     12.08     19.13      0.00      0.00
          SMF 1          BASEFDOT 100YR-24HR    19.15    113.20     113.50    0.0003     77207     12.00     11.01     19.15      4.13
          SMF 3          BASEFDOT 100YR-24HR    16.10    116.48     118.40    0.0002     90967     12.00      8.84     16.09      4.46
  SMF 3 OUTFALL          BASEFDOT 100YR-24HR    16.47    114.79     116.00    0.0006     11148     16.03     14.44     16.47     14.42
  SUBBASIN 3-01          BASEFDOT 100YR-24HR    17.54    115.36     115.66    0.0010       115     12.00      0.12     11.50      0.40
  SUBBASIN 3-04          BASEFDOT 100YR-24HR    17.54    115.36     116.53    0.0007       123     15.12      0.37     11.50      0.42
  SUBBASIN 3-06          BASEFDOT 100YR-24HR    17.54    115.36     117.57   -0.0004       120     12.00      0.11     15.12      0.29
  SUBBASIN 3-25          BASEFDOT 100YR-24HR    12.00    121.90     125.74    0.0005       142     12.00      0.17     11.92      0.17
  SUBBASIN 3-26          BASEFDOT 100YR-24HR    11.98    121.75     125.50    0.0007       189     12.00      0.25     11.98      0.25
 SUBBASIN 3-26A          BASEFDOT 100YR-24HR    21.03    117.37     123.41    0.0005       115     12.00      0.08     13.84      0.29
  SUBBASIN 3-27          BASEFDOT 100YR-24HR     0.00    121.20     125.10   -0.0018       117     12.00      0.52      0.00     20.96
  SUBBASIN 3-28          BASEFDOT 100YR-24HR    21.00    117.13     121.31    0.0008       198     21.08     10.13     21.10     10.13
  SUBBASIN 3-29          BASEFDOT 100YR-24HR    21.08    117.58     120.30    0.0004      6798     21.00     10.01     21.25     10.01
  SUBBASIN 3-30          BASEFDOT 100YR-24HR    20.90    117.07     120.55   -0.0010       149     21.08     10.16     25.79     10.19
 TAILWATER PCDC          BASEFDOT 100YR-24HR     0.00    107.43     107.43    0.0000        98     16.00     22.54      0.00      0.00
     DITCH 1-01          BASE FDOT 10YR-24HR    12.12    112.41     114.00    0.0009      3742     12.00      0.82     12.17      0.76
     DITCH 1-02          BASE FDOT 10YR-24HR    12.11    112.37     114.00    0.0010      1151     12.00      1.10     12.11      1.08
     DITCH 2-01          BASE FDOT 10YR-24HR    12.04    113.05     113.70    0.0009      2829     12.00      1.99     12.04      1.98
     DITCH 2-02          BASE FDOT 10YR-24HR    12.07    113.23     116.80    0.0008      2843     12.00      1.53     12.06      1.51
     DITCH 2-03          BASE FDOT 10YR-24HR    12.02    113.43     116.00    0.0005       505     12.00      0.99     12.03      0.99
     DITCH 2-04          BASE FDOT 10YR-24HR    12.02    113.63     114.50    0.0010      1354     12.00      0.81     12.02      0.80
     DITCH 3-01          BASE FDOT 10YR-24HR    20.71    115.16     115.50    0.0002     44033     19.05      8.24     21.22      8.03
     DITCH 3-02          BASE FDOT 10YR-24HR    20.53    118.10     119.76    0.0001      5449     20.33      5.64     20.46      5.64
     DITCH 3-03          BASE FDOT 10YR-24HR    16.35    116.70     119.50    0.0001      1683     16.25      1.38     16.35      1.38
 DITCH TO SMF 3          BASE FDOT 10YR-24HR    20.60    114.90     115.00   -0.0007      2379     20.98      8.15     21.01      8.12
       MH S-301          BASE FDOT 10YR-24HR    20.64    114.97     116.60    0.0010       232     20.98      7.69     20.98      8.15
       MH S-329          BASE FDOT 10YR-24HR    19.09    116.13     119.00    0.0017       777      0.00     20.96     19.09      7.45
       MH S-335          BASE FDOT 10YR-24HR    19.14    116.88     124.20    0.0003       296     20.79      5.76     20.79      5.93
       MH S-337          BASE FDOT 10YR-24HR    19.10    116.32     119.60    0.0010       409     19.10      7.30     19.13      7.30
   OFFSITE 3-01          BASE FDOT 10YR-24HR    27.17    113.65     113.28    0.0000    379117     12.08     13.24      0.00      0.00
          SMF 1          BASE FDOT 10YR-24HR    19.27    112.53     113.50    0.0003     74523     12.00      8.02     19.27      2.82
          SMF 3          BASE FDOT 10YR-24HR    16.23    116.15     118.40    0.0002     89576     12.00      6.48     16.23      3.08
  SMF 3 OUTFALL          BASE FDOT 10YR-24HR    19.99    114.42     116.00    0.0007     10267     19.58     10.92     19.99     10.92
  SUBBASIN 3-01          BASE FDOT 10YR-24HR    20.64    114.97     115.66   -0.0010       115     12.00      0.09     37.57      0.23
  SUBBASIN 3-04          BASE FDOT 10YR-24HR    20.64    114.97     116.53   -0.0006       148     19.00      0.27     11.98      0.17
  SUBBASIN 3-06          BASE FDOT 10YR-24HR    20.64    114.97     117.57   -0.0003       197     12.00      0.08     20.85      0.23
  SUBBASIN 3-25          BASE FDOT 10YR-24HR    12.00    121.87     125.74    0.0005       140     12.00      0.13     11.91      0.13
  SUBBASIN 3-26          BASE FDOT 10YR-24HR    11.96    121.71     125.50    0.0007       184     12.00      0.19     11.96      0.19
 SUBBASIN 3-26A          BASE FDOT 10YR-24HR    19.14    116.88     123.41    0.0004       138     12.00      0.06     11.95      0.05
  SUBBASIN 3-27          BASE FDOT 10YR-24HR     0.00    121.20     125.10   -0.0018       117     12.00      0.38      0.00     20.96
  SUBBASIN 3-28          BASE FDOT 10YR-24HR    19.11    116.74     121.31    0.0008       236     20.79      6.01     20.81      6.01
  SUBBASIN 3-29          BASE FDOT 10YR-24HR    20.69    117.00     120.30    0.0004      6697     20.46      5.91     20.78      5.91
  SUBBASIN 3-30          BASE FDOT 10YR-24HR    19.11    116.71     120.55   -0.0010       167     20.81      6.03     20.81      6.03
 TAILWATER PCDC          BASE FDOT 10YR-24HR     0.00    107.43     107.43    0.0000        98     19.00     16.06      0.00      0.00
     DITCH 1-01          BASE  FDOT 2YR-24HR    12.11    112.21     114.00    0.0008      2516     12.00      0.50     12.11      0.47
     DITCH 1-02          BASE  FDOT 2YR-24HR    12.10    112.16     114.00    0.0007       955     12.00      0.68     12.10      0.67
     DITCH 2-01          BASE  FDOT 2YR-24HR    12.20    112.89     113.70    0.0007      2524     12.00      1.18     12.20      1.13
     DITCH 2-02          BASE  FDOT 2YR-24HR    12.09    113.07     116.80    0.0007      2455     12.00      0.91     12.07      0.89
```

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
DITCH 2-03	BASE	FDOT 2YR-24HR	12.04	113.31	116.00	0.0005	472	12.00	0.58	12.04	0.58
DITCH 2-04	BASE	FDOT 2YR-24HR	12.02	113.49	114.50	0.0009	1038	12.00	0.47	12.02	0.46
DITCH 3-01	BASE	FDOT 2YR-24HR	21.46	114.60	115.50	0.0002	39411	20.80	3.31	21.40	3.24
DITCH 3-02	BASE	FDOT 2YR-24HR	21.62	117.45	119.76	-0.0001	3074	21.42	2.04	21.51	2.04
DITCH 3-03	BASE	FDOT 2YR-24HR	16.89	116.48	119.50	0.0001	878	16.92	0.61	16.89	0.61
DITCH TO SMF 3	BASE	FDOT 2YR-24HR	21.38	113.88	115.00	0.0006	1889	21.30	3.32	21.59	3.29
MH S-301	BASE	FDOT 2YR-24HR	21.38	113.90	116.60	-0.0010	471	21.08	2.82	21.30	3.32
MH S-329	BASE	FDOT 2YR-24HR	21.05	115.48	119.00	0.0017	786	0.00	20.96	21.05	2.90
MH S-335	BASE	FDOT 2YR-24HR	21.12	116.24	124.20	0.0005	318	21.13	2.25	21.15	2.20
MH S-337	BASE	FDOT 2YR-24HR	21.05	115.61	119.60	0.0009	458	21.03	2.83	21.05	2.83
OFFSITE 3-01	BASE	FDOT 2YR-24HR	27.17	113.08	113.28	0.0000	328077	12.17	7.36	0.00	0.00
SMF 1	BASE	FDOT 2YR-24HR	22.19	112.25	113.50	0.0004	73413	12.00	5.01	22.19	0.84
SMF 3	BASE	FDOT 2YR-24HR	16.89	115.77	118.40	0.0003	88026	12.00	4.10	16.89	1.74
SMF 3 OUTFALL	BASE	FDOT 2YR-24HR	21.31	113.54	116.00	0.0007	8151	21.06	4.92	21.31	4.91
SUBBASIN 3-01	BASE	FDOT 2YR-24HR	21.38	113.90	115.66	-0.0010	115	12.00	0.06	35.41	0.18
SUBBASIN 3-04	BASE	FDOT 2YR-24HR	21.38	113.90	116.53	0.0003	246	12.00	0.12	11.61	0.11
SUBBASIN 3-06	BASE	FDOT 2YR-24HR	21.08	113.91	117.57	0.0002	191	12.00	0.05	11.97	0.05
SUBBASIN 3-25	BASE	FDOT 2YR-24HR	12.00	121.84	125.74	0.0004	137	12.00	0.08	11.91	0.08
SUBBASIN 3-26	BASE	FDOT 2YR-24HR	11.95	121.67	125.50	0.0005	178	12.00	0.12	11.95	0.12
SUBBASIN 3-26A	BASE	FDOT 2YR-24HR	21.12	116.24	123.41	0.0003	149	12.00	0.04	21.00	0.06
SUBBASIN 3-27	BASE	FDOT 2YR-24HR	0.00	121.20	125.10	-0.0018	117	12.00	0.25	0.00	20.96
SUBBASIN 3-28	BASE	FDOT 2YR-24HR	21.08	116.11	121.31	0.0006	239	21.08	2.25	21.07	2.25
SUBBASIN 3-29	BASE	FDOT 2YR-24HR	21.13	116.35	120.30	0.0004	6373	21.00	2.21	21.16	2.19
SUBBASIN 3-30	BASE	FDOT 2YR-24HR	21.09	116.03	120.55	0.0010	168	21.07	2.27	21.09	2.27
TAILWATER PCDC	BASE	FDOT 2YR-24HR	0.00	107.43	107.43	0.0000	98	19.08	6.95	0.00	0.00
DITCH 1-01	BASE	FDOT 50YR-24HR	12.13	112.57	114.00	0.0008	4730	12.00	1.11	12.20	1.01
DITCH 1-02	BASE	FDOT 50YR-24HR	12.12	112.54	114.00	0.0010	1302	12.00	1.47	12.12	1.45
DITCH 2-01	BASE	FDOT 50YR-24HR	12.03	113.09	113.70	0.0009	2899	12.00	2.71	12.03	2.71
DITCH 2-02	BASE	FDOT 50YR-24HR	12.07	113.35	116.80	0.0007	3139	12.00	2.09	12.05	2.07
DITCH 2-03	BASE	FDOT 50YR-24HR	12.02	113.54	116.00	0.0005	541	12.00	1.36	12.02	1.36
DITCH 2-04	BASE	FDOT 50YR-24HR	12.02	113.73	114.50	0.0010	1600	12.00	1.12	12.01	1.11
DITCH 3-01	BASE	FDOT 50YR-24HR	19.14	115.55	115.50	0.0002	47290	15.53	12.07	24.34	10.17
DITCH 3-02	BASE	FDOT 50YR-24HR	21.38	120.15	119.76	-0.0001	16086	19.42	9.64	21.59	9.34
DITCH 3-03	BASE	FDOT 50YR-24HR	19.21	116.99	119.50	0.0001	2838	16.00	2.16	15.85	2.16
DITCH TO SMF 3	BASE	FDOT 50YR-24HR	17.19	115.25	115.00	0.0006	2556	24.00	10.23	24.01	10.22
MH S-301	BASE	FDOT 50YR-24HR	18.45	115.35	116.60	0.0010	224	24.80	10.55	24.00	10.23
MH S-329	BASE	FDOT 50YR-24HR	19.15	116.59	119.00	0.0017	649	0.00	20.96	19.15	11.81
MH S-335	BASE	FDOT 50YR-24HR	21.06	117.30	124.20	0.0004	219	21.12	9.47	21.13	9.69
MH S-337	BASE	FDOT 50YR-24HR	19.16	116.91	119.60	0.0010	321	14.07	11.83	24.86	12.26
OFFSITE 3-01	BASE	FDOT 50YR-24HR	27.17	114.29	113.28	0.0001	436816	12.08	18.60	0.00	0.00
SMF 1	BASE	FDOT 50YR-24HR	19.16	113.14	113.50	0.0003	76973	12.00	10.74	19.16	4.01
SMF 3	BASE	FDOT 50YR-24HR	16.10	116.45	118.40	0.0002	90844	12.00	8.63	16.08	4.34
SMF 3 OUTFALL	BASE	FDOT 50YR-24HR	16.63	114.78	116.00	0.0006	11119	16.08	14.33	16.63	14.29
SUBBASIN 3-01	BASE	FDOT 50YR-24HR	18.45	115.35	115.66	-0.0010	115	12.00	0.12	34.92	0.38
SUBBASIN 3-04	BASE	FDOT 50YR-24HR	18.45	115.35	116.53	0.0007	123	15.30	0.36	29.93	0.38
SUBBASIN 3-06	BASE	FDOT 50YR-24HR	18.45	115.36	117.57	-0.0004	120	12.00	0.11	15.30	0.29
SUBBASIN 3-25	BASE	FDOT 50YR-24HR	12.00	121.90	125.74	0.0005	141	12.00	0.17	11.90	0.17
SUBBASIN 3-26	BASE	FDOT 50YR-24HR	12.00	121.74	125.50	0.0008	188	12.00	0.25	12.00	0.25
SUBBASIN 3-26A	BASE	FDOT 50YR-24HR	21.06	117.30	123.41	0.0005	115	12.00	0.08	13.52	0.31
SUBBASIN 3-27	BASE	FDOT 50YR-24HR	0.00	121.20	125.10	-0.0018	117	12.00	0.50	0.00	20.96
SUBBASIN 3-28	BASE	FDOT 50YR-24HR	21.05	117.07	121.31	0.0008	210	21.02	9.79	21.00	9.79
SUBBASIN 3-29	BASE	FDOT 50YR-24HR	21.08	117.50	120.30	0.0004	6772	21.00	9.68	21.14	9.66
SUBBASIN 3-30	BASE	FDOT 50YR-24HR	19.16	116.99	120.55	-0.0010	160	21.00	9.82	25.31	10.18
TAILWATER PCDC	BASE	FDOT 50YR-24HR	0.00	107.43	107.43	0.0000	98	16.04	22.12	0.00	0.00
DITCH 1-01	BASE	FDOT 5YR-24HR	12.12	112.32	114.00	0.0008	3205	12.00	0.68	12.15	0.63
DITCH 1-02	BASE	FDOT 5YR-24HR	12.11	112.28	114.00	0.0008	1067	12.00	0.91	12.11	0.90
DITCH 2-01	BASE	FDOT 5YR-24HR	12.06	113.03	113.70	0.0008	2783	12.00	1.62	12.06	1.62
DITCH 2-02	BASE	FDOT 5YR-24HR	12.08	113.17	116.80	0.0007	2678	12.00	1.25	12.07	1.23
DITCH 2-03	BASE	FDOT 5YR-24HR	12.01	113.38	116.00	0.0004	491	12.00	0.80	12.03	0.80
DITCH 2-04	BASE	FDOT 5YR-24HR	12.02	113.57	114.50	0.0010	1219	12.00	0.65	12.02	0.65
DITCH 3-01	BASE	FDOT 5YR-24HR	20.74	114.89	115.50	0.0002	41867	19.10	5.85	20.58	5.75
DITCH 3-02	BASE	FDOT 5YR-24HR	20.86	117.79	119.76	0.0001	4357	20.58	3.88	20.72	3.87

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
DITCH 3-03	BASE	FDOT 5YR-24HR	16.65	116.60	119.50	0.0001	1316	16.50	1.01	16.48	1.01
DITCH TO SMF 3	BASE	FDOT 5YR-24HR	20.49	114.49	115.00	-0.0007	2177	20.94	5.84	20.94	5.82
MH S-301	BASE	FDOT 5YR-24HR	20.50	114.53	116.60	-0.0010	481	20.94	5.45	20.94	5.84
MH S-329	BASE	FDOT 5YR-24HR	19.14	115.83	119.00	0.0017	805	0.00	20.96	19.14	5.20
MH S-335	BASE	FDOT 5YR-24HR	21.01	116.56	124.20	0.0004	321	21.06	4.00	21.06	4.11
MH S-337	BASE	FDOT 5YR-24HR	20.75	115.99	119.60	0.0008	473	20.59	5.09	20.61	5.09
OFFSITE 3-01	BASE	FDOT 5YR-24HR	27.17	113.40	113.28	0.0000	356498	12.17	10.56	0.00	0.00
SMF 1	BASE	FDOT 5YR-24HR	21.62	112.74	113.50	0.0003	75363	12.00	6.66	21.62	1.46
SMF 3	BASE	FDOT 5YR-24HR	16.37	115.98	118.40	0.0003	88895	12.00	5.40	16.37	2.46
SMF 3 OUTFALL	BASE	FDOT 5YR-24HR	20.08	114.07	116.00	0.0007	9411	19.63	8.13	20.08	8.12
SUBBASIN 3-01	BASE	FDOT 5YR-24HR	20.50	114.53	115.66	-0.0010	115	12.00	0.07	36.35	0.23
SUBBASIN 3-04	BASE	FDOT 5YR-24HR	20.50	114.53	116.53	-0.0005	154	19.00	0.19	24.78	0.16
SUBBASIN 3-06	BASE	FDOT 5YR-24HR	20.50	114.53	117.57	0.0003	214	12.00	0.07	19.09	0.15
SUBBASIN 3-25	BASE	FDOT 5YR-24HR	11.99	121.86	125.74	0.0005	139	12.00	0.11	11.99	0.11
SUBBASIN 3-26	BASE	FDOT 5YR-24HR	12.00	121.69	125.50	0.0006	181	12.00	0.16	11.92	0.16
SUBBASIN 3-26A	BASE	FDOT 5YR-24HR	21.01	116.56	123.41	0.0003	148	12.00	0.05	11.88	0.05
SUBBASIN 3-27	BASE	FDOT 5YR-24HR	0.00	121.20	125.10	-0.0018	117	12.00	0.32	0.00	20.96
SUBBASIN 3-28	BASE	FDOT 5YR-24HR	21.00	116.41	121.31	0.0007	245	21.00	4.18	21.01	4.18
SUBBASIN 3-29	BASE	FDOT 5YR-24HR	21.03	116.68	120.30	0.0003	6558	20.92	4.10	21.06	4.09
SUBBASIN 3-30	BASE	FDOT 5YR-24HR	21.00	116.39	120.55	-0.0010	172	21.00	4.19	21.01	4.19
TAILWATER PCDC	BASE	FDOT 5YR-24HR	0.00	107.43	107.43	0.0000	98	19.08	11.38	0.00	0.00
DITCH 1-01	BASEFLMOD	25YR-24HR	12.36	113.16	114.00	0.0007	7584	12.00	4.27	12.38	2.70
DITCH 1-02	BASEFLMOD	25YR-24HR	12.33	113.08	114.00	0.0007	1789	12.31	3.89	12.33	3.89
DITCH 2-01	BASEFLMOD	25YR-24HR	12.23	113.23	113.70	0.0006	3169	12.21	6.94	12.23	6.93
DITCH 2-02	BASEFLMOD	25YR-24HR	12.37	114.08	116.80	0.0008	4884	12.08	6.28	12.35	5.12
DITCH 2-03	BASEFLMOD	25YR-24HR	12.34	114.22	116.00	0.0006	799	12.08	3.70	12.13	3.50
DITCH 2-04	BASEFLMOD	25YR-24HR	12.34	114.36	114.50	0.0009	6668	12.00	4.13	12.18	2.79
DITCH 3-01	BASEFLMOD	25YR-24HR	16.77	115.23	115.50	0.0002	44626	15.14	9.37	16.77	8.32
DITCH 3-02	BASEFLMOD	25YR-24HR	15.30	118.17	119.76	0.0002	5670	15.00	6.08	15.26	6.03
DITCH 3-03	BASEFLMOD	25YR-24HR	13.89	116.86	119.50	0.0002	2342	13.75	2.15	13.87	2.14
DITCH TO SMF 3	BASEFLMOD	25YR-24HR	16.77	114.97	115.00	-0.0006	2416	16.78	8.42	16.88	8.39
MH S-301	BASEFLMOD	25YR-24HR	16.77	115.05	116.60	-0.0010	232	16.77	7.95	16.78	8.42
MH S-329	BASEFLMOD	25YR-24HR	15.44	116.21	119.00	0.0017	765	0.00	20.96	15.45	8.09
MH S-335	BASEFLMOD	25YR-24HR	15.60	116.95	124.20	0.0006	284	15.66	6.07	15.67	6.26
MH S-337	BASEFLMOD	25YR-24HR	15.48	116.40	119.60	0.0010	402	15.41	7.98	15.42	7.98
OFFSITE 3-01	BASEFLMOD	25YR-24HR	27.17	113.52	113.28	0.0003	367176	12.25	43.98	0.00	0.00
SMF 1	BASEFLMOD	25YR-24HR	14.38	112.62	113.50	0.0007	74886	12.08	40.28	14.38	2.99
SMF 3	BASEFLMOD	25YR-24HR	13.52	116.38	118.40	0.0004	90553	12.08	29.95	13.52	4.05
SMF 3 OUTFALL	BASEFLMOD	25YR-24HR	16.62	114.51	116.00	0.0007	10466	16.29	11.69	16.62	11.66
SUBBASIN 3-01	BASEFLMOD	25YR-24HR	16.77	115.05	115.66	0.0010	115	12.00	0.47	12.02	0.44
SUBBASIN 3-04	BASEFLMOD	25YR-24HR	16.77	115.05	116.53	-0.0007	146	12.04	0.98	12.00	1.40
SUBBASIN 3-06	BASEFLMOD	25YR-24HR	16.77	115.05	117.57	0.0003	189	12.00	0.44	12.04	0.43
SUBBASIN 3-25	BASEFLMOD	25YR-24HR	12.03	122.11	125.74	0.0003	150	12.00	0.68	12.02	0.67
SUBBASIN 3-26	BASEFLMOD	25YR-24HR	12.05	122.00	125.50	0.0004	211	12.02	0.99	12.05	0.99
SUBBASIN 3-26A	BASEFLMOD	25YR-24HR	15.60	116.95	123.41	0.0006	133	12.00	0.32	12.08	0.26
SUBBASIN 3-27	BASEFLMOD	25YR-24HR	0.00	121.20	125.10	-0.0018	117	12.04	2.01	0.00	20.96
SUBBASIN 3-28	BASEFLMOD	25YR-24HR	15.58	116.82	121.31	0.0006	232	15.63	6.33	15.65	6.33
SUBBASIN 3-29	BASEFLMOD	25YR-24HR	15.61	117.07	120.30	0.0006	6720	15.26	6.29	15.65	6.23
SUBBASIN 3-30	BASEFLMOD	25YR-24HR	15.57	116.79	120.55	-0.0010	164	15.64	6.34	15.65	6.35
TAILWATER PCDC	BASEFLMOD	25YR-24HR	0.00	107.43	107.43	0.0000	98	12.20	25.84	0.00	0.00

10.5 Orifice Drawdown Calculations

VERTICAL
ORIFICE
DRAWDOWN

Project: **SR 60 over CSX**
FPID No.: **436559-1-52-01**
FDA No.: **471.00**

Designed By: **S. Curran** **Date:** **8/15/16**
Checked By: **J. Hernandez** **Date:** **8/15/16**

Pond 1

Orifice Discharge = Coef*Area*(2g*head)^.5
Orifice Area: 0.02 ft.
Orifice Diameter: 2.00 inches
Number of Orifices: 1
Orifice Coefficient 0.60

DCIA = 10.390 acres
Reqd. Treatment Depth = 4.800 inches
Treatment Volume = 181,035 cf
Required Storage = - cf
Total Required Volume = 181,035 cf

Orifice Discharge: **0.07 cfs.**

Pond Stage	Pond Stage ft.	Pond Area sf	Increament. Time hr	Cumulative Time hr	Max Head value	Incremental Q value	Increament. Volume cf	Cumulative Volume cf
Control / SHW Elev.	110.00	64,364	18.745	**191.25**	-	-	-	-
	110.01	64,411	13.264	172.50	0.01	0.01	780	780
	110.02	64,457	10.838	159.24	0.02	0.02	781	1,561
	110.04	64,504	9.393	148.40	0.04	0.02	782	2,343
	110.05	64,551	8.407	139.01	0.05	0.02	782	3,125
	110.06	64,598	7.681	130.60	0.06	0.03	783	3,908
	110.07	64,645	7.116	122.92	0.07	0.03	783	4,691
	110.08	64,692	6.661	115.80	0.08	0.03	784	5,475
	110.10	64,739	6.285	109.14	0.10	0.03	784	6,260
	110.11	64,786	5.967	102.86	0.11	0.03	785	7,045
	110.12	64,833	5.693	96.89	0.12	0.04	786	7,830
	110.13	64,880	5.455	91.20	0.13	0.04	786	8,616
	110.15	64,927	5.244	85.74	0.15	0.04	787	9,403
	110.16	64,974	5.057	80.50	0.16	0.04	787	10,190
	110.17	65,021	4.889	75.44	0.17	0.04	788	10,978
	110.18	65,068	4.738	70.55	0.18	0.04	788	11,766
	110.19	65,116	4.599	65.81	0.19	0.05	789	12,555
Need 110.20 in 60 hrs	110.21	65,163	4.473	61.21	0.21	0.05	790	13,345
	110.22	65,210	4.357	56.74	0.22	0.05	790	14,135
	110.23	65,257	4.250	52.38	0.23	0.05	791	14,926
	110.24	65,304	4.150	48.13	0.24	0.05	791	15,717
	110.25	65,351	4.058	43.98	0.25	0.05	792	16,509
	110.27	65,399	3.971	39.93	0.27	0.05	792	17,301
36 hour drawdown= 36.36 ft	110.28	65,446	3.891	35.95	0.28	0.06	793	18,094
	110.29	65,493	3.815	32.06	0.29	0.06	794	18,888
	110.30	65,540	3.743	28.25	0.30	0.06	794	19,682
	110.32	65,588	3.676	24.50	0.32	0.06	795	20,477
	110.33	65,635	3.612	20.83	0.33	0.06	795	21,272
	110.34	65,682	3.552	17.22	0.34	0.06	796	22,068
	110.35	65,730	3.495	13.66	0.35	0.06	796	22,864
	110.36	65,777	3.441	10.17	0.36	0.06	797	23,661
	110.38	65,825	3.389	6.73	0.38	0.06	798	24,459
	110.39	65,872	3.340	3.34	0.39	0.07	798	25,257
Weir Elevation	110.40	65,919	-	-	0.40	0.07	799	26,056

VERTICAL ORIFICE DRAWDOWN

Project: **SR 60 over CSX**
FPID No.: **436559-1-52-01**
FDA No.: **471.00**

Designed By: **S. Curran** **Date:** **8/15/16**
Checked By: **J. Hernandez** **Date:** **8/15/16**

Pond 3

Orifice Discharge = Coef*Area*(2g*head)^.5
Orifice Area: 0.02 ft.
Orifice Diameter: 2.13 inches
Number of Orifices: 1
Orifice Coefficient 0.60

DCIA = 5.370 acres
Reqd. Treatment Depth = 3.600 inches
Treatment Volume = 70,175 cf
Required Storage = - cf
Total Required Volume = 70,175 cf

Orifice Discharge: **0.06** **cfs.**

Pond Stage	Pond Stage ft.	Pond Area sf	Increament. Time hr	Cumulative Time hr	Max Head value	Incremental Q value	Increament. Volume cf	Cumulative Volume cf
Control / SHW Elev.	114.70	83,417	18.634	**189.49**	-	-	-	-
	114.71	83,455	13.182	170.85	0.01	0.01	759	759
	114.72	83,492	10.768	157.67	0.02	0.02	759	1,517
	114.73	83,529	9.330	146.90	0.03	0.02	759	2,277
	114.74	83,566	8.348	137.57	0.04	0.02	760	3,036
	114.75	83,604	7.624	129.23	0.05	0.03	760	3,796
	114.75	83,641	7.062	121.60	0.05	0.03	760	4,556
	114.76	83,678	6.609	114.54	0.06	0.03	761	5,317
	114.77	83,715	6.234	107.93	0.07	0.03	761	6,078
	114.78	83,753	5.916	101.70	0.08	0.03	761	6,839
	114.79	83,790	5.644	95.78	0.09	0.04	762	7,600
	114.80	83,827	5.406	90.14	0.10	0.04	762	8,362
	114.81	83,865	5.196	84.73	0.11	0.04	762	9,124
	114.82	83,902	5.009	79.54	0.12	0.04	763	9,887
	114.83	83,939	4.841	74.53	0.13	0.04	763	10,650
	114.84	83,977	4.690	69.68	0.14	0.04	763	11,413
	114.85	84,014	4.552	64.99	0.15	0.05	764	12,177
Need 114.85 in 60 hrs	114.85	84,051	4.426	60.44	0.15	0.05	764	12,941
	114.86	84,089	4.309	56.02	0.16	0.05	764	13,705
	114.87	84,126	4.202	51.71	0.17	0.05	765	14,470
	114.88	84,164	4.103	47.51	0.18	0.05	765	15,235
	114.89	84,201	4.010	43.40	0.19	0.05	765	16,000
	114.90	84,238	3.924	39.39	0.20	0.05	766	16,766
	114.91	84,276	3.843	35.47	0.21	0.05	766	17,531
36 hour drawdown = 38.73'	114.92	84,313	3.767	31.63	0.22	0.06	766	18,298
	114.93	84,351	3.695	27.86	0.23	0.06	767	19,064
	114.94	84,388	3.628	24.16	0.24	0.06	767	19,831
	114.95	84,426	3.564	20.54	0.25	0.06	767	20,599
	114.95	84,463	3.504	16.97	0.25	0.06	768	21,366
	114.96	84,500	3.446	13.47	0.26	0.06	768	22,134
	114.97	84,538	3.392	10.02	0.27	0.06	768	22,903
	114.98	84,575	3.340	6.63	0.28	0.06	769	23,672
	114.99	84,613	3.290	3.29	0.29	0.06	769	24,441
Weir Elevation	115.00	84,650	-	-	0.30	0.06	769	25,210

Appendix 11.0

MISCELLANEOUS CALCULATIONS

11.1 BMPTrains

GENERAL SITE INFORMATION: V 7.7

GO TO INTRODUCTION PAGE

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT
SR 60 CSX Basin 1/2

VIEW ZONE MAP

VIEW MEAN ANNUAL RAINFALL MAP

GO TO WATERSHED CHARACTERISTICS

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT Zone 2

Mean Annual Rainfall (Please use rainfall map): 50.00 Inches

Type of analysis: CLICK ON CELL BELOW TO SELECT Net improvement

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): %

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 7.7

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers =	Input data
Red Numbers =	Calculated

HELP - LAND USES/EMC

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION

L - 4 Catchment-Parallel

VIEW CATCHMENT CONFIGURATION

CATCHMENT NO.1 CHARACTERISTICS:

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	User Defined (must over write concentrations)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	User Defined (must over write concentrations)

Total pre-development catchment area:	11.06	AC
Total post-development catchment or BMP analysis area:	11.06	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	26.28	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	66.91	%
Estimated BMPArea (No loading from this area)	1.80	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(**N**):	2.117	mg/L	2.117	mg/L
EMC(**P**):	0.367	mg/L	0.367	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	14.892	ac-ft/year
Average annual post runoff volume (note no BMP area):	22.805	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	38.880	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	6.740	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	59.539	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	10.322	kg/year

CATCHMENT NO.2 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	User Defined (must over write concentrations)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	User Defined (must over write concentrations)

Total pre-development catchment area:	3.63	AC
Total post-development catchment or BMP analysis area:	3.63	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	26.28	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	100.00	%
Estimated BMPArea (No loading from this area)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):	2.117	mg/L	2.117	mg/L
EMC(**P**):	0.367	mg/L	0.367	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	4.888	ac-ft/year
Average annual post runoff volume (note no BMP area):	12.236	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	12.761	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	2.212	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	31.946	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	5.538	kg/year

CATCHMENT NO.3 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	User Defined (must over write concentrations)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	User Defined (must over write concentrations)

Total pre-development catchment area:	1.66	AC
Total post-development catchment or BMP analysis area:	1.66	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	26.28	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	41.57	%
Estimated BMPArea (no loading from this area)	0.97	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):	2.117	mg/L	2.117	mg/L
EMC(**P**):	0.367	mg/L	0.367	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	2.235	ac-ft/year
Average annual post runoff volume (note no BMP area):	1.220	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	5.835	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	1.012	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	3.184	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	0.552	kg/year

CATCHMENT NO.4 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	User Defined (must over write concentrations)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	User Defined (must over write concentrations)

Total pre-development catchment area:	2.92	AC
Total post-development catchment or BMP analysis area:	2.92	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	26.28	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	28.08	%
Estimated BMPArea (no loading from this area)	2.10	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):	2.117	mg/L	2.117	mg/L
EMC(**P**):	0.367	mg/L	0.367	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	3.932	ac-ft/year
Average annual post runoff volume (note no BMP area):	1.145	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	10.265	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	1.779	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	2.990	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	0.518	kg/year

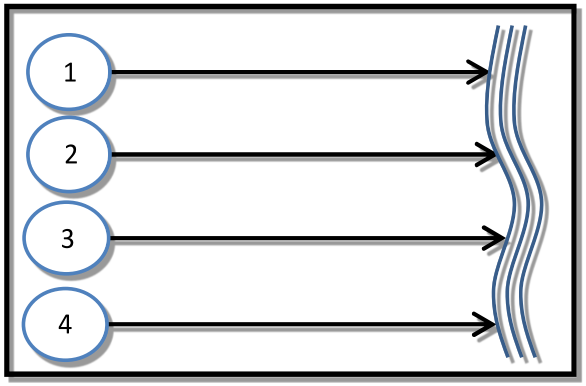
STORMWATER TREATMENT ANALYSIS:	V 7.7	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

If not done, specify pre- and post-development watershed characteristics.

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	30.636	%
Required Treatment Eff (**Phosphorus**):	30.636	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN

WET DETENTION

EXFILTRATION TRENCH

RAIN GARDEN

SWALE

USER DEFINED BMP

PERVIOUS PAVEMENT

STORMWATER HARVESTING

FILTRATION including Up-Flow Filters

LINED REUSE POND & UNDERDRAIN INPUT

NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.

GREENROOF

RAINWATER HARVESTING

MANAGED AQUATIC PLANTS

VEGETATED NATURAL BUFFER

VEGETATED FILTER STRIP

TREE WELL

CATCHMENT AND TREATMENT SUMMARY RESULTS

WET DETENTION: V 7.7

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

WET DETENTION POND SERVING: SR 60 CSX Basin 1/2

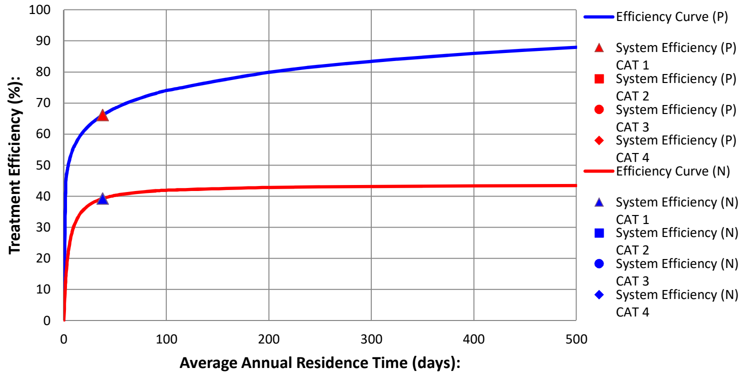
GO TO STORMWATER TREATMENT ANALYSIS

HELP - EXAMPLE PROBLEM 4

Loadings from BMP area are contained by the BMP, thus no BMP area load.	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	11.060	3.630	1.660	2.920	ac
Total post-development catchment area:	9.260	3.630	0.690	0.820	ac
Average annual residence time (between 1 and 500 days):	38.00				days
Littoral Zone or other improvements used?	NO				
Littoral Zone or other improvement efficiency credit:					%
Total **Nitrogen** removal required:	34.699				%
Total **Phosphorus** removal required:	34.699				%
Total **Nitrogen** removal efficiency provided:	39.228				%
Total **Phosphorus** removal efficiency provided:	66.127				%
Is the wet detention sufficient:	YES				
Average annual runoff volume into the pond:	22.805	12.236	1.220	1.145	ac-ft/yr

To Achieve the Treatment Efficiency Shown in the Graph Below, the Following Must Hold

Minimum Pond Permanent Pool Volume:	2.374				ac-ft

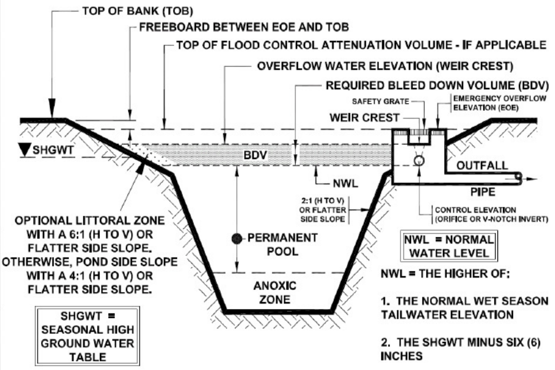


NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. The lines are produced from the conditions of catchment one, thus other catchments are shown with the data points.

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION.

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Remaining treatment efficiency needed (**Nitrogen**):	0.000				%
Remaining treatment efficiency needed (**Phosphorus**):	0.000				%



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

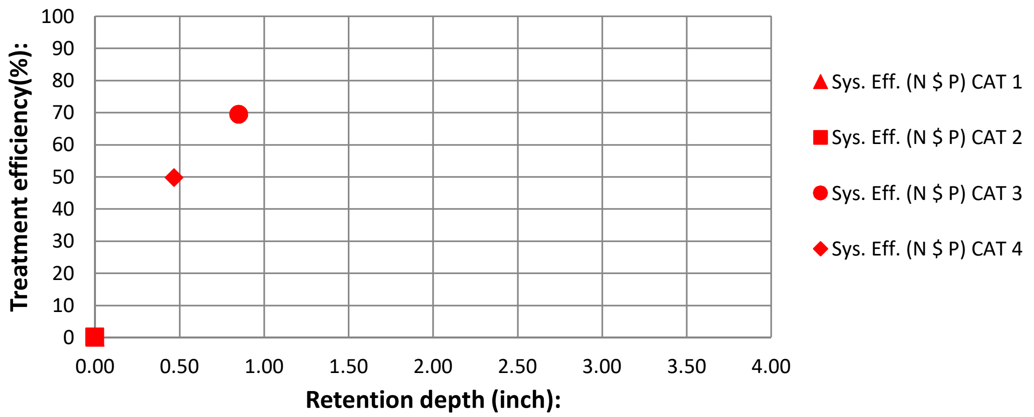
Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010

SWALE

V 7.7

SWALE SERVING CONTRIBUTING CATCHMENT:	SR 60 CSX Basin 1/2

Loadings from BMP area are contained by the BMP, thus no BMP area load.	Catchment 1	Catchment 2	Catchment3	Catchment 4	
Contributing catchment area:	9.260	3.630	0.690	0.820	ac
Required treatment efficiency (**Nitrogen**):	34.699	60.056	0.000	0.000	%
Required treatment efficiency (**Phosphorus**):	34.699	60.056	0.000	0.000	%
Swale top width calculated for flood conditions [W]:			15.00	15.00	ft
Swale bottom width (0 for triangular section) [B]:			5.00	5.00	ft
Swale length [L]:			685.00	1246.00	ft
Average impervious length:			685.00	902.00	ft
Average impervious width (including shoulder):			31.00	31.00	ft
Average width of the pervious area to include swale width:			40.00	40.00	ft
Contributing catchment area:	0.00	0.00	38360.00	50512.00	ft^2
Swale slope (ft drop/ft length) [S]:			0.002	0.003	
Manning's N:			0.410	0.410	
Soil infiltration rate:			0.800	0.800	in/hr
Side slope of swale (horizontal ft/vertical ft) [Z]:			4.000	4.000	
Infiltrated storage depth:	0.000	0.000	0.222	0.284	in
Cumulative height of the swale blocks [H]:			1.00	1.00	ft
Length of the berm upstream of the crest [Lb]:			5.00	5.00	ft
Volume of water in swales upstream of swale blocks:	0.000	0.000	0.628	0.183	in
Total volume:	0.000	0.000	0.851	0.467	in
Provided treatment efficiency (**Nitrogen**):	0.000	0.000	69.385	49.751	%
Provided treatment efficiency (**Phosphorus**):	0.000	0.000	69.385	49.751	%



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the swale as the function of retention depth. The graph illustrates that there is diminishing effectiveness as the retention depth is increased.

HELP - EXAMPLE PROBLEM 1

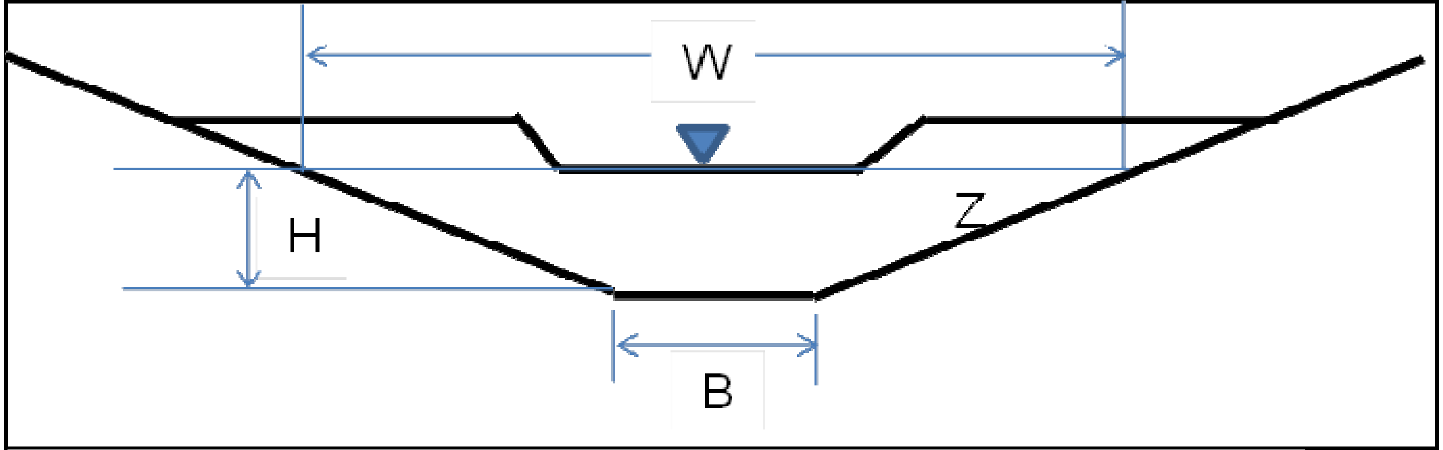
Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

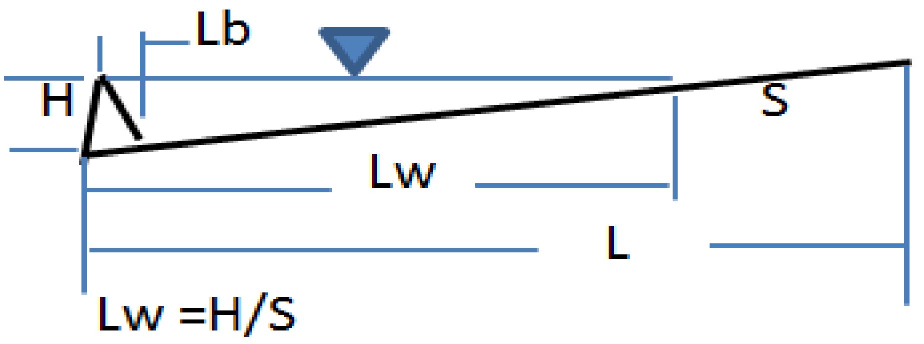
HELP - BACKGROUND

GO TO STORMWATER TREATMENT ANALYSIS

	Catchment 1	Catchment 2	Catchment3	Catchment 4	
Concentration reduction? (If S<= 1% or H>= 6 in)					
Provided percent mass reductions in surface discharges are:					
Nitrogen efficiency	0.000	0.000	69.385	49.751	
Phosphorus efficiency	0.000	0.000	69.385	49.751	
If you are you interested in the mass of pollutants removed before percolating into the groundwater?					
Specify soil media					
Nitrogen mass reduction in groundwater discharge					%
Phosphorus mass reduction in groundwarer discharge					%

View Media Mixes





User Defined BMP

V 7.7

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

USER DEFINED BMP SERVING: SR 60 CSX Basin 1/2

GO TO STORMWATER TREATMENT ANALYSIS

Your Name of BMP		Storm Sewer			
Contributing catchment area	11.060	3.630	1.660	2.920	ac
Required treatment efficiency (**Nitrogen**):	34.699	60.056	0.000	0.000	%
Required treatment efficiency (**Phosphorus**):	34.699	60.056	0.000	0.000	%
Is this a retention or other system*?		Other			
If retention, storage depth is:					in
The calculated storage volume is:	0.000	0.000	0.000	0.000	ac-ft
Treatment efficiency (Nitrogen):					%
Treatment efficiency (Phosphorus):					%
Provided treatment efficiency (Nitrogen):		0.00			%
Provided treatment efficiency (Phosphorus):		0.00			%

* Examples of other systems are street sweeping, dry detention, chemical treatment, and pre-treatment devices

Enter a short description of BMP below (no more than 200 characters)

Storm Sewer from Basin 2 that is piped directly to PCDC.

Attach a detailed explanation with supporting data to support removal efficiencies.
Monitoring shall be required when the applicant proposes design criteria not found in this model and does not have specific test data or other data to support the removal claims

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH USER DEFINED BMP. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH USER DEFINED BMP.

	Catch 1	Catch 2	Catch 3	Catch 4	
Remaining treatment efficiency needed (**Nitrogen**):	34.699	60.056	0.000	0.000	%
Required pre-treatment efficiency (**Phosphorus**):	34.699	60.056	0.000	0.000	%

CATCHMENTS AND TREATMENT SUMMARY RESULTS V 7.7

CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SR 60 CSX Basin 1/2	Optional Identification	

	Catchment 1:	Catchment 2:	Catchment 3:	Catchment 4:
BMP Name	Wet Detention	0.00	Swale	Swale
BMP Name				
BMP Name				

Summary Performance of Entire Watershed

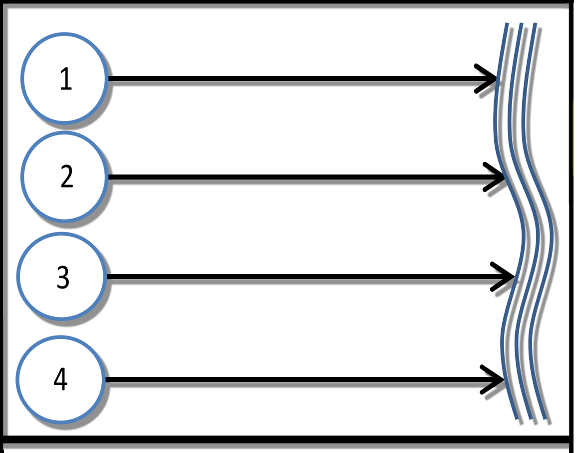
Catchment Configuration	L - 4 Catchment-Parallel	
Nitrogen Pre Load (kg/yr)	67.74	
Phosphorus Pre Load (kg/yr)	11.74	
Nitrogen Post Load (kg/yr)	97.66	
Phosphorus Post Load (kg/yr)	16.93	
Target Load Reduction (N) %	30.6	
Target Load Reduction (P) %	30.6	
Target Discharge Load, N (kg/yr)	67.74	
Target Discharge Load, P (kg/yr)	11.74	
Provided Overall Efficiency, N (%):	27.7	
Provided Overall Efficiency, P (%):	44.1	
Discharged Load, N (kg/yr & lb/yr):	70.61	155.52
Discharged Load, P (kg/yr & lb/yr):	9.46	20.85
Load Removed, N (kg/yr & lb/yr):	27.05	59.59
Load Removed, P (kg/yr & lb/yr):	7.47	16.45

Treatment Objectives or Target

NOT MET

8/25/2016

BMPTRAINS MODEL



GENERAL SITE INFORMATION: V 7.7

GO TO INTRODUCTION PAGE

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: **SR 60 CSX Basin 3**

VIEW ZONE MAP

VIEW MEAN ANNUAL RAINFALL MAP

GO TO WATERSHED CHARACTERISTICS

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT **Zone 2**

Mean Annual Rainfall (Please use rainfall map): **50.00** Inches

Type of analysis: CLICK ON CELL BELOW TO SELECT **Net improvement**

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): ☐ ☐ %

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 7.7

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers =	Input data
Red Numbers =	Calculated

HELP - LAND USES/EMC

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION

B - 2 Catchment-Series

VIEW CATCHMENT CONFIGURATION

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

CATCHMENT NO.1 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT	
Pre-development land use: with default EMCs	User Defined (must over write concentrations)	
	CLICK ON CELL BELOW TO SELECT	
Post-development land use: with default EMCs	User Defined (must over write concentrations)	
Total pre-development catchment area:	5.37	AC
Total post-development catchment or BMP analysis area:	5.37	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	14.42	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	98.69	%
Estimated BMPArea (No loading from this area)	2.78	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(**N**):	1.182	mg/L	1.182	mg/L
EMC(**P**):	0.135	mg/L	0.135	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	5.482	ac-ft/year
Average annual post runoff volume (note no BMP area):	8.638	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	7.992	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	0.913	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	12.592	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	1.438	kg/year

CATCHMENT NO.2 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT	
Pre-development land use: with default EMCs	User Defined (must over write concentrations)	
	CLICK ON CELL BELOW TO SELECT	
Post-development land use: with default EMCs	User Defined (must over write concentrations)	
Total pre-development catchment area:	71.82	AC
Total post-development catchment or BMP analysis area:	71.82	AC
Pre-development Non DCIA CN:	84.00	
Pre-development DCIA percentage:	14.42	%
Post-development Non DCIA CN:	84.00	
Post-development DCIA percentage:	14.70	%
Estimated BMPArea (No loading from this area)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):	1.182	mg/L	1.182	mg/L
EMC(**P**):	0.135	mg/L	0.135	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	73.322	ac-ft/year
Average annual post runoff volume (note no BMP area):	73.868	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	106.882	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	12.207	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	107.679	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	12.298	kg/year

CATCHMENT NO.3 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT	
Pre-development land use: with default EMCs		
	CLICK ON CELL BELOW TO SELECT	
Post-development land use: with default EMCs		
Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMPArea (no loading from this area)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):		mg/L		mg/L
EMC(**P**):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

CATCHMENT NO.4 CHARACTERISTICS:

	CLICK ON CELL BELOW TO SELECT	
Pre-development land use: with default EMCs		
	CLICK ON CELL BELOW TO SELECT	
Post-development land use: with default EMCs		
Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMPArea (no loading from this area)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(**N**):		mg/L		mg/L
EMC(**P**):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

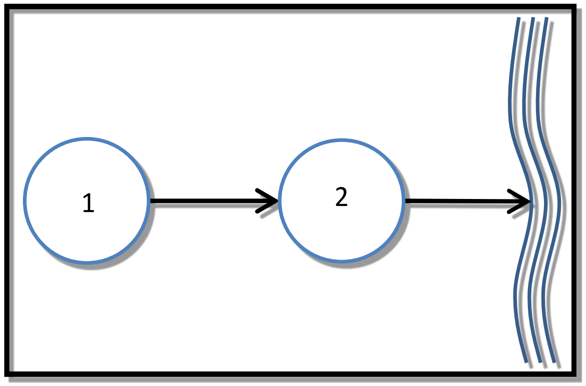
STORMWATER TREATMENT ANALYSIS:	V 7.7	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

If not done, specify pre- and post-development watershed characteristics.

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	4.487	%
Required Treatment Eff (**Phosphorus**):	4.487	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION	EXFILTRATION TRENCH	RAIN GARDEN	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION including Up-Flow Filters	LINED REUSE POND & UNDERDRAIN INPUT		
GREENROOF	RAINWATER HARVESTING	MANAGED AQUATIC PLANTS			
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL			

NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.

CATCHMENT AND TREATMENT SUMMARY RESULTS

WET DETENTION: V 7.7

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

WET DETENTION POND SERVING: **SR 60 CSX Basin 3**

GO TO STORMWATER TREATMENT ANALYSIS

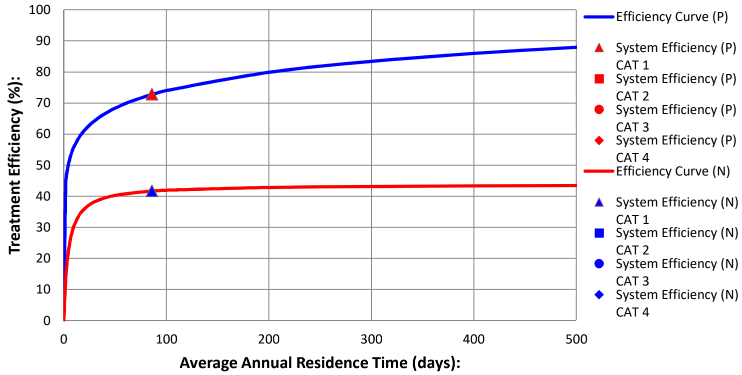
HELP - EXAMPLE PROBLEM 4

Loadings from BMP area are contained by the BMP, thus no BMP area load.

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	5.370	71.820	0.000	0.000	ac
Total post-development catchment area:	2.590	71.820	0.000	0.000	ac
Average annual residence time (between 1 and 500 days):	86.00				days
Littoral Zone or other improvements used?	NO				
Littoral Zone or other improvement efficiency credit:					%
Total **Nitrogen** removal required:	36.535				%
Total **Phosphorus** removal required:	36.535				%
Total **Nitrogen** removal efficiency provided:	41.630				%
Total **Phosphorous** removal efficiency provided:	72.739				%
Is the wet detention sufficient:	YES				
Average annual runoff volume into the pond:	8.638	73.868			ac-ft/yr

To Achieve the Treatment Efficiency Shown in the Graph Below, the Following Must Hold

Minimum Pond Permanent Pool Volume:	2.035				ac-ft

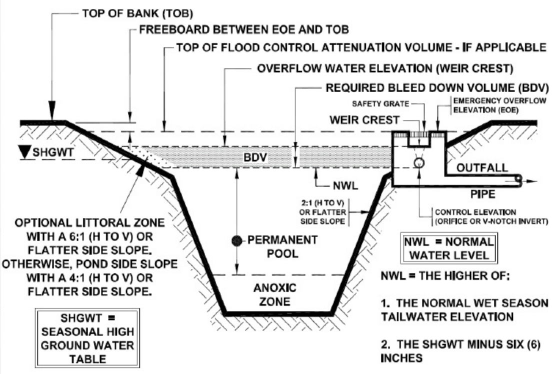


NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. The lines are produced from the conditions of catchment one, thus other catchments are shown with the data points.

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION.

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Remaining treatment efficiency needed (**Nitrogen**):	0.000				%
Remaining treatment efficiency needed (**Phosphorus**):	0.000				%



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

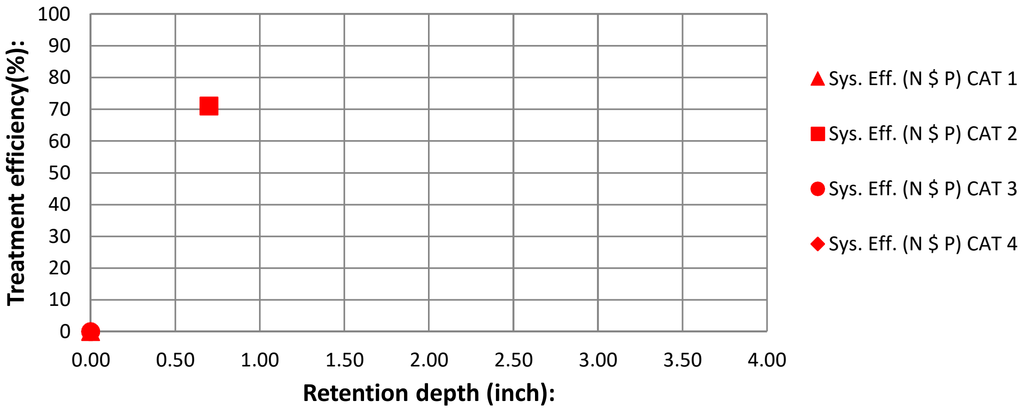
Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010

SWALE

V 7.7

SWALE SERVING CONTRIBUTING CATCHMENT: SR 60 CSX Basin 3

Loadings from BMP area are contained by the BMP, thus no BMP area load.	Catchment 1	Catchment 2	Catchment3	Catchment 4	
Contributing catchment area:	2.590	71.820	0.000	0.000	ac
Required treatment efficiency (**Nitrogen**):	36.535	0.740			%
Required treatment efficiency (**Phosphorus**):	36.535	0.740			%
Swale top width calculated for flood conditions [W]:		30.00			ft
Swale bottom width (0 for triangular section) [B]:		5.00			ft
Swale length [L]:		1000.00			ft
Average impervious length:		0.00			ft
Average impervious width (including shoulder):		31.00			ft
Average width of the pervious area to include swale width:		90.00			ft
Contributing catchment area:	0.00	0.00	0.00	0.00	ft^2
Swale slope (ft drop/ft length) [S]:		0.000			
Manning's N:		0.410			
Soil infiltration rate:		0.800			in/hr
Side slope of swale (horizontal ft/vertical ft) [Z]:		4.000			
Infiltrated storage depth:	0.000	0.401	0.000	0.000	in
Cumulative height of the swale blocks [H]:		0.50			ft
Length of the berm upstream of the crest [Lb]:		5.00			ft
Volume of water in swales upstream of swale blocks:	0.000	0.299	0.000	0.000	in
Total volume:	0.000	0.700	0.000	0.000	in
Provided treatment efficiency (**Nitrogen**):	0.000	70.946	0.000	0.000	%
Provided treatment efficiency (**Phosphorus**):	0.000	70.946	0.000	0.000	%



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the swale as the function of retention depth. The graph illustrates that there is diminishing effectiveness as the retention depth is increased.

HELP - EXAMPLE PROBLEM 1

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP - BACKGROUND

GO TO STORMWATER TREATMENT ANALYSIS

	Catchment 1	Catchment 2	Catchment3	Catchment 4
Concentration reduction? (If S<= 1% or H>= 6 in)				

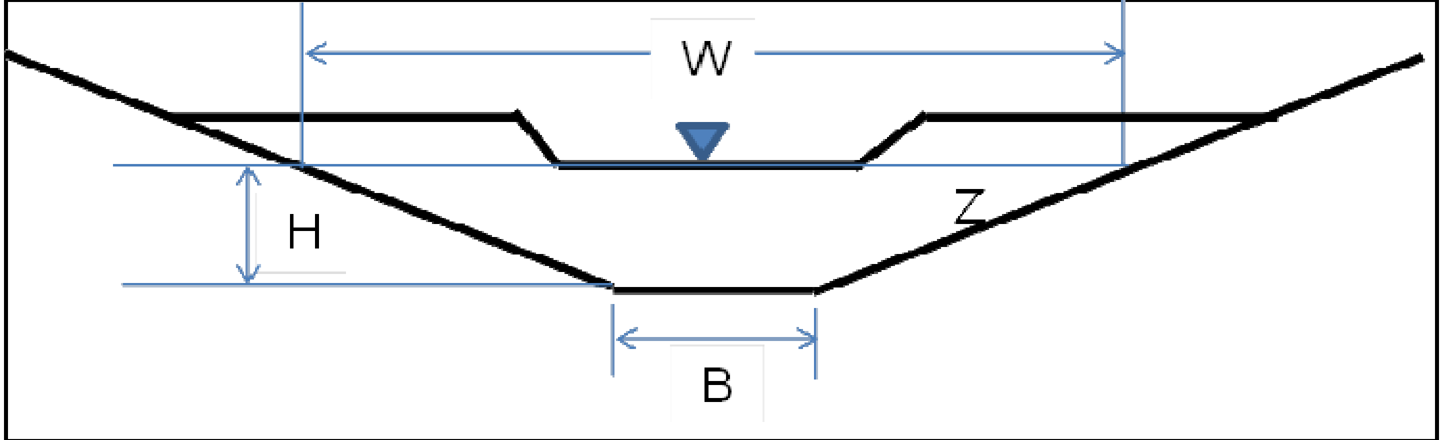
Provided percent mass reductions in surface discharges are:

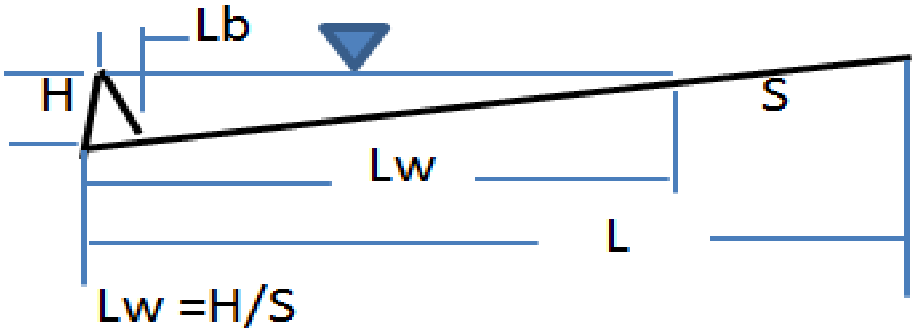
Nitrogen efficiency	0.000	70.946	0.000	0.000
Phosphorus efficiency	0.000	70.946	0.000	0.000

If you are you interested in the mass of pollutants removed before percolating into the groundwater?

View Media Mixes

Specify soil media					
Nitrogen mass reduction in groundwater discharge					%
Phosphorus mass reduction in groundwarer discharge					%





CATCHMENTS AND TREATMENT SUMMARY RESULTS V 7.7

CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used,
   an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SR 60 CSX Basin 3	Optional Identification	

	Catchment 1:	Catchment 2:	Catchment 3:	Catchment 4:
BMP Name	Wet Detention	Swale		
BMP Name				
BMP Name				

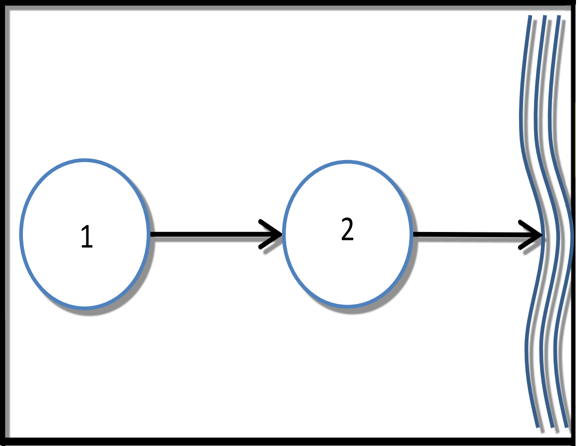
Summary Performance of Entire Watershed

Catchment Configuration	B - 2 Catchment-Series	
Nitrogen Pre Load (kg/yr)	114.87	
Phosphorus Pre Load (kg/yr)	13.12	
Nitrogen Post Load (kg/yr)	120.27	
Phosphorus Post Load (kg/yr)	13.74	
Target Load Reduction (N) %	4.5	
Target Load Reduction (P) %	4.5	
Target Discharge Load, N (kg/yr)	114.87	
Target Discharge Load, P (kg/yr)	13.12	
Provided Overall Efficiency, N (%):	70.8	
Provided Overall Efficiency, P (%):	71.5	
Discharged Load, N (kg/yr & lb/yr):	35.15	77.42
Discharged Load, P (kg/yr & lb/yr):	3.92	8.62
Load Removed, N (kg/yr & lb/yr):	85.12	187.49
Load Removed, P (kg/yr & lb/yr):	9.82	21.63

Treatment Objectives or Target MET

8/25/2016

BMPTRAINS MODEL



11.2 Spread Calculations

GUTTER SPREAD FOR BARRIER WALL INLETS

COMPUTED BY: TMK **DATE:** 8/24/2016

Project: SR 60 Over CSX **CHECKED BY:** SC **DATE:** 8/25/2016

Grate Length (ft) = 3.33	Grate Width (ft) = 1.83	Intensity (in/hr) = 4.0	Manning's n = 0.016	T Safety Factor (Sump) = 2

S-#	Station	(G)rade or (S)ump	Drainage Area (ac)	Runoff Coeff.	Q runoff (cfs)	Q bypass (cfs)	Q total (cfs)	Sx (ft/ft)	S (ft/ft)	T (ft)	T max (ft)	Check OK or ?	Q inter (cfs)	Q bypass (cfs)	Bypass to S-#	REMARKS
338	4418+06	G	0.10	0.95	0.38	0.14	0.52	0.060	0.015	2.6	10.0	OK	0.51	0.01		
334	4417+60	G	0.36	0.95	1.37	0.06	1.43	0.060	0.018	3.7	10.0	OK	1.29	0.14	336	
330	4415+90	G	0.26	0.95	0.99	0.06	1.05	0.060	0.027	3.1	10.0	OK	0.99	0.06	333	
325	4414+59	G	0.23	0.95	0.87	0.23	1.11	0.060	0.030	3.1	10.0	OK	1.04	0.06	330	
321	4413+37	G	0.46	0.95	1.75	0.19	1.94	0.060	0.030	3.8	10.0	OK	1.70	0.23	325	
315	4410+20	G	0.39	0.95	1.48	0.21	1.69	0.060	0.023	3.8	10.0	OK	1.50	0.19	321	
311	4407+20	G	0.39	0.95	1.48	0.26	1.74	0.060	0.016	4.1	10.0	OK	1.53	0.21	315	
303	4404+20	G	0.50	0.95	1.90	0.00	1.90	0.060	0.008	4.8	10.0	OK	1.64	0.26	311	
																High Point
220	4397+60	G	0.50	0.95	1.90	0.00	1.90	0.060	0.008	4.8	10.0	OK	1.64	0.26	210	
210	4392+40	G	0.81	0.95	3.08	0.26	3.34	0.060	0.021	5.0	10.0	OK	2.65	0.69	203	
203	4390+00	G	0.38	0.95	1.44	0.69	2.13	0.060	0.027	4.0	10.0	OK	1.84	0.29	123	
123	4385+40	G	0.72	0.95	2.74	0.29	3.03	0.060	0.027	4.6	10.0	OK	2.46	0.56	114	
114	4381+40	G	0.52	0.95	1.98	0.56	2.54	0.060	0.005	5.9	10.0	OK	2.12	0.41	110	
110	4379+00	G	0.31	0.95	1.18	0.41	1.59	0.060	0.003	5.4	10.0	OK	1.43	0.17		

GUTTER SPREAD FOR BARRIER WALL INLETS

COMPUTED BY: TMK **DATE:** 8/23/2016
Project: SR 60 over CSX **CHECKED BY:** SC **DATE:** 8/25/2016

Grate Length (ft) = 3.33	Grate Width (ft) = 1.83	Intensity (in/hr) = 4.0	Manning's n = 0.016	T Safety Factor (Sump) = 2

S-#	Station	(G)rade or (S)ump	Drainage Area (ac)	Runoff Coeff.	Q runoff (cfs)	Q bypass (cfs)	Q total (cfs)	Sx (ft/ft)	S (ft/ft)	T (ft)	T max (ft)	Check OK or ?	Q inter (cfs)	Q bypass (cfs)	Bypass to S-#	REMARKS
332	3415+90	G	0.17	0.95	0.65	0.03	0.67	0.060	0.026	2.6	10.0	OK	0.66	0.02		
327	3414+60	G	0.16	0.95	0.61	0.21	0.82	0.060	0.030	2.7	10.0	OK	0.79	0.03	332	
323	3413+38	G	0.43	0.95	1.63	0.20	1.83	0.060	0.030	3.7	10.0	OK	1.62	0.21	327	
317	3410+20	G	0.40	0.95	1.51	0.22	1.74	0.060	0.023	3.8	10.0	OK	1.54	0.20	323	
313	3407+20	G	0.40	0.95	1.52	0.26	1.78	0.060	0.016	4.1	10.0	OK	1.56	0.22	317	
305	3404+20	G	0.50	0.95	1.90	0.00	1.90	0.060	0.008	4.8	10.0	OK	1.64	0.26	313	
																High Point
221	3397+60	G	0.50	0.95	1.90	0.00	1.90	0.060	0.008	4.8	10.0	OK	1.64	0.26	211	
211	3392+40	G	0.81	0.95	3.09	0.26	3.35	0.060	0.021	5.0	10.0	OK	2.66	0.69	204	
204	3390+00	G	0.38	0.95	1.43	0.69	2.12	0.060	0.027	4.0	10.0	OK	1.83	0.29	124	
124	3385+40	G	0.72	0.95	2.74	0.29	3.03	0.060	0.027	4.6	10.0	OK	2.47	0.56	116	
116	3381+40	G	0.52	0.95	1.98	0.56	2.54	0.060	0.006	5.7	10.0	OK	2.11	0.42	112	
112	3379+00	G	0.31	0.95	1.18	0.42	1.60	0.060	0.003	5.4	10.0	OK	1.43	0.17		

GUTTER SPREAD FOR BARRIER WALL INLETS

COMPUTED BY: TMK **DATE:** 8/23/2016
CHECKED BY: SC **DATE:** 8/25/2016

Project: SR 60 Over CSX

Grate Length (ft) = 3.33	Grate Width (ft) = 1.4166	Intensity (in/hr) = 4.0	Manning's n = 0.016	T Safety Factor (Sump) = 2

S-#	Station	(G)rade or (S)ump	Drainage Area (ac)	Runoff Coeff.	Q runoff (cfs)	Q bypass (cfs)	Q total (cfs)	Sx (ft/ft)	S (ft/ft)	T (ft)	T max (ft)	Check OK or ?	Q inter (cfs)	Q bypass (cfs)	Bypass to S-#	REMARKS
322	4413+40	G	0.12	0.95	0.46	0.02	0.48	0.050	0.030	2.5	10.8	OK	0.45	0.03	326	Right Side
316	4410+20	G	0.10	0.95	0.38	0.01	0.39	0.050	0.023	2.4	10.8	OK	0.37	0.02	322	Right Side
312	4407+20	G	0.08	0.95	0.30	0.00	0.30	0.050	0.016	2.4	10.8	OK	0.29	0.01	316	Right Side
304	4404+20	G	0.03	0.95	0.11	0.00	0.11	0.050	0.008	1.9	10.8	OK	0.11	0.00	312	Right Side
																High Point
115	4381+40	G	0.11	0.95	0.42	0.00	0.42	0.050	0.005	3.3	10.8	OK	0.39	0.03		Right Side
111	4379+00	G	0.07	0.95	0.27	0.03	0.29	0.050	0.003	3.2	10.8	OK	0.28	0.01		Right Side
108	4376+66	G	0.07	0.95	0.27	0.01	0.28	0.050	0.003	3.2	10.8	OK	0.27	0.01		Right Side

GUTTER SPREAD FOR BARRIER WALL INLETS

COMPUTED BY: TMK **DATE:** 8/23/2016
Project: SR 60 Over CSX **CHECKED BY:** SC **DATE:** 8/25/2016

Grate Length (ft) = 3.33
Grate Width (ft) = 1.4166
Intensity (in/hr) = 4.0
Manning's n = 0.016
T Safety Factor (Sump) = 2

S-#	Station	(G)rade or (S)ump	Drainage Area (ac)	Runoff Coeff.	Q runoff (cfs)	Q bypass (cfs)	Q total (cfs)	Sx (ft/ft)	S (ft/ft)	T (ft)	T max (ft)	Check OK or ?	Q inter (cfs)	Q bypass (cfs)	Bypass to S-#	REMARKS
322	3413+38	G	0.12	0.95	0.46	0.03	0.48	0.050	0.030	2.5	10.8	OK	0.45	0.03	326	Left Side
316	3410+20	G	0.11	0.95	0.42	0.02	0.43	0.050	0.023	2.5	10.8	OK	0.41	0.03	322	Left Side
312	3407+20	G	0.09	0.95	0.34	0.00	0.34	0.050	0.016	2.5	10.8	OK	0.33	0.02	316	Left Side
304	3404+20	G	0.04	0.95	0.14	0.00	0.14	0.050	0.008	2.0	10.8	OK	0.14	0.00	312	Left Side
																High Point
115	3381+40	G	0.12	0.95	0.46	0.00	0.46	0.050	0.005	3.4	10.8	OK	0.42	0.03	111	Left Side
111	3379+00	G	0.11	0.95	0.42	0.03	0.45	0.050	0.003	3.8	10.8	OK	0.42	0.03	108	Left Side
108	3376+65	G	0.12	0.95	0.46	0.03	0.48	0.050	0.003	3.9	10.8	OK	0.45	0.03		Left Side

SPREAD CALCULATIONS

FDA Project Number : 47100
FDA Project Name : SR 60 over CSX
FDOT FINANCIAL #: 436559-1-52-01
Designed by: TK Date: 22-Jun-16
Checked by: SC Date: 8/25/2016

DESIGN SPEED: 30 MPH
MAXIMUM SPREAD (ft), T= 8.5 = 1.5' + 7' (14'/2)
/

DESIGN SPEED <= 45 MPH; KEEP 1/2 OF LANE CLEAR
45< DESIGN SPEED <= 55MPH; KEEP 8' OF LANE CLEAR
DESIGN SPEED > 55 MPH; NO ENCROACHMENT

Allowable Spread: 8.5

NE Frontage Rd

STA.	Structure #	C	I	A	Overland Runoff	Previous By-pass	Total Flow	Cross Slope (ft/ft)	Long slope (%)	Spread (ft) (n=.016)	Intercepted Flow (Chart A-1 to A-16)	Bypass Flow	Bypass to Inlet	Good / No Good	Inlet Type	Notes
300+05.87	S-300	0.88	4.00	0.120	0.424	0.051	0.475	0.020	0.580	6.0	0.418	0.057		GOOD	P-5	
301+54.58	S-302	0.89	4.00	0.140	0.500	0.022	0.522	0.020	0.580	6.3	0.471	0.051	S-300	GOOD	P-5	
303+39.84	S-306	0.88	4.00	0.110	0.386	0.016	0.402	0.020	0.580	5.7	0.380	0.022	S-302	GOOD	P-5	
304.75.19	S-308	0.88	4.00	0.120	0.424	0.010	0.434	0.020	1.367	5.0	0.418	0.016	S-306	GOOD	P-5	
306+35.59	S-314	0.88	4.00	0.110	0.386	0.000	0.386	0.020	1.367	4.8	0.376	0.010	S-308	GOOD	P-5	
313+77.11	S-328	0.79	4.00	0.050	0.158	0.000	0.158	0.020	0.300	4.5	0.156	0.002	S-324	GOOD	P-5	

SPREAD CALCULATIONS

FDA Project Number : 47100
FDA Project Name : SR 60 over CSX
FDOT FINANCIAL #: 436559-1-52-01
Designed by: TK Date: 22-Jun-16
Checked by: SC Date: 8/25/2016

DESIGN SPEED: 30 MPH
MAXIMUM SPREAD (ft), T= 8.5 = 1.5' + 7' (14'/2)
/

DESIGN SPEED <= 45 MPH; KEEP 1/2 OF LANE CLEAR
45< DESIGN SPEED <= 55MPH; KEEP 8' OF LANE CLEAR
DESIGN SPEED > 55 MPH; NO ENCROACHMENT

Allowable Spread: 8.5

Mid Frontage Rd

STA.	Structure #	C	I	A	Overland Runoff	Previous By-pass	Total Flow	Cross Slope (ft/ft)	Long slope (%)	Spread (ft) (n=.016)	Intercepted Flow (Chart A-1 to A-16)	Bypass Flow	Bypass to Inlet	Good / No Good	Inlet Type	Notes
200+05.44	S-209	0.95	4.00	0.070	0.266	0.000	0.266	0.020	0.567	4.9	0.266	0.000		GOOD	P-5	
201+03.59	S-212	0.95	4.00	0.110	0.418	0.000	0.418	0.020	0.567	5.8	0.418	0.000	S-209	GOOD	P-5	
202+59.48	S-213	0.95	4.00	0.030	0.114	0.000	0.114	0.020	1.279	3.1	0.114	0.000	S-213	GOOD	P-5	

SPREAD CALCULATIONS

FDA Project Number : 47100
FDA Project Name : SR 60 over CSX
FDOT FINANCIAL #: 436559-1-52-01
Designed by: JH Date: 22-Jun-16
Checked by: TK Date: 8/25/2016

DESIGN SPEED: 30 MPH
MAXIMUM SPREAD (ft), T= 8.97

DESIGN SPEED <= 45 MPH; KEEP 1/2 OF LANE CLEAR
45< DESIGN SPEED <= 55MPH; KEEP 8' OF LANE CLEAR
DESIGN SPEED > 55 MPH; NO ENCROACHMENT

Allowable Spread: 8.97

S-318

STA.	Structure #	C	I	A	Overland Runoff	Previous By-pass	Total Flow	Cross Slope (ft/ft)	Long slope (%)	Spread (ft) (n=.016)	Intercepted Flow (Chart A-1 to A-16)	Bypass Flow	Bypass to Inlet	Good / No Good	Inlet Type	Notes
309+36.35	S-318	0.88	4.00	0.120	0.424	0.000	0.424	0.050	0.347	3.6	0.407	0.017	S-319	`	Drop Curb	

SPREAD CALCULATIONS

FDA Project Number : 47100
FDA Project Name : SR 60 over CSX
FDOT FINANCIAL #: 436559-1-52-01
Designed by: JH Date: 22-Jun-16
Checked by: TK Date: 8/25/2016

DESIGN SPEED: 30 MPH
MAXIMUM SPREAD (ft), T= 13

DESIGN SPEED <= 45 MPH; KEEP 1/2 OF LANE CLEAR
45< DESIGN SPEED <= 55MPH; KEEP 8' OF LANE CLEAR
DESIGN SPEED > 55 MPH; NO ENCROACHMENT

/

Allowable Spread: 13

S-319

STA.	Structure #	C	I	A	Overland Runoff	Previous By-pass	Total Flow	Cross Slope (ft/ft)	Long slope (%)	Spread (ft) (n=.016)	Intercepted Flow (Chart A-1 to A-16)	Bypass Flow	Bypass to Inlet	Good / No Good	Inlet Type	Notes
311+16.80	S-319	0.89	4.00	0.140	0.500	0.170	0.670	0.050	0.347	4.3	0.456	0.214	S-324	GOOD	Drop Curb	

SPREAD CALCULATIONS

FDA Project Number : 47100
FDA Project Name : SR 60 over CSX
FDOT FINANCIAL #: 436559-1-52-01
Designed by: JH Date: 22-Jun-16
Checked by: TK Date: 8/25/2016

DESIGN SPEED: 30 MPH
MAXIMUM SPREAD (ft), T= 20.12

DESIGN SPEED <= 45 MPH; KEEP 1/2 OF LANE CLEAR
45< DESIGN SPEED <= 55MPH; KEEP 8' OF LANE CLEAR
DESIGN SPEED > 55 MPH; NO ENCROACHMENT

Allowable Spread: 20.12

S-324

STA.	Structure #	C	I	A	Overland Runoff	Previous By-pass	Total Flow	Cross Slope (ft/ft)	Long slope (%)	Spread (ft) (n=.016)	Intercepted Flow (Chart A-1 to A-16)	Bypass Flow	Bypass to Inlet	Good / No Good	Inlet Type	Notes
312+55	S-324	0.87	4.00	0.200	0.696	0.216	0.912	0.050	SAG	2.0				GOOD	V	USING FIGURE A-17, SPREAD IS CALCULATED

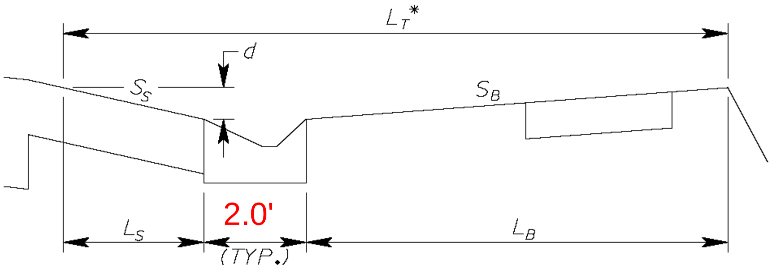
DROP CURB
COMPOSITE SLOPE CALCULATION

Project: SR 60 at CSX RR
FPID No.: 436559-1-52-01
FDA No.: 47100

Designed By: J. Hernandez **Date:** 9-Sep-16
Checked By: Tammy Kreisle **Date:** 9-Sep-16

S-318 (3410+20.00 LT)

Typical Cross Section



L_T (FT) = 8.97 = Total Contained Length before Spill-over or Lane Encroachment
S_S (FT/FT) = 0.09 = Slope on Travel lane-side of Curb
S_B (FT/FT) = 0.13 = Slope on Back-side of Curb

A_{SG} (SF) = 0.11 = Area Contained in Drop Curb (Constant Value)
W_{SG} (SF) = 2.00 = Width of Drop Curb (Constant Value)

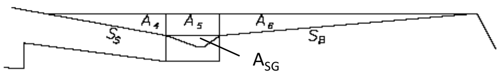
R_S = 0.60 = Travel lane Slope Ratio
R_B = 0.43 = Back Slope Ratio

L_S / L_T = 58.41% = Travel lane-side Percentage of Width
L_B / L_T = 41.59% = Back-side Percentage of Width

L_S (FT) = 4.07 = Max Length of Spread on Travel lane-side
L_B (FT) = 2.90 = Max Length of Spread on Back-side

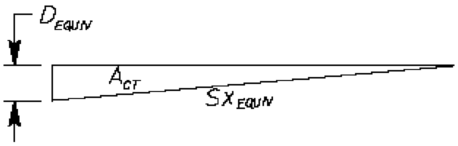
$d = d_S = d_B$ (FT) = 0.382672 = Depth of spread over Drop Curb

A_4 (SF) = 0.779 = Area of Spread Over Travel lane-side
A_5 (SF) = 0.765 = Area of Spread Over Drop Curb
A_6 (SF) = 0.555 = Area of Spread Over Back-side



A_{CT} (SF) = 2.21 = Total Composite Area (Contained)

D_{EQUIV} (IN) = 5.91 = Spread Equivalent Depth
Sx_{EQUIV} (FT/FT) = 0.05 = Equivalent Sx
Spread (FT) = 8.97



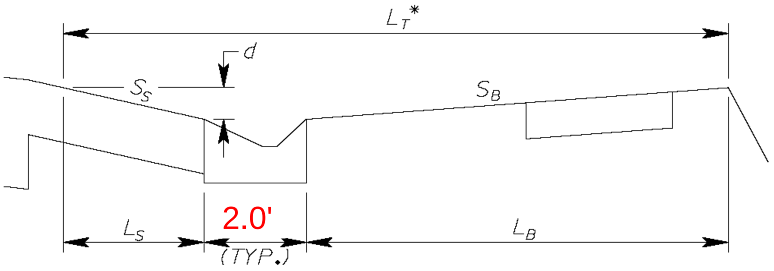
DROP CURB
COMPOSITE SLOPE CALCULATION

Project: SR 60 at CSX RR
FPID No.: 436559-1-52-01
FDA No.: 47100

Designed By: J. Hernandez **Date:** 9-Sep-16
Checked By: Tammy Kreisle **Date:** 9-Sep-16

S-319 (3412+00.00 LT.)

Typical Cross Section



L_T (FT) = 13.00 = Total Contained Length before Spill-over or Lane Encroachment
S_s (FT/FT) = 0.09 = Slope on Travel lane-side of Curb
S_B (FT/FT) = 0.13 = Slope on Back-side of Curb

A_{SG} (SF) = 0.11 = Area Contained in Drop Curb (Constant Value)
W_{SG} (SF) = 2.00 = Width of Drop Curb (Constant Value)

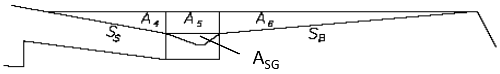
R_S = 0.60 = Travel lane Slope Ratio
R_B = 0.43 = Back Slope Ratio

L_S / L_T = 58.41% = Travel lane-side Percentage of Width
L_B / L_T = 41.59% = Back-side Percentage of Width

L_S (FT) = 6.42 = Max Length of Spread on Travel lane-side
L_B (FT) = 4.58 = Max Length of Spread on Back-side

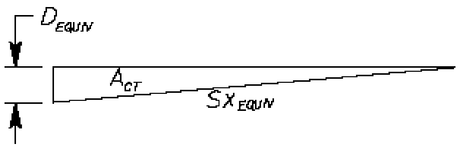
$d = d_S = d_B$ (FT) = 0.603929 = Depth of spread over Drop Curb

A_4 (SF) = 1.940 = Area of Spread Over Travel lane-side
A_5 (SF) = 1.208 = Area of Spread Over Drop Curb
A_6 (SF) = 1.382 = Area of Spread Over Back-side



A_{CT} (SF) = 4.64 = Total Composite Area (Contained)

D_{EQUIV} (IN) = 8.57 = Spread Equivalent Depth
Sx_{EQUIV} (FT/FT) = 0.05 = Equivalent Sx
Spread (FT) = 13.00



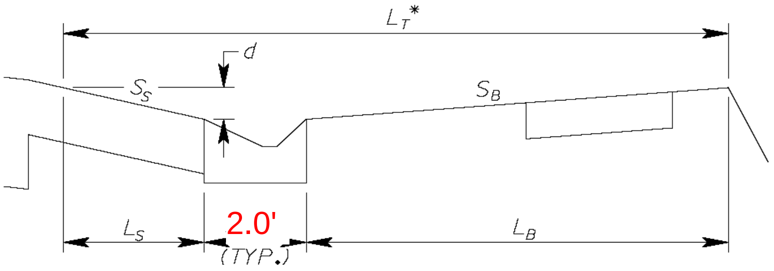
DROP CURB
COMPOSITE SLOPE CALCULATION

Project: SR 60 at CSX RR
FPID No.: 436559-1-52-01
FDA No.: 47100

Designed By: J. Hernandez **Date:** 9-Sep-16
Checked By: Tammy Kreisle **Date:** 9-Sep-16

S-324 (3413+37.85 LT.)

Typical Cross Section



L_T (FT) = 20.12 = Total Contained Length before Spill-over or Lane Encroachment
S_S (FT/FT) = 0.09 = Slope on Travel lane-side of Curb
S_B (FT/FT) = 0.13 = Slope on Back-side of Curb

A_{SG} (SF) = 0.40 = Area Contained in Drop Curb (Constant Value)
W_{SG} (SF) = 2.00 = Width of Drop Curb (Constant Value)

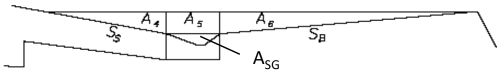
R_S = 0.60 = Travel lane Slope Ratio
R_B = 0.43 = Back Slope Ratio

L_S / L_T = 58.41% = Travel lane-side Percentage of Width
L_B / L_T = 41.59% = Back-side Percentage of Width

L_S (FT) = 10.58 = Max Length of Spread on Travel lane-side
L_B (FT) = 7.54 = Max Length of Spread on Back-side

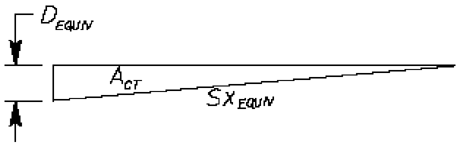
$d = d_S = d_B$ (FT) = 0.994836 = Depth of spread over Drop Curb

A_4 (SF) = 5.264 = Area of Spread Over Travel lane-side
A_5 (SF) = 1.990 = Area of Spread Over Drop Curb
A_6 (SF) = 3.749 = Area of Spread Over Back-side



A_{CT} (SF) = 11.40 = Total Composite Area (Contained)

D_{EQUIV} (IN) = 13.60 = Spread Equivalent Depth
Sx_{EQUIV} (FT/FT) = 0.06 = Equivalent Sx
Spread (FT) = 20.12



11.3 Skimmer Flow Calculations

FLOW AREAS UNDER SKIMMERS

Project: SR 60 at CSX RR

FPID No. 436559-1-52-01 **Designed By:** J. Hernandez **Date:** 8/19/2016
FDA No.: 471.00 **Checked By:** S. Curran **Date:** 8/24/2016

SKIMMERS ATTACHED TO CONTROL STRUCTURE - FLOW AREA CALCULATION

A_f																		A_s				
STRUCTURE #	LOCATION	SIDE	POND SIDE SLOPE	DBI TYPE	GRATE ELEV.	DHW ELEV.	SLOT ELEV.	# OF SLOTS	SLOT WIDTH	ORIFICE ELEV.	DITCH / POND ELEV.	STR. WIDTH	FLOW AREA THROUGH SLOT	BOTTOM OF SKIMMER ELEV.	SKIMMER HEIGHT "H"	SKIMMER LENGTH "L"	SKIMMER LENGTH FROM FACE OF STR. TO SKIMMER "L2"	A1 FLOW AREA UNDER FRONT OF SKIMMER	A2=A3 FLOW AREA UNDER SIDE OF SKIMMER	TOTAL FLOW AREA UNDER SKIMMER	RATIO As / Af	REMARKS
			1:X					EA.	IN.		FT.	FT.	SF	FT.	IN.	IN.	IN.	SF	SF	SF		
CS-1	3385+83.77	LT.	3	D	112.70	112.62	110.40	1	3	110	101.00	5.08	0.56	109.60	37	31	18.5	2.61	0.40	3.40	6.1	
CS-4	21+22.32	LT.	3	D	116.40	116.38	115.00	1	9	114.7	105.80	5.08	1.04	114.30	25	28	15.5	2.19	0.28	2.74	2.7	

11.4 Cross Drain Calculations

Project: **SR 60 over CSX**

FPID: **436559-1-52-01**

Comp. by: SC
Checked by:
Date: 8/17/2016
Sheet No.: 1 of 2

Subject: Proposed Condition Cross Drain Analysis (Using ICPR data)
Location:
Description: Extrapolation of Peak Stage and Discharge

Extrapolation of the 500 yr Discharge and Peak Stage

Flow Rate		
Storm Event Return	Peak Stage	Discharge (cfs)
10	115.19	7.93
25	115.55	9.79
50	115.21	8.03
100	115.56	9.82
500	116.90	16.69
Overtopping	119.4	29.56

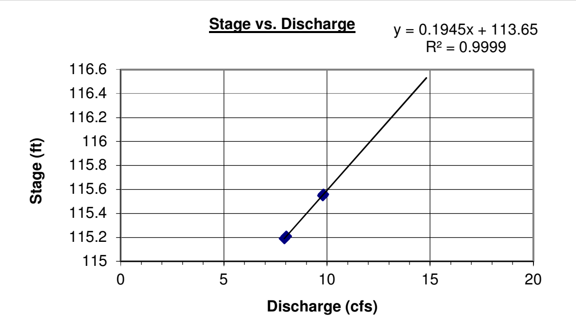
Discharge = x
Peak Stage = y

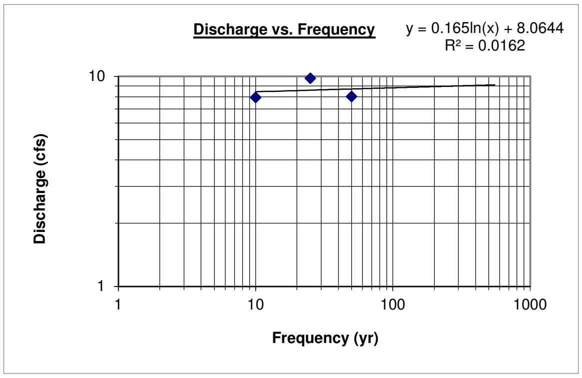
Enter	🟦
Calculate 1st	🟨
Calculate 2nd	🟥
Calculate 3rd	🟩
Calculate 4th	🟪

Frequency = x
Discharge = y

Discharge		
Storm Event Return Frequency (years)	Discharge (cfs)	Storm Frequency (%)
10	7.93	10.00%
25	9.79	4.00%
50	8.03	2.00%
100	9.82	1.00%
500	16.69	0.20%
Overtopping	29.56	0

Overtopping Storm Return Frequency (years)	**N/A**





Appendix 12.0

OPTIONAL PIPE MATERIALS

Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-313, S-317, S-327
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.1
Max Allowable Manning's n	0.012	Resistivity	8600
Diameter (inches)	12.00	Chlorides	45
		Sulfates	15.5

Type of Culvert	Service Life	Environment			
(NRCP) Non-Reinforced Concrete	268	Pass			
(RCP) Steel-Reinforced Concrete	154	Pass			1
(RCP) Steel-Reinforced Concrete	154	Pass			2
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

1) Steel-Reinforced Concrete (RCP) culverts may only be used in this environment with approval from the State Drainage Engineer.
2) Steel-Reinforced Concrete (RCP) culverts may only be used in this environment with approval from the State Drainage Engineer.
3) HDPE and PP not allowed in the Florida Keys for 100 year service life. No restrictions for 50 year service life.
4) HDPE and PP not allowed in the Florida Keys for 100 year service life. No restrictions for 50 year service life.

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-100, S-110, S-111, S-115, S-116, S-122, S-124, S-127
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.1
Max Allowable Manning's n	0.012	Resistivity	8600
Diameter (inches)	18.00	Chlorides	45
		Sulfates	15.5

Type of Culvert	Service Life	Environment			
(NRCP) Non-Reinforced Concrete	268	Pass			
(RCP) Steel-Reinforced Concrete	154	Pass			1
(RCP) Steel-Reinforced Concrete	154	Pass			2
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-101, S-103, S-125, S-206, S-209, S-333, S-334, S-336
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.1
Max Allowable Manning's n	0.012	Resistivity	8600
Diameter (inches)	24.00	Chlorides	45
		Sulfates	15.5

Type of Culvert	Service Life	Environment			
(NRCP) Non-Reinforced Concrete	268	Pass			
(RCP) Steel-Reinforced Concrete	196	Pass			1
(RCP) Steel-Reinforced Concrete	196	Pass			2
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-310, S-314, S-318, S-319, S-329, S-335
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.1
Max Allowable Manning's n	0.012	Resistivity	8600
Diameter (inches)	30.00	Chlorides	45
		Sulfates	15.5

Type of Culvert	Service Life	Environment		
(NRCP) Non-Reinforced Concrete	268	Pass		
(RCP) Steel-Reinforced Concrete	252	Pass		[1]
(RCP) Steel-Reinforced Concrete	252	Pass		[2]
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass		
(HDPE) High Density Polyethylene, CL II	100+	Pass		[3]
(PP) Polypropylene	100+	Pass		[4]

(SRPE)	100	Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-117
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.1
Max Allowable Manning's n	0.012	Resistivity	8600
Diameter (inches)	42.00	Chlorides	45
		Sulfates	15.5

Type of Culvert	Service Life	Environment			
(RCP) Steel-Reinforced Concrete	360	Pass			1
(RCP) Steel-Reinforced Concrete	360	Pass			2
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4

(NRCP)UNAVAILABLE in this size	268	Fail		
(SRPE)	100	Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(PVC)UNAVAILABLE in this size		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(CASP/SRASP)SRASP CANNOT be used		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-301
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	4.2
Max Allowable Manning's n	0.012	Resistivity	18000
Diameter (inches)	30.00	Chlorides	30
		Sulfates	4.8

Type of Culvert	Service Life	Environment			
(RCP) Steel-Reinforced Concrete	314	Pass			[1]
(RCP) Steel-Reinforced Concrete	314	Pass			[2]
(NRCP) Non-Reinforced Concrete	296	Pass			
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			
(HDPE) High Density Polyethylene, CL II	100+	Pass			[3]
(PP) Polypropylene	100+	Pass			[4]

(SRPE)	100	Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-204, S-211, S-221, S-323
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	3.9
Max Allowable Manning's n	0.012	Resistivity	5300
Diameter (inches)	12.00	Chlorides	45
		Sulfates	27.6

Type of Culvert	Service Life	Environment			
(NRCP) Non-Reinforced Concrete	169	Pass			
(RCP) Steel-Reinforced Concrete	154	Pass			1
(RCP) Steel-Reinforced Concrete	154	Pass			2
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-102, S-112, S-114, S-222, S-300, S-308
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	3.9
Max Allowable Manning's n	0.012	Resistivity	5300
Diameter (inches)	18.00	Chlorides	45
		Sulfates	27.6

Type of Culvert	Service Life	Environment			
(NRCP) Non-Reinforced Concrete	169	Pass			
(RCP) Steel-Reinforced Concrete	154	Pass			[1]
(RCP) Steel-Reinforced Concrete	154	Pass			[2]
(HDPE) High Density Polyethylene, CL II	100+	Pass			[3]
(PP) Polypropylene	100+	Pass			[4]
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-104, S-105, S-119, S-205, S-212, S-324
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	3.9
Max Allowable Manning's n	0.012	Resistivity	5300
Diameter (inches)	24.00	Chlorides	45
		Sulfates	27.6

Type of Culvert	Service Life	Environment			
(RCP) Steel-Reinforced Concrete	196	Pass			1
(RCP) Steel-Reinforced Concrete	196	Pass			2
(NRCP) Non-Reinforced Concrete	169	Pass			
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			

(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(SRPE)UNAVAILABLE in this size		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-106, S-107, S-108
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	3.9
Max Allowable Manning's n	0.012	Resistivity	5300
Diameter (inches)	30.00	Chlorides	45
		Sulfates	27.6

Type of Culvert	Service Life	Environment			
(RCP) Steel-Reinforced Concrete	251	Pass			[1]
(RCP) Steel-Reinforced Concrete	251	Pass			[2]
(NRCP) Non-Reinforced Concrete	169	Pass			
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			
(HDPE) High Density Polyethylene, CL II	100+	Pass			[3]
(PP) Polypropylene	100+	Pass			[4]

(SRPE)	100	Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		

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Florida Department of Transportation

Corrosion Research Laboratory

Culvert Service Life Estimator

Date Aug 16, 2016

Project Name:	SR 60 Over CSX
FM #:	436559-1-52-01
Structure Number:	S-109, S-113
County:	Polk
Designer:	SCT

Design Life (Years)	100	pH	3.9
Max Allowable Manning's n	0.012	Resistivity	5300
Diameter (inches)	36.00	Chlorides	45
		Sulfates	27.6

Type of Culvert	Service Life	Environment			
(RCP) Steel-Reinforced Concrete	299	Pass			1
(RCP) Steel-Reinforced Concrete	299	Pass			2
(NRCP) Non-Reinforced Concrete	169	Pass			
(PVC) Polyvinyl Chloride, ASTM F-949	100+	Pass			
(HDPE) High Density Polyethylene, CL II	100+	Pass			3
(PP) Polypropylene	100+	Pass			4

(SRPE)	100	Fail		
(HDPE)CANNOT be used		Fail		
(CAP/SRAP)SRAP CANNOT be used		Fail		
(CASP/SRASP)SRASP CANNOT be used		Fail		
(CSP/SRSP)SRSP CANNOT be used		Fail		

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